Public Review Draft

SOUTH BASIN GROUNDWATER PROTECTION PROJECT

Draft Program Environmental Impact Report
SCH No. 2023100188

Prepared for
Orange County Water District

December 2024

ESA

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Prepared for
Orange County Water District
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CONTENTS

South Basin Groundwater Protection Project
Draft Program Environmental Impact Report

Appendices

Figures

Tables

EXECUTIVE SUMMARY

South Basin Groundwater Protection Project Draft Program Environmental Impact Report

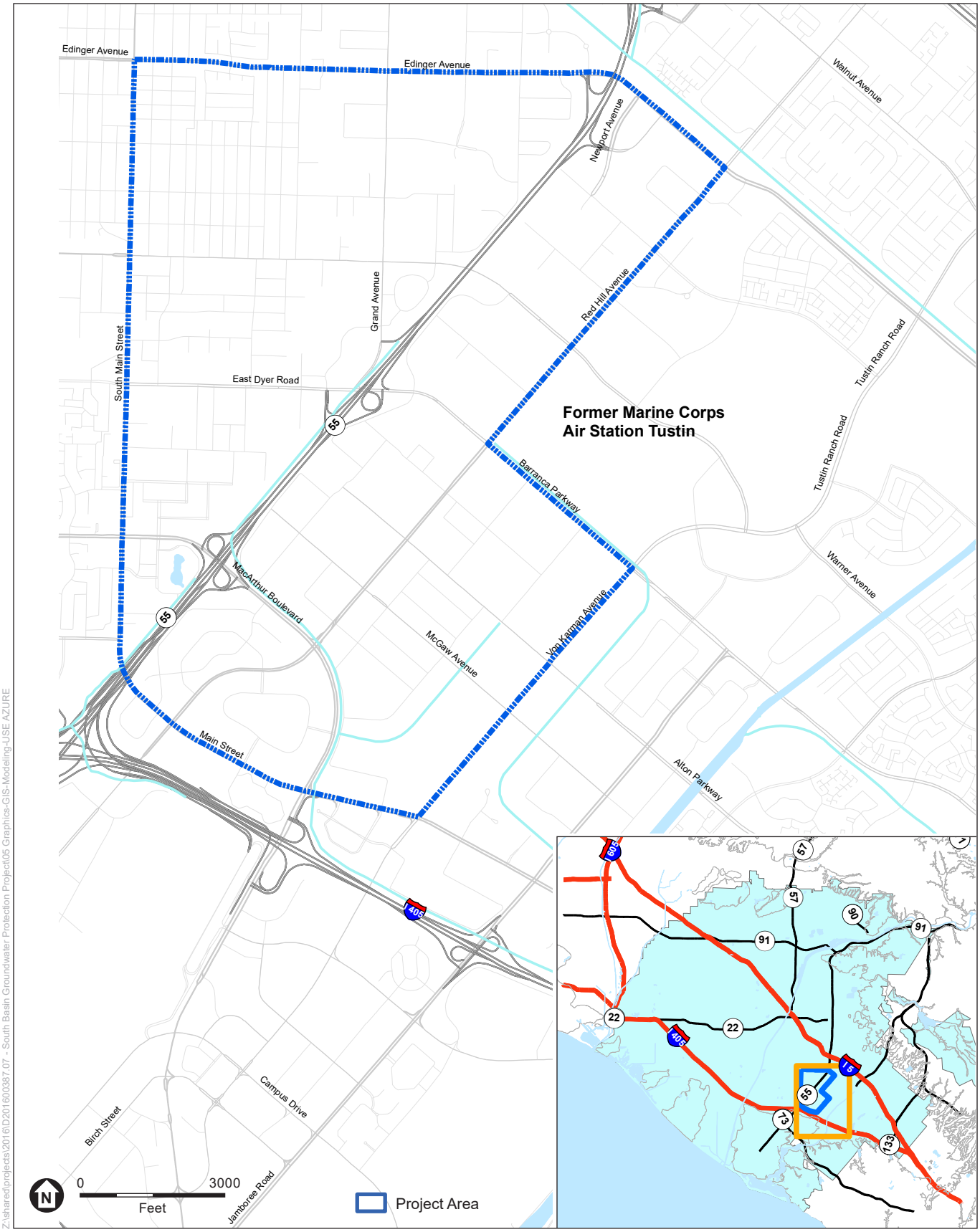
ES.1 Introduction

Orange County Water District (OCWD) is proposing to approve the Interim Remedial Action Plan (IRAP) and secure other relevant permits and approvals for the South Basin Groundwater Protection Project (proposed Project). The proposed Project consists of remedial measures that would extract contaminated groundwater from the Shallow Aquifer System, treat the water locally, then discharge the treated water to the sanitary sewer system. The proposed Project will take place within an approximately 5.6 square mile area (Project Area) in the south-central portion of the Orange County Groundwater Basin (Basin). The Costa Mesa Freeway (CA-55) crosses the Project Area between the Santa Ana Freeway (Interstate 5) on the north and the San Diego Freeway (Interstate 405) on the south. The Project Area is shown in **Figure ES-1**.

OCWD is the Lead Agency pursuant to the California Environmental Quality Act (CEQA) and has prepared this Draft Program Environmental Impact Report (PEIR) to satisfy CEQA, as set forth in the California Public Resources Code, Division 13, Section 21000 et seq., and the State CEQA Guidelines (CEQA Guidelines), Title 14 of the California Code of Regulations, Chapter 3, Section 15000 et seq. In accordance with CEQA Guidelines Section 15121(a), the purpose of an environmental impact report (EIR) is to serve as an informational document that will generally inform public agency decision makers and the public of the significant environmental effects of a project, and possible ways to minimize those significant effects. The State Clearinghouse Number is 2023100188.

ES.2 Project Background

OCWD is authorized under the Orange County Water District Act (District Act) to manage the Basin and one of the primary roles of OCWD is to manage the Basin's water quality to ensure safe groundwater supplies. OCWD's statutory powers include the powers to "transport, reclaim, purify, treat, inject, extract, or otherwise manage and control water for the beneficial use of persons or property within the district and to improve and protect the quality of the groundwater supplies within the district," to "provide for the protection and enhancement of the environment within and outside the district in connection with the water activities of the district," and to "expend available funds to perform any cleanup, abatement, or remedial work required under the circumstances which, in the determination of the board of directors, is required by the magnitude of the endeavor or the urgency of prompt action needed to prevent, abate, or contain any threatened or existing contamination of, or pollution to, the surface or groundwaters of the district" (District Act, §§ 2(6)(j), 2(7), 8(b)).



SOURCE: Hargis+Associates, Inc., 2019

South Basin Groundwater Protection Project

Figure ES-1
Location Map

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Groundwater contamination from industrial and manufacturing activities, underground storage tank leaks, waste disposal practices, and many other sources occurs in the Basin. In some instances, contamination from these sources may be isolated to localized areas and shallow portions of the groundwater system and does not threaten the deeper parts of the groundwater system from which existing drinking water supply wells pump. However, the Shallow Aquifer System is designated as a municipal beneficial use supply source by the Santa Ana Regional Water Quality Control Board (RWQCB 2019 – Water Quality Control Plan Santa Ana River Basin, as amended) and is a valuable environmental resource worthy of protection from contamination. In addition, in some areas of the basin where densely spaced industrial properties have been present for decades and have released chemicals to the groundwater, the groundwater contamination from these sites has migrated off the individual sites and merged to form extensive "commingled plumes" of contamination. In these cases, including the South Basin (Project Area), the uncontrolled contaminant plumes have not been comprehensively contained or treated by responsible parties and, therefore, threaten the drinking water supply. The Project Area contamination is located within the southeastern part of the Basin and includes an approximately 5.6-square mile area (see Figure ES-1) in the cities of Santa Ana, Irvine, and Tustin, California (City or collectively, the Cities).

The contamination in the Project Area has been divided into two operable units (OUs) which designate geographic areas, specific problems, or areas where a specific action is required. Operable Unit 1 (OU1) pertains to vadose zone and groundwater contamination in the Shallow Aquifer System directly beneath source properties (Aquilogic 2015). Operable Unit 2 (OU2) is groundwater contamination in the Shallow Aquifer System off-site of the source site properties and is the primary focus of this proposed Project.

From a remedial objectives standpoint, there is overlap between OU1 and OU2. For example, in some cases responsible parties are conducting groundwater remediation in areas outside the source area property boundaries. The proposed Project will account for these situations by locating and operating facilities in such a manner that minimizes overlap with and/or impact to other remedial efforts. In addition, while an objective of the proposed Project is to remediate groundwater contamination beyond source site boundaries, it may be necessary to locate Project facilities on source site properties due to land availability, construction and operational requirements and constraints, hydrogeologic characteristics, contaminant distribution, surface water receptor locations, actions by responsible parties (or lack thereof), public safety, and other factors.

In 2004, following volatile organic compound (VOC) and perchlorate detections at its well number 3 (IRWD-3), Irvine Ranch Water District (IRWD) requested that OCWD exercise its statutory authority to develop a plan to investigate and remediate groundwater contamination in the area encompassing IRWD-3. OCWD subsequently commissioned an investigation of contamination in the vicinity of IRWD-3 which resulted in 37 sites being identified as potential sources of tetrachloroethene (PCE), trichloroethene (TCE), and/or perchlorate (Todd 2007).

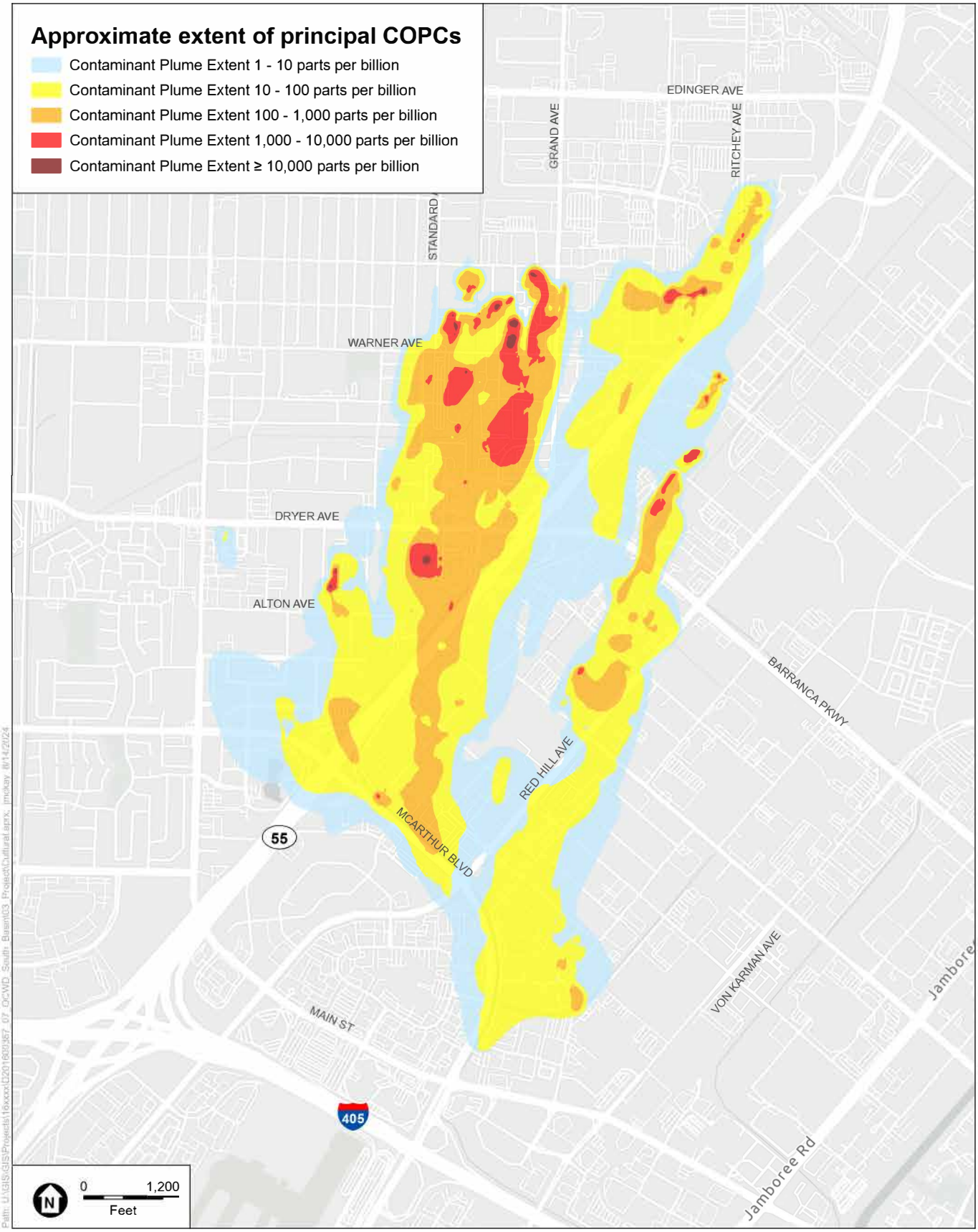
Following the identification of potential source sites, a series of remedial investigations by OCWD, including the installation of 39 groundwater monitoring wells and over 200 cone penetrometer test (CPT) soil borings, occurred between 2008 and 2020, and resulted in the South Basin Groundwater Protection Project's (SBGPP) *Preliminary Remedial Investigation Report, Operable Unit 2* (Aquilogic 2015) and *Supplemental Remedial Investigation Report, Operable Unit 2* (Hargis+Associates 2020).

In 2018, a technical advisory committee (TAC) was formed to oversee and advise the OCWD on its Remedial Investigation (RI) and Feasibility Study (FS) activities in OU2 in compliance with the National Oil and Hazardous Substances Pollution Contingency Plan (National Contingency Plan or NCP) (40 Code of Federal Regulations [CFR], Part 300). The TAC members included the California Department of Toxic Substances Control (DTSC), the Santa Ana Regional Water Quality Control Board (Regional Board), and the State Water Resources Control Board (State Water Board). The TAC met regularly during the RI/FS process from 2018 to January 2023.

South Basin contaminants have been detected in OU2 at concentrations exceeding maximum contaminant levels (MCLs) in the groundwater in the Shallow Aquifer System above a depth of approximately 100 feet below ground surface (bgs). The main contaminants or chemicals of concern (COCs) within OU2 include TCE, PCE (also known as perchloroethylene), 1,1-dichloroethene (1,1-DCE), 1,4-dioxane, and perchlorate. Other constituents have also been detected above MCLs less frequently, including but not limited to 1,1-dichloroethane (1,1-DCA), 1,2-dichloroethane (1,2-DCA), cis-1,2-dichloroethene (cis-1,2-DCE), vinyl chloride, and hexavalent chromium (Cr[VI]). The distribution of COCs in the Shallow Aquifer System exceeds two miles in length and one mile in width and is elongated in the general direction of groundwater flow, which is to the south-southwest (**Figure ES-2**).

Following the remedial investigations, and with the input of the TAC, OCWD conducted a FS to provide a detailed evaluation and comparative analysis of remedial alternatives. As part of the FS process, a Feasibility Study Initial Screening Evaluation (FSISE) and Feasibility Study Detailed Evaluation (FSDE) were prepared to address groundwater contamination in OU2 (EA 2021a, 2021b). The FS was completed on January 27, 2023 (EA 2023). The FS evaluated six alternatives for remediation of OU2. These alternatives included the following:

- Alternative 1 – No Action
- Alternative 2 – Monitored Natural Attenuation
- Alternative 3 – Containment and Treatment of Relatively High Concentration and Leading-Edge Areas Using Groundwater Extraction and Treatment with Discharge to Public Owned Treatment Works (POTW) and Groundwater Replenishment System Advanced Wastewater Purification Facility (GWRS)
- Alternative 4 – Containment and Treatment of Relatively High Concentration and Leading-Edge Areas Using Groundwater Extraction and Treatment with Injection to the Basal Sand
- Alternative 5 – In-Situ Treatment of Relatively High Concentration and Leading-Edge Areas Using Chemical Oxidation
- Alternative 6 – Containment and In-Situ Treatment of Relatively High Concentration and Leading-Edge Areas Using Chemical Oxidation Combined with Groundwater Extraction and Treatment with Discharge to POTW and GWRS



SOURCE: Supplemental Remedial Investigation Report 2020; ESA, 2024.

