Acoustical Assessment
Related Bristol Specific Plan Project
City of Santa Ana, California

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LIST OF ABBREVIATED TERMS

ADT	average daily traffic
dBA	A-weighted sound level
CEQA	California Environmental Quality Act
CNEL	community equivalent noise level
L_{dn}	day-night noise level
dB	decibel
L_{eq}	equivalent noise level
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
HVAC	heating ventilation and air conditioning
Hz	hertz
in/sec	inches per second
L_{max}	maximum noise level
µPa	micropascals
L_{min}	minimum noise level
PPV	peak particle velocity
RMS	root mean square
VdB	vibration velocity decibels

1 INTRODUCTION

This report documents the results of an Acoustical Assessment completed for the Related Bristol Specific Plan Project (Project). The purpose of this Acoustical Assessment is to evaluate the potential construction and operational noise and vibration levels associated with the Project and determine the level of impact the Project would have on the environment.

This analysis has been undertaken to analyze whether the proposed Project would result in any new or substantially more severe significant environmental impacts as compared to the conclusions discussed in the certified final Santa Ana General Plan Update Program Environmental Impact Report (General Plan EIR) (State Clearinghouse No. 2020029087). The purpose of this analysis is to support a Supplemental EIR that will document whether any new noise-related impacts would occur from the Project (described below) compared to the impacts and analyses identified in the General Plan EIR pursuant to State California Environmental Quality Act (CEQA) Guidelines Section 15162 (et seq.).

1.1 Project Location

The project site is in the south portion of the City of Santa Ana (City). The approximately 41.13-gross-acre project site is bordered by MacArthur Boulevard to the north, Sunflower Avenue to the south, and Bristol Street to the east. The west side of the site is bordered by Plaza Drive between MacArthur Boulevard and Callen's Common and by existing development between Callen's Common and Sunflower Avenue to the west.

Vehicular access to the project site, which is currently developed as a predominately commercial shopping center, is provided from Bristol Street, Callen's Common, MacArthur Boulevard, Sunflower Avenue, and Plaza Drive.

Regional access to the project site is provided from Interstate 405 (I-405) from the onramp/offramp at Bristol Street approximately 0.5 mile to the south and from State Route 55 (SR-55) from the onramp/offramp at MacArthur Boulevard approximately 1.25 miles to the east. The site is approximately 1.5 miles northwest of John Wayne Airport; see **Exhibit 1: Regional Vicinity Map** and **Exhibit 2: Site Vicinity Map**.

1.2 Project Description

The Project would demolish the existing shopping center (approximately 465,063 square feet [sf]) and related infrastructure to allow for development of a mixed-use development. As shown in **Table 1: Land Use Summary**, the Project proposes 3,750 multi-family residential units; 350,000 sf of commercial uses; a 250-key hotel; a senior living/continuum of care use with 200 units; and approximately 13 acres of common open space. Parking would be provided by above- and below-ground parking structures providing shared parking; refer to **Exhibit 3: Conceptual Site Plan**.

The Project would be constructed in three phases. Construction of the Project may be progressively implemented in stages, provided that vehicular access, public facilities, and infrastructure are constructed to adequately serve the development. The project site would be graded and excavated in phases. The total export is expected to be approximately 1,340,325 cubic yards (cy) with an import of approximately 10,000 cy. Phase 1 export is approximately 640,550 cy and import is approximately 5,000 cy. Phase 2 export is approximately 214,906 cy and import is approximately 2,000 cy. Phase 3 export is approximately 484,869 cy and import is approximately 3,000 cy. It is anticipated that dewatering would be required due to high groundwater levels in the area. In addition to export and import associated with grading and

excavation, all of the existing buildings, pavement, and improvements would be demolished with each phase of construction and exported from the project site.

Table 1: Land Use Summary

Land Use	Proposed Development	Existing Development
Residential	3,750 du	0
Senior Living/Continuum of Care	200 units	0
Hotel	250 keys	0
Commercial	350,000 gsf	465,063 sf
Open Space (Common)	13.1 acres	0

du = dwelling unit; gsf = gross square feet; sf = square feet

The Project is anticipated to be implemented over a period of approximately nine years with demolition and construction activities anticipated to commence in the first quarter of 2026 and construction completed in the third quarter of 2036. Construction of Phase 1 is expected to commence in the first quarter of 2026 with completion in the first quarter of 2030 or approximately 42 months. Land uses in the Phase 2 and Phase 3 areas would be operational while Phase 1 is under construction. Phase 2 is expected to commence in the second quarter of 2030 with completion in the fourth quarter of 2032 or approximately 44 months. Phase 3 is expected to commence in the first quarter of 2033 with completion in the second quarter of 2036 or approximately 40 months.

The Phase 1 area is located south of Callen's Common and extends to Sunflower Avenue. Phase 2 and Phase 3 are located north of Callen's Common and extend to MacArthur Boulevard. The Phase 2 area is approximately one-third of the northern portion of the project site and is bordered by MacArthur Boulevard to the north, Callen's Common to the south, Bristol Street to the east, and Phase 3 of the proposed project to the west. The Phase 3 area is bordered by MacArthur Boulevard to the north, Callen's Common to the south, Phase 2 to the east, and Plaza Drive to the west.

Phase 1 includes the demolition of all on-site buildings and infrastructure on the southern portion of the project site bordered by Callen's Common to the north. Subsurface excavation would occur to allow for the construction of up to two levels of subterranean parking. Phase 1 assumes the construction of 1,375 multi-family residential units, 250,000 sf of retail uses, a 250-key hotel, a 200-unit senior living/continuum of care building, and a public open space area, as well as associated landscape improvements and infrastructure upgrades. All existing on-site development north of Callen's Common would remain operational during Phase 1.

Phase 2 includes the demolition of all on-site buildings and infrastructure within the Phase 2 area of the site. Subsurface excavation would occur to allow for the construction of one level of subterranean parking. No subterranean parking would be located under the Bristol Central Park (described below). Phase 2 assumes the construction of 856 multi-family residential units, 65,000 sf of retail uses, public open space areas, as well as associated landscape improvements and infrastructure upgrades.

Phase 3 includes the demolition on-site buildings and infrastructure within the Phase 3 area of the site. Subsurface excavation would occur to allow for the construction of one level of subterranean parking. No subterranean parking would be located under the Bristol Central Park (described below). Phase 3 assumes the construction of 1,519 multi-family residential units, 35,000 sf of retail uses, public open space areas,

as well as associated landscape improvements and infrastructure upgrades; refer to **Table 2: Conceptual Phasing**.

Table 2: Conceptual Phasing

Use	Mixed-Use/ Village Core District	Mixed-Use/ Residential District		Total
	Phase 1	Phase 2	Phase 3	
Residential (units)	1,375	856	1,519	3,750
Commercial (gsf)	250,000	65,000	35,000	350,000
Hospitality (keys)	250	--	--	250
Senior/Continuum of Care (units)	200	--	--	200

gsf = gross square feet

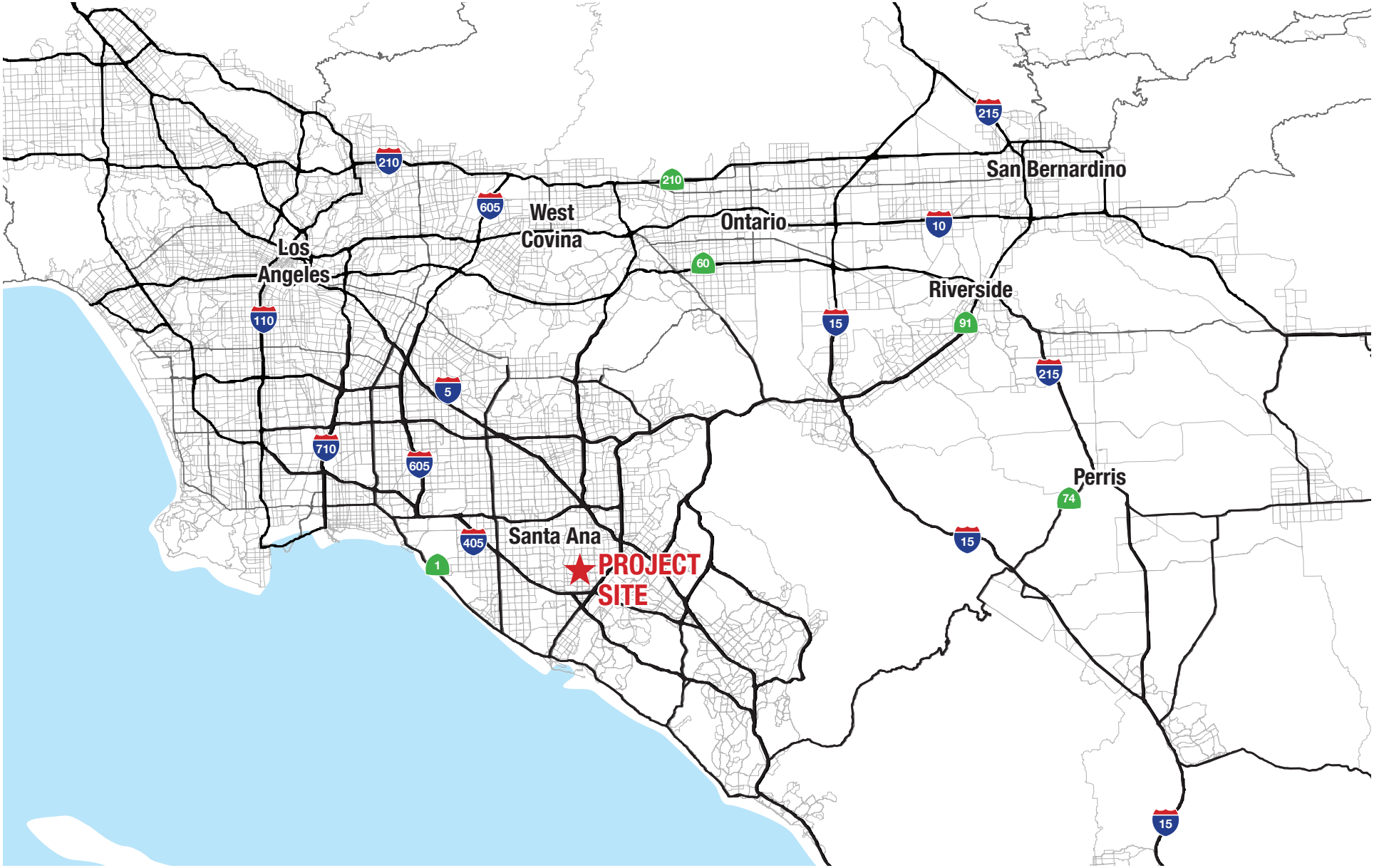

EXHIBIT 1: Regional Vicinity Map
Related Bristol
City of Santa Ana

Not to Scale

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Expect More. Experience Better.

EXHIBIT 2: Site Vicinity Map
Related Bristol
City of Santa Ana

Not to Scale

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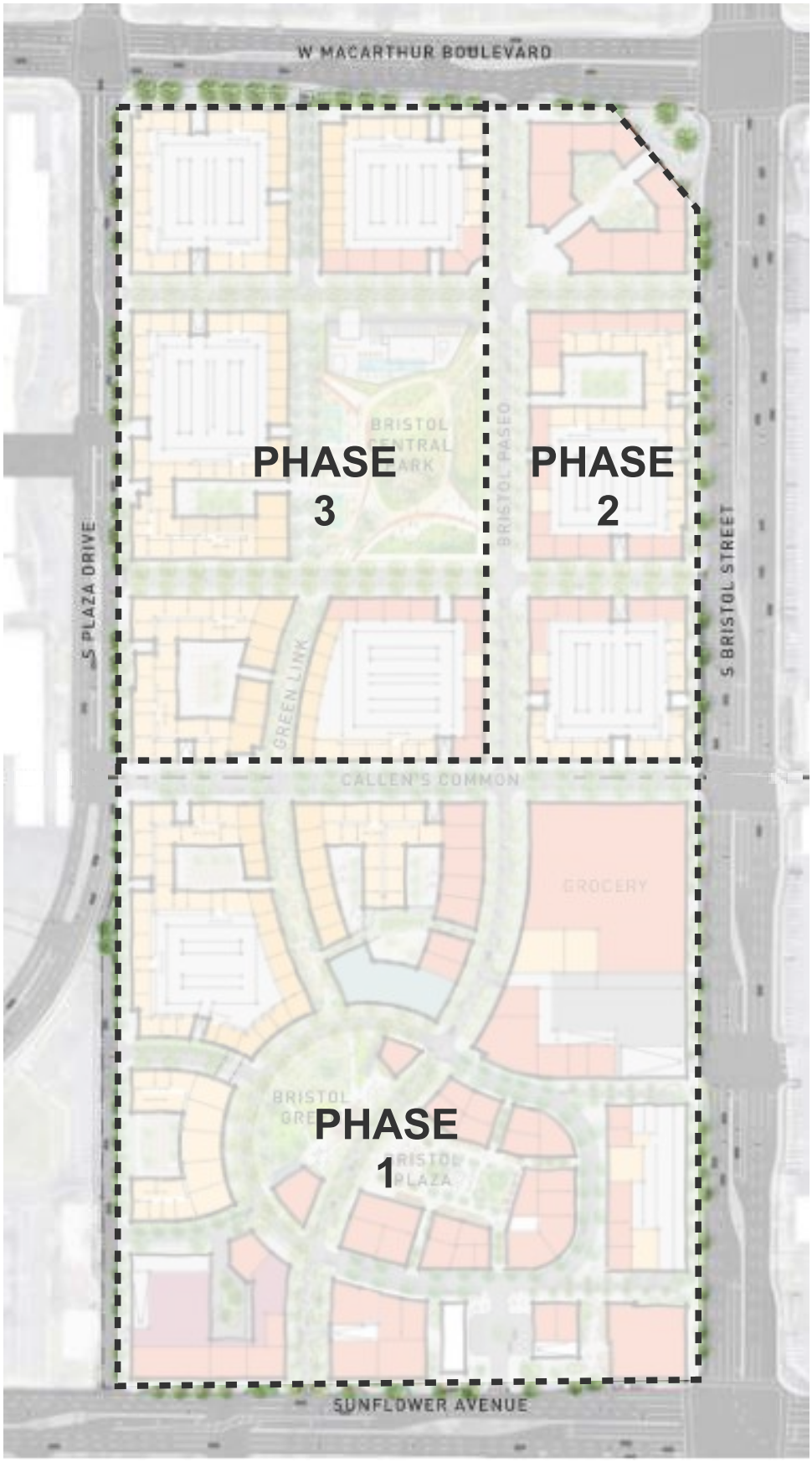

EXHIBIT 3: Conceptual Site Plan
Related Bristol
City of Santa Ana

Not to Scale

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Expect More. Experience Better.

2 ACOUSTIC FUNDAMENTALS

2.1 Sound and Environmental Noise

Acoustics is the science of sound. Sound can be described as the mechanical energy of a vibrating object transmitted by pressure waves through a medium (e.g., air) to human (or animal) ear. If the pressure variations occur frequently enough (at least 20 times per second), they can be heard and are called sound. The number of pressure variations per second is called the frequency of sound and is expressed as cycles per second, or hertz (Hz).

Noise is defined as loud, unexpected, or annoying sound. The fundamental acoustics model consists of a noise source, a receptor, and the propagation path between the two. The loudness of the noise source, obstructions, or atmospheric factors affecting the propagation path, determine the perceived sound level and noise characteristics at the receptor. Acoustics deal primarily with the propagation and control of sound. A typical noise environment consists of a base of steady background noise that is the sum of many distant and indistinguishable noise sources. The sound from individual local sources is superimposed on this background noise. These sources can vary from an occasional aircraft or train passing by to continuous noise from traffic on a major highway. Perceptions of sound and noise are highly subjective from person to person.

Measuring sound directly in terms of pressure would require a large range of numbers. To avoid this, the decibel (dB) scale was devised. The dB scale uses the hearing threshold of 20 micropascals (µPa) as a point of reference, defined as 0 dB. Other sound pressures are then compared to this reference pressure, and the logarithm is taken to keep the numbers in a practical range. The dB scale allows a million-fold increase in pressure to be expressed as 120 dB, and changes in levels correspond closely to human perception of relative loudness. **Table 3: Typical Noise Levels** provides typical noise levels.

Table 3: Typical Noise Levels

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
	– 110 –	Rock Band
Jet fly-over at 1,000 feet		
	– 100 –	
Gas lawnmower at 3 feet		
	– 90 –	
Diesel truck at 50 feet at 50 miles per hour		Food blender at 3 feet
	– 80 –	Garbage disposal at 3 feet
Noisy urban area, daytime		
Gas lawnmower, 100 feet	**– 70 –**	Vacuum cleaner at 10 feet
Commercial area		Normal Speech at 3 feet
Heavy traffic at 300 feet	**– 60 –**	
		Large business office
Quiet urban daytime	**– 50 –**	Dishwasher in 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: California Department of Transportation, *Technical Noise Supplement to the Traffic Noise Analysis Protocol*, September 2013.

Noise Descriptors

The dB 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. Several rating scales have been developed to analyze the adverse effect of community noise on people. Because environmental noise fluctuates over time, these scales consider that the effect of noise on people is largely dependent on the total acoustical energy content of the noise, as well as the time of day when the noise occurs. Most commonly, environmental sounds are described in terms of equivalent noise level (L_{eq}) that has the same acoustical energy as the summation of all the time-varying events. While L_{eq} represents the continuous sound pressure level over the measurement period, the day-night noise level (L_{dn}) and Community Equivalent Noise Level (CNEL) are measures of energy average during a 24-hour period, with dB weighted sound levels from 7:00 p.m. to 7:00 a.m. Each is applicable to this analysis and defined in **Table 4: Definitions of Acoustical Terms**.

Table 4: Definitions of Acoustical Terms

Term	Definitions
Decibel (dB)	A unit describing the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure. The reference pressure for air is 20.
Sound Pressure Level	Sound pressure is the sound force per unit area, usually expressed in µPa (or 20 micronewtons per square meter), where 1 pascal is the pressure resulting from a force of 1 newton exerted over an area of 1 square meter. The sound pressure level is expressed in dB as 20 times the logarithm to the base 10 of the ratio between the pressures exerted by the sound to a reference sound pressure (e.g., 20 µPa). Sound pressure level is the quantity that is directly measured by a sound level meter.
Frequency (Hz)	The number of complete pressure fluctuations per second above and below atmospheric pressure. Normal human hearing is between 20 Hz and 20,000 Hz. Infrasonic sound are below 20 Hz and ultrasonic sounds are above 20,000 Hz.
A-Weighted Sound Level (dBA)	The sound pressure level in dB as measured on a sound level meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise.
Equivalent Noise Level (L_{eq})	The average acoustic energy content of noise for a stated period of time. Thus, the L_{eq} of a time-varying noise and that of a steady noise are the same if they deliver the same acoustic energy to the ear during exposure. For evaluating community impacts, this rating scale does not vary, regardless of whether the noise occurs during the day or the night.
Maximum Noise Level (L_{max}) Minimum Noise Level (L_{min})	The maximum and minimum dBA during the measurement period.
Exceeded Noise Levels (L_{01}, L_{10}, L_{50}, L_{90})	The dBA values that are exceeded 1%, 10%, 50%, and 90% of the time during the measurement period.
Day-Night Noise Level (L_{dn})	A 24-hour average L_{eq} with a 10 dBA weighting added to noise during the hours of 10:00 p.m. to 7:00 a.m. to account for noise sensitivity at nighttime. The logarithmic effect of these additions is that a 60 dBA 24-hour L_{eq} would result in a measurement of 66.4 dBA L_{dn}.
Community Noise Equivalent Level (CNEL)	A 24-hour average L_{eq} with a 5 dBA weighting during the hours of 7:00 a.m. to 10:00 a.m. and a 10 dBA weighting added to noise during the hours of 10:00 p.m. to 7:00 a.m. to account for noise sensitivity in the evening and nighttime, respectively. The logarithmic effect of these additions is that a 60 dBA 24-hour L_{eq} would result in a measurement of 66.7 dBA CNEL.
Ambient Noise Level	The composite of noise from all sources near and far. The normal or existing level of environmental noise at a given location.

Table 4: Definitions of Acoustical Terms	
Term	**Definitions**
Intrusive	That noise which intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of a sound depends on its amplitude, duration, frequency, and time of occurrence and tonal or informational content as well as the prevailing ambient noise level.

Because sound levels can vary markedly over a short period of time, a method for describing either the sound's average character (L_{eq}) or the variations' statistical behavior (L_{XX}) must be utilized. The scientific instrument used to measure noise is the sound level meter. Sound level meters can accurately measure environmental noise levels to within about plus or minus 1 dBA. Various computer models are used to predict environmental noise levels from sources, such as roadways and airports. The predicted models' accuracy depends on various factors, such as the distance between the noise receptor and the noise source, the character of the ground surface (e.g., hard or soft), and the presence or absence of structures (e.g., walls or buildings) or topography, and how well model inputs reflect these conditions.

A-Weighted Decibels

The perceived loudness of sounds is dependent on many factors, including sound pressure level and frequency content. However, within the usual range of environmental noise levels, perception of loudness is relatively predictable and can be approximated by dBA values. There is a strong correlation between dBA and the way the human ear perceives sound. For this reason, the dBA has become the standard tool of environmental noise assessment. All noise levels reported in this document are in terms of dBA, but are expressed as dB, unless otherwise noted.

Addition of Decibels

The dB scale is logarithmic, not linear, and therefore sound levels cannot be added or subtracted through ordinary arithmetic. Two sound levels 10 dB apart differ in acoustic energy by a factor of 10.[1] When the standard logarithmic dB is A-weighted, an increase of 10 dBA is generally perceived as a doubling in loudness. For example, a 70-dBA sound is half as loud as an 80-dBA sound and twice as loud as a 60-dBA sound.[2] When two identical sources are each producing sound of the same loudness, the resulting sound level at a given distance would be 3 dBA higher than one source under the same conditions.[3] Under the dB scale, three sources of equal loudness together would produce an increase of approximately 5 dBA.

Sound Propagation and Attenuation

Sound spreads (propagates) uniformly outward in a spherical pattern, and the sound level decreases (attenuates) at a rate of approximately 6 dB for each doubling of distance from a stationary or point source. Sound from a line source, such as a highway, propagates outward in a cylindrical pattern. Sound levels attenuate at a rate of approximately 3 dB for each doubling of distance from a line source, such as a roadway, depending on ground surface characteristics.[4] No excess attenuation is assumed for hard surfaces like a parking lot or a body of water. Soft surfaces, such as soft dirt or grass, can absorb sound,

1 California Department of Transportation, Technical Noise Supplement to the Traffic Noise Analysis Protocol, September 2013.

2 *Noise Sources and Their Effects*. Available at: https://www.chem.purdue.edu/chemsafety/Training/PPETrain/dblevels.htm

3 FHWA, *Noise Fundamentals,* 2017. Available at: https://www.fhwa.dot.gov/environMent/noise/regulations_and_guidance/polguide/polguide02.cfm

4 California Department of Transportation, *Technical Noise Supplement to the Traffic Noise Analysis Protocol*, Page 2-29, September 2013.

so an excess ground-attenuation value of 1.5 dB per doubling of distance is normally assumed in this report.

Noise levels may also be reduced by intervening structures; generally, a single row of buildings between the noise receptor and the noise source reduces the noise level by about 5 dBA, while a solid wall or berm can reduce noise levels by 5 to 15 dBA.[5] The way older homes in California were constructed generally provides a reduction of exterior-to-interior noise levels of about 20 to 25 dBA with closed windows. The exterior-to-interior reduction of newer residential units is generally 30 dBA or more.

Human Response to Noise

The human response to environmental noise is subjective and varies considerably from individual to individual. Noise in the community has often been cited as a health problem, not in terms of actual physiological damage, such as hearing impairment, but in terms of inhibiting general well-being and contributing to undue stress and annoyance. The health effects of noise in the community arise from interference with human activities, including sleep, speech, recreation, and tasks that demand concentration or coordination. Hearing loss can occur at the highest noise intensity levels.

Noise environments and consequences of human activities are usually well represented by median noise levels during the day or night or over a 24-hour period. Environmental noise levels are generally considered low when the CNEL is below 60 dBA, moderate in the 60 to 70 dBA range, and high above 70 dBA. Examples of low daytime levels are isolated, natural settings with noise levels as low as 20 dBA and quiet, suburban, residential streets with noise levels around 40 dBA.[6] Noise levels above 45 dBA at night can disrupt sleep. Examples of moderate-level noise environments are urban residential or semi-commercial areas (typically 55 to 60 dBA) and commercial locations (typically 60 dBA). People may consider louder environments adverse, but most will accept the higher levels associated with noisier urban residential or residential-commercial areas (60 to 75 dBA) or dense urban or industrial areas (65 to 80 dBA). Regarding increases in dBA, the following relationships should be noted[7]:

- Except in carefully controlled laboratory experiments, a 1-dBA change cannot be perceived by humans.
- Outside of the laboratory, a 3-dBA change is considered a just-perceivable difference.
- A minimum 5-dBA change is required before any noticeable change in community response would be expected. A 5-dBA increase is typically considered substantial.
- A 10-dBA change is subjectively heard as an approximate doubling in loudness and would almost certainly cause an adverse change in community response.

Effects of Noise on People

Hearing Loss. While physical damage to the ear from an intense noise impulse is rare, a degradation of auditory acuity can occur even within a community noise environment. Hearing loss occurs mainly due to chronic exposure to excessive noise but may be due to a single event such as an explosion. Natural hearing loss associated with aging may also be accelerated from chronic exposure to loud noise. The Occupational Safety and Health Administration has a noise exposure standard that is set at the noise threshold where

[5] Federal Highway Administration, Highway Traffic and Construction Noise - Problem and Response**,** April 2006.

[6] Compiled from James P. Cowan, *Handbook of Environmental Acoustics,* 1994 and Cyril M. Harris, Handbook of Noise Control, 1979.

[7] Compiled from California Department of Transportation, *Technical Noise Supplement to the Traffic Noise Analysis Protocol*, September 2013, and FHWA, *Noise Fundamentals,* 2017.

hearing loss may occur from long-term exposures. The maximum allowable level is 90 dBA averaged over 8 hours. If the noise is above 90 dBA, the allowable exposure time is correspondingly shorter.[8]

Annoyance. Attitude surveys are used for measuring the annoyance felt in a community for noises intruding into homes or affecting outdoor activity areas. In these surveys, it was determined that causes for annoyance include interference with speech, radio and television, house vibrations, and interference with sleep and rest. The L_{dn} as a measure of noise has been found to provide a valid correlation of noise level and the percentage of people annoyed. People have been asked to judge the annoyance caused by aircraft noise and ground transportation noise. There continues to be disagreement about the relative annoyance of these different sources. A noise level of about 55 dBA L_{dn} is the threshold at which a substantial percentage of people begin to report annoyance[9].

2.2 Groundborne Vibration

Sources of groundborne vibrations include natural phenomena (earthquakes, volcanic eruptions, sea waves, landslides, etc.) or man-made causes (explosions, machinery, traffic, trains, construction equipment, etc.). Vibration sources may be continuous (e.g., factory machinery) or transient (e.g., explosions or heavy equipment use during construction). Ground vibration consists of rapidly fluctuating motions or waves with an average motion of zero. Several different methods are typically used to quantify vibration amplitude. One is the peak particle velocity (PPV); another is the root mean square (RMS) velocity. The PPV is defined as the maximum instantaneous positive or negative peak of the vibration wave and is expressed in terms of inches-per- second (in/sec). The RMS velocity is defined as the average of the squared amplitude of the signal and is expressed in terms of velocity decibels (VdB). The PPV and RMS vibration velocity amplitudes are used to evaluate human response to vibration.

Table 5: Human Reaction and Damage to Buildings for Continuous or Frequent Intermittent Vibrations, displays the reactions of people and the effects on buildings produced by continuous vibration levels. The annoyance levels shown in the table should be interpreted with care since vibration may be found to be annoying at much lower levels than those listed, depending on the level of activity or the individual's sensitivity. To sensitive individuals, vibrations approaching the threshold of perception can be annoying. Low-level vibrations frequently cause irritating secondary vibration, such as a slight rattling of windows, doors, or stacked dishes. The rattling sound can give rise to exaggerated vibration complaints, even though there is very little risk of actual structural damage. In high noise environments, which are more prevalent where groundborne vibration approaches perceptible levels, this rattling phenomenon may also be produced by loud airborne environmental noise causing induced vibration in exterior doors and windows.

Ground vibration can be a concern in instances where buildings shake, and substantial rumblings occur. However, it is unusual for vibration from typical urban sources such as buses and heavy trucks to be perceptible. Common sources for groundborne vibration are planes, trains, and construction activities such as earth-moving which requires the use of heavy-duty earth moving equipment. For the purposes of this analysis, a PPV descriptor with units of inches per second (in/sec) is used to evaluate construction-generated vibration for building damage and human complaints.

[8] U.S. Department of Labor, Occupational Safety and Health Standards, *29 CFR 1910* (Occupational Noise Exposure).
[9] Federal Interagency Committee on Noise, Federal Agency Review of Selected Airport Noise Analysis Issues, August 1992.

Table 5: Human Reaction and Damage to Buildings for Continuous or Frequent Intermittent Vibrations

Maximum PPV (in/sec)	Vibration Annoyance Potential Criteria	Vibration Damage Potential Threshold Criteria	FTA Vibration Damage Criteria
0.008	--	Extremely fragile historic buildings, ruins, ancient monuments	--
0.01	Barely Perceptible	--	--
0.04	Distinctly Perceptible	--	--
0.1	Strongly Perceptible	Fragile buildings	--
0.12	--	--	Buildings extremely susceptible to vibration damage
0.2	--	--	Non-engineered timber and masonry buildings
0.25	--	Historic and some old buildings	--
0.3	--	Older residential structures	Engineered concrete and masonry (no plaster)
0.4	Severe	--	--
0.5	--	New residential structures, Modern industrial/commercial buildings	Reinforced-concrete, steel or timber (no plaster)

PPV = peak particle velocity; in/sec = inches per second; FTA = Federal Transit Administration

Source: California Department of Transportation, *Transportation and Construction Vibration Guidance Manual*, 2020 and Federal Transit administration, Transit Noise and Vibration Assessment Manual, 2018.

3 REGULATORY SETTING

To limit population exposure to physically or psychologically damaging as well as intrusive noise levels, the federal government, the State of California, various county governments, and most municipalities in the State have established standards and ordinances to control noise.

3.1 State of California

California Government Code

California Government Code Section 65302(f) mandates that the legislative body of each county and city adopt a noise element as part of its comprehensive general plan. The local noise element must recognize the land use compatibility guidelines established by the State Department of Health Services. The guidelines rank noise land use compatibility in terms of "normally acceptable", "conditionally acceptable", "normally unacceptable", and "clearly unacceptable" noise levels for various land use types. Single-family homes are "normally acceptable" in exterior noise environments up to 60 CNEL and "conditionally acceptable" up to 70 CNEL. Multiple-family residential uses are "normally acceptable" up to 65 CNEL and "conditionally acceptable" up to 70 CNEL. Schools, libraries, and churches are "normally acceptable" up to 70 CNEL, as are office buildings and business, commercial, and professional uses.

Title 24 – Building Code

The State's noise insulation standards are codified in the California Code of Regulations, Title 24: Part 1, Building Standards Administrative Code, and Part 2, California Building Code. These noise standards are applied to new construction in California for interior noise compatibility from exterior noise sources. The regulations specify that acoustical studies must be prepared when noise-sensitive structures, such as residential buildings, schools, hotel rooms, or hospitals, are located near major transportation noise sources, and where such noise sources create an exterior noise level of 65 dBA CNEL or higher. Acoustical studies that accompany building plans must demonstrate that the structure has been designed to limit interior noise in habitable rooms to acceptable noise levels. For new multi-family residential buildings and habitable rooms (including hotels), the acceptable interior noise limit for new construction is 45 dBA CNEL.

3.2 Local

City of Santa Ana General Plan Update

The City of Santa Ana General Plan Update is a long-range policy and planning document intended to guide the development, conservation, and enhancement of Santa Ana. The Santa Ana General Plan specifies interior and exterior noise guidelines for land uses in the Noise Element. The City requires that new developments be designed to meet these guidelines[10]. Because the City is mostly fully developed, the goals and policies within the Santa Ana General Plan are focused on remedial measures to deal with existing noise problems, prevention of new noise problems, and establishing appropriate noise emission standards per land use. Noise compatibility can be achieved by avoiding the location of conflicting land uses adjacent to one another, incorporating buffers and noise control techniques including setbacks, landscaping, building transitions, site design, and building construction techniques. Selection of the appropriate noise control technique would vary depending on the level of noise that needs to be reduced as well as the location and intended land use. Santa Ana General Plan policies that directly address reducing and avoiding noise or vibration impacts include the following:

[10] City of Santa Ana, *General Plan Noise Element,* April 2022.

Noise Element

Goal 1: Ensure that existing and future land uses are compatible with current and projected local and regional noise conditions.

Policy 1.1. Noise Standards: Utilize established Citywide Noise Standards and guidelines to inform land use decisions and guide noise management strategies.

Policy 1.2. Sound Design: Encourage functional and attractive designs to mitigate excessive noise levels.

Policy 1.3. Regional Noise Impacts: Collaborate with local and regional transit agencies and other jurisdictions to minimize regional traffic noise and other sources of noise in the City.

Policy 1.4. Sensitive Uses: Protect noise sensitive land uses from excessive, unsafe, or otherwise disruptive noise levels.

GOAL 2: Reduce the impact of known sources of noise and vibration.

Policy 2.1. Transportation Related Noise: Reduce noise generated from traffic, railroads, transit, and airports to the extent feasible.

Policy 2.2. Stationary Related Noise: Minimize noise impacts from commercial and industrial facilities adjacent to residential uses or zones where residential uses are permitted.

Policy 2.3. Temporary and/or Nuisance Noise: Minimize the effects of intermittent, short-term, or other nuisance noise sources.

GOAL 3: Protect sensitive land uses from airport related noise impacts.

Policy 3.3. Residential Mitigation: Require all residential land uses in 60 dB(A) CNEL or 65 dB(A) CNEL Noise Contours to be sufficiently mitigated so as not to exceed an interior standard of 45 dB(A) CNEL.

The proposed noise and land use compatibility standards for various land uses are shown in **Table 6**, below (General Plan EIR Table 5.12-8), Interior and Exterior Noise Compatibility Standards (dBA CNEL).

Mobility Element

Policy CE-1.7. Proactive Mitigation: Proactively mitigate potential air quality, noise, congestion, safety, and other impacts from the transportation network on residents and business.

Policy CE-1.8. Environmental Sustainability: Consider air and water quality, noise reduction, neighborhood character, and street-level aesthetics when making improvements to travelways.

Policy CE-4.8. Noise Mitigation: Encourage physical and operational improvements to reduce noise levels around major roads, freeways, and rail corridors, in particular around sensitive land uses.

As noted, the City of Santa Ana is largely built out and the street system is well established, creating challenges for separating noise-sensitive land uses from primary noise sources. The General Plan Noise Element establishes policies guarding against new noise or land use conflicts to minimize the impact of existing noise sources on the community. **Table 6: City of Santa Ana Interior and Exterior Noise Standards (dBA CNEL)** identifies the City's interior and exterior noise guidelines for land use planning. It should also be noted that the Santa Ana General Plan Noise Element mentions that residential uses should be protected with additional insulation, above normal building construction, within areas of greater than 60 dBA CNEL.

Table 6: City of Santa Ana Interior and Exterior Noise Standards (dBA CNEL)			
Category	**Land Use Categories**	**Interior[1] (dBA)**	**Exterior[2] (dBA)**
Residential	Single-Family, duplex, multi-family	45[3]	65
Institutional	Hospital, school classroom/ playgrounds	45	65
	Religious facility, library	45	NA
Open Space	Parks	NA	65
NA: Not Applicable; dBA: A-weighted decibel			
1. Interior areas (to include but are not limited to): bedrooms, bathrooms, kitchens, living rooms, dining rooms, private offices, and conference rooms. 2. Exterior areas shall mean: private yards of single-family homes, park picnic areas, school playgrounds, common areas. Private open space, such as atriums on balconies, shall be excluded from exterior areas provided sufficient common area is included within the project. 3. Interior noise level requirements contemplate a closed-window condition. Mechanical ventilation system or other means of natural ventilation shall be provided per Chapter 12 of the Uniform Building Code, as necessary.			
Source: City of Santa Ana, *General Plan Noise Element*, Table N-1: Interior and Exterior Noise Standards, April 2022.			

City of Santa Ana Municipal Code

A noise ordinance is intended to control unnecessary, excessive, and annoying sounds from stationary, non-transportation noise sources. Noise ordinance requirements are not applicable to mobile noise sources such as heavy trucks traveling on public roadways. Federal and State laws preempt control of mobile noise sources on public roads. The Santa Ana Noise ordinance standards (Article VI, Noise Control within Chapter 18, Health and Sanitation, of the Municipal Code) generally apply to noises affecting residential land uses. The Santa Ana Municipal Code prohibits the production of excessive noise as it pertains to residential uses. **Table 7: Santa Ana Exterior Noise Standards** shows these noise standards for residential properties within the City of Santa Ana.

Table 7: Santa Ana Exterior Noise Standards	
Noise Level	**Time Period**
55 dB(A)	7:00 a.m. to 10:00 p.m.
50 dB(A)	10:00 p.m. to 7:00 a.m.
Source: City of Santa Ana Municipal Code, Chapter 18, Article VI, Section 18-312, February 3, 2023.	

The City of Santa Ana (Municipal Code Section 18.314(e) (Special Provisions)) exempts noise associated with construction, repair, remodeling, or grading of any real property from the noise limitations of the municipal code, provided that construction activities do not take place between the hours of 8:00 p.m. and 7:00 a.m. on weekdays, including Saturdays, or any time on Sundays or federal holidays.

4 EXISTING CONDITIONS

4.1 Existing Noise Sources

The City of Santa Ana is characterized as a predominately urban environment. Much of the City has been developed with residential, commercial and industrial land uses. Transportation related noise is the primary noise source in the City. Other noise sources include noise generated from commercial, residential, institutional, and recreational activities.

Mobile Sources

Existing roadway noise levels were calculated for the roadway segments in the Project vicinity. This task was accomplished using the Federal Highway Administration (FHWA) Highway Traffic Noise Prediction Model (FHWA-RD-77-108) and existing traffic volumes from the Project traffic analysis (prepared by Linscott Law & Greenspan Engineers, 2022). The noise prediction model calculates the average noise level at specific locations based on traffic volumes, average speeds, roadway geometry, and site environmental conditions. The average vehicle noise rates (also referred to as energy rates) used in the FHWA model have been modified to reflect average vehicle noise rates identified for California by the California Department of Transportation (Caltrans). The Caltrans data indicates that California automobile noise is 0.8 to 1.0 dBA higher than national levels and that medium and heavy truck noise is 0.3 to 3.0 dBA lower than national levels. The average daily noise levels along roadway segments proximate to the project site are included in **Table 8: Existing Traffic Noise Levels**.

Table 8: Existing Traffic Noise Levels

Roadway Segment	ADT	dBA CNEL[1]
Fairview Street, between Segerstrom Avenue and MacArthur Boulevard (Santa Ana)	56,973	69.5
Fairview Street, between MacArthur Boulevard and Sunflower Avenue (Santa Ana)	54,025	64.7
Fairview Street, between Sunflower Avenue and S. Coast Drive (Costa Mesa)	48,087	67.8
Fairview Street, between S. Coast Drive and I-405 NB Ramps (Costa Mesa)	58,231	68.3
Fairview Street, between I-405 NB Ramps and I-405 SB Ramps (Costa Mesa/Caltrans)	43,770	67.1
Fairview Street, between I-405 SB Ramps and Baker Street (Costa Mesa)	48,390	67.7
Bear Street, between Segerstrom Avenue and MacArthur Boulevard (Santa Ana)	17,008	62.8
Bear Street, between MacArthur Boulevard and Sunflower Avenue (Santa Ana/Costa Mesa)	17,989	63.4
Bear Street, between Sunflower Avenue and S. Coast Drive (Costa Mesa)	29,134	65.7
Bear Street, between S. Coast Drive and Paularino Avenue (Costa Mesa)	30,398	65.7
Bear Street, between Paularino Avenue and Baker Street (Costa Mesa)	38,267	66.3
S. Plaza Drive, between MacArthur Boulevard and Callen's Common (Santa Ana)	5,308	54.3
S. Plaza Drive, between Callen's Common and Sunflower Avenue (Santa Ana)	4,843	53.9
Bristol Street, between Segerstrom Avenue and MacArthur Boulevard (Santa Ana)	44,293	67.4
Bristol Street, between MacArthur Boulevard and Callen's Common (Santa Ana)	46,145	67.7
Bristol Street, between Callen's Common and Sunflower Avenue (Santa Ana)	44,768	67.5
Bristol Street, between Sunflower Avenue and Anton Boulevard (Costa Mesa)	49,274	68.2
Bristol Street, between Anton Boulevard and I-405 NB Ramps (Costa Mesa)	56,559	69.5
Bristol Street, between I-405 NB Ramps and I-405 SB Ramps (Costa Mesa/Caltrans)	58,259	68.7
Bristol Street, between I-405 SB Ramps and Paularino Avenue (Costa Mesa)	39,269	66.7

Table 8: Existing Traffic Noise Levels

Roadway Segment	ADT	dBA CNEL[1]
Bristol Street, between Paularino Avenue and Baker Street (Costa Mesa)	40,662	67.1
Flower Street, between Dyer Road and MacArthur Boulevard (Santa Ana)	15,150	61.1
Flower Street, between MacArthur Boulevard and Sunflower Avenue (Santa Ana)	9,338	59.0
Main Street, between Dyer Road and MacArthur Boulevard (Santa Ana)	30,688	66.9
Main Street, between MacArthur Boulevard and Sunflower Avenue (Santa Ana)	23,929	65.8
Main Street, between Sunflower Avenue and Red Hill Avenue (Santa Ana/Irvine)	23,638	65.9
Segerstrom Avenue, between Fairview Street and Bear Street (Santa Ana)	21,253	63.9
Segerstrom Avenue, between Bear Street and Bristol Street (Santa Ana)	28,544	65.1
Segerstrom Avenue, between Bristol Street and Flower Street (Santa Ana)	23,189	64.2
Dyer Road, between Flower Street and Main Street (Santa Ana)	29,175	65.3
MacArthur Boulevard, between Fairview Street and Bear Street (Santa Ana)	31,076	65.8
MacArthur Boulevard, between Bear Street and S. Plaza Drive (Santa Ana)	37,959	66.7
MacArthur Boulevard, between S. Plaza Drive and Bristol Street (Santa Ana)	34,622	66.3
MacArthur Boulevard, between Bristol Street and Flower Street (Santa Ana)	37,835	66.6
MacArthur Boulevard, between Flower Street and Main Street (Santa Ana)	38,325	66.7
MacArthur Boulevard, between Main Street and SR-55 SB Ramps (Santa Ana)	48,923	67.8
MacArthur Boulevard, between SR-55 SB Ramps and SR-55 NB Ramps (Santa Ana/Irvine/Caltrans)	50,476	67.7
Sunflower Avenue, between Fairview Street and Bear Street (Santa Ana/Costa Mesa)	16,071	62.6
Sunflower Avenue, between Bear Street and S. Plaza Drive (Santa Ana/Costa Mesa)	28,528	65.6
Sunflower Avenue, between S. Plaza Drive and Bristol Street (Santa Ana/Costa Mesa)	27,615	65.3
Sunflower Avenue, between Bristol Street and Flower Street (Santa Ana/Costa Mesa)	21,571	65.4
Bristol Street, south of Baker Street (Santa Ana)	27,756	65.3

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

1. Traffic noise levels are at 100 feet from the roadway centerline. The actual sound level at any receptor location is dependent upon such factors as the source-to-receptor distance and the presence of intervening structures, barriers, and topography.

