

4.6 Noise

4.6.1 Methodology

This section describes the existing conditions of the Arroyo Seco Canyon Project (ASCP) Areas 2 and 3 (Project/proposed Project) site and vicinity, identifies associated regulatory requirements, evaluates potential impacts, and identifies mitigation measures related to implementation of the proposed Project. The analysis of the Project impacts related to noise and vibration is based on:

Appendix G: Field Noise Measurement Data, December 2019; Construction Noise Modeling Input/Output, February 2020; and Traffic Noise Modeling Input/Output (during Construction), February 2020

Although not a part of the proposed Project, there are specific components in Area 2 that are approved to move forward without additional environmental review that are included in the equipment and activity assumptions that constitute the basis for the noise analysis and this section. The improvements to be conducted in Area 2, which have been previously approved to proceed in accordance with the 2015 ASCP MND, include:

1. Removal of existing K-rails along an approximate 150-foot-long segment of the Gabrielino Trail/Access Road between Bridge No. 3 and the intake structure, and
2. Stabilization and repaving of a portion of the Gabrielino Trail/Access Road with asphalt.

These non-Project improvements are included in the noise analysis assumptions because their construction is anticipated to occur simultaneously with the proposed Project improvements, likely using the same equipment. As such, it was determined to be unrealistic to parse out the short-term construction activities of the various Project components; therefore, the noise impacts of constructing all improvements within Area 2 are considered in this section.

Similarly, although not a part of the proposed Project, there are specific components in Area 3 that are approved to move forward without additional environmental review that are included in this section and in the construction noise assumptions. The improvements to be conducted in Area 3, which have been previously approved to proceed in accordance with the 2015 ASCP MND, include:

1. Demolition of various facilities, including inlet/outlet structures, dry vaults, woodsheds, utility light pole, pipes and valves, chainlink fencing, corrugated metal pipes, and other small appurtenant structures, to allow for the reconstructed basins;
2. Construction and operation of new pre-fabricated restroom, new sewer lift station, and associated pipelines, including a new 12-inch-diameter potable water pipeline and a new sewer line within the JPL Bridge;
3. Construction and operation of new pipelines, including a 12-inch-diameter well line, 16-inch-diameter utility service line, and 12-inch-diameter booster line;
4. Removal of the Behner WTP's influent and effluent lines and removal of the 8-inch-diameter sludge line from the Behner WTP;
5. Construction and operation of the recreational parking lot at the northern end of Area 3;

6. Construction/realignment and operation of Explorer Road; and
7. Construction of new fencing, gates, a roundabout, a guard station, a trail pathway, and signs at the northern end of the parking lot.

Additional details related to these non-Project components are included in Appendix A-3, 2015 ASCP Initial Study/Mitigated Negative Declaration.

The non-Project components within Areas 2 and 3 listed above were previously approved for both short-term construction and long-term operations. Only the short-term construction activities for these non-Project components are modeled in the noise analysis, as all operational aspects were approved through the 2015 IS/MND and there would be no changes associated with the long-term operations of the proposed Project when compared to the 2015 IS/MND, as further described in Section 3, Project Description, of this Draft EIR.

Comments received in response to the Notice of Preparation (NOP) are summarized in Table 1, Notice of Preparation and Scoping Comment Letters Summary, included in Section 1, Introduction of this Draft EIR. A copy of the NOP and Initial Study is included in Appendix A-1, the Appendices to the Initial Study are included in Appendix A-2, and the comment letters received in response to the NOP are included in Appendix A-3 of this Draft EIR.

4.6.2 Existing Conditions

Noise-Sensitive Receptors

Noise-sensitive receptors include land uses where an excessive amount of noise would interfere with normal operations or activities and where a high degree of noise control may be necessary. Examples include schools, hospitals, and residential areas. Recreational areas may be considered noise-sensitive where quiet and solitude may be an important aspect of the specific recreational experience (City of Pasadena 2002).

As described in Section 2, Environmental Setting, the Project site consists of two primary areas, as shown on Figure 2-1, Local Vicinity and Regional Location, including Area 2, Diversion and Intake Replacement and Area 3, Spreading Basin Improvements, which are connected by the North Arroyo Boulevard (i.e., Gabrielino Trail/Access Road). The proposed Project involves construction activity and facility improvements in Areas 2 and 3, as well as construction truck traffic along portions of the Gabrielino Trail/Access Road. The former Travelling Screen and Chlorine Building (Screen Building) adjacent to Area 2 and the Behner WTP adjacent to Area 3 would be used for temporary construction materials and equipment staging only.

Area 2. The nearest homes to Area 2 are approximately 800 feet to the east on Canyon Dell Drive in Altadena, part of unincorporated Los Angeles County. A U.S. Forest Service (USFS) compound (which includes a residence) is located approximately 870 feet to the northwest, in the City of Pasadena. Residential neighborhoods to the west in the City of La Cañada Flintridge are more than 1,700 feet from Area 2.

Area 3. Single-family residential neighborhoods exist to the east of Area 3. Some homes are in the City of Pasadena and others are in Altadena. The closest homes to Area 3 are on Ridgeview Drive in Altadena and Crestford Drive in Pasadena, approximately 250 feet from the Project site. North Windsor Avenue, between the I-210 freeway and Explorer Drive, would be used by traffic generated by the proposed Project. There are homes adjacent to North Windsor Avenue in the City of Pasadena and in the community of Altadena. Passive and active recreational areas, including the Gabrielino Trail, are near all Project areas and are described in Section 4.7, Recreation.

Existing Noise Levels

Area 2 is located in a rural setting approximately 800 feet from suburban development. Local noise sources include occasional vehicles, recreational visitors, wind, and other natural sounds. Average hourly daytime noise levels (L_{eq}) are estimated to be 40 to 45 A-weighted decibels (dBA) L_{eq} .

Area 3 is located within a developed area and includes the City’s open space area (i.e., former JPL East Parking Lot). The principal local noise sources in the surrounding area are (1) industrial activities, including material handling equipment at the JPL campus to the west and (2) vehicles coming to, using, and leaving the parking lot. Average hourly daytime noise levels are estimated to be 50 to 55 dBA L_{eq} .

Ambient noise level measurements were conducted on December 3, 2019 near the residential receptors east and southeast of Area 3, including along North Windsor Avenue. Table 4.6-1 provides the location, date, and time the noise measurements were taken. The noise measurements were taken using a Soft-DB Piccolo sound level meter equipped with a 0.5-inch, pre-polarized condenser microphone with pre-amplifier. The sound level meter meets the current American National Standards Institute standard for a Type 2 (General Purpose) sound level meter. The accuracy of the sound level meter was verified using a field calibrator before and after the measurements, and the measurements were conducted with the microphone positioned approximately five feet above the ground.

