DRAFT

INITIAL STUDY/ MITIGATED NEGATIVE DECLARATION

LAKE FOREST WOODS SEWER IMPROVEMENTS

PROJECT NO. 11123

Irvine Ranch WATER DISTRICT

LSA

December 2023

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DRAFT

INITIAL STUDY/ MITIGATED NEGATIVE DECLARATION

LAKE FOREST WOODS SEWER IMPROVEMENTS

PROJECT NO. 11123

Lead Agency:

Irvine Ranch Water District
15600 Sand Canyon Avenue
Irvine, California 92618
(949) 453-5300
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December 2023

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TABLE OF CONTENTS

FIGURES

TABLES

APPENDICES

LIST OF ABBREVIATIONS AND ACRONYMS

AAQS	ambient air quality standards
AB	Assembly Bill
ABS	acrylonitrile butadiene styrene
ac	acre/acres
ADT	average daily trips
AQMP	Air Quality Management Plan
Basin	South Coast Air Basin
bgs	below ground surface
BMPs	best management practices
BTU	British Thermal Units
CalEEMod	California Emissions Estimator Model
CalFire	California Department of Fire and Forestry Protection
California Register	California Register of Historical Resources
Caltrans	California Department of Transportation
CARB	California Air Resources Board
CBC	California Building Code
CCR	California Code of Regulations
CDFW	California Department of Fish and Wildlife
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CGP	Construction General Permit
CH_4	methane
City	City of Lake Forest
Cortese	Hazardous Waste and Substances Sites
CNDDB	California Natural Diversity Database
CNEL	Community Noise Equivalent Level
CNPS	California Native Plant Society
CO	carbon monoxide
CO_2	carbon dioxide

CO_2e	carbon dioxide equivalent
County	County of Orange
CWA	Clean Water Act
DAMP	Orange County Drainage Area Management Plan
dB	decibels
dBA	A-weighted decibels
DTSC	Department of Toxic Substances Control
EFZ	Earthquake Fault Zone
EIR	Environmental Impact Report
EO	Executive Order
EPA	United States Environmental Protection Agency
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FIRM	Flood Insurance Rate Map
FMMP	Farmland Mapping and Monitoring Program
ft	foot/feet
FTA	Federal Transit Administration
FTA Manual	FTA Transit Noise and Vibration Impact Assessment Manual
GHGs	greenhouse gases
gpm	gallons per minute
GWh	gigawatt-hours
GWP	global warming potential
HFCs	hydrofluorocarbons
HOA	Homeowners Association
in/sec	inches per second
IRWD	Irvine Ranch Water District
IS/MND	Initial Study/Mitigated Negative Declaration
Kizh Nation	Gabrieleño Band of Mission Indians – Kizh Nation
kW	kilowatts
kWh	kilowatt-hours
proposed Project	Lake Forest Woods Sewer Improvements

L_{dn}	day-night average level
LID	Low Impact Development
L_{eq}	equivalent continuous sound level
LOS	level of service
LRA	Local Responsibility Area
LSTs	localized significance thresholds
LUST	Leaking Underground Storage Tank
MBTA	Migratory Bird Treaty Act
MDR	Medium density residential
mi	mile/miles
MM	Mitigation Measure
MND	Mitigated Negative Declaration
mpg	miles per gallon
MRZ	Mineral Resource Zone
MS4	Municipal Separate Storm Sewer System
MSL	Mean sea level
MT	metric tons
N_2O	nitrous oxide
NAHC	Native American Heritage Commission
NCCP/HCP	Natural Communities Conservation Plan/Habitat Conservation Plan
NF_3	nitrogen trifluoride
NO	nitric oxide
NO_2	nitrogen dioxide
NOD	Notice of Determination
NO_X	nitrogen oxides
O_3	ozone
O&M	Operation and maintenance
OCFA	Orange County Fire Authority
OCWD	Orange County Water District
OPR	Office of Planning and Research
Pb	lead

PCBs	polychlorinated biphenyls
PCE	passenger car equivalent
PFCs	perfluorocarbons
PM	particulate matter
PM_{10}	particulate matter less than 10 microns in size
$PM_{2.5}$	particulate matter less than 2.5 microns in size
PPV	peak particle velocity
PRC	Public Resources Code
PRIMP	Paleontological Resources Impact Mitigation Program
PTGAB	Pilo Tube Guided Augar Boring
PVC	polyvinyl chloride
RMS	root-mean-square
RWQCB	Regional Water Quality Control Board
SB	Senate Bill
SCAG	Southern California Association of Governments
SCAQMD	South Coast Air Quality Management District
SCCIC	South Central Coastal Information Center
SCE	Southern California Edison
SCS	Sustainable Communities Strategy
sf	square foot/feet
SF_6	sulfur hexafluoride
SGMA	Sustainable Groundwater Management Act
SLF	Sacred Land File
SMARA	Surface Mining and Reclamation Act
SNA	John Wayne Airport
SO_2	sulfur dioxide
SRA	Source Receptor Area
SVP	Society of Vertebrate Paleontology
SWPPP	Storm Water Pollution Prevention Plan
SWRCB	State Water Resources Control Board
TACs	toxic air contaminants

USACE	United States Army Corps of Engineers
VCP	Vitrified clay pipe
VdB	vibration velocity decibels
VHFHSZ	Very High Fire Hazard Severity Zone
VMT	vehicle miles traveled
VOCs	volatile organic compounds
WOTS	Waters of the State
WOTUS	Waters of the United States

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1.0 INTRODUCTION

1.1 PURPOSE OF THIS INITIAL STUDY

The purpose of this Initial Study/Mitigated Negative Declaration (IS/MND) is to (1) describe the proposed The Lake Forest Woods Sewer Improvements (Project), which would be constructed in the City of Lake Forest; and (2) provide an evaluation of potential environmental effects associated with the Project's construction and operation.

This IS/MND has been prepared pursuant to the California Environmental Quality Act (CEQA), as amended (Public Resources Code [PRC] §21000 et seq.) and in accordance with the *State CEQA Guidelines* (California Code of Regulations [CCR] §15000 et seq.). Consistent with *State CEQA Guidelines* Section 15071, this IS/MND includes a description of the proposed Project, an evaluation of the potential environmental impacts associated with implementation of the proposed Project, and findings from the environmental analysis.

Pursuant to Section 15367 of the *State CEQA Guidelines*, the Irvine Ranch Water District (IRWD) is the Lead Agency for the Project. The Lead Agency is the public agency that has the principal responsibility for carrying out or approving a project that may have a significant effect on the environment. IRWD, as the Lead Agency, has the authority for Project approval and adoption or certification of the accompanying environmental documentation.

1.2 SUMMARY OF FINDINGS

Based on the Initial Study environmental checklist form prepared for the Project (Chapter 5.0), the proposed Project would have no impact or less than significant impacts in the following environmental areas: Aesthetics, Agriculture and Forest Resources, Air Quality, Energy, Greenhouse Gas Emissions, Hazards and Hazards and Hazardous Materials, Hydrology and Water Quality, Land Use and Planning, Mineral Resources, Population and Housing, Public Services, Recreation, Transportation and Traffic, Utilities and Service Systems, and Wildfire**.** The proposed Project has the potential to have significant impacts on Biological Resources, Cultural Resources, Geology and Soils, Noise, and Tribal Cultural Resources. Mitigation measures have been identified to reduce potentially significant impacts to less than significant. With incorporation of the recommended mitigation measures described herein, all impacts would be reduced to a less than significant level.

According to the *State CEQA Guidelines*, it is appropriate to prepare a Mitigated Negative Declaration (MND) for the proposed Project because, after incorporation of the recommended mitigation measures, potentially significant environmental impacts would be eliminated or reduced to a level considered less than significant.

1.3 ORGANIZATION OF THIS INITIAL STUDY

This IS/MND is organized into chapters, as described below.

- **1.0: Introduction.** This section provides an introduction and overview of the conclusions in this IS/MND.

- **2.0: Project Information.** This chapter provides summary information related to the proposed Project.

- **3.0: Project Description.** This chapter provides a brief description of the Project location, relevant background information, and a description of the existing conditions of the Project site and vicinity. This section also provides a description of the proposed Project and necessary discretionary approvals.

- **4.0: Environmental Factors Potentially Affected.** This chapter provides a list of the environmental factors that would be potentially affected by this Project and a determination by IRWD as to the appropriate environmental document.

- **5.0: Environmental Checklist and Evaluation of Environmental Impacts.** This chapter contains an analysis of environmental impacts identified in the environmental checklist and identifies mitigation measures that have been recommended to eliminate any potentially significant effects or to reduce them to a level considered less than significant.

- **6.0: Mitigation Monitoring and Reporting Program.** Consistent with the requirements of PRC Section 21081.6, a mitigation monitoring and reporting program has been prepared for the proposed Project. The program describes the requirements and procedures to be followed by IRWD to ensure that all mitigation measures adopted as part of the proposed Project would be carried out as described in this IS/MND.

- **7.0: List of Preparers.** This chapter identifies the personnel who were responsible for preparing the environmental document and technical studies.

- **8.0: References.** This chapter identifies the references used to prepare this IS/MND.

1.4 PUBLIC REVIEW

Publication of this Initial Study marks the beginning of a 30-day public review and comment period. During this period, the Initial Study will be available to local, State, and federal agencies and to interested organizations and individuals for review. The 30-day review period begins on January 12, 2024, and ends on February 12, 2024. Written comments concerning the environmental review contained in this Initial Study during the 30-day public review period should be sent via email to Uk@IRWD.com or via regular mail to:

Irvine Ranch Water District
Water Resources & Environmental Compliance Department
Attn: Andy Uk, Environmental Compliance Analyst
15600 Sand Canyon Avenue
Irvine, CA 92618
Tel: (949) 453-5326

The Initial Study can be reviewed and downloaded online at: http://www.irwd.com/doing-business/environmental-documents or at the IRWD headquarters at the address listed above.

Following the conclusion of the public review period, the IRWD Board of Directors will consider adoption of the IS/MND for the proposed Project together with any comments received during the public review process. If the proposed Project is approved, IRWD will file a Notice of Determination, which will be available for public inspection and posted within 24 hours of receipt at the Orange County Clerk-Recorder's Office for 30 days. The filing of the Notice of Determination starts a 30-day statute of limitations on court challenges to the approval under CEQA (*State CEQA Guidelines* Section 15075(g)).

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2.0 PROJECT INFORMATION

1. **Project Title:**

   Lake Forest Woods Sewer Improvements

2. **Lead Agency Name and Address:**

   Irvine Ranch Water District
   Water Resources & Environmental Compliance Department
   15600 Sand Canyon Avenue
   Irvine, CA 92618

3. **Contact Person and Phone Number:**

   Andy Uk, Environmental Compliance Analyst
   (949) 453-5326
   Uk@IRWD.com

4. **Project Location:**

   The proposed Project would be located in The Woods community in the City of Lake Forest within the County of Orange. Portions of the proposed improvements are located within a reach of Upper San Diego Creek and the Glenwood Tributary. The proposed Project site is bounded by Toledo Way to the northeast and Jeronimo Road to the southwest.

5. **Project Sponsor's Name and Address:**

   Irvine Ranch Water District
   Water Resources & Environmental Compliance Department
   15600 Sand Canyon Avenue
   Irvine, CA 92618

6. **General Plan Designation:**

   Open Space, Low Density Residential

7. **Zoning:**

   Medium Density Residential

8. **Description of Project:**

   The Irvine Ranch Water District (IRWD) proposes to replace, relocate, and protect portions of their existing sewer facilities that are at risk of damage from erosion by the adjacent San Diego Creek and Glenwood Tributary and provide associated access improvements (proposed Project) within The Woods community in Lake Forest, California, as described in more detail in Section 3.0, Project Description.

9. Surrounding Land Uses and Setting:

The proposed improvements are within a single -family residential housing community that surrounds a reach of Upper San Diego Creek and the Glenwood Tributary. The Project site is bounded by Toledo Way to the northeast and Jeronimo Road to the southwest. The land is owned by two Lake Forest Woods homeowners' associations which are responsible for maintenance of this section of the creek. A more detailed description of the existing site and surrounding land uses is provided in Section 3.0, Project Description.

10. Other Public Agencies Whose Approval is Required (e.g., permits, financial approval, or participation agreements):

- California Department of Fish and Wildlife (CDFW)
- United States Army Corps of Engineers (USACE)
- Regional Water Quality Control Board (RWQCB)
- Lake Forest Community Association
- Lake Forest II Master Homeowners Association
- City of Lake Forest

11. Have California Native American tribes traditionally and culturally affiliated with the project area requested consultation pursuant to Public Resource Code section 21080.3.1? If so, is there a plan for consultation that includes, for example, the determination of significance of impacts to tribal cultural resources, procedures regarding confidentiality, etc.?

On February 23, 2023, IRWD sent notification letters, to the California Native American Tribes that requested inclusion on IRWD's Assembly Bill (AB) 52 notification list. The letters, sent via certified mail to the tribal contacts, described the Project, provided maps of the Project site, and invited the tribes to request consultation should they have any concerns. IRWD received requests to consult from two tribes: the Gabrieleño Band of Mission Indians – Kizh Nation and the Juaneño Band of Mission Indians, Acjachemen Nation. Details of the tribal consultation are provided in Section 5.18, Tribal Cultural Resources.

3.0 PROJECT DESCRIPTION

The Irvine Ranch Water District (IRWD) proposes to replace, relocate, and protect existing sewer facilities and provide associated access improvements (Project) within The Woods community in Lake Forest, California. The proposed Project is required to reduce risk of failure to IRWD facilities caused by erosion from the creeks and to improve access to all IRWD facilities along approximately 1,400 feet of Upper San Diego Creek and 600 feet of a tributary to Upper San Diego Creek (Glenwood Tributary).

3.1 PROJECT LOCATION

The proposed Project site is in The Woods community in the City of Lake Forest within the County of Orange. As shown in Figure 1, Project Location, regional access to the Project site is provided by State Route 241, approximately 3 miles northeast of the Project site, and by Interstate 5, 1.3 miles southwest of the Project site.

The proposed improvements are within a single-family residential housing community that surrounds a reach of Upper San Diego Creek and the Glenwood Tributary. The Project site is bounded by Toledo Way to the northeast and Jeronimo Road to the southwest. Figure 2 shows the boundaries of the Project site.

3.2 PROJECT BACKGROUND

IRWD owns and maintains water and sewer facilities within the City of Lake Forest. Existing sewers and related infrastructure within the Project site collect wastewater from the surrounding residential development built within a former eucalyptus tree farm. Portions of the existing sewer facilities were constructed in and around the San Diego Creek and Glenwood Tributary creek channels. Two homeowners' associations, the Lake Forest Community Association and the Lake Forest II Master Homeowners Association, own all the property where IRWD's facilities are located and are responsible for maintenance of those portions of the creek channels within their boundaries. IRWD has 20- to 25-foot easements surrounding their existing sewer facilities for operation and maintenance of its facilities. OC Flood (also known as the Orange County Flood Control Department) does not own or maintain any flood control facilities on the portions of San Diego Creek and Glenwood Tributary outside of the existing culverts under Toledo Way and Jeronimo Road.

The gravity sewers were constructed in the early 1970s when it was common practice to construct gravity sewers parallel to creeks to take advantage of the natural topography. The gravity sewers generally consist of 8-inch, 10-inch and 12-inch diameter vitrified clay pipe (VCP) and are centered within 20- to 25-foot-wide sewer easements. Sewer laterals providing service to each connection

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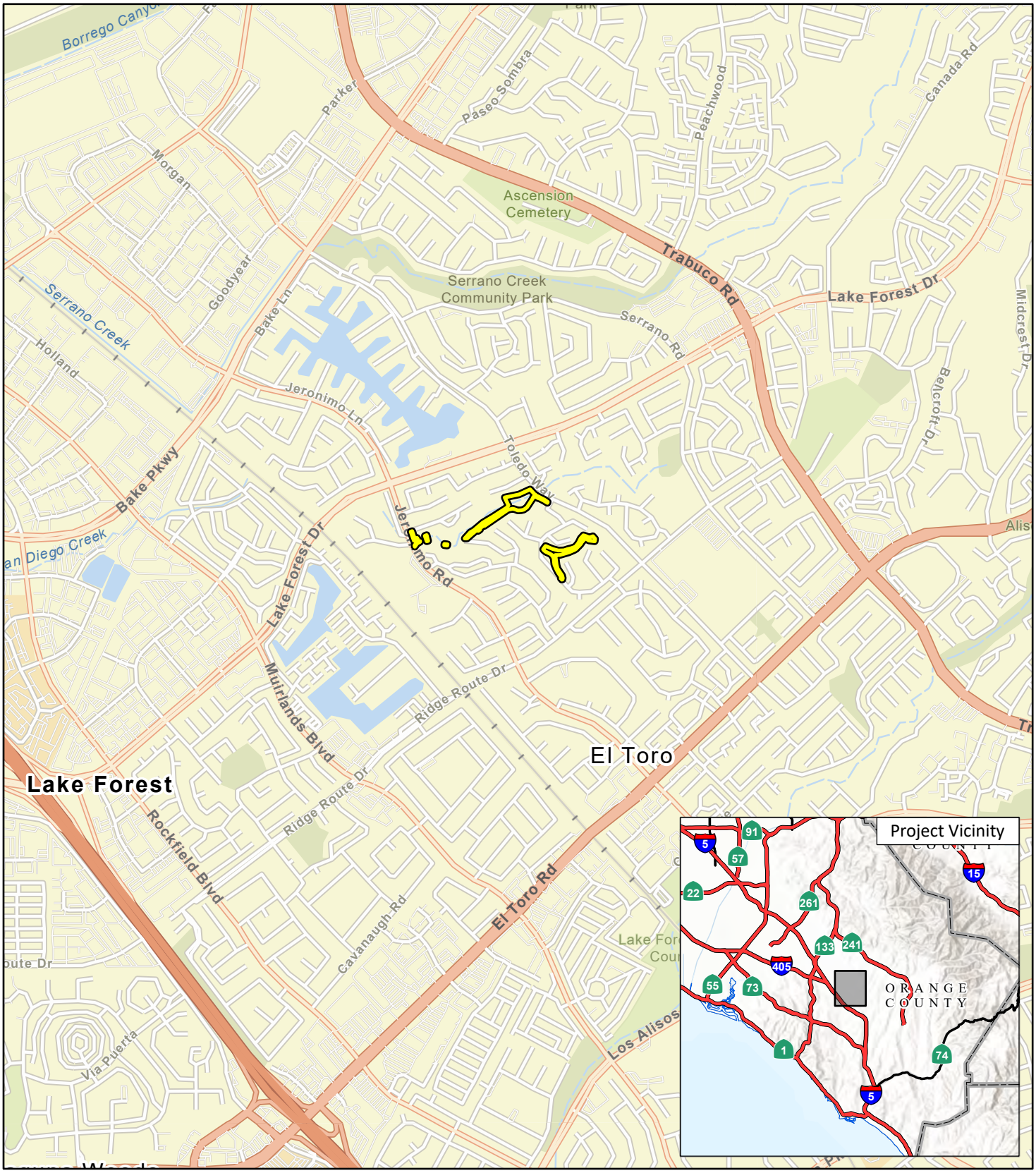

LSA

Project Location

FIGURE 1

N

0 1000 2000

FEET

SOURCE: Esri (2023)

The Woods Sewer Improvements Project

Project Location

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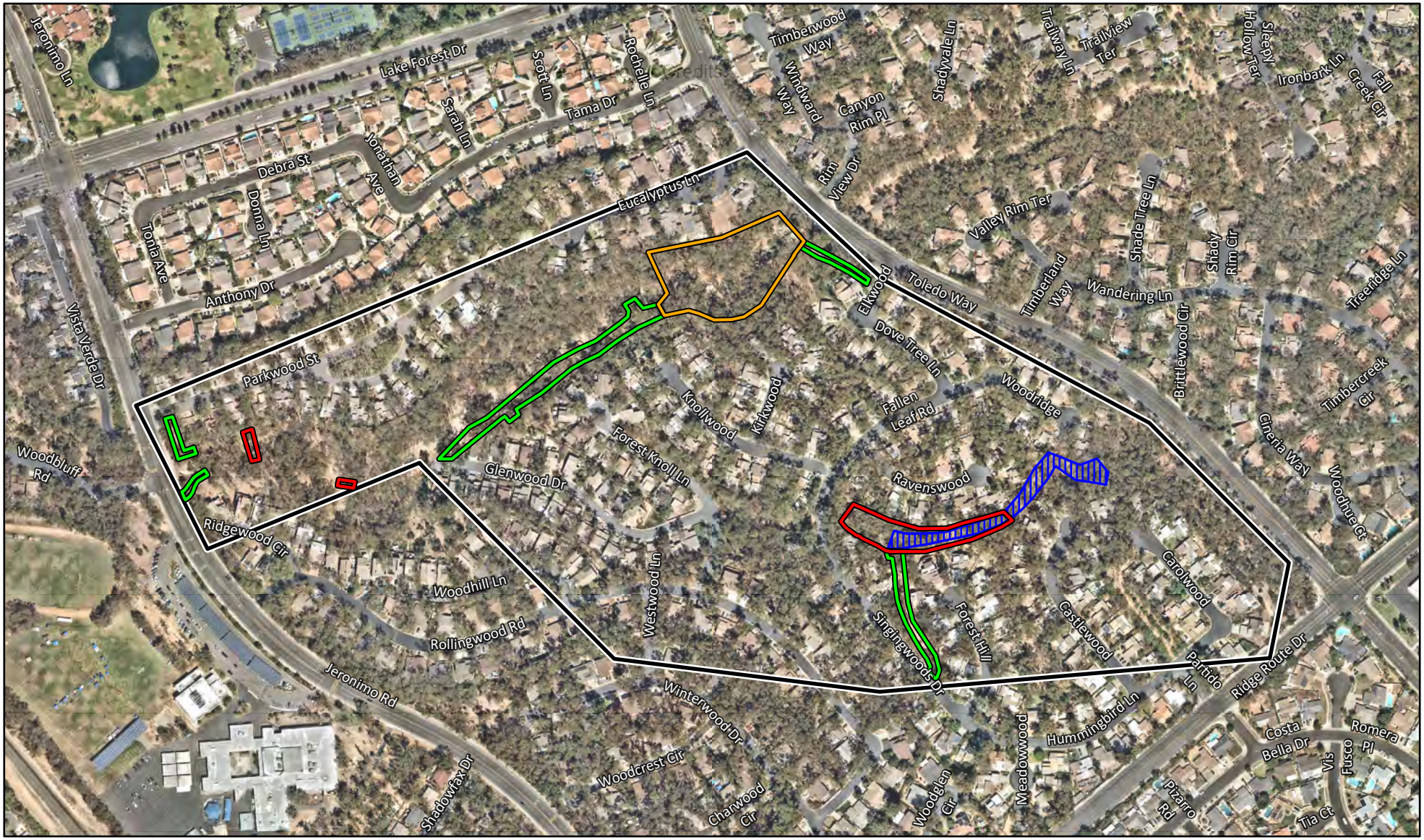

LSA

Project Location
Access Improvement Work Area
Sewer Improvement Work Area
Sewer and Access Improvement Work Area
Watershed Improvement Work Area

FIGURE 2

N

0 200 400
FEET

SOURCE: Nearmap (8/31/2022)

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The Woods Sewer Improvements Project

Project Site

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are generally 4-inch plastic (acrylonitrile butadiene styrene [ABS]) pipe.[1] The manholes have been previously retrofitted with waterproof covers to minimize inflow of stormwater into the sewer and odors to neighboring residential properties. Some manholes have been reinforced with grouted corrugated metal pipe for protection, but these measures are not considered permanent solutions. Gabion drop structures were previously installed by the homeowners' associations across the flow line of the creek to provide erosion control; however, these have all failed and have been left in their failed condition.

Due to the lack of flood control improvements to control erosion on the creeks, various elements of IRWD's existing sewer system within the Project site are at risk of damage due to lack of protective soil cover that has been eroded within the flow path of the creek, primarily caused by failed grade control structures.[2] Grade control structures are critical to control flow velocities in the creek during storms. Without grade control, high velocities along steep gradients cause erosion and scouring of the creek bed. Areas with the most severe erosion were observed downstream of the failed gabion drop structures. The average rate of scour along the Upper San Diego Creek has been approximately 2.5 inches/year and the average rate of scour along the Glenwood Tributary appears to have been closer to 1.0 inch/year. Based on United States Geological Survey stream gauge data for three nearby watersheds, it was determined that the existing scour at the Project site was likely caused by small storm events (smaller than a 100-year storm event), indicating that further scour is likely to occur and that a storm event could cause significantly more disturbance to the channel.[3] Therefore, there is the potential for future lateral and vertical scour that would further threaten the stability of the facilities. Total future vertical scour is estimated at 10.2 feet on Upper San Diego Creek and 4.2 feet along the Glenwood Tributary.[4] Additionally, the existing sewer lines can no longer be accessed by maintenance vehicles due to erosion of existing access roads and downcutting of the creek which is compromising bank stability [5,6].

IRWD's existing sewer manhole number 36 and a portion of the associated sewer line adjacent to the San Diego Creek were completely exposed by severe erosion from storm events between December of 2022 and January of 2023. In February of 2023, IRWD obtained emergency permits and hired a contractor to install 295 tons of half -ton riprap around the existing sewer access hole and pipeline to prevent damage to the facilities from subsequent storm events prior to the approval and implementation of the proposed Lake Forest Woods Sewer Improvements.

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1 Woodard & Curran. 2021. *Access & Facilities Improvements for Sewer Systems in The Woods, Final Facilities Plan*. October.

2 A grade control structure is an earthen, wooden, concrete, or other structure used to prevent gully development and streambed erosion.

3 Woodard and Curran. 2021. *Access & Facilities Improvements for Sewer Systems in The Woods, Final Facilities Plan*. October.

4 Ibid.

5 Ibid.

6 Ibid.

3.3 PROJECT PURPOSE

The objective of the proposed Project is to reduce risk to infrastructure caused by scour by relocating the existing sewer facilities in the creek to areas outside the scour zone where feasible, using stream bed improvements such as new grade control structures with the intention to potentially reduce stream erosion and scour at IRWD facilities and adding concrete encasement to protect new or existing sewer facilities that cannot be relocated outside the scour zone. The proposed project would also include access improvements for ongoing maintenance of the sewer facilities. In total, IRWD would install approximately 870 feet of new sewer pipeline within Upper San Diego Creek and approximately 500 feet of new sewer pipeline in the Glenwood Tributary. Proposed improvements and structures would be designed and located to minimize impacts to San Diego Creek, minimize the extent of impervious surfaces within the project area and re-plant disturbed areas with native species.

3.4 PROJECT COMPONENTS

Specific improvements to be implemented as part of the proposed Project are described further below. Proposed improvements are shown on Figure 3.

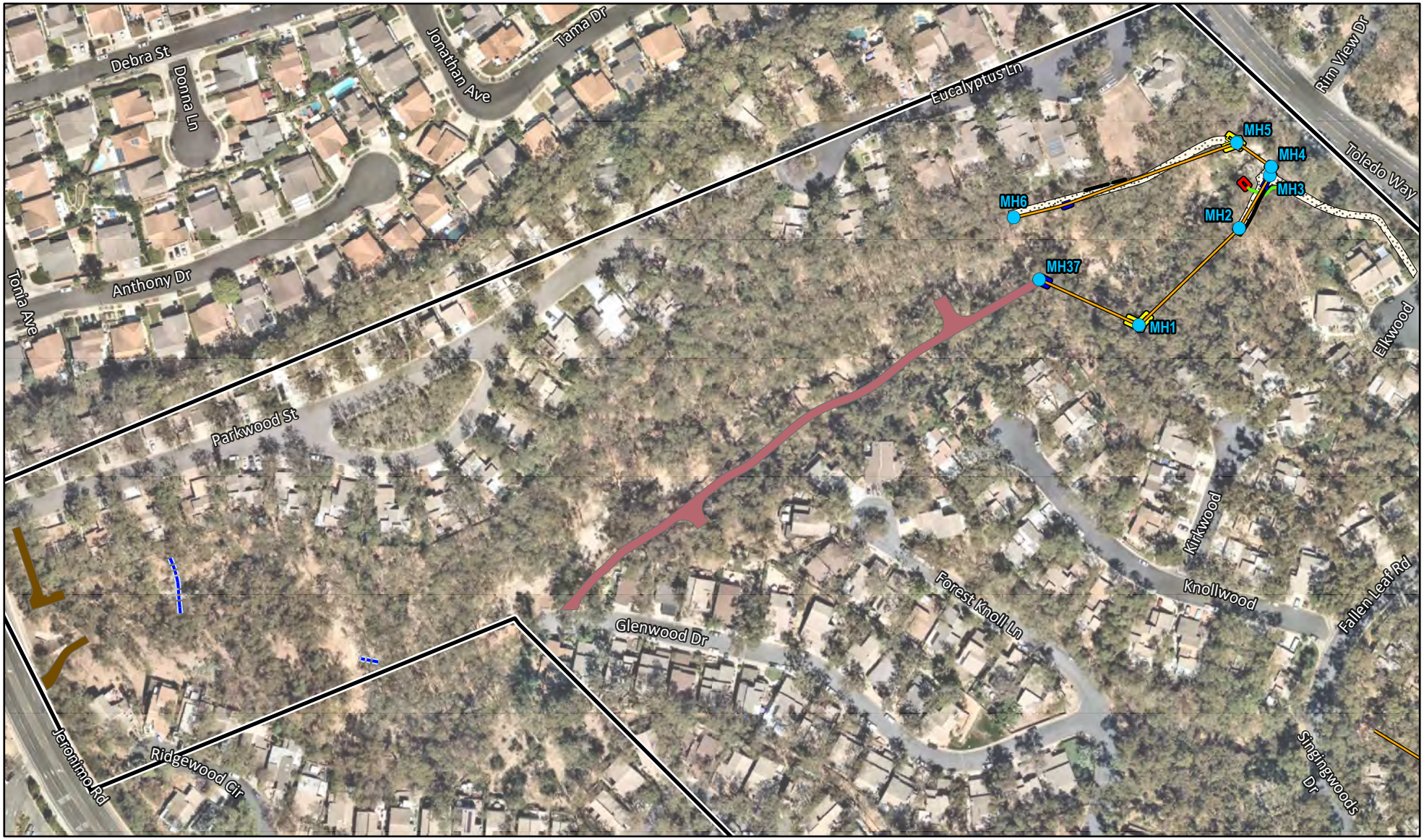
3.4.1 Upper San Diego Creek

Along Upper San Diego Creek, IRWD proposes to install new 8 and 10-inch polyvinyl chloride (PVC) pipe and eight new precast concrete manholes, repair/replace portions of a concrete pad at the existing drainage crossing and reconnect the existing 4-inch ABS service laterals. New pipelines would be installed via open trench or trenchless construction methods. Following installation, the pipe will be encased in concrete to protect the pipe. Backfill would be compacted to minimum density of 90-95 percent. The top elevation of the trench would be restored to the original grade. A portion of the pipe would be installed via trenchless methods (Pilot Tube Guided Auger Boring) due to the steep terrain and proximity to private property lines. In addition, approximately 616 feet of existing sewer pipelines within the scour envelope would be abandoned in place and filled with concrete slurry to reduce the amount of excavation and disturbed area within the creek.

Portions of the existing concrete pad that encompasses existing Manholes 46 and 47 would be demolished and replaced as necessary to remove and dispose of the above-grade portions of the manholes and construction of the new manholes and pipelines. Above -grade portions of the existing sewer manholes would be removed and disposed. The remaining below grade portions of these manholes would be filled with 0.75-inch rock. Manhole 39 would be removed and replaced in the same location.

In addition, IRWD proposes to install ungrouted riprap check dams at several locations within this section of the Upper San Diego Creek to reduce scour and protect existing sewer infrastructure and access roads. Riprap check dams would consist of large, ungrouted, rock riprap underlain with unwoven fabric and compacted fill.

The existing dirt access road extending along the north side of Upper San Diego Creek would be replaced with a gravel access road within the existing pipeline easement and a new gravel access road would be constructed along the south side of Upper San Diego Creek. The existing dirt access



LSA

- Project Location

Proposed Project Features

- Manhole
- Sewer Line
- Concrete Cap Over Existing Sewer
- Stackable Block Wall < 3'
- Launch Shaft
- Replacement of Existing Access Road Pavement with Asphalt Concrete Pavement
- Replacement of Existing Access Road Pavement with Concrete Pavement
- Compacted Gravel Over Existing Dirt Access Road
- Check Dam Installation
- Reception Shaft
- Concrete V-ditch
- Riprap Installation

FIGURE 3a

N

0 100 200
FEET

SOURCE: Nearmap (8/31/2022)

The Woods Sewer Improvements Project

Proposed Project – Upper San Diego Creek Tributary

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LSA

Project Location

Proposed Project Features

- Manhole
- Sewer Line
- Sewer Lateral
- Concrete Cap Over Existing Sewer
- Stackable Block Wall < 3'
- Launch Shaft
- Replacement of Existing Access Road Pavement with Asphalt Concrete Pavement
- Replacement of Existing Access Road Pavement with Concrete Pavement
- Compacted Gravel Over Existing Dirt Access Road
- Check Dam Installation
- Reception Shaft
- Concrete V-ditch
- Riprap Installation

0 75 150
FEET

SOURCE: Nearmap (8/31/2022)

FIGURE 3b

The Woods Sewer Improvements Project

Proposed Project – Glenwood Tributary

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road off Glenwood Drive would also be replaced with a gravel access road. Gravel access roads would consist of 12-inch Class II aggregate base compacted to 95 percent. Retaining walls, up to 3 feet tall, may be installed in some locations along proposed access roads and outside of the creek channel to limit the amount additional grading. In addition, the existing paved access roads off Elkwood Lane, Parkwood Street, and Jeronimo Road would be repaved.

3.4.2 Glenwood Tributary

Along the Glenwood Tributary, IRWD proposes to install a new concrete incased 8-inch PVC pipeline, two new precast concrete manholes, and reconnections of the existing service laterals. The new sewer line would run along the southern bank of the Glenwood Tributary connecting to existing 8-inch sewer lines and the existing 4-inch ABS service laterals would be extended as required to reach the new sewer location. The relocation and concrete encasement of the sewer line will reduce the risk of damage from scour.

Approximately 500 linear feet of 8-inch sewer line would be abandoned in place and filled with cement slurry. In addition, two existing manholes (Manholes 138 and 140) would be abandoned, in the same manner as described above for manholes 35, 36 and 37.

In addition, IRWD proposes to install ungrouted riprap check dams at various locations within the project location of the Glenwood Tributary to reduce the potential for scour.

The existing paved access road from Singingwoods Drive would be widened and repaved. A proposed retaining wall, up to 3 feet tall, may be installed along the east side of the access road to reduce the amount of additional grading.

3.5 PROJECT CONSTRUCTION

As described above, new pipelines would be installed via open trench construction or trenchless methods, either horizontal directional drilling or pipe jacking, as described further below:

- *Trenching.* Some of the pipeline replacement would use open cut construction methods. Trench depths would range between 4 and 19 feet with trench widths between 2 and 4 feet wide.

- *Trenchless Methods.* Pilot Tube Guided Auger Boring (PTGAB) would be used in areas where trenching would need to be avoided due to steep terrain and/or proximity to adjacent residences. These methods require excavation of entry and exit pits at the beginning and end of pipeline installation (usually at manhole locations) to accommodate the equipment and personnel. For this project, excavation pits would be at both ends of the trenchless segments. Trenchless jacking shafts would be approximately 10-feet by 26-feet (260 square feet) in size and vary in depth between 13 and 24 feet. Trenchless receiving shafts would be approximately 8-feet by 12-feet (96 square feet) in size and vary in depth between 15 and 24 feet.

The project contractor would install sewer bypasses as needed, to maintain sewer service during construction. Notice would be provided to affected residents at least five working days in advance of sewer service lateral modifications.

Access for construction and staging would be via existing IRWD access roads off Toledo Way, Fallen Leaf Road, and Glenwood Drive. Construction equipment and materials would be staged within IRWD's existing 20- to 25-foot-wide easements. Staging would not take place within the creek channel.

Project construction is anticipated to start in July 2024 and would be completed by November 2025 (approximately 15 months). Construction activities would typically take place from 8:00 a.m. to 4:00 p.m., Monday through Friday. It is anticipated that project construction would require an approximately 10-person crew on site daily.

During project construction, the contractor would employ the use of some heavy construction machinery, likely including excavator and/or backhoe, bobtail or larger trucks to off-haul spoils, dump trucks, pick-up trucks, and a crane and air compressor/generator.

For trenchless construction, anticipated equipment for the proposed Project would consist of tracked excavators and/or backhoes, soil compactors, 0.5-ton and 0.75-ton trucks, truck-mounted crane, guided boring power pack (diesel engine or electric motor, pumps, and compressor). Refueling such equipment would be limited to designated areas in compliance with best management practices (BMP). In addition, the project contractor would provide containment under the construction vehicles to prevent leaks while vehicles are not being used.

Construction of the proposed Project would require demolition and removal of approximately 110 tons of existing asphalt and concrete pavement. Additionally, project construction would require 2,629 cubic yards of imported soil and 1,654 cubic yards of soil export, for a total net import of 975 cubic yards of soil.

Project construction would require the removal of 131 eucalyptus trees, some of which are within the riparian area under the jurisdiction of the CDFW. Consistent with regulatory requirements, eucalyptus trees within the riparian area would be replaced with native tree species at a minimum 1:1 replacement ratio in areas where there is sufficient water to support the new trees. Native trees would be planted following project construction and monitored to ensure successful establishment.

3.6 OPERATION AND MAINTENANCE ACTIVITIES

Currently, IRWD conducts various operation and maintenance activities, including sewer cleaning and monitoring in addition to emergency response activities and repairs. IRWD crews clean these sewer segments at least every 2 years and inspect them on an annual basis. Limited access and slope instability has affected IRWD's ability to perform routine maintenance activities safely and efficiently. Operation and maintenance activities associated with the proposed Project would be the same as currently takes place for the existing sewer facilities except that IRWD would have improved access to the sewer facilities. Maintenance of the grade control structures is being currently being negotiated between IRWD and the HOAs, but maintenance activities would be similar to those conducted for existing sewer facilities.

3.7 DISCRETIONARY ACTIONS

While IRWD is the CEQA Lead Agency for the proposed Project, other agencies also have discretionary authority related to the project and approvals Any other required approvals, permits, or authorization from other agencies are classified as "Responsible Agencies" under CEQA. According to Section 15381 of the *State CEQA Guidelines*, a Responsible Agency is defined as a public agency other than the Lead Agency that would have discretionary approval of the proposed Project or some component of the project, including mitigation. A list of these agencies and potential permits and approvals that may be required is provided in Table 3.A. It should be noted that while water districts are exempt from compliance with building ordinances of the county or city in which it is located, the proposed Project would be designed to meet the appropriate codes and standards.

Table 3.A: Potential Permits and Approvals

Agency	Action
Lead Agency	
IRWD	• Adoption of the IS/MND
Other Agencies	
Lake Forest Community Association	• Right of Entry and Sewer Easements
Lake Forest II Master Homeowners Association	• Right of Entry and Sewer Easements[1]
United States Army Corps of Engineers	• Section 404 permit
Regional Water Quality Control Board	• Section 401 Water Quality Certification
California Department of Fish and Wildlife	• Lake and Streambed Alteration (LSA)
City of Lake Forest	• Permit required to prune and transport eucalyptus trees.

Source: LSA and IRWD (2023).

[1] IRWD will request and obtain new easements for the relocated portions of the sewer from the Lake Forest Woods Homeowners Associations and will relinquish existing easements for portions of the sewer that will be abandoned.

IRWD = Irvine Ranch Water District

IS/MND = Initial Study/Mitigated Negative Declaration

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4.0 ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED

The environmental factors checked below would be potentially affected by this project, involving at least one impact that is "Less than Significant with Mitigation Incorporated" as indicated by the checklists on the following pages.

☐ Aesthetics	☐ Agriculture and Forestry Resources	☐ Air Quality
☒ Biological Resources	☒ Cultural Resources	☐ Energy
☒ Geology & Soils	☐ Greenhouse Gas Emissions	☐ Hazards & Hazardous Materials
☐ Hydrology/Water Quality	☐ Land Use & Planning	☐ Mineral Resources
☒ Noise	☐ Population & Housing	☐ Public Services
☐ Recreation	☐ Transportation	☒ Tribal Cultural Resources
☐ Utilities/Service Systems	☐ Wildfire	☒ Mandatory Findings of Significance

DETERMINATION. On the basis of this initial evaluation:

1. I find that the Project **could not** have a significant effect on the environment, and a **NEGATIVE DECLARATION** will be prepared. ☐

2. I find that although the proposed Project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the Project have been made by or agreed to by the Project proponent. A **MITIGATED NEGATIVE DECLARATION** will be prepared. ☒

3. I find the proposed Project **may have a significant effect** on the environment, and an **ENVIRONMENTAL IMPACT REPORT** is required. ☐

4. I find that the proposed Project **may have a "potentially significant impact" or "potentially significant unless mitigated impact"** on the environment, but at least one effect (1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and (2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An **ENVIRONMENTAL IMPACT REPORT** is required, but it must analyze only the effects that remain to be addressed. ☐

5. I find that although the proposed Project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or Negative Declaration pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or Negative Declaration, including revisions or mitigation measures that are imposed upon the proposed Project, nothing further is required. ☐

IRWD Representative

1/8/2024
DATE

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5.0 ENVIRONMENTAL CHECKLIST AND EVALUATION OF ENVIRONMENTAL IMPACTS

1. A brief explanation is required for all answers except "No Impact" answers that are adequately supported by the information sources a Lead Agency cites in the parentheses following each question. A "No Impact" answer is adequately supported if the referenced information sources show that the impact simply does not apply to Projects like the one involved (e.g., the Project falls outside a fault rupture zone). A "No Impact" answer should be explained where it is based on Project-specific factors as well as general standards (e.g., the Project will not expose sensitive receptors to pollutants, based on a Project-specific screening analysis).

2. All answers must take account of the whole action involved, including off-site as well as on-site, cumulative as well as Project-level, indirect as well as direct, and construction as well as operational impacts.

3. Once the Lead Agency has determined that a particular physical impact may occur, then the checklist answers must indicate whether the impact is potentially significant, less than significant with mitigation, or less than significant. "Potentially Significant Impact" is appropriate if there is substantial evidence that an effect may be significant. If there are one or more "Potentially Significant Impact" entries when the determination is made, an Environmental Impact Report (EIR) is required.

4. "Negative Declaration: Less Than Significant With Mitigation Incorporated" applies where the incorporation of mitigation measures has reduced an effect from "Potentially Significant Impact" to a "Less Than Significant Impact." The Lead Agency must describe the mitigation measures and briefly explain how they reduce the effect to a less than significant level (mitigation measures from earlier analyses may be cross-referenced, as discussed below).

5. Earlier analyses may be used where, pursuant to the tiering, Program EIR, or other California Environmental Quality Act (CEQA) process, an effect has been adequately analyzed in an earlier EIR or Negative Declaration (Section 15063 (c)(3)(D)). In this case, a brief discussion should identity the following:

    a) **Earlier Analysis Used:** Identify and state where they are available for review.

    b) **Impacts Adequately Addressed:** Identify which effects from the above checklist were within the scope of and adequately analyzed in an earlier document pursuant to applicable legal standards, and state whether such effects were addressed by mitigation measures based on the earlier analysis.

    c) **Mitigation Measures:** For effects that are "Less Than Significant with Mitigation Measures Incorporated," describe the mitigation measures which were incorporated or refined from the earlier document and the extent to which they address site-specific conditions for the Project.

6. Lead Agencies are encouraged to incorporate into the checklist references to information sources for potential impacts (e.g., general plans, zoning ordinances). Reference to a previously prepared or outside document should, where appropriate, include a reference to the page or pages where the statement is substantiated.

7. Supporting Information Sources: A source list should be attached, and other sources used or individuals contacted should be cited in the discussion.

8. This is only a suggested form, and Lead Agencies are free to use different formats; however, Lead Agencies should normally address the questions from this checklist that are relevant to a Project's environmental effects in whatever format is selected.

9. The explanation of each issue should identify:

    a) The significance criteria or threshold, if any, used to evaluate each question; and
    b) The mitigation measure identified, if any, to reduce the impact to less than significant.

5.1 AESTHETICS

Except as provided in Public Resources Code Section 21099, would the project:		Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a)	Have a substantial adverse effect on a scenic vista?	☐	☐	☒	☐
b)	Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	☐	☐	☐	☒
c)	In non-urbanized areas, substantially degrade the existing visual character or quality of public views of the site and its surroundings? (Public views are those that are experienced from a publicly accessible vantage point.) If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality?	☐	☐	☒	☐
d)	Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	☐	☐	☐	☒

a) Except as provided in Public Resources Code (PRC) Section 21099, would the Project have a substantial adverse effect on a scenic vista?

California State Government Code Section 65560(b)(3) stipulates that city and county General Plans address "…Open space for outdoor recreation, including but not limited to, areas of outstanding scenic, historical and cultural value; areas particularly suited for park and recreation purposes, including access to lakeshores, beaches, and rivers and streams; and areas that serve as links between major recreation and open-space reservations, including utility easements, banks of rivers and streams, trails, and scenic highway corridors…"

A scenic vista is generally defined as a viewpoint that provides expansive views of a highly valued landscape for the benefit of the general public. Aesthetic components of a scenic vista generally include: (1) scenic quality; (2) sensitivity level; and (3) view access. While the City of Lake Forest contains many areas and viewsheds with scenic value, the Lake Forest General Plan does not designate any official scenic vista points.[7] However, significant visual resources in the Lake Forest include several prominent creeks, including Aliso Creek, Serrano Creek, San Diego Creek, and the Borrego Canyon Wash, and the eucalyptus groves that surround portions of these features.[8] Other prominent visual features include views of ridgelines hillsides, and canyons. The most significant visual feature outside the City of Lake Forest is the Santa Ana Mountains to the northeast, the most prominent landmark being Santiago Peak.

7 City of Lake Forest. 2019a. *Public Draft Environmental Impact Report for the 2040 Lake Forest General Plan SCH#2019090102.* November.

8 Ibid.

The proposed Project is located in an area that is primarily characterized by urban development. Development in the Project vicinity includes primarily local roads and residential housing. The Project site is approximately 8 miles southwest of the Santa Ana Mountains and due to surrounding development, views of Santiago Peak are obscured. Views of Aliso Creek, Serrano Creek, and the Borrego Canyon Wash are also obscured due to surrounding development and topography. The proposed Project involves the installation of new sewer pipeline and associated infrastructure (e.g., manholes), riprap check dams and access road improvements, primarily within existing IRWD easements. Improvements would be located in an area with existing sewer infrastructure and would be located primarily underground. Vistas at the Project site consist primarily of urban land uses, including residential buildings, roadways, landscaping, and other infrastructure. Views of the Project site from scenic areas generally blend in with surrounding urban development, especially when viewed from local roadways.

Implementation of the proposed Project would reduce risk of failure to IRWD facilities and improve access to IRWD facilities within Upper San Diego Creek and the Glenwood Tributary. New pipelines would be installed primarily via open trench construction, with a portion of the pipeline installed via trenchless methods due to steep terrain and proximity to private homes. Following installation, the top elevation of the trench would be graded to the original grade, and as such, would not be visible from public viewpoints surrounding the Project site. Visible features, such as manholes, access roads and potential retaining walls would be at-grade or minimal height (maximum 3 feet high) and would not substantially reduce views from adjacent residential uses or public vantage points along Lake Forest Drive, Jeronimo Road or Toledo way. Similarly, the proposed Project would not substantially reduce or impair views of mountains to the northeast that are not already being impaired by the surrounding commercial development, and views of the mountains would remain visible from Lake Forest Drive.

Upon completion, the proposed Project would be largely underground and out of view. Therefore, because there are no designated scenic vistas within Lake Forest and because the proposed Project would not substantially impair views of Serrano Creek or mountains to the northeast, the proposed Project would have a **less than significant** impact to scenic vistas, and no mitigation would be required.

Significance Determination: Less Than Significant Impact
Mitigation Measures: No mitigation is required.

b) Except as provided in PRC Section 21099, would the Project substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a State Scenic Highway?

The California Department of Transportation (Caltrans) Landscape Architecture Program administers the Scenic Highway Program, which is contained in the Streets and Highways Code, Sections 260–263. State Highways are classified as either Officially Listed or Eligible. There are no officially

designated or eligible State scenic highways located in Lake Forest. [9] The only officially designated State scenic highway in Orange County is a portion of CA-91, which runs west to east through Anaheim Hills from the Intersection of CA-91 and CA-55 to the portion of CA-91 adjacent to Yorba Regional Park. This scenic corridor is approximately 16 miles northwest of the Project site and does not provide views of Lake Forest or the immediate surrounding areas.[10]

The Orange County General Plan designates El Toro Road located approximately 0.5 miles southeast of the Project site and the portion of Santa Margarita Parkway located approximately 2.7 miles northeast of the Project site as Landscape Corridors within its Scenic Highway Plan. Although implementation of the proposed Project would require the removal of approximately 131 eucalyptus trees, the Project site is not visible from either of these identified Landscape Corridors. In addition, as described in Section 5.4, Biological Resources, eucalyptus trees to be removed would be replaced with native tree species at a minimum 1:1 ratio. As such, implementation of the proposed Project would not substantially degrade scenic vistas visible from either Landscape Corridor.

Therefore, the proposed Project would have **no impact** related to scenic resources within a State Scenic Highway corridor. No mitigation is required.

Significance Determination: No Impact
Mitigation Measures: No mitigation is required.

c) Except as provided in PRC Section 21099, would the project, in non-urbanized areas, substantially degrade the existing visual character or quality of public views of the site and its surroundings? (Public views are those that are experienced from a publicly accessible vantage point.) If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality?

The existing visual character in the vicinity of the proposed Project consists primarily of urban development, consisting of existing roadways and residential uses, with extensive eucalyptus plantings defining the edges of the creek channels. The Project site is bounded by Toledo Way to the northeast and Jeronimo Road to the southwest. Publicly accessible vantage points of the Project site are limited due to site vegetation and topography. As discussed below, the proposed Project would not conflict with applicable zoning or General Plan regulations governing scenic quality.

Construction. Construction activities associated with the pipeline installation would be visible from adjacent uses. However, all temporary construction-related visual impacts such as construction equipment, staging areas, stockpile locations, and construction fencing would be removed following completion of construction. Therefore, implementation of the proposed Project would have no impact associated with degrading the existing visual character or quality of the Project site and its surroundings. No mitigation is required.

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9 City of Lake Forest. 2019a. *Public Draft Environmental Impact Report for the 2040 Lake Forest General Plan SCH#2019090102.* November.

10 California Department of Transportation. 2012. California Scenic Highways Program website. Website: http://www.dot.ca.gov/hq/LandArch/scenic_highways/scenic_hwy.htm (accessed January 10, 2023).

Operation. The proposed Project would install new, underground pipeline along 1,400 feet of Upper San Diego Creek and 600 feet of the Glenwood Tributary in order to reduce risk of failure to IRWD facilities. Additional improvements would include repaving/paving of access roads, and installation of new manholes, short retaining walls (less than 3 feet tall), and riprap check dams within the creek channel. Upon completion, the majority of proposed improvements would be underground and out of view. Other improvements would be largely at-grade and would be consistent with existing utility infrastructure in the vicinity of the Project site. Implementation of the proposed Project would require removal of approximately 131 eucalyptus trees to accommodate proposed improvements however, as outlined in Section 3.0 Project Description, the proposed Project would include site restoration and native tree planting following sewer construction. In addition, the number of eucalyptus trees to be removed would be small compared to the number of existing trees that would remain. Therefore, the proposed Project would not substantially degrade the existing visual character or quality of public views of the Project site from adjacent roadways (e.g., Toledo Way, Jeronimo Road) and its surroundings or conflict with applicable zoning or other requirements governing scenic quality. This impact is considered **less than significant** and no mitigation is required.

Significance Determination: Less Than Significant Impact
Mitigation Measures: No mitigation is required.

d) Except as provided in PRC Section 21099, would the project create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?

Lighting impacts are evaluated in terms of the project's net change in ambient lighting conditions, the intensity and direction of project lighting, and the impact of the project to light-sensitive land uses. Streetlights, and vehicle head and taillights are the existing sources of light and glare in the vicinity of the Project site.

Construction of the proposed Project would be limited to daytime hours, generally from 7:00 a.m. to 8:00 p.m., in accordance with City of Lake Forest policies.[11] Any construction-related illumination during evening and nighttime hours would be shielded to the extent feasible, would consist of the minimum lighting required for safety and security purposes only, and would occur only for the duration required for the temporary construction process. Due to its limited scope and short duration, light resulting from construction activities would not substantially impact sensitive uses, substantially alter the character of off-site areas surrounding the construction area or interfere with the performance of an off-site activity. Therefore, construction of the proposed Project would not create a new source of substantial light or glare that would adversely affect day or nighttime views in the area, and light impacts associated with construction would be less than significant. No mitigation would be required.

[11] City of Lake Forest. 2019b. Lake Forest Municipal Code, Section 11.16.060(H).

No permanent sources of lighting would be installed as part of the proposed Project. The proposed Project would not create a new source of substantial light or glare which would adversely affect day or nighttime views in the area and **no impact** would occur.

Significance Determination: No Impact
Mitigation Measures: No mitigation is required.

5.2 AGRICULTURE AND FORESTRY RESOURCES

In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Dept. of Conservation as an optional model to use in assessing impacts on agriculture and farmland. In determining whether impacts to forest resources, including timberland, are significant environmental effects, lead agencies may refer to information compiled by the California Department of Forestry and Fire Protection regarding the state's inventory of forest land, including the Forest and Range Assessment Project and the Forest Legacy Assessment project; and forest carbon measurement methodology provided in Forest Protocols adopted by the California Air Resources Board. Would the project:	**Potentially Significant Impact**	**Less Than Significant With Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	☐	☐	☐	☒
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?	☐	☐	☐	☒
c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?	☐	☐	☐	☒
d) Result in the loss of forest land or conversion of forest land to non-forest use?	☐	☐	☐	☒
e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland to non-agricultural use or conversion of forest land to non-forest use?	☐	☐	☐	☒

a) *Would the Project convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?*

The California Natural Resources Agency Farmland Mapping and Monitoring Program (FMMP) produces maps and statistical data used for analyzing impacts on California's agricultural resources. Agricultural land is rated according to soil quality and irrigation status, with the best quality land being Prime Farmland. The maps are updated every 2 years with the use of a computer mapping system, aerial imagery, public review, and field reconnaissance.

The Project site is classified as "Urban and Built-Up Land" on maps prepared by FMMP.[12] Urban and Built-Up Land is occupied by structures with a building density of at least one unit to 1.5 acres, or approximately six structures to a 10-acre parcel. Common examples include residential, industrial, commercial, institutional facilities, cemeteries, airports, golf courses, sanitary landfills, sewage treatment and water control structures. No Farmland is mapped on or near the Project site. Therefore, the Project would not convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance to a non-agricultural use. **No impact** would occur, and no mitigation is required.

Significance Determination: No Impact
Mitigation Measures: No mitigation is required.

b) Would the Project conflict with existing zoning for agricultural use, or a Williamson Act contract?

The Project site is zoned as Medium Density Residential (MDR) in the City of Lake Forest General Plan. Therefore, the proposed Project would not conflict with existing zoning for agricultural use. The Project site is also not under a Williamson Act contract. Therefore, implementation of the proposed Project would not conflict with existing zoning for agricultural use, or a Williamson Act contract. **No impact** would occur and no mitigation is required.

Significance Determination: No Impact
Mitigation Measures: No mitigation is required.

c) Would the Project conflict with existing zoning for, or cause rezoning of, forest land (as defined in PRC section 12220(g)), timberland (as defined by PRC section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?

The Project site is not located on forest land (as defined in PRC section 12220(g)) or timberland (as defined by PRC section 4526), and would not conflict with existing zoning for, or cause rezoning of, forest land, timberland, or timberland zoned Timberland Production (as defined by Government Code section 51104(g)). **No impact** would occur and no mitigation is required.

Significance Determination: No Impact
Mitigation Measures: No mitigation is required.

d) Would the Project result in the loss of forest land or conversion of forest land to non-forest use?

Refer to Section 4.2.1c above. The Project is not located on forest land or timberland, and would not conflict with existing zoning for, or cause rezoning of, forest land, timberland, or timberland zoned Timberland Production. Therefore, the Project would not result in the loss of forest land or conversion of forest land to non-forest use. **No impact** would occur and no mitigation is required.

[12] California Department of Conservation. 2016. Division of Land Resource Protection, Farmland Mapping and Monitoring Program, Orange County Important Farmland 2016. Available online at: California Important Farmland Finder (accessed November 22, 2022).

Significance Determination: No Impact
Mitigation Measures: No mitigation is required.

e) Would the Project involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland to non-agricultural use or conversion of forest land to non-forest use?

Refer to Sections 4.2.1.a and 4.2.1.c. The proposed Project would replace, relocate, and upgrade sewer facilities and provide associated access improvements within The Woods community in Lake Forest. The proposed Project would not involve any other changes to the existing environment, which due to their location or nature, could result in conversion of Farmland to a non-agricultural use, or conversion of forest land to a non-forest use. **No impact** would occur and no mitigation is required.

Significance Determination: No Impact
Mitigation Measures: No mitigation is required.

5.3 AIR QUALITY

Where available, the significance criteria established by the applicable air quality management district or air pollution control district may be relied upon to make the following determinations. Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Conflict with or obstruct implementation of the applicable air quality plan?	☐	☐	☒	☐
b) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in non-attainment under an applicable federal or state ambient air quality standard?	☐	☐	☒	☐
c) Expose sensitive receptors to substantial pollutant concentrations?	☐	☐	☒	☐
d) Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?	☐	☐	☒	☐

The Project site is within the South Coast Air Basin (Basin). The South Coast Air Quality Management District (SCAQMD) is the regional government agency that monitors and regulates air pollution within the Basin. The federal Clean Air Act and the California Clean Air Act mandate the control and reduction of specific air pollutants. Under these acts, the United States Environmental Protection Agency (USEPA) and the California Air Resources Board (CARB) have established ambient air quality standards for specific "criteria" pollutants, designed to protect public health and welfare. Primary criteria pollutants include carbon monoxide (CO), volatile organic compounds (VOC), nitrogen oxides (NO_X), particulate matter less than 10 microns in size (PM_{10}), sulfur dioxide (SO_2), and lead (Pb). Secondary criteria pollutants include ozone (O_3), and particulate matter less than 2.5 microns in size ($PM_{2.5}$). The ambient air quality standard for each criteria pollutant represents the level that is considered safe to the public and avoids specific adverse health effects associated with each criteria pollutant.

The Basin is in nonattainment for the federal and State standards for O_3 and $PM_{2.5}$, and nonattainment for the State PM_{10} standard. In addition, the Basin is in attainment/maintenance for the federal PM_{10}, CO, SO2, and nitrogen dioxide (NO_2) standards. The SCAQMD has established project-level CEQA thresholds for VOC, NO_X, CO, SO2, PM_{10}, and $PM_{2.5}$ (Table 5.A).

Table 5.A: SCAQMD CEQA Construction and Operation Thresholds of Significance (lbs/day)

Emission Source	Pollutant Emissions Threshold (lbs/day)					
	VOC	NO_X	CO	SO_2	PM_{10}	$PM_{2.5}$
Construction Thresholds	75	100	550	150	150	55
Operation Thresholds	55	55	550	150	150	55

Source: South Coast Air Quality Management District (1993).
CO = carbon monoxide
lbs/day = pounds per day
NO_X = nitrogen oxides
$PM_{2.5}$ = particulate matter less than 2.5 microns in size
PM_{10} = particulate matter less than 10 microns in size
SCAQMD = South Coast Air Quality Management District
SO_2 = sulfur dioxide
VOC = volatile organic compounds

The SCAQMD considers any project in the Basin with construction- or operation-related emissions that exceed any of the emission thresholds below to have potentially significant impacts.

In addition, the SCAQMD published its Final Localized Significance Threshold Methodology in June 2003 (updated July 2008), recommending that all air quality analyses include an assessment of air quality impacts to nearby sensitive receptors.[13] This guidance was used to analyze potential localized air quality impacts associated with construction of the proposed Project. Localized significance thresholds (LSTs) are developed based on the size or total area of the emission source, the ambient air quality in the source receptor area, and the distance between the proposed Project and the nearest sensitive receptor. The SCAQMD defines structures that house persons (e.g., children, the elderly, persons with pre-existing respiratory or cardiovascular illness, and athletes and others who engage in frequent exercise) or places where they gather as sensitive receptors (i.e., residences, schools, playgrounds, child-care centers, convalescent centers, retirement homes, and athletic fields). The Project site is located within two homeowners' associations (HOAs), the Lake Forest Community Association and the Lake Forest II Master Homeowners Association. As such, the nearest sensitive receptors are single-family residential units located within the Project site.

LSTs are based on the ambient concentrations of that pollutant within the project Source Receptor Area (SRA) and the distance to the nearest sensitive receptor. For the proposed Project, the appropriate SRA for the LST is the Saddleback Valley (SRA 19). SCAQMD provides LST screening tables for 25-, 50-, 100-, 200-, and 500-meter source-receptor distances. As mentioned above, the closest sensitive receptors to the project site are residential uses including the single-family homes within the Project site. In cases where receptors may be closer than 82 feet (25 meters), any distances within the 82-foot (25-meter) buffer zone can be used. As such, the minimum distance of 25 meters was used for purposes of the LST assessment.

The Project site is approximately 3.5 acres. Therefore, based on the anticipated construction equipment and based on the anticipated grading and ground-disturbing activities, it is assumed that the maximum daily disturbed area for the proposed Project would be 3.5 acres.[14] As such, the LSTs for a 3.5-acre site at 25 meters were derived by interpolation. Table 5.B shows the emissions thresholds that would apply based on the project size and distance to nearby receptors during project construction and operation.

[13] South Coast Air Quality Management District (SCAQMD). 2008. Final Localized Significance Threshold Methodology. July. Website: http://www.aqmd.gov/docs/default-source/ceqa/handbook/localized-significance-thresholds/final-lst-methodology-document.pdf (accessed February 2023).

[14] SCAQMD. n.d. Fact Sheet for Applying CalEEMod to Localized Significance Thresholds. Website: http://www.aqmd.gov/docs/default-source/ceqa/handbook/localized-significance-thresholds/caleemod-guidance.pdf (accessed February 2023).

Table 5.B: SCAQMD Localized Significance Thresholds

Emissions Source	Pollutant Emissions Threshold (lbs/day)			
	NO_X	CO	PM_{10}	$PM_{2.5}$
Construction	164.0	1,399.0	9.0	6.0
Operation	164.0	1,399.0	2.5	1.5

Source: *Final Localized Significance Threshold Methodology.* (SCAQMD 2008).
CO = carbon monoxide
lbs/day = pounds per day
NO_X = nitrogen oxides
PM_{10} = particulate matter less than 10 microns in size
$PM_{2.5}$ = particulate matter less than 2.5 microns in size
SCAQMD = South Coast Air Quality Management District

a) Would the Project conflict with or obstruct implementation of the applicable air quality plan?

An Air Quality Management Plan (AQMP) describes air pollution control strategies to be undertaken by a city or county in a region classified as a nonattainment area to meet the requirements of the federal Clean Air Act. The main purpose of an AQMP is to bring an area into compliance with the requirements of federal and State ambient air quality standards (AAQS). The Basin is in nonattainment for the federal and State standards for O_3 and $PM_{2.5}$. Therefore, the Basin is classified as a nonattainment area and an AQMP is required. The applicable air quality plan is the SCAQMD's adopted 2022 AQMP.[15] The AQMP is based on regional growth projections developed by the Southern California Association of Governments (SCAG).

A consistency determination plays an essential role in local agency project review by linking local planning and unique individual projects to the air quality plans. A consistency determination fulfills the CEQA goal of fully informing local agency decision-makers of the environmental costs of the project under consideration at a stage early enough to ensure that air quality concerns are addressed. Only new or amended General Plan elements, Specific Plans, and significantly unique projects need to undergo a consistency review given that the air quality plan strategy is based on projections from local General Plans.

The City's General Plan is consistent with the SCAQMD AQMP. Pursuant to the methodology provided in the SCAQMD CEQA Air Quality Handbook, consistency with the Basin 2022 AQMP is affirmed when a project: (1) would not increase the frequency or severity of an air quality standards violation or cause a new violation and (2) is consistent with the growth assumptions in the AQMP. Consistency review is presented as follows:

1. The proposed Project would result in short-term construction and long-term operational pollutant emissions that are all less than the CEQA significance emissions thresholds established by SCAQMD, as demonstrated in Section 3.3.b, below. Therefore, the proposed Project would not result in an increase in the frequency or severity of an air quality standards violation or cause a new air quality standards violation.

[15] South Coast Air Quality Management District. 2022. 2022 Air Quality Management Plan. Adopted December 2, 2022.

2. The *CEQA Air Quality Handbook* indicates that consistency with AQMP growth assumptions must be analyzed for new or amended General Plan elements, Specific Plans, and significant projects. Significant projects include airports, electrical generating facilities, petroleum and gas refineries, designation of oil drilling districts, water ports, solid waste disposal sites, and offshore drilling facilities; therefore, the proposed Project is not defined as significant. In addition, the proposed Project would not require a change to the General Plan land use designation or the current zoning and would be consistent with the City's General Plan and Zoning Ordinance.

Based on the consistency analysis presented above, the proposed Project would not conflict with or obstruct implementation of the applicable air quality plan. Impacts would be **less than significant,** and no mitigation is required.

Significance Determination: Less Than Significant Impact
Mitigation Measures: No mitigation is required.

b) Would the Project result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in non-attainment under an applicable federal or state ambient air quality standard?

As identified above, the Basin is currently designated as nonattainment for the federal and State standards for O_3 and $PM_{2.5}$. The Basin's nonattainment status is attributed to the region's development history. Past, present, and future development projects contribute to the region's adverse air quality impacts on a cumulative basis. By its very nature, air pollution is largely a cumulative impact. No single project is sufficient in size to, by itself, to result in nonattainment of AAQS. Instead, a project's individual emissions contribute to existing cumulatively significant adverse air quality impacts. If a project's contribution to the cumulative impact is considerable, then the5-14educe5-14t's impact on air quality would be considered significant.

In developing thresholds of significance for air pollutants, the SCAQMD considered the emission levels for which a project's individual emissions would be cumulatively considerable. If a project exceeds the identified SCAQMD significance thresholds identified above in Table 3.A, its emissions would be cumulatively considerable, resulting in significant adverse air quality impacts to the region's existing air quality conditions. Therefore, additional analysis to assess cumulative impacts is not necessary. The following analysis assesses the potential project-level air quality impacts associated with construction and operation of the proposed Project.

Construction Emissions. During construction, short-term degradation of air quality may occur due to the release of particulate matter emissions (i.e., fugitive dust) generated by site preparation and grading activities. Emissions from construction equipment are also anticipated and would include CO, NO_X, VOC, directly emitted $PM_{2.5}$ or PM_{10}, and toxic air contaminants such as diesel exhaust particulate matter.

Project construction activities would include tree removal and site preparation, sewer construction (trenching), watershed improvements, access improvements, and tree planting and site restoration. Construction-related effects on air quality from the proposed Project would be greatest during the site preparation phase due to the disturbance of soils. If not properly controlled, these activities

would temporarily generate particulate emissions. Sources of fugitive dust would include disturbed soils at the construction site. Unless properly controlled, vehicles leaving the site would deposit dirt and mud on local streets, which could be an additional source of airborne dust after it dries. PM_{10} emissions would vary from day to day, depending on the nature and magnitude of construction activity and local weather conditions. PM_{10} emissions would depend on soil moisture, silt content of soil, wind speed, and amount of operating equipment. Larger dust particles would settle near the source, whereas fine particles would be dispersed over greater distances from the construction site.

Water or other soil stabilizers can be used to control dust, resulting in emission reductions of 50 percent or more. SCAQMD has established Rule 403: Fugitive Dust, which would require IRWD to implement measures that would reduce the amount of particulate matter generated during the construction period. The Rule 403 measures that were incorporated in this analysis include:

- Water active sites at least three times daily (locations where grading is to occur shall be thoroughly watered prior to earthmoving).

- Cover all trucks hauling dirt, sand, soil, or other loose materials, or maintain at least 2 feet (0.6 meter) of freeboard (vertical space between the top of the load and the top of the trailer) in accordance with the requirements of California Vehicle Code Section 23114.

- Reduce traffic speeds on all unpaved roads to 15 miles per hour or less.

In addition to dust-related PM_{10} emissions, heavy trucks and construction equipment powered by gasoline and diesel engines would generate CO, sulfur oxides (SO_X), NO_X, VOCs, and some soot particulate ($PM_{2.5}$ and PM_{10}) in exhaust emissions. If construction activities were to increase traffic congestion in the area, CO and other emissions from traffic would increase slightly while those vehicles idle in traffic. These emissions would be temporary in nature and limited to the immediate area surrounding the construction site.

Construction emissions were estimated for the project using the California Emissions Estimator Model version 2022.1 (CalEEMod). The construction schedule assumes that construction would begin in July 2024 and would be completed by May 2025, which was included in CalEEMod. In addition, the proposed Project would include the import of 2,629 cubic yards of soil and the export of 1,654 cubic yards of soil, for a total net import of 975 cubic yards of soil, which was also included in CalEEMod. This analysis used the construction equipment provided by the IRWD, which assumes the use of backhoes, compactors, dump trucks, pavement saws, bulldozers, feller bunchers/harvesters, stump grinders, woodchippers, cranes, delivery trucks, power packs (bore drill, pumps, and compressor), and concrete trucks. Construction equipment is expected to be shared during construction activities that overlap, such as access improvement construction activities.

