

# **FINAL**

**NOISE REPORT FOR THE SANDIA CREEK DRIVE  
BRIDGE REPLACEMENT AND FISH PASSAGE PROJECT,  
SAN DIEGO COUNTY, CALIFORNIA  
Record ID #: PDS2020-LDGRMJ-30309;  
Environmental Log #: TBD**

*Prepared For:*

**County of San Diego  
Planning and Development Services**  
5510 Overland Avenue, Suite 110  
San Diego, California 92123

*Project Applicant:*

**California Trout, South Coast Region**  
5425 Oberlin Drive, Suite 209,  
San Diego, California 92121  
*Contact: Sandra Jacobson, Director*

*Prepared by:*

**DUDEK**

605 Third Street  
Encinitas, California 92024  
*Mike Greene, INCE Bd. Cert.  
County-Approved Preparer  
760.685.0741*

**DECEMBER 2021**



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## GLOSSARY OF TERMS AND ACRONYMS

Acronym/Abbreviation	Definition
°F	Degrees Fahrenheit
ADT	Average Daily Traffic
ANSI	American National Standards Institute
Caltrans	California Department of Transportation
CEQA	California Environmental Quality Act
CNEL	Community Noise Equivalent Level
County	County of San Diego
dB	Decibel
dB(A)	A-weighted decibel
dBA	A-weighted decibel
EIR	Environmental Impact Report
FHWA	Federal Highway Administration
Hz	Hertz
$L_{eq}$	Equivalent noise level over a period of time
$L_{max}$	Maximum noise level
MM	Mitigation Measure
NSLU	Noise Sensitive Land Use
PDF	Project Design Feature
PPV	Peak Particle Velocity
re	Reference
RMS	Root Mean Square
SANDAG	San Diego Association of Governments
TWC	The Wildlands Conservancy
VdB	Vibration Decibel

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## **EXECUTIVE SUMMARY**

The proposed Sandia Creek Drive Bridge Replacement and Fish Passage Project (proposed project) site is located within an unincorporated portion of the County of San Diego (County). This project consists of the removal and replacement of an aging low-flow concrete box culvert river crossing that has created a significant fish passage barrier on the Santa Margarita River with a new concrete wide-flange girder bridge. The new bridge will span the river (360 ft in width), with one pier and constructed in two sections. The bridge will provide two paved traffic lanes (12 ft wide) with two shoulders (8 feet wide) within a 68-ft road right-of-way. The new bridge will be constructed about 160 feet downstream of the existing Sandia Creek Drive bridge to replace that flood-prone structure. The culvert crossing will be removed and will not be available once the new bridge is built. Once constructed, the operation of the bridge would not require or involve any noise-generating mechanical equipment or machinery, beyond routine maintenance similar to that required for the existing bridge.

### **Noise Sensitive Land Uses Affected by Airborne Noise**

Direct and cumulative construction noise impacts at off-site NSLUs are predicted to be less than significant as a result of the proposed project. Because the project consists of replacement of the existing culvert crossing with a new bridge, no new vehicular trips would be generated, and a traffic study was not needed. Because the proposed project would not result in the generation of additional vehicle trips or mechanical equipment noise during operation, the proposed project will not result in any increase in operational noise. Additionally, the proposed new bridge would be located at approximately the same distance or slightly further from the nearest noise-sensitive receivers (also known as noise-sensitive land uses or NSLUs) as the existing bridge (more than 1,300 feet). Although periodic maintenance activity noise would occur, such activities would be similar to those occurring for the existing bridge, and therefore would be less than significant.

### **Groundborne Vibration and Noise Impacts**

Groundborne vibration during project construction at nearby existing NSLU due to proposed construction activities would be a potentially significant impact. There are no substantial vibration sources associated with project operation. Groundborne vibration from motor vehicle traffic (i.e., passenger vehicles and trucks) would be unchanged from levels associated with the existing bridge, because the proposed project would not result in an increase in the number or size of the motor vehicles traveling through the area. Furthermore, the proposed new bridge would be located at approximately the same distance or slightly further from the nearest NSLUs

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as the existing bridge (more than 1,300 feet). Therefore, vibration impacts associated with project operation would be less than significant.

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## 1 INTRODUCTION

This report analyzes the noise impacts from both construction and operation of the proposed project. The proposed project is located within an unincorporated portion of the County. The proposed project is located in a rural area about two miles north of Fallbrook. The 62-acre project site is near the middle of a 1400-acre parcel recently acquired by The Wildlands Conservancy from Fallbrook Public Utility District. This parcel is managed as open space for conservation and recreation uses. The project site is adjoined by U.S. Marine Corps Base Camp Pendleton to the west, low density residential tracts in Sandia Creek and Rock Mountain canyons to the north, and Santa Margarita Trail Preserve to the east (see Figure 1). This noise report evaluates potential short-term construction noise and groundborne vibration impacts from the proposed project at the nearest NSLUs. Potential long-term noise/vibration impacts associated with traffic at the site and project-generated off-site traffic, as well as noise from on-site operations (during periodic maintenance activities), are also evaluated. The noise impacts are assessed based on County noise criteria as specified in the Noise Element of the General Plan and the Noise Ordinance. References cited in this report can be found in Attachment 1.

### 1.1 Project Description

The proposed Sandia Creek Drive Bridge Replacement and Fish Passage Project (proposed project) site is located within an unincorporated portion of the County of San Diego (County). This project consists of the removal and replacement of an aging low-flow concrete box culvert river crossing that has created a significant fish passage barrier on the Santa Margarita River with a new concrete wide-flange girder bridge. The new bridge will span the river (360 ft in width), with one pier and constructed in two sections. The bridge will provide two paved traffic lanes (12 ft wide) with two shoulders (8 feet wide) within a 68-ft road right-of-way. As shown in Figure 2, the new bridge will be constructed about 160 feet downstream of the existing Sandia Creek Drive bridge to replace that flood-prone structure.

Construction of this span bridge will allow passage of endangered steelhead to 12 miles of upstream spawning and rearing habitat and enhance the unique biological and recreational values of the newly created Santa Margarita River Trail Preserve. The bridge lies in the middle of this property recently acquired by The Wildlands Conservancy (TWC) who will provide conservation, education and recreational opportunities to the public in perpetuity. The new bridge replaces the existing Sandia Creek Drive concrete box culvert low-flow river crossing, which periodically floods and has a limited line of sight in a heavily used trail area. The new bridge will straighten out the road as it approaches the river from the south to increase safety, and the existing bend will become the entrance way to the parking lot. There is ample parking

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at the Sandia Creek Drive parking area next to the bridge, which will be further improved (at a later date) by TWC to add a ranger station, restrooms, educational signage and paving. The project construction would also include temporary trail construction for an equestrian connector trail to route horse riders away from the construction zone, approximately 8 ft wide tread and 600 ft long on the east side of Sandia Creek Drive and south of the river. The existing Sandia Creek Drive will remain open for traffic until construction of the new structure is completed. The existing bridge will then be demolished to re-create a more natural condition. Finally, the abandoned concrete ford crossing that is approximately 800 feet downstream of the new bridge location will also be removed to remove that barrier to steelhead migration.

## 1.1.1 Project Design Features

The project would not incorporate Project Design Features.

## 1.2 Environmental Settings and Existing Conditions

### 1.2.1 Setting and Location

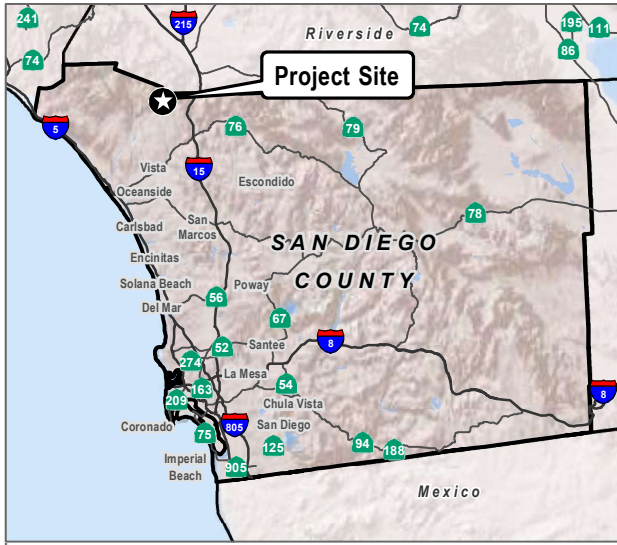
The proposed project is located in a rural area within unincorporated San Diego County, about two miles north of Fallbrook. The 62-acre project site is near the middle of a 1400-acre parcel recently acquired by The Wildlands Conservancy from Fallbrook Public Utility District. This parcel is managed as open space for conservation and recreation uses. The project site is adjoined by U.S. Marine Corps Base Camp Pendleton to the west, low density residential tracts in Sandia Creek and Rock Mountain canyons to the north, and Santa Margarita Trail Preserve to the east.


Single-family residences exist to the south and north of the project site, along Santa Margarita Drive and Little Rock Road, respectively. The nearest such residences (NSLUs) are located approximately 1,100 feet or more from the project site<sup>1</sup>. The lands adjacent to the project site are designated Open Space Park or Preserve and the nearby residential uses are designated Spaced Rural Residential<sup>2</sup>.

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<sup>1</sup> i.e., the nearest staging area/roadway work; the existing bridge itself is located approximately 1,300 feet or further from the nearest NSLU.

<sup>2</sup> The existing residences are located atop steep hillsides overlooking the valleys. The surrounding terrain nearer to the project site is extremely rugged and consists primarily of wild lands, unlikely to present a suitable site for a future residence.



 Project Site

SOURCE: USGS 7.5-Minute Series Temecula Quadrangle



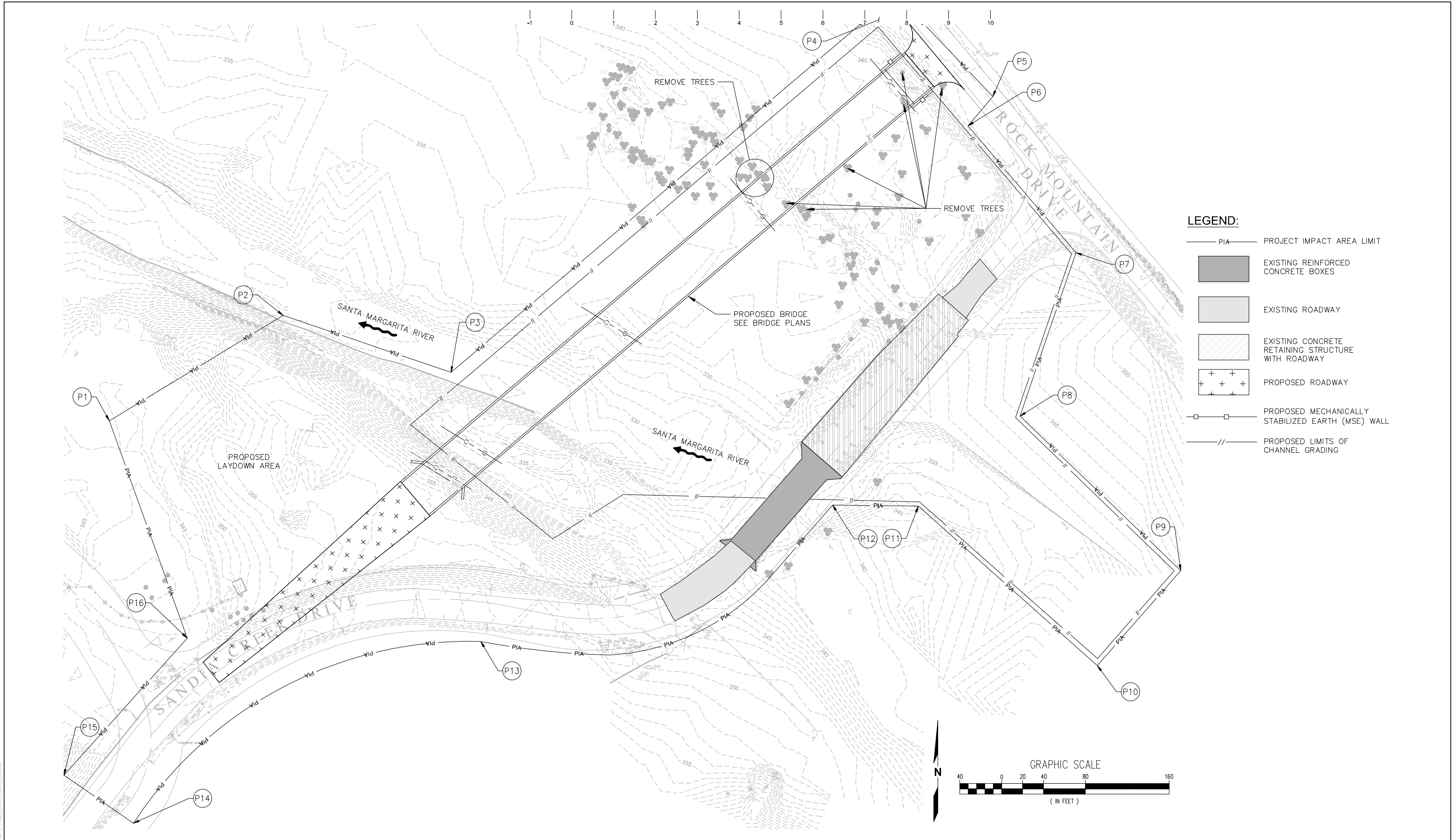
FIGURE 1

Project Location

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SOURCE: County of San Diego Department of Public Works 2020

**FIGURE 2**  
Site Plan



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The ambient noise measurements were conducted on August 18, 2020. Three (3) short-term noise measurements were made. The short-term noise measurement locations are depicted in Figure 3 as Sites ST1 through ST3. Representative measurements were conducted near the closest residences, located to the southwest of the project site approximately 1,100 feet or more away, as well as the 2<sup>nd</sup>-closest residences, located to the northeast of the project site approximately 1,500 feet or more away. Measurements were also conducted at a grouping of more distant residences located approximately 3,700 feet or more away from the project site. Other residences also exist at various locations in the project vicinity, to the north and east. For example, a few residences exist to the north of the project, approximately 1,800 feet or more away. However, all of these are further away than the nearest sites represented by ST1 and ST2, and (similarly to the measured locations) have varying degrees of intervening topography (i.e., hilltops or ridgelines) between the residence and the project site.