South Basin Groundwater Protection Project

Figure ES-2

South Basin Ground Water Contamination Plume

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Apart from Alternative 1, each of the FS Alternatives also incorporates groundwater monitoring, institutional controls and sealing Legacy (abandoned) Water Wells, if located and accessible. OCWD selected Alternative 3 from the FS as the proposed Project to be analyzed in this PEIR. Alternative 3 ranked the highest of the alternatives based on the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) evaluation criteria, including:

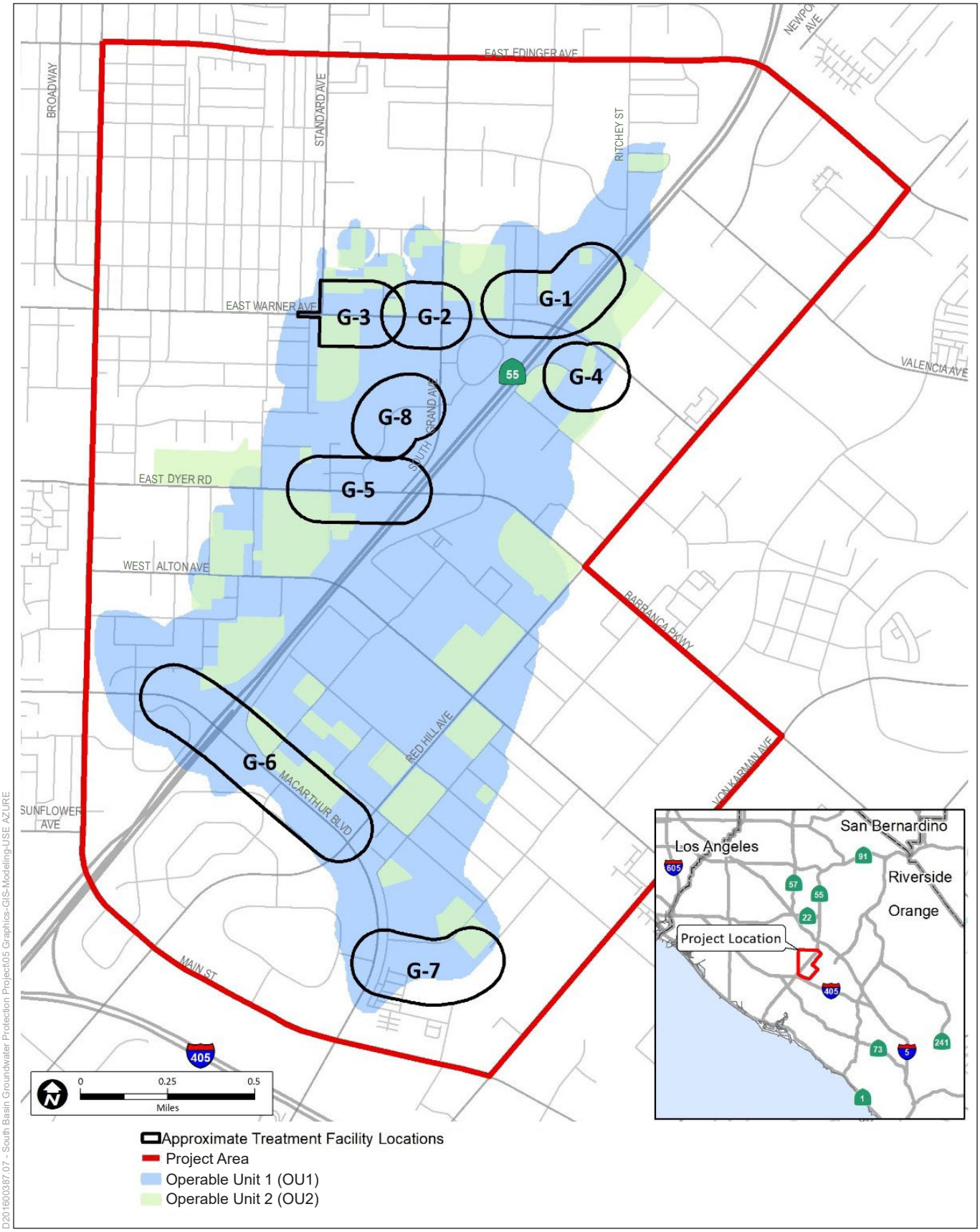
- Overall Protection of Human Health and the Environment
- Compliance with ARARs
- Long-Term Effectiveness and Permanence
- Reduction of Toxicity, Mobility, or Volume through Treatment
- Short-Term Effectiveness
- Implementability
- Cost

OCWD has prepared an IRAP to summarize the information contained in the RI and FS, to provide the public with a reasonable opportunity to comment on the preferred alternative for interim remedial action, as well as alternative plans under consideration, and to participate in the selection of a remedial action in the Project Area. Pursuant to NCP Sections 300.430(f)(2)–(4), OCWD must approve the IRAP following public and agency comment in order to adopt and implement FS Alternative 3 (herein referred to as the proposed Project).

ES.3 Objectives

CEQA Guidelines Section 15124(b) requires that a project description contain "a statement of the objectives sought by the proposed project." In addition, Section 15124(b) further states that "the statement of objectives should include the underlying purpose of the project." The FS-defined Remedial Action Objectives (RAOs) for the groundwater Interim Remedial Measures (IRMs) are to protect human health and the environment with respect to the COCs that have migrated from multiple source properties and have commingled in OU2 of the Project Area, forming a large, dissolved contaminant plume (see Figure ES-2). Source sites/properties (OU1) are indicated on **Figure ES-3**. Protection of human health is accomplished by preventing human ingestion of groundwater containing COCs exceeding MCLs/risk-based standards, and protection of the environment is accomplished by decreasing further degradation of the groundwater resource due to plume expansion and maintaining surface water COC concentrations at levels that are protective of potential ecological receptors. The proposed Project's objectives are the same as the FS RAOs and are presented as follows:

- Protect groundwater resources from further degradation by preventing lateral and vertical migration of high concentration of chemicals of concern (COCs) into zones with lower concentrations of COCs within OU2;
- Protect groundwater resources by preventing the potential for vertical migration of high concentration COCs from the upper/middle portions of the Shallow Aquifer System to the Principal Aquifer System through Legacy Water Supply Wells;



D2016003B7.07 - South Basin Groundwater Protection Project\05 Graphics-GIS-Modeling-USE AZURE

SOURCE: Orange County Water District, 2024

South Basin Groundwater Protection Project

Figure ES-3
South Basin Approximate Facility Alignments and Operable Units

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- Protect groundwater resources from further degradation by preventing the spread of COCs exceeding MCLs in the leading-edge areas of the plume;
- Implement a reliable interim groundwater remedy(s) that is compatible with ongoing and planned remediation at source sites and associated off-property locations, where applicable;
- Prevent discharge of COCs exceeding ecological risk-based concentrations from the Shallow Aquifer System to surface water channels; and
- Prevent human exposure to contaminated groundwater with COC concentrations exceeding MCLs

ES.4 Project Description

The proposed Project is a groundwater extraction and treatment system (GETS) within OU2 of the South Basin that would extract contaminated groundwater from the Shallow Aquifer System, treat the water locally, then discharge the treated water to the sanitary sewer system. The treated groundwater would then mix with other wastewater flows in the sewer, which ultimately flow to OC San's Reclamation Plant No. 1 in Fountain Valley, California. The extracted groundwater would undergo further treatment consistent with the existing sewer treatment programs at OC San facility before flowing to GWRS where it will undergo its final advanced treatment consistent with existing GWRS treatment requirements, before being recharged back into the Basin at OCWD's existing recharge facilities identified above. The proposed Project would include the installation and operation of below ground groundwater extraction facilities (wells, trenches, and/or drains equipped with pumps) and conveyance piping, local groundwater treatment facilities for sediment and VOCs removal using filtration and GAC, and discharge piping to the sanitary sewer system. The proposed Project will use the existing treatment facilities at the POTW and GWRS and will not require the construction of new treatment, transportation, or recharge facilities after the point that the treated water joins the sanitary sewer system. Figure ES-3 shows the general locations of the proposed Project infrastructure in Alignments G-1 through G-8 (Project Infrastructure).

The array of extraction facilities would be located and installed to create groundwater barriers against the migration of the contamination plume. The approximate alignments for the proposed Project infrastructure have been identified in Figure ES-3; however, the precise location, number, and configuration for each facility component (e.g., extraction wells, trenches, drains, pipelines, and treatment facilities) will be determined and subject to future environmental review during project implementation (discussed in Section 2.5.1, *Preliminary Design Investigation*, Section 2.5.2, *Remedy Design,* and Section 2.5.3, *Remedy Construction*, and). As a result, this Draft PEIR will evaluate the proposed Project at a program level to determine whether OCWD will pursue Alternative 3 from the FS (**Appendix E** of this Draft PEIR), and future project-level CEQA analysis will be performed at Project Implementation (discussed in Section 2.5, *Project Implementation*), when the design of the extraction facilities, pipelines, and local treatment facilities (Project Infrastructure) is completed, and specific implementing actions are identified.

Proceeding with a PEIR and selecting an interim remedy before designing the precise locations of the Project Infrastructure is necessary, both because of the significant investigation and design costs that must be incurred before a final design of the interim remedy can be reached, and because of the need to reach agreements with overlying landowners or exercise eminent domain to acquire suitable sites for operation

of the Project Infrastructure. The process of acquiring sites and designing the Project Infrastructure cannot take place until a decision is made as to which of the alternatives the OCWD is going to pursue.

ES.4.1 Extraction Facilities

The proposed Project would comprise up to 8 groundwater extraction facility alignments consisting of a total of up to 100 extraction wells and up to 4 trenches and/or drains (extraction facilities). The extraction facilities would be equipped with submersible pumps to pump contaminated groundwater from three aquifer units of the Shallow Aquifer System that occur within the upper 100 feet from the ground surface in locations where groundwater contaminant concentrations are located to contain the groundwater contaminant plume and achieve the project objectives and at the distal end of the commingled plume. The exact number and location of the extraction wells and/or trenches/drains will be determined during the Remedy Design Phase after further detailed hydrogeologic investigations are performed along each proposed extraction alignment and land availability evaluations are conducted; see Chapter 2, *Project Description*, Section 2.5.1, *Preliminary Design Investigation*. However, the extraction alignments will be within the eight treatment facility locations G-1 through G-8 shown on Figure ES-3.

ES.4.2 Monitoring Wells

In addition to the extraction facilities, up to 200 monitoring wells will be constructed to monitor the groundwater levels and quality in the areas of the extraction facilities and in the surrounding Project Area including areas outside of the groundwater treatment alignments G-1 through G-8. It is anticipated that the monitoring wells will be constructed to depths up to 130 feet bgs, however the exact depths of the monitoring wells will not be known until well construction occurs. For purposes of this evaluation, it can be assumed that monitoring wells will not exceed a depth of 130 feet bgs. The exact number and location of the monitoring wells are not currently known until further detailed hydrogeologic investigations are performed along each proposed groundwater extraction facility alignment and land availability evaluations are conducted (see Chapter 2, *Project Description*, Section 2.5.1, *Preliminary Design Investigation*).

ES.4.3 Local Groundwater Treatment Plants

The proposed Project will also include local groundwater treatment plants to remove sediment and VOCs from the groundwater produced by the extraction facilities prior to discharge to the sanitary sewer. Up to 9 local groundwater treatment plants will be required. Each extraction well alignment will have one groundwater treatment plant located near the alignment, except for alignment G-6, in the vicinity of MacArthur Boulevard, which will have two treatment plants: one at each end of the alignment on either side of SR 55. Each treatment plan would be located within or near its respective alignment and would consist of a fenced concrete pad for a cartridge or bag filter to treat for sediment, up to two GAC vessels (lead-lag) to treat for VOCs, instrumentation and control panels, power drop and panel, and a tie-in to a local sewer lateral pipeline (estimated at 100 feet length). Total groundwater flow through each treatment system will range from 1 to 100 gallons per minute, with the total combined flow from all treatment systems between 10 and 1,000 gallons per minute (see Chapter 2, *Project Description*, Section 2.5.3, *Remedy Construction*). The exact number and location of the groundwater treatment plants are not currently known until further detailed hydrogeologic investigations are performed along each proposed

groundwater extraction facility alignment and land availability evaluations are conducted (see Chapter 2, *Project Description*, Section 2.5.1, *Preliminary Design Investigation*).

ES.4.4 Conveyance Pipelines

Between up to 25,000 feet of collection and discharge piping will be needed to collect and convey groundwater pumped from the monitoring wells and extraction facilities to the local groundwater treatment plants and then to the sanitary sewer. Conveyance pipelines would primarily be underground with some piping occurring above ground at the entry points to the local groundwater treatment plants. The precise length and location of the pipelines will be determined during the Remedy Design Phase (see Chapter 2, *Project Description*, Section 2.5.1, *Preliminary Design Investigation*).

ES.5 Project Alternatives

According to CEQA Guidelines Section 15126.6, an EIR must describe a reasonable range of alternatives to a proposed project that would feasibly attain most of the basic project objectives and would avoid or substantially lessen any of the proposed Project's significant environmental effects. Alternatives to the proposed Project were developed and analyzed in the FS and are summarized below. A detailed description and analysis of these project alternatives is provided in Chapter 4, *Alternatives Analysis*.

ES.5.1 Alternative 1 – No Project Alternative

This alternative is included as a baseline alternative and does not include active remediation, institutional controls, sealing Legacy Water Supply Wells, or monitoring of groundwater quality or groundwater elevations within OU2.

ES.5.2 Alternative 2 – In-Situ Treatment of Relatively High Concentration and Leading-Edge Areas Using Chemical Oxidation (ISCO Alternative)

This alternative would include installation of injection wells screened in all or portions of the aquifer layers within the Shallow Aquifer System and periodic application of In-Situ Chemical Oxidation (ISCO) using sodium persulfate. Dissolution of sodium persulfate results in the formation of the persulfate anion ($S_2O_8^{2-}$) and two sodium ions (Na^+). The persulfate anion is a strong oxidant, which itself can degrade many environmental contaminants or it can be catalyzed with various reactants to form the more powerful sulfate radical. This alternative would be applied at select and accessible locations within higher concentration and leading-edge areas of the plumes. ISCO would be applied in transects within relatively high COC concentration area to decrease lateral and vertical migration of high concentration COCs into zones with lower concentrations within OU2; decrease the threat of COC migration from the Shallow Aquifer System to the Principal Aquifer System through Legacy Water Supply Wells that cannot be located or properly destroyed; and begin to treat and reduce the concentration of COCs in OU2 groundwater. ISCO would be applied in leading-edge areas to control the spread of OU2 COCs and minimize discharge of COCs exceeding ecological risk-based concentration from the Shallow Aquifer System to surface water channels. Groundwater monitoring would be conducted to evaluate water quality, maintain compliance with permits, plans, or orders, and to evaluate remediation progress.

ES.5.3 Alternative 3 – Containment and Treatment of Relatively High Concentration and Leading-Edge Areas Using Groundwater Extraction and Treatment with Injection to the Basal Sand (GETS and Injection Alternative)

This alternative would include installation of groundwater extraction wells screened in all or portions of the aquifer layers within the Shallow Aquifer System; installation of injection wells screened in the Basal Sand within the Shallow Aquifer System; and construction of one aboveground groundwater treatment system within the Project Area to treat all of the extracted groundwater prior to injection into the Basal Sand. This alternative would have extraction facilities and monitoring wells at the same locations with effectively the same performance as the proposed Project. It will differ from the proposed Project as it will have one centralized groundwater treatment plant and injection wells. Extracted groundwater would initially be treated using UV light and hydrogen peroxide technology to reduce 1,4-dioxane to required treatment levels. Groundwater would then be passed through granular activated carbon (GAC) to treat the remaining COCs. Additional treatment to reduce total dissolved solids may also be performed. Treated water would then be injected into the Basal Sand using injection wells located near the treatment plant. Groundwater monitoring would be conducted using new and existing monitoring wells to evaluate water quality, maintain compliance with permits, plans, or orders, and to evaluate remediation progress.

ES.5.4 Environmentally Superior Alternative

As required by CEQA Guidelines Section 15126.6, one of the alternatives must be identified as an Environmentally Superior Alternative. The Environmentally Superior Alternative is the one that would result in the fewest or least significant environmental impacts. If the Environmentally Superior Alternative is the No Project Alternative (No Project/No Treatment), then an Environmentally Superior Alternative must be selected from the remaining alternatives. Here, the No Project Alternative is not environmentally superior, because it does not achieve any of the proposed Project's objectives in remediating contamination and protecting the groundwater, and, as a result, would result in substantially worse impacts in the areas of water quality and hazardous substances.

The ISCO Alternative would result in similar impacts to Land Use as compared to the proposed Project and would have fewer impacts to Aesthetics, Cultural Resources, Geology and Soils, Hazards and Hazardous Materials, Transportation, Tribal Cultural Resources, and Utilities and Service System as compared to the proposed Project. The ISCO Alternative would have greater impacts on Air Quality and GHG, Biological Resources, Energy, Hydrology and Water Quality, and Noise as compared to the proposed Project. Accordingly, the ISCO alternative is similar to the proposed Project in some areas, environmentally superior to the proposed Project in other areas, and environmentally inferior to the proposed Project in other areas. However, the most qualitatively significant of the impacts of the ISCO Alternative are the potential production of hexavalent chromium as a byproduct in the groundwater, and the increased air quality and GHG impacts, because these impacts could create hazards to human health.

The GETS and Injection Alternative would result in similar impacts to Land Use as compared to the proposed Project and would have greater impacts to Aesthetics, Air Quality and GHG, Biological Resources, Cultural Resources, Energy, Geology and Soils, Hazards and Hazardous Materials, Hydrology and Water Quality, Noise, Transportation, Tribal Cultural Resources, and Utilities and Service Systems as

compared to the proposed Project. These greater impacts are based in large part on the greater length of the conveyance pipelines, the larger treatment plant area, and the addition of 15 injection wells, as compared to the proposed Project.

Accordingly, when comparing the Project Alternatives, the GETS and Injection Alternative is the environmentally superior alternative from amongst the alternatives since it meets all of the Project objectives; however, and the proposed Project is environmentally superior to any of the alternatives since it would meet all of the objectives and would result in fewer environmental impacts as compared to the GETS and Injection Alternative.

ES.6 Areas of Controversy

Pursuant to CEQA Guidelines Section 15123(b)(2), a lead agency is required to include areas of controversy raised by agencies and the public in the EIR summary. Areas of controversy have been identified for the proposed Project based on comments made during the 30-day public review period in response to information published in the Notice of Preparation (NOP). Areas of controversy included concerns about impacts to groundwater resources, health and safety, water quality due to the proposed Project changing the direction of the plume and noise and traffic as a result of construction.

ES.7 Summary of Impacts

Table ES-1 presents a summary of the impacts and mitigation measures identified by the PEIR, as discussed in greater detail in Chapter 3. The level of significance for each impact was determined using significance criteria (thresholds) developed for each category of impacts; these criteria are described in the appropriate sections of Chapter 3. Significant impacts are those adverse environmental impacts that meet or exceed the significance thresholds; less than significant impacts do not exceed the thresholds. Table ES-1 indicates the mitigation measures that will avoid, minimize, or otherwise reduce significant impacts to a less than significant level.

ES.7.1 Significant and Unavoidable Environmental Effects

As required by CEQA Guidelines Section 15126.2(c), an EIR must describe any significant impacts that cannot be avoided, including those impacts that can be mitigated but not reduced to a less than significant level. Where there are impacts that cannot be alleviated without imposing an alternative design, their implications and the reasons the project is being proposed, notwithstanding their effect, should be described. The proposed Project did not result in a significant and unavoidable impact.

ES.7.2 Significant Irreversible Environmental Changes

CEQA Guidelines Sections 15126(c) and 15126.2(d) require that an EIR analyze the extent to which a project's primary and secondary effects would affect the environment and commit nonrenewable resources to uses that future generations would not be able to reverse. "Significant irreversible environmental changes" include the use of nonrenewable natural resources during the initial and continued phases of the project, should this use result in the unavailability of these resources in the future. Also, irreversible damage can result from environmental accidents associated with the project.

Irretrievable commitments of these resources are required to be evaluated in an EIR to ensure that such consumption is justified.