Tier 2 construction equipment or higher is required by the California Air Resources Board (CARB) In-Use Off-Road Diesel Fueled Fleets Regulation.[16] As such, this analysis assumes the use of Tier 2 construction equipment, except for the power pack which would use Tier 4 Final engines, and compliance with SCAQMD Rule 403 measures, which was included in CalEEMod. In addition, construction one-way haul trips were provided by IRWD, which assumes 11 haul trips for tree removal and site preparation, 65 haul trips for sewer construction, 101 haul trips for access improvements, 63 haul trips for watershed improvements, and 29 haul trips for site restoration, which was also included in CalEEMod. In addition, this analysis assumes that haul trucks would travel 10 miles. All other construction details are not yet known; therefore, default assumptions (e.g., construction worker and vendor truck trips and fleet activities) from CalEEMod were used. CalEEMod uses widely accepted methodologies for estimating emissions combined with default data from sources such as the USEPA emission factors, CARB vehicle emission models, and studies commissioned by California agencies.[17] Therefore, default model assumptions would be considered appropriate for the proposed project. Construction emissions are summarized in Table 5.C below. Appendix A provides CalEEMod output sheets.

Table 5.C: Short-Term Regional Construction Emissions

Construction Phase	Total Daily Regional Pollutant Emissions (lbs/day)							
	VOCs	NO_X	CO	SO_X	Fugitive PM_{10}	Exhaust PM_{10}	Fugitive $PM_{2.5}$	Exhaust $PM_{2.5}$
2024	2.5	85.4	62.2	0.2	8.9	2.3	3.4	2.1
2025	1.4	49.2	34.8	0.1	5.2	1.3	2.0	1.2
Peak Daily Emissions	**2.5**	**85.4**	**62.2**	**0.2**	**11.2**		**5.5**	
SCAQMD Threshold	**75.0**	**100.0**	**550.0**	**150.0**	**150.0**		**55.0**	
Significant?	**No**	**No**	**No**	**No**	**No**		**No**	

Source: Compiled by LSA (September 2023).
Note: PM_{10} and $PM_{2.5}$ fugitive emissions are from the Mitigated results; the only "mitigation" measures applied in this modeling are required dust control measures per SCAQMD Rule 403.
CO = carbon monoxide
lbs/day = pounds per day
NO_X = nitrogen oxides
$PM_{2.5}$ = particulate matter less than 2.5 microns in size
PM_{10} = particulate matter less than 10 microns in size
SCAQMD = South Coast Air Quality Management District
SO_X = sulfur oxides
VOCs = volatile organic compounds

As shown in Table 5.C, construction emissions associated with the project would not exceed the SCAQMD's thresholds for VOC, NO_X, CO, SO_X, $PM_{2.5}$, and PM_{10}. Therefore, construction of the proposed Project would not result in a cumulatively considerable increase of any criteria pollutant for which the project region is in nonattainment under an applicable federal or State ambient air quality standard. Impacts would be **less than significant** and no mitigation is required.

[16] California Air Resources Board (CARB). n.d. *Guide to Off-Road Vehicle & Equipment Regulations*. Website: https://ww2.arb.ca.gov/sites/default/files/offroadzone/pdfs/offroad_booklet.pdf (accessed September 2022).

[17] CalEEMod. 2022. *CalEEMod User Guide Version 2022.1.* Website: https://www.caleemod.com/documents/user-guide/01_User%20Guide.pdf (accessed September 2023)

Operational Emissions: Long-term air pollutant emission impacts are those associated with mobile sources (e.g., vehicle trips), energy sources (e.g., electricity), and area sources (e.g., landscape maintenance equipment use) related to the proposed Project. The proposed Project would replace, relocate, and upgrade sewer facilities and provide associated access improvements within the Woods Community. Currently, the IRWD conducts various operation and maintenance activities, including maintenance, pipeline monitoring by IRWD staff either on foot or by vehicle, and emergency response activities and repairs. Upon completion of construction activities, operation and maintenance associated with the proposed Project would remain the same as currently occurs for the existing sewer facilities. Based on Section 5.17, Transportation, no additional trips are anticipated due to implementation of the proposed Project. As such, the proposed Project would not result in a significant increase in the generation of vehicle trips or vehicle miles traveled (VMT) that would increase air pollutant emissions. The proposed Project would not result in a substantial source of energy or area source emissions. Therefore, operation of the proposed Project would not result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or State ambient air quality standard. Impacts would be **less than significant** and no mitigation is required.

Significance Determination: Less Than Significant Impact
Mitigation Measures: No mitigation is required.

c) Would the Project expose sensitive receptors to substantial pollutant concentrations?

Sensitive receptors are people who have an increased sensitivity to air pollution or environmental contaminants. The SCAQMD defines structures that house persons (e.g., children, the elderly, persons with pre-existing respiratory or cardiovascular illness, and athletes and others who engage in frequent exercise) or places where they gather (i.e., residences, schools, playgrounds, child-care centers, convalescent centers, retirement homes, and athletic fields) as sensitive receptors.

As previously discussed, LSTs are based on the ambient concentrations of that pollutant within the project SRA and the distance to the nearest sensitive receptor. The nearest sensitive receptors are single-family residential units located within the Project site. For the proposed Project, the appropriate SRA for the LST is the Saddleback Valley (SRA 19). Based on the anticipated construction equipment and based on the anticipated grading and ground-disturbing activities, it is assumed that the maximum daily disturbed area for the proposed Project would be 3.5 acres.[18]

The results of the LST analysis[19] for construction of the proposed Project are summarized in Table 5.D below. As shown in Table 5.D, the proposed Project would not result in an exceedance of a SCAQMD LST during project construction. Additionally, as discussed in Threshold b), the proposed

[18] SCAQMD. n.d. Fact Sheet for Applying CalEEMod to Localized Significance Thresholds. Website: http://www.aqmd.gov/docs/default-source/ceqa/handbook/localized-significance-thresholds/caleemod-guidance.pdf (accessed February 2023).

[19] To be conservative, it was assumed that the entire 3.5-acre project site would be disturbed. The LSTs are derived by interpolation using the LST lookup tables for a 3.5-acre site and a receptor distance of 25 meters (82 feet).

Project operational activities would not be considered significant. Therefore, the project would not expose sensitive receptors to substantial pollutant concentrations during project construction or operation. Impacts would be less than significant and mitigation is not required.

Table 5.D: Project Localized Construction Emissions (in Pounds Per Day)

Source	NO_X	CO	PM_{10}	$PM_{2.5}$
On-Site Project Emissions	73.8	58.1	4.6	2.7
Localized Significance Threshold	164.0	1,399.0	9.0	6.0
Exceeds Threshold?	**No**	**No**	**No**	**No**

Source: Compiled by LSA (February 2023).
Note: Source Receptor Area 19, based on a 3.5-acre construction disturbance daily area, at a distance of 25 meters.
CO = carbon monoxide
NO_X = nitrogen oxides
$PM_{2.5}$ = particulate matter less than 2.5 microns in size
PM_{10} = particulate matter less than 10 microns in size

Significance Determination: Less Than Significant Impact
Mitigation Measures: No mitigation is required.

d) Would the Project result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?

The Project's potential to result in emissions adversely affecting a substantial number of people is described below.

Construction. According to SCAQMD, land uses generally associated with odor complaints include agricultural uses (livestock and farming), wastewater treatment plants, food processing plants, chemical plants, composting operations, refineries, landfills, dairies, and fiberglass molding facilities. The proposed Project does not include any uses identified by SCAQMD as being associated with emitting objectionable odors.

Project construction would generate limited odors over the short term, primarily from equipment exhaust. The painting of buildings and structures or the installation of asphalt surfaces may also create odors. However, construction activity would be temporary and would cease after individual construction is completed. Additionally, construction activities that would generate odors are expected to be isolated to the immediate vicinity of the construction site. Therefore, odors from construction equipment exhaust and installation of asphalt surfaces would not adversely affect a substantial number of people.

Additionally, IRWD would be required to implement standard control measures to limit fugitive dust and construction equipment emissions, which would reduce odor impacts, in accordance with SCAQMD Rules 402, 1103, and 1113. SCAQMD Rule 402 regarding nuisances states: "A person shall not discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health or safety of any such persons or the

public, or which cause, or have a natural tendency to cause, injury or damage to business or property." SCAQMD Rule 1113, limits the VOC content of architectural coatings (e.g., paint), and SCAQMD Rule 1108, identifies standards regarding the application of asphalt. Adherence to the standards identified in SCAQMD Rules 1113 and 1108 is required for all construction projects to reduce emissions and objectionable odors impacts.

Adherence to the SCAQMD Rules identified above and Title 13, Section 2449(d)(D) of the California Code of Regulation would reduce odor impacts to people on or near the Project site during construction. Additionally, as previously discussed, construction activities would be temporary, and odors generated from construction activities would be isolated to the immediate vicinity of the construction site. Therefore, project construction activities would not result in other emissions (such as those leading to odors) adversely affecting a substantial number of people. Impacts would be **less than significant,** and no mitigation is required.

Operation. Land uses generally associated with long-term objectionable odors include agricultural uses, wastewater treatment plants, food-processing plants, chemical plants, composting operations, refineries, landfills, dairies, and fiberglass molding facilities. The proposed Project would replace, relocate, and upgrade sewer facilities and provide access improvements within the Woods Community. As described above, two homeowners' associations (HOAs), the Lake Forest Community Association and the Lake Forest II Master Homeowners Association own the creek properties within which IRWD's facilities are located and are responsible for maintenance of the creek where it flows across their respective properties. The purpose of the proposed Project is to reduce risk to infrastructure caused by scour by relocating and upgrading sewer facilities. Although, operation of the proposed Project would include the collection of wastewater from the surrounding residential development, the proposed Project would improve the existing conditions by improving grade control, soil cover, and access to the sewer facilities. Therefore, operation of the proposed Project would not result in other emissions (such as those leading to odors) adversely affecting a substantial number of people. Impacts would be **less than significant,** and no mitigation is required.

Significance Determination: Less Than Significant Impact
Mitigation Measures: No mitigation is required.

5.4 BIOLOGICAL RESOURCES

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?	☐	☒	☐	☐
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?	☐	☐	☐	☒
c) Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	☐	☒	☐	☐
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	☐	☐	☒	☐
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☐	☒	☐	☐
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	☐	☐	☐	☒

The following analysis summarizes the potential impacts of the proposed Project on biological resources. The potential impacts to biological resources were evaluated using the Project Description, a literature search (i.e., California Natural Diversity Database [CNDDB], California Native Plant Society [CNPS], and Information for Planning and Consultation database), and existing conditions and land use designations. In addition, a site visit was conducted on January 11, 2023, to assess the existing biological resources associated with the Project site. Refer to Appendix B for the Biological Resources Assessment prepared for the proposed Project.[20]

[20] LSA Associates, Inc. 2023a. Biological Resources Assessment for the Wood Sewer Improvements Project, Lake Forest, Orange County, California. November.

a) Would the Project have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?

The majority of the Project site consists of eucalyptus groves, which are predominantly comprised of Tasmanian blue gum (*Eucalyptus globulus*), with a sparse, understory of non-native plant species. Ongoing soil disturbance and the resulting competitive exclusion by invasive nonnative plants, predominantly eucalyptus trees, limit the potential for native flora to occur on the Project site. Although several special-status plant species were identified in the records searches and literature review as occurring or potentially occurring in the vicinity of the Project site and surrounding areas, there are no special-status plant species within or adjoining the Project site. A map of the vegetation on the Project site is included in the Biological Resources Assessment (Appendix B).

Of the special-status animal species identified in the records searches and literature review, none were observed on site at the time of the site survey. Although not observed during the site survey, Monarch butterfly (*Danaus plexippus*), identified from the CNDDB records search has a high potential to roost within the Project site during winter months. Monarch butterfly was listed as a Candidate under the federal Endangered Species Act by the USFWS in December 2020. Monarch butterflies overwinter in Tasmanian blue gum which is found in abundance throughout the Project site. Overwintering sites are protected as sensitive habitat areas by the CDFW. Implementation of Mitigation Measure BIO-1, described below would reduce potential impacts to Monarch butterfly to **less than significant**.

In addition, potential direct and/or indirect impacts (e.g., clearing and grubbing of vegetation and noise during construction) could potentially disrupt or otherwise adversely affect bird nesting activities in and/or adjacent to the construction area. Such bird species are protected under the federal Migratory Bird Treaty Act and the California Fish and Game Code. Implementation of Mitigation Measure BIO-2, which requires avoiding tree removal and other work activities during the nesting season and conducting preconstruction surveys for nesting hawks and other migratory birds prior to any work during the nesting season, and additional measures to ensure avoidance of any "take" would reduce potential impacts to nesting birds to **less than significant.**

Significance Determination: Less Than Significant with Mitigation Incorporated
Mitigation Measure: The following mitigation measures would apply to the proposed Project.

MM BIO-1 **Pre-Construction Monarch Butterfly Clearance Surveys.** Should work activities occur within the overwintering period for monarch butterfly (October through March), a qualified biologist will conduct pre-construction surveys to confirm the presence or absence of overwintering activity within the work areas. The pre-construction survey will take place no more than 3 days prior to commencement of work activities. If overwintering monarch butterfly are observed within the work area (or areas potentially indirectly affected by Project activities as determined by the qualified biologist) and the work cannot be postponed until monarch butterfly is no longer present, IRWD will obtain

written approval from the USFWS or the CDFW, as applicable, prior to completing Project work at these locations.

MM BIO-2 **Preconstruction Nesting Bird Surveys and Active Nest Avoidance Buffers.** If vegetation removal, construction, or grading activities are planned to take place within the active nesting bird season (February 15 through August 31), a qualified biologist will conduct a preconstruction nesting bird survey no more than 3 days prior to the start of such activities. The nesting bird survey should include the Project site and areas within 300 feet of the site that could potentially be affected by project-related activities such as noise, vibration, increased human activity, and dust. If any active bird nests are found within areas that could be directly or indirectly impacted by project-related activities, the qualified biologist should establish an appropriate buffer zone around each active nest. The appropriate buffer should be determined by the qualified biologist based on species, location, and the nature of the proposed activities. Project activities should be avoided within the buffer zone until each nest is deemed no longer active by a qualified biologist.

b) Would the project have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?

As described in the Biological Resources Assessment for the proposed Project,[21] although no special-status natural communities were observed within the Project site, the majority of the vegetation consists of Tasmanian blue gum (*Eucalyptus globulus*). Although there is vegetation in the form of eucalyptus groves throughout both San Diego Creek and Glenwood Tributary, it consists of Tasmanian blue gum and has resulted in extensive biological, chemical, and physical degradation of streams, and riparian and upland habitats throughout the Project area. The eucalyptus oil excreted by Tasmanian blue gum competitively excludes native and non-native species from creating an understory, resulting in loss of habitat and soil stability which contribute to accelerated streambed erosion. Although *E. globulus* is a non-native species, eucalyptus groves are used as overwintering sites by monarch butterfly. Because Tasmanian blue gum is used for overwintering by monarch butterflies, it is considered a sensitive habitat area by the CDFW. A portion of the Tasmanian blue gum trees proposed for removal are within CDFW riparian jurisdiction, impacts to these trees would be mitigated through the jurisdictional waters regulatory permitting process. Prior to impacting any state or federally protected jurisdictional features, IRWD would obtain permits from the USACE (Clean Water Act [CWA] Section 404 permit), Regional Water Quality Control Board (RWQCB, CWA Section 401 water quality certification), and CDFW (Streambed Alteration Agreement), as required. Impacts to jurisdictional features would be mitigated by providing compensatory mitigation at a minimum 1:1 ratio in area. A Habitat Mitigation and Monitoring Plan would be prepared and implemented for proposed mitigation approaches as part of the regulatory permitting process. This plan would be subject to approval by the USACE, RWQCB, and/or CDFW prior to any disturbance of

[21] LSA Associates, Inc. 2023a. Biological Resources Assessment for the Wood Sewer Improvements Project, Lake Forest, Orange County, California. November.

jurisdictional features. Compliance with regulatory requirements would ensure that the proposed Project would not result in the removal of, or other direct impacts to riparian habitat or any other sensitive natural communities. This impact would be **less than significant.**

Significance Determination: Less Than Significant Impact
Mitigation Measures: No mitigation measures are required.

c) Would the project have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?

Two streams were delineated within the Project area: (1) San Diego Creek, which is an ephemeral stream and consisted of discontinuous ponding within the Project area at the time of the jurisdictional delineation; and (2) Glenwood Tributary, which consisted of active flows throughout its extent within the Project area and which contributes flows directly to San Diego Creek. Both of these features were determined to be jurisdictional. San Diego Creek and Glenwood Tributary were determined to be non-wetland waters of the United States (WOTUS)/waters of the State (WOTS) and CDFW streambed (see Table 5.E).

Table 5.E: Potential Jurisdictional Areas by Drainage Name

Feature Name	Non-wetland WOTUS USACE Jurisdiction (acres)	CDFW Jurisdiction (acres)	Non-wetland WOTS RWQCB Jurisdiction (acres)
San Diego Creek	0.973	1.66	0.973
Glenwood Tributary	0.329	0.956	0.329
Total Jurisdictional Acres	**1.30**	**2.61**	**1.30**

Source: Compiled by LSA (2022).
Note: Totals may appear inaccurate due to rounding.
CDFW = California Department of Fish and Wildlife
RWQCB = Regional Water Quality Control Board
USACE = Army Corps of Engineers

Implementation of the proposed Project would require fill of jurisdictional features to accommodate proposed improvements, including placement of the new pipelines and associate infrastructure, and ungrouted riprap check dams within the creek channels. The proposed Project would result in 0.124 acre of permanent impacts and 0.354 acre of temporary impacts to non-wetland waters of the United States/waters of the State and 0.118 acre of permanent impacts and 0.373 acre of temporary impacts to streambanks under the jurisdiction of the CDFW (see Table 5.F). Implementation of the proposed Project would also include on-site habitat restoration in nuisance runoff areas and within ungrouted areas of riprap.

Table 5.F: Potential Impacts to Jurisdictional Areas by Drainage Name

Feature Name	USACE Non-Wetland WOTUS (ac)		RWQCB Non-Wetland WOTS (ac)[1]		CDFW Streams/Rivers/Riparian Habitat (ac)	
	Permanent Impacts	Temporary Impacts	Permanent Impacts	Temporary Impacts	Permanent Impacts	Temporary Impacts
San Diego Creek	0.0937	0.175	0.0937	0.175	0.0562	0.11
Glenwood Tributary	0.0303	0.179	0.0303	0.179	0.0620	0.257
Total	**0.124**	**0.354**	**0.124**	**0.354**	**0.11**	**0.37**

Source: Compiled by LSA (2023).
Note: Totals may appear inaccurate due to rounding.
Ac = acre(s)
CDFW = California Department of Fish and Wildlife
RWQCB = Regional Water Quality Control Board
USFWS = United States Fish and Wildlife Services
WOTS = waters of the State
WOTUS = waters of the United States

In compliance with regulatory requirements, IRWD would obtain the necessary regulatory permits prior to work within jurisdictional areas and to compensate for impacts to jurisdictional features. Compliance with these regulatory requirements would ensure that potential impacts to wetlands would be reduced to a **less-than-significant** level.

Significance Determination: Less Than Significant Impact
Compliance Measures: No mitigation measures are required.

d) Would the project interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?

While wildlife could use Upper San Diego Creek and the Glenwood Tributary for movement purposes, the Project site does not function as a wildlife corridor. The noise, vibration, light, dust, or other human disturbance within the construction areas would only temporarily deter wildlife from using areas during construction activities. These indirect effects could temporarily alter migration behaviors, territories, or foraging habitats in a small area surrounding the Project site. However, because these are temporary effects, it is likely that wildlife already living and moving in close proximity to the Project site and existing residential developments would alter their normal functions for the duration of the project construction but would then re-establish these functions once all temporary construction effects have been removed. Furthermore, the proposed Project would not place any barriers within the habitat linkage or interfere with habitat connectivity. Therefore, the proposed Project would not interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors or impede the use of native wildlife nursery sites. This impact is considered **less than significant** and no mitigation is required.

Significance Determination: Less Than Significant Impact

Mitigation Measures: No mitigation is required.

e) Would the project conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?

The proposed Project is not expected to conflict with any local policies or ordinances protecting biological resources. The proposed Project would result in the removal of approximately 131 eucalyptus trees within the Project site to accommodate proposed improvements. In compliance with the City of Lake Forest Municipal Code (Section 6.20.025), if any eucalyptus trees on the Project site are to be removed or trimmed between April 1 and November 1, IRWD must first obtain a permit from the City for the transportation of any logs, branches, or trunks to an off-site location for disposal. In addition, as described above, a portion of the eucalyptus trees proposed for removal are within CDFW riparian jurisdiction, impacts to these trees would be mitigated through the regulatory permitting process, as described above. It is anticipated that mitigation for permanent impacts to these trees will occur at no less than a 1:1 ratio; wherein replacement of eucalyptus trees would consist of native tree species. Compliance with these existing regulatory requirements would ensure that impacts associated with removal of eucalyptus trees in the Project area are reduced to less than significant. No mitigation is required.

Significance Determination: Less Than Significant Impact
Mitigation Measures: No mitigation measures are required.

f) Would the project conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?

The Project site is located within the Orange County Central and Coastal Natural Communities Conservation Plan/Habitat Conservation Plan (NCCP/HCP) planning area but outside the boundaries of the NCCP/HCP Reserve System. The Project site is in an area identified in the NCCP/HCP as urbanized and designated for development. Development of the proposed Project would not result in the removal of any sensitive habitat species identified in the Orange County Central and Coastal NCCP/HCP. The proposed Project would not conflict with local ordinances or the adopted HCP, NCCP, or other approved local, regional, or State HCP. Therefore, the proposed Project would result in a **less than significant impact** related to local ordinances and the adopted NCCP/HCP, and no mitigation is required.

Significance Determination: Less Than Significant Impact
Mitigation Measures: No mitigation is required.

5.5 CULTURAL RESOURCES

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Cause a substantial adverse change in the significance of a historical resource pursuant to §15064.5?	☐	☒	☐	☐
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?	☐	☒	☐	☐
c) Disturb any human remains, including those interred outside of dedicated cemeteries?	☐	☒	☐	☐

a) Would the Project cause a substantial adverse change in the significance of a historical resource pursuant to §15064.5?

CEQA defines a "historical resource" as a resource that meets one or more of the following criteria: (1) listed in, or determined eligible for listing in, the California Register of Historical Resources (California Register); (2) listed in a local register of historical resources as defined in PRC Section 5020.1(k); (3) identified as significant in a historical resource survey meeting the requirements of PRC Section 5024.1(g); or (4) determined to be a historical resource by a project's Lead Agency (PRC Section 21084.1 and *State CEQA Guidelines* Section 15064.5[a]). Under CEQA, historical resources can include precontact (i.e., Native American) archaeological deposits, historic-period archaeological deposits, historic buildings, and historic districts.

The California Register defines a "historical resource" as a resource that meets one or more of the following criteria: (1) associated with events that have made a significant contribution to the broad patterns or local or regional history of the cultural heritage of California or the United States; (2) associated with the lives of persons important to local, California, or national history; (3) embodies the distinctive characteristics of a type, period, region, or method of construction or represents the work of a master or possesses high artistic values; or (4) has yielded, or has the potential to yield, information important to the prehistory or history of the local area, California, or the nation.

Implementation of the proposed Project would not cause a substantial adverse change in the significance of a historical resource as defined in Section 15064.5 of the *State CEQA Guidelines* or the California Register. As detailed in the Cultural Resources Assessment (Appendix C),[22] a records search was conducted on December 14, 2022, to identify historic resources in the Project area. The records search was conducted by Stacy St. James, Coordinator at the California Historical Resources Information System's South Central Coastal Information Center (SCCIC) housed at California State University, Fullerton. The SCCIC houses the pertinent archaeological and historic site and survey information necessary to determine whether cultural resources are known to exist within the Project area.

[22] LSA Associates. 2023b. Cultural Resources Assessment, The Woods Sewer Improvements Project, Lake Forest, Orange County, California. April.

The record search results indicate that 10 cultural resources assessments have been conducted within a 0.25-mile radius of the Project site including OR-00209, OR-02930, OR-03431, OR-03747, OR-03757, OR-04064, OR-04169 and OR-04182, all of which were field studies, along with OR-02662 (a record search), and OR-03373 (a monitoring report). None of the Project site and approximately 15 percent of the 0.25-mile records search radius has been included in previous cultural resources surveys. The record search results indicate one cultural resource (P-30-000038, a prehistoric artifact scatter) was previously recorded within the 0.25-mile record search radius.

The California Native American Heritage Commission (NAHC) maintains a confidential Sacred Lands File (SLF), which contains sites of traditional, cultural, or religious value to the Native American community. The NAHC was contacted on November 7, 2022, to request a search of the SLF for the APE. The NAHC responded to the request in a letter dated December 7, 2022. The results of the SLF search the NAHC conducted were negative.

There are no structures on the Project site that are eligible for listing in the California Register, listed in a local register of historic places, or identified as or determined to be a historic resource by the City. In addition, no archeological resources were identified during an archeological field survey conducted on March 31, 2023.[23]

The Project site is not designated as a historical/archaeological resource and no built environment, archaeological resources or indications of subsurface archaeological deposits were identified within the Project site. The sediments observed during the field survey are of a type that could contain archaeological resources.[24] However, the proposed Project work would take place along the banks of creek tributaries that would have been potentially subject to seasonal flooding, resulting in the movement of any deposited artifacts. Additionally, the direct vicinity of the Project area has been previously disturbed for residential development and planting of eucalyptus trees, further reducing the potential for *in situ* archaeological deposits.[25] For the above-stated reasons, there is a low potential for project implementation would affect intact subsurface archaeological resources within the Project area, which could qualify as a historical resource under CEQA.

As outlined in Section 3.0, Project Description, the proposed Project would use PTGAB in areas where trenching would need to be avoided due to steep terrain and/or proximity to adjacent residences. These methods require excavation of entry and exit pits at the beginning and end of pipeline installation (usually at manhole locations) to accommodate the equipment and personnel. Excavated soil would be removed by the augers to the entry pit/launch shaft and stockpiled. Excavated materials would be monitored by tribal monitors, as required by Mitigation Measure TCR-1 and work would be halted until the resource is evaluated. However, any archaeological cultural resources that be discovered in excavated soils, having been removed from their site context, would not have the integrity necessary to qualify as historical resources under CEQA. Despite the negative results of the field survey, it cannot entirely be ruled out that archaeological

23 LSA Associates. 2023b. Cultural Resources Assessment, The Woods Sewer Improvements Project, Lake Forest, Orange County, California. April.

24 Ibid.

25 Ibid.

cultural resources could be encountered during project construction at the Project site. Should archaeological deposits be encountered during project ground disturbance, a substantial adverse change in the significance of a historical resource would occur from its demolition, destruction, relocation, or alteration such that the significance of the resource would be materially impaired (CEQA Guidelines Section 15064.5(b)(1)). To mitigate this potential impact, IRWD would be required to implement Mitigation Measure CUL-1, below. Implementation of Mitigation Measure CUL-1 would reduce the level of the potential impact through the identification of archaeological deposits during construction; the evaluation of unanticipated discoveries; and the recovery of significant archaeological data from those resources that warrant such investigation (i.e., historical or unique archaeological resources). This process would recover scientifically consequential information from at-risk resources, in consultation with tribal representatives, to offset their potential loss. Therefore, with implementation of Mitigation Measure CUL-1, this impact would be reduced to **less than significant.**

Significance Determination: Less Than Significant with Mitigation Incorporated
Mitigation Measure: The following mitigation measure would apply to the proposed Project.

MM CUL-1 **Cultural Resources.** Prior to commencement of construction activities, Irvine Ranch Water District shall verify that the Project contract specifications include requirements specifying that if archaeological resources are discovered during excavation, grading, or construction activities, work shall cease within 50 feet (ft) of the find until a qualified archaeologist from the Orange County List of Qualified Archaeologists has evaluated the find in accordance with federal, State, and local guidelines to determine whether the find constitutes a "unique archaeological resource," as defined in Section 21083.2(g) of the California Public Resources Code (PRC). Personnel of the proposed Project shall not collect or move any archaeological materials and associated materials. Construction activity may continue unimpeded on other portions of the Project site. The found deposits shall be treated in accordance with federal, State, and local guidelines, including those set forth in PRC Section 21083.2.

b) Would the project cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5?

According to the CEQA Guidelines, "When a project will impact an archaeological site, a lead agency shall first determine whether the site is an historical resource" (CEQA Guidelines Section 15064.5I(1)). Those archaeological sites that do not qualify as historical resources shall be assessed to determine if these qualify as "unique archaeological resources" (California PRC Section 21083.2).

As stated in Response 5.5(a), given the previous disturbance of the Project site as a result of seasonal flooding, residential development and planting of eucalyptus trees, the likelihood of encountering subsurface archaeological cultural resources during ground-disturbing construction activities is low. However, archaeological deposits identified during project construction shall be treated by IRWD—in consultation with a qualified archaeologist meeting the Secretary of the Interior's Professional Qualifications Standards for Archaeology—in accordance with Mitigation Measure CUL-1. With implementation of Mitigation Measure CUL-1, identified above, impacts to

archaeological resources would be reduced to **less than significant**. Therefore, the proposed Project would not cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5 of the *State CEQA Guidelines*, and no additional mitigation is required.

Significance Determination: Less Than Significant with Mitigation Incorporated
Mitigation Measure: Implementation of MM CUL-1 described above.

c) Would the project disturb any humans remains, including those interred outside of dedicated cemeteries?

As stated in Response 5.5(b), given the previous disturbance of the Project site as a result of seasonal flooding, residential development and planting of eucalyptus trees, the likelihood of encountering subsurface archaeological cultural resources during ground-disturbing construction activities is low. In the unlikely event that human remains are encountered during Project excavation, the proper authorities would be notified, and standard procedures for the respectful handling of human remains during the earthmoving activities would be adhered to. Construction contractors are required to adhere to California Code of Regulations (CCR) Section 15064.5(e), PRC Section 5097, and Section 7050.5 of the State's Health and Safety Code. To ensure proper treatment of burials, in the event of an unanticipated discovery of a burial, human bone, or suspected human bone, the law requires that all excavation or grading in the vicinity of the find halt immediately, the area of the find be protected, and the contractor immediately notify the County Coroner of the find. If the remains are determined to be prehistoric, the coroner would notify the Native American Heritage Commission, which will determine and notify the Most Likely Descendant. With the permission of Irvine Ranch Water District (IRWD) or an authorized representative, the Most Likely Descendant may inspect the site of discovery. IRWD would meet and confer with the Most Likely Descendant regarding their recommendations prior to disturbing the site with further construction activity. Compliance with these provisions would ensure that any potential impacts to unknown buried human remains would be reduced to **less than significant** by ensuring appropriate examination, treatment, and protection of human remains as required by State law.

Significance Determination: Less than Significant Impact
Compliance Measures: No mitigation measures are required.

5.6 ENERGY

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?	☐	☐	☒	☐
b) Conflict with or obstruct a state or local plan for renewable energy or energy efficiency?	☐	☐	☐	☒

The Project site is within the service territory of Southern California Edison (SCE). SCE provides electricity to more than 15 million people in a 50,000-square-mile area of Central, Coastal, and Southern California.[26] According to the California Energy Commission (CEC), total electricity consumption in the SCE service area in 2021 was 103,045 gigawatt hours (GWh) (36,375 GWh for the residential sector and 51,057 GWh for the non-residential sector). Total electricity consumption in Orange County in 2021 was 18,931.8 GWh (18,931,838,624 kilowatt-hours [kWh]).[27]

Gasoline is the most used transportation fuel in California, with 97 percent of all gasoline being consumed by light-duty cars, pickup trucks, and sport utility vehicles. According to the most recent data available, total gasoline consumption in California was 289,918 thousand barrels or 1,464.7 trillion British thermal units (BTU) in 2020.[28] Of the total gasoline consumption, 273,289 thousand barrels or 1,380.7 trillion BTU were consumed for transportation.[29] Based on fuel consumption obtained from CARB's California Emissions Factor Model, Version 2021, 1,230.0 million gallons of gasoline and 155.9 million gallons of diesel will be consumed from vehicle trips in Orange County in 2023.

a) Would the project result in a potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources during project construction or operation?

The proposed Project would increase the demand for electricity and gasoline when compared to existing site conditions. The discussion and analysis provided below is based on the data included in the CalEEMod output, which is included in Appendix A.

[26] Southern California Edison (SCE). 2020. About Us. Website: https://www.sce.com/about-us/who-we-are (accessed December 2022).

[27] California Energy Commission (CEC). 2020. Electricity Consumption by County and Entity. Website: http://www.ecdms.energy.ca.gov/elecbycounty.aspx and http://www.ecdms.energy.ca.gov/elecbyutil.aspx (accessed December 2022).

[28] A British Thermal Unit is defined as the amount of heat required to raise the temperature of one pound of water by one degree Fahrenheit.

[29] U.S. Department of Energy, EIA. 2021a. California State Profile and Energy Estimates. Table F3: Motor gasoline consumption, price, and expenditure estimates, 2020. Website: eia.gov/state/seds/data.php?incfile=/state/seds/sep_fuel/html/fuel_mg.html&sid=CA (accessed December 2022).

Construction-Period Energy Use. The anticipated construction schedule assumes that the proposed Project would be built over approximately 15 months. The proposed Project would require tree removal and site preparation, sewer construction (trenching), watershed improvements, access improvements, and site restoration.

Construction of the proposed Project would require energy for the manufacture and transportation of building materials and for preparation of the site for grading activities and construction. Petroleum fuels (e.g., diesel and gasoline) would be the primary sources of energy for these activities.

Construction activities are not anticipated to result in an inefficient use of energy because gasoline and diesel fuel would be supplied by construction contractors who would conserve the use of their supplies to minimize their costs on the proposed Project. Energy usage on the Project site during construction would be temporary in nature and would be relatively small in comparison to the State's available energy sources. Therefore, construction energy impacts would be **less than significant**, and no mitigation would be required.

Operational Energy Use. Operational energy use is typically associated with natural gas use, electricity consumption, and fuel used for vehicle trips associated with the project.

As discussed above, the proposed Project would replace, relocate, and upgrade sewer facilities and provide access improvements within the Woods community. These are gravity sewers and do not require energy use. Currently, the IRWD conducts various operation and maintenance activities, including maintenance, pipeline monitoring by IRWD staff either on foot or by vehicle, and emergency response activities and repairs. Upon completion of construction activities, operation and maintenance associated with the proposed Project would remain the same as currently occurs for the existing sewer facilities. As described in Section 5.17, Transportation, no additional trips are anticipated due to implementation of the proposed Project; as such, the proposed Project is not expected to generate a substantial increase in fuel used for vehicle trips.

In addition, the purpose of the proposed Project is to reduce risk of failure and to improve access to all IRWD facilities along the Upper San Diego Creek and Glenwood Tributary areas. Implementation of the proposed Project would not result in additional energy consumption. Therefore, the proposed Project would not result in the wasteful, inefficient, or unnecessary consumption of energy resources. Impacts would be **less than significant**, and no mitigation measures would be necessary.

Significance Determination: Less Than Significant Impact
Mitigation Measure: No mitigation is required.

b) Would the project conflict with or obstruct a state or local plan for renewable energy or energy efficiency?

As indicated above, energy usage on the Project site during construction would be temporary in nature. In addition, once operational, the proposed Project would not result in additional energy consumption. As such, the proposed Project would not conflict with California's energy conservation plans as described in the CEC's 2021 Integrated Energy Policy Report and 2022 Integrated Energy

Policy Report Update. Thus, as shown above, the proposed Project would avoid or reduce the inefficient, wasteful, and unnecessary consumption of energy and would not result in any irreversible or irretrievable commitments of energy. Therefore, the proposed Project would not result in the wasteful, inefficient, or unnecessary consumption of energy resources during project construction or operation. No impact would occur and no mitigation is required.

Significance Determination: No Impact
Mitigation Measure: No mitigation is required.

5.7 GEOLOGY AND SOILS

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:				
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.	☐	☐	☐	☒
ii) Strong seismic ground shaking?	☐	☐	☐	☒
iii) Seismic-related ground failure, including liquefaction?	☐	☐	☒	☐
iv) Landslides?	☐	☐	☒	☐
b) Result in substantial soil erosion or the loss of topsoil?	☐	☐	☒	☐
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?	☐	☐	☒	☐
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property?	☐	☐	☒	☐
e) Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?	☐	☐	☒	☐
f) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	☐	☒	☐	☐

a) Would the Project directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:

i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.

Surface rupture occurs when the ground surface is broken due to fault movement during an earthquake. The location of surface rupture generally can be assumed to be along an active or potentially active major fault trace.

The Alquist-Priolo Fault Zoning Act was signed into law in 1972 and went into effect in 1973. The purpose of this Act was to require the State Geologist to delineate "Earthquake Fault Zones" (EFZs) along known active faults in California. If a city or county were affected by the EFZs, they would be required to regulate certain development projects within the zones. As with all of Southern California, the Project site is subject to strong ground motion resulting from earthquakes on nearby

faults. According to the Draft Geotechnical Evaluation,[30] provided in Appendix D, the Elsinore fault zone and the Newport Inglewood fault zone are the two most active and closet fault zones to the Project site. However, the Project site is not within a designated EFZ.[31] Therefore, the proposed Project would not expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving the rupture of a known earthquake fault. **No impact** would occur and no mitigation is required.

Significance Determination: No Impact
Mitigation Measures: No mitigation is required.

ii) Would the Project directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving strong seismic ground shaking?

The Project site, like all of Southern California, is in an active seismic region. Ground shaking resulting from earthquakes associated with both nearby and more distant faults is likely to occur. Buried pipelines, like the proposed Project, are generally less susceptible to damage from strong ground shaking than above ground structures since below ground pipelines are typically embedded in compacted backfill that can tolerate more seismic movement. Accepted procedures for placement of the sewer lines and construction measures necessary to minimize potential adverse effects have been incorporated into the project design. Compliance with the recommendations in the Draft Geotechnical Evaluation and standard engineering practices would reduce any potential impacts related to on-site seismic ground shaking to a less than significant level. While the Project site would be exposed to seismic ground shaking, the proposed Project would not cause or exacerbate strong seismic ground shaking that would expose people or structures to significant risk of injury or loss of property. **No impact** would occur and no mitigation is required.

Significance Determination: No Impact
Mitigation Measures: No mitigation is required.

iii) Would the Project directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving seismic-related ground failure, including liquefaction?

Liquefaction commonly occurs when three conditions are present simultaneously: (1) high groundwater; (2) relatively loose, cohesion-lacking (sandy) soil; and (3) earthquake-generated seismic waves. Liquefaction effects can manifest in several ways, including loss of bearing, lateral spread, dynamic settlement, and flow failures.

Due to the relatively shallow depth to groundwater and the presence of poorly consolidated channel deposits along the existing creek beds, the lower elevations of the creek areas at the site are located

[30] Ninyo & Moore. 2022. Draft Geotechnical Evaluation, Lake Forest Woods Sewer Improvement Project, Irvine Ranch Water District, Lake Forest, California. September 2.
[31] Ibid.

in an area mapped as being susceptible to liquefaction by the California Geological Survey.[32] The elevated terrain adjacent to the creek beds are not located in areas mapped as being subject to seismically-induced liquefaction. However, the majority of the soils encountered in exploratory borings conducted as part of the Draft Geotechnical Evaluation were very dense; therefore, significant liquefaction-induced settlement is not anticipated in the alluvial soils.[33] Additionally, the proposed Project would not include structures for human occupancy. Therefore, impacts involving seismic-related ground failure, including liquefaction, would be **less than significant**, and no mitigation is required.

Significance Determination: Less than Significant Impact
Mitigation Measures: No mitigation is required.

iv) Would the Project directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving landslides?

Seismically induced landslides and other slope failures are common occurrences during or soon after earthquakes in areas with significant ground slopes. According to CGS, the Project site is not located within an earthquake-induced landslide zone.[34] Further, ground elevations along the proposed alignment at Upper San Diego Creek range from approximately 378 to 406 feet above mean sea level (MSL), and ground elevations along the alignment at Glenwood Creek range from approximately 398 to 409 feet above MSL. Although the channel banks are incised, the Project site lacks significant slopes, and no significant slopes would be constructed as part of the proposed Project. Therefore, the potential for project impacts involving seismically induced landslides is **less than significant**, and no mitigation is required.

Significance Determination: Less Than Significant Impact
Mitigation Measures: No mitigation is required.

b) Would the Project result in substantial soil erosion or the loss of topsoil?

During construction activities, excavated soil would be exposed, and there would be an increased potential for soil erosion and sedimentation compared to existing conditions during the period of earthwork activities and between the time when earthwork is completed and new vegetation is established or hardscape is installed. As discussed in Response 5.10(c)(i), because construction of the Project would disturb more than 1 acre of soil, the proposed Project would be subject to the requirements of the State Water Resources Control Board's National Pollutant Elimination System (NPDES) General Permit for Storm Water Discharge Associated with Construction and Land Disturbance Activities (Order No. 2009-0009-DWQ, as amended by Orders No. 2010-0014-DWQ and

32 California Geological Survey. 2021. California Earthquake Hazards Zone Application. Website: maps.conservation.ca.gov/cgs/EQZApp/app/ (accessed April 10, 2023).
33 Ninyo & Moore. 2022. Draft Geotechnical Evaluation, Lake Forest Woods Sewer Improvement Project, Irvine Ranch Water District, Lake Forest, California. September 2.
34 California Geological Survey. 2021. California Earthquake Hazards Zone Application. Website: maps.conservation.ca.gov/cgs/EQZApp/app/ (accessed April 10, 2023).

2012-0006-DWQ, NPDES No. CAS000002) (Construction General Permit). Therefore, preparation of a Storm Water Pollution Prevention Plan (SWPPP) and implementation of Erosion Control and Sediment Control BMPs would be required. The proposed Project is intended to reduce risk to infrastructure caused by scour by relocating and upgrading sewer facilities and to provide access improvements for ongoing maintenance activities; therefore, implementation of the proposed Project would improve erosion conditions and substantial on-site erosion and loss of topsoil would not occur. For these reasons, impacts related to erosion or loss of topsoil would be **less than significant**, and no mitigation is required.

Significance Determination: Less Than Significant Impact
Mitigation Measures: No mitigation is required.

c) Would the Project be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?

Landslides and other forms of mass wasting, including mud flows, debris flows, and soil slips, occur as soil moves downslope under the influence of gravity. Landslides are frequently triggered by intense rainfall or seismic shaking.

As discussed in Section 5.7.a, on-site soils would not be subject to lateral spreading, landslide or liquefaction. The proposed Project would be designed and constructed with adequate foundations and bedding in accordance with standard engineering practices and the recommendations of the Geotechnical Evaluation. The Project site is not anticipated to become unstable as a result of the proposed Project, or potentially result in on- or off-site landslides, liquefaction, or lateral spreading. Therefore, the proposed Project would not result in a geologic hazard from landslide, lateral spreading, subsidence, liquefaction or collapse and the impact is **less than significant** and no mitigation is required.

Significance Determination: Less Than Significant Impact
Mitigation Measures: No mitigation is required.

d) Would the Project be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property?

Expansion and contraction of volume can occur when expansive soils undergo alternating cycles of wetting (swelling) and drying (shrinking). During these cycles, the volume of the soil changes markedly. Changes in soil volume could result in significant expansion pressure on any structures proposed as part of future development of the Project site. Expansive soils are common throughout California and can cause damage to foundations and slabs unless properly treated during construction.

Soil types found on the Project site primarily include Myford sandy loam, 2 to 9 percent slopes and Myford sandy loam 9 to 30 percent slopes, eroded, according to the Natural Resources Conservation

Service web soil survey.[35] The shrink-swell potential for these types of soil is low.[36] Therefore, impacts associated with expansive soils would be **less than significant** and no mitigation is required.

Significance Determination: Less Than Significant Impact
Mitigation Measures: No mitigation is required.

e) Would the Project have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?

Implementation of the project would not include installation of septic tanks or alternative wastewater disposal systems. The proposed Project would replace, relocate, and upgrade existing IRWD sewer facilities within Upper San Diego Creek and the Glenwood Tributary to reduce their risk of failure. Therefore, there would be **no impact** to soils and wastewater disposal and no mitigation is required.

Significance Determination: No Impact
Mitigation Measures: No mitigation is required.

f) Would the Project directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?

The *Paleontological Analysis of The Woods Sewer Improvements Project*[37] prepared by LSA and dated September 29, 2023, evaluated potential impacts on paleontological resources with implementation of the proposed Project (Appendix E).

Geologic mapping shows the Project site contains Young Axial Channel Deposits and Very Old Alluvial Fan Deposits.[38] The geotechnical report prepared for the proposed Project identified that the Very Old Alluvial Fan Deposits could be found below the Young Axial Channel Deposits beginning at depths ranging from 8 to 19 feet.[39] Additionally, Artificial Fill may also be present within the Project site from previous construction of the existing sewer system and The Woods neighborhood. According to the fossil locality search conducted by the Natural History Museum of Los Angeles County, there are no known fossil localities within the boundaries of the Project site. However, this search noted one record of a fossil locality nearby from unknown Pleistocene age sediments similar

35 United States Department of Agriculture Soil Conservation Service. 2019. Web Soil Survey. Website: websoilsurvey.sc.egov.usda.gov/App/HomePage.htm (accessed April 10, 2023).
36 Ninyo & Moore. 2022. op. cit.
37 LSA. 2023c. *Paleontological Analysis of The Woods Sewer Improvements Project, Lake Forest, Orange County, California*. September 29.
38 Morton, Douglas M., and Fred K. Miller. 2006. Geologic Map of the San Bernardino and Santa Ana 30-minute by 60-minute quadrangles, California. Digital preparation by Pamela M. Cosette and Kelly R. Bovard. Prepared by the United States Geological Survey (USGS) in cooperation with the California Geological Survey. USGS Open File Report 2007-1217. Map Scale 1:100,000
39 Ninyo & Moore. 2022. Draft Geotechnical Evaluation, Lake Forest Woods Sewer Improvement Project, Irvine Ranch Water District, Lake Forest, California. September 2.

to those within the Project site (i.e., the Young Axial Channel Deposits and Very Old Alluvial Fan Deposits

The project site contains Young Axial Channel Deposits, which have low paleontological sensitivity from the surface to a depth of 10 feet and high sensitivity below that depth, and Very Old Alluvial Fan Deposits, which have high paleontological sensitivity. Excavations for improvements within Upper San Diego Creek are expected to reach depths of 4 to 24 feet within sediments of both the Young Axial Channel Deposits and Very Old Alluvial Fan Deposits. Excavations for improvements within Glenwood Tributary are expected to reach depths of 4 to 24 feet; however, these activities would only take place within the Very Old Alluvial Fan Deposits. Development of this project is thus expected to extend into paleontologically sensitive sediments and has the potential to impact scientifically significant paleontological resources. Therefore, Mitigation Measures PALEO-1, PALEO-2, and PALEO-3 would be implemented during ground-disturbing activities to ensure potential impacts on paleontological resources are reduced to a less than significant level.

Significance Determination: Less Than Significant with Mitigation Incorporated
Mitigation Measures: The following mitigation measures would apply to the proposed project.

MM PALEO-1 A paleontologist who meets the qualifications established by the Society of Vertebrate Paleontology (SVP) shall be retained to develop a Paleontological Resources Impact Mitigation Program (PRIMP) for this project. The PRIMP shall be consistent with the standards of the SVP and include the methods that will be used to protect paleontological resources that may exist within the project site, as well as procedures for monitoring, fossil preparation and identification, curation into a repository, and preparation of a report at the conclusion of grading.

MM PALEO-2 Excavation and grading activities in deposits with high paleontological sensitivity (i.e., Young Axial Channel Deposits below a depth of 10 feet and Very Old Alluvial Fan Deposits) shall be monitored by a qualified paleontological monitor following a PRIMP. No monitoring is required for excavations in deposits with no paleontological sensitivity (i.e., Artificial Fill). If paleontological resources are encountered during the course of ground disturbance, the paleontological monitor shall have the authority to temporarily redirect construction away from the area of the find. In the event that paleontological resources are encountered when a paleontological monitor is not present, work in the immediate area of the find shall be redirected, and the paleontologist or paleontological monitor shall be contacted to assess the find for scientific significance. If determined to be scientifically significant, the fossil shall be collected from the field. Collected resources shall be prepared to the point of identification, identified to the lowest taxonomic level possible, cataloged, and curated into the permanent collections of a museum repository. At the conclusion of the monitoring program, a report of findings shall be prepared to document the results of the monitoring program.

5.8 GREENHOUSE GAS EMISSIONS

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	☐	☐	☒	☐
b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?	☐	☐	☒	☐

Greenhouse gases (GHGs) are present in the atmosphere naturally, are released by natural sources, or are formed from secondary reactions taking place in the atmosphere. The gases that are widely seen as the principal contributors to human-induced global climate change are:

- Carbon dioxide (CO_2)
- Methane (CH_4)
- Nitrous oxide (N_2O)
- Hydrofluorocarbons (HFCs)
- Perfluorocarbons (PFCs)
- Sulfur Hexafluoride (SF_6)

Over the last 200 years, humans have caused substantial quantities of GHGs to be released into the atmosphere. These extra emissions are increasing GHG concentrations in the atmosphere and enhancing the natural greenhouse effect, believed to be causing global warming. While manmade GHGs include naturally occurring GHGs such as CO_2, methane, and N_2O, some gases, like HFCs, PFCs, and SF_6 are completely new to the atmosphere.

Certain gases, such as water vapor, are short-lived in the atmosphere. Others remain in the atmosphere for significant periods of time, contributing to climate change in the long term. Water vapor is excluded from the list of GHGs above because it is short-lived in the atmosphere and its atmospheric concentrations are largely determined by natural processes, such as oceanic evaporation.

These gases vary considerably in terms of Global Warming Potential (GWP), which is a concept developed to compare the ability of each GHG to trap heat in the atmosphere relative to another gas. The GWP is based on several factors, including the relative effectiveness of a gas to absorb infrared radiation and length of time that the gas remains in the atmosphere ("atmospheric lifetime"). The GWP of each gas is measured relative to CO_2, the most abundant GHG; the definition of GWP for a particular GHG is the ratio of heat trapped by one unit mass of the GHG to the ratio of heat trapped by one unit mass of CO_2 over a specified time period. GHG emissions are typically measured in terms of pounds or tons of "CO_2 equivalents" (CO_2e).

State CEQA Guidelines Section 15064(b) provides that the "determination of whether a project may have a significant effect on the environment calls for careful judgment on the part of the public agency involved, based to the extent possible on scientific and factual data," and further states that an "ironclad definition of significant effect is not always possible because the significance of an activity may vary with the setting."

Appendix G of the *State CEQA Guidelines* includes significance thresholds for GHG emissions. A project would normally have a significant effect on the environment if it would do either of the following:

- Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment; or
- Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs.

Currently, there is no Statewide GHG emissions threshold that has been used to determine the potential GHG emissions impacts of a project. Threshold methodology and thresholds are currently developed and revised by air districts in California.

a) Would the Project generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?

In October 2008, the South Coast Air Quality Management District (SCAQMD) released a Draft Guidance Document – Interim CEQA Greenhouse Gas (GHG) Significance Threshold that suggested a tiered approach to analyzing GHG emissions in a project level analysis. In the Draft Guidance Document, the SCAQMD provided numerical thresholds that can be applied to smaller projects (like the proposed Project). Although the interim GHG significance threshold is 3,000 metric tons (MT) per year of carbon dioxide equivalents (CO_2e) for residential and commercial land uses. If emissions exceed the numerical screening threshold, a more detailed review of the project's GHG emissions is warranted. The SCAQMD has not addressed emission thresholds for construction; however, the SCAQMD requires quantification and disclosure.

This section discusses the project's impacts related to the release of GHG emissions for the construction and operational phases of the project. Construction and operational GHG emissions were estimated using CalEEMod using the same methodology for the criteria pollutants described in Section 5.3, Air Quality.

Construction Activities. Construction activities associated with the proposed Project would produce combustion emissions from various sources. During construction, GHGs would be emitted through the operation of construction equipment and from worker and builder supply vendor vehicles, each of which typically use fossil-based fuels to operate. The combustion of fossil-based fuels creates GHGs such as CO_2, CH_4, and N_2O. Furthermore, CH_4 is emitted during the fueling of heavy equipment. Exhaust emissions from on-site construction activities would vary daily as construction activity levels change.

SCAQMD does not provide a separate GHG significance threshold for construction emissions; rather, applicable guidance specifies that construction emissions should be amortized over 30 years (a typical project lifetime), added to the project operational emissions, and that total compared to the GHG significance threshold. As shown in Table 5.G, the construction emissions associated with the proposed Project would be approximately 1,264.1 MT CO_2e per year. Based on the 30-year lifespan of the proposed Project, the proposed Project would result in GHG emissions of approximately 42.1 MT CO_2e per year (See the CalEEMod output in Appendix A for details).

Table 5.G: Construction Greenhouse Gas Emissions

Construction Year	Total Emissions per Year (MT)			Total Emissions per Year (MT CO_2e)
	CO_2	CH_4	N_2O	
2024	1,016.3	<1.0	<1.0	1,031.4
2025	225.7	<1.0	<1.0	232.6
Total Emissions for the Entire Construction Process				**1,264.1**
Total Construction Emissions Amortized over 30 Years				**42.1**

Source: Compiled by LSA (February 2023).
CH_4 = methane
CO_2 = carbon dioxide
CO_2e = carbon dioxide equivalent
MT CO_2e = metric tons of carbon dioxide equivalent
MT = metric tons
N_2O = nitrous oxide

Since there is no separate GHG significance threshold for construction emissions, project level and cumulative GHG emissions during construction activities alone would be **less than significant,** and no mitigation is required.

Operational GHG Emissions. Long-term GHG emissions are typically generated from mobile sources (e.g., cars, trucks, and buses), area sources (e.g., maintenance activities and landscaping), indirect emissions from sources associated with energy consumption, waste sources (land filling and waste disposal), and water sources (water supply and conveyance, treatment, and distribution). Mobile-source GHG emissions would include project-generated vehicle and truck trips to and from the Project site. Area-source emissions would be associated with activities such as landscaping and maintenance on the Project site. Waste source emissions are typically generated by the energy generated by land filling and other methods of disposal related to transporting and managing project-generated waste.

As discussed in Section 4.3 Air Quality, the proposed Project would replace, relocate, and upgrade sewer facilities and provide associated access improvements within the Woods Community. Currently, the IRWD conducts various operation and maintenance activities, including maintenance, pipeline monitoring by IRWD staff either on foot or by vehicle, and emergency response activities and repairs. Upon completion of construction activities, operation and maintenance associated with the proposed Project would remain the same as currently occurs for the existing sewer facilities. As described in Section 5.17, Transportation, no additional trips are anticipated due to implementation of the proposed Project. As such, the project would not result in a significant increase in the generation of vehicle trips or VMT that would increase GHG emissions. The project would not be a substantial source of energy, area, waste, or water source emissions. Therefore, the proposed

Project would not generate GHG emissions that would have a significant impact on the environment. Therefore, impacts would be **less than significant**. Mitigation is not required.

Significance Determination: Less Than Significant Impact
Mitigation Measures: No mitigation is required.

b) Would the Project conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?

Executive Order (EO) B-30-15 added the immediate target of reducing GHG emissions to 40 percent below 1990 levels by 2030. CARB released a second update to the Scoping Plan, the 2017 Scoping Plan, to reflect the 2030 target set by EO B-30-15 and codified by Senate Bill (SB) 32. SB 32 affirms the importance of addressing climate change by codifying into statute the GHG emissions reductions target of at least 40 percent below 1990 levels by 2030 contained in EO B-30-15. The companion bill to SB 32, AB 197, provides additional direction to the CARB related to the adoption of strategies to reduce GHG emissions. Additional direction in AB 197 intended to provide easier public access to air emissions data that are collected by CARB was posted in December 2016.

In addition, the 2022 Scoping Plan assesses progress toward the statutory 2030 target, while laying out a path to achieving carbon neutrality no later than 2045. The 2022 Scoping Plan focuses on outcomes needed to achieve carbon neutrality by assessing paths for clean technology, energy deployment, natural and working lands, and others, and is designed to meet the State's long-term climate objectives and support a range of economic, environmental, energy security, environmental justice, and public health priorities.

The Scoping Plan contains GHG reduction measures that work towards reducing GHG emissions, consistent with the targets set EO B-30-15 and codified by SB 32 and AB 197. The measures applicable to the proposed Project include energy efficiency measures, water conservation and efficiency measures, and transportation and motor vehicle measures, as discussed below.

Energy efficient measures are intended to maximize energy efficiency building and appliance standards, pursue additional efficiency efforts including new technologies and new policy and implementation mechanisms, and pursue comparable investment in energy efficiency from all retail providers of electricity in California. In addition, these measures are designed to expand the use of green building practices to reduce the carbon footprint of California's new and existing inventory of buildings. The proposed Project would not result in additional energy consumption; therefore, the proposed Project would not conflict with energy efficient measures.

Water conservation and efficiency measures are intended to continue efficiency programs and use cleaner energy sources to move and treat water. Increasing the efficiency of water transport and reducing water use would reduce GHG emissions. As noted above, the proposed Project would replace, relocate, and upgrade sewer facilities and provide associated access improvements within the Woods community. The proposed Project would not conflict with any of the water conservation and efficiency measures.

The goal of transportation and motor vehicle measures is to develop regional GHG emissions reduction targets for passenger vehicles. As identified above, no additional trips are anticipated due to implementation of the proposed Project. Therefore, the proposed Project would not conflict with the identified transportation and motor vehicle measures.

The proposed Project would be determined to have a less than significant individual and cumulative impact related to GHG emissions. Therefore, the proposed Project would not generate GHG emissions that would have a significant impact on the environment, nor would the project conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs. Associated impacts would be **less than significant,** and no mitigation is required.

Significance Determination: Less Than Significant Impact
Mitigation Measures: No mitigation is required.

5.9 HAZARDS AND HAZARDOUS MATERIALS

Would the project:		Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a)	Create a significant hazard to the public or the environment through the routine transport, use or disposal of hazardous materials?	☐	☐	☒	☐
b)	Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	☐	☐	☒	☐
c)	Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	☐	☐	☒	☐
d)	Be located on a site which is included on a list of hazardous materials sites complied pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	☐	☐	☒	☐
e)	For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard or excessive noise for people residing or working in the project area?	☐	☐	☐	☒
f)	Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☐	☒	☐
g)	Expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires?	☐	☐	☒	☐

a) Would the Project create a significant hazard to the public or the environment through the routine transport, use or disposal of hazardous materials?

Hazardous materials are chemicals that could potentially cause harm during an accidental release or mishap, and are defined as being toxic, corrosive, flammable, reactive, and irritant, or a strong sensitizer.[40] Hazardous substances include all chemicals regulated under the United States Department of Transportation "hazardous materials" regulations and the EPA "hazardous waste" regulations. Hazardous wastes require special handling and disposal because of their potential to damage public health and the environment. The probable frequency and severity of consequences from the routine transport, use, or disposal of hazardous materials is affected by the type of substance, the quantity used or managed, and the nature of the activities and operations.

Construction. The proposed Project would replace, relocate, and upgrade sewer facilities and provide associated access improvements along approximately 1,400 feet of Upper San Diego Creek

[40] A "sensitizer" is a chemical that can cause a substantial proportion of people or animals to develop an allergic reaction in normal tissue after repeated exposure to a chemical.

and 600 feet of a tributary to Glenwood Tributary. Construction activities associated with the proposed Project would use a limited amount of hazardous and flammable substances (e.g., oils) during heavy equipment operation for site excavation and construction. Potentially hazardous substances such as chemical agents, solvents and paints would also be used during construction. However, the amount of hazardous chemicals present during construction is limited and would be used in compliance with existing government regulations, including implementation of BMPs to protect water quality. In addition, the potential for the release of hazardous materials during Project construction is low, and even if a release would occur, it would not result in a significant hazard to the public, surrounding land uses, or environment due to the small quantities of these materials associated with construction vehicles. As part of Project implementation, existing facilities to be replaced would be abandoned in place and filled with concrete slurry; however, this material is not hazardous.

Operation. Operation and maintenance (O&M) of the proposed Project would be the same as currently occurs for the existing sewer infrastructure. During O&M, no hazardous materials would be routinely transported, used or disposed of. As currently occurs, IRWD would be required to comply with existing government regulations in the use and disposal of any hazardous materials necessary for maintenance of the project pipeline, and such materials would not be used in sufficient strength or quantity to create a substantial risk to human or environmental health. Therefore, the proposed Project would have a **less than significant** impact related to the routine transport, use, or disposal of hazardous materials.

Significance Determination: Less Than Significant Impact
Mitigation Measures: No mitigation is required.

b) Would the Project create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?

As described in 5.9.a above, O&M of the proposed Project would not require routine use of hazardous materials; therefore, no hazards or hazardous materials impacts related to long-term operation of the project are anticipated.

The hazardous materials most likely to be used during construction include typical construction materials such as gasoline, diesel, motor oil, lubricants, solvents, and adhesives, as well as drilling fluids used for trenchless construction activities. Drips and small spills would be the most likely potential hazardous materials releases to occur, however any release that occurs in close proximity to sensitive habitat (e.g., a stream) could have a significant impact on the environment, if not properly controlled.

While gas and diesel fuel would typically be used by construction vehicles, BMPs would be utilized to ensure that no construction-related fuel hazards occur. Such materials would be kept at construction staging areas and would be secured when not in use. In the unlikely event of a spill, fuels would be controlled and disposed of in accordance with applicable regulations. IRWD would be required to prepare and implement a SWPPP in accordance with the Construction General Permit, which would reduce the potential for hazardous materials releases to occur during construction and

would reduce the potential for spills to impact sensitive habitat or human health, to less than significant. Therefore, development of the proposed Project would not create a significant hazard to the public or environment. This impact would be **less than significant** and no mitigation is required.

Significance Determination: Less Than Significant Impact
Mitigation Measures: No mitigation is required.

c) Would the Project emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?

Eight schools are located within one mile of the Project site. The schools in the surrounding area and their distance from the Project site are shown in Table 5.H.

Table 5.H: Surrounding Schools and Distance from Project Site

School Name and Address	Approximate Distance from the Project Site
Serrano Intermediate School, 24642 Jeronimo Road	0.01 miles southwest (across Jeronimo Road)
Santiago Elementary School, 24982 Rivendell Drive	0.20 miles south
El Toro High School, 25255 Toledo Way	0.06 miles southeast (south of Ridge Road, east of Toledo Way)
La Madera Elementary School, 25350 Serrano Road	0.15 miles east (across Toledo Way)
Rancho Canada Elementary School, 21801 Winding Way	0.45 miles northeast
Grace Christian Schools, 26052 Trabuco Road	0.90 miles southeast
Olivewood Elementary School, 23391 Dune Mear Road	0.93 miles southwest

Four schools are located within one-quarter mile of the Project site including Serrano Intermediate School, Santiago Elementary School, El Toro High School, and La Madera Elementary School. The proposed Project would replace, relocate, and upgrade existing sewer facilities and provide associated access improvements. Due to the nature of the Project as a sewer pipeline improvement project, the proposed Project is not of the type to emit hazardous emissions or handle hazardous or acutely hazardous materials or substances, as described above in Responses 5.9(a) and 5.9(b). Therefore, the proposed Project would not emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school. This impact would be less than significant and no mitigation is required.

Significance Determination: Less Than Significant Impact
Mitigation Measures: No mitigation is required.

d) Would the Project be located on a site which is included on a list of hazardous materials sites complied pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?

Government Code Section 65962.5 states that the California Department of Toxic Substances shall compile and maintain annually a list of hazardous waste facilities subject to corrective action as part of the Health and Safety Code. This list is commonly referred to as the Cortese List. The Project site and a one-mile radius encompassing the Project site were evaluated via the State Water Resources

Control Board (SWRCB) GeoTracker database,[41] the Department of Toxic Substances Control's (DTSC) EnviroStor database,[42] and the Hazardous Waste and Substances Sites (Cortese) List [43] for the purposes of identifying recognized environmental conditions or historical recognized environmental conditions. Twenty properties with active or historical recognized environmental conditions were identified within one mile of the Project site, as detailed in Table 5.I.

Table 5.I: Hazardous Materials Database Search

Property	REC[1]	Historical Recognized Environmental Condition	Location Relative to the Project Site	Status of the Property
El Toro High School at 25255 Toledo Way	-	Waste Oil, motor oil, hydraulic fluid, and lubricating fluid contamination of soil.	Approximately 1,550 feet southeast of the Project site.	Completed – Case closed as of 2/28/1991. A closure letter or other formal closure decision document has been issued for the site.
Southern California Edison at 22641 Lake Forest Drive	-	Gasoline, waste oil, motor oil, hydraulic fluid, and lubricating fluid contamination on site.	Approximately 690 feet north of the Project site.	Completed – Case closed as of 1/9/1988. A closure letter or other formal closure decision document has been issued for the site.
Chevron at 20731 Lake Forest Drive	-	Gasoline contamination of soil.	Approximately 3,050 feet northeast of the Project site.	Completed – Case closed as of 4/20/1998. A closure letter or other formal closure decision document has been issued for the site.
Shell Oil at 21762 lake Forest Drive	-	Gasoline contamination of an aquifer used for drinking water supply.	Approximately 3,830 feet northeast of the Project site.	Completed – Case closed as of 5/1/2014. A closure letter or other formal closure decision document has been issued for the site.
Continental Cleaners at 22421 El Toro Road	No potential contaminates or media of concern specified.	-	Approximately 3,020 feet east of the projects site.	Open – Site assessment as of 1/1/1995
Unocal at 22391 El Toro Road	-	Gasoline contamination of soil.	Approximately 3.400 feet east of the Project site	Completed – Case closed as of 12/19/1997. A closure letter or other formal closure decision document has been issued for the site.
Mobil #18-170 at 2281 El Toro Road	-	Gasoline contamination of an aquifer used for drinking water supply.	Approximately 3,610 feet east of the Project site.	Completed – Case closed as of 4/9/2018. A closure letter or other formal closure decision document has been issued for this site.

41 State Water Resources Control Board. 2022. Geotracker Database. https://geotracker.waterboards.ca.gov/ (accessed November 21, 2022).

42 California Department of Toxic Substances Control. 2022. EnviroStor Database Website: https://www.envirostor.dtsc.ca.gov/public/ (accessed November 21, 2022).

43 California Environmental Protection Agency (Cal/EPA). 2020. Cortese List Data Resources. Website: calepa.ca.gov/sitecleanup/corteselist/ (accessed November 21, 2022).

Table 5.I: Hazardous Materials Database Search

Property	REC[1]	Historical Recognized Environmental Condition	Location Relative to the Project Site	Status of the Property
Sycamore Cleaners at 22345 El Toro Road	-		Approximately 3,960 feet east of the Project site.	Completed – Case closed as of 10/25/1996. A closure letter or other formal closure decision document has been issued for this site.
Aspen Cleaners at 22851 Lake Forest Drive Suite B	-	No potential contaminates or media of concern specified.	Approximately 1,740 feet southeast of the Project site.	Completed – Case closed as of 8/22/2001. A closure letter or other formal closure decision document has been issued for this site.
Gordon Moving & Storage Inc. at 15041 Bake Lakeway	-	No potential contaminates or media of concern specified.	Approximately 4,120 feet northwest of the Project site.	Completed – Case closed as of 10/4/1993. A closure letter or other formal closure decision document has been issued for this site.
Consolidated Freightways at 5 Holland	-	Diesel contamination of soil.	Approximately 4,870 feet northwest of the Project site.	Completed – Case closed as of 3/5/1997. A closure letter or other formal closure decision document has been issued for this site.
Cal Sonic Muir Graphics Inc. at 9999 Muirlands Boulevard	-	No potential contaminates or media of concern specified.	Approximately 4,150 feet west of the Project site.	Completed – Case closed as of 6/13/1991. A closure letter or other formal closure decision document has been issued for this site.
Arboretum Apartments at 22700 lake Forest Drive	-	No potential contaminates or media of concern specified.	Approximately 3,160 feet southwest of the Project site.	Completed – Case closed as of 5/20/2002. A closure letter or other formal closure decision document has been issued for this site.
Econo Lube n Tune at 22861 Lake Forest Drive	-	Solvents contamination of soil.	Approximately 5,190 feet southwest of the Project site.	Completed – Case closed as of 1/14/1991. A closure letter or other formal closure decision document has been issued for this site.
Los Alisos Water District at 22312 Muirlands Boulevard	-	Diesel and gasoline contamination of groundwater for uses other than drinking water.	Approximately 2,950 feet southwest of the Project site.	Completed – Case closed as of 11/16/1993. A closure letter or other formal closure decision document has been issued for this site.
Chevron #9-0884 at 22942 Ridge Route	-	Gasoline contamination of an aquifer used for drinking water supply.	Approximately 3,190 feet southwest of the Project site.	Completed – Case closed as of 1/15/2015. A closure letter or other formal closure decision document has been issued for this site.
Chevron at 22942 Rudge Route	-	Gasoline contamination of soil.	Approximately 3,190 feet southwest of the Project site.	Completed – Case closed as of 6/3/1998. A closure letter or other formal closure decision document has been issued for this site.

Table 5.I: Hazardous Materials Database Search

Property	REC[1]	Historical Recognized Environmental Condition	Location Relative to the Project Site	Status of the Property
Unocal #6186 at 24382 Muirlands Boulevard	-	Gasoline contamination of soil.	Approximately 3,980 feet south of the Project site.	Completed- Case closed as of 6/21/1994. A closure letter or other formal closure decision document has been issued for this site.
OC Fire Station #19 at 23022 El Toro Road	-	Diesel contamination of soil.	Approximately 3,360 feet south of the Project site.	Completed – Case closed as of 7/13/1998. A closure letter or other formal closure decision document has been issued for this site.
Lake Forest Town Center/Dry Cleaner at 22641 Lake Forest Drive	Tetrachloroethylene (PCE) and Trichloroethylene (TCE) contamination of groundwater for uses other than drinking water, soil, and soil vapor.	-	Approximately 3,010 feet west of the Project site.	Active – Cleanup is active as of 6/14/2016. Fieldwork activities were scheduled to be completed by August 2020.

Sources: State Water Resources Control Board.2022, California Department of Toxic Substances Control. 2022, California Department of Toxic Substances 2022

[1] Recognized Environmental Condition

As shown in Table 5.G, the regulatory oversight statuses of all but two recorded release sites, listed leaking underground storage tanks (LUSTs) and spill sites within one mile of the Project site are closed. A closed site indicates that regulatory requirements for response actions, such as site assessment and remediation, have either been completed or were not necessary and therefore potential migration of residual contaminants in groundwater beneath the Project site does not likely pose a risk to human health and the environment.