The three short-term noise measurements locations are described in the following text and the results of the measurements are shown in Table 1. The field noise data sheets are included as Attachment 2.

**ST1** Measurement location ST1 is located southwest of the project site, near the northern end of Santa Margarita Drive. ST 1 is adjacent to a small cluster of single-family residences located on a mountain overlooking the project site. Because access to the residential neighborhood is restricted by a locked gate, the measurement location ST1 is as close to the nearest residence (shown in Figure 3 as M1) as possible. Because the local area is relatively isolated with little to no through-traffic or other prominent noise sources and therefore relatively quiet, the measurement at ST1 is representative of M1 and the adjacent residences. The measured average noise level at ST1 was 43.9 A-weighted decibels (dBA) and was primarily attributable to local traffic. Other noise sources included birds, distant traffic and rustling leaves.

**ST2** Measurement location ST2 is located northeast of the project site, adjacent to Rock Mountain Drive. ST2 is east of several single-family residences located on a mountain overlooking the project site. Because access to the roadway (Little Rock Road) leading to the residences is restricted by a locked gate, the measurement location ST2 is as close to the second-nearest residence (shown in Figure 3 as M2) as possible. Because the local area is relatively isolated with little to no through-traffic or other prominent noise sources and therefore relatively quiet, the measurement at ST2 is representative of M2 and other nearby residences. The measured average noise level at ST2 was 32.4 dBA and was primarily attributable to rustling leaves. Other noise sources included birds.

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**ST3** Measurement location ST3 is located south of the project site, adjacent to Vista del Lago (the local street) and amid several single-family residences. ST3 represents a third grouping of distant residential land uses (shown in Figure 3 as ST 3/M4) in the project vicinity. Similarly, to measurements ST1 and ST2, the local area is relatively isolated with little to no through-traffic or other prominent noise sources and therefore relatively quiet. The measured average noise level at ST3 was 36.3 dBA and was primarily attributable to distant conversations. Other noise sources included birds, distant traffic and rustling leaves.

**Table 1**  
**Short-Term Noise Measurements**

Site	Description	Date/Time	Leq <sup>1</sup> (dBA)	L <sub>max</sub> <sup>2</sup> (dBA)	L <sub>min</sub> <sup>3</sup> (dBA)
ST1	Near the closest residences, southwest of project site	August 18, 2020 11:00 to 11:10 a.m.	43.9	57.9	33
ST2	Near the 2nd-closest residences, northeast of project site	August 18, 2020 11:30 to 11:40 a.m.	32.4	47.2	25.7
ST3	Adjacent to distant residences, south of project site.	August 18, 2020 10:40 to 10:50 a.m.	36.3	52.6	25.9

Source: Attachment 2.

**Notes:**

<sup>1</sup> Equivalent Continuous Sound Level (Energy-Averaged Sound Level)

<sup>2</sup> Maximum Sound Level

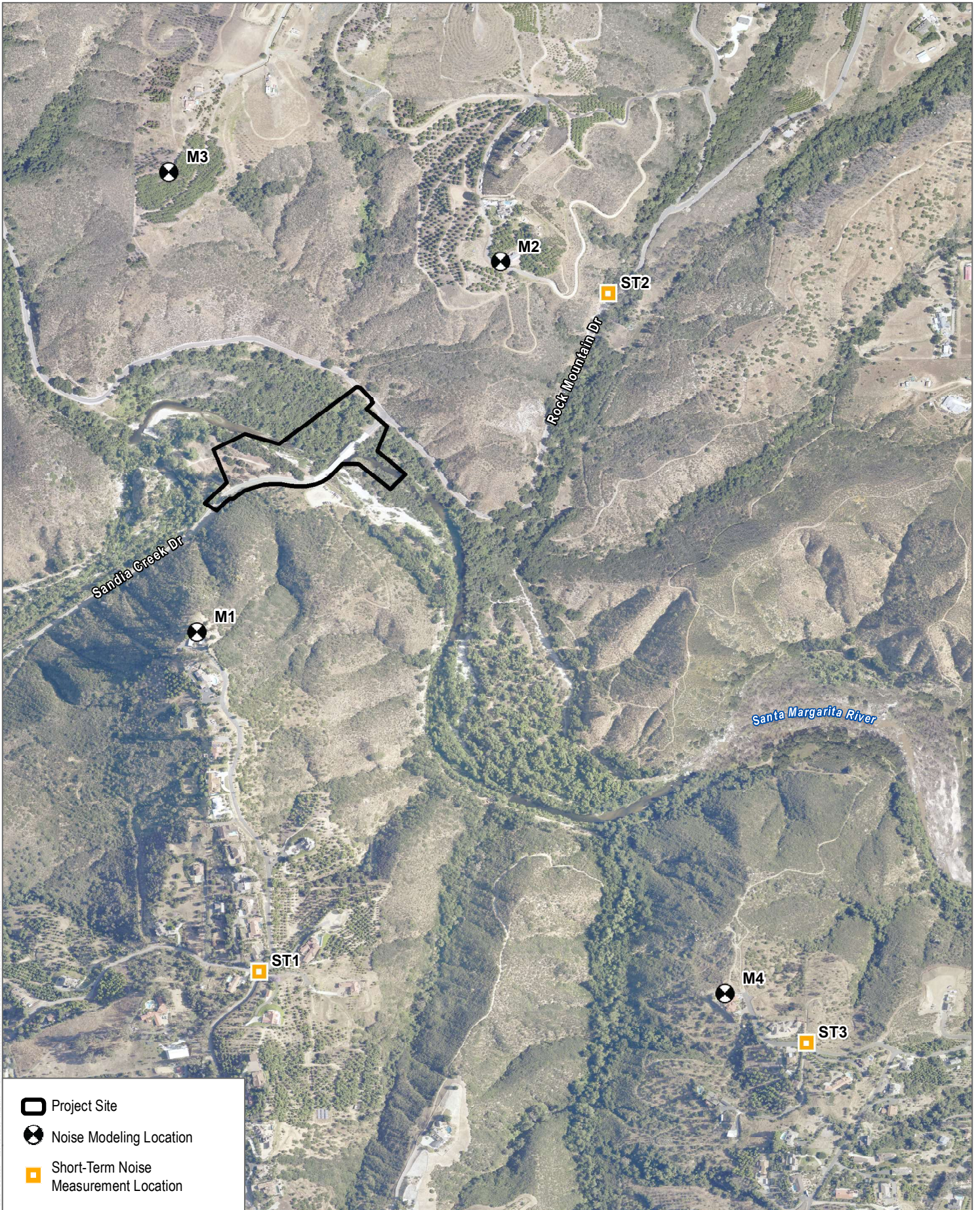
<sup>3</sup> Minimum Sound Level

Weather during the noise measurements was the following: temperature was 85 degrees Fahrenheit (°F), relative humidity was 40%, 2 mile-per-hour easterly wind, and sunny sky (August 18, 2020).

## 1.3 Methodology and Equipment

### 1.3.1 Noise Measuring Methodology and Procedures

Noise levels were measured at NSLUs in vicinity of the project site using a Rion NL-52 sound level meter. All measurements were taken with the microphone at a height of 5 feet above existing ground level and fitted with a windscreen. Sound level meter calibration was checked before and after use. The noise measurements were taken in the surrounding area near the project site on August 18, 2020, between the hours of 10:40 a.m. and 11:40 a.m. During the measurement period, the weather was dry and calm (approximately 2 miles per hour), and the average temperature was 85 degrees Fahrenheit (°F), with approximately 40% relative humidity.



SOURCE: SanGIS 2017

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## 1.3.2 Noise Modeling Software

The Federal Highway Administration's Roadway Construction Noise Model (RCNM; FHWA 2008) and project-specific construction equipment were used to estimate construction noise levels at the nearest NSLUs. Input variables for the RCNM consist of the receiver/land use types, the equipment type and number of each (e.g., two excavators, a loader, a dump truck), the duty cycle for each piece of equipment (i.e., percentage of hours the equipment typically works per day), acoustical shielding (if any) and the distance from the sensitive noise receptor. The RCNM has default duty cycle values for the various pieces of equipment, which were derived from an extensive study of typical construction activity patterns. Those default duty cycle values were used for this noise analysis. The input / output files for the RCNM noise model are provided in Attachment 3.

## 1.3.3 Noise Formulas and Calculations

### Construction Noise

The noise levels generated by construction equipment would vary greatly depending on factors such as the type and specific model of the equipment, the condition of the equipment, and the operation being performed. The average sound level of the construction activity also depends upon the amount of time that the equipment operates and the intensity of the construction during the time period. Construction activities would occur during the County's allowable hours of operation.

Construction of the project is expected to last for approximately 2 years (currently scheduled to begin in May 2022 and to end in March 2024). Construction would involve several phases including clearing and grubbing, utility relocation, dewatering, substructure and concrete work, roadway grading and paving, superstructure bridge construction and steel placement, and demolition of the existing bridge. The maximum noise level ranges for various pieces of construction equipment at a distance of 50 feet are depicted in Table 2. Note that these are maximum noise levels, not the average sound level generally used in this assessment. The average sound level at construction sites is typically less than the maximum noise level because the equipment operates in alternating cycles of full power and lower power. Also, the equipment moves around the construction site, especially during clearing, grubbing, and grading and paving activities. Additionally, due to the dynamic nature of a construction site, noise levels are calculated from the center of the activity.

Typically, the greatest 1-hour average noise level occurs during clearing, grubbing, and grading/excavation activities. Construction equipment used during construction typically

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includes scrapers, graders, pumps, dozers, compactors, front end loaders and water trucks. Based on prior noise measurements of construction activities, typical 1-hour average noise levels during ground clearing and grading activities range from approximately 75 to 80 dBA at 50 feet from the closest construction work area. Construction noise in a well-defined area typically attenuates at approximately 6 dB per doubling of distance. When the sites have an absorptive ground surface, such as soft dirt, grass, or scattered bushes and trees, an excess ground attenuation value of 1.5 dB per doubling distance can be assumed (Caltrans 2013). Additionally, if the line-of-sight between the noise source(s) and the receiver(s) is obstructed by a solid structure such as a building or intervening terrain, the construction noise level would be reduced by a minimum of 5 dB.

Off-site construction-related worker traffic noise and daily construction trips were compared to existing ADT volumes.

**Table 2  
Typical Construction Equipment Maximum Noise Levels**

Equipment Type	Typical Equipment Noise Level (L <sub>max</sub> , dBA at 50 Feet)
Air compressor	78
Auger drill rig	84
Backhoe	78
Compactor	80
Compressor	78
Concrete pump truck	81
Concrete Saw	90
Crane	81
Dozer	82
Dump truck	76
Excavator	81
Flatbed truck	74
Front end loader	79
Generator	72
Grader	85
Jackhammer	85
Man lift	75
Paver	77
Pumps	77
Roller	80
Scraper	84
Tractor	84

Source: FHWA 2006.

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**Note:**  $L_{max}$  = maximum sound level; dBA = A-weighted decibels.

As discussed above, the Federal Highway Administration's RCNM and project-specific construction equipment were used to estimate construction noise levels at the nearest NSLUs.

The project site is zoned Open Space (S80) and consists of the Santa Margarita River riparian area with sensitive vegetation communities and species. As the County of San Diego Noise Ordinance does not have an established noise limit for biologically sensitive habitats, noise limits for sensitive habitats have been taken from the Biological Resources Guidelines for Determining Significance, which requires that noise levels to sensitive avian species are limited to less than 60 dBA  $L_{eq}$  (1-hour) or the ambient noise level plus 3 decibels, whichever is greater, at active nest locations. Potential impacts to sensitive biological species in the project vicinity are analyzed in the Biological Assessment (Biological Resources Letter Report for the Santa Margarita River Fish Passage and Bridge Replacement Project, San Diego County, California) prepared by Dudek. In the Biological Assessment, it was determined that potential short-term indirect impacts to special-status wildlife species and nesting birds could occur as a result of construction noise disturbance, among other issues (Impact W-5; Impact W-6). These indirect impacts would be mitigated to less than significant through implementation of mitigation measures, including biological monitoring, minimizing human disturbance outside of work limits during construction by installing temporary construction fencing or flagging, or curtailment of construction during the breeding/nesting season of migratory bird species.