As described in Section 5.3, *Growth Inducement Potential and Significant Irreversible Environmental Changes*, of this Draft PEIR, the proposed Project would extract contaminated groundwater, treat and recharge treated groundwater into the Basin. The proposed Project would not include construction of residential or commercial buildings and thus would not increase the demand for or require new public services and utilities facilities (including water supply, fire protection and other emergency services, public education, and parks and recreation facilities). The nature of the proposed Project is to clean the groundwater of contaminates; such activities would not result in increased economic activity or population growth in the Project Area.

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TABLE ES-1
SUMMARY OF IMPACTS

Environmental Impact	Mitigation Measure	Project Components	Significance Determination after Mitigation
Aesthetics			
Impact 3.1-1: The proposed Project could have a substantial adverse effect on a scenic vista.	Not Applicable	All Components	Less than Significant
Impact 3.1-2: The proposed Project could substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway.	Not Applicable	All Components	No Impact
Impact 3.1-3: The proposed Project could substantially degrade the existing visual character or quality of public views of the site and its surroundings.	Not Applicable	All Components	Less than Significant
Impact 3.1-4: The proposed Project could create a new source of substantial light or glare which would adversely affect day or nighttime views in the area.	**AES-1:** For future construction or work activity implemented under the proposed Project, all nighttime construction lighting and temporary or permanent security lighting installed on new facilities shall be shielded and directed downward to avoid light spill onto neighboring properties.	• Extraction Facilities • Monitoring Wells • Local Groundwater Treatment Plants.	Less than Significant with Mitigation
Impact 3.1-5: Concurrent construction and operation of the proposed Project and related projects in the geographic scope could result in cumulative short-term and long-term impacts to aesthetics.	Implement AES-1	• Extraction Facilities • Monitoring Wells • Local Groundwater Treatment Plants.	Less than Significant with Mitigation
Air Quality/GHG			
Impact 3.2-1: The proposed Project could conflict with or obstruct implementation of the applicable air quality plan.	Not Applicable	Not Applicable	Less than Significant
Impact 3.2-2: The proposed Project could result in a cumulatively considerable net increase of any criteria pollutant for which the project region is nonattainment under an applicable federal or state ambient air quality standard.	**AQ-1: Air Quality Analysis.** Prior to approval, construction and operation of the PDI Workplan and Remedy Construction (subsequent phases of the Project) OCWD shall conduct an air quality analysis to determine whether the Project phase would exceed applicable significance thresholds. If the thresholds are not exceeded, no further mitigation is needed. If a threshold would be exceeded, OCWD shall require performance standards to achieve emission reductions to below the corresponding threshold. Performance standards may include, but are not limited to, one or more of the following, as applicable to the individual project phase: • The use of equipment that meets the Tier 4 interim and/or final off-road emission standards. • The use of alternative-fueled or zero emission equipment in place of fossil-fueled equipment. • Phase the Project implementation to limit construction of Project components from overlapping or occurring concurrently to avoid exceeding local or regional air quality thresholds, where feasible.	All Components	Less than Significant with Mitigation
Impact 3.2-3: The proposed Project could expose sensitive receptors to substantial pollutant concentrations.	Implement AQ-1	All Components	Less than Significant with Mitigation
Impact 3.2-4: The proposed Project could result in other emissions (such as those leading to odors) adversely affecting a substantial number of people.	Not Applicable	All Components	Less than Significant
Impact 3.2-5: The proposed Project could generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment.	Not Applicable	All Components	Less than Significant
Impact 3.2-6: The proposed Project could conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases.	Not Applicable	All Components	Less than Significant
Impact 3.2-7: Concurrent construction and operation of the proposed Project and related projects in the geographic scope could result in cumulative short-term and long-term impacts to air quality.	Implement AQ-1	All Components-During Construction	Less than Significant with Mitigation
Impact 3.2-8: Concurrent construction and operation of the proposed Project and related projects in the geographic scope could result in cumulative short-term and long-term impacts to greenhouse gas emissions.	Not Applicable	All Components	Less than Significant

Environmental Impact	Mitigation Measure	Project Components	Significance Determination after Mitigation
Biological Resources			
Impact 3.3-1: The proposed Project could 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 Game or U.S. Fish and Wildlife Service.	**BIO-1:** To prevent impacts to nesting birds and raptors, work activities within 500 feet of suitable nesting habitat shall be timed to avoid the season when nests may be active (i.e., January 15 to September 15). If work activities occur within the nesting season, a qualified biologist shall conduct a focused survey within 30 days of the anticipated start date, and no less than 3 days prior to ground disturbance, to identify any active nests within 500 feet of the development footprint. If an active nest is found, the nest shall be avoided, and a suitable buffer zone shall be delineated in the field where no impacts shall occur until the chicks have fledged the nest or has otherwise been deemed inactive by a qualified biologist. Construction buffers shall be 300 feet for passerines or up to 500 feet for raptors; however, avoidance buffers may be reduced at the discretion of the biologist, depending on the location of the nest and species tolerance to human presence and construction-related noises and vibrations.	All Components	Less than Significant with Mitigation
Impact 3.3-2: The proposed Project could 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.	Not Applicable	All Components	Less than Significant
Impact 3.3-3: The proposed Project could 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.	Not Applicable	All Components	Less than Significant
Impact 3.3-4: The proposed Project could 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.	Not Applicable	All Components	Less than Significant
Impact 3.3-5: The proposed Project could conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance.	Not Applicable	All Components	Less than Significant
Impact 3.3-6: The proposed Project could conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan.	Not Applicable	All Components	No Impact
Impact 3.3-7: Concurrent construction and operation of the proposed Project and related projects in the geographic scope could result in cumulative short-term and long-term impacts to biological resources.	Implement BIO-1	All Components-During Construction	Less than Significant with Mitigation
Cultural Resources			
Impact 3.4-1: The proposed Project could cause a substantial adverse change in the significance of a historical resource pursuant to Section 15064.5.	**CUL-1: Retention of a Qualified Archaeologist and WEAP Training.** OCWD shall retain an archaeologist who meets the Secretary of the Interior's Professional Qualifications Standards for Archaeology (Qualified Archaeologist). The qualified archaeologist and representative from the consulting Native American Tribe(s), shall conduct construction worker archaeological resources sensitivity training at the Project kick-off meeting with OCWD's Project General Contractor prior to the start of the first ground disturbing activities (including vegetation removal, pavement removal, etc.) for the proposed Project. In the event construction crews are phased or rotated, additional training shall be conducted by the Project General Contractor for new construction personnel working on ground-disturbing activities. The General Contractor shall inform construction workers of the types of prehistoric and historic archaeological resources that may be encountered, and of the proper procedures to be enacted in the event of an inadvertent discovery of archaeological resources or human remains, and safety precautions to be taken when working with archaeological monitors. Documentation shall be retained by the qualified archaeologist demonstrating that the appropriate construction personnel attended the training. **CUL-2: Unanticipated Archaeological Discovery.** The retained Qualified Archaeologist shall instruct construction personnel as part of ground disturbing activities, including excavation, grading, and drilling to halt or redirect activities if any materials are uncovered that are suspected of being associated with historical or prehistoric occupation. In the event potentially significant archaeological resources are encountered during earthmoving activities, the construction contractor shall cease such activity within 50 feet of the affected area and notify OCWD and the retained Qualified archaeologist, the latter of which who shall evaluate the find in accordance with the provisions of CEQA Guidelines Section 15064.5(c)(f). If the find appears to be prehistoric in origin, evaluation will be performed with involvement from Native American Tribal representatives identified by the Native American Heritage Commission as culturally affiliated with the Project Area. Personnel of the proposed Project shall not collect or move any archaeological materials and associated materials. Demolition activities shall not resume until the qualified archaeologist has made a determination on the significance of the resource. If it is determined that the discovered archaeological resource constitutes a historical resource or unique archaeological resource pursuant to CEQA, avoidance and preservation in place shall be the preferred manner of mitigation. Preservation in place maintains the important relationship between artifacts and their archaeological context and also serves to avoid conflict with traditional and religious values of groups who may ascribe meaning to the resource. Preservation in place may be accomplished by, but is not limited to, avoidance, incorporating the resource into open space, capping, or deeding the site into a permanent conservation easement. In the event that preservation in place is determined to be infeasible and data recovery through excavation is the only feasible mitigation available, an Archaeological Resources Treatment Plan shall be prepared and implemented by the qualified archaeologist that provides for the adequate recovery of the scientifically consequential information contained in the archaeological resource. The OCWD shall consult with appropriate Native American tribal representatives in determining treatment for prehistoric or Native American resources to ensure cultural values ascribed to the resources, beyond those that	All Components	Less than Significant with Mitigation

Environmental Impact	Mitigation Measure	Project Components	Significance Determination after Mitigation
	are scientifically important, are considered. Lastly, the long-term disposition of any materials collected as a result of treatment plan implementation should be determined in consultation with the affiliated tribe(s), where relevant, and may include onsite reburial, curation at a public, non-profit institution, or donation to a local Native American Tribe, school, public agency, or historical society. **CUL-3: Monitoring Report.** At the conclusion of archaeological monitoring, the Qualified Archaeologist shall prepare a final monitoring report. The report shall include a summary of monitoring results, description of resources unearthed, if any, significance evaluation and treatment of the resources, and the results of the artifact processing, analysis, and research. Appropriate California Department of Parks and Recreation 523 Forms shall be appended to the report, as necessary. The report shall be submitted to OCWD to signify the satisfactory completion of the proposed Project and required mitigation measures. The Qualified Archaeologist shall submit a copy of the final report to the South-Central Coastal Information Center within 30 days of its acceptance by OCWD. Additionally, as applicable, copies of the final report shall also be filed at the Irvine Historical Museum and the City of Irvine Community Development Department as applicable. **CUL-4: Discovery of Unanticipated Human Remains.** If human remains are encountered, the OCWD or its contractor shall halt work in the vicinity (within 100 feet) of the discovery and contact the Orange County Coroner in accordance with Public Resources Code Section 5097.98 and Health and Safety Code Section 7050.5, which requires that no further disturbance shall occur until the County Coroner has made the necessary findings as to origin and disposition pursuant to Public Resources Code Section 5097.98. If the remains are determined to be of Native American descent, the coroner has 24 hours to notify the Native American Heritage Commission (NAHC). The NAHC shall then identify the person(s) thought to be the Most Likely Descendent (MLD). The MLD may, with the permission of the landowner, or his or her authorized representative, inspect the site of the discovery of the Native American remains and may recommend to the owner or the person responsible for the excavation work means for treating or disposing, with appropriate dignity, the human remains and any associated grave goods. The MLD shall complete their inspection and make their recommendation within 48 hours of being granted access by the landowner to inspect the discovery. The recommendation may include the scientific removal and nondestructive analysis of human remains and items associated with Native American burials. Upon the discovery of the Native American remains, the landowner shall ensure that the immediate vicinity, according to generally accepted cultural or archaeological standards or practices, where the Native American human remains are located, is not damaged or disturbed by further development activity until the landowner has discussed and conferred, as prescribed in this mitigation measure, with the MLD regarding their recommendations, if applicable, taking into account the possibility of multiple human remains. The landowner shall discuss and confer with the MLD on all reasonable options regarding their preferences for treatment. If the NAHC is unable to identify an MLD, or the MLD identified fails to make a recommendation, or the landowner rejects the recommendation of the MLD and the mediation provided for in Subdivision (k) of Section 5097.94, if invoked, fails to provide measures acceptable to the landowner, the landowner or his or her authorized representative shall inter the human remains and items associated with Native American human remains with appropriate dignity on the facility property in a location not subject to further and future subsurface disturbance. **CUL-5: Project Redesign.** If subsequent Project Phases result in Infrastructure Alignments being located within any of the previously identified historic resources or a property over 45-years of age, then the proposed Project shall be redesigned to avoid any on-site proposed Project work on any of the previously identified historic resources or a property over 45-years of age. For the 16 resources (P-30-177121, -177122, -177123, -177124, -177125, -177126, -177127, -177128, -177129, -17730, -177132, -177133, -177521, 1540 Brookhollow Drive, 1601 Warmer Avenue, and 2231 Ritchey Drive) with a low likelihood of being recommended eligible for listing in the CR and/or at the local level, proposed Project work may be visible from these properties but shall be located at least 100 feet from the property. For the three resources (P-30-177044, -177120, -177131) that have a moderate or high likelihood of being recommended eligible for listing in the CR and/or at the local level, no proposed Project work should be visible from the property. If proposed Project work occurs on-site at any previously identified historic resources or property over 45 years of age or is visible from P-30-177044, P-30-177120, or P-30-177131, then Mitigation Measure CUL-6 is recommended to reduce potential impacts to previously unknown and identified historical resources to less than significant levels under CEQA. **CUL-6: Historic Resources Assessment.** If Infrastructure Alignments change in subsequent Project Phases and include areas that contain properties that are more than 45 years old, the proposed Project proponent shall retain a qualified architectural historian, defined as meeting the Secretary of the Interior's Professional Qualification Standards for architectural history, to conduct a historic resources assessment including: a records search at the South-Central Coastal Information Center; a review of pertinent archives, databases, and sources; a pedestrian field survey; recordation of all identified historic resources on California Department of Parks and Recreation 523 forms; and preparation of a technical report documenting the methods and results of the assessment. All identified historic resources will be assessed for the proposed Project's potential to result in direct and/or indirect effects on those resources and any historic resource that may be affected shall be evaluated for its potential significance under national and state criteria prior to OCWD's approval of proposed Project plans and publication of subsequent CEQA documents. The qualified architectural historian shall provide recommendations regarding additional work, treatment, or mitigation for affected historical resources to be implemented prior to their demolition or alteration. Impacts on historical resources shall be analyzed using CEQA thresholds to determine if a proposed Project would result in a substantial adverse change in the significance of a historical resource. If a potentially significant impact would occur, Orange County Water District shall require appropriate mitigation to lessen the impact to the degree feasible		

Environmental Impact	Mitigation Measure	Project Components	Significance Determination after Mitigation
Impact 3.4-2: The proposed Project could cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5.	Implement CUL-1, Cul-2, and CUL-3	All Components	Less than Significant with Mitigation
Impact 3.4-3: The proposed Project could disturb any human remains, including those interred outside of dedicated cemeteries.	Implement CUL-4	All Components	Less than Significant with Mitigation
Impact 3.4-4: Concurrent construction and operation of the proposed Project and related projects in the geographic scope could result in cumulative short-term and long-term impacts to cultural resources	Implement CUL-1, CUL 2, CUL-3 and CUL-4	All Components	Less than Significant with Mitigation
Energy			
Impact 3.5-1: The proposed Project could result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation.	Not Applicable	All Components	Less than Significant
Impact 3.5-2: The proposed Project could conflict with or obstruct a state or local plan for renewable energy or energy efficiency.	Not Applicable	All Components	Less than Significant
Impact 3.5-3: Concurrent construction and operation of the proposed Project and related projects in the geographic scope could result in cumulative short-term and long-term impacts to energy.	Not Applicable	All Components	Less than Significant
Geology and Soils			
Impact 3.6-1: The proposed Project could directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving strong seismic ground shaking or seismic-related ground failure, including liquefaction.	Not Applicable	All Components	Less than Significant
Impact 3.6-2: The proposed Project could result in substantial soil erosion or the loss of topsoil.	Not Applicable	All Components	Less than Significant
Impact 3.6-3: The proposed Project could be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the proposed Project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse.	Not Applicable	All Components	Less than Significant
Impact 3.6-4: The proposed Project could be located on expansive soil creating substantial direct or indirect risks to life or property.	Not Applicable	All Components	Less than Significant
Impact 3.6-5: The proposed Project could directly or indirectly destroy a unique paleontological resource or site or unique geologic feature.	**GEO-1: Retention of a Qualified Paleontologist.** Prior to the start of ground disturbance, the OCWD shall retain a Qualified Paleontologist meeting the Society of Vertebrate Paleontology (SVP 2010) standards. The Qualified Paleontologist shall attend any pre-grade construction meetings to determine when and where excavations will occur below a depth of 25 feet below the existing ground surface. a. Prior to any ground disturbance activities the OCWD Project Manager shall retain a qualified paleontologist to prepare a Worker's Environmental Awareness Program (WEAP) which shall include a training meeting(s) for all construction personnel prior to the start of any ground disturbing activities. The WEAP training shall include, at a minimum, the following information: review of local and State laws and regulations pertaining to paleontological resources; types of fossils that could be encountered if ground disturbing activity reaches the Pleistocene alluvium; photos of example fossils based on the regional LACM collections that could occur on site for reference; and b. In the event an unanticipated fossil discovery is made during ground disturbing activities, construction activities shall halt in a radius of 50 feet of the fossil, and the qualified professional paleontologist retained by the OCWD shall be notified to evaluate the discovery, determine its significance, and evaluate whether additional mitigation or treatment is warranted. If paleontological resources are encountered during augering or drilling, excavation may continue if a new spoils mound can be established while the find is properly documented by a paleontological monitor. In either scenario, work in the area of the discovery shall resume once the find is properly documented and authorization is given by the qualified paleontologist to resume construction work. Any significant paleontological resources found shall be prepared, identified, analyzed, and permanently curated in an approved regional museum repository.	All Components	Less than Significant with Mitigation
Impact 3.6-6: Concurrent construction and operation of the proposed Project and related projects in the geographic scope could result in cumulative short-term and long-term impacts to geology and soils.	Implement GEO-1	All Components	Less than Significant with Mitigation
Hazards and Hazardous Materials			
Impact 3.7-1: The proposed Project could create a significant hazard to the public or the environment through the routine transport, use, disposal of hazardous materials, or the upset and accident conditions involving the release of hazardous materials into the environment.	Not Applicable	All Components	Less than Significant
Impact 3.7-2: The proposed Project could emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within 0.25 miles of an existing or proposed sensitive receptors, such as schools, day care centers, or hospitals.	Not Applicable	All Components	Less than Significant
Impact 3.7-3: The proposed Project could be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code § 65962.5 and, as a result, would create a significant hazard to the public or the environment.	Not Applicable	All Components	Less than Significant