The two active cleanup sites identified are the Lake Forest Town Center/Dry Cleaner at 22641 Lake Forest Drive approximately 3,010 feet west of the Project site and Continental Cleaners at 22421 El Toro Road approximately 3,020 feet east of the Project site. The Lake Forest Town Center/Dry Cleaner site is under a Voluntary Cleanup Agreement to investigate and remediate the site under DTSC oversight. The Continental Cleaners is a Cleanup Program Site. Based on the type of cleanup site and distance from the Project site, neither of these sites represent a significant risk to public health or safety on the Project site.[44]

Although there are hazardous waste sites listed within the surrounding vicinity, the Project site is not included on a list of hazardous materials sites compiled pursuant to Government Code Section

[44] State Water Resource Control Board, GeoTracker. Continental Cleaners (T10000017731). Available at: https://geotracker.waterboards.ca.gov/profile_report.asp?global_id=T10000017731. (accessed January 24, 2023).

65962.5. Since the proposed Project would not be located on a site that is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and would not create a significant hazard to the public or the environment, impacts would be **less than significant** and no mitigation is required.

Significance Determination: Less Than Significant Impact
Mitigation Measures: No mitigation is required.

e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard or excessive noise for people residing or working in the project area?

The closest airport facility to the Project site is the John Wayne Airport (SNA) located in the City of Santa Ana in the northern portion of Orange County approximately 9.6 miles northwest of the Project site. The City of Lake Forest, including the Project site, is not located within the Runway Protection Zone, Inner/Outer Safety Zone, Inner Turning Zone, Sideline Safety Zone, or Traffic Pattern Zone for SNA, and the Project site is not within the land use compatibility zones for nearby airports. Therefore, the Project would not result in a safety hazard for people residing or working in the Project area. There would be **no impact**.

Significance Determination: No Impact
Mitigation Measures: No mitigation is required.

f) Would the Project impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?

The Orange County Fire Authority (OCFA) is responsible for providing fire protection and suppression, inspection services, paramedic emergency medical services, and hazardous material response to citizens and visitors to Lake Forest. Roads used as response corridors/evacuation routes usually follow the most direct path to or from various parts of a community. For the Project site and the surrounding areas, the main corridors anticipated to be used by emergency services providers are Lake Forest Drive, Trabuco Road, Jeronimo Road, and other arterials and freeways in this part of Lake Forest.

Construction. Construction of the proposed Project would not result in substantial temporary traffic delays, as traffic flow would be maintained. No public road or lane closures would be required. The existing access roads would be closed when construction of access improvements occurs. Therefore, the proposed Project would not physically interfere with the implementation of an adopted emergency response plan or evacuation plan. This impact would be **less than significant**.

Operation. The Proposed project would replace, relocate, and upgrade existing sewer facilities along the alignment of existing underground pipelines and provide associated access improvements. O&M of the proposed Project would be the same as currently occurs for the existing pipeline and would not impair or physically interfere with emergency response or evacuation plans.

As described in Section 3.0, Project Description, the proposed Project would improve existing access routes to the proposed pipeline alignment; however, emergency access to the Project site would not change. Further, the proposed Project would not reconfigure any existing roadways, result in road closures during operation of the Project, or include features that would otherwise hinder emergency response or evacuation. Therefore, operation of the proposed Project would not impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan. Potential Project impacts would be **less than significant**, and no mitigation would be required.

Significance Determination: Less Than Significant Impact
Mitigation Measures: No mitigation is required.

g) Would the Project expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires?

The Project site is located within a developed urban area and according to the California Department of Fire and Forestry Protection (CalFire), the Project site is not located in a Very High Fire Hazard Severity Zone.[45] Construction of the proposed pipeline improvements would occur primarily within the existing IRWD easement and along the existing pipeline alignments. Project construction and operation would not change the characteristics of the Project site in a way that would make the Project site more susceptible to wildland fires. During construction, the most likely source of ignition would be by mechanical activities such as operation of backhoes, mini excavators, or rolled compactors. However, the potential for ignition can be greatly reduced through equipment features, fuel treatment, and management of behavior. Therefore, impacts associated with exposing people or structures to a significant risk of loss, injury, or death involving wildland fires would be **less than significant**.

Significance Determination: Less Than Significant Impact
Mitigation Measures: No mitigation is required.

[45] California Department of Fire and Forestry Protection. 2008. Lake Forest Very High Fire Hazard Severity Zones in LRA. Available online at: osfm.fire.ca.gov/media/5889/c30_lakeforest_vhfsz.pdf (Accessed January 13, 2023).

5.10 HYDROLOGY AND WATER QUALITY

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality or otherwise substantially degrade surface or ground water quality?	☐	☐	☒	☐
b) Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?	☐	☐	☒	☐
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:				
i) Result in substantial erosion or siltation on- or off-site;	☐	☐	☒	☐
ii) Substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite;	☐	☐	☒	☐
iii) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or	☐	☐	☒	☐
iv) Impede or redirect flood flows?	☐	☐	☒	☐
d) In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?	☐	☐	☒	☐
e) Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?	☐	☐	☒	☐

a) Would the Project violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality or otherwise substantially degrade surface or ground water quality?

Construction. Pollutants of concern during construction include sediments, trash, petroleum products, concrete waste (dry and wet), sanitary waste, and chemicals. Each of these pollutants on its own or in combination with other pollutants can have a detrimental effect on water quality. During construction activities, excavated soil would be exposed, and there would be an increased potential for soil erosion and sedimentation compared to existing conditions. In addition, chemicals, liquid products, petroleum products (for example, paints, solvents, and fuels), and concrete-related waste may be spilled or leaked and have the potential to be transported via storm runoff into receiving waters.

Because construction of the proposed Project would disturb greater than 1 acre of soil, the project is subject to the requirements of the National Pollutant Discharge Elimination System (NPDES) permit Waste Discharge Requirements for Discharges of Storm Water Runoff Associated with Construction and Land Disturbance Activities (Order No. 2009-0009-DWQ, NPDES No. CAS000002, as amended by

Order Nos. 2010-0014-DWQ and 2012-0006-DWQ) (Construction General Permit). The Construction General Permit (CGP) requires preparation of a Stormwater Pollution Prevention Plan (SWPPP) and implementation of construction Best Management Practices (BMPs) during construction activities. Construction BMPs would include, but not be limited to, Erosion Control and Sediment Control BMPs designed to minimize erosion and retain sediment on site and Good Housekeeping BMPs to prevent spills, leaks, and discharge of construction debris and waste into receiving waters. Adherence with the CGP would ensure construction impacts related to surface water quality standards, waste discharge requirements, and surface water quality would be **less than significant**.

According to the Geotechnical Evaluation[46] prepared for the project, four exploratory borings were drilled to depths of approximately 31.5 feet below ground surface (bgs). Groundwater was encountered at the time of drilling in borings B-2 and B-3 at depths of approximately 24 feet (363 feet above MSL) and 26 feet (366 feet above MSL) bgs, respectively. Regional maps indicate that the historic high groundwater at the site is mapped as being less than approximately 20 feet below the ground surface near the creek beds.[47] Fluctuations in the level of groundwater can occur due to variations in ground surface topography, subsurface stratification, rainfall, irrigation practices, groundwater pumping, and other factors. Based on the depth of groundwater and depths of excavation, groundwater may be encountered during excavation activities. Release of dewatered groundwater to surface waters can introduce total dissolved solids and other constituents to surface waters and could cause degradation of the receiving water quality. In the event that groundwater is encountered during construction and groundwater dewatering is necessary, any groundwater dewatering during excavation would be conducted in accordance with the requirements of the CGP, which allows the discharge of dewatering effluent if the source of the water is uncontaminated groundwater and is properly filtered or treated, using appropriate technology.

Adherence with the CGP, including implementation of the required SWPPP, Construction BMPs, and dewatering requirements, including preparation of erosion and sediment control plans, would ensure construction impacts related to surface water quality standards, waste discharge requirements, and surface water quality would be **less than significant.**

Operation. The proposed Project is located within the jurisdiction of the Santa Ana Regional Water Quality Control Board (RWQCB). O&M of the proposed Project would be the same as currently occurs for the existing sewer infrastructure. As currently occurs, pollutants of concern would be limited to those associated with vehicle operation (e.g., oil and grease) for maintenance of proposed facilities. Pollutants from vehicles accessing the Project site would be minimal because of the limited traffic to and from the site and would be same as currently occurs under existing conditions. Implementation of the Proposed project would improve the resiliency of IRWD's existing sewer system and reduce the potential for future scour at IRWD facilities and erosion within the creek channel.

Following project construction, the total impervious surface area in the Project area would be approximately 0.13 acre (5,500 square feet [sf], consisting of new and repaved/replaced hardscape

46 Ninyo & Moore. 2022. op. cit.
47 Ibid.

associated primarily with the proposed access roads. Because the proposed Project would result in the addition or replacement of 5,000 sf or more of impervious surface, it meets the criteria for significant redevelopment projects and would be classified as a priority project as defined within the North Orange County Municipal Separate Storm Sewer System (MS4) Permit.[48] The design of the proposed Project would be consistent with the Orange County Stormwater Program and include Source Control and Low Impact Development (LID) Best Management Practices (BMPs) that would capture and retain storm water and target and remove pollutants of concern to reduce impacts to water quality during operation of the Project. As outlined in Section 3.0, the proposed Project would include installation of ungrouted riprap check dams at several locations within Upper San Diego Creek and the Glenwood Tributary, which would slow creek flows and reduce scour. Additionally, proposed paved access roads would include concrete ditches to capture stormwater runoff to be discharged to a riprap energy dissipator. With compliance with the North Orange County MS4 Permit and implementation of BMPs and proposed project features, the proposed Project would not violate any water quality standards or waste discharge requirements or substantially degrade surface water quality during operation. Therefore, construction and operational impacts related to violation of water quality standards or waste discharge requirements would be **less than significant**, and no mitigation is required.

Significance Determination: Less Than Significant Impact
Mitigation Measures: No mitigation is required.

b) Would the Project substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?

As discussed above in Response 5.10(a), groundwater was encountered during exploratory borings at depths of approximately 24 feet (363 feet above MSL) and 26 feet (366 feet above MSL) bgs. Based on the depth of groundwater and depth of excavation, excavation activities could encounter groundwater during construction. In the event that groundwater is encountered during construction and groundwater dewatering is necessary, any groundwater dewatering during excavation would be conducted in accordance with the requirements of the CGP, which allows the discharge of dewatering effluent if the source of the water is uncontaminated groundwater and is properly filtered or treated, using appropriate technology.

The Project would result in approximately 0.13 ac of impervious surface area on site, which could result in a minimal decrease in on-site infiltration. However, due to the depth to groundwater, it is unlikely that groundwater recharge from storm water infiltration currently occurs on the Project site. Regardless, any decrease in infiltration at the Project site would be minimal in comparison to

[48] State of California Regional Water Quality Control Board Santa Ana Region. 2011. *Waste Discharge Requirements for The County of Orange, Orange County Flood Control District and The Incorporated Cities of Orange County within the Santa Ana Region Areawide Urban Storm Water Runoff Orange County, Order No. R8-2009-0030, NPDES Permit No. CAS618030. As amended by Order No. R8-2010-0062.* May 19. Website: https://www.waterboards.ca.gov/santaana/board_decisions/adopted_orders/orders/2009/09_030_oc_ms4_as_amended_by_10_062.pdf (accessed April 13, 2023).

the size of the Coastal Plain of Orange County Groundwater Basin, which underlies the Project site and has a storage capacity of 38,000,000 acre-feet.[49]

Furthermore, operation of the proposed Project would not include groundwater extraction. For these reasons, a less than significant impact related to depletion of groundwater supplies or interference with groundwater recharge during project operation would occur, and no mitigation is required.

Significance Determination: Less Than Significant Impact
Mitigation Measures: No mitigation is required.

c) Would the Project substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:

i) Result in substantial erosion or siltation on- or off-site?

During construction activities, soil would be exposed and disturbed, drainage patterns would be temporarily altered during grading and other construction activities, and there could be an increased potential for soil erosion and siltation compared to existing conditions. Additionally, during a storm event, soil erosion and siltation may occur at an accelerated rate. However, as discussed above in Response 5.10(a), the CGP requires the preparation of a SWPPP to identify construction BMPs to be implemented as part of the proposed Project to reduce impacts on water quality during construction, including those impacts associated with soil erosion and siltation. With compliance with the requirements in the CGP and implementation of construction BMPs, construction impacts related to on- or off-site erosion or siltation would be **less than significant**.

During operation, the proposed Project would generally maintain the existing drainage pattern on the Project site. As discussed in Response 4.10(a), the proposed Project would increase the total impervious surface area on the Project site by approximately 0.13 ac, which would increase on-site storm water flows. Increases in on-site runoff could lead to downstream erosion. However, as discussed in Response 5.10(a), BMPs will be implemented in compliance with the North Orange County MS4 Permit. These BMPs will be designed to capture storm water runoff in compliance with the requirements of the North Orange County MS4 Permit. Additionally, the proposed Project would include installation of ungrouted riprap check dams at several locations within Upper San Diego Creek and the Glenwood Tributary. These improvements would result in beneficial effects by reducing scour and protecting new and existing sewer infrastructure and access roads. Therefore, because the proposed Project would not substantially change the storm water runoff from the Project site, the proposed Project would not contribute to downstream erosion or siltation. As such, operational impacts related to on-site or off-site erosion or siltation would be **less than significant**, and no mitigation is required.

[49] California Department of Water Resources (DWR). 2004. Bulletin 118, Coastal Plain of Orange County Groundwater Basin. February 27.

Significance Determination: Less Than Significant Impact
Mitigation Measures: No mitigation is required.

ii) Would the Project substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite?

Development of the proposed Project would result in an increase in impervious surfaces on the Project site that could have the potential to increase the volume and rate of stormwater runoff discharged from the Project site. However, as previously discussed, BMPs will be implemented in compliance with the North Orange County MS4 Permit. These BMPs will be designed to capture storm water runoff in compliance with the requirements of the North Orange County MS4 Permit. Additionally, the proposed Project would include installation of ungrouted riprap check dams at several locations within Upper San Diego Creek and the Glenwood Tributary. These improvements would result in beneficial effects by reducing scour and protecting existing sewer infrastructure and access roads. Therefore, due to the implementation of BMPs as required by the MS4 Permit, the proposed Project would not substantially increase the rate or amount of surface runoff in a manner that would result in flooding on- or off site. Impacts would be **less than significant**.

Significance Determination: Less Than Significant Impact
Mitigation Measures: No mitigation is required.

iii) Would the Project substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?

As discussed in Section 5.10.a, pollutants of concern during construction include sediments, trash, petroleum products, concrete waste (dry and wet), sanitary waste, and chemicals. Each of these pollutants on its own or in combination with other pollutants can have a detrimental effect on water quality. Drainage patterns would be temporarily altered during grading and other construction activities, and construction-related pollutants could be spilled, leaked, or transported via storm runoff into adjacent drainages and downstream receiving waters. However, as previously discussed, the proposed Project would be required to comply with the requirements set forth by the CGP and SWPPP, which would specify BMPs to be implemented to control the discharge of pollutants in stormwater runoff as a result of construction activities. With compliance with the requirements in the CGP and implementation of construction BMPs, construction impacts related to on- or off-site erosion or siltation would be **less than significant**.

As discussed previously, the proposed Project would generally maintain the existing drainage pattern on the Project site during operation, as O&M of the proposed Project would be the same as currently occurs for the existing pipelines. However, as described in Response 5.10(c)(ii) above, the proposed Project would increase the impervious surface area compared to existing conditions, which would increase the volume of storm water runoff and more effectively transport pollutants to

receiving waters. However, the proposed Project would include BMPs to target and remove pollutants of concern and capture storm water runoff to reduce runoff volume and velocity in compliance with the North Orange County MS4 Permit. Further, the proposed Project would not exceed the capacity of existing or planned sewer systems for the 10-year storm event. Storm water runoff discharged to the sanitary sewer system would ultimately be conveyed and treated at IRWD's Los Alisos Water Recycling Plant. Additionally, the project would result in minimal new source pollutants in storm water runoff (e.g., limited to pollutants from vehicles accessing the Project site for routine maintenance and to periodically check on facilities). Therefore, Project operation would not substantially increase the amount of pollutants transported by storm water runoff to receiving waters. Therefore, impacts related to the creation or contribution of storm water runoff that would exceed the capacity of existing or planned storm water drainage systems or the provision of substantial additional sources of polluted runoff would be **less than significant** and no mitigation is required.

Significance Determination: Less Than Significant Impact
Mitigation Measures: No mitigation is required.

iv) Would the Project substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would impede or redirect flood flows?

According to Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) Nos. 06059C0314J, the Project site is located within Zone X, Area of Minimal Flood Hazard. Because the Project would not place improvements or structures directly within a 100-year floodplain, the project would not impede or redirect flood flows. Therefore, no impact would occur related to impeding or redirecting of flood flows, and no mitigation is required.

Significance Determination: No Impact
Mitigation Measures: No mitigation is required.

d) In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?

As discussed in Response 5.10(c)(iv), the Project site is located within Zone X, Area of Minimal Flood Hazard. Additionally, the Project site is not within a direct dam inundation zone.[50] Therefore, the Project site is not subject to inundation from flooding, and there is no risk of release of pollutants due to inundation from flooding. No mitigation is required.

Tsunamis are generated ocean wave trains generally caused by tectonic displacement of the seafloor associated with shallow earthquakes, seafloor landslides, rockfalls, and exploding volcanic islands. The Project site is located approximately 11 mi from the ocean shoreline. In addition,

[50] California Department of Water Resources, Division of Safety of Dams. 2020. California Dam Breach Inundation Maps. Website: https://fmds.water.ca.gov/webgis/?appid=dam_prototype_v2 (accessed April 14, 2023).

according to the Tsunami Inundation Map for Emergency Planning,[51] the Project site is not in a tsunami inundation area. Therefore, there is no risk of release of pollutants due to a tsunami. No mitigation is required.

Seiching occurs when seismic ground shaking induces standing waves (seiches) inside water retention facilities (e.g., reservoirs and lakes). Such waves can cause retention structures to fail and flood downstream properties. The Project site is located approximately 2 mi northwest of the El Toro Reservoir, approximately 3 mi northwest of Lake Mission Viejo, and approximately 4 mi west of the Upper Oso Reservoir. Due to distance between these features and the Project site, the Project site would not be inundated in the event of a seiche. As stated in Section 4.9, Hazards and Hazardous Materials, potentially hazardous substances such as chemical agents, solvents, and paints would be used during construction. Potentially hazardous materials from routine project maintenance may also be used during operation of the proposed Project. However, the amount of these chemicals present during Project construction and operation would be limited and would be in compliance with existing government regulations. Therefore, in the unlikely event of inundation from a seiche, the proposed Project would not substantially increase the risk of release of pollutants due to inundation from seiche, and impacts would be less than significant. No mitigation is required.

Significance Determination: Less Than Significant Impact
Mitigation Measures: No mitigation is required.

e) Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?

The Project is within the jurisdiction of the Santa Ana RWQCB. The Santa Ana RWQCB adopted a Water Quality Control Plan (i.e., Basin Plan) (January 1995, updated June 2019 to include approved amendments) that designates beneficial uses for all surface and groundwater within their jurisdiction and establishes the water quality objectives and standards necessary to protect those beneficial uses. As previously discussed, the proposed Project would comply with existing NPDES permit requirements, including the CGP and North Orange County MS4 Permit, and would implement construction and operational BMPs to reduce pollutants of concern in stormwater runoff. Compliance with these regulatory requirements would ensure that the proposed Project would not degrade or alter water quality, causing the receiving waters to exceed the water quality objectives, or impair the beneficial use of receiving waters. As such, the proposed Project would not result in water quality impacts that would conflict with the Basin Plan. Construction and operational impacts related to a conflict with the Basin Plan would be less than significant.

The Sustainable Groundwater Management Act (SGMA) was enacted in September 2014. The SGMA requires governments and water agencies of high- and medium-priority basins to halt overdraft of groundwater basins. Specifically, SGMA requires the formation of local Groundwater Sustainability Agencies, which are required to adopt Groundwater Sustainability Plans (GSPs), or an approved alternative to a GSP, to manage the sustainability of groundwater basins in California. The Project

[51] California Department of Conservation (DOC). 2022. *Orange County Tsunami Hazard Areas.* Website: https://www.conservation.ca.gov/cgs/tsunami/maps/orange (accessed April 14, 2023)

site is located within the Coastal Plain of the Orange County Groundwater Basin. The Coastal Plain is identified by the Department of Water Resources as a medium-priority basin;[52] therefore, development of a GSP or an approved GSP alternative is required. In lieu of a GSP, OCWD, IRWD, and the City of La Habra developed the Basin 8-1 Alternative, which establishes objectives and criteria for groundwater management within the Coastal Plain of the Orange County Groundwater Basin and is designed to be functionally equivalent to a GSP.[53] As described in Responses 5.10((b), the proposed Project would not interfere with groundwater recharge in the vicinity of the Project site. Therefore, the project would not conflict with or obstruct the implementation of the Basin 8-1 Alternative, which is functionally equivalent to a sustainable groundwater management plan, and no mitigation is required.

Significance Determination: Less Than Significant Impact
Mitigation Measures: No mitigation is required.

52 California Department of Water Resources (DWR). 2020. SGMA Basin Prioritization Dashboard, Groundwater Basins. Website: https://gis.water.ca.gov/app/bp-dashboard/p2/ (accessed April 14, 2023).

53 Orange County Water District. 2017. *Basin 8-1 Alternative*. January 1.

5.11 LAND USE AND PLANNING

Would the project:		Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a)	Physically divide an established community?	☐	☐	☐	☒
b)	Cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect?	☐	☐	☐	☒

a) Would the Project physically divide an established community?

The physical division of an established community typically refers to the construction of a physical feature (such as an interstate highway or railroad tracks) or removal of a means of access (such as a local road or bridge) that would impair mobility within an existing community, or between a community and outlying areas. Implementation of the proposed Project would replace, relocate, and upgrade sewer facilities and provide associated access improvements within an existing residential community. Proposed improvements would be located along the alignment of the existing pipeline, primarily within IRWD's existing easement. The proposed Project would not expand the existing sewer system; therefore, implementation of the project would not physically divide an established community and **no impact** would occur.

Significance Determination: No Impact
Mitigation Measures: No mitigation is required.

b) Would the Project cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect?

The Project site is designated as Open Space and Low Density Residential in the City of Lake Forest General Plan and is zoned Medium Density Residential (MDR) in the City of Lake Forest Municipal Code. Wastewater facilities are not subject to city zoning regulations per Government Code 53091. The proposed Project would not change existing land use within the Project site and would not result in the conversion of adjacent land uses or conflicts with applicable City land use designations or zoning standards. The proposed Project would not conflict with any applicable land use plan, policy or regulation with jurisdiction over the project.

The City of Lake Forest General Plan (2020) and relevant sections of the City's Municipal Code outline relevant policies and regulations applicable to the proposed Project, including policies to preserve visual, cultural, and natural resources and to protect the health and safety of their citizens. Consistent with the goals and policies of these relevant planning documents, the project has been designed to minimize impacts to natural and cultural resources. The proposed Project's conformance and/or potential conflicts with these ordinances are described in the relevant resource sections of this Initial Study. Therefore, the project would be consistent with applicable land use plans, policies and regulations, and no additional mitigation is required.

Significance Determination: No Impact
Mitigation Measures: No mitigation is required.

5.12 MINERAL RESOURCES

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	☐	☐	☐	☒
b) Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?	☐	☐	☐	☒

a) Would the Project result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?

Minerals are any naturally occurring chemical element or compound, or groups of elements and compounds, formed from inorganic processes and organic substances including, but not limited to, coal, peat and oil-bearing rock, but excluding geothermal resources, natural gas and petroleum. In 1975, the California Legislature enacted the Surface Mining and Reclamation Act (SMARA), which, among other things, provided guidelines for the classification and designation of mineral lands. Areas are classified on the basis of geologic factors without regard to existing land use and land ownership. The areas are categorized into four Mineral Resource Zones (MRZs):

- **MRZ-1:** An area where adequate information indicates that no significant mineral deposits are present, or where it is judged that little likelihood exists for their presence.
- **MRZ-2:** An area where adequate information indicates that significant mineral deposits are present, or where it is judged that a high likelihood exists for their presence.
- **MRZ-3:** An area containing mineral deposits, the significance of which cannot be evaluated.
- **MRZ-4:** An area where available information is inadequate for assignment to any other MRZ.

Of the four categories, lands classified as MRZ-2 are of the greatest importance. Such areas are underlain by demonstrated mineral resources or are located where geologic data indicate that significant measured or indicated resources are present. MRZ-2 areas are designated by the Mining and Geology Board as being "regionally significant". Such designations require that a Lead Agency's land use decisions involving designated areas be made in accordance with its mineral resource management policies and that it considers the importance of the mineral resource to the region or the State as a whole, not just to the Lead Agency's jurisdiction.

According to the Orange County General Plan, Orange County has a significant amount of mineral resources. As identified in California Geological Survey's Special Report 143, Parts III and IV, for the Orange County Region, the areas classified and designated as deposits containing significant sand and gravel resources are located in portions of the Santa Ana River, Santiago Creek, San Juan Creek,

Arroyo Trabuco, as well as other scattered areas. The California Geological Survey also identifies fire clay and industrial sand as having historically been produced in large quantities within Orange County. The California Office of Mine Reclamation periodically publishes a list of qualified permitted aggregate mines regulated under SMARA that is generally referred to as the AB 3098 List. The Public Contract Code precludes mining operations that are not on the AB 3098 List from selling sand, gravel, aggregates or other mined materials to State or local agencies. As of August 21, 2018, there are two aggregate mines on the AB 3098 list in Orange County: Lapeyre Industrial Sands, Inc; and Ortega Rock. Neither of the two listed sites are within the City of Lake Forest.

Within the City of Lake Forest, mineral resources include sand and gravel. Approximately 62 acres of land in the eastern portion of the City is designated as MRZ-2. The MRZ-2 resource area, previously known as the El Toro Materials Sand and Gravel Operation, in the eastern portion of the City was previously excavated for sand and gravel materials. However, the El Toro Materials Sand and Gravel Operation is no longer operational and has been redeveloped. No known mineral deposits or resources are located within Lake Forest that are of significant value to the region or the state. Therefore, the proposed Project would not result in the loss of availability of a known mineral resources that would be of value to the region and the residents of the state, and **no impact** would occur.

Significance Determination: No Impact
Mitigation Measures: No mitigation is required.

b) Would the Project result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?

As stated in Response 4.12.1a, no known valuable mineral resources exist on or near the Project site. In addition, the Project site is not identified on a local General Plan, Specific Plan, or other land use plan as a location of a locally important mineral resource. The proposed Project would not result in the loss of a locally important mineral resource recovery site. Therefore, no significant impacts related to mineral resources would result from Project implementation, and no mitigation is required.

Significance Determination: No Impact
Mitigation Measures: No mitigation is required.

5.13 NOISE

Would the project result in:	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less than Significant Impact	No Impact
a) Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	☐	☐	☒	☐
b) Generation of excessive groundborne vibration or groundborne noise levels?	☐	☒	☐	☐
c) For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒

The discussion and analysis provided in this section describes the potential short-term construction noise and vibration impacts associated with the proposed Project, as well as long-term operational noise impacts.

The following provides an overview of the characteristics of sound and vibration as well as the regulatory framework that applies to noise and vibration in the vicinity of the Project site.

Characteristics of Sound. Noise is usually defined as unwanted sound. Noise consists of any sound that may produce physiological or psychological damage and/or interfere with communication, work, rest, recreation, or sleep.

Several noise measurement scales exist that are used to describe noise in a particular location. A decibel is a unit of measurement that indicates the relative intensity of a sound. Sound levels in decibels are calculated on a logarithmic basis. An increase of 10 decibels (dB) represents a tenfold increase in acoustic energy, while 20 dB is 100 times more intense, and 30 dB is 1,000 times more intense. Each 10 dB increase in sound level is perceived as approximately a doubling of loudness; similarly, each 10 dB decrease in sound level is perceived as half as loud.

A-weighted decibels (dBA) are an expression of the relative loudness of sounds in air as perceived by the human ear. That is, an A-weighted noise level de-emphasizes low and very high frequencies of sound similar to the human ear's de-emphasis of these frequencies. Unlike linear units (e.g., inches or pounds), decibels are measured on a logarithmic scale representing points on a sharply rising curve.

As noise spreads from a source, it loses energy; therefore, the farther away the noise receiver is from the noise source, the lower the perceived noise level would be. Geometric spreading causes

the sound level to attenuate or be reduced, resulting in a 6 dB reduction in the noise level for each doubling of distance from a single point source of noise to the noise-sensitive receptor of concern.

There are many ways to rate noise for various time periods, but an appropriate rating of ambient noise affecting humans also accounts for the annoying effects of sound. The equivalent continuous sound level (L_{eq}) is the total sound energy of time-varying noise over a sample period. However, the predominant rating scales for human communities in the State of California are the L_{eq}, the Community Noise Equivalent Level (CNEL), and the day-night average level (L_{dn}) based on A-weighted decibels. CNEL is the time-varying noise over a 24-hour period, with a 5 dBA weighting factor applied to the hourly L_{eq} for noise occurring from 7:00 p.m. to 10:00 p.m. (defined as relaxation hours) and a 10 dBA weighting factor applied to noise occurring from 10:00 p.m. to 7:00 a.m. (defined as sleeping hours). L_{dn} is similar to the CNEL scale, but without the adjustment for events occurring during the evening relaxation hours. CNEL and L_{dn} are within 1 dBA of each other and are normally interchangeable. The City uses the CNEL noise scale for long-term noise impact assessment.

Characteristics of Vibration. Vibration refers to ground-borne noise and perceptible motion. Ground-borne vibration is almost exclusively a concern inside buildings and is rarely perceived as a problem where the motion may be discernible, but there is less adverse reaction without the effects associated with the shaking of a building. Vibration energy propagates from a source through intervening soil and rock layers to the foundations of nearby buildings. The vibration then propagates from the foundation throughout the remainder of the structure. Building vibration may be perceived by occupants as motion of building surfaces, the rattling of items on shelves or hanging on walls, or a low-frequency rumbling noise, otherwise referred to as ground-borne noise. Typically, sources that have the potential to generate ground-borne noise are likely to produce airborne noise impacts that mask the radiated ground-borne noise. The rumbling noise is caused by the vibrating walls, floors, and ceilings radiating sound waves. Annoyance from vibration often occurs when the vibration exceeds the threshold of perception by 10 dB or less. This is an order of magnitude below the damage threshold for normal buildings.

Typical sources of ground-borne vibration are construction activities (e.g., blasting, pile driving, and operating heavy-duty earthmoving equipment) and occasional traffic on rough roads. Problems with ground-borne vibration and noise from these sources are usually localized to areas within approximately 100 ft of the vibration source, although there are examples of ground-borne vibration causing interference out to distances greater than 200 ft. When roadways are smooth, vibration from traffic, even heavy trucks, is rarely perceptible. For most projects, it is assumed that the roadway surface will be smooth enough that ground-borne vibration from street traffic will not exceed the impact criteria; however, construction of the Project could result in ground-borne vibration that could be perceptible and annoying.

Ground-borne vibration has the potential to disturb people as well as damage buildings. Ground-borne vibration is usually measured in terms of vibration velocity, either the root-mean-square (RMS) velocity or peak particle velocity (PPV). RMS is best for characterizing human response to building vibration, and PPV is used to characterize the potential for damage. Decibel notation acts to compress the range of numbers required to describe vibration. Vibration velocity level in decibels is defined as:

$$L_v = 20 \log_{10} [V/V_{ref}]$$

where L_v is the velocity in decibels (VdB), "V" is the RMS velocity amplitude, and "V_{ref}" is the reference velocity amplitude, or $1x10^{-6}$ inches per second used in the United States.

Applicable Noise Standards. The City regulates noise based on the criteria presented in the Noise Element of the General Plan as well as the Municipal Code. As discussed below, the City does not have adopted construction noise thresholds; therefore, Federal Transit Administration (FTA) criteria will be used to assess potential construction noise impacts.

City of Lake Forest Noise Element of the General Plan. The noise standards specified on Table PS-1 of the City's General Plan Noise Element are used as a guideline to evaluate the acceptability of the noise levels at sensitive uses. These standards are for the assessment of long-term vehicular traffic noise impacts. The City has exterior noise criteria for outdoor living areas associated with single-family and multifamily residential uses such that exterior active-use areas should not exceed 60 dBA CNEL. Additionally, the City has exterior noise criteria for office uses and parks such that exterior activity areas should not exceed 65 dBA CNEL and 70 dBA CNEL, respectively.

City of Lake Forest Municipal Code. Section 11.16.040, Exterior Noise Standards, of the Municipal Code identifies a maximum permissible exterior ambient noise level for residential uses of no greater than 55 dBA during daytime hours (7:00 a.m. to 10:00 p.m.) and no greater than 50 dBA during nighttime hours (10:00 p.m. to 7:00 a.m.).

In order to properly assess the impact of events at the exterior living area that occur for periods of time less than 30 minutes within a given hour, Section 11.16.040 B provides the following additions based on duration:

1. The noise standard for a cumulative period of more than 30 minutes in any hour; or
2. The noise standard plus 5 dBA for a cumulative period of more than 15 minutes in any hour; or
3. The noise standard plus 10 dBA for a cumulative period of more than 5 minutes in any hour; or
4. The noise standard plus 15 dBA for a cumulative period of more than 1 minute in any hour; or
5. The noise standard plus 20 dBA for any period of time.

If the ambient noise level exceeds any of the first four noise limit categories above, the cumulative period applicable to said category shall be increased to reflect that ambient noise level. If the ambient noise level exceeds the fifth noise limit category, the maximum allowable noise level under the fifth category shall be increased to reflect the maximum ambient noise level.

To properly assess the impact of events in the interior living area that occur for periods of less than 30 minutes within a given hour, Section 11.16.050 B provides the following additions based on duration:

1. The noise standard for a cumulative period of more than 5 minutes in any hour; or
2. The noise standard plus 5 dBA for a cumulative period of more than 1 minute in any hour; or
3. The noise standard plus 10 dBA for any period of time.

In the event the ambient noise level exceeds either of the first two noise limit categories above, the cumulative period applicable to said category shall be increased to reflect that ambient noise level. In the event the ambient noise level exceeds the third noise limit category, the maximum allowable noise level under the third category shall be increased to reflect the maximum ambient noise level.

In regard to the regulation of construction noise impacts, the City's Municipal Code, Section 11.16.060 Exemptions, states the following activities shall be exempted from the provisions of this chapter:

> Part H. Noise sources associated with construction, repair, remodeling, or grading of any real property, provided said activities do not take place between the hours of 8:00 p.m. and 7:00 a.m. on weekdays, including Saturday, or at any time on Sunday or a legal City of Lake Forest holiday.

Because the City's Municipal Code does not establish construction noise thresholds, for the purposes of analyzing significance under CEQA, the FTA's criteria[54] are used. The general assessment criteria for construction noise identifies a 1-hour noise level of 90 dBA L_{eq} for residential uses during daytime hours and a 1-hour noise level of 100 dBA L_{eq} for commercial and industrial uses. This provides reasonable criteria for assessing construction noise impacts based on the potential for adverse community reaction when the noise criteria are exceeded.

Federal Transit Administration. The Lake Forest Municipal Code exempts construction activities and no standard criteria for assessing construction noise impacts are provided by the City. Therefore, for purposes of determining the significance of the noise increase experienced at noise-sensitive uses surrounding the project, the guidelines and noise criteria in the FTA *Transit Noise and Vibration Impact Assessment Manual*[55] (2018 FTA Manual) described above are used in this analysis for construction noise impact identification. These guidelines provide reasonable criteria for assessing construction noise impacts based on the potential for adverse community reaction when the noise criteria are exceeded.

The criteria for potential building damage from ground-borne vibration and noise are based on the maximum levels for a single event. Table 5.J lists the potential ground-borne vibration building damage criteria associated with construction activities, as suggested in the 2018 FTA Manual.[56] FTA guidelines show that a vibration level of up to 0.5 in/sec PPV[57] is considered safe for buildings consisting of reinforced concrete, steel, or timber (no plaster), and would not result in any construction ground-borne vibration damage. For a non-engineered (those not designed by an engineer or architect) timber and masonry building, the construction building ground-borne vibration damage criterion is 0.2 in/sec PPV.

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54 Federal Transit Administration (FTA). 2018. *Transit Noise and Vibration Impact Assessment Manual*. FTA Report No. 0123. September.

55 Ibid.

56 Ibid.

57 Ibid.

Table 5.J: Construction Vibration Damage Criteria

Building Category	PPV (in/sec)
Reinforced concrete, steel, or timber (no plaster)	0.50
Engineered concrete and masonry (no plaster)	0.30
Non-engineered timber and masonry	0.20
Buildings extremely susceptible to vibration damage	0.12

Source: *Transit Noise and Vibration Impact Assessment Manual* (FTA 2018).
FTA = Federal Transit Administration
in/sec = inches per second
PPV = peak particle velocity

Thresholds of Significance. A project would normally have a significant effect on the environment related to noise and vibration if it would substantially increase the ambient noise levels for adjoining areas or conflict with the adopted environmental plans and the goals of the community in which the Project is located. The applicable noise standards governing this Project site are the criteria in the City's Noise Ordinance and the 2018 FTA Manual.[58]

Existing Noise Environment. The Project site is surrounded by residential uses including the single-family homes within the Project site. To assess the existing noise environment surrounding the Project site, a combination of long-term and short-term noise measurements were gathered around the perimeter of the Project site. LSA conducted two long-term 24-hour measurements from November 29, 2022, to November 30, 2022. The locations of the noise measurements are shown on Figure 4, with the results shown in Table 5.K. Additionally, three short-term noise levels measurements were gathered along the major roadway in the project vicinity. Daytime traffic noise levels range from 57.0 to 74.9 dBA L_{eq}. Noise monitoring locations are shown on Figure 4 and noise monitoring sheets are included in Appendix F.

[58] Federal Transit Administration (FTA). 2018. *Transit Noise and Vibration Impact Assessment Manual*. FTA Report No. 0123. September.

LSA

FIGURE 4

LEGEND

- Project Site Boundary
- ST-1 - Short-term Noise Monitoring Location
- LT-1 - Long-term Noise Monitoring Location

N

0 550 1100

FEET

SOURCE: Google Earth 2023

I:\IRW2001.03\G\Noise_Locs.ai (4/25/2023)

Woods Sewer Improvements

Noise Monitoring Locations

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Table 5.K: Existing Noise Level Measurements

Location	Date	Daytime Noise Levels[1] (dBA L_{eq})	Nighttime Noise Levels[2] (dBA L_{eq})
LT-1: Located west end of Eucalyptus Lane, on a tree in middle of cul-de-sac, approximately 590 feet away from Toledo Way centerline.	11/29/22 to 11/30/22	45.3 – 56.0	39.2 – 51.5
LT-2: Located at 24952 Ravenswood, on a utility pole near northeast corner of property, approximately 200 feet away from Fallen Leaf Road.	11/29/22 to 11/30/22	45.5 – 52.6	38.0 – 46.7
ST-1: Located east of Lake Forest Drive, approximately 18 feet east of outside lane of Lake Forest Drive	11/29/22	64.2 – 74.9	58.1 – 70.4
ST-2: Located north of Toledo Way, approximately 18 feet north of the edge of the outside lane of Toledo Way, and 18 feet from end of wall to the east	11/29/22	61.5 – 72.2	55.4 – 67.7
ST-3: Located West of Ridge Route, across from Costa Bella, approximately 17 feet west of the edge of the outside lane of Ridge Route.	11/29/22	57.0 – 67.7	50.9 – 63.2

Source: Compiled by LSA (2023).
[1] Daytime Noise Levels were measured from 7:00 a.m. to 10:00 p.m.
[2] Nighttime Noise Levels were measured from 10:00 p.m. to 7:00 a.m.
[3] Short-term measurement data estimated based on corresponding long-term
dBA = A-weighted decibel
L_{eq} = the average noise level during a specific hour
LT = long-term measurement
ST = Short-term measurement

Sensitive Land Uses in the Project Vicinity. The proposed Project has two components identified as the Upper San Diego Creek tributary sewer improvements and Glenwood tributary sewer and watershed improvements. Sensitive receptors at each respective location were evaluated to identify the nearest sensitive receptors.

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

Construction Noise Impacts. Noise impacts from the proposed Project would be associated with construction activities. The proposed Project would consist of replacing, relocating, and upgrading sewer facilities and provide access improvements for ongoing maintenance activities within The Woods community. Construction-related noise levels would be higher than existing ambient noise levels in the Project area today but would no longer occur once construction of the Project is completed.

Two types of potential short-term noise impacts could occur during construction of the proposed Project: (1) noise impacts related to construction crew commutes and the transportation of construction equipment and materials to the site; and (2) noise impacts associated with tree

removal and site preparation, watershed improvements, access improvements, sewer construction, and tree replanting and site restoration.

Construction crew commutes and the transport of construction equipment and materials to the Project site will result in a maximum of 282 trips per day during the phase with the highest construction activity, which would incrementally increase noise levels on access roads leading to the site. Although there would be a relatively high single-event noise exposure from heavy trucks, potentially causing intermittent noise nuisance (passing pickup trucks at 50 ft would generate up to a maximum of 75 dBA), the effect on longer-term (hourly or daily) ambient noise levels would be small (i.e., less than 0.1 dBA) given that the traffic volume increase on adjacent roadways is at most 282 trips. Therefore, construction-related impacts associated with worker commutes and equipment transport to the Project site would be less than significant.

The second type of potential short-term noise impact is related to noise generated during tree removal and site preparation, watershed improvements, access improvements, sewer construction, and tree replanting and site restoration. Construction is completed in discrete steps, each of which has its own mix of equipment and consequently its own noise characteristics. These various sequential phases would change the character of the noise generated on the site and therefore the noise levels surrounding the site as construction progresses. Despite the variety in the type and size of construction equipment, similarities in the dominant noise sources and patterns of operation allow construction-related noise ranges to be categorized by work phase. Typical operating cycles for these types of construction equipment may involve 1 or 2 minutes of full-power operation followed by 3 or 4 minutes at lower power settings.

Once the composite reference maximum noise level is calculated for each phase, the usage factor provided in Table 5.L is utilized to calculate the hourly noise level impact for each piece of equipment based on the following equation:

$$L_{eq}(equip) = E.L. + 10\log(U.F.) - 20\log\left(\frac{D}{50}\right)$$

where: $L_{eq}(equip)$ = L_{eq} at a receiver resulting from the operation of a single piece of equipment over a specified time period

E.L. = noise emission level of the particular piece of equipment at a reference distance of 50 ft

U.F. = usage factor that accounts for the fraction of time that the equipment is in use over the specified period of time

D = distance from the receiver to the piece of equipment

Table 5.L: Typical Maximum Construction Equipment Noise Levels (L_{max})

Type of Equipment	Acoustical Usage Factor	Suggested Maximum Sound Levels for Analysis (dBA L_{max} at 50 ft)
Air Compressor	40	80
Backhoe	40	80
Cement Mixer	40	85
Concrete/Industrial Saw	20	90
Crane	16	85
Excavator	40	85
Generator	50	82
Grader	40	85
Loader	40	80
Paver	50	85
Roller	20	85
Rubber Tire Dozer	40	85
Scraper	40	85
Tractor	40	84
Truck	40	84
Welder	40	73

Source: Roadway Construction Noise Model (FHWA 2006).
dBA = A-weighted decibels
ft = feet
L_{max} = maximum noise level

Each piece of construction equipment operates as an individual point source. Utilizing the following equation, a composite noise level can be calculated when multiple sources of noise operate simultaneously:

$$Leq\ (composite) = 10 * \log_{10}\left(\sum_{1}^{n} 10^{\frac{Ln}{10}}\right)$$

Utilizing the equations from the methodology above and the reference information in Tables 5.K and 5.L, the composite noise level of the two loudest pieces of equipment, as required by the FTA criteria, would be 87 dBA L_{eq} at a distance of 50 ft from the construction area. This noise level would be the same for the loudest phase at each project location. Table 5.M below provides a summary of the reference noise levels during construction by phase.

The nearest sensitive receptor would be the single-family homes located within 25 ft of proposed access road improvements, which would include grading and pavement replacement. It is expected that noise levels during construction at the nearest residences to these work areas would approach 87 dBA L_{eq}. All other sensitive receptors are located further from areas of construction and would therefore experience lower noise levels.

Table 5.M: Noise Levels By Construction Phase

Phase	Type of Equipment	Reference Level at 50 ft (dBA L_{max})	Composite Reference Level at 50 ft	
			dBA L_{max}	dBA L_{eq}
Tree Removal and Site Preparation	Concrete Saw	90	91	87
	Grader	85		
Watershed Improvements	Grader	85	88	84
	Tractor	84		
Access Improvements	Grader	85	88	84
	Scraper	84		
Tree Planting and Site Restoration	Grader	85	88	84
	Tractor	84		
Sewer Construction	Grader	84	88	86
	Tractor	85		

Source: Compiled by LSA (2023).

dBA = A-weighted decibel
ft = feet
L_{eq} = average noise level
L_{max} = maximum noise level

While construction-related, short-term noise levels have the potential to be higher than existing ambient noise levels, which range from 45.3 to 56.0 dBA L_{eq} during daytime hours, in the vicinity of the proposed Project, the noise impacts would no longer occur once project construction is completed. Furthermore, construction-related noise impacts at the nearest sensitive receptors would remain below the 90 dBA L_{eq} 1-hour construction noise level criteria as established by the FTA.[59]

Construction activities occurring as part of the Project shall be subject to the limitations and requirements of the City of Lake Forest Municipal Code, which states that construction activities are prohibited between the hours of 8:00 p.m. and 7:00 a.m. on weekdays, including Saturday, or at any time on Sunday or a legal City of Lake Forest holiday. Compliance with the City's Noise Ordinance would ensure that construction noise does not disturb the residential uses during hours when ambient noise levels are likely to be lower (i.e., at night). Therefore, construction activity noise impacts would be less than significant.

Off-Site Operation-Related Impacts. Noise impacts associated with the long-term operation-related noise must comply with the standards presented in Section 11.16.040 of the City's Municipal Code, which were described above. Upon completion of construction activities, operation and maintenance associated with the proposed Project would remain the same as currently occurs for the existing sewer facilities. As described in Section 4.17, Transportation, no additional trips are anticipated due to implementation of the proposed Project. As such, the project would not result in a significant increase in the generation of vehicle trips or vehicle miles traveled (VMT) that would increase noise impacts.

[59] Federal Transit Administration (FTA). 2018. *Transit Noise and Vibration Impact Assessment Manual*. FTA Report No. 0123. September.

Significance Determination: Less Than Significant Impact
Compliance Measures: No mitigation measures are required.

b) Would the Project result in generation of excessive groundborne vibration or groundborne noise levels?

Construction Ground -Borne Vibration Impacts. Ground-borne vibration generated by construction equipment can result in varying degrees of ground vibration, depending on the equipment. The operation of construction equipment causes ground-borne vibrations that spread through the ground and diminish in strength with distance. Buildings on soil near an active construction area respond to these vibrations, which range from imperceptible to low rumbling sounds with perceptible vibrations and slight damage at the highest vibration levels. Ground-borne vibration and ground-borne noise impacts tend to occur when physically forceful or ground-penetrating equipment is used (e.g., pile drivers) or where blasting is necessary. Construction activities would include excavation and earth-moving vehicles (i.e., excavators which would be similar to large bulldozers), but no pile driving or percussive impact construction methods would be used. Table 5.N shows the PPV values and vibration levels (in terms of VdB) from construction vibration sources at 25 ft from construction vibration sources for comparison purposes.

Table 5.N: Ground-borne Vibration Source Amplitudes for Construction Equipment

Equipment	Reference PPV/L_V at 25 ft	
	PPV (in/sec)	L_V (VdB)[1]
Hoe Ram	0.089	87
Large Bulldozer	0.089	87
Caisson Drilling	0.089	87
Loaded Trucks	0.076	86
Jackhammer	0.035	79
Small Bulldozer	0.003	58

Source: *Transit Noise and Vibration Impact Assessment Manual* (FTA 2018).
[1] RMS VdB re 1 µin/sec.
µin/sec = micro-inches per second
ft = feet
FTA = Federal Transit Administration
in/sec = inches per second
L_V = velocity in decibels
PPV = peak particle velocity
RMS = root-mean-square
VdB = vibration velocity decibels

Based on the FTA Manual, a small bulldozer or similar equipment would generate vibration levels of 0.003 PPV (in/sec) and 58 VdB when measured at 25 ft. Loaded trucks used for trenching would generate the highest ground-borne vibration levels. Utilizing the information in Table 5.N, a loaded truck would generate vibration levels of 0.076 PPV (in/sec) and 86 VdB when measured at 25 ft. The closest sensitive receptors are single-family residences located within 10 ft of the work area locations. At 10 feet, the vibration levels are expected to approach 0.3 PPV in/sec at the nearest surrounding structures and would exceed the 0.2 PPV in/sec damage threshold considered safe for non-engineered timber and masonry buildings, which would result in a potentially significant impact. Short-term construction impacts related to ground-borne vibration or ground-borne noise would be temporary in nature and would cease upon construction. Therefore, construction would

not result in any ground-borne vibration damage, and impacts would be less than significant with the incorporation of MM-NOI-2 as detailed below.

Significance Determination: Less Than Significant Impact with Mitigation Incorporated
Mitigation Measures: The following mitigation measure would apply to the proposed Project.

MM NOI-1 **Construction Vibration.** Prior to commencement of construction, IRWD shall verify that the approved plans require that the construction contractor shall implement the following mitigation measures during project construction activities to ensure that damage does not occur at surrounding structures:

- A 15-foot buffer between existing structures and the Project site area shall be clearly delineated with stakes, fencing or other conspicuous boundary markings, to outline the area in which the use of heavy equipment shall be avoided.

- Heavy construction equipment shall only be used at least 15 feet from existing surrounding structures. However, if the use of heavy equipment is required within 15 feet of surrounding structures, the following measures should be employed:

    - Identify structures that are located within 15 feet (ft) of where heavy construction equipment would be used and that have the potential to be affected by ground-borne vibration. This task shall be conducted by a qualified structural engineer as approved by IRWD, or designee.

    - Develop a vibration monitoring and construction contingency plan for approval by the IRWD, to identify structures where monitoring would be conducted; set up a vibration monitoring schedule; define structure-specific vibration limits; and address the need to conduct photo, elevation, and crack surveys to document before and after construction conditions. Construction contingencies would be identified for when vibration levels approached the limits.

    - At a minimum, monitor vibration during initial demolition activities. Monitoring results may indicate the need for more or less intensive measurements.

    - When vibration levels approach limits, suspend construction and implement contingencies as identified in the approved vibration monitoring and construction contingency plan to either lower vibration levels or secure the affected structures.

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

The proposed Project is not within an airport land use plan or within two miles of a public airport or public use airport. The nearest public use airport is John Wayne Airport in the City of Santa Ana, 9.9 mi west of the Project site.[60] As a result, the proposed Project would not expose people residing or working in the Project area to excessive noise levels from aircraft. Therefore, no noise impact? related to the Project site's proximity to a public airport or any airport land use plan would occur, and no mitigation is required.

Significance Determination: No Impact
Mitigation Measures: No mitigation is required.

60 John Wayne Airport (JWA). 2019. Annual 60, 65, 70, and 75 CNEL Noise Contour Maps.

5.14 POPULATION AND HOUSING

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Induce substantial unplanned population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	☐	☐	☐	☒
b) Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒

a) Would the Project induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?

The proposed Project would replace, relocate, and upgrade sewer facilities and provide associated access improvements. Proposed improvements would occur primarily within the existing sewer pipeline easement owned and maintained by IRWD. Construction of the proposed Project would provide short-term jobs over an approximately 10-month period, starting in summer/fall 2023. Many of the construction jobs would be temporary or seasonal and would be specific to the variety of construction activities. The workforce would include a variety of craftspeople (e.g., cement finishers, ironworkers, welders, carpenters, electricians, painters, and laborers). Generally, construction workers are only at a job site for the time frame in which their specific skills are needed to complete that phase of construction. Although the proposed Project would increase the number of employees at the Project site during construction activities, it is expected that local and regional construction workers would be available to serve the proposed Project's construction needs. Project-related construction workers would not be expected to relocate their household's place of residence as a consequence of working on the proposed Project; therefore, construction would not be expected to increase the population of Lake Forest or its surrounding communities.

The proposed Project would not provide additional major infrastructure or increase the capacity of the existing sewer system to accommodate new development, nor would the proposed Project extend or expand infrastructure or services to existing undeveloped areas in the vicinity of the proposed alignment. Because the proposed sewer lines would be installed to serve the existing sewer system, and not anticipated increased demand for future development around the Project site, it would not substantially induce growth. The proposed Project would not include any new housing, commercial or industrial uses. Therefore, the Project would not directly or indirectly induce substantial population growth and **no impact** would occur.

Significance Determination: No Impact
Mitigation Measures: No mitigation is required.

b) Would the Project displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?

The proposed Project would replace, relocate, and upgrade sewer facilities and provide associated access improvements within the community of Lake Forest. Proposed improvements would be constructed, primarily within the easement owned and maintained by IRWD. Although existing residences are located adjacent to the Project boundaries, no housing or people would be displaced as a result of implementation of the project. Therefore, implementation of the proposed Project would not result in an impact related to the displacement of substantial numbers of existing housing or people, thereby necessitating the construction of replacement housing elsewhere. No mitigation is required.

Significance Determination: No Impact
Mitigation Measures: No mitigation is required.

5.15 PUBLIC SERVICES

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Result in substantial adverse physical impacts associated with the provision of or need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:				
i) Fire protection?	☐	☐	☐	☒
ii) Police protection?	☐	☐	☐	☒
iii) Schools?	☐	☐	☐	☒
iv) Parks?	☐	☐	☐	☒
v) Other public facilities?	☐	☐	☐	☒

a) Would the project result in substantial adverse physical impacts associated with the provision of or need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:

i) Fire protection?
ii) Police protection?
iii) Schools?
iv) Parks?
v) Other public facilities?

Implementation of the proposed Project would replace, relocate, and upgrade sewer facilities and provide associated access improvements to reduce risk of failure to IRWD facilities and to improve access to all IRWD facilities along approximately Upper San Diego Creek and Glenwood Tributary. The proposed Project does not include the construction of structures that would increase the population in the area or that would generate a higher demand for fire or police services, schools, parks, or other public facilities. Therefore, the demand for public services for the project would be the same as under existing conditions and **no impact** would occur.

Significance Determination: No Impact
Mitigation Measures: No mitigation would be required.

5.16 RECREATION

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	☐	☐	☐	☒
b) Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?	☐	☐	☐	☒

a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?

The City of Lake Forest Recreation Services Department operates and maintains 30 parks with the development of additional parks planned in the future. The City is also currently updating 10 smaller City parks. The City of Lake Forest has identified three categories of parks: mini parks, neighborhood parks, and community parks. Each category has standards set for desirable size, service area, and acres to population ratio.

Implementation of the proposed Project would replace, relocate, and upgrade sewer facilities and provide associated access improvements to reduce risk of failure to IRWD facilities and to improve access to all IRWD facilities along approximately Upper San Diego Creek and Glenwood Tributary. No housing would be constructed as part of the proposed Project and there would not be a change in the number of employees on site or increase the number of residents in Lake Forest or the surrounding communities. Therefore, implementation of the proposed Project would not increase the use of existing neighborhood or regional parks in the project vicinity. Implementation of the proposed Project would not have an adverse effect on existing park facilities and would not generate a demand for additional recreational facilities. Therefore, **no impact** would occur.

Significance Determination: No Impact
Mitigation Measures: No mitigation is required.

b) Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?

Refer to Section 3.16.1a, above. The proposed Project does not include recreational facilities and would not change the number of employees on site or increase the number of residents in Lake Forest or the surrounding communities. Therefore, the proposed Project would not result in the increased use of existing neighborhood or regional parks or other recreational facilities or create a demand for the construction or expansion of parks and recreational facilities beyond what currently

exists. Therefore, there would be **no impact** to parks or recreation resources, and no mitigation is required.

Significance Determination: No Impact
Mitigation Measures: No mitigation is required.

5.17 TRANSPORTATION

Would the project:	Potentially Significant Impact	Less than Significant With Mitigation Incorporated	Less than Significant Impact	No Impact
a) Conflict with a program plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities?	☐	☐	☒	☐
b) Conflict or be inconsistent with CEQA Guidelines section 15064.3, subdivision (b)?	☐	☐	☒	☐
c) Substantially increase hazards due to a geometric design feature (e. g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	☐	☐	☒	☐
d) Result in inadequate emergency access?	☐	☐	☒	☐

a) Would the Project conflict with a program plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities?

As detailed in Section 3.3, the proposed project would install new sewer pipeline within Upper San Diego Creek and in the Glenwood Tributary. Repair and replacement of manholes and concrete pads, construction of new gravel access roads, installation of retaining walls, and installation of ungrouted riprap for bank stabilization would also be necessary to complete the sewer pipeline replacement. Access to the project site would be via existing IRWD access roads off Toledo Way, Fallen Leaf Road, and Glenwood Drive. Construction equipment and materials would be staged within IRWD's existing easements. Construction would take place in phases over a 15-month period.

Typical operation of the proposed Project would be conducted remotely, and there would not be any full-time dedicated staff at the site. The proposed Project will not generate vehicle trips for normal day-to-day operations.

To assess the impact of the proposed Project on the surrounding circulation system, the proposed Project trips that would be generated on a temporary basis throughout each phase of construction were estimated based on the anticipated number of workers and trucks.

Construction of the proposed Project will generally include the following steps (phase durations):

- **Tree Removal and Site Preparation of Upper San Diego Creek Area** (3 weeks)
- **Sewer Construction – Upper San Diego Creek Area** (25 weeks)
- **Tree Removal and Site Preparation – Glenwood Tributary Area** (1 week)
- **Sewer Construction – Glenwood Tributary Area** (10 weeks)
- **Watershed Improvements – Upper San Diego Creek** (7 weeks)
- **Watershed Improvements – Glenwood Tributary Area** (6 weeks)
- **Access Improvements – Upper San Diego Creek Area** (8 weeks)
- **Access Improvements – Glenwood Tributary Area** (2 weeks)
- **Site Restoration – Both Areas** (2 weeks)

While watershed improvements to the Glenwood Tributary Area and Access Improvements to the Upper San Diego Creek Area may overlap, no more than 10 construction workers are anticipated to be on-site each day. Considering the quantity of import/export for each phase and construction days during those phases, no more than 5 one-way haul trips are anticipated per day. It is assumed that workers would arrive at the site in the a.m. peak hour and depart the site during the p.m. peak hour. Once delivered to the site, equipment would remain staged within the project site for the remainder of that phase. Haul truck trips are anticipated throughout the day, including both peak hours.

Based on the anticipated construction needs, the following travel patterns are possible:

- 10 inbound passenger vehicle trips during the a.m. peak hour
- 10 outbound passenger vehicle trips during the p.m. peak hour
- 5 inbound haul trucks per day of which 1 would occur in the a.m. peak hour
- 5 outbound haul trucks per day of which 1 would occur in the p.m. peak hour

A passenger car equivalent (PCE) factor of 3.0 could be applied to the haul trucks resulting in 50 PCE daily trips (13 in the a.m. peak hour and 13 in the p.m. peak hour). This level of traffic volume represents less than 1 percent of the per-lane capacity identified in the City of Lake Forest Transportation Analysis Guidelines[61]. Therefore, the proposed Project is not anticipated to contribute to any level of service (LOS) or operational deficiencies to the surrounding circulation system based on its low number of trips for a temporary duration.

Although the proposed Project would generate construction (temporary) vehicles/trucks, it would not preclude alternative modes of transportation or facilities (e.g., transit, bicycle, or pedestrian). The proposed Project is consistent with the City's General Plan Mobility Element (adopted June 2020).[62] The proposed Project would not make any permanent changes to the public right-of way in the Project vicinity and would not conflict with existing or planned transit, roadway, bicycle, or pedestrian facilities. Therefore, the proposed Project would not conflict with a program plan, ordinance, or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities.

Significance Determination: Less Than Significant Impact
Mitigation Measures: No mitigation is required.

[61] City of Lake Forest. 2020a. City of Lake Forest Transportation Analysis Guidelines. July 21. (Table 6 of Appendix 2) Website: https://www.lakeforestca.gov/sites/default/files/lake-forest/departments/CEQA%20Significance%20Thresholds%20Guide%202020%20%2B%20Transpo%20Analysis%20Guidelines_20201116195304713 5.pdf (accessed May 2023).

[62] City of Lake Forest. 2020b. Lake Forest 2040 General Plan Mobility Element. Adopted June 2020. Website: https://www.lakeforestca.gov/sites/default/files/lake-forest/departments/4_General%20Plan%20-%20Mobility.pdf (accessed May 2023).

b) Would the Project conflict or be inconsistent with CEQA Guidelines section 15064.3, subdivision (b)?

State CEQA Guidelines Section 15064.3, subdivision (b), states that transportation impacts for land use projects are to be measured by evaluating the project's vehicle miles traveled (VMT), as outlined in the following:

> *Vehicle miles traveled exceeding an applicable threshold of significance may indicate a significant impact. Generally, projects within one-half mile of either an existing major transit stop or a stop along an existing high-quality transit corridor should be presumed to cause a less than significant transportation impact. Projects that decrease vehicle miles traveled in the project area compared to existing conditions should be presumed to have a less than significant transportation impact.*

VMT is the amount and distance of automobile travel attributable to a project. According to the Office of Planning and Research (OPR) *Technical Advisory on Evaluating Transportation Impacts in CEQA* (December 2018),[63] "automobile" refers to "on-road passenger vehicles, specifically cars and light trucks." Thus, construction trucks do not need to be included in the project VMT assessment.

Additionally, the OPR technical advisory recommends VMT screening thresholds for smaller projects. The footnote on page 12 of the OPR technical advisory states the following:

> ***Screening Thresholds for Small Projects***
>
> *Many local agencies have developed screening thresholds to indicate when detailed analysis is needed. Absent substantial evidence indicating that a project would generate a potentially significant level of VMT, or inconsistency with a Sustainable Communities Strategy (SCS) or general plan, projects that generate or attract fewer than 110 trips per day generally may be assumed to cause a less-than-significant transportation impact.*

The OPR technical advisory recommends that projects generating fewer than 110 trips will be assumed to cause a less than significant transportation impact. In addition, the City of Lake Forest *Transportation Analysis Guidelines* (July 21, 2020)[64] has established a screening criterion for projects generating up to 110 average daily trips (ADT). As such, a project generating 110 ADT or less is screened out of a VMT analysis due to the presumption of a less-than-significant impact.

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63 Office of Planning and Research (OPR). 2018. Technical Advisory on Evaluating Transportation Impacts in CEQA. December. Website: http://opr.ca.gov/docs/20190122-743_Technical_Advisory.pdf (accessed May 2023).

64 City of Lake Forest. 2020c. City of Lake Forest CEQA Significance Thresholds Guide. July 21. (Appendix 2) Website: https://www.lakeforestca.gov/sites/default/files/lake-forest/departments/CEQA%20Significance%20Thresholds%20Guide%202020%20%2B%20Transpo%20Analysis%20Guidelines_20201116 1953047135.pdf (accessed May 2023).

The proposed Project is estimated to generate nominal ADT (20 passenger vehicle ADT) and peak-hour trips (10 trips) on a temporary basis for construction, and it would not generate any new vehicle trips during day-to-day operations since the project is addressing the infrastructure needs. As such, it is considered a small project and assumed to have a less than significant impact on transportation. Therefore, the proposed Project is not subject to a VMT analysis. Potential impacts would be less than significant, and no mitigation is required.

Significance Determination: Less than Significant Impact
Mitigation Measures: No mitigation is required.

c) Would the Project substantially increase hazards due to a geometric design feature (e. g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?

Regional access to the Project site is provided by Lake Forest Drive, Toledo Way, Jeronimo Road and Ridge Route Drive. Site access for IRWD facilities is provided by various access roads on Dove Tree Lane, Glenwood Drive, and Singingwoods Drive. As outlined in the Section 3.0, Project Description, the proposed Project includes improvements to the existing access roads, including creation of a new gravel access road, placement of gravel on existing access roads, and replacement/repaving of existing paved access roads. As such, the proposed Project would not substantially increase hazards for vehicles due to a geometric design feature or incompatible uses, and impacts would be less than significant. No mitigation is required.

Significance Determination: Less than Significant Impact
Mitigation Measures: No mitigation is required.

d) Would the Project result in inadequate emergency access?

Site access would not change as part of the proposed Project and would continue to be accessed from existing IRWD access roads on Dove Tree Lane, Glenwood Drive, and Singingwoods Drive. As part of the proposed Project, some of the existing access roads to IRWD facilities would be improved. The existing dirt access road extending along the north side of Upper San Diego Creek would be replaced with a gravel access road within the existing pipeline easement and a new gravel access road would be constructed along the south side of Upper San Diego Creek within a portion of the new sewer easement. The existing dirt access road off Glenwood Drive would also be replaced with a gravel access road. In addition, the existing paved access road from Singingwoods Drive would be widened and repaved. Therefore, emergency access would continue to be provided by these access roads. Since the proposed Project would not modify the existing configuration of the Project site, emergency access to the site would not be affected. Impacts associated with emergency access would be less than significant. No mitigation is required.

Significance Determination: Less Than Significant Impact
Mitigation Measures: No mitigation is required.

5.18 TRIBAL CULTURAL RESOURCES

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:				
i) Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code section 5020.1(k)?	☐	☐	☒	☐
ii) A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1? In applying the criteria set forth in subdivision (c) of Public Resource Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.	☐	☒	☐	☐

a) Would the project cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is

i) Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code section 5020.1(k)?

ii) A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1? In applying the criteria set forth in subdivision (c) of Public Resource Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe?

Chapter 532, Statutes of 2014 (i.e., AB 52), requires that Lead Agencies evaluate a project's potential to impact "tribal cultural resources". Such resources include "[s]ites, features, places, cultural landscapes, sacred places, and objects with cultural value to a California Native American tribe that are eligible for inclusion in the California Register of Historical Resources or included in a local register of historical resources." AB 52 also gives Lead Agencies the discretion to determine, supported by substantial evidence, whether a resource qualifies as a "tribal cultural resource".

Also, per AB 52 (specifically, PRC 21080.3.1), a CEQA Lead Agency must consult with California Native American tribes that are traditionally and culturally affiliated with the geographic area of the

proposed Project and have previously requested that the Lead Agency provide the tribe with notice of such projects.

As discussed in Section 5.5, the results of the records search indicate that 10 cultural resources assessments have been conducted within a 0.25-mile radius of the Project site including OR-00209, OR-02930, OR-03431, OR-03747, OR-03757, OR-04064, OR-04169 and OR-04182, all of which were field studies, along with OR-02662 (a record search), and OR-03373 (a monitoring report). None of the Project site and approximately 15 percent of the 0.25-mile records search radius has been included in previous cultural resources surveys. The record search results indicate one cultural resource (P-30-000038, a prehistoric artifact scatter) was previously recorded within the 0.25-mile record search radius. However, no cultural resources have been previously recorded within the Project site. In addition, no cultural resources were identified during the field survey of the Project site conducted on March 31, 2023. Furthermore, the Project site does not contain any buildings or structures that meet any California Register criteria or qualify as "historical resources" as defined by CEQA. Therefore, the proposed Project would not cause a substantial adverse change in the significance of a historical resource as defined in Section 15064.5 of the *State CEQA Guidelines* or PRC Section 5020.1(k).

On February 23, 2023, IRWD sent letters for the purpose of AB 52 consultation to the following tribes:

- Gabrieleño Band of Mission Indians – Kizh Nation, Andrew Salas, Chairman
- Juaneño Band of Mission Indians – Acjachemen Nation, Joyce Stanfield Perry, Tribal Manager

On February 28, 2023, IRWD received a response from Andrew Salas, Chairman for the Gabrieleño Band of Mission Indians – Kizh Nation (Kizh Nation). IRWD and Kizh Nation met for a consultation meeting on March 23, 2023. At the consultation meeting, the Kizh Nation explained that their tribal ancestry is connected to the family umbrella of the Gabrieleno Indian territory, which spans the Southern California region, including the project site. Kizh Nation further elaborated that bodies of water, such as lakes, rivers, creeks and streams, attracted high population tribal settlements and the travel and trade related to these tribal settlements. Notably, the Kizh Nation stated that the Spanish established the "Portola trade routes" from the late 1700s, which can confirm the presence of Native American Indian tribes in these areas, since there is documentation of the Spanish explorers interacting with Native American Indian tribes along the Portola trade routes. On March 30, 2023, Kizh Nation provided supplemental materials to IRWD via email, which included maps depicting a formerly established Portola trade route adjacent to the project site. However, the scale and level of detail of the maps are not sufficient to determine whether the Portola trade route bypasses or intersects with the current Project site, nor provides a clear indication or spatial reference of distance relative to the Project site. The Kizh Nation also expressed their concern regarding potential uncovering of undiscovered tribal cultural resources during earth moving and ground-disturbing construction activities associated with the proposed project due to their ancestral presence in the region, the Project site's location near a body of water and the location of the Portola trade route. To address tribal concerns, IRWD has proposed tribal monitoring of ground disturbing activities as described in Mitigation Measure TCR-1 below. IRWD formally closed consultation on July 17, 2023.