## Operational Noise

Because the proposed project would not result in the generation of additional vehicle trips or mechanical equipment noise during operation, the proposed project will not result in any increase in operational noise. Additionally, the proposed new bridge would be located at approximately the same distance from the nearest NSLUs as the existing bridge. Although periodic inspection and maintenance activity noise would occur, such activities would be similar to those occurring for the existing bridge. For these reasons, modeling of operational noise was not conducted.



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## 2 NOISE SENSITIVE LAND USES AFFECTED BY AIRBORNE NOISE

### 2.1 Guidelines for the Determination of Significance

Guidelines for the determination of significance of environmental noise impacts for this and other impact sections were promulgated by the County in January 2009 in the County's Noise Guidelines (County of San Diego 2009a).

A proposed project would result in a significant impact if the implementation would result in the exposure of any on-site or off-site existing or reasonably foreseeable future NSLUs to exterior or interior noise (including noise generated from a project combined with noise from roads, railroads, airports, heliports, and all other noise sources) greater than any of the following:

#### A. Exterior Locations

- i. 60 dB (CNEL)
- ii. An increase of 10 dB (CNEL) over preexisting noise

In the case of single-family residential detached NSLUs, exterior noise shall be measured at an outdoor living area that adjoins and is on the same lot as the dwelling and that contains at least the following minimum area:

- i. Net lot area up to 4,000 square feet: 400 square feet
- ii. Net lot area 4,000 square feet to 10 acres: 10% of net lot area
- iii. Net lot area over 10 acres: 1 acre

For all projects, exterior noise shall be measured at all exterior areas provided for group or private usable open space.

#### B. Interior Locations

45 dB (CNEL) except for the following cases:

- i. Rooms that are usually occupied only part of the day (i.e., schools, libraries, or similar facilities) in which the interior 1-hour average sound level due to noise outside should not exceed 50 dBA
- ii. Corridors, hallways, stairwells, closets, bathrooms, or any room with a volume less than 490 cubic feet

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## County General Plan

The General Plan Update was adopted by the County on August 3, 2011 (County of San Diego 2011). Revisions to the General Plan Noise Element have not been updated in the County’s Noise Guidelines at this time; however, the new General Plan Update noise compatibility guidelines and standards as contained in the General Plan Update are applicable to the proposed project. Table 3 provides the County’s current noise compatibility guidelines, and Table 4 provides the County’s noise standards.

**Table 3  
Noise Compatibility Guidelines**

Land Use Category		Exterior Noise Levels					
		55	60	65	70	75	80
A	Residential—single-family residences, mobile homes, senior housing, convalescent homes						
B	Residential—multifamily residences, mixed-use (commercial/residential)						
C	Transient lodging—motels, hotels, resorts						
D*	Schools, churches, hospitals, nursing homes, childcare facilities						
E*	Passive recreational parks, nature preserves, contemplative spaces, cemeteries						
F*	Active parks, golf courses, athletic fields, outdoor spectator sports, water recreation						
G*	Office/professional, government, medical/dental, commercial, retail, laboratories						
H*	Industrial, manufacturing, utilities, agriculture, mining, stables, warehouse, maintenance/repair						
ACCEPTABLE—Specified land use is satisfactory based on the assumption that any buildings involved are of normal construction, without any special noise insulation requirements.							
CONDITIONALLY ACCEPTABLE—New construction or development should be undertaken only after a detailed noise analysis is conducted to determine if noise reduction measures are necessary to achieve acceptable levels for land use. Criteria for determining exterior and interior noise levels are listed in Table 4, Noise Standards. If a project cannot mitigate noise to a level deemed acceptable, the appropriate County decision maker must determine that mitigation has been provided to the greatest extent practicable or that extraordinary circumstances exist.							
UNACCEPTABLE—New construction or development shall not be undertaken.							

\* Denotes facilities used for part of the day; therefore, an hourly standard would be used rather than CNEL.

# Noise Report for The Sandia Creek Drive Bridge Replacement and Fish Passage Project, San Diego County, California

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**Table 4  
Noise Standards**

1. The exterior noise level (as defined in Item 3) standard for Category A shall be 60 CNEL, and the interior noise level standard for indoor habitable rooms shall be 45 CNEL.
2. The exterior noise level standard for Categories B and C shall be 65 CNEL, and the interior noise level standard for indoor habitable rooms shall be 45 CNEL.
3. The exterior noise level standard for Categories D and G shall be 65 CNEL and the interior noise level standard shall be 50 dBA $L_{eq}$ (one hour average).
4. For single-family detached dwelling units, “exterior noise level” is defined as the noise level measured at an outdoor living area which adjoins and is on the same lot as the dwelling, and which contains at least the following minimum net lot area: <ul style="list-style-type: none"> <li>• for lots less than 4,000 square feet in area, the exterior area shall include 400 square feet;</li> <li>• for lots between 4,000 square feet to 10 acres in area, the exterior area shall include 10% of the lot area;</li> <li>• for lots over 10 acres in area, the exterior area shall include 1 acre.</li> </ul>
5. For all other residential land uses, “exterior noise level” is defined as noise measured at exterior areas which are provided for private or group usable open space purposes. “Private Usable Open Space” is defined as usable open space intended for use of occupants of one dwelling unit, normally including yards, decks, and balconies. When the noise limit for Private Usable Open Space cannot be met, then a Group Usable Open Space that meets the exterior noise level standard shall be provided. “Group Usable Open Space” is defined as usable open space intended for common use by occupants of a development, either privately owned and maintained or dedicated to a public agency, normally including swimming pools, recreation courts, patios, open landscaped areas, and greenbelts with pedestrian walkways and equestrian and bicycle trails, but not including off-street parking and loading areas or driveways.
6. For non-residential noise sensitive land uses, exterior noise level is defined as noise measured at the exterior area provided for public use.
7. For noise sensitive land uses where people normally do not sleep at night, the exterior and interior noise standard may be measured using either CNEL or the one-hour average noise level determined at the loudest hour during the period when the facility is normally occupied.
8. The exterior noise standard does not apply for land uses where no exterior use area is proposed or necessary, such as a library.
9. For Categories E and F the exterior noise level standard shall not exceed the limit defined as “Acceptable” in Table N-1 or an equivalent one-hour noise standard.

**Note:** Exterior Noise Level compatibility guidelines for Land Use Categories A-H are identified in Table 11.

## 2.2 Potential Noise Impacts

### 2.2.1 Potential Build-Out Noise Conditions and Impacts

The proposed project consists of the replacement of an existing roadway bridge with a new, replacement bridge (shown in Figure 2). As such, the project itself does not have a noise compatibility standard. The nearest NSLUs are single-family residences located approximately 1,300 feet or more from the existing bridge. As shown in Table 4, row B, single-family residential land uses have a noise compatibility standard of 60 dBA CNEL as “conditionally acceptable.” Traffic and operational noise impacts at existing land uses (i.e., off-site locations) are assessed in Section 2.3.

# Noise Report for The Sandia Creek Drive Bridge Replacement and Fish Passage Project, San Diego County, California

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## 2.2.2 Design Considerations and Mitigation Measures

The proposed project will not expose any existing and foreseeable future noise sensitive receptors to noise that exceeds the County's Noise standards. Therefore, there are no Project Design Features or Mitigation Measures necessary for this aspect of the project.

## 2.2.3 Summary

The proposed project is a replacement roadway bridge; there is no County noise/land use compatibility standard for roadways or bridges. The nearest NSLUs (single-family residential) have a noise standard of 60 dBA CNEL. Off-site noise-sensitive receivers are addressed in Section 2.3.

## 2.3 Off-Site Direct and Cumulative Noise Impacts

The proposed project would not result in an increase in traffic volumes, a change in vehicle mix (the percentages of autos, trucks or other vehicle types) or traffic speeds on local roadways. Furthermore, the nearest NSLUs, located 1,300 feet or more away, would be approximately the same distance (in the case of the residences to the northeast) or slightly further (in the case of the residences to the southwest and south) from the replacement bridge; thus, traffic noise levels would not increase compared to existing noise levels.

### 2.3.1 Direct Noise Impacts

Noise from motor vehicle traffic is primarily a function of volume, vehicle mix, speed, and proximity. Traffic noise impacts would not occur as a result of the proposed project because as stated previously, the construction of the proposed new bridge would not increase traffic volumes, traffic speeds, or result in a change in the vehicle mix. Furthermore, the location of the new bridge, approximately 160 feet to the northwest, would result in a small but relatively insignificant increase in the bridge-receiver distance for the residences to the southwest and south (located approximately 1,300 feet and 3,700 feet away or more), and in a small but relatively insignificant decrease in the bridge-receiver distance for the residences to the northeast (located approximately 1,500 feet or more away). This change in bridge-receiver distances would be negligible in terms of received traffic noise; the lateral shift in either direction would be on the order of 50 feet, which for distances of 1,300 feet or more would amount to an increase or decrease in traffic noise of less than 0.5 dBA<sup>3</sup>. A change of this magnitude would not be audible or reliably measurable in the context of the community noise environment.

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<sup>3</sup> This roadway carries low volume of vehicle traffic (i.e., approximately 1,000 trips per day), therefore, treating the vehicles as point-sources was appropriate. Based upon a change in noise level for infrequently traveled

# Noise Report for The Sandia Creek Drive Bridge Replacement and Fish Passage Project, San Diego County, California

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A substantial noise increase is defined as an increase of 10 dBA CNEL above existing conditions, as stated in the *County of San Diego Noise Report Guidelines*, Section 4.1-A(ii). However, the *Report Format and Content Requirements* include a statement that a “doubling of sound energy” is considered a significant impact at a “documented noisy site” (County of San Diego 2009b). A documented noisy site is a location with NSLU that currently exceeds 60 dBA CNEL. Thus, a substantial increase is defined as a 10 dBA increase, or greater, over existing noise levels when existing and future noise levels are below the County’s 60 dBA CNEL standard, or a 3 dBA increase when existing or future noise levels equal or exceed the County’s 60 dBA CNEL standard.

As shown in Table 1, existing daytime ambient noise levels at nearby NSLUs are low, ranging from approximately 32 to 44 dBA  $L_{eq}$ . 24-hour average noise levels would be well below 60 dBA CNEL. Thus, the local NSLUs are not documented noisy sites, so a noise increase of 10 dBA or more would need to occur to count as a substantial noise increase. As discussed above, the proposed project would not result in any increase in traffic noise. Therefore, there would be **no direct noise impact** from project-related traffic.

## 2.3.2 Cumulatively Significant Noise Impacts

Similar to direct traffic noise impacts, a cumulative traffic noise impact occurs when the noise level would exceed the applicable standard and when a substantial noise level increase over existing noise occurs. Cumulative impacts are caused by project traffic in combination with traffic from other closely related past, present, and reasonably foreseeable future projects.

For the reasons discussed above, no changes in traffic noise would occur as a result of the proposed project, either under existing or future (i.e., existing plus project) conditions. Because the proposed project would replace the existing culvert bridge, the replacement bridge is not anticipated to result in an increase in average daily vehicle trips. Therefore, this would be a less than significant impact.

Additionally, the proposed project’s contribution at all off-site locations would be less than cumulatively considerable, defined by the County’s Noise Guidelines as an increase less than 2 dBA CNEL (County of San Diego 2009a). Therefore, traffic noise increases associated with the proposed project would be **less than significant**.

## 2.3.3 Design Considerations and Mitigation Measure Calculations

As previously identified, the proposed project would not result in substantial or otherwise significant increases in traffic noise levels at off-site locations. Off-site impacts from traffic

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roadway as for a point source (6 dBA per doubling of distance) with additional reduction for soft ground and shrubs (1.5 dBA per doubling of distance), for a combined attenuation rate of 7.5 dBA per doubling of distance (Caltrans 2013):  $25 * \text{Log}(1,350/1,300) = 0.41$  dB.

## Noise Report for The Sandia Creek Drive Bridge Replacement and Fish Passage Project, San Diego County, California

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noise level increases are considered **less than significant; no direct or cumulatively considerable impacts** would result from the proposed project with regard to traffic noise. Therefore, no Project Design Features or Mitigation Measures are required or proposed with regard to project-related traffic noise.

### 2.3.4 Summary

The proposed project will not result in additional average daily trips compared to what is currently occurring with the culvert bridge. Based on the analysis above, no off-site NSLUs would experience a 10 dB or greater change in future noise levels, nor would off-site NSLUs be exposed to noise levels greater than the County's compatibility levels due to the project. The noise increase from the proposed project is approximately 0.5 dBA, therefore, traffic noise impacts would be less than significant and not cumulatively considerable.

# Noise Report for The Sandia Creek Drive Bridge Replacement and Fish Passage Project, San Diego County, California

## 3 PROJECT-GENERATED AIRBORNE NOISE

### 3.1 Guidelines for the Determination of Significance

The County’s Noise Ordinance, Section 36.404 (County of San Diego 2009c), sets limits on the noise levels generated from one property to another, such as from mechanical equipment. It is unlawful for a person to cause or allow noise generated on a particular property to exceed the 1-hour average sound level at any point on or beyond the boundaries of the property, as shown in Table 5.