Environmental Impact	Mitigation Measure	Project Components	Significance Determination after Mitigation
Impact 3.7-4: The proposed Project could result in a safety hazard for people residing or working in the proposed Project Area within an airport land use plan or 2 miles of a public airport or public use airport.	Not Applicable	All Components	Less than Significant
Impact 3.7-5: The proposed Project could impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan.	Not Applicable	All Components	Less than Significant
Impact 3.7-6: Concurrent construction and operation of the proposed Project and related projects in the geographic scope could result in cumulative short-term and long-term impacts to hazards and hazardous materials.	Not Applicable	All Components	Less than Significant
Hydrology and Water Quality			
Impact 3.8-1: The proposed Project could violate water quality standards or waste discharge requirements or otherwise substantially degrade surface or groundwater quality.	Not Applicable	All Components	Beneficial Impact
Impact 3.8-2: The proposed Project could substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the Basin.	Not Applicable	All Components	Beneficial Impact
Impact 3.8-3: The proposed Project could 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: result in substantial erosion or siltation on- or off-site; substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site; 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; impede or redirect flood flows.	Not Applicable	All Components	Less than Significant
Impact 3.8-4: The proposed Project could be located in flood hazard, tsunami, or seiche zones, and risk release of pollutants due to project inundation.	Not Applicable	Not Applicable	Less than Significant
Impact 3.8-5: The proposed Project could conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan.	Not Applicable	Not Applicable	Beneficial Impact
Impact 3.8-6: Concurrent construction and operation of the proposed Project and related projects in the geographic scope could result in cumulative short-term and long-term impacts to hydrology and water quality	Not Applicable	All Components	Beneficial Impact
Land Use			
Impact 3.9-1: The proposed Project could physically divide an established community.	Not Applicable	All Components	No Impact
Impact 3.9-2: The proposed Project could 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.	Not Applicable	All Components	Less than Significant
Impact 3.9-3: Concurrent construction and operation of the proposed Project and related projects in the geographic scope could result in cumulative short-term and long-term impacts to land use and planning	Not Applicable	All Components	Less than Significant
Noise			
Impact 3.10-1: The proposed Project could generate a substantial temporary or permanent increase in ambient noise levels in the vicinity of the proposed Project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies	**NOI-1:** OCWD shall require the construction contractors to implement the following measures, as applicable, during construction of the proposed extraction facilities, monitoring wells and conveyance pipelines are within 125 feet of a sensitive receptor and if construction of the groundwater treatment plants is within 150 feet of a sensitive receptor: • Construction activities in the vicinity of noise-sensitive uses shall implement noise-reduction measures, as feasible, which may include, but are not limited to, one or more of the following, as applicable to the proposed Project: o Install temporary sound barriers for construction activities that occur adjacent to occupied noise-sensitive receptors. o Equip construction equipment with effective mufflers, sound-insulating hoods or enclosures, vibration dampers, and other Best Available Control Technology (BACT). o Limit non-essential idling of construction equipment to no more than five minutes per hour. • OCWD shall designate a Noise Complaint Coordinator for the Project to be responsible for logging and responding to complaints regarding construction noise. **NOI-2:** Prior to ground disturbance, OCWD shall prepare a construction schedule that phases the Project implementation to limit construction of multiple Project components from overlapping or occurring concurrently within 125 feet of sensitive receptors to avoid exceeding local noise thresholds.	All Components	Less than Significant with Mitigation

Environmental Impact	Mitigation Measure	Project Components	Significance Determination after Mitigation
Impact 3.10-2: The proposed Project could generate excessive ground-borne vibration or ground-borne noise levels.	**NOI-3:** OCWD shall require the construction contractor to implement the following measures, as applicable, during construction of proposed facilities that are required to use vibration-generating equipment: • Sensitive receptors (residences, residential areas, schools, hotels and hospitals) within 100 feet of proposed Project construction activities shall be identified and notified prior to initiation of vibration-generating construction activity. Sensitive receptors are defined as residences, schools, hotels, hospitals, and other uses that are sensitive to loud noise. Structures are defined as historic buildings, older residential buildings, and buildings that are sensitive to high vibration levels. • Limit the use of vibratory rollers: o Vibratory rollers at least 86 feet from human sensitive receptors and 26 feet from sensitive residential structures, and 37 feet from sensitive historic structures and buildings that are sensitive to high vibration levels. o If vibratory rollers must be used within 86 feet from human sensitive receptors, limit the use within 86 feet to daytime hours as defined in the applicable ordinance of the County of Orange, City of Irvine, City of Santa Ana, or City of Tustin. o If vibratory rollers must be used within 26 feet from sensitive residential structures and 37 feet from sensitive historic structures and buildings that are sensitive to high vibration level as identified on Figure 3.4-1 and 3.4-2, the construction contractor shall conduct crack surveys before paving to prevent potential architectural damage to nearby structures. The surveys shall be done by photographs, video tape, or visual inventory, and shall include inside as well as outside locations. All existing cracks in walls, floors, and driveways shall be documented with sufficient detail for comparison after construction to determine whether actual vibration damage occurred. A post-construction survey shall be conducted to document the condition of the surrounding buildings after the construction is complete. • Limit the use of other vibration-generating equipment: o If other vibration-generating equipment must be used within 50 feet from sensitive human receptors, limit the use within 50 feet to daytime hours as defined in the applicable ordinance of the County of Orange, City of Irvine, City of Santa Ana, or City of Tustin.	All Components	Less than Significant with Mitigation
Impact 3.10-3: The proposed Project could expose people residing or working in the proposed Project Area to excessive noise levels in the vicinity of a private airstrip or an airport land use plan.	Not Applicable	All Components	Less than Significant
Impact 3.10-4: Concurrent construction and operation of the proposed Project and related projects in the geographic scope could result in cumulative short-term and long-term impacts to noise and vibration	Implement NOI-1 through NOI-3	All Components	Less than Significant with Mitigation
Transportation			
Impact 3.11-1: The proposed Project could conflict with a program plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities.	Not Applicable	All Components	Less than Significant
Impact 3.11-2: The proposed Project could conflict or be inconsistent with CEQA Guidelines Section 15064.3, subdivision (b)	Not Applicable	All Components	Less than Significant
Impact 3.11-3: The proposed Project could substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment).	Not Applicable	All Components	Less than Significant
Impact 3.11-4: The proposed Project could result in inadequate emergency access.	Not Applicable	All Components	Less than Significant
Impact 3.11-5: Concurrent construction and operation of the proposed Project and related projects in the geographic scope could result in cumulative short-term and long-term impacts to transportation	Not Applicable	All Components	Less than Significant
Tribal Cultural Resources			
Impact 3.12-1: The proposed Project could 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 either 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), or is 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 Resources Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.	**TCR-1: Native American Monitor.** Prior to ground disturbance, the OCWD shall retain a Native American Monitor from the AB 52 Tribal Contact list. The Native American Monitor shall be present during the following construction activities that have the potential for encountering tribal cultural resources: demolition, pavement removal, clearing/grubbing, drilling/augering, potholing, grading, trenching, excavation, tree removal or other ground disturbing activity associated with the Project, whether on the Project Area or in connection with Project off-site improvements (collectively “ground disturbing activities”). Notwithstanding the foregoing, Native American monitoring shall not be required for any moving of soils after they have been initially disturbed or displaced by Project-related construction. The OCWD shall prepare a monitoring agreement with the Native American Monitor that outlines the roles and responsibilities of the Native American Monitor prior to ground disturbance Prior to commencement ground disturbing activities, a Tribal Cultural Resources Sensitivity Training session shall be held for those construction personnel who will be directly involved in the ground disturbing activities. The training session shall be carried out by the Native American Monitor and shall focus on how to identify tribal cultural resources that may be encountered during ground disturbing activities and the procedures to be followed in such an event. If construction crews are phased, additional trainings shall be conducted for new personnel. The OCWD, or their contractors, shall ensure new construction personnel are made available for and attend the training. The OCWD shall retain documentation demonstrating attendance. If the Native American Monitor is not present at the Project Area on any given workday, the ground disturbing activities may continue if the workers involved in such activities attended the training session.	All Components	Less than Significant with Mitigation

Environmental Impact	Mitigation Measure	Project Components	Significance Determination after Mitigation
	Full-time monitoring may be reduced to part-time inspections, or ceased entirely, if determined appropriate by the Native American Monitor in the event there appears to be little to no potential for impacting tribal cultural resources. Native American monitoring shall conclude no later than conclusion of ground disturbing activities. **TCR-2: Monitoring Logs.** The Native American Monitor shall complete daily monitoring logs that 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 Tribe. Monitor logs shall 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. Copies of monitor logs shall be provided to the OCWD upon written request to the Tribe. The Applicant shall not be deemed to be out of compliance with this measure if the Native American Monitor fails to complete or submit any such monitoring logs. **TCR-3: Discovery of Potential Tribal Cultural Resources.** In the event of a discovery of potential tribal cultural resources at the Project Area, the Qualified Archaeologist identified in Mitigation Measure CUL- 1 (after consultation with the Native American Monitor) shall have the authority to temporarily divert, redirect, or halt ground-disturbance activities to allow identification, evaluation, and potential recovery of such potential resources. After consulting with the Native American Monitor and OCWD, the Qualified Archaeologist shall establish an appropriate buffer area in accordance with industry standards, reasonable assumptions regarding the potential for additional discoveries in the vicinity, and safety considerations for those making an evaluation and potential recovery of the discovery. This buffer area shall be established around the find where ground-disturbing activities shall not be allowed to continue. Work shall be allowed to continue outside of the buffer area. Within three (3) business days of such discovery, a meeting shall take place between the OCWD, the Qualified Archaeologist, and the Tribe to discuss the significance of the find and whether it qualifies as a tribal cultural resource pursuant to Public Resources Code Section 21074(a). If, as a result of the meeting and after consultation with the Tribe, OCWD determines, based on substantial evidence, that the resource is in fact a tribal cultural resource, the Qualified Archaeologist shall develop a reasonable and feasible treatment plan, with input from the Tribe as necessary, and with the concurrence of the OCWD. The treatment measures in the treatment plan shall be in compliance with any applicable federal, State, or local laws, rules or regulations. The treatment plan shall also include measures regarding the curation of the recovered resources. The OCWD may recommence ground disturbance activities inside of the specified radius of the discovery site only after it has complied with all of the recommendations developed and approved pursuant to the process set forth in the above paragraphs. The recovered Native American resources may be placed in the custody of the Tribe, who may choose to use them for their educational purposes or they may be curated at a public, non-profit institution with a research interest in the materials. If neither the Tribe nor an institution accepts the resources, they may be donated to a local school or historical society in the area for educational purposes. Notwithstanding the above paragraph, any information determined to be confidential in nature by OCWD, shall be excluded from submission to the South Central Coastal Information Center or the general public under the applicable provisions of the California Public Records Act, California Public Resources Code Section 6254(r).		
Impact 3.12-2: Concurrent construction and operation of the proposed Project and related projects in the geographic scope could result in cumulative short-term and long-term impacts to tribal cultural resources.	Not Applicable	All Components	Less than Significant
Utilities and Service Systems			
Impact 3.13-1: The proposed Project could 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.	**UTIL-1: Underground Utilities Search.** During design and prior to construction of proposed Project wells and conveyance pipelines, the OCWD Project Manager shall ensure that an underground utilities search is conducted and coordinate with all utility providers that operate in the same public rights-of-way impacted by construction activities. OCWD shall ensure that any temporary disruption in utility service caused by construction is immediately identified and that any affected parties are notified.	• Extraction Wells • Monitoring Wells • Conveyance Pipelines	Less than Significant with Mitigation
Impact 3.13-2: The proposed Project could have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years.	Not Applicable	All Components	Less than Significant
Impact 3.13-3: The proposed Project could result in a determination by the wastewater treatment provider which serves or may serve the proposed Project that it has adequate capacity to serve the proposed Project's projected demand in addition to the provider's existing commitments.	Not Applicable	All Components	Less than Significant
Impact 3.13-4: The proposed Project could 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.	Not Applicable	All Components	Less than Significant
Impact 3.13-5: The proposed Project could comply with federal, state, and local management and reduction statutes and regulations related to solid waste.	Not Applicable	All Components	Less than Significant
Impact 3.13-6: Concurrent construction and operation of the proposed Project and related projects in the geographic scope could result in cumulative short-term and long-term impacts to utilities and service systems.	Implement UTIL-1	• Extraction Wells • Monitoring Wells • Conveyance Pipelines	Less than Significant with Mitigation

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CHAPTER 1
Introduction

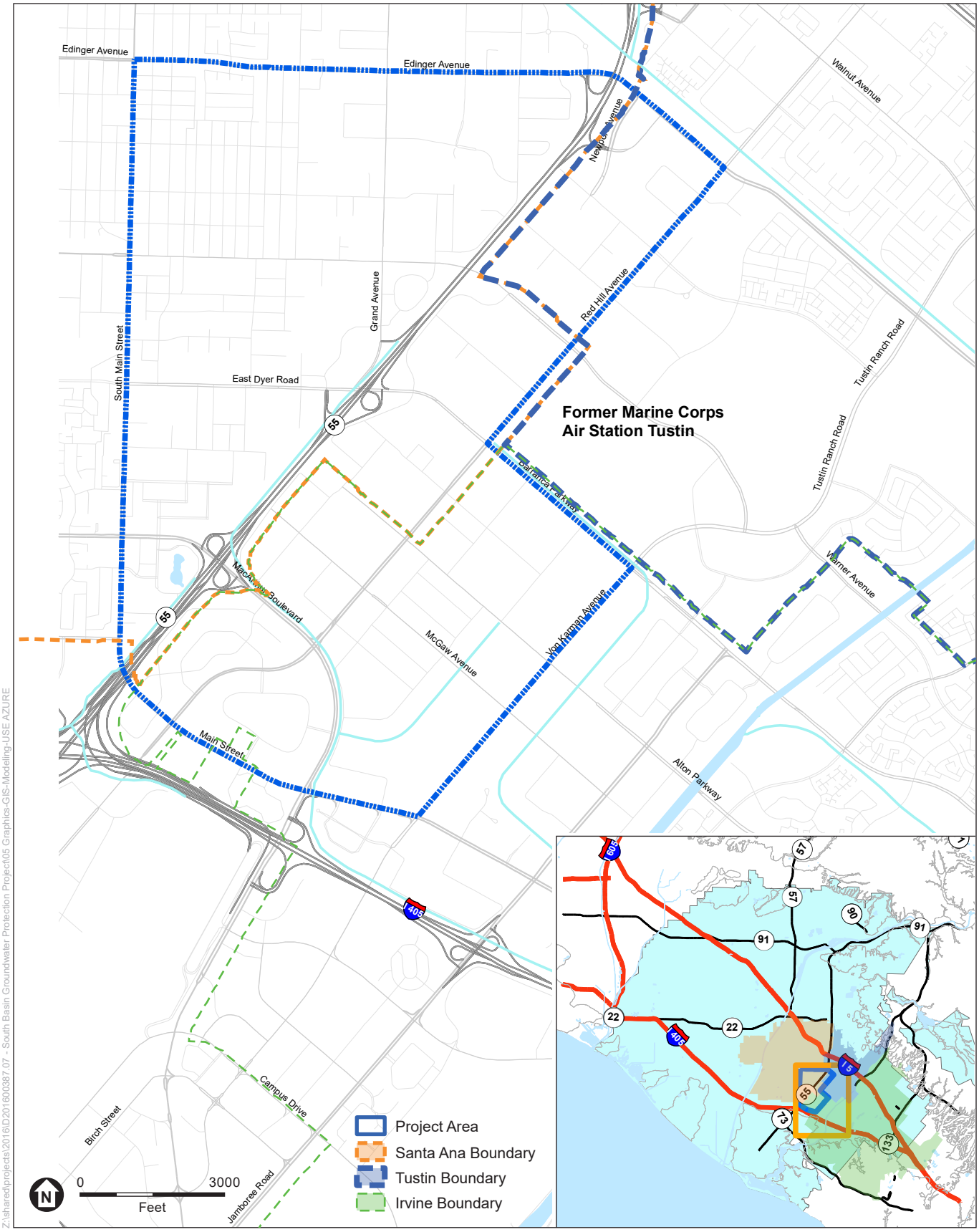
1.1 Introduction

Orange County Water District (OCWD) is proposing to approve the Interim Remedial Action Plan (IRAP) and secure other relevant permits and approvals for the South Basin Groundwater Protection Project (proposed Project). The proposed Project consists of remedial measures that would extract contaminated groundwater from the Shallow Aquifer System, treat the water locally, then discharge the treated water to the sanitary sewer system. The proposed Project will take place within an approximately 5.6 square mile area (Project Area) in the south-central portion of the Orange County Groundwater Basin (Basin, **Figure 1-1**). The Costa Mesa Freeway (CA-55) crosses the Project Area between the Santa Ana Freeway (Interstate 5) on the north and the San Diego Freeway (Interstate 405) on the south.

1.2 Purpose of the Draft PEIR

OCWD is the Lead Agency pursuant to the California Environmental Quality Act (CEQA) and has prepared this Draft Program Environmental Impact Report (PEIR) to satisfy CEQA, as set forth in the California Public Resources Code, Division 13, Section 21000, et seq., and the State CEQA Guidelines (CEQA Guidelines), Title 14 of the California Code of Regulations, Chapter 3, Section 15000 et seq. In accordance with CEQA Guidelines Section 15121(a), the purpose of an environmental impact report (EIR) is to serve as an informational document that will generally inform public agency decision makers and the public of the significant environmental effects of a project, and possible ways to minimize those significant effects. CEQA Guidelines Section 15151 contains the following standards for EIR adequacy:

> *An EIR should be prepared with a sufficient degree of analysis to provide decision makers with information which enables them to make a decision which intelligently takes account of environmental consequences. An evaluation of the environmental effects of a proposed project need not be exhaustive, but the sufficiency of an EIR is to be reviewed in the light of what is reasonably feasible. Disagreement among experts does not make an EIR inadequate, but the EIR should summarize the main points of disagreement among the experts. The courts have looked not for perfection but for adequacy, completeness, and a good faith effort at full disclosure.*



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SOURCE: Hargis+Associates, Inc., 2019

South Basin Groundwater Protection Project

Figure 1-1
Location Map

ESA

This Draft PEIR is a Program EIR, which is defined in CEQA Guidelines section 15168 as:

> *[A]n EIR which may be prepared on a series of actions that can be characterized as one large project and are related either:*
>
> *(1) Geographically,*
>
> *(2) as logical parts in the chain of contemplated action,*
>
> *(3) in connection with issuance of rules, regulations, plans, or other generally criteria to govern the conduct of a continuing program, or*
>
> *(4) as individual activities carried out under the same authorizing statutory or regulatory authority and having generally similar environmental effects which can be mitigated in similar ways.*

The proposed Project will be implemented in three phases outlined in Section 2.5. The three phases are related both geographically and as logical parts in the chain of contemplated action.