On March 22, 2023, Joyce Perry, Cultural Resource Director for the Juaneño Band of Mission Indians, Acjachemen Nation emailed IRWD with a request for tribal monitoring during ground disturbance, the results of the SCCIC cultural resources record search, and any proposed mitigation measures from IRWD. IRWD responded to Joyce Perry's request and provided her the SCCIC cultural resources records search results and Native American Heritage Commission (NAHC)'s Sacred Land File (SLF) search results. On April 11, 2023, IRWD staff exchanged emails with Joyce Perry to deliberate specific concerns related to encountering cultural resources and the presence of multiple cultural report sites within a one-mile vicinity of the project site. On April 12, 2023, Joyce Perry responded via email, clarifying to IRWD staff that the Juaneño Band of Mission Indians, Acjachemen Nation would not be requesting tribal monitoring for tribal cultural resources, nor expressing further concern regarding potential tribal cultural resources within the project site. On April 17, 2023, Joyce Perry of the Juaneño Band of Mission Indians, Acjachemen Nation confirmed alongside IRWD that consultation pursuant to AB 52 is concluded.

As described in Section 5.5, given that the proposed Project work would take place along the banks of creek tributaries that would have been potentially subject to seasonal flooding, resulting in the movement of any deposited artifacts and the direct vicinity of the Project area has been previously disturbed, the likelihood of encountering subsurface tribal cultural resources during ground-disturbing construction activities is low. However, in the unlikely event that excavation for the proposed Project uncovers a yet-to-be-discovered tribal cultural resource, implementation of Mitigation Measure TCR-1 would reduce any potential impacts to previously undiscovered tribal cultural resources to a less than significant level.

Significance Determination: Less than Significant with Mitigation Incorporated.
Mitigation Measure: The following mitigation measure would apply to the proposed project.

MM TCR-1 **Unknown Tribal Cultural Resources.** Prior to the commencement of earthwork activities that would involve excavation greater than five feet in depth, the Irvine Ranch Water District (IRWD) will provide written notification to the Native American representatives from the Gabrieleno Band of Mission Indians – Kizh Nation ("tribal representatives") indicating the date of the commencement of the excavation earthwork activities.

- Prior to construction activity commencement involving excavation depths greater than five feet, IRWD will coordinate a tribal cultural resources informational session between the tribal representatives, IRWD staff and IRWD's construction contractor's supervision team and machine operators. During the commencement of excavation and subsurface activities below five feet in depth, including horizontal boring, IRWD will coordinate with the tribal representatives and invite them to be present at the project site, with reasonable access, at their own expense and in a manner that will not conflict construction activities or cause contractor construction delays, to observe these earthwork activities.

- If a tribal cultural resource is found and the discovery is potentially significant under CEQA as determined by IRWD's consulting Project

archaeologist and the tribal representative, all construction activities in the immediate vicinity of the discovery will cease (i.e., not less than the surrounding 50 feet) and will not resume until the discovered tribal cultural resource is assessed by the tribal representatives. The Kizh Nation will recover and retain all discovered tribal cultural resources in the form and/or manner as they deem appropriate, in their sole discretion, and for any purpose that they deem is appropriate, including for educational, cultural and/or historic purposes.

- The tribal representatives will document and provide logs to IRWD detailing the time/date of the visit, the outcome of the site visit and will detail proposed activities they intend for their following site visit. The logs will also specifically provide descriptions of the relevant ground-disturbing activities, the type of construction activities performed, locations of ground-disturbing activities, soil types, cultural-related materials, and any other facts, conditions, materials, or discoveries of significance to the Kizh Nation. The monitor logs will identify and describe any discovered tribal cultural resources, including but not limited to, Native American cultural and historical artifacts, remains, places of significance, etc., as well as any discovered Native American (ancestral) human remains and burial goods.

5.19 UTILITIES AND SERVICE SYSTEMS

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Require or result in the relocation or construction of new or expanded water, wastewater treatment or storm water drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects?	☐	☐	☒	☐
b) Have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years?	☐	☐	☒	☐
c) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	☐	☐	☒	☐
d) Generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals?	☐	☐	☒	☐
e) Comply with federal, state, and local management and reduction statutes and regulations related to solid wastes?	☐	☐	☒	☐

a) Would the Project require or result in the relocation or construction of new or expanded water, wastewater treatment or storm water drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects?

A variety of local and regional purveyors in this area provide and maintain utility and service system facilities associated with electricity, water, stormwater, wastewater, solid waste, communications and natural gas.

Water and Wastewater. The majority of the City's residents are provided water, wastewater collection, and wastewater treatment services by IRWD, whose boundaries cover 8,300 acres in the City (83 percent of the total area of the City).[65] IRWD's potable water supply consists of nearly 250 miles of potable water lines. According to the most recent IRWD Water Master Plan update, groundwater makes up 53% of the total water supply, recycled water makes up 24 percent, imported (treated and untreated) makes of 20 percent, and native surface water makes up around 3 percent.

[65] City of Lake Forest. 2019a. *Public Draft Environmental Impact Report for the 2040 Lake Forest General Plan SCH#2019090102.* November.

IRWD provides wastewater collection and wastewater treatment to the majority of residents in the City and maintains approximately 175 miles of sewer mains within the City.[66] Existing sewers and related infrastructure located within the Project site collect wastewater from the surrounding residential development. IRWD is the Lead Agency for the proposed Project and owns and maintains water and sewer facilities within the Project area.

The proposed Project would not result in the construction of new water or wastewater treatment facilities or expansion of such facilities. The proposed Project would replace, relocate, and upgrade sewer facilities and provide associated access improvements to reduce risk of failure to IRWD facilities and to improve access to all IRWD facilities along approximately Upper San Diego Creek and Glenwood Tributary. Development of the proposed Project would provide beneficial effects by improving IRWD's sewer system reliability by protecting the pipelines from damage due to scour within the channel. Although the proposed Project itself includes the construction of a new wastewater pipelines and associated improvements, the proposed pipelines would replace the existing pipelines, which are at risk of failure due to scour. Additionally, as described in Section 3.5, Operation and Maintenance Activities, O&M activities associated with the proposed Project would be the same as currently occurs for the existing sewer facilities. Further, overall water and wastewater demands would remain similar to existing conditions, and any increase in water demand or wastewater generation during Project construction or operation would be minimal and incidental to the overall IRWD system. Therefore, a **less than significant** impact would occur, and no mitigation is required.

Stormwater. The City of Lake Forest owns and operates the City's stormwater control systems. The Orange County Drainage Area Management Plan (DAMP) (2003) contains the specific water pollutant control elements of the Orange County Stormwater Program and is the County's primary policy, planning and implementation document for stormwater compliance. The City of Lake Forest Local Implementation Plan is the principal guidance and compliance document specific to the City of Lake Forest and works in conjunction with the Orange County DAMP.

The proposed Project would replace, relocate, and upgrade sewer facilities and provide associated access improvements along approximately the same alignment as the existing sewer pipeline. Proposed pipelines would be located underground; other improvements would be at-grade. improvements would be located underground. Access road improvements would result in a minimal increase in the amount of impervious surface at the Project site. Therefore, implementation of the proposed Project would not affect the amount of on-site runoff and therefore, would not require the expansion of stormwater facilities. No additional stormwater drainage facilities would be required and **no impact** would occur.

Gas, Electricity and Telecommunications. Southern California Edison provides electricity service in the City and natural gas is provided by the Southern California Gas Company. Traditional telephone service is provided by AT&T and its various precursor companies. A variety of cellular and wireless

[66] City of Lake Forest. 2019a. *Public Draft Environmental Impact Report for the 2040 Lake Forest General Plan SCH#2019090102.* November.

service companies operate in Lake Forest, providing important voice and data connections for the community.[67]

The proposed Project would replace, relocate, and upgrade sewer facilities and provide associated access improvements along approximately the same alignment as the existing sewer pipeline. No new gas, electricity or telecommunications facilities would be required to serve the proposed Project. Therefore, the proposed Project would not require or result in the relocation or construction of new or expanded gas, electricity or telecommunications facilities and no impact would occur.

Significance Determination: Less Than Significant Impact
Mitigation Measures: No mitigation is required.

b) Would the Project have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years?

The proposed Project would replace, relocate, and upgrade sewer facilities and provide associated access improvements within the Project area. The proposed Project would not result in an increase in water demand for the Project site. New or expanded water supply entitlements would not be required to serve the proposed Project. The proposed Project would require potable or reclaimed water for dust suppression during project construction. However, the amount of water required would be relatively small and would only be needed during the construction period. As such, there would be sufficient water supplies available to serve the proposed Project and reasonably foreseeable future development during normal, dry, and multiple dry years. A **less than significant** impact related to water supplies would occur and no mitigation is required.

Significance Determination: Less Than Significant Impact
Mitigation Measures: No mitigation is required.

c) Would the Project result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?

The proposed Project would replace, relocate, and upgrade sewer facilities and provide associated access improvements within the Project site. Various elements of the existing sewer system within the Project site are at risk of damage due to lack of protective soil cover that has been eroded within the flow path of the creek, primarily caused by failed grade control structures.[68] Additionally, the existing sewer lines can no longer be accessed by maintenance vehicles due to erosion of existing

[67] City of Lake Forest Public Works Department. n.d. *Utility Services.* Website: https://www.lakeforestca.gov/en/departments/public-works/utility-services. (Access January 10, 2023)

[68] A grade control structure is an earthen, wooden, concrete, or other structure used to prevent gully development and streambed erosion.

access roads and downcutting of the creek, which is compromising bank stability.[69] The proposed Project is intended to reduce risk of failure to IRWD facilities. As such, the proposed Project would not result in an increase in wastewater capacity for the Project site, as it is designed to meet the existing needs and capacity of the IRWD system. Development of the proposed Project would provide beneficial effects by improving the sewer distribution system reliability. Therefore, a **less than significant** impact would occur, and no mitigation is required.

Significance Determination: Less Than Significant Impact
Mitigation Measures: No mitigation is required.

d) Would the Project generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals?

The City of Lake Forest has a sole-source contract with CR&R Incorporated Environmental Services to collect solid waste, recycling, and green waste from residential and commercial sectors. Approximately 90 percent of the waste from the City is deposited in the Frank R. Bowerman Sanitary Landfill. In 2017, the City disposed of approximately 56,548 tons of solid waste into the Frank R. Bowerman Sanitary Landfill. The Frank R. Bowerman Sanitary Landfill is a Class III, municipal solid waste landfill and is one of the largest landfills in the state. The landfill is permitted for 11,500 tons per day (TPD) maximum with an 85,000 TPD annual average. As of 2019, in the Frank R. Bowerman Sanitary Landfill has a remaining capacity of 87,384,799 cubic yards and as enough project capacity to serve residents and businesses until approximately 2053.[70]

Implementation of the proposed Project would generate solid waste associated with construction activities, including construction materials, trench spoils, and general refuse. To minimize the amount of solid waste, some solid waste generated by the proposed Project, such as excavated soils would be re-compacted on site. Other non-hazardous waste would be hauled to local disposal centers for recycling or taken to landfills. The proposed Project would generate approximately 110 tons of demolition debris. The quantity of solid waste materials associated with construction would be limited to the construction period and would not pose a significant impact upon existing landfills. No additional solid waste would be generated by long-term O&M of the proposed Project, which would be the same as currently occurs under existing conditions. Impacts related to solid waste disposal are considered **less than significant**, and no mitigation is required.

Significance Determination: Less Than Significant Impact
Mitigation Measures: No mitigation is required.

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69 Woodard & Curran. 2021. *Access & Facilities Improvements for Sewer Systems in The Woods, Final Facilities Plan*. October.

70 City of Lake Forest. 2019a. *Public Draft Environmental Impact Report for the 2040 Lake Forest General Plan SCH#2019090102.* November.

e) Would the Project comply with federal, state, and local management and reduction statutes and regulations related to solid wastes?

The California Integrated Waste Management Act (AB 939) changed the focus of solid waste management from landfill to diversion strategies (e.g., source reduction, recycling, and composting). The purpose of the diversion strategies is to reduce dependence on landfills for solid waste disposal. AB 939 established mandatory diversion goals of 25 percent by 1995 and 50 percent by 2000.

Although the proposed Project is not expected to generate substantial amounts of solid waste during construction or operation, some solid waste would be generated. As such, the proposed Project would be required to comply with applicable federal, State, and local regulations related to solid waste disposal.

The proposed Project would comply with existing and future statutes and regulations, including waste diversion programs mandated by City, State, or federal law. In addition, as discussed above, the proposed Project would not result in excessive production of solid waste that would exceed the capacity of the existing landfill serving the Project site. Therefore, the proposed Project would not result in an impact related to federal, State, and local statutes and regulations related to solid wastes, and no mitigation would be required.

Significance Determination: Less Than Significant Impact
Mitigation Measures: No mitigation is required.

5.20 WILDFIRE

If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Impair an adopted emergency response plan or emergency evacuation plan?	☐	☐	☒	☐
b) Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to, pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire?	☐	☐	☒	☐
c) Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment?	☐	☐	☒	☐
d) Expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes?	☐	☐	☒	☐

a) If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the Project impair an adopted emergency response plan or emergency evacuation plan?

The Project site is not located within any State responsibility areas (SRA) for fire service and is not within a very high fire hazard severity zone (VHFHSZ).[71] Operation of the proposed Project does not include any characteristics (e.g., permanent road closures or the long-term blocking of road access) that would physically impair or otherwise conflict with an adopted emergency response plan or emergency evacuation plan. The proposed Project would be required to comply with all applicable codes and ordinances for emergency vehicle access, which would ensure adequate access to, from, and on site for emergency vehicles. Adherence to these codes and ordinances would ensure that construction and operation of the proposed Project would not impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan. Therefore, the proposed Project would not inhibit an emergency response plan or an emergency evacuation plan during construction. This impact would be **less than significant** and no mitigation is required.

Significance Determination: Less Than Significant Impact
Mitigation Measures: No mitigation is required.

[71] California Department of Fire and Forestry Protection. 2022. Orange County State Responsibility Area Fire Hazard Severity Zones (map). Website: osfm.fire.ca.gov/media/4qvlvwdg/fhsz_county_sra_11x17_orange_ada.pdf (accessed January 10, 2023).

b) If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the Project, due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to, pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire?

The Project site consists of Eucalyptus groves with a sparse, understory of non-native plant species surrounded by developed areas, consisting of single-family residences and associated asphalt-paved roadways. These developed areas are located throughout the Project site. As discussed in Response 5.20.a, the Project site is not within a VHFHSZ. The proposed Project would replace, relocate and upgrade existing sewer facilities and provide associated access improvements. The proposed Project construction and operation would not change the characteristics of the Project site. As such, the proposed Project would not exacerbate wildfire risks and thereby expose project occupants to pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire, and this impact would be **less than significant**.

Significance Determination: Less Than Significant Impact
Mitigation Measures: No mitigation is required.

c) If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the Project require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment?

The proposed Project would replace, relocate, and upgrade sewer facilities within Upper San Diego Creek and the Glenwood Tributary. Implementation of the proposed Project would require connection of new sewer facilities to existing facilities, as well as reconnection of the existing 4-inch service laterals once improvements are complete. Although these utility connections and improvements would be extended throughout the Project site, they would primarily be located underground and would not exacerbate fire risk. Furthermore, the Project site is not located in or near State Responsibility Areas and is not located within a VHFHSZ. Therefore, the proposed Project would not include infrastructure (e.g., roads, fuel breaks, emergency water sources, power lines, or other utilities) that would exacerbate fire risk or that would result in impacts to the environment, and impacts would be **less than significant**. No mitigation is required.

Significance Determination: Less Than Significant Impact
Mitigation Measures: No mitigation is required.

d) If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the Project expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes?

In its existing condition, the Project site is predominantly flat. According to the FEMA FIRM, the Project site is located within Zone X, Area of Minimal Flood Hazard. As described in Response 5.20 (a), the Project site is not located within a VHFHSZ. Additionally, as described in Response 5.7 (a) (iv), the Project site is not located within a landslide zone. Therefore, downslope flooding as a result of

runoff, post-fire slope instability, or drainage changes are unlikely to occur at the site. Furthermore, due to the developed nature of the Project site and distance from the nearest VHFHSZ, risks associated with wildfires are considered less than significant. The proposed Project would not expose people or structures to significant risks (including downslope or downstream flooding or landslides) as a result of runoff, post-fire slope instability, or drainage changes, and impacts would be **less than significant**. No mitigation is required.

Significance Determination: Less Than Significant Impact
Mitigation Measures: No mitigation is required.

5.21 MANDATORY FINDINGS OF SIGNIFICANCE

		Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a)	Does the project have the potential to substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, substantially reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	☐	☒	☐	☐
b)	Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?	☐	☐	☒	☐
c)	Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	☐	☒	☐	☐

a) Does the project have the potential to substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, substantially reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?

The proposed Project would replace, relocate, and upgrade sewer facilities and provide associated access improvements within The Woods community. The proposed Project is intended to reduce risk of failure to IRWD facilities and to improve access to all IRWD facilities along approximately 1,400 feet of Upper San Diego Creek and 600 feet of the Glenwood Tributary. As described in Sections 5.4, Biological Resources, and 5.5, Cultural Resources, with the incorporation of the identified mitigation measures, implementation of the proposed Project: (a) would not degrade the quality of the environment; (b) would not substantially reduce the habitats of fish or wildlife species; (c) would not cause a fish or wildlife population to drop below self-sustaining levels; (d) would not threaten to eliminate a plant or animal; and (e) would not eliminate important examples of major periods of California history or prehistory. With respect to the quality of the environment, the Project would not preclude the ability to achieve long-term environmental goals.

Significance Determination: Less than Significant with Mitigation Incorporated
Mitigation Measures: Refer to Mitigation Measures BIO-1 and BIO-2, Regulatory Compliance Measure BIO-1, Mitigation Measure CUL-1, Regulatory Compliance Measure CUL-1, and Mitigation Measure PALEO-1, PALEO-2, and PALEO-3.

b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects.)

The proposed Project would replace, relocate, and upgrade sewer facilities and provide associated access improvements within The Woods community. The proposed Project is intended to reduce risk of failure to IRWD facilities and to improve access to all IRWD facilities along approximately 1,400 feet of Upper San Diego Creek and 600 feet of the Glenwood Tributary. Based on the analysis provided in Chapter 5.0, impacts related to the proposed Project are less than significant or can be reduced to less than significant levels with incorporation of mitigation measures. The proposed Project's contribution to any significant cumulative impacts would be less than cumulatively considerable.

Significance Determination: Less Than Significant Impact
Mitigation Measures: No mitigation is required.

c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?

The proposed Project would replace, relocate, and upgrade sewer facilities and provide associated access improvements within The Woods community. The proposed Project is intended to reduce risk of failure to IRWD facilities and to improve access to all IRWD facilities along approximately 1,400 feet of Upper San Diego Creek and 600 feet of the Glenwood Tributary, resulting in a beneficial effect to the IRWD system. Based on the analysis in Chapter 5.0, development of the proposed Project would not cause substantial adverse effects to human beings because all impacts would be less than significant or, as described in Section 5.13, Noise, can be mitigated to a less than significant level.

Significance Determination: Less than Significant with Mitigation Incorporated
Mitigation Measures: Refer to Regulatory Compliance Measure NOI-1, and Mitigation Measure NOI-1.

6.0 MITIGATION MONITORING AND REPORTING PROGRAM

6.1 MITIGATION MONITORING REQUIREMENTS

Public Resources Code (PRC) Section 21081.6 (enacted by the passage of Assembly Bill [AB] 3180) mandates that the following requirements shall apply to all reporting or mitigation monitoring programs:

- The public agency shall adopt a reporting or monitoring program for the changes made to the Project or conditions of Project approval in order to mitigate or avoid significant effects on the environment. The reporting or monitoring program shall be designed to ensure compliance during Project implementation. For those changes which have been required or incorporated into the Project at the request of a Responsible Agency or a public agency having jurisdiction by law over natural resources affected by the Project, that agency shall, if so requested by the Lead Agency or a Responsible Agency, prepare and submit a proposed reporting or monitoring program.

- The Lead Agency shall specify the location and custodian of the documents or other material which constitute the record of proceedings upon which its decision is based. A public agency shall provide the measures to mitigate or avoid significant effects on the environment that are fully enforceable through permit conditions, agreements, or other measures. Conditions of Project approval may be set forth in referenced documents which address required mitigation measures or in the case of the adoption of a plan, policy, regulation, or other Project, by incorporating the mitigation measures into the plan, policy, regulation, or Project design.

- Prior to the close of the public review period for a draft Environmental Impact Report (EIR) or Mitigated Negative Declaration (MND), a Responsible Agency, or a public agency having jurisdiction over natural resources affected by the Project, shall either submit to the Lead Agency complete and detailed performance objectives for mitigation measures which would address the significant effects on the environment identified by the Responsible Agency or agency having jurisdiction over natural resources affected by the Project, or refer the Lead Agency to appropriate, readily available guidelines or reference documents. Any mitigation measures submitted to a Lead Agency by a Responsible Agency or an agency having jurisdiction over natural resources affected by the Project shall be limited to measures which mitigate impacts to resources which are subject to the statutory authority of, and definitions applicable to, that agency. Compliance or noncompliance by a Responsible Agency or agency having jurisdiction over natural resources affected by a Project with that requirement shall not limit that authority of the Responsible Agency or agency having jurisdiction over natural resources affected by a Project, or the authority of the Lead Agency, to approve, condition, or deny Projects as provided by this division or any other provision of law.

6.2 MITIGATION MONITORING PROCEDURES

The mitigation monitoring and reporting program has been prepared in compliance with PRC Section 21081.6. The program describes the requirements and procedures to be followed by the Irvine Ranch Water District (IRWD) to ensure that all mitigation measures adopted as part of the proposed Project would be carried out as described in this Initial Study/Mitigated Negative Declaration (IS/MND). Table 6.A lists each of the mitigation measures specified in this IS/MND and identifies the party or parties responsible for implementation and monitoring of each measure.

Table 6.A: Mitigation and Monitoring Reporting Program

Mitigation Measures		Responsible Party	Timing for Mitigation Measure
4.1 Aesthetics			
The proposed Project would not result in significant adverse impacts related to aesthetics. No mitigation would be required.			
4.2 Agriculture and Forestry Resources			
The proposed Project would not result in significant adverse impacts related to agriculture and forestry resources. No mitigation would be required.			
4.3 Air Quality			
The proposed Project would not result in significant adverse impacts related to air quality. No mitigation would be required.			
4.4 Biological Resources			
MM BIO-1:	**Pre-Construction Monarch Butterfly Clearance Surveys.** Should work activities occur within the overwintering period for Monarch butterfly (October through March), a qualified biologist will conduct pre-construction surveys to confirm the presence or absence of overwintering activity within the work areas. The pre-construction survey will take place no more than 24 hours prior to commencement of work activities. If overwintering Monarch butterfly are observed within the work area (or areas potentially indirectly affected by Project activities as determined by the qualified biologist) and the work cannot be postponed until Monarch butterfly is no longer present, IRWD will obtain written approval from the USFWS or the CDFW, as applicable, prior to completing Project work at these locations.	Project Biologist	Prior to construction
MM BIO-2:	**Preconstruction Nesting Bird Surveys and Active Nest Avoidance Buffers.** If vegetation removal, construction, or grading activities are planned to take place within the active nesting bird season (February 15 through August 31), a qualified biologist should conduct a preconstruction nesting bird survey no more than 3 days prior to the start of such activities. The nesting bird survey should include the Project site and areas immediately adjacent to the site that could potentially be affected by project-related activities such as noise, vibration, increased human activity, and dust. If any active bird nests are found within areas that could be directly or indirectly impacted by project-related activities, the qualified biologist should establish an appropriate buffer zone around each active nest. The appropriate buffer should be determined by the qualified biologist based on species, location, and the nature of the proposed activities. Project activities should be avoided within the buffer zone until each nest is deemed no longer active by a qualified biologist.	Project Biologist	Prior to construction

Table 6.A: Mitigation and Monitoring Reporting Program

Mitigation Measures		Responsible Party	Timing for Mitigation Measure
4.5 Cultural Resources			
MM CUL-1	**Cultural Resources.** Prior to commencement of construction activities, Irvine Ranch Water District shall verify that the Project includes requirements specifying that if archaeological resources are discovered during excavation, grading, or construction activities, work shall cease within 50 feet (ft) of the find until a qualified archaeologist from the Orange County List of Qualified Archaeologists has evaluated the find in accordance with federal, State, and local guidelines to determine whether the find constitutes a "unique archaeological resource," as defined in Section 21083.2(g) of the California Public Resources Code (PRC). Personnel of the proposed Project shall not collect or move any archaeological materials and associated materials. Construction activity may continue unimpeded on other portions of the Project site. The found deposits shall be treated in accordance with federal, State, and local guidelines, including those set forth in PRC Section 21083.2.	Construction Contractor and Project Archaeologist	Prior to construction and throughout the construction period
4.6 Energy			
The proposed Project would not result in significant adverse impacts related to energy. No mitigation would be required.			
4.7 Geology and Soils			
MM PALEO-1	A paleontologist who meets the qualifications established by the Society of Vertebrate Paleontology (SVP) shall be retained to develop a Paleontological Resources Impact Mitigation Program (PRIMP) for this project. The PRIMP shall be consistent with the standards of the SVP and include the methods that will be used to protect paleontological resources that may exist within the project site, as well as procedures for monitoring, fossil preparation and identification, curation into a repository, and preparation of a report at the conclusion of grading.	Qualified Paleontologist	Prior to construction

Table 6.A: Mitigation and Monitoring Reporting Program

Mitigation Measures		Responsible Party	Timing for Mitigation Measure
MM PALEO-2	Excavation and grading activities in deposits with high paleontological sensitivity (i.e., Young Axial Channel Deposits below a depth of 10 feet and Very Old Alluvial Fan Deposits) shall be monitored by a qualified paleontological monitor following a PRIMP. No monitoring is required for excavations in deposits with no paleontological sensitivity (i.e., Artificial Fill). If paleontological resources are encountered during the course of ground disturbance, the paleontological monitor shall have the authority to temporarily redirect construction away from the area of the find. In the event that paleontological resources are encountered when a paleontological monitor is not present, work in the immediate area of the find shall be redirected, and the paleontologist or paleontological monitor shall be contacted to assess the find for scientific significance. If determined to be scientifically significant, the fossil shall be collected from the field. Collected resources shall be prepared to the point of identification, identified to the lowest taxonomic level possible, cataloged, and curated into the permanent collections of a museum repository. At the conclusion of the monitoring program, a report of findings shall be prepared to document the results of the monitoring program.	Qualified Paleontologist and Construction Contractor	During project construction
4.8 Greenhouse Gas Emissions			
The proposed Project would not result in significant adverse impacts related to greenhouse gas emissions. No mitigation would be required.			
4.9 Hazards and Hazardous Materials			
The proposed Project would not result in significant adverse impacts related to hazards and hazardous materials. No mitigation would be required.			
4.10 Hydrology and Water Quality			
The proposed Project would not result in significant adverse impacts related to hydrology and water quality. No mitigation would be required.			
4.11 Land Use and Planning			
The proposed Project would not result in significant adverse impacts related to land use and planning. No mitigation would be required.			
4.12 Mineral Resources			
The proposed Project would not result in significant adverse impacts related to mineral resources. No mitigation would be required.			
4.13 Noise			
MM NOI-1	**Construction Vibration.** Prior to commencement of construction, IRWD shall verify that the approved plans require that the construction contractor shall implement the following mitigation measures during project construction activities to ensure that damage does not occur at surrounding structures: • A 15-foot buffer between existing structures and the Project site area shall be clearly delineated with stakes, fencing or other conspicuous boundary markings, to outline the area in which the use of heavy equipment shall be avoided. • The use of heavy construction shall be avoided within 15 feet of existing surrounding structures. However, if the use of heavy equipment is required within 15 feet of surrounding	Construction Contractor and IRWD	Prior to and during construction

Table 6.A: Mitigation and Monitoring Reporting Program

Mitigation Measures	Responsible Party	Timing for Mitigation Measure
structures, the following measures should be employed: o Identify structures that are located within 15 feet (ft) of heavy construction activities and that have the potential to be affected by ground-borne vibration. This task shall be conducted by a qualified structural engineer as approved by the City's Director of Community Development, or designee. o Develop a vibration monitoring and construction contingency plan for approval by the City Director of Community Development, or designee, to identify structures where monitoring would be conducted; set up a vibration monitoring schedule; define structure-specific vibration limits; and address the need to conduct photo, elevation, and crack surveys to document before and after construction conditions. Construction contingencies would be identified for when vibration levels approached the limits. o At a minimum, monitor vibration during initial demolition activities. Monitoring results may indicate the need for more or less intensive measurements. o When vibration levels approach limits, suspend construction and implement contingencies as identified in the approved vibration monitoring and construction contingency plan to either lower vibration levels or secure the affected structures.		
4.14 Population and Housing		
The proposed Project would not result in significant adverse impacts related to population and housing. No mitigation would be required.		
4.15 Public Services		
The proposed Project would not result in significant adverse impacts related to public services. No mitigation would be required.		
4.16 Recreation		
The proposed Project would not result in significant adverse impacts related to recreation. No mitigation would be required.		
4.17 Transportation		
The proposed Project would not result in significant adverse impacts related to transportation. No mitigation would be required.		
4.18 Tribal Cultural Resources		
MM TCR-1 **Unknown Tribal Cultural Resources.** Prior to the commencement of earthwork activities that would involve excavation greater than five feet in depth, the Irvine Ranch Water District (IRWD) will provide written notification to the Native American representatives from the Gabrieleno Band of Mission Indians – Kizh Nation ("tribal representatives") indicating the date of the commencement of the excavation earthwork activities. • Prior to construction activity commencement involving excavation depths greater than five feet, IRWD will coordinate a tribal cultural resources informational session between the tribal representatives, IRWD staff and IRWD's construction contractor's supervision team and machine operators. During the commencement of excavation and subsurface activities below five feet in depth, including horizontal boring, IRWD will coordinate with the tribal representatives and	Construction Contractor, Tribal Representative and IRWD	Prior to and during construction

Table 6.A: Mitigation and Monitoring Reporting Program

Mitigation Measures	Responsible Party	Timing for Mitigation Measure
invite them to be present at the project site, with reasonable access, at their own expense and in a manner that will not conflict construction activities or cause contractor construction delays, to observe these earthwork activities. • If a tribal cultural resource is found and the discovery is potentially significant under CEQA as determined by IRWD's consulting Project archaeologist and the tribal representative, all construction activities in the immediate vicinity of the discovery will cease (i.e., not less than the surrounding 50 feet) and will not resume until the discovered tribal cultural resource is assessed by the tribal representatives. The Kizh Nation will recover and retain all discovered tribal cultural resources in the form and/or manner as they deem appropriate, in their sole discretion, and for any purpose that they deem is appropriate, including for educational, cultural and/or historic purposes. • The tribal representatives will document and provide logs to IRWD detailing the time/date of the visit, the outcome of the site visit and will detail proposed activities they intend for their following site visit. The logs will also specifically provide descriptions of the relevant ground-disturbing activities, the type of construction activities performed, locations of ground-disturbing activities, soil types, cultural-related materials, and any other facts, conditions, materials, or discoveries of significance to the Kizh Nation. The monitor logs will identify and describe any discovered tribal cultural resources, including but not limited to, Native American cultural and historical artifacts, remains, places of significance, etc., as well as any discovered Native American (ancestral) human remains and burial goods.		
4.19 Utilities and Service Systems		
The proposed Project would not result in significant adverse impacts related to utilities and service systems. No mitigation would be required.		
4.20 Wildfire		
The proposed Project would not result in significant adverse impacts related to wildfire. No mitigation would be required.		

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7.0 LIST OF PREPARERS

7.1 IRVINE RANCH WATER DISTRICT

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Alex Murphy	Senior Engineer
Andy Uk	Environmental Compliance Specialist

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APPENDIX A

CALEEMOD OUTPUT WORKSHEETS

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The Woods Sewer Improvement Project Custom Report

Table of Contents

1. Basic Project Information

1.1. Basic Project Information

Data Field	Value
Project Name	The Woods Sewer Improvement Project
Construction Start Date	2/1/2024
Lead Agency	—
Land Use Scale	Project/site
Analysis Level for Defaults	County
Windspeed (m/s)	2.50
Precipitation (days)	6.00
Location	33.639314674056436, -117.69716135354325
County	Orange
City	Lake Forest
Air District	South Coast AQMD
Air Basin	South Coast
TAZ	6022
EDFZ	7
Electric Utility	Southern California Edison
Gas Utility	Southern California Gas
App Version	2022.1.1.19

1.2. Land Use Types

Land Use Subtype	Size	Unit	Lot Acreage	Building Area (sq ft)	Landscape Area (sq ft)	Special Landscape Area (sq ft)	Population	Description
Road Construction	10.0	Mile	3.55	0.00	0.00	—	—	—

1.3. User-Selected Emission Reduction Measures by Emissions Sector

No measures selected

2. Emissions Summary

2.1. Construction Emissions Compared Against Thresholds

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Un/Mit.	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	2.53	2.29	77.3	62.2	0.12	2.04	4.30	6.34	1.87	1.62	3.49	—	14,050	14,050	0.67	0.49	7.09	14,218
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	3.27	2.51	85.4	62.2	0.16	2.28	8.87	11.2	2.09	3.45	5.54	—	18,982	18,982	1.16	1.42	0.49	19,435
Average Daily (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	1.10	0.96	32.6	25.6	0.05	0.86	1.06	1.91	0.78	0.36	1.14	—	6,139	6,139	0.31	0.27	1.65	6,230
Annual (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.20	0.18	5.94	4.66	0.01	0.16	0.19	0.35	0.14	0.07	0.21	—	1,016	1,016	0.05	0.05	0.27	1,031

2.2. Construction Emissions by Year, Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Year	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily - Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

2024	2.53	2.29	77.3	62.2	0.12	2.04	4.30	6.34	1.87	1.62	3.49	—	14,050	14,050	0.67	0.49	7.09	14,218
Daily - Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2024	3.27	2.51	85.4	62.2	0.16	2.28	8.87	11.2	2.09	3.45	5.54	—	18,982	18,982	1.16	1.42	0.49	19,435
2025	2.06	1.44	49.2	34.8	0.11	1.28	5.29	6.56	1.18	1.96	3.14	—	13,061	13,061	0.88	1.22	0.41	13,448
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2024	1.10	0.96	32.6	25.6	0.05	0.86	1.06	1.91	0.78	0.36	1.14	—	6,139	6,139	0.31	0.27	1.65	6,230
2025	0.21	0.15	5.06	3.57	0.01	0.13	0.55	0.68	0.12	0.20	0.32	—	1,363	1,363	0.09	0.13	0.73	1,405
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2024	0.20	0.18	5.94	4.66	0.01	0.16	0.19	0.35	0.14	0.07	0.21	—	1,016	1,016	0.05	0.05	0.27	1,031
2025	0.04	0.03	0.92	0.65	< 0.005	0.02	0.10	0.12	0.02	0.04	0.06	—	226	226	0.02	0.02	0.12	233

3. Construction Emissions Details

3.1. Tree Removal and Site Preparation - SD Creek Area (2024) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.39	1.39	44.9	33.8	0.06	1.48	—	1.48	1.36	—	1.36	—	5,900	5,900	0.24	0.05	—	5,920
Dust From Material Movement	—	—	—	—	—	—	3.18	3.18	—	1.38	1.38	—	—	—	—	—	—	—
Demolition	—	—	—	—	—	—	0.15	0.15	—	0.02	0.02	—	—	—	—	—	—	—

Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.05	0.05	1.72	1.30	< 0.005	0.06	—	0.06	0.05	—	0.05	—	226	226	0.01	< 0.005	—	227
Dust From Material Movement	—	—	—	—	—	—	0.12	0.12	—	0.05	0.05	—	—	—	—	—	—	—
Demolition	—	—	—	—	—	—	0.01	0.01	—	< 0.005	< 0.005	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.01	0.31	0.24	< 0.005	0.01	—	0.01	0.01	—	0.01	—	37.5	37.5	< 0.005	< 0.005	—	37.6
Dust From Material Movement	—	—	—	—	—	—	0.02	0.02	—	0.01	0.01	—	—	—	—	—	—	—
Demolition	—	—	—	—	—	—	< 0.005	< 0.005	—	< 0.005	< 0.005	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.11	0.10	0.09	1.35	0.00	0.00	0.28	0.28	0.00	0.07	0.07	—	291	291	0.01	0.01	1.19	296
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

Hauling	0.05	0.01	0.56	0.27	< 0.005	< 0.005	0.10	0.10	< 0.005	0.03	0.03	—	399	399	0.04	0.06	0.81	420
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.05	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	10.8	10.8	< 0.005	< 0.005	0.02	10.9
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	< 0.005	< 0.005	0.02	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	15.3	15.3	< 0.005	< 0.005	0.01	16.1
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	1.79	1.79	< 0.005	< 0.005	< 0.005	1.81
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	2.54	2.54	< 0.005	< 0.005	< 0.005	2.66

3.3. Tree Removal and Site Preparation - Glenwood (2024) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Dust From Material Movement	—	—	—	—	—	—	0.00	0.00	—	0.00	0.00	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Dust From Material Movement	—	—	—	—	—	—	0.00	0.00	—	0.00	0.00	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Dust From Material Movement	—	—	—	—	—	—	0.00	0.00	—	0.00	0.00	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.05	0.01	0.58	0.27	< 0.005	< 0.005	0.10	0.10	< 0.005	0.03	0.03	—	400	400	0.04	0.06	0.02	419
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	< 0.005	< 0.005	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	6.57	6.57	< 0.005	< 0.005	0.01	6.90
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	1.09	1.09	< 0.005	< 0.005	< 0.005	1.14

3.5. Site Restoration (2024) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.53	0.53	17.7	13.5	0.02	0.54	—	0.54	0.49	—	0.49	—	2,365	2,365	0.10	0.02	—	2,373
Dust From Material Movement	—	—	—	—	—	—	0.21	0.21	—	0.02	0.02	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.53	0.53	17.7	13.5	0.02	0.54	—	0.54	0.49	—	0.49	—	2,365	2,365	0.10	0.02	—	2,373
Dust From Material Movement	—	—	—	—	—	—	0.21	0.21	—	0.02	0.02	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.02	0.02	0.53	0.41	< 0.005	0.02	—	0.02	0.01	—	0.01	—	71.3	71.3	< 0.005	< 0.005	—	71.5
Dust From Material Movement	—	—	—	—	—	—	0.01	0.01	—	< 0.005	< 0.005	—	—	—	—	—	—	—

Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	< 0.005	0.10	0.07	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	11.8	11.8	< 0.005	< 0.005	—	11.8
Dust From Material Movement	—	—	—	—	—	—	< 0.005	< 0.005	—	< 0.005	< 0.005	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.05	0.04	0.04	0.56	0.00	0.00	0.12	0.12	0.00	0.03	0.03	—	121	121	< 0.005	< 0.005	0.50	123
Vendor	< 0.005	< 0.005	0.03	0.01	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	24.9	24.9	< 0.005	< 0.005	0.07	26.0
Hauling	0.13	0.03	1.48	0.70	0.01	0.01	0.26	0.28	0.01	0.07	0.09	—	1,053	1,053	0.09	0.17	2.15	1,107
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.05	0.04	0.04	0.49	0.00	0.00	0.12	0.12	0.00	0.03	0.03	—	116	116	< 0.005	< 0.005	0.01	117
Vendor	< 0.005	< 0.005	0.03	0.02	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	24.9	24.9	< 0.005	< 0.005	< 0.005	25.9
Hauling	0.12	0.03	1.53	0.71	0.01	0.01	0.26	0.28	0.01	0.07	0.09	—	1,053	1,053	0.09	0.17	0.06	1,106
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.02	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	3.53	3.53	< 0.005	< 0.005	0.01	3.58
Vendor	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	0.75	0.75	< 0.005	< 0.005	< 0.005	0.78
Hauling	< 0.005	< 0.005	0.05	0.02	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	31.7	31.7	< 0.005	0.01	0.03	33.3
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	< 0.005	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	0.58	0.58	< 0.005	< 0.005	< 0.005	0.59
Vendor	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	0.12	0.12	< 0.005	< 0.005	< 0.005	0.13

Hauling	< 0.005	< 0.005	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	5.25	5.25	< 0.005	< 0.005	< 0.005	5.52

3.7. Watershed Improvements (2024) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.97	0.97	34.5	25.3	0.04	0.99	—	0.99	0.90	—	0.90	—	4,700	4,700	0.19	0.04	—	4,717
Dust From Material Movement	—	—	—	—	—	—	3.18	3.18	—	1.38	1.38	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.10	0.10	3.50	2.57	< 0.005	0.10	—	0.10	0.09	—	0.09	—	476	476	0.02	< 0.005	—	478
Dust From Material Movement	—	—	—	—	—	—	0.32	0.32	—	0.14	0.14	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.02	0.02	0.64	0.47	< 0.005	0.02	—	0.02	0.02	—	0.02	—	78.9	78.9	< 0.005	< 0.005	—	79.2

Dust From Material Movement	—	—	—	—	—	—	0.06	0.06	—	0.03	0.03	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.08	0.07	0.07	0.79	0.00	0.00	0.19	0.19	0.00	0.04	0.04	—	185	185	< 0.005	0.01	0.02	187
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.27	0.06	3.33	1.55	0.02	0.03	0.57	0.60	0.03	0.16	0.19	—	2,288	2,288	0.20	0.37	0.12	2,402
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.01	0.08	0.00	0.00	0.02	0.02	0.00	< 0.005	< 0.005	—	19.0	19.0	< 0.005	< 0.005	0.03	19.3
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.03	0.01	0.34	0.16	< 0.005	< 0.005	0.06	0.06	< 0.005	0.02	0.02	—	232	232	0.02	0.04	0.20	244
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.02	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	3.15	3.15	< 0.005	< 0.005	0.01	3.19
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.01	< 0.005	0.06	0.03	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	38.4	38.4	< 0.005	0.01	0.03	40.3

3.9. Access Improvements - SD Creek Area (2024) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.14	1.14	38.8	28.8	0.06	1.19	—	1.19	1.09	—	1.09	—	5,575	5,575	0.23	0.05	—	5,594
Dust From Material Movement	—	—	—	—	—	—	3.18	3.18	—	1.38	1.38	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.01	0.38	0.28	< 0.005	0.01	—	0.01	0.01	—	0.01	—	54.6	54.6	< 0.005	< 0.005	—	54.7
Dust From Material Movement	—	—	—	—	—	—	0.03	0.03	—	0.01	0.01	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	< 0.005	0.07	0.05	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	9.03	9.03	< 0.005	< 0.005	—	9.06
Dust From Material Movement	—	—	—	—	—	—	0.01	0.01	—	< 0.005	< 0.005	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.11	0.10	0.10	1.19	0.00	0.00	0.28	0.28	0.00	0.07	0.07	—	277	277	0.01	0.01	0.03	281
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.43	0.10	5.33	2.48	0.02	0.04	0.91	0.96	0.04	0.26	0.30	—	3,668	3,668	0.33	0.59	0.19	3,851
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	2.75	2.75	< 0.005	< 0.005	0.01	2.79
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	< 0.005	< 0.005	0.05	0.02	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	35.9	35.9	< 0.005	0.01	0.03	37.7
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	< 0.005	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	0.46	0.46	< 0.005	< 0.005	< 0.005	0.46
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	< 0.005	< 0.005	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	5.94	5.94	< 0.005	< 0.005	0.01	6.24

3.11. Access Improvements - SD Creek Area (2025) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.14	1.14	38.8	28.8	0.06	1.19	—	1.19	1.09	—	1.09	—	5,578	5,578	0.23	0.05	—	5,597

Dust From Material Movement	—	—	—	—	—	—	3.18	3.18	—	1.38	1.38	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.12	0.12	3.95	2.94	0.01	0.12	—	0.12	0.11	—	0.11	—	568	568	0.02	< 0.005	—	570
Dust From Material Movement	—	—	—	—	—	—	0.32	0.32	—	0.14	0.14	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.02	0.02	0.72	0.54	< 0.005	0.02	—	0.02	0.02	—	0.02	—	94.0	94.0	< 0.005	< 0.005	—	94.3
Dust From Material Movement	—	—	—	—	—	—	0.06	0.06	—	0.03	0.03	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.11	0.10	0.09	1.11	0.00	0.00	0.28	0.28	0.00	0.07	0.07	—	272	272	0.01	0.01	0.03	275
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.41	0.10	5.16	2.44	0.02	0.04	0.91	0.96	0.04	0.26	0.30	—	3,606	3,606	0.33	0.58	0.19	3,788

Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.01	0.12	0.00	0.00	0.03	0.03	0.00	0.01	0.01	—	28.0	28.0	< 0.005	< 0.005	0.05	28.4
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.04	0.01	0.53	0.25	< 0.005	< 0.005	0.09	0.10	< 0.005	0.03	0.03	—	367	367	0.03	0.06	0.33	386
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.02	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	4.64	4.64	< 0.005	< 0.005	0.01	4.70
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.01	< 0.005	0.10	0.04	< 0.005	< 0.005	0.02	0.02	< 0.005	< 0.005	0.01	—	60.7	60.7	0.01	0.01	0.05	63.8

3.13. Access Improvements - Glenwood (2025) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Dust From Material Movement	—	—	—	—	—	—	< 0.005	< 0.005	—	< 0.005	< 0.005	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Dust From Material Movement	—	—	—	—	—	—	< 0.005	< 0.005	—	< 0.005	< 0.005	—	—	—	—	—	—	—

Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Dust From Material Movement	—	—	—	—	—	—	< 0.005	< 0.005	—	< 0.005	< 0.005	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.41	0.10	5.16	2.44	0.02	0.04	0.91	0.96	0.04	0.26	0.30	—	3,606	3,606	0.33	0.58	0.19	3,788
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.02	0.01	0.30	0.14	< 0.005	< 0.005	0.05	0.05	< 0.005	0.01	0.02	—	207	207	0.02	0.03	0.19	218
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	< 0.005	< 0.005	0.05	0.03	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	34.3	34.3	< 0.005	0.01	0.03	36.1

3.15. Watershed Improvements (2024) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Dust From Material Movement	—	—	—	—	—	—	0.00	0.00	—	0.00	0.00	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Dust From Material Movement	—	—	—	—	—	—	0.00	0.00	—	0.00	0.00	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Dust From Material Movement	—	—	—	—	—	—	0.00	0.00	—	0.00	0.00	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.27	0.06	3.33	1.55	0.02	0.03	0.57	0.60	0.03	0.16	0.19	—	2,288	2,288	0.20	0.37	0.12	2,402
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	< 0.005	< 0.005	0.03	0.02	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	22.4	22.4	< 0.005	< 0.005	0.02	23.5
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	< 0.005	< 0.005	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	3.71	3.71	< 0.005	< 0.005	< 0.005	3.89

3.17. Watershed Improvements (2025) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Dust From Material Movemen	—	—	—	—	—	—	0.00	0.00	—	0.00	0.00	—	—	—	—	—	—	—

Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Dust From Material Movement	—	—	—	—	—	—	0.00	0.00	—	0.00	0.00	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Dust From Material Movement	—	—	—	—	—	—	0.00	0.00	—	0.00	0.00	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.25	0.06	3.22	1.52	0.02	0.03	0.57	0.60	0.03	0.16	0.19	—	2,249	2,249	0.20	0.36	0.12	2,363
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.02	0.01	0.28	0.13	< 0.005	< 0.005	0.05	0.05	< 0.005	0.01	0.02	—	194	194	0.02	0.03	0.17	204
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Worker	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	< 0.005	< 0.005	0.05	0.02	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	32.1	32.1	< 0.005	0.01	0.03	33.7

3.19. Sewer Construction - SD Creek Area (2024) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	2.03	2.03	73.8	58.1	0.11	1.99	—	1.99	1.80	—	1.80	—	11,132	11,132	0.45	0.09	—	11,170
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	2.03	2.03	73.8	58.1	0.11	1.99	—	1.99	1.80	—	1.80	—	11,132	11,132	0.45	0.09	—	11,170
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.67	0.67	24.3	19.1	0.03	0.65	—	0.65	0.59	—	0.59	—	3,660	3,660	0.15	0.03	—	3,672
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.12	0.12	4.43	3.48	0.01	0.12	—	0.12	0.11	—	0.11	—	606	606	0.02	< 0.005	—	608

Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.22	0.20	0.17	2.59	0.00	0.00	0.54	0.54	0.00	0.13	0.13	—	559	559	0.01	0.02	2.28	567
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.28	0.07	3.31	1.58	0.02	0.03	0.59	0.62	0.03	0.16	0.19	—	2,359	2,359	0.21	0.38	4.82	2,481
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.22	0.20	0.19	2.27	0.00	0.00	0.54	0.54	0.00	0.13	0.13	—	532	532	0.01	0.02	0.06	538
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.28	0.06	3.43	1.60	0.02	0.03	0.59	0.62	0.03	0.16	0.19	—	2,361	2,361	0.21	0.38	0.13	2,478
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.07	0.06	0.06	0.78	0.00	0.00	0.18	0.18	0.00	0.04	0.04	—	177	177	< 0.005	0.01	0.32	180
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.09	0.02	1.13	0.52	0.01	0.01	0.19	0.20	0.01	0.05	0.06	—	776	776	0.07	0.12	0.68	815
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.01	0.14	0.00	0.00	0.03	0.03	0.00	0.01	0.01	—	29.3	29.3	< 0.005	< 0.005	0.05	29.8
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.02	< 0.005	0.21	0.10	< 0.005	< 0.005	0.04	0.04	< 0.005	0.01	0.01	—	128	128	0.01	0.02	0.11	135

3.21. Sewer Construction - Glenwood (2024) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.28	0.06	3.43	1.60	0.02	0.03	0.59	0.62	0.03	0.16	0.19	—	2,361	2,361	0.21	0.38	0.13	2,478
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.04	0.01	0.46	0.21	< 0.005	< 0.005	0.08	0.08	< 0.005	0.02	0.03	—	317	317	0.03	0.05	0.28	333
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.01	< 0.005	0.08	0.04	< 0.005	< 0.005	0.01	0.02	< 0.005	< 0.005	< 0.005	—	52.5	52.5	< 0.005	0.01	0.05	55.1

4. Operations Emissions Details

4.10. Soil Carbon Accumulation By Vegetation Type

4.10.1. Soil Carbon Accumulation By Vegetation Type - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Vegetation	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.2. Above and Belowground Carbon Accumulation by Land Use Type - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.3. Avoided and Sequestered Emissions by Species - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Species	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

5. Activity Data

5.1. Construction Schedule

Phase Name	Phase Type	Start Date	End Date	Days Per Week	Work Days per Phase	Phase Description
Tree Removal and Site Preparation - SD Creek Area	Linear, Grubbing & Land Clearing	4/4/2024	4/23/2024	5.00	14.0	Upper SD Creek Area
Tree Removal and Site Preparation - Glenwood	Linear, Grubbing & Land Clearing	10/8/2024	10/15/2024	5.00	6.00	Glenwood Tributary Area
Site Restoration	Linear, Grading & Excavation	3/21/2024	4/4/2024	5.00	11.0	Both Areas
Watershed Improvements	Linear, Drainage, Utilities, & Sub-Grade	11/7/2024	12/27/2024	5.00	37.0	Upper SD Creek Area
Access Improvements - SD Creek Area	Linear, Drainage, Utilities, & Sub-Grade	12/27/2024	2/21/2025	5.00	41.0	Upper SD Creek Area

Access Improvements - Glenwood	Linear, Drainage, Utilities, & Sub-Grade	2/21/2025	3/21/2025	5.00	21.0	Glenwood Tributary Area
Watershed Improvements	Linear, Drainage, Utilities, & Sub-Grade	12/27/2024	2/13/2025	5.00	35.0	Glenwood Tributary Area
Sewer Construction - SD Creek Area	Linear, Trenching	4/24/2024	10/8/2024	5.00	120	Upper SD Creek Area
Sewer Construction - Glenwood	Linear, Trenching	10/15/2024	12/22/2024	5.00	49.0	Glenwood Tributary Area

5.2. Off-Road Equipment

5.2.1. Unmitigated

Phase Name	Equipment Type	Fuel Type	Engine Tier	Number per Day	Hours Per Day	Horsepower	Load Factor
Tree Removal and Site Preparation - SD Creek Area	Excavators	Diesel	Tier 2	1.00	8.00	87.0	0.43
Tree Removal and Site Preparation - SD Creek Area	Tractors/Loaders/Backhoes	Diesel	Tier 2	1.00	8.00	36.0	0.38
Tree Removal and Site Preparation - SD Creek Area	Graders	Diesel	Tier 2	1.00	8.00	148	0.41
Tree Removal and Site Preparation - SD Creek Area	Scrapers	Diesel	Tier 2	1.00	8.00	423	0.48
Tree Removal and Site Preparation - SD Creek Area	Plate Compactors	Diesel	Tier 2	1.00	8.00	8.00	0.43
Tree Removal and Site Preparation - SD Creek Area	Dumpers/Tenders	Diesel	Tier 2	1.00	8.00	16.0	0.38
Tree Removal and Site Preparation - SD Creek Area	Concrete/Industrial Saws	Diesel	Tier 2	2.00	8.00	33.0	0.73

Tree Removal and Site Preparation - SD Creek Area	Rubber Tired Dozers	Diesel	Tier 2	1.00	8.00	367	0.40
Tree Removal and Site Preparation - SD Creek Area	Other Construction Equipment	Diesel	Tier 2	1.00	8.00	82.0	0.42
Tree Removal and Site Preparation - SD Creek Area	Other Construction Equipment	Diesel	Tier 2	1.00	8.00	82.0	0.42
Tree Removal and Site Preparation - SD Creek Area	Other General Industrial Equipment	Diesel	Tier 2	1.00	8.00	93.0	0.40
Site Restoration	Cranes	Diesel	Tier 2	1.00	8.00	36.0	0.38
Site Restoration	Off-Highway Trucks	Diesel	Tier 2	1.00	8.00	376	0.38
Site Restoration	Tractors/Loaders/Backhoes	Diesel	Tier 2	1.00	8.00	84.0	0.37
Site Restoration	Graders	Diesel	Tier 2	1.00	8.00	148	0.41
Site Restoration	Plate Compactors	Diesel	Tier 2	1.00	8.00	8.00	0.43
Watershed Improvements	Excavators	Diesel	Tier 2	1.00	8.00	37.0	0.48
Watershed Improvements	Tractors/Loaders/Backhoes	Diesel	Tier 2	1.00	8.00	84.0	0.37
Watershed Improvements	Graders	Diesel	Tier 2	1.00	8.00	148	0.41
Watershed Improvements	Scrapers	Diesel	Tier 2	1.00	8.00	423	0.48
Watershed Improvements	Plate Compactors	Diesel	Tier 2	1.00	8.00	8.00	0.43
Watershed Improvements	Rubber Tired Dozers	Diesel	Tier 2	1.00	8.00	367	0.40
Watershed Improvements	Dumpers/Tenders	Diesel	Tier 2	1.00	8.00	16.0	0.38
Watershed Improvements	Tractors/Loaders/Backhoes	Diesel	Tier 2	1.00	8.00	84.0	0.37

Access Improvements - SD Creek Area	Excavators	Diesel	Tier 2	1.00	8.00	37.0	0.48
Access Improvements - SD Creek Area	Tractors/Loaders/Backhoes	Diesel	Tier 2	1.00	8.00	14.0	0.74
Access Improvements - SD Creek Area	Graders	Diesel	Tier 2	1.00	8.00	148	0.41
Access Improvements - SD Creek Area	Scrapers	Diesel	Tier 2	1.00	8.00	8.00	0.43
Access Improvements - SD Creek Area	Plate Compactors	Diesel	Tier 2	1.00	8.00	11.0	0.74
Access Improvements - SD Creek Area	Rubber Tired Dozers	Diesel	Tier 2	1.00	8.00	96.0	0.40
Access Improvements - SD Creek Area	Dumpers/Tenders	Diesel	Tier 2	1.00	8.00	423	0.48
Access Improvements - SD Creek Area	Dumpers/Tenders	Diesel	Tier 2	1.00	8.00	16.0	0.38
Access Improvements - SD Creek Area	Tractors/Loaders/Backhoes	Diesel	Tier 2	1.00	8.00	84.0	0.37
Access Improvements - SD Creek Area	Off-Highway Trucks	Diesel	Tier 2	1.00	8.00	376	0.38
Access Improvements - SD Creek Area	Pavers	Diesel	Tier 2	1.00	8.00	81.0	0.42
Access Improvements - SD Creek Area	Rollers	Diesel	Tier 2	1.00	8.00	36.0	0.38
Sewer Construction - SD Creek Area	Cranes	Diesel	Tier 2	2.00	8.00	367	0.29
Sewer Construction - SD Creek Area	Off-Highway Trucks	Diesel	Tier 2	2.00	8.00	376	0.38
Sewer Construction - SD Creek Area	Excavators	Diesel	Tier 2	1.00	8.00	36.0	0.38
Sewer Construction - SD Creek Area	Tractors/Loaders/Backhoes	Diesel	Tier 2	1.00	8.00	84.0	0.37
Sewer Construction - SD Creek Area	Graders	Diesel	Tier 2	1.00	8.00	148	0.41

Sewer Construction - SD Creek Area	Scrapers	Diesel	Tier 2	1.00	8.00	423	0.48
Sewer Construction - SD Creek Area	Plate Compactors	Diesel	Tier 2	1.00	8.00	8.00	0.43
Sewer Construction - SD Creek Area	Forklifts	Diesel	Tier 2	2.00	8.00	82.0	0.20
Sewer Construction - SD Creek Area	Dumpers/Tenders	Diesel	Tier 2	1.00	8.00	16.0	0.38
Sewer Construction - SD Creek Area	Tractors/Loaders/Backhoes	Diesel	Tier 2	2.00	8.00	84.0	0.37
Sewer Construction - SD Creek Area	Bore/Drill Rigs	Diesel	Tier 4 Final	1.00	8.00	150	0.50
Sewer Construction - SD Creek Area	Pumps	Diesel	Tier 4 Final	3.00	8.00	11.0	0.74
Sewer Construction - SD Creek Area	Air Compressors	Diesel	Tier 4 Final	1.00	8.00	37.0	0.48
Sewer Construction - SD Creek Area	Generator Sets	Diesel	Tier 2	1.00	8.00	14.0	0.74
Sewer Construction - SD Creek Area	Off-Highway Trucks	Diesel	Tier 2	1.00	8.00	376	0.38
Sewer Construction - SD Creek Area	Skid Steer Loaders	Diesel	Tier 2	2.00	8.00	5.00	0.37

5.3. Construction Vehicles

5.3.1. Unmitigated

Phase Name	Trip Type	One-Way Trips per Day	Miles per Trip	Vehicle Mix
Tree Removal and Site Preparation - SD Creek Area	—	—	—	—
Tree Removal and Site Preparation - SD Creek Area	Worker	30.0	13.2	LDA,LDT1,LDT2
Tree Removal and Site Preparation - SD Creek Area	Vendor	0.00	7.75	HHDT,MHDT

Tree Removal and Site Preparation - SD Creek Area	Hauling	11.0	10.0	HHDT
Tree Removal and Site Preparation - SD Creek Area	Onsite truck	—	—	HHDT
Sewer Construction - Glenwood	—	—	—	—
Sewer Construction - Glenwood	Worker	0.00	13.2	LDA,LDT1,LDT2
Sewer Construction - Glenwood	Vendor	0.00	7.75	HHDT,MHDT
Sewer Construction - Glenwood	Hauling	65.0	10.0	HHDT
Sewer Construction - Glenwood	Onsite truck	—	—	HHDT
Tree Removal and Site Preparation - Glenwood	—	—	—	—
Tree Removal and Site Preparation - Glenwood	Worker	0.00	13.2	LDA,LDT1,LDT2
Tree Removal and Site Preparation - Glenwood	Vendor	0.00	7.75	HHDT,MHDT
Tree Removal and Site Preparation - Glenwood	Hauling	11.0	10.0	HHDT
Tree Removal and Site Preparation - Glenwood	Onsite truck	—	—	HHDT
Sewer Construction - SD Creek Area	—	—	—	—
Sewer Construction - SD Creek Area	Worker	57.5	13.2	LDA,LDT1,LDT2
Sewer Construction - SD Creek Area	Vendor	0.00	7.75	HHDT,MHDT
Sewer Construction - SD Creek Area	Hauling	65.0	10.0	HHDT
Sewer Construction - SD Creek Area	Onsite truck	—	—	HHDT
Watershed Improvements	—	—	—	—
Watershed Improvements	Worker	20.0	13.2	LDA,LDT1,LDT2
Watershed Improvements	Vendor	0.00	7.75	HHDT,MHDT
Watershed Improvements	Hauling	63.0	10.0	HHDT
Watershed Improvements	Onsite truck	—	—	HHDT
Access Improvements - SD Creek Area	—	—	—	—

Access Improvements - SD Creek Area	Worker	30.0	13.2	LDA,LDT1,LDT2
Access Improvements - SD Creek Area	Vendor	0.00	7.75	HHDT,MHDT
Access Improvements - SD Creek Area	Hauling	101	10.0	HHDT
Access Improvements - SD Creek Area	Onsite truck	—	—	HHDT
Access Improvements - Glenwood	—	—	—	—
Access Improvements - Glenwood	Worker	0.00	13.2	LDA,LDT1,LDT2
Access Improvements - Glenwood	Vendor	0.00	7.75	HHDT,MHDT
Access Improvements - Glenwood	Hauling	101	10.0	HHDT
Access Improvements - Glenwood	Onsite truck	—	—	HHDT
Watershed Improvements	—	—	—	—
Watershed Improvements	Worker	0.00	13.2	LDA,LDT1,LDT2
Watershed Improvements	Vendor	0.00	7.75	HHDT,MHDT
Watershed Improvements	Hauling	63.0	10.0	HHDT
Watershed Improvements	Onsite truck	—	—	HHDT
Site Restoration	—	—	—	—
Site Restoration	Worker	12.5	13.2	LDA,LDT1,LDT2
Site Restoration	Vendor	1.00	7.75	HHDT,MHDT
Site Restoration	Hauling	29.0	10.0	HHDT
Site Restoration	Onsite truck	—	—	HHDT

5.4. Vehicles

5.4.1. Construction Vehicle Control Strategies

Control Strategies Applied	PM10 Reduction	PM2.5 Reduction
Water unpaved roads twice daily	55%	55%
Limit vehicle speeds on unpaved roads to 25 mph	44%	44%
Sweep paved roads once per month	9%	9%

5.5. Architectural Coatings

Phase Name	Residential Interior Area Coated (sq ft)	Residential Exterior Area Coated (sq ft)	Non-Residential Interior Area Coated (sq ft)	Non-Residential Exterior Area Coated (sq ft)	Parking Area Coated (sq ft)

5.6. Dust Mitigation

5.6.1. Construction Earthmoving Activities

Phase Name	Material Imported (Cubic Yards)	Material Exported (Cubic Yards)	Acres Graded (acres)	Material Demolished (Ton of Debris)	Acres Paved (acres)
Tree Removal and Site Preparation - SD Creek Area	0.00	166	3.50	100	—
Tree Removal and Site Preparation - Glenwood	0.00	0.00	3.50	0.00	—
Site Restoration	120	340	3.55	0.00	—
Watershed Improvements	1,000	0.00	3.50	0.00	—
Access Improvements - SD Creek Area	998	620	3.50	0.00	—
Access Improvements - Glenwood	511	528	3.50	0.00	—
Watershed Improvements	0.00	0.00	3.55	0.00	—

5.6.2. Construction Earthmoving Control Strategies

Control Strategies Applied	Frequency (per day)	PM10 Reduction	PM2.5 Reduction
Water Exposed Area	2	61%	61%

5.7. Construction Paving

Land Use	Area Paved (acres)	% Asphalt
Road Construction	3.55	100%

5.8. Construction Electricity Consumption and Emissions Factors

kWh per Year and Emission Factor (lb/MWh)

Year	kWh per Year	CO2	CH4	N2O
2024	0.00	532	0.03	< 0.005
2025	0.00	532	0.03	< 0.005

5.18. Vegetation

5.18.1. Land Use Change

5.18.1.1. Unmitigated

Vegetation Land Use Type	Vegetation Soil Type	Initial Acres	Final Acres

5.18.1. Biomass Cover Type

5.18.1.1. Unmitigated

Biomass Cover Type	Initial Acres	Final Acres

5.18.2. Sequestration

5.18.2.1. Unmitigated

Tree Type	Number	Electricity Saved (kWh/year)	Natural Gas Saved (btu/year)

8. User Changes to Default Data

Screen	Justification

Construction: Construction Phases	Default construction activities and duration changed to match the schedule provided by client which includes tree removal and site preparation, sewer construction, watershed improvements, access improvements, and site restoration.
Construction: Off-Road Equipment	Construction equipment matched to what was provided by client. Analysis would assume Tier 2 engine for all construction equipment except for the bore drill which will be tier 4. Horsepower and load factor remain default for all equipment except the bore drill (150 hp) and skid steers (5 hp). In addition, construction equipment would be shared for overlapping activities.
Construction: Dust From Material Movement	The project would have 2,629 CY of soil imported and 1,654 CY of soil exported for a net total of 975 CY of soil imported. Grading quantities changed to match net totals for each construction activity as provided by client.
Construction: Trips and VMT	Hauling trips provided by client for each construction activity. Hauling trip length will be set to 10 miles. Worker and vender trips are set to default as well as all construction trip lengths.
Construction: Demolition	Approximately 100 tons of debris would be demolished

APPENDIX B

BIOLOGICAL RESOURCES ASSESSMENT

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CARLSBAD
CLOVIS
IRVINE
LOS ANGELES
PALM SPRINGS
POINT RICHMOND
RIVERSIDE
ROSEVILLE
SAN LUIS OBISPO

November 20, 2023

Kellie Welch, Water Resources Manager
Irvine Ranch Water District
3512 Michelson Drive
Irvine, California 92612

Subject: Biological Resources Assessment for The Woods Sewer Improvements Project, Lake Forest, Orange County, California

Dear Ms. Welch:

The purpose of this Biological Resources Technical Memorandum is to describe and document potential impacts to biological resources—including sensitive and special-status species—associated with implementation of the proposed The Woods Sewer Improvements Project (project) within The Woods Neighborhood in Lake Forest, Orange County, California. This technical information is provided for project review under the California Environmental Quality Act (CEQA), the California Endangered Species Act (CESA), and the Federal Endangered Species Act (FESA).

PROJECT DESCRIPTION

The Irvine Ranch Water District (IRWD) proposes to replace, relocate, and upgrade sewer facilities and provide associated access improvements within The Woods community in order to reduce risk of failure of IRWD facilities and the potential for downstream impacts, as well as to improve access to all IRWD facilities along approximately 1,400 feet of Upper San Diego Creek and within 600 feet of a tributary to Upper San Diego Creek (Glenwood Tributary).

PROJECT LOCATION

The proposed project site is located in The Woods community in Lake Forest, Orange County (see Figure 1, Regional and Project Location; all figures are provided in Attachment A). Regional access to the project site is provided by State Route (SR) 241, located approximately 3 miles northeast of the project site, and by Interstate (I) 5, located approximately 1.3 miles southwest of the project site.

The proposed improvements are located within a reach of Upper San Diego Creek and the Glenwood Tributary, and the project site is generally surrounded by single-family residential uses. The project site is bounded by Toledo Way to the northeast and Jeronimo Road to the southwest.

PROJECT BACKGROUND

IRWD owns and maintains water and sewer facilities within Lake Forest. Existing sewers and related infrastructure within the project site collect wastewater from the surrounding residential development built within a former eucalyptus tree farm. Two homeowners' associations (HOAs), the Lake Forest Community Association and the Lake Forest II Master Homeowners Association, own the

creek properties within which IRWD's facilities are located. The HOAs are responsible for maintenance of the creek where it flows across their respective properties. IRWD has 20- to 25-foot easements within these creek areas for operation and maintenance of its water and sewer facilities.

The gravity sewers were constructed in the early 1970s, when it was common practice to construct gravity sewers parallel to creeks to take advantage of the natural topography. The gravity sewers generally consist of 8-inch, 10-inch, and 12-inch-diameter vitrified clay pipe (VCP) and are centered within 20- to 25-foot-wide sewer easements. Sewer laterals providing service to each connection (home) are generally 4-inch plastic (acrylonitrile butadiene styrene [ABS]) pipe.[1] The manholes have been previously retrofitted with waterproof covers to minimize inflow of stormwater into the sewer and release of odors to neighboring residential properties. Some manholes have been reinforced with grouted corrugated metal pipe for protection, but these measures are not considered permanent solutions. Gabion drop structures were installed across the flow line of the creek to provide grade control; however, these have all failed and remain in place, in dilapidated condition.

Various elements of the existing sewer system within the project site are at risk of damage due to lack of protective soil cover that has been eroded within the flow path of the creek, primarily caused by failed grade control structures. The average rate of scour along the Upper San Diego Creek has been approximately 2.5 inches/year, and the average rate of scour along the Glenwood Tributary appears to have been closer to 1.0 inch/year. There is a potential for future lateral and vertical scour that would further threaten the stability of the facilities. Additionally, the existing sewer lines can no longer be accessed by maintenance vehicles due to erosion of existing access roads and downcutting of the creek, which is compromising bank stability.[2]

METHODS

Literature Review and Records Search

LSA Biologist Jeremy Rosenthal conducted a literature review and record search on January 4, 2023, to identify the existence and potential for occurrence of sensitive or special-status plant and animal species[3] in the vicinity of the project site. Mr. Rosenthal also examined federal and State lists of sensitive species. Current electronic database records reviewed included the following:

- **California Natural Diversity Database information (CNDDB – RareFind 5)**, which is administered by the California Department of Fish and Wildlife (CDFW). This database covers sensitive plant

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1 Irvine Ranch Water District (IRWD). 2021. *Access & Facilities Improvements for Sewer Systems in The Woods, Final Facilities Plan*. October.

2 Woodard & Curran, Inc. 2021. *The Woods Sewer Facilities Plan*. October.

3 For the purposes of this report, the term "special-status species" refers to those species that are listed or proposed for listing under CESA and/or FESA; California Fully Protected Species; plants with a California Rare Plant Rank of 1, 2, or 3; California Species of Special Concern; and California Special Animals. It should be noted that "Species of Special Concern" and "California Special Animal" are administrative designations made by the CDFW and carry no formal legal protection status. However, Section 15380 of the *State CEQA Guidelines* indicates that these species should be included in an analysis of project impacts if they can be shown to meet the criteria of sensitivity outlined therein.

and animal species as well as sensitive natural communities that occur in California. Records from six United States Geological Survey (USGS) quadrangles within 3 miles of the project site (*El Toro, Tustin, Santiago Peak, Laguna Beach, San Juan Capistrano,* and *Canada Gobernadora*) were obtained from this database to assist with the field survey.