**Table 5  
County of San Diego Noise Ordinance Sound Level Limits**

No.	Zone	Applicable Hours	Sound Level Limit dB L <sub>eq</sub> (1 hour)
1	RS, RD, RR, RMH, A70, A72, S80, S81, S90, S92, RV, and RU with a General Plan Land Use Designation density of less than 10.9 dwelling units per acre	7 a.m. to 10 p.m.	50
		10 p.m. to 7 a.m.	45
2	RRO, RC, RM, S86, V5, RV, and RU with a General Plan Land Use Designation density of 10.9 or more dwelling units per acre	7 a.m. to 10 p.m.	55
		10 p.m. to 7 a.m.	50
3	S-94, V4, and all other commercial zones	7 a.m. to 10 p.m.	60
		10 p.m. to 7 a.m.	55
4	V1, V2	7 a.m. to 7 p.m.	60
	V1, V2	7 a.m. to 10 p.m.	55
	V1	10 p.m. to 7 a.m.	55
	V2	10 p.m. to 7 a.m.	50
	V3	7 a.m. to 10 p.m.	70
	V3	10 p.m. to 7 a.m.	65
5	M-50, M-52, and M-54	Anytime	70
6	S82, M56, and M58	Anytime	75
7	S88 (see County Noise Ordinance, Section 36.404(c))		

**Source:** Adapted from the County of San Diego Noise Ordinance, Section 36.404.

**Notes:** Pursuant to Section 36.404 of the County’s Noise Ordinance:

- a Except as provided in Section 36.409 of the County’s Noise Ordinance, it shall be unlawful for any person to cause or allow the creation of any noise, which exceeds the 1-hour average sound level limits in Table 36.404 of the County’s Noise Ordinance, when the 1-hour average sound level is measured at the property line of the property on which the noise is produced or at any location on a property that is receiving the noise.
- b Where a noise study has been conducted and the noise mitigation measures recommended by that study have been made conditions of approval of a Major Use Permit, which authorizes the noise-generating use or activity and the decision-making body approving the Major Use Permit determined that those mitigation measures reduce potential noise impacts to a level below significance, implementation and compliance with those noise mitigation measures shall constitute compliance with subsection (a).
- c S88 zones are specific planning areas, which allow for different uses. The sound level limits in Table 36.404 of the County’s Noise Ordinance that apply in an S88 zone depend on the use being made of the property. The limits in Table 36.404, subsection (1) of the County’s Noise Ordinance apply to property with a residential, agricultural, or civic use. The limits in subsection (3) apply to property with a commercial use. The limits in subsection (5) apply to property with an industrial use that would only be allowed in an M50, M52, or M54 zone. The limits in subsection (6) apply to all property with an extractive use or a use that would only be allowed in an M56 or M58 zone.



# Noise Report for The Sandia Creek Drive Bridge Replacement and Fish Passage Project, San Diego County, California

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- d If the measured ambient noise level exceeds the applicable limit in Table 36.404 in the County's Noise Ordinance, the allowable 1-hour average sound level shall be the 1-hour average ambient noise level, plus 3 dB. The ambient noise level shall be measured when the alleged noise violation source is not operating.
- e The sound level limit at a location on a boundary between two zones is the arithmetic mean of the respective limits for the two zones. The 1-hour average sound level limit applicable to extractive industries, however, including borrow pits and mines, shall be 75 dB at the property line regardless of the zone in which the extractive industry is located.
- f A fixed-location public utility distribution or transmission facility located on or adjacent to a property line shall be subject to the sound level limits of this section, measured at or beyond 6 feet from the boundary of the easement on which the facility is located.

Section 36.408 of the Noise Ordinance states:

Except for emergency work, it shall be unlawful for any person to operate or cause to be operated, construction equipment:

- (a) Between 7 p.m. and 7 a.m.
- (b) On a Sunday or a holiday. For purposes of this section, a holiday means January 1st, the last Monday in May, July 4th, the first Monday in September, December 25th and any day appointed by the President as a special national holiday or the Governor of the State as a special State holiday. A person may, however, operate construction equipment on a Sunday or holiday between the hours of 10 a.m. and 5 p.m. at the person's residence or for the purpose of constructing a residence for himself or herself, provided that the operation of construction equipment is not carried out for financial consideration or other consideration of any kind and does not violate the limitations in sections 36.409 and 36.410.

Section 36.409 of the Noise Ordinance states:

Except for emergency work, it shall be unlawful for any person to operate construction equipment or cause the construction equipment to be operated, exceeding an average sound level of 75 dBA for an 8-hour period, between 7 a.m. and 7 p.m., when measured at the boundary line of the property where the noise source is located or on any occupied property where the noise is being received.

Section 36.410 (as adapted) states the following:

In addition to the general limitations on sound levels in Section 36.404 and the limitations on construction equipment in Section 36.409, the following additional sound level limitations shall apply:

- (a) Except for emergency work or work on a public road project, no person shall produce or cause to be produced an impulsive noise that exceeds the

# Noise Report for The Sandia Creek Drive Bridge Replacement and Fish Passage Project, San Diego County, California

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maximum sound level shown in [Table 6], when measured at the boundary line of the property where the noise source is located or on any occupied property where the noise is received, for 25% of the minutes in the measurement period, as described in Section [36.410](c) [of the County’s Noise Ordinance]. The maximum sound level depends on the use being made of the occupied property. The uses in [Table 5] are as described in the County Zoning Ordinance.

**Table 6**  
**County of San Diego Noise Ordinance, Section 36.410, Maximum Sound Level (Impulsive) Measured at Occupied Property in Decibels**

Occupied Property Use	dBA
Residential, village zoning or civic use	82
Agricultural, commercial or industrial use	85

(b) Except for emergency work, no person working on a public road project shall produce or cause to be produced an impulsive noise that exceeds the maximum sound level shown in [Table 7], when measured at the boundary line of the property where the noise source is located or on any occupied property where the noise is received, for 25% of the minutes in the measurement period, as described in Section [36.410](c) [of the County’s Noise Ordinance]. The maximum sound level depends on the use being made of the occupied property. The uses in [Table 5] are as described in the County Zoning Ordinance.

**Table 7**  
**County of San Diego Noise Ordinance, Section 36.410, Maximum Sound Level (Impulsive) Measured at Occupied Property in Decibels for Public Road Projects**

Occupied Property Use	dBA
Residential, village zoning or civic use	85
Agricultural, commercial or industrial use	90

(c) The minimum measurement period for any measurements conducted under this section shall be one hour. During the measurement period a measurement shall be conducted every minute from a fixed location on an occupied property. The measurements shall measure the maximum sound

# Noise Report for The Sandia Creek Drive Bridge Replacement and Fish Passage Project, San Diego County, California

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level during each minute of the measurement period. If the sound level caused by construction equipment or the producer of the impulsive noise, exceeds the maximum sound level for any portion of any minute it will be deemed that the maximum sound level was exceeded during that minute.

The Project Site is zoned (Open Space) S80 and is subject to the operational noise threshold of one-hour average of 50 dBA or 45 dBA and temporary construction noise of an eight-hour average of 75 dBA. The proposed project will result in a significant impact if it results in noise levels that exceed the thresholds specified in sections 36.404 through 36.410 of the County's Noise Ordinance.

## 3.2 Potential Operational Noise Impacts (Non-Construction Noise)

### 3.2.1 Potential Buildout Noise Conditions without Mitigation

Project operational noise impacts were evaluated by review of the most recent available project descriptions and proposed operations information.

#### Stationary Source Noise

Based upon information provided by the project applicant, the operation of the proposed replacement bridge would not require, include or involve any noise-generating mechanical equipment or machinery, beyond routine inspections and maintenance similar to that required for the existing bridge. San Diego County will own and operate the new bridge and will pay for maintenance and inspections. The steel girder is proposed to be weathering steel whose patina does not require painting or sealing except for girder ends at 30 years. Maintenance of the weathered steel bridge would consist of truck inspection every two years, and use of a UBIT (Under Bridge Inspection Truck) every four years. These activities use 2-axle utility trucks (i.e., not heavy trucks), are passive in nature (that is, they do not involve drilling, pounding or other "invasive" inspection techniques) and thus are not anticipated to create high noise levels. Therefore, there would be **no noise impact** resulting from stationary source noise or any other operational noise.

### 3.2.2 Design Considerations and Mitigation Measures

As discussed above, the project will comply with the County's Noise Ordinance threshold. There are no Project Design Features or Mitigation Measures necessary for this aspect of the proposed project.

# Noise Report for The Sandia Creek Drive Bridge Replacement and Fish Passage Project, San Diego County, California

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### 3.2.3 Summary

The proposed project is a replacement roadway bridge, and no stationary mechanical equipment would be used in operation of the bridge, beyond during periodic routine inspection and maintenance similar to the existing bridge. There would be **no impact** associated with operational noise.

## 3.3 Potential General Construction Noise Impacts

### 3.3.1 Potential On-Site Temporary Construction Noise Impacts without Mitigation

#### Construction Equipment

The proposed project construction would occur in phases over a period of approximately 19 months (not including pre-construction activities such as staking and surveying). Construction would begin with mobilization activities<sup>4</sup>, and would finish with demobilization and site restoration, as shown in Table 8.

Construction noise would be temporary and short-term. Construction noise typically occurs intermittently and varies depending on the nature of each phase of construction (e.g., clearing and grubbing, substructure and concrete retaining walls, demolition, etc.) due to the different types of construction activities.

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<sup>4</sup> The project construction would also include temporary trail construction for an equestrian connector trail to route horse riders away from the construction zone, approximately 8 ft wide tread and 600 ft long on the east side of Sandia Creek Drive and south of the river. The trail construction will utilize hand tools including shovels, rakes, Mattock, Pulaski and limited chain saw use for brush trimming. The trail will be constructed during Jan-Mar 2022, ahead of the construction start. There will be intermittent chain saw use and some ground pounding which will cause less than significant noise /vibration impact based upon distance to the nearest NSLUs (approximately 950 feet) and the fact that only hand tools would be utilized..

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**Table 8  
Construction Phases, Equipment and Timeline**

Construction Phase	Construction Equipment Quantity and Type	Estimated Timeline (Months)																			Worker Vehicles Estimate (Typical Day)	Heavy Trucks Estimate (Typical Day)
		9/1/2022	10/1/2022	11/1/2022	12/1/2022	1/1/2023	2/1/2023	3/1/2023	4/1/2023	5/1/2023	6/1/2023	7/1/2023	8/1/2023	9/1/2023	10/1/2023	11/1/2023	12/1/2023	1/1/2024	2/1/2024	3/1/2024		
Mobilization / Demobilization 1 - Delivery of equip, materials, temp buildings, fencing.	10 Transport Trucks	█	█																		2	10
Mobilization / Demobilization 2 - Delivery of large equipment	8 Transport Trucks	█	█																		2	8
Mobilization / Demobilization 3 - Delivery of water tender for dust control	1 Transport Truck	█	█																		2	1
Mobilization / Demobilization 4 - Stockpiling / moving material	1 Dozer	█	█																		2	0
Clearing and Grubbing	1 Tractor, 2 Excavators, 1 Generator, 1 Signal Board (i.e., Generator), 1 Water Truck			█	█																5	0
Utility Relocation / Dewatering (these phases would occur concurrently)	1 Air Compressor, 2 Generator Sets, 2 Graders, 1 Plate Compactor, 1 Pump, 1 Forklift, 4 Scrapers, 1 Signal Board (i.e., Generator), 2 Tractors/Load			█	█																18	0

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	ers Backhoes, 1 Water Truck																																																	
Roadway	1 Paver, 1 Paving Equipment, 1 Roller, 1 Signal Board (i.e., Generator), 2 Tractors/ Loaders Backhoes, 1 Water Truck																																						8	4										
Substructure and Wing walls	2 Cranes, 1 Auger Drill, 2 Crawler Tractors, 4 Excavators, 2 Graders, 3 Rollers, 3 Rubber-Tired Loaders, 4 Scrapers, 1 Signal Board (i.e., Generator), 2 Tractors/ Loaders Backhoes, 1 Water Truck																																								28	4								
Superstructure Bridge construction (bridge superstructure including girder and deck construction) / Steel (placement of steel girder, installation of deck panes, construction of slab approach, placement of moisture barrier and grid of reinforcing steel bars, barrier formation, and final AC pavement) / Rock Slope Protection and Earthwork (these phases occur concurrently)	1 Crane, 1 Compressor, 1 Generator, 2 Graders, 1 Plate Compactor, 1 Pump, 1 Forklift, 4 Scrapers, 1 Signal Board (i.e., Generator), 2																																																28	12

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	Tractors/ Loaders Backhoes, 1 Pressure Washer (i.e., Compressor), 1 Water Truck																					
Demolition of Existing Sandia Creek Bridge	1 Jackhammer, 1 Crane, 1 Concrete / Industrial Saw, 2 Rubber- Tired Dozers																		8	5		
Project Site Restoration	Pickup Trucks, Hand Tools (negligible noise anticipated)																				3	1

**Source:** Construction equipment estimates and worker vehicle estimates based upon the Sacramento Metropolitan Air Quality Management District’s Roadway Construction Emissions Model (RCEM), has a module for estimation of bridge construction work: <http://www.airquality.org/Businesses/CEQA-Land-Use-Planning/CEQA-Guidance-Tools>. These estimates were then reviewed and approved by the project applicant, with a few minor revisions / additions. Heavy truck estimates based upon information provided by project engineers (KPFF).