The primary purpose of this Draft PEIR is to provide an objective, full-disclosure document to inform agency decision makers and the public of the direct and indirect environmental impacts of the proposed Project. To satisfy this purpose, the Draft PEIR will:

- Identify and evaluate potential environmental impacts of the proposed Project.
- Assess cumulative impacts of the proposed Project in conjunction with related past, present, and reasonably foreseeable future projects within the Project Area.
- Indicate the manner in which those environmental impacts can be mitigated or avoided.
- Identify and evaluate a reasonable range of alternatives that have the potential to reduce or eliminate potentially significant impacts associated with the proposed Project while feasibly accomplishing most of the proposed Project's objectives (Section 2.3).
- Identify impacts, if any, which even with the implementation of mitigation measures would be unavoidable and adverse.
- Provide documentation supporting these determinations.

1.2.1 Intended Use of the Draft PEIR

An EIR is an informational document that is intended to inform regulatory agency decision makers and the public of the significant adverse environmental effects of a project and any feasible mitigation measures that may substantially reduce or avoid the significant impacts. It also discusses alternatives to the project that could accomplish most of the primary objectives while substantially reducing or avoiding significant environmental impacts.

This Draft PEIR is prepared under the direction of OCWD for the following purposes:

- To satisfy the requirements of CEQA in connection with the approval of the IRAP and future discretionary actions relating to the proposed Project.

- To inform the public, local community, and responsible or interested public agencies of the scope of the proposed Project and to describe the potential significant environmental impacts; mitigation measures to avoid or reduce the effects; and alternatives to the proposed Project.
- To enable OCWD to consider environmental impacts when deciding whether to approve, modify or deny the proposed Project.
- To serve as a source document for responsible agencies to issue permits and approvals, as required, for implementation of the proposed Project.

As described in the CEQA Guidelines, lead agencies are charged with the duty to avoid or substantially lessen the significant environmental impacts and to consider project alternatives for their project(s). Where mitigation measures or project alternatives are not feasible, the impact is considered significant and unavoidable.

In accordance with CEQA Guidelines Section 15125, an EIR must include a description of the physical environmental conditions in the vicinity of the proposed project. This environmental setting will normally constitute the baseline physical conditions against which a Lead Agency evaluates whether an impact is significant. The environmental analysis contained in Chapter 3 of this Draft PEIR uses the Notice of Preparation (NOP) date (discussed below) as the baseline for the description of the physical conditions that might be affected by the proposed Project.

The purpose of an EIR is not to recommend approval or denial of a proposed project. Rather, an EIR is required to identify the significant adverse environmental effects of a proposed project to the physical environment, and to identify measures that avoid or mitigate those impacts to the extent feasible. When environmental impacts are identified as significant and unavoidable in the sense that no feasible mitigation measures or alternatives have been identified that would reduce the impact to a less than significant level, OCWD may still approve the proposed Project after adopting all feasible mitigation measures and alternatives if, through the adoption of a statement of overriding considerations, it finds that social, economic, legal, technological, or other benefits outweigh these impacts.

1.3 Draft PEIR Organization

This Draft PEIR is organized into chapters, as identified, and briefly described below. Chapters are further divided into sections (e.g., Chapter 3, *Environmental Setting, Impact Analysis, and Mitigation Measures*, and Section 3.2, *Air Quality and Greenhouse Gas Emissions*).

- **Executive Summary:** The Executive Summary presents a summary of the proposed Project and the potential environmental impacts. It identifies the mitigation measures that would be implemented and level of significance after mitigation (as fully described in Chapter 3). It also provides a summary of alternatives to the proposed Project and a summary of known controversial issues.
- **Chapter 1, Introduction:** This chapter presents a discussion of the purpose and use of this Draft PEIR.
- **Chapter 2, Project Description:** This chapter provides a detailed description of the proposed Project. It defines the proposed Project's location and setting, background, objectives, a description of the

proposed Project design, implementation and operation, and the requested approvals, entitlements and intended use of this Draft PEIR.

- **Chapter 3, Environmental Setting, Impact Analysis, and Mitigation Measures:** This chapter describes the environmental setting and identifies the direct, indirect, and cumulative impacts of the proposed Project for each of the following environmental topics: Aesthetics; Air Quality and Greenhouse Gas Emissions; Biological Resources; Cultural Resources; Energy; Geology and Soils; Hazards and Hazardous Materials; Hydrology and Water Quality; Land Use and Planning; Noise; Transportation; Tribal Cultural Resources; and Utilities and Service Systems. For the assessment of cumulative impacts, this chapter includes a list of closely related past, present and reasonably foreseeable probable future projects to be considered together with the proposed Project. This chapter also summarizes environmental topics for which no significant impact would occur.
- **Chapter 4, Alternatives Analysis:** This chapter provides additional information regarding proposed Project alternatives to be considered by decision makers in compliance with State CEQA Guidelines Section 15126.6. This alternatives analysis evaluates a reasonable range of potential alternatives that may reduce environmental impacts associated with implementation of the proposed Project.
- **Chapter 5, Growth Inducement:** This chapter identifies the growth inducing effects of the proposed Project.
- **Chapter 6, References:** This chapter sets forth a comprehensive listing of all sources of information used in the preparation of this Draft PEIR. This includes organizations and persons that were contacted during the preparation of this Draft PEIR.
- **Chapter 7, Report Preparers:** This chapter identifies the Lead Agency personnel and consultants involved with preparation of this Draft PEIR.
- **Chapter 8, Acronyms and Abbreviations:** This chapter provides a list of acronyms that are used throughout this Draft PEIR.
- **Appendices:** This Draft PEIR includes several appendices that provide either background information or additional technical support for the analysis.

1.4 CEQA Environmental Review Process

1.4.1 CEQA Process Overview

OCWD determined that implementation of the proposed Project could have a significant effect on the environment and therefore required preparation of an EIR. OCWD prepared this Draft PEIR to provide the public and the Responsible and Trustee agencies with information about the potentially significant environmental effects of the proposed Project, to identify possible ways to minimize potentially significant effects, and to describe and evaluate feasible alternatives to the proposed Project.

The proposed Project would include multiple soil borings, well arrays, and treatment facilities located within the Project Area to accomplish the proposed Project objectives; however, specific locations of these proposed Project components have not been determined. This Draft PEIR provides a foundation for any necessary future environmental review documents that focus on the location- and action-specific

impacts associated with the execution of soil borings, or the construction and operation of the wells, conveyance pipelines, and treatment facilities. A PEIR can provide the following additional advantages (CEQA Guidelines Section 15168[b]):

- Provide for a more exhaustive consideration of effects and alternatives than would be practical in an EIR on an individual action.
- Ensure consideration of cumulative impacts that might not be evident in a case-by-case or project-by-project analysis.
- Avoid duplicative consideration of basic policy issues.
- Allow the lead agency to consider broad policy alternatives and program-wide mitigation measures early in the process when the agency has greater flexibility to deal with basic problems or cumulative impacts.
- Facilitate a reduction in paperwork.

This Draft PEIR analysis is not intended to focus on the site-specific construction and operation details of each soil boring, conveyance pipelines, well array or treatment facility. Rather, this Draft PEIR serves as a first-tier environmental document that focuses on the effects of implementing the proposed Project overall as a plan to investigate, treat, and reduce the migration of the contaminated groundwater plume.

This Draft PEIR has been prepared to comply with CEQA and CEQA Guidelines and is to be used by local regulators and the public in their review of the potential significant adverse environmental impacts of the proposed Project and alternatives, and mitigation measures that would minimize or avoid those potential environmental effects. OCWD will consider the information presented in this Draft PEIR, along with other factors, prior to considering and making any final decisions regarding the proposed Project.

1.4.2 Notice of Preparation and Public Scoping

Pursuant to CEQA Guidelines Section 15082, the Lead Agency is required to send a Notice of Preparation (NOP) stating that a PEIR will be prepared to the State Office of Planning and Research (OPR), Responsible and Trustee agencies, and federal agencies involved in funding or approving the project. The NOP must provide sufficient information in order for responsible agencies to make a meaningful response. At a minimum, the NOP must include a description of the project, location of the project, and probable environmental effects of the project (CEQA Guidelines Section 15082(a)(1)). Within 30 days after receiving the NOP, Responsible and Trustee agencies and OPR shall provide the Lead Agency with specific details about the scope and content of the environmental information related to that agency's area of statutory responsibility that should be included in this Draft PEIR (CEQA Guidelines Section 15082(b)).

On October 5, 2023, OCWD published a NOP for a PEIR for a 30-day review period and circulated it to OPR and local, state, and federal agencies, including Responsible and Trustee agencies, as well as organizations and persons who expressed interest in the proposed Project. The NOP provided a general description of the proposed Project, a description of the Project Area, and an overview of environmental topics that will be evaluated within the PEIR. The NOP was made available on OCWD's website. Eight letters were received in response to the NOP. A copy of the NOP, NOP circulation list, and comment letters are included in this Draft PEIR in **Appendix A**. On October 19, 2023, in accordance with CEQA

Guidelines Section 15082, OCWD held a public scoping meeting to describe the proposed Project, to identify the environmental topics that would be addressed, and to describe the CEQA process for the PEIR. To notify the Responsible and Trustee Agencies and public of the scoping meeting, OCWD posted information about the meeting on OCWD's website, by email, and by mail to surrounding property owners and interested parties. OCWD provided an opportunity for meeting attendees to submit written and verbal comments on the scope of the environmental evaluation; eight written comment letters by mail and/or email, and four verbal comments were received at the scoping meeting.

1.4.3 Draft PEIR

This Draft PEIR has been prepared pursuant to the requirements of CEQA Guidelines Section 15126 and provides an analysis of reasonably foreseeable impacts associated with the construction and operation of the proposed Project. The environmental baseline for determining potential impacts is the date of publication of the NOP for the proposed Project unless otherwise indicated (CEQA Guidelines Section 15125(a)). The baseline setting for each environmental topic assessed in this Draft PEIR describes the existing conditions as of the publication of the NOP. The impact analysis is based on changes to existing conditions that would result due to implementation of the proposed Project.

In accordance with CEQA Guidelines Section 15126, Chapter 3 of this Draft PEIR describes the Project Area and the existing baseline environmental and regulatory setting, identifies potential direct and indirect, short-term, long-term, and cumulative adverse environmental impacts associated with proposed Project implementation, and identifies mitigation measures for potentially significant adverse impacts. Significance criteria are defined at the beginning of each impact analysis section for each environmental topic analyzed in this Draft PEIR.

1.4.4 Draft PEIR Public Review

This Draft PEIR will be circulated for review and comment by the public and other interested parties, agencies, and organizations for 45 days in accordance with CEQA Guidelines Sections 15087 and 15105. During the 45-day review period, this Draft PEIR, as well as appendices and all supporting materials and references, can be found at the OCWD website https://www.ocwd.com/working-with-us/public-notices/, at OCWD's front desk at 18700 Ward Street, Fountain Valley, CA, and at the following library locations during normal business hours.

OC Library – Heritage Park Regional Library
14361 Yale Avenue, Irvine, CA 92604
Hours of operation:
10 a.m.–8 p.m. Monday–Thursday
9 a.m.–5 p.m. Friday–Sunday

Delhi Center
505 E. Central Ave., Santa Ana, CA 92707
Hours of operation:
8:30 a.m.–8:00 p.m. (Monday, Tuesday, & Thursday)
8:30 a.m.–5:00 p.m. (Wednesday & Friday)
Closed on Saturday and Sunday

OC Library – Tustin Branch
345 E. Main Street, Tustin, CA 92780
Hours of operation:
10 a.m.–7 p.m. Monday–Thursday
9 a.m.–5 p.m. Friday–Sunday

Santa Ana Public Library – Newhope Branch
122 N. Newhope Street, Santa Ana, CA 92703
Hours of operation:
10 a.m.–8 p.m. Monday–Thursday
10 a.m.–6 p.m. Friday–Saturday
Closed on Sunday

Interested parties may provide written comments on the Draft PEIR and direct inquiries to:

Attention: Shawn Nevill
Orange County Water District
18700 Ward Street
Fountain Valley, CA 92708
Email: snevill@ocwd.com

Comments on the Draft PEIR must be received by close of business on the last day of the 45-day review period.

1.4.5 Final PEIR Publication and Certification

Once this Draft PEIR public review period has ended, OCWD will prepare written responses to all timely submitted comments. The Final PEIR will be comprised of this Draft PEIR, responses to comments received on this Draft PEIR, and any changes or corrections to this Draft PEIR that are made as part of the responses to comments. As the Lead Agency, OCWD will make the Final PEIR available for public review prior to it considering any final decision regarding approval of the proposed Project (CEQA Guidelines Section 15089(b)). The Final PEIR must be available to commenting agencies at least 10 days prior to certification (CEQA Guidelines Section 15088(b)).

Prior to considering the proposed Project for approval, OCWD will review and consider the information presented in the Final PEIR and will decide whether to certify that the Final PEIR has been adequately prepared in accordance with CEQA. Once the Final PEIR is certified, OCWD's Board of Directors may proceed to consider any final decisions regarding the proposed Project (CEQA Guidelines Sections 15090, 15096(f)). Prior to approving the proposed Project, OCWD must make written Findings in accordance with CEQA Guidelines Section 15091. In addition, OCWD must adopt a Statement of Overriding Considerations (SOC) concerning each significant environmental effect identified in the Final PEIR (if any) that cannot be fully mitigated to a less than significant level. If one is needed, then the SOC will be included in the record of the proposed Project's approval and mentioned in the Notice of Determination (NOD) following CEQA Guidelines Section 15093(c). Pursuant to CEQA Guidelines Section 15094, OCWD will file a NOD with the State Clearinghouse and County Clerk within five working days if the proposed Project is approved.

1.4.6 Mitigation Monitoring and Reporting Program

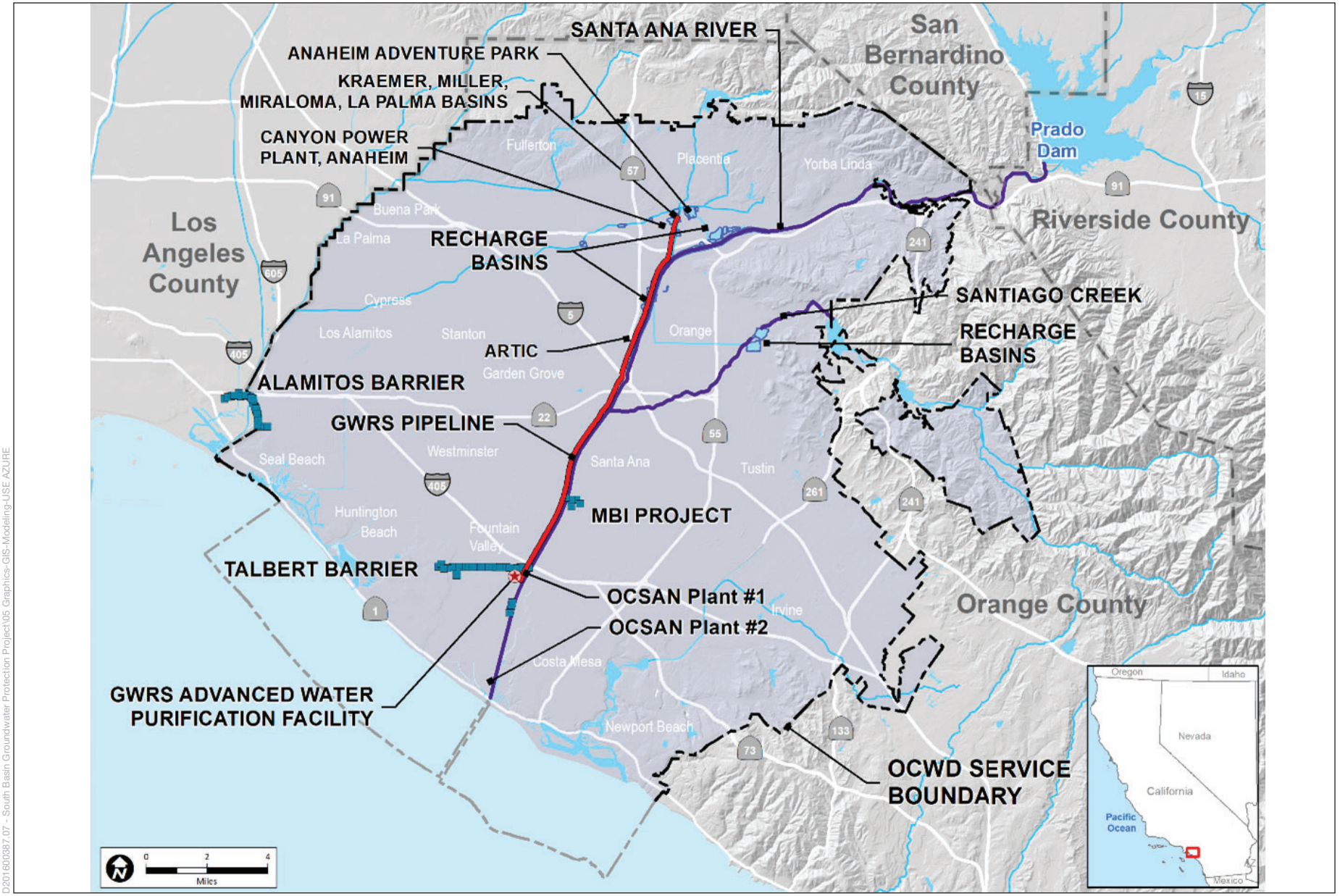
CEQA Guidelines Section 15097 requires Lead Agencies to "adopt a program for monitoring or reporting on the revisions which it has required in the project and the measures it has imposed to mitigate or avoid significant environmental effects". The mitigation measures, if any, adopted as part of the Final PEIR will be included in a Mitigation Monitoring and Reporting Program (MMRP) and implemented by OCWD.