- **Information for Planning and Consultation (IPaC)** is a project planning tool that streamlines the United States Fish and Wildlife Service (USFWS) environmental review process. The information is generated directly from USFWS field offices. This database covers sensitive plant and animal species as well as sensitive natural communities and critical habitats that occur in California.

- **The USFWS National Wetlands Inventory** was reviewed to determine whether any wetlands or surface waters of the United States have been previously identified in the survey area.[4]

In addition to the databases listed above, the review included historic and current aerial imagery, existing environmental reports for developments in the project vicinity, and regional habitat conservation plans and local land use policies related to biological resources.

Field Surveys

LSA Biologist Jeremy Rosenthal conducted a general biological survey of the project site on November 16, 2022, and January 11, 2023, from 9:00 a.m. to 12:00 p.m. and 9:45 a.m. to 11:15 a.m., respectively. He surveyed the entire project site on foot and noted all biological resources observed. He noted suitable habitat for any species of interest or concern and photographed general site conditions. The weather conditions during the November field survey were warm and calm with 0 percent cloud cover, winds from 1 to 2 miles per hour (mph), and a temperature of 70 degrees Fahrenheit (˚F). The weather conditions during the January field survey were cool and calm with 100 percent cloud cover, winds from 1 to 2 mph, and a temperature of 52˚F. Representative site photographs are provided in Attachment B.

RESOURCES EVALUATED

Habitat/Vegetation

The project site consists of eucalyptus groves with a sparse understory of nonnative plant species (see Figure 2, Vegetation). Ongoing soil disturbance and competitive exclusion by invasive nonnative plants (predominantly eucalyptus trees) limit the potential for native flora to occur on the project site. Attachment C provides a complete list of plant species identified within the proposed project site.

- **Eucalyptus Groves (approximately 55.60 acres):** The majority of the project site consists of eucalyptus groves, which consist predominantly of Tasmanian blue gum (*Eucalyptus globulus*). The understory is sparse and consists of mostly bare ground and nonnative, noxious weedy

[4] United States Fish and Wildlife Service (USFWS). 2022. USFWS National Wetlands Inventory (NWI), Online Mapper Tool. Website: https://www.fws.gov/wetlands/data/mapper.html (accessed February and November 2023).

species, including common burclover (*Medicago polymorpha*), Bermuda buttercup (*Oxalis pes-caprae*), English plantain (*Plantago lanceolata*), and smilo grass (*Stipa miliacea*).

- **Developed (approximately 9.74 acres):**Developed areas within the project site consist of single-family residences and associated asphalt-paved roadways. Developed areas are located throughout the project site.

A total of 39 vascular plant species were identified within the project site during the November 2021 field survey (refer to Attachment C). A total of 32 (82.1 percent) of these plant species represent nonnative taxa, reflecting a high level of disturbance within the project site.

Wildlife

Native wildlife habitat is absent from the project site. Furthermore, the development surrounding the project site and absence of suitable foraging habitat make the site undesirable for many native wildlife species. Mr. Rosenthal observed 14 wildlife species: Anna's hummingbird (*Calypte anna*), Allen's hummingbird (*Selasphorus sasin*), turkey vulture (*Cathartes aura*), red-tailed hawk (*Buteo jamaicensis*), black phoebe (*Sayornis nigricans*), American crow (*Corvus brachyrhynchos*), house wren (*Troglodytes aedon*), house finch (*Haemorhous mexicanus*), lesser goldfinch (*Spinus psaltria*), spotted towhee (*Pipilo maculatus*), California towhee (*Melozone crissalis*), song sparrow (*Melospiza melodia*), white-crowned sparrow (*Zonotrichia leucophrys*), and yellow-rumped warbler (*Setophaga coronata*). No special-status animal species were observed during the site survey, and suitable habitat for such species is absent from the proposed project disturbance limits. In addition, the project site does not function as a wildlife movement corridor. Furthermore, no nesting birds or their nests were observed at the time of the habitat assessment.

Special-Status Species

Special-Status Plant Species

Based on review of the current biological database records,[5] there are known occurrence records of 40 special-status plant species in the vicinity of the project site.

Regarding the special-status plants, 5 of the 40 species are visually conspicuous (woody/shrubby) when present and/or are detectable year-round. Because summer holly (*Comarostaphylis diversifolia* ssp. *diversifolia*), Tecate cypress (*Hesperocyparis forbesii*), decumbent goldenbush (*Isocoma menziesii* var. *decumbens*), chaparral nolina (*Nolina cismontana*), and Nuttall's scrub oak (*Quercus dumosa*) were not observed within the project site during the site survey but would have been observed if present, these species were determined to be absent from the project site.

Of the remaining 35 special-status plant species, 33 species are not expected to occur within the project site due to the lack of suitable habitat and/or conditions on site. However, two special-status

[5] California Department of Fish and Wildlife (CDFW). 2021. California Natural Diversity Database. RareFind 5 (Version 5.2.14). Website: https://www.wildlife.ca.gov/Data/CNDDB/Maps-and-Data (accessed November 2021).

plant species (California satintail [*Imperata brevifolia*] and San Bernardino aster [*Symphyotrichum defoliatum*]) identified from the database records searches and known to occur in other locations nearby the project site have a low probability of occurrence based on the existing habitat and conditions on site. California satintail has a California Rare Plant Rank (CRPR) of 2B.1, which is a California Native Plant Society (CNPS) designation given to plants considered rare, threatened, or endangered in California but more common elsewhere and seriously threatened in California. Plummer's mariposa lily has a CRPR of 1B.2, which is a CNPS designation given to plants that are rare, threatened, or endangered in California and elsewhere and fairly threatened in California. These species do not have federal or State listings of threatened or endangered, but impacts to substantial populations may be considered an impact under CEQA. None of these special-status plants were observed during the site surveys conducted on November 16, 2022, and January 11, 2023, which are the appropriate seasons for California satintail and San Bernardino aster.

Special-Status Animal Species

Based on review of the current biological database records,[6] there are known occurrence records of 57 special-status animal species in the vicinity of the project site.

Of the 57 special-status animal species, 56 are not expected to occur within the project site due to the lack of suitable habitat and/or conditions on site.

Although not observed during the site survey, monarch butterfly (*Danaus plexippus*), identified from the CNDDB records search has a high potential to roost within the project site during winter months. Monarch butterfly was listed as a Candidate under FESA by the USFWS in December 2020.[7] Monarch butterfly is a migratory species of butterfly that typically overwinters along the west coast of the United States in groves of Tasmanian blue gum, Monterey pine (*Pinus radiata*), and Monterey cypress (*Hesperocyparis macrocarpa*), all of which act as roost trees.[8] Adult monarch butterflies require a diversity of blooming nectar resources during breeding and migration, which they feed on throughout their migration routes and breeding grounds (spring through fall). Monarch butterflies also need milkweed for both egg-laying and larval feeding among nectar resources. Milkweed species required for egg-laying and larval feeding are not present within the Biological Study Area (BSA). Overwintering sites are protected as sensitive habitat areas. To avoid potential effects to monarch butterfly, implementation of the following measure is recommended:

- Should work activities occur within the overwintering period for monarch butterfly (October through March), a qualified biologist will conduct pre-construction surveys to confirm the presence or absence of overwintering activity within the work areas. The pre-construction survey will take place no more than 3 days prior to commencement of work activities. If

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6 CDFW. 2021. California Natural Diversity Database. RareFind 5 (Version 5.2.14). Website: https://www.wildlife.ca.gov/Data/CNDDB/Maps-and-Data (accessed November 2021).

7 USFWS. 2023. Environmental Conservation Online System (ECOS). Website: https://ecos.fws.gov/ecp/species/9743 (accessed April 2023).

8 USFWS. 2020. *Monarch (Danaus plexippus) Species Status Assessment Report,* Version 2.1. Website: https://ecos.fws.gov/ServCat/DownloadFile/191345 (accessed April 2023).

overwintering monarch butterflies are observed within the work area (or areas potentially indirectly affected by project activities as determined by the qualified biologist) and the work cannot be postponed until monarch butterfly is no longer present, IRWD will obtain written approval from the USFWS or the CDFW, as applicable, prior to completing project work at these locations. With successful implementation of these measures, impacts to monarch butterfly would be avoided, and no additional avoidance or minimization measures are warranted.

Attachment D contains tables that identify those special-status plant and animal species known to occur or that potentially occur in the vicinity of the project site. It includes each species' conservation status and probability of occurrence within the proposed construction footprint.

Special-Status Natural Communities

While no special-status natural communities identified within the current electronic database records reviewed were observed within the project site, the majority of the vegetation consists of Tasmanian blue gum. Because Tasmanian blue gum is used for overwintering by monarch butterfly, it is considered a sensitive habitat area.

Approximately 121 to 131 Tasmanian blue gum trees are proposed for removal. Of those trees, 19 are within CDFW riparian (bank-to-bank) jurisdiction and/or CDFW-associated riparian vegetation jurisdiction (Figure 3). Impacts to these trees will be mitigated through the jurisdictional waters permitting process under Sections 1600 through 1616 of the California Fish and Game Code, which is further discussed under the Jurisdictional Waters subsection, below. It is anticipated that mitigation for permanent impacts to these trees will occur at no less than a 1:1 ratio, wherein replacement of Tasmanian blue gum eucalyptus trees will consist of native tree or arborescent shrub species.

Soils

According to the Natural Resources Conservation Service (NRCS) online soil survey, the soils mapped on the site include Myford sandy loam, 2 to 9 percent slopes and 9 to 30 percent slopes, and Xeralfic arents, loamy, 2 to 9 percent slopes (Figure 4).[9] Soil observed throughout the site appears to be consistent with this designation. None of the mapped soils are considered hydric soils, and the site has a drainage class ranging from moderately well drained to well drained (Table A).

[9] Natural Resources Conservation Service, United States Department of Agriculture. Web Soil Survey. Website: http://websoilsurvey.nrcs.usda./ (accessed April 2023).

Table A: Mapped Soils Classifications

Soil	Drainage Class	Frequency of Flooding	Frequency of Ponding	Hydric Soil Rating
Myford sandy loam, 2 to 9 percent slopes	Moderately well drained	None	None	No
Myford sandy loam, 9 to 30 percent slopes, eroded	Moderately well drained	None	None	No
Xeralfic arents, loamy, 2 to 9 percent slopes	Well drained	None	None	No

Source: United States Department of Agriculture (2019).

National Wetland Inventory

Based on the National Wetlands Inventory (NWI) query, the following feature type was mapped within the project site as shown on Figure 5, National Wetland Inventory:

- A seasonally flooded intermittent riverine streambed (R4SBC) was identified in the northwestern portion of the project site.

This feature is San Diego Creek and is further discussed in the Wetlands and Jurisdictional Features subsection, below.

Local Policies and Ordinances Protecting Biological Resources

City and county general plans and development ordinances may include regulations or policies governing biological resources. For example, policies may require tree preservation or designate local species survey areas, species of interest, or significant ecological areas.

Lake Forest Municipal Code Title 6, Chapter 6.20

Under the City of Lake Forest (City) Municipal Code (Section 6.20.025), during the period from April 1 to October 31, it is unlawful for any person to prune, cut branches from, top, or cut down any eucalyptus tree on public property within Lake Forest or to transport on the City's streets or highways any logs, branches, or trunk of any eucalyptus tree unless a eucalyptus tree cutting permit has been obtained from the site. Approximately 102 to 112 eucalyptus trees that are proposed for removal as a part of the proposed project will require a Eucalyptus Tree Cutting Permit from the City. No permit fees are required.

Regional Regulations

Natural Community Conservation Plan and Habitat Conservation Plan, County of Orange, Coastal Subregion

The Natural Communities Conservation Planning Act was enacted to encourage broad-based planning to provide for effective protection and conservation of the State's wildlife resources while continuing to allow appropriate development and growth.[10] Natural Community Conservation Plans

[10] Natural Communities Coalition. 2023. *Natural Community Conservation Plan & Habitat Conservation Plan.* County of Orange Central & Coastal Subregion Parts I & II: NCCP/HCP. Website: https://occonservation.org/wp-content/uploads/2015/04/NCCP-Parts-I-II-Plan.pdf (accessed October 2023).

(NCCPs) may be implemented that identify measures necessary to conserve and manage natural biological diversity within the planning area while allowing compatible and appropriate economic development, growth, and other human uses. The County of Orange (County), in conjunction with State and federal resource agencies, local jurisdictions, utility companies, the Transportation Corridor Agencies (TCA), and major private landowners, prepared the Natural Community Conservation Plan/Habitat Conservation Plan (NCCP/HCP) for the Central-Coastal NCCP Subregion. The NCCP/HCP was approved on April 16, 1996, and the Implementation Agreement was executed on July 17, 1996. The NCCP/HCP is intended to ensure the long-term survival of special-status coastal sage scrub-dependent plant and wildlife species and certain other identified species and habitats while allowing for reasonable economic growth in accordance with State-sanctioned NCCP and federally sanctioned HCP program guidelines. While the project site is within the NCCP/HCP plan area, it is not within The Reserve System; therefore, no further analysis is required.

Jurisdictional Waters

The United States Army Corps of Engineers (USACE) regulates discharges of dredged or fill material into waters of the United States. These waters include wetlands and nonwetland bodies of water that meet specific criteria, including a direct or indirect connection to interstate commerce. The USACE regulatory jurisdiction pursuant to Section 404 of the federal Clean Water Act (CWA) is founded on a connection, or nexus, between the waterbody in question and interstate commerce. This connection may be direct (through a tributary system linking a stream channel with traditional navigable waters used in interstate or foreign commerce) or indirect (through a nexus identified in the USACE regulations). To be considered a jurisdictional wetland under Section 404, an area must possess three wetland characteristics, each with its unique set of mandatory wetland criteria: hydrophytic vegetation, hydric soils, and wetland hydrology.

The CDFW, under Sections 1600 through 1616 of the California Fish and Game Code, regulates alterations to lakes, rivers, and streams (defined by the presence of a channel bed and banks, and at least an intermittent flow of water) where fish or wildlife resources may be adversely affected.

The Regional Water Quality Control Board (RWQCB) is responsible for the administration of Section 401 of the CWA. Typically, the areas subject to jurisdiction of the RWQCB coincide with those of the USACE (i.e., waters of the United States, including any wetlands). The RWQCB may also assert authority over “waters of the State” under waste discharge requirements pursuant to the Porter-Cologne Water Quality Control Act (Porter-Cologne Act).

Two distinct drainages (San Diego Creek and Glenwood Tributary) were identified within the Jurisdictional Delineation Study Area (JDSA) (refer to Figure 6), and in this case, both were determined to be jurisdictional. San Diego Creek and Glenwood Tributary were determined to be nonwetland waters of the United States/waters of the State and CDFW streambed (see Table B). Potential impacts to jurisdictional areas are noted in Table C.

Table B: Potential Jurisdictional Areas by Drainage Name

Feature Name	Nonwetland WOTUS USACE Jurisdiction (acres)	CDFW Jurisdiction (acres)	Nonwetland WOTS RWQCB Jurisdiction (acres)
San Diego Creek	0.97	1.66	0.97
Glenwood Tributary	0.33	0.96	0.33
Total Jurisdictional Acres	**1.30**	**2.61**	**1.30**

Source: Compiled by LSA (2023).
Note: Totals may appear inaccurate due to rounding.
CDFW = California Department of Fish and Wildlife
RWQCB = Regional Water Quality Control Board
USACE = United States Army Corps of Engineers
WOTUS = waters of the United States
WOTS = waters of the State

Table C: Potential Impacts to Jurisdictional Areas by Drainage Name

Feature Name	USACE Nonwetland WOTUS (ac)		RWQCB Nonwetland WOTS (ac)		CDFW Streams/Rivers/Riparian Habitat (ac)	
	Permanent Impacts	Temporary Impacts	Permanent Impacts	Temporary Impacts	Permanent Impacts	Temporary Impacts
San Diego Creek	0.094	0.175	0.094	0.175	0.056	0.116
Glenwood Tributary	0.030	0.179	0.030	0.179	0.062	0.257
Total	**0.124**	**0.354**	**0.124**	**0.354**	**0.118**	**0.373**

Source: Compiled by LSA (2023).
Note: Totals may appear inaccurate due to rounding.
ac = acre/acres
CDFW = California Department of Fish and Wildlife
RWQCB = Regional Water Quality Control Board
USACE = United States Army Corps of Engineers
WOTS = waters of the State
WOTUS = waters of the United States

Due to impacts to jurisdictional features, regulatory permits are required, including those under Section 404 of the CWA as administered by the USACE, a Water Quality Certification under Section 401 of the CWA or Waste Discharge Requirements under the Porter-Cologne Act as administered by the RWQCB, and a Streambed Alteration Agreement under Section 1602 of the California Fish and Game Code as administered by the CDFW.

To avoid inadvertent impacts to jurisdictional waters, implementation of the following measure is recommended:

- Prior to the start of project activities, signs shall be installed in upland areas adjacent to Drainage 1. The signs shall note that the area is an Environmentally Sensitive Area and that entry is prohibited.

IMPACT FINDINGS

Vegetation and Habitat Impacts

While none of the special-status natural communities that were identified by the current database records review were observed within the project site, the majority of the vegetation consists of

Tasmanian blue gum. Because Tasmanian blue gum is (can be) used for overwintering by monarch butterfly, it is considered a sensitive habitat area.

A total of 19 of the Tasmanian blue gum trees proposed for removal are within CDFW streambed (bank-to-bank) and/or associated riparian vegetation jurisdiction (Figure 3). Impacts to these trees will be mitigated through the jurisdictional waters regulatory permitting process. It is anticipated that mitigation for permanent impacts to these trees will occur at no less than a 1:1 ratio, wherein replacement of Tasmanian blue gum eucalyptus trees will consist of native tree species.

Under the City of Lake Forest Municipal Code (Section 6.20.025), the approximately 102 to 112 Tasmanian blue gum eucalyptus trees that are proposed for removal as a part of the proposed project will require a Eucalyptus Tree Cutting Permit from the City. No permit fees are required. Refer to Figure 3 for those Tasmanian blue gum eucalyptus trees that are proposed for removal.

Special-Status Plant Species

No special-status plant or animal species were observed during the site survey. The project site consists of eucalyptus groves with a sparse understory of nonnative plant species. Ongoing soil disturbance and the competitive exclusion resulting from the dominant eucalyptus canopy limit the potential for native flora to occur on the project site. Therefore, focused surveys for special-status plant species are not warranted.

Special Status Animal Species

No special-status animal species were observed during the site survey, and suitable habitat for such species is absent from the proposed project disturbance limits. In addition, the project site does not function as a wildlife movement corridor. Furthermore, no nesting birds or their nests were observed at the time of the biological assessment.

Potential direct and/or indirect impacts (e.g., clearing and grubbing of vegetation and noise during construction) could potentially disrupt or otherwise adversely affect bird nesting activities in and/or adjacent to the project impact area. However, implementation of the recommended avoidance measure identified below would reduce potential impacts to nesting birds to less than significant levels. Other avoidance and minimization measures identified below would address potential construction-related impacts to nesting birds.

Bio-Measure #1: Pre-Construction Nesting Bird Surveys and Active Nest Avoidance Buffers

If vegetation removal, construction, or grading activities are planned to take place within the active nesting bird season (February 15 through August 31), a qualified biologist should conduct a pre-construction nesting bird survey no more than 3 days prior to the start of such activities. The nesting bird survey should include the project site and areas immediately adjacent to the site that could potentially be affected by project-related activities such as noise, vibration, increased human activity, and dust. If any active bird nests are found within areas that could be directly or indirectly impacted by project-related activities, the qualified biologist should establish an appropriate buffer zone around each active nest. The appropriate buffer should be determined by the qualified

biologist based on species, location, and the nature of the proposed activities. Project activities should be avoided within the buffer zone until each nest is deemed no longer active by a qualified biologist.

Monarch butterfly is a USFWS Candidate species and was identified in the CNDDB records search. While patterns of monarch butterfly overwintering sites cannot reliably be predicted, the abundance of Tasmanian blue gum trees throughout the project site indicates that monarch butterfly have a potential to overwinter within the project site. Overwintering sites are protected as sensitive habitat areas. To avoid potential effects to monarch butterfly, the follow avoidance and minimization measures identified would address potential construction-related impacts to monarch butterfly.

Bio-Measure #2: Pre-Construction Monarch Butterly Clearance Surveys

Should work activities occur within the overwintering period for monarch butterfly (October through March), a qualified biologist will conduct pre-construction surveys to confirm the presence or absence of overwintering activity within the work areas. The pre-construction survey will take place no more than 3 days prior to commencement of work activities. If overwintering monarch butterfly are observed within the work area (or areas potentially indirectly affected by project activities as determined by the qualified biologist) and the work cannot be postponed until monarch butterfly is no longer present, IRWD will obtain written approval from the USFWS or the CDFW, as applicable, prior to completing project work at these locations. With successful implementation of these measures, impacts to monarch butterfly would be avoided, and no additional avoidance or minimization measures are warranted.

Consistency with Adopted Habitat Conservation Plan/Natural Community Conservation Plan and Local Policies

The project site is not within sensitive conservation areas identified by State, regional, or local plans. Protected trees are absent from the project site. Thus, project implementation would not conflict with any regional conservation plan or local policies related to biological resources.

Sincerely,

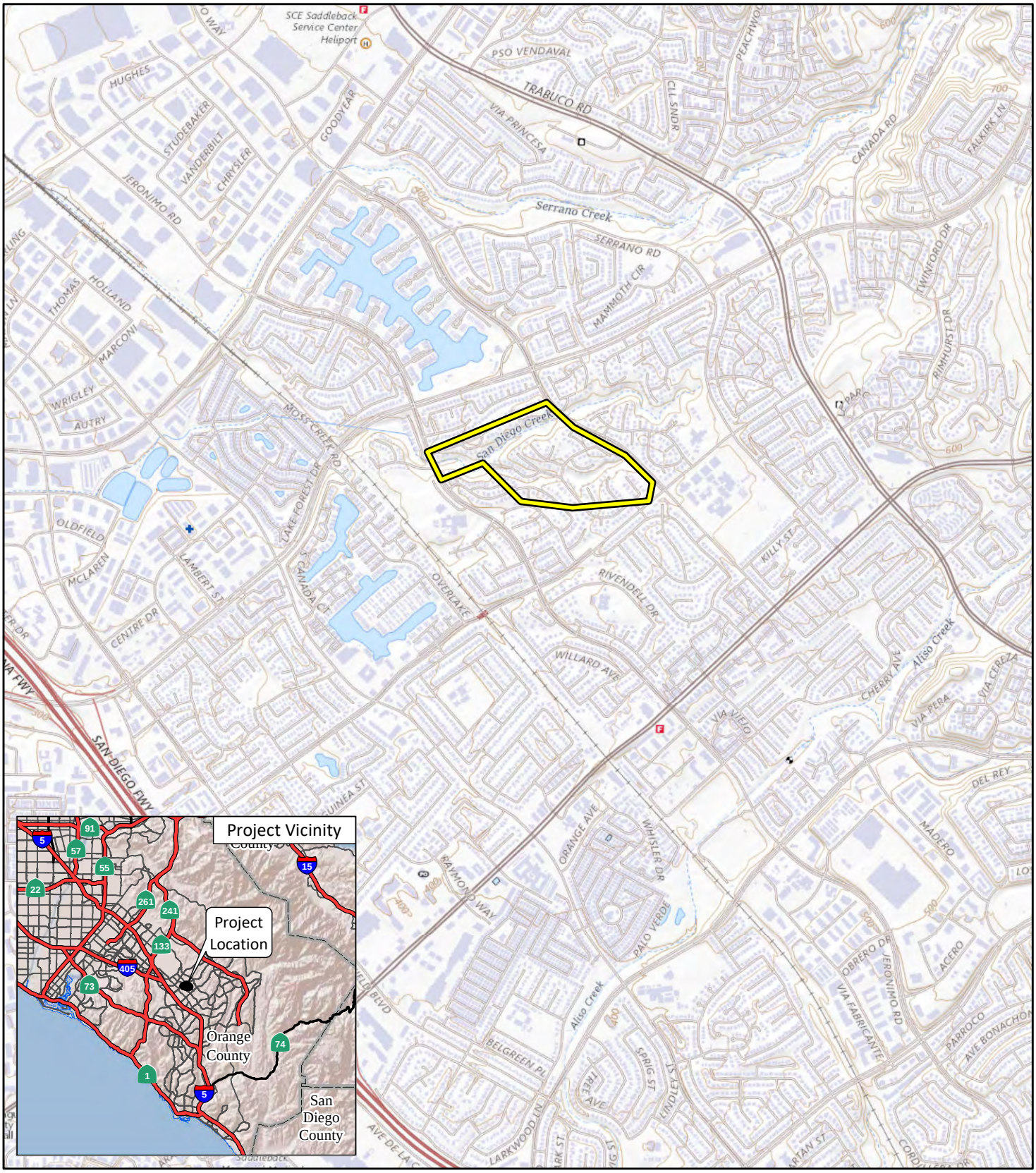
LSA Associates, Inc.

Jeremy Rosenthal
Biologist

Attachments: A – Figures 1 through 6
B – Representative Site Photos
C – Plant and Animal Species Observed
D – Summary of Special-Status Species

ATTACHMENT A

FIGURES 1 THROUGH 6



LSA

LEGEND

Project Location

FIGURE 1

N

0 1000 2000

FEET

SOURCE: USGS The National Map (2018)

I:\IRW2001.03\GIS\MXD\ProjectLocation_TNM.mxd (10/31/2022)

Lake Forest Woods
Sewer Improvements Project

Project Location

LSA

Work Area

Land Cover

Eucalyptus Groves (55.6228 acres)

Developed (9.7441 acres)

FIGURE 2

N

0 250 500

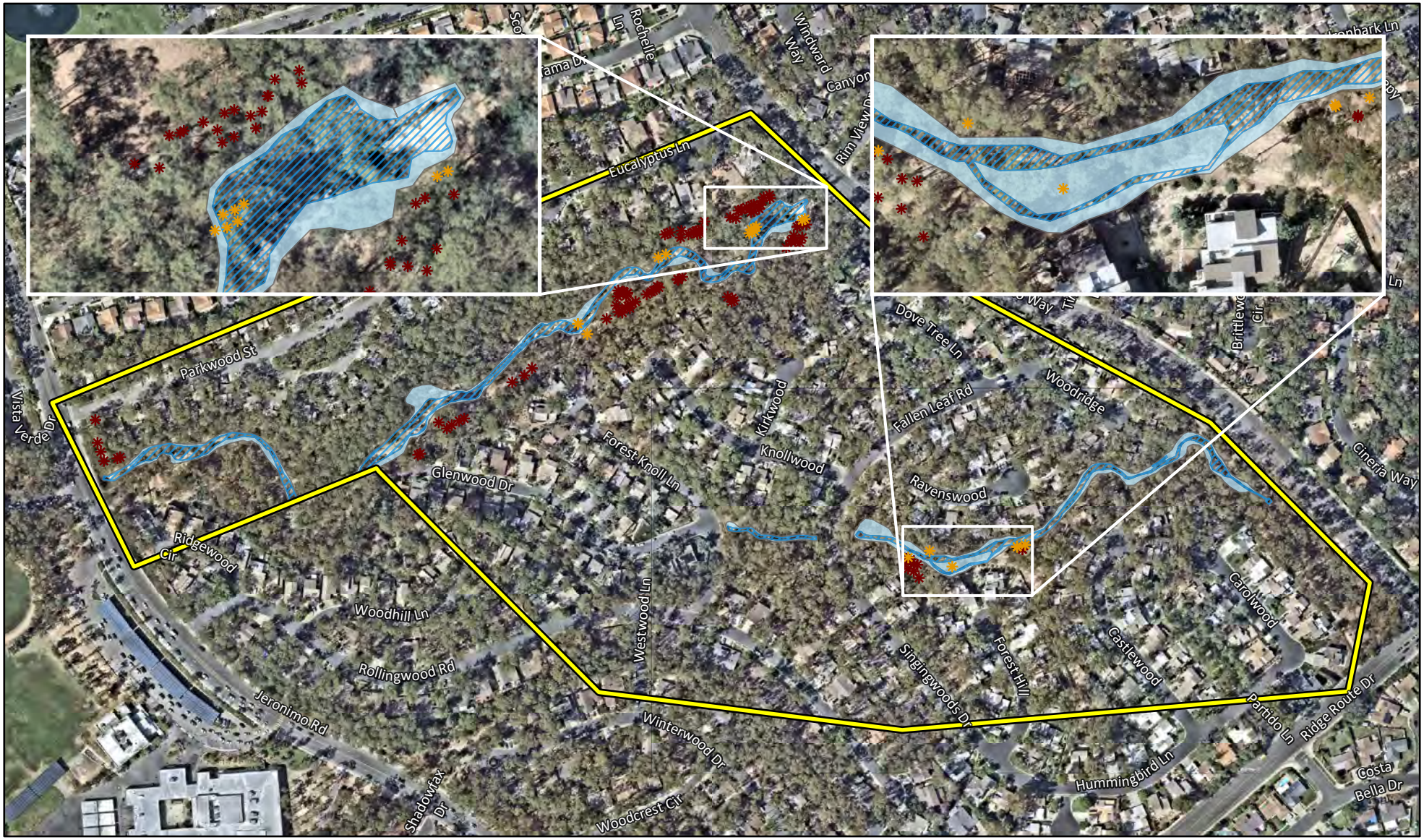
FEET

The Woods Sewer Improvements Project

Vegetation

SOURCE: Google Imagery (2020), USDA NRCS (2022)

J:\IRW2001.03\GIS\Pro\The Woods Sewer Improvements Project.aprx (1/17/2023)



LSA

Work Area

Jurisdictional Areas

CDFW Lake or Streambed (2.614 acres)

USACE/RWQCB Non-Wetland Waters (1.302 acres)

Proposed Eucalyptus Tree Removal

CDFW Jurisdiction (19)

City of Lake Forest Tree Preservation Ordinance (102)

0 175 350

FEET

SOURCE: Nearmap (9/2023)

J:\IRW2001.03\GIS\Pro\The Woods Sewer Improvements Project.aprx (11/15/2023)

FIGURE 3

The Woods Sewer Improvements Project

Trees Proposed for Removal

LSA

Work Area

Soils

173 - Myford sandy loam, 2 to 9 percent slopes

177 - Myford sandy loam, 9 to 30 percent slopes, eroded

217 - Xeralfic arents, loamy, 2 to 9 percent slopes

N

0 250 500

FEET

FIGURE 4

The Woods Sewer Improvements Project

Soils

SOURCE: Google Imagery (2020), USDA NRCS (2022)

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LSA

Work Area

Wetlands - Riverine

FIGURE 5

N

0 250 500

FEET

The Woods Sewer Improvements Project

National Wetlands Inventory

SOURCE: Google Imagery (2020), USFWS (2022)

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LSA

Work Area

Jurisdictional Areas

CDFW Lake or Streambed (2.614 acres)

USACE/RWQCB Non-Wetland Waters (1.302 acres)

FIGURE 6

N

0 175 350

FEET

SOURCE: Google Imagery (2022)

J:\IRW2001.03\GIS\Pro\The Woods Sewer Improvements Project.aprx (11/15/2023)

The Woods Sewer Improvements Project

Delineation of Jurisdictional Areas

ATTACHMENT B

REPRESENTATIVE SITE PHOTOS

Photo 1: Looking south at San Diego Creek located on the northwestern portion of the project site. Photo Date November 16, 2022.

Photo 2: Looking northeast at Glenwood Tributary located on the northeastern portion of the project site. Photo Data November 16, 2022.

Photo 3: Typical view of the Eucalyptus groves located throughout the project site. Photo Date January 11, 2023.

Photo 4: Additional view of San Diego Creek looking north from the western portion of the project site. Photo Date January 11, 2023.

ATTACHMENT C

PLANT AND ANIMAL SPECIES OBSERVED

PLANT SPECIES OBSERVED

* Species not native to the study area

CONIFERS	
Pinaceae	**Pine family**
*Picea pungens**	blue spruce
Pinus sp.*	pines
EUDICOT FLOWERING PLANTS	
Anacardiaceae	**Sumac family**
Rhus integrifolia	lemonade berry
*Schinus terebinthifolius**	Brazilian peppertree
*Searsia lancea**	African sumac
Araliaceae	**Ginseng family**
*Hedera helix**	English ivy
Asteraceae	**Sunflower family**
Artemisia californica	California sagebrush
Pseudognaphalium californicum	California everlasting
*Pulicaria paludosa**	Spanish sunflower
Sonchus sp.*	sowthistle
Bignoniaceae	**Bignonia family**
*Tecoma capensis**	South African cape honeysuckle
Brassicaceae	**Mustard family**
Brassica sp.*	mustard
*Lepidium didymum**	lesser wart-cress
Cactaceae	**Cactus family**
Opuntia littoralis	coastal prickly pear
Callitrichaceae	**Water-Starwort family**
Callitriche marginata	winged water-starwort
Chenopodiaceae	**Saltbush family**
*Chenopodium album**	lamb's quarters
Crassulaceae	**Stonecrop family**
*Crassula argentea**	jade plant
Euphorbiaceae	**Spurge family**
*Euphorbia peplus**	petty spurge
*Euphorbia tirucalli**	fire stick
Fabaceae	**Pea family**
*Medicago polymorpha**	common burclover

Hamamelidaceae	**Witch-hazel family**
*Liquidambar styraciflua**	sweetgum
Lamiaceae	**Mint family**
*Rosmarinus officinalis**	rosemary
Malvaceae	**Mallow family**
*Malva parviflora**	cheeseweed
Myrsinaceae	**Myrsine family**
*Lysimachia arvensis**	scarlet pimpernel
Myrtaceae	**Myrtle family**
*Eucalyptus globulus**	Tasmanian blue gum
*Eucalyptus sideroxylon**	red ironbark
Oxalidaceae	**Oxalis family**
*Oxalis pes-caprae**	Bermuda buttercup
Pittosporaceae	**Pittosporum family**
*Pittosporum tobira**	Japanese cheesewood
Plantaginaceae	**Plantain family**
*Plantago lanceolata**	English plantain
Rubiaceae	**Madder family**
Galium aparine	goose grass
Ulmaceae	**Elm Family**
*Ulmus parvifolia**	Siberian elm
Urticaceae	**Nettle Family**
*Urtica urens**	dwarf nettle
Verbenaceae	**Vervain family**
*Lantana camara**	lantana

MONOCOTS FLOWERING PLANTS

Arecaceae	**Palm family**
*Washingtonia robusta**	Mexican fan palm
Cyperaceae	**Sedge family**
Cyperus eragrostis	tall umbrella-sedge
Poaceae	**Grass family**
*Cynodon dactylon**	Bermuda grass
*Stipa miliacea**	smilo grass
Pontederiaceae	**Pickerel-weed family**
*Acacia dealbata**	silver wattle

ANIMAL SPECIES OBSERVED

* Species not native to the study area

BIRDS	
Trochilidae	**Hummingbirds**
Calypte anna	Anna's hummingbird
Selasphorus sasin	Allen's hummingbird
Cathartidae	**American Vultures**
Cathartes aura	turkey vulture
Accipitridae	**Kites, Hawks, and Eagles**
Buteo jamaicensis	red-tailed hawk
Tyrannidae	**Tyrant Flycatchers**
Sayornis nigricans	black phoebe
Corvidae	**Crows and Ravens**
Corvus brachyrhynchos	American crow
Troglodytidae	**Wrens**
Troglodytes aedon	house wren
Fringillidae	**Finches**
Haemorhous mexicanus	house finch
Spinus psaltria	lesser goldfinch
Passerellidae	**New World Sparrows**
Pipilo maculatus	spotted towhee
Melozone crissalis	California towhee
Melospiza melodia	song sparrow
Zonotrichia leucophrys	white-crowned sparrow
Parulidae	**Wood Warblers**
Setophaga coronata	yellow-rumped warbler

ATTACHMENT D

SUMMARY OF SPECIAL-STATUS SPECIES

Table D: CNDDB Special Status Species Identified as Potentially Occurring or Known to Occur in the Project Vicinity

Species	Status	Habitat and Distribution	Sample Occurrence Probability
Plants			
Aphanisma blitoides **Aphanisma**	US: – CA: 1B.2	Annual herb. Sandy or clay soils on slopes or bluffs near the ocean, usually in coastal bluff scrub, coastal dunes, or coastal scrub, below 305 meters (1,000 feet) elevation. Known in California from Ventura, Santa Barbara, Los Angeles, Orange, and San Diego counties. Also occurs in Mexico. Blooms March through June.	**Not Expected.** Suitable habitat is not present within the project site.
Astragalus brauntonii **Braunton's milk-vetch**	US: FE CA: 1B.1	Perennial herb. Generally shallow calcium carbonate soils derived from marine substrates, although it is occasionally found downstream of known occurrences on noncarbonate soils where survivorship of plants may be reduced. Usually on sandstone with carbonate layers following fire but may follow other disturbance and occur on stiff, gravelly clay soils over granite. Typically associated with the fire-dependent chaparral habitat on limestone and on downwash sites below 640 meters (2,100 feet) elevation. Known only from Los Angeles, Orange, Riverside, and Ventura counties. Blooms January through August.	**Not Expected.** Suitable habitat is not present within the project site.
Atriplex coulteri **Coulter's saltbush**	US: – CA: 1B.2	Perennial herb. Alkaline or clay soils in ocean bluffs and ridge tops and alkaline low places in coastal bluff scrub, coastal dunes, coastal sage scrub, and valley and foothill grasslands below 460 meters (1,500 feet) elevation. In California, known only from Los Angeles, Orange, Santa Barbara, San Bernardino, San Luis Obispo, Ventura, and San Diego counties. Also occurs in Mexico. Reports of this species from Riverside County are based on misidentification of *Atriplex serenana* ssp. *davidsonii* (*The Vascular Plants of Western Riverside County, California*. F.M. Roberts et al., 2004). Blooms March through October.	**Not Expected.** Suitable habitat is not present within the project site.
Atriplex pacifica **South coast saltscale**	US: – CA: 1B.2	Annual herb. Alkali soils in coastal sage scrub, playas, coastal bluff scrub, coastal dunes, and chenopod scrub below 200 meters (600 feet) elevation and perhaps formerly up to about 430 meters (1,400 feet) elevation in Los Angeles County. In California, known from the Channel Islands and mainland Los Angeles, San Diego, and Orange counties. Also occurs in Mexico. Believed extirpated from Ventura County. Reports of this species from Riverside County are based on misidentification of *Atriplex serenana* ssp. *davidsonii* (*The Vascular Plants of Western Riverside County, California*. F.M. Roberts et al., 2004). Blooms March through October.	**Not Expected.** Suitable habitat is not present within the project site.
Atriplex parishii **Parish's brittlescale**	US: – CA: 1B.1	Annual herb. Alkali soils in meadows, vernal pools, chenopod scrub, and playas. Usually on drying alkali flats with fine soils. In California, known from Riverside and San Diego counties. Also occurs in Mexico. Believed extirpated from Los Angeles, Orange, and San Bernardino counties. Blooms June through October.	**Not Expected.** Suitable habitat is not present within the project site.

Table D: CNDDB Special Status Species Identified as Potentially Occurring or Known to Occur in the Project Vicinity

Species	Status	Habitat and Distribution	Sample Occurrence Probability
Atriplex serenana var. *davidsonii* **Davidson's saltscale**	US: – CA: 1B.2	Annual herb. Alkaline soils in scrub and herbaceous communities from 10 to 460 meters (30 to 1,500 feet) elevation. In California, known only from Los Angeles, Orange, Riverside, San Diego, San Luis Obispo, and Ventura counties. Believed extirpated from Santa Barbara and perhaps Los Angeles counties. Also occurs in Mexico. Blooms April through October.	**Not Expected.** Suitable habitat is not present within the project site.
Brodiaea filifolia **Thread-leaved brodiaea**	US: FT CA: CE/1B.1	Perennial herb. Usually on clay or associated with vernal pools or alkaline flats; occasionally in vernally moist sites in fine soils (clay loam, silt loam, fine sandy loam, loam, and loamy fine sand). Typically associated with needlegrass or alkali grassland or vernal pools. Occurs from 25 to 1,120 meters (80 to 3,700 feet) elevation. Known only from Los Angeles, Orange, Riverside, San Bernardino, San Diego, and San Luis Obispo counties, California. Blooms March through June.	**Not Expected.** Suitable habitat is not present within the project site.
Calochortus weedii var. *intermedius* **Intermediate mariposa-lily**	US: – CA: 1B.2	Perennial herb. Dry, open, rocky slopes and rock outcrops in chaparral, coastal sage scrub, and grassland, at 105 to 855 meters (340 to 2,800 feet) elevation. Known only from Los Angeles, Orange, Riverside, and San Bernardino counties, California. In the western Riverside County area, this species is known from the hills and valleys west of Lake Skinner and Vail Lake (*The Vascular Plants of Western Riverside County, California*. F.M. Roberts et al., 2004). Appears to intergrade with *Calochortus plummerae*, which is mostly east and north of the Santa Ana Mountains. Blooms May through July.	**Not Expected.** Suitable habitat is not present within the project site.
Centromadia parryi ssp. *australis* **Southern tarplant**	US: – CA: 1B.1	Annual herb. In vernally wet areas such as edges of marshes and vernal pools, at edges of roads and trails, and in other areas of compacted, poorly drained, or alkaline soils where competition from other plants is limited, often due to disturbance, below 425 meters (1,400 feet) elevation. In California, known only from Santa Barbara, Ventura, Los Angeles, Orange, and San Diego counties. Also occurs in Mexico. Blooms May through November.	**Not Expected.** Suitable habitat is not present within the project site.
Chaenactis glabriuscula var. *orcuttiana* **Orcutt's pincushion**	US: – CA: 1B.1	Annual herb. Sandy areas of coastal bluff scrub and coastal sand dunes below 100 meters (300 feet) elevation. In California, known only from Los Angeles, Orange (believed extirpated), San Diego, and Ventura counties. Also occurs in Mexico. Blooms January through August.	**Not Expected.** Suitable habitat is not present within the project site. Project site is not within appropriate elevation range.
Clinopodium (Satureja) chandleri **San Miguel savory**	US: – CA: 1B.2	Perennial herb. Rocky, moist sites in oak woodland or tall, dense chaparral or at the margins of these communities in coastal sage scrub or grassland, at 110 to 1,210 meters (400 to 4,000 feet) elevation. Prefers moist, rocky canyons with trees or large shrubs. Known only from Orange, Riverside, and San Diego counties, California, and Baja California, Mexico. In western Riverside County, is restricted to the Santa Ana Mountains.	**Not Expected.** Suitable habitat is not present within the project site.

Table D: CNDDB Special Status Species Identified as Potentially Occurring or Known to Occur in the Project Vicinity

Species	Status	Habitat and Distribution	Sample Occurrence Probability
Comarostaphylis diversifolia ssp. *diversifolia* **Summer holly**	US: – CA: 1B.2	Evergreen shrub. Chaparral or cismontane woodland at 30 to 790 meters (100 to 2,600 feet). In California, known only from Orange, Riverside, and Santa Barbara, and San Diego Counties. Also occurs in Mexico. Blooms March through May. Blooms April through June.	**Not Expected.** Suitable habitat is not present within the project site. Additionally, species is visually conspicuous (woody/ shrubby) when present, is detectable year-round, and was not observed at the time of the 2023 field survey.
Dudleya cymosa ssp. *ovatifolia* **Santa Monica dudleya**	US: FT	Perennial herb. Cracks and crevices of rock outcrops and cliff faces (volcanic or sedimentary) in canyons (primarily on north-facing slopes) in chaparral and coastal scrub at 150 to 1,700 meters (500 to 5,500 feet) elevation. Known only from Los Angeles and Orange counties, California. Blooms March through June.	**Not Expected.** Suitable habitat is not present within the project site. Project site is not within appropriate elevation range.
Dudleya multicaulis **Many-stemmed dudleya**	US: – CA: 1B.2	Perennial herb. Heavy, often clay soils or around granitic outcrops in chaparral, coastal sage scrub, and grassland below 790 meters (2,600 feet) elevation. Known only from Los Angeles, Orange, Riverside, San Bernardino, and San Diego counties. Blooms April through July.	**Not Expected.** Suitable habitat is not present within the project site.
Dudleya stolonifera **Laguna Beach dudleya**	US: FT CA: CT/1B.1	Perennial herb. Rocky areas (generally north-facing sandstone cliffs) at 10 to 260 meters (30 to 850 feet) elevation. Known only from Orange County, California, near Laguna Beach, with most occurrences in Laguna Canyon west of SR-73. Blooms May through July.	**Not Expected.** Suitable habitat is not present within the project site.
Dudleya viscida **Sticky dudleya**	US: – CA: 1B.2	Perennial herb. Rocky areas in coastal bluff scrub, chaparral, coastal sage scrub, and cismontane woodland from 10 to 550 meters (30 to 1,800 feet) elevation. Known only from Orange and San Diego counties, California. Blooms May through June.	**Not Expected.** Suitable habitat is not present within the project site.
Euphorbia misera **Cliff spurge**	US: – CA: 2B.2	Perennial herb. Rocky sites within coastal bluff scrub, coastal sage scrub, and Mojavean desert scrub at 10 to 500 meters (30 to 1,600 feet) elevation. In California, known only from the Channel Islands, coastal Orange and San Diego counties, and Riverside County deserts. Also occurs in Mexico. Blooms December through August.	**Not Expected.** Suitable habitat is not present within the project site.
Helianthus nuttallii ssp. *parishii* **Los Angeles sunflower**	US: – CA: 1A	Perennial herb. Marshes and swamps (coastal salt and freshwater) at 10 to 500 meters (30 to 1,600 feet) elevation. This species is historically known from Los Angeles, Orange, and San Bernardino counties, California. Last seen in 1937 and presumed extinct. Plants found in 2002 at Castaic Spring along the Santa Clara River in Los Angeles County were initially reported as possibly this taxon, but instead appear to be hybrids or evolutionary intermediates between *H. nuttallii* and *H. californicus*, based on chromosome counts and pollen morphology (*A Quantitative Analysis of Pollen Variation in Two Southern California Perennial* Helianthus *(Heliantheae: Asteraceae)*, J.M. Porter and N. Fraga, 2004). Blooms August through October.	**Not Expected.** Suitable habitat is not present within the project site.

Table D: CNDDB Special Status Species Identified as Potentially Occurring or Known to Occur in the Project Vicinity

Species	Status	Habitat and Distribution	Sample Occurrence Probability
Hesperocyparis (Callitropsis, Cupressus) forbesii **Tecate cypress**	US: – CA: 1B.1	Evergreen tree found in closed-cone coniferous forest and chaparral at elevations from 255 to 1,500 meters (800 to 5,000 feet). In California, known from Orange and San Diego counties. Trees known from Riverside County are planted. Also occurs in Mexico. Blooms year-round.	**Not Expected.** Suitable habitat is not present within the project site. Project site is not within appropriate elevation range. Additionally, species is visually conspicuous (woody/shrubby) when present, is detectable year-round, and was not observed at the time of the 2023 field survey.
Horkelia cuneata ssp. *puberula* **Mesa horkelia**	US: – CA: 1B	Perennial herb. Sandy or gravelly soils in chaparral, or rarely in cismontane woodland or coastal scrub at 70 to 825 meters (200 to 2,700 feet) elevation. Known only from San Luis Obispo, Santa Barbara, Ventura, Los Angeles, Orange, and San Bernardino counties, California. Believed extirpated from Riverside and San Diego counties. Blooms February through July (sometimes to September).	**Not Expected.** Suitable habitat is not present within the project site.
Imperata brevifolia **California satintail**	US: - CA: 2B.1	Perennial grass. Springs, meadows, streambanks, moist canyons, canals, alkaline sinks, and similar wet areas below 1,220 meters (4,000 feet) elevation. Known from Butte, Fresno, Imperial, Inyo, Kern, Lake, Los Angeles, Orange, Riverside, San Bernardino, Tehama, Tulare, and Ventura counties, although many collections are old and the populations likely extirpated. Also occurs in other areas of the western United States and Mexico. Blooms September through May.	**Low.** While suitable streambanks are present, no known occurrences have been documented within 3 miles of the project site.
Isocoma menziesii var. *decumbens* **Decumbent goldenbush**	US: – CA: 1B.2	Shrub. Sandy soils, often in disturbed areas, in coastal scrub and chaparral from 10 to 135 meters (30 to 440 feet) elevation. Known from mainland Orange and San Diego counties and from San Clemente and Santa Catalina islands in California. Also occurs in Baja California. Blooms April through November.	**Not Expected.** Suitable habitat is not present within the project site. Additionally, species is visually conspicuous (woody/ shrubby) when present, is detectable year-round, and was not observed at the time of the 2023 field survey.
Lasthenia glabrata ssp. *coulteri* **Coulter's goldfields**	US: – CA: 1B.1	Vernal pools and alkaline soils in marshes, playas, and similar habitats below 1,220 meters (4,000 feet) elevation. Known from Colusa, Merced, Tulare, Orange, Riverside, Santa Barbara, San Diego, San Luis Obispo, Tehama, Ventura, and Yolo Counties. Believed extirpated from Kern, Los Angeles, and San Bernardino counties, and possibly also from Tulare County. Also occurs in Mexico. Blooms February through June.	**Not Expected.** Suitable habitat is not present within the project site.

Table D: CNDDB Special Status Species Identified as Potentially Occurring or Known to Occur in the Project Vicinity

Species	Status	Habitat and Distribution	Sample Occurrence Probability
Lepechinia cardiophylla **Heart-leaved pitcher sage**	US: – CA: 1B.2	Perennial herb. Closed-cone coniferous forest, chaparral, and cismontane woodland at 550 to 1,370 meters (1,800 to 4,500 feet) elevation. Occurs in the Santa Ana Mountains in Riverside and Orange counties. Also reported from San Diego County and Baja California. Blooms April through July.	**Not Expected.** Suitable habitat is not present within the project site. Project site is not within the appropriate elevation range.
Lepidium virginicum var. *robinsonii* **Robinson's pepper-grass**	US: – CA: 4.3	Annual herb. Dry soils in coastal sage scrub and chaparral below 885 meters (2,900 feet) elevation. In California, known only from Los Angeles, Orange, Riverside, Santa Barbara, San Bernardino, and San Diego counties and Santa Cruz Island. Also occurs in Mexico. Blooms January through July.	**Not Expected.** Suitable habitat is not present within the project site.
Monardella hypoleuca ssp. *intermedia* **Intermediate monardella**	US: – CA: 1B.3	Perennial rhizomatous herb. Usually understory, often found in steep, brushy areas in chaparral, cismontane woodland, and sometimes lower montane coniferous forests from 200 to 1,250 meters (660 to 4,100 feet) elevation. Endemic to California and only known from Orange, Riverside, and San Diego counties. Blooms April through September.	**Not Expected.** Suitable habitat is not present within the project site. Project site is not within appropriate elevation range.
Monardella macrantha ssp. *hallii* **Hall's monardella**	US: – CA: 1B.3	Perennial herb. Dry slopes and ridges in openings in chaparral, woodland, and forest at 695 to 2,195 meters (2,280 to 7,200 feet) elevation. Known only from Los Angeles, San Diego, Orange, Riverside, and San Bernardino counties, California. In the western Riverside County area, known only from higher elevations in the Santa Ana and Agua Tibia mountains (*The Vascular Plants of Western Riverside County, California*. F.M. Roberts et al., 2004). Blooms June through August (sometimes to October).	**Not Expected.** Project site is not within appropriate elevation range.
Nama stenocarpa **Mud nama**	US: – CA: 2B.2 NCCP: NC	Annual or perennial herb. Lake shores, riverbanks, and similar intermittently wet areas at 5 to 500 meters (20 to 1,600 feet) elevation. Known in California from San Diego, Orange, and Riverside counties and from San Clemente Island. Believed extirpated from Los Angeles and Imperial counties. Known also from Baja California and Arizona. Blooms January through July.	**Not Expected.** While suitable riverbanks and intermittently wet areas are present, no known occurrences have been documented within 3 miles of the project site. Additionally, this species was not observed during the field survey, which took place during the appropriate blooming period.
Nasturtium (Rorippa) gambelii **Gambel's watercress**	US: FE CA: CT/1B.1	Perennial herb. Marshes from 5 to 330 meters (20 to 1,100 feet) elevation. Currently believed to occur in California only in Santa Barbara and San Luis Obispo counties. There are historical records from Los Angeles, Orange, and San Bernardino counties. A historical report from San Diego County likely constitutes a misidentification. Also occurs in Baja California. Blooms April through September.	**Not Expected.** Suitable habitat is not present within the project site.

Table D: CNDDB Special Status Species Identified as Potentially Occurring or Known to Occur in the Project Vicinity

Species	Status	Habitat and Distribution	Sample Occurrence Probability
Navarretia prostrata **Prostrate vernal pool navarretia**	US: – CA: 1B.2	Annual herb. Vernal pools, usually alkaline, from 15 to 1,210 meters (50 to 4,000 feet) elevation. Known only from Alameda, Fresno, Los Angeles, Merced, Monterey, Orange, Riverside, San Benito, San Diego, and San Luis Obispo counties. Presumed extirpated from San Bernardino County. Blooms April through July.	**Not Expected.** Suitable habitat is not present within the project site.
Nolina cismontana **Chaparral nolina**	US: – CA: 1B.2	Perennial shrub. Sandstone or gabbro in chaparral and coastal sage scrub at 140 to 1,275 meters (500 to 4,200 feet) elevation. Known from Orange, Riverside, San Diego, and Ventura counties, California. Blooms May through July.	**Not Expected.** Suitable habitat is not present within the project site. Project site is not within the appropriate elevation range. Additionally, species is visually conspicuous (woody/shrubby) when present, is detectable year-round, and was not observed at the time of the 2023 field survey.
Pentachaeta aurea ssp. *allenii* **Allen's pentachaeta**	US: – CA: 1B.1	Annual herb. Grasslands and openings in coastal scrub from 75 to 520 meters (250 to 1,700 feet) elevation. Known only from Orange County, California. Blooms March through June.	**Not Expected.** Suitable habitat is not present within the project site.
Phacelia keckii **Santiago Peak phacelia**	US: – CA: 1B.3	Annual herb. Closed-cone coniferous forest and chaparral in elevations from 545 to 1,600 meters (1,800 to 5,200 feet). Known from Orange and Riverside counties. In the western Riverside County area, this species is scarce and known from higher elevations in the Santa Ana Mountains, Agua Tibia Mountains, and Arroyo Seco Creek (*The Vascular Plants of Western Riverside County, California*. F.M. Roberts et al., 2004). Blooms May through June.	**Not Expected.** Suitable habitat is not present within the project site. Project site is not within the appropriate elevation range.
Pseudognaphalium leucocephalum **White rabbit-tobacco**	US: – CA: 2B.2	Perennial herb. Sand and gravel at the edges of washes or mouths of steep canyons at 0 to 2,100 meters (0 to 7,000 feet) elevation. In California, known from Los Angeles, Orange, Riverside, Santa Barbara, San Diego, San Luis Obispo, and Ventura counties. Also occurs in Arizona, New Mexico, Texas, and Mexico. Blooms usually August through November.	**Not Expected.** Suitable habitat is not present within the project site.
Quercus dumosa **Nuttall's scrub oak**	US: - CA: 1B.1	Evergreen shrub. On sandy and clay loam soils near the coast within closed-cone coniferous forest, chaparral, and coastal scrub from 15 to 400 meters (50 to 1,300 feet) elevation. In California, known only from western Orange, Santa Barbara, and San Diego counties. Also known from Baja California. Blooms year-round.	**Not Expected.** Suitable habitat is not present within the project site. Additionally, species is visually conspicuous (woody/ shrubby) when present, is detectable year-round, and was not observed at the time of the 2023 field survey.

Table D: CNDDB Special Status Species Identified as Potentially Occurring or Known to Occur in the Project Vicinity

Species	Status	Habitat and Distribution	Sample Occurrence Probability
Senecio aphanactis **Chaparral ragwort**	US: – CA: 2B.2	Annual herb. Openings (especially alkaline flats) in cismontane woodland, coastal sage scrub, and chaparral at 15 to 800 meters (50 to 2,600 feet) elevation. Known in California from Alameda, Contra Costa, Fresno, Los Angeles, Merced, Monterey, Orange, Riverside, Santa Barbara, Santa Clara, San Diego, San Luis Obispo, Solano, and Ventura counties. Also occurs in Baja California. Blooms January through April.	**Not Expected.** Suitable habitat is not present within the project site.
Sidalcea neomexicana **Salt spring checkerbloom**	US: – CA: 2B.2	Perennial herb. Alkaline springs and brackish marshes below 1,530 meters (5,000 feet) elevation. In California, known only from Kern, Orange, Riverside, San Bernardino, San Diego, and Ventura Counties. Believed extirpated from Los Angeles County. Also known from Arizona, New Mexico, Nevada, Utah, and Mexico. Blooms March through June.	**Not Expected.** Suitable habitat is not present within the project site. Project site is not within the appropriate elevation range.
Suaeda esteroa **Estuary seablite**	US: – CA: 1B.2	Perennial herb. Coastal salt marshes below 5 meters (15 feet) elevation. Occurs along immediate coast from Santa Barbara County to Baja California. Blooms May through October (January).	**Not Expected.** Suitable habitat is not present within the project site. Project site is not within the appropriate elevation range.
Symphyotrichum defoliatum **San Bernardino aster**	US: – CA: 1B.2	Perennial herb. Vernally wet sites (such as ditches, streams, and springs) in many plant communities below 2,040 meters (6,700 feet) elevation. In California, known from Ventura, Kern, San Bernardino, Los Angeles, Orange, Riverside, and San Diego counties. May also occur in San Luis Obispo County. In the western Riverside County area, this species is scarce and documented only from Temescal and San Timoteo canyons (*The Vascular Plants of Western Riverside County, California*. F.M. Roberts et al., 2004). Blooms July through November.	**Low.** While streams are present, no known occurrences have been documented within 3 miles of the project site.
Verbesina dissita **Big-leaved crown-beard**	US: FT CA: CT/ 1B.1	Perennial herb. Steep, rocky, primarily north-facing slopes in maritime chaparral at 45 to 210 meters (150 to 700 feet) elevation within 1.5 miles of the ocean and rarely in coastal sage scrub near the bottoms of south-facing slopes opposite north-facing slopes of maritime chaparral. Known only from Orange County in central and southern areas of Laguna Beach, California, and from Baja California. Blooms April through July.	**Not Expected.** Suitable habitat is not present within the project site.
Invertebrates			
Bombus crotchii **Crotch bumble bee**	US: – CA: CE	Nectars on *Antirrhinum, Phacelia, Clarkia, Dendromecon, Eschscholzia,* and *Eriogonum* in coastal California east to the Sierra-Cascade crest and south into Mexico. Active in spring and summer.	**Not Expected.** Suitable habitat is not present within the project site.
Branchinecta sandiegonensis **San Diego fairy shrimp**	US: FE CA: SA	Small, shallow (usually less than 30 centimeters deep), relatively clear but unpredictable vernal pools on coastal terraces. Pools must retain water for a minimum of 13 days for this species to reproduce (3 to 8 days for hatching, and 10 to 20 days to reach reproductive maturity). Known from Orange and San Diego counties, and Baja California. Seasonally following rains in late fall, winter, and spring.	**Not Expected.** Suitable habitat is not present within the project site.

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Species	Status	Habitat and Distribution	Sample Occurrence Probability
Cicindela latesignata latesignata **Tiger beetle**	US: – CA: SA	Mudflats and beaches in coastal southern California. Presumed active in spring through fall.	**Not Expected.** Suitable habitat is not present within the project site.
Danaus plexippus (wintering sites) **Monarch butterfly**	US: C CA: SA	Winter roosts located in wind-protected tree groves (eucalyptus, Monterey pine, cypress) with nectar and water sources nearby. Active September through March.	**High.** Substantial habitat, including eucalyptus groves and water sources, is present throughout the entirety of the project site.
Streptocephalus woottoni **Riverside fairy shrimp**	US: FE CA: SA	Warm-water vernal pools (i.e., large, deep pools that retain water into the warm season) with low to moderate dissolved solids, in annual grassland areas interspersed through chaparral or coastal sage scrub vegetation. Suitable habitat includes some artificially created or enhanced pools, such as some stock ponds, that have vernal pool-like hydrology and vegetation. Known from areas within about 50 miles of the coast from Ventura County south to San Diego County and Baja California. Seasonally active following rains; typically January through April.	**Not Expected.** Suitable habitat is not present within the project site.
Tryonia imitator **Mimic tryonia (=California brackishwater snail)**	US: - CA: SA	Inhabits coastal lagoons, estuaries, and salt marshes, from Sonoma County south to San Diego County. Found only in permanently submerged areas in a variety of sediment types; able to withstand a wide range of salinities. Presumed active year-round.	**Not Expected.** Suitable habitat is not present within the project site.
Fish			
Eucyclogobius newberryi **Tidewater goby**	US: FE CA: SSC	Brackish-water habitats along the California coast from Agua Hedionda Lagoon (San Diego County) to the mouth of the Smith River (Del Norte County). Found in shallow lagoons and lower stream reaches. Year-round.	**Not Expected.** Suitable habitat is not present within the project site.
Gila orcuttii **Arroyo chub**	US: – CA: SSC	Perennial streams or intermittent streams with permanent pools; slow-water sections of streams with mud or sand substrates; spawning occurs in pools. Native to Los Angeles, San Gabriel, San Luis Rey, Santa Ana, and Santa Margarita river systems; introduced in Santa Ynez, Santa Maria, Cuyama, and Mojave river systems and smaller coastal streams. Year-round.	**Not Expected.** Suitable habitat is not present within the project site.

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Species	Status	Habitat and Distribution	Sample Occurrence Probability
Oncorhynchus mykiss irideus **Southern steelhead – Southern California**	US: FE CA: SA	Federal listing refers to runs in coastal basins from the Santa Maria River south to the southern extent of the range (presently considered to be Malibu Creek). Proposed rulemaking 12/19/2000 to extend southern portion of the range to San Mateo. Year-round.	**Not Expected.** Suitable habitat is not present within the project site.
Rhinichthys osculus ssp. 8 **Santa Ana speckled dace**	US: – CA: SSC	Found in the headwaters of the Santa Ana and San Gabriel river drainages. Found in riffles in small streams and shore areas with abundant gravel and rock. Year-round.	**Not Expected.** Suitable habitat is not present within the project site.
Amphibians			
Anaxyrus (Bufo) californicus **Arroyo toad**	US: FE CA: SSC	Washes and arroyos with open water, sand or gravel beds, and, for breeding, pools with sparse overstory vegetation. Coastal and a few desert streams from Santa Barbara County to Baja California. Active March through July.	**Not Expected.** Suitable habitat is not present within the project site.
Spea hammondii **Western spadefoot**	US: – CA: SSC	Grasslands and occasionally hardwood woodlands; largely terrestrial but requires rain pools or other ponded water persisting at least 3 weeks for breeding; burrows in loose soils during dry season. Occurs in the Central Valley and adjacent foothills, the nondesert areas of southern California and Baja California. Active October through April (following onset of winter rains).	**Not Expected.** Suitable habitat is not present within the project site.
Taricha torosa **Coast Range newt**	US: – CA: SSC	Breeds in ponds, reservoirs, and slow-moving streams with long-lasting (at least through July) clean water; uses nearby upland areas including grassland, chaparral, and woodland; coastal drainages from Mendocino County south to San Diego County, with populations from San Luis Obispo County south designated as sensitive. Active October through May.	**Not Expected.** Suitable habitat is not present within the project site.
Reptiles			
Anniella stebbinsi **Southern California legless lizard**	US: – CA: SSC	Inhabits sandy or loose, loamy soils with high moisture content under sparse vegetation in southern California. Active nearly year-round, at least in southern areas.	**Not Expected.** Suitable habitat is not present within the project site.
Arizona elegans occidentalis **California glossy snake**	US: – CA: SSC	Scrub and grassland habitats, often with loose or sandy soils. Patchily distributed from the eastern portion of San Francisco Bay to southern San Joaquin Valley and in nondesert areas of southern California. Also occurs in Baja California, Mexico. Most active March through June (nocturnal).	**Not Expected.** Suitable habitat is not present within the project site.

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Species	Status	Habitat and Distribution	Sample Occurrence Probability
Aspidoscelis hyperythra **Orange-throated whiptail**	US: – CA: SA NCCP: C	Prefers washes and other sandy areas with patches of brush and rocks, in chaparral, coastal sage scrub, juniper woodland, and oak woodland from sea level to 915 meters (3,000 feet) elevation. Perennial plants required. Occurs in Riverside, Orange, San Diego counties west of the crest of the Peninsular Ranges, in extreme southern San Bernardino County near Colton, and in Baja California. Active in March through July, with reduced activity August through October	**Not Expected.** Suitable habitat is not present within the project site.
Aspidoscelis tigris stejnegeri **Coastal western whiptail**	US: – CA: SSC NCCP: C	Woodlands, riparian areas, and sparsely vegetated areas in a wide variety of habitats, including coastal sage scrub and sparse grassland. Occurs in valleys and foothills from Ventura County to Baja California. Active April through August.	**Not Expected.** Suitable habitat is not present within the project site.
Crotalus ruber **Red diamond rattlesnake**	US: – CA: SSC NCCP: C	Desert scrub, thornscrub, open chaparral, and woodland; occasional in grassland and cultivated areas. Prefers rocky areas and dense vegetation. Morongo Valley in San Bernardino and Riverside counties to the west and south into Mexico. Active mid-spring through mid-fall.	**Not Expected.** Suitable habitat is not present within the project site.
Emys marmorata **Western pond turtle**	US: – CA: SSC	Inhabits permanent or nearly permanent water. Absent from desert regions, except in the Mojave Desert along the Mojave River and its tributaries. Requires basking sites such as partially submerged logs, rocks, or open mud banks. Active year-round, with reduced activity November through March.	**Not Expected.** Suitable habitat is not present within the project site.
Phrynosoma blainvillii (coronatum) **Coast horned lizard**	US: – CA: SSC NCCP: C	Primarily in sandy soil in open areas, especially washes and floodplains, in many plant communities. Requires open areas for sunning, bushes for cover, patches of loose soil for burial, and an abundant supply of ants or other insects. Occurs west of the deserts from northern Baja California north to Shasta County below 2,400 meters (8,000 feet) elevation. Active April through July, with reduced activity August through October.	**Not Expected.** Suitable habitat is not present within the project site.
Salvadora hexalepis virgultea **Coast patch-nosed snake**	US: – CA: SSC	Coastal chaparral, washes, sandy flats, and rocky areas. Widely distributed throughout lowlands, up to 2,130 meters (7,000 feet) elevation, in Southern California from the coast to the eastern border. Active diurnally throughout most of the year.	**Not Expected.** Suitable habitat is not present within the project site.
Thamnophis hammondii **Two-striped garter snake**	US: – CA: SSC	Highly aquatic. Only in or near permanent sources of water. Streams with rocky beds supporting willows or other riparian vegetation. From Monterey County to northwest Baja California. Active year-round. Diurnal.	**Not Expected.** Suitable habitat is not present within the project site.

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Species	Status	Habitat and Distribution	Sample Occurrence Probability
Birds			
Accipiter cooperii (nesting) **Cooper's hawk**	US: – CA: SA NCCP: NC	Forages in a wide range of habitats, but primarily in forests and woodlands. These include natural areas as well as human-created habitats such as plantations and ornamental trees in urban landscapes. Usually nests in tall trees (20 to 60 feet) in extensive forested areas (generally woodlots of 4 to 8 hectares, with canopy closure of greater than 60 percent). Occasionally nests in isolated trees in more open areas. Active year-round.	**Not expected (nesting).** Suitable nesting habitat is not present within the project site. Foraging opportunities are present within the project site.
Agelaius tricolor (nesting colony) **Tricolored blackbird**	US: – CA: CT/SSC (breeding) NCCP: C	Open country. Forages in grassland and cropland habitats. Nests in large groups near fresh water, preferably in emergent wetland with tall, dense cattails or tules, but also in thickets of willow, blackberry, wild rose, or tall herbs. Seeks cover for roosting in emergent wetland vegetation, especially cattails and tules, and also in trees and shrubs. Occurs in western Oregon, California, and northwestern Baja California. Active year-round.	**Not Expected.** Suitable habitat is not present within the project site.
Aimophila ruficeps canescens **Southern California rufous-crowned sparrow**	US: – CA: SA NCCP: C	Steep, rocky coastal sage scrub and open chaparral habitats, particularly scrubby areas mixed with grasslands. From Santa Barbara County to northwestern Baja California. Active year-round, diurnal activity.	**Not Expected.** Suitable habitat is not present within the project site.
Ammodramus savannarum (nesting) **Grasshopper sparrow**	US: – CA: SSC (breeding) NCCP: NC	Grasslands, agricultural fields, prairie, old fields, and open savanna. Uncommon and very local summer resident on grassy slopes and mesas west of the deserts. Only rarely in migration and in winter. Coastal Southern California. Active March through September, and also in the winter along the southern California coast.	**Not Expected.** Suitable habitat is not present within the project site.
Aquila chrysaetos (nesting & wintering) **Golden eagle**	US: – CA: CFP NCCP: C	Generally open country of the Temperate Zone worldwide. Nesting primarily in rugged mountainous country. Uncommon resident in southern California. Active year-round. Diurnal.	**Not Expected.** Suitable habitat is not present within the project site.
Asio otus (nesting) **Long-eared owl**	US: – CA: SSC (breeding)	Scarce and local in forests and woodlands throughout much of the Northern Hemisphere. Rare resident in coastal southern California. Nests and roosts in dense willow-riparian woodland and oak woodland, but forages over wider areas. Breeds from valley foothill hardwood up to ponderosa pine habitat. Active year-round. Nocturnal.	**Not Expected.** Suitable habitat is not present within the project site.