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Using the FHWA’s RCNM construction noise model (described in Section 1.3.2) and construction information (types and number of construction equipment by phase) as shown in Table 8, the estimated noise levels from construction were calculated for a representative range of distances, as shown in Table 9, Construction Noise Modeling Results Summary. The RCNM inputs and outputs are provided in Attachment 3.

**Table 9**  
**Construction Noise Modeling Results Summary (dBA L<sub>eq</sub>)**

Construction Phase	Construction Noise at Representative Receivers			
	M1 - Nearest Residence to the Southwest	M2 - Nearest Residence to the Northeast	M3 - Nearest Residence to the North	M2 - Nearest Residence to the South
Mobilization / Demobilization 1 - Delivery of equip, materials, temp buildings, fencing.	40	35	34	25
Mobilization / Demobilization 2 - Delivery of large equipment	39	34	33	24
Mobilization / Demobilization 3 - Delivery of water tender for dust control	30	25	24	15
Mobilization / Demobilization 4 - Stockpiling / moving material	38	33	32	23
Clearing and Grubbing	42	40	35	28
Utility Relocation / Dewatering (these phases occur concurrently)	48	46	43	34
Roadway	43	41	39	29
Substructure and Concrete Retaining Walls	50	48	46	36
Roadway and Substructure and Concrete Retaining Walls combined (during overlapping schedule period)	51	49	47	37
Superstructure Bridge construction / Steel / Rock Slope Protection and Earthwork (these phases occur concurrently)	48	46	44	34
Demolition of Existing Sandia Creek Bridge	45	44	41	32

**Source:** Attachment 3

**Note:** The Attenuation rate used is 6 dB per doubling of distance, plus an additional 1.5 dB per doubling of distance for absorptive ground surface, such as soft dirt, grass, or scattered bushes and trees, to account for the dense vegetation surrounding the project site in all directions (Caltrans 2013). Additionally, a 5 dB reduction is used in order to account for the intervening ridgelines between the project site and the nearby NSLU.

As presented in Table 9, the highest noise levels are predicted to occur during construction of the roadway and substructure and concrete retaining walls, when noise levels from construction

## Noise Report for The Sandia Creek Drive Bridge Replacement and Fish Passage Project, San Diego County, California

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activities would be as high as 51 dBA equivalent continuous sound level ( $L_{eq}$ ) at the nearest residences, located to the southwest of the project site. During other phases of construction work the noise levels would range from approximately 30 to 48 dBA  $L_{eq}$  at the nearest residence, located to the southwest. At the other residences, located further away, construction noise levels would be slightly lower.

Although the estimated noise levels from construction are relatively low (due to the large distances between the noise source and the receivers), nearby off-site NSLUs (i.e., the residences) would be exposed to somewhat elevated construction noise levels because the ambient noise levels are also relatively low. However, the exposure would be short-term and would cease upon project construction. It is anticipated that construction activities associated with the proposed project would take place between 7:00 a.m. and 5:00 p.m., and would not take place on Sundays or public holidays. At the nearest NSLUs the estimated noise levels would be well below the construction noise limits in County of San Diego Noise Ordinance Section 36.409 (75 dBA averaged over an 8-hour period).

The project site is zoned Open Space (S80) and is in the Santa Margarita River riparian corridor that contains sensitive vegetation communities and species. As the County of San Diego Noise Ordinance does not have an established noise limit for biologically sensitive habitats, noise limits for sensitive habitats have been taken from the Biological Resources Guidelines for Determining Significance, which requires that noise levels to sensitive avian species are limited to less than 60 dBA LEQ (1-hour) or the ambient noise level plus 3 decibels, whichever is greater, at active nest locations. Noise impacts to the on-site sensitive biological species are analyzed in the Biological Assessment prepared by Dudek. To reduce noise impacts to the biological resources, the proposed project would include M-BI-1 (biological monitoring) to ensure avoidance of unnecessary direct impacts to habitat as well as ensure avoidance of direct impacts to wildlife. Other mitigation measures include M-BI-2 temporary construction fencing or flagging to avoid and minimize impacts to habitat outside of work limits, and M-BI-13 best management practices to prevent avoidable impacts during construction activities. With implementation of mitigation measures mentioned above, direct and indirect impacts to the sensitive habits from construction would be less than significant. Further impact analysis to sensitive species is detailed in the Biological Report prepared by Dudek and dated September 2021.

Therefore, noise impacts from construction would be **less than significant**. No mitigation measures are required.

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## 3.3.2 Potential Off-Site Temporary Construction Noise Impacts without Mitigation

During construction, the proposed project would also result in a short-term increase in noise levels from off-site traffic on the local roadway network, but this increase would not be sufficient to increase traffic noise levels a substantial amount. It is expected that up to 28 daily worker commute trips (i.e., 28 round-trips) would occur during the substructure/concrete retaining walls as well as the substructure/steel/rock slope phases of the project. The substructure/steel/rock slope phase would be the maximum construction-related traffic anticipated for the proposed project. During this approximately 3-month long phase, it is estimated that a total of approximately 748 haul trucks and other material trucks would be needed; averaged over the 3-month (60 working days) phase, this would equate to 12 heavy trucks (i.e., 12 round-trips) per day. Construction-related traffic would be distributed over the local and regional roadway network and would access the site from Sandia Creek Drive.

Typically, traffic volumes must double to create an increase in perceptible (3 dBA) traffic noise (Caltrans 2013). Because Sandia Creek Drive has an existing ADT of approximately 1,000 vehicles, the vehicles added to the local roadway network from the proposed project's construction-related traffic would not result in a 3 dBA increase in the daily or peak hour traffic noise levels. Therefore, the additional construction-related traffic would have a **less-than-significant**, temporary increase in overall traffic noise levels.

## 3.3.3 Design Considerations and Temporary Mitigation Measures

There are no Project Design Features or Mitigation Measures necessary for this aspect of the proposed project.

## 3.3.4 Summary

During project construction, the noise from on-site activities would be relatively low; at the nearest NSLU the construction noise level would range from approximately 30 to 51 dBA  $L_{eq}$ . These levels would be well below the construction noise limits in County of San Diego Noise Ordinance Section 36.409 (75 dBA averaged over an 8-hour period). Additionally, off-site worker vehicle trips and heavy truck trips related to the proposed project would not result in a 3 dBA increase in daily or peak hour traffic noise levels. Therefore, construction noise impacts would be **less than significant**.

# Noise Report for The Sandia Creek Drive Bridge Replacement and Fish Passage Project, San Diego County, California

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## 3.4 Potential Impulsive Noise Impacts

### 3.4.1 Potential Impulsive Noise Impacts without Mitigation

Impulsive noise sources include pavement breaking, rock crushing, impact-type pile driving, blasting or rock drilling. With the exception of demolition of the existing bridge structure by jackhammer, no other construction-related or operational impulsive noise sources are proposed as part of the proposed project. The use of a jackhammer was included in the analysis of the project's demolition phase. As shown in Table 9, the highest estimated noise level during this phase would be approximately 45 dBA  $L_{eq}$  at the nearest NSLU. Furthermore, based on the RCNM User's Guide Table 1 (CA/T equipment noise emissions and acoustical usage factors database) (FHWA 2006), the measured maximum noise level of a jackhammer at a distance of 50 feet is 89 dBA  $L_{max}$ . At the nearest noise-sensitive land use, located approximately 1,300 feet from the existing bridge, the resulting maximum noise level would be approximately 49 dBA  $L_{max}$ <sup>5</sup>. This level would be well below the applicable noise standard for impulsive noise in Section 36.410 of the County of San Diego's Noise Ordinance, as shown in Table 7 of this noise report, of 85 dBA  $L_{max}$  for residential land uses. Therefore, the noise impact from impulsive noise sources would be **less than significant**.

### 3.4.2 Design Considerations and Mitigation Measures

Because the noise impact from impulsive noise sources would be less than significant, no project design features or mitigation measures are required.

### 3.4.3 Summary

Noise impacts from impulsive noise sources (which would be limited to jackhammering during the demolition phase) would be **less than significant**.

## 3.5 Cumulative or Combined Noise Impacts

### 3.5.1 Potential Combined Noise Impacts

Project implementation would result in potentially significant noise impacts associated with the combination of construction activities at existing NSLUs. Noise is a localized occurrence and attenuates rapidly with distance. Therefore, only future projects in the direct vicinity of the project site could add to construction source noise generated by the proposed project and result in a

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<sup>5</sup> Attenuation rate used is 6 dB per doubling of distance, plus an additional 1.5 dB per doubling of distance for absorptive ground surface, such as soft dirt, grass, or scattered bushes and trees (Caltrans 2013), to account for the dense vegetation surrounding the project site in all directions. Additionally, a 5 dB reduction is used in order to account for the intervening ridgelines between the project site and the nearby NSLU.

# Noise Report for The Sandia Creek Drive Bridge Replacement and Fish Passage Project, San Diego County, California

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cumulative noise impact. Additionally, because construction noise is temporary, only cumulative projects occurring during or prior to the proposed project would result in a cumulative noise impact.

The 62-acre project site is near the middle of a 1400-acre parcel recently acquired by The Wildlands Conservancy from Fallbrook Public Utility District. This parcel is managed as open space for conservation and recreation uses. There are no planned projects, with the possible exception of a nearby visitor center; however, the construction of a visitor center (should it occur) would not take place during construction of the proposed project. Therefore, it is concluded that cumulative impacts would be **less than significant**.

## **3.5.2 Design Considerations and Mitigation Measures**

### **3.5.2.1 Project Design Features**

Because cumulative noise impacts would be less than significant, no project design features or mitigation measures are required.

### **3.5.3 Summary**

Noise impacts from cumulative projects would be **less than significant**.

# Noise Report for The Sandia Creek Drive Bridge Replacement and Fish Passage Project, San Diego County, California

## 4 GROUNDBORNE VIBRATION AND NOISE IMPACTS

### 4.1 Guidelines for the Determination of Significance

Project implementation could expose nearby residential land uses to groundborne vibration and noise levels equal to or greater than acceptable levels. Table 10 specifies groundborne vibration criteria by land use category within the County of San Diego, and Table 11 specifies groundborne vibration criteria for sensitive buildings (i.e., types of land uses in which vibration is of special concern).

**Table 10**  
**Guidelines for Determining the Significance**  
**of Groundborne Vibration and Noise Impacts**

Land Use Category	Groundborne Vibration Impact Levels (inches/second RMS)		Groundborne Noise Impact Levels (dB re 20 micropascals)	
	Frequent Events <sup>a</sup>	Occasional or Infrequent Events <sup>b</sup>	Frequent Events <sup>a</sup>	Occasional or Infrequent Events <sup>b</sup>
Category 1: Buildings where low ambient vibration is essential for interior operations (research and manufacturing facilities with special vibration constraints) <sup>f</sup>	0.0018 <sup>c</sup>	0.0018 <sup>c</sup>	Not applicable <sup>d,e</sup>	Not applicable <sup>d,e</sup>
Category 2: Residences and buildings where people normally sleep (hotels, hospitals, residences, and other sleeping facilities) <sup>f</sup>	0.0040	0.010	35 dBA	43 dBA
Category 3: Institutional land uses with primarily daytime use (schools, churches, libraries, other institutions, and quiet offices) <sup>f</sup>	0.0056	0.014	40 dBA	48 dBA

**Source:** FTA 2018.

RMS = root mean square; re = relative

**Notes:**

- <sup>a</sup> "Frequent events" is defined as more than 70 vibration events per day. Most rapid transit projects fall into this category.
- <sup>b</sup> "Infrequent events" is defined as fewer than 70 vibration events per day. This category includes most commuter rail systems.
- <sup>c</sup> This criterion limit is based on levels that are acceptable for most moderately sensitive equipment such as optical microscopes. Vibration-sensitive manufacturing or research will require detailed evaluation to define acceptable vibration levels. Ensuring lower vibration levels in a building often requires special design of the HVAC systems and stiffened floors.
- <sup>d</sup> Vibration-sensitive equipment is not sensitive to groundborne noise.
- <sup>e</sup> There are some buildings, such as concert halls, TV and recording studios, and theaters that can be very sensitive to vibration and noise but do not fit into any of the three categories. Table 11 gives criteria for acceptable levels of groundborne vibration and noise for these various types of special uses.
- <sup>f</sup> For Categories 2 and 3 with occupied facilities, isolated events such as blasting are significant when the PPV exceeds 1 inch per second. Non-transportation vibration sources such as impact pile drivers or hydraulic breakers are significant when their PPV exceeds 0.1 inch per second. More specific criteria for structures and potential annoyance were developed by Caltrans (2020) and will be used to evaluate these continuous or transient sources in the County.

# Noise Report for The Sandia Creek Drive Bridge Replacement and Fish Passage Project, San Diego County, California

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**Table 11**  
**Guidelines for Determining the Significance of Groundborne Vibration and Noise Impacts for Special Buildings**

Type of Building or Room	Groundborne Vibration Impact Levels (inches/second RMS)		Groundborne Noise Impact Levels (dB re 20 micropascals)	
	<i>Frequent Events<sup>a</sup></i>	<i>Occasional or Infrequent Event<sup>b</sup></i>	<i>Frequent Events<sup>a</sup></i>	<i>Occasional or Infrequent Events<sup>b</sup></i>
Concert halls, TV studios, and recording studios	0.0018	0.0018	25 dBA	25 dBA
Auditoriums	0.0040	0.010	30 dBA	38 dBA
Theaters	0.0040	0.010	35 dBA	43 dBA

**Source:** FTA 2018.

RMS = root mean square; re = relative

**Notes:**

<sup>a</sup> "Frequent Events" is defined as more than 70 vibration events per day. Most rapid transit projects fall into this category.