Source: Based on traffic data within the *Traffic Circulation Analysis*, prepared by Linscott Law & Greenspan Engineers, 2022. Refer to Appendix B for traffic noise modeling assumptions and results.

As identified in **Table 8**, the existing traffic-generated noise level on project-vicinity roadways currently ranges from 53.9 dBA CNEL to 69.5 dBA CNEL 100 feet from the centerline. As previously described, CNEL is 24-hour average noise level with a 5 dBA "weighting" during the hours of 7:00 p.m. to 10:00 p.m. and a 10 dBA "weighting" added to noise during the hours of 10:00 p.m. to 7:00 a.m. to account for noise sensitivity in the evening and nighttime, respectively.

Stationary Sources

The stationary noise sources in the vicinity of the project site are existing residential and commercial properties to the west and south. Noise sources from residential commercial uses typically include mechanical equipment such as HVAC, automobile-related noise such as cars starting and doors slamming, and landscaping equipment. The noise associated with these sources may represent a single-event noise occurrence or short-term noise.

4.2 Noise Measurements

The Project area is primarily occupied by commercial uses. To quantify existing ambient noise levels in the Project area, Kimley-Horn conducted six short-term noise measurements on October 18, 2022, and long-term noise measurements in January and February 2023; see **Appendix A: Existing Ambient Noise Measurements**. The noise measurement sites were representative of typical existing noise exposure within and immediately adjacent to the project site. The 10-minute measurements were taken between 1:56 p.m. and 3:48 p.m. on a Tuesday. Measurements of L_{eq} are considered representative of the noise levels throughout the day. The average noise levels and sources of noise measured at each location are listed in **Table 9: Existing Noise Measurements** and shown on **Exhibit 4: Noise Measurement Locations**.

Table 9: Existing Noise Measurements

Site	Location	Measurement Period	Duration	L_{eq} (dBA)[1]
Short-Term Noise Measurements				
ST-1	1101 West Stevens Ave, near the southeast corner of the project site	1:56 – 2:06 p.m.	10 Minutes	58.4
ST-2	3333 Bristol Street, near the southeast corner of the project site	2:20 – 2:30 p.m.	10 Minutes	58.8
ST-3	South Coast Metro, near the southwest corner of the project site	2:37 – 2:47 p.m.	10 Minutes	59.5
ST-4	3772 South Plaza Drive, west of the project site	2:59 – 3:09 p.m.	10 Minutes	60.9
ST-5	3400 South Plaza Drive, near the northwest corner of the project site	3:18 – 3:28 p.m.	10 Minutes	62.6
ST-6	1200 West MacArthur Blvd, near northeast corner of the project site	3:38 – 3:48 p.m.	10 Minutes	71.0
Site	**Location**	**Measurement Period**	**Duration**	**L_{eq} (dBA) (day/night)**
Long-Term Noise Measurements				
LT-1	Northeast corner of Callen's Common and South Plaza Drive	1/18/23 to 1/19/23	24 hours	61.6 / 55.9
LT-2	Southeast corner of MacArthur Boulevard and South Plaza Drive	1/23/23 to 1/24/23	24 hours	68.0 / 63.2
LT-3	Along the west side of Bristol Street, approximately 300 feet south of MacArthur Boulevard	1/24/23 to 1/25/23	24 hours	68.2 / 65.4
LT-4	Along the west side of Bristol Street, approximately 130 feet north of Callen's Common	2/1/23 to 2/2/23	24 hours	62.2 / 59.1

1. The Santa Ana General Plan Update EIR included one measurement (ST-16) on the sidewalk in front of the project site (55 feet west of centerline). The measured L_{eq} was 76.1 dBA at 8:11 a.m. For this project specific analysis, additional noise measurements were taken to determine the baseline noise levels at the receptors surrounding all sides of the project site. The recent noise levels are consistent with the General Plan Update EIR considering distance from roadways and time of day fluctuations.

Source: Noise measurements taken by Kimley-Horn, October 18, 2022 and January 18 through February 2, 2023. See Appendix A for noise measurement results.

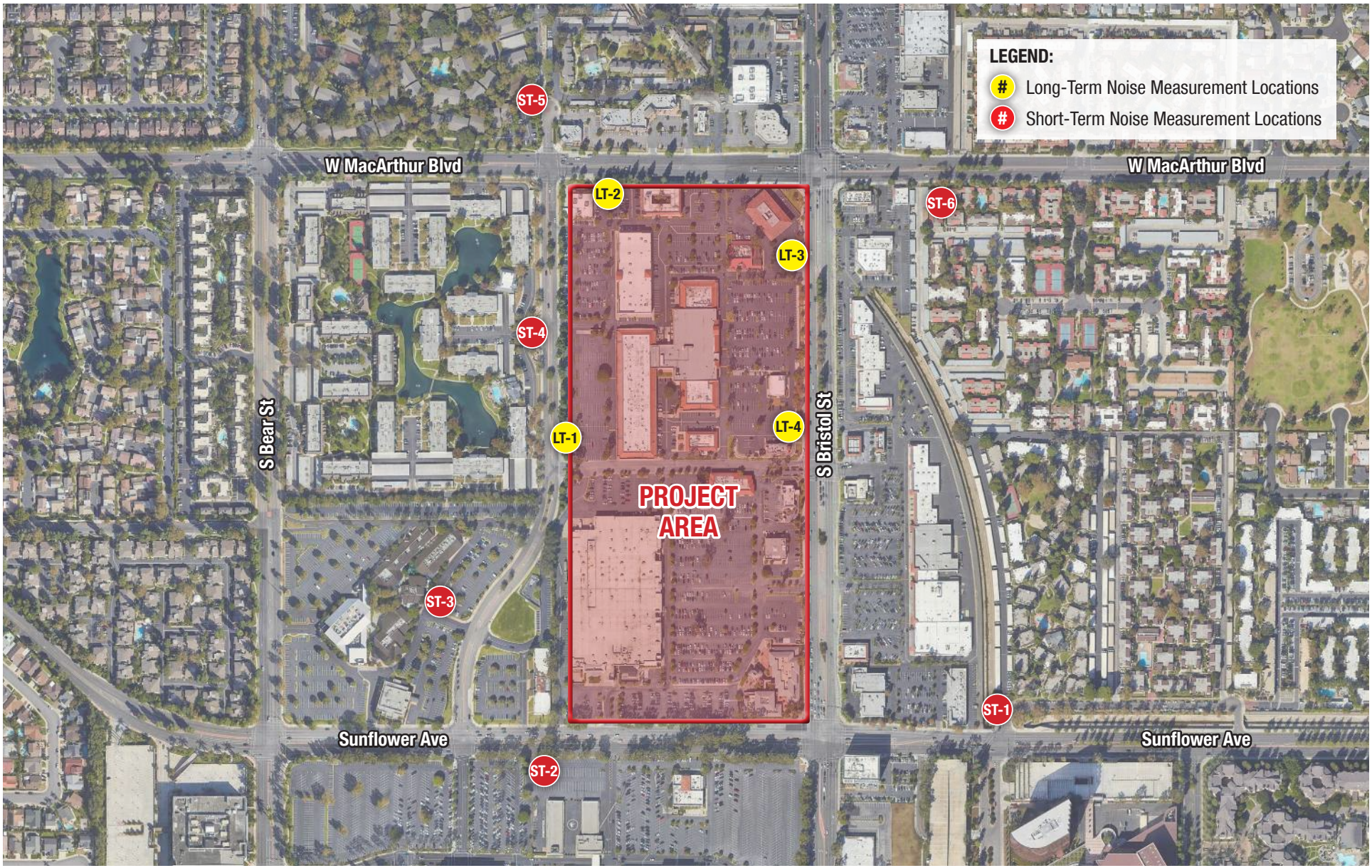


EXHIBIT 4: Noise Measurement Locations
Related Bristol
City of Santa Ana

Not to Scale

Kimley»Horn
Expect More. Experience Better.

4.3 Sensitive Receptors

Noise exposure goals for various types of land uses reflect the varying noise sensitivities associated with those uses. Noise sensitive uses typically include residences, hospitals, schools, childcare facilities, and places of assembly. Vibration sensitive receivers are generally similar to noise sensitive receivers but may also include businesses, such as research facilities and laboratories that use vibration-sensitive equipment. The project site is surrounded by a mix of residential and commercial properties to the west, north, east, and south, and I-405 to the south. Noise sensitive land uses nearest to the project site are listed in **Table 10: Sensitive Receptors**.

Table 10: Sensitive Receptors

Receptor Description	Distance and Direction from the Project
Multi-family Residences	130 feet to the west
Multi-family Residences	292 feet to the northwest
Multi-family Residences	460 feet to the east
Bomo Koral Park	1,580 feet to the east

Source: Google Earth

5 SIGNIFICANCE CRITERIA AND METHODOLOGY

5.1 CEQA Thresholds

State CEQA Guidelines Appendix G contains analysis guidelines related to noise and vibration. These guidelines have been used by the City to develop thresholds of significance for this analysis. A project would create a significant environmental impact if it would:

- Generate a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies;
- Generate excessive groundborne vibration or groundborne noise levels; and
- For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, expose people residing or working in the project area to excessive noise levels.

Thresholds

Construction Noise

The City of Santa Ana does not establish quantitative construction noise standards; therefore, this analysis conservatively uses the FTA's threshold of 80 dBA (8-hour L_{eq}) for residential uses and 85 dBA (8-hour L_{eq}) for non-residential uses to evaluate construction noise impacts. FTA's nighttime construction noise threshold (potentially needed for Project concrete pours only) are 70 dBA (8-hour L_{eq}) for residential uses and 85 dBA (8-hour L_{eq}) for commercial non-residential uses.[11]

Operational Noise

Non-Transportation Noise

Non-transportation related noise generators are commonly called "stationary," "fixed," "area," or "point" sources of noise. Industrial processing, mechanical equipment, pumping stations, and heating, ventilating, and air conditioning (HVAC) equipment are examples of fixed location, non-transportation noise sources.

Operational noise is evaluated based on the standards within the City's Noise Ordinance (Santa Ana Municipal Code, Chapter 18, Article VI, Section 18-312, Ch. 19.42.030: Noise or Sound Level) and the City's General Plan.

In general, commercial/industrial noise within the City of Santa Ana is not considered excessive. However, where residential locations are adjacent to commercial/industrial zones or trucking operations, a significant impact may exist if exterior noise levels exceed the City's 55 dBA daytime (7:00 a.m. to 10:00 p.m.) and 50 dBA nighttime (10:00 p.m. to 7:00 a.m.) standards (see **Table 7**).

Mobile Noise

Traffic noise, including automobiles, trucks, and other motor vehicles is the most pervasive source of noise in the City of Santa Ana. Traffic generated noise impacts are evaluated based on standards within the General Plan. A project will normally have a significant effect on the environment related to noise if it will substantially increase the ambient noise levels for adjoining areas. Most people can detect changes in sound levels of approximately 3 dBA under normal, quiet conditions, and changes of 1 to 3 dBA are

[11] Federal Transit Administration, *Transit Noise and Vibration Impact Assessment Manual*, Table 7-2, Page 179, September 2018.

detectable under quiet, controlled conditions. Changes of less than 1 dBA are usually indiscernible. A change of 5 dBA is readily discernible to most people in an exterior environment. Based on this, the following thresholds of significance are used to assess traffic noise impacts at sensitive receptor locations:

- Greater than 1.5 dBA increase for ambient noise environments of 65 dBA CNEL and higher;
- Greater than 3 dBA increase for ambient noise environments of 60 -64 CNEL; and
- Greater than 5 dBA increase for ambient noise environments of less than 60 dBA CNEL.

Vibration

The City currently does not have a significance threshold to assess vibration impacts. The Caltrans 2020 Transportation and Construction Vibration Guidance Manual identifies the vibration threshold for human annoyance, vibrations levels of 0.04 in/sec begin to cause annoyance and levels of 0.2 in/sec is used for building damage.

5.2 Methodology

Construction

Construction noise levels were based on typical noise levels generated by construction equipment published by the Federal Transit Administration (FTA) and the Federal Highway Administration (FHWA). Construction noise is assessed in dBA L_{eq}. This unit is appropriate because L_{eq} can be used to describe noise level from operation of each piece of equipment separately, and levels can be combined to represent the noise level from all equipment operating during a given period.

Construction noise modeling was conducting using the FHWA Roadway Construction Noise Model (RCNM). Reference noise levels are used to estimate operational noise levels at nearby noise-sensitive receptors based on a standard noise attenuation rate of 6 dB per doubling of distance (line-of-sight method of sound attenuation for point sources of noise). Noise level estimates do not account for the presence of intervening structures or topography, which may reduce noise levels at receptor locations. Therefore, the noise levels presented herein represent a conservative, reasonable worst-case estimate of actual temporary construction noise. The City of Santa Ana does not establish quantitative construction noise standards. As noted above, this analysis conservatively uses the FTA's threshold of 80 dBA (8-hour L_{eq}) for residential uses and 85 dBA (8-hour L_{eq}) for commercial/non-residential uses to evaluate construction noise impacts. FTA's nighttime construction noise threshold (potentially needed for Project concrete pours only) are 70 dBA (8-hour L_{eq}) for residential uses and 85 dBA (8-hour L_{eq}) for commercial non-residential uses.

Operations

The analysis of the "Without Project" and "With Project" noise environments is based on noise prediction modeling and empirical observations. Reference noise level data are used to estimate the Project's operational noise levels from stationary sources. Noise levels are collected from field noise measurements and other published sources from similar types of activities are used to estimate noise levels expected with the Project's stationary sources. The reference noise levels are used to represent a worst-case noise environment as noise level from stationary sources can vary throughout the day. Operational noise is evaluated based on the City's Noise Ordinance and General Plan standards.

An analysis was conducted of the Project's effect on traffic noise conditions at off-site land uses. "Without Project" traffic noise levels were compared to "With Project" traffic noise levels. The environmental baseline is the "Without Project" condition. The "Without Project" and "With Project" traffic noise levels

in the Project vicinity were calculated using the FHWA Highway Noise Prediction Model (FHWA-RD-77-108). The actual sound level at any receptor location is dependent upon such factors as the source-to-receptor distance and the presence of intervening structures (walls and buildings), barriers, and topography. The noise attenuating effects of changes in elevation, topography, and intervening structures were not included in the model. Therefore, the modeling effort is considered a worst-case representation of the roadway noise. In general, a 3-dBA increase in traffic noise is barely perceptible to people, while a 5-dBA increase is readily noticeable.

As a result of the Supreme Court decision regarding the assessment of the environment's impacts on projects (*California Building Industry Association (CBIA) v. Bay Area Air Quality Management District (BAAQMD*), 62 Cal. 4th 369 (No. S 213478) issued December 17, 2015), it is generally no longer the purview of the CEQA process to evaluate the impact of existing environmental conditions on any given project. As a result, while the noise from existing sources is considered as part of the baseline, the direct effects of exterior noise from nearby noise sources relative to land use compatibility of the Project is not a required topic for impact evaluation under CEQA. As required by General Plan Noise Element Policy 1.1, noise levels will be considered in land use planning decisions to prevent future noise and land use incompatibilities. At the discretion of the Santa Ana Planning and Building Agency, considerations may include, but not necessarily be limited to, standards that specify acceptable noise limits for various land uses, noise-reduction features, acoustical design in new construction, and enforcement of the California Uniform Building Code and City provisions for indoor and outdoor noise levels.

Vibration

Groundborne vibration levels associated with Project construction-related activities were evaluated utilizing typical groundborne vibration levels associated with construction equipment, obtained from FTA published data for construction equipment. Potential groundborne vibration impacts related to building/structure damage and interference with sensitive existing operations were evaluated, considering the distance from construction activities to nearby land uses and typically applied criteria. Project construction would not include pile driving. Buildings would use a mat foundation and any piles would be drilled and cast-in-place (i.e., not driven).

For a structure built traditionally, without assistance from qualified engineers, the FTA guidelines show that a vibration level of up to 0.20 in/sec is considered safe and would not result in any vibration damage. FTA guidelines show that modern engineered buildings built with reinforced-concrete, steel or timber can withstand vibration levels up to 0.50 in/sec and not experience vibration damage. The Caltrans 2020 *Transportation and Construction Vibration Guidance Manual* identifies the vibration threshold for human annoyance, vibrations levels of 0.04 in/sec begin to cause annoyance and levels of 0.2 in/sec is used for building damage.

6 POTENTIAL IMPACTS AND MITIGATION

Overview of the Santa Ana General Plan Update Program EIR

The Santa Ana General Plan Update Program EIR (General Plan EIR) analyzed potential noise impacts (construction noise and vibration and operational traffic noise) associated with the buildout development potential of the General Plan. The General Plan EIR determined that at a programmatic level, construction noise would be significant and unavoidable, construction vibration would be less than significant, and operational traffic noise would be significant and unavoidable.

The General Plan EIR identified Mitigation Measure N-1 to reduce potential noise impacts during construction to the extent feasible. Mitigation Measure N-1 requires limiting construction hours to 7:00 a.m. to 8:00 p.m., use best available noise control techniques (e.g., mufflers, intake silencers, etc.), use hydraulically powered impact tools, locate stationary equipment away from sensitive uses, limit construction traffic, post construction notices, idling minimization, minimize horns and alarms, and use temporary barriers where necessary. However, due to the potential for construction activities to occur proximate to sensitive uses, the number of construction projects occurring simultaneously, and the potential duration of construction activities, construction noise could result in a temporary substantial increase in noise levels above ambient conditions. Therefore, General Plan EIR found that impacts would remain significant and unavoidable despite implementation of Mitigation Measure N-1. The General Plan EIR noted that the identification of program-level impacts do not preclude the finding of a less than significant impact for subsequent projects analyzed at the project level.

The General Plan EIR determined that there are no feasible or practical mitigation measures available to reduce project-generated traffic noise to less than significant levels for existing residences along the affected roadways. No individual measure and no set of feasible or practical mitigation measures are available to reduce project-generated traffic noise to less than significant levels in all cases. Therefore, the General Plan EIR concluded that traffic noise would remain a significant and unavoidable impact. The General Plan EIR noted that the identification of program-level impacts do not preclude the finding of a less than significant impact for subsequent projects analyzed at the project level.

The General Plan EIR identified Mitigation Measures N-2, N-3, and N-4, as well as adherence to associated performance standards to reduce construction vibration to less than significant levels. Specifically, Mitigation Measure N-2 would reduce potential pile driving vibration impacts during construction below the pertinent thresholds. (Note that the Project does not include pile driving.) Mitigation Measure N-3 requires new residential projects within 200 feet of an existing railroad line to conduct a groundborne vibration and noise evaluation, and Mitigation Measure N-4 requires industrial developments proposed near sensitive uses to conduct a noise and vibration analysis to reduce potential impacts to less-than-significant levels. No significant and unavoidable vibration impacts would remain.

6.1 Acoustical Impacts

Threshold 6.1 Would the Project generate a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?

Construction

On-Site Construction Noise. Construction noise typically occurs intermittently and varies depending on the construction activity's nature or phase (e.g., land clearing, grading, excavation, paving). Noise generated by construction equipment, including earth movers, material handlers, and portable

generators, can reach high levels. During construction, exterior noise levels could affect noise-sensitive receptors near the construction site. The nearest sensitive receptors to the project site construction area are existing residential uses to the west with the nearest residential building located approximately 130 feet from the on-site construction area. However, it is noted that construction activities would occur throughout the project site and would not be concentrated at a single point near noise-sensitive receptors.

Construction activities would include demolition, site preparation, grading, building construction, paving, and architectural coating. Such activities would require:

- Industrial saws, excavators, and dozers during demolition;
- Dozers and tractors during site preparation;
- Excavators, graders, dozers, scrapers, and tractors during grading;
- Cranes, forklifts, generators, tractors, and welders during building construction;
- Pavers, rollers, and paving equipment during paving; and
- Air compressors during architectural coating.

Typical noise levels associated with individual construction equipment are listed in **Table 11: Typical Construction Noise Levels**.

Table 11: Typical Construction Noise Levels

Equipment	Typical Noise Level (dBA) at 50 feet from Source	Typical Noise Level (dBA) at 130 feet from Source[1]
Air Compressor	80	71.7
Backhoe	80	71.7
Compactor	82	73.7
Concrete Mixer	85	76.7
Concrete Pump	82	73.7
Concrete Vibrator	76	67.7
Crane, Mobile	83	74.7
Dozer	85	76.7
Generator	82	73.7
Grader	85	76.7
Impact Wrench	85	76.7
Jack Hammer	88	79.7
Loader	80	71.7
Paver	85	76.7
Pneumatic Tool	85	76.7
Pump	77	68.7
Roller	85	76.7
Saw	76	67.7
Scraper	85	76.7
Shovel	82	73.7
Truck	84	75.7

1. Calculated using the inverse square law formula for sound attenuation: $dBA_2 = dBA_1+20Log(d_1/d_2)$
Where: dBA_2 = estimated noise level at receptor; dBA_1 = reference noise level; d_1 = reference distance; d_2 = receptor location distance

Source: Federal Transit Administration, *Transit Noise and Vibration Impact Assessment Manual*, September 2018.

As noted above, Project construction would not include pile driving. Buildings would use a mat foundation and any piles would be drilled and cast-in-place (i.e., not driven). Typical operating cycles for these types of construction equipment may involve one or two minutes of full power operation followed by three to four minutes at lower power settings. Other primary sources of acoustical disturbance would be random incidents, which would last less than one minute (such as dropping large pieces of equipment or the hydraulic movement of machinery lifts).

Although the construction equipment noise levels in **Table 11** are from FTA's 2018 *Transit Noise and Vibration Impact Assessment Manual*, the noise levels are based on measured data from a U.S. Environmental Protection Agency report which uses data from the 1970s,[12] the FHWA Roadway Construction Noise Model which uses data from the early 1990s, and other measured data. Since that time, construction equipment has been required to meet more stringent emissions standards and the additional necessary exhaust systems also reduce noise from what is shown in the table.

Section 18-314 (Special Provisions) of the City of Santa Ana Municipal Code exempts noise sources associated with construction activities from the City's established noise standards as long as the activities do not take place between the hours of 8:00 p.m. and 7:00 a.m. on weekdays, including Saturday, or any time on Sunday or a federal holiday. While the City establishes limits to the hours during which construction activity may take place, it does not identify specific noise level limits for construction noise levels. The City's permitted hours of construction are required in recognition that construction activities undertaken during daytime hours are a typical part of living in an urban environment and do not cause a significant impact. However, this analysis conservatively uses the FTA's threshold of 80 dBA and 85 dBA (8-hour L_{eq}) to evaluate construction noise impacts for residential and commercial uses, respectively.[13]

Phase 1 Construction Noise

The noise levels calculated in **Table 12: Phase 1 Construction Noise Levels** show estimated exterior construction noise. Construction noise levels drop off at a rate of about 6 dBA per doubling of distance between the noise source and receptor. Construction equipment would operate throughout the project site and the associated noise levels would not occur at a fixed location for extended periods of time. As noted above, the nearest sensitive receptors to Phase 1 are located approximately 130 feet away. It is noted that construction equipment would move around on-site and not all equipment would operate at the closest point to sensitive receptors to the center of the construction activity area. Therefore, the analysis assumed simultaneous operation of the two loudest pieces of equipment closest to sensitive receptors and the remaining equipment at an average distance. The construction area would encompass a large area and would not concentrate all equipment at the construction area boundary. The nature of construction is such that all equipment it not (1) used simultaneously and (2) not used at the exact same location (because equipment serves different purpose) and equipment is spread across the construction area. Because practically all equipment in the equipment mix would not operate at the closest point to the nearest sensitive receptor, for the reasons outlined above, and analysis assuming that the noisiest equipment would operate concurrently at the construction boundary closest to the nearest sensitive receptor reflects a conservative analysis. Construction noise levels shown in **Table 12** focus on the closest receptors. Noise levels at receptors further away would be lower.

[12] U.S. Environmental Protection Agency, Noise from Construction Equipment and Operations, Building Equipment and Home Appliances, NTID300.1, December 31, 1971.

[13] Federal Transit Administration, *Transit Noise and Vibration Impact Assessment Manual*, Table 7-2, Page 179, September 2018.

Table 12 shows that construction noise levels for Phase 1 would not exceed the 80-dBA threshold. Additionally, compliance with Section 18-314 (Special Provisions) of the City of Santa Ana Municipal Code would minimize impacts from construction noise, as construction would be limited to daytime hours. Therefore, Phase 1 construction activities would result in a less than significant noise impact.

Table 13: Phase 1 Construction Noise Levels

Construction Phase	Off-Site Receptor Location			Worst Case Modeled Exterior Noise Level (dBA L_{eq})	Noise Threshold (dBA L_{eq})[2]	Exceeded?
	Land Use	Direction	Distance (feet)[1]			
Demolition	Residential	Northwest	130-650	75.7	80	No
Site Preparation	Residential	Northwest	130-650	74.2	80	No
Grading	Residential	Northwest	130-650	75.4	80	No
Building Construction	Residential	Northwest	130-650	73.0	80	No
Paving	Residential	Northwest	130-650	74.9	80	No
Architectural Coating	Residential	Northwest	130-650	65.4	80	No

1. Distance assumes the two loudest pieces of equipment closest to receptors and remaining equipment would be an average distance from the construction activity area to the nearest receptors. Not all equipment would operate at the closest distance to the receptors.
2. Threshold from Federal Transit Administration, *Transit Noise and Vibration Impact Assessment Manual,* Table 7-3, 2018.

Source: Federal Highway Administration, *Roadway Construction Noise Model,* 2006. Refer to Appendix B for noise modeling results.

Phase 2 Construction Noise

The noise levels calculated in **Table 14: Phase 2 Construction Noise Levels**, show estimated exterior construction noise. Construction noise levels drop off at a rate of about 6 dBA per doubling of distance between the noise source and receptor. Construction equipment would operate throughout the project site and the associated noise levels would not occur at a fixed location for extended periods of time. As noted above, the nearest off-site sensitive receptors to Phase 2 are located 410 feet or more away. Construction equipment would move around on-site and not all equipment would operate at the closest point to sensitive receptors. Construction noise levels shown in **Table 14** focus on the closest receptors. Noise levels at receptors further away would be lower.

Table 14: Phase 2 Construction Noise Levels

Construction Phase	Off-Site Receptor Location			Worst Case Modeled Exterior Noise Level (dBA L_{eq})	Noise Threshold (dBA L_{eq})[2]	Exceeded?
	Land Use	Direction	Distance (feet)[1]			
Demolition	Residential	East	410-600	67.0	80	No
Site Preparation	Residential	East	410-600	67.2	80	No
Grading	Residential	East	410-600	68.0	80	No
Building Construction	Residential	East	410-600	66.3	80	No
Paving	Residential	East	410-600	66.7	80	No
Architectural Coating	Residential	East	410-600	55.4	80	No

1. Distance assumes the two loudest pieces of equipment closest to receptors and remaining equipment would be an average distance from the construction activity area to the nearest receptors. Not all equipment would operate at the closest distance to the receptors.
2. Threshold from Federal Transit Administration, *Transit Noise and Vibration Impact Assessment Manual,* Table 7-3, 2018.

Source: Federal Highway Administration, *Roadway Construction Noise Model,* 2006. Refer to Appendix B for noise modeling results.

Table 14 shows that off-site construction noise levels for Phase 2 would not exceed the 80-dBA threshold. In addition to off-site receptors, Phase 2 construction would occur after Phase 1 is constructed and

occupied. These future on-site receptors would be located approximately 130 to 500 feet or more away from where heavy equipment would be located. The loudest Phase 2 noise level would occur during grading and would be 75.6 dBA at the Phase 1 residences located 130 feet away.[14] Therefore, Phase 2 construction noise would not exceed FTA standards at future on-site residences. Additionally, compliance with Section 18-314 (Special Provisions) of the City of Santa Ana Municipal Code would minimize impacts from construction noise, as construction would be limited to daytime hours. Therefore, Phase 2 construction activities would result in a less than significant noise impact.

Phase 3 Construction Noise

The noise levels calculated in **Table 15: Phase 3 Construction Noise Levels**, show estimated exterior construction noise. Construction noise levels drop off at a rate of about 6 dBA per doubling of distance between the noise source and receptor. Construction equipment would operate throughout the project site and the associated noise levels would not occur at a fixed location for extended periods of time. As noted above, the nearest off-site sensitive receptors to Phase 3 are located 130 feet away from the construction boundary. Construction equipment would move around on-site and not all equipment would operate at the closest point to sensitive receptors. Construction noise levels shown in **Table 15** focus on the closest receptors. Noise levels at receptors further away would be lower.

Table 15: Phase 3 Construction Noise Levels

Construction Phase	Receptor Location			Worst Case Modeled Exterior Noise Level (dBA L_{eq})	Noise Threshold (dBA L_{eq})[2]	Exceeded?
	Land Use	Direction	Distance (feet)[1]			
Demolition	Residential	West	130-400	75.9	80	No
Site Preparation	Residential	West	130-400	74.8	80	No
Grading	Residential	West	130-400	75.9	80	No
Building Construction	Residential	West	130-400	73.7	80	No
Paving	Residential	West	130-400	75.2	80	No
Architectural Coating	Residential	West	130-400	65.4	80	No

1. Distance assumes the two loudest pieces of equipment closest to receptors and remaining equipment would be an average distance from the construction activity area to the nearest receptors. Not all equipment would operate at the closest distance to the receptors.
2. Threshold from Federal Transit Administration, *Transit Noise and Vibration Impact Assessment Manual,* Table 7-3, 2018.

Source: Federal Highway Administration, *Roadway Construction Noise Model,* 2006. Refer to Appendix B for noise modeling results.

Table 15 shows that off-site construction noise levels for Phase 3 would not exceed the 80-dBA threshold. In addition to the off-site receptors, Phase 3 construction would occur after Phase 1 and Phase 2 are constructed and occupied. These future on-site receptors would be located approximately 130 feet away from the construction boundary. The loudest Phase 3 noise level would occur during demolition and grading would be 76.5 dBA at the Phase 1 and Phase 2 residences located 130 feet away.[15] Therefore, Phase 3 construction noise would not exceed FTA standards at future on-site residences. Additionally, compliance with Section 18-314 (Special Provisions) of the City of Santa Ana Municipal Code would minimize impacts from construction noise, as construction would be limited to daytime hours. Therefore, Phase 1, Phase 2, and Phase 3 construction activities would result in a less than significant noise impact.

[14] Based on the inverse square law of sound attenuation. See Appendix B for noise modeling results.
[15] Based on the inverse square law of sound attenuation. See Appendix B for noise modeling results.

Off-Site Construction Noise

During Phase 1 construction, off-site improvements would also occur in the roadways adjacent to the project site. The off-site improvements include the installation and upgrade of water, stormwater, and sewer utilities, as well as roadway improvements that include intersection improvements and median reconstruction. The off-site improvements would include excavators, loaders, and trucks during pavement demolition and trenching activities and pavers, rollers, and loaders for paving activities.

Because off-site construction would occur within roadways, equipment would move linearly and would not operate in a fixed location for extended durations. The distance assumptions for off-site construction noise represent the worst-case noise scenario because construction activities would typically not be located near a sensitive receptor for the entire construction period. In addition, construction noise levels are not constant, and in fact, construction activities and associated noise levels would fluctuate and generally be brief and sporadic, depending on the type, intensity, and location of construction activities. Construction noise would be acoustically dispersed throughout the construction area and would be masked by surrounding roadway noise.

Table 16: Off-Site Construction Noise Levels shows that off-site construction noise would not exceed the FTA's standard. Additionally, when the worst-case off-site noise level (77.4 dBA during demolition) is combined with the worst-case on-site construction noise level (75.7 dBA during Phase 1 demolition), noise levels would be 79.6 dBA, which is below the FTA's 80 dBA standard. Therefore, impacts would be less than significant in this regard.

Table 16: Off-Site Construction Noise Levels

Construction Phase	Off-Site Receptor Location			Worst Case Modeled Exterior Noise Level (dBA L_{eq})	Noise Threshold (dBA L_{eq})[2]	Exceeded?
	Land Use	Direction	Distance (feet)[1]			
Demolition	Residential	Northwest	75	77.4	80	No
Trenching	Residential	Northwest	75	76.4	80	No
Paving	Residential	Northwest	75	75.4	80	No

1. Distance is from the nearest receptor to the off-site construction activity area on the project site. Not all equipment would operate at the closest distance to the receptors.
2. Threshold from Federal Transit Administration, *Transit Noise and Vibration Impact Assessment Manual,* Table 7-3, 2018.

Source: Federal Highway Administration, *Roadway Construction Noise Model,* 2006. Refer to Appendix B for noise modeling results.

Actual construction-related noise activities would be lower than the conservative levels described above and would cease upon completion of construction. Due to the variability of construction activities and equipment for the Project, overall construction noise levels would be intermittent and would fluctuate over time. In addition, the noise modeling assumes that construction noise is constant, when, in fact, construction activities and associated noise levels would fluctuate and generally be brief and sporadic, depending on the type, intensity, and location of construction activities. It is also noted that Project construction equipment would be equipped with functioning mufflers as mandated by the state, and construction would occur throughout the project site and would not be concentrated or confined in the area directly adjacent to off-site or on-site sensitive receptors.

Nighttime Construction Noise

The Santa Ana Municipal Code allows construction to occur between the hours of 7:00 a.m. and 8:00 p.m. on weekdays and Saturdays. Project construction could require extended construction hours to accommodate concrete pours that would occur during normal construction hours and during nighttime

hours. The nighttime concrete pours would use the following construction equipment: concrete mixer trucks, concrete pump truck, concrete vibrator, generator, trucks, and air compressors.

The cities of Santa Ana and Costa Mesa do not establish quantitative construction noise standards. As noted above, this analysis conservatively uses the FTA's nighttime construction noise threshold of 70 dBA (8-hour L_{eq}) for residential uses and 85 dBA (8-hour L_{eq}) for commercial non-residential uses. **Table 17: Nighttime Concrete Pour Noise Levels** show that construction noise associated with nighttime concrete pours would be up to 71.0 dBA for off-site receptors. The other construction phases, such as demolition and grading would not occur at night. Nighttime construction noise would have the potential to exceed FTA's 70 dBA threshold. Mitigation Measure **(MM) NOI-1** requires enclosures for stationary concrete pour equipment (e.g., generators, air compressors, etc.) and buffer distances for mobile equipment (including concrete trucks) to minimize nighttime construction noise. Enclosures would muffle noise from stationary equipment and minimum buffer distances would ensure mobile equipment operates at a sufficient distance to attenuate noise levels. **Table 16** shows that with mitigation impacts would be reduced to less than significant levels.

Table 17: Nighttime Concrete Pour Noise Levels

Construction Phase	Off-Site Receptor Location			Worst-Case Modeled Exterior Noise Level (dBA L_{eq})		Noise Threshold (dBA L_{eq})[2]	Exceeded with Mitigation?
	Land Use	Direction	Distance (feet)[1]	Unmitigated	Mitigated		
Phase 1 Off-Site	Residential	Northwest	130-650	70.3	69.5	70	No
Phase 2 Off-Site	Residential	West	410-600	63.9	N/A	70	No
Phase 3 Off-Site	Residential	West	130-400	71.0	69.7	70	No
Phase 2 (Phase 1 On-Site Receptors)	Residential	South	130-500	70.6	69.8	70	No
Phase 3 (Phase 1 On-Site Receptors)	Residential	West	130-300	71.9	69.8	70	No

1. Distance assumes the two loudest pieces of equipment closest to receptors and remaining equipment would be an average distance from the construction activity area to the nearest receptors. Not all equipment would operate at the closest distance to the receptors.
2. Threshold from Federal Transit Administration, *Transit Noise and Vibration Impact Assessment Manual,* Table 7-3, 2018.

Source: Federal Highway Administration, *Roadway Construction Noise Model,* 2006. Refer to Appendix B for noise modeling results.

As noted above, subsequent phase construction would occur while completed phases are occupied. Future on-site receptors would be located approximately 130 to 500 feet away from subsequent phase construction. The loudest nighttime noise levels would potentially be 70.6 dBA during Phase 2 and 71.9 dBA during Phase 3 (see **Table 17**). It is noted that nighttime construction would be limited to brief periods when nighttime concrete pours would be necessary (i.e., nighttime activities would not occur during the entire construction period). Nighttime construction noise relative to the on-site receptors (i.e., receptors that are part of the Project) would be reduced to less than significant levels with the implementation of **MM NOI-1**.

Construction Traffic Noise

Construction noise may be generated by large trucks moving materials to and from the project site. The Project would include demolition of existing buildings. Grading would require approximately 640,550 cubic yards of export for Phase 1; approximately 214,906 cubic yards of export for Phase 2; and approximately 484,869 cubic yards of export for Phase 3, which would result in approximately 80,069, 26,863, and 60,609 roundtrip truck hauling trips, respectively. Building construction would result in approximately 2,019 worker trips per day in Phase 1, 961 worker trips per day in Phase 2, and 1,649 worker

trips per day in Phase 3 during the building construction stage of each phase. Noise generated from construction traffic would increase short-term noise; however, these noise levels are temporary and would cease once construction is complete. The trucks associated with construction would occur during the allowable hours for construction specified in the Municipal Code (7:00 a.m. to 8:00 p.m. on weekdays and Saturdays). Trucks (including trucks hauling excavated material) would also occur during the allowable daytime hours only. Delivery trucks, haul trucks, and worker vehicles associated with the construction of the proposed Project would vary from day to day, with the highest volumes generally occurring during construction initiation.

The Project's off-site construction traffic noise impact was analyzed by using the FHWA RD-77-108 model to quantify noise from the Project's construction trips with existing traffic noise levels along the potential haul routes (i.e., Bristol Street, MacArthur Boulevard, and Sunflower Avenue). The location of roadside sensitive receptors was also considered. The Project would require heavy trucks over the course of the construction period to accommodate the soil off haul and material deliveries necessary for construction. The addition of haul trucks would alter the fleet mix of haul route roadways. This effect was accounted for by adjusting the fleet mix to represent the worst-case condition (i.e., increasing the truck percentages to represent the maximum number of daily worker and truck trips) in the FHWA RD-77-108 model.

Table 18: Construction Traffic Noise Levels identifies the predicted noise levels at nearby roadway segments near the project site. **Table 18** shows that construction traffic noise levels would not exceed the 85 dBA construction thresholds for commercial uses (soil hauling would not occur along residential streets). It should be noted that roadway noise levels would not increase ambient noise levels above the perceptible range (3.0 dBA) for any of the construction phases. Additionally, General Plan EIR Mitigation Measure **N-1** requires construction traffic use City approved haul routes to the extent feasible. Off-sit soil hauling would occur during daytime hours within a commercial area (i.e., not along residences). Therefore, a less than significant impact would occur.