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Species	Status	Habitat and Distribution	Sample Occurrence Probability
Athene cunicularia (burrow sites) **Burrowing owl**	US: – CA: SSC NCCP: NC	Open country in much of North and South America. Usually occupies ground squirrel burrows in open, dry grasslands; agricultural and range lands; railroad rights-of-way; and margins of highways, golf courses, and airports. Often utilizes man-made structures, such as earthen berms, cement culverts, cement, asphalt, rock, or wood debris piles. Avoids thick, tall vegetation, brush, and trees, but may occur in areas where brush or tree cover is less than 30 percent. Year-round.	**Not Expected.** Suitable habitat is not present within the project site.
Buteo regalis (wintering) **Ferruginous hawk**	US: – CA: SA	Forages in open fields, grasslands and agricultural areas, sagebrush flats, desert scrub, fringes of pinyon-juniper habitats, and other open country in western North America. Not known to breed in California. Active mid-September through mid-April.	**Not Expected.** Suitable habitat is not present within the project site.
Campylorhynchus brunneicapillus sandiegensis **Coastal cactus wren**	US: – CA: SSC (year round)	Inhabits coastal sage scrub, nesting almost exclusively in thickets of cholla (*Opuntia prolifera*) and prickly pear (*Opuntia littoralis* and *Opuntia oricola*), typically below 150 meters (500 feet) elevation. Found in coastal areas of Orange and San Diego counties, and extreme northwestern Baja California, Mexico. Active year-round (nonmigratory).	**Not Expected.** Suitable habitat is not present within the project site.
Circus cyaneus (nesting) **Northern harrier**	US: – CA: SSC (breeding)	Marshy habitats, grassland, and other open country; uncommon in open desert and brushlands. Nests on the ground in open (treeless) wetland and upland areas, including cultivated cropland and dry grassland. Nests usually constructed in tall, dense clumps of vegetation. Found in the Temperate Zone worldwide. Active year-round.	**Not Expected.** Suitable habitat is not present within the project site.
Coccyzus americanus occidentalis (nesting) **Western yellow-billed cuckoo**	US: FT CA: CE	Breeds and nests in extensive stands of dense cottonwood/willow riparian forest along broad, lower flood bottoms of larger river systems at scattered locales in western North America; winters in South America. Active June through September.	**Not Expected.** Suitable habitat is not present within the project site.
Coturnicops noveboracensis **Yellow rail**	US: – CA: SSC	Inhabits freshwater marshes, as a very local breeder in the northeastern interior of California and as a winter visitor (early October to mid-April) on the coast and in the Suisun Marsh region. Active year-round.	**Not Expected.** Suitable habitat is not present within the project site.
Elanus leucurus (nesting) **White-tailed kite**	US: – CA: CFP	Typically nests in riparian trees such as oaks, willows, and cottonwoods at low elevations. Forages in open country. Found in South America and in southern areas and along the western coast of North America. Active year-round.	**Not Expected.** Suitable habitat is not present within the project site.

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Species	Status	Habitat and Distribution	Sample Occurrence Probability
Empidonax traillii extimus **Southwestern willow flycatcher**	US: FE CA: CE	Rare and local breeder in extensive riparian areas of dense willows or (rarely) tamarisk, usually with standing water, in the southwestern United States and possibly extreme northwestern Mexico. Winters in Central and South America. Below 6,000 feet elevation. Active May through September.	**Not Expected.** Suitable habitat is not present within the project site.
Eremophila alpestris actia **California horned lark**	US: – CA: SA	Open grasslands and fields, agricultural area, open montane grasslands. This subspecies is resident from northern Baja California northward throughout nondesert areas to Humboldt County, including the San Joaquin Valley and the western foothills of the Sierra Nevada (north to Calaveras County). Prefers bare ground such as plowed or fall-planted fields for nesting, but may also nest in marshy soil. During the breeding season, this is the only subspecies of horned lark in nondesert southern California; however, from September through April or early May, other subspecies visit the area. Active year-round (inland areas).	**Not Expected.** Suitable habitat is not present within the project site.
Icteria virens (nesting) **Yellow-breasted chat**	US: – CA: SSC (breeding)	Riparian thickets of willow, brushy tangles near watercourses. Nests in riparian woodland throughout much of western North America. Winters in Central America. Active April through September.	**Not Expected.** Suitable habitat is not present within the project site.
Laterallus jamaicensis coturniculus **California black rail**	US: – CA: CT/CFP	Requires shallow water in salt marshes, freshwater marshes, wet meadows, or flooded grassy vegetation. Prefers areas of moist soil vegetated by fine-stemmed emergent plants, rushes, grasses, or sedges, with scattered small pools. Known from coastal California, northwestern Baja California, the lower Imperial Valley, and the lower Colorado River of Arizona and California. Now extirpated from virtually all of coastal Southern California. Active year-round.	**Not Expected.** Suitable habitat not present within the project site.
Passerculus sandwichensis beldingi **Belding's savannah sparrow**	US: – CA: CE	Resident in salt marshes, with rare exception (e.g., Islas Todos Santos, Baja California), of Pacific Coast from Santa Barbara County to Baja California.	**Not Expected.** Suitable habitat is not present within the project site.
Polioptila californica californica **Coastal California gnatcatcher**	US: FT CA: SSC	Inhabits coastal sage scrub in low-lying foothills and valleys up to about 500 meters (1,640 feet) elevation in cismontane southwestern California and Baja California. Active year-round.	**Not Expected.** Suitable habitat is not present within the project site.

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Rallus obsoletus levipes **Light-footed Ridgway's rail**	US: FE CA: SE/CFP	Found in salt marshes traversed by tidal sloughs, where cordgrass and common woody pickleweed are the dominant vegetation. Requires dense growth of either common woody pickleweed or cordgrass for nesting or escape cover; feeds on mollusks and crustaceans.	**Not Expected.** Suitable habitat is not present within the project site.
Setophagia petechia (nesting) **Yellow warbler**	US: – CA: SSC (breeding)	Riparian woodland while nesting in the western United States and northwestern Baja California; more widespread in brushy areas and woodlands during migration. Occurs from western Mexico to northern South America in winter. Migrants are widespread and common. Three subspecies breed in California: *morcomi, brewsteri,* and *sonorana.* (Sonoran yellow warbler nests along the Colorado River). Active summer, winter, or year-round, depending on locale.	**Not Expected (Nesting).** Suitable nesting habitat is not present within the project site.
Sternula antillarum browni (nesting colony) **California least tern**	US: FE CA: CE/CFP	Nests along the coast from San Francisco Bay south to northern Baja California. Forages in shallow water. Colonial breeder on bare or sparsely vegetated, flat substrates, sand beaches, alkali flats, landfills, or paved areas. Active April through October.	**Not Expected.** Suitable habitat is not present within the project site.
Vireo bellii pusillus **Least Bell's vireo**	US: FE CA: CE	Riparian forests and willow thickets. The most critical structural component of least Bell's vireo habitat in California is a dense shrub layer 2 to 10 feet (0.6–3.0 meters) above ground. Willows are usually dominant. Nests from central California to northern Baja California. Winters in southern Baja California. Active April through September.	**Not Expected.** Suitable habitat is not present within the project site.
Mammals			
Sorex ornatus salicornicus **Southern California saltmarsh shrew**	US: – CA: SSC	Coastal marshes with dense vegetation and woody debris for cover. Known only from Los Angeles, Ventura, and Orange counties. Active year-round and mostly nocturnal.	**Not Expected.** Suitable habitat is not present within the project site.
Antrozous pallidus **Pallid bat**	US: – CA: SSC	Most common in open, dry habitats with rocky areas for roosting. Day roosts in caves, crevices, rocky outcrops, tree hollows or crevices, mines, and occasionally buildings, culverts, and bridges. Night roosts may be more open sites, such as porches and open buildings. Grasslands, shrublands, woodlands, and forests in western North America. Active year-round; nocturnal.	**Not Expected.** Suitable habitat is not present within the project site.

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Species	Status	Habitat and Distribution	Sample Occurrence Probability
Choeronycteris mexicana **Mexican long-tongued bat**	US: - CA: SSC	Occasionally found in San Diego County, which is on the periphery of its range. Feeds on nectar and pollen of night-blooming succulents. Roosts in relatively well-lit caves, and in and around buildings. Active year-round.	**Not Expected.** Suitable habitat is not present within the project site.
Eumops perotis californicus **Western mastiff bat**	US: – CA: SSC	Occurs in many open, semi-arid to arid habitats, including conifer and deciduous woodlands, coastal scrub, grasslands, chaparral, etc.; roosts in crevices in vertical cliff faces, high buildings, and tunnels, and travels widely when foraging. Active year-round; nocturnal.	**Not Expected.** Suitable habitat is not present within the project site.
Lasiurus blossevillii **Western red bat**	US: CA: CSC (in process)	Roosts in the foliage of trees and shrubs, commonly in edge habitats along streams or open fields, and sometimes in orchards or urban areas. Often associated with riparian habitats, particularly those containing sycamores and cottonwoods. Active year-round; nocturnal.	**Not Expected.** Suitable habitat is not present within the project site.
Myotis yumanensis **Yuma myotis**	US: – CA: SA	Optimal habitats are open forests and woodlands with sources of water over which to feed. Common and widespread in California. Uncommon in the Mojave Desert and Colorado Desert regions, except for mountains. Ranging generally from sea level to 2,440 meters (8,000 feet). Roosts in buildings, mines, caves, or crevices, and occasionally in swallow nests and under bridges. Primarily active in the warmer months.	**Not Expected.** Suitable habitat is not present within the project site.
Nyctinomops macrotis **Big free-tailed bat**	US: – CA: SSC	Inhabits rugged, rocky canyon country in the southwestern United States. Found from northern South America and the Caribbean Islands northward to the western United States. In the southwestern United States, populations appear to be scattered. Assumed active year-round.	**Not Expected.** Suitable habitat is not present within the project site.
Chaetodipus fallax fallax **Northwestern San Diego pocket mouse**	US: – CA: SSC	Found in sandy herbaceous areas, usually associated with rocks or coarse gravel in coastal scrub, chaparral, grasslands, and sagebrush, from Los Angeles County through southwestern San Bernardino, western Riverside, and San Diego counties to northern Baja California. Active year-round.	**Not Expected.** Suitable habitat is not present within the project site.
Neotoma lepida intermedia **San Diego desert woodrat**	US: – CA: SSC	Found in desert scrub and coastal sage scrub habitat, especially in association with cactus patches. Builds stick nests around cacti, or on rocky crevices. Occurs along the Pacific slope from San Luis Obispo County to northwest Baja California. Active year-round, mainly nocturnal, occasionally crepuscular and diurnal.	**Not Expected.** Suitable habitat is not present within the project site.

Table D: CNDDB Special Status Species Identified as Potentially Occurring or Known to Occur in the Project Vicinity

Species	Status	Habitat and Distribution	Sample Occurrence Probability
Onychomys torridus ramona **Southern grasshopper mouse**	US: – CA: SSC	Believed to inhabit sandy or gravelly valley floor habitats with friable soils in open and semi-open scrub, including coastal sage scrub, mixed chaparral, low sagebrush, riparian scrub, and annual grassland with scattered shrubs, preferring low to moderate shrub cover. More susceptible to small- and large-scale habitat loss and fragmentation than most other rodents due to its low fecundity, low population density, and large home range size. Arid portions of southwestern California and northwestern Baja California. Active year-round; nocturnal.	**Not Expected.** Suitable habitat is not present within the project site.
Perognathus longimembris pacificus **Pacific pocket mouse**	US: FE CA: SSC	Historically occupied open habitats on sandy soils along the coast from Los Angeles to the Mexican border. Now known from only four sites in Orange and San Diego counties. Active April through September.	**Not Expected.** Suitable habitat is not present within the project site.
Taxidea taxus **American badger**	US: – CA: SSC	Primary habitat requirements seem to be sufficient food and friable soils in relatively open uncultivated ground in grasslands, woodlands, and desert. Widely distributed in North America. Active year-round.	**Not Expected.** Suitable habitat is not present within the project site.

US: Federal Classifications
C = Candidate.
FE = Listed as Endangered.
FT = Listed as Threatened.

CA: State Classifications
CE = Listed as Endangered.
CT = Listed as Threatened.
SA = Special Animal. Refers to any other animal monitored by the Natural Diversity Data Base, regardless of its legal or rarity status.
SSC = Species of Special Concern. Refers to animals with vulnerable or seriously declining populations.

CNPS Designations:
1A = Plants presumed extinct in California and rare/extinct elsewhere.
1B.1 = Rare, threatened, or endangered in California and elsewhere.
1B.2 = Plants rare, threatened, or endangered in California and elsewhere; fairly threatened in California.
1B.3 = Plants rare, threatened, or endangered in California and elsewhere; not very threatened in California.
2B.1 = Plants rare, threatened, or endangered in California but more common elsewhere; seriously threatened in California.
2B.2 = Plants rare, threatened, or endangered in California but more common elsewhere; fairly threatened in California.
2B.3 = Plants rare, threatened, or endangered in California but more common elsewhere; not very threatened in California.
2B = Plants rare, threatened, or endangered in California, but more common elsewhere; not very threatened in California.
4.2 = Plants of limited distribution; fairly threatened in California.
4.3 = Plants of limited distribution; not very threatened in California.

CA = California
CNPS = California Native Plant Society
US = United States

APPENDIX C

CULTURAL RESOURCES ASSESSMENT

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CULTURAL RESOURCES ASSESSMENT

THE WOODS SEWER IMPROVEMENTS

LAKE FOREST, ORANGE COUNTY, CALIFORNIA

LSA

April 2023

CULTURAL RESOURCES ASSESSMENT

THE WOODS SEWER IMPROVEMENTS

LAKE FOREST, ORANGE COUNTY, CALIFORNIA

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Project No. IRW2001.03

LSA

April 2023

EXECUTIVE SUMMARY

LSA conducted a cultural resources assessment for The Woods Sewer Improvements (project) in Lake Forest, Orange County, California. The assessment included a record search, archival research, a field survey, and this report. The undertaking requires permits from the United States Army Corps of Engineers (USACE) and is subject to Section 106 of the National Historic Preservation Act of 1966 (NHPA). The USACE is the lead federal agency responsible for implementation of Section 106. The undertaking includes extensive sewer system improvements.

The 3.83-acre Area of Potential Effects (APE) was delineated pursuant to Section 106 of the NHPA and includes all areas where historic properties may be directly or indirectly affected by project-related activities. This includes access improvements, sewer improvements, and watershed improvements areas.

The following steps were taken to identify historic properties. A records search for the project was conducted by Stacy St. James, Coordinator for the South Central Coastal Information Center of the California Historical Resources Information System at California State University, Fullerton. The records search included a review of all previously recorded cultural resources and previous cultural resources studies within 0.25 mile of the APE (none of which include any portion of the APE). The record search results indicate that no resources have been previously recorded within the APE, one cultural resource has been previously recorded within the 0.25-mile study area, and none of the APE has been subject to previous survey or environmental evaluation.

The California Native American Heritage Commission (NAHC) maintains a confidential Sacred Lands File (SLF), which contains sites of traditional, cultural, or religious value to the Native American community. The NAHC was contacted on November 7, 2022, to request a search of the SLF. The NAHC responded to the request in a letter dated December 7, 2022. The results of the SLF search conducted by the NAHC were negative. As part of Section 106, USACE will consult with Native American groups associated with the APE and its vicinity.

Historic aerial photographs were examined to provide historic land use information about the APE and vicinity. A cultural resources survey of the APE was conducted on March 31, 2023. As a result of that survey, no cultural resources were identified within the APE.

Through the various avenues of research, this study did not encounter any “historic properties,” as defined by Section 106, within the APE. No built environment, archaeological resources or indications of subsurface archaeological deposits were identified within the APE. Therefore, it is unlikely that project implementation would affect intact subsurface archaeological resources within the APE. As such, a finding of *No Historic Properties Affected* for cultural resources is recommended. If archaeological deposits are identified during project activities, the provisions in 36 CFR 800.13(b) (*Discoveries without prior planning*) should be followed.

TABLE OF CONTENTS

PHOTOGRAPHS

APPENDICES

LIST OF ABBREVIATIONS AND ACRONYMS

ABS	acrylonitrile butadiene styrene
APE	Area of Potential Effects
IRWD	Irvine Ranch Water District
NAHC	Native American Heritage Commission
NHPA	National Historic Preservation Act of 1966
project	The Woods Sewer Improvements Project
PVC	polyvinyl chloride
SCCIC	South Central Coastal Information Center
SLF	Sacred Lands File
USACE	United States Army Corps of Engineers
USGS	United States Geological Survey

INTRODUCTION

LSA prepared a cultural resources assessment for The Woods Sewer Improvements (project), which would require grading, excavation, and other ground-disturbing activities. The project requires permits from the United States Army Corps of Engineers (USACE) and is subject to Section 106 of the National Historic Preservation Act of 1966 (NHPA). The USACE is the lead federal agency responsible for implementation of Section 106.

LSA personnel involved in the preparation of this report included Kerrie Collison, M.A., Registered Professional Archaeologist (RPA) 28731436 and Riordan Goodwin, Registered Archaeologist (RA) 28090.

Ms. Collison has more than 13 years of experience as a professional archaeologist conducting field surveys, conducting subsurface excavations and studies, and preparing reports for projects throughout California. She earned her B.S. in Social Sciences from California Polytechnic State University, San Luis Obispo, and her M.A. in Anthropology with an emphasis in Public Archaeology from California State University, Northridge. Ms. Collison meets the Secretary of the Interior Professional Qualification Standards for Archaeology.

Mr. Goodwin has more than 30 years of experience conducting cultural resource assessments, constraints analyses, Phase II testing and Phase III data recovery programs throughout Southern California. He earned his B.A. in Anthropology from San Diego State University and has conducted survey, testing, data recovery, and monitoring programs, as well as Native American consultation throughout his career.

LSA Archaeologist Aaron McCann completed the field survey for this project. Mr. McCann earned his B.A. in Anthropology from California State University, Fullerton, in 2018 and is currently enrolled in the M.A. Anthropology program at California State University, Fullerton. He has more than 14 years of archaeological surveying, excavation, and monitoring experience throughout California.

At the request of Irvine Ranch Water District (IRWD), LSA performed a cultural resources study on the 3.83-acre Area of Potential Effects (APE) in Lake Forest, Orange County, California. The APE is in Section 23 of Township 6 South, Range 8 West, San Bernardino Baseline and Meridian, as depicted on the United States Geological Survey (USGS) *El Toro, California* 7.5-minute topographic quadrangle map (USGS 1982). It is generally bounded by Jeronimo Road to the southwest, Ridge Route Drive to the southeast, Toledo Way to the northeast, and Lake Forest Drive to the northwest (Appendix A, Maps 1, 2, and 3).

PROJECT DESCRIPTION

IRWD proposes to implement the following access and sewer facility improvements within The Woods neighborhood in Lake Forest, California.

Along Upper San Diego Creek, IRWD proposes to install new 8 and 10-inch polyvinyl chloride (PVC) pipe and eight new precast concrete manholes, repair/replace portions of a concrete pad at the existing drainage crossing and reconnect the existing 4-inch acrylonitrile butadiene styrene (ABS)

service laterals. New pipelines would be installed via open trench or trenchless construction methods. Following installation, the pipe will be encased in concrete.

A portion of the pipe would be installed via trenchless methods (Pilo Tube Guided Augar Boring) due to the steep terrain and proximity to private property lines. In addition, approximately 1,200 feet of existing sewer pipelines within the scour envelope would be abandoned in place and filled with concrete slurry to reduce the amount of excavation and disturbed area within the creek. Portions of the existing concrete pad that encompasses existing two manholes would be demolished and replaced as necessary to remove and dispose of the above grade portions of the manholes, below grade portions would be filled with cement slurry and abandoned in place. Above grade portions of other existing sewer manholes would be removed and the materials off hauled. The remaining portions of these manholes would be cement filled, and slurry filled. One manhole would be removed and replaced in the same location.

In addition, IRWD proposes to install ungrouted riprap check dams or bank stabilization measures at several locations within Upper San Diego Creek to reduce scour and protect existing sewer infrastructure and access roads. Riprap check dams would consist of large, ungrouted rock riprap underlain with unwoven fabric and compacted fill.

The existing dirt access road extending along the north side of Upper San Diego Creek would be replaced with a gravel access road within the existing pipeline easement and a new gravel access road would be constructed along the south side of Upper San Diego Creek within a portion of the new sewer easement. The existing dirt access road off Glenwood Drive would also be replaced with a gravel access road. The existing paved access roads off Dove Tree Lane, Parkwood Street, and Jeronimo Road would be repaved.

Along the Glenwood Tributary, IRWD proposes to install a new concrete incased 8-inch PVC pipeline, two new precast concrete manholes, and reconnections of the existing service laterals. The new sewer line would run along the southern bank of the Glenwood Tributary connecting to existing 8-inch sewer lines. Existing 4-inch ABS service laterals would be relocated as required. The relocation and concrete encasement of the sewer line will reduce the risk of damage from scour.

Approximately 600 linear feet of 8-inch sewer would be abandoned in place and filled with cement slurry. In addition, two existing manholes would be abandoned, in the same manner as described above. IRWD also proposes to install ungrouted riprap check dams at various locations within the Glenwood Tributary to slow stream flow and allow sediment to settle out.

The existing paved access road from Singingwoods Drive would be widened and repaved.

AREA OF POTENTIAL EFFECTS

The APE was delineated pursuant to Section 106 of the NHPA and includes all areas where historic properties may be directly or indirectly affected by project-related activities. Direct impact areas include access improvements, sewer improvements, and watershed improvements areas along the Upper San Diego Creek and the Glenwood Tributary (Appendix A, Map 3). The Vertical APE extends to a maximum of 19 feet deep. Most of the replacement pipeline would be placed in trenches with

depths varying depending on the diameter of the pipe installed and ground conditions. Trench depths would range between 4 and 19 feet with trench widths between 2 and 4 feet wide. Access roads will be excavated to a maximum depth of 20 feet. Access roads and concrete pads will be excavated to a maximum depth of 4 feet.

ENVIRONMENTAL SETTING AND BACKGROUND

NATURAL SETTING

The APE is in the Southern California Coastal Plain in an area 8.4 miles from the coast. The project region is characterized by a semi-arid climate with dry, hot summers and moderate winters. Rainfall ranges from 5 to 15 inches annually (Beck and Haase 1974). Most precipitation occurs in the form of winter rain, with occasional warm, monsoonal showers in the late summer. Water sources include two ephemeral drainages that transect the north and central portions of the APE, and Aliso Creek (which flows southwest) 1.2 miles to the south.

The APE, at an elevation averaging 380 feet, falls into the middle portion of the Lower Sonoran life zone of California (Schoenherr 1992), which ranges from below sea level to 3,500 feet. The APE and surrounding area have a mostly coastal sage scrub plant community, but much of the biotic character has been altered from its natural setting by suburban development. Extensive fauna are known locally, including many endemic species of rodents, reptiles, birds, and insects.

PREHISTORIC SETTING

Chronologies of prehistoric cultural change in Southern California have been attempted numerous times, and several are reviewed in Moratto (1984). No single description is universally accepted, as the various chronologies are based primarily on material developments identified by researchers familiar with sites in a particular region and variation exists essentially due to the differences in those items found at the sites. Small differences occur over time and space, which combine to form patterns that are variously interpreted.

Currently, two primary regional culture chronology syntheses are commonly referenced in the archaeological literature. The first, Wallace (1955), describes four cultural horizons or time periods: Horizon I – Early Man (9000–6000 BC), Horizon II – Milling Stone Assemblages (6000–3000 BC), Horizon III – Intermediate Cultures (3000 BC–AD 500), and Horizon IV – Late Prehistoric Cultures (AD 500–historic contact). This chronology was refined (Wallace 1978) using absolute chronological dates obtained after 1955.

The second cultural chronology (Warren 1968) is based broadly on Southern California prehistoric cultures and was also revised (Warren 1984; Warren and Crabtree 1986). Warren's 1984 chronology includes five periods in prehistory: Lake Mojave (7000–5000 BC), Pinto (5000–2000 BC), Gypsum (2000 BC–AD 500), Saratoga Springs (AD 500–1200), and Protohistoric (AD 1200–historic contact). Changes in settlement pattern and subsistence focus are viewed as cultural adaptations to a changing environment, which begins with gradual environmental warming in the late Pleistocene, continues with the desiccation of the desert lakes, followed by a brief return to pluvial conditions, and concludes with a general warming and drying trend, with periodic reversals that continue to the present (Warren and Crabtree 1986).

ETHNOGRAPHIC SETTING

The APE is near the intersection of the traditional tribal territories of the Gabrielino and Juaneño, which were fluid and changed over time. Typically, the native culture groups in Southern California are named after nearby Spanish period missions, and such is the case for these coastal Takic populations. For instance, the term, "Gabrielino" is applied to the natives inhabiting the region around Mission San Gabriel, and the name "Juaneño" was assigned to any native living in the vicinity of San Juan Capistrano.

Gabrielino

The Late Prehistoric Period ended in 1769, when Franciscan friars and Spanish soldiers began establishing mission outposts along the California coast. At that time, what is now the greater Los Angeles area to as far south as Aliso Creek was occupied by the Gabrielino Indians. This indicates that the current APE is at the southern end of Gabrielino territory.

Gabrielino refers to the Shoshonean (Takic) speaking Native Americans who lived throughout Los Angeles, western San Bernardino and Riverside, and Orange counties, and who were historically affiliated with Mission San Gabriel Arcángel. Some of these Shoshonean people also called themselves *Tong-va* (Johnson 1962; McCawley 1996).

The Gabrielino were hunters and gatherers who used both inland and coastal food resources. They caught and collected seasonally occurring food resources and evolved a semi-sedentary lifestyle, living in permanent and semi-permanent villages along inland watercourses and coastal estuaries. These villages took advantage of the varied resources available at such locales. Seasonally, as foods became available, the Gabrielino moved to temporary gathering camps and collected plant foods such as acorns, buckwheat, chia, berries, or fruits. They also periodically established camps along the coast or at estuaries to gather shellfish or to hunt waterfowl (Hudson 1971; McCawley 1996).

The Gabrielino lived in small, semi-permanent villages that were the focus of family life. Patrilineally linked extended families lived within each village (Kroeber 1925; Johnson 1962; Bean and Smith 1978). These kin groups were affiliated in several village clans. Both the clans and the villages were apparently exogamous; mission records suggest that after her marriage, a woman resided at her husband's village.

Gabrielino villages were politically independent even when marriage ties existed. The village was administered by a headman who inherited his position from his father. Shamans guided religious and medical activities, and group hunting or fishing was supervised by individual male specialists. An active and elaborate system of rituals and ceremony was present when the Spanish padres arrived to establish Mission San Gabriel. Rituals included individual rites of passage, village rites, and participation in the widespread *Chingichngish* cult. The cult of the culture hero, *Chingichngish*, was observed and recorded by Franciscan Friar Geronimo Boscana while he resided at Missions San Juan Capistrano and San Luis Rey (Harrington 1933, 1934; Boscana 1933; Hanna 1933).

Juaneño

The Juaneño occupied a relatively small territory between Gabrielino territory to the north and Luiseño territory to the south. The Juaneño language, however, was a dialect of the Luiseño language (Kroeber 1925). Juaneño territory extended from the ocean at the mouth of Aliso Creek to the southern crest of the Santa Ana Mountains following Aliso Creek. Along its southern boundary, Juaneño territory ran between San Onofre and Las Pulgas creeks (Kroeber 1925). This places the current APE just north of the northern boundary of Juaneño territory. Much of what is known about the Juaneño comes from studies of the Gabrielino and Luiseño.

Rather than having a distinct language, Juaneño speech was said to be a dialect of Luiseño (Kroeber 1925). White (1963) states that the dialectical differences between the Juaneño and Luiseño "did not prevent mutual understanding" and that although local variations in culture between Juaneño and Luiseño existed, it was at a village level rather than a tribal level, suggesting only minor differences between the two groups. Sparkman (1908) and White (1963) believed that the Juaneño were really a subgroup of the greater Luiseño tribe. These previous descriptions suggest major similarities between the Luiseño and Juaneño, based primarily on language. In any event, major similarities existed between the Luiseño and Juaneño groups, much greater than the similarities between the Juaneño and Gabrielino.

Juaneño culture was similar to Gabrielino culture in that it was characterized by an elaborate system of ritual and ceremony. The Gabrielino jimson weed ceremonies were practiced by the Juaneño, who in turn helped convey them to the Luiseño. As with the Luiseño, these rites were inspired by their god, *Chingichngish,* and were recorded by Franciscan Friar Gerónimo Boscana during his residence at Missions San Juan Capistrano and San Luis Rey (Boscana 1933; Hanna 1933; Harrington 1933, 1934). Upon reaching puberty, children were given a drug, possibly a mixture of jimson weed and tobacco, during a communal ritual. The drug created visions, usually of an animal, in which the children were instructed to place all confidence since the animal vision would defend them from future danger. Animals mentioned by the Luiseño as guardian spirits included the coyote, bear, crow, raven, and rattlesnake (Kroeber 1925).

The Juaneño were hunters and gatherers who used both inland and coastal food resources. They hunted and collected seasonally available food resources. They were semi-sedentary, sometimes occupying permanent communities at coastal estuaries or along inland watercourses. Common habitation areas included rivers, streams, and inland watercourses; sheltered coastal bays and estuaries; and the transition zone marking the interface between prairies and foothills (Oxendine 1983). The presence of water, a stable food supply, and some measure of protection from flooding were among the most important factors in choosing a living site. Communities in the interior regions often maintained permanent geographical territories or use areas averaging approximately 30 square miles. Village size generally ranged from 50 to 100 inhabitants. It is unclear if the extent of territory and village population were similar at coastal settlements where food resources are thought to have been more plentiful (White 1963; Oxendine 1983).

What is known about the Gabrielino and Juaneño was recorded principally during the initial European expeditions through the Southern California area. Due to the rapid reduction in

indigenous populations during the late 1700s and early 1800s, later expeditions did not encounter the same pristine native populations observed during earlier excursions.

HISTORIC SETTING

In California, the historic era is generally divided into three periods: the Spanish Period (1769 to 1821), the Mexican Period (1821 to 1848), and the American Period (1848 to present).

Spanish Period

Gaspar de Portolá led the first overland expedition through what would become Orange County in 1769, and 2 years later Mission San Gabriel was established in what is now Los Angeles County. Mission San Juan Capistrano (in Orange County) was founded in 1776. These two missions claimed much of what is now Orange County, predominantly using the land for grazing livestock and horses until the 1830s (Orange County Historical Society 2023).

Mexican Period

By 1823, just two years after Mexico gained independence from Spain (with the 1821 treaty of Cordoba) El Camino Real connected a series of small, self-reliant missions, pueblos, and presidios from San Diego to Sonoma. Beginning in 1834, these missions would be secularized under Mexican rule and the missions' vast landholdings would be granted as *ranchos* to prominent citizens who would occupy and improve the land. Sixteen *ranchos* were granted in Orange County, including the *Rancho Cañada de los Alisos* made by Governor Alvarado to José Serrano in 1842 (which includes the APE).

American Period

El Toro/City of Lake Forest

Spanish for "The Bull," the El Toro area was named for a friendly bull that frequented the area near Juan Avila's adobe houses along San Juan Road (now Interstate 5) at Aliso Creek. The cluster of houses became known as Rancho El Toro (Meadows 1966, Salley 1977). In 1888, the Santa Fe Railroad laid tracks across Aliso Creek about 1 mile north of the Avila Adobe area and named the station there "El Toro"; the community's post office opened the same year and the El Toro School District was established the following year (Meadows 1966, Salley 1977).

The western city boundaries of Lake Forest nearly match those of *Rancho Cañada de los Alisos*, from which the original El Toro place name derived. The ranch land remained in the Serrano family until financial problems forced them to sell. The land subsequently became used for agricultural purposes and in the first decade of the 1900s, Dwight Whiting planted 400 acres of rapidly growing eucalyptus trees (in response to the lumber shortage in California) before it was realized that eucalyptus split easily and also warped during curing, rendering it unusable for most building purposes (Strudwick 2019). A variety of crops were profitably cultivated, cattle and poultry ranching along with beekeeping was also successful, and, by the mid-1910s, the community included a hotel, store, school, church and two warehouses (McGroarty 2014). On eve of World War II, it remained a modest community of just 130 people (Strudwick 2019).

The transition from agriculture began with the establishment of the Marine Corps Air Station on 4,700 acres of olive fields during World War II. Although it was a boon to the local economy through the Cold War era, the air base fostered suburban development in the surrounding area that further encroached upon agricultural fields (Strudwick 2019).

El Toro incorporated as part of the City of Lake Forest in 1991. Today, Lake Forest encompasses 16.7 square miles. Notably, the area contains neither a natural lake nor a natural forest. The "forest" refers to the eucalyptus grove Whiting planted in the early 1900s. Although the city's name became Lake Forest, the post office remains El Toro because a Lake Forest post office in the Tahoe area, although closed, had already been named (Salley 1977).

ARCHIVAL RESEARCH METHOD AND RESULTS

RECORD SEARCH

On December 14, 2022, a record search for the APE and a 0.25-mile search radius was conducted by Stacy St. James, Coordinator at the California Historical Resources Information System's South Central Coastal Information Center (SCCIC) housed at California State University, Fullerton. The record search included a review of all recorded cultural resources and previous studies within the search radius.

The record search results indicate that 10 cultural resources assessments have been conducted within a 0.25-mile radius of the APE including OR-00209, OR-02930, OR-03431, OR-03747, OR-03757, OR-04064, OR-04169 and OR-04182, all of which were field studies, along with OR-02662 (a record search), and OR-03373 (a monitoring report) (Appendix B). None of the APE and approximately 15 percent of the 0.25-mile records search radius has been included in previous cultural resources surveys. The record search results indicate one cultural resource (P-30-000038, a prehistoric artifact scatter) was previously recorded within the 0.25-mile record search radius.

SACRED LANDS FILE SEARCH

The California Native American Heritage Commission (NAHC) maintains a confidential Sacred Lands File (SLF), which contains sites of traditional, cultural, or religious value to the Native American community. The NAHC was contacted on November 7, 2022, to request a search of the SLF for the APE. The NAHC responded to the request in a letter dated December 7, 2022. The results of the SLF search the NAHC conducted were negative (Appendix C). As part of Section 106, USACE will consult with Native American groups associated with the APE and its vicinity, as provided in the NAHC response.

OTHER RESEARCH

LSA conducted additional research during April 2023. Aerial photographs indicate that although there was never any conspicuous built environment on the APE, it was intermittently under cultivation from the 1930s into the 1970s and was suburban residential development by the 1980s (HistoricAerials.com 2023).

FIELD SURVEY METHODS AND RESULTS

LSA Archaeologist Aaron McCann conducted a cultural resources field survey on March 31, 2023. Mr. McCann walked transects spaced less than 5 meters (16.4 feet), with particular attention given to surfaces and areas with exposed soil. The survey began in the Upper San Diego Creek section of the APE at the sections nearest Jeronimo Road. The two westernmost sections were partially paved with asphalt and at the bottom of a slope (Photographs 1 and 2). The survey continued northwest along the alignment of the tributary until the edge of the APE near Toledo Way. Sediments in the surveyed areas of the Upper San Diego Creek main consisted of medium brown sandy alluvium that extended to at least 10 centimeters (4 inches) deep, based on spots that were exposed using a trowel.

Much of the Glenwood Tributary portion of the APE is within the creek alignment since the creek is bounded by private property up to the creek bed (Photograph 3). Sediments in the creek alignment were medium-brown, sandy alluvium with river cobbles. The portion of the APE designated to be a watershed improvement area was mostly landscaped and covered with low-lying vegetation. Other portions of this area of the APE were paved with asphalt (Photograph 4).

Both the Upper San Diego Creek area and the Glenwood Tributary area contain numerous eucalyptus trees, which serves as evidence of some level of previous disturbance since eucalyptus trees are not native to California.

No cultural resources were identified within the APE as a result of the field survey.

Photograph 1: Westernmost section of Upper San Diego Creek APE. View to northeast.

Photograph 2: Sewer improvement area in Upper San Diego Creek. View to northeast.

Photograph 3: Watershed improvement work area in the Glenwood Tributary. View to southwest.

Photograph 4: Asphalt and sediments along the Glenwood Tributary. View to north.

CONCLUSIONS AND RECOMMENDATIONS

As a result of the record search, archival research, and field survey, this study did not encounter any "historic properties", as defined by Section 106, within the APE. No built environment, archaeological resources or indications of subsurface archaeological deposits were identified within the APE. The sediments observed in the APE during the survey are of a type that could contain archaeological resources. However, the proposed project work would take place along the banks of creek tributaries that would have been potentially subject to seasonal flooding, resulting in the movement of any deposited artifacts. Additionally, the direct vicinity of the APE has been previously disturbed for residential development and planting of eucalyptus trees, further reducing the potential for *in situ* archaeological deposits.

For the above-stated reasons, there is a low potential for project implementation would affect intact subsurface archaeological resources within the APE. As such, a finding of *No Historic Properties Affected* for cultural resources is recommended and no further cultural resource investigations are recommended. If archaeological deposits are identified during project activities, the provisions in 36 CFR 800.13(b) (*Discoveries without prior planning*) should be followed. Upon completion of monitoring activities, the archaeologist should prepare a report to document the methods and results of monitoring activities. This report should be submitted to the SCCIC.

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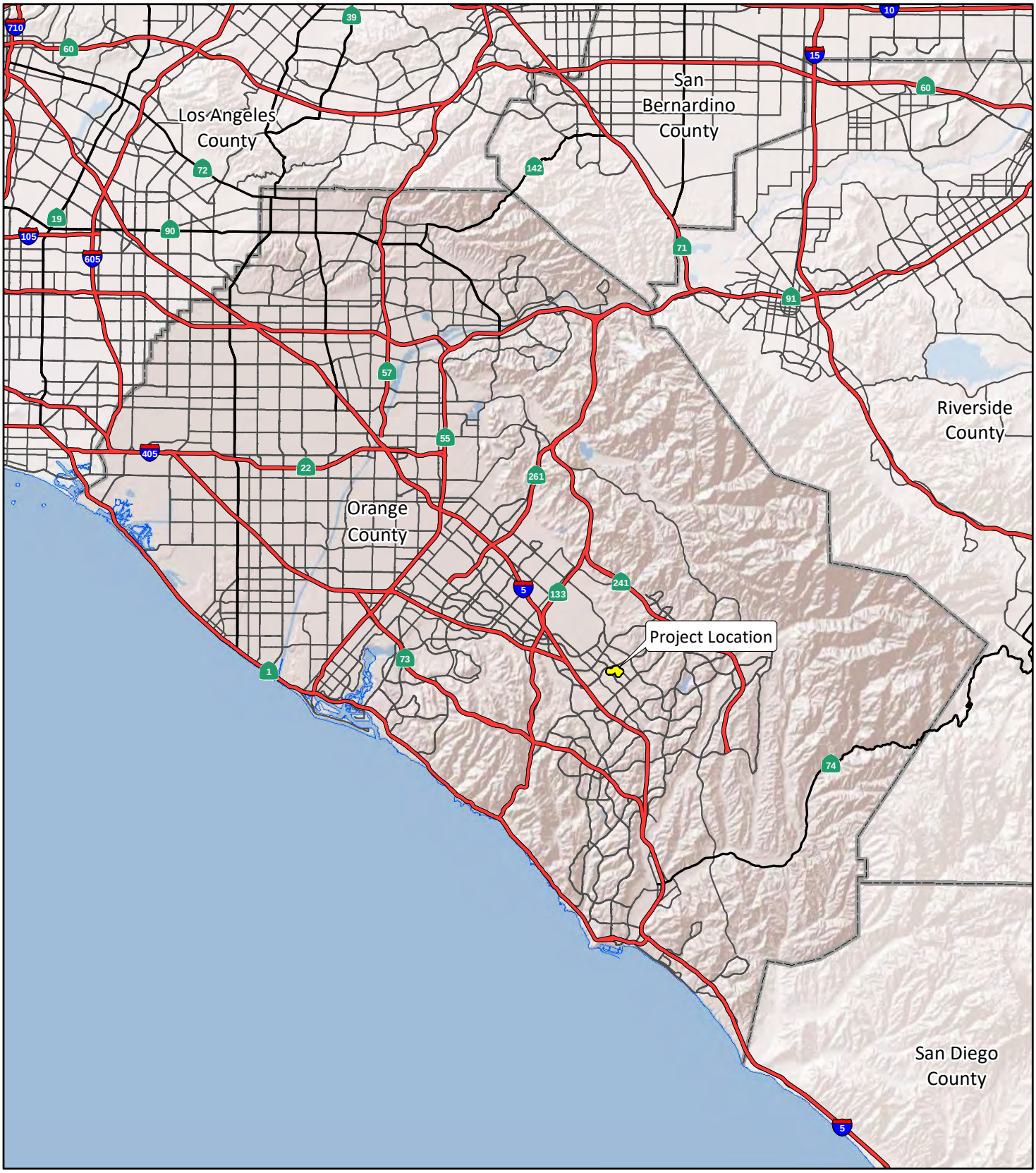
APPENDIX A

PROJECT MAPS



LSA

LEGEND

Project Location

FIGURE 1

N

0 3 6

MILES

SOURCE: Esri (2022)

The Woods Sewer Improvements Project

Project Vicinity

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LSA

LEGEND

Project Location

MAP 2

N

0 1000 2000

FEET

The Woods Sewer Improvements Project

Project Location

SOURCE: USGS 7.5' Quad - *El Toro, CA* (1982)

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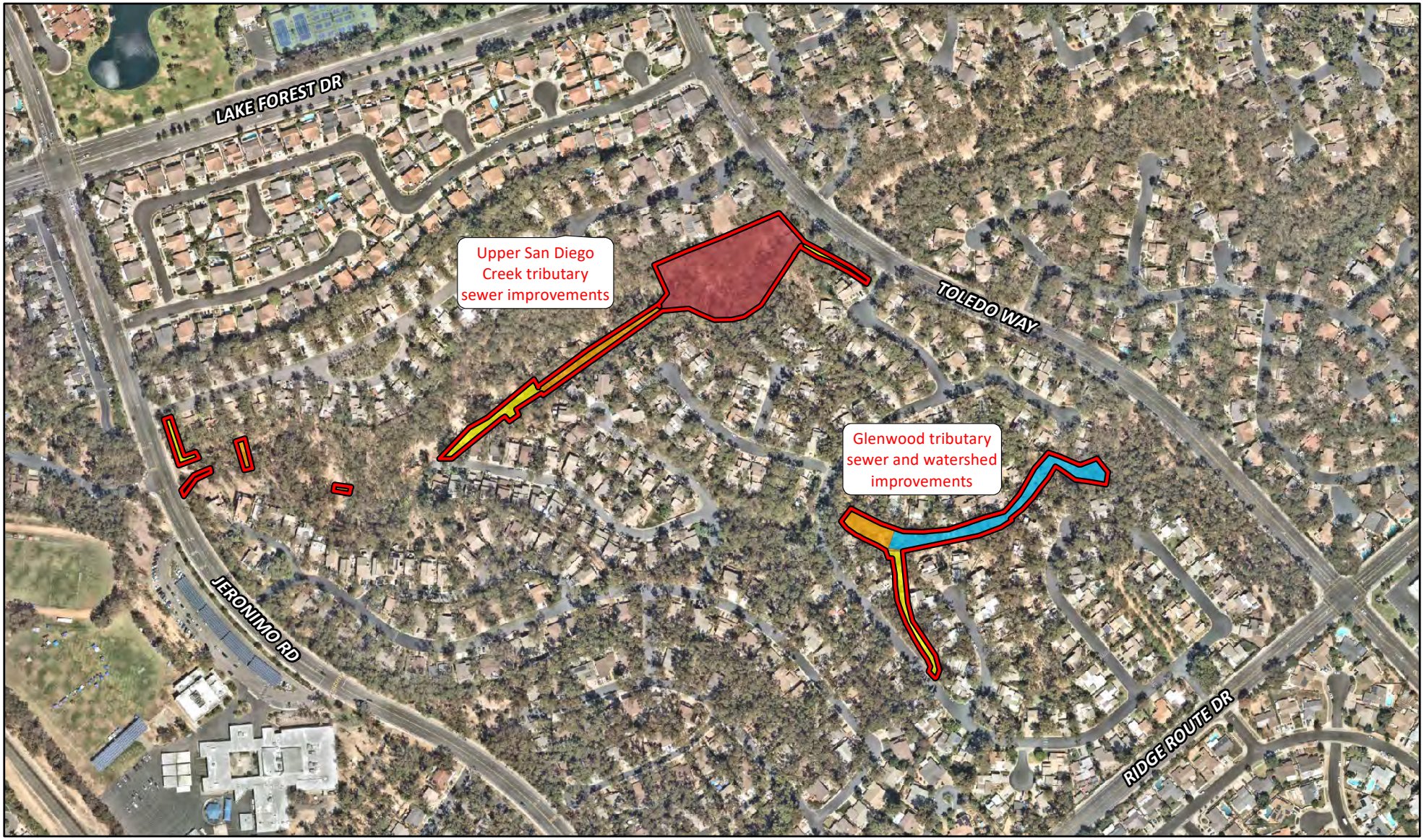

LSA

MAP 3

LEGEND

- Area of Potential Effects
- Access Improvement Work Area
- Sewer Improvement Work Area
- Sewer and Access Improvement Work Area
- Watershed Improvement Work Area

0 200 400
FEET

SOURCE: Nearmap (8/31/2022)

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The Woods Sewer Improvements Project

Area of Potential Effects

APPENDIX B

SCCIC RECORD SEARCH RESULTS

CONFIDENTIAL

APPENDIX C

SACRED LANDS FILE SEARCH RESULTS

NATIVE AMERICAN HERITAGE COMMISSION

NAHC HEADQUARTERS
1550 Harbor Boulevard
Suite 100
West Sacramento,
California 95691
(916) 373-3710
nahc@nahc.ca.gov
NAHC.ca.gov

December 7, 2022

Kerrie Collison
LSA

Via Email to: kerrie.collison@lsa.net

Re: Lake Forest Woods Sewer Improvements Project, Orange County

Dear Ms. Collison:

A record search of the Native American Heritage Commission (NAHC) Sacred Lands File (SLF) was completed for the information you have submitted for the above referenced project. The results were negative. However, the absence of specific site information in the SLF does not indicate the absence of cultural resources in any project area. Other sources of cultural resources should also be contacted for information regarding known and recorded sites.

Attached is a list of Native American tribes who may also have knowledge of cultural resources in the project area. This list should provide a starting place in locating areas of potential adverse impact within the proposed project area. I suggest you contact all of those indicated; if they cannot supply information, they might recommend others with specific knowledge. By contacting all those listed, your organization will be better able to respond to claims of failure to consult with the appropriate tribe. If a response has not been received within two weeks of notification, the Commission requests that you follow-up with a telephone call or email to ensure that the project information has been received.

If you receive notification of change of addresses and phone numbers from tribes, please notify me. With your assistance, we can assure that our lists contain current information.

If you have any questions or need additional information, please contact me at my email address: Andrew.Green@nahc.ca.gov.

Sincerely,

Andrew Green

Andrew Green
Cultural Resources Analyst

Attachment

Native American Heritage Commission
Native American Contact List
Orange County
12/7/2022

Gabrieleno Band of Mission Indians - Kizh Nation
Andrew Salas, Chairperson
P.O. Box 393 — Gabrieleno
Covina, CA, 91723
Phone: (626) 926 - 4131
admin@gabrielenoindians.org

Gabrieleno/Tongva San Gabriel Band of Mission Indians
Anthony Morales, Chairperson
P.O. Box 693 — Gabrieleno
San Gabriel, CA, 91778
Phone: (626) 483 - 3564
Fax: (626) 286-1262
GTTribalcouncil@aol.com

Gabrielino /Tongva Nation
Sandonne Goad, Chairperson
106 1/2 Judge John Aiso St., #231 — Gabrielino
Los Angeles, CA, 90012
Phone: (951) 807 - 0479
sgoad@gabrielino-tongva.com

Gabrielino Tongva Indians of California Tribal Council
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Bellflower, CA, 90707
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Fax: (562) 761-6417
gtongva@gmail.com

Gabrielino Tongva Indians of California Tribal Council
Christina Conley, Tribal Consultant and Administrator
P.O. Box 941078 — Gabrielino
Simi Valley, CA, 93094
Phone: (626) 407 - 8761
christina.marsden@alumni.usc.edu

Gabrielino-Tongva Tribe
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West Hills, CA, 91307
Phone: (310) 403 - 6048
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Juaneno Band of Mission Indians
Sonia Johnston, Chairperson
P.O. Box 25628 — Juaneno
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sonia.johnston@sbcglobal.net

Juaneno Band of Mission Indians Acjachemen Nation - Belardes
Joyce Perry, Tribal Manager
4955 Paseo Segovia — Juaneno
Irvine, CA, 92603
Phone: (949) 293 - 8522
kaamalam@gmail.com

Juaneno Band of Mission Indians Acjachemen Nation - Belardes
Matias Belardes, Chairperson
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San Juan Capisttrano, CA, 92675
Phone: (949) 293 - 8522
kaamalam@gmail.com

Juaneno Band of Mission Indians Acjachemen Nation 84A
Heidi Lucero, Chairperson
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San Juan Capistrano, CA, 92675
Phone: (562) 879 - 2884
hllucero105@gmail.com

La Jolla Band of Luiseno Indians
Norma Contreras, Chairperson
22000 Highway 76 — Luiseno
Pauma Valley, CA, 92061
Phone: (760) 742 - 3771

Pala Band of Mission Indians
Shasta Gaughen, Tribal Historic Preservation Officer
PMB 50, 35008 Pala Temecula Rd. — Cupeno, Luiseno
Pala, CA, 92059
Phone: (760) 891 - 3515
Fax: (760) 742-3189
sgaughen@palatribe.com

This list is current only as of the date of this document. Distribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resource Section 5097.98 of the Public Resources Code.

This list is only applicable for contacting local Native Americans with regard to cultural resources assessment for the proposed Lake Forest Woods Sewer Improvements Project, Orange County.

Pauma Band of Luiseno Indians
Temet Aguilar, Chairperson
P.O. Box 369 Luiseno
Pauma Valley, CA, 92061
Phone: (760) 742 - 1289
Fax: (760) 742-3422
bennaecalac@aol.com

Santa Rosa Band of Cahuilla Indians
Lovina Redner, Tribal Chair
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Anza, CA, 92539
Phone: (951) 659 - 2700
Fax: (951) 659-2228
lsaul@santarosa-nsn.gov

Soboba Band of Luiseno Indians
Isaiah Vivanco, Chairperson
P. O. Box 487 Cahuilla
San Jacinto, CA, 92581 Luiseno
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Fax: (951) 654-4198
ivivanco@soboba-nsn.gov

Soboba Band of Luiseno Indians
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Fax: (951) 654-4198
jontiveros@soboba-nsn.gov

This list is current only as of the date of this document. Distribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resource Section 5097.98 of the Public Resources Code.

This list is only applicable for contacting local Native Americans with regard to cultural resources assessment for the proposed Lake Forest Woods Sewer Improvements Project, Orange County.

APPENDIX D

GEOTECHNICAL INVESTIGATION

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Geotechnical Evaluation

Lake Forest Woods Sewer Improvement Project

Irvine Ranch Water District

Lake Forest, California

Woodard & Curran

24422 Avenida de la Carlota, Suite 180 | Laguna Hills, California 92653

September 2, 2022 | Project No. 211992001

Geotechnical | Environmental | Construction Inspection & Testing | Forensic Engineering & Expert Witness

Geophysics | Engineering Geology | Laboratory Testing | Industrial Hygiene | Occupational Safety | Air Quality | GIS

Ninyo & Moore

Geotechnical & Environmental Sciences Consultants

Ninyo & Moore
Geotechnical & Environmental Sciences Consultants

CELEBRATING 35 YEARS

Geotechnical Evaluation
Lake Forest Woods Sewer Improvement Project
Irvine Ranch Water District
Lake Forest, California

Ms. Janet Fordunski
Woodard & Curran
24422 Avenida de la Carlota, Suite 180 | Laguna Hills, California 92653

September 2, 2022 | Project No. 211992001

Emily Homan, PG
Project Geologist

PROFESSIONAL GEOLOGIST
EMILY CHRISTINE HOMAN
No. 9882
STATE OF CALIFORNIA

Michael Putt, PG, CEG
Principal Geologist

CERTIFIED ENGINEERING GEOLOGIST
MICHAEL LEWIS PUTT
No. 2341
STATE OF CALIFORNIA

Madan Chirumalla, PE, GE
Principal Engineer

REGISTERED PROFESSIONAL ENGINEER
MADAN CHIRUMALLA
No. 3047
GEOTECHNICAL
STATE OF CALIFORNIA

GM/ECH/MLP/MAC/shs

CONTENTS

TABLES

FIGURES

APPENDICES

1 INTRODUCTION

In accordance with your request and authorization, Ninyo & Moore has performed a geotechnical evaluation for the Irvine Ranch Water District's (IRWD) Lake Forest Woods Sewer Improvement Project in the City of Lake Forest, California (Figure 1). Our services included evaluation of the soil and groundwater conditions at selected locations along the proposed pipeline alignments and preparation of this report presenting our findings, conclusions, and geotechnical recommendations for the new sewer alignment.

2 SCOPE OF SERVICES

Our scope of services included the following:

- Project coordination, planning, and scheduling the subsurface exploration.
- Review of readily available background material, including published geologic maps, fault and seismic hazards maps, groundwater data, topographic maps, stereoscopic aerial photographs, and project-related plans.
- Permit acquisition from the Orange County Health Care Agency for drilling borings penetrating groundwater.
- Field reconnaissance to observe the general site conditions, mark the boring locations, and coordinate with Underground Service Alert for utility clearance.
- Subsurface exploration consisting of the drilling, sampling, and logging of four small-diameter borings to depths up to approximately 31½ feet below the ground surface. The borings were logged by a representative of our firm, and bulk and relatively undisturbed soil samples were collected at selected intervals for laboratory testing.
- Laboratory testing on selected soil samples including evaluation of in-situ moisture content and dry density, gradation, percentage of particles finer than the No. 200 sieve, Atterberg limits, direct shear strength, expansion index, soil corrosivity, and R-value.
- Data compilation and engineering analysis of the information obtained from our background review, subsurface exploration, and laboratory testing.
- Preparation of this geotechnical report presenting our findings, conclusions, and recommendations for design and construction of the project.

3 SITE DESCRIPTION AND PROPOSED CONSTRUCTION

The project site is located in The Woods residential community in Lake Forest, California (Figure 1). The Woods is bounded by Lake Forest Drive to the north, Toledo Way to the east, Ridge Route Drive to the south, and Jeronimo Road to the west. The southwest-trending Upper San Diego Creek crosses the northern portion of the residential development with a tributary drainage referred to as Glenwood Creek that trends west-southwest through the center of the

community. Numerous mature eucalyptus trees are present along the creek areas. Walking trails and a pedestrian bridge are located along Upper San Diego Creek. Sewer pipelines consisting of 8 to 10-inch vitrified clay pipe were constructed during the 1970s along the existing creek beds. Ground elevations along the proposed alignment at Upper San Diego Creek range from approximately 378 to 406 feet above mean sea level (MSL), and ground elevations along the alignment at Glenwood Creek range from approximately 398 to 409 feet above MSL (KDM Meridian, 2022). We understand that erosion of the creek banks has been a recurring issue and previous grade control structures and gabions, constructed along the creek banks by the home owners association, have failed. Based on a recent hydrologic assessment, there is a potential for future scour and downcutting along the creeks and several segments of sewer pipeline and manholes are at high risk for damage during a 100-year flow event.

We understand that the sewer improvement project will consist of abandoning selected segments of the existing sewer pipelines and constructing new PVC pipelines and new manholes that will be located beyond the anticipated scour envelope along Upper San Diego Creek and Glenwood Creek. Within the Upper San Diego Creek area, approximately 1,360 linear feet and six manholes will be abandoned or demolished and replaced with 1,310 feet of new sewer pipeline and eight new manholes. The proposed invert depth of the proposed sewer pipe along the Upper San Diego Creek varies from approximately 5 to as deep as approximately 31 feet below the ground surface. However, we understand that alternative alignments are being considered to reduce the depth of the excavations where the pipelines are planned in the sloping ground that ascends away from Upper San Diego Creek.

At Glenwood Creek, approximately 600 linear feet of pipeline and two manholes will be removed and approximately 915 feet of new sewer pipeline and two new manholes will be constructed. The proposed invert depth along Glenwood Creek will vary from approximately 5 to 13½ feet below the ground surface. The project will also include new lateral connections, pipeline encasement in some areas, improvement to the existing access roads, and construction of rip-rap grade control structures.

We understand that the primary construction method for installing the sewer pipeline will be open-cut trenching. However, trenchless construction methods are being considered between proposed Manholes 1 through 5 in the Upper San Diego Creek area. Launching and receiving pits will be located near these manholes in order to install the pipeline. Temporary shoring is anticipated for the trenches, manholes, and the launching and receiving pits.

4 SUBSURFACE EVALUATION AND LABORATORY TESTING

Our subsurface exploration was performed on July 12th and July 13th, 2022, and consisted of drilling, logging, and sampling of four small-diameter borings to depths of up to approximately 31½ feet using a limited-access track-mounted drill rig with hollow-stem augers. The purpose of the exploratory borings was to observe the subsurface materials and to collect bulk and relatively undisturbed samples for laboratory testing. Representative samples were transported to our laboratory for geotechnical testing. Logs of the exploratory borings are presented in Appendix A. The approximate locations of the exploratory borings are shown on Figures 2 and 3.

Geotechnical laboratory testing was performed on representative samples to evaluate the in-situ moisture content and dry density, gradation analysis, percentage of particles finer than the No. 200 sieve, Atterberg limits, direct shear strength, expansion index, and soil corrosivity. The results of the moisture content and dry density tests are presented on our boring logs in Appendix A. Other laboratory test results are presented in Appendix B.

5 GEOLOGIC AND SUBSURFACE CONDITIONS

5.1 Regional Geology

The subject site is situated in the Peninsular Ranges Geomorphic Province of Southern California (Norris and Webb, 1990). The province is characterized by northwest to southeast trending mountain ranges and valleys and similarly trending strike-slip faults associated with the boundary between the North American and Pacific tectonic plates. In general, the mountain ranges are underlain by Jurassic-age metavolcanic and metasedimentary rocks and Cretaceous-age igneous rocks of the southern California batholith.

Published geologic maps indicate that the lower portions of the site along the existing creek beds are underlain by Holocene and late Pleistocene age young axial channel deposits generally consisting of silt, sand, and gravel, and the elevated terrain surrounding the creek beds are underlain by middle to early Pleistocene age alluvial fan deposits consisting of silt, sand, gravel, and conglomerate (Morton and Miller, 2006). The regional geologic conditions are shown on Figure 4.

5.2 Surface and Subsurface Conditions

The materials encountered in our subsurface exploration generally consisted of alluvium and very old alluvial fan deposits to the depths explored of up to 31½ feet. Generalized descriptions of the materials encountered during our subsurface exploration are presented below. More detailed descriptions are provided on our boring logs in Appendices A.

5.2.1 Alluvium

Alluvium was encountered at the surface to depths ranging from approximately 8 to 19 feet below the ground surface and generally consisted of moist, dense to very dense, silty sand and clayey sand with variable amounts of gravel, and hard, sandy clay with gravel. Occasional cobbles and boulders were encountered that resulted in difficult drilling conditions and should be anticipated during construction.

5.2.2 Very Old Alluvial Fan Deposits

Middle to early Pleistocene-age alluvial fan deposits were encountered beneath the alluvium in all borings to the total depths explored of up to approximately 31½ feet. These very old alluvial fan deposits encountered generally consisted of moist to wet, very dense, silt, silty sand, and clayey sand with gravel, and moist, hard, sandy clay with gravel.

5.3 Groundwater

Groundwater was encountered at the time of drilling in borings B-2 and B-3 at depths of approximately 24 feet (363 feet above MSL) and 26 feet (366 feet above MSL) below the ground surface, respectively. The groundwater level was measured in boring B-2 at approximately 18½ feet (368½ feet above MSL) below the ground surface, approximately 30 minutes after drilling. In boring B-3, the groundwater level was measured at approximately 22½ feet (369½ feet above MSL) below the ground surface, approximately 15 minutes after drilling. Regional maps indicate that the historic high groundwater at the site is mapped as being less than approximately 20 feet below the ground surface near the creek beds [California Division of Mines and Geology (CDMG, 2000)]. Fluctuations in the level of groundwater will occur due to variations in ground surface topography, subsurface stratification, rainfall, irrigation practices, groundwater pumping, and other factors that were not evident at the time of our field evaluation.

6 FAULTING AND SEISMICITY

The proposed sewer pipeline is not located within a State of California Earthquake Fault Zone (formerly known as an Alquist-Priolo Special Studies Zone) (Hart and Bryant, 2007). However, the site is located in a seismically active area, as is the majority of southern California, and the potential for strong ground motion in the project area is considered significant during the design life of the proposed pipeline. Figure 5 shows the approximate site location relative to the major faults in the region.

The principal seismic hazards evaluated at the subject site are surface rupture, ground motion, and liquefaction. A brief description of these hazards and the potential for their occurrences at the site are discussed below.

6.1 Surface Ground Rupture

Based on our review of the referenced literature and our site reconnaissance, no active faults are known to cross the site. Therefore, the probability of damage from ground rupture at this site is considered to be low. However, lurching or cracking of the ground surface as a result of nearby seismic events is possible.

6.2 Ground Motion

Considering the proximity of the site to active faults capable of producing a maximum moment magnitude of 6.0 or more, the project area has a high potential for experiencing strong ground motion. The 2019 California Building Code (CBC) specifies that the risk-targeted maximum considered earthquake (MCE_R) ground motion response accelerations be used to evaluate seismic loads for design of buildings and other structures. The MCE_R ground motion response accelerations are based on the spectral response accelerations for 5 percent damping in the direction of maximum horizontal response and incorporate a target risk for structural collapse equivalent to 1 percent in 50 years with deterministic limits for near-source effects. The horizontal peak ground acceleration (PGA) that corresponds to the MCE_R for the project area was calculated as 0.58g for Site Class C using the 2019 Structural Engineers Association of California (SEAOC)/Office of Statewide Health Planning and Development (OSHPD) seismic design tool (web-based).

The 2019 CBC specifies that the potential for liquefaction and soil strength loss be evaluated, where applicable, for the mapped maximum considered earthquake geometric mean (MCE_G) PGA (PGA_M) with adjustment for site class effects in accordance with the American Society of Civil Engineers (ASCE) 7-16 Standard. The MCE_G PGA is based on the geometric mean PGA with a 2 percent probability of exceedance in 50 years. The PGA_M was calculated as 0.609g using the 2022 SEAOC/OSHPD seismic design tool (web-based).

6.3 Liquefaction

Liquefaction is the phenomenon in which loosely deposited granular soils and low-plastic fine-grained soils located below the water table undergo rapid loss of shear strength due to excess pore pressure generation when subjected to strong earthquake-induced ground shaking. Sufficient ground shaking duration results in the loss of grain-to-grain contact due to a rapid rise

in pore water pressure. This causes the soil to behave as a fluid for a short time. Liquefaction is generally known to occur in saturated or near-saturated cohesionless soils at depths shallower than 50 feet below the ground surface. Factors known to influence liquefaction potential include composition and thickness of soil layers, grain size, relative density, groundwater level, degree of saturation, and both intensity and duration of ground shaking.

Due to the relatively shallow depth to groundwater and the presence of poorly-consolidated axial channel deposits along the existing creek beds, the lower elevations of the creek areas at the site are located in an area mapped as being susceptible to liquefaction (California Geological Survey, 2001). The elevated terrain adjacent to the creek beds are not located in areas mapped as being subject to seismically-induced liquefaction. The sewer pipeline does not include structures for human occupancy and evaluation of the liquefaction potential along the alignment was not within the scope of our services for this study. However, the majority of the soils encountered in our exploratory borings were very dense and significant liquefaction-induced settlement is not anticipated in the alluvial soils.

7 CONCLUSIONS

Based on the results of our geotechnical evaluation, it is our opinion that construction of the proposed sewer pipeline replacement project is feasible from a geotechnical standpoint provided that the recommendations presented in this report are incorporated into the design and construction of the project.

In general, the following conclusions were made:

- The site is underlain by alluvial deposits generally comprised of Holocene and late Pleistocene axial channel deposits and middle to late Pleistocene very old alluvial fan deposits. The younger alluvium consisted of moist, dense to very dense, silty sand and clayey sand with variable amounts of gravel, and hard, sandy clay with gravel and occasional cobbles and boulders. The older alluvial deposits encountered generally consisted of moist to wet, very dense, silt, silty sand, and clayey sand with gravel, and hard, sandy clay with gravel.

- The presence of cobbles and boulders in the alluvial soils resulted in difficult drilling conditions. Difficult excavating conditions due to cobbles and boulders should be anticipated and planned for by the contractor. Screening, crushing, or disposal of oversize materials should be anticipated.

- Some of the near-surface granular soils encountered at the site have low cohesion and may be subject to caving. These soils should be considered Type C soils in accordance with Occupational Safety and Health Administration (OSHA) soil classifications. Appropriate shoring systems for these types of soils should be considered during planning where site constraints do not allow for sloped excavations.

- The on-site soils should be suitable for use as compacted fill provided they are free of trash, debris, roots, vegetation, deleterious materials, and cobbles or hard lumps of material in excess of 4 inches in diameter.

- Groundwater was measured in borings B-2 and B-3 approximately 15 to 30 minutes after drilling at depths of approximately 18½ and 22½ feet below the ground surface, respectively, corresponding to elevations of 368½ to 369½ feet above MSL. Regional maps indicate the historic high groundwater level at the site is less than approximately 20 feet below the ground surface in the creek beds. The depths to groundwater were measured shortly after drilling was completed and are not considered stabilized. Furthermore, the borings were performed during prolonged drought conditions. Although the groundwater elevation encountered at the time our borings were performed is deeper than the planned pipeline invert depths, depending on the seasonal conditions at the time of construction, the groundwater level may rise and groundwater could be encountered. Shallow groundwater conditions, seepage, and/or dewatering should be anticipated during construction. Furthermore, groundwater could also be encountered if access pits for slip lining or other excavations will be located near the creek beds where historically shallow groundwater has been mapped and if there is surface runoff in the creeks at the time of construction.

- For the trenchless construction, the silty sand, clayey sand, and silt materials are expected to exhibit cohesive running to running behavior. Clays may exhibit squeezing behavior. Trenchless construction should anticipate encountering transitions between sandy and silty soils, and interbedded layers of clay.

- Existing utilities and structures are present along the project alignment that will require protecting in-place during construction. Temporary shoring should be designed to reduce the potential movement of exposed cuts and damage to the nearby structures and utilities.

- The proposed sewer pipeline alignment is not located within a State of California Earthquake Fault Zone (formerly known as the Alquist-Priolo Special Studies Zone). Based on our review of published geologic maps, there are no known active faults underlying the sites. Therefore, the potential for surface rupture at the site is considered to be low.

- The lower elevation creek areas within the proposed sewer pipeline alignment are located within an area mapped by the State of California (CDMG, 2001) as being susceptible to earthquake-induced liquefaction. Soil liquefaction during a significant earthquake event could result in pipeline damage. However, due to the very dense nature of the subsurface soils, significant liquefaction-induced settlement is not anticipated. Mitigation measures to reduce damage to pipelines from liquefaction may include flexible pipeline material or flexible joints.

- Our limited laboratory corrosion testing indicates that the site soils can be classified as corrosive based on the California Department of Transportation (Caltrans, 2021) corrosion guidelines due to relatively low pH value on the sample tested.

8 RECOMMENDATIONS

The recommendations presented in the following sections provide general geotechnical criteria regarding the design and construction of the sewer pipeline. The recommendations are based on the results of our subsurface evaluation and laboratory testing, our review of the referenced geologic materials, and our geotechnical analysis. The proposed construction should be

performed in conformance with the recommendations presented in this report, project specification, and appropriate agency standards.

8.1 Earthwork

Based on our understanding of the project, the earthwork is anticipated to consist of site clearing, open cut trenching, excavation of launching and receiving pits, tunneling, and backfilling of trenches, manholes, and access pits. We anticipate open cut trench excavations ranging from approximately 5 to 31 feet deep. Excavations of approximately 7 to 15 feet deep will be needed at the launching and receiving pits. Work within the public right-of-way for trenched excavations should comply with the requirements of the "Greenbook" Standard Specifications for Public Works Construction. Earthwork should be performed in accordance with the requirements of applicable governing agencies and the recommendations presented in the following sections.

8.1.1 Construction Plan Review and Pre-Construction Conference

We recommend that the construction plans be submitted to Ninyo & Moore for review to evaluate conformance to the geotechnical recommendations provided in this report. We further recommend that a pre-construction conference be held. The owner and/or their representative, the governing agency representatives, the civil engineer, the geotechnical engineer, and the contractor should be in attendance to discuss the work plan and project schedule. Discussions should include how earthwork will be performed, site safety, and regulatory agency requirements.

8.1.2 Site Clearing

Prior to performing site excavations, the alignment should be cleared of surface obstructions, debris, abandoned utilities, and other deleterious materials. Existing utilities within the project limits should be re-routed or protected from damage by construction activities. Obstructions that extend below finish grade, if any, should be removed and the resulting holes filled with compacted soils. Materials generated from the clearing operations should be removed from the project site and disposed at a legal dumpsite.

8.1.3 Excavation Characteristics

Based on our subsurface exploration and experience, we anticipate that excavations within alluvial soils at the site may be accomplished with heavy earthmoving equipment, including backhoes, excavators, or other trenching equipment in good condition. We anticipate that the materials along the alignment will vary from dense to very dense, silt, silty sand, and clayey sand, and hard, lean clay, with gravel. The contractor should anticipate difficult excavating

conditions due to cobbles and/or boulders. Screening, crushing, or disposal of oversize materials should be anticipated.

8.1.4 Temporary Excavations and Shoring

Soils along the project alignment include sands and silts with little cohesion that are considered to be prone to caving. In addition, excavations that are close to parallel utilities may encounter loose trench zone materials which are also considered unstable. The site soils should be treated as “Type C” soils in accordance with the OSHA criteria.