CHAPTER 2
Project Description

2.1 Background

Orange County Water District (OCWD) was formed in 1933 by the California legislature to manage the Orange County Groundwater Basin (Basin), which comprises a 350-square-mile area underlying the central and northern portions of Orange County and provides 85 percent of the water supplies to 19 cities and retail water agencies and 2.5 million people (**Figure 2-1**). OCWD is authorized under the Orange County Water District Act (District Act) to manage the Basin, and one of the primary roles of OCWD is to manage the Basin's water quality to ensure safe groundwater supplies. OCWD's statutory powers include the powers to "transport, reclaim, purify, treat, inject, extract, or otherwise manage and control water for the beneficial use of persons or property within the district and to improve and protect the quality of the groundwater supplies within the district," to "provide for the protection and enhancement of the environment within and outside the district in connection with the water activities of the district," and to "expend available funds to perform any cleanup, abatement, or remedial work required under the circumstances which, in the determination of the board of directors, is required by the magnitude of the endeavor or the urgency of prompt action needed to prevent, abate, or contain any threatened or existing contamination of, or pollution to, the surface or groundwaters of the district" (District Act, §§ 2(6)(j), 2(7), 8(b)).

Groundwater contamination from industrial and manufacturing activities, underground storage tank leaks, waste disposal practices, and many other sources occurs in the Basin. In some instances, contamination from these sources may be isolated to localized areas and shallow portions of the groundwater system and does not threaten the deeper parts of the groundwater system from which existing drinking water supply wells pump. However, the Shallow Aquifer is designated as a municipal beneficial use supply source by the Santa Ana Regional Water Quality Control Board (RWQCB 2019 – Water Quality Control Plan Santa Ana River Basin, as amended) and is a valuable environmental resource worthy of protection from contamination. In addition, in some areas of the Basin where densely spaced industrial properties have been present for decades and have released chemicals to the groundwater, the groundwater contamination from these sites has migrated off the individual sites and merged to form extensive "commingled plumes" of contamination. In these cases, including the Project Area, the uncontrolled contaminant plumes have not been comprehensively contained or treated by responsible parties and, therefore, threaten the drinking water supply. The Project Area contamination is located within the southeastern part of the Basin and includes an approximately 5.6-square-mile area (Figure 1-1 and **Figure 2-2**) in the cities of Santa Ana, Irvine, and Tustin, California (City or collectively, the Cities). **Figure 2-3** provides a generalized cross-section of the South Basin aquifer system that shows the Shallow and Principal aquifers that comprise the relevant portion of the Basin.



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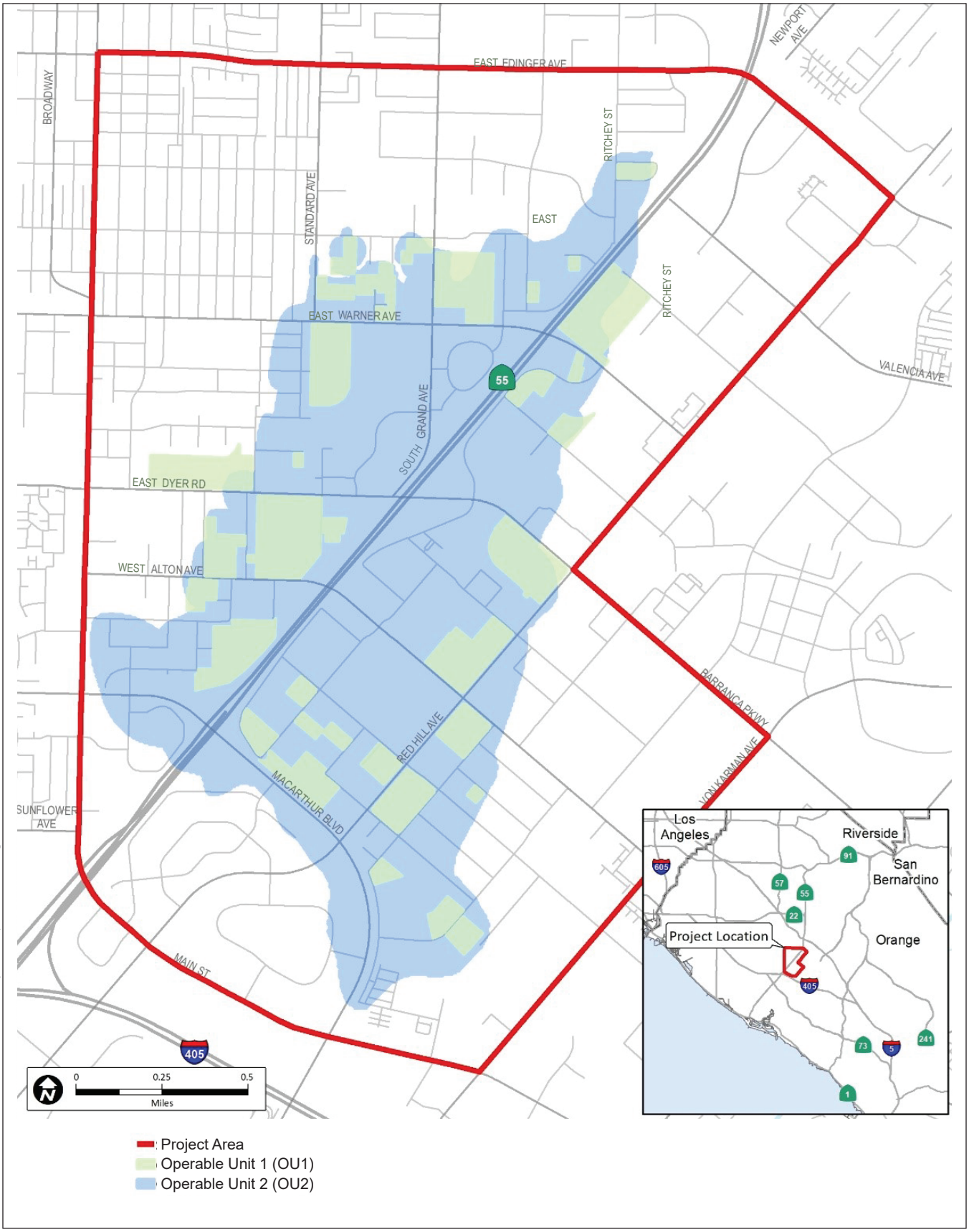
SOURCE: Orange County Water District, 2024

South Basin Groundwater Protection Project

Figure 2-1
OCWD Service Area and Groundwater Recharge Facilities

ESA



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SOURCE: Orange County Water District, 2024

South Basin Groundwater Protection Project

Figure 2-2
South Basin Groundwater Protection Project Study Area and Operable Units

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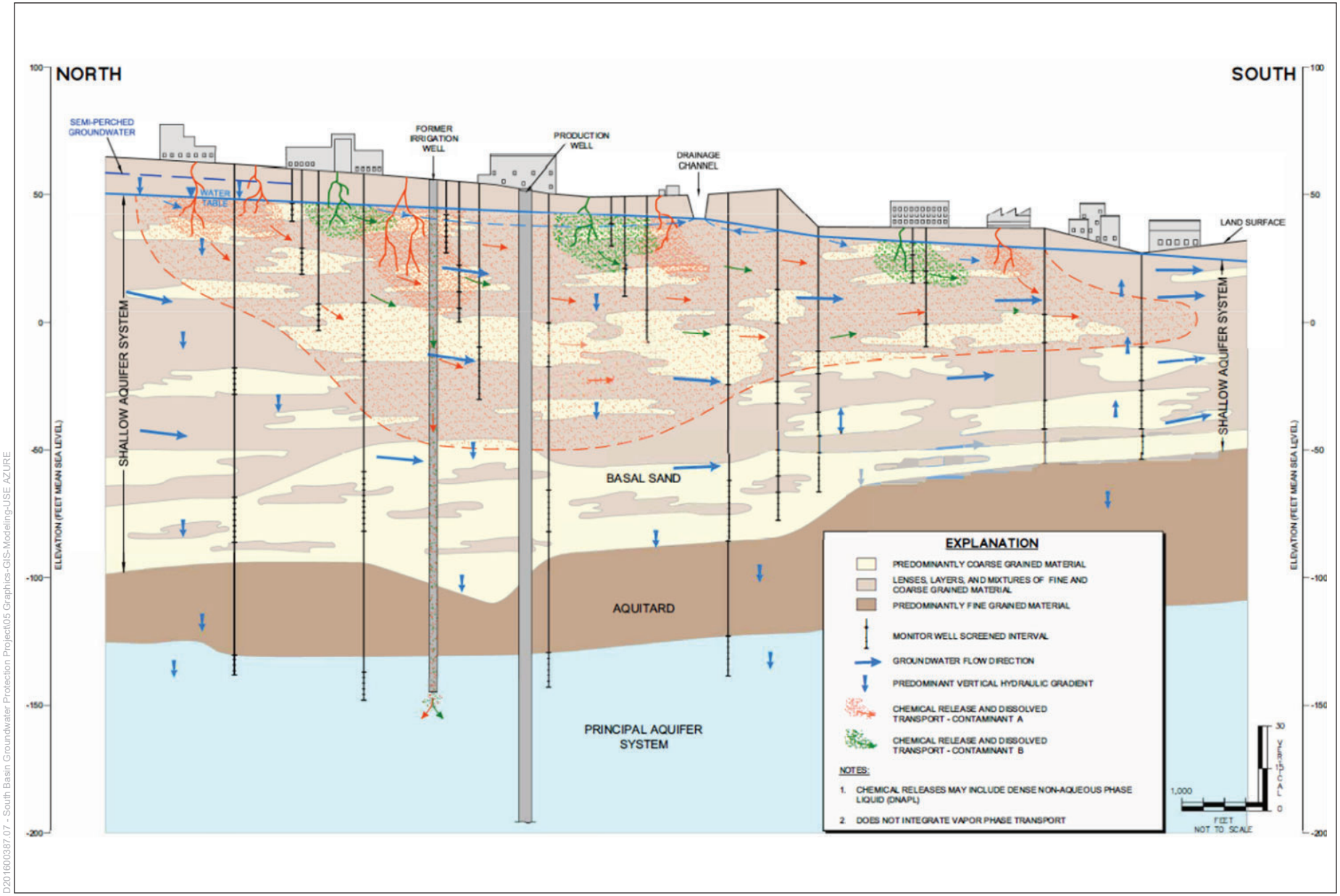

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SOURCE: Hargis and Associates, July 2020

South Basin Groundwater Protection Project

Figure 2-3

Aquifer Stratigraphic Profile and Contamination Schematice

ESA

The contamination in the Project Area has been divided into two operable units (OUs) depicted in Figure 2-2, which designate geographic areas, specific problems, or areas where a specific action is required. Operable Unit 1 (OU1) pertains to vadose zone and groundwater contamination in the Shallow Aquifer System directly beneath source properties (Aquilogic 2015). Operable Unit 2 (OU2) is groundwater contamination in the Shallow Aquifer System off-site of the source site properties and is the primary focus of this proposed Project.

From a remedial objectives standpoint, there is overlap between OU1 and OU2. For example, in some cases responsible parties are conducting groundwater remediation in areas outside the source area property boundaries. The proposed Project will account for these situations by locating and operating facilities in such a manner that minimizes overlap with and/or impact to other remedial efforts. In addition, while an objective of the proposed Project is to remediate groundwater contamination beyond source site boundaries, it may be necessary to locate proposed Project facilities on source site properties due to land availability, construction and operational requirements and constraints, hydrogeologic characteristics, contaminant distribution, surface water receptor locations, actions by responsible parties (or lack thereof), public safety, and other factors. These factors will be considered during the Project Design phase, in keeping with the Remedial Action Objectives listed in Section 2.3.

In 2004, following volatile organic compound (VOC) and perchlorate detections in water pumped from its well number 3 (IRWD-3), Irvine Ranch Water District (IRWD) requested that OCWD exercise its statutory authority to develop a plan to investigate and remediate groundwater contamination in the area encompassing IRWD-3. OCWD subsequently commissioned an investigation of contamination in the vicinity of IRWD-3 which resulted in 37 sites being identified as potential sources of tetrachloroethene (PCE), trichloroethene (TCE), and/or perchlorate (Todd, 2007). Following the identification of potential source sites, a series of remedial investigations by OCWD, including the installation of 39 groundwater monitoring wells and over 200 cone penetrometer test (CPT) soil borings, occurred between 2008 and 2020, and resulted in the South Basin Groundwater Protection Project's (SBGPP) *Preliminary Remedial Investigation Report, Operable Unit 2* (Aquilogic 2015) and *Supplemental Remedial Investigation Report, Operable Unit 2* (Hargis+Associates 2020).

In 2018, a technical advisory committee (TAC) was formed to oversee and advise OCWD on its Remedial Investigation (RI) and Feasibility Study (FS) activities in OU2 in compliance with the National Oil and Hazardous Substances Pollution Contingency Plan (National Contingency Plan or NCP) (40 Code of Federal Regulations [CFR], Part 300). The TAC members included the California Department of Toxic Substances Control (DTSC), the Santa Ana Regional Water Quality Control Board (Regional Board), and the State Water Resources Control Board (State Water Board). The TAC met regularly during the RI/FS process from 2018 to January 2023.

South Basin contaminants have been detected in OU2 at concentrations exceeding maximum contaminant levels (MCLs) in the groundwater in the Shallow Aquifer System above a depth of approximately 100 feet below ground surface (bgs). The chemicals of concern (COCs) within OU2 include TCE, PCE (also known as perchloroethylene), 1,1-dichloroethene (1,1-DCE), 1,4-dioxane, and perchlorate. Other constituents have also been detected above MCLs less frequently, including, but not limited to: 1,1-dichloroethane (1,1-DCA), 1,2-dichloroethane (1,2-DCA), cis-1,2-dichloroethene (cis-1,2-DCE), vinyl chloride, and hexavalent chromium (Cr[VI]). The distribution area of COCs in the Shallow Aquifer

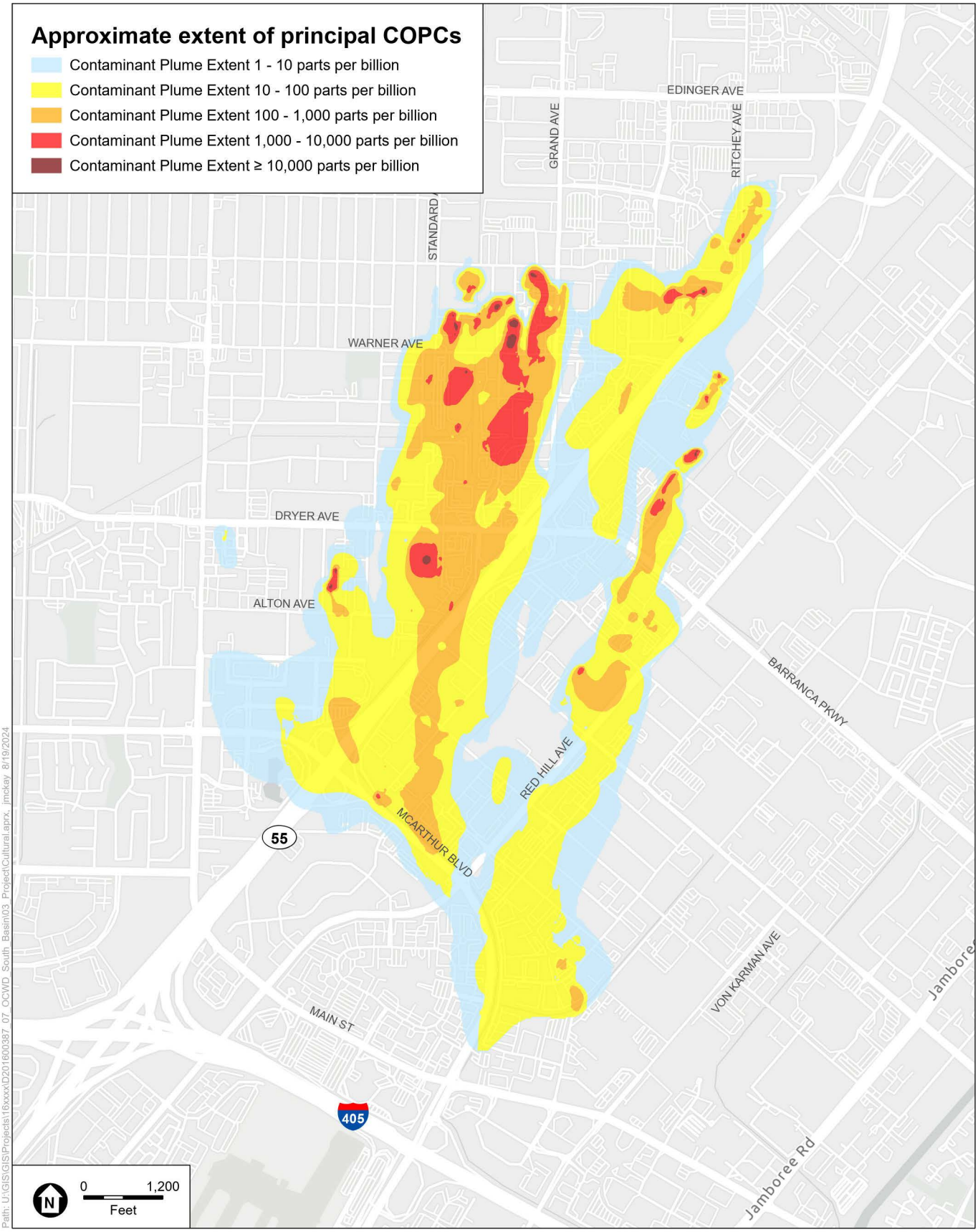
System exceeds 2 miles in length and 1 mile in width and is elongated in the general direction of groundwater flow, which is to the south-southwest. **Figure 2-4** shows the distribution of contaminant concentrations within the groundwater.

Following the remedial investigations, and with the input of the TAC, OCWD conducted a FS to provide a detailed evaluation and comparative analysis of remedial alternatives. As part of the FS process, a Feasibility Study Initial Screening Evaluation (FSISE) and Feasibility Study Detailed Evaluation (FSDE) were prepared to address groundwater contamination in OU2 (EA 2021a, 2021b). The FS was completed on January 27, 2023 (EA 2023) and evaluated six alternatives for remediation of OU2, which included the following:

- Alternative 1 – No Action
- Alternative 2 – Monitored Natural Attenuation
- Alternative 3 – Containment and Treatment of Relatively High Concentration and Leading-Edge Areas Using Groundwater Extraction and Treatment with Discharge to Public Owned Treatment Works (POTW) and Groundwater Replenishment System Advanced Wastewater Purification Facility (GWRS)
- Alternative 4 – Containment and Treatment of Relatively High Concentration and Leading-Edge Areas Using Groundwater Extraction and Treatment with Injection to the Basal Sand
- Alternative 5 – In-Situ Treatment of Relatively High Concentration and Leading-Edge Areas Using Chemical Oxidation
- Alternative 6 – Containment and In-Situ Treatment of Relatively High Concentration and Leading-Edge Areas Using Chemical Oxidation Combined with Groundwater Extraction and Treatment with Discharge to POTW and GWRS

Apart from Alternative 1 – No Action, each of the FS Alternatives also incorporates groundwater monitoring, institutional controls and sealing Legacy (abandoned) Water Wells, if located and accessible. OCWD selected Alternative 3 from the FS as the proposed Project to be analyzed in this Draft PEIR. Alternative 3 ranked the highest of the alternatives evaluated in the FS based on the following seven NCP evaluation criteria.

- Overall Protection of Human Health and the Environment
- Compliance with ARARs
- Long-Term Effectiveness and Permanence
- Reduction of Toxicity, Mobility, or Volume through Treatment
- Short-Term Effectiveness
- Implementability
- Cost



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SOURCE: Supplemental Remedial Investigation Report 2020; ESA, 2024.

South Basin Groundwater Protection Project

Figure 2-4
South Basin Ground Water Contamination Plume

ESA

A comparison of the estimated costs to construct and operate the FS alternatives selected for further analysis in this Draft PEIR is provided in **Table 2-1**. The operational costs assume a 30-year project duration.

TABLE 2-1
FS ALTERNATIVES OPERATIONAL COST

Alternative	Preliminary Design Investigation ($M)	Construction ($M)	Operation ($M)	Total Cost ($M)
1 – No Project (FS Alternative 1)	0	0	0	0
2 – ISCO (FS Alternative 5)	7.5	50.5	424.6	482.6
3 – GETS and Injection (FS Alternative 4)	3.6	31.3	43.6	78.5
Proposed Project (FS Alternative 3)	**3.1**	**11.5**	**31.2**	**45.7**

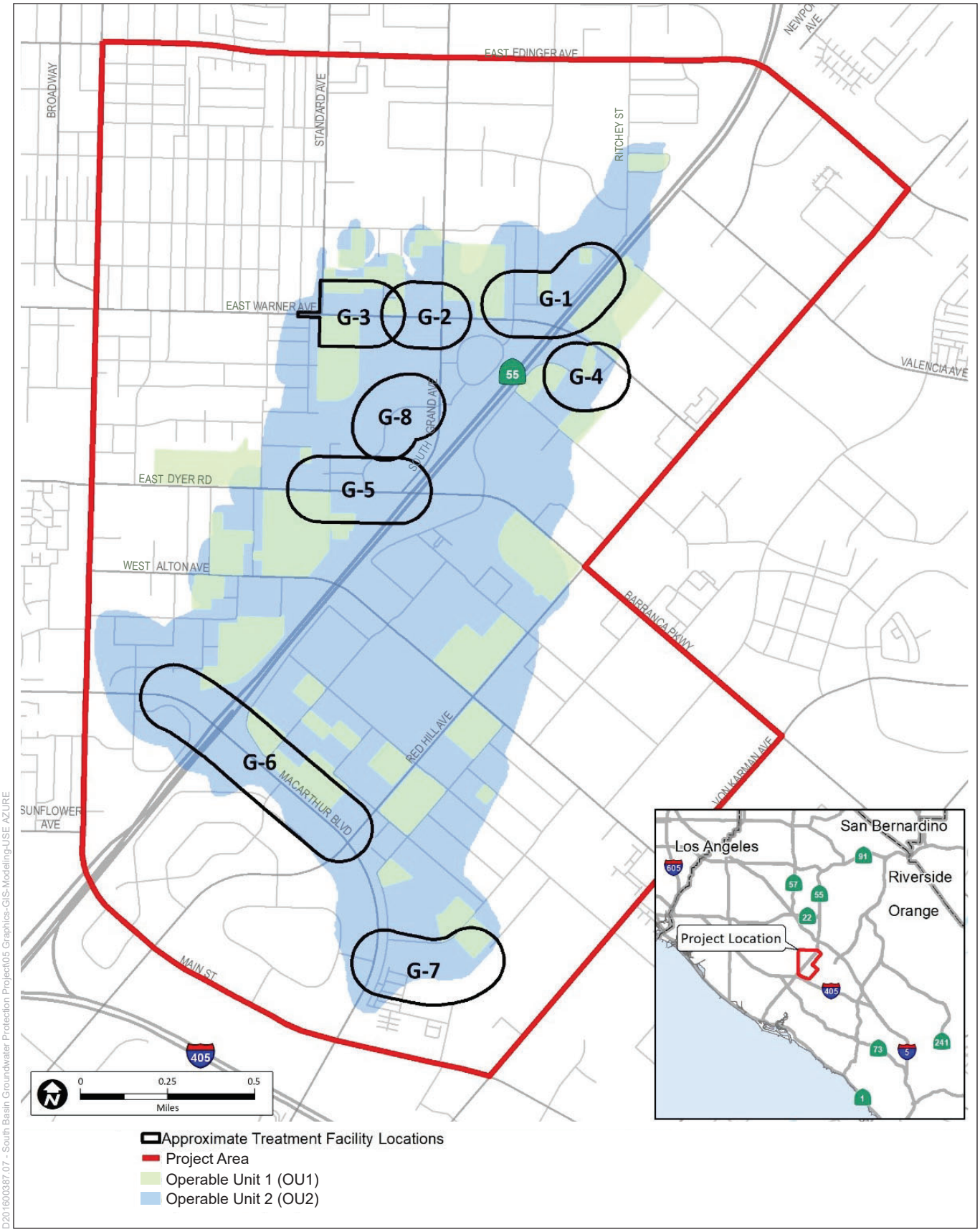
OCWD has prepared a proposed IRAP to summarize the information contained in the RI and FS, provide the public with a reasonable opportunity to comment on the preferred alternative for interim remedy as well as alternative plans under consideration, and to participate in the selection of the interim remedy in the Project Area. Pursuant to Sections 300.430(f)(2)–(4) of the NCP, OCWD must approve the IRAP following public and agency comment in order to adopt and implement FS Alternative 3 (the proposed Project).

2.2 Project Location and Setting

The Project Area (also referred to as the SBGPP Area, SBGPP Study Area, or Study Area in the IRAP and RI/FS) is located within the Coastal Plain of the Orange County Groundwater Basin (referred to herein as the "Orange County Groundwater Basin" or "Basin"). The Basin covers approximately 350 square miles and is bordered by the Puente and Chino Hills on the north, the Santa Ana Mountains on the east, and the San Joaquin Hills on the south. The Pacific Ocean lies to the southwest. The northwestern boundary is defined by the Orange County–Los Angeles County line.

The Project Area covers the OU2 portion of the South Basin, comprising approximately 5.6 square miles in the southeastern portion of the Basin (see Figure 2-2). The Project Area is east of the Santa Ana River and north of the San Joaquin Hills. The Costa Mesa Freeway (CA-55) crosses the Project Area between the Santa Ana Freeway (Interstate 5) on the north and the San Diego Freeway (Interstate 405) on the south.

The proposed Project would extract contaminated groundwater from OU2 and convey the water to local groundwater treatment plants. Once water is extracted from OU2 and treated, it will be discharged to the sanitary sewer system where it will be blended with other wastewater and transported via pipelines to the Orange County Sanitation District Reclamation Plant No. 1 (OC San Plant No. 1) located at 10844 Ellis Avenue, Fountain Valley, California. Following treatment at OC San Plant No. 1, the wastewater will be conveyed for advanced purification at OCWD's GWRS, at 18700 Ward Street, Fountain Valley, California (see Figure 2-1). The precise alignment of the pipelines and any necessary upgrades to the sanitary sewer system will be determined and will be subject to additional future environmental review at the project level prior to construction, but will be within the facility locations G-1 through G-8 depicted in **Figure 2-5**.



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SOURCE: Orange County Water District, 2024

South Basin Groundwater Protection Project

Figure 2-5
South Basin Approximate Facility Alignments and Operable Units

ESA

The highly purified recycled water that meets regulatory discharge requirements from GWRS is then transported via existing pipelines to (1) existing injection wells that are used to create a seawater intrusion barrier in the cities of Fountain Valley and Huntington Beach (Talbert Barrier), (2) percolation basins in Anaheim, where water naturally filters through sand and gravel to the underlying aquifers to increase the local drinking water supply (Recharge Basins), and (3) injection wells located in the City of Santa Ana that are used to replenish the aquifer (MBI Project) (see Figure 2-1).

2.3 Project Objectives

CEQA Guidelines Section 15124(b) requires that a project description contain "a statement of the objectives sought by the proposed project." In addition, Section 15124(b) further states that "the statement of objectives should include the underlying purpose of the project." The FS-defined Remedial Action Objectives (RAOs) for the groundwater Interim Remedial Measures (IRMs) are to protect human health and the environment with respect to the COCs that have migrated from multiple source properties and have commingled in OU2 of the Project Area, forming a large, dissolved contaminant plume (see Figure 2-4). Source sites (OU1) are indicated on Figure 2-5. Protection of human health is accomplished by preventing human ingestion of groundwater containing COCs exceeding MCLs/risk-based standards, and protection of the environment is accomplished by decreasing further degradation of the groundwater resource and maintaining surface water COC concentrations at levels that are protective of potential ecological receptors. The proposed Project has the same objectives as the FS RAOs and are presented as follows:

- Protect groundwater resources from further degradation by preventing lateral and vertical migration of high concentrations of chemicals of concern (COCs) into zones with lower concentrations of COCs within OU2;
- Protect groundwater resources by preventing the potential for vertical migration of high concentration COCs from the upper/middle portions of the Shallow Aquifer System to the Principal Aquifer System through Legacy Water Supply Wells;
- Protect groundwater resources from further degradation by preventing the spread of COCs exceeding MCLs in the leading-edge areas of the plume;
- Implement a reliable interim groundwater remedy(s) that is compatible with ongoing and planned remediation at source sites and associated off-property locations, where applicable;
- Prevent discharge of COCs exceeding ecological risk-based concentrations from the Shallow Aquifer System to surface water channels; and
- Prevent human exposure to contaminated groundwater with COC concentrations exceeding MCLs.

2.4 Project Components

The proposed Project is a groundwater extraction and treatment system (GETS) within the Project Area that would extract contaminated groundwater from the Shallow Aquifer System, treat the water locally, then discharge the treated water to the sanitary sewer system. The treated groundwater would then mix with other wastewater flows in the sewer, which ultimately flow to OC San Plant No. 1 in Fountain Valley, California. The extracted groundwater would undergo further treatment at OC San Plant No. 1

consistent with their existing sewer treatment programs before flowing to OCWD's GWRS where it will undergo its final advanced treatment consistent with existing GWRS treatment requirements, before being recharged back into the Basin at OCWD's existing recharge facilities identified in Figure 2-1. The proposed Project would include the installation and operation of below ground groundwater extraction facilities (wells, trenches, and/or drains equipped with pumps), conveyance piping, local groundwater treatment plants for sediment and VOCs removal using filtration and granular activated carbon (GAC), and discharge piping to the sanitary sewer system. The proposed Project will use the existing treatment facilities at the POTW and GWRS and will not require the construction of new treatment, transportation, or recharge facilities after the point that the treated water joins the sanitary sewer system. Figure 2-5 shows the general locations of the proposed Project infrastructure in Alignments G-1 through G-8 (Project Infrastructure).

The extraction facilities would be located and installed to create groundwater barriers to prevent the further migration and expansion of the contamination plume. The approximate alignments for the proposed Project infrastructure have been identified in Figure 2-5; however, the precise location, number, and configuration for each facility component (e.g., extraction wells, trenches, drains, pipelines, and treatment facilities) will be determined and subject to future environmental review during the project design phase (Remedy Design phase, discussed in Section 2.5.1, *Preliminary Design Investigation*, and Section 2.5.3, *Project Construction*, and Section 2.5.2, *Remedy Design*). As a result, this Draft PEIR will evaluate the proposed Project at a program level to determine whether OCWD will pursue Alternative 3 from the FS (Appendix E of this Draft PEIR), and future project-level CEQA analysis will be performed at the Remedy Design phase, when the design of the extraction facilities, pipelines, and local treatment facilities (Project Infrastructure) is completed, and specific implementing actions are identified.

Proceeding with a PEIR and selecting an interim remedy before designing the precise locations of the Project Infrastructure is necessary, both because of the significant investigation and design costs that must be incurred before a final design of the interim remedy can be reached, and because of the need to reach agreements with overlying landowners or exercise eminent domain to acquire suitable sites for operation of the Project Infrastructure. The process of acquiring sites and designing the Project Infrastructure cannot take place until a decision is made as to which of the alternatives OCWD is going to pursue.

2.4.1 Extraction Facilities

The proposed Project would comprise up to 8 groundwater extraction facility alignments consisting of a total of up to 100 extraction wells and up to 4 trenches and/or drains (extraction facilities). The extraction facilities would be equipped with submersible pumps to pump contaminated groundwater from three aquifer units of the Shallow Aquifer System that occur within the upper 100 feet from the ground surface in locations to contain the groundwater contaminant plume and achieve the proposed Project objectives and at the distal end of the commingled plume. The exact number and location of the extraction wells and/or trenches/drains will be determined during the Remedy Design phase after further detailed hydrogeologic investigations are performed along each proposed extraction alignment and land availability evaluations are conducted, see Section 2.5.1. However, the extraction alignments will be within the eight treatment facility locations G-1 through G-8 shown on Figure 2-5.

2.4.2 Monitoring Wells

In addition to the extraction facilities, up to 200 monitoring wells will be constructed to monitor the groundwater levels and quality in the areas of the extraction facilities and in the surrounding Project Area including areas outside of the groundwater treatment alignments G-1 through G-8. It is anticipated that the monitoring wells will be constructed to depths up to 130 feet bgs, however the exact depths of the monitoring wells will not be known until well construction occurs. For purposes of this evaluation, it can be assumed that monitoring wells will not exceed a depth of 130 feet bgs. The exact number and location of the monitoring wells are not known until further detailed hydrogeologic investigations are performed along each proposed groundwater extraction facility alignment and land availability evaluations are conducted (see Section 2.5.1).

2.4.3 Local Groundwater Treatment Plants

The proposed Project will also include local groundwater treatment plants to remove sediment and VOCs from the groundwater produced by the extraction facilities prior to discharge to the sanitary sewer. Up to 9 local groundwater treatment plants will be required. Each extraction well alignment will have one groundwater treatment plant located near the alignment, except for alignment G-6, in the vicinity of MacArthur Boulevard, which will have two treatment plants: one at each end of the alignment on either side of SR 55. Each treatment plant would be located within or near its respective alignment and would consist of a fenced concrete pad for a cartridge or bag filter to treat for sediment, up to two GAC vessels (lead-lag) to treat for VOCs, instrumentation and control panels, power drop and panel, and a tie-in to a local sewer lateral pipeline (estimated at 100 feet length). Total groundwater flow through each treatment plant will range from 1 to 100 gallons per minute, with the total combined flow from all treatment plants between 10 and 1,000 gallons per minute (see Section 2.5.3).

2.4.4 Conveyance Pipelines

Up to 25,000 feet of collection and discharge piping (conveyance pipelines) will be needed to collect and convey groundwater pumped from the extraction facilities to the local groundwater treatment plants and then to the sanitary sewer. Conveyance pipelines would primarily be underground with some piping occurring above ground at the entry points to the local groundwater treatment plants. The precise length and location of the conveyance pipelines will be determined during the Remedy Design phase.

2.4.5 Orange County Sanitation District and OCWD's Groundwater Replenishment System

The treated groundwater that is discharged from the local groundwater treatment plants to the sanitary sewer will mix with existing wastewater within the sewer system and flow to the existing OC San Plant No. 1 in Fountain Valley, California. Nearly Wastewater flows from OC San are sent to the GWRS advanced water treatment facility in Fountain Valley, California where they receive further treatment and ultimately are recharged back into the Basin at the recharge facilities shown in Figure 2-1, in compliance with RWQCB Order No. R8-2022-0050.

2.5 Project Implementation

The proposed Project will be implemented in three phases: (1) Preliminary Design Investigation (PDI), (2) Remedy Design, and (3) Remedy Construction. Phases 1 and 3 will go through their own environmental review, described in further detail below. It is anticipated that the design activities that take place during Phase 2 will not have any effect on the environment, and that the remedy design will be subject to environmental review in connection with Phase 3, before that design is approved by OCWD. Therefore, it is anticipated that no separate environmental review will be necessary for Phase 2. In the unlikely event that any activities are proposed during Phase 2 that could affect the environment (such as the performance of additional CPTs or the installation of additional monitoring facilities not approved in Phase 1), an appropriate environmental review will take place before such activities are approved.

2.5.1 Preliminary Design Investigation

Additional detailed site-specific hydrogeologic information (e.g., contaminant concentrations, groundwater extraction rates, and aquifer transmissivity) is needed to prepare the Remedy Design and will be collected through a PDI within the areas identified for groundwater extraction (see Figure 2-5 areas G-1 through G-8). The PDI will include the collection of soil and groundwater samples by direct-push, auger, and/or rotary-sonic drilling methods; test extraction wells and trenches; and monitoring wells. The PDI will include drilling between 350 and 600 soil borings, the installation of between 18 and 36 test extraction wells, one test trench/drain system, and between 25 and 50 monitoring wells.

The extraction facilities will be tested to measure local extraction rates, water quality, and water level data from areas G-1 through G-8 that will inform the Remedy Design. Some or all of the facilities constructed during the PDI will become part of the regulatory required interim remedy, as determined during Remedy Design. A description of the PDI facilities is included below.

Upon approval of the IRAP and this Draft PEIR by OCWD, a PDI work plan will be prepared and will include detailed plans and specifications for the soil borings and wells that will be part of the PDI. This Draft PEIR provides a foundation for any necessary future environmental review documents that focus on the location- and project-specific impacts associated with construction and operation of the extraction and treatment facilities. Prior to OCWD approval of the PDI work plan, OCWD will evaluate whether a tiered, subsequent, or supplemental environmental document is required under CEQA Section 21094 or 21166, and CEQA Guidelines Section 15162 or 15168.

PDI Soil Borings

Soil borings will be used to gather soil and groundwater data in the areas designated as G-1 through G-8. The soil borings may be performed using cone penetrometer tests (CPTs) or other direct-push investigative methods, hollow-stem auger, and/or rotary-sonic drilling methods. Soil boring locations will be selected based on data needs and may be on public and/or private property.

Construction logistics and long-term monitoring and maintenance logistics will be considered during the site selection process. Soil borings located in Santa Ana, Tustin or Irvine will be subject to any applicable city ordinances and regulations. Prior to mobilization, the contractor will be required to obtain soil boring permits from the Orange County Health Care Agency and, where necessary, encroachment permits from

the city in which the boring is located. Site access agreements will be pursued with owners of private property, as applicable.

Prior to mobilization of drilling equipment, an underground service alert will be conducted to mark the approximate location of buried utilities adjacent to each boring location. Additionally, the drilling contractor will conduct an air knife utility clearance at each borehole location before drilling starts. The air knife clearance will be completed to the diameter of the borehole necessitated by the drilling method and to a maximum depth of 10 feet.

Borehole drilling will be done using direct-push, rotary sonic, and/or hollow-stem auger drilling methods. For direct push, a 1- to 3-inch-diameter rod will be pushed into the subsurface to the desired depth where the collection of soil and/or groundwater samples will occur. For rotary-sonic drilling, boreholes will be drilled by rotating and vibrating a core barrel and steel casings (sonic casings) to the desired depth. A continuous formation core will be obtained during rotary-sonic drilling. Various diameter sonic casings (up to 12-inch diameter) will be utilized to maintain borehole integrity and to seal off individual aquifers encountered during drilling. For hollow-stem auger drilling, a 6- to 10-inch-diameter auger will be rotated into the subsurface to the desired depth. Soil and water sampling will occur using tools lowered into the hollow-stem auger drill pipe.

Once sampling is complete, the drilling equipment will be removed from the borehole and the boreholes will be backfilled with a bentonite and/or cement bentonite material that will be conveyed into the borehole from the bottom up to the ground surface, in accordance with California Well Standards. The ground surface will be repaired to match the existing surface (e.g., asphalt, concrete, landscaping).

Drilling wastes, including solids and fluids, will be contained on site during drilling and sampling. During demobilization for each site, all drilling waste will be disposed of in accordance with all applicable laws and regulations.

Work activity will primarily be during daylight hours; however, there may be a need for night work in some cases to accommodate local encroachment permit and property access requirements. It is anticipated that 4 to 12 hours will be required at each borehole location. The construction equipment required for borehole drilling will include but is not limited to a truck mounted direct-push drill rig and/or rotary drill rig and support truck equipped with an air compressor, pumps, concrete saws, and welders.

PDI Extraction Facilities and Monitoring Wells

Based on the results of the soil boring data, locations of test extraction facilities and associated monitoring wells will be identified for the purpose of providing the data necessary to support Remedy Design. As stated above, the PDI will include the installation of up to 36 test extraction wells (4- to 6-inch diameter), one test trench/drain system, and up to 50 monitoring wells (2- to 4-inch diameter).

The wells will be constructed in the same manner as those described in Section 2.5.3. The extraction facilities (wells or trenches) will be used to test extraction rates, water level drawdown, and water quality. Extraction testing would include pumping groundwater from each facility for up to 8 hours per facility. The pumped groundwater would be contained on site in above ground portable storage tanks. Groundwater levels would be measured during testing and groundwater samples would be collected. Once

testing is complete, the waste generated during the testing would be disposed of in accordance with local, state, and federal regulations.

At the conclusion of the PDI, the extraction facilities and monitoring wells constructed as part of the PDI would be incorporated into the final design of the interim remedy for use in the proposed Project.

2.5.2 Remedy Design

Following the completion of the PDI field work and data analysis, a Remedy Design will be prepared for the proposed Project and will include the number and location of monitoring wells, extraction facilities, local groundwater treatment plants, and conveyance pipelines. The development of the remedy design will include the following steps:

- Acquire the most recent monitoring results from each of the individual OU1 Source Sites.
- Determine the remediation status for each individual OU1 Source Site (proposed or operating, and what remedial method is being used [e.g., GETS, In situ, MNA], if any).
- Update the numerical groundwater flow model, incorporating the updated Source Site data, to develop a current plume map.
- Quantify the effect of each proposed extraction facility on each individual OU1 Source Site to minimize the potential adverse effects to remediation of the source site, if any. Adverse effects would include the following:
  - Changing the direction of groundwater flow such that contaminated groundwater would flow through currently uncontaminated or less contaminated portions of the aquifer.
  - Increasing the hydraulic gradient such that source sites that are implementing or are proposing to implement in situ remedial methods would lose containment and contaminated groundwater would flow through currently uncontaminated or less contaminated areas of the aquifer.

  Note that changes to groundwater flow direction or hydraulic gradient that would result in flow through portions of the aquifer that are as or more contaminated than the source site would not be considered an adverse effect.
- For those proposed Project extraction facilities identified in the PDI phase that are near OU1 remediation sites which have or plan a GETS remedial method that would cause an adverse effect to a Source Site, redesign the remedy by one or both of the following:
  - Reduce the pumping rate of the particular GETS alignment to a rate that prevents drawing contaminated groundwater through the portion of the aquifer that is less or not contaminated.
  - Relocate extraction facility components (i.e., wells, trenches, or drains) of the particular GETS alignment to a location that prevents drawing contaminated groundwater through a portion of the aquifer that is less or not contaminated.
- If the remedial method is changed, re-run the numerical groundwater flow model to verify the proposed remedy does not result in undesirable adverse effects. If undesirable adverse effects still occur, redesign the remedial method until undesirable adverse effects would not occur.

- As discussed further below in Section 2.5.5, *Adaptive Management*, the operation of the proposed Project would include Adaptive Management that would monitor the response of the aquifer to remedy operations and adjustments operations, as needed to most effectively achieve the RAOs.

Once selected, the Remedy Design would identify the specific project facilities, including the number, location, depth, length, and type of extraction facilities, monitoring wells, pipelines, and treatment plants. As discussed below, OCWD will then consider the adoption and construction of the Remedy Design.

2.5.3 Remedy Construction

The final design for the proposed Project's interim remedy will be adopted and constructed by OCWD following the completion of the PDI and Remedy Design phases. The interim remedy will comprise extraction facilities and monitoring wells, conveyance piping, local treatment plants, electrical connections, and instrumentation. Prior to approval of the final design and construction of the interim remedy, OCWD will evaluate the final design of the interim remedy and any changes that the final design makes to the interim remedy described below, and will determine whether a tiered, subsequent, or supplemental environmental document is required under CEQA Section 21094 or 21166 and CEQA Guidelines Section 15162 or 15168.

Extraction Facilities and Monitoring Wells

The proposed Project will include extraction facilities and monitoring wells. The extraction facilities will be used to pump contaminated groundwater from the Shallow Aquifer System and may include wells, trenches, and drains, depending on the individual site conditions. Monitoring wells will be used to measure water quality and water levels within the proposed Project Area, will be used to monitor the response of the Shallow Aquifer System to remedy operations.

Extraction facility and monitoring well locations will be selected based on monitoring and extraction needs and may be on public and/or private property. Construction and long-term monitoring and maintenance logistics will be considered during the site selection process as part of Remedy Design. Facilities will comply with any city ordinances and regulations for wells, treatment plants, or encroachment permits. Prior to mobilization, the contractor will be required to obtain mandatory Well Construction Permits from the Orange County Health Care Agency and, where necessary, encroachment permits from the city in which the extraction facility or conveyance pipelines is located.

The temporary construction area for extraction facilities and monitoring wells will be approximately 15 feet wide by 150 feet long. The permanent area required for the final extraction facility and monitoring wells will be approximately 5 feet by 5 feet, and depending on location will be either at grade or between 2 feet to 4 feet above grade.

Prior to mobilization of drilling and trenching equipment, an underground service alert will be conducted to mark the approximate location of buried utilities adjacent to each location. Additionally, the contractor will conduct an air knife utility clearance at each borehole location before drilling starts. The air knife clearance will be completed to the diameter of the borehole and to a maximum depth of 10 feet.

Drilling and well construction will be completed using either hollow-stem auger or rotary sonic drilling methods. For rotary-sonic drilling, boreholes will be drilled by rotating and vibrating a core barrel and steel casings (sonic casings) to the desired depth. A continuous formation core will be obtained during rotary-sonic drilling. Various diameter sonic casings (up to 12 inches diameter) will be utilized to maintain borehole integrity and to seal off individual aquifers encountered during drilling. For hollow-stem auger drilling, a 6- to 10-inch-diameter auger will be rotated into the subsurface to the desired depth. Soil and water sampling will occur using tools lowered into the hollow-stem auger drill pipe casing.

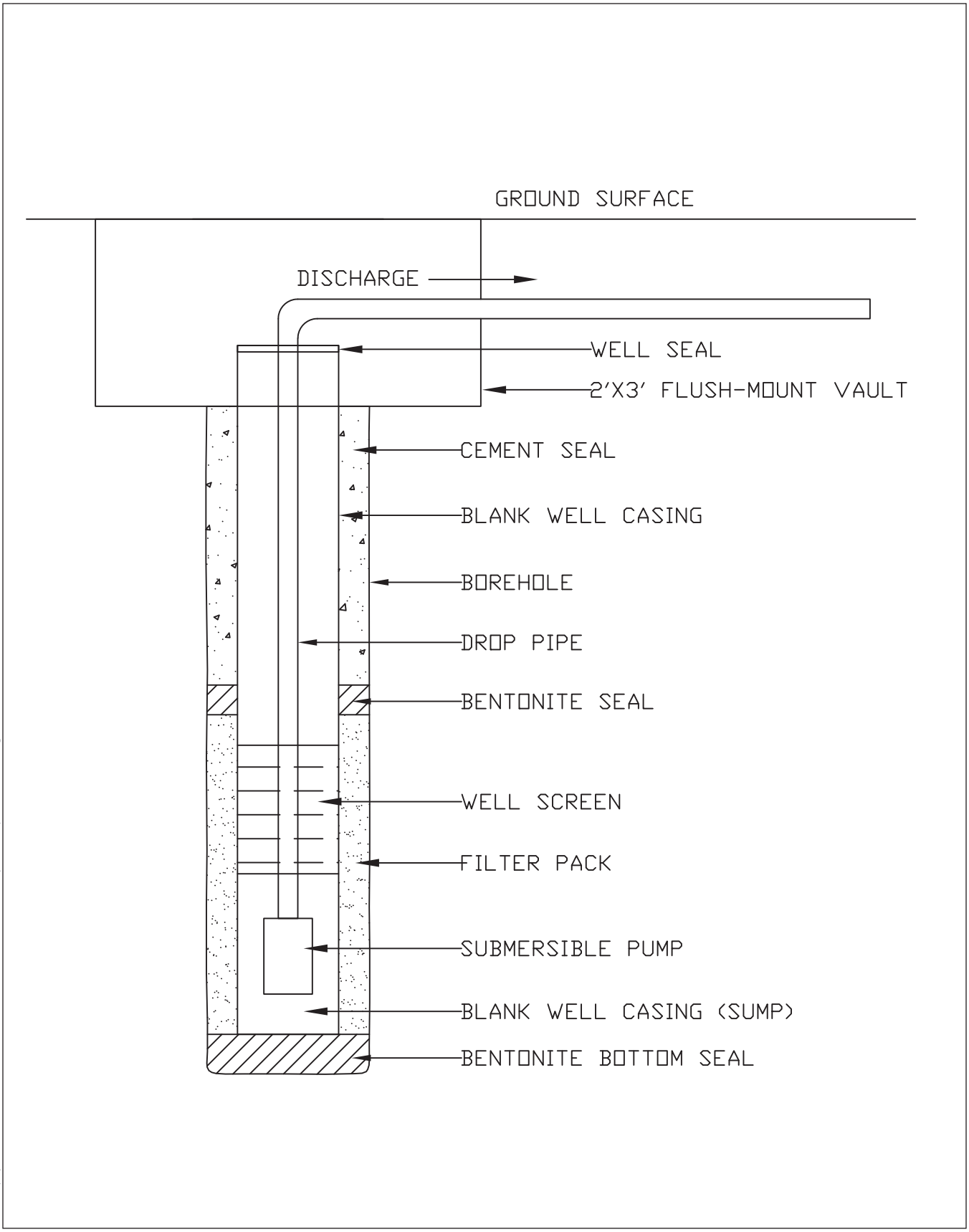
Each extraction facility (either well or trench) will have a 4- to 6-inch-diameter polyvinyl chloride (PVC) well casing and a 4- to 6-inch-diameter stainless-steel wire wrap screen. Each monitoring well will have a 2- to 4-inch-diameter PVC well casing and mill-slot screen. Both extraction facility and monitoring well screen length and slot opening width will be determined at completion of drilling after review of the continuous formation core. The well casing and screen will be suspended in tension inside the drill casing (e.g., sonic or hollow-stem auger). Backfill, such as filter pack and bentonite, will be conveyed into the annulus between the well casing and drill casing. Cement seal material will be pumped through a construction tremie installed to the top of previously placed backfill, and all drill casing will be removed.

The monitoring wells and extraction facilities will be developed utilizing a combination of line swabbing, bailing, and pumping to remove sediment and turbidity. Upon completion of development of the extraction facilities, a pump test will be conducted to obtain aquifer hydraulic characteristics such as hydraulic conductivity (permeability). Each extraction facility and monitoring well head will be contained in an above- or below-grade well cover or vault that is compatible with the surrounding land uses and remedy design. Extraction facilities will be equipped with electric submersible pumps that will require a dedicated electrical power supply, which will require underground electrical conduits connecting the well site to a power source. The elevations of all wells will be surveyed relative to the project datum.

Construction-derived solids and fluids will be contained onsite during well construction and development. During demobilization from each site, the contractor will dispose of all materials generated in accordance with all applicable laws and regulations.

Work activity will primarily be during daylight hours, however, there may be a need for night work in some cases to accommodate local encroachment permit requirements, as determined during the Remedy Design phase. It is anticipated that each well and/or associated trench construction would be approximately 10 to 15 days but would not exceed 60 days. The construction equipment required to develop and install a well includes but is not limited to a truck mounted drill rig, backhoe/track hoe, dump truck, air compressors, pumps, concrete saws, and welders. **Figure 2-6** shows a conceptual cross-section of an extraction well and monitoring well, **Figure 2-7** shows a picture of an access hatch to the underground well vault.

Truck and personnel ingress and egress will be required for each monitoring and extraction well site for groundwater level measurements, groundwater sampling, and operation and maintenance.



SOURCE: Orange County Water District

South Basin Groundwater Protection Project

Figure 2-6
Typical Well Cross-Section

ESA

D201600387.07

SOURCE: Orange County Water District, 2024

South Basin Groundwater Protection Project

Figure 2-7
Typical Extraction Well

ESA

Local Groundwater Treatment Plants

Local groundwater treatment plants would provide particulate filtration and VOC removal from extracted groundwater prior to discharge to the sewer. It is assumed that a total of up to nine local groundwater treatment plants will be required, one each for groundwater extraction Alignments G-1 through G-5, G-7, and G-8 and two for the longest alignment (G-6) along MacArthur Boulevard (see Figure 2-5). Each treatment plant's footprint will be between approximately 10 feet by 10 feet and 20 feet by 20 feet. The treatment plants will include a secure enclosure to protect the units from vandalism. A roof may be necessary in certain circumstances if requested by property owner or to screen views from the surrounding land uses. The roof height will not exceed 12 feet. **Figure 2-8** shows a picture of a typical treatment plant. Truck and personnel ingress and egress will be required for each treatment plant for operation and maintenance.

Conveyance Pipelines

The conveyance pipelines will be constructed with corrosion resistant materials (e.g., polyvinyl chloride (PVC), high-density polyethylene (HDPE) or fiber reinforced polymer (FRP)) between the newly installed groundwater extraction facilities, local groundwater treatment plants, and the existing sanitation sewer. The up to 25,000 feet of conveyance pipelines would vary in size from 3-inch to 10-inch HDPE depending on the amount of water being extracted and number of wells operating in series. Construction methods would include open-trench installation and possibly horizontal directional drilling or micro tunneling to avoid construction through busy intersections. Open trenches would be 4 to 6 feet wide and 6 to 12 feet deep. Excavation depths will vary depending on location of existing utilities. The main pipelines will be installed primarily within existing roadway rights-of-way to the extent feasible. However, pipeline laterals connecting the extraction wells and treatment units to the main pipelines will be installed on public or private property, depending on locations of the extraction wells and treatment units. Pipelines will be constructed according to best practices and standards. For open-trench installations in paved areas, pavement will be replaced according to applicable city standards. Work includes installation of all pipeline fittings, valves, and appurtenances, which includes underground vaults for operation and maintenance access. On average, 100 to 500 feet of pipeline will be installed per day. The construction equipment required to install the conveyance pipelines will include but not be limited to excavator, backhoe/track hoe, dump truck, paving equipment, rollers, and concrete saws.

Electrical and Instrumentation

The extraction well and treatment unit sites will require electrical and instrumentation installation. Electrical infrastructure may include installation of above and below ground high- and low-voltage wiring, transformers, switchgear, motor control centers, variable frequency drives, motor actuated valves, lighting and various conduits. All electrical and instrumentation equipment will be installed according to best practices and standards (e.g., National Electrical Manufacturers Association, Institute of Electrical and Electronics Engineers, etc.), and will be installed in weather resistant enclosures or small buildings.

D201600387.07

SOURCE: Orange County Water District, 2024

South Basin Groundwater Protection Project

Figure 2-8
Typical Treatment Plant

ESA

2.5.4 Operation and Maintenance

The proposed Project will be in operation for up to 30 years. Once operational, the monitoring wells and extraction facilities and treatment plants will require periodic maintenance and inspection to ensure the site and equipment are functioning properly, including ingress and egress for equipment and personnel. Monitoring well and extraction facility site visits will include groundwater level measurements, groundwater sampling, and