Table 18: Construction Traffic Noise Levels

Roadway Segment	Without Construction		With Construction		Change	Construction Noise Threshold	Significant Impact? [2]
	ADT	dBA CNEL [1]	ADT	dBA CNEL [1]			
Phase 1							
Bristol Street, between MacArthur Boulevard and Callen's Common (Santa Ana)	46,145	67.7	49,074	69.3	1.6	85	No
Bristol Street, between Callen's Common and Sunflower Avenue (Santa Ana)	44,768	67.5	47,697	69.1	1.7	85	No
Bristol Street, between Sunflower Avenue and Anton Boulevard (Costa Mesa)	49,274	68.2	52,203	69.7	1.5	85	No
Bristol Street, between Anton Boulevard and I-405 NB Ramps (Costa Mesa)	56,559	69.5	59,488	70.9	1.4	85	No
Bristol Street, between I-405 NB Ramps and I-405 SB Ramps (Costa Mesa/Caltrans)	58,259	68.7	61,188	70.1	1.3	85	No
MacArthur Boulevard, between S. Plaza Drive and Bristol Street (Santa Ana)	34,622	66.3	37,551	68.3	2.1	85	No
Sunflower Avenue, between S. Plaza Drive and Bristol Street (Santa Ana/Costa Mesa)	27,615	65.3	30,544	67.8	2.5	85	No

Table 18: Construction Traffic Noise Levels

Roadway Segment	Without Construction		With Construction		Change	Construction Noise Threshold	Significant Impact? [2]
	ADT	dBA CNEL [1]	ADT	dBA CNEL [1]			
Phase 2							
Bristol Street, between MacArthur Boulevard and Callen's Common (Santa Ana)	51,586	68	52,954	68.9	0.7	85	No
Bristol Street, between Callen's Common and Sunflower Avenue (Santa Ana)	50,098	68	51,466	68.7	0.8	85	No
Bristol Street, between Sunflower Avenue and Anton Boulevard (Costa Mesa)	55,366	69	56,734	69.4	0.7	85	No
Bristol Street, between Anton Boulevard and I-405 NB Ramps (Costa Mesa)	66,204	70	67,572	70.8	0.6	85	No
Bristol Street, between I-405 NB Ramps and I-405 SB Ramps (Costa Mesa/Caltrans)	66,353	69	67,721	69.9	0.6	85	No
MacArthur Boulevard, between S. Plaza Drive and Bristol Street (Santa Ana)	38,095	67	39,463	67.6	1.0	85	No
Sunflower Avenue, between S. Plaza Drive and Bristol Street (Santa Ana/Costa Mesa)	31,199	66	32,567	67.0	1.1	85	No
Phase 3							
Bristol Street, between MacArthur Boulevard and Callen's Common (Santa Ana)	52,509	68.2	55,076	69.7	1.5	85	No
Bristol Street, between Callen's Common and Sunflower Avenue (Santa Ana)	50,994	68.0	53,561	69.5	1.5	85	No
Bristol Street, between Sunflower Avenue and Anton Boulevard (Costa Mesa)	56,351	68.7	58,918	70.1	1.4	85	No
Bristol Street, between Anton Boulevard and I-405 NB Ramps (Costa Mesa)	67,335	70.2	69,902	71.4	1.2	85	No
Bristol Street, between I-405 NB Ramps and I-405 SB Ramps (Costa Mesa/Caltrans)	67,518	69.4	70,085	70.6	1.2	85	No
MacArthur Boulevard, between S. Plaza Drive and Bristol Street (Santa Ana)	38,787	66.7	41,354	68.6	1.9	85	No
Sunflower Avenue, between S. Plaza Drive and Bristol Street (Santa Ana/Costa Mesa)	31,752	65.9	34,319	68.1	2.2	85	No

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

1. Traffic noise levels are at 100 feet from the roadway centerline. The actual sound level at any receptor location is dependent upon such factors as the source-to-receptor distance and the presence of intervening structures, barriers, and topography.
2. Potential impacts occur when the Project change exceeds the FTA's construction thresholds.

Source: Without Construction traffic data is based on the Traffic Circulation Analysis, prepared by Linscott Law & Greenspan Engineers, 2022. With Construction traffic data includes construction traffic modeled for the Project Air Quality Assessment. Refer to Appendix B for traffic noise modeling assumptions and results.

Operations

Project implementation would create new sources of noise in the site vicinity. The mixed-use development's major noise sources including the followings:

- Mechanical equipment (i.e., trash compactors, air conditioners, etc.);
- Plazas/Open Spaces;
- Landscape Maintenance Activities;
- Parking areas (i.e., car door slamming, car radios, engine start-up, and car pass-by); and

- Off-site traffic noise

Mechanical Equipment

The project site is located near residential properties to the west, northwest, and east, while properties to the southwest, south, and southeast are primarily commercial. The nearest sensitive receptors to the project site are residences approximately 130 feet west of the Project's western property boundary. Potential stationary noise sources related to long-term operation of the project site would include mechanical equipment. Mechanical equipment (e.g., heating ventilation and air conditioning [HVAC] equipment) typically generates noise levels of approximately 52 dBA at 50 feet[16]. At the closest sensitive receptor, approximately 130 feet away, mechanical equipment noise levels would attenuate to 43.7 dBA, which is below the City's ambient noise standards of 55 dBA for residential receptors (refer to **Table 7**) and below the measured ambient levels ranging from 58.4 to 71.0 dBA (refer to **Table 9**). Operation of mechanical equipment would not increase ambient noise levels beyond the acceptable compatible land use noise levels. Therefore, the proposed Project would result in a less than significant impact related to stationary noise levels.

Open Spaces/Plazas

The Project includes open spaces and plazas that could generate noise from people gathering (i.e., crowds) or from amplified music. Crowd noise from special events at the project site could be audible at the nearest noise-sensitive receptors (i.e., residences approximately 130 feet to the west). It should be noted that the plazas and open spaces would be located at the Project's interior and surrounded by proposed buildings. These areas would be approximately 350 feet from sensitive receptors. The surrounding buildings would also block the line of sight to sensitive receptors and provide at least 15 dBA of noise attenuation.[17]

Crowd noise is dependent on various factors including vocal effort, impulsiveness, and the random orientation of the crowd members. Crowd noise is estimated at 60 dBA at one meter (3.28 feet) away for raised normal speaking.[18] This noise level would have a +5 dBA adjustment for the impulsiveness of the noise source, and a -3 dBA adjustment for the random orientation of the crowd members. Therefore, crowd noise would be approximately 62 dBA at one meter from the source.[19] Crowd noise at the nearest noise-sensitive receptors (residences to the west) would be approximately 18 dBA, without considering attenuation from surrounding buildings.

Special events at the plazas/open spaces could involve amplified live or recorded music. Amplified music is typically 88 dBA at 20 feet.[20] Noise levels from amplified music at the nearest noise-sensitive receptors (residences approximately 350 feet west of the plazas) would be 63 dBA. As noted above, the plazas would be surrounded by Project buildings, which would attenuate this noise level to 48 dBA. As such, crowd and music would not exceed the City's 55 dBA noise standard and would be below the measured ambient

[16] Elliott H. Berger, Rick Neitzel, and Cynthia A. Kladden, *Noise Navigator Sound Level Database with Over 1700 Measurement Values*, July 6, 2010.
[17] Federal Highway Administration, *Roadway Construction Noise Model User's Guide Final Report*, 2006.
[18] M.J. Hayne, et al, *Prediction of Crowd Noise*, Acoustics, November 2011.
[19] Ibid.
[20] Occupational Safety and Health Administration (OSHA), *Occupational Noise Exposure, Typical Sound Levels (extrapolated)* https://www.osha.gov/noise#:~:text=OSHA%20sets%20legal%20limits%20on,for%20an%208%20hour%20day, accessed February 2023.

levels ranging from 58.4 to 71.0 dBA (refer to **Table 9**). Therefore, noise impacts from crowds/amplified music would be less than significant.

Landscape Maintenance Activities

Development and operation of the Project includes new landscaping that would require periodic maintenance. Noise generated by a gasoline-powered lawnmower is estimated to be approximately 64.4 dBA at 50 feet.[21] Maintenance activities would operate during daytime hours for brief periods of time as allowed by the City of Santa Ana Municipal Code and would not permanently increase ambient noise levels in the area and would be consistent with activities that currently occur at the surrounding uses as well as landscape maintenance associated with the existing on-site shopping center. The closest sensitive receptor to the project site is residential unit located approximately 130 feet to the west. At this distance, a gasoline-powered lawnmower noise level would be attenuated to 56.1 dBA. Based on the existing ambient noise measurements conducted by Kimley-Horn on October 18, 2022, the minimum ambient noise level was 58.4 dBA which is already above the City's ambient noise standards of 55 dBA for residential receptors. Therefore, a gasoline-powered lawnmower noise level of 56.1 dBA is less than the ambient noise levels and would not represent a noticeable noise level increase. Furthermore, it should be noted that Mitigation Measure AQ-5 in the Project Air Quality Assessment requires electric landscape equipment. Electric landscape equipment is approximately 10 to 20 dBA quieter[22] than gasoline-powered equipment. Therefore, the landscape maintenance noise levels discussed above are conservative and the proposed Project would result in a less than significant impact related to landscape maintenance noise levels.

Parking Noise

All parking would be provided on the project site with the majority in subterranean and at-grade/above-grade parking garages. Parking standards reflect shared/joint/reciprocal concepts. As previously noted, up to two levels of subterranean parking in Phase 1 and one level of subterranean parking in Phase 2 and Phase 3. No subterranean parking would be located under Bristol Central Park. There would be some on-street parking throughout the project site.

Traffic associated with parking lots is typically not of sufficient volume to exceed community noise standards, which are based on a time-averaged scale such as the CNEL scale. The instantaneous maximum sound levels generated by a car door slamming, engine starting up, and car pass-bys range from 53 to 61 dBA.[23] Conversations in parking areas may also be an annoyance to adjacent sensitive receptors. Sound levels of speech typically range from 33 dBA at 50 feet for normal speech to 50 dBA at 50 feet for very loud speech.[24] It should be noted that parking lot noises are instantaneous noise levels compared to noise standards in the hourly L_{eq} metric, which are averaged over the entire duration of a time period. As a result, actual noise levels over time resulting from parking lot activities would be far lower than the reference levels identified above.

For the purpose of providing a conservative, quantitative estimate of the noise levels that would be generated from the vehicles entering and exiting the parking lot, the methodology recommended by FTA for the general assessment of stationary transit noise sources is used. Using the methodology, the

[21] Ibid.

[22] Noise Pollution Clearinghouse, *Quiet Lawns Creating The "Perfect" Landscape Without Polluting the Soundscape* https://www.nonoise.org/library/qz7/QuietLawns05.pdf , accessed February 2023.

[23] Kariel, H. G., *Noise in Rural Recreational Environments*, Canadian Acoustics 19(5), 3-10, 1991.

[24] Elliott H. Berger, Rick Neitzel, and Cynthia A. Kladden. Noise Navigator Sound Level Database with Over 1700 Measurement Values, July 6, 2010.

Project's peak hourly noise level that would be generated by the on-site parking levels was estimated using the following FTA equation for a parking lot:

$$L_{eq(h)} = SEL_{ref} + 10 \log (NA/1{,}000) - 35.6$$

Where:

$L_{eq(h)}$ = hourly L_{eq} noise level at 50 feet

SEL_{ref} = reference noise level for stationary noise source represented in sound exposure level (SEL) at 50 feet

NA = number of automobiles per hour

35.6 is a constant in the formula, calculated as 10 times the logarithm of the number of seconds in an hour

Based on the peak hour trip generation rates in the Traffic Study, approximately 1,810 trips during the worst-case peak hour (Phase 1, Phase 2, and Phase 3 combined gross trips with no credit for existing trips) would be made to the project site each day. Using the FTA's reference noise level of 92 dBA SEL[25] at 50 feet from the noise source, the Project's highest peak hour vehicle trips would generate noise levels of approximately 59 dBA L_{eq} at 50 feet from the parking lot. The nearest off-site residential property is 130 feet west of the project site. Based strictly on distance attenuation, parking lot noise at the nearest receptor would be 50.7 dBA which is below the City's residential and non-residential noise standards of 55 dBA and below the measured ambient levels ranging from 58.4 to 71.0 dBA (refer to **Table 9**). Therefore, noise impacts from parking would be less than significant.

Off-Site Phase 1 Traffic Noise

Implementation of the Project would generate increased traffic volumes along nearby roadway segments in the cities of Santa Ana and Costa Mesa. Based on the Traffic Circulation Analysis, Phase 1 of the proposed Project would result in approximately 12,298 daily trips. The Phase 1 Opening Year "2030 Without Project" and "2030 With Project" scenarios are compared in **Table 19: Phase 1 Traffic Noise Levels**. As shown in **Table 19**, roadway noise levels without the Project, would range from 54.2 dBA CNEL to 70.2 dBA CNEL and with the Project between 54.5 dBA CNEL and 70.3 dBA CNEL. Project-generated traffic would result in a maximum increase of 0.4 dBA. In general, a 3-dBA increase in traffic noise is barely perceptible to people, while a 5-dBA increase is readily noticeable. **Table 19** shows that none of the roadway segments would exceed the City's standards for increases in traffic noise (greater than 1.5 dBA increase for ambient noise environments of 65 dBA CNEL and higher; greater than 3 dBA increase for ambient noise environments of 60 to 64 CNEL; and greater than 5 dBA increase for ambient noise environments of less than 60 dBA CNEL). Therefore, Phase 1 Opening Year traffic noise would result in a less than significant impact.

Table 19: Phase 1 Traffic Noise Levels

Roadway Segment	2030 Without Project		2030 With Project		Change	Normally Acceptable Standard	Significant Impact? [2]
	ADT	dBA CNEL [1]	ADT	dBA CNEL [1]			
Fairview Street, between Segerstrom Avenue and MacArthur Boulevard (Santa Ana)	62,900	69.9	62,925	69.9	0.0	65	No
Fairview Street, between MacArthur Boulevard and Sunflower Avenue (Santa Ana)	59,954	65.2	59,979	65.2	0.0	65	No

[25] Federal Transit Administration, Transit Noise and Vibration Impact Assessment Manual, September 2018.

Table 19: Phase 1 Traffic Noise Levels

Roadway Segment	2030 Without Project		2030 With Project		Change	Normally Acceptable Standard	Significant Impact? [2]
	ADT	dBA CNEL [1]	ADT	dBA CNEL [1]			
Fairview Street, between Sunflower Avenue and S. Coast Drive (Costa Mesa)	53,444	68.3	53,475	68.3	0.0	60	No
Fairview Street, between S. Coast Drive and I-405 NB Ramps (Costa Mesa)	63,912	68.7	63,952	68.7	0.0	60	No
Fairview Street, between I-405 NB Ramps and I-405 SB Ramps (Costa Mesa/Caltrans)	48,214	67.5	48,254	67.5	0.0	60	No
Fairview Street, between I-405 SB Ramps and Baker Street (Costa Mesa)	53,203	68.1	53,243	68.1	0.0	60	No
Bear Street, between Segerstrom Avenue and MacArthur Boulevard (Santa Ana)	18,369	63.2	18,433	63.2	0.0	65	No
Bear Street, between MacArthur Blvd and Sunflower Avenue (Santa Ana/Costa Mesa)	19,428	63.7	19,453	63.8	0.0	60	No
Bear Street, between Sunflower Avenue and S. Coast Drive (Costa Mesa)	31,465	66.0	31,963	66.1	0.1	67.5	No
Bear Street, between S. Coast Drive and Paularino Avenue (Costa Mesa)	33,197	66.0	33,688	66.1	0.1	60	No
Bear Street, between Paularino Avenue and Baker Street (Costa Mesa)	41,750	66.7	41,997	66.7	0.0	60	No
S. Plaza Drive, between MacArthur Boulevard and Callen's Common (Santa Ana)	5,733	54.6	6,267	55.0	0.4	65	No
S. Plaza Drive, between Callen's Common and Sunflower Avenue (Santa Ana)	5,230	54.2	5,559	54.5	0.3	65	No
Bristol Street, between Segerstrom Avenue and MacArthur Boulevard (Santa Ana)	49,501	67.8	49,980	67.9	0.0	65	No
Bristol Street, between MacArthur Boulevard and Callen's Common (Santa Ana)	51,586	68.1	53,000	68.3	0.1	65	No
Bristol Street, between Callen's Common and Sunflower Avenue (Santa Ana)	50,098	67.9	51,128	68.0	0.1	65	No
Bristol Street, between Sunflower Avenue and Anton Boulevard (Costa Mesa)	55,366	68.7	57,176	68.8	0.1	67.5	No
Bristol Street, between Anton Boulevard and I-405 NB Ramps (Costa Mesa)	66,204	70.2	68,014	70.3	0.1	67.5	No
Bristol Street, between I-405 NB Ramps and I-405 SB Ramps (Costa Mesa/Caltrans)	66,353	69.3	67,767	69.4	0.1	67.5	No
Bristol Street, between I-405 SB Ramps and Paularino Avenue (Costa Mesa)	43,442	67.1	43,669	67.1	0.0	67.5	No
Bristol Street, between Paularino Avenue and Baker Street (Costa Mesa)	44,946	67.5	45,173	67.6	0.0	67.5	No
Flower Street, between Dyer Road and MacArthur Boulevard (Santa Ana)	16,661	61.5	16,724	61.5	0.0	65	No
Flower Street, between MacArthur Boulevard and Sunflower Avenue (Santa Ana)	10,384	59.5	10,409	59.5	0.0	65	No
Main Street, between Dyer Road and MacArthur Boulevard (Santa Ana)	34,075	67.3	34,100	67.3	0.0	65	No
Main Street, between MacArthur Boulevard and Sunflower Avenue (Santa Ana)	26,921	66.3	26,946	66.3	0.0	65	No

Table 19: Phase 1 Traffic Noise Levels

Roadway Segment	2030 Without Project		2030 With Project		Change	Normally Acceptable Standard	Significant Impact? [2]
	ADT	dBA CNEL [1]	ADT	dBA CNEL [1]			
Main Street, between Sunflower Avenue and Red Hill Avenue (Santa Ana/Irvine)	26,725	66.5	26,919	66.5	0.0	60	No
Segerstrom Avenue, between Fairview Street and Bear Street (Santa Ana)	23,274	64.3	23,363	64.3	0.0	65	No
Segerstrom Avenue, between Bear Street and Bristol Street (Santa Ana)	31,149	65.5	31,174	65.5	0.0	65	No
Segerstrom Avenue, between Bristol Street and Flower Street (Santa Ana)	25,316	64.6	25,422	64.6	0.0	65	No
Dyer Road, between Flower Street and Main Street (Santa Ana)	31,781	65.6	31,887	65.6	0.0	65	No
MacArthur Boulevard, between Fairview Street and Bear Street (Santa Ana)	34,265	66.2	34,376	66.2	0.0	65	No
MacArthur Boulevard, between Bear Street and S. Plaza Drive (Santa Ana)	41,699	67.1	41,821	67.1	0.0	65	No
MacArthur Boulevard, between S. Plaza Drive and Bristol Street (Santa Ana)	38,095	66.7	38,140	66.7	0.0	65	No
MacArthur Boulevard, between Bristol Street and Flower Street (Santa Ana)	41,462	67.0	42,441	67.1	0.1	65	No
MacArthur Boulevard, between Flower Street and Main Street (Santa Ana)	41,852	67.1	42,768	67.2	0.1	65	No
MacArthur Boulevard, between Main Street and SR-55 SB Ramps (Santa Ana)	54,572	68.3	55,488	68.4	0.1	65	No
MacArthur Boulevard, between SR-55 SB Ramps and SR-55 NB Ramps (Santa Ana/ Irvine/ Caltrans)	55,605	68.1	56,159	68.2	0.0	60	No
Sunflower Avenue, between Fairview Street and Bear Street (Santa Ana/Costa Mesa)	18,732	63.3	18,991	63.4	0.1	60	No
Sunflower Avenue, between Bear Street and S. Plaza Drive (Santa Ana/Costa Mesa)	32,185	66.1	32,716	66.2	0.1	65	No
Sunflower Avenue, between S. Plaza Drive and Bristol Street (Santa Ana/Costa Mesa)	31,199	65.8	32,428	66.0	0.2	65	No
Sunflower Avenue, between Bristol Street and Flower Street (Santa Ana/Costa Mesa)	25,581	66.1	25,775	66.1	0.0	65	No
Bristol Street, south of Baker Street (Santa Ana)	30,901	65.8	31,128	65.8	0.0	65	No

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

1. Traffic noise levels are at 100 feet from the roadway centerline. The actual sound level at any receptor location is dependent upon such factors as the source-to-receptor distance and the presence of intervening structures, barriers, and topography.
2. Potential impacts occur when the Project change exceeds the City's standards for increases in traffic noise (greater than 1.5 dBA increase for ambient noise environments of 65 dBA CNEL and higher; greater than 3 dBA increase for ambient noise environments of 60 to 64 CNEL; and greater than 5 dBA increase for ambient noise environments of less than 60 dBA CNEL).

Source: Based on traffic data within the *Traffic Circulation Analysis*, prepared by Linscott Law & Greenspan Engineers, 2022. Refer to Appendix B for traffic noise modeling assumptions and results.

Off-Site Phase 2 Traffic Noise

Based on the Traffic Circulation Analysis, Phase 2 of the proposed Project would result in approximately 4,458 daily trips. The Phase 2 Opening Year "2032 Without Project" and "2032 With Project" scenarios are compared in **Table 20: Phase 2 Traffic Noise Levels**. As shown in **Table 20**, roadway noise levels without the Project would range from 54.3 dBA CNEL to 70.2 dBA CNEL and with the Project between 54.6 dBA CNEL and 70.4 dBA CNEL. Project-generated traffic would result in a maximum increase of 0.5 dBA. In general, a 3-dBA increase in traffic noise is barely perceptible to people, while a 5-dBA increase is readily noticeable. **Table 20** shows that none of the roadway segments would exceed the City's standards for increases in traffic noise (greater than 1.5 dBA increase for ambient noise environments of 65 dBA CNEL and higher; greater than 3 dBA increase for ambient noise environments of 60 to 64 CNEL; and greater than 5 dBA increase for ambient noise environments of less than 60 dBA CNEL). Therefore, Phase 2 Opening Year traffic noise would result in a less than significant impact.

Table 20: Phase 2 Traffic Noise Levels

Roadway Segment	2032 Without Project		2032 With Project		Change	Normally Acceptable Standard	Significant Impact? [2]
	ADT	dBA CNEL [1]	ADT	dBA CNEL [1]			
Fairview Street, between Segerstrom Avenue and MacArthur Boulevard (Santa Ana)	64,039	70.0	64,064	70.0	0.0	65	No
Fairview Street, between MacArthur Boulevard and Sunflower Avenue (Santa Ana)	61,035	65.3	61,060	65.3	0.0	65	No
Fairview Street, between Sunflower Avenue and S. Coast Drive (Costa Mesa)	54,406	68.4	54,470	68.4	0.0	60	No
Fairview Street, between S. Coast Drive and I-405 NB Ramps (Costa Mesa)	65,077	68.8	65,184	68.8	0.0	60	No
Fairview Street, between I-405 NB Ramps and I-405 SB Ramps (Costa Mesa/Caltrans)	49,089	67.6	49,196	67.6	0.0	60	No
Fairview Street, between I-405 SB Ramps and Baker Street (Costa Mesa)	54,171	68.2	54,278	68.2	0.0	60	No
Bear Street, between Segerstrom Avenue and MacArthur Boulevard (Santa Ana)	18,709	63.2	18,876	63.3	0.0	65	No
Bear Street, between MacArthur Boulevard and Sunflower Avenue (Santa Ana/Costa Mesa)	19,788	63.8	19,813	63.8	0.0	60	No
Bear Street, between Sunflower Avenue and S. Coast Drive (Costa Mesa)	32,047	66.1	32,615	66.1	0.1	67.5	No
Bear Street, between S. Coast Drive and Paularino Avenue (Costa Mesa)	33,805	66.1	34,332	66.2	0.1	60	No
Bear Street, between Paularino Avenue and Baker Street (Costa Mesa)	42,516	66.8	42,799	66.8	0.0	60	No
S. Plaza Drive, between MacArthur Boulevard and Callen's Common (Santa Ana)	5,839	54.7	6,522	55.2	0.5	65	No

Table 20: Phase 2 Traffic Noise Levels

Roadway Segment	2032 Without Project		2032 With Project		Change	Normally Acceptable Standard	Significant Impact? [2]
	ADT	dBA CNEL [1]	ADT	dBA CNEL [1]			
S. Plaza Drive, between Callen's Common and Sunflower Avenue (Santa Ana)	5,327	54.3	5,761	54.6	0.3	65	No
Bristol Street, between Segerstrom Avenue and MacArthur Boulevard (Santa Ana)	50,387	67.9	51,395	68.0	0.1	65	No
Bristol Street, between MacArthur Boulevard and Callen's Common (Santa Ana)	52,509	68.2	55,126	68.4	0.2	65	No
Bristol Street, between Callen's Common and Sunflower Avenue (Santa Ana)	50,994	68.0	53,300	68.2	0.2	65	No
Bristol Street, between Sunflower Avenue and Anton Boulevard (Costa Mesa)	56,351	68.7	59,268	69.0	0.2	67.5	No
Bristol Street, between Anton Boulevard and I-405 NB Ramps (Costa Mesa)	67,335	70.2	70,252	70.4	0.2	67.5	No
Bristol Street, between I-405 NB Ramps and I-405 SB Ramps (Costa Mesa/Caltrans)	67,518	69.4	69,802	69.5	0.1	67.5	No
Bristol Street, between I-405 SB Ramps and Paularino Avenue (Costa Mesa)	44,227	67.2	44,616	67.2	0.0	67.5	No
Bristol Street, between Paularino Avenue and Baker Street (Costa Mesa)	45,759	67.6	46,148	67.7	0.0	67.5	No
Flower Street, between Dyer Road and MacArthur Boulevard (Santa Ana)	16,964	61.6	17,130	61.6	0.0	65	No
Flower Street, between MacArthur Boulevard and Sunflower Avenue (Santa Ana)	10,571	59.5	10,596	59.5	0.0	65	No
Main Street, between Dyer Road and MacArthur Boulevard (Santa Ana)	34,689	67.4	34,714	67.4	0.0	65	No
Main Street, between MacArthur Boulevard and Sunflower Avenue (Santa Ana)	27,400	66.4	27,425	66.4	0.0	65	No
Main Street, between Sunflower Avenue and Red Hill Avenue (Santa Ana/Irvine)	27,198	66.6	27,554	66.6	0.1	60	No
Segerstrom Avenue, between Fairview Street and Bear Street (Santa Ana)	23,699	64.3	23,994	64.4	0.1	65	No
Segerstrom Avenue, between Bear Street and Bristol Street (Santa Ana)	31,719	65.6	31,847	65.6	0.0	65	No
Segerstrom Avenue, between Bristol Street and Flower Street (Santa Ana)	25,780	64.7	25,989	64.7	0.0	65	No
Dyer Road, between Flower Street and Main Street (Santa Ana)	32,365	65.7	32,574	65.7	0.0	65	No

Table 20: Phase 2 Traffic Noise Levels

Roadway Segment	2032 Without Project		2032 With Project		Change	Normally Acceptable Standard	Significant Impact? [2]
	ADT	dBA CNEL [1]	ADT	dBA CNEL [1]			
MacArthur Boulevard, between Fairview Street and Bear Street (Santa Ana)	34,887	66.3	35,174	66.3	0.0	65	No
MacArthur Boulevard, between Bear Street and S. Plaza Drive (Santa Ana)	42,458	67.1	42,859	67.2	0.0	65	No
MacArthur Boulevard, between S. Plaza Drive and Bristol Street (Santa Ana)	38,787	66.7	39,373	66.8	0.1	65	No
MacArthur Boulevard, between Bristol Street and Flower Street (Santa Ana)	42,219	67.1	44,259	67.3	0.2	65	No
MacArthur Boulevard, between Flower Street and Main Street (Santa Ana)	42,619	67.2	44,494	67.3	0.2	65	No
MacArthur Boulevard, between Main Street and SR-55 SB Ramps (Santa Ana)	55,550	68.4	57,425	68.5	0.1	65	No
MacArthur Boulevard, between SR-55 SB Ramps and SR-55 NB Ramps (Santa Ana/Irvine/Caltrans)	56,615	68.2	57,729	68.3	0.1	60	No
Sunflower Avenue, between Fairview Street and Bear Street (Santa Ana/Costa Mesa)	19,053	63.4	19,345	63.4	0.1	60	No
Sunflower Avenue, between Bear Street and S. Plaza Drive (Santa Ana/Costa Mesa)	32,756	66.2	33,390	66.3	0.1	65	No
Sunflower Avenue, between S. Plaza Drive and Bristol Street (Santa Ana/Costa Mesa)	31,752	65.9	32,979	66.1	0.2	65	No
Sunflower Avenue, between Bristol Street and Flower Street (Santa Ana/Costa Mesa)	26,012	66.2	26,368	66.2	0.1	65	No
Bristol Street, south of Baker Street (Santa Ana)	31,457	65.9	31,846	65.9	0.1	65	No

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

1. Traffic noise levels are at 100 feet from the roadway centerline. The actual sound level at any receptor location is dependent upon such factors as the source-to-receptor distance and the presence of intervening structures, barriers, and topography.
2. Potential impacts occur when the Project change exceeds the City's standards for increases in traffic noise (greater than 1.5 dBA increase for ambient noise environments of 65 dBA CNEL and higher; greater than 3 dBA increase for ambient noise environments of 60 to 64 CNEL; and greater than 5 dBA increase for ambient noise environments of less than 60 dBA CNEL).

Source: Based on traffic data within the *Traffic Circulation Analysis*, prepared by Linscott Law & Greenspan Engineers, 2022. Refer to Appendix B for traffic noise modeling assumptions and results.

Off-Site Phase 3 Traffic Noise

Implementation of the Project would generate increased traffic volumes along nearby roadway segments. Based on the Traffic Circulation Analysis, Phase 3 of the proposed Project would result in approximately 6,062 daily trips. The Phase 3 Opening Year "2036 Without Project" and "2036 With Project" scenarios are compared in **Table 21: Phase 3 Traffic Noise Levels**. As shown in **Table 20**, roadway noise levels without the Project, would range from 54.6 dBA CNEL to 70.4 dBA CNEL and with the Project between 55.0 dBA CNEL and 70.6 dBA CNEL. Project generated traffic would result in a maximum increase of 0.4 dBA. In general, a 3-dBA increase in traffic noise is barely perceptible to people, while a 5-dBA increase is readily

noticeable. The table shows that none of the roadway segments would exceed the City's standards for increases in traffic noise (greater than 1.5 dBA increase for ambient noise environments of 65 dBA CNEL and higher; greater than 3 dBA increase for ambient noise environments of 60 to 64 CNEL; and greater than 5 dBA increase for ambient noise environments of less than 60 dBA CNEL). Therefore, Phase 3 Opening Year traffic noise would result in a less than significant impact.

Table 22: Phase 3 Traffic Noise Levels

Roadway Segment	2036 Without Project		2036 With Project		Change	Normally Acceptable Standard	Significant Impact? [2]
	ADT	dBA CNEL [1]	ADT	dBA CNEL[1]			
Fairview Street, between Segerstrom Avenue and MacArthur Boulevard (Santa Ana)	66,318	70.2	66,343	70.2	0.0	65	No
Fairview Street, between MacArthur Boulevard and Sunflower Avenue (Santa Ana)	63,196	65.4	63,221	65.4	0.0	65	No
Fairview Street, between Sunflower Avenue and S. Coast Drive (Costa Mesa)	56,339	68.5	56,403	68.5	0.0	60	No
Fairview Street, between S. Coast Drive and I-405 NB Ramps (Costa Mesa)	67,391	69.0	67,443	69.0	0.0	60	No
Fairview Street, between I-405 NB Ramps and I-405 SB Ramps (Costa Mesa/Caltrans)	50,825	67.8	50,877	67.8	0.0	60	No
Fairview Street, between I-405 SB Ramps and Baker Street (Costa Mesa)	56,092	68.3	56,144	68.3	0.0	60	No
Bear Street, between Segerstrom Avenue and MacArthur Boulevard (Santa Ana)	19,327	63.4	19,352	63.4	0.0	65	No
Bear Street, between MacArthur Boulevard and Sunflower Avenue (Santa Ana/Costa Mesa)	20,320	63.9	20,345	63.9	0.0	60	No
Bear Street, between Sunflower Avenue and S. Coast Drive (Costa Mesa)	33,258	66.2	33,718	66.3	0.1	67.5	No
Bear Street, between S. Coast Drive and Paularino Avenue (Costa Mesa)	35,091	66.3	35,564	66.3	0.1	60	No
Bear Street, between Paularino Avenue and Baker Street (Costa Mesa)	44,069	66.9	44,298	67.0	0.0	60	No
S. Plaza Drive, between MacArthur Boulevard and Callen's Common (Santa Ana)	6,314	55.0	6,742	55.3	0.3	65	No
S. Plaza Drive, between Callen's Common and Sunflower Avenue (Santa Ana)	5,744	54.6	6,242	55.0	0.4	65	No
Bristol Street, between Segerstrom Avenue and MacArthur Boulevard (Santa Ana)	52,195	68.1	53,086	68.1	0.1	65	No
Bristol Street, between MacArthur Boulevard and Callen's Common (Santa Ana)	54,449	68.4	57,194	68.6	0.2	65	No

Table 22: Phase 3 Traffic Noise Levels

Roadway Segment	2036 Without Project		2036 With Project		Change	Normally Acceptable Standard	Significant Impact? [2]
	ADT	dBA CNEL [1]	ADT	dBA CNEL[1]			
Bristol Street, between Callen's Common and Sunflower Avenue (Santa Ana)	52,880	68.2	55,336	68.4	0.2	65	No
Bristol Street, between Sunflower Avenue and Anton Boulevard (Costa Mesa)	59,000	68.9	62,422	69.2	0.2	67.5	No
Bristol Street, between Anton Boulevard and I-405 NB Ramps (Costa Mesa)	70,275	70.4	73,697	70.6	0.2	67.5	No
Bristol Street, between I-405 NB Ramps and I-405 SB Ramps (Costa Mesa/Caltrans)	70,211	69.5	72,873	69.7	0.2	67.5	No
Bristol Street, between I-405 SB Ramps and Paularino Avenue (Costa Mesa)	45,846	67.3	46,231	67.4	0.0	67.5	No
Bristol Street, between Paularino Avenue and Baker Street (Costa Mesa)	47,434	67.8	47,819	67.8	0.0	67.5	No
Flower Street, between Dyer Road and MacArthur Boulevard (Santa Ana)	17,530	61.7	17,587	61.7	0.0	65	No
Flower Street, between MacArthur Boulevard and Sunflower Avenue (Santa Ana)	10,944	59.7	10,969	59.7	0.0	65	No
Main Street, between Dyer Road and MacArthur Boulevard (Santa Ana)	35,916	67.5	35,941	67.5	0.0	65	No
Main Street, between MacArthur Boulevard and Sunflower Avenue (Santa Ana)	28,357	66.5	28,382	66.5	0.0	65	No
Main Street, between Sunflower Avenue and Red Hill Avenue (Santa Ana/Irvine)	28,191	66.7	28,543	66.8	0.1	60	No
Segerstrom Avenue, between Fairview Street and Bear Street (Santa Ana)	24,468	64.5	24,545	64.5	0.0	65	No
Segerstrom Avenue, between Bear Street and Bristol Street (Santa Ana)	32,880	65.8	33,008	65.8	0.0	65	No
Segerstrom Avenue, between Bristol Street and Flower Street (Santa Ana)	26,667	64.9	26,767	64.9	0.0	65	No
Dyer Road, between Flower Street and Main Street (Santa Ana)	33,492	65.9	33,592	65.9	0.0	65	No
MacArthur Boulevard, between Fairview Street and Bear Street (Santa Ana)	36,005	66.4	36,030	66.4	0.0	65	No
MacArthur Boulevard, between Bear Street and S. Plaza Drive (Santa Ana)	43,976	67.3	44,001	67.3	0.0	65	No
MacArthur Boulevard, between S. Plaza Drive and Bristol Street (Santa Ana)	40,435	66.9	40,737	67.0	0.0	65	No
MacArthur Boulevard, between Bristol Street and Flower Street (Santa Ana)	44,014	67.3	46,188	67.5	0.2	65	No

Table 22: Phase 3 Traffic Noise Levels

Roadway Segment	2036 Without Project		2036 With Project		Change	Normally Acceptable Standard	Significant Impact? [2]
	ADT	dBA CNEL [1]	ADT	dBA CNEL[1]			
MacArthur Boulevard, between Flower Street and Main Street (Santa Ana)	44,515	67.3	46,632	67.5	0.2	65	No
MacArthur Boulevard, between Main Street and SR-55 SB Ramps (Santa Ana)	57,870	68.5	59,987	68.7	0.2	65	No
MacArthur Boulevard, between SR-55 SB Ramps and SR-55 NB Ramps (Santa Ana/Irvine/Caltrans)	58,839	68.4	60,072	68.5	0.1	60	No
Sunflower Avenue, between Fairview Street and Bear Street (Santa Ana/ Costa Mesa)	19,706	63.5	19,998	63.6	0.1	60	No
Sunflower Avenue, between Bear Street and S. Plaza Drive (Santa Ana/ Costa Mesa)	34,478	66.4	35,003	66.5	0.1	65	No
Sunflower Avenue, between S. Plaza Drive and Bristol Street (Santa Ana/ Costa Mesa)	33,676	66.2	35,255	66.4	0.2	65	No
Sunflower Avenue, between Bristol Street and Flower Street (Santa Ana/ Costa Mesa)	26,923	66.3	27,275	66.4	0.1	65	No
Bristol Street, south of Baker Street (Santa Ana)	32,615	66.0	33,000	66.1	0.1	65	No

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

1. Traffic noise levels are at 100 feet from the roadway centerline. The actual sound level at any receptor location is dependent upon such factors as the source-to-receptor distance and the presence of intervening structures, barriers, and topography.
2. Potential impacts occur when the Project change exceeds the City's standards for increases in traffic noise (greater than 1.5 dBA increase for ambient noise environments of 65 dBA CNEL and higher; greater than 3 dBA increase for ambient noise environments of 60 to 64 CNEL; and greater than 5 dBA increase for ambient noise environments of less than 60 dBA CNEL).

Source: Based on traffic data within the *Traffic Circulation Analysis*, prepared by Linscott Law & Greenspan Engineers, 2022. Refer to Appendix B for traffic noise modeling assumptions and results.

Off-Site Horizon Year (Phase 1 Plus Phase 2 Plus Phase 3) Traffic Noise

The Horizon Year "2045 Without Project" and "2045 Plus Project" scenarios were also compared. As shown in **Table 23: Horizon Year (Phase 1 Plus Phase 2 Plus Phase 3) Traffic Noise Levels**, roadway noise levels would range between 54.6 dBA CNEL and 70.6 dBA CNEL at 100 feet from the centerline without the Project and between 55.0 dBA CNEL and 70.8 dBA CNEL with the Project. The Project would result in a maximum increase of 0.4 dBA. In general, a 3-dBA increase in traffic noise is barely perceptible to people, while a 5-dBA increase is readily noticeable. **Table 23** shows that none of the roadway segments would exceed the City's standards for increases in traffic noise (greater than 1.5 dBA increase for ambient noise environments of 65 dBA CNEL and higher; greater than 3 dBA increase for ambient noise environments of 60 to 64 CNEL; and greater than 5 dBA increase for ambient noise environments of less than 60 dBA CNEL). Therefore, Horizon Year 2045 traffic noise would result in a less than significant impact.

As discussed above, operation of the Project would not result in significant noise impacts.

Table 23: Horizon Year (Phase 1 Plus Phase 2 Plus Phase 3) Traffic Noise Levels

Roadway Segment	2045 Without Project		2045 With Project		Change	Normally Acceptable Standard	Significant Impact? [2]
	ADT	dBA CNEL [1]	ADT	dBA CNEL [1]			
Fairview Street, between Segerstrom Avenue and MacArthur Boulevard (Santa Ana)	69,634	70.4	69,659	70.4	0.0	65	No
Fairview Street, between MacArthur Boulevard and Sunflower Avenue (Santa Ana)	66,356	65.6	66,381	65.6	0.0	65	No
Fairview Street, between Sunflower Avenue and S. Coast Drive (Costa Mesa)	59,156	68.7	59,220	68.7	0.0	60	No
Fairview Street, between S. Coast Drive and I-405 NB Ramps (Costa Mesa)	70,761	69.2	70,813	69.2	0.0	60	No
Fairview Street, between I-405 NB Ramps and I-405 SB Ramps (Costa Mesa/Caltrans)	53,366	68.0	53,418	68.0	0.0	60	No
Fairview Street, between I-405 SB Ramps and Baker Street (Costa Mesa)	58,897	68.5	58,949	68.5	0.0	60	No
Bear Street, between Segerstrom Avenue and MacArthur Boulevard (Santa Ana)	20,293	63.6	20,318	63.6	0.0	65	No
Bear Street, between MacArthur Boulevard and Sunflower Avenue (Santa Ana/Costa Mesa)	21,336	64.2	21,361	64.2	0.0	60	No
Bear Street, between Sunflower Avenue and S. Coast Drive (Costa Mesa)	34,921	66.4	35,381	66.5	0.1	67.5	No
Bear Street, between S. Coast Drive and Paularino Avenue (Costa Mesa)	36,846	66.5	37,319	66.6	0.1	60	No
Bear Street, between Paularino Avenue and Baker Street (Costa Mesa)	46,272	67.1	46,501	67.2	0.0	60	No
S. Plaza Drive, between MacArthur Boulevard and Callen's Common (Santa Ana)	6,630	55.2	7,058	55.5	0.3	65	No
S. Plaza Drive, between Callen's Common and Sunflower Avenue (Santa Ana)	5,780	54.6	6,278	55.0	0.4	65	No
Bristol Street, between Segerstrom Avenue and MacArthur Boulevard (Santa Ana)	54,805	68.3	55,696	68.3	0.1	65	No
Bristol Street, between MacArthur Boulevard and Callen's Common (Santa Ana)	57,171	68.6	59,916	68.8	0.2	65	No
Bristol Street, between Callen's Common and Sunflower Avenue (Santa Ana)	55,524	68.4	57,980	68.6	0.2	65	No
Bristol Street, between Sunflower Avenue and Anton Boulevard (Costa Mesa)	61,950	69.2	65,372	69.4	0.2	67.5	No

Table 23: Horizon Year (Phase 1 Plus Phase 2 Plus Phase 3) Traffic Noise Levels

Roadway Segment	2045 Without Project		2045 With Project		Change	Normally Acceptable Standard	Significant Impact? [2]
	ADT	dBA CNEL [1]	ADT	dBA CNEL [1]			
Bristol Street, between Anton Boulevard and I-405 NB Ramps (Costa Mesa)	73,789	70.6	77,211	70.8	0.2	67.5	No
Bristol Street, between I-405 NB Ramps and I-405 SB Ramps (Costa Mesa/Caltrans)	73,722	69.8	76,384	69.9	0.2	67.5	No
Bristol Street, between I-405 SB Ramps and Paularino Avenue (Costa Mesa)	48,138	67.6	48,523	67.6	0.0	67.5	No
Bristol Street, between Paularino Avenue and Baker Street (Costa Mesa)	49,806	68.0	50,191	68.0	0.0	67.5	No
Flower Street, between Dyer Road and MacArthur Boulevard (Santa Ana)	18,407	61.9	18,464	62.0	0.0	65	No
Flower Street, between MacArthur Boulevard and Sunflower Avenue (Santa Ana)	11,491	59.9	11,516	59.9	0.0	65	No
Main Street, between Dyer Road and MacArthur Boulevard (Santa Ana)	37,712	67.7	37,737	67.7	0.0	65	No
Main Street, between MacArthur Boulevard and Sunflower Avenue (Santa Ana)	29,775	66.7	29,800	66.8	0.0	65	No
Main Street, between Sunflower Avenue and Red Hill Avenue (Santa Ana/Irvine)	29,601	66.9	29,953	67.0	0.1	60	No
Segerstrom Avenue, between Fairview Street and Bear Street (Santa Ana)	24,629	64.5	24,706	64.5	0.0	65	No
Segerstrom Avenue, between Bear Street and Bristol Street (Santa Ana)	34,524	66.0	34,652	66.0	0.0	65	No
Segerstrom Avenue, between Bristol Street and Flower Street (Santa Ana)	27,540	65.0	27,640	65.0	0.0	65	No
Dyer Road, between Flower Street and Main Street (Santa Ana)	34,666	66.0	34,766	66.0	0.0	65	No
MacArthur Boulevard, between Fairview Street and Bear Street (Santa Ana)	37,805	66.6	37,830	66.6	0.0	65	No
MacArthur Boulevard, between Bear Street and S. Plaza Drive (Santa Ana)	46,175	67.5	46,200	67.5	0.0	65	No
MacArthur Boulevard, between S. Plaza Drive and Bristol Street (Santa Ana)	42,457	67.1	42,759	67.2	0.0	65	No
MacArthur Boulevard, between Bristol Street and Flower Street (Santa Ana)	46,215	67.5	48,389	67.7	0.2	65	No
MacArthur Boulevard, between Flower Street and Main Street (Santa Ana)	46,741	67.6	48,858	67.8	0.2	65	No
MacArthur Boulevard, between Main Street and SR-55 SB Ramps (Santa Ana)	60,764	68.8	62,881	68.9	0.1	65	No
MacArthur Boulevard, between SR-55 SB Ramps and SR-55 NB Ramps (Santa Ana/Irvine/Caltrans)	71,625	69.2	72,858	69.3	0.1	60	No

Table 23: Horizon Year (Phase 1 Plus Phase 2 Plus Phase 3) Traffic Noise Levels

Roadway Segment	2045 Without Project		2045 With Project		Change	Normally Acceptable Standard	Significant Impact? [2]
	ADT	dBA CNEL [1]	ADT	dBA CNEL [1]			
Sunflower Avenue, between Fairview Street and Bear Street (Santa Ana/Costa Mesa)	20,691	63.7	20,983	63.8	0.1	60	No
Sunflower Avenue, between Bear Street and S. Plaza Drive (Santa Ana/Costa Mesa)	36,202	66.6	36,727	66.7	0.1	65	No
Sunflower Avenue, between S. Plaza Drive and Bristol Street (Santa Ana/Costa Mesa)	35,360	66.4	36,939	66.6	0.2	65	No
Sunflower Avenue, between Bristol Street and Flower Street (Santa Ana/Costa Mesa)	28,269	66.5	28,621	66.6	0.1	65	No
Bristol Street, south of Baker Street (Santa Ana)	34,246	66.2	34,631	66.3	0.0	65	No

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

1. Traffic noise levels are at 100 feet from the roadway centerline. The actual sound level at any receptor location is dependent upon such factors as the source-to-receptor distance and the presence of intervening structures, barriers, and topography.
2. Potential impacts occur when the Project change exceeds the City's standards for increases in traffic noise (greater than 1.5 dBA increase for ambient noise environments of 65 dBA CNEL and higher; greater than 3 dBA increase for ambient noise environments of 60 to 64 CNEL; and greater than 5 dBA increase for ambient noise environments of less than 60 dBA CNEL).

Source: Based on traffic data within the *Traffic Circulation Analysis*, prepared by Linscott Law & Greenspan Engineers, 2022. Refer to Appendix B for traffic noise modeling assumptions and results.

On-Site Noise

The California Supreme Court in a December 2015 opinion (*California Building Industry Association v. Bay Area Air Quality Management District,* 62 Cal. 4th 369 [No. S 213478]) confirmed that CEQA, with several specific exceptions, is concerned with the impacts of a project on the environment, not the effects the existing environment may have on a project. Therefore, this section is not required under CEQA and is included for informational purposes only. The evaluation of the significance of project impacts in the following discussion is provided to ensure compliance with City and State Building Code noise standards.

Future residents at the project site would be exposed to mobile traffic noise along Bristol Street, MacArthur Boulevard, Sunflower Avenue, and Plaza Drive. **Table 23** shows that noise levels along these roadways would be up to 68.8 dBA (along Bristol Street from MacArthur Boulevard to Callen's Common) at 100 feet from the roadway centerline. At 70 feet, traffic noise would be approximately 71 dBA. Therefore, the proposed residences at the project site have the potential to exceed the City's 65 dBA exterior and 45 dBA interior noise standards (based on an outdoor to indoor attenuation rate of 25 dB[26]).

General Plan Noise Element Policy 1.1 requires noise levels to be considered in land use planning decisions to prevent future noise and land use incompatibilities. At the discretion of the Santa Ana Planning and Building Agency, considerations may include, but not necessarily be limited to, standards that specify acceptable noise limits for various land uses, noise-reduction features, acoustical design in new construction, and enforcement of the California Uniform Building Code and City provisions for indoor and outdoor noise levels. **MM NOI-2** is required to ensure compliance with General Plan Noise Element Policy

[26] U.S. EPA, *Protective Noise Levels*, November 1978.

1.1 which requires a detailed acoustical study demonstrating that all residential units would meet the City's 65 dBA exterior and 45 dBA interior noise standards by incorporating applicable noise reduction features. Compliance with **MM NOI-2** would result in a less than significant impact.

Mitigation Measures:

General Plan Update Mitigation Measures

GP MM N-1 Construction contractors shall implement the following measures for construction activities conducted in the City of Santa Ana. Construction plans submitted to the City shall identify these measures on demolition, grading, and construction plans submitted to the City: The City of Santa Ana Planning and Building Agency shall verify that grading, demolition, and/or construction plans submitted to the City include these notations prior to issuance of demolition, grading, and/or building permits.

- Construction activity is limited to the hours: Between 7 AM to 8 PM Monday through Saturday, as prescribed in Municipal Code Section 18-314(e). Construction is prohibited on Sundays.
- During the entire active construction period, equipment and trucks used for project construction shall use the best-available noise control techniques (e.g., improved mufflers, equipment re-design, use of intake silencers, ducts, engine enclosures, and acoustically attenuating shields or shrouds), wherever feasible.
- Impact tools (e.g., jack hammers and hoe rams) shall be hydraulically or electrically powered wherever possible. Where the use of pneumatic tools is unavoidable, an exhaust muffler on the compressed air exhaust shall be used along with external noise jackets on the tools.
- Stationary equipment, such as generators and air compressors shall be located as far as feasible from nearby noise-sensitive uses.
- Stockpiling shall be located as far as feasible from nearby noise-sensitive receptors.
- Construction traffic shall be limited, to the extent feasible, to approved haul routes established by the City Planning and Building Agency.
- At least 10 days prior to the start of construction activities, a sign shall be posted at the entrance(s) to the job site, clearly visible to the public, that includes permitted construction days and hours, as well as the telephone numbers of the City's and contractor's authorized representatives that are assigned to respond in the event of a noise or vibration complaint. If the authorized contractor's representative receives a complaint, he/she shall investigate, take appropriate corrective action, and report the action to the City.
- Signs shall be posted at the job site entrance(s), within the on-site construction zones, and along queueing lanes (if any) to reinforce the prohibition of unnecessary engine idling. All other equipment shall be turned off if not in use for more than 5 minutes.
- During the entire active construction period and to the extent feasible, the use of noise-producing signals, including horns, whistles, alarms, and bells, shall be for safety warning purposes only. The construction manager shall use smart back-up

alarms, which automatically adjust the alarm level based on the background noise level or switch off back-up alarms and replace with human spotters in compliance with all safety requirements and laws.

- Erect temporary noise barriers (at least as high as the exhaust of equipment and breaking line-of-sight between noise sources and sensitive receptors), as necessary and feasible, to maintain construction noise levels at or below the performance standard of 80 dBA Leq. Barriers shall be constructed with a solid material that has a density of at least 4 pounds per square foot with no gaps from the ground to the top of the barrier.

Project Specific Mitigation Measures

MM NOI-1 Prior to the issuance of construction/grading permits, the Project Applicant shall obtain a permit to complete work outside the standard construction hours outlined in Santa Ana Municipal Code Section 18-314(e). In addition, the Project Applicant and/or contractor(s) shall develop a nighttime construction noise control plan that requires the following:

Stationary equipment such as generators and air compressors shall adhere to the following:

- Stationary equipment (e.g., generators, air compressors, etc.) shall be located 300 feet or more away from residences.
- Stationary equipment shall be surrounded with noise barriers to achieve a minimum 10 dBA reduction. Alternatively, a temporary noise barrier may be used along the property line.

Mobile equipment such as concrete mixer trucks, pump trucks shall adhere to the following:

- The nighttime noise control plan shall prohibit mobile equipment and trucks from operating within the following distances to off-site sensitive receptors:
  - **Phase 1**: Trucks and equipment shall be 140 feet or more away from the Versailles residences along Plaza Drive.
  - **Phase 2**: No minimum distance required (Phase 2 is 410 feet from sensitive receptors and would not exceed thresholds).
  - **Phase 3**: Trucks and equipment shall be 150 feet or more away from the Versailles residences along Plaza Drive.
- The nighttime noise control plan shall prohibit mobile equipment and trucks from operating within the following distances to on-site sensitive receptors:
  - **Phase 1**: No minimum distance is required because no on-site receptors would be constructed prior to Phase 1.
  - **Phase 2**: Trucks and equipment shall be 150 feet or more away from Phase 1 on-site residences.
  - **Phase 3**: Trucks and equipment shall be 170 feet or more away from Phase 1 and Phase 2 on-site residences.

MM NOI-2 Prior to issuance of building permits for Phase 1, Phase 2, and Phase 3, a detailed acoustical study based on architectural plans shall be prepared by a qualified acoustical consultant to demonstrate compliance with General Plan Noise Element Policy 1.1. The acoustical study shall be submitted to the City's Planning and Building Agency to demonstrate that all residential units would meet the City's 65 dBA exterior noise standard and 45 dBA interior noise standard to the satisfaction of the Planning and Building Agency Executive Director. This mitigation measure complies with the applicable sections of the California Building Code (Title 24 of the California Code of Regulations). The necessary noise reduction may be achieved by implementing noise control measures at the receiver locations. The required noise attenuation measures shall be incorporated into the applicable building plans and specifications.

Level of Significance: Less than significant impact.

Threshold 6.2 Would the Project generate excessive groundborne vibration or groundborne noise levels?

Construction Vibration

Construction can generate varying degrees of ground vibration, depending on the construction procedures and equipment. Operation of construction equipment generates vibrations that spread through the ground and diminish with distance from the source. Construction on the project site would have the potential to result in varying degrees of temporary groundborne vibration, depending on the specific construction equipment used and the operations involved.

The FTA has published standard vibration velocities for construction equipment operations. In general, the FTA architectural damage criterion for continuous vibrations (i.e., 0.2 in/sec) appears to be conservative. The types of construction vibration impacts include human annoyance and building damage. Human annoyance occurs when construction vibration rises significantly above the threshold of human perception for extended periods of time. Building damage can be cosmetic or structural. Ordinary buildings that are not particularly fragile would not experience any cosmetic damage (e.g., plaster cracks) at distances beyond 30 feet. This distance can vary substantially depending on the soil composition and underground geological layer between vibration source and receiver. In addition, not all buildings respond similarly to vibration generated by construction equipment. For example, for a building that is constructed with reinforced concrete with no plaster, the FTA guidelines show that a vibration level of up to 0.20 in/sec is considered safe and would not result in any construction vibration damage.

In addition, Transportation and Construction Vibration Guidance Manual prepared by California Department of Transportation (Caltrans)[27], has identified vibration at the level of 0.04 in/sec PPV is barely perceptible and would be considered as annoyance threshold.

Table 24: Typical Construction Equipment Vibration Levels, lists vibration levels at 25 feet for typical construction equipment. Vibration levels at 50 feet, the distance from the Project boundary to the nearest existing structure (Regency Theatres) is also included in **Table 24**. Groundborne vibration generated by construction equipment spreads through the ground and diminishes in magnitude with increases in distance. As indicated in **Table 24**, based on FTA data, vibration velocities from typical heavy construction

[27] California Department of Transportation, *Transportation and Construction Vibration Guidance Manual*, April 2022.

equipment operations that would be used during Project construction range from 0.003 to 0.089 in/sec PPV at 25 feet from the source of activity.

Table 24: Typical Construction Equipment Vibration Levels

Equipment	Peak Particle Velocity at 25 Feet (in/sec)	Peak Particle Velocity at 50 Feet (in/sec)[1]	Peak Particle Velocity at 100 Feet (in/sec)[1]
Large Bulldozer	0.089	0.0315	0.011
Caisson Drilling	0.089	0.0315	0.011
Loaded Trucks	0.076	0.0269	0.010
Jackhammer	0.035	0.0124	0.004
Small Bulldozer/Tractors	0.003	0.0011	0.0001

1. Calculated using the following formula: $PPV_{equip} = PPV_{ref} \times (25/D)^{1.5}$, where: PPV_{equip} = the peak particle velocity in in/sec of the equipment adjusted for the distance; PPV_{ref} = the reference vibration level in in/sec from Table 7-4 of the Federal Transit Administration, *Transit Noise and Vibration Impact Assessment Manual*, 2018; D = the distance from the equipment to the receiver.

Source: Federal Transit Administration, *Transit Noise and Vibration Impact Assessment Manual*, 2018.

In addition to the Regency Theater, located approximately 50 feet from the Project, the nearest on-site and off-site structures to the Project construction site would be approximately 50 and 100 feet away from the nearest point of construction, respectively. On-site structures would be the existing buildings and the future buildings that would be developed by the Project. **Table 24** shows that at 50 feet the vibration velocities from construction equipment would not exceed 0.0315 in/sec PPV, which is below the Caltrans' 0.04 in/sec PPV threshold for annoyance and FTA's 0.20 in/sec PPV threshold for building damage. Vibration levels would be lower at off-site structures (100 feet away or more). It is also acknowledged that construction activities would occur throughout the project site and would not be concentrated at the point closest to the nearest structure. Therefore, vibration impacts associated with Project construction would be less than significant.

Operational Vibration

Once operational, the Project would not be a significant source of groundborne vibration. Groundborne vibration surrounding the Project currently result from heavy-duty vehicular travel (e.g., refuse trucks, heavy duty trucks, delivery trucks, and transit buses) on the nearby local roadways. Operations of the proposed Project would include activities associated with residential development that typically would not cause excessive ground-borne vibrations. Due to the rapid drop-off rate of groundborne vibration and the short duration of the associated events, vehicular traffic-induced groundborne vibration is rarely perceptible beyond the roadway right-of-way, and rarely results in vibration levels that cause damage to buildings in the vicinity. According to the FTA Noise and Vibration Manual, trucks rarely create vibration levels that exceed 70 VdB (equivalent to 0.012 in/sec PPV) when they are on roadways. Therefore, automobiles accessing the project site or traveling along surrounding roadways would not exceed FTA thresholds for building damage or annoyance. Impacts would be less than significant in this regard.

Mitigation Measures: No mitigation is required.

Level of Significance: Less than significant impact.

Threshold 6.3 For a Project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the Project expose people residing or working in the Project area to excessive noise levels?

The nearest airport to the project site is the John Wayne Airport located approximately 1.4 miles to the southeast. Although the project site is within 2.0 miles of a public airport, a review of the John Wayne Airport Land Use Plan[28] shows the project site is not located within any noise impact zones. According to the City of Santa Ana Airport Land Use Commission Airport Environs (2008), the project site is outside of the airport's 65 dBA CNEL noise contour. Additionally, there are no private airstrips near the project site. Therefore, the Project would not expose people residing or working in the area to excessive airport- or airstrip-related noise levels and no mitigation is required.

Mitigation Measures: No mitigation is required.

Level of Significance: Less than significant impact.

6.2 Cumulative Noise Impacts

Cumulative Construction Noise

The Project's construction activities would not result in a substantial temporary increase in ambient noise levels. Construction noise would be periodic and temporary noise impacts that would cease upon completion of construction activities. The Project would contribute to other proximate construction project noise impacts if construction activities were conducted concurrently. However, based on the noise analysis above, the Project's construction-related noise impacts would be less than significant following the City of Santa Ana's Municipal Code.

Construction activities at other planned and approved projects near the project site would be required to comply with applicable City rules related to noise and would take place during daytime hours on the days permitted by the applicable Municipal Code, and projects requiring discretionary City approvals would be required to evaluate construction noise impacts, comply with the City's standard conditions of approval, and implement mitigation, if necessary, to minimize noise impacts. Construction noise impacts are by nature localized. Based on the fact that noise dissipates as it travels away from its source, noise impacts would be limited to the project site and vicinity. Therefore, Project construction would not result in a cumulatively considerable contribution to significant cumulative impacts, assuming such a cumulative impact existed, and impacts in this regard are not cumulatively considerable.

Cumulative Operational Noise

Cumulative Off-Site Traffic Noise

Cumulative noise impacts describe how much noise levels are projected to increase over existing conditions with the development of the proposed Project and other foreseeable projects. Cumulative noise impacts would occur primarily as a result of increased traffic on local roadways due to buildout of the proposed Project and other projects in the vicinity. Cumulative increases in traffic noise levels were estimated by comparing the Existing and Horizon Year Without Project scenarios to the Horizon Year Plus Project scenario. The traffic analysis considers cumulative traffic from future growth assumed in the transportation model, as well as cumulative projects.

[28] John Wayne Airport, *Airport Land Use Plan*, 2008.

A project's contribution to a cumulative traffic noise increase would be considered significant when the City's standards for increases in traffic noise are exceeded (greater than 1.5 dBA increase for ambient noise environments of 65 dBA CNEL and higher; greater than 3 dBA increase for ambient noise environments of 60 to 64 CNEL; and greater than 5 dBA increase for ambient noise environments of less than 60 dBA CNEL).

Table 25: Cumulative Off-Site Traffic Noise Levels identifies the traffic noise effects along roadway segments in the Project vicinity for "Existing," "Horizon Year Without Project," and "Horizon Year With Project," conditions, including incremental and net cumulative impacts.

Table 25: Cumulative Off-Site Traffic Noise Levels

Roadway Segment	Existing dBA CNEL	Horizon Year Without Project[1] dBA CNEL	Horizon Year With Project[1] dBA CNEL	Difference In dBA Between Existing and Horizon Year With Project	Difference In dBA Between Horizon Year Without Project and Horizon Year With Project	Land Use Threshold dBA CNEL	Cumulatively Significant Impact?[2]
Fairview Street, between Segerstrom Avenue and MacArthur Boulevard (Santa Ana)	69.5	70.4	70.4	0.9	0.0	65	No
Fairview Street, between MacArthur Boulevard and Sunflower Avenue (Santa Ana)	64.7	65.6	65.6	0.9	0.0	65	No
Fairview Street, between Sunflower Avenue and S. Coast Drive (Costa Mesa)	67.8	68.7	68.7	0.9	0.0	60	No
Fairview Street, between S. Coast Drive and I-405 NB Ramps (Costa Mesa)	68.3	69.2	69.2	0.8	0.0	60	No
Fairview Street, between I-405 NB Ramps and I-405 SB Ramps (Costa Mesa/Caltrans)	67.1	68.0	68.0	0.9	0.0	60	No
Fairview Street, between I-405 SB Ramps and Baker Street (Costa Mesa)	67.7	68.5	68.5	0.9	0.0	60	No
Bear Street, between Segerstrom Avenue and MacArthur Boulevard (Santa Ana)	62.8	63.6	63.6	0.8	0.0	65	No
Bear Street, between MacArthur Boulevard and Sunflower Avenue (Santa Ana/Costa Mesa)	63.4	64.2	64.2	0.7	0.0	60	No
Bear Street, between Sunflower Avenue and S. Coast Drive (Costa Mesa)	65.7	66.4	66.5	0.8	0.1	67.5	No
Bear Street, between S. Coast Drive and Paularino Avenue (Costa Mesa)	65.7	66.5	66.6	0.9	0.1	60	No
Bear Street, between Paularino Avenue and Baker Street (Costa Mesa)	66.3	67.1	67.2	0.8	0.0	60	No

Table 25: Cumulative Off-Site Traffic Noise Levels

Roadway Segment	Existing dBA CNEL	Horizon Year Without Project[1] dBA CNEL	Horizon Year With Project[1] dBA CNEL	Difference In dBA Between Existing and Horizon Year With Project	Difference In dBA Between Horizon Year Without Project and Horizon Year With Project	Land Use Threshold dBA CNEL	Cumulatively Significant Impact?[2]
S. Plaza Drive, between MacArthur Boulevard and Callen's Common (Santa Ana)	54.3	55.2	55.5	1.2	0.3	65	No
S. Plaza Drive, between Callen's Common and Sunflower Avenue (Santa Ana)	53.9	54.6	55.0	1.1	0.4	65	No
Bristol Street, between Segerstrom Avenue and MacArthur Boulevard (Santa Ana)	67.4	68.3	68.3	1.0	0.0	65	No
Bristol Street, between MacArthur Boulevard and Callen's Common (Santa Ana)	67.7	68.6	68.8	1.1	0.2	65	No
Bristol Street, between Callen's Common and Sunflower Avenue (Santa Ana)	67.5	68.4	68.6	1.1	0.2	65	No
Bristol Street, between Sunflower Avenue and Anton Boulevard (Costa Mesa)	68.2	69.2	69.4	1.2	0.2	67.5	No
Bristol Street, between Anton Boulevard and I-405 NB Ramps (Costa Mesa)	69.5	70.6	70.8	1.4	0.2	67.5	No
Bristol Street, between I-405 NB Ramps and I-405 SB Ramps (Costa Mesa/Caltrans)	68.7	69.8	69.9	1.2	0.2	67.5	No
Bristol Street, between I-405 SB Ramps and Paularino Avenue (Costa Mesa)	66.7	67.6	67.6	0.9	0.0	67.5	No
Bristol Street, between Paularino Avenue and Baker Street (Costa Mesa)	67.1	68.0	68.0	0.9	0.0	67.5	No
Flower Street, between Dyer Road and MacArthur Boulevard (Santa Ana)	61.1	61.9	62.0	0.9	0.0	65	No
Flower Street, between MacArthur Boulevard and Sunflower Avenue (Santa Ana)	59.0	59.9	59.9	0.9	0.0	65	No
Main Street, between Dyer Road and MacArthur Boulevard (Santa Ana)	66.9	67.7	67.7	0.9	0.0	65	No
Main Street, between MacArthur Boulevard and Sunflower Avenue (Santa Ana)	65.8	66.7	66.8	1.0	0.0	65	No
Main Street, between Sunflower Avenue and Red Hill Avenue (Santa Ana/Irvine)	65.9	66.9	67.0	1.0	0.1	60	No

Table 25: Cumulative Off-Site Traffic Noise Levels

Roadway Segment	Existing dBA CNEL	Horizon Year Without Project[1] dBA CNEL	Horizon Year With Project[1] dBA CNEL	Difference In dBA Between Existing and Horizon Year With Project	Difference In dBA Between Horizon Year Without Project and Horizon Year With Project	Land Use Threshold dBA CNEL	Cumulatively Significant Impact?[2]
Segerstrom Avenue, between Fairview Street and Bear Street (Santa Ana)	63.9	64.5	64.5	0.7	0.0	65	No
Segerstrom Avenue, between Bear Street and Bristol Street (Santa Ana)	65.1	66.0	66.0	0.8	0.0	65	No
Segerstrom Avenue, between Bristol Street and Flower Street (Santa Ana)	64.2	65.0	65.0	0.8	0.0	65	No
Dyer Road, between Flower Street and Main Street (Santa Ana)	65.3	66.0	66.0	0.8	0.0	65	No
MacArthur Boulevard, between Fairview Street and Bear Street (Santa Ana)	65.8	66.6	66.6	0.9	0.0	65	No
MacArthur Boulevard, between Bear Street and S. Plaza Drive (Santa Ana)	66.7	67.5	67.5	0.9	0.0	65	No
MacArthur Boulevard, between S. Plaza Drive and Bristol Street (Santa Ana)	66.3	67.1	67.2	0.9	0.0	65	No
MacArthur Boulevard, between Bristol Street and Flower Street (Santa Ana)	66.6	67.5	67.7	1.1	0.2	65	No
MacArthur Boulevard, between Flower Street and Main Street (Santa Ana)	66.7	67.6	67.8	1.1	0.2	65	No
MacArthur Boulevard, between Main Street and SR-55 SB Ramps (Santa Ana)	67.8	68.8	68.9	1.1	0.1	65	No
MacArthur Boulevard, between SR-55 SB Ramps and SR-55 NB Ramps (Santa Ana/Irvine/Caltrans)	67.7	69.2	69.3	1.6	0.1	60	No[3]
Sunflower Avenue, between Fairview Street and Bear Street (Santa Ana/Costa Mesa)	62.6	63.7	63.8	1.2	0.1	60	No
Sunflower Avenue, between Bear Street and S. Plaza Drive (Santa Ana/ Costa Mesa)	65.6	66.6	66.7	1.1	0.1	65	No
Sunflower Avenue, between S. Plaza Drive and Bristol Street (Santa Ana/ Costa Mesa)	65.3	66.4	66.6	1.3	0.2	65	No
Sunflower Avenue, between Bristol Street and Flower Street (Santa Ana/ Costa Mesa)	65.4	66.5	66.6	1.2	0.1	65	No

Table 25: Cumulative Off-Site Traffic Noise Levels

Roadway Segment	Existing dBA CNEL	Horizon Year Without Project[1] dBA CNEL	Horizon Year With Project[1] dBA CNEL	Difference In dBA Between Existing and Horizon Year With Project	Difference In dBA Between Horizon Year Without Project and Horizon Year With Project	Land Use Threshold dBA CNEL	Cumulatively Significant Impact?[2]
Bristol Street, south of Baker Street (Santa Ana)	65.3	66.2	66.3	1.0	0.0	65	No

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

1. Traffic noise levels are at 100 feet from the roadway centerline. The actual sound level at any receptor location is dependent upon such factors as the source-to-receptor distance and the presence of intervening structures, barriers, and topography.
2. Potential impacts occur when the Project change exceeds the City's standards for increases in traffic noise (greater than 1.5 dBA increase for ambient noise environments of 65 dBA CNEL and higher; greater than 3 dBA increase for ambient noise environments of 60 to 64 CNEL; and greater than 5 dBA increase for ambient noise environments of less than 60 dBA CNEL).
3. Although with project noise levels exceed 1.5 dBA in the horizon year compared to existing conditions, the Project's increment is 0.1 dBA, which is not perceptible and not cumulatively considerable. The closest noise-sensitive receptors to this segment of MacArthur Boulevard (between SR-55 SB Ramps and SR-55 NB Ramps) are residences approximately 1,900 feet to the west. At this distance, future noise levels would attenuate to approximately 50 dBA CNEL and would be less than significant.

Source: Based on traffic data within the *Traffic Circulation Analysis*, prepared by Linscott Law & Greenspan Engineers, 2022. Refer to Appendix B for traffic noise modeling assumptions and results.

Table 25 shows the volume of traffic generated by the Project on MacArthur Boulevard, between SR-55 SB Ramps and SR-55 NB Ramps, would exceed 1.5 dBA for an ambient noise environment of 65 dBA and higher when comparing Horizon Year With Project conditions to existing conditions. However, the Project's incremental contribution would be 0.1 dBA (i.e., far below a 3.0 barely perceptible increase and below the City's 1.5 dBA increase). Therefore, although related cumulative projects and growth would increase traffic noise levels along this segment, the Project's incremental effects would not be cumulatively considerable.

It should be noted that the General Plan EIR identified significant and unavoidable impacts for traffic noise, but did not analyze this segment of MacArthur Boulevard. However, General Plan EIR Figure 5.12-5 and Figure 5.12-10 show that this segment of MacArthur Boulevard (between SR-55 SB Ramps and SR-55 NB Ramps) is also within the 70+ dBA contour of SR-55). Therefore, the "Horizon Year With Project" noise level of 69.3 dBA would be lower than the SR-55 traffic noise in this area.

As described above, cumulative operational noise impact from related projects, in conjunction with Project-specific noise impacts would not be cumulatively considerable and cumulative traffic noise impacts would be less than significant.

Cumulative Stationary Noise

Stationary noise sources of the proposed Project would result in an incremental increase in non-transportation noise sources in the vicinity of the project site. However, as discussed above, operational noise caused by the proposed Project would be less than significant. Similar to the proposed Project, other planned and approved projects would be required to mitigate for stationary noise impacts at nearby sensitive receptors, if necessary. As stationary noise sources are generally localized, there is a limited potential for other projects to contribute to cumulative noise impacts.

No known past, present, or reasonably foreseeable projects would combine with the operational noise levels generated by the Project to increase noise levels above acceptable standards because each project

must comply with applicable City regulations that limit operational noise. Therefore, the Project, together with other projects, would not create a significant cumulative impact, and even if there was such a significant cumulative impact, the Project would not make a cumulatively considerable contribution to significant cumulative operational noises.

Given that noise dissipates as it travels away from its source, operational noise impacts from on-site activities and other stationary sources would be limited to the project site and vicinity. Thus, cumulative operational noise impacts from related projects, in conjunction with Project specific noise impacts, would not be cumulatively significant.

Mitigation Measures: No mitigation is required.

Level of Significance: Less than significant impact.

7 REFERENCES

1. California Department of Transportation, *California Vehicle Noise Emission Levels*, 1987.
2. California Department of Transportation, *Traffic Noise Analysis Protocol*, 2020.
3. California Department of Transportation, *Technical Noise Supplement to the Traffic Noise Analysis Protocol*, 2013.
4. California Department of Transportation, *Transportation and Construction Vibration Guidance Manual*, 2020.
5. City of Santa Ana, *General Plan Mobility Element*, April 2022.
6. City of Santa Ana, *General Plan Noise Element*, April 2022.
7. City of Santa Ana Municipal Code, *Chapter 18, Article VI, Section 18-312*, January 2023.
8. Cowan, James P., *Handbook of Environmental Acoustics*, 1994.
9. Federal Highway Administration, *Noise Fundamentals*, 2017.
10. Federal Highway Administration, *Noise Measurement Handbook – Final Report*, 2018.
11. Federal Highway Administration, *Roadway Construction Noise Model*, 2006.
12. Federal Highway Administration, *Roadway Construction Noise Model User's Guide Final Report*, 2006.
13. Federal Interagency Committee on Noise, *Federal Agency Review of Selected Airport Noise Analysis Issues*, 1992.
14. Federal Transit Administration, *Transit Noise and Vibration Impact Assessment Manual*, 2018.
15. Linscott Law & Greenspan Engineers, *Traffic Circulation Analysis Scope of Work for Related Bristol Project*, 2022.
16. United States Environmental Protection Agency, *Protective Noise Levels (EPA 550/9-79-100)*, 1979.

Appendix A

Existing Ambient Noise Measurements

Noise Measurement Field Data

Project:	Santa Ana Bristol Commons	**Job Number:**	194295001
Site No.:	ST-1	**Date:**	10/18/2022
Analyst:	Sarah Miller and Sean Gorden	**Time:**	1:56-2:06 PM
Location:	1101 W Stevens Ave, Santa Ana, CA 92707 near southeast corner of project site		
Noise Sources:	Cars and pedestrians		
Comments:			

Results (dBA):

	Leq:	Lmin:	Lmax:	Peak:
Measurement 1:	58.4	49.8	70.2	95.7

Equipment	
Sound Level Meter:	LD SoundExpert LxT
Calibrator:	CAL200
Response Time:	Slow
Weighting:	A
Microphone Height:	5 feet

Weather	
Temp. (degrees F):	84°
Wind (mph):	4
Sky:	Clear
Bar. Pressure:	29.92"
Humidity:	40%

Photo:

Kimley»Horn

Summary

File Name on Meter	ST-.001.s
File Name on PC	LxTse_0007061-20221018 135653-ST-.001.ldbin
Serial Number	0007061
Model	SoundExpert® LxT
Firmware Version	2.404
User	
Location	
Job Description	
Note	

Measurement

Description	
Start	2022-10-18 13:56:53
Stop	2022-10-18 14:06:53
Duration	00:10:00.0
Run Time	00:10:00.0
Pause	00:00:00.0
Pre-Calibration	2022-10-11 15:28:34
Post-Calibration	None
Calibration Deviation	---

Overall Settings

RMS Weight	A Weighting
Peak Weight	A Weighting
Detector	Slow
Preamplifier	Direct
Microphone Correction	FF:90 2116
Integration Method	Linear
OBA Range	Normal
OBA Bandwidth	1/1 and 1/3
OBA Frequency Weighting	A Weighting
OBA Max Spectrum	At LMax
Overload	119.8 dB

	A	**C**
Under Range Peak	**76.0**	73.0
Under Range Limit	**12.0**	10.5
Noise Floor	2.8	1.3

	First	**Second**
Instrument Identification	Kimley-Horn and Associates	1100 W. Town&Country Rd, #700

Results

LA_{eq}	58.4 dB		
LAE	86.2 dB		
EA	46.122 µPa²h		
$LA_{peak\ (max)}$	2022-10-18 14:01:12		95.7
LAS_{max}	2022-10-18 14:01:12		70.2
LAS_{min}	2022-10-18 14:03:22		49.8
SEA	-99.9 dB		

	Exceedance Counts	**Duration**
LAS > 85.0 dB	0	0.0

LAS > 115.0 dB	0	0.0
LApeak > 135.0 dB	0	0.0
LApeak > 137.0 dB	0	0.0
LApeak > 140.0 dB	0	0.0

Community Noise	**Ldn**	**LDay 07:00-22:00**
	58.4	58.4

LCeq	69.3	dB
LAeq	58.4	dB
LCeq - LAeq	10.9	dB
LAIeq	60.5	dB
LAeq	58.4	dB
LAIeq - LAeq	2.1	dB

	A	
	dB	**Time Stamp**
Leq	58.4	
LS(max)	70.2	2022/10/18 14:01:12
LS(min)	49.8	2022/10/18 14:03:22
LPeak(max)	95.7	2022/10/18 14:01:12

Overload Count	0	
Overload Duration	0.0	s
OBA Overload Count	0	
OBA Overload Duration	0.0	s

Statistics

LA 5.00	62.6	dB
LA 10.00	60.8	dB
LA 33.30	58.2	dB
LA 50.00	57.1	dB
LA 66.60	55.8	dB
LA 90.00	53.4	dB

Calibration History

Preamp	**Date**	**dB re. 1V/Pa**
PRMLxT1L	2022-10-11 15:28:26	-28.90
PRMLxT1L	2022-10-04 07:54:40	-29.35
PRMLxT1L	2022-09-06 16:57:48	-29.17
PRMLxT1L	2022-08-30 07:18:05	-28.97
PRMLxT1L	2022-08-23 17:05:17	-28.86
PRMLxT1L	2022-08-17 11:26:02	-28.89
PRMLxT1L	2022-08-16 15:37:51	-28.74
PRMLxT1L	2022-08-09 16:00:21	-28.86
PRMLxT1L	2022-08-03 10:37:30	-28.67
PRMLxT1L	2022-08-02 14:52:32	-29.25
PRMLxT1L	2022-07-27 11:29:48	-28.66

Noise Measurement Field Data

Project:	Santa Ana Bristol Commons	**Job Number:**	194295001
Site No.:	ST-2	**Date:**	10/18/2022
Analyst:	Sarah Miller and Sean Gorden	**Time:**	2:20-2:30 PM
Location:	3333 Bristol St., Costa Mesa, CA 92626 near southeast corner of project site		
Noise Sources:	Cars and pedestrians		
Comments:			

Results (dBA):

	Leq:	Lmin:	Lmax:	Peak:
Measurement 1:	58.8	50.9	69.7	80.8

Equipment	
Sound Level Meter:	LD SoundExpert LxT
Calibrator:	CAL200
Response Time:	Slow
Weighting:	A
Microphone Height:	5 feet

Weather	
Temp. (degrees F):	84°
Wind (mph):	4
Sky:	Clear
Bar. Pressure:	29.92"
Humidity:	40%

Photo:

Kimley»Horn

Summary

File Name on Meter	ST-.002.s
File Name on PC	LxTse_0007061-20221018 142004-ST-.002.ldbin
Serial Number	0007061
Model	SoundExpert® LxT
Firmware Version	2.404
User	
Location	
Job Description	
Note	

Measurement

Description	
Start	2022-10-18 14:20:04
Stop	2022-10-18 14:30:04
Duration	00:10:00.0
Run Time	00:10:00.0
Pause	00:00:00.0
Pre-Calibration	None
Post-Calibration	None
Calibration Deviation	---

Overall Settings

RMS Weight	A Weighting	
Peak Weight	A Weighting	
Detector	Slow	
Preamplifier	Direct	
Microphone Correction	FF:90 2116	
Integration Method	Linear	
OBA Range	Normal	
OBA Bandwidth	1/1 and 1/3	
OBA Frequency Weighting	A Weighting	
OBA Max Spectrum	At LMax	
Overload	119.8 dB	
	A	**C**
Under Range Peak	**76.0**	73.0
Under Range Limit	**12.0**	10.5
Noise Floor	2.8	1.3
	First	**Second**
Instrument Identification	Kimley-Horn and Associates	1100 W. Town&Country Rd, #700

Results

LA_{eq}	58.8 dB
LAE	86.6 dB
EA	50.572 µPa²h

LApeak (max)	2022-10-18 14:26:32	80.8
LASmax	2022-10-18 14:20:04	69.7
LASmin	2022-10-18 14:26:31	50.9
SEA	-99.9 dB	

	Exceedance Counts	**Duration**
LAS > 85.0 dB	0	0.0
LAS > 115.0 dB	0	0.0
LApeak > 135.0 dB	0	0.0
LApeak > 137.0 dB	0	0.0
LApeak > 140.0 dB	0	0.0

Community Noise	**Ldn**	**LDay 07:00-22:00**
	58.8	58.8

LCeq	69.5 dB
LAeq	58.8 dB
LCeq - LAeq	10.7 dB
LAleq	59.5 dB
LAeq	58.8 dB
LAleq - LAeq	0.7 dB

	A	
	dB	**Time Stamp**
Leq	58.8	
LS(max)	69.7	2022/10/18 14:20:04
LS(min)	50.9	2022/10/18 14:26:31
LPeak(max)	80.8	2022/10/18 14:26:32

Overload Count	0
Overload Duration	0.0 s
OBA Overload Count	0
OBA Overload Duration	0.0 s

Statistics

LA 5.00	62.5 dB
LA 10.00	61.9 dB
LA 33.30	58.9 dB
LA 50.00	57.9 dB
LA 66.60	56.7 dB
LA 90.00	54.1 dB

Calibration History

Preamp	**Date**	**dB re. 1V/Pa**
PRMLxT1L	2022-10-11 15:28:26	-28.90
PRMLxT1L	2022-10-04 07:54:40	-29.35
PRMLxT1L	2022-09-06 16:57:48	-29.17

Noise Measurement Field Data

Project:	Santa Ana Bristol Commons	**Job Number:**	194295001
Site No.:	ST-3	**Date:**	10/18/2022
Analyst:	Sarah Miller and Sean Gorden	**Time:**	2:37-2:47 PM
Location:	South Coast Metro, Santa Ana, CA 92704 near southwest corner of project site		
Noise Sources:	Cars and pedestrians		
Comments:			

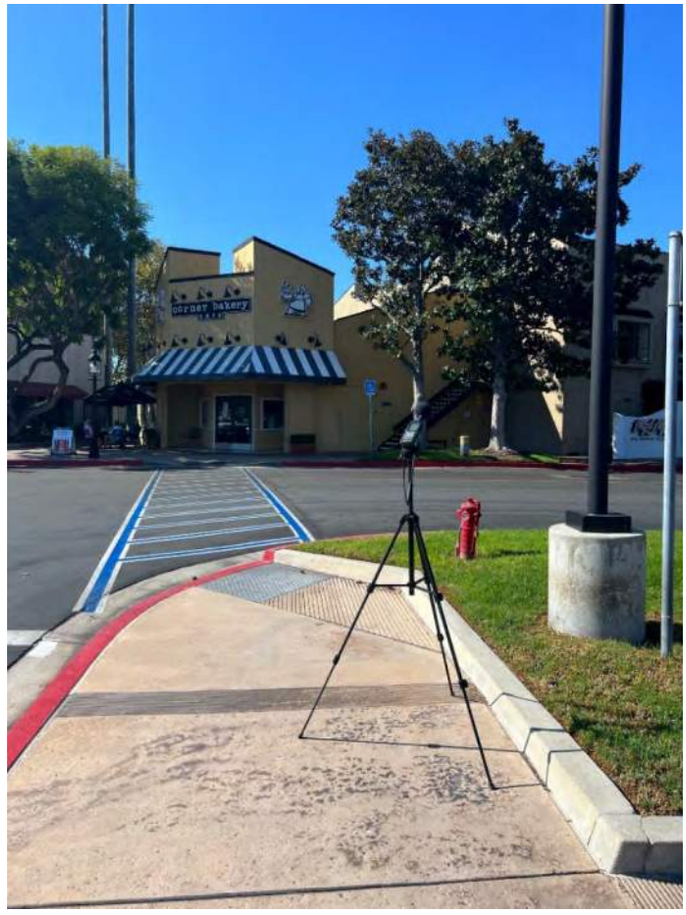
Results (dBA):

	Leq:	Lmin:	Lmax:	Peak:
Measurement 1:	59.5	49.8	79.4	101.3

Equipment	
Sound Level Meter:	LD SoundExpert LxT
Calibrator:	CAL200
Response Time:	Slow
Weighting:	A
Microphone Height:	5 feet

Weather	
Temp. (degrees F):	84°
Wind (mph):	4
Sky:	Clear
Bar. Pressure:	29.92"
Humidity:	40%

Photo:



Kimley»Horn

Summary

File Name on Meter	ST-.003.s
File Name on PC	LxTse_0007061-20221018 143741-ST-.003.ldbin
Serial Number	0007061
Model	SoundExpert® LxT
Firmware Version	2.404
User	
Location	
Job Description	
Note	

Measurement

Description	
Start	2022-10-18 14:37:41
Stop	2022-10-18 14:47:41
Duration	00:10:00.0
Run Time	00:10:00.0
Pause	00:00:00.0
Pre-Calibration	None
Post-Calibration	None
Calibration Deviation	---

Overall Settings

RMS Weight	A Weighting	
Peak Weight	A Weighting	
Detector	Slow	
Preamplifier	Direct	
Microphone Correction	FF:90 2116	
Integration Method	Linear	
OBA Range	Normal	
OBA Bandwidth	1/1 and 1/3	
OBA Frequency Weighting	A Weighting	
OBA Max Spectrum	At LMax	
Overload	119.8 dB	
	A	**C**
Under Range Peak	**76.0**	73.0
Under Range Limit	**12.0**	10.5
Noise Floor	2.8	1.3
	First	**Second**
Instrument Identification	Kimley-Horn and Associates	1100 W. Town&Country Rd, #700

Results

LA_{eq}	59.5 dB
LAE	87.3 dB
EA	59.417 µPa²h

LApeak (max)	2022-10-18 14:46:18	101.3
LASmax	2022-10-18 14:46:19	79.4
LASmin	2022-10-18 14:37:43	49.8
SEA	-99.9 dB	

	Exceedance Counts	**Duration**
LAS > 85.0 dB	0	0.0
LAS > 115.0 dB	0	0.0
LApeak > 135.0 dB	0	0.0
LApeak > 137.0 dB	0	0.0
LApeak > 140.0 dB	0	0.0

Community Noise	**Ldn**	**LDay 07:00-22:00**
	59.5	59.5

LCeq	75.0 dB
LAeq	59.5 dB
LCeq - LAeq	15.5 dB
LAleq	65.6 dB
LAeq	59.5 dB
LAleq - LAeq	6.1 dB

	A	
	dB	**Time Stamp**
Leq	59.5	
LS(max)	79.4	2022/10/18 14:46:19
LS(min)	49.8	2022/10/18 14:37:43
LPeak(max)	101.3	2022/10/18 14:46:18

Overload Count	0
Overload Duration	0.0 s
OBA Overload Count	0
OBA Overload Duration	0.0 s

Statistics

LA 5.00	63.6 dB
LA 10.00	59.8 dB
LA 33.30	54.8 dB
LA 50.00	53.0 dB
LA 66.60	52.1 dB
LA 90.00	51.0 dB

Calibration History

Preamp	**Date**	**dB re. 1V/Pa**
PRMLxT1L	2022-10-11 15:28:26	-28.90
PRMLxT1L	2022-10-04 07:54:40	-29.35
PRMLxT1L	2022-09-06 16:57:48	-29.17

Noise Measurement Field Data

Project:	Santa Ana Bristol Commons	**Job Number:**	194295001
Site No.:	ST-4	**Date:**	10/18/2022
Analyst:	Sarah Miller and Sean Gorden	**Time:**	2:59-3:09 PM
Location:	3772 S Plaza Dr., Santa Ana, CA 92704 west of project site		
Noise Sources:	Cars and pedestrians		
Comments:			

Results (dBA):

	Leq:	Lmin:	Lmax:	Peak:
Measurement 1:	60.9	45.8	74.9	97.4

Equipment	
Sound Level Meter:	LD SoundExpert LxT
Calibrator:	CAL200
Response Time:	Slow
Weighting:	A
Microphone Height:	5 feet

Weather	
Temp. (degrees F):	84°
Wind (mph):	5
Sky:	Clear
Bar. Pressure:	29.93"
Humidity:	41%

Photo:

Kimley»Horn

Summary

File Name on Meter	ST-.004.s
File Name on PC	LxTse_0007061-20221018 145918-ST-.004.ldbin
Serial Number	0007061
Model	SoundExpert® LxT
Firmware Version	2.404
User	
Location	
Job Description	
Note	

Measurement

Description	
Start	2022-10-18 14:59:18
Stop	2022-10-18 15:09:18
Duration	00:10:00.0
Run Time	00:10:00.0
Pause	00:00:00.0
Pre-Calibration	None
Post-Calibration	None
Calibration Deviation	---

Overall Settings

RMS Weight	A Weighting	
Peak Weight	A Weighting	
Detector	Slow	
Preamplifier	Direct	
Microphone Correction	FF:90 2116	
Integration Method	Linear	
OBA Range	Normal	
OBA Bandwidth	1/1 and 1/3	
OBA Frequency Weighting	A Weighting	
OBA Max Spectrum	At LMax	
Overload	119.8 dB	
	A	**C**
Under Range Peak	**76.0**	73.0
Under Range Limit	**12.0**	10.5
Noise Floor	2.8	1.3
	First	**Second**
Instrument Identification	Kimley-Horn and Associates	1100 W. Town&Country Rd, #700

Results

LA_{eq}	60.9 dB
LAE	88.7 dB
EA	82.018 µPa²h

LApeak (max)	2022-10-18 15:00:25	97.4
LASmax	2022-10-18 15:03:41	74.9
LASmin	2022-10-18 15:05:33	45.8
SEA	-99.9 dB	

	Exceedance Counts	**Duration**
LAS > 85.0 dB	0	0.0
LAS > 115.0 dB	0	0.0
LApeak > 135.0 dB	0	0.0
LApeak > 137.0 dB	0	0.0
LApeak > 140.0 dB	0	0.0

Community Noise	**Ldn**	**LDay 07:00-22:00**
	60.9	60.9

LCeq	68.5 dB
LAeq	60.9 dB
LCeq - LAeq	7.6 dB
LAleq	63.0 dB
LAeq	60.9 dB
LAleq - LAeq	2.1 dB

	A	
	dB	**Time Stamp**
Leq	60.9	
LS(max)	74.9	2022/10/18 15:03:41
LS(min)	45.8	2022/10/18 15:05:33
LPeak(max)	97.4	2022/10/18 15:00:25

Overload Count	0
Overload Duration	0.0 s
OBA Overload Count	0
OBA Overload Duration	0.0 s

Statistics

LA 5.00	66.4 dB
LA 10.00	63.8 dB
LA 33.30	60.0 dB
LA 50.00	56.6 dB
LA 66.60	52.4 dB
LA 90.00	48.5 dB

Calibration History

Preamp	**Date**	**dB re. 1V/Pa**
PRMLxT1L	2022-10-11 15:28:26	-28.90
PRMLxT1L	2022-10-04 07:54:40	-29.35
PRMLxT1L	2022-09-06 16:57:48	-29.17

Noise Measurement Field Data

Project:	Santa Ana Bristol Commons	**Job Number:**	194295001
Site No.:	ST-5	**Date:**	10/18/2022
Analyst:	Sarah Miller and Sean Gorden	**Time:**	3:18-3:28 PM
Location:	3400 S Plaza Dr., Santa Ana, CA 92704 near northwest corner of project site		
Noise Sources:	Cars and pedestrians		
Comments:			

Results (dBA):

	Leq:	Lmin:	Lmax:	Peak:
Measurement 1:	62.6	47.5	84.9	99.4

Equipment	
Sound Level Meter:	LD SoundExpert LxT
Calibrator:	CAL200
Response Time:	Slow
Weighting:	A
Microphone Height:	5 feet

Weather	
Temp. (degrees F):	84°
Wind (mph):	5
Sky:	Clear
Bar. Pressure:	29.93"
Humidity:	41%

Photo:

Kimley»Horn

Summary

File Name on Meter	ST-.005.s
File Name on PC	LxTse_0007061-20221018 151815-ST-.005.ldbin
Serial Number	0007061
Model	SoundExpert® LxT
Firmware Version	2.404
User	
Location	
Job Description	
Note	

Measurement

Description	
Start	2022-10-18 15:18:15
Stop	2022-10-18 15:28:15
Duration	00:10:00.0
Run Time	00:10:00.0
Pause	00:00:00.0
Pre-Calibration	None
Post-Calibration	None
Calibration Deviation	---

Overall Settings

RMS Weight	A Weighting	
Peak Weight	A Weighting	
Detector	Slow	
Preamplifier	Direct	
Microphone Correction	FF:90 2116	
Integration Method	Linear	
OBA Range	Normal	
OBA Bandwidth	1/1 and 1/3	
OBA Frequency Weighting	A Weighting	
OBA Max Spectrum	At LMax	
Overload	119.8 dB	
	A	**C**
Under Range Peak	**76.0**	73.0
Under Range Limit	**12.0**	10.5
Noise Floor	2.8	1.3
	First	**Second**
Instrument Identification	Kimley-Horn and Associates	1100 W. Town&Country Rd, #700

Results

LA_{eq}	62.6 dB	
LAE	90.4 dB	
EA	121.313 µPa²h	

LApeak (max)	2022-10-18 15:19:29	99.4
LASmax	2022-10-18 15:19:29	84.9
LASmin	2022-10-18 15:20:07	47.5
SEA	-99.9 dB	

	Exceedance Counts	**Duration**
LAS > 85.0 dB	0	0.0
LAS > 115.0 dB	0	0.0
LApeak > 135.0 dB	0	0.0
LApeak > 137.0 dB	0	0.0
LApeak > 140.0 dB	0	0.0

Community Noise	**Ldn**	**LDay 07:00-22:00**
	62.6	62.6

LCeq	71.5 dB
LAeq	62.6 dB
LCeq - LAeq	8.9 dB
LAleq	66.5 dB
LAeq	62.6 dB
LAleq - LAeq	3.9 dB

	A	
	dB	**Time Stamp**
Leq	62.6	
LS(max)	84.9	2022/10/18 15:19:29
LS(min)	47.5	2022/10/18 15:20:07
LPeak(max)	99.4	2022/10/18 15:19:29

Overload Count	0
Overload Duration	0.0 s
OBA Overload Count	0
OBA Overload Duration	0.0 s

Statistics

LA 5.00	62.8 dB
LA 10.00	58.5 dB
LA 33.30	55.4 dB
LA 50.00	54.3 dB
LA 66.60	52.7 dB
LA 90.00	50.4 dB

Calibration History

Preamp	**Date**	**dB re. 1V/Pa**
PRMLxT1L	2022-10-11 15:28:26	-28.90
PRMLxT1L	2022-10-04 07:54:40	-29.35
PRMLxT1L	2022-09-06 16:57:48	-29.17

Noise Measurement Field Data

Project:	Santa Ana Bristol Commons	**Job Number:**	194295001
Site No.:	ST-6	**Date:**	10/18/2022
Analyst:	Sarah Miller and Sean Gorden	**Time:**	3:38-3:48 PM
Location:	1200 W MacArthur Blvd, Santa Ana, CA 92707 near northeast corner of project site		
Noise Sources:	Cars and pedestrians		
Comments:			

Results (dBA):

	Leq:	Lmin:	Lmax:	Peak:
Measurement 1:	71.0	55.7	90.7	104.6

Equipment	
Sound Level Meter:	LD SoundExpert LxT
Calibrator:	CAL200
Response Time:	Slow
Weighting:	A
Microphone Height:	5 feet

Weather	
Temp. (degrees F):	84°
Wind (mph):	5
Sky:	Clear
Bar. Pressure:	29.93"
Humidity:	41%

Photo:

Kimley»Horn

Summary

File Name on Meter	ST-.006.s
File Name on PC	LxTse_0007061-20221018 153825-ST-.006.ldbin
Serial Number	0007061
Model	SoundExpert® LxT
Firmware Version	2.404
User	
Location	
Job Description	
Note	

Measurement

Description	
Start	2022-10-18 15:38:25
Stop	2022-10-18 15:48:25
Duration	00:10:00.0
Run Time	00:10:00.0
Pause	00:00:00.0
Pre-Calibration	None
Post-Calibration	None
Calibration Deviation	---

Overall Settings

RMS Weight	A Weighting	
Peak Weight	A Weighting	
Detector	Slow	
Preamplifier	Direct	
Microphone Correction	FF:90 2116	
Integration Method	Linear	
OBA Range	Normal	
OBA Bandwidth	1/1 and 1/3	
OBA Frequency Weighting	A Weighting	
OBA Max Spectrum	At LMax	
Overload	119.8 dB	
	A	**C**
Under Range Peak	**76.0**	73.0
Under Range Limit	**12.0**	10.5
Noise Floor	2.8	1.3
	First	**Second**
Instrument Identification	Kimley-Horn and Associates	1100 W. Town&Country Rd, #700

Results

LA_{eq}	71.0 dB
LAE	98.8 dB
EA	839.283 µPa²h

LApeak (max)	2022-10-18 15:40:41	104.6
LASmax	2022-10-18 15:40:42	90.7
LASmin	2022-10-18 15:39:08	55.7
SEA	-99.9 dB	

	Exceedance Counts	**Duration**
LAS > 85.0 dB	1	4.3
LAS > 115.0 dB	0	0.0
LApeak > 135.0 dB	0	0.0
LApeak > 137.0 dB	0	0.0
LApeak > 140.0 dB	0	0.0

Community Noise	**Ldn**	**LDay 07:00-22:00**
	71.0	71.0

LCeq	77.6 dB
LAeq	71.0 dB
LCeq - LAeq	6.6 dB
LAleq	72.7 dB
LAeq	71.0 dB
LAleq - LAeq	1.7 dB

	A	
	dB	**Time Stamp**
Leq	71.0	
LS(max)	90.7	2022/10/18 15:40:42
LS(min)	55.7	2022/10/18 15:39:08
LPeak(max)	104.6	2022/10/18 15:40:41

Overload Count	0
Overload Duration	0.0 s
OBA Overload Count	0
OBA Overload Duration	0.0 s

Statistics

LA 5.00	73.6 dB
LA 10.00	72.0 dB
LA 33.30	69.1 dB
LA 50.00	67.5 dB
LA 66.60	65.5 dB
LA 90.00	61.0 dB

Calibration History

Preamp	**Date**	**dB re. 1V/Pa**
PRMLxT1L	2022-10-11 15:28:26	-28.90
PRMLxT1L	2022-10-04 07:54:40	-29.35
PRMLxT1L	2022-09-06 16:57:48	-29.17

Noise Measurement Field Data

Project:	Santa Ana Bristol Commons	**Job Number:**	194295001
Site No.:	LT-1	**Date:**	1/18/23-1/19/2023
Analyst:	Kiana Graham and Skye Hansen	**Time:**	14:05-14:30
Location:	Corner of Callens Commons and S Plaza Dr		
Noise Sources:	Cars and pedestrians		
Comments:			

Results (dBA):

	Leq:	Lmin:	Lmax:	Peak:
Measurement 1:	60.3	42.6	87.6	108.7

Equipment	
Sound Level Meter:	LD SoundExpert LxT
Calibrator:	CAL200
Response Time:	Slow
Weighting:	A
Microphone Height:	5 feet

Weather	
Temp. (degrees F):	57
Wind (mph):	9
Sky:	Clear
Bar. Pressure:	30.06"
Humidity:	65%

Photo:

Kimley»Horn

Summary

File Name on Meter	LT_.010.s
File Name on PC	LxTse_0007061-20230118 140526-LT_.010.ldbin
Serial Number	0007061
Model	SoundExpert® LxT
Firmware Version	2.404
User	
Location	
Job Description	
Note	

Measurement

Description	
Start	2023-01-18 14:05:26
Stop	2023-01-19 14:30:59
Duration	24:25:32.602
Run Time	24:25:32.602
Pause	00:00:00.0
Pre-Calibration	2023-01-17 11:11:32
Post-Calibration	None
Calibration Deviation	---

Overall Settings

RMS Weight	A Weighting
Peak Weight	A Weighting
Detector	Slow
Preamplifier	PRMLxT1L
Microphone Correction	FF:90 2116
Integration Method	Linear
OBA Range	Normal
OBA Bandwidth	1/1 and 1/3
OBA Frequency Weighting	A Weighting
OBA Max Spectrum	At LMax
Overload	122.9 dB

	A	**C**	**Z**
Under Range Peak	**79.4**	76.4	81.4
Under Range Limit	**24.4**	25.5	31.7
Noise Floor	15.2	16.4	22.6

	First	**Second**	**Third**
Instrument Identification	Kimley-Horn and Associates	1100 W. Town&Country Rd, #700	Orange, CA 92868

Results

LA_{eq}	60.3 dB
LAE	109.7 dB

EA	10.469 mPa²h		
LApeak (max)	2023-01-18 14:05:43	108.7	dB
LASmax	2023-01-18 16:33:24	87.6	dB
LASmin	2023-01-19 02:21:54	42.6	dB
SEA	-99.9 dB		

	Exceedance Counts	Duration	
LAS > 85.0 dB	3	6.3	s
LAS > 115.0 dB	0	0.0	s
LApeak > 135.0 dB	0	0.0	s
LApeak > 137.0 dB	0	0.0	s
LApeak > 140.0 dB	0	0.0	s

Community Noise	**Ldn**	**LDay 07:00-22:00**	**Night 22:00-07:00**
	63.7	61.6	55.9

LCeq	70.5	dB
LAeq	60.3	dB
LCeq - LAeq	10.2	dB
LAIeq	62.7	dB
LAeq	60.3	dB
LAIeq - LAeq	2.4	dB

	A		C
	dB	**Time Stamp**	**dB**
Leq	60.3		70.5
LS(max)	87.6	2023/01/18 16:33:24	
LS(min)	42.6	2023/01/19 2:21:54	
LPeak(max)	108.7	2023/01/18 14:05:43	

Overload Count	0	
Overload Duration	0.0	s
OBA Overload Count	0	
OBA Overload Duration	0.0	s

Statistics

LA 5.00	65.5	dB
LA 10.00	62.9	dB
LA 33.30	58.5	dB
LA 50.00	56.2	dB
LA 66.60	53.3	dB
LA 90.00	47.5	dB

Calibration History

Preamp	**Date**	**dB re. 1V/Pa**
PRMLxT1L	2023-01-17 11:11:32	-29.12
PRMLxT1L	2022-12-14 07:52:53	-29.37

Noise Measurement Field Data			
Project:	Santa Ana Bristol Commons	**Job Number:**	194295001
Site No.:	LT-2	**Date:**	1/23/23-1/24/2023
Analyst:	Skye Hansen	**Time:**	14:11-14:11
Location:	Corner of W MacArthur Blvd and S plaza Dr		
Noise Sources:	Cars and pedestrians		
Comments:			

Results (dBA):

	Leq:	Lmin:	Lmax:	Peak:
Measurement 1:	66.7	44.0	97.8	113.2

Equipment	
Sound Level Meter:	LD SoundExpert LxT
Calibrator:	CAL200
Response Time:	Slow
Weighting:	A
Microphone Height:	5 feet

Weather	
Temp. (degrees F):	62
Wind (mph):	10
Sky:	Clear
Bar. Pressure:	30.02"
Humidity:	21%

Photo:

Kimley»Horn

Summary

File Name on Meter	LT_.011.s
File Name on PC	LxTse_0007061-20230123 141108-LT_.011.ldbin
Serial Number	0007061
Model	SoundExpert® LxT
Firmware Version	2.404
User	
Location	
Job Description	
Note	

Measurement

Description	
Start	2023-01-23 14:11:08
Stop	2023-01-24 14:11:23
Duration	24:00:14.703
Run Time	24:00:14.703
Pause	00:00:00.0
Pre-Calibration	2023-01-17 11:11:32
Post-Calibration	None
Calibration Deviation	---

Overall Settings

RMS Weight	A Weighting
Peak Weight	A Weighting
Detector	Slow
Preamplifier	PRMLxT1L
Microphone Correction	FF:90 2116
Integration Method	Linear
OBA Range	Normal
OBA Bandwidth	1/1 and 1/3
OBA Frequency Weighting	A Weighting
OBA Max Spectrum	At LMax
Overload	122.9 dB

	A	**C**	**Z**
Under Range Peak	**79.4**	76.4	81.4
Under Range Limit	**24.4**	25.5	31.7
Noise Floor	15.2	16.4	22.6

	First	**Second**	**Third**
Instrument Identification	Kimley-Horn and Associates	1100 W. Town&Country Rd, #700	Orange, CA 92868

Results

LA_{eq}	66.7 dB
LAE	116.1 dB

EA	44.910 mPa²h	
LApeak (max)	2023-01-23 18:55:36	113.2 dB
LASmax	2023-01-24 11:30:11	97.8 dB
LASmin	2023-01-24 00:55:41	44.0 dB
SEA	-99.9 dB	

	Exceedance Counts	**Duration**
LAS > 85.0 dB	17	57.2 s
LAS > 115.0 dB	0	0.0 s
LApeak > 135.0 dB	0	0.0 s
LApeak > 137.0 dB	0	0.0 s
LApeak > 140.0 dB	0	0.0 s

Community Noise	**Ldn**	**LDay 07:00-22:00**	**LNight 22:00-07:00**
	70.7	68.0	63.2

LCeq	74.9 dB	
LAeq	66.7 dB	
LCeq - LAeq	8.2 dB	
LAleq	68.4 dB	
LAeq	66.7 dB	
LAleq - LAeq	1.7 dB	

	A		**C**
	dB	**Time Stamp**	**dB**
Leq	66.7		74.9
LS(max)	97.8	2023/01/24 11:30:11	
LS(min)	44.0	2023/01/24 0:55:41	
LPeak(max)	113.2	2023/01/23 18:55:36	

Overload Count	0
Overload Duration	0.0 s
OBA Overload Count	0
OBA Overload Duration	0.0 s

Statistics

LA 5.00	71.6 dB
LA 10.00	70.3 dB
LA 33.30	65.4 dB
LA 50.00	61.8 dB
LA 66.60	57.6 dB
LA 90.00	49.4 dB

Calibration History

Preamp	**Date**	**dB re. 1V/Pa**
PRMLxT1L	2023-01-17 11:11:32	-29.12
PRMLxT1L	2022-12-14 07:52:53	-29.37

Noise Measurement Field Data

Project:	Santa Ana Bristol Commons	**Job Number:**	194295001
Site No.:	LT-3	**Date:**	1/24/23-1/25/2023
Analyst:	Skye Hansen	**Time:**	14:11-14:50
Location:	Corner of S Bristol St and W MacArthur Blvd		
Noise Sources:	Cars and pedestrians		
Comments:			

Results (dBA):

	Leq:	Lmin:	Lmax:	Peak:
Measurement 1:	67.3	46.1	97.4	121.8

Equipment	
Sound Level Meter:	LD SoundExpert LxT
Calibrator:	CAL200
Response Time:	Slow
Weighting:	A
Microphone Height:	5 feet

Weather	
Temp. (degrees F):	60
Wind (mph):	7
Sky:	Clear
Bar. Pressure:	30.24"
Humidity:	52%

Photo:

Kimley»Horn

Summary

File Name on Meter	LT_.012.s
File Name on PC	LxTse_0007061-20230124 141146-LT_.012.ldbin
Serial Number	0007061
Model	SoundExpert® LxT
Firmware Version	2.404
User	
Location	
Job Description	
Note	

Measurement

Description	
Start	2023-01-24 14:11:46
Stop	2023-01-25 14:50:00
Duration	24:25:27.203
Run Time	24:25:24.703
Pause	00:00:02.5
Pre-Calibration	2023-01-17 11:11:32
Post-Calibration	None
Calibration Deviation	---

Overall Settings

RMS Weight	A Weighting
Peak Weight	A Weighting
Detector	Slow
Preamplifier	PRMLxT1L
Microphone Correction	FF:90 2116
Integration Method	Linear
OBA Range	Normal
OBA Bandwidth	1/1 and 1/3
OBA Frequency Weighting	A Weighting
OBA Max Spectrum	At LMax
Overload	122.9 dB

	A	**C**	**Z**
Under Range Peak	**79.4**	76.4	81.4
Under Range Limit	**24.4**	25.5	31.7
Noise Floor	15.2	16.4	22.6

	First	**Second**	**Third**
Instrument Identification	Kimley-Horn and Associates	Town&Country Rd, #700	Orange, CA 92868

Results

LA_{eq}	67.3 dB
LAE	116.7 dB

EA	52.465 mPa²h		
LApeak (max)	2023-01-24 15:52:00	121.8	dB
LASmax	2023-01-25 01:42:06	97.4	dB
LASmin	2023-01-25 02:25:21	46.1	dB
SEA	134.8 dB		

	Exceedance Counts	**Duration**
LAS > 85.0 dB	18	52.5 s
LAS > 115.0 dB	0	0.0 s
LApeak > 135.0 dB	0	0.0 s
LApeak > 137.0 dB	0	0.0 s
LApeak > 140.0 dB	0	0.0 s

Community Noise	**Ldn**	**LDay 07:00-22:00**	**LNight 22:00-07:00**
	72.3	68.2	65.4

LCeq	76.3	dB
LAeq	67.3	dB
LCeq - LAeq	9.0	dB
LAIeq	69.4	dB
LAeq	67.3	dB
LAIeq - LAeq	2.1	dB

	A		**C**
	dB	**Time Stamp**	**dB**
Leq	67.3		76.3
LS(max)	97.4	2023/01/25 1:42:06	
LS(min)	46.1	2023/01/25 2:25:21	
LPeak(max)	121.8	2023/01/24 15:52:00	

Overload Count	1	
Overload Duration	2.1	s
OBA Overload Count	1	
OBA Overload Duration	2.1	s

Statistics

LA 5.00	72.6	dB
LA 10.00	71.0	dB
LA 33.30	66.4	dB
LA 50.00	63.5	dB
LA 66.60	60.4	dB
LA 90.00	54.5	dB

Calibration History

Preamp	**Date**	**dB re. 1V/Pa**
PRMLxT1L	2023-01-17 11:11:32	-29.12
PRMLxT1L	2022-12-14 07:52:53	-29.37

Noise Measurement Field Data

Project:	Santa Ana Bristol Commons	**Job Number:**	194295001
Site No.:	LT-4	**Date:**	2/1/23-2/2/2023
Analyst:	Skye Hansen	**Time:**	12:52-13:02
Location:	Corner of Callens Commons and S Bristol Dr		
Noise Sources:	Cars and pedestrians		
Comments:			

Results (dBA):

	Leq:	Lmin:	Lmax:	Peak:
Measurement 1:	61.3	42.2	92.9	106.0

Equipment	
Sound Level Meter:	LD SoundExpert LxT
Calibrator:	CAL200
Response Time:	Slow
Weighting:	A
Microphone Height:	5 feet

Weather	
Temp. (degrees F):	70
Wind (mph):	2
Sky:	Clear
Bar. Pressure:	30.25"
Humidity:	22%

Photo:

Kimley»Horn

Summary

File Name on Meter	LT_.014.s
File Name on PC	LxTse_0007061-20230201 125253-LT_.014.ldbin
Serial Number	0007061
Model	SoundExpert® LxT
Firmware Version	2.404
User	
Location	
Job Description	
Note	

Measurement

Description	
Start	2023-02-01 12:52:53
Stop	2023-02-02 13:02:54
Duration	24:10:00.898
Run Time	24:10:00.898
Pause	00:00:00.0
Pre-Calibration	2023-02-01 12:49:11
Post-Calibration	None
Calibration Deviation	---

Overall Settings

RMS Weight	A Weighting
Peak Weight	A Weighting
Detector	Slow
Preamplifier	PRMLxT1L
Microphone Correction	FF:90 2116
Integration Method	Linear
OBA Range	Normal
OBA Bandwidth	1/1 and 1/3
OBA Frequency Weighting	A Weighting
OBA Max Spectrum	At LMax
Overload	123.1 dB

	A	**C**
Under Range Peak	**79.6**	76.6
Under Range Limit	**24.4**	25.6
Noise Floor	15.3	16.5

	First	**Second**
Instrument Identification	Kimley-Horn and Associates	1100 W. Town&Country Rd, #700

Results

LA_{eq}	61.3 dB
LAE	110.7 dB

EA	13.040	mPa^2h	
$L_{Apeak\ (max)}$	2023-02-01 17:51:43		106.0
L_{ASmax}	2023-02-01 17:51:43		92.9
L_{ASmin}	2023-02-02 03:09:49		42.2
SEA	-99.9	dB	

	Exceedance Counts	Duration
LAS > 85.0 dB	1	11.4
LAS > 115.0 dB	0	0.0
L_{Apeak} > 135.0 dB	0	0.0
L_{Apeak} > 137.0 dB	0	0.0
L_{Apeak} > 140.0 dB	0	0.0

Community Noise	Ldn	LDay 07:00-22:00
	66.2	62.2

L_{Ceq}	71.4	dB
L_{Aeq}	61.3	dB
L_{Ceq} - L_{Aeq}	10.1	dB
L_{AIeq}	62.7	dB
L_{Aeq}	61.3	dB
L_{AIeq} - L_{Aeq}	1.4	dB

	A	
	dB	**Time Stamp**
L_{eq}	61.3	
$L_{S(max)}$	92.9	2023/02/01 17:51:43
$L_{S(min)}$	42.2	2023/02/02 3:09:49
$L_{Peak(max)}$	106.0	2023/02/01 17:51:43

Overload Count	0	
Overload Duration	0.0	s
OBA Overload Count	0	
OBA Overload Duration	0.0	s

Statistics

LA 5.00	66.0	dB
LA 10.00	64.5	dB
LA 33.30	60.3	dB
LA 50.00	57.9	dB
LA 66.60	55.5	dB
LA 90.00	50.5	dB

Calibration History

Preamp	Date	dB re. 1V/Pa
PRMLxT1L	2023-02-01 12:49:09	-29.28

Appendix B

Noise Modeling Data

Project: **Related Bristol Phase 1**

Construction Noise Impact on Sensitive Receptors

Parameters

Construction Hours:	Daytime hours (7 am to 7 pm)	8
	Evening hours (7 pm to 10 pm)	0
	Nighttime hours (10 pm to 7 am)	0
Leq to L10 factor		3

	Receptor (Land Use)	Distance to: Closest Receptor (feet)	Avg Dist. (feet)	Shielding	Direction
1	Residential	130	650	0	NW

						RECEPTOR 1	
Construction Phase	**Equipment Type**	**No. of Equip.**	**Acoustical Usage Factor**	**Reference Noise Level at 50ft per Unit, Lmax**	**Distance**	**Noise Level at Receptor 1, Lmax**	**Noise Level at Receptor 1, Leq**
Demolition							
	Concrete Saw	1	20%	90	130	81.3	74.3
	Excavator	3	40%	81	650	63.2	59.2
	Dozer	1	40%	82	650	59.4	55.4
	Dozer	1	40%	82	130	73.4	69.4
Combined LEQ							**75.7**
Site Preparation							
	Tractor	1	40%	84	130	75.7	71.7
	Dozer	1	40%	82	130	73.4	69.4
	Tractor	3	40%	84	650	66.5	62.5
	Dozer	2	40%	82	650	62.4	58.5
Combined LEQ							**74.2**
Grading							
	Excavator	2	40%	81	650	61.4	57.5
	Grader	1	40%	85	130	76.7	72.7
	Dozer	1	40%	82	650	59.4	55.4
	Scraper	1	40%	84	130	75.3	71.3
	Scraper	1	40%	84	650	61.3	57.3
	Tractor	2	40%	84	650	64.7	60.8
Combined LEQ							**75.4**
Building Construction							
	Crane	1	16%	81	130	72.3	64.3
	Front End Loader	3	40%	79	650	61.6	57.6
	Generator	1	50%	81	650	58.3	55.3
	Tractor	1	40%	84	130	75.7	71.7
	Tractor	2	40%	84	650	64.7	60.8
	Welder/Torch	1	40%	74	650	51.7	47.7
Combined LEQ							**73.0**
Paving							
	Paver	2	50%	77	650	57.9	54.9
	Pavement Scarafier	1	20%	90	130	81.2	74.2
	Pavement Scarafier	1	20%	90	650	67.2	60.2
	Roller	1	20%	80	130	71.7	64.7
	Roller	1	20%	80	650	57.7	50.7
Combined LEQ							**74.9**
Architectural Coating							
	Compressor (air)	1	40%	78	130	69.4	65.4
Combined LEQ							**65.4**

Source for Ref. Noise Levels: RCNM, 2005

Project: **Related Bristol Phase 2**

Construction Noise Impact on Sensitive Receptors

Parameters

Construction Hours:	Daytime hours (7 am to 7 pm)	8
	Evening hours (7 pm to 10 pm)	0
	Nighttime hours (10 pm to 7 am)	0
Leq to L10 factor		3

	Receptor (Land Use)	Distance to: Closest Receptor (feet)	Avg Dist. (feet)	Shielding	Direction
1	Residential	410	600	0	N

						RECEPTOR	1
Construction Phase	**Equipment Type**	**No. of Equip.**	**Acoustical Usage Factor**	**Reference Noise Level at 50ft per Unit, Lmax**	**Distance**	**Noise Level at Receptor 1, Lmax**	**Noise Level at Receptor 1, Leq**
Demolition							
	Concrete Saw	1	20%	90	410	71.3	64.3
	Excavator	3	40%	81	600	63.9	59.9
	Dozer	1	40%	82	410	63.4	59.4
	Dozer	1	40%	82	600	60.1	56.1
Combined LEQ							**67.0**
Site Preparation							
	Tractor	1	40%	84	410	65.7	61.7
	Dozer	1	40%	82	410	63.4	59.4
	Tractor	3	40%	84	600	67.2	63.2
	Dozer	2	40%	82	600	63.1	59.1
Combined LEQ							**67.2**
Grading							
	Excavator	2	40%	81	600	62.1	58.1
	Grader	1	40%	85	410	66.7	62.7
	Dozer	1	40%	82	600	60.1	56.1
	Scraper	1	40%	84	410	65.3	61.3
	Scraper	1	40%	84	600	62.0	58.0
	Tractor	2	40%	84	600	65.4	61.4
Combined LEQ							**68.0**
Building Construction							
	Crane	1	16%	81	410	62.3	54.4
	Front End Loader	3	40%	79	600	62.3	58.3
	Generator	1	50%	81	600	59.0	56.0
	Tractor	1	40%	84	410	65.7	61.7
	Tractor	2	40%	84	600	65.4	61.4
	Welder/Torch	1	40%	74	600	52.4	48.4
Combined LEQ							**66.3**
Paving							
	Paver	2	50%	77	600	58.6	55.6
	Pavement Scarafier	1	20%	90	410	71.2	64.2
	Roller	1	20%	80	410	61.7	54.7
	Pavement Scarafier	1	20%	90	600	67.9	60.9
	Roller	1	20%	80	600	58.4	51.4
Combined LEQ							**66.7**
Architectural Coating							
	Compressor (air)	1	40%	78	410	59.4	55.4
Combined LEQ							**55.4**

Source for Ref. Noise Levels: RCNM, 2005

Project: **Related Bristol Phase 2 - On Site**

Construction Noise Impact on Sensitive Receptors

Parameters

Construction Hours:	Daytime hours (7 am to 7 pm)	8
	Evening hours (7 pm to 10 pm)	0
	Nighttime hours (10 pm to 7 am)	0
Leq to L10 factor		3

		Distance to:			
	Receptor (Land Use)	**Closest Receptor (feet)**	**Avg Dist. (feet)**	**Shielding**	**Direction**
1	Phase 1 (dist. from Phase 2 const.)	130	500	0	N

						RECEPTOR	**1**
Construction Phase	**Equipment Type**	**No. of Equip.**	**Acoustical Usage Factor**	**Reference Noise Level at 50ft per Unit, Lmax**	**Distance**	**Noise Level at Receptor 1, Lmax**	**Noise Level at Receptor 1, Leq**
Grading							
	Excavator	2	40%	81	500	63.7	59.7
	Grader	1	40%	85	130	76.7	72.7
	Dozer	1	40%	82	500	61.7	57.7
	Scraper	1	40%	84	130	75.3	71.3
	Scraper	1	40%	84	500	63.6	59.6
	Tractor	2	40%	84	500	67.0	63.0
Combined LEQ							**75.6**

Source for Ref. Noise Levels: RCNM, 2005

Project: **Related Bristol Phase 3**

Construction Noise Impact on Sensitive Receptors

Parameters

Construction Hours:	Daytime hours (7 am to 7 pm)	8
	Evening hours (7 pm to 10 pm)	0
	Nighttime hours (10 pm to 7 am)	0
Leq to L10 factor		3

	Receptor (Land Use)	Distance to: Closest Receptor (feet)	Avg Dist. (feet)	Shielding	Direction
1	Residential	130	400	0	W

						RECEPTOR	1
Construction Phase	**Equipment Type**	**No. of Equip.**	**Acoustical Usage Factor**	**Reference Noise Level at 50ft per Unit, Lmax**	**Distance**	**Noise Level at Receptor 1, Lmax**	**Noise Level at Receptor 1, Leq**
Demolition							
	Concrete Saw	1	20%	90	130	81.3	74.3
	Excavator	3	40%	81	400	67.4	63.4
	Dozer	1	40%	82	130	73.4	69.4
	Dozer	1	40%	82	400	63.6	59.7
Combined LEQ							**75.9**
Site Preparation							
	Tractor	1	40%	84	130	75.7	71.7
	Dozer	1	40%	82	130	73.4	69.4
	Tractor	3	40%	84	400	70.7	66.7
	Dozer	2	40%	82	400	66.6	62.7
Combined LEQ							**74.8**
Grading							
	Excavator	2	40%	81	400	65.6	61.7
	Grader	1	40%	85	130	76.7	72.7
	Dozer	1	40%	82	400	63.6	59.7
	Scraper	1	40%	84	130	75.3	71.3
	Scraper	1	40%	84	400	65.5	61.6
	Tractor	2	40%	84	400	68.9	65.0
Combined LEQ							**75.9**
Building Construction							
	Crane	1	16%	81	130	72.3	64.3
	Front End Loader	3	40%	79	400	65.8	61.8
	Generator	1	50%	81	400	62.5	59.5
	Tractor	1	40%	84	130	75.7	71.7
	Tractor	2	40%	84	400	68.9	65.0
	Welder/Torch	1	40%	74	400	55.9	52.0
Combined LEQ							**73.7**
Paving							
	Paver	2	50%	77	400	62.1	59.1
	Pavement Scarafier	1	20%	90	130	81.2	74.2
	Roller	1	20%	80	130	71.7	64.7
	Pavement Scarafier	1	20%	90	400	71.4	64.4
	Roller	1	20%	80	400	61.9	54.9
Combined LEQ							**75.2**
Architectural Coating							
	Compressor (air)	1	40%	78	130	69.4	65.4
Combined LEQ							**65.4**

Source for Ref. Noise Levels: RCNM, 2005

Project: **Related Bristol Phase 3 - On Site**

Construction Noise Impact on Sensitive Receptors

Parameters

Construction Hours:	Daytime hours (7 am to 7 pm)	8
	Evening hours (7 pm to 10 pm)	0
	Nighttime hours (10 pm to 7 am)	0
Leq to L10 factor		3

	Receptor (Land Use)	Distance to: Closest Receptor (feet)	Avg Dist. (feet)	Shielding	Direction
1	Phase 2 (dist. from Phase 3 const.)	130	300	0	W

						RECEPTOR	1
Construction Phase	**Equipment Type**	**No. of Equip.**	**Acoustical Usage Factor**	**Reference Noise Level at 50ft per Unit, Lmax**	**Distance**	**Noise Level at Receptor 1, Lmax**	**Noise Level at Receptor 1, Leq**
Grading							
	Excavator	2	40%	81	300	68.1	64.2
	Grader	1	40%	85	130	76.7	72.7
	Dozer	1	40%	82	300	66.1	62.2
	Scraper	1	40%	84	130	75.3	71.3
	Scraper	1	40%	84	300	68.0	64.1
	Tractor	2	40%	84	300	71.4	67.5
Combined LEQ							**76.5**

Source for Ref. Noise Levels: RCNM, 2005

Project: **Related Bristol Off Site Improvements**

Construction Noise Impact on Sensitive Receptors

Parameters

Construction Hours:	Daytime hours (7 am to 7 pm)	8
	Evening hours (7 pm to 10 pm)	0
	Nighttime hours (10 pm to 7 am)	0
Leq to L10 factor		3

	Receptor (Land Use)	Distance (feet)	Shielding	Direction
1	Residential	75	0	W

						RECEPTOR	1
Construction Phase	**Equipment Type**	**No. of Equip.**	**Acoustical Usage Factor**	**Reference Noise Level at 50ft per Unit, Lmax**	**Distance**	**Noise Level at Receptor 1, Lmax**	**Noise Level at Receptor 1, Leq**
Demolition							
	Dump Truck	1	40%	77	75	73.0	69.0
	Excavator	1	40%	81	75	77.2	73.2
	Dozer	1	40%	82	75	78.2	74.2
Combined LEQ							**77.4**
Trenching							
	Excavator	1	40%	81	75	77.2	73.2
	Dump Truck	1	40%	77	75	73.0	69.0
	Front End Loader	1	40%	79	75	75.6	71.6
Combined LEQ							**76.4**
Paving							
	Paver	1	50%	77	75	73.7	70.7
	Roller	1	20%	80	75	76.5	69.5
	Front End Loader	1	40%	79	75	75.6	71.6
Combined LEQ							**75.4**

Source for Ref. Noise Levels: RCNM, 2005

Project: **Nighttime Concrete Pour - (Unmitigated)**
Construction Noise Impact on Sensitive Receptors

Parameters

Construction Hours:	Daytime hours (7 am to 7 pm)	12
	Evening hours (7 pm to 10 pm)	3
	Nighttime hours (10 pm to 7 am	9
Leq to L10 factor		3

	Receptor (Land Use)	**Distance to: Receptor (feet)**	**Distance to: Construction Area (feet)**	**Shielding**	**Direction**
1	Phase 1 (dist. from Phase 2 const.)	130	500	0	S
2	Phase 2 (dist. from Phase 3 const.)	130	300	0	W
3	Phase 1 Off Site	130	650	0	NW
4	Phase 2 Off Site	410	600	0	N&W
5	Phase 3 Off Site	130	400	0	W

					RECEPTOR		**1**	**RECEPTOR**		**2**	**RECEPTOR**		**3**	**RECEPTOR**		**4**	**RECEPTOR**		**5**
Construction Phase	**Equipment Type**	**No. of Equip.**	**Acoustical Usage Factor**	**Reference Noise Level at 50ft per Unit, Lmax**	**Distance (feet)**	**Noise Level at Receptor 1, Lmax**	**Noise Level at Receptor 1, Leq**	**Distance (feet)**	**Noise Level at Receptor 2, Lmax**	**Noise Level at Receptor 2, Leq**	**Distance (feet)**	**Noise Level at Receptor 3, Lmax**	**Noise Level at Receptor 3, Leq**	**Distance (feet)**	**Noise Level at Receptor 4, Lmax**	**Noise Level at Receptor 4, Leq**	**Distance (feet)**	**Noise Level at Receptor 5, Lmax**	**Noise Level at Receptor 5, Leq**
Paving/Concrete Pour																			
	Concrete Mixer Truck	1	40%	79	130	70.5	66.5	130	70.5	66.5	130	70.5	66.5	410	60.5	56.5	130	70.5	66.5
	Concrete Mixer Truck	1	40%	79	500	58.8	54.8	300	63.2	59.3	650	56.5	52.5	600	57.2	53.2	400	60.7	56.8
	Concrete Mixer Truck	1	40%	79	500	58.8	54.8	300	63.2	59.3	650	56.5	52.5	600	57.2	53.2	400	60.7	56.8
	Concrete Mixer Truck	1	40%	79	500	58.8	54.8	300	63.2	59.3	650	56.5	52.5	600	57.2	53.2	400	60.7	56.8
	Concrete Pump Truck	1	20%	81	500	61.4	54.4	300	65.8	58.8	650	59.1	52.1	600	59.8	52.8	400	63.3	56.3
	Front End Loader	1	40%	79	130	70.8	66.8	130	70.8	66.8	130	70.8	66.8	410	60.8	56.8	130	70.8	66.8
	Vibratory Concrete Mixer	1	20%	80	500	60.0	53.0	300	64.4	57.4	650	57.7	50.7	600	58.4	51.4	400	61.9	54.9
	Generator	1	50%	81	500	60.6	57.6	300	65.0	62.0	650	58.3	55.3	600	59.0	56.0	400	62.5	59.5
	Compressor (air)	1	40%	78	500	57.7	53.7	300	62.1	58.2	650	55.4	51.4	600	56.1	52.1	400	59.6	55.7
Combined LEQ							**70.6**			**71.9**			**70.3**			**63.9**			**71.0**

Source for Ref. Noise Levels: RCNM, 2005

Project: **Nighttime Concrete Pour - (Mitigated)**

Construction Noise Impact on Sensitive Receptors

Parameters

Construction Hours: Daytime hours (7 am to 7 pm)		12
	Evening hours (7 pm to 10 pm)	3
	Nighttime hours (10 pm to 7 am	9
Leq to L10 factor		3

	Receptor (Land Use)	Distance to: Receptor (feet)	Distance to: Construction Area (feet)	Shielding	Direction
1	Phase 1 (dist. from Phase 2 const.)	140	500	0	S
2	Phase 2 (dist. from Phase 3 const.)	170	300	0	W
3	Phase 1 Off Site	140	650	0	NW
4	Phase 2 Off Site	410	600	0	W
5	Phase 3 Off Site	150	400	0	W

Construction Phase	Equipment Type	No. of Equip.	Acoustical Usage Factor	Reference Noise Level at 50ft per Unit, Lmax	w/Mitigation	RECEPTOR 1 Distance (feet)	Noise Level at Receptor 1, Lmax	Noise Level at Receptor 1, Leq	Leq w/MM	RECEPTOR 2 Distance (feet)	Noise Level at Receptor 2, Lmax	Noise Level at Receptor 2, Leq	Leq w/MM	RECEPTOR 3 Distance (feet)	Noise Level at Receptor 3, Lmax	Noise Level at Receptor 3, Leq	Leq w/MM	RECEPTOR 4 Distance (feet)	Noise Level at Receptor 4, Lmax	Noise Level at Receptor 4, Leq	Leq w/MM	RECEPTOR 5 Distance (feet)	Noise Level at Receptor 5, Lmax	Noise Level at Receptor 5, Leq	Leq w/MM
Paving/Concrete Pour																									
	Concrete Mixer Truck	1	40%	79	79	140	69.9	65.9	65.9	170	68.2	64.2	64.2	140	69.9	65.9	65.9	410	60.5	56.5	56.5	150	69.3	65.3	65.3
	Concrete Mixer Truck	1	40%	79	79	500	58.8	54.8	54.8	300	63.2	59.3	59.3	650	56.5	52.5	52.5	600	57.2	53.2	53.2	400	60.7	56.8	56.8
	Concrete Mixer Truck	1	40%	79	79	500	58.8	54.8	54.8	300	63.2	59.3	59.3	650	56.5	52.5	52.5	600	57.2	53.2	53.2	400	60.7	56.8	56.8
	Concrete Mixer Truck	1	40%	79	79	500	58.8	54.8	54.8	300	63.2	59.3	59.3	650	56.5	52.5	52.5	600	57.2	53.2	53.2	400	60.7	56.8	56.8
	Concrete Pump Truck	1	20%	81	81	500	61.4	54.4	54.4	300	65.8	58.8	58.8	650	59.1	52.1	52.1	600	59.8	52.8	52.8	400	63.3	56.3	56.3
	Front End Loader	1	40%	79	79	140	70.2	66.2	66.2	170	68.5	64.5	64.5	140	70.2	66.2	66.2	410	60.8	56.8	56.8	150	69.6	65.6	65.6
	Vibratory Concrete Mixer	1	20%	80	80	500	60.0	53.0	53.0	300	64.4	57.4	57.4	650	57.7	50.7	50.7	600	58.4	51.4	51.4	400	61.9	54.9	54.9
	Generator	1	50%	81	71	500	60.6	57.6	47.6	300	65.0	62.0	52.0	650	58.3	55.3	45.3	600	59.0	56.0	46.0	400	62.5	59.5	49.5
	Compressor (air)	1	40%	78	68	500	57.7	53.7	43.7	300	62.1	58.2	48.2	650	55.4	51.4	41.4	600	56.1	52.1	42.1	400	59.6	55.7	45.7
Combined LEQ								**70.1**	**69.8**			**70.6**	**69.8**			**69.7**	**69.5**			**63.9**	**62.9**			**70.2**	**69.7**

Source for Ref. Noise Levels: RCNM, 2005

FHWA Highway Noise Prediction Model (FHWA-RD-77-108) with California Vehicle Noise (CALVENO) Emission Levels

Project Name: Santa Ana Bristol Commons
Project Number: 194295001
Scenario: Construction Traffic - Phase 1, No Project
Ldn/CNEL: CNEL

Assumed 24-Hour Traffic Distribution:	Day	Evening	Night
Total ADT Volumes	77.70%	12.70%	9.60%
Medium-Duty Trucks	87.43%	5.05%	7.52%
Heavy-Duty Trucks	89.10%	2.84%	8.06%

						Vehicle Mix			Distance from Centerline of Roadway			
		Median	ADT	Speed	Alpha	Medium	Heavy	CNEL at	Distance to Contour			
#	Roadway Segment	Lanes	Width	Volume	(mph)	Factor	Trucks	Trucks	100 Feet	70 CNEL	65 CNEL	60 CNEL	55 CNEL
15	Bristol Street, between MacArthur Boulevard and Callen's Common (Santa Ana)	6	24	46,145	40	0.5	2.0%	1.00%	67.7	70	150	324	698
16	Bristol Street, between Callen's Common and Sunflower Avenue (Santa Ana)	6	20	44,768	40	0.5	2.0%	1.00%	67.5	68	146	314	677
17	Bristol Street, between Sunflower Avenue and Anton Boulevard (Costa Mesa)	7	24	49,274	40	0.5	2.0%	1.00%	68.2	75	162	350	754
18	Bristol Street, between Anton Boulevard and I-405 NB Ramps (Costa Mesa)	11	4	56,559	40	0.5	2.0%	1.00%	69.5	92	199	429	925
19	Bristol Street, between I-405 NB Ramps and I-405 SB Ramps (Costa Mesa/Caltra	8	4	58,259	40	0.5	2.0%	1.00%	68.7	82	177	382	824
33	MacArthur Boulevard, between S. Plaza Drive and Bristol Street (Santa Ana)	6	14	34,622	40	0.5	2.0%	1.00%	66.3	-	121	261	563
40	Sunflower Avenue, between S. Plaza Drive and Bristol Street (Santa Ana/Costa M	6	16	27,615	40	0.5	2.0%	1.00%	65.3	-	105	226	486

[1] Distance is from the centerline of the roadway segment to the receptor location.
"-" = contour is located within the roadway right-of-way.

FHWA Highway Noise Prediction Model (FHWA-RD-77-108) with California Vehicle Noise (CALVENO) Emission Levels

Project Name: Santa Ana Bristol Commons
Project Number: 194295001
Scenario: Construction Traffic - Phase 1, With Project
Ldn/CNEL: CNEL

Assumed 24-Hour Traffic Distribution:	Day	Evening	Night
Total ADT Volumes	77.70%	12.70%	9.60%
Medium-Duty Trucks	87.43%	5.05%	7.52%
Heavy-Duty Trucks	89.10%	2.84%	8.06%

							Vehicle Mix		Distance from Centerline of Roadway				
#	Roadway	Segment	Lanes	Median Width	ADT Volume	Speed (mph)	Alpha Factor	Medium Trucks	Heavy Trucks	CNEL at 100 Feet	Distance to Contour 70 CNEL	65 CNEL	60 CNEL	55 CNEL
15	Bristol Street,	between MacArthur Boulevard and Callen's Common (Santa Ana)	6	24	49,074	40	0.5	1.9%	2.79%	69.3	90	193	416	896
16	Bristol Street,	between Callen's Common and Sunflower Avenue (Santa Ana)	6	20	47,697	40	0.5	1.9%	2.85%	69.1	88	189	406	875
17	Bristol Street,	between Sunflower Avenue and Anton Boulevard (Costa Mesa)	7	24	52,203	40	0.5	1.9%	2.69%	69.7	96	206	444	956
18	Bristol Street,	between Anton Boulevard and I-405 NB Ramps (Costa Mesa)	11	4	59,488	40	0.5	1.9%	2.48%	70.9	114	246	530	1,142
19	Bristol Street,	between I-405 NB Ramps and I-405 SB Ramps (Costa Mesa/Caltra	8	4	61,188	40	0.5	1.9%	2.44%	70.1	101	218	470	1,012
33	MacArthur Boulevard,	between S. Plaza Drive and Bristol Street (Santa Ana)	6	14	37,551	40	0.5	1.8%	3.35%	68.3	77	166	359	772
40	Sunflower Avenue,	between S. Plaza Drive and Bristol Street (Santa Ana/Costa M	6	16	30,544	40	0.5	1.8%	3.88%	67.8	71	153	329	709

[1] Distance is from the centerline of the roadway segment to the receptor location.
"-" = contour is located within the roadway right-of-way.

FHWA Highway Noise Prediction Model (FHWA-RD-77-108) with California Vehicle Noise (CALVENO) Emission Levels

Project Name: Santa Ana Bristol Commons
Project Number: 194295001
Scenario: Construction Traffic - Phase 2, No Project
Ldn/CNEL: CNEL

Assumed 24-Hour Traffic Distribution:	Day	Evening	Night
Total ADT Volumes	77.70%	12.70%	9.60%
Medium-Duty Trucks	87.43%	5.05%	7.52%
Heavy-Duty Trucks	89.10%	2.84%	8.06%

							Vehicle Mix		Distance from Centerline of Roadway				
#	Roadway	Segment	Lanes	Median Width	ADT Volume	Speed (mph)	Alpha Factor	Medium Trucks	Heavy Trucks	CNEL at 100 Feet	Distance to Contour 70 CNEL	65 CNEL	60 CNEL	55 CNEL
15	Bristol Street,	between MacArthur Boulevard and Callen's Common (Santa Ana)	6	24	51,586	40	0.5	2.0%	1.00%	68.1	75	162	349	752
16	Bristol Street,	between Callen's Common and Sunflower Avenue (Santa Ana)	6	20	50,098	40	0.5	2.0%	1.00%	67.9	73	157	339	730
17	Bristol Street,	between Sunflower Avenue and Anton Boulevard (Costa Mesa)	7	24	55,366	40	0.5	2.0%	1.00%	68.7	82	176	378	815
18	Bristol Street,	between Anton Boulevard and I-405 NB Ramps (Costa Mesa)	11	4	66,204	40	0.5	2.0%	1.00%	70.2	103	221	477	1,027
19	Bristol Street,	between I-405 NB Ramps and I-405 SB Ramps (Costa Mesa/Caltra	8	4	66,353	40	0.5	2.0%	1.00%	69.3	90	194	417	898
33	MacArthur Boulevard,	between S. Plaza Drive and Bristol Street (Santa Ana)	6	14	38,095	40	0.5	2.0%	1.00%	66.7	-	129	278	600
40	Sunflower Avenue,	between S. Plaza Drive and Bristol Street (Santa Ana/Costa M	6	16	31,199	40	0.5	2.0%	1.00%	65.8	-	114	245	527

[1] Distance is from the centerline of the roadway segment to the receptor location.
"-" = contour is located within the roadway right-of-way.

FHWA Highway Noise Prediction Model (FHWA-RD-77-108) with California Vehicle Noise (CALVENO) Emission Levels

Project Name: Santa Ana Bristol Commons
Project Number: 194295001
Scenario: Construction Traffic - Phase 2, With Project
Ldn/CNEL: CNEL

Assumed 24-Hour Traffic Distribution:	Day	Evening	Night
Total ADT Volumes	77.70%	12.70%	9.60%
Medium-Duty Trucks	87.43%	5.05%	7.52%
Heavy-Duty Trucks	89.10%	2.84%	8.06%

							Vehicle Mix		Distance from Centerline of Roadway				
#	Roadway	Segment	Lanes	Median Width	ADT Volume	Speed (mph)	Alpha Factor	Medium Trucks	Heavy Trucks	CNEL at 100 Feet	Distance to Contour 70 CNEL	65 CNEL	60 CNEL	55 CNEL
15	Bristol Street,	between MacArthur Boulevard and Callen's Common (Santa Ana)	6	24	52,954	40	0.5	1.9%	1.74%	68.9	84	181	390	841
16	Bristol Street,	between Callen's Common and Sunflower Avenue (Santa Ana)	6	20	51,466	40	0.5	1.9%	1.76%	68.7	82	176	380	819
17	Bristol Street,	between Sunflower Avenue and Anton Boulevard (Costa Mesa)	7	24	56,734	40	0.5	2.0%	1.69%	69.4	91	195	420	905
18	Bristol Street,	between Anton Boulevard and I-405 NB Ramps (Costa Mesa)	11	4	67,572	40	0.5	2.0%	1.58%	70.8	112	242	521	1,123
19	Bristol Street,	between I-405 NB Ramps and I-405 SB Ramps (Costa Mesa/Caltra	8	4	67,721	40	0.5	2.0%	1.58%	69.9	98	212	456	982
33	MacArthur Boulevard,	between S. Plaza Drive and Bristol Street (Santa Ana)	6	14	39,463	40	0.5	1.9%	2.00%	67.6	70	150	323	695
40	Sunflower Avenue,	between S. Plaza Drive and Bristol Street (Santa Ana/Costa M	6	16	32,567	40	0.5	1.9%	2.21%	67.0	-	136	292	629

[1] Distance is from the centerline of the roadway segment to the receptor location.
"-" = contour is located within the roadway right-of-way.

FHWA Highway Noise Prediction Model (FHWA-RD-77-108) with California Vehicle Noise (CALVENO) Emission Levels

Project Name: Santa Ana Bristol Commons
Project Number: 194295001
Scenario: Construction Traffic - Phase 3, No Project
Ldn/CNEL: CNEL

Assumed 24-Hour Traffic Distribution:	Day	Evening	Night
Total ADT Volumes	77.70%	12.70%	9.60%
Medium-Duty Trucks	87.43%	5.05%	7.52%
Heavy-Duty Trucks	89.10%	2.84%	8.06%

							Vehicle Mix		Distance from Centerline of Roadway				
#	Roadway	Segment	Lanes	Median Width	ADT Volume	Speed (mph)	Alpha Factor	Medium Trucks	Heavy Trucks	CNEL at 100 Feet	Distance to Contour 70 CNEL	65 CNEL	60 CNEL	55 CNEL
15	Bristol Street,	between MacArthur Boulevard and Callen's Common (Santa Ana)	6	24	52,509	40	0.5	2.0%	1.00%	68.2	76	164	353	761
16	Bristol Street,	between Callen's Common and Sunflower Avenue (Santa Ana)	6	20	50,994	40	0.5	2.0%	1.00%	68.0	74	159	343	739
17	Bristol Street,	between Sunflower Avenue and Anton Boulevard (Costa Mesa)	7	24	56,351	40	0.5	2.0%	1.00%	68.7	82	178	383	825
18	Bristol Street,	between Anton Boulevard and I-405 NB Ramps (Costa Mesa)	11	4	67,335	40	0.5	2.0%	1.00%	70.2	104	224	482	1,039
19	Bristol Street,	between I-405 NB Ramps and I-405 SB Ramps (Costa Mesa/Caltra	8	4	67,518	40	0.5	2.0%	1.00%	69.4	91	196	422	909
33	MacArthur Boulevard,	between S. Plaza Drive and Bristol Street (Santa Ana)	6	14	38,787	40	0.5	2.0%	1.00%	66.7	-	131	282	607
40	Sunflower Avenue,	between S. Plaza Drive and Bristol Street (Santa Ana/Costa M	6	16	31,752	40	0.5	2.0%	1.00%	65.9	-	115	248	534

[1] Distance is from the centerline of the roadway segment to the receptor location.
"-" = contour is located within the roadway right-of-way.

FHWA Highway Noise Prediction Model (FHWA-RD-77-108) with California Vehicle Noise (CALVENO) Emission Levels

Project Name: Santa Ana Bristol Commons
Project Number: 194295001
Scenario: Construction Traffic - Phase 3, With Project
Ldn/CNEL: CNEL

Assumed 24-Hour Traffic Distribution:	Day	Evening	Night
Total ADT Volumes	77.70%	12.70%	9.60%
Medium-Duty Trucks	87.43%	5.05%	7.52%
Heavy-Duty Trucks	89.10%	2.84%	8.06%

							Vehicle Mix		Distance from Centerline of Roadway				
				Median	ADT	Speed	Alpha	Medium	Heavy	CNEL at	Distance to Contour			
#	Roadway	Segment	Lanes	Width	Volume	(mph)	Factor	Trucks	Trucks	100 Feet	70 CNEL	65 CNEL	60 CNEL	55 CNEL
15	Bristol Street, between MacArthur Boulevard and Callen's Common (Santa Ana)		6	24	55,076	40	0.5	1.9%	2.62%	69.7	95	205	442	952
16	Bristol Street, between Callen's Common and Sunflower Avenue (Santa Ana)		6	20	53,561	40	0.5	1.9%	2.67%	69.5	93	200	431	930
17	Bristol Street, between Sunflower Avenue and Anton Boulevard (Costa Mesa)		7	24	58,918	40	0.5	1.9%	2.52%	70.1	102	219	473	1,019
18	Bristol Street, between Anton Boulevard and I-405 NB Ramps (Costa Mesa)		11	4	69,902	40	0.5	1.9%	2.28%	71.4	124	268	578	1,245
19	Bristol Street, between I-405 NB Ramps and I-405 SB Ramps (Costa Mesa/Caltra		8	4	70,085	40	0.5	1.9%	2.27%	70.6	109	235	505	1,089
33	MacArthur Boulevard, between S. Plaza Drive and Bristol Street (Santa Ana)		6	14	41,354	40	0.5	1.9%	3.16%	68.6	81	175	376	810
40	Sunflower Avenue, between S. Plaza Drive and Bristol Street (Santa Ana/Costa M		6	16	34,319	40	0.5	1.9%	3.60%	68.1	75	161	348	749

[1] Distance is from the centerline of the roadway segment to the receptor location.
"-" = contour is located within the roadway right-of-way.

FHWA Highway Noise Prediction Model (FHWA-RD-77-108) with California Vehicle Noise (CALVENO) Emission Levels

Project Name: Santa Ana Bristol Commons
Project Number: 194295001
Scenario: Existing (2022)
Ldn/CNEL: CNEL

Assumed 24-Hour Traffic Distribution:	Day	Evening	Night
Total ADT Volumes	77.70%	12.70%	9.60%
Medium-Duty Trucks	87.43%	5.05%	7.52%
Heavy-Duty Trucks	89.10%	2.84%	8.06%

							Vehicle Mix		Distance from Centerline of Roadway				
				Median	ADT	Speed	Alpha	Medium	Heavy	CNEL at	Distance to Contour			
#	Roadway	Segment	Lanes	Width	Volume	(mph)	Factor	Trucks	Trucks	100 Feet	70 CNEL	65 CNEL	60 CNEL	55 CNEL
1	Fairview Street,	between Segerstrom Avenue and MacArthur Boulevard (Santa Ana)	6	8	56,973	45	0.5	2.0%	1.00%	69.5	93	200	431	928
2	Fairview Street,	between MacArthur Boulevard and Sunflower Avenue (Santa Ana)	6	24	54,025	25	0.5	2.0%	1.00%	64.7	-	96	207	446
3	Fairview Street,	between Sunflower Avenue and S. Coast Drive (Costa Mesa)	6	24	48,087	40	0.5	2.0%	1.00%	67.8	72	155	333	717
4	Fairview Street,	between S. Coast Drive and I-405 NB Ramps (Costa Mesa)	6	0	58,231	40	0.5	2.0%	1.00%	68.3	78	167	360	775
5	Fairview Street,	between I-405 NB Ramps and I-405 SB Ramps (Costa Mesa/Caltrans)	6	0	43,770	40	0.5	2.0%	1.00%	67.1	64	138	297	641
6	Fairview Street,	between I-405 SB Ramps and Baker Street (Costa Mesa)	6	12	48,390	40	0.5	2.0%	1.00%	67.7	70	151	325	701
7	Bear Street,	between Segerstrom Avenue and MacArthur Boulevard (Santa Ana)	4	4	17,008	40	0.5	2.0%	1.00%	62.8	-	72	154	332
8	Bear Street,	between MacArthur Boulevard and Sunflower Avenue (Santa Ana/Costa Mesa)	6	14	17,989	40	0.5	2.0%	1.00%	63.4	-	78	169	364
9	Bear Street,	between Sunflower Avenue and S. Coast Drive (Costa Mesa)	6	24	29,134	40	0.5	2.0%	1.00%	65.7	-	111	238	514
10	Bear Street,	between S. Coast Drive and Paularino Avenue (Costa Mesa)	6	12	30,398	40	0.5	2.0%	1.00%	65.7	-	111	239	514
11	Bear Street,	between Paularino Avenue and Baker Street (Costa Mesa)	4	0	38,267	40	0.5	2.0%	1.00%	66.3	57	122	264	568
12	S. Plaza Drive,	between MacArthur Boulevard and Callen's Common (Santa Ana)	4	16	5,308	25	0.5	2.0%	1.00%	54.3	-	-	-	89
13	S. Plaza Drive,	between Callen's Common and Sunflower Avenue (Santa Ana)	4	16	4,843	25	0.5	2.0%	1.00%	53.9	-	-	-	84
14	Bristol Street,	between Segerstrom Avenue and MacArthur Boulevard (Santa Ana)	6	16	44,293	40	0.5	2.0%	1.00%	67.4	67	144	309	666
15	Bristol Street,	between MacArthur Boulevard and Callen's Common (Santa Ana)	6	24	46,145	40	0.5	2.0%	1.00%	67.7	70	150	324	698
16	Bristol Street,	between Callen's Common and Sunflower Avenue (Santa Ana)	6	20	44,768	40	0.5	2.0%	1.00%	67.5	68	146	314	677
17	Bristol Street,	between Sunflower Avenue and Anton Boulevard (Costa Mesa)	7	24	49,274	40	0.5	2.0%	1.00%	68.2	75	162	350	754
18	Bristol Street,	between Anton Boulevard and I-405 NB Ramps (Costa Mesa)	11	4	56,559	40	0.5	2.0%	1.00%	69.5	92	199	429	925
19	Bristol Street,	between I-405 NB Ramps and I-405 SB Ramps (Costa Mesa/Caltrans)	8	4	58,259	40	0.5	2.0%	1.00%	68.7	82	177	382	824
20	Bristol Street,	between I-405 SB Ramps and Paularino Avenue (Costa Mesa)	6	4	39,269	40	0.5	2.0%	1.00%	66.7	60	129	279	600
21	Bristol Street,	between Paularino Avenue and Baker Street (Costa Mesa)	6	24	40,662	40	0.5	2.0%	1.00%	67.1	-	138	298	641
22	Flower Street,	between Dyer Road and MacArthur Boulevard (Santa Ana)	4	12	15,150	35	0.5	2.0%	1.00%	61.1	-	55	118	255
23	Flower Street,	between MacArthur Boulevard and Sunflower Avenue (Santa Ana)	4	12	9,338	35	0.5	2.0%	1.00%	59.0	-	-	86	185
24	Main Street,	between Dyer Road and MacArthur Boulevard (Santa Ana)	6	10	30,688	45	0.5	2.0%	1.00%	66.9	62	133	286	617
25	Main Street,	between MacArthur Boulevard and Sunflower Avenue (Santa Ana)	6	12	23,929	45	0.5	2.0%	1.00%	65.8	-	113	244	525
26	Main Street,	between Sunflower Avenue and Red Hill Avenue (Santa Ana/Irvine)	6	25	23,638	45	0.5	2.0%	1.00%	65.9	-	116	249	536
27	Segerstrom Avenue,	between Fairview Street and Bear Street (Santa Ana)	4	15	21,253	40	0.5	2.0%	1.00%	63.9	-	84	181	391
28	Segerstrom Avenue,	between Bear Street and Bristol Street (Santa Ana)	4	14	28,544	40	0.5	2.0%	1.00%	65.1	-	102	220	475
29	Segerstrom Avenue,	between Bristol Street and Flower Street (Santa Ana)	4	14	23,189	40	0.5	2.0%	1.00%	64.2	-	89	192	413
30	Dyer Road,	between Flower Street and Main Street (Santa Ana)	4	15	29,175	40	0.5	2.0%	1.00%	65.3	-	104	224	482
31	MacArthur Boulevard,	between Fairview Street and Bear Street (Santa Ana)	6	14	31,076	40	0.5	2.0%	1.00%	65.8	-	113	243	524
32	MacArthur Boulevard,	between Bear Street and S. Plaza Drive (Santa Ana)	6	14	37,959	40	0.5	2.0%	1.00%	66.7	-	129	278	598
33	MacArthur Boulevard,	between S. Plaza Drive and Bristol Street (Santa Ana)	6	14	34,622	40	0.5	2.0%	1.00%	66.3	-	121	261	563
34	MacArthur Boulevard,	between Bristol Street and Flower Street (Santa Ana)	6	14	37,835	40	0.5	2.0%	1.00%	66.6	-	129	277	597
35	MacArthur Boulevard,	between Flower Street and Main Street (Santa Ana)	6	14	38,325	40	0.5	2.0%	1.00%	66.7	-	130	280	602
36	MacArthur Boulevard,	between Main Street and SR-55 SB Ramps (Santa Ana)	6	18	48,923	40	0.5	2.0%	1.00%	67.8	72	154	332	715
37	MacArthur Boulevard,	between SR-55 SB Ramps and SR-55 NB Ramps (Santa Ana/Irvine/Caltra	6	0	50,476	40	0.5	2.0%	1.00%	67.7	70	152	327	705
38	Sunflower Avenue,	between Fairview Street and Bear Street (Santa Ana/Costa Mesa)	4	12	16,071	40	0.5	2.0%	1.00%	62.6	-	70	150	323
39	Sunflower Avenue,	between Bear Street and S. Plaza Drive (Santa Ana/Costa Mesa)	6	25	28,528	40	0.5	2.0%	1.00%	65.6	-	109	236	508
40	Sunflower Avenue,	between S. Plaza Drive and Bristol Street (Santa Ana/Costa Mesa)	6	16	27,615	40	0.5	2.0%	1.00%	65.3	-	105	226	486
41	Sunflower Avenue,	between Bristol Street and Flower Street (Santa Ana/Costa Mesa)	6	14	21,571	45	0.5	2.0%	1.00%	65.4	-	106	228	492
42	Sunflower Avenue,	between Bristol Street and Flower Street (Santa Ana/Costa Mesa)	0	0	17,778	0	0.5	2.0%	1.00%	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!
43	Bristol Street,	south of Baker Street (Santa Ana)	6	16	27,756	40	0.5	2.0%	1.00%	65.3	-	105	226	488

[1] Distance is from the centerline of the roadway segment to the receptor location.
"-" = contour is located within the roadway right-of-way.

FHWA Highway Noise Prediction Model (FHWA-RD-77-108) with California Vehicle Noise (CALVENO) Emission Levels

Project Name: Santa Ana Bristol Commons
Project Number: 194295001
Scenario: Existing+Phase 1
Ldn/CNEL: CNEL

Assumed 24-Hour Traffic Distribution:	Day	Evening	Night
Total ADT Volumes	77.70%	12.70%	9.60%
Medium-Duty Trucks	87.43%	5.05%	7.52%
Heavy-Duty Trucks	89.10%	2.84%	8.06%

							Vehicle Mix		Distance from Centerline of Roadway				
				Median	ADT	Speed	Alpha	Medium	Heavy	CNEL at	Distance to Contour			
#	Roadway	Segment	Lanes	Width	Volume	(mph)	Factor	Trucks	Trucks	100 Feet	70 CNEL	65 CNEL	60 CNEL	55 CNEL
1	Fairview Street,	between Segerstrom Avenue and MacArthur Boulevard (Santa Ana)	6	8	56,998	45	0.5	2.0%	1.00%	69.5	93	200	431	928
2	Fairview Street,	between MacArthur Boulevard and Sunflower Avenue (Santa Ana)	6	24	54,050	25	0.5	2.0%	1.00%	64.7	-	96	207	446
3	Fairview Street,	between Sunflower Avenue and S. Coast Drive (Costa Mesa)	6	24	48,118	40	0.5	2.0%	1.00%	67.8	72	155	333	718
4	Fairview Street,	between S. Coast Drive and I-405 NB Ramps (Costa Mesa)	6	0	58,271	40	0.5	2.0%	1.00%	68.3	78	167	360	776
5	Fairview Street,	between I-405 NB Ramps and I-405 SB Ramps (Costa Mesa/Caltrans)	6	0	43,810	40	0.5	2.0%	1.00%	67.1	64	138	298	641
6	Fairview Street,	between I-405 SB Ramps and Baker Street (Costa Mesa)	6	12	48,430	40	0.5	2.0%	1.00%	67.7	70	151	325	701
7	Bear Street,	between Segerstrom Avenue and MacArthur Boulevard (Santa Ana)	4	4	17,072	40	0.5	2.0%	1.00%	62.8	-	72	155	333
8	Bear Street,	between MacArthur Boulevard and Sunflower Avenue (Santa Ana/Costa Mesa)	6	14	18,014	40	0.5	2.0%	1.00%	63.4	-	78	169	364
9	Bear Street,	between Sunflower Avenue and S. Coast Drive (Costa Mesa)	6	24	29,632	40	0.5	2.0%	1.00%	65.7	-	112	241	519
10	Bear Street,	between S. Coast Drive and Paularino Avenue (Costa Mesa)	6	12	30,889	40	0.5	2.0%	1.00%	65.7	-	112	241	519
11	Bear Street,	between Paularino Avenue and Baker Street (Costa Mesa)	4	0	38,514	40	0.5	2.0%	1.00%	66.3	57	123	265	571
12	S. Plaza Drive,	between MacArthur Boulevard and Callen's Common (Santa Ana)	4	16	5,842	25	0.5	2.0%	1.00%	54.7	-	-	-	95
13	S. Plaza Drive,	between Callen's Common and Sunflower Avenue (Santa Ana)	4	16	5,172	25	0.5	2.0%	1.00%	54.1	-	-	-	88
14	Bristol Street,	between Segerstrom Avenue and MacArthur Boulevard (Santa Ana)	6	16	44,772	40	0.5	2.0%	1.00%	67.4	67	145	311	671
15	Bristol Street,	between MacArthur Boulevard and Callen's Common (Santa Ana)	6	24	47,559	40	0.5	2.0%	1.00%	67.8	71	153	330	712
16	Bristol Street,	between Callen's Common and Sunflower Avenue (Santa Ana)	6	20	45,798	40	0.5	2.0%	1.00%	67.6	69	148	319	687
17	Bristol Street,	between Sunflower Avenue and Anton Boulevard (Costa Mesa)	7	24	51,084	40	0.5	2.0%	1.00%	68.3	77	166	359	773
18	Bristol Street,	between Anton Boulevard and I-405 NB Ramps (Costa Mesa)	11	4	58,369	40	0.5	2.0%	1.00%	69.6	94	203	438	944
19	Bristol Street,	between I-405 NB Ramps and I-405 SB Ramps (Costa Mesa/Caltrans)	8	4	59,673	40	0.5	2.0%	1.00%	68.8	84	180	389	837
20	Bristol Street,	between I-405 SB Ramps and Paularino Avenue (Costa Mesa)	6	4	39,496	40	0.5	2.0%	1.00%	66.7	60	130	280	603
21	Bristol Street,	between Paularino Avenue and Baker Street (Costa Mesa)	6	24	40,889	40	0.5	2.0%	1.00%	67.1	-	139	299	644
22	Flower Street,	between Dyer Road and MacArthur Boulevard (Santa Ana)	4	12	15,213	35	0.5	2.0%	1.00%	61.1	-	55	119	256
23	Flower Street,	between MacArthur Boulevard and Sunflower Avenue (Santa Ana)	4	12	9,363	35	0.5	2.0%	1.00%	59.0	-	-	86	185
24	Main Street,	between Dyer Road and MacArthur Boulevard (Santa Ana)	6	10	30,713	45	0.5	2.0%	1.00%	66.9	62	133	286	617
25	Main Street,	between MacArthur Boulevard and Sunflower Avenue (Santa Ana)	6	12	23,954	45	0.5	2.0%	1.00%	65.8	-	113	244	525
26	Main Street,	between Sunflower Avenue and Red Hill Avenue (Santa Ana/Irvine)	6	25	23,832	45	0.5	2.0%	1.00%	66.0	-	116	250	539
27	Segerstrom Avenue,	between Fairview Street and Bear Street (Santa Ana)	4	15	21,342	40	0.5	2.0%	1.00%	63.9	-	84	182	392
28	Segerstrom Avenue,	between Bear Street and Bristol Street (Santa Ana)	4	14	28,569	40	0.5	2.0%	1.00%	65.2	-	102	221	475
29	Segerstrom Avenue,	between Bristol Street and Flower Street (Santa Ana)	4	14	23,295	40	0.5	2.0%	1.00%	64.3	-	89	192	415
30	Dyer Road,	between Flower Street and Main Street (Santa Ana)	4	15	29,281	40	0.5	2.0%	1.00%	65.3	-	104	224	484
31	MacArthur Boulevard,	between Fairview Street and Bear Street (Santa Ana)	6	14	31,187	40	0.5	2.0%	1.00%	65.8	-	113	244	525
32	MacArthur Boulevard,	between Bear Street and S. Plaza Drive (Santa Ana)	6	14	38,081	40	0.5	2.0%	1.00%	66.7	-	129	278	600
33	MacArthur Boulevard,	between S. Plaza Drive and Bristol Street (Santa Ana)	6	14	34,667	40	0.5	2.0%	1.00%	66.3	-	121	261	563
34	MacArthur Boulevard,	between Bristol Street and Flower Street (Santa Ana)	6	14	38,814	40	0.5	2.0%	1.00%	66.8	-	131	282	607
35	MacArthur Boulevard,	between Flower Street and Main Street (Santa Ana)	6	14	39,241	40	0.5	2.0%	1.00%	66.8	-	132	284	612
36	MacArthur Boulevard,	between Main Street and SR-55 SB Ramps (Santa Ana)	6	18	49,839	40	0.5	2.0%	1.00%	67.9	72	156	336	724
37	MacArthur Boulevard,	between SR-55 SB Ramps and SR-55 NB Ramps (Santa Ana/Irvine/Cal	6	0	51,030	40	0.5	2.0%	1.00%	67.8	71	153	329	710
38	Sunflower Avenue,	between Fairview Street and Bear Street (Santa Ana/Costa Mesa)	4	12	16,330	40	0.5	2.0%	1.00%	62.7	-	70	151	326
39	Sunflower Avenue,	between Bear Street and S. Plaza Drive (Santa Ana/Costa Mesa)	6	25	29,059	40	0.5	2.0%	1.00%	65.7	-	111	239	514
40	Sunflower Avenue,	between S. Plaza Drive and Bristol Street (Santa Ana/Costa Mesa)	6	16	28,844	40	0.5	2.0%	1.00%	65.5	-	108	232	500
41	Sunflower Avenue,	between Bristol Street and Flower Street (Santa Ana/Costa Mesa)	6	14	21,765	45	0.5	2.0%	1.00%	65.4	-	107	230	495
42	Sunflower Avenue,	between Bristol Street and Flower Street (Santa Ana/Costa Mesa)	0	0	17,972	0	0.5	2.0%	1.00%	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!
43	Bristol Street,	south of Baker Street (Santa Ana)	6	16	27,983	40	0.5	2.0%	1.00%	65.4	-	106	228	490

[1] Distance is from the centerline of the roadway segment to the receptor location.
"-" = contour is located within the roadway right-of-way.

FHWA Highway Noise Prediction Model (FHWA-RD-77-108) with California Vehicle Noise (CALVENO) Emission Levels

Project Name: Santa Ana Bristol Commons
Project Number: 194295001
Scenario: Existing+Phase 1&2
Ldn/CNEL: CNEL

Assumed 24-Hour Traffic Distribution:	Day	Evening	Night
Total ADT Volumes	77.70%	12.70%	9.60%
Medium-Duty Trucks	87.43%	5.05%	7.52%
Heavy-Duty Trucks	89.10%	2.84%	8.06%

							Vehicle Mix		Distance from Centerline of Roadway				
				Median	ADT	Speed	Alpha	Medium	Heavy	CNEL at	Distance to Contour			
#	Roadway	Segment	Lanes	Width	Volume	(mph)	Factor	Trucks	Trucks	100 Feet	70 CNEL	65 CNEL	60 CNEL	55 CNEL
1	Fairview Street,	between Segerstrom Avenue and MacArthur Boulevard (Santa Ana)	6	8	56,998	45	0.5	2.0%	1.00%	69.5	93	200	431	928
2	Fairview Street,	between MacArthur Boulevard and Sunflower Avenue (Santa Ana)	6	24	54,050	25	0.5	2.0%	1.00%	64.7	-	96	207	446
3	Fairview Street,	between Sunflower Avenue and S. Coast Drive (Costa Mesa)	6	24	48,151	40	0.5	2.0%	1.00%	67.8	72	155	333	718
4	Fairview Street,	between S. Coast Drive and I-405 NB Ramps (Costa Mesa)	6	0	58,338	40	0.5	2.0%	1.00%	68.3	78	167	360	776
5	Fairview Street,	between I-405 NB Ramps and I-405 SB Ramps (Costa Mesa/Caltrans)	6	0	43,877	40	0.5	2.0%	1.00%	67.1	64	138	298	642
6	Fairview Street,	between I-405 SB Ramps and Baker Street (Costa Mesa)	6	12	48,497	40	0.5	2.0%	1.00%	67.7	70	151	326	702
7	Bear Street,	between Segerstrom Avenue and MacArthur Boulevard (Santa Ana)	4	4	17,175	40	0.5	2.0%	1.00%	62.9	-	72	155	334
8	Bear Street,	between MacArthur Boulevard and Sunflower Avenue (Santa Ana/Costa Mesa)	6	14	18,014	40	0.5	2.0%	1.00%	63.4	-	78	169	364
9	Bear Street,	between Sunflower Avenue and S. Coast Drive (Costa Mesa)	6	24	29,702	40	0.5	2.0%	1.00%	65.7	-	112	241	520
10	Bear Street,	between S. Coast Drive and Paularino Avenue (Costa Mesa)	6	12	30,925	40	0.5	2.0%	1.00%	65.7	-	112	241	520
11	Bear Street,	between Paularino Avenue and Baker Street (Costa Mesa)	4	0	38,550	40	0.5	2.0%	1.00%	66.3	57	123	265	571
12	S. Plaza Drive,	between MacArthur Boulevard and Callen's Common (Santa Ana)	4	16	5,991	25	0.5	2.0%	1.00%	54.8	-	-	-	97
13	S. Plaza Drive,	between Callen's Common and Sunflower Avenue (Santa Ana)	4	16	5,277	25	0.5	2.0%	1.00%	54.2	-	-	-	89
14	Bristol Street,	between Segerstrom Avenue and MacArthur Boulevard (Santa Ana)	6	16	45,301	40	0.5	2.0%	1.00%	67.5	68	146	314	676
15	Bristol Street,	between MacArthur Boulevard and Callen's Common (Santa Ana)	6	24	48,762	40	0.5	2.0%	1.00%	67.9	72	156	336	724
16	Bristol Street,	between Callen's Common and Sunflower Avenue (Santa Ana)	6	20	47,074	40	0.5	2.0%	1.00%	67.7	70	151	325	700
17	Bristol Street,	between Sunflower Avenue and Anton Boulevard (Costa Mesa)	7	24	52,191	40	0.5	2.0%	1.00%	68.4	78	169	364	784
18	Bristol Street,	between Anton Boulevard and I-405 NB Ramps (Costa Mesa)	11	4	59,476	40	0.5	2.0%	1.00%	69.7	96	206	444	956
19	Bristol Street,	between I-405 NB Ramps and I-405 SB Ramps (Costa Mesa/Caltrans)	8	4	60,543	40	0.5	2.0%	1.00%	68.9	85	182	392	845
20	Bristol Street,	between I-405 SB Ramps and Paularino Avenue (Costa Mesa)	6	4	39,658	40	0.5	2.0%	1.00%	66.7	60	130	280	604
21	Bristol Street,	between Paularino Avenue and Baker Street (Costa Mesa)	6	24	41,051	40	0.5	2.0%	1.00%	67.1	-	139	300	645
22	Flower Street,	between Dyer Road and MacArthur Boulevard (Santa Ana)	4	12	15,316	35	0.5	2.0%	1.00%	61.1	-	55	119	257
23	Flower Street,	between MacArthur Boulevard and Sunflower Avenue (Santa Ana)	4	12	9,363	35	0.5	2.0%	1.00%	59.0	-	-	86	185
24	Main Street,	between Dyer Road and MacArthur Boulevard (Santa Ana)	6	10	30,713	45	0.5	2.0%	1.00%	66.9	62	133	286	617
25	Main Street,	between MacArthur Boulevard and Sunflower Avenue (Santa Ana)	6	12	23,954	45	0.5	2.0%	1.00%	65.8	-	113	244	525
26	Main Street,	between Sunflower Avenue and Red Hill Avenue (Santa Ana/Irvine)	6	25	23,994	45	0.5	2.0%	1.00%	66.0	-	117	251	542
27	Segerstrom Avenue,	between Fairview Street and Bear Street (Santa Ana)	4	15	21,548	40	0.5	2.0%	1.00%	63.9	-	85	183	394
28	Segerstrom Avenue,	between Bear Street and Bristol Street (Santa Ana)	4	14	28,672	40	0.5	2.0%	1.00%	65.2	-	103	221	476
29	Segerstrom Avenue,	between Bristol Street and Flower Street (Santa Ana)	4	14	23,398	40	0.5	2.0%	1.00%	64.3	-	90	193	416
30	Dyer Road,	between Flower Street and Main Street (Santa Ana)	4	15	29,384	40	0.5	2.0%	1.00%	65.3	-	104	225	485
31	MacArthur Boulevard,	between Fairview Street and Bear Street (Santa Ana)	6	14	31,363	40	0.5	2.0%	1.00%	65.8	-	114	245	527
32	MacArthur Boulevard,	between Bear Street and S. Plaza Drive (Santa Ana)	6	14	38,360	40	0.5	2.0%	1.00%	66.7	-	130	280	603
33	MacArthur Boulevard,	between S. Plaza Drive and Bristol Street (Santa Ana)	6	14	35,208	40	0.5	2.0%	1.00%	66.3	-	123	264	569
34	MacArthur Boulevard,	between Bristol Street and Flower Street (Santa Ana)	6	14	39,875	40	0.5	2.0%	1.00%	66.9	-	133	287	618
35	MacArthur Boulevard,	between Flower Street and Main Street (Santa Ana)	6	14	40,200	40	0.5	2.0%	1.00%	66.9	-	134	289	622
36	MacArthur Boulevard,	between Main Street and SR-55 SB Ramps (Santa Ana)	6	18	50,798	40	0.5	2.0%	1.00%	68.0	73	158	340	733
37	MacArthur Boulevard,	between SR-55 SB Ramps and SR-55 NB Ramps (Santa Ana/Irvine/Cal	6	0	51,590	40	0.5	2.0%	1.00%	67.8	72	154	332	715
38	Sunflower Avenue,	between Fairview Street and Bear Street (Santa Ana/Costa Mesa)	4	12	16,363	40	0.5	2.0%	1.00%	62.7	-	70	152	327
39	Sunflower Avenue,	between Bear Street and S. Plaza Drive (Santa Ana/Costa Mesa)	6	25	29,162	40	0.5	2.0%	1.00%	65.7	-	111	239	515
40	Sunflower Avenue,	between S. Plaza Drive and Bristol Street (Santa Ana/Costa Mesa)	6	16	28,842	40	0.5	2.0%	1.00%	65.5	-	108	232	500
41	Sunflower Avenue,	between Bristol Street and Flower Street (Santa Ana/Costa Mesa)	6	14	21,927	45	0.5	2.0%	1.00%	65.4	-	107	231	497
42	Sunflower Avenue,	between Bristol Street and Flower Street (Santa Ana/Costa Mesa)	0	0	18,134	0	0.5	2.0%	1.00%	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!
43	Bristol Street,	south of Baker Street (Santa Ana)	6	16	28,145	40	0.5	2.0%	1.00%	65.4	-	106	229	492

[1] Distance is from the centerline of the roadway segment to the receptor location.
"-" = contour is located within the roadway right-of-way.

FHWA Highway Noise Prediction Model (FHWA-RD-77-108) with California Vehicle Noise (CALVENO) Emission Levels

Project Name: Santa Ana Bristol Commons
Project Number: 194295001
Scenario: Existing+Phase 1, 2 & 3
Ldn/CNEL: CNEL

Assumed 24-Hour Traffic Distribution:	Day	Evening	Night
Total ADT Volumes	77.70%	12.70%	9.60%
Medium-Duty Trucks	87.43%	5.05%	7.52%
Heavy-Duty Trucks	89.10%	2.84%	8.06%

							Vehicle Mix		Distance from Centerline of Roadway				
				Median	ADT	Speed	Alpha	Medium	Heavy	CNEL at	Distance to Contour			
#	Roadway	Segment	Lanes	Width	Volume	(mph)	Factor	Trucks	Trucks	100 Feet	70 CNEL	65 CNEL	60 CNEL	55 CNEL
1	Fairview Street,	between Segerstrom Avenue and MacArthur Boulevard (Santa Ana)	6	8	56,998	45	0.5	2.0%	1.00%	69.5	93	200	431	928
2	Fairview Street,	between MacArthur Boulevard and Sunflower Avenue (Santa Ana)	6	24	54,050	25	0.5	2.0%	1.00%	64.7	-	96	207	446
3	Fairview Street,	between Sunflower Avenue and S. Coast Drive (Costa Mesa)	6	24	48,151	40	0.5	2.0%	1.00%	67.8	72	155	333	718
4	Fairview Street,	between S. Coast Drive and I-405 NB Ramps (Costa Mesa)	6	0	58,283	40	0.5	2.0%	1.00%	68.3	78	167	360	776
5	Fairview Street,	between I-405 NB Ramps and I-405 SB Ramps (Costa Mesa/Caltrans)	6	0	43,822	40	0.5	2.0%	1.00%	67.1	64	138	298	641
6	Fairview Street,	between I-405 SB Ramps and Baker Street (Costa Mesa)	6	12	48,442	40	0.5	2.0%	1.00%	67.7	70	151	325	701
7	Bear Street,	between Segerstrom Avenue and MacArthur Boulevard (Santa Ana)	4	4	17,033	40	0.5	2.0%	1.00%	62.8	-	72	154	333
8	Bear Street,	between MacArthur Boulevard and Sunflower Avenue (Santa Ana/Costa Mesa)	6	14	18,014	40	0.5	2.0%	1.00%	63.4	-	78	169	364
9	Bear Street,	between Sunflower Avenue and S. Coast Drive (Costa Mesa)	6	24	29,594	40	0.5	2.0%	1.00%	65.7	-	112	241	519
10	Bear Street,	between S. Coast Drive and Paularino Avenue (Costa Mesa)	6	12	30,871	40	0.5	2.0%	1.00%	65.7	-	112	241	519
11	Bear Street,	between Paularino Avenue and Baker Street (Costa Mesa)	4	0	38,496	40	0.5	2.0%	1.00%	66.3	57	123	265	570
12	S. Plaza Drive,	between MacArthur Boulevard and Callen's Common (Santa Ana)	4	16	5,736	25	0.5	2.0%	1.00%	54.6	-	-	-	94
13	S. Plaza Drive,	between Callen's Common and Sunflower Avenue (Santa Ana)	4	16	5,341	25	0.5	2.0%	1.00%	54.3	-	-	-	90
14	Bristol Street,	between Segerstrom Avenue and MacArthur Boulevard (Santa Ana)	6	16	45,184	40	0.5	2.0%	1.00%	67.4	68	145	313	675
15	Bristol Street,	between MacArthur Boulevard and Callen's Common (Santa Ana)	6	24	48,890	40	0.5	2.0%	1.00%	67.9	73	156	337	725
16	Bristol Street,	between Callen's Common and Sunflower Avenue (Santa Ana)	6	20	47,224	40	0.5	2.0%	1.00%	67.7	70	151	326	702
17	Bristol Street,	between Sunflower Avenue and Anton Boulevard (Costa Mesa)	7	24	52,696	40	0.5	2.0%	1.00%	68.5	79	170	366	789
18	Bristol Street,	between Anton Boulevard and I-405 NB Ramps (Costa Mesa)	11	4	59,981	40	0.5	2.0%	1.00%	69.7	96	207	446	962
19	Bristol Street,	between I-405 NB Ramps and I-405 SB Ramps (Costa Mesa/Caltrans)	8	4	60,921	40	0.5	2.0%	1.00%	68.9	85	183	394	849
20	Bristol Street,	between I-405 SB Ramps and Paularino Avenue (Costa Mesa)	6	4	39,654	40	0.5	2.0%	1.00%	66.7	60	130	280	604
21	Bristol Street,	between Paularino Avenue and Baker Street (Costa Mesa)	6	24	41,047	40	0.5	2.0%	1.00%	67.1	-	139	300	645
22	Flower Street,	between Dyer Road and MacArthur Boulevard (Santa Ana)	4	12	15,207	35	0.5	2.0%	1.00%	61.1	-	55	119	256
23	Flower Street,	between MacArthur Boulevard and Sunflower Avenue (Santa Ana)	4	12	9,363	35	0.5	2.0%	1.00%	59.0	-	-	86	185
24	Main Street,	between Dyer Road and MacArthur Boulevard (Santa Ana)	6	10	30,713	45	0.5	2.0%	1.00%	66.9	62	133	286	617
25	Main Street,	between MacArthur Boulevard and Sunflower Avenue (Santa Ana)	6	12	23,954	45	0.5	2.0%	1.00%	65.8	-	113	244	525
26	Main Street,	between Sunflower Avenue and Red Hill Avenue (Santa Ana/Irvine)	6	25	23,990	45	0.5	2.0%	1.00%	66.0	-	117	251	542
27	Segerstrom Avenue,	between Fairview Street and Bear Street (Santa Ana)	4	15	21,330	40	0.5	2.0%	1.00%	63.9	-	84	182	391
28	Segerstrom Avenue,	between Bear Street and Bristol Street (Santa Ana)	4	14	28,672	40	0.5	2.0%	1.00%	65.2	-	103	221	476
29	Segerstrom Avenue,	between Bristol Street and Flower Street (Santa Ana)	4	14	23,289	40	0.5	2.0%	1.00%	64.3	-	89	192	415
30	Dyer Road,	between Flower Street and Main Street (Santa Ana)	4	15	29,275	40	0.5	2.0%	1.00%	65.3	-	104	224	484
31	MacArthur Boulevard,	between Fairview Street and Bear Street (Santa Ana)	6	14	31,101	40	0.5	2.0%	1.00%	65.8	-	113	243	524
32	MacArthur Boulevard,	between Bear Street and S. Plaza Drive (Santa Ana)	6	14	37,984	40	0.5	2.0%	1.00%	66.7	-	129	278	599
33	MacArthur Boulevard,	between S. Plaza Drive and Bristol Street (Santa Ana)	6	14	34,924	40	0.5	2.0%	1.00%	66.3	-	122	263	566
34	MacArthur Boulevard,	between Bristol Street and Flower Street (Santa Ana)	6	14	40,009	40	0.5	2.0%	1.00%	66.9	-	134	288	620
35	MacArthur Boulevard,	between Flower Street and Main Street (Santa Ana)	6	14	40,442	40	0.5	2.0%	1.00%	66.9	-	134	290	624
36	MacArthur Boulevard,	between Main Street and SR-55 SB Ramps (Santa Ana)	6	18	51,040	40	0.5	2.0%	1.00%	68.0	74	158	341	736
37	MacArthur Boulevard,	between SR-55 SB Ramps and SR-55 NB Ramps (Santa Ana/Irvine/Cal	6	0	51,709	40	0.5	2.0%	1.00%	67.8	72	154	332	716
38	Sunflower Avenue,	between Fairview Street and Bear Street (Santa Ana/Costa Mesa)	4	12	16,363	40	0.5	2.0%	1.00%	62.7	-	70	152	327
39	Sunflower Avenue,	between Bear Street and S. Plaza Drive (Santa Ana/Costa Mesa)	6	25	29,053	40	0.5	2.0%	1.00%	65.7	-	111	239	514
40	Sunflower Avenue,	between S. Plaza Drive and Bristol Street (Santa Ana/Costa Mesa)	6	16	29,194	40	0.5	2.0%	1.00%	65.5	-	109	234	505
41	Sunflower Avenue,	between Bristol Street and Flower Street (Santa Ana/Costa Mesa)	6	14	21,923	45	0.5	2.0%	1.00%	65.4	-	107	231	497
42	Sunflower Avenue,	between Bristol Street and Flower Street (Santa Ana/Costa Mesa)	0	0	18,130	0	0.5	2.0%	1.00%	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!
43	Bristol Street,	south of Baker Street (Santa Ana)	6	16	28,141	40	0.5	2.0%	1.00%	65.4	-	106	229	492

[1] Distance is from the centerline of the roadway segment to the receptor location.
"-" = contour is located within the roadway right-of-way.

FHWA Highway Noise Prediction Model (FHWA-RD-77-108) with California Vehicle Noise (CALVENO) Emission Levels

Project Name: Santa Ana Bristol Commons
Project Number: 194295001
Scenario: Year 2030
Ldn/CNEL: CNEL

Assumed 24-Hour Traffic Distribution:	Day	Evening	Night
Total ADT Volumes	77.70%	12.70%	9.60%
Medium-Duty Trucks	87.43%	5.05%	7.52%
Heavy-Duty Trucks	89.10%	2.84%	8.06%

							Vehicle Mix		Distance from Centerline of Roadway				
				Median	ADT	Speed	Alpha	Medium	Heavy	CNEL at	Distance to Contour			
#	Roadway	Segment	Lanes	Width	Volume	(mph)	Factor	Trucks	Trucks	100 Feet	70 CNEL	65 CNEL	60 CNEL	55 CNEL
1	Fairview Street,	between Segerstrom Avenue and MacArthur Boulevard (Santa Ana)	6	8	62,900	45	0.5	2.0%	1.00%	69.9	99	214	460	991
2	Fairview Street,	between MacArthur Boulevard and Sunflower Avenue (Santa Ana)	6	24	59,954	25	0.5	2.0%	1.00%	65.2	-	103	222	478
3	Fairview Street,	between Sunflower Avenue and S. Coast Drive (Costa Mesa)	6	24	53,444	40	0.5	2.0%	1.00%	68.3	77	166	357	770
4	Fairview Street,	between S. Coast Drive and I-405 NB Ramps (Costa Mesa)	6	0	63,912	40	0.5	2.0%	1.00%	68.7	82	178	383	825
5	Fairview Street,	between I-405 NB Ramps and I-405 SB Ramps (Costa Mesa/Caltrans)	6	0	48,214	40	0.5	2.0%	1.00%	67.5	68	147	317	684
6	Fairview Street,	between I-405 SB Ramps and Baker Street (Costa Mesa)	6	12	53,203	40	0.5	2.0%	1.00%	68.1	75	161	346	746
7	Bear Street,	between Segerstrom Avenue and MacArthur Boulevard (Santa Ana)	4	4	18,369	40	0.5	2.0%	1.00%	63.2	-	75	162	350
8	Bear Street,	between MacArthur Boulevard and Sunflower Avenue (Santa Ana/Costa Mesa)	6	14	19,428	40	0.5	2.0%	1.00%	63.7	-	82	178	383
9	Bear Street,	between Sunflower Avenue and S. Coast Drive (Costa Mesa)	6	24	31,465	40	0.5	2.0%	1.00%	66.0	-	116	251	541
10	Bear Street,	between S. Coast Drive and Paularino Avenue (Costa Mesa)	6	12	33,197	40	0.5	2.0%	1.00%	66.0	-	117	253	545
11	Bear Street,	between Paularino Avenue and Baker Street (Costa Mesa)	4	0	41,750	40	0.5	2.0%	1.00%	66.7	60	130	280	602
12	S. Plaza Drive,	between MacArthur Boulevard and Callen's Common (Santa Ana)	4	16	5,733	25	0.5	2.0%	1.00%	54.6	-	-	-	94
13	S. Plaza Drive,	between Callen's Common and Sunflower Avenue (Santa Ana)	4	16	5,230	25	0.5	2.0%	1.00%	54.2	-	-	-	88
14	Bristol Street,	between Segerstrom Avenue and MacArthur Boulevard (Santa Ana)	6	16	49,501	40	0.5	2.0%	1.00%	67.8	72	155	333	717
15	Bristol Street,	between MacArthur Boulevard and Callen's Common (Santa Ana)	6	24	51,586	40	0.5	2.0%	1.00%	68.1	75	162	349	752
16	Bristol Street,	between Callen's Common and Sunflower Avenue (Santa Ana)	6	20	50,098	40	0.5	2.0%	1.00%	67.9	73	157	339	730
17	Bristol Street,	between Sunflower Avenue and Anton Boulevard (Costa Mesa)	7	24	55,366	40	0.5	2.0%	1.00%	68.7	82	176	378	815
18	Bristol Street,	between Anton Boulevard and I-405 NB Ramps (Costa Mesa)	11	4	66,204	40	0.5	2.0%	1.00%	70.2	103	221	477	1,027
19	Bristol Street,	between I-405 NB Ramps and I-405 SB Ramps (Costa Mesa/Caltrans)	8	4	66,353	40	0.5	2.0%	1.00%	69.3	90	194	417	898
20	Bristol Street,	between I-405 SB Ramps and Paularino Avenue (Costa Mesa)	6	4	43,442	40	0.5	2.0%	1.00%	67.1	64	138	298	642
21	Bristol Street,	between Paularino Avenue and Baker Street (Costa Mesa)	6	24	44,946	40	0.5	2.0%	1.00%	67.5	69	148	318	686
22	Flower Street,	between Dyer Road and MacArthur Boulevard (Santa Ana)	4	12	16,661	35	0.5	2.0%	1.00%	61.5	-	59	126	272
23	Flower Street,	between MacArthur Boulevard and Sunflower Avenue (Santa Ana)	4	12	10,384	35	0.5	2.0%	1.00%	59.5	-	-	92	198
24	Main Street,	between Dyer Road and MacArthur Boulevard (Santa Ana)	6	10	34,075	45	0.5	2.0%	1.00%	67.3	66	142	307	661
25	Main Street,	between MacArthur Boulevard and Sunflower Avenue (Santa Ana)	6	12	26,921	45	0.5	2.0%	1.00%	66.3	-	122	263	567
26	Main Street,	between Sunflower Avenue and Red Hill Avenue (Santa Ana/Irvine)	6	25	26,725	45	0.5	2.0%	1.00%	66.5	-	125	270	582
27	Segerstrom Avenue,	between Fairview Street and Bear Street (Santa Ana)	4	15	23,274	40	0.5	2.0%	1.00%	64.3	-	89	193	415
28	Segerstrom Avenue,	between Bear Street and Bristol Street (Santa Ana)	4	14	31,149	40	0.5	2.0%	1.00%	65.5	-	108	234	503
29	Segerstrom Avenue,	between Bristol Street and Flower Street (Santa Ana)	4	14	25,316	40	0.5	2.0%	1.00%	64.6	-	94	203	438
30	Dyer Road,	between Flower Street and Main Street (Santa Ana)	4	15	31,781	40	0.5	2.0%	1.00%	65.6	-	110	237	511
31	MacArthur Boulevard,	between Fairview Street and Bear Street (Santa Ana)	6	14	34,265	40	0.5	2.0%	1.00%	66.2	-	120	259	559
32	MacArthur Boulevard,	between Bear Street and S. Plaza Drive (Santa Ana)	6	14	41,699	40	0.5	2.0%	1.00%	67.1	64	137	296	637
33	MacArthur Boulevard,	between S. Plaza Drive and Bristol Street (Santa Ana)	6	14	38,095	40	0.5	2.0%	1.00%	66.7	-	129	278	600
34	MacArthur Boulevard,	between Bristol Street and Flower Street (Santa Ana)	6	14	41,462	40	0.5	2.0%	1.00%	67.0	63	137	295	635
35	MacArthur Boulevard,	between Flower Street and Main Street (Santa Ana)	6	14	41,852	40	0.5	2.0%	1.00%	67.1	64	138	296	639
36	MacArthur Boulevard,	between Main Street and SR-55 SB Ramps (Santa Ana)	6	18	54,572	40	0.5	2.0%	1.00%	68.3	77	166	357	769
37	MacArthur Boulevard,	between SR-55 SB Ramps and SR-55 NB Ramps (Santa Ana/Irvine/Cal	6	0	55,605	40	0.5	2.0%	1.00%	68.1	75	162	349	752
38	Sunflower Avenue,	between Fairview Street and Bear Street (Santa Ana/Costa Mesa)	4	12	18,732	40	0.5	2.0%	1.00%	63.3	-	77	166	358
39	Sunflower Avenue,	between Bear Street and S. Plaza Drive (Santa Ana/Costa Mesa)	6	25	32,185	40	0.5	2.0%	1.00%	66.1	-	119	255	550
40	Sunflower Avenue,	between S. Plaza Drive and Bristol Street (Santa Ana/Costa Mesa)	6	16	31,199	40	0.5	2.0%	1.00%	65.8	-	114	245	527
41	Sunflower Avenue,	between Bristol Street and Flower Street (Santa Ana/Costa Mesa)	6	14	25,581	45	0.5	2.0%	1.00%	66.1	-	119	256	551
42	Sunflower Avenue,	between Bristol Street and Flower Street (Santa Ana/Costa Mesa)	0	0	22,212	0	0.5	2.0%	1.00%	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!
43	Bristol Street,	south of Baker Street (Santa Ana)	6	16	30,901	40	0.5	2.0%	1.00%	65.8	-	113	243	524

[1] Distance is from the centerline of the roadway segment to the receptor location.
"-" = contour is located within the roadway right-of-way.

FHWA Highway Noise Prediction Model (FHWA-RD-77-108) with California Vehicle Noise (CALVENO) Emission Levels

Project Name: Santa Ana Bristol Commons
Project Number: 194295001
Scenario: Year 2030+Phase 1
Ldn/CNEL: CNEL

Assumed 24-Hour Traffic Distribution:	Day	Evening	Night
Total ADT Volumes	77.70%	12.70%	9.60%
Medium-Duty Trucks	87.43%	5.05%	7.52%
Heavy-Duty Trucks	89.10%	2.84%	8.06%

							Vehicle Mix		Distance from Centerline of Roadway				
				Median	ADT	Speed	Alpha	Medium	Heavy	CNEL at	Distance to Contour			
#	Roadway	Segment	Lanes	Width	Volume	(mph)	Factor	Trucks	Trucks	100 Feet	70 CNEL	65 CNEL	60 CNEL	55 CNEL
1	Fairview Street,	between Segerstrom Avenue and MacArthur Boulevard (Santa Ana)	6	8	62,925	45	0.5	2.0%	1.00%	69.9	99	214	460	992
2	Fairview Street,	between MacArthur Boulevard and Sunflower Avenue (Santa Ana)	6	24	59,979	25	0.5	2.0%	1.00%	65.2	-	103	222	478
3	Fairview Street,	between Sunflower Avenue and S. Coast Drive (Costa Mesa)	6	24	53,475	40	0.5	2.0%	1.00%	68.3	77	166	357	770
4	Fairview Street,	between S. Coast Drive and I-405 NB Ramps (Costa Mesa)	6	0	63,952	40	0.5	2.0%	1.00%	68.7	83	178	383	825
5	Fairview Street,	between I-405 NB Ramps and I-405 SB Ramps (Costa Mesa/Caltrans)	6	0	48,254	40	0.5	2.0%	1.00%	67.5	68	147	317	684
6	Fairview Street,	between I-405 SB Ramps and Baker Street (Costa Mesa)	6	12	53,243	40	0.5	2.0%	1.00%	68.1	75	161	347	747
7	Bear Street,	between Segerstrom Avenue and MacArthur Boulevard (Santa Ana)	4	4	18,433	40	0.5	2.0%	1.00%	63.2	-	76	163	351
8	Bear Street,	between MacArthur Boulevard and Sunflower Avenue (Santa Ana/Costa Mesa)	6	14	19,453	40	0.5	2.0%	1.00%	63.8	-	83	178	383
9	Bear Street,	between Sunflower Avenue and S. Coast Drive (Costa Mesa)	6	24	31,963	40	0.5	2.0%	1.00%	66.1	-	118	254	546
10	Bear Street,	between S. Coast Drive and Paularino Avenue (Costa Mesa)	6	12	33,688	40	0.5	2.0%	1.00%	66.1	-	119	255	550
11	Bear Street,	between Paularino Avenue and Baker Street (Costa Mesa)	4	0	41,997	40	0.5	2.0%	1.00%	66.7	60	130	281	605
12	S. Plaza Drive,	between MacArthur Boulevard and Callen's Common (Santa Ana)	4	16	6,267	25	0.5	2.0%	1.00%	55.0	-	-	-	100
13	S. Plaza Drive,	between Callen's Common and Sunflower Avenue (Santa Ana)	4	16	5,559	25	0.5	2.0%	1.00%	54.5	-	-	-	92
14	Bristol Street,	between Segerstrom Avenue and MacArthur Boulevard (Santa Ana)	6	16	49,980	40	0.5	2.0%	1.00%	67.9	72	156	335	722
15	Bristol Street,	between MacArthur Boulevard and Callen's Common (Santa Ana)	6	24	53,000	40	0.5	2.0%	1.00%	68.3	77	165	355	765
16	Bristol Street,	between Callen's Common and Sunflower Avenue (Santa Ana)	6	20	51,128	40	0.5	2.0%	1.00%	68.0	74	159	343	740
17	Bristol Street,	between Sunflower Avenue and Anton Boulevard (Costa Mesa)	7	24	57,176	40	0.5	2.0%	1.00%	68.8	83	179	387	833
18	Bristol Street,	between Anton Boulevard and I-405 NB Ramps (Costa Mesa)	11	4	68,014	40	0.5	2.0%	1.00%	70.3	105	225	485	1,046
19	Bristol Street,	between I-405 NB Ramps and I-405 SB Ramps (Costa Mesa/Caltrans)	8	4	67,767	40	0.5	2.0%	1.00%	69.4	91	196	423	911
20	Bristol Street,	between I-405 SB Ramps and Paularino Avenue (Costa Mesa)	6	4	43,669	40	0.5	2.0%	1.00%	67.1	64	139	299	644
21	Bristol Street,	between Paularino Avenue and Baker Street (Costa Mesa)	6	24	45,173	40	0.5	2.0%	1.00%	67.6	69	148	319	688
22	Flower Street,	between Dyer Road and MacArthur Boulevard (Santa Ana)	4	12	16,724	35	0.5	2.0%	1.00%	61.5	-	59	126	272
23	Flower Street,	between MacArthur Boulevard and Sunflower Avenue (Santa Ana)	4	12	10,409	35	0.5	2.0%	1.00%	59.5	-	-	92	199
24	Main Street,	between Dyer Road and MacArthur Boulevard (Santa Ana)	6	10	34,100	45	0.5	2.0%	1.00%	67.3	66	143	307	662
25	Main Street,	between MacArthur Boulevard and Sunflower Avenue (Santa Ana)	6	12	26,946	45	0.5	2.0%	1.00%	66.3	-	122	264	568
26	Main Street,	between Sunflower Avenue and Red Hill Avenue (Santa Ana/Irvine)	6	25	26,919	45	0.5	2.0%	1.00%	66.5	-	126	271	585
27	Segerstrom Avenue,	between Fairview Street and Bear Street (Santa Ana)	4	15	23,363	40	0.5	2.0%	1.00%	64.3	-	90	193	416
28	Segerstrom Avenue,	between Bear Street and Bristol Street (Santa Ana)	4	14	31,174	40	0.5	2.0%	1.00%	65.5	-	108	234	504
29	Segerstrom Avenue,	between Bristol Street and Flower Street (Santa Ana)	4	14	25,422	40	0.5	2.0%	1.00%	64.6	-	95	204	439
30	Dyer Road,	between Flower Street and Main Street (Santa Ana)	4	15	31,887	40	0.5	2.0%	1.00%	65.6	-	110	238	512
31	MacArthur Boulevard,	between Fairview Street and Bear Street (Santa Ana)	6	14	34,376	40	0.5	2.0%	1.00%	66.2	-	121	260	560
32	MacArthur Boulevard,	between Bear Street and S. Plaza Drive (Santa Ana)	6	14	41,821	40	0.5	2.0%	1.00%	67.1	64	138	296	638
33	MacArthur Boulevard,	between S. Plaza Drive and Bristol Street (Santa Ana)	6	14	38,140	40	0.5	2.0%	1.00%	66.7	-	129	279	600
34	MacArthur Boulevard,	between Bristol Street and Flower Street (Santa Ana)	6	14	42,441	40	0.5	2.0%	1.00%	67.1	64	139	299	645
35	MacArthur Boulevard,	between Flower Street and Main Street (Santa Ana)	6	14	42,768	40	0.5	2.0%	1.00%	67.2	65	140	301	648
36	MacArthur Boulevard,	between Main Street and SR-55 SB Ramps (Santa Ana)	6	18	55,488	40	0.5	2.0%	1.00%	68.4	78	168	361	778
37	MacArthur Boulevard,	between SR-55 SB Ramps and SR-55 NB Ramps (Santa Ana/Irvine/Cal	6	0	56,159	40	0.5	2.0%	1.00%	68.2	76	163	351	757
38	Sunflower Avenue,	between Fairview Street and Bear Street (Santa Ana/Costa Mesa)	4	12	18,991	40	0.5	2.0%	1.00%	63.4	-	78	168	361
39	Sunflower Avenue,	between Bear Street and S. Plaza Drive (Santa Ana/Costa Mesa)	6	25	32,716	40	0.5	2.0%	1.00%	66.2	-	120	258	556
40	Sunflower Avenue,	between S. Plaza Drive and Bristol Street (Santa Ana/Costa Mesa)	6	16	32,428	40	0.5	2.0%	1.00%	66.0	-	117	251	541
41	Sunflower Avenue,	between Bristol Street and Flower Street (Santa Ana/Costa Mesa)	6	14	25,775	45	0.5	2.0%	1.00%	66.1	-	119	257	554
42	Sunflower Avenue,	between Bristol Street and Flower Street (Santa Ana/Costa Mesa)	0	0	22,406	0	0.5	2.0%	1.00%	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!
43	Bristol Street,	south of Baker Street (Santa Ana)	6	16	31,128	40	0.5	2.0%	1.00%	65.8	-	113	244	527

[1] Distance is from the centerline of the roadway segment to the receptor location.
"-" = contour is located within the roadway right-of-way.

FHWA Highway Noise Prediction Model (FHWA-RD-77-108) with California Vehicle Noise (CALVENO) Emission Levels

Project Name: Santa Ana Bristol Commons
Project Number: 194295001
Scenario: Year 2032
Ldn/CNEL: CNEL

Assumed 24-Hour Traffic Distribution:	Day	Evening	Night
Total ADT Volumes	77.70%	12.70%	9.60%
Medium-Duty Trucks	87.43%	5.05%	7.52%
Heavy-Duty Trucks	89.10%	2.84%	8.06%

							Vehicle Mix		Distance from Centerline of Roadway				
				Median	ADT	Speed	Alpha	Medium	Heavy	CNEL at	Distance to Contour			
#	Roadway	Segment	Lanes	Width	Volume	(mph)	Factor	Trucks	Trucks	100 Feet	70 CNEL	65 CNEL	60 CNEL	55 CNEL
1	Fairview Street,	between Segerstrom Avenue and MacArthur Boulevard (Santa Ana)	6	8	64,039	45	0.5	2.0%	1.00%	70.0	100	216	466	1,003
2	Fairview Street,	between MacArthur Boulevard and Sunflower Avenue (Santa Ana)	6	24	61,035	25	0.5	2.0%	1.00%	65.3	-	104	225	484
3	Fairview Street,	between Sunflower Avenue and S. Coast Drive (Costa Mesa)	6	24	54,406	40	0.5	2.0%	1.00%	68.4	78	168	361	779
4	Fairview Street,	between S. Coast Drive and I-405 NB Ramps (Costa Mesa)	6	0	65,077	40	0.5	2.0%	1.00%	68.8	83	180	387	835
5	Fairview Street,	between I-405 NB Ramps and I-405 SB Ramps (Costa Mesa/Caltrans)	6	0	49,089	40	0.5	2.0%	1.00%	67.6	69	149	321	692
6	Fairview Street,	between I-405 SB Ramps and Baker Street (Costa Mesa)	6	12	54,171	40	0.5	2.0%	1.00%	68.2	76	163	351	755
7	Bear Street,	between Segerstrom Avenue and MacArthur Boulevard (Santa Ana)	4	4	18,709	40	0.5	2.0%	1.00%	63.2	-	76	164	354
8	Bear Street,	between MacArthur Boulevard and Sunflower Avenue (Santa Ana/Costa Mesa)	6	14	19,788	40	0.5	2.0%	1.00%	63.8	-	84	180	388
9	Bear Street,	between Sunflower Avenue and S. Coast Drive (Costa Mesa)	6	24	32,047	40	0.5	2.0%	1.00%	66.1	-	118	254	547
10	Bear Street,	between S. Coast Drive and Paularino Avenue (Costa Mesa)	6	12	33,805	40	0.5	2.0%	1.00%	66.1	-	119	256	552
11	Bear Street,	between Paularino Avenue and Baker Street (Costa Mesa)	4	0	42,516	40	0.5	2.0%	1.00%	66.8	61	131	283	610
12	S. Plaza Drive,	between MacArthur Boulevard and Callen's Common (Santa Ana)	4	16	5,839	25	0.5	2.0%	1.00%	54.7	-	-	-	95
13	S. Plaza Drive,	between Callen's Common and Sunflower Avenue (Santa Ana)	4	16	5,327	25	0.5	2.0%	1.00%	54.3	-	-	-	89
14	Bristol Street,	between Segerstrom Avenue and MacArthur Boulevard (Santa Ana)	6	16	50,387	40	0.5	2.0%	1.00%	67.9	73	156	337	726
15	Bristol Street,	between MacArthur Boulevard and Callen's Common (Santa Ana)	6	24	52,509	40	0.5	2.0%	1.00%	68.2	76	164	353	761
16	Bristol Street,	between Callen's Common and Sunflower Avenue (Santa Ana)	6	20	50,994	40	0.5	2.0%	1.00%	68.0	74	159	343	739
17	Bristol Street,	between Sunflower Avenue and Anton Boulevard (Costa Mesa)	7	24	56,351	40	0.5	2.0%	1.00%	68.7	82	178	383	825
18	Bristol Street,	between Anton Boulevard and I-405 NB Ramps (Costa Mesa)	11	4	67,335	40	0.5	2.0%	1.00%	70.2	104	224	482	1,039
19	Bristol Street,	between I-405 NB Ramps and I-405 SB Ramps (Costa Mesa/Caltrans)	8	4	67,518	40	0.5	2.0%	1.00%	69.4	91	196	422	909
20	Bristol Street,	between I-405 SB Ramps and Paularino Avenue (Costa Mesa)	6	4	44,227	40	0.5	2.0%	1.00%	67.2	65	140	302	650
21	Bristol Street,	between Paularino Avenue and Baker Street (Costa Mesa)	6	24	45,759	40	0.5	2.0%	1.00%	67.6	69	149	322	694
22	Flower Street,	between Dyer Road and MacArthur Boulevard (Santa Ana)	4	12	16,964	35	0.5	2.0%	1.00%	61.6	-	59	128	275
23	Flower Street,	between MacArthur Boulevard and Sunflower Avenue (Santa Ana)	4	12	10,571	35	0.5	2.0%	1.00%	59.5	-	-	93	201
24	Main Street,	between Dyer Road and MacArthur Boulevard (Santa Ana)	6	10	34,689	45	0.5	2.0%	1.00%	67.4	67	144	311	669
25	Main Street,	between MacArthur Boulevard and Sunflower Avenue (Santa Ana)	6	12	27,400	45	0.5	2.0%	1.00%	66.4	-	124	267	574
26	Main Street,	between Sunflower Avenue and Red Hill Avenue (Santa Ana/Irvine)	6	25	27,198	45	0.5	2.0%	1.00%	66.6	-	127	273	589
27	Segerstrom Avenue,	between Fairview Street and Bear Street (Santa Ana)	4	15	23,699	40	0.5	2.0%	1.00%	64.3	-	90	195	420
28	Segerstrom Avenue,	between Bear Street and Bristol Street (Santa Ana)	4	14	31,719	40	0.5	2.0%	1.00%	65.6	-	110	236	509
29	Segerstrom Avenue,	between Bristol Street and Flower Street (Santa Ana)	4	14	25,780	40	0.5	2.0%	1.00%	64.7	-	96	206	444
30	Dyer Road,	between Flower Street and Main Street (Santa Ana)	4	15	32,365	40	0.5	2.0%	1.00%	65.7	52	111	240	517
31	MacArthur Boulevard,	between Fairview Street and Bear Street (Santa Ana)	6	14	34,887	40	0.5	2.0%	1.00%	66.3	-	122	263	566
32	MacArthur Boulevard,	between Bear Street and S. Plaza Drive (Santa Ana)	6	14	42,458	40	0.5	2.0%	1.00%	67.1	64	139	299	645
33	MacArthur Boulevard,	between S. Plaza Drive and Bristol Street (Santa Ana)	6	14	38,787	40	0.5	2.0%	1.00%	66.7	-	131	282	607
34	MacArthur Boulevard,	between Bristol Street and Flower Street (Santa Ana)	6	14	42,219	40	0.5	2.0%	1.00%	67.1	64	138	298	642
35	MacArthur Boulevard,	between Flower Street and Main Street (Santa Ana)	6	14	42,619	40	0.5	2.0%	1.00%	67.2	65	139	300	646
36	MacArthur Boulevard,	between Main Street and SR-55 SB Ramps (Santa Ana)	6	18	55,550	40	0.5	2.0%	1.00%	68.4	78	168	361	778
37	MacArthur Boulevard,	between SR-55 SB Ramps and SR-55 NB Ramps (Santa Ana/Irvine/Cal	6	0	56,615	40	0.5	2.0%	1.00%	68.2	76	164	353	761
38	Sunflower Avenue,	between Fairview Street and Bear Street (Santa Ana/Costa Mesa)	4	12	19,053	40	0.5	2.0%	1.00%	63.4	-	78	168	362
39	Sunflower Avenue,	between Bear Street and S. Plaza Drive (Santa Ana/Costa Mesa)	6	25	32,756	40	0.5	2.0%	1.00%	66.2	-	120	258	557
40	Sunflower Avenue,	between S. Plaza Drive and Bristol Street (Santa Ana/Costa Mesa)	6	16	31,752	40	0.5	2.0%	1.00%	65.9	-	115	248	534
41	Sunflower Avenue,	between Bristol Street and Flower Street (Santa Ana/Costa Mesa)	6	14	26,012	45	0.5	2.0%	1.00%	66.2	-	120	259	557
42	Sunflower Avenue,	between Bristol Street and Flower Street (Santa Ana/Costa Mesa)	0	0	22,568	0	0.5	2.0%	1.00%	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!
43	Bristol Street,	south of Baker Street (Santa Ana)	6	16	31,457	40	0.5	2.0%	1.00%	65.9	-	114	246	530

[1] Distance is from the centerline of the roadway segment to the receptor location.
"-" = contour is located within the roadway right-of-way.

FHWA Highway Noise Prediction Model (FHWA-RD-77-108) with California Vehicle Noise (CALVENO) Emission Levels

Project Name: Santa Ana Bristol Commons
Project Number: 194295001
Scenario: Year 2032+Phases 1& 2
Ldn/CNEL: CNEL

Assumed 24-Hour Traffic Distribution:	Day	Evening	Night
Total ADT Volumes	77.70%	12.70%	9.60%
Medium-Duty Trucks	87.43%	5.05%	7.52%
Heavy-Duty Trucks	89.10%	2.84%	8.06%

							Vehicle Mix		Distance from Centerline of Roadway				
				Median	ADT	Speed	Alpha	Medium	Heavy	CNEL at	Distance to Contour			
#	Roadway	Segment	Lanes	Width	Volume	(mph)	Factor	Trucks	Trucks	100 Feet	70 CNEL	65 CNEL	60 CNEL	55 CNEL
1	Fairview Street,	between Segerstrom Avenue and MacArthur Boulevard (Santa Ana)	6	8	64,064	45	0.5	2.0%	1.00%	70.0	100	216	466	1,003
2	Fairview Street,	between MacArthur Boulevard and Sunflower Avenue (Santa Ana)	6	24	61,060	25	0.5	2.0%	1.00%	65.3	-	104	225	484
3	Fairview Street,	between Sunflower Avenue and S. Coast Drive (Costa Mesa)	6	24	54,470	40	0.5	2.0%	1.00%	68.4	78	168	362	779
4	Fairview Street,	between S. Coast Drive and I-405 NB Ramps (Costa Mesa)	6	0	65,184	40	0.5	2.0%	1.00%	68.8	84	180	388	836
5	Fairview Street,	between I-405 NB Ramps and I-405 SB Ramps (Costa Mesa/Caltrans)	6	0	49,196	40	0.5	2.0%	1.00%	67.6	69	149	322	693
6	Fairview Street,	between I-405 SB Ramps and Baker Street (Costa Mesa)	6	12	54,278	40	0.5	2.0%	1.00%	68.2	76	163	351	756
7	Bear Street,	between Segerstrom Avenue and MacArthur Boulevard (Santa Ana)	4	4	18,876	40	0.5	2.0%	1.00%	63.3	-	77	165	356
8	Bear Street,	between MacArthur Boulevard and Sunflower Avenue (Santa Ana/Costa Mesa)	6	14	19,813	40	0.5	2.0%	1.00%	63.8	-	84	180	388
9	Bear Street,	between Sunflower Avenue and S. Coast Drive (Costa Mesa)	6	24	32,615	40	0.5	2.0%	1.00%	66.1	-	119	257	554
10	Bear Street,	between S. Coast Drive and Paularino Avenue (Costa Mesa)	6	12	34,332	40	0.5	2.0%	1.00%	66.2	-	120	259	557
11	Bear Street,	between Paularino Avenue and Baker Street (Costa Mesa)	4	0	42,799	40	0.5	2.0%	1.00%	66.8	61	132	284	612
12	S. Plaza Drive,	between MacArthur Boulevard and Callen's Common (Santa Ana)	4	16	6,522	25	0.5	2.0%	1.00%	55.2	-	-	-	102
13	S. Plaza Drive,	between Callen's Common and Sunflower Avenue (Santa Ana)	4	16	5,761	25	0.5	2.0%	1.00%	54.6	-	-	-	94
14	Bristol Street,	between Segerstrom Avenue and MacArthur Boulevard (Santa Ana)	6	16	51,395	40	0.5	2.0%	1.00%	68.0	74	158	341	736
15	Bristol Street,	between MacArthur Boulevard and Callen's Common (Santa Ana)	6	24	55,126	40	0.5	2.0%	1.00%	68.4	79	169	365	786
16	Bristol Street,	between Callen's Common and Sunflower Avenue (Santa Ana)	6	20	53,300	40	0.5	2.0%	1.00%	68.2	76	164	353	761
17	Bristol Street,	between Sunflower Avenue and Anton Boulevard (Costa Mesa)	7	24	59,268	40	0.5	2.0%	1.00%	69.0	85	184	396	853
18	Bristol Street,	between Anton Boulevard and I-405 NB Ramps (Costa Mesa)	11	4	70,252	40	0.5	2.0%	1.00%	70.4	107	230	496	1,068
19	Bristol Street,	between I-405 NB Ramps and I-405 SB Ramps (Costa Mesa/Caltrans)	8	4	69,802	40	0.5	2.0%	1.00%	69.5	93	200	431	929
20	Bristol Street,	between I-405 SB Ramps and Paularino Avenue (Costa Mesa)	6	4	44,616	40	0.5	2.0%	1.00%	67.2	65	141	303	654
21	Bristol Street,	between Paularino Avenue and Baker Street (Costa Mesa)	6	24	46,148	40	0.5	2.0%	1.00%	67.7	70	150	324	698
22	Flower Street,	between Dyer Road and MacArthur Boulevard (Santa Ana)	4	12	17,130	35	0.5	2.0%	1.00%	61.6	-	60	129	277
23	Flower Street,	between MacArthur Boulevard and Sunflower Avenue (Santa Ana)	4	12	10,596	35	0.5	2.0%	1.00%	59.5	-	-	93	201
24	Main Street,	between Dyer Road and MacArthur Boulevard (Santa Ana)	6	10	34,714	45	0.5	2.0%	1.00%	67.4	67	144	311	670
25	Main Street,	between MacArthur Boulevard and Sunflower Avenue (Santa Ana)	6	12	27,425	45	0.5	2.0%	1.00%	66.4	-	124	267	575
26	Main Street,	between Sunflower Avenue and Red Hill Avenue (Santa Ana/Irvine)	6	25	27,554	45	0.5	2.0%	1.00%	66.6	-	128	276	594
27	Segerstrom Avenue,	between Fairview Street and Bear Street (Santa Ana)	4	15	23,994	40	0.5	2.0%	1.00%	64.4	-	91	197	423
28	Segerstrom Avenue,	between Bear Street and Bristol Street (Santa Ana)	4	14	31,847	40	0.5	2.0%	1.00%	65.6	51	110	237	511
29	Segerstrom Avenue,	between Bristol Street and Flower Street (Santa Ana)	4	14	25,989	40	0.5	2.0%	1.00%	64.7	-	96	207	446
30	Dyer Road,	between Flower Street and Main Street (Santa Ana)	4	15	32,574	40	0.5	2.0%	1.00%	65.7	52	112	241	519
31	MacArthur Boulevard,	between Fairview Street and Bear Street (Santa Ana)	6	14	35,174	40	0.5	2.0%	1.00%	66.3	-	123	264	569
32	MacArthur Boulevard,	between Bear Street and S. Plaza Drive (Santa Ana)	6	14	42,859	40	0.5	2.0%	1.00%	67.2	65	140	301	649
33	MacArthur Boulevard,	between S. Plaza Drive and Bristol Street (Santa Ana)	6	14	39,373	40	0.5	2.0%	1.00%	66.8	-	132	285	613
34	MacArthur Boulevard,	between Bristol Street and Flower Street (Santa Ana)	6	14	44,259	40	0.5	2.0%	1.00%	67.3	66	143	308	663
35	MacArthur Boulevard,	between Flower Street and Main Street (Santa Ana)	6	14	44,494	40	0.5	2.0%	1.00%	67.3	67	143	309	665
36	MacArthur Boulevard,	between Main Street and SR-55 SB Ramps (Santa Ana)	6	18	57,425	40	0.5	2.0%	1.00%	68.5	80	171	369	796
37	MacArthur Boulevard,	between SR-55 SB Ramps and SR-55 NB Ramps (Santa Ana/Irvine/Cal	6	0	57,729	40	0.5	2.0%	1.00%	68.3	77	166	358	771
38	Sunflower Avenue,	between Fairview Street and Bear Street (Santa Ana/Costa Mesa)	4	12	19,345	40	0.5	2.0%	1.00%	63.4	-	79	170	365
39	Sunflower Avenue,	between Bear Street and S. Plaza Drive (Santa Ana/Costa Mesa)	6	25	33,390	40	0.5	2.0%	1.00%	66.3	-	121	262	564
40	Sunflower Avenue,	between S. Plaza Drive and Bristol Street (Santa Ana/Costa Mesa)	6	16	32,979	40	0.5	2.0%	1.00%	66.1	-	118	254	547
41	Sunflower Avenue,	between Bristol Street and Flower Street (Santa Ana/Costa Mesa)	6	14	26,368	45	0.5	2.0%	1.00%	66.2	-	121	261	562
42	Sunflower Avenue,	between Bristol Street and Flower Street (Santa Ana/Costa Mesa)	0	0	22,924	0	0.5	2.0%	1.00%	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!
43	Bristol Street,	south of Baker Street (Santa Ana)	6	16	31,846	40	0.5	2.0%	1.00%	65.9	-	115	248	535

[1] Distance is from the centerline of the roadway segment to the receptor location.
"-" = contour is located within the roadway right-of-way.

FHWA Highway Noise Prediction Model (FHWA-RD-77-108) with California Vehicle Noise (CALVENO) Emission Levels

Project Name: Santa Ana Bristol Commons
Project Number: 194295001
Scenario: Year 2036
Ldn/CNEL: CNEL

Assumed 24-Hour Traffic Distribution:	Day	Evening	Night
Total ADT Volumes	77.70%	12.70%	9.60%
Medium-Duty Trucks	87.43%	5.05%	7.52%
Heavy-Duty Trucks	89.10%	2.84%	8.06%

							Vehicle Mix		Distance from Centerline of Roadway				
				Median	ADT	Speed	Alpha	Medium	Heavy	CNEL at	Distance to Contour			
#	Roadway	Segment	Lanes	Width	Volume	(mph)	Factor	Trucks	Trucks	100 Feet	70 CNEL	65 CNEL	60 CNEL	55 CNEL
1	Fairview Street,	between Segerstrom Avenue and MacArthur Boulevard (Santa Ana)	6	8	66,318	45	0.5	2.0%	1.00%	70.2	103	221	477	1,027
2	Fairview Street,	between MacArthur Boulevard and Sunflower Avenue (Santa Ana)	6	24	63,196	25	0.5	2.0%	1.00%	65.4	-	107	230	495
3	Fairview Street,	between Sunflower Avenue and S. Coast Drive (Costa Mesa)	6	24	56,339	40	0.5	2.0%	1.00%	68.5	80	172	370	797
4	Fairview Street,	between S. Coast Drive and I-405 NB Ramps (Costa Mesa)	6	0	67,391	40	0.5	2.0%	1.00%	69.0	85	184	397	854
5	Fairview Street,	between I-405 NB Ramps and I-405 SB Ramps (Costa Mesa/Caltrans)	6	0	50,825	40	0.5	2.0%	1.00%	67.8	71	153	329	708
6	Fairview Street,	between I-405 SB Ramps and Baker Street (Costa Mesa)	6	12	56,092	40	0.5	2.0%	1.00%	68.3	77	167	359	773
7	Bear Street,	between Segerstrom Avenue and MacArthur Boulevard (Santa Ana)	4	4	19,327	40	0.5	2.0%	1.00%	63.4	-	78	168	362
8	Bear Street,	between MacArthur Boulevard and Sunflower Avenue (Santa Ana/Costa Mesa)	6	14	20,320	40	0.5	2.0%	1.00%	63.9	-	85	183	395
9	Bear Street,	between Sunflower Avenue and S. Coast Drive (Costa Mesa)	6	24	33,258	40	0.5	2.0%	1.00%	66.2	-	121	260	561
10	Bear Street,	between S. Coast Drive and Paularino Avenue (Costa Mesa)	6	12	35,091	40	0.5	2.0%	1.00%	66.3	-	122	262	565
11	Bear Street,	between Paularino Avenue and Baker Street (Costa Mesa)	4	0	44,069	40	0.5	2.0%	1.00%	66.9	62	134	290	624
12	S. Plaza Drive,	between MacArthur Boulevard and Callen's Common (Santa Ana)	4	16	6,314	25	0.5	2.0%	1.00%	55.0	-	-	-	100
13	S. Plaza Drive,	between Callen's Common and Sunflower Avenue (Santa Ana)	4	16	5,744	25	0.5	2.0%	1.00%	54.6	-	-	-	94
14	Bristol Street,	between Segerstrom Avenue and MacArthur Boulevard (Santa Ana)	6	16	52,195	40	0.5	2.0%	1.00%	68.1	74	160	345	743
15	Bristol Street,	between MacArthur Boulevard and Callen's Common (Santa Ana)	6	24	54,449	40	0.5	2.0%	1.00%	68.4	78	168	362	779
16	Bristol Street,	between Callen's Common and Sunflower Avenue (Santa Ana)	6	20	52,880	40	0.5	2.0%	1.00%	68.2	76	163	351	757
17	Bristol Street,	between Sunflower Avenue and Anton Boulevard (Costa Mesa)	7	24	59,000	40	0.5	2.0%	1.00%	68.9	85	183	395	850
18	Bristol Street,	between Anton Boulevard and I-405 NB Ramps (Costa Mesa)	11	4	70,275	40	0.5	2.0%	1.00%	70.4	107	230	496	1,069
19	Bristol Street,	between I-405 NB Ramps and I-405 SB Ramps (Costa Mesa/Caltrans)	8	4	70,211	40	0.5	2.0%	1.00%	69.5	93	201	433	933
20	Bristol Street,	between I-405 SB Ramps and Paularino Avenue (Costa Mesa)	6	4	45,846	40	0.5	2.0%	1.00%	67.3	67	143	309	665
21	Bristol Street,	between Paularino Avenue and Baker Street (Costa Mesa)	6	24	47,434	40	0.5	2.0%	1.00%	67.8	71	153	330	711
22	Flower Street,	between Dyer Road and MacArthur Boulevard (Santa Ana)	4	12	17,530	35	0.5	2.0%	1.00%	61.7	-	61	130	281
23	Flower Street,	between MacArthur Boulevard and Sunflower Avenue (Santa Ana)	4	12	10,944	35	0.5	2.0%	1.00%	59.7	-	-	95	205
24	Main Street,	between Dyer Road and MacArthur Boulevard (Santa Ana)	6	10	35,916	45	0.5	2.0%	1.00%	67.5	68	148	318	685
25	Main Street,	between MacArthur Boulevard and Sunflower Avenue (Santa Ana)	6	12	28,357	45	0.5	2.0%	1.00%	66.5	-	127	273	587
26	Main Street,	between Sunflower Avenue and Red Hill Avenue (Santa Ana/Irvine)	6	25	28,191	45	0.5	2.0%	1.00%	66.7	-	130	280	603
27	Segerstrom Avenue,	between Fairview Street and Bear Street (Santa Ana)	4	15	24,468	40	0.5	2.0%	1.00%	64.5	-	92	199	429
28	Segerstrom Avenue,	between Bear Street and Bristol Street (Santa Ana)	4	14	32,880	40	0.5	2.0%	1.00%	65.8	52	112	242	522
29	Segerstrom Avenue,	between Bristol Street and Flower Street (Santa Ana)	4	14	26,667	40	0.5	2.0%	1.00%	64.9	-	98	211	454
30	Dyer Road,	between Flower Street and Main Street (Santa Ana)	4	15	33,492	40	0.5	2.0%	1.00%	65.9	53	114	245	529
31	MacArthur Boulevard,	between Fairview Street and Bear Street (Santa Ana)	6	14	36,005	40	0.5	2.0%	1.00%	66.4	-	124	268	578
32	MacArthur Boulevard,	between Bear Street and S. Plaza Drive (Santa Ana)	6	14	43,976	40	0.5	2.0%	1.00%	67.3	66	142	306	660
33	MacArthur Boulevard,	between S. Plaza Drive and Bristol Street (Santa Ana)	6	14	40,435	40	0.5	2.0%	1.00%	66.9	-	134	290	624
34	MacArthur Boulevard,	between Bristol Street and Flower Street (Santa Ana)	6	14	44,014	40	0.5	2.0%	1.00%	67.3	66	142	307	660
35	MacArthur Boulevard,	between Flower Street and Main Street (Santa Ana)	6	14	44,515	40	0.5	2.0%	1.00%	67.3	67	143	309	665
36	MacArthur Boulevard,	between Main Street and SR-55 SB Ramps (Santa Ana)	6	18	57,870	40	0.5	2.0%	1.00%	68.5	80	172	371	800
37	MacArthur Boulevard,	between SR-55 SB Ramps and SR-55 NB Ramps (Santa Ana/Irvine/Cal	6	0	58,839	40	0.5	2.0%	1.00%	68.4	78	168	362	781
38	Sunflower Avenue,	between Fairview Street and Bear Street (Santa Ana/Costa Mesa)	4	12	19,706	40	0.5	2.0%	1.00%	63.5	-	80	172	370
39	Sunflower Avenue,	between Bear Street and S. Plaza Drive (Santa Ana/Costa Mesa)	6	25	34,478	40	0.5	2.0%	1.00%	66.4	-	124	267	576
40	Sunflower Avenue,	between S. Plaza Drive and Bristol Street (Santa Ana/Costa Mesa)	6	16	33,676	40	0.5	2.0%	1.00%	66.2	-	120	258	555
41	Sunflower Avenue,	between Bristol Street and Flower Street (Santa Ana/Costa Mesa)	6	14	26,923	45	0.5	2.0%	1.00%	66.3	-	123	265	570
42	Sunflower Avenue,	between Bristol Street and Flower Street (Santa Ana/Costa Mesa)	0	0	23,327	0	0.5	2.0%	1.00%	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!
43	Bristol Street,	south of Baker Street (Santa Ana)	6	16	32,615	40	0.5	2.0%	1.00%	66.0	-	117	252	543

[1] Distance is from the centerline of the roadway segment to the receptor location.
"-" = contour is located within the roadway right-of-way.

FHWA Highway Noise Prediction Model (FHWA-RD-77-108) with California Vehicle Noise (CALVENO) Emission Levels

Project Name: Santa Ana Bristol Commons
Project Number: 194295001
Scenario: Year 2036+Phases 1, 2 & 3
Ldn/CNEL: CNEL

Assumed 24-Hour Traffic Distribution:	Day	Evening	Night
Total ADT Volumes	77.70%	12.70%	9.60%
Medium-Duty Trucks	87.43%	5.05%	7.52%
Heavy-Duty Trucks	89.10%	2.84%	8.06%

							Vehicle Mix		Distance from Centerline of Roadway				
				Median	ADT	Speed	Alpha	Medium	Heavy	CNEL at	Distance to Contour			
#	Roadway	Segment	Lanes	Width	Volume	(mph)	Factor	Trucks	Trucks	100 Feet	70 CNEL	65 CNEL	60 CNEL	55 CNEL
1	Fairview Street,	between Segerstrom Avenue and MacArthur Boulevard (Santa Ana)	6	8	66,343	45	0.5	2.0%	1.00%	70.2	103	221	477	1,027
2	Fairview Street,	between MacArthur Boulevard and Sunflower Avenue (Santa Ana)	6	24	63,221	25	0.5	2.0%	1.00%	65.4	-	107	230	495
3	Fairview Street,	between Sunflower Avenue and S. Coast Drive (Costa Mesa)	6	24	56,403	40	0.5	2.0%	1.00%	68.5	80	172	370	798
4	Fairview Street,	between S. Coast Drive and I-405 NB Ramps (Costa Mesa)	6	0	67,443	40	0.5	2.0%	1.00%	69.0	85	184	397	855
5	Fairview Street,	between I-405 NB Ramps and I-405 SB Ramps (Costa Mesa/Caltrans)	6	0	50,877	40	0.5	2.0%	1.00%	67.8	71	153	329	708
6	Fairview Street,	between I-405 SB Ramps and Baker Street (Costa Mesa)	6	12	56,144	40	0.5	2.0%	1.00%	68.3	77	167	359	774
7	Bear Street,	between Segerstrom Avenue and MacArthur Boulevard (Santa Ana)	4	4	19,352	40	0.5	2.0%	1.00%	63.4	-	78	168	362
8	Bear Street,	between MacArthur Boulevard and Sunflower Avenue (Santa Ana/Costa Mesa)	6	14	20,345	40	0.5	2.0%	1.00%	63.9	-	85	183	395
9	Bear Street,	between Sunflower Avenue and S. Coast Drive (Costa Mesa)	6	24	33,718	40	0.5	2.0%	1.00%	66.3	-	122	263	566
10	Bear Street,	between S. Coast Drive and Paularino Avenue (Costa Mesa)	6	12	35,564	40	0.5	2.0%	1.00%	66.3	-	123	265	571
11	Bear Street,	between Paularino Avenue and Baker Street (Costa Mesa)	4	0	44,298	40	0.5	2.0%	1.00%	67.0	63	135	291	626
12	S. Plaza Drive,	between MacArthur Boulevard and Callen's Common (Santa Ana)	4	16	6,742	25	0.5	2.0%	1.00%	55.3	-	-	-	105
13	S. Plaza Drive,	between Callen's Common and Sunflower Avenue (Santa Ana)	4	16	6,242	25	0.5	2.0%	1.00%	55.0	-	-	-	99
14	Bristol Street,	between Segerstrom Avenue and MacArthur Boulevard (Santa Ana)	6	16	53,086	40	0.5	2.0%	1.00%	68.1	75	162	349	752
15	Bristol Street,	between MacArthur Boulevard and Callen's Common (Santa Ana)	6	24	57,194	40	0.5	2.0%	1.00%	68.6	81	173	374	805
16	Bristol Street,	between Callen's Common and Sunflower Avenue (Santa Ana)	6	20	55,336	40	0.5	2.0%	1.00%	68.4	78	168	362	780
17	Bristol Street,	between Sunflower Avenue and Anton Boulevard (Costa Mesa)	7	24	62,422	40	0.5	2.0%	1.00%	69.2	88	190	410	883
18	Bristol Street,	between Anton Boulevard and I-405 NB Ramps (Costa Mesa)	11	4	73,697	40	0.5	2.0%	1.00%	70.6	110	238	512	1,103
19	Bristol Street,	between I-405 NB Ramps and I-405 SB Ramps (Costa Mesa/Caltrans)	8	4	72,873	40	0.5	2.0%	1.00%	69.7	96	206	444	956
20	Bristol Street,	between I-405 SB Ramps and Paularino Avenue (Costa Mesa)	6	4	46,231	40	0.5	2.0%	1.00%	67.4	67	144	311	669
21	Bristol Street,	between Paularino Avenue and Baker Street (Costa Mesa)	6	24	47,819	40	0.5	2.0%	1.00%	67.8	71	154	332	715
22	Flower Street,	between Dyer Road and MacArthur Boulevard (Santa Ana)	4	12	17,587	35	0.5	2.0%	1.00%	61.7	-	61	131	282
23	Flower Street,	between MacArthur Boulevard and Sunflower Avenue (Santa Ana)	4	12	10,969	35	0.5	2.0%	1.00%	59.7	-	-	95	206
24	Main Street,	between Dyer Road and MacArthur Boulevard (Santa Ana)	6	10	35,941	45	0.5	2.0%	1.00%	67.5	69	148	318	685
25	Main Street,	between MacArthur Boulevard and Sunflower Avenue (Santa Ana)	6	12	28,382	45	0.5	2.0%	1.00%	66.5	-	127	273	588
26	Main Street,	between Sunflower Avenue and Red Hill Avenue (Santa Ana/Irvine)	6	25	28,543	45	0.5	2.0%	1.00%	66.8	-	131	282	608
27	Segerstrom Avenue,	between Fairview Street and Bear Street (Santa Ana)	4	15	24,545	40	0.5	2.0%	1.00%	64.5	-	93	200	430
28	Segerstrom Avenue,	between Bear Street and Bristol Street (Santa Ana)	4	14	33,008	40	0.5	2.0%	1.00%	65.8	52	113	243	523
29	Segerstrom Avenue,	between Bristol Street and Flower Street (Santa Ana)	4	14	26,767	40	0.5	2.0%	1.00%	64.9	-	98	211	455
30	Dyer Road,	between Flower Street and Main Street (Santa Ana)	4	15	33,592	40	0.5	2.0%	1.00%	65.9	53	114	246	530
31	MacArthur Boulevard,	between Fairview Street and Bear Street (Santa Ana)	6	14	36,030	40	0.5	2.0%	1.00%	66.4	-	125	268	578
32	MacArthur Boulevard,	between Bear Street and S. Plaza Drive (Santa Ana)	6	14	44,001	40	0.5	2.0%	1.00%	67.3	66	142	307	660
33	MacArthur Boulevard,	between S. Plaza Drive and Bristol Street (Santa Ana)	6	14	40,737	40	0.5	2.0%	1.00%	67.0	-	135	291	627
34	MacArthur Boulevard,	between Bristol Street and Flower Street (Santa Ana)	6	14	46,188	40	0.5	2.0%	1.00%	67.5	68	147	317	682
35	MacArthur Boulevard,	between Flower Street and Main Street (Santa Ana)	6	14	46,632	40	0.5	2.0%	1.00%	67.5	69	148	319	686
36	MacArthur Boulevard,	between Main Street and SR-55 SB Ramps (Santa Ana)	6	18	59,987	40	0.5	2.0%	1.00%	68.7	82	176	380	819
37	MacArthur Boulevard,	between SR-55 SB Ramps and SR-55 NB Ramps (Santa Ana/Irvine/Cal	6	0	60,072	40	0.5	2.0%	1.00%	68.5	79	171	367	791
38	Sunflower Avenue,	between Fairview Street and Bear Street (Santa Ana/Costa Mesa)	4	12	19,998	40	0.5	2.0%	1.00%	63.6	-	80	173	374
39	Sunflower Avenue,	between Bear Street and S. Plaza Drive (Santa Ana/Costa Mesa)	6	25	35,003	40	0.5	2.0%	1.00%	66.5	-	125	270	582
40	Sunflower Avenue,	between S. Plaza Drive and Bristol Street (Santa Ana/Costa Mesa)	6	16	35,255	40	0.5	2.0%	1.00%	66.4	-	123	266	572
41	Sunflower Avenue,	between Bristol Street and Flower Street (Santa Ana/Costa Mesa)	6	14	27,275	45	0.5	2.0%	1.00%	66.4	-	124	267	575
42	Sunflower Avenue,	between Bristol Street and Flower Street (Santa Ana/Costa Mesa)	0	0	23,679	0	0.5	2.0%	1.00%	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!
43	Bristol Street,	south of Baker Street (Santa Ana)	6	16	33,000	40	0.5	2.0%	1.00%	66.1	-	118	254	547

[1] Distance is from the centerline of the roadway segment to the receptor location.
"-" = contour is located within the roadway right-of-way.

FHWA Highway Noise Prediction Model (FHWA-RD-77-108) with California Vehicle Noise (CALVENO) Emission Levels

Project Name: Santa Ana Bristol Commons
Project Number: 194295001
Scenario: Year 2045
Ldn/CNEL: CNEL

Assumed 24-Hour Traffic Distribution:	Day	Evening	Night
Total ADT Volumes	77.70%	12.70%	9.60%
Medium-Duty Trucks	87.43%	5.05%	7.52%
Heavy-Duty Trucks	89.10%	2.84%	8.06%

							Vehicle Mix		Distance from Centerline of Roadway				
				Median	ADT	Speed	Alpha	Medium	Heavy	CNEL at	Distance to Contour			
#	Roadway	Segment	Lanes	Width	Volume	(mph)	Factor	Trucks	Trucks	100 Feet	70 CNEL	65 CNEL	60 CNEL	55 CNEL
1	Fairview Street,	between Segerstrom Avenue and MacArthur Boulevard (Santa Ana)	6	8	69,634	45	0.5	2.0%	1.00%	70.4	106	229	492	1,061
2	Fairview Street,	between MacArthur Boulevard and Sunflower Avenue (Santa Ana)	6	24	66,356	25	0.5	2.0%	1.00%	65.6	-	110	237	512
3	Fairview Street,	between Sunflower Avenue and S. Coast Drive (Costa Mesa)	6	24	59,156	40	0.5	2.0%	1.00%	68.7	82	177	382	823
4	Fairview Street,	between S. Coast Drive and I-405 NB Ramps (Costa Mesa)	6	0	70,761	40	0.5	2.0%	1.00%	69.2	88	190	410	883
5	Fairview Street,	between I-405 NB Ramps and I-405 SB Ramps (Costa Mesa/Caltrans)	6	0	53,366	40	0.5	2.0%	1.00%	68.0	73	158	339	731
6	Fairview Street,	between I-405 SB Ramps and Baker Street (Costa Mesa)	6	12	58,897	40	0.5	2.0%	1.00%	68.5	80	172	371	799
7	Bear Street,	between Segerstrom Avenue and MacArthur Boulevard (Santa Ana)	4	4	20,293	40	0.5	2.0%	1.00%	63.6	-	81	173	374
8	Bear Street,	between MacArthur Boulevard and Sunflower Avenue (Santa Ana/Costa Mesa)	6	14	21,336	40	0.5	2.0%	1.00%	64.2	-	88	189	408
9	Bear Street,	between Sunflower Avenue and S. Coast Drive (Costa Mesa)	6	24	34,921	40	0.5	2.0%	1.00%	66.4	-	125	269	579
10	Bear Street,	between S. Coast Drive and Paularino Avenue (Costa Mesa)	6	12	36,846	40	0.5	2.0%	1.00%	66.5	-	126	271	584
11	Bear Street,	between Paularino Avenue and Baker Street (Costa Mesa)	4	0	46,272	40	0.5	2.0%	1.00%	67.1	64	139	299	645
12	S. Plaza Drive,	between MacArthur Boulevard and Callen's Common (Santa Ana)	4	16	6,630	25	0.5	2.0%	1.00%	55.2	-	-	-	104
13	S. Plaza Drive,	between Callen's Common and Sunflower Avenue (Santa Ana)	4	16	5,780	25	0.5	2.0%	1.00%	54.6	-	-	-	94
14	Bristol Street,	between Segerstrom Avenue and MacArthur Boulevard (Santa Ana)	6	16	54,805	40	0.5	2.0%	1.00%	68.3	77	165	356	768
15	Bristol Street,	between MacArthur Boulevard and Callen's Common (Santa Ana)	6	24	57,171	40	0.5	2.0%	1.00%	68.6	80	173	374	805
16	Bristol Street,	between Callen's Common and Sunflower Avenue (Santa Ana)	6	20	55,524	40	0.5	2.0%	1.00%	68.4	78	168	363	782
17	Bristol Street,	between Sunflower Avenue and Anton Boulevard (Costa Mesa)	7	24	61,950	40	0.5	2.0%	1.00%	69.2	88	189	408	879
18	Bristol Street,	between Anton Boulevard and I-405 NB Ramps (Costa Mesa)	11	4	73,789	40	0.5	2.0%	1.00%	70.6	110	238	512	1,104
19	Bristol Street,	between I-405 NB Ramps and I-405 SB Ramps (Costa Mesa/Caltrans)	8	4	73,722	40	0.5	2.0%	1.00%	69.8	96	208	447	964
20	Bristol Street,	between I-405 SB Ramps and Paularino Avenue (Costa Mesa)	6	4	48,138	40	0.5	2.0%	1.00%	67.6	69	148	319	687
21	Bristol Street,	between Paularino Avenue and Baker Street (Costa Mesa)	6	24	49,806	40	0.5	2.0%	1.00%	68.0	73	158	341	734
22	Flower Street,	between Dyer Road and MacArthur Boulevard (Santa Ana)	4	12	18,407	35	0.5	2.0%	1.00%	61.9	-	63	135	290
23	Flower Street,	between MacArthur Boulevard and Sunflower Avenue (Santa Ana)	4	12	11,491	35	0.5	2.0%	1.00%	59.9	-	-	98	212
24	Main Street,	between Dyer Road and MacArthur Boulevard (Santa Ana)	6	10	37,712	45	0.5	2.0%	1.00%	67.7	71	152	328	708
25	Main Street,	between MacArthur Boulevard and Sunflower Avenue (Santa Ana)	6	12	29,775	45	0.5	2.0%	1.00%	66.7	-	131	282	607
26	Main Street,	between Sunflower Avenue and Red Hill Avenue (Santa Ana/Irvine)	6	25	29,601	45	0.5	2.0%	1.00%	66.9	-	134	289	623
27	Segerstrom Avenue,	between Fairview Street and Bear Street (Santa Ana)	4	15	24,629	40	0.5	2.0%	1.00%	64.5	-	93	200	431
28	Segerstrom Avenue,	between Bear Street and Bristol Street (Santa Ana)	4	14	34,524	40	0.5	2.0%	1.00%	66.0	54	116	250	539
29	Segerstrom Avenue,	between Bristol Street and Flower Street (Santa Ana)	4	14	27,540	40	0.5	2.0%	1.00%	65.0	-	100	215	464
30	Dyer Road,	between Flower Street and Main Street (Santa Ana)	4	15	34,666	40	0.5	2.0%	1.00%	66.0	54	117	251	541
31	MacArthur Boulevard,	between Fairview Street and Bear Street (Santa Ana)	6	14	37,805	40	0.5	2.0%	1.00%	66.6	-	129	277	597
32	MacArthur Boulevard,	between Bear Street and S. Plaza Drive (Santa Ana)	6	14	46,175	40	0.5	2.0%	1.00%	67.5	68	147	317	682
33	MacArthur Boulevard,	between S. Plaza Drive and Bristol Street (Santa Ana)	6	14	42,457	40	0.5	2.0%	1.00%	67.1	64	139	299	645
34	MacArthur Boulevard,	between Bristol Street and Flower Street (Santa Ana)	6	14	46,215	40	0.5	2.0%	1.00%	67.5	68	147	317	682
35	MacArthur Boulevard,	between Flower Street and Main Street (Santa Ana)	6	14	46,741	40	0.5	2.0%	1.00%	67.6	69	148	319	687
36	MacArthur Boulevard,	between Main Street and SR-55 SB Ramps (Santa Ana)	6	18	60,764	40	0.5	2.0%	1.00%	68.8	83	178	383	826
37	MacArthur Boulevard,	between SR-55 SB Ramps and SR-55 NB Ramps (Santa Ana/Irvine/Cal	6	0	71,625	40	0.5	2.0%	1.00%	69.2	89	192	413	890
38	Sunflower Avenue,	between Fairview Street and Bear Street (Santa Ana/Costa Mesa)	4	12	20,691	40	0.5	2.0%	1.00%	63.7	-	82	177	382
39	Sunflower Avenue,	between Bear Street and S. Plaza Drive (Santa Ana/Costa Mesa)	6	25	36,202	40	0.5	2.0%	1.00%	66.6	-	128	276	595
40	Sunflower Avenue,	between S. Plaza Drive and Bristol Street (Santa Ana/Costa Mesa)	6	16	35,360	40	0.5	2.0%	1.00%	66.4	-	124	266	573
41	Sunflower Avenue,	between Bristol Street and Flower Street (Santa Ana/Costa Mesa)	6	14	28,269	45	0.5	2.0%	1.00%	66.5	-	127	273	589
42	Sunflower Avenue,	between Bristol Street and Flower Street (Santa Ana/Costa Mesa)	0	0	24,493	0	0.5	2.0%	1.00%	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!
43	Bristol Street,	south of Baker Street (Santa Ana)	6	16	34,246	40	0.5	2.0%	1.00%	66.2	-	121	260	561

[1] Distance is from the centerline of the roadway segment to the receptor location.
"-" = contour is located within the roadway right-of-way.

FHWA Highway Noise Prediction Model (FHWA-RD-77-108) with California Vehicle Noise (CALVENO) Emission Levels

Project Name: Santa Ana Bristol Commons
Project Number: 194295001
Scenario: Year 2045+Phases 1, 2 & 3
Ldn/CNEL: CNEL

Assumed 24-Hour Traffic Distribution:	Day	Evening	Night
Total ADT Volumes	77.70%	12.70%	9.60%
Medium-Duty Trucks	87.43%	5.05%	7.52%
Heavy-Duty Trucks	89.10%	2.84%	8.06%

							Vehicle Mix		Distance from Centerline of Roadway				
				Median	ADT	Speed	Alpha	Medium	Heavy	CNEL at	Distance to Contour			
#	Roadway	Segment	Lanes	Width	Volume	(mph)	Factor	Trucks	Trucks	100 Feet	70 CNEL	65 CNEL	60 CNEL	55 CNEL
1	Fairview Street,	between Segerstrom Avenue and MacArthur Boulevard (Santa Ana)	6	8	69,659	45	0.5	2.0%	1.00%	70.4	106	229	493	1,061
2	Fairview Street,	between MacArthur Boulevard and Sunflower Avenue (Santa Ana)	6	24	66,381	25	0.5	2.0%	1.00%	65.6	-	110	238	512
3	Fairview Street,	between Sunflower Avenue and S. Coast Drive (Costa Mesa)	6	24	59,220	40	0.5	2.0%	1.00%	68.7	82	178	382	824
4	Fairview Street,	between S. Coast Drive and I-405 NB Ramps (Costa Mesa)	6	0	70,813	40	0.5	2.0%	1.00%	69.2	88	190	410	883
5	Fairview Street,	between I-405 NB Ramps and I-405 SB Ramps (Costa Mesa/Caltrans)	6	0	53,418	40	0.5	2.0%	1.00%	68.0	73	158	340	732
6	Fairview Street,	between I-405 SB Ramps and Baker Street (Costa Mesa)	6	12	58,949	40	0.5	2.0%	1.00%	68.5	80	172	371	799
7	Bear Street,	between Segerstrom Avenue and MacArthur Boulevard (Santa Ana)	4	4	20,318	40	0.5	2.0%	1.00%	63.6	-	81	174	374
8	Bear Street,	between MacArthur Boulevard and Sunflower Avenue (Santa Ana/Costa Mesa)	6	14	21,361	40	0.5	2.0%	1.00%	64.2	-	88	189	408
9	Bear Street,	between Sunflower Avenue and S. Coast Drive (Costa Mesa)	6	24	35,381	40	0.5	2.0%	1.00%	66.5	-	126	271	585
10	Bear Street,	between S. Coast Drive and Paularino Avenue (Costa Mesa)	6	12	37,319	40	0.5	2.0%	1.00%	66.6	-	127	273	589
11	Bear Street,	between Paularino Avenue and Baker Street (Costa Mesa)	4	0	46,501	40	0.5	2.0%	1.00%	67.2	65	139	300	647
12	S. Plaza Drive,	between MacArthur Boulevard and Callen's Common (Santa Ana)	4	16	7,058	25	0.5	2.0%	1.00%	55.5	-	-	-	108
13	S. Plaza Drive,	between Callen's Common and Sunflower Avenue (Santa Ana)	4	16	6,278	25	0.5	2.0%	1.00%	55.0	-	-	-	100
14	Bristol Street,	between Segerstrom Avenue and MacArthur Boulevard (Santa Ana)	6	16	55,696	40	0.5	2.0%	1.00%	68.3	78	167	360	776
15	Bristol Street,	between MacArthur Boulevard and Callen's Common (Santa Ana)	6	24	59,916	40	0.5	2.0%	1.00%	68.8	83	179	385	830
16	Bristol Street,	between Callen's Common and Sunflower Avenue (Santa Ana)	6	20	57,980	40	0.5	2.0%	1.00%	68.6	80	173	373	805
17	Bristol Street,	between Sunflower Avenue and Anton Boulevard (Costa Mesa)	7	24	65,372	40	0.5	2.0%	1.00%	69.4	91	196	423	911
18	Bristol Street,	between Anton Boulevard and I-405 NB Ramps (Costa Mesa)	11	4	77,211	40	0.5	2.0%	1.00%	70.8	114	245	528	1,138
19	Bristol Street,	between I-405 NB Ramps and I-405 SB Ramps (Costa Mesa/Caltrans)	8	4	76,384	40	0.5	2.0%	1.00%	69.9	99	213	458	987
20	Bristol Street,	between I-405 SB Ramps and Paularino Avenue (Costa Mesa)	6	4	48,523	40	0.5	2.0%	1.00%	67.6	69	149	321	691
21	Bristol Street,	between Paularino Avenue and Baker Street (Costa Mesa)	6	24	50,191	40	0.5	2.0%	1.00%	68.0	74	159	343	738
22	Flower Street,	between Dyer Road and MacArthur Boulevard (Santa Ana)	4	12	18,464	35	0.5	2.0%	1.00%	62.0	-	63	135	291
23	Flower Street,	between MacArthur Boulevard and Sunflower Avenue (Santa Ana)	4	12	11,516	35	0.5	2.0%	1.00%	59.9	-	-	99	212
24	Main Street,	between Dyer Road and MacArthur Boulevard (Santa Ana)	6	10	37,737	45	0.5	2.0%	1.00%	67.7	71	153	329	708
25	Main Street,	between MacArthur Boulevard and Sunflower Avenue (Santa Ana)	6	12	29,800	45	0.5	2.0%	1.00%	66.8	-	131	282	607
26	Main Street,	between Sunflower Avenue and Red Hill Avenue (Santa Ana/Irvine)	6	25	29,953	45	0.5	2.0%	1.00%	67.0	-	135	292	628
27	Segerstrom Avenue,	between Fairview Street and Bear Street (Santa Ana)	4	15	24,706	40	0.5	2.0%	1.00%	64.5	-	93	200	432
28	Segerstrom Avenue,	between Bear Street and Bristol Street (Santa Ana)	4	14	34,652	40	0.5	2.0%	1.00%	66.0	54	116	251	540
29	Segerstrom Avenue,	between Bristol Street and Flower Street (Santa Ana)	4	14	27,640	40	0.5	2.0%	1.00%	65.0	-	100	216	465
30	Dyer Road,	between Flower Street and Main Street (Santa Ana)	4	15	34,766	40	0.5	2.0%	1.00%	66.0	54	117	252	542
31	MacArthur Boulevard,	between Fairview Street and Bear Street (Santa Ana)	6	14	37,830	40	0.5	2.0%	1.00%	66.6	-	129	277	597
32	MacArthur Boulevard,	between Bear Street and S. Plaza Drive (Santa Ana)	6	14	46,200	40	0.5	2.0%	1.00%	67.5	68	147	317	682
33	MacArthur Boulevard,	between S. Plaza Drive and Bristol Street (Santa Ana)	6	14	42,759	40	0.5	2.0%	1.00%	67.2	65	140	301	648
34	MacArthur Boulevard,	between Bristol Street and Flower Street (Santa Ana)	6	14	48,389	40	0.5	2.0%	1.00%	67.7	70	152	327	704
35	MacArthur Boulevard,	between Flower Street and Main Street (Santa Ana)	6	14	48,858	40	0.5	2.0%	1.00%	67.8	71	153	329	708
36	MacArthur Boulevard,	between Main Street and SR-55 SB Ramps (Santa Ana)	6	18	62,881	40	0.5	2.0%	1.00%	68.9	85	182	392	845
37	MacArthur Boulevard,	between SR-55 SB Ramps and SR-55 NB Ramps (Santa Ana/Irvine/Cal	6	0	72,858	40	0.5	2.0%	1.00%	69.3	90	194	418	900
38	Sunflower Avenue,	between Fairview Street and Bear Street (Santa Ana/Costa Mesa)	4	12	20,983	40	0.5	2.0%	1.00%	63.8	-	83	179	386
39	Sunflower Avenue,	between Bear Street and S. Plaza Drive (Santa Ana/Costa Mesa)	6	25	36,727	40	0.5	2.0%	1.00%	66.7	-	129	279	601
40	Sunflower Avenue,	between S. Plaza Drive and Bristol Street (Santa Ana/Costa Mesa)	6	16	36,939	40	0.5	2.0%	1.00%	66.6	-	127	274	590
41	Sunflower Avenue,	between Bristol Street and Flower Street (Santa Ana/Costa Mesa)	6	14	28,621	45	0.5	2.0%	1.00%	66.6	-	128	276	594
42	Sunflower Avenue,	between Bristol Street and Flower Street (Santa Ana/Costa Mesa)	0	0	24,845	0	0.5	2.0%	1.00%	#NUM!	#NUM!	#NUM!	#NUM!	#NUM!
43	Bristol Street,	south of Baker Street (Santa Ana)	6	16	34,631	40	0.5	2.0%	1.00%	66.3	-	122	262	565

[1] Distance is from the centerline of the roadway segment to the receptor location.
"-" = contour is located within the roadway right-of-way.