Temporary excavations are anticipated to be stable at inclinations near 1:1 (horizontal to vertical) up to a depth of about 4 feet below the existing grade and stable at inclinations of approximately 1½:1 (horizontal to vertical) for excavations deeper than 4 feet but no more than 20 feet below existing grade. Some surficial sloughing may occur, and temporary slopes should be evaluated in the field by the project geotechnical consultant. Excavations should be performed in accordance with OSHA regulations.

Shored trenches are anticipated for the project due to the planned excavation depth of up to approximately 31 feet, trench instability, and limited working area. Due to the very dense nature of the subsurface soils, as well as the presence of gravel, cobbles, and boulders, installation of driven sheet piles or driven H-piles may be difficult, which should be considered by the contractor when planning their shoring systems.

Shoring systems should be designed for the anticipated soil conditions using the lateral earth pressure values shown on Figures 6 and 7 for cantilevered excavations and Figures 8 and 9 for braced excavations. The recommended design pressures are based on the assumption that the shoring system is constructed without raising the ground surface elevation behind the shored sidewalls of the excavation, that there are no surcharge loads, such as soil stockpiles and construction materials, and that no loads act above a 1:1 (horizontal to vertical) plane ascending from the base of the shoring system. For a shoring system subjected to the above-mentioned surcharge loads, the contractor should include the effect of these loads on the lateral earth pressures acting on the shored walls.

The selection of shoring systems and construction installation should also consider the protection of adjacent improvements. The sandy materials along the alignment have a potential for caving and shoring systems should be installed and removed such that adjacent improvements are not left unsupported.

We anticipate that settlement of the ground surface will occur behind the shored excavation. The amount of settlement depends heavily on the type of shoring system, the contractor's workmanship, and soil conditions. To reduce the potential for distress to adjacent improvements, we recommend that the shoring system be designed to limit the ground settlement behind the shoring system to ½ inch or less. Possible causes of settlement that should be addressed include settlement during installation of the shoring elements, excavation for structure construction, construction vibrations, and removal of the support system. We recommend that shoring installation be evaluated carefully by the contractor prior to construction and that ground vibration and settlement monitoring be performed during construction.

The contractor should retain a qualified and experienced engineer to design the shoring system. The shoring parameters presented in this report are preliminary in nature. The contractor should evaluate the adequacy of these parameters and make the appropriate modifications for their design. We recommend that the contractor take appropriate measures to protect workers. OSHA requirements pertaining to worker safety should be observed.

8.1.5 Construction Dewatering

Regional maps indicate that the historic high groundwater levels in the vicinity of the projects are as low as approximately 20 feet below the ground surface. Groundwater was measured during our subsurface evaluation at depths as shallow as approximately 18½ feet below the ground surface. As described in the Conclusions section of this report, although the groundwater elevation encountered at the time our borings were performed is deeper than the planned pipeline invert depths, depending on the seasonal conditions at the time of construction, the groundwater level may rise and groundwater could be encountered. Fluctuations in the depth to groundwater will occur and shallower groundwater depths should be anticipated. Therefore, seepage and/or groundwater should be anticipated during construction.

Where groundwater is encountered during construction, dewatering will be involved in order to perform work in a dry condition. The dewatering system design should be performed by a specialty dewatering contractor. The dewatering scheme may include pumping of groundwater from well points within or outside of the shoring. Drawing down of the water level within the excavation may affect the water level outside of the excavation. This will result in an increase in effective stresses and may induce settlement of the soils underlying adjacent improvements. Design of the groundwater withdrawal system is the responsibility of the contractor.

The soils at the project site is generally comprised of interbedded sands, silts, and clays. The sands have relatively high permeability while the silts and clays have relatively low permeability. Excavating around the existing utility may involve especially high groundwater flow rates where drainage from sand or gravel bedding/backfill zones occurs. Special measures to seal these zones may be involved.

Depending on the permeability of soil between the bottom of the excavation and the bottom of the shoring system, as well as the effectiveness of water tightening between shored panels, drawing down of the water level within the excavation defined by the “cofferdam” may affect the water level outside of the excavation. We recommend that the dewatering be performed from inside the shoring system and the groundwater level be lowered no more than 3 feet below the excavation. Monitoring wells should be installed outside the excavation to monitor groundwater levels. Depending on the type of shoring and dewatering systems, the contractor may consider pump testing or an independent evaluation of the potential for groundwater inflow and/or resulting settlement. Additional measures, such as grouting and groundwater recharging may be implemented in the design to reduce the potential for groundwater inflow and resulting settlement. Disposal of groundwater should be performed in accordance with the guidelines of the Regional Water Quality Control Board.

8.1.6 Excavation Bottom Stability

Where groundwater is not encountered during construction, the excavation bottoms are anticipated to expose relatively dense to very dense alluvial soils that are anticipated to be suitable to support the new pipeline without additional remedial excavation. However, if the trench subgrade becomes disturbed during excavation, the bottom should be scarified to a depth of 8 inches (or to the depth of the disturbed zone), moisture conditioned, and recompacted to 90 percent relative compaction per ASTM International (ASTM) D1557.

Excavations close to or below the groundwater (before or after dewatering) will encounter wet and loose or soft ground conditions. Wet soils may be subject to pumping under heavy equipment loads. In general, unstable bottom conditions may be mitigated by overexcavating the excavation bottom to approximately 2 feet and replacing aggregate base or with gravel wrapped by geo-fabric (Mirafi 140N or equivalent). The purpose of the geofabric is to reduce the potential for migration of fine-grained materials into the gravel and thereby reducing the potential for creating voids due to soil migration.

8.1.7 Fill Material

In general, the on-site soils should be suitable for re-use as fill for the backfill of trenches, manholes, and for the launching and receiving pits. Fill material should be free of oversize rocks, debris, roots, vegetation, or other deleterious materials. Wet soils should be processed to a moisture content that is slightly above the laboratory optimum moisture and suitable for compaction. Oversize material larger than about 4 inches in largest dimension should be broken into smaller pieces or should be removed from the site. Due to the presence of cobble-size material in the project areas, the contractor should anticipate screening oversize cobbles and possible boulders from backfill materials. Materials for use as fill should be evaluated by Ninyo & Moore prior to compaction.

Imported fill material, if used, should also consist of clean, granular material with a low expansion potential, corresponding to an expansion index of 50 or less. The soil should also be tested for corrosive properties prior to importing. We recommend that the imported materials satisfy the Caltrans (2021) criteria for non-corrosive soils (i.e., soils having a chloride concentration of less than 500 parts per million [ppm], a soluble sulfate content of less than 0.15 percent (1,500 ppm), a pH value of more than 5.5, or an electrical resistivity of more than 1,500 ohm-centimeters). Materials for use as fill should be evaluated by Ninyo & Moore prior to importing. The contractor should be responsible for the uniformity of import material brought to the site.

8.1.8 Fill Placement and Compaction

Fill material should be compacted to a relative compaction of 90 percent as evaluated by ASTM International (ASTM) D1557. Fill material should be moisture-conditioned to slightly above the laboratory optimum moisture content. The lift thickness for fill soils will vary depending on the type of compaction equipment used, but should generally be placed in horizontal lifts not exceeding 8 inches in loose thickness. Fill should be tested for the specified compaction level and moisture content by the geotechnical consultant.

8.1.9 Pipe Bedding

We recommend that the sewer pipeline be supported on 6 inches or more of granular bedding material. Bedding material should be placed around pipe zone to 1 foot or more above the top of the pipe. The bedding material should be classified as sand, should be free of organic material, and have a sand equivalent of 30 or more. We do not recommend gravel be used for bedding material. It has been our experience that the voids within gravel material are

sufficiently large to allow fines to migrate into the voids, thereby creating the potential for sinkholes and depressions to develop at the ground surface.

Special care should be taken not to allow voids beneath and around the pipe. Compaction of the bedding material and backfill should proceed along both sides of the pipe concurrently. Trench backfill, including bedding material, should be placed and compacted with mechanical equipment in accordance with the recommendations presented in the Earthwork section of this report.

8.1.10 Modulus of Soil Reaction

The modulus of soil reaction is used to characterize the stiffness of soil backfill placed along the sides of buried flexible pipelines for the purpose of evaluating deflection caused by the weight of the backfill above the pipe. We recommend that a modulus of soil reaction of 1,000 pounds per square inch (psi) be used for design for trenches up to 5 feet deep and 1,400 psi may be used for trenches deeper than 5 feet, provided that granular bedding material or concrete slurry be placed adjacent to the pipe, as recommended in the previous section.

8.2 Trenchless Construction

It is our understanding that trenchless construction method may be utilized to install an approximately 380-foot portion of the pipeline. The tunneling method selected for the project should be designed for the anticipated soil conditions. The sewer pipeline is anticipated to have an invert depth ranging from approximately 7 to 15 feet below the ground surface at the launching and receiving pits. In general, we anticipate that the tunneling operations will encounter materials similar to those encountered in our exploratory borings including dense to very dense silt, silty sand, and clayey sand, and hard lean clay with scattered gravel. Cobbles and boulders were also encountered in our borings and should be anticipated by the contractor.

The granular soil is expected to exhibit cohesive running and running behavior and clays may exhibit squeezing behavior. The tunneling contractor should take appropriate precautions to avoid piping or loss of material into the tunnel excavation. Casing should be advanced ahead of the excavation. Open face tunnel conditions should be avoided.

Ground surface settlement may occur from the tunneling, mainly as a result of loss of ground during drilling. The actual magnitudes of these losses are largely dependent on the type and strength of the ground, groundwater or seepage conditions, size and depth of the pipe, equipment capabilities, and the skill of the contractor. We anticipate that the tunnel excavation will advance

with a carrier casing. After the carrier pipe is in place, the annular space between the pipe and tunnel should be grouted to reduce settlement. Due to the depth to the pipeline below the ground surface, it is our opinion that drilling induced ground settlement of negligible magnitude can be achieved by the contractor utilizing appropriate construction techniques for the anticipated subsurface conditions. However, the amount of induced settlement at the ground surface by the tunneling operations can be controlled by the contractor's means and methods. We recommend that an experienced specialty contractor be used for the tunneling operations.

In order to evaluate the load factors on the proposed pipeline, the loading presented in Table 1 should be used for the 10-inch diameter pipe section.

Table 1 – Loading on 10-Inch Diameter Trenchless Segments

Approximate Depth from Existing Ground Surface to Top of Pipeline (feet)	Load on Pipeline (pounds/lineal foot of pipe)
5	500
10	700
15	800
20	850
25	850
30	850

Notes:
Based on McCarthy, David F., 2002, Essentials of Soil Mechanics and Foundations: Basic Geotechnics, Prentice Hall, 6th Edition.
Linear interpolation may be used to obtain loading between the depths shown.
Loading assumes up to 24-inch diameter sleeve. Loading may need to be modified for different sleeve sizes.

8.3 Pressures for Thrust Blocks and Launching

Thrust restraint for buried pipelines and lateral pressures for launching may be achieved by transferring the thrust force to the soil outside the pipe through a thrust block. Thrust blocks may be designed using the passive lateral earth pressures presented on Figure 10. Excavations for construction of thrust blocks should be backfilled with granular backfill material and compacted following the recommendations presented in this report.

8.4 Corrosivity

Laboratory testing was performed on a representative soil sample to evaluate pH, electrical resistivity, water-soluble chloride content, and water-soluble sulfate content. The soil pH and electrical resistivity tests were performed in general accordance with California Test Method (CT) 643. Chloride content testing was performed in general accordance with CT 422. Sulfate content testing was performed in general accordance with CT 417. The laboratory test results are presented in Appendix C.

The results of our corrosivity testing indicated a pH level of approximately 5.5, an electrical resistivity of approximately 2,683 ohm-centimeters, chloride content of approximately 110 ppm,

and sulfate content of approximately 10 ppm (0.001 percent). Based on the laboratory test results and Caltrans criteria (2021), the project site can be classified as a corrosive site due to a relatively low pH level of approximately 5.5. A corrosive site is defined as having earth materials with a pH of 5.5 or less, an electrical resistivity of 1,500 ohm-centimeters or less, chloride concentrations of 500 ppm or more, and 0.15 percent sulfates (i.e., 1,500 ppm) or more.

8.5 Concrete

Concrete in contact with soil or water that contains high concentrations of water-soluble sulfates can be subject to premature chemical and/or physical deterioration. The potential for sulfate attack is negligible for water-soluble sulfate contents in soil ranging from 0.00 to 0.10 percent by weight, moderate for water-soluble sulfate contents ranging from 0.10 to 0.20 percent by weight, severe for water-soluble sulfate contents ranging from 0.20 to 2.00 percent by weight, and very severe for water-soluble sulfate contents over 2.00 percent by weight. The soil samples tested for this evaluation, using Caltrans Test Method 417, indicate a water-soluble sulfate content of approximately 0.001 percent by weight (i.e., 10 ppm). Accordingly, the on-site soils are considered to have a negligible potential for sulfate attack. However, due to the potential variability of the on-site soils, consideration should be given to using Type II/V cement for the project.

In order to reduce the potential for shrinkage cracks in the concrete during curing, we recommend that the concrete for the proposed improvements, if applicable, be placed with a slump of 4 inches based on ASTM C 143. The slump should be checked periodically at the site prior to concrete placement. We further recommend that concrete cover over reinforcing steel for foundations be provided in accordance with CBC (2019). The structural engineer should be consulted for additional concrete specifications.

9 CONSTRUCTION MONITORING PROGRAM

The proposed pipelines are located relatively close to residential structures. To reduce the potential for construction related claims, construction monitoring programs should be implemented to monitor ground vibrations, ground surface settlement, and lateral movement of shoring support systems where they are near settlement sensitive improvements. These monitoring programs should be in-place and conducted prior to the start of construction to reduce the potential for damage claims and to facilitate settlement of legitimate damage claims. The resulting data should be reviewed and evaluated during construction and distributed to appropriate parties during the course of construction.

9.1 Documentation of Existing Conditions

We recommend that pre-construction condition surveys be performed on structures within approximately 50 feet of the proposed excavations prior to construction. This distance should be extended to 100 feet adjacent to proposed excavations if driven and/or vibratory sheet or soldier piles are installed. This survey should include locating existing cracks and measuring widths of cracks, in combination with videotape documentation of existing conditions. In addition, interviews should be conducted with utility owners so that existing knowledge about the age, type, and maintenance history of affected utilities is available prior to construction.

9.2 Construction Vibrations

People can perceive vibrations from construction activities at significantly lower levels than might cause cosmetic damage to structures. The Transportation and Construction Vibration Guidance Manual (Caltrans, 2020) indicates that transient vibrations, such as from pile driving or construction activities, may be noticeable at peak particle velocities as low as 0.02 inch per second (ips). The vibrations from the construction activities may be disturbing and result in complaints and/or damage claims at peak particle velocities as low as 0.2 to 0.4 ips. However, these vibration levels are well below the level considered to cause cosmetic damage to residential construction.

There is also the possibility of settlement of the soil during construction activities due to vibrations. This settlement may result in damage to structures. If the construction vibrations can be maintained below a peak particle velocity of 0.2 ips, the settlement can likely be limited to acceptable levels based on past projects in similar conditions.

For the above stated reasons, we recommend that seismographs be used in the early stages of construction to monitor the vibrations. Seismographs should be located near structures and improvements next to the construction activities. Additional seismographs should be located at various structures and improvements farther from the construction activities to monitor vibrations as a function of distance from the sites. Periodic vibration monitoring is recommended during other construction activities. After review of the data obtained, the number of seismographs may be reduced at the discretion of the client and the geotechnical consultant.

9.3 Groundwater Monitoring

As previously noted, settlement of the ground surface and adjacent structures may also be caused by drawdown of the water table. Should the Contractor select using dewatering, we recommend that the contractor monitor water levels outside of the excavations. To monitor the groundwater levels outside of the excavations, we recommend that groundwater monitoring wells be installed.

The monitoring wells should be installed at locations that will be accessible during construction. The groundwater levels should be monitored daily during dewatering as appropriate.

9.4 Ground Surface Settlement

We recommend that arrays of ground surface settlement points be installed around the proposed excavations. The contractor should submit a monitoring plan showing the proposed locations of settlement points for review and approval by the project engineer. We recommend that the contractor be responsible for maintaining total settlement at any survey point to less than ½ inch. If the settlements reach this limit, we recommend that a further review of construction methodologies be performed and appropriate changes be made. We recommend that ground surface settlement points be installed at appropriate intervals along the pipeline alignment and adjacent to excavations deeper than 10 feet.

9.5 Survey Grid for Trenchless Construction

A survey grid to monitor ground settlement during installation of the trenchless pipeline section should be implemented in general accordance with the guidelines presented in Caltrans Guidelines and Specifications for Trenchless Technology Projects (Caltrans, 2018) and Design Bulletin No. 83-04 (Caltrans, 2014). According to the bulletin, subsurface monitoring points should be installed to depths of approximately 5 and 10 feet above the crown of the proposed pipeline, above utilities, and on the shoulders of the highway. Subsurface monitoring points should be constructed in general accordance with the guidelines presented on the Design Bulletin No. 83-04. Surface monitoring points should be used to supplement the subsurface points; however, surface monitoring points should not be used alone to monitor ground settlement. In general, we recommend that subsurface and surface monitoring points be spaced at approximately 100-foot intervals. The actual locations of monitoring points should be approved by the project engineer and will be influenced by the proximity of existing settlement-sensitive improvements, available space, and possible other factors. Remote sensing of subsurface monitoring points may also be considered for the project.

Once installed, monitoring points should be surveyed prior to drilling to establish a baseline. According to Caltrans, the surface and subsurface monitoring points should be read hourly when the boring operation reaches within about 23 feet of the point, otherwise the points should be read at least once a day or every 50 feet of advancement, whichever is more frequent. The settlement monitoring points should be installed and monitored by an independent consultant/contractor. Caltrans recommends a survey accuracy of 0.005 foot. The following table, reproduced from Caltrans Design Bulletin No. 83-04, provides the frequency of reading, action level, and maximum

allowed settlement for ground settlement monitoring points. The settlement monitoring program should be established in accordance with the Caltrans District 12 requirements and/or the agency guidelines.

Table 2 – Ground Settlement Monitoring

Type of Settlement Monitoring Point	Frequency of Reading	Action Level	Maximum Allowed
Surface	Hourly when heading is within 23 feet, otherwise daily	¼ inch	½ inch
Surface (in traffic lanes)	Before and after tunneling	---	¼ inch
Subsurface	Hourly when heading is within 23 feet, otherwise daily	1½ inches	2½ inches

Action Level

The action level is the amount of allowable settlement at which corrective action should be taken, such as filling voids or the contractor altering their procedures, such as limiting the amount of radial overcut and filling the annulus with bentonite slurry during drilling. If the action level is reached during tunneling operations, the tunneling operations should be stopped until an appropriate corrective action can be implemented.

Maximum Allowed Settlement

The maximum allowed settlement is the amount of settlement at which mitigation, such as grouting, is required. The contractor should be responsible for maintaining the total settlement beneath adjacent structures, including highway embankments to less than ½ inch. If settlements reach ¼ inch, we recommend that a review of the contractor's methods be performed and appropriate changes be made, if needed.

9.6 Lateral Movement for Shoring Support System

It may be appropriate to install inclinometers or establish survey points behind excavations located in sloped areas where existing structures are located above a 1:1 (horizontal to vertical) plane projected from the bottom of the proposed excavations to the ground surface. The inclinometers or survey points should be monitored and evaluated daily during excavation activities to provide an advanced warning system of potential problems. As discussed previously, we recommend that the shoring system be designed to limit the ground settlement behind the shoring system to ½ inch or less to reduce the potential for distress to adjacent structures/improvements. If settlements reach ¼ inch, we recommend that a review of the contractor's methods be performed and appropriate changes be made, if needed.

10 CONSTRUCTION OBSERVATION

The recommendations provided in this report are based on our understanding of the proposed project and our evaluation of the data collected based on subsurface conditions disclosed by widely spaced exploratory borings. It is imperative that the geotechnical consultant checks the interpolated subsurface conditions during construction. We recommend that Ninyo & Moore review the project plans and specifications prior to construction. It should be noted that, upon review of these documents, some recommendations presented in this report may be revised or modified.

During construction we recommend that the duties of the geotechnical consultant include, but not be limited to:

- Review of contractors tunneling plans, excavation and shoring plans, and the construction monitoring program, including the vibration monitoring, groundwater monitoring, and survey results collected during construction.
- Observing trench excavation bottoms for suitability to support the new pipelines,
- Observation and testing during the placement and compaction of trench backfill.
- Evaluating imported materials, if any, prior to their use as fill.

The recommendations provided in this report assume that Ninyo & Moore will be retained as the geotechnical consultant during the construction phase of this project. If another geotechnical consultant is selected, we request that the selected consultant indicate to the owner and to our firm in writing that our recommendations are understood and that they are in full agreement with our recommendations.

11 LIMITATIONS

The field evaluation, laboratory testing, and geotechnical analysis presented in this geotechnical report have been conducted in general accordance with current practice and the standard of care exercised by geotechnical consultants performing similar tasks in the project area. No warranty, expressed or implied, is made regarding the conclusions, recommendations, and opinions presented in this report. There is no evaluation detailed enough to reveal every subsurface condition. Variations may exist and conditions not observed or described in this report may be encountered during construction. Uncertainties relative to subsurface conditions can be reduced through additional subsurface exploration. Additional subsurface evaluation will be performed upon request. Please also note that our evaluation was limited to assessment of the geotechnical

aspects of the project, and did not include evaluation of environmental concerns or the presence of hazardous materials.

This document is intended to be used only in its entirety. No portion of the document, by itself, is designed to completely represent any aspect of the project described herein. Ninyo & Moore should be contacted if the reader requires additional information or has questions regarding the content, interpretations presented, or completeness of this document.

This report is intended for design purposes only. It does not provide sufficient data to prepare an accurate bid by contractors. It is suggested that the bidders and their geotechnical consultant perform an independent evaluation of the subsurface conditions in the project areas. The independent evaluations may include, but not be limited to, review of other geotechnical reports prepared for the adjacent areas, site reconnaissance, and additional exploration and laboratory testing.

Our conclusions, recommendations, and opinions are based on an analysis of the observed site conditions. If geotechnical conditions different from those described in this report are encountered, our office should be notified, and additional recommendations, if warranted, will be provided upon request. It should be understood that the conditions of a site could change with time as a result of natural processes or the activities of man at the subject site or nearby sites. In addition, changes to the applicable laws, regulations, codes, and standards of practice may occur due to government action or the broadening of knowledge. The findings of this report may, therefore, be invalidated over time, in part or in whole, by changes over which Ninyo & Moore has no control.

This report is intended exclusively for use by the client. Any use or reuse of the findings, conclusions, and/or recommendations of this report by parties other than the client is undertaken at said parties' sole risk.

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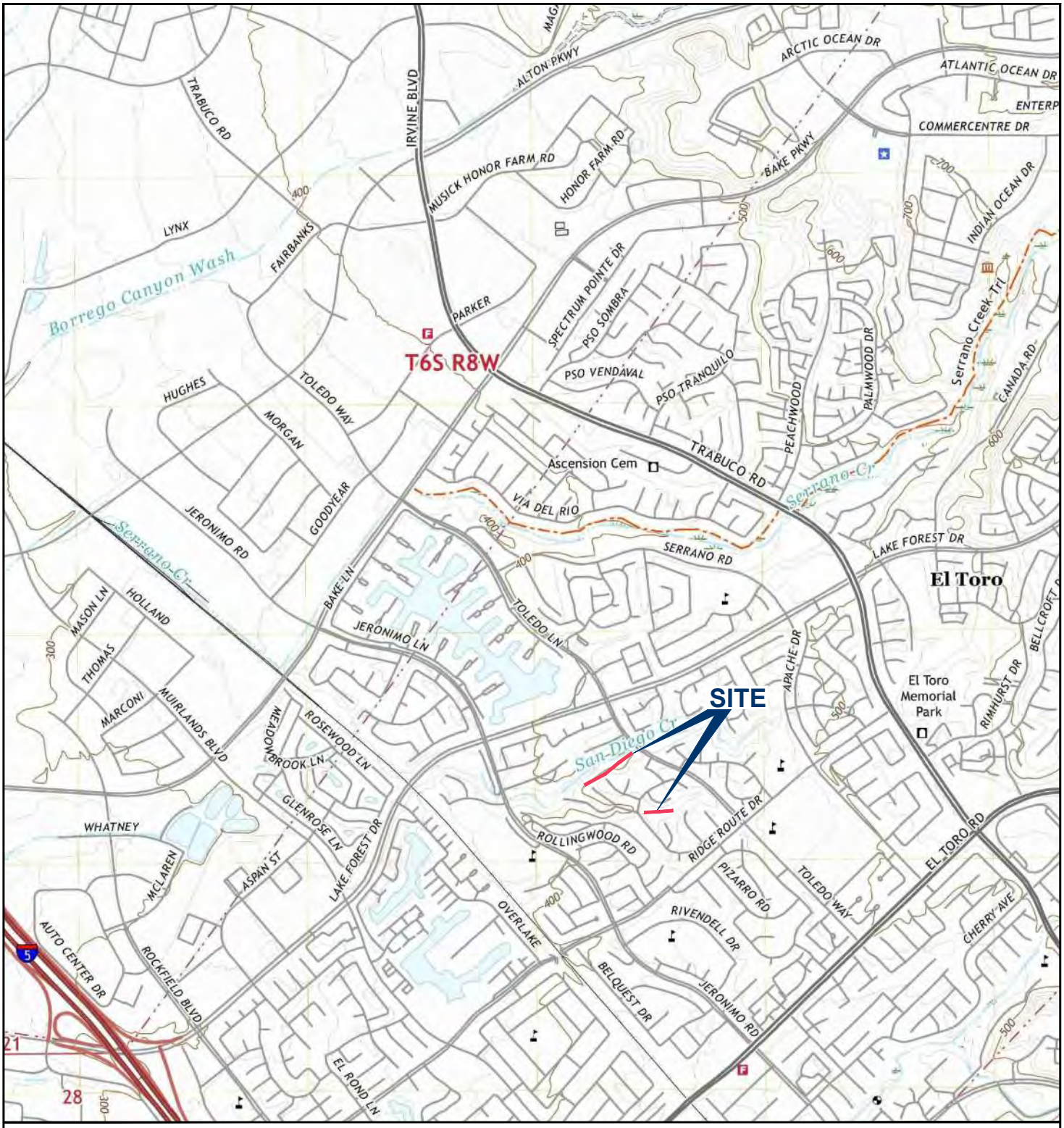
FIGURES



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NOTE: DIMENSIONS, DIRECTIONS AND LOCATIONS ARE APPROXIMATE. I REFERENCE: USGS, 2022.

N

FEET
0 2,000 4,000

FIGURE 1

SITE LOCATION

LAKE FOREST WOODS SEWER INPROVEMENTS
LAKE FOREST, CALIFORNIA

211992001 I 9/22

Ninyo & Moore
Geotechnical & Environmental Sciences Consultants

LEGEND

B-3 TD=30.9 — BORING; TD=TOTAL DEPTH IN FEET

FEET
0 80 160

NOTE: DIMENSIONS, DIRECTIONS AND LOCATIONS ARE APPROXIMATE. I REFERENCE: WOODARD & CURRAN, 2022.

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FIGURE 2

PROJECT ALIGNMENT AND BORING LOCATIONS - UPPER SAN DIEGO CREEK

LAKE FOREST WOODS SEWER INPROVEMENTS
LAKE FOREST, CALIFORNIA

211992001 I 9/22

Ninyo & Moore
Geotechnical & Environmental Sciences Consultants

LEGEND

B-4
TD=31.4
BORING;
TD=TOTAL DEPTH IN FEET

N

FEET
0 80 160

NOTE: DIMENSIONS, DIRECTIONS AND LOCATIONS ARE APPROXIMATE. I REFERENCE: WOODARD & CURRAN, 2022.

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FIGURE 3

Ninyo & Moore
Geotechnical & Environmental Sciences Consultants

PROJECT ALIGNMENT AND BORING LOCATIONS - GLENWOOD CREEK

LAKE FOREST WOODS SEWER INPROVEMENTS
LAKE FOREST, CALIFORNIA

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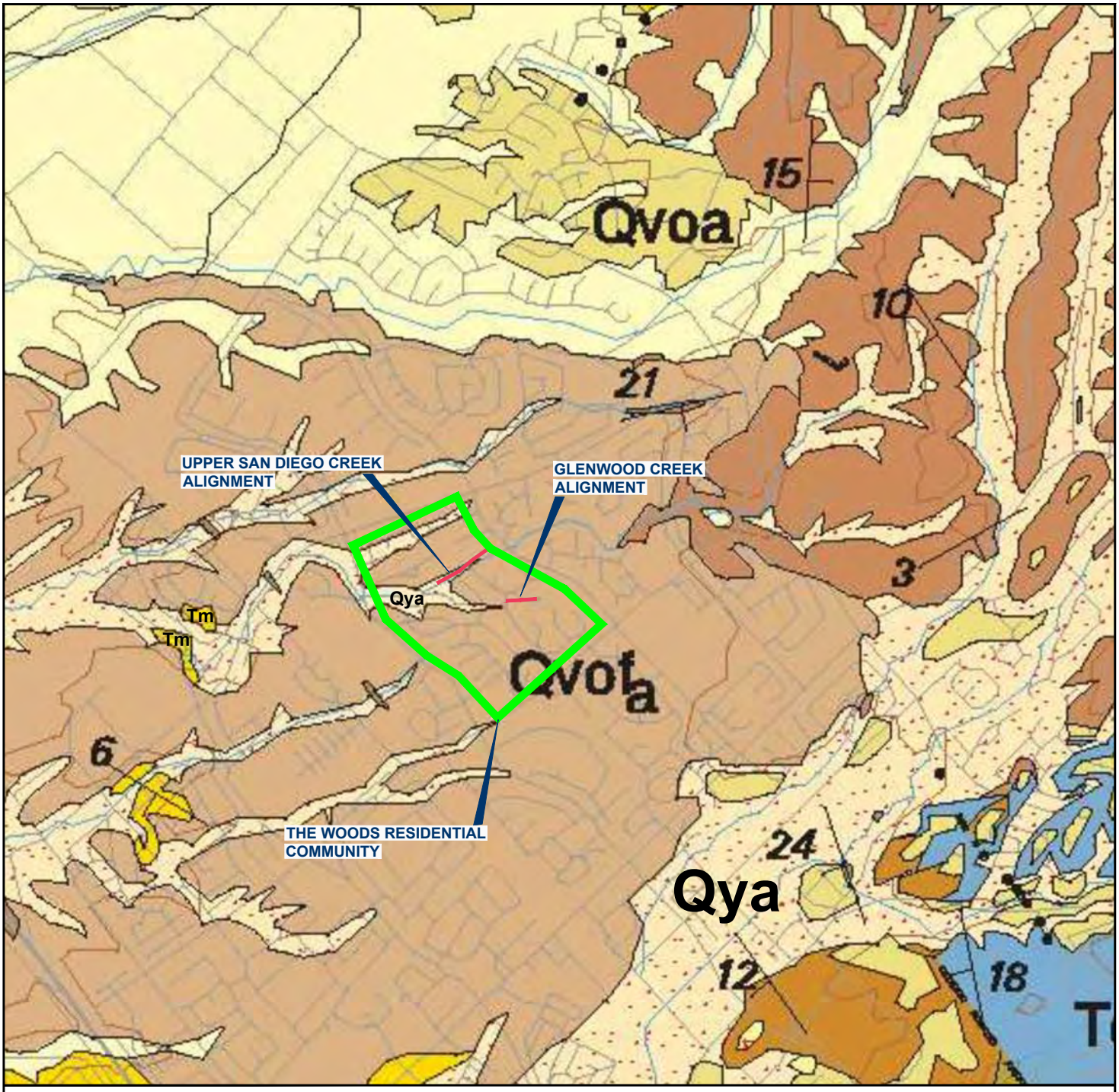

LEGEND

Qya	HOLOCENE AND LATE PLEISTOCENE AXIAL-CHANNEL DEPOSITS		GEOLOGIC CONTACT
Qvof	MIDDLE TO EARLY PLEISTOCENE VERY OLD ALLUVIAL FAN DEPOSITS		FAULT

N

FEET

0 2,000 4,000

NOTE: DIMENSIONS, DIRECTIONS AND LOCATIONS ARE APPROXIMATE. I REFERENCE: MORTON AND MILLER, 2006.

211992001_RG.dwg 08/12/2022 JDP, GK

FIGURE 4

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REGIONAL GEOLOGY

LAKE FOREST WOODS SEWER INPROVEMENTS
LAKE FOREST, CALIFORNIA

211992001 I 9/22

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NOTE: DIRECTIONS, DIMENSIONS AND LOCATIONS ARE APPROXIMATE.

SOURCES: CALIFORNIA GEOLOGICAL SURVEY, ACCESSED AUGUST 11, 2022, AT: https://www.usgs.gov/natural-hazards/earthquake-hazards/faults; ESRI, 2021.

FIGURE 5

FAULT LOCATIONS

LAKE FOREST WOODS SEWER IMPROVEMENTS
IRVINE RANCH WATER DISTRICT
LAKE FOREST, CALIFORNIA
211992001 | 9/22

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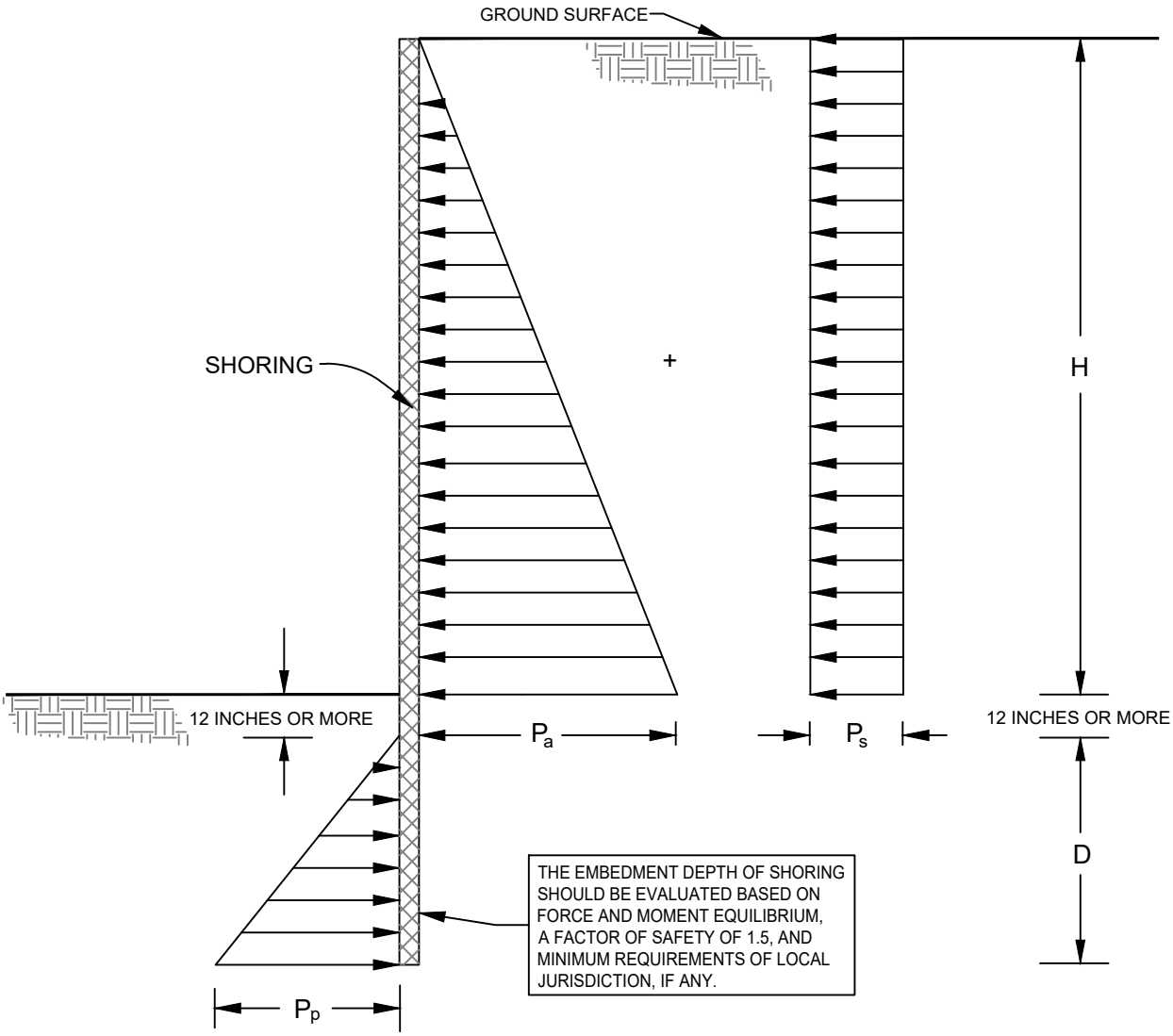

NOTES:

1. ACTIVE LATERAL EARTH PRESSURE, P_a
   P_a = 37H psf
2. CONSTRUCTION TRAFFIC INDUCED SURCHARGE PRESSURE, P_s
   P_s = 120 psf
3. PASSIVE LATERAL EARTH PRESSURE, P_p
   P_p = 380D psf
4. ASSUMES GROUNDWATER IS NOT PRESENT
5. H AND D ARE IN FEET

NOT TO SCALE

211992001_LEP-CS1.dwg 09/02/2022 GK

FIGURE 6

LATERAL EARTH PRESSURES FOR TEMPORARY CANTILEVERED SHORING

LAKE FOREST WOODS SEWER INPROVEMENTS
LAKE FOREST, CALIFORNIA

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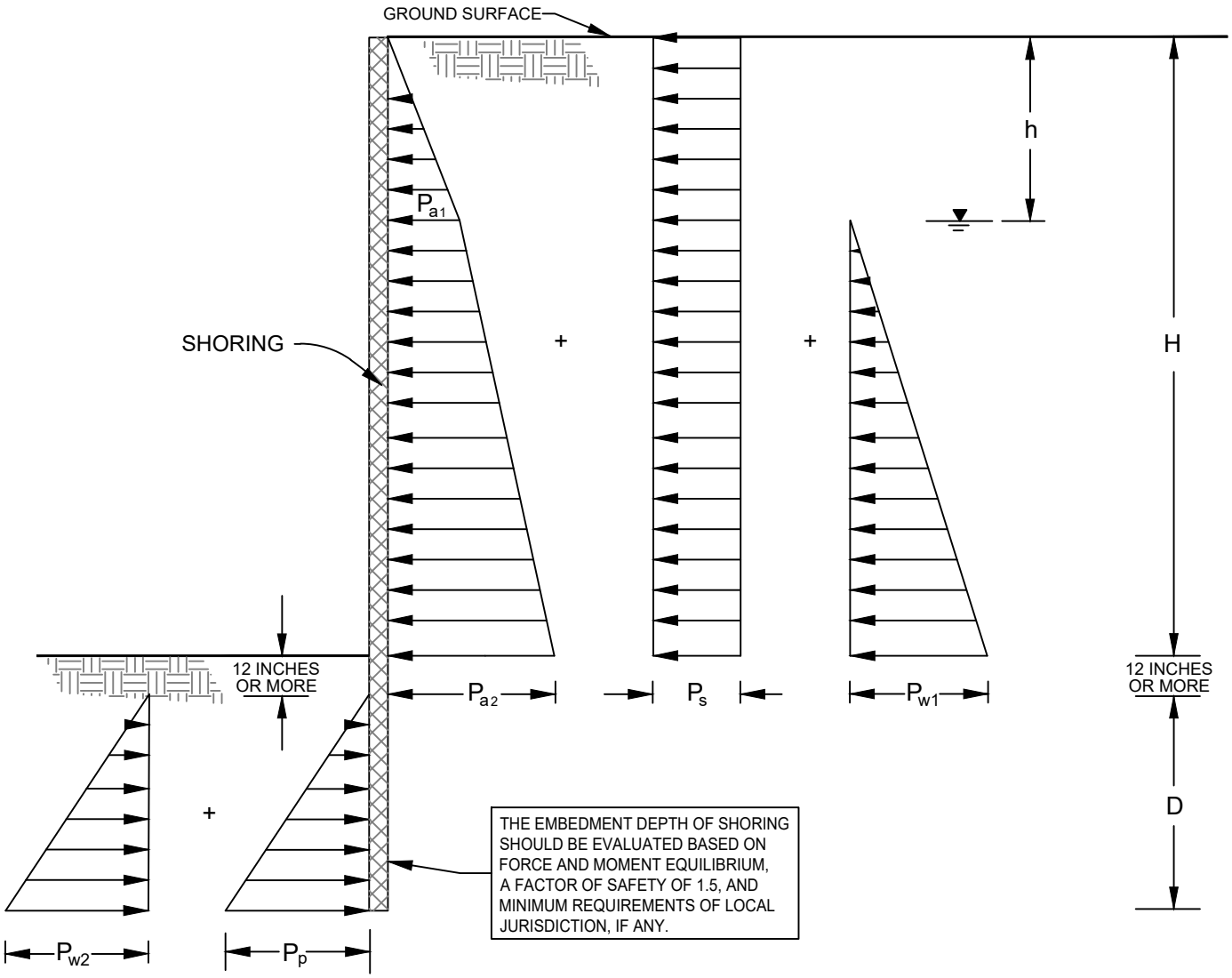

NOTES:

1. ACTIVE LATERAL EARTH PRESSURE, P_a
   P_{a1} = 37h psf; $P_{a2} = P_{a1} + 18(H - h)$ psf
2. CONSTRUCTION TRAFFIC INDUCED SURCHARGE PRESSURE, P_s
   P_s = 120 psf
3. HYDROSTATIC PRESSURE, P_{w1} & P_{w2}
   $P_{w1} = 62.4(H - h)$ psf
   $P_{w2} = 62.4D$ psf
4. PASSIVE LATERAL EARTH PRESSURE, P_p
   P_p = 180D psf
5. SURCHARGES FROM EXCAVATED SOIL OR CONSTRUCTION MATERIALS ARE NOT INCLUDED
6. H, h AND D ARE IN FEET
7. ⏚ GROUNDWATER TABLE
8. P_{w2} IS APPLICABLE WHEN DEWATERING IS TO BE PERFORMED FROM INSIDE OR OUTSIDE OF THE EXCAVATION

NOT TO SCALE

211992001_LEP-CS2.dwg 09/02/2022 GK

FIGURE 7

LATERAL EARTH PRESSURES FOR TEMPORARY CANTILEVERED SHORING

LAKE FOREST WOODS SEWER INPROVEMENTS
LAKE FOREST, CALIFORNIA

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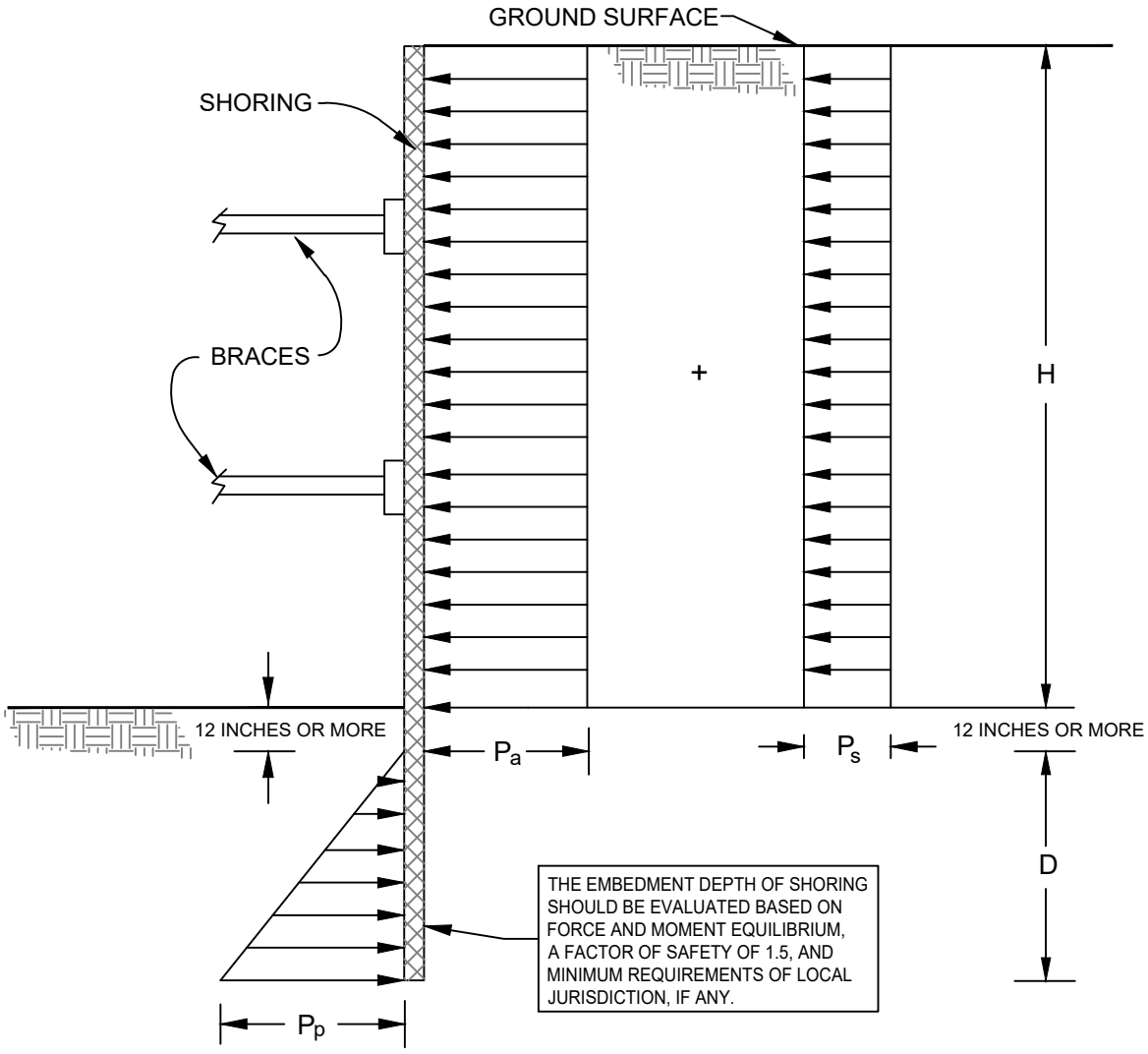

NOTES:

1. APPARENT LATERAL EARTH PRESSURE, P_a
   P_a = 24H psf
2. CONSTRUCTION TRAFFIC INDUCED SURCHARGE PRESSURE, P_s
   P_s = 120 psf
3. PASSIVE LATERAL EARTH PRESSURE, P_p
   P_p = 380D psf
4. ASSUMES GROUNDWATER IS NOT PRESENT
5. SURCHARGES FROM EXCAVATED SOIL OR CONSTRUCTION MATERIALS ARE NOT INCLUDED
6. H AND D ARE IN FEET

NOT TO SCALE

211992001_LEP-BE(GS).dwg 09/02/2022 GK

FIGURE 8

LATERAL EARTH PRESSURES FOR BRACED EXCAVATION (GRANULAR SOIL)

LAKE FOREST WOODS SEWER INPROVEMENTS
LAKE FOREST, CALIFORNIA

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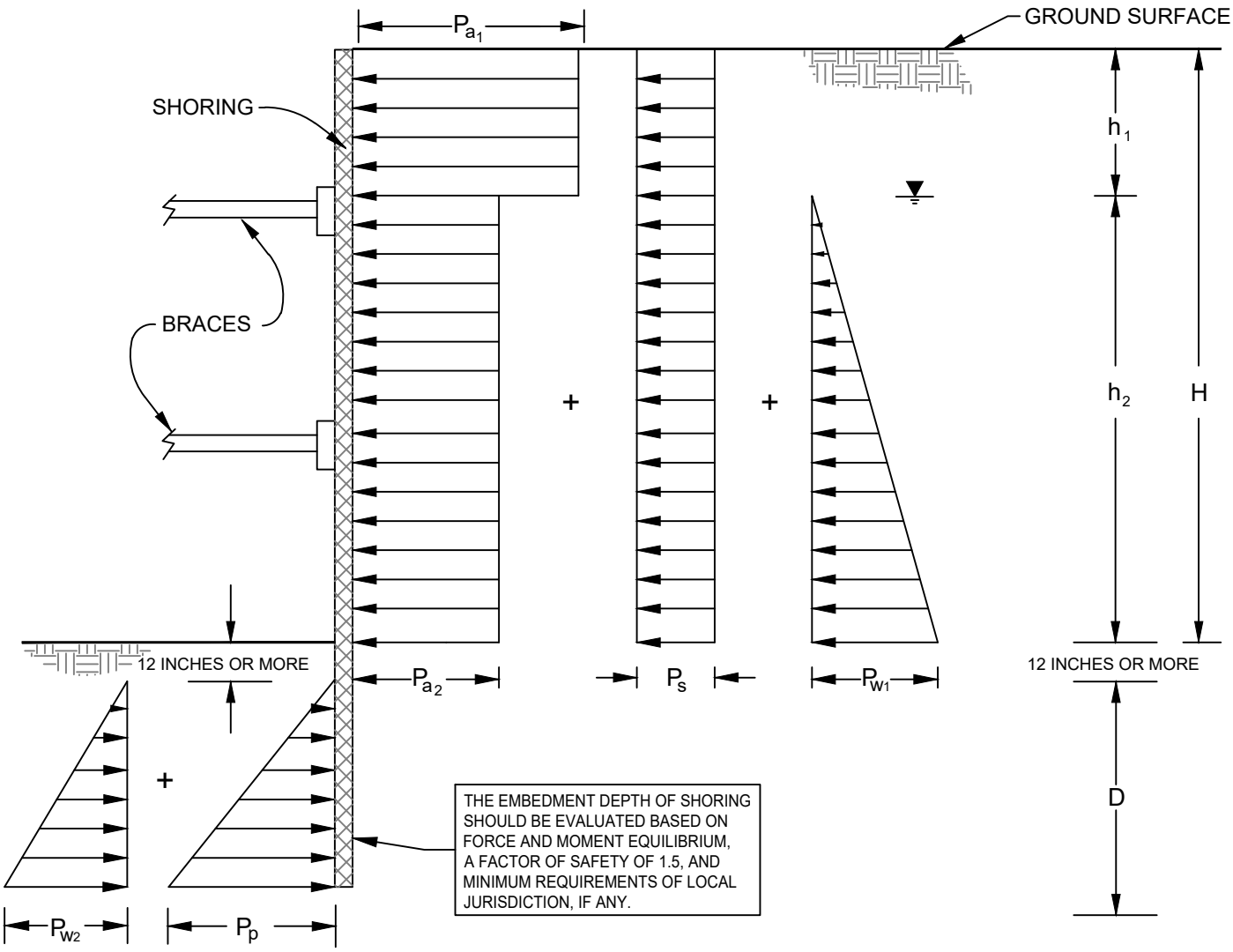

NOTES:

1. APPARENT LATERAL EARTH PRESSURES, P_{a1} AND P_{a2}
   $P_{a_1} = 24h_1$ psf
   $P_{a_2} = 12h_2$ psf
2. CONSTRUCTION TRAFFIC INDUCED SURCHARGE PRESSURE, P_s
   $P_s = 120$ psf
3. HYDROSTATIC PRESSURE, P_{w1} & P_{w2}
   $P_{w1} = 62.4(H - h)$ psf
   $P_{w2} = 62.4D$ psf
4. PASSIVE PRESSURE, P_p
   $P_p = 180D$ psf
5. SURCHARGES FROM EXCAVATED SOIL OR CONSTRUCTION MATERIALS ARE NOT INCLUDED
6. H, h_1, h_2 AND D ARE IN FEET
7. ▽ GROUNDWATER TABLE
8. P_{w2} IS APPLICABLE WHEN DEWATERING IS TO BE PERFORMED FROM INSIDE OR OUTSIDE OF THE EXCAVATION

NOT TO SCALE

211992001_LEP-BEBG(GS).dwg 09/02/2022 GK

FIGURE 9

LATERAL EARTH PRESSURES FOR BRACED EXCAVATION BELOW GROUNDWATER (GRANULAR SOIL)

LAKE FOREST WOODS SEWER INPROVEMENTS
LAKE FOREST, CALIFORNIA

Ninyo & Moore
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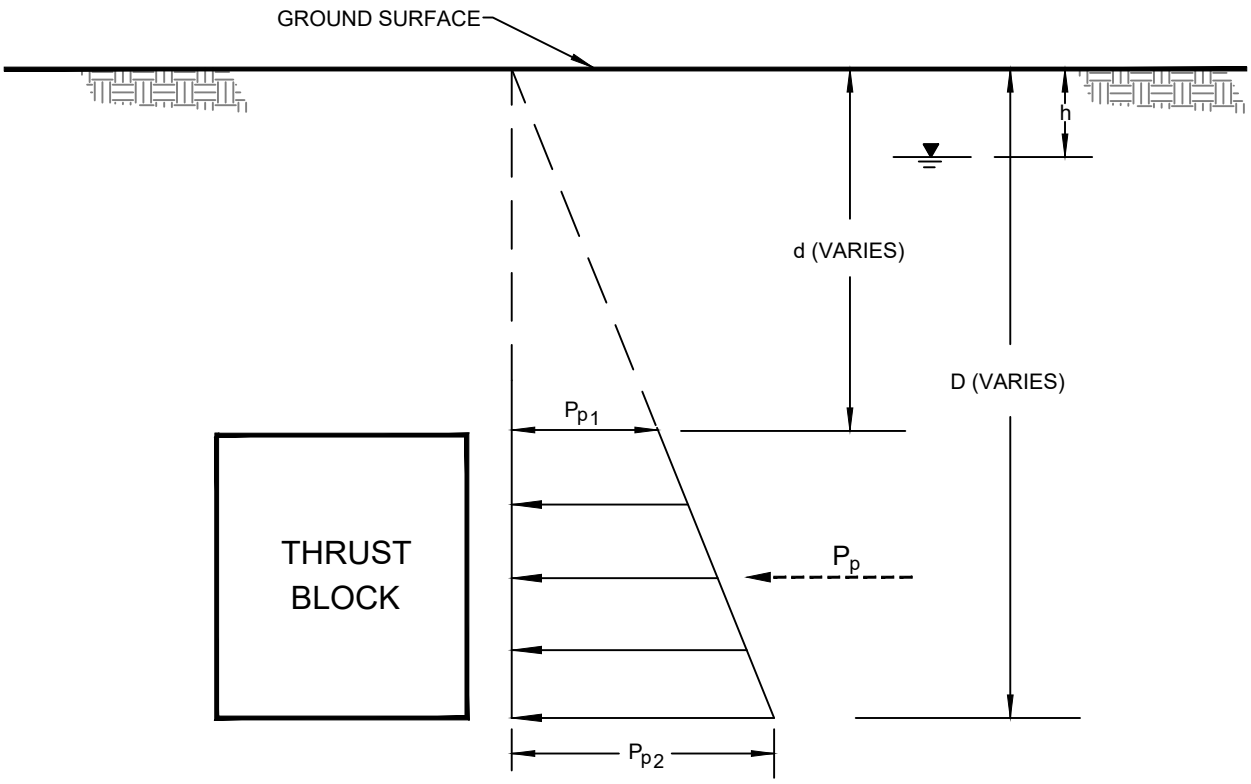

NOTES:

1. GROUNDWATER BELOW BLOCK
   $P_p = 380(D^2-d^2)$ lb/ft
2. GROUNDWATER ABOVE BLOCK
   $P_p = 1.6(D - d)[124.8h + 57(D+d)]$ lb/ft
3. ASSUMES BACKFILL IS GRANULAR MATERIAL
4. ASSUMES THRUST BLOCK IS ADJACENT TO COMPETENT MATERIAL
5. D, d AND h ARE IN FEET
6. GROUNDWATER TABLE

NOT TO SCALE

211992001_LEP-TB.dwg 09/02/2022 GK

FIGURE 10

THRUST BLOCK LATERAL EARTH PRESSURE DIAGRAM

LAKE FOREST WOODS SEWER INPROVEMENTS
LAKE FOREST, CALIFORNIA

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APPENDIX A

Boring Logs

APPENDIX A

BORING LOGS

Field Procedure for the Collection of Disturbed Samples

Disturbed soil samples were obtained in the field using the following method.

Bulk Samples

Bulk samples of representative earth materials were obtained from the exploratory borings. The samples were bagged and transported to the laboratory for testing.

The Standard Penetration Test (SPT) Sampler

Disturbed drive samples of earth materials were obtained by means of a Standard Penetration Test sampler. The sampler is composed of a split barrel with an external diameter of 2 inches and an unlined internal diameter of 1-3/8 inches. The sampler was driven into the ground 18 inches with a 140-pound hammer free-falling from a height of 30 inches in general accordance with ASTM D 1586. The blow counts were recorded for every 6 inches of penetration; the blow counts reported on the logs are those for the last 12 inches of penetration. Soil samples were observed and removed from the sampler, bagged, sealed and transported to the laboratory for testing.

Field Procedure for the Collection of Relatively Undisturbed Samples

Relatively undisturbed soil samples were obtained in the field using the following method.

The Modified Split-Barrel Drive Sampler

The sampler, with an external diameter of 3 inches, was lined with 1-inch-long, thin brass rings with inside diameters of approximately 2.4 inches. The sample barrel was driven into the ground with the weight of a hammer in general accordance with ASTM D 3550. The driving weight was permitted to fall freely. The approximate length of the fall, the weight of the hammer, and the number of blows per foot of driving are presented on the boring logs as an index to the relative resistance of the materials sampled. The samples were removed from the sample barrel in the brass rings, sealed, and transported to the laboratory for testing.

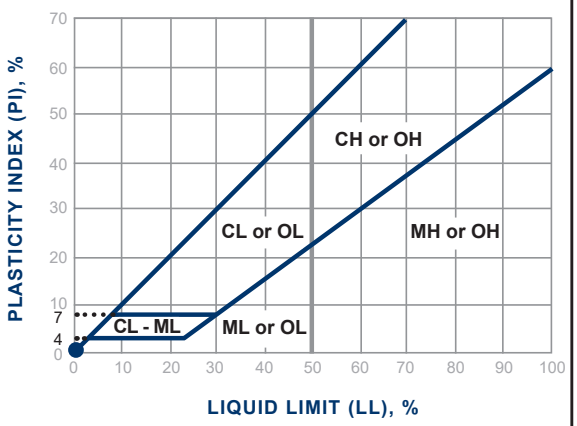
Soil Classification Chart Per ASTM D 2488

Primary Divisions			Secondary Divisions	
			Group Symbol	Group Name
COARSE-GRAINED SOILS more than 50% retained on No. 200 sieve	**GRAVEL** more than 50% of coarse fraction retained on No. 4 sieve	CLEAN GRAVEL less than 5% fines	GW	well-graded GRAVEL
			GP	poorly graded GRAVEL
		GRAVEL with DUAL CLASSIFICATIONS 5% to 12% fines	GW-GM	well-graded GRAVEL with silt
			GP-GM	poorly graded GRAVEL with silt
			GW-GC	well-graded GRAVEL with clay
			GP-GC	poorly graded GRAVEL with clay
		GRAVEL with FINES more than 12% fines	GM	silty GRAVEL
			GC	clayey GRAVEL
			GC-GM	silty, clayey GRAVEL
	SAND 50% or more of coarse fraction passes No. 4 sieve	CLEAN SAND less than 5% fines	SW	well-graded SAND
			SP	poorly graded SAND
		SAND with DUAL CLASSIFICATIONS 5% to 12% fines	SW-SM	well-graded SAND with silt
			SP-SM	poorly graded SAND with silt
			SW-SC	well-graded SAND with clay
			SP-SC	poorly graded SAND with clay
		SAND with FINES more than 12% fines	SM	silty SAND
			SC	clayey SAND
			SC-SM	silty, clayey SAND
FINE-GRAINED SOILS 50% or more passes No. 200 sieve	**SILT and CLAY** liquid limit less than 50%	INORGANIC	CL	lean CLAY
			ML	SILT
			CL-ML	silty CLAY
		ORGANIC	OL (PI > 4)	organic CLAY
			OL (PI < 4)	organic SILT
	SILT and CLAY liquid limit 50% or more	INORGANIC	CH	fat CLAY
			MH	elastic SILT
		ORGANIC	OH (plots on or above "A"-line)	organic CLAY
			OH (plots below "A"-line)	organic SILT
	Highly Organic Soils		PT	Peat

Grain Size

Description		Sieve Size	Grain Size	Approximate Size
Boulders		> 12"	> 12"	Larger than basketball-sized
Cobbles		3 - 12"	3 - 12"	Fist-sized to basketball-sized
Gravel	Coarse	3/4 - 3"	3/4 - 3"	Thumb-sized to fist-sized
	Fine	#4 - 3/4"	0.19 - 0.75"	Pea-sized to thumb-sized
Sand	Coarse	#10 - #4	0.079 - 0.19"	Rock-salt-sized to pea-sized
	Medium	#40 - #10	0.017 - 0.079"	Sugar-sized to rock-salt-sized
	Fine	#200 - #40	0.0029 - 0.017"	Flour-sized to sugar-sized
Fines		Passing #200	< 0.0029"	Flour-sized and smaller

Plasticity Chart



Apparent Density - Coarse-Grained Soil

Apparent Density	Spooling Cable or Cathead		Automatic Trip Hammer	
	SPT (blows/foot)	Modified Split Barrel (blows/foot)	SPT (blows/foot)	Modified Split Barrel (blows/foot)
Very Loose	≤ 4	≤ 8	≤ 3	≤ 5
Loose	5 - 10	9 - 21	4 - 7	6 - 14
Medium Dense	11 - 30	22 - 63	8 - 20	15 - 42
Dense	31 - 50	64 - 105	21 - 33	43 - 70
Very Dense	> 50	> 105	> 33	> 70

Consistency - Fine-Grained Soil

Consis-tency	Spooling Cable or Cathead		Automatic Trip Hammer	
	SPT (blows/foot)	Modified Split Barrel (blows/foot)	SPT (blows/foot)	Modified Split Barrel (blows/foot)
Very Soft	< 2	< 3	< 1	< 2
Soft	2 - 4	3 - 5	1 - 3	2 - 3
Firm	5 - 8	6 - 10	4 - 5	4 - 6
Stiff	9 - 15	11 - 20	6 - 10	7 - 13
Very Stiff	16 - 30	21 - 39	11 - 20	14 - 26
Hard	> 30	> 39	> 20	> 26

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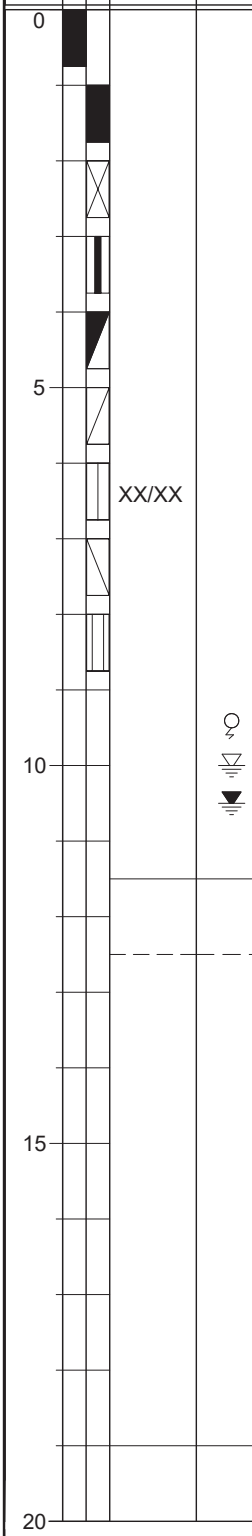
USCS METHOD OF SOIL CLASSIFICATION

BORING LOG EXPLANATION SHEET



Bulk sample.

Modified split-barrel drive sampler.

No recovery with modified split-barrel drive sampler.

Sample retained by others.

Standard Penetration Test (SPT).

No recovery with a SPT.

Shelby tube sample. Distance pushed in inches/length of sample recovered in inches.

No recovery with Shelby tube sampler.

Continuous Push Sample.

Seepage.

Groundwater encountered during drilling.

Groundwater measured after drilling.

SM

MAJOR MATERIAL TYPE (SOIL):

Solid line denotes unit change.

CL

Dashed line denotes material change.

Attitudes: Strike/Dip
b: Bedding
c: Contact
j: Joint
f: Fracture
F: Fault
cs: Clay Seam
s: Shear
bss: Basal Slide Surface
sf: Shear Fracture
sz: Shear Zone
sbs: Shear Bedding Surface

The total depth line is a solid line that is drawn at the bottom of the boring.

DATE DRILLED 7/12/22 BORING NO. B-1

GROUND ELEVATION 383' ± (MSL) SHEET 1 OF 1

METHOD OF DRILLING 8" Hollow-Stem Auger (2R Drilling)

DRIVE WEIGHT 140 lbs. (Auto. Trip Hammer) DROP 30"

SAMPLED BY GM LOGGED BY GM REVIEWED BY MLP

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0						SM	ALLUVIUM: Yellowish brown, moist, very dense, silty SAND with gravel; few rootlets.
		50/3"	6.1	107.5		SC	Yellowish brown, moist, very dense, clayey SAND; trace gravel.
10		50/5"				SC	VERY OLD ALLUVIAL FAN DEPOSITS: Reddish brown, moist, very dense, clayey SAND with gravel.
		50/5"					
						SM	Reddish brown, moist, very dense, silty SAND; trace gravel.
20		69				CL	Grayish brown, moist, hard, sandy CLAY with gravel.
		50/3"	17.3	94.0			
30		42					Decrease in gravel.
							Total Depth = 31.5 feet. Groundwater was not encountered during drilling. Backfilled with cement-bentonite grout on 7/12/22. Notes: Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report. The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.
40							

DATE DRILLED 7/12/22 BORING NO. B-2

GROUND ELEVATION 387' ± (MSL) SHEET 1 OF 1

METHOD OF DRILLING 8" Hollow-Stem Auger (2R Drilling)

DRIVE WEIGHT 140 lbs. (Auto. Trip Hammer) DROP 30"

SAMPLED BY GM LOGGED BY GM REVIEWED BY MLP

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0						SC	ALLUVIUM: Dark yellowish brown, moist, very dense, clayey SAND; trace gravel.
		95	5.3	112.2			Few pinhole pores.
						SM	Dark yellowish brown, moist, dense, silty SAND.
10		51					Olive brown.
						CL	Olive brown, moist, hard, sandy CLAY with gravel; trace cobbles.
		55	13.5	104.8			@ 18.5': Groundwater measured approximately 30 minutes after drilling.
						SM	VERY OLD ALLUVIAL FAN DEPOSITS: Reddish brown, wet, very dense, silty SAND; trace gravel.
20		75					@ 24': Groundwater encountered during drilling; wet.
						SC	Olive brown, wet, very dense, clayey SAND.
		53					
30		50/5"					Total Depth = 30.4 feet. Groundwater was encountered during drilling at approximately 24 feet. Groundwater was measured approximately 30 minutes after drilling at approximately 18.5 feet. Backfilled with cement-bentonite grout on 7/12/22.
40							Notes: Groundwater may rise to a level higher than that measured in borehole due to seasonal variations in precipitation and several other factors as discussed in the report. The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.

DATE DRILLED 7/12/22 BORING NO. B-3

GROUND ELEVATION 392' ± (MSL) SHEET 1 OF 1

METHOD OF DRILLING 8" Hollow-Stem Auger (2R Drilling)

DRIVE WEIGHT 140 lbs. (Auto. Trip Hammer) DROP 30"

SAMPLED BY GM LOGGED BY GM REVIEWED BY MLP

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0						SC	ALLUVIUM: Yellowish brown, moist, very dense, clayey SAND with gravel.
		50/5"					Few to little rootlets.
						SM	VERY OLD ALLUVIAL FAN DEPOSITS: Yellowish brown, moist, very dense, silty SAND.
10		50/3"	6.2	100.7			
		90	8.4	103.1			Grayish brown.
20		39					Gray.
							@ 22.5': Groundwater measured 15 minutes after drilling; wet.
		50/5"	17.6	112.0			@ 26': Groundwater encountered during drilling.
30		81/11"					
							Total Depth = 30.9 feet. Groundwater was encountered at approximately 26 feet during drilling. Groundwater was measured at approximately 22.5 feet 15 minutes after drilling was complete. Backfilled with cement-bentonite grout on 7/12/22. Notes: Groundwater may rise to a level higher than that measured in borehole due to seasonal variations in precipitation and several other factors as discussed in the report. The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.
40							

FIGURE A- 3

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LAKE FOREST WOODS SEWER IMPROVEMENTS
LAKE FOREST, CALIFORNIA

DATE DRILLED 7/13/22 BORING NO. B-4

GROUND ELEVATION 402' ± (MSL) SHEET 1 OF 1

METHOD OF DRILLING 8" Hollow-Stem Auger (2R Drilling)

DRIVE WEIGHT 140 lbs. (Auto. Trip Hammer) DROP 30"

SAMPLED BY GM LOGGED BY GM REVIEWED BY MLP

DEPTH (feet)	SAMPLES (Bulk / Driven)	BLOWS/FOOT	MOISTURE (%)	DRY DENSITY (PCF)	SYMBOL	CLASSIFICATION U.S.C.S.	DESCRIPTION/INTERPRETATION
0						SM	ALLUVIUM: Grayish brown, moist, very dense, silty SAND with gravel; few cobbles; trace boulders.
		50/3"	9.2	118.5			Difficult drilling.
10		50/5"					Yellowish brown.
							Difficult drilling.
		100/11"	10.0	100.0		ML	VERY OLD ALLUVIAL FAN DEPOSITS: Gray and light yellowish brown, moist, very dense, SILT; trace sand.
						SM	Light yellowish brown, moist, very dense, silty SAND.
20		86/9"	13.2	92.7			
		96/8"					Few oxidized layers.
30		76/11"					Few gravel.
							Total Depth = 31.4 feet. Groundwater was not encountered during drilling. Backfilled with cement-bentonite grout on 7/13/22. Notes: Groundwater, though not encountered at the time of drilling, may rise to a higher level due to seasonal variations in precipitation and several other factors as discussed in the report. The ground elevation shown above is an estimation only. It is based on our interpretations of published maps and other documents reviewed for the purposes of this evaluation. It is not sufficiently accurate for preparing construction bids and design documents.
40							

APPENDIX B

Laboratory Testing

APPENDIX B

LABORATORY TESTING

Classification
Soils were visually and texturally classified in accordance with the Unified Soil Classification System (USCS) in general accordance with ASTM D 2488. Soil classifications are indicated on the logs of the exploratory borings in Appendix A.