<sup>b</sup> "Infrequent Events" is defined as fewer than 70 vibration events per day. This category includes most commuter rail systems.

As stated in note F of Table 10, Caltrans criteria shall be used for transient sources such as those associated with project construction. Therefore, for the purposes of this vibration analysis, impacts from general construction would occur if vibration levels exceed 0.0040 inch per second RMS (County of San Diego 2009b).

## 4.2 Potential Groundborne Vibration and Noise Impacts

### 4.2.1 Potential Groundborne Vibration and Noise Impacts without Mitigation

#### 4.2.1.1 Operations

No operational components of the proposed project include significant groundborne noise or vibration sources, and no significant vibrations sources currently exist, or are planned, in the project area. Thus, no significant groundborne noise or vibration impacts would occur with the operation of the proposed project and impacts would be **less than significant**.

#### 4.2.1.2 Construction

On-site construction equipment that would cause the most groundborne vibration and noise would be associated with the substructure / concrete retaining walls phase and the demolition phase. During the substructure / concrete retaining walls phase, the largest vibration levels are anticipated to be generated by the planned use of tractors, graders, excavators a drill rig, and similar heavy equipment, as well as rollers. According to the Federal Transit Administration (FTA 2018), vibration levels associated with the use of these types of heavy equipment generate



# Noise Report for The Sandia Creek Drive Bridge Replacement and Fish Passage Project, San Diego County, California

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vibration levels of 0.089 to 0.210 inch per second PPV or 87 to 94 vibration decibels (VdB) at 25 feet, as shown in Table 12. Additionally, loaded trucks used for soil hauling during grading could generate vibration levels of approximately 0.076 inch per second PPV (or 86 VdB) at 25 feet. According to the FTA’s methodology for determining vibration propagation and Caltrans guidance regarding the relation between PPV and RMS displacement, vibration levels would fall below the County-recommended Caltrans thresholds for residences of 0.004 inch per second RMS<sup>6</sup> beyond a distance of approximately 170 feet from large bulldozers and similar heavy equipment and 300 feet from vibratory rollers. Loaded trucks would fall below the threshold approximately 150 feet away.

**Table 12**  
**Typical Construction Equipment Vibration Levels**

Equipment	PPV at 25 feet (inch per second)	Approximate Vibration Level (VdB) at 25 Feet*
Pile drive (impact) – typical	0.644	104
Pile drive (sonic) – typical	0.170	93
Vibratory roller	0.210	94
Jackhammer	0.035	79
Large bulldozer	0.089	87
Caisson drilling	0.089	87
Loaded trucks	0.076	86
Small bulldozer	0.003	58

**Sources:** FTA 2018; Caltrans 2020.

PPV = peak particle velocity

**Note:**

\* Where noise level is the velocity level in decibels (VdB) referenced to 1 microinch/second and based on the RMS velocity amplitude.

The nearest sensitive receptors to on-site construction are the residences southwest of the project site located approximately 1,300 feet from the project site. For the equipment type with the highest vibration level anticipated for this project (the vibratory roller), the estimated vibration level would be approximately 0.0004 inch per second RMS. Therefore, vibration levels would be well below the County threshold of 0.004 inch per second RMS from construction activities at the nearest receptors. This impact would be **less than significant**.

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<sup>6</sup> Conservatively assuming a crest factor of 1.414 (ratio of PPV to RMS displacement in inches per second), per the Transportation and Construction Vibration Guidance Manual (Caltrans 2020).

# Noise Report for The Sandia Creek Drive Bridge Replacement and Fish Passage Project, San Diego County, California

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## 4.2.2 Design Considerations and Mitigation Measures

Potential impact from vibration associated with the proposed project would be less than significant. Thus, no design consideration or mitigation measures associated with groundborne vibration are required.

## 4.2.3 Summary

Groundborne vibration impacts associated with heavy construction equipment would be **less-than-significant**.

# Noise Report for The Sandia Creek Drive Bridge Replacement and Fish Passage Project, San Diego County, California

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## 5 SUMMARY OF PROJECT IMPACTS, DESIGN CONSIDERATIONS, MITIGATION, AND CONCLUSION

The preceding analysis provides an evaluation of compatibility of the proposed land uses with the existing and future noise environment of the project site, potential noise and vibration impacts due to construction of the proposed project, and the direct and indirect noise generated by operation of the proposed project.

### 5.1 Land Use Compatibility

The land use planned for the project site would be compatible with the existing and future noise environment, as shown in the preceding analysis. The project site would not result in the addition of proposed NSLUs that would be adversely affected by aircraft operations or other noise sources. The potential noise effects from the proposed project would be **less than significant**. No design considerations or mitigation measures are proposed.

### 5.2 Airborne Noise

#### 5.2.1 Operations

Because the proposed bridge would replace an older but similar bridge in the same area and would not result in an increase in vehicle speed, type, or volume, and because the proposed bridge would not introduce any stationary sources, operational noise associated with the proposed project would be effectively unchanged from existing conditions. Noise impacts associated with operation of the proposed project were analyzed and found to result in **no impact**.

##### 5.2.1.1 Design Considerations

There are no Project Design Features or Mitigation Measures necessary for this aspect of the proposed project.

##### 5.2.1.2 Summary

With regard to project-generated airborne noise impacts associated with project operation at affected NSLUs, there would be **no impact**.

# Noise Report for The Sandia Creek Drive Bridge Replacement and Fish Passage Project, San Diego County, California

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## 5.2.2 Construction

During project construction, the noise from on-site activities would be relatively low; at the nearest NSLU the construction noise level would range from approximately 30 to 51 dBA Leq. These levels would be well below the construction noise limits in County of San Diego Noise Ordinance Section 36.409 (75 dBA averaged over an 8-hour period). Additionally, off-site worker vehicle trips and heavy truck trips related to the proposed project would not result in a 3 dBA increase in daily or peak hour traffic noise levels. Therefore, construction noise impacts would be **less than significant**.

### 5.2.2.1 Design Considerations

There are no Project Design Features or Mitigation Measures necessary for this aspect of the proposed project.

### 5.2.2.2 Summary

Project-generated airborne noise impacts associated with project construction at affected NSLUs would be **less than significant**.

## 5.3 Vibration

Groundborne vibration generated by the proposed project would be **less than significant**. No project design features or mitigation measures are required.

# Noise Report for The Sandia Creek Drive Bridge Replacement and Fish Passage Project, San Diego County, California

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## 6 CERTIFICATION

The following is a list of preparers, persons, and organizations involved with the noise assessment.

### **DUDEK**

Mike Greene, INCE Bd. Cert., Acoustician, County-Approved Noise Consultant

Connor Burke, Environmental Specialist / Acoustics and Air Quality

Carrie Kubacki, GIS Specialist

Rachel Dobrolenski, Publications Specialist

# Noise Report for The Sandia Creek Drive Bridge Replacement and Fish Passage Project, San Diego County, California

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# **ATTACHMENT 1**

*References Cited*

## ATTACHMENT 1

### References Cited

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- SANDAG (San Diego Association of Governments). 2020. Traffic Forecast Information Center. Accessed 8/18/2020. <https://tfic.sandag.org/#>



## ATTACHMENT 1 (Continued)

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# **ATTACHMENT 2**

## *Noise Measurement Data*



## Field Noise Measurement Data

Record: 1294

Project Name	Santa Margarita
Observer(s)	Connor Burke
Date	2020-08-18

### Meteorological Conditions

Temp (F)	85
Humidity % (R.H.)	40
Wind	Calm
Wind Speed (MPH)	2
Wind Direction	East
Sky	Sunny

### Instrument and Calibrator Information

Instrument Name List	(ENC) Rion NL-52
Instrument Name	(ENC) Rion NL-52
Instrument Name Lookup Key	(ENC) Rion NL-52
Manufacturer	Rion
Model	NL-52
Serial Number	553896
Calibrator Name	(ENC) LD CAL150
Calibrator Name	(ENC) LD CAL150
Calibrator Name Lookup Key	(ENC) LD CAL150
Calibrator Manufacturer	Larson Davis
Calibrator Model	LD CAL150
Calibrator Serial #	5152
Pre-Test (dBA SPL)	94
Post-Test (dBA SPL)	94
Windscreen	Yes
Weighting?	A-WTD
Slow/Fast?	Slow
ANSI?	Yes

### Monitoring

Record #	1
Site ID	ST3
Site Location Lat/Long	33.403933, -117.233138
Begin (Time)	10:40:00
End (Time)	10:50:00
Leq	36.3
Lmax	52.6
Lmin	25.9
Other Lx?	L90, L50, L10
L90	27
L50	30
L10	38.1
Other Lx (Specify Metric)	L
Primary Noise Source	Distant construction.
Other Noise Sources (Background)	Birds, Distant Traffic, Rustling Leaves
Other Noise Sources Additional Description	Rumbling from Camp Pendleton.
Is the same instrument and calibrator being used as previously noted?	Yes
Are the meteorological conditions the same as previously noted?	Yes

## Description / Photos

### Site Photos

#### Photo



#### Comments / Description

Facing north

### Monitoring

Record #	2
Site ID	ST1
Site Location Lat/Long	33.405137, -117.242712
Begin (Time)	11:00:00
End (Time)	11:10:00
Leq	43.9
Lmax	57.9
Lmin	33
Other Lx?	L90, L50, L10
L90	35.2
L50	37.5
L10	43.9
Other Lx (Specify Metric)	L
Primary Noise Source	Traffic
Other Noise Sources (Background)	Birds, Distant Traffic, Rustling Leaves
Is the same instrument and calibrator being used as previously noted?	Yes
Are the meteorological conditions the same as previously noted?	Yes

## Site Photos

Photo



## Monitoring

<b>Record #</b>	3
<b>Site ID</b>	ST2
<b>Site Location Lat/Long</b>	33.416886, -117.236597
<b>Begin (Time)</b>	11:30:00
<b>End (Time)</b>	11:40:00
<b>Leq</b>	32.4
<b>Lmax</b>	47.2
<b>Lmin</b>	25.7
<b>Other Lx?</b>	L90, L50, L10
<b>L90</b>	26.6
<b>L50</b>	28.5
<b>L10</b>	31.7
<b>Other Lx (Specify Metric)</b>	L
<b>Primary Noise Source</b>	Rustling leaves
<b>Other Noise Sources (Background)</b>	Birds, Rustling Leaves
<b>Other Noise Sources Additional Description</b>	Hawk screech
<b>Is the same instrument and calibrator being used as previously noted?</b>	Yes
<b>Are the meteorological conditions the same as previously noted?</b>	Yes

## Site Photos

Photo



**ATTACHMENT 3**  
*Construction Noise Modeling*  
*Input/Output Data*





Construction Noise Modeling - Estimated Worst-Case Construction Noise at Nearest Residence (M1)

construction noise limit per City of San Diego at res **75**  
allowable hours over which Leq **8**

Construction Phase	Federal Highway Administration (FHWA) Roadway Construction Noise Model (RCNM) User's Guide Equipment Type	Total Equipment Qty	AUF % (from FHWA RCNM)	Reference Lmax @ 50 ft. from FHWA RCNM	Project Equipment Description, and/or Notes (all reference levels from FHWA RCNM Users Guide)	Source to NSR Distance (ft.)	Barrier Adjustment (dB)	Distance-Adjusted Lmax	Allowable Operation Time (hours)	Allowable Operation Time (minutes)	Predicted 8-hour Leq
Mob/Demob 1 - Delivery of equip, materials, temp buildings, fencing.	Flat Bed Truck	10	40	74	Reference level for FTA "Truck" noise source matches that for Flat Bed Truck, so using Flat Bed Truck	1100	5	34.3	8	480	40
Total for Mob/Demob 1 - Delivery of equip, materials, temp buildings, fencing. Phase:											
<b>40.4</b>											
Mob/Demob 2 - delivery of large equipment -	Flat Bed Truck	8	40	74	Reference level for FTA "Truck" noise source matches that for Flat Bed Truck, so using Flat Bed Truck	1100	5	34.3	8	480	39
Total for Mob/Demob 2 - delivery of large equipment - Phase:											
<b>39.4</b>											
Mob/Demob 3 - delivery of water tender - dust control.	Flat Bed Truck	1	40	74	Reference level for FTA "Truck" noise source matches that for Flat Bed Truck, so using Flat Bed Truck	1100	5	34.3	8	480	30
Total for Mob/Demob 3 - delivery of water tender - dust control. Phase:											
<b>30.4</b>											
Mob/Demob 4 - stockpiling/moving material	Dozer	1	40	82	Dozer	1100	5	42.3	8	480	38
Total for Mob/Demob 4 - stockpiling/moving material Phase:											
<b>38.4</b>											
Clear and Grub	Tractor	1	50	84	Tractor	1300	5	42.3	8	480	39
	Excavator	2	40	81	Excavator	1300	5	39.3	8	480	38
	Generator	1	50	72	Generator	1300	5	30.3	8	480	27
	Flat Bed Truck	1	40	74	Reference level for FTA "Truck" noise source matches that for Flat Bed Truck, so using Flat Bed Truck	1300	5	32.3	8	480	28
Total for Clear and Grub Phase:											
<b>42.2</b>											
Utility Relocation / Dewatering	Compressor (air)	1	50	78	Compressor (air)	1300	5	36.3	8	480	33
	Generator	2	50	72	Generator	1300	5	30.3	8	480	30
	Grader	2	40	85	Grader	1300	5	43.3	8	480	42
	Compactor (ground)	1	20	80	Compactor (ground)	1300	5	38.3	8	480	31
	Pumps	1	50	77	Pumps	1300	5	35.3	8	480	32
	Man Lift	2	20	75	Man Lift	1300	5	33.3	8	480	29
	Scraper	4	40	84	Scraper	1300	5	42.3	8	480	44
	Front End Loader	1	40	79	Front End Loader	1300	5	37.3	8	480	33
	Backhoe	1	40	78	Backhoe	1300	5	36.3	8	480	32
	Flat Bed Truck	1	40	74	Reference level for FTA "Truck" noise source matches that for Flat Bed Truck, so using Flat Bed Truck	1300	5	32.3	8	480	28
Total for Utility Relocation / Dewatering Phase:											
<b>47.5</b>											
Roadway	Paver	1	50	77	Paver	1300	5	35.3	8	480	32
	Concrete Pump Truck	2	20	81	Concrete Pump Truck	1300	5	39.3	8	480	35
	Roller	2	20	80	Roller	1300	5	38.3	8	480	34
	Generator	1	50	72	Generator	1300	5	30.3	8	480	27
	Tractor	1	40	84	Tractor	1300	5	42.3	8	480	38

Front End Loader	2	40	79
Flat Bed Truck	1	40	74

Front End Loader	1300	5	37.3	8	480	36
Reference level for FTA "Truck" noise source matches that for Flat Bed Truck, so using Flat Bed Truck	1300	5	32.3	8	480	28

Total for Roadway Phase: **43.1**

Substructure and Concrete Retaining Walls	Crane	1	50	81
	Auger Drill Rig	1	20	84
	Tractor	2	40	84
	Excavator	4	40	81
	Grader	2	40	85
	Roller	3	20	80
	Front End Loader	3	40	79
	Scraper	4	40	84
	Generator	1	50	72
	Tractor	1	40	84
	Backhoe	1	40	78
	Flat Bed Truck	1	40	74

Crane	1300	5	39.3	8	480	36
Auger Drill Rig	1300	5	42.3	7	420	35
Tractor	1300	5	42.3	8	480	41
Excavator	1300	5	39.3	8	480	41
Grader	1300	5	43.3	8	480	42
Roller	1300	5	38.3	8	480	36
Front End Loader	1300	5	37.3	8	480	38
Scraper	1300	5	42.3	8	480	44
Generator	1300	5	30.3	8	480	27
Tractor	1300	5	42.3	8	480	38
Backhoe	1300	5	36.3	8	480	32
Reference level for FTA "Truck" noise source matches that for Flat Bed Truck, so using Flat Bed Truck	1300	5	32.3	8	480	28

Total for Substructure and Concrete Retaining Walls Phase: **50.0**

Superstructure bridge construction/Steel placement/Rock slope protection and earthwork	Crane	1	50	81
	Compressor (air)	2	40	78
	Generator	2	50	72
	Grader	2	40	85
	Compactor (ground)	1	20	80
	Pumps	1	50	77
	Man Lift	1	20	75
	Scraper	4	40	84
	Generator	1	50	72
	Backhoe	1	40	78
	Front End Loader	1	40	79
	Flat Bed Truck	1	40	74

Crane	1300	5	39.3	8	480	36
Compressor (air)	1300	5	36.3	8	480	35
Generator	1300	5	30.3	8	480	30
Grader	1300	5	43.3	8	480	42
Compactor (ground)	1300	5	38.3	8	480	31
Pumps	1300	5	35.3	8	480	32
Man Lift	1300	5	33.3	8	480	26
Scraper	1300	5	42.3	8	480	44
Generator	1300	5	30.3	8	480	27
Backhoe	1300	5	36.3	8	480	32
Front End Loader	1300	5	37.3	8	480	33
Reference level for FTA "Truck" noise source matches that for Flat Bed Truck, so using Flat Bed Truck	1300	5	32.3	8	480	28

Total for Superstructure bridge construction/Steel placement/Rock slope protection and earthwork Phase: **47.9**

Demolition of existing Sandia Creek Drive bridge	Jackhammer	1	50	85
	Crane	1	16	81
	Concrete Saw	1	20	90
	Dozer	2	40	82

Jackhammer	1300	5	43.3	8	480	40
Crane	1300	5	39.3	8	480	31
Concrete Saw	1300	5	48.3	8	480	41
Dozer	1300	5	40.3	8	480	39

Total for Demolition of existing Sandia Creek Drive bridge Phase: **45.4**

To User: bordered cells are inputs, unbordered cells have formulae

**Highest Estimated Construction Noise Level: 50.0**

Construction Noise Modeling - Estimated Worst-Case Construction Noise at 2nd-Nearest Residence (M2)

construction noise limit per City of San Diego at res  
allowable hours over which Leq

75  
8

Construction Phase	Federal Highway Administration (FHWA) Roadway Construction Noise Model (RCNM) User's Guide Equipment Type	Total Equipment Qty	AUF % (from FHWA RCNM)	Reference Lmax @ 50 ft. from FHWA RCNM	Project Equipment Description, and/or Notes (all reference levels from FHWA RCNM Users Guide)	Source to NSR Distance (ft.)	Barrier Adjustment (dB)	Distance-Adjusted Lmax	Allowable Operation Time (hours)	Allowable Operation Time (minutes)	Predicted 8-hour Leq
Mob/Demob 1 - Delivery of equip, materials, temp buildings, fencing.	Flat Bed Truck	10	40	74	Reference level for FTA "Truck" noise source matches that for Flat Bed Truck, so using Flat Bed Truck	1700	5	29.0	8	480	35
Total for Mob/Demob 1 - Delivery of equip, materials, temp buildings, fencing. Phase:											
Mob/Demob 2 - delivery of large equipment -	Flat Bed Truck	8	40	74	Reference level for FTA "Truck" noise source matches that for Flat Bed Truck, so using Flat Bed Truck	1700	5	29.0	8	480	34
Total for Mob/Demob 2 - delivery of large equipment - Phase:											
Mob/Demob 3 - delivery of water tender - dust control.	Flat Bed Truck	1	40	74	Reference level for FTA "Truck" noise source matches that for Flat Bed Truck, so using Flat Bed Truck	1700	5	29.0	8	480	25
Total for Mob/Demob 3 - delivery of water tender - dust control. Phase:											
Mob/Demob 4 - stockpiling/moving material	Dozer	1	40	82	Dozer	1700	5	37.0	8	480	33
Total for Mob/Demob 4 - stockpiling/moving material Phase:											
Clear and Grub	Tractor	1	50	84	Tractor	1500	5	40.6	8	480	38
	Excavator	2	40	81	Excavator	1500	5	37.6	8	480	37
	Generator	1	50	72	Generator	1500	5	28.6	8	480	26
	Flat Bed Truck	1	40	74	Reference level for FTA "Truck" noise source matches that for Flat Bed Truck, so using Flat Bed Truck	1500	5	30.6	8	480	27
Total for Clear and Grub Phase:											
Utility Relocation / Dewatering	Compressor (air)	1	50	78	Compressor (air)	1500	5	34.6	8	480	32
	Generator	2	50	72	Generator	1500	5	28.6	8	480	29
	Grader	2	40	85	Grader	1500	5	41.6	8	480	41
	Compactor (ground)	1	20	80	Compactor (ground)	1500	5	36.6	8	480	30
	Pumps	1	50	77	Pumps	1500	5	33.6	8	480	31
	Man Lift	2	20	75	Man Lift	1500	5	31.6	8	480	28
	Scraper	4	40	84	Scraper	1500	5	40.6	8	480	43
	Front End Loader	1	40	79	Front End Loader	1500	5	35.6	8	480	32
	Backhoe	1	40	78	Backhoe	1500	5	34.6	8	480	31
	Flat Bed Truck	1	40	74	Reference level for FTA "Truck" noise source matches that for Flat Bed Truck, so using Flat Bed Truck	1500	5	30.6	8	480	27
Total for Utility Relocation / Dewatering Phase:											
Roadway	Paver	1	50	77	Paver	1500	5	33.6	8	480	31
	Concrete Pump Truck	2	20	81	Concrete Pump Truck	1500	5	37.6	8	480	34
	Roller	2	20	80	Roller	1500	5	36.6	8	480	33
	Generator	1	50	72	Generator	1500	5	28.6	8	480	26
	Tractor	1	40	84	Tractor	1500	5	40.6	8	480	37

	Front End Loader	2	40	79	Front End Loader	1500	5	35.6	8	480	35
	Flat Bed Truck	1	40	74	Reference level for FTA "Truck" noise source matches that for Flat Bed Truck, so using Flat Bed Truck	1500	5	30.6	8	480	27
										<b>Total for Roadway Phase:</b>	<b>41.3</b>
Substructure and Concrete Retaining Walls	Crane	1	50	81	Crane	1500	5	37.6	8	480	35
	Auger Drill Rig	1	20	84	Auger Drill Rig	1500	5	40.6	8	480	34
	Tractor	2	40	84	Tractor	1500	5	40.6	8	480	40
	Excavator	4	40	81	Excavator	1500	5	37.6	8	480	40
	Grader	2	40	85	Grader	1500	5	41.6	8	480	41
	Roller	3	20	80	Roller	1500	5	36.6	8	480	34
	Front End Loader	3	40	79	Front End Loader	1500	5	35.6	8	480	36
	Scraper	4	40	84	Scraper	1500	5	40.6	8	480	43
	Generator	1	50	72	Generator	1500	5	28.6	8	480	26
	Tractor	1	40	84	Tractor	1500	5	40.6	8	480	37
	Backhoe	1	40	78	Backhoe	1500	5	34.6	8	480	31
	Flat Bed Truck	1	40	74	Reference level for FTA "Truck" noise source matches that for Flat Bed Truck, so using Flat Bed Truck	1500	5	30.6	8	480	27
											<b>Total for Substructure and Concrete Retaining Walls Phase:</b>
Superstructure bridge construction/Steel placement/Rock slope protection and earthwork	Crane	1	50	81	Crane	1500	5	37.6	8	480	35
	Compressor (air)	2	40	78	Compressor (air)	1500	5	34.6	8	480	34
	Generator	2	50	72	Generator	1500	5	28.6	8	480	29
	Grader	2	40	85	Grader	1500	5	41.6	8	480	41
	Compactor (ground)	1	20	80	Compactor (ground)	1500	5	36.6	8	480	30
	Pumps	1	50	77	Pumps	1500	5	33.6	8	480	31
	Man Lift	1	20	75	Man Lift	1500	5	31.6	8	480	25
	Scraper	4	40	84	Scraper	1500	5	40.6	8	480	43
	Generator	1	50	72	Generator	1500	5	28.6	8	480	26
	Backhoe	1	40	78	Backhoe	1500	5	34.6	8	480	31
	Front End Loader	1	40	79	Front End Loader	1500	5	35.6	8	480	32
	Flat Bed Truck	1	40	74	Reference level for FTA "Truck" noise source matches that for Flat Bed Truck, so using Flat Bed Truck	1500	5	30.6	8	480	27
											<b>Total for Superstructure bridge construction/Steel placement/Rock slope protection and earthwork Phase:</b>
Demolition of existing Sandia Creek Drive bridge	Jackhammer	1	50	85	Jackhammer	1500	5	41.6	8	480	39
	Crane	1	16	81	Crane	1500	5	37.6	8	480	30
	Concrete Saw	1	20	90	Concrete Saw	1500	5	46.6	8	480	40
	Dozer	2	40	82	Dozer	1500	5	38.6	8	480	38
										<b>Total for Demolition of existing Sandia Creek Drive bridge Phase:</b>	<b>43.6</b>

To User: bordered cells are inputs, unbordered cells have formulae

**Highest Estimated Construction Noise Level: 48.2**

Construction Noise Modeling - Estimated Worst-Case Construction Noise at Residence to North (M3)

construction noise limit per City of San Diego at residence  
allowable hours over which Leq

**75**  
**8**

Construction Phase	Federal Highway Administration (FHWA) Roadway Construction Noise Model (RCNM) User's Guide Equipment Type	Total Equipment Qty	AUF % (from FHWA RCNM)	Reference Lmax @ 50 ft. from FHWA RCNM	Project Equipment Description, and/or Notes (all reference levels from FHWA RCNM Users Guide)	Source to NSR Distance (ft.)	Barrier Adjustment (dB)	Distance-Adjusted Lmax	Allowable Operation Time (hours)	Allowable Operation Time (minutes)	Predicted 8-hour Leq
Mob/Demob 1 - Delivery of equip, materials, temp buildings, fencing.	Flat Bed Truck	10	40	74	Reference level for FTA "Truck" noise source matches that for Flat Bed Truck, so using Flat Bed Truck	1900	5	27.6	8	480	34
Total for Mob/Demob 1 - Delivery of equip, materials, temp buildings, fencing. Phase:											
											<b>33.6</b>
Mob/Demob 2 - delivery of large equipment -	Flat Bed Truck	8	40	74	Reference level for FTA "Truck" noise source matches that for Flat Bed Truck, so using Flat Bed Truck	1900	5	27.6	8	480	33
Total for Mob/Demob 2 - delivery of large equipment - Phase:											
											<b>32.7</b>
Mob/Demob 3 - delivery of water tender - dust control.	Flat Bed Truck	1	40	74	Reference level for FTA "Truck" noise source matches that for Flat Bed Truck, so using Flat Bed Truck	1900	5	27.6	8	480	24
Total for Mob/Demob 3 - delivery of water tender - dust control. Phase:											
											<b>23.6</b>
Mob/Demob 4 - stockpiling/moving material	Dozer	1	40	82	Dozer	1900	5	35.6	8	480	32
Total for Mob/Demob 4 - stockpiling/moving material Phase:											
											<b>31.6</b>
Clear and Grub	Tractor	1	50	68	Tractor	1800	5	22.3	8	480	19
	Excavator	2	40	81	Excavator	1800	5	35.3	8	480	34
	Generator	1	50	72	Generator	1800	5	26.3	8	480	23
	Flat Bed Truck	1	40	74	Reference level for FTA "Truck" noise source matches that for Flat Bed Truck, so using Flat Bed Truck	1800	5	28.3	8	480	24
Total for Clear and Grub Phase:											
											<b>35.2</b>
Utility Relocation / Dewatering	Compressor (air)	1	50	78	Compressor (air)	1800	5	32.3	8	480	29
	Generator	2	50	72	Generator	1800	5	26.3	8	480	26
	Grader	2	40	85	Grader	1800	5	39.3	8	480	38
	Compactor (ground)	1	20	80	Compactor (ground)	1800	5	34.3	8	480	27
	Pumps	1	50	77	Pumps	1800	5	31.3	8	480	28
	Man Lift	2	20	75	Man Lift	1800	5	29.3	8	480	25
	Scraper	4	40	84	Scraper	1800	5	38.3	8	480	40
	Front End Loader	1	40	79	Front End Loader	1800	5	33.3	8	480	29
	Backhoe	1	40	78	Backhoe	1800	5	32.3	8	480	28
	Flat Bed Truck	1	40	74	Reference level for FTA "Truck" noise source matches that for Flat Bed Truck, so using Flat Bed Truck	1800	5	28.3	8	480	24
Total for Utility Relocation / Dewatering Phase:											
											<b>43.5</b>
Roadway	Paver	1	50	77	Paver	1800	5	31.3	8	480	28
	Concrete Pump Truck	2	20	81	Concrete Pump Truck	1800	5	35.3	8	480	31
	Roller	2	20	80	Roller	1800	5	34.3	8	480	30
	Generator	1	50	72	Generator	1800	5	26.3	8	480	23
	Tractor	1	40	84	Tractor	1800	5	38.3	8	480	34

Front End Loader	2	40	79
Flat Bed Truck	1	40	74

Front End Loader	1800	5	33.3	8	480	32
Reference level for FTA "Truck" noise source matches that for Flat Bed Truck, so using Flat Bed Truck	1800	5	28.3	8	480	24

Total for Roadway Phase: **39.0**

Substructure and Concrete Retaining Walls	Crane	1	50	81
	Auger Drill Rig	1	20	84
	Tractor	2	40	84
	Excavator	4	40	81
	Grader	2	40	85
	Roller	3	20	80
	Front End Loader	3	40	79
	Scraper	4	40	84
	Generator	1	50	72
	Tractor	1	40	84
	Backhoe	1	40	78
	Flat Bed Truck	1	40	74

Crane	1800	5	35.3	8	480	32
Auger Drill Rig	1800	5	38.3	7	420	31
Tractor	1800	5	38.3	8	480	37
Excavator	1800	5	35.3	8	480	37
Grader	1800	5	39.3	8	480	38
Roller	1800	5	34.3	8	480	32
Front End Loader	1800	5	33.3	8	480	34
Scraper	1800	5	38.3	8	480	40
Generator	1800	5	26.3	8	480	23
Tractor	1800	5	38.3	8	480	34
Backhoe	1800	5	32.3	8	480	28
Reference level for FTA "Truck" noise source matches that for Flat Bed Truck, so using Flat Bed Truck	1800	5	28.3	8	480	24

Total for Substructure and Concrete Retaining Walls Phase: **45.9**

Superstructure bridge construction/Steel placement/Rock slope protection and earthwork	Crane	1	50	81
	Compressor (air)	2	40	78
	Generator	2	50	72
	Grader	2	40	85
	Compactor (ground)	1	20	80
	Pumps	1	50	77
	Man Lift	1	20	75
	Scraper	4	40	84
	Generator	1	50	72
	Backhoe	1	40	78
	Front End Loader	1	40	79
	Flat Bed Truck	1	40	74

Crane	1800	5	35.3	8	480	32
Compressor (air)	1800	5	32.3	8	480	31
Generator	1800	5	26.3	8	480	26
Grader	1800	5	39.3	8	480	38
Compactor (ground)	1800	5	34.3	8	480	27
Pumps	1800	5	31.3	8	480	28
Man Lift	1800	5	29.3	8	480	22
Scraper	1800	5	38.3	8	480	40
Generator	1800	5	26.3	8	480	23
Backhoe	1800	5	32.3	8	480	28
Front End Loader	1800	5	33.3	8	480	29
Reference level for FTA "Truck" noise source matches that for Flat Bed Truck, so using Flat Bed Truck	1800	5	28.3	8	480	24

Total for Superstructure bridge construction/Steel placement/Rock slope protection and earthwork Phase: **43.9**

Demolition of existing Sandia Creek Drive bridge	Jackhammer	1	50	85
	Crane	1	16	81
	Concrete Saw	1	20	90
	Dozer	2	40	82

Jackhammer	1900	5	38.6	8	480	36
Crane	1900	5	34.6	8	480	27
Concrete Saw	1900	5	43.6	8	480	37
Dozer	1900	5	35.6	8	480	35

Total for Demolition of existing Sandia Creek Drive bridge Phase: **40.6**

To User: bordered cells are inputs, unbordered cells have formulae

**Highest Estimated Construction Noise Level: 45.9**

Construction Noise Modeling - Estimated Worst-Case Construction Noise at Distant Residences to the South (M4)

construction noise limit per City of San Diego at residential areas is 75 dBA  
allowable hours over which Leq is 8 hours

75  
8

Construction Phase	Federal Highway Administration (FHWA) Roadway Construction Noise Model (RCNM) User's Guide Equipment Type	Total Equipment Qty	AUF % (from FHWA RCNM)	Reference Lmax @ 50 ft. from FHWA RCNM	Project Equipment Description, and/or Notes (all reference levels from FHWA RCNM Users Guide)	Source to NSR Distance (ft.)	Barrier Adjustment (dB)	Distance-Adjusted Lmax	Allowable Operation Time (hours)	Allowable Operation Time (minutes)	Predicted 8-hour Leq
Mob/Demob 1 - Delivery of equip, materials, temp buildings, fencing.	Flat Bed Truck	10	40	74	Reference level for FTA "Truck" noise source matches that for Flat Bed Truck, so using Flat Bed Truck	3700	5	18.6	8	480	25
Total for Mob/Demob 1 - Delivery of equip, materials, temp buildings, fencing. Phase:											
<b>24.6</b>											
Mob/Demob 2 - delivery of large equipment -	Flat Bed Truck	8	40	74	Reference level for FTA "Truck" noise source matches that for Flat Bed Truck, so using Flat Bed Truck	3700	5	18.6	8	480	24
Total for Mob/Demob 2 - delivery of large equipment - Phase:											
<b>23.6</b>											
Mob/Demob 3 - delivery of water tender - dust control.	Flat Bed Truck	1	40	74	Reference level for FTA "Truck" noise source matches that for Flat Bed Truck, so using Flat Bed Truck	3700	5	18.6	8	480	15
Total for Mob/Demob 3 - delivery of water tender - dust control. Phase:											
<b>14.6</b>											
Mob/Demob 4 - stockpiling/moving material	Dozer	1	40	82	Dozer	3700	5	26.6	8	480	23
Total for Mob/Demob 4 - stockpiling/moving material Phase:											
<b>22.6</b>											
Clear and Grub	Tractor	1	50	84	Tractor	3700	5	28.6	8	480	26
	Excavator	2	40	81	Excavator	3700	5	25.6	8	480	25
	Generator	1	50	72	Generator	3700	5	16.6	8	480	14
	Flat Bed Truck	1	40	74	Reference level for FTA "Truck" noise source matches that for Flat Bed Truck, so using Flat Bed Truck	3700	5	18.6	8	480	15
Total for Clear and Grub Phase:											
<b>28.4</b>											
Utility Relocation / Dewatering	Compressor (air)	1	50	78	Compressor (air)	3700	5	22.6	8	480	20
	Generator	2	50	72	Generator	3700	5	16.6	8	480	17
	Grader	2	40	85	Grader	3700	5	29.6	8	480	29
	Compactor (ground)	1	20	80	Compactor (ground)	3700	5	24.6	8	480	18
	Pumps	1	50	77	Pumps	3700	5	21.6	8	480	19
	Man Lift	2	20	75	Man Lift	3700	5	19.6	8	480	16
	Scraper	4	40	84	Scraper	3700	5	28.6	8	480	31
	Front End Loader	1	40	79	Front End Loader	3700	5	23.6	8	480	20
	Backhoe	1	40	78	Backhoe	3700	5	22.6	8	480	19
	Flat Bed Truck	1	40	74	Reference level for FTA "Truck" noise source matches that for Flat Bed Truck, so using Flat Bed Truck	3700	5	18.6	8	480	15
Total for Utility Relocation / Dewatering Phase:											
<b>33.7</b>											
Roadway	Paver	1	50	77	Paver	3700	5	21.6	8	480	19
	Concrete Pump Truck	2	20	81	Concrete Pump Truck	3700	5	25.6	8	480	22
	Roller	2	20	80	Roller	3700	5	24.6	8	480	21
	Generator	1	50	72	Generator	3700	5	16.6	8	480	14
	Tractor	1	40	84	Tractor	3700	5	28.6	8	480	25



Front End Loader	2	40	79
Flat Bed Truck	1	40	74

Front End Loader	3700	5	23.6	8	480	23
Reference level for FTA "Truck" noise source matches that for Flat Bed Truck, so using Flat Bed Truck	3700	5	18.6	8	480	15

Total for Roadway Phase: **29.3**

Substructure and Concrete Retaining Walls	Crane	1	50	81
	Auger Drill Rig	1	20	84
	Tractor	2	40	84
	Excavator	4	40	81
	Grader	2	40	85
	Roller	3	20	80
	Front End Loader	3	40	79
	Scraper	4	40	84
	Generator	1	50	72
	Tractor	1	40	84
	Backhoe	1	40	78
	Flat Bed Truck	1	40	74

Crane	3700	5	25.6	8	480	23
Auger Drill Rig	3700	5	28.6	7	420	21
Tractor	3700	5	28.6	8	480	28
Excavator	3700	5	25.6	8	480	28
Grader	3700	5	29.6	8	480	29
Roller	3700	5	24.6	8	480	22
Front End Loader	3700	5	23.6	8	480	24
Scraper	3700	5	28.6	8	480	31
Generator	3700	5	16.6	8	480	14
Tractor	3700	5	28.6	8	480	25
Backhoe	3700	5	22.6	8	480	19
Reference level for FTA "Truck" noise source matches that for Flat Bed Truck, so using Flat Bed Truck	3700	5	18.6	8	480	15

Total for Substructure and Concrete Retaining Walls Phase: **36.2**

Superstructure bridge construction/Steel placement/Rock slope protection and earthwork	Crane	1	50	81
	Compressor (air)	2	40	78
	Generator	2	50	72
	Grader	2	40	85
	Compactor (ground)	1	20	80
	Pumps	1	50	77
	Man Lift	1	20	75
	Scraper	4	40	84
	Generator	1	50	72
	Backhoe	1	40	78
	Front End Loader	1	40	79
	Flat Bed Truck	1	40	74

Crane	3700	5	25.6	8	480	23
Compressor (air)	3700	5	22.6	8	480	22
Generator	3700	5	16.6	8	480	17
Grader	3700	5	29.6	8	480	29
Compactor (ground)	3700	5	24.6	8	480	18
Pumps	3700	5	21.6	8	480	19
Man Lift	3700	5	19.6	8	480	13
Scraper	3700	5	28.6	8	480	31
Generator	3700	5	16.6	8	480	14
Backhoe	3700	5	22.6	8	480	19
Front End Loader	3700	5	23.6	8	480	20
Reference level for FTA "Truck" noise source matches that for Flat Bed Truck, so using Flat Bed Truck	3700	5	18.6	8	480	15

Total for Superstructure bridge construction/Steel placement/Rock slope protection and earthwork Phase: **34.2**

Demolition of existing Sandia Creek Drive bridge	Jackhammer	1	50	85
	Crane	1	16	81
	Concrete Saw	1	20	90
	Dozer	2	40	82

Jackhammer	3700	5	29.6	8	480	27
Crane	3700	5	25.6	8	480	18
Concrete Saw	3700	5	34.6	8	480	28
Dozer	3700	5	26.6	8	480	26

Total for Demolition of existing Sandia Creek Drive bridge Phase: **31.6**

To User: bordered cells are inputs, unbordered cells have formulae

**Highest Estimated Construction Noise Level: 36.2**