Five short-term noise measurement locations (ST) that represent existing sensitive receivers were selected near the Project Site. These locations are depicted as receivers ST1–ST6 on Figure 4.6-1, Noise Measurement Locations. The measured energy-averaged (L_{eq}), minimum (L_{min}) and maximum (L_{max}) noise levels are provided in Table 4.6-1. The field noise data sheets are included in Appendix G. The primary noise sources at the sites identified in Table 4.6-1 consisted of traffic along adjacent and distant roadways; distant landscaping activities noise, distant barking dogs, and birdsong represented secondary noise sources. As shown in Table 4.6-1, the measured sound levels ranged from approximately 57 dBA L_{eq} at ST4 to 66 dBA L_{eq} at ST5.

Table 4.6-1. Measured Noise Levels

Receptors	Location	Date	Time	L_{eq} (Dba)	L_{min} (Dba)	L_{max} (Dba)
ST1	East of Project Site, adjacent to residence at 898 W. Altadena Drive	12/3/2019	9:42 a.m.–9:57 a.m.	62.2	50.7	80.7
ST2	East of Project Site, adjacent to residence at 892 W. Mariposa Street	12/3/2019	10:11 a.m.–10:26 a.m.	62.8	53	82.7
ST3	Southeast of Project Site, at western edge of Sunset Overlook Park, along Windsor Avenue	12/3/2019	10:41 a.m.–10:56 a.m.	62.6	54.5	75.2
ST4	Southeast of Project Site, adjacent to residence at 978 Kent Street	12/3/2019	11:04 a.m.–11:20 a.m.	57.2	50.9	74
ST5	Southeast of Project Site, adjacent to residence at 2245 North Windsor Avenue	12/3/2019	11:29 a.m.–11:44 a.m.	66.4	52.5	80.4

Source: Appendix G

Notes: L_{eq} = equivalent continuous sound level (time-averaged sound level); L_{max} = maximum sound level during the measurement interval; dBA = A-weighted decibels.

4.6.3 Relevant Plans, Policies, and Ordinances

Federal

There are no federal noise standards that would directly regulate environmental noise during construction and operation of the proposed Project. The following is provided because guidance summarized herein is used or pertains to the analysis.

Federal Transit Administration

Though not regulatory in nature, the U.S. Department of Transportation Federal Transit Administration (DOT) has established vibration guidance for various land uses based on their potential for human annoyance and activity disruption. In general, and according to DOT guidelines, groundborne vibration of 75 velocity decibels (VdB) or greater would be considered potentially annoying. Vibration of 85 VdB or greater would likely be highly annoying and disruptive for most land uses (DOT 2018). (VdB is a unit used to measure and describe vibration.) These guidelines are generally used to evaluate the significance of operational effects from transit projects. However, these guidelines are referenced in this EIR for the purposes of quantitatively describing the levels of vibration that are typically considered disruptive.

Typically, potential building and structural damages are the foremost concern when evaluating the impacts of construction-related vibration. Table 4.6-2 summarizes the DOT's vibration guidelines for building and structural damage.

Table 4.6-2. Groundborne Vibration Damage Potential

Building Category	Vibration Damage (in/sec PPV)
I. Reinforced-concrete, steel or timber (no plaster)	0.5
II. Engineered concrete and masonry (no plaster)	0.3
III. Non-engineered timber and masonry buildings	0.2
IV. Buildings extremely susceptible to vibration damage	0.12

Source: DOT 2018.

Notes: PPV = peak particle velocity

State

Government Code Section 65302(g)

California Government Code Section 65302(g) requires the preparation of a noise element in a general plan, which must identify and appraise the noise problems in the community. The noise element must recognize the guidelines adopted by the Office of Noise Control in the State Department of Health Services and shall quantify, to the extent practicable, current and projected noise levels for the following sources in the general plan's planning area:

- Highways and freeways
- Primary arterials and major local streets

- Passenger and freight on-line railroad operations and ground rapid transit systems
- Aviation and airport-related operations
- Local industrial plants
- Other ground stationary noise sources contributing to the community noise environment

California General Plan Guidelines

The California General Plan Guidelines, published by the Governor’s Office of Planning and Research (OPR), provides guidance for the acceptability of specific land use types within areas of specific noise exposure. Table 4.6-3 presents guidelines for determining acceptable and unacceptable community noise exposure limits for various land use categories. The guidelines also present adjustment factors that may be used to arrive at noise acceptability standards that reflect the noise control goals of the community, the particular community’s sensitivity to noise, and the community’s assessment of the relative importance of noise pollution. OPR guidelines are advisory in nature. Local jurisdictions, including the City of Pasadena, have the responsibility to set specific noise standards based on local conditions.

Table 4.6-3. Land Use Compatibility for Community Noise Environments

Land Use	Community Noise Exposure (CNEL)			
	<i>Normally Acceptable</i> ¹	<i>Conditionally Acceptable</i> ²	<i>Normally Unacceptable</i> ³	<i>Clearly Unacceptable</i> ⁴
Residential-low density, single-family, duplex, mobile homes	50–60	55–70	70–75	75–85
Residential – multiple-family	50–65	60–70	70–75	70–85
Transit lodging – motel, hotels	50–65	60–70	70–80	80–85
Schools, libraries, churches, hospitals, nursing homes	50–70	60–70	70–80	80–85
Auditoriums, concert halls, amphitheaters	NA	50–70	NA	65–85
Sports arenas, outdoor spectators sports	NA	50–75	NA	70–85
Playgrounds, neighborhood parks	50–70	NA	67.5–77.5	72.5–85
Golf courses, riding stables, water recreation, cemeteries	50–70	NA	70–80	80–85
Office buildings, business commercial and professional	50–70	67.5–77.5	75–85	NA
Industrial, manufacturing, utilities, agriculture	50–75	70–80	75–85	NA

Source: OPR 2003

Notes: CNEL = community noise equivalent level; NA = not applicable

¹ Normally Acceptable: Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.

- 2 Conditionally Acceptable: New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features have been included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning, will normally suffice.
- 3 Normally Unacceptable: New construction or development should be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise-insulation features must be included in the design.
- 4 Clearly Unacceptable: New construction or development should generally not be undertaken.

Local

While the proposed Project would be located in the City of Pasadena, there are nearby noise-sensitive receptors in the cities of Pasadena and La Cañada Flintridge, as well as the unincorporated community of Altadena. The applicable noise standards of all three jurisdictions are provided below.

City of Pasadena

The City of Pasadena has established guidelines and standards in its General Plan and Municipal Code. The Noise Element recognizes that construction activity is a source of occasional temporary nuisance noise throughout the City and that these and other such nuisance noises are common to cities and, because of their unpredictable nature, must be addressed on a case-by-case basis.

The following policies are applicable to the Project:

Policy 7b: The City will encourage limitations on construction activities adjacent to sensitive noise receptors.

Policy 7c: The City will encourage construction and landscaping activities that employ techniques to minimize noise.

The City Municipal Code (Title 9, article IV, Chapter 9.36, Noise Restrictions) is the City’s Noise Ordinance. It is the City’s policy “. . . to prohibit unnecessary, excessive and annoying noises from all sources . . . Noise at certain levels is detrimental to the health and welfare of the general public”. The following sections of the Noise Ordinance are applicable to the Project:

Section 9.36.050 – General Noise Sources

This is applicable for long-term, operational noise and states “It is unlawful for any person to create, cause, make or continue to make or permit to be made or continued any noise or sound which exceeds the ambient noise level at the property line of any property by more than 5 decibels”. In accordance with Section 9.36.040, adjustments are made to the allowable noise level for steady audible tones, repeated impulsive noise, and noise occurring for limited time periods.

Section 9.36.070 – Construction Projects

This section is applicable for Construction Projects and states:

- A. No person shall operate any pile driver, power shovel, pneumatic hammer, derrick power hoist, forklift, cement mixer or any other similar construction equipment within a residential district or within a radius of 500 feet therefrom at any time other than as listed below:
 1. From 7:00 AM to 7:00 PM Monday through Friday;
 2. From 8:00 AM to 5:00 PM on Saturday; and

3. Operation of any of the listed construction equipment is prohibited on Sundays and holidays.
- B. No person shall perform any construction or repair work on buildings, structures or projects within a residential district or within a radius of 500 feet there from in such a manner that a reasonable person of normal sensitiveness residing in the area is caused discomfort or annoyance at any time other than as listed below:
1. From 7:00 AM to 7:00 PM Monday through Friday;
 2. From 8:00 AM to 5:00 PM on Saturday; and
 3. Performance of construction or repair work is prohibited on Sundays and holidays.
- C. For purposes of this section, holidays are New Year’s Day, Martin Luther King Jr. Day, Lincoln’s Birthday, Washington’s Birthday, Memorial Day, Independence Day, Labor Day, Veterans Day, Thanksgiving Day, Day after Thanksgiving, and Christmas.

Section 9.36.080 – Construction Equipment.

This section states that “It is unlawful for any person to operate any powered construction equipment if the operation of such equipment emits noise at a level in excess of 85 dBA when measured within a radius of 100 feet from such equipment”.

Los Angeles County

The Los Angeles County noise restrictions are applicable to the properties within the Altadena community. Section 12.08 of the County of Los Angeles Code (County Code) contains the County Noise Ordinance. The County sets maximum construction noise levels “at residential structures.” As shown in Table 4.6-5 below, the daytime noise level limit at single-family residences for mobile construction equipment is 75 dBA. The County’s Noise Ordinance requirements are not applicable to mobile noise sources such as automobiles or heavy trucks when traveling in a legal manner on public roadways or on private property. Mobile noise source control is preempted by federal and State laws.

Table 4.6-4. County of Los Angeles Construction Noise Limits

Time Interval	Single-Family Residential (dBA)	Multi-Family Residential (dBA)	Semi-Residential or Commercial (dBA)
<i>Mobile Equipment</i>			
Daily, except Sundays and legal holidays, 7:00 AM to 8:00 PM	75	80	85
Daily, 8:00 PM to 7:00 AM, and all day Sunday and legal holidays	60	64	70
<i>Stationary Equipment</i>			
Daily, except Sundays and legal holidays, 7:00 AM to 8:00 PM	60	65	70
Daily, 8:00 PM to 7:00 AM, and all day Sunday and legal holidays	50	55	60

Source: County of Los Angeles 2013

City of La Cañada Flintridge

The City of La Cañada Flintridge does not have quantitative standards for construction noise.

Applicable Vibration Standards

Neither the City of Pasadena nor the City of La Cañada Flintridge has vibration standards. Section 12.08.560 of the Los Angeles County Code states, “Operating or permitting the operation of any device that creates vibration which is above the vibration perception threshold of any individual at or beyond the property boundary of the source if on private property, or at 150 feet (46 meters) from the source if on a public space or public right-of-way is prohibited. The perception threshold shall be a motion velocity of 0.01 in/sec over the range of 1 to 100 Hertz”.

4.6.4 Thresholds of Significance

The significance criteria used to evaluate the Project impacts related to noise are based on Appendix G of the CEQA Guidelines. According to Appendix G of the CEQA Guidelines, a significant impact related to noise would occur if the project would:

- a) Result in generation of 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.
- b) Result in generation of excessive groundborne vibration or groundborne noise levels.
- c) For a project located in 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?

Through the analysis in the Initial Study (see Appendix A-1), it was determined that the proposed Project would not expose people residing or working in the Project area to excessive noise levels as a result of the Project being located in 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. (i.e., Threshold c). Accordingly, this issue is not further analyzed in the EIR. Based on the remaining thresholds, a significant impact related to noise would occur if the project would:

- a) Result in generation of 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.
- b) Result in generation of excessive groundborne vibration or groundborne noise levels.

4.6.5 Environmental Impacts Analysis

Threshold 4.6a. Would the project result in generation of 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 of the Project improvements would be phased, with construction in Area 2 requiring approximately 3 months (August 2021 through October 2021), and construction in Area 3 requiring approximately 9 months (March 2022 through November 2022). During construction of the proposed Project, activities would include demolition of existing structures, site preparation, grading/excavation, construction of structures, paving, dewatering, and application of architectural coating. Construction-related noise would also be generated on local roadways, from worker vehicles and trucks accessing the Project site.

On-Site Construction Noise

Construction activities would require the use of standard construction equipment such as loaders, dozers, backhoes, dump trucks, graders, pumps, rollers, and cranes. Construction equipment with substantially higher noise-generation characteristics (such as pile drivers, rock drills, blasting equipment) would not be necessary for the proposed Project, although the use of a hoe ram (i.e., a percussive hammer-type device) is anticipated during demolition. Additionally, in the interest of minimizing the export of excavated materials from the Project site, the City may implement a mechanical shaker to sort and sift through excavated soils to separate finer soils from larger rocks. These devices have been accounted for in the construction noise analysis.

The range of maximum noise levels for various types of construction equipment at a distance of 50 feet is depicted in Table 4.6-6. The noise values represent maximum noise generation, or full-power operation of the equipment. Simultaneous operation of more than one piece of equipment would increase the sound level of the equipment operating individually. As an example, a loader and two dozers, all operating at full power and relatively close together, would generate a maximum sound level of approximately 90 dBA at 50 feet from their operating locations. As one increases the distance between equipment, and/or the separation of areas with simultaneous construction activity, dispersion and distance attenuation reduce the effects of separate noise sources added together. In addition, typical operating cycles may involve 2 minutes of full-power operation, followed by 3 or 4 minutes at lower levels. The average noise level during construction activity is generally lower, since maximum noise generation may only occur up to 50% of the time.

Table 4.6-6. Construction Equipment Maximum Noise Emission Levels

Equipment	Maximum Sound Level (dBA) 50 Feet from Source
Roller	74
Concrete vibrator	76
Pump	76
Saw	76
Backhoe	80
Air compressor	81

Table 4.6-6. Construction Equipment Maximum Noise Emission Levels

Equipment	Maximum Sound Level (dBA) 50 Feet from Source
Generator	81
Compactor	82
Concrete pump	82
Crane, mobile	83
Concrete mixer	85
Dozer	85
Grader	85
Impact wrench	85
Loader	85
Pneumatic tool	85
Jackhammer	88
Truck	88
Paver	89

Source: DOT 2018.

The nearest sensitive receptors to Area 2 are the residential land uses approximately 800 feet to the east in Altadena, part of unincorporated Los Angeles County, the USFS compound approximately 870 feet to the northwest in Pasadena, and residential land uses approximately 1,700 feet to the west in the City of La Cañada Flintridge¹. The nearest sensitive receptors to Area 3 are the residential land uses approximately 250 feet to the east in Altadena and in Pasadena. Whereas the Area 2 active Project construction area is quite small, the construction area constituting Area 3 is relatively large. While the nearest work within Area 3 would take place within 250 feet of the nearest residences, construction activities would more typically take place approximately 400 feet from the nearest residences².

The Federal Highway Administration’s (FHWA) Roadway Construction Noise Model (RCNM) (FHWA 2008) was used to estimate construction noise levels at the nearest noise-sensitive land uses. Although the model was funded and promulgated by the Federal Highway Administration, the RCNM is often used for non-roadway projects because the

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- 1 Pedestrians, hikers, bicyclists, and equestrians could come near construction activities in Areas 2 and 3 while using the Gabrielino Trail/Access Road. These recreational users are not considered noise-sensitive receptors because they are mobile and a temporary presence, like pedestrians on a residential street, or bicyclists on a bike path. Nearby recreational users would have the option of modifying their activities to avoid exposure to undesirable noise levels. Additionally, because the users of the trail are by definition mobile, the duration of noise exposure of any one individual to noise from construction would be brief.
 - 2 Because proposed construction activities would take place both near and far relative to any one noise-sensitive receiver, the concept of the “acoustic center” is used for providing typical noise levels. The acoustic center is the idealized point from which the energy sum of all activity noise, near and far, would be centered. The acoustic center is derived by taking the square root of the product of the nearest and the farthest equipment noise–receiver distances.

same types of equipment used for roadway projects are also used for other project types. Input variables for the RCNM consist of the receiver/land use types, the equipment type and number of each (e.g., two graders, a loader, a tractor), the duty cycle for each piece of equipment (e.g., percentage of hours the equipment typically works per day), and the distance from the noise-sensitive receiver. No topographical or structural shielding was assumed in the modeling. The RCNM has default duty-cycle values for the various pieces of equipment, which were derived from an extensive study of typical demolition activity patterns (FHWA 2008). Those default duty-cycle values were used for this noise analysis.

Using the Federal Highway Administration’s RCNM construction noise model and construction information (types and number of construction equipment by phase), the estimated noise levels from construction were calculated (summarized in Table 4.6-7). At Area 2, noise levels were estimated at the residential areas to the east and to the west, and the USFS compound to the northwest; at Area 3, noise levels were estimated at the nearest residences (located to the east) for both the relatively brief periods of time during which construction would take place at the nearest source-receiver distances, and during the longer periods of time when construction would take place both near and far from adjacent receivers. The RCNM inputs and outputs are provided in Appendix G. Note that these estimates are conservative, as they do not account for any potential reduction in noise levels from topographical shielding, ground absorption effects, or atmospheric absorption.

Table 4.6-7 Construction Noise Modeling Results

Project Phase	Noise-Sensitive Receiver	Nearest or Typical Construction Activity Distance (feet)	L _{eq} (dBA)
Area 2 Construction Phases			
Area 2 - Demolition	Residences to the east of Project Site	Nearest / Typical Construction Work (800')	63
	USFS Compound to the northwest of Project Site	Nearest / Typical Construction Work (870')	62
	Residences to the west of Project Site	Nearest / Typical Construction Work (1,700')	56
Area 2 - Site Preparation	Residences to the east of Project Site	Nearest / Typical Construction Work (800')	59
	USFS Compound to the northwest of Project Site	Nearest / Typical Construction Work (870')	58
	Residences to the west of Project Site	Nearest / Typical Construction Work (1,700')	53
Area 2 - Grading/Excavation	Residences to the east of Project Site	Nearest / Typical Construction Work (800')	62
	USFS Compound to the northwest of Project Site	Nearest / Typical Construction Work (870')	61
	Residences to the west of Project Site	Nearest / Typical Construction Work (1,700')	56
Area 2 - Building Construction	Residences to the east of Project Site	Nearest / Typical Construction Work (800')	60
	USFS Compound to the northwest of Project Site	Nearest / Typical Construction Work (870')	59
	Residences to the west of Project Site	Nearest / Typical Construction Work (1,700')	53

Table 4.6-7 Construction Noise Modeling Results

Project Phase	Noise-Sensitive Receiver	Nearest or Typical Construction Activity Distance (feet)	L _{eq} (dBA)
Area 2 - Paving	Residences to the east of Project Site	Nearest / Typical Construction Work (800')	62
	USFS Compound to the northwest of Project Site	Nearest / Typical Construction Work (870')	61
	Residences to the west of Project Site	Nearest / Typical Construction Work (1,700')	55
Area 2 - Dewatering	Residences to the east of Project Site	Nearest / Typical Construction Work (800')	55
	USFS Compound to the northwest of Project Site	Nearest / Typical Construction Work (870')	55
	Residences to the west of Project Site	Nearest / Typical Construction Work (1,700')	49
Area 3 Construction Phases			
Area 3 - Demolition	Residences to the east of Project Site	Nearest Construction Work (250')	67
		Typical Construction Work (400')	68
Area 3 - Site Preparation	Residences to the east of Project Site	Nearest Construction Work (250')	60
		Typical Construction Work (400')	61
Area 3 - Grading/Excavation	Residences to the east of Project Site	Nearest Construction Work (250')	68
		Typical Construction Work (400')	69
Area 3 - Building Construction	Residences to the east of Project Site	Nearest Construction Work (250')	61
		Typical Construction Work (400')	63
Area 3 - Paving	Residences to the east of Project Site	Nearest Construction Work (250')	66
		Typical Construction Work (400')	67
Area 3 - Architectural Coating	Residences to the east of Project Site	Nearest Construction Work (250')	55
		Typical Construction Work (400')	56

Source: Appendix G

As shown in Table 4.6-7, the highest noise levels from Area 2 construction are predicted to occur at residences located to the east of the work (located in Altadena, in unincorporated Los Angeles County) during the demolition phase, when noise levels are estimated to be approximately 63 dBA L_{eq}. This would be less than the Los Angeles County noise standard for construction of 75 dBA. At the USFS compound (located within the City of Pasadena), the highest estimated noise levels are estimated to be approximately 62 dBA L_{eq}. This level would be less than the noise limit of 85 dBA set forth in Section 9.36.080 of the City of Pasadena Municipal Code. At residences located to the west (located in the City of La Cañada Flintridge), the highest estimated noise levels are estimated to occur during demolition and grading / excavation, when noise levels are estimated to be approximately 56 dBA L_{eq}. This noise level is relatively low, by community noise standards; construction work may be audible at times, but would not be considered to be intrusive by a person of average sensibilities. Thus, the construction noise impacts from Area 2 would be less than significant, and no mitigation is required. Additionally, the construction work within Area 2 must be conducted in accordance with Section 9.36.070 of the City of Pasadena Municipal Code, which limits

noise-generating construction activities to between the hours of 7:00 AM and 7:00 PM Monday through Friday and between the hours of 8:00 AM and 5:00 PM Saturday in or within 500 feet of a residential district. No noise-generating construction activities would be conducted on Sundays and federal holidays.

At noise-sensitive areas adjacent to Area 3 (residents within Altadena and the City of Pasadena), the highest construction noise levels at the nearby residences located are predicted to occur during the demolition phase and grading/excavation phases, when noise levels are estimated to be approximately 67 dBA L_{eq} and 68 dBA L_{eq} , respectively, when construction occurs near the eastern Project boundary. More typically, when construction activities occur throughout Area 3, noise levels would range from approximately 51 to 63 dBA L_{eq} . These levels are below the noise limits of 75 dBA set by Section 12.08 of the County Code (i.e., County Noise Ordinance) and of the limit of 85 dBA set forth in Section 9.36.080 of the City of Pasadena Municipal Code. Therefore, impacts would be less than significant.

During the louder phases of construction, the estimated noise levels would be approximately 5 decibels above measured ambient noise levels; the noise would be audible and could interfere with the typical/normal volumes of speech of persons outside. Pedestrians, hikers, bicyclists, and equestrians could come near construction activities in Areas 2 and 3 while using the Gabrielino Trail/Access Road. These recreational users are not considered sensitive receptors to noise because they are mobile and a temporary presence, similar to pedestrians on a residential street. Although there is an expectation for noise in natural open space areas, such as the Arroyo Seco, to be minimal, the proposed Project's construction activities would be temporary and not unusual in duration or intensity. Recreational users of the Gabrielino Trail/Access Road would have the option of modifying their activities to avoid exposure to undesirable noise levels. Additionally, because the users of the trail are by definition mobile, the duration of noise exposure of any one individual to noise from construction would be brief.

As previously discussed in Section 2, Environmental Setting, of this Draft EIR and presented in Table 2-1, the City is committed to implementing noise mitigation, as repeated below in MM-NOI-1, through the implementation of the adopted Mitigation Monitoring and Reporting Program (MMRP) associated with the 2015 IS/MND. Therefore, MM-NOI-1 would be incorporated into the Project without alterations from the MMRP, in order to further reduce noise from construction within Area 3 and to support Policies 7b and 7c of the Pasadena Comprehensive General Plan's Noise Element. MM-NOI-1 specifies noise-control measures to minimize noise effects upon sensitive receptors. In addition, the Project would be conducted in accordance with the City's Municipal Code requirements regarding limitations on noise-generating construction activities to the specified hours.

The effectiveness of MM-NOI-1 would vary from several decibels, which in general is a relatively small change, to ten or more decibels, which subjectively would be perceived as a substantial change, depending upon the specific equipment and the original condition of that equipment, the specific locations of the noise sources and the receivers, etc. Installation of more effective silencers could range from several decibels to well over 10 decibels. Reduction of idling equipment could reduce overall noise levels from barely any reduction to several decibels.

Implementation of MM-NOI-1 and compliance with applicable municipal code restrictions related to construction activities would ensure that short-term construction noise generated by on-site construction activity would not result in substantial temporary increases 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.

Off-Site Roadway Construction Noise

The Project would result in local, short-term increases in roadway noise as a result of construction traffic. Project-related traffic would include workers commuting to and from Areas 2 and 3; vendors bringing materials; and haul trucks removing demolished structural materials, vegetative materials, and excavated soils from the Project site, as well as trucks entering the Project area to deliver materials, concrete, etc. Construction trucks hauling soils and debris to and from off-site disposal facilities are expected to come to the site from I-210 at the Windsor Avenue off-ramp and head north on Windsor Avenue to the intersection with Ventura Street. At this intersection is a fork in the road, one leading to Explorer Road into Area 3 and the other leading to the gated North Arroyo Boulevard, which passes adjacent to residential properties and the Behner WTP. North of the JPL Bridge, North Arroyo Boulevard (the Gabrielino Trail/Access Road) would be used for construction vehicles and equipment transport to and from Area 2. Explorer Road and potentially North Arroyo Boulevard would be used to access Area 3.

Construction worker estimates and vendor truck trips by construction phase were based on information provided by the City. These include:

- 26 daily worker trips during Area 2 and Area 3 construction work;
- 2 daily vendor trucks during most of the construction work (both Areas 2 and 3);
- An average of 14 haul truck trips per day during Area 2 work;
- A peak of 86 daily haul truck trips during Area 2 work for approximately 5 working days,
- An average of 84 haul truck trips per day during Area 3 work; and,
- A peak of 475 daily haul truck trips during Area 3 demolition work, for approximately 10 working days.

Using the construction trip estimates and the FHWA traffic noise prediction model (TNM 2.5) (FHWA 2004), traffic noise level modeling was performed in order to estimate the temporary increase in noise from construction worker and heavy truck trips, when added to the existing traffic volumes. Based upon a review of average daily traffic volumes (ADT) for weekday counts conducted by the Los Angeles County Department of Public Works (LACDPW), the most recent available ADTs were selected. On North Windsor Avenue between Woodbury Road/Oak Grove Drive and Figueroa Drive, the most recent ADT (conducted in 2017) was 12,128 vehicles per day. On North Windsor Avenue between Figueroa Drive and Ventura Street the most recent ADT (conducted in 2019) was 8,121 vehicles per day. The existing average daily weekday ADT for Explorer Road north of Windsor Avenue (in 2017) was 3,492 (County of Los Angeles 2020). Typically, a growth factor would be applied to traffic volume years not occurring in the baseline year (2019); however, based upon a review of historic ADT counts in the area (which seemed to trend both slightly positive and slightly negative in recent years), it was deemed inappropriate to assume a growth rate.

The ADT volumes cited above for North Windsor Avenue and Explorer Road were used as the basis to which the typical and peak-period construction vehicles were added, for the purpose of estimating the resulting traffic noise increase during Project construction. As shown in Table 4.6-8, during both typical and peak-period Area 2 work, the increase in average hourly traffic noise levels would be approximately 1 dB, when rounded to whole decibels. Although individual truck pass-bys would be clearly audible, the change in traffic noise level on an hourly average basis would be negligible.

Table 4.6-8. Construction Traffic Noise Modeling Results

Receiver	Existing (L_{eq} (dBA)	Existing plus Area 2 Work (Typical) (L_{eq} (dBA)	Existing plus Area 2 Work (Peak) (L_{eq} (dBA)	Increase (Typical) (dB)	Increase (Peak) (L_{eq} (dB)	Existing plus Area 3 Work (Typical) (L_{eq} (dBA)	Existing plus Area 3 Work (Peak) (L_{eq} (dBA)	Increase (Typical) (L_{eq} (dB)	Increase (Peak) (L_{eq} (dB)
Receiver 1 - North Windsor Avenue - Woodbury Road / Oak Grove Drive to Figueroa Drive	65	66	66	1	1	66	68	1	3
Receiver 2 - North Windsor Avenue - Figueroa Drive to Ventura Street	64	64	65	0	1	64	67	0	3
Receiver 3 - Explorer Road - North of North Windsor Avenue	51	n/a	n/a	n/a	n/a	53	57	2	6

Source: Appendix G

Note: Traffic noise modeling receivers located at a receiver distance of 50 feet from roadway centerline for North Windsor Avenue and 150 feet for Explorer Road, based on typical source-receiver distances in these areas.

n/a – no truck traffic anticipated on Explorer Road during Area 2 work.

As shown in Table 4.6-8, during typical Area 3 work, the increase in average hourly traffic noise levels would range from approximately 0 dB (when rounded to whole numbers) to 1 dB along North Windsor Avenue and approximately 2 dB along Explorer Road. Again, individual truck pass-bys would be audible; however, because a change in noise level of 3 dB or less is typically not readily perceptible to the average listener, these short-term noise increases would be less than significant.

During peak-period construction work in Area 3, an increase of approximately 3 dB is predicted along North Windsor Avenue, and an increase of approximately 6 dB is predicted along Explorer Road. Because a change in noise level of 3 dB or less is typically not readily perceptible to the average listener, the increase along North Windsor Avenue is not considered significant. The short-term noise increase along Explorer Road would be perceptible; however, the predicted noise level from Area 3 peak-period traffic would be quite low and would be less than existing measured ambient noise levels in the vicinity (i.e., ambient noise levels of approximately 62 to 63 dBA L_{eq}).

Therefore, construction traffic, including haul/dump trucks related to construction activities, would not result in 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. Impacts would be less than significant and no mitigation is required.

Long-Term Operational Impacts

As described in Section 3, Project Description, PWP's future schedule of operation and maintenance activities for Project-related facilities would not substantively differ from the current maintenance routine and procedures. No new employees are required for the long-term operation of the Project components; therefore, no long-term operational noise or vibration from traffic would result. At Area 2, there would be the addition of two new hydraulic motors and two hydraulically operated winches. The motors, which would be relatively small (approximately 5.5 inches in length) would be used to actuate the slide gate and screen at the intake (outside of the service building). The hydraulically operated winch would be located at the crest gate, but the equipment to control the winch would be located within the proposed approximately 106-square foot Service Building, and thus completely enclosed. The operation of this equipment would be generally limited to during storm events. Typically, the crest gate would be in either the up or down position and there would be no mechanical noise. The crest gate would only modulate a small percentage of the time (approximately 15 days out of an average year, at which time there would be intermittent operation). In all, it is estimated that the crest gate would be repositioned up or down approximately 10 times in an average year during the winter/wet season, with each change taking a few minutes. In summary, mechanical equipment noise would be infrequent and relatively low in noise level, and therefore would result in a less than significant noise impact. Therefore, at Area 3, no long-term operational noise or vibration from mobile equipment or stationary machinery would result. As such, the Project not result in generation of a substantial 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. Impacts would be less than significant and no mitigation is required.

Threshold 4.6b Would the project result in generation of excessive groundborne vibration or groundborne noise levels?

Short-Term Construction Impacts

Construction activities that might expose persons to excessive ground-borne vibration or ground-borne noise could cause a potentially significant impact. Ground-borne vibration information related to construction activities (including demolition) has been collected by the California Department of Transportation (Caltrans 2013). Information from Caltrans indicates that continuous vibrations with a peak particle velocity of approximately 0.1 inches per second begin to annoy people. The heavier pieces of construction equipment, such as bulldozers, would have peak particle velocities of approximately 0.089 inches per second or less at a distance of 25 feet. The same vibration level (0.089 inches per second PPV at a distance of 25 feet) is cited for a hoe ram (DOT 2018).

Ground-borne vibration is typically attenuated over short distances. At the distance from the nearest vibration-sensitive receivers near Area 2 (residences located approximately 800 feet to the east) to where demolition / construction activity would be occurring on the Project site, and with the anticipated construction equipment, the peak particle velocity vibration level would be approximately 0.0005 inches per second. These vibration levels would be well below the vibration threshold of potential annoyance of 0.1 inches per second, as well as Los Angeles County's threshold of perception standard of 0.01 inches per second.

At the distance from the nearest vibration-sensitive receivers near Area 3 (residences located approximately 250 feet to the east) to where demolition/construction activity would be occurring on the Project site, and with the anticipated construction equipment, the peak particle velocity vibration level would be approximately 0.0028 inches per second. These vibration levels would also be well below the vibration threshold of potential annoyance of 0.1 inches per second, as well as Los Angeles County's threshold of perception standard of 0.01 inches per second.

The major concern with regards to construction vibration is related to building damage, which typically occurs at vibration levels of 0.5 inches per second or greater for buildings of reinforced-concrete, steel or timber construction. As discussed above, the anticipated vibration levels associated with on-site Project construction and at Areas 2 and 3 would be approximately 0.0005 and 0.0028 inches per second respectively, which are well below the threshold of 0.5 inches per second for building damage. Therefore, short-term construction activities of the proposed Project would not result in generation of excessive short-term groundborne vibration or groundborne noise levels. Impacts would be less than significant and no mitigation is required.

Long-Term Operational Impacts

As described in Section 3, Project Description, PWP's future schedule of operation and maintenance activities for Project-related facilities would not substantively differ from the current maintenance routine and procedures. No new employees are required for the long-term operation of the Project components; therefore, no long-term operational vibration from traffic would result. As discussed previously, Area 2 would include the installation of several pieces of mechanical equipment (motors and winches). However, these items would be relatively small, would not produce substantial levels of groundborne vibration and would operate infrequently. At Area 3, no new noise-generating land uses are proposed; therefore, no long-term operational vibration from mobile equipment or stationary machinery would result. As such, the Project will not result in generation of excessive long-term groundborne vibration or groundborne noise levels. Impacts would be less than significant and no mitigation is required.

4.6.6 Cumulative Impacts

The cumulative projects listed in Section 4.2.2, List of Cumulative Projects, summarizes the potential for overlapping short-term construction activities between the proposed Project and cumulative projects. The general area of these projects is identified in Figure 3-5, Cumulative Projects, in Section 3, Project Description. The geographic scope of the area potentially affected by cumulative noise impacts from construction and operation consists of receptor locations that could be exposed to noise and/or vibration from the proposed Project and from related projects. Because both noise and vibration attenuate with distance, the geographic scope consists of the Project study area and related projects within approximately 0.25-mile. Additionally, both noise and groundborne vibration are relatively ephemeral in nature; thus, Project timing is an important consideration.

As discussed in greater detail in Section 4, Environmental Impact Analysis of this Draft EIR, the cumulative projects were chosen based on direction from the City. ASCP Area 1 construction, while relatively near Area 2, is anticipated to begin in 2023 (and thus, after the completion of the proposed Project). The Devil's Gate Reservoir Sediment Removal and Management Project is located to the southwest of Area 3; sediment removal and placement is ongoing and expected to conclude in Fall 2022, with habitat restoration continuing through Fall 2023; the OGAI projects could begin construction as early as 2021 if funds become available, but

is located over 0.42-mile from the Project site. The LACFCD Pumpback/Intake at Devil's Gate (Devil's Gate Dam to Eaton) project would begin sometime after the completion of Devil's Gate and the proposed Project; and the Explorer Groundwater Well construction could potentially be concurrent with proposed Project Area 3, although no CEQA documentation has yet been prepared. Of the projects identified and described in Section 4, Environmental Impact Analysis, the Devil's Gate Reservoir Sediment Removal and Management Project is the one nearest to the Project site³ and with a potential overlap in construction activities. Therefore, the Devil's Gate project is the one with the greatest potential to result in cumulative noise impacts with regards to the proposed Project.

On-Site Construction Noise

As discussed above, the analysis of on-site construction noise determined that at noise-sensitive areas adjacent to Area 3 (the portion of the Project site nearest to the Devil's Gate project), the highest construction noise levels at the nearby residences are predicted to occur during the demolition phase and grading / excavation phases, when noise levels are estimated to be approximately 67 dBA L_{eq} and 68 dBA L_{eq} , respectively, when construction occurs near the eastern Project boundary. These noise levels were below the limits set by the City and County Code requirements and were less than significant. MM-NOI-1 would be implemented to further reduce noise from construction within Area 3 and to support Policies 7b and 7c of the Pasadena Comprehensive General Plan's Noise Element.

The Project would also comply with Section 9.36.070 of the City of Pasadena Municipal Code, which limits noise-generating construction activities to between the hours of 7:00 AM and 7:00 PM Monday through Friday and between the hours of 8:00 AM and 5:00 PM Saturday in or within 500 feet of a residential district. The Devil's Gate project's construction equipment noise emissions were determined in that project's EIR to be less than significant; furthermore, the portion of the Project site representing an active work area (Basin J) is located approximately 500 feet from the Devil's Gate project site to the southwest. Therefore, it is unlikely that construction noise from the two projects would combine in a measurable fashion at nearby noise-sensitive receivers, located approximately 250 feet or more further to the east (at 750 feet from the Devil's Gate work, the noise level would be diminished by approximately 10 dB compared to the same noise level at 250 feet). Therefore, with implementation of MM-NOI-1 and compliance with applicable municipal code restrictions related to construction activities for the Project and cumulative projects, short-term construction noise generated by on-site construction activity would not result in cumulatively considerable substantial temporary increases 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.

³ Note that construction equipment assumptions associated with specific components in Areas 2 and 3 that are approved to move forward without additional environmental review have been incorporated as part of the construction noise analysis addressed in Section 4.6.5, and are thus not considered as part of this cumulative impacts discussion.

Off-Site Roadway Construction Noise

As discussed above, the analysis of off-site construction noise determined that the short-term noise level increase from the Project along North Windsor Avenue would be 1 dB or less; along Explorer Road, the short-term noise level increase would be 2 dB or less. Explorer Road (and the receivers near Explorer Road) are located approximately 0.7-mile or further from the construction route associated with the Devil's Gate project (North Windsor Avenue, Oak Grove Drive, Berkshire Place). The portion of the Project's construction route that would be in proximity to and partially coincident with the Devil's Gate project is limited to the area of North Windsor Avenue at Oak Grove Drive and adjacent to the I-210 freeway. As shown in Table 4.6-8, the predicted noise level increase in this area would be 1 dB or less. Similarly, the predicted noise level increase in this area from the Devil's Gate project is 0 dB⁴. Thus, while individual truck pass-by noise would be clearly audible to nearby noise-sensitive receivers located near North Windsor Avenue and Oak Grove Drive, the cumulative increase would be negligible, less than significant and not cumulatively considerable.

Vibration

The proposed Project and related projects may generate vibration during construction processes. Ground vibration generated by construction equipment spreads through the ground and diminishes greatly in magnitude with increases in distance. As described above, vibration produced during construction of the Project would be well below thresholds of perception, annoyance or building damage. The Devil's Gate project EIR determined that there could be an exceedance of the Los Angeles County threshold of perception; a mitigation measure was required, restricting the use of large bulldozers and other large equipment within 180 feet of residential uses. With implementation of this mitigation measure, it was determined that the resultant vibration would be less than significant. Additionally, the closest portion of the Project site representing an active work area (Basin J) is located approximately 500 feet from the Devil's Gate Project site to the southwest⁵. Therefore, construction vibration from the two projects are not expected to combine at nearby noise-sensitive receivers. Cumulative impacts related to construction vibration would therefore be less than significant.

Long-Term Operational Impacts

Once operational, the proposed Project would not generate new sources of noise or groundborne vibration. As such, it would not have the potential to contribute to any long-term, cumulatively considerable impacts related to operational noise or vibration.

⁴ As shown in Table 3.14-6, Final EIR Devil's Gate Reservoir Sediment Removal and Management Project. Los Angeles County. Accessed 02/19/2020. https://dpw.lacounty.gov/wrd/Projects/DevilGate/FEIR/Devils_Gate_FEIR_2014_10_20_Vol_1_Section_3.pdf. October 2014

⁵ At 500 feet, and with the anticipated construction equipment, the peak particle velocity vibration level would be approximately 0.001 inches per second, which would be well below the vibration threshold of potential annoyance of 0.1 inches per second, as well as Los Angeles County's threshold of perception standard of 0.01 inches per second.

4.6.7 Mitigation Measures

MM-NOI-1 The City and/or their Construction Contractor shall implement the following noise reduction measures during all construction activities:

- Equip all construction equipment (fixed or mobile) with properly operating and maintained mufflers, consistent with or exceeding manufacturers' standards.
- Ensure that construction equipment engine enclosures and covers as provided by manufacturers shall be in place during operation.
- Place all stationary construction equipment so that the equipment is as far as feasible from noise-sensitive receptors and so that the emitted noise is directed away from the noise-sensitive receptors.
- Locate equipment and materials staging in areas that will create the greatest distance between staging area noise sources and noise-sensitive receptors during Project construction.
- Ensure that construction equipment is shut down when not in use.
- Limit haul truck deliveries to the same hours specified for the operation of construction equipment.

4.6.8 Level of Significance After Mitigation

With implementation of MM-NOI-1, temporary noise increases from construction activities would be less than significant.

No mitigation is required for short-term construction vibration, or long-term operational noise or vibration impacts.

4.6.9 References

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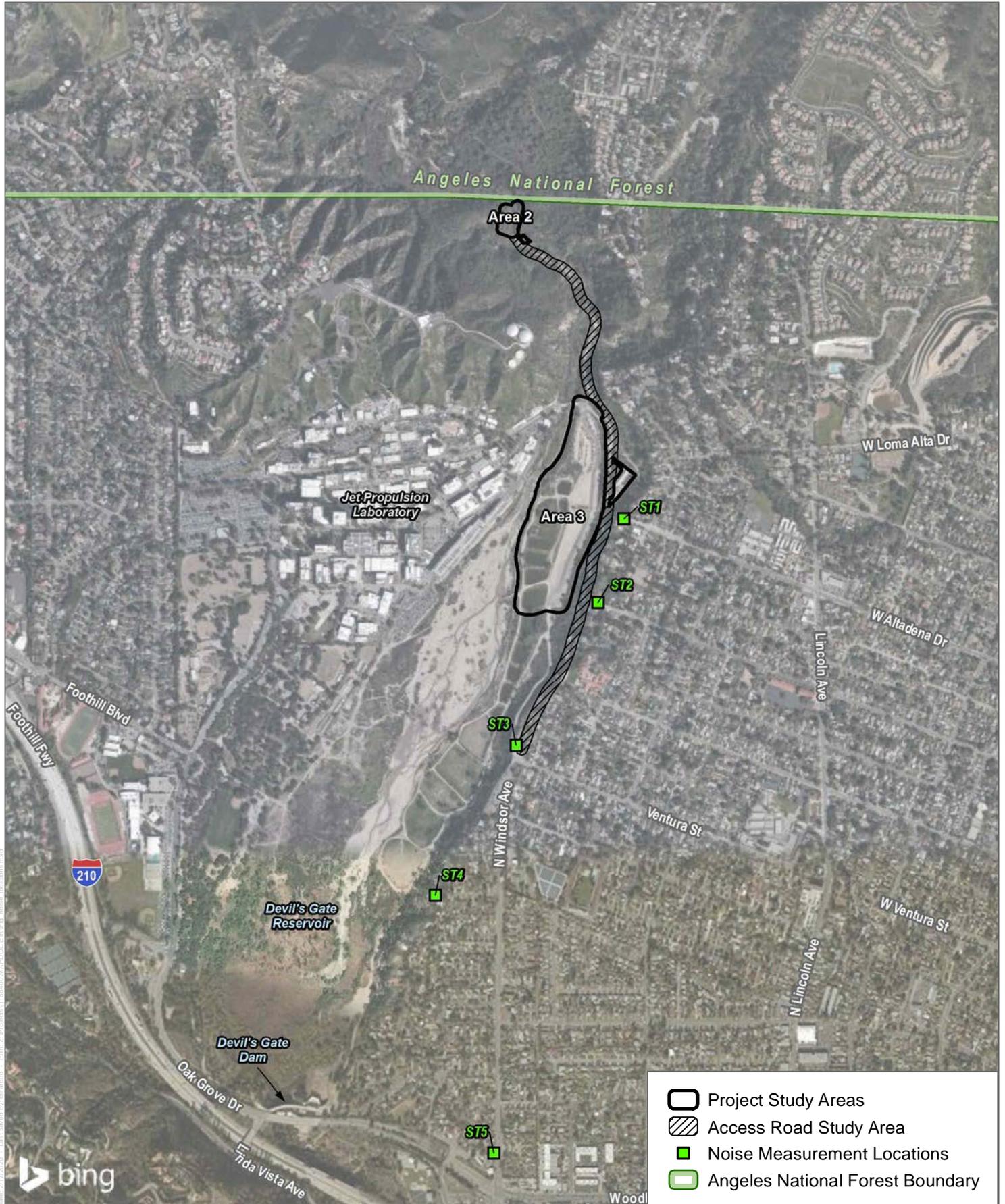
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SOURCE: Bing 2019, Open Street Map 2019

FIGURE 4.6-1

Noise Measurement Locations

Arroyo Seco Canyon Project Areas 2 and 3



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