In-Place Moisture and Density Tests
The moisture content and dry density of relatively undisturbed samples obtained from the exploratory borings were evaluated in general accordance with ASTM D 2937. The test results are presented on the logs of the exploratory borings in Appendix A.

Gradation Analysis
Gradation analysis tests were performed on selected representative soil samples in general accordance with ASTM D 422. The grain-size distribution curves are shown on Figures B-1 and B-2. These test results were utilized in evaluating the soil classifications in accordance with the Unified Soil Classification System (USCS).

200 Wash
An evaluation of the percentage of particles finer than the No. 200 sieve in selected soil samples was performed in general accordance with ASTM D 1140. The results of the tests are presented on Figure B-3.

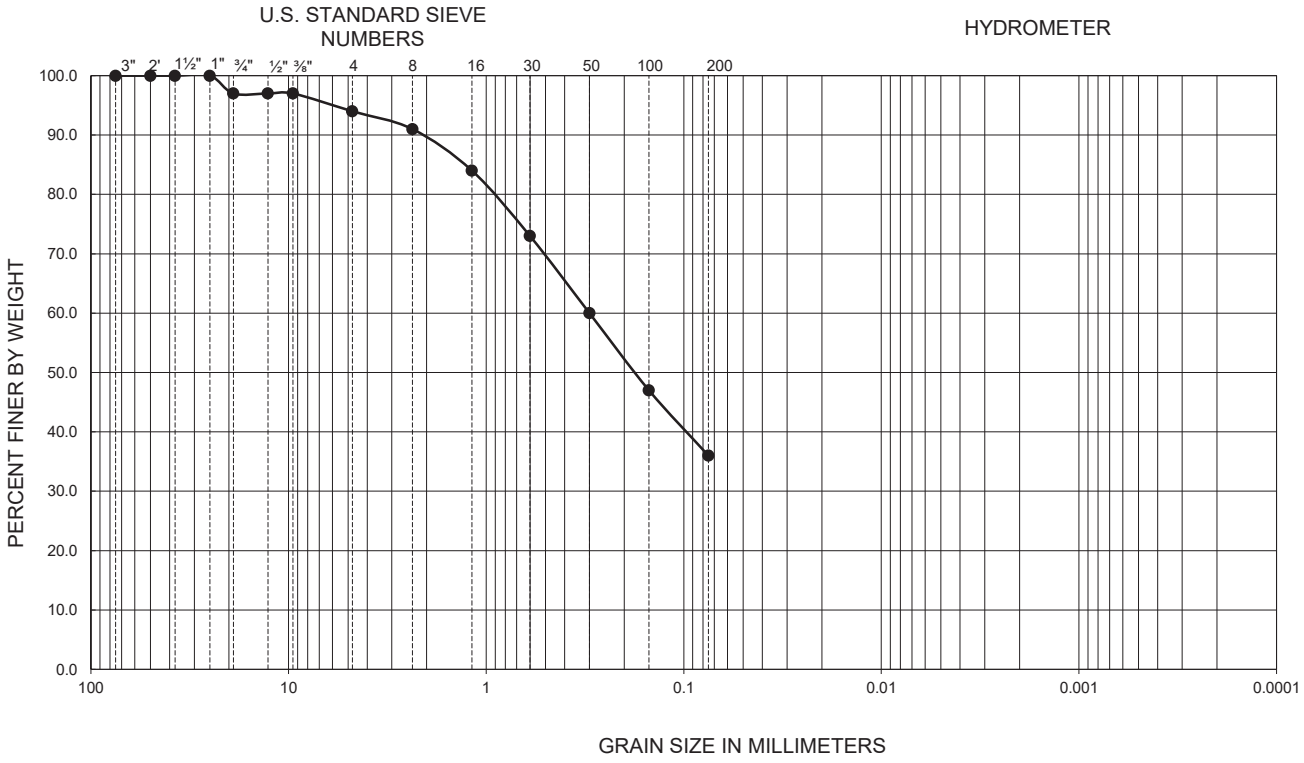
Atterberg Limits
Tests were performed on selected representative fine-grained soil samples to evaluate the liquid limit, plastic limit, and plasticity index in general accordance with ASTM D 4318-00. The test results were utilized to evaluate the soil classification in accordance with the USCS. The test results and classifications are shown on Figure B-4.

Direct Shear Tests
Direct shear tests were performed on relatively undisturbed samples in general accordance with ASTM D 3080 to evaluate the shear strength characteristics of the selected materials. The samples were inundated during shearing to represent adverse field conditions. The results are presented on Figures B-5 and B-6.

Expansion Index Tests
The expansion index of selected materials was evaluated in general accordance with Uniform Building Code (UBC) Standard No. 18-2 (ASTM D 4829). Specimens were molded under a specified compactive energy at approximately 50 percent saturation (plus or minus 1 percent). The prepared 1-inch thick by 4-inch diameter specimens were loaded with a surcharge of 144 pounds per square foot and were inundated with tap water. Readings of volumetric swell were made for a period of 24 hours. The results of these tests are presented on Figure B-7.

Soil Corrosivity Tests
Soil pH, and resistivity tests were performed on a representative sample in general accordance with California Test (CT) 643. The soluble sulfate and chloride content of the selected sample was evaluated in general accordance with CT 417 and CT 422, respectively. The test results are presented on Figure B-8.

GRAVEL		SAND			FINES	
Coarse	Fine	Coarse	Medium	Fine	SILT	CLAY



Symbol	Sample Location	Depth (ft)	Liquid Limit	Plastic Limit	Plasticity Index	D_{10}	D_{30}	D_{60}	C_u	C_c	Passing No. 200 (percent)	USCS
●	B-2	0.0-5.0	--	--	--	--	--	--	--	--	36	SC

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 6913

FIGURE B-1

GRADATION TEST RESULTS

LAKE FOREST WOODS SEWER IMPROVEMENTS
LAKE FOREST, CALIFORNIA

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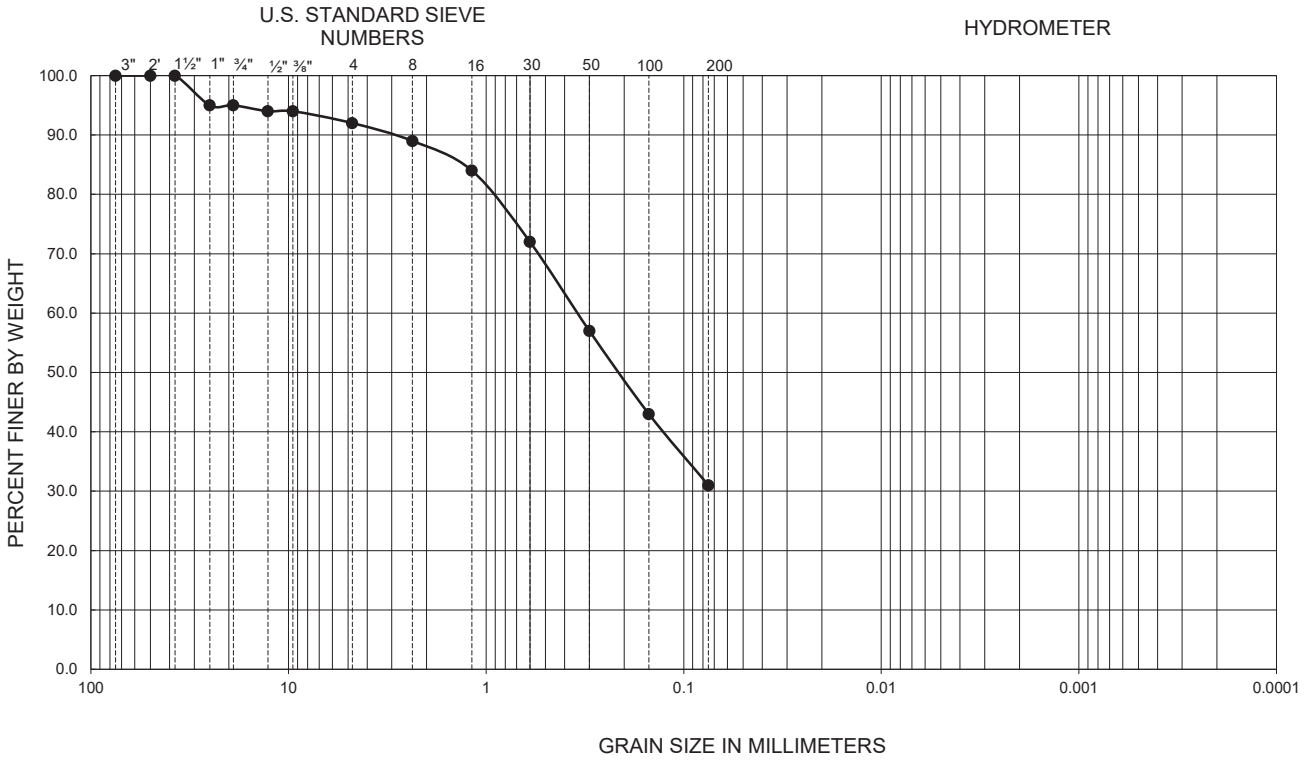
211992001 Fig B-1 SIEVE w No 8 @ B-2 0.0-5.0

GRAVEL		SAND			FINES	
Coarse	Fine	Coarse	Medium	Fine	SILT	CLAY



Symbol	Sample Location	Depth (ft)	Liquid Limit	Plastic Limit	Plasticity Index	D_{10}	D_{30}	D_{60}	C_u	C_c	Passing No. 200 (percent)	USCS
●	B-4	0.0-5.0	--	--	--	--	--	--	--	--	31	SM

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 6913

FIGURE B-2

GRADATION TEST RESULTS

LAKE FOREST WOODS SEWER IMPROVEMENTS
LAKE FOREST, CALIFORNIA

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SAMPLE LOCATION	SAMPLE DEPTH (ft)	DESCRIPTION	PERCENT PASSING NO. 4	PERCENT PASSING NO. 200	USCS (TOTAL SAMPLE)
B-1	20.0-21.0	SILTY SAND	100	13	SM
B-3	15.0-16.5	SILTY SAND	100	13	SM

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 1140

FIGURE B-3

NO. 200 SIEVE ANALYSIS TEST RESULTS

LAKE FOREST WOODS SEWER IMPROVEMENTS
LAKE FOREST, CALIFORNIA

211992001 | 9/22

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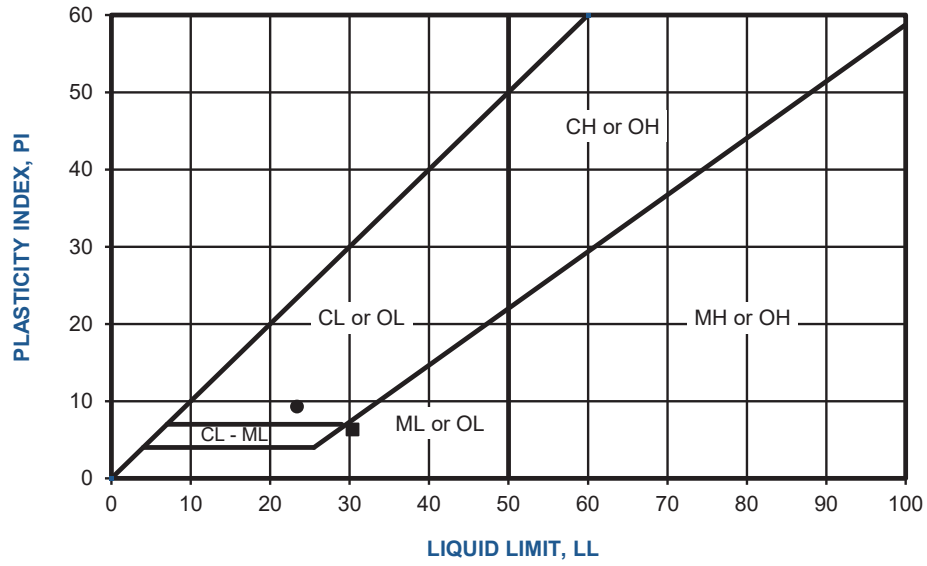
SYMBOL	LOCATION	DEPTH (ft)	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	USCS CLASSIFICATION (Fraction Finer Than No. 40 Sieve)	USCS
●	B-3	0.0-5.0	23	14	9	CL	SC
■	B-4	15.0-16.5	30	24	6	ML	ML



PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 4318

FIGURE B-4

ATTERBERG LIMITS TEST RESULTS

LAKE FOREST WOODS SEWER IMPROVEMENTS
LAKE FOREST, CALIFORNIA

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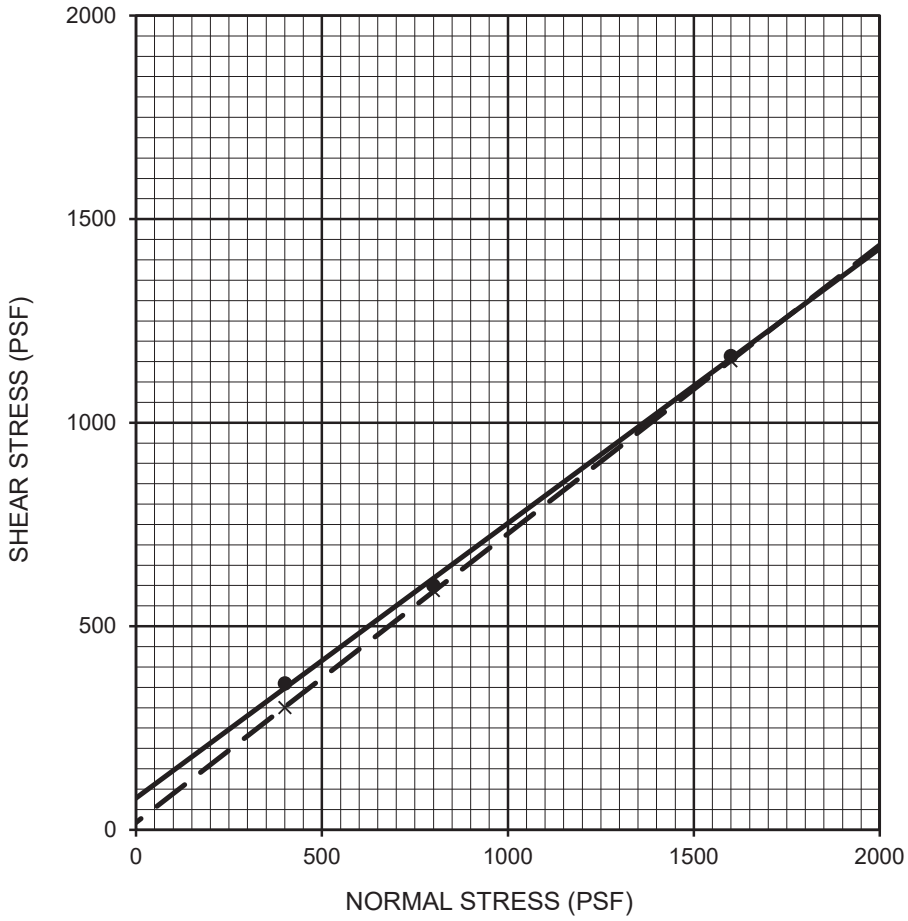

Description	Symbol	Sample Location	Depth (ft)	Shear Strength	Cohesion (psf)	Friction Angle (degrees)	Soil Type
CLAYEY SAND	—●—	B-2	5.0-6.5	Peak	78	34	SC
CLAYEY SAND	– – X – –	B-2	5.0-6.5	Ultimate	18	35	SC

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 3080

FIGURE B-5

DIRECT SHEAR TEST RESULTS

LAKE FOREST WOODS SEWER IMPROVEMENTS
LAKE FOREST, CALIFORNIA

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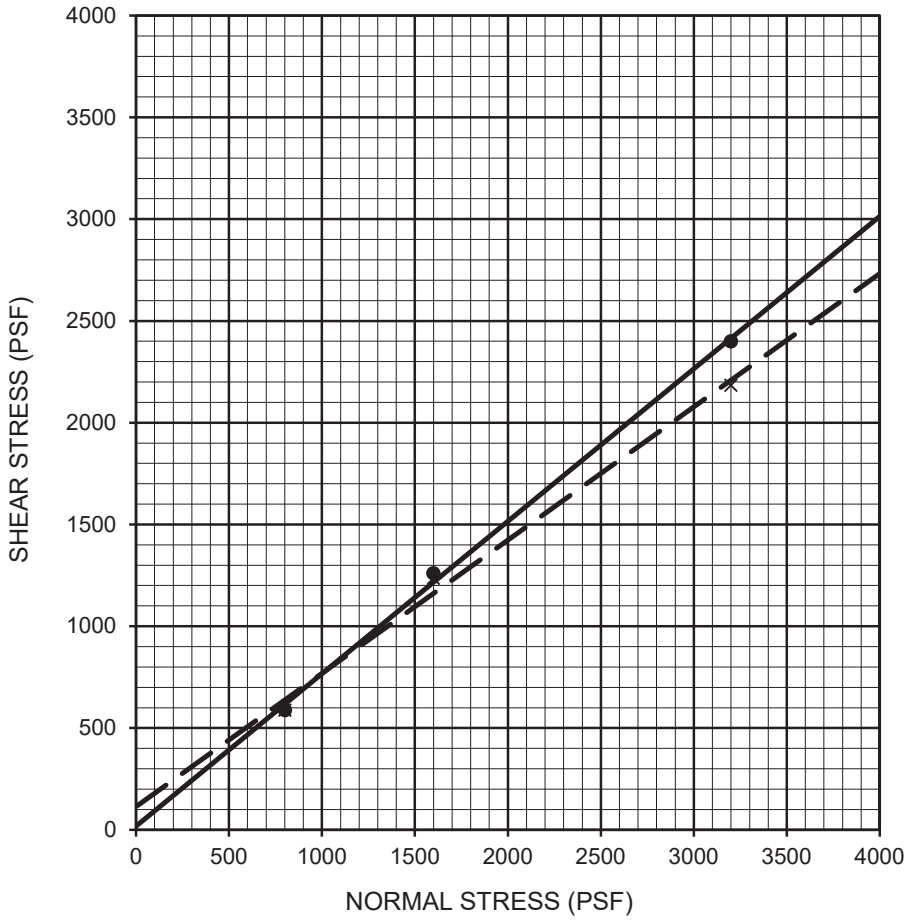

Description	Symbol	Sample Location	Depth (ft)	Shear Strength	Cohesion (psf)	Friction Angle (degrees)	Soil Type
SILTY SAND	—●—	B-3	10.0-11.5	Peak	18	37	SM
SILTY SAND	– – X – –	B-3	10.0-11.5	Ultimate	114	33	SM

PERFORMED IN GENERAL ACCORDANCE WITH ASTM D 3080

FIGURE B-6

DIRECT SHEAR TEST RESULTS

LAKE FOREST WOODS SEWER IMPROVEMENTS
LAKE FOREST, CALIFORNIA

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SAMPLE LOCATION	SAMPLE DEPTH (ft)	INITIAL MOISTURE (percent)	COMPACTED DRY DENSITY (pcf)	FINAL MOISTURE (percent)	VOLUMETRIC SWELL (in)	EXPANSION INDEX	POTENTIAL EXPANSION
B-2	0.0-5.0	9.7	112.0	15.9	0.021	21	Low

PERFORMED IN GENERAL ACCORDANCE WITH ☐ UBC STANDARD 18-2 ☑ ASTM D 4829

FIGURE B-7

EXPANSION INDEX TEST RESULTS

LAKE FOREST WOODS SEWER IMPROVEMENTS
LAKE FOREST, CALIFORNIA

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SAMPLE LOCATION	SAMPLE DEPTH (ft)	pH [1]	RESISTIVITY [1] (ohm-cm)	SULFATE CONTENT [2]		CHLORIDE CONTENT [3] (ppm)
				(ppm)	(%)	
B-3	0.0-5.0	5.5	2,683	10	0.001	110

[1] PERFORMED IN GENERAL ACCORDANCE WITH CALIFORNIA TEST METHOD 643
[2] PERFORMED IN GENERAL ACCORDANCE WITH CALIFORNIA TEST METHOD 417
[3] PERFORMED IN GENERAL ACCORDANCE WITH CALIFORNIA TEST METHOD 422

FIGURE B-8
CORROSIVITY TEST RESULTS

LAKE FOREST WOODS SEWER IMPROVEMENTS
LAKE FOREST, CALIFORNIA

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APPENDIX E

PALEONTOLOGICAL ANALYSIS

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CARLSBAD
CLOVIS
IRVINE
LOS ANGELES
PALM SPRINGS
POINT RICHMOND
RIVERSIDE
ROSEVILLE
SAN LUIS OBISPO

MEMORANDUM

DATE: September 29, 2023

TO: Kellie Welch, Water Resources Manager, Irvine Ranch Water District

FROM: Jacob Biewer, M.S., Paleontologist, and Sarah Rieboldt, Ph.D., Associate/Principal Paleontologist

SUBJECT: Paleontological Analysis of The Woods Sewer Improvements Project, Lake Forest, Orange County, California

INTRODUCTION

This memorandum was prepared to ensure that The Woods Sewer Improvements Project (project) in Lake Forest, Orange County, California, is in compliance with all applicable State and City of Lake Forest (City) regulations and requirements regarding paleontological resources. These regulations and requirements include the California Environmental Quality Act (CEQA): Public Resources Code (PRC) Division 13, Chapter 2.6; the *State CEQA Guidelines*: California Code of Regulations, Title 14, Chapter 3, Appendix G; PRC 5097.5; and the Recreation and Resources Element of the City General Plan (City of Lake Forest, 2020). This memorandum also follows industry best practices as documented by the Society of Vertebrate Paleontology (SVP, 2010). It addresses the potential for the project to impact paleontological resources and, if needed, includes mitigation measures and other recommendations to minimize these impacts. The Irvine Ranch Water District (IRWD) is the Lead Agency under CEQA.

PROJECT LOCATION AND DESCRIPTION

The project is located in The Woods community in Lake Forest within a reach of Upper San Diego Creek and the Glenwood Tributary that is bounded by Toledo Way to the northeast and Jeronimo Road to the southwest. The project site is depicted on the United States Geological Survey (USGS) *El Toro, California* 7.5-minute topographic quadrangle map in Township 6 South, Range 8 West, in unsectioned land of the Cañada de los Alisos Land Grant, San Bernardino Baseline and Meridian (USGS, 1982; Figure 1 [all figures provided in Attachment B]).

The objective of the proposed project is to reduce risk to infrastructure caused by scour by: relocating the existing sewer facilities in the creek to areas outside the scour zone, using stream bed improvements such as new grade control structures or bank stabilization to reduce the potential for scour, or adding concrete encasement to protect existing sewer facilities and to provide access improvements for ongoing maintenance activities. In total, IRWD would install approximately 1,300 feet of new sewer pipeline within Upper San Diego Creek and approximately 500 feet of new sewer

pipeline in the Glenwood Tributary. Specific improvements along each of these reaches are described further below, and their locations are shown on Figure 2.

Upper San Diego Creek

Along Upper San Diego Creek, IRWD proposes to install new 8- and 10-inch polyvinyl chloride (PVC) pipe and eight new precast concrete manholes, to repair/replace portions of a concrete pad at the existing drainage crossing, and to reconnect the existing 4-inch ABS service laterals. New pipelines would be installed via open trench or trenchless construction methods. Following installation, the pipe will be encased in concrete. Backfill would be compacted to minimum density of 90–95 percent. The top elevation of the trench would be restored to the original grade. A portion of the pipe would be installed via trenchless methods due to the steep terrain and proximity to private property lines. In addition, approximately 1,200 feet of existing sewer pipelines within the scour envelope would be abandoned in place and filled with concrete slurry to reduce the amount of excavation and disturbed area within the creek.

Portions of the existing concrete pad that encompasses existing Manholes 46 and 47 would be demolished and replaced as necessary to remove and dispose of the above grade portions of the manholes; below grade portions would be filled with cement slurry and abandoned in place. Above grade portions of the existing sewer manholes would be removed and the materials off hauled. The remaining portions of these manholes would be cement filled and slurry filled. Manhole 39 would be removed and replaced in the same location.

In addition, IRWD proposes to install ungrouted riprap check dams or bank stabilization measures at several locations within Upper San Diego Creek to reduce scour and protect existing sewer infrastructure and access roads. Riprap check dams would consist of large, ungrouted rock riprap underlain with unwoven fabric and compacted fill.

The existing dirt access road extending along the north side of Upper San Diego Creek would be replaced with a gravel access road within the existing pipeline easement, and a new gravel access road would be constructed along the south side of Upper San Diego Creek. The existing dirt access road off Glenwood Drive would also be replaced with a gravel access road. Gravel access roads would consist of 12-inch Class II aggregate base compacted to 95 percent. Retaining walls, up to 3 feet tall, may be installed in some locations along the access roads where slope stabilization is required. In addition, the existing paved access roads off Dove Tree Lane, Parkwood Street, and Jeronimo Road would be repaved.

Glenwood Tributary

Along the Glenwood Tributary, IRWD proposes to install a new concrete encased 8-inch PVC pipeline, two new precast concrete manholes, and reconnections of the existing service laterals. The new sewer line would run along the southern bank of the Glenwood Tributary connecting to existing 8-inch sewer lines. Existing 4-inch ABS service laterals would be relocated as required. The relocation and concrete encasement of the sewer line will reduce the risk of damage from scour.

Approximately 600 linear feet of 8-inch sewer line would be abandoned in place and filled with cement slurry. In addition, two existing manholes (Manholes 138 and 140) would be abandoned, in the same manner as described above for Manholes 35, 36, and 37.

In addition, IRWD proposes to install ungrouted riprap check dams at various locations within the Glenwood Tributary to slow stream flow and allow sediment to settle out.

The existing paved access road from Singingwoods Drive would be widened and repaved. A proposed retaining wall, up to 3 feet tall, may be installed along the east side of the access road, if needed for slope stabilization.

Excavation Information

Development of the project will involve installation of bypass piping followed by new pipelines via open trench construction or trenchless methods (either horizontal directional drilling or pipe jacking), demolition or abandonment of unneeded existing manholes and sewer pipelines, and installation of improvements to access roads and watershed. The deepest excavation associated with the project is expected to be for the trenchless jacking and receiving shafts, which will extend to a maximum depth of approximately 23 feet (personal communication, Justin Kraetsch, Woodard & Curran, September 11, 2023). The excavation depths of the various components of the project are listed in Table A, below.

Table A: Anticipated Maximum Excavation Depths for Components of The Woods Sewer Improvements Project

Project Component	Depth (ft)[1]
Open Trenches	4–16
Trenchless Jacking Shafts	15–21
Trenchless Receiving Shafts	8–23
Manholes	6–20
Access Roads	≤ 4
Concrete Pad Repair/Replace	≤ 1
Watershed Improvements	2.6–6.5

[1] Personal communication, Justin Kraetsch, Woodard & Curran, September 11, 2023.
ft = foot/feet

METHODS

LSA examined geologic maps of the project site and reviewed relevant geological and paleontological literature to determine which geologic units are present within the project site and whether fossils have been recovered within the project site or from those or similar geologic units elsewhere in the region. A fossil locality search was conducted through the Natural History Museum of Los Angeles County (NHMLAC) to determine the status and extent of previously recorded paleontological resources within and surrounding the project site. A pedestrian field survey of the project site was conducted by LSA Paleontologist Sarah Rieboldt, Ph.D., on June 14, 2023. This

survey involved walking parallel transects over the project site to document and collect any paleontological resources that may have been present, as well as to note the sediments at the surface.

RESULTS

Literature Review

The project site is in the Peninsular Ranges Geomorphic Province, a 900-mile-long northwest-southeast trending structural block with similarly trending faults, that extends from the Transverse Ranges in the north to the tip of Baja California in the south and includes the Los Angeles Basin (California Geological Survey, 2002; Norris and Webb, 1976). The total width of this province is 225 miles, extending from the Colorado Desert in the east, across the continental shelf, to the southern Channel Islands (Santa Barbara, San Nicolas, Santa Catalina, and San Clemente) in the west (Sharp, 1976). This province is characterized by a series of mountain ranges and valleys that trend in a northwest-southeast direction roughly parallel to the San Andreas Fault Zone (Norris and Webb, 1976; Sharp, 1976). It contains extensive pre-Cenozoic (more than 66 million years ago [Ma]) igneous and metamorphic rocks covered by Cenozoic (less than 66 Ma) sedimentary deposits (Norris and Webb, 1976).

Geologic mapping by Morton and Miller (2006) shows the project site contains Young Axial Channel Deposits and Very Old Alluvial Fan Deposits (Figure 3). The geotechnical report prepared for this project identified that the Very Old Alluvial Fan Deposits could be found below the Young Axial Channel Deposits beginning at depths ranging from 8 to 19 feet (Ninyo & Moore, 2022). Additionally, while not mapped by Morton and Miller (2006), Artificial Fill may also be present within the project site from previous construction of the existing sewer system and The Woods neighborhood. These geologic units and their relative paleontological sensitivities are described in more detail below. The dates for the geologic time intervals are based on the *International Chronostratigraphic Chart* prepared by the International Commission on Stratigraphy (Cohen et al., 2023).

Artificial Fill

Artificial Fill consists of sediments that have been removed from one location and transported to another location by human activity, rather than by natural means. The transportation distance can vary from a few feet to many miles, and composition is dependent on the source and purpose. Artificial Fill will sometimes contain modern debris such as asphalt, wood, bricks, concrete, metal, glass, plastic, and even plant material.

While Artificial Fill may contain fossils, these fossils have been removed from their original location and are thus out of stratigraphic context. Therefore, they are not considered important for scientific study. As such, Artificial Fill has no paleontological sensitivity.

Young Axial Channel Deposits

The Young Axial Channel Deposits are Holocene to late Pleistocene in age (less than 129,000 years ago) and consist of slightly to moderately consolidated silt, sand, gravel, and boulders (Morton and Miller, 2006). They formed as streams and washes carried sediment down from higher elevations.

Although Holocene (less than 11,700 years ago) deposits can contain remains of plants and animals, only those from the middle to early Holocene (4,200 to 11,700 years ago) are considered scientifically important (SVP, 2010), and fossils from this time interval are not very common. However, the older, Pleistocene sediments in this unit have produced scientifically important fossils elsewhere in the region (Jefferson, 1991a, 1991b; Miller, 1971; Reynolds and Reynolds, 1991; Springer et al., 2009). These older, Pleistocene deposits span the end of the Rancholabrean North American Land Mammal Age (NALMA), which dates from 11,000 to 240,000 years ago (Sanders et al., 2009) and was named for the Rancho La Brea fossil site in central Los Angeles. The presence of *Bison* defines the beginning of the Rancholabrean NALMA (Bell et al., 2004), but fossils from this time also include other large and small mammals, reptiles, fish, invertebrates, and plants (Jefferson, 1991a, 1991b; Miller, 1971; Reynolds and Reynolds, 1991; Springer et al., 2009). There is a potential to find these types of fossils in the older sediments of this geologic unit, which may be encountered below a depth of approximately 10 feet. Therefore, these deposits are assigned a low paleontological sensitivity above a depth of 10 feet and a high sensitivity below that mark.

Very Old Alluvial Fan Deposits

The Very Old Alluvial Fan Deposits formed during the middle to early Pleistocene (129,000 years ago to 2.58 Ma) and consist of a mixture of silt, sand, gravel, and conglomerate (Morton and Miller, 2006). They are moderately to well consolidated, have been dissected by erosional gullies, and show some soil development (Morton and Miller, 2006). The formed as sediments were eroded from the mountains and carried to lower elevations by rivers and streams and deposited in a fan- or lobe-shape.

The Very Old Alluvial Fan Deposits formed during an interval that spans three NALMAs: the Rancholabrean, the Irvingtonian (240,000–1.8 Ma), and the Blancan (1.8–4.75 Ma) (Bell et al., 2004; Sanders et al., 2009). Fossils are known in similar Rancholabrean, Irvingtonian, and Blancan deposits from excavations for roads, housing developments, and quarries, as well as scientific investigations within the Southern California area (Bell et al., 2004; Miller, 1971; Pajak et al., 1996). These fossils include mammoths, mastodons, horses, camels, saber-toothed cats, coyotes, deer, peccaries, and sloths, as well as smaller animals like rodents, rabbits, birds, reptiles, and fish. As such, these deposits are considered to have high paleontological sensitivity.

Fossil Locality Search

According to the fossil locality search conducted by the NHMLAC, there are no known fossil localities within the boundaries of the project site. However, this search noted one record of a fossil locality nearby from unknown Pleistocene age sediments similar to those within the project site (i.e., the Young Axial Channel Deposits and Very Old Alluvial Fan Deposits). LACM VP 4119, located within Jeronimo Open Space adjacent to Jeronimo Road, yielded remains of bison (*Bison*) at a depth of 20 feet. A copy of the fossil locality search results from the NHMLAC is provided in Attachment C.

Field Survey

The landscape of the San Diego Creek section of the project site consists of a tree-lined drainage with anastomosing walking trails on one or both sides of the creek, occasional manholes, a bridge, culverts at the east and west ends, and steep sides rising to the surrounding neighborhoods. Several

trails, some of which are paved, connect down to the main creekbed in between houses. The Glenwood Tributary section is similar to the San Diego Creek section in that it consists of a steep, tree-lined drainage, with houses capping the surrounding ridges, and in some cases adjacent to the creek itself. The western portion of the Glenwood Tributary section has a well-maintained trail with a bridge, but the eastern section splits off the trail system, which continues into the elevated neighborhood. The eastern portion continues along the drainage, in between houses, becoming steeper and narrower. At both the San Diego Creek and Glenwood Tributary sections of the project site, visibility ranged from 0 to 100 percent, given the steep terrain, existing sewer infrastructure, development of a trail system, and substantial vegetation coverage. Areas with existing sewer facilities and sections of the trails were covered with pavement, concrete, or associated structures like culverts and bridges. Other areas beneath bushes and eucalyptus trees were covered in leaves, shed bark, and sticks. In some places within the creek, along the trails, and in steep sides, exposures showed clear views of the sediments. Some Artificial Fill was noted within the creek in several locations, as well as along the trails where it was used for construction of those facilities or where erosion necessitated repairs, maintenance, and stabilization of the banks and slopes. Along the creek, trails, and steep slopes, native sediments were noted consisting of silt, sand, gravel, cobbles, and boulders. The majority of these sediments were medium to dark brown to reddish in color, consistent with the Very Old Alluvial Fan Deposits mapped by Morton and Miller (2006). At the west end of the project site, the native sediments exposed at the lower elevations along the trails and within the creek consisted of somewhat lighter brown sand and silt, consistent with mapping of Young Axial Channel Deposits by Morton and Miller (2006); however, abundant cobbles and boulders were noted in the creek, presumably eroded from the adjacent hillsides. No paleontological resources were noted during the survey.

CONCLUSIONS AND RECOMMENDATIONS

The project site contains Young Axial Channel Deposits, which have low paleontological sensitivity from the surface to a depth of 10 feet and high sensitivity below that depth, and Very Old Alluvial Fan Deposits, which have high paleontological sensitivity. Excavations for improvements within Upper San Diego Creek are expected to reach depths of 4 to 24 feet within sediments of both the Young Axial Channel Deposits and Very Old Alluvial Fan Deposits. Excavations for improvements within Glenwood Tributary are likewise expected to reach depths of 4 to 24 feet; however, these activities will only occur within the Very Old Alluvial Fan Deposits. Development of this project is thus expected to extend into paleontologically sensitive sediments and has the potential to impact scientifically significant paleontological resources. Therefore, in order to mitigate potential impacts to these resources, LSA recommends the following mitigation measures:

PALEO-1 A paleontologist who meets the qualifications established by the Society of Vertebrate Paleontology (SVP) shall be retained to develop a Paleontological Resources Impact Mitigation Program (PRIMP) for this project. The PRIMP shall be consistent with the standards of the SVP and include the methods that will be used to protect paleontological resources that may exist within the project site, as well as procedures for monitoring, fossil preparation and identification, curation into a repository, and preparation of a report at the conclusion of grading.

PALEO-2 Excavation and grading activities in deposits with high paleontological sensitivity (i.e., Young Axial Channel Deposits below a depth of 10 feet and Very Old Alluvial Fan Deposits) shall be monitored by a qualified paleontological monitor following a PRIMP. No monitoring is required for excavations in deposits with no paleontological sensitivity (i.e., Artificial Fill). If paleontological resources are encountered during the course of ground disturbance, the paleontological monitor shall have the authority to temporarily redirect construction away from the area of the find. In the event that paleontological resources are encountered when a paleontological monitor is not present, work in the immediate area of the find shall be redirected, and the paleontologist or paleontological monitor shall be contacted to assess the find for scientific significance. If determined to be scientifically significant, the fossil shall be collected from the field.

PALEO-3 Collected resources shall be prepared to the point of identification, identified to the lowest taxonomic level possible, cataloged, and curated into the permanent collections of a museum repository. At the conclusion of the monitoring program, a report of findings shall be prepared to document the results of the monitoring program.

Implementation of Mitigation Measures PALEO-1 through PALEO-3 will ensure that project impacts on paleontological resources will be reduced to a level that is less than significant.

Attachments:
- A: References
- B: Figure 1: Project Location
  Figure 2: Improvement Work Areas
  Figure 3: Geology Map
- C: Fossil Locality Search Results from the Natural History Museum of Los Angeles County

ATTACHMENT A

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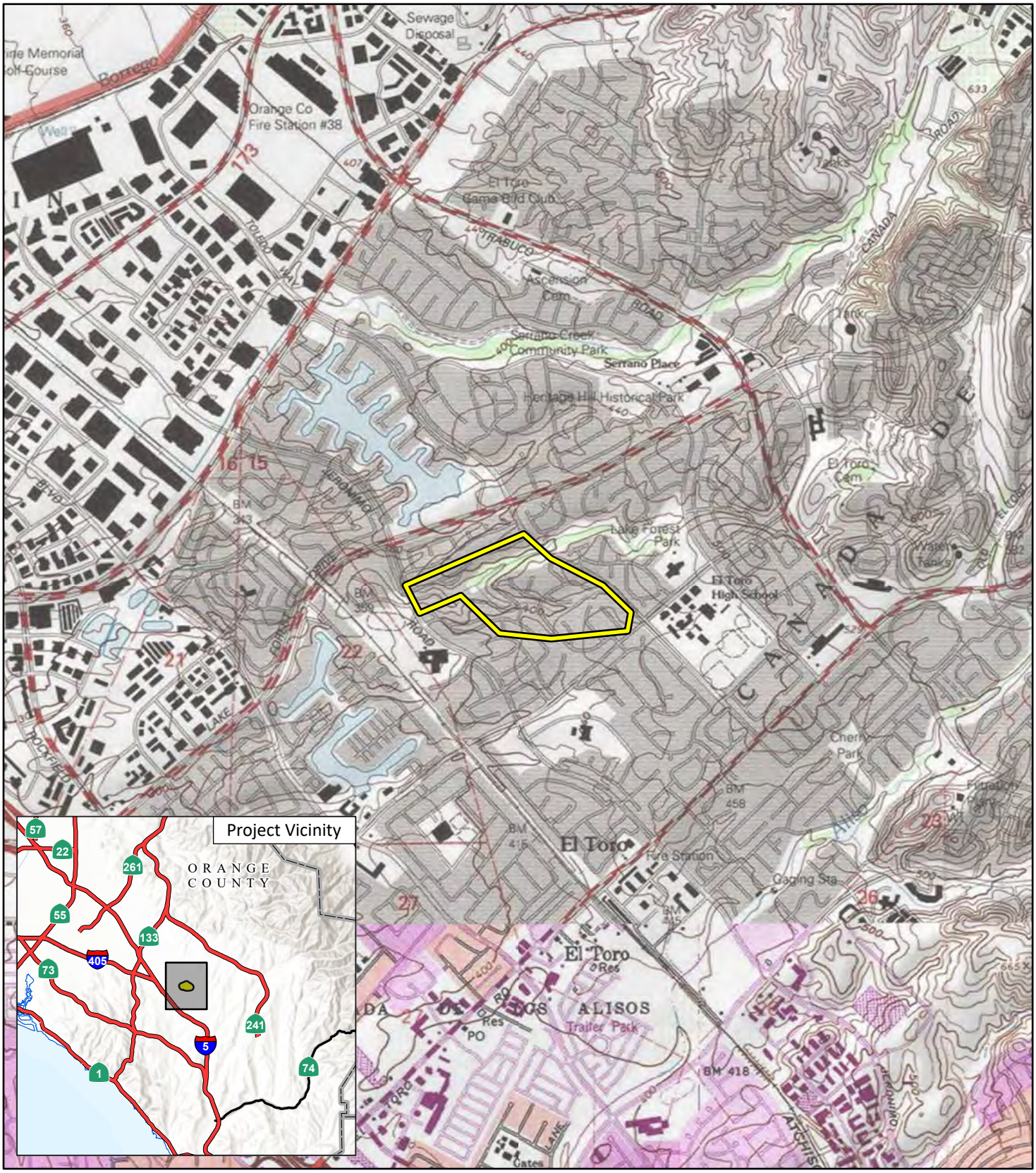
ATTACHMENT B

FIGURES



LSA

FIGURE 1

The Woods Sewer Improvements Project

Project Location

SOURCE: USGS 7.5' Quadrangle: *El Toro (1982)*, CA

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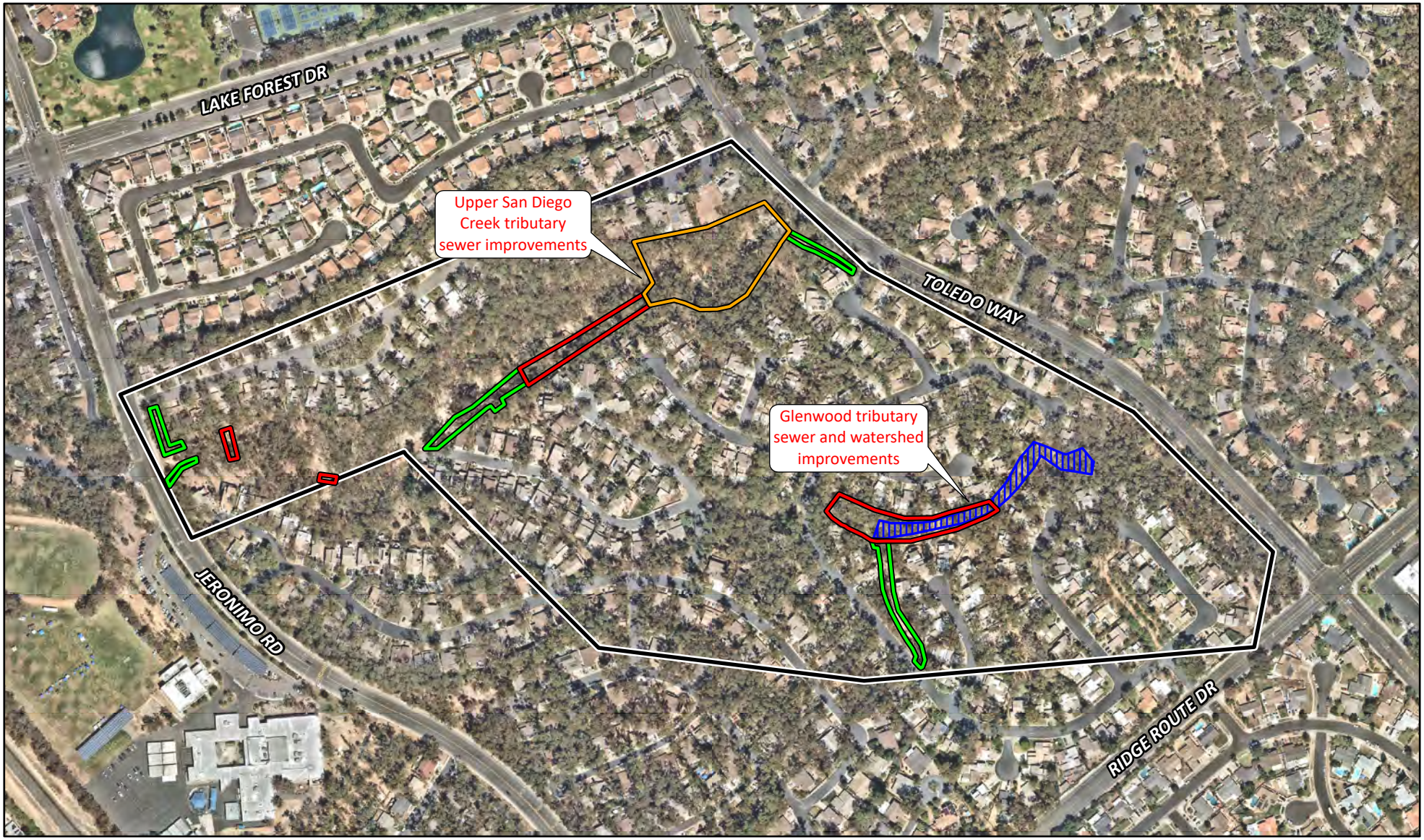


LSA

Project Location
Sewer Improvement Work Area
Access Improvement Work Area
Sewer and Access Improvement Work Area
Watershed Improvement Work Area

FIGURE 2

N

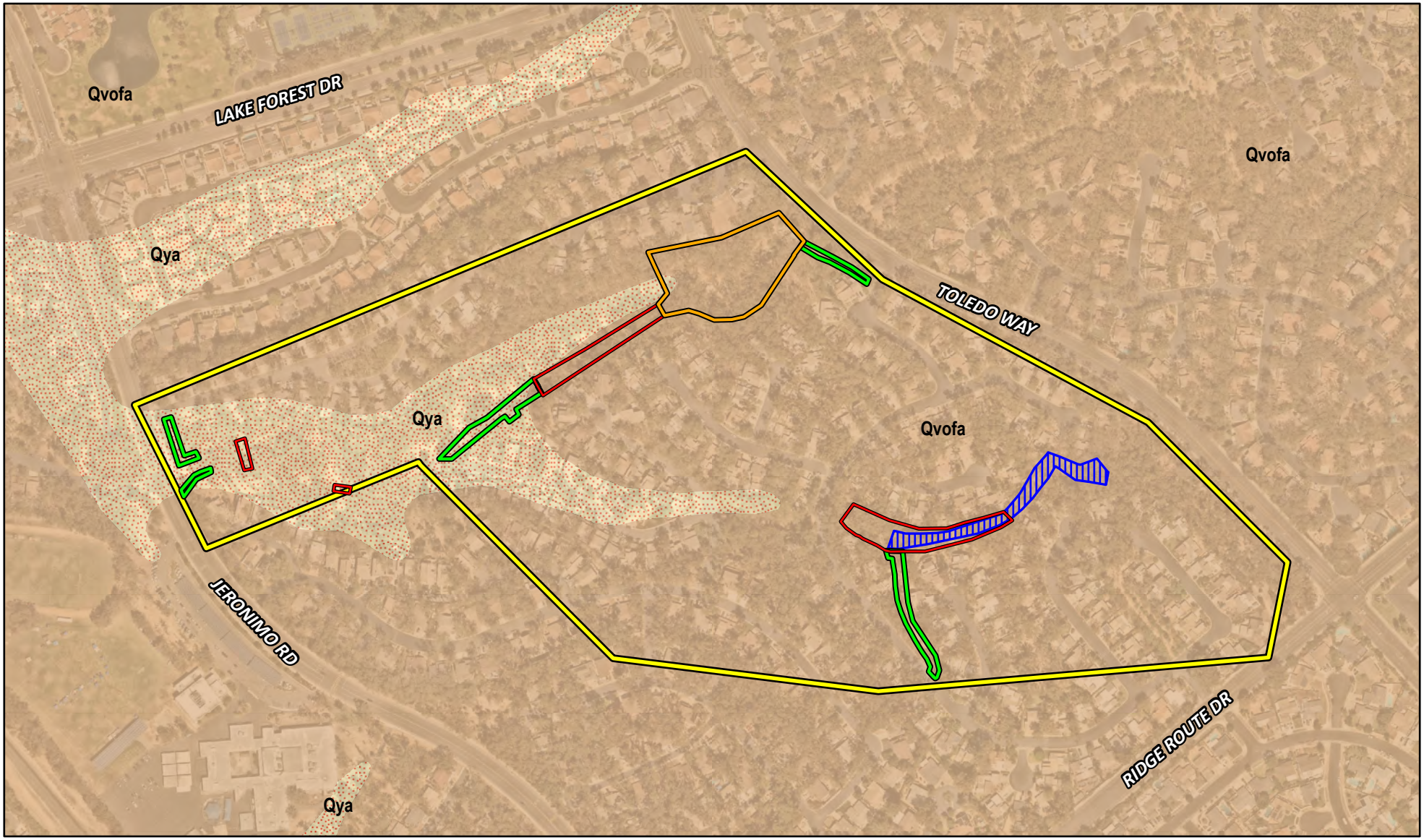
0 200 400
FEET

SOURCE: Nearmap (8/31/2022)

J:\IRW2001.03\GIS\Pro\The Woods Sewer Improvements Project.aprx (6/22/2023)

The Woods Sewer Improvements Project

Improvement Work Areas



LSA

Project Location
Sewer Improvement Work Area
Access Improvement Work Area
Sewer and Access Improvement Work Area
Watershed Improvement Work Area

Geology
(Qya) Young Axial Channel Deposits
(Qvof) Very Old Alluvial Fan Deposits

FIGURE 3

0 200 400
FEET

SOURCE: Nearmap (8/31/2022); Morton and Miller (2006)

J:\IRW2001.03\GIS\Pro\The Woods Sewer Improvements Project.aprx (6/22/2023)

The Woods Sewer Improvements Project

Geology Map

ATTACHMENT C

FOSSIL LOCALITY SEARCH RESULTS FROM THE NATURAL HISTORY MUSEUM OF LOS ANGELES COUNTY

Natural History Museum
of Los Angeles County
900 Exposition Boulevard
Los Angeles, CA 90007
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NATURAL HISTORY MUSEUM
LOS ANGELES COUNTY

Research & Collections

e-mail: paleorecords@nhm.org

April 2, 2023

LSA Associates, Inc.
Attn: Jacob Biewer

re: Paleontological resources for The Woods Sewer Improvements Project (#IRW2001.03)

Dear Jacob:

I have conducted a thorough search of our paleontology collection records for the locality and specimen data for proposed development at The Woods Sewer Improvements project area as outlined on the portion of the El Toro USGS topographic quadrangle map that you sent to me via e-mail on March 23, 2023. We do not have any fossil localities that lie directly within the proposed project area, but we do have fossil localities nearby from the same sedimentary deposits that occur in the proposed project area, either at the surface or at depth.

The following table shows the closest known localities in the collection of the Natural History Museum of Los Angeles County (NHMLA).

Locality Number	Location	Formation	Taxa	Depth
LACM IP 31319	on Muirland Blvd near Canada Road, El Toro	Monterey Formation	Invertebrates (uncatalogued)	Unknown (housing excavations)
LACM IP 5284	west of the intersection of Muirland Blvd and Canada Road, Lake Forest	Vaqueros Formation	Invertebrates (mollusks)	Unknown
LACM VP 3186	south side of Trabuco Road about 200 feet east of the intersection of Trabuco Road & La Vina	Capistrano Formation, Oso Member (nearly flat lying white sands with a clay - shale bed in mid section)	Fish (*Pimelometopon, Smilodonichthys, Carcharocles, Anoplogaster, Carcharodon, Prionace, Oncorhynchus, Isurus, Thyrsocles, Paralichthys*, Ophidiidae); mammals (*Hypolagus*, Artiodactyla); birds (*Mancalla*)	Unknown (600-620 feet elevation), in roadcut
LACM VP 3410	on the northwest side of El Toro Road (Los Alisos Avenue on old maps) & northeast of the intersection fo El Toro Road & Trabuco Road	Capistrano Formation (alternating white & orange beds of coarse firm quartzite sandstone with feldspar & micaceous particles)	Mako shark (*Isurus*); eared seal (Otariidae)	Unknown (elevation 615-630 feet)
LACM VP 4668	west of El Toro Road	Capistrano Formation	Whale clade (Cetacea)	16 feet bgs

	& north of Trabuco Road, El Toro			
LACM VP 4119	Jeronimo Open Space; adjacent to Jeronimo Rd.	Unknown formation (Pleistocene; greenish silt)	Bison (*Bison*)	20 feet bgs

VP, Vertebrate Paleontology; IP, Invertebrate Paleontology; bgs, below ground surface

This records search covers only the records of the NHMLA. It is not intended as a paleontological assessment of the project area for the purposes of CEQA or NEPA. Potentially fossil-bearing units are present in the project area, either at the surface or in the subsurface. As such, NHMLA recommends that a full paleontological assessment of the project area be conducted by a paleontologist meeting Bureau of Land Management or Society of Vertebrate Paleontology standards.

Sincerely,

Alyssa Bell, Ph.D.
Natural History Museum of Los Angeles County

enclosure: invoice

APPENDIX F

NOISE MONITORING RESULTS

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Noise Measurement Survey – 24 HR

Project Number: IRW2001.03
Project Name: The Woods Sewer

Test Personnel: Corey Knips
Equipment: Spark 703+ (SN:20224)

Site Number: LT-1 Date: 11/29/2022

Time: From 12:00 p.m. To 12:00 p.m.

Site Location: West end of Eucalyptus Lane, on tree in middle of cul-de-sac.

Primary Noise Sources: Faint hum of traffic on Lake Forest Drive, very light traffic on Eucalyptus Lane.

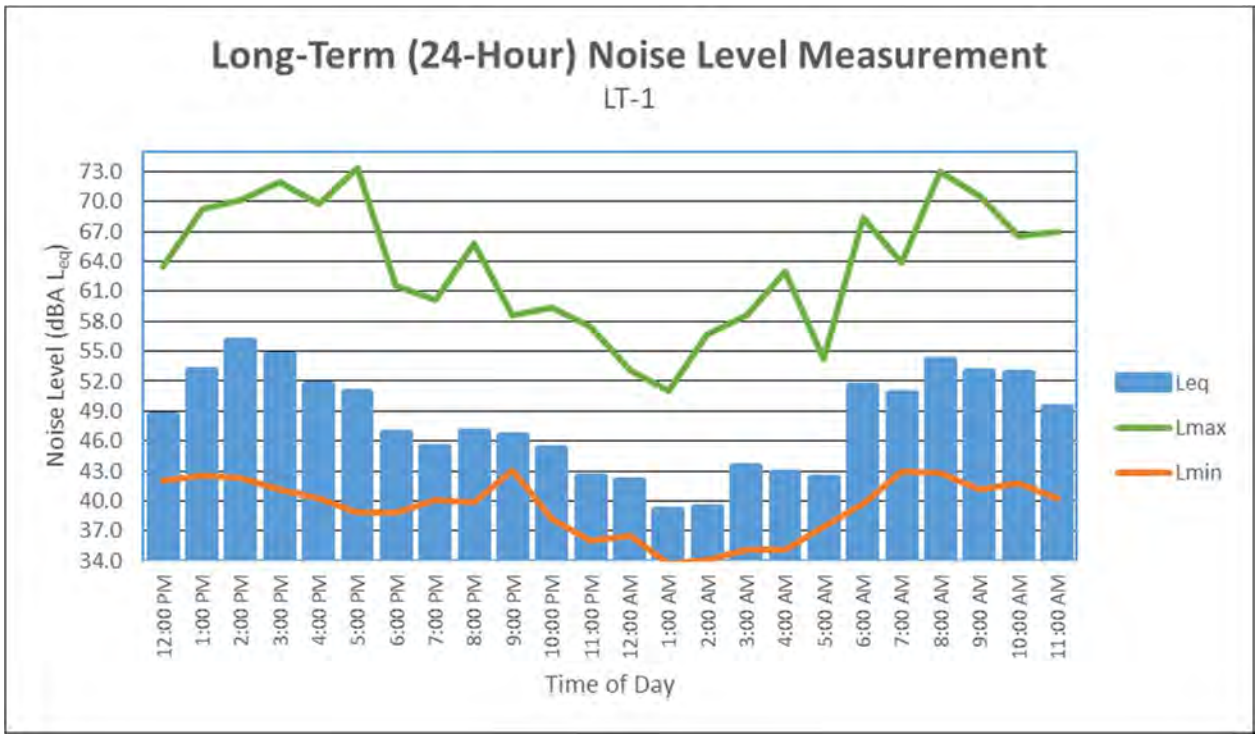
Comments:

Photo:

Long-Term (24-Hour) Noise Level Measurement Results at LT-1

Start Time	Date	Noise Level (dBA)		
		L_{eq}	L_{max}	L_{min}
12:00 PM	11/29/2022	48.6	63.5	42.0
1:00 PM	11/29/2022	53.0	69.2	42.6
2:00 PM	11/29/2022	56.0	70.2	42.3
3:00 PM	11/29/2022	54.7	72.0	41.2
4:00 PM	11/29/2022	51.6	69.8	40.3
5:00 PM	11/29/2022	50.9	73.3	38.8
6:00 PM	11/29/2022	46.8	61.6	38.8
7:00 PM	11/29/2022	45.3	60.2	40.1
8:00 PM	11/29/2022	46.9	65.8	39.9
9:00 PM	11/29/2022	46.6	58.6	43.1
10:00 PM	11/29/2022	45.3	59.4	38.2
11:00 PM	11/29/2022	42.4	57.5	36.0
12:00 AM	11/30/2022	42.1	53.1	36.6
1:00 AM	11/30/2022	39.2	51.0	33.7
2:00 AM	11/30/2022	39.4	56.7	34.1
3:00 AM	11/30/2022	43.4	58.6	35.1
4:00 AM	11/30/2022	42.8	63.0	35.1
5:00 AM	11/30/2022	42.3	54.3	37.5
6:00 AM	11/30/2022	51.5	68.3	39.7
7:00 AM	11/30/2022	50.7	63.9	42.9
8:00 AM	11/30/2022	54.1	72.9	42.8
9:00 AM	11/30/2022	53.0	70.5	41.2
10:00 AM	11/30/2022	52.9	66.5	41.8
11:00 AM	11/30/2022	49.4	67.0	40.3

Source: Compiled by LSA Associates, Inc. (2022).
dBA = A-weighted decibel
L_{eq} = equivalent continuous sound level
L_{max} = maximum instantaneous noise level
L_{min} = minimum measured sound level



Noise Measurement Survey – 24 HR

Project Number: IRW2001.03
Project Name: The Woods Sewer

Test Personnel: Corey Knips
Equipment: Spark 706RC (SN:17119)

Site Number: LT-2 Date: 11/29/2022

Time: From 12:00 p.m. To 12:00 p.m.

Site Location: 24952 Ravenswood, on utility pole near northeast corner of property.

Primary Noise Sources: Faint traffic on local streets, very light traffic on Ravenswood, and bubbling fountain in front yard of residence (faint).

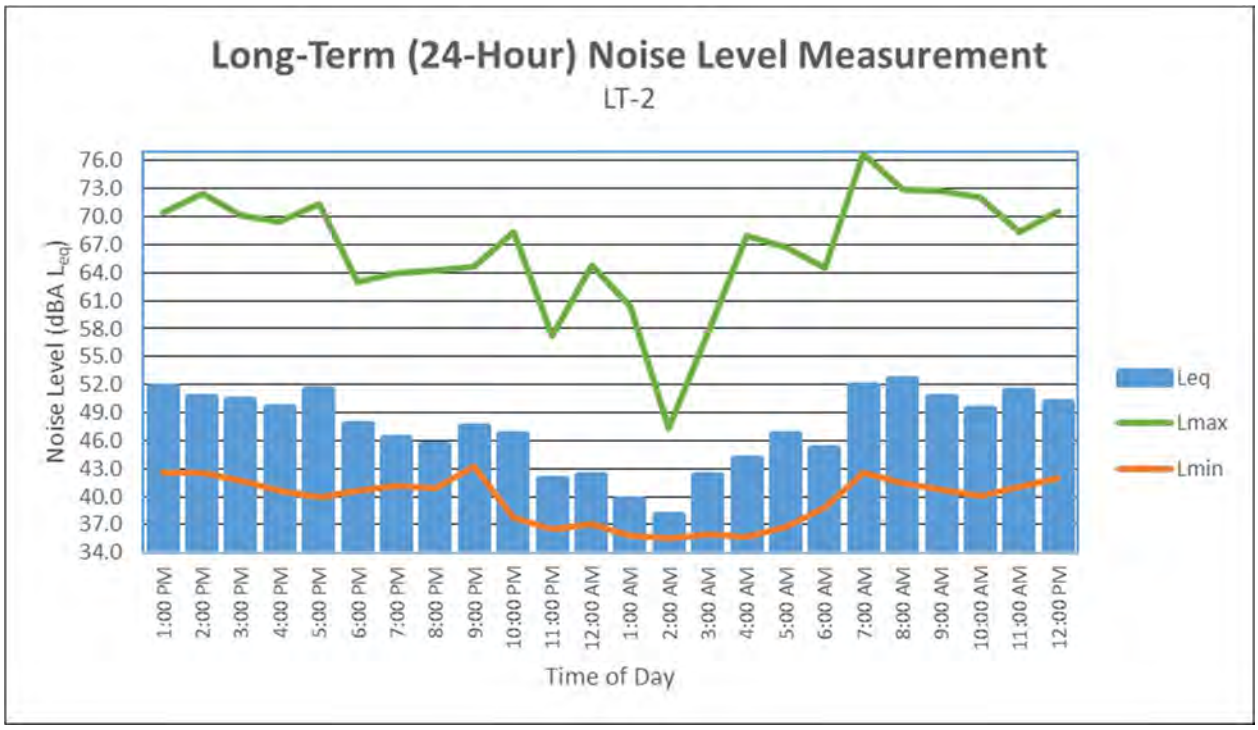
Comments:

Photo:

Long-Term (24-Hour) Noise Level Measurement Results at LT-2

Start Time	Date	Noise Level (dBA)		
		L_{eq}	L_{max}	L_{min}
1:00 PM	11/29/2022	51.7	70.4	42.6
2:00 PM	11/29/2022	50.7	72.5	42.5
3:00 PM	11/29/2022	50.4	70.1	41.7
4:00 PM	11/29/2022	49.6	69.5	40.6
5:00 PM	11/29/2022	51.4	71.4	40.0
6:00 PM	11/29/2022	47.8	63.0	40.6
7:00 PM	11/29/2022	46.3	64.0	41.2
8:00 PM	11/29/2022	45.5	64.2	40.9
9:00 PM	11/29/2022	47.5	64.6	43.2
10:00 PM	11/29/2022	46.6	68.3	37.7
11:00 PM	11/29/2022	41.9	57.2	36.5
12:00 AM	11/30/2022	42.3	64.8	37.0
1:00 AM	11/30/2022	39.7	60.4	35.8
2:00 AM	11/30/2022	38.0	47.4	35.6
3:00 AM	11/30/2022	42.2	57.6	36.0
4:00 AM	11/30/2022	44.0	68.0	35.7
5:00 AM	11/30/2022	46.7	66.7	36.8
6:00 AM	11/30/2022	45.2	64.5	38.8
7:00 AM	11/30/2022	51.9	76.7	42.6
8:00 AM	11/30/2022	52.6	72.9	41.4
9:00 AM	11/30/2022	50.6	72.8	40.7
10:00 AM	11/30/2022	49.4	72.1	40.1
11:00 AM	11/30/2022	51.4	68.4	41.0
12:00 PM	11/30/2022	50.1	70.6	42.0

Source: Compiled by LSA Associates, Inc. (2022).
dBA = A-weighted decibel
L_{eq} = equivalent continuous sound level
L_{max} = maximum instantaneous noise level
L_{min} = minimum measured sound level



Noise Measurement Survey

Project Number: IRW2001.03
Project Name: The Woods Sewer
Test Personnel: Corey Knips
Equipment: Larson Davis 831 SLM

Site Number: ST-1 Date: 11/29/22 Time: From 1:16 pm To 1:36 pm

Site Location: East side of Lake Forest Drive, across from driveway for Lake Forest Sun & Sail Club. Approximately 18 feet east of outside lane of Lake Forest Drive.

Primary Noise Sources: Traffic on Lake Forest Drive.

Measurement Results:

	dBA
L_{eq}	71.8
L_{max}	84.1
L_{min}	46.2
L_{peak}	109.3
L_2	78.3
L_8	76.5
L_{25}	73.3
L_{50}	68.5
L_{90}	55.4
L_{99}	48.0

Atmospheric Conditions:

Maximum Wind Velocity (mph)	6.5
Average Wind Velocity (mph)	1.9
Temperature (F)	64.6
Relative Humidity (%)	58.0
Comments:	

Comments: Approximately 10 feet west of property wall, which is 6 foot tall on a 4-foot berm.

Location Photo:

Noise Measurement Survey

Project Number: IRW2001.03
Project Name: The Woods Sewer
Test Personnel: Corey Knips
Equipment: Larson Davis 831 SLM

Site Number: ST-2 Date: 11/29/22 Time: From 12:07 pm To 12:27 pm

Site Location: On north side of Toledo Way, across from Elkwood. Approximately 18 feet north of the edge of the outside lane of Toledo Way. Approximately 2-3 feet north of sidewalk and 18 feet from end of wall to the east.

Primary Noise Sources: Very light traffic on Toledo Way and faint traffic on Lake Forest Drive.

Measurement Results:

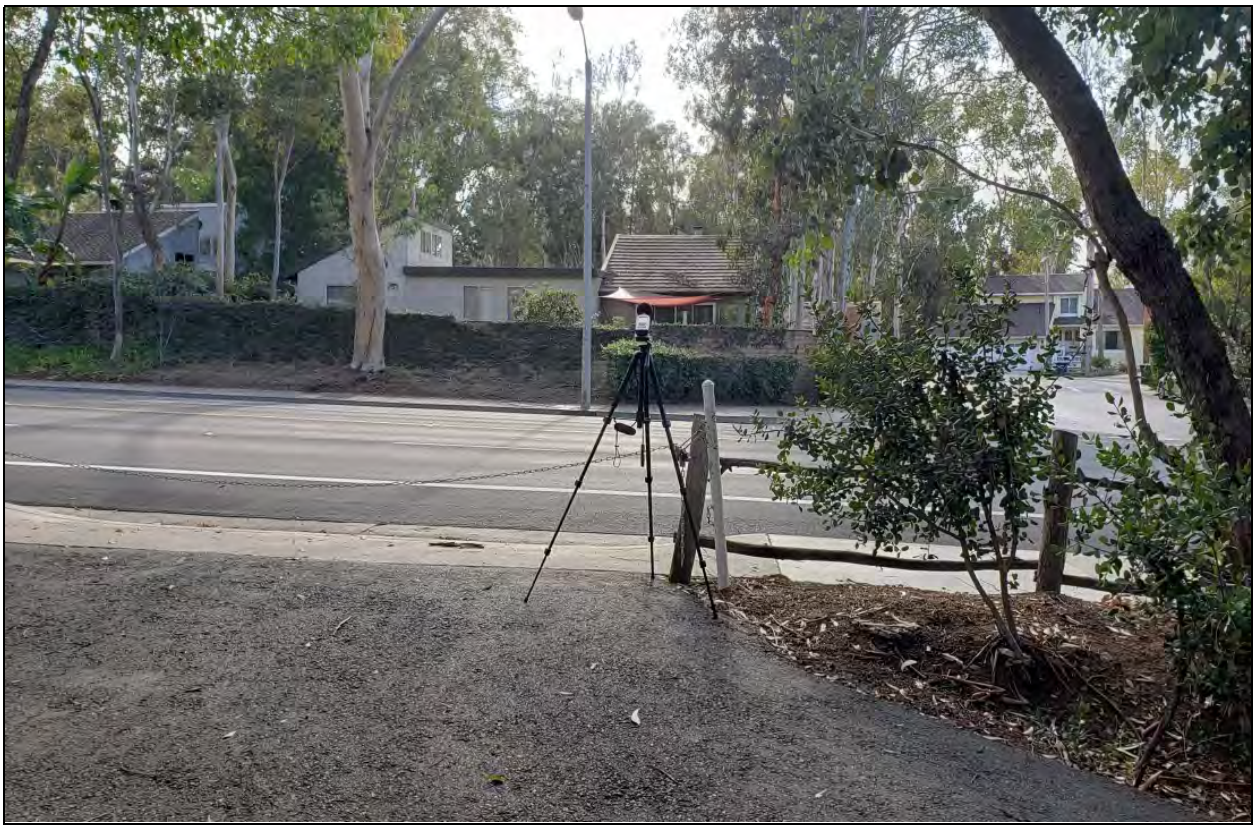
	dBA
L_{eq}	62.9
L_{max}	76.0
L_{min}	40.7
L_{peak}	97.5
L_2	72.2
L_8	69.0
L_{25}	61.5
L_{50}	51.4
L_{90}	43.4
L_{99}	41.1

Atmospheric Conditions:

Maximum Wind Velocity (mph)	6.8
Average Wind Velocity (mph)	1.6
Temperature (F)	65.0
Relative Humidity (%)	55.4
Comments:	

Comments:

Location Photo:



Noise Measurement Survey

Project Number: IRW2001.03
Project Name: The Woods Sewer
Test Personnel: Corey Knips
Equipment: Larson Davis 831 SLM

Site Number: ST-3 Date: 11/29/22 Time: From 12:39 pm To 12:59 pm

Site Location: West side of Ridge Route, across from Costa Bella. Approximately 17 ft west of the edge of the outside lane of Ridge Route. At southwest corner of wider part of the sidewalk.

Primary Noise Sources: Traffic on Ridge Route Drive.

Measurement Results:

	dBA
L_{eq}	61.8
L_{max}	75.1
L_{min}	42.8
L_{peak}	91.0
L_2	70.6
L_8	67.6
L_{25}	61.7
L_{50}	53.3
L_{90}	45.7
L_{99}	43.8

Atmospheric Conditions:

Maximum Wind Velocity (mph)	6.8
Average Wind Velocity (mph)	1.6
Temperature (F)	65.0
Relative Humidity (%)	55.4
Comments:	

Comments:

Location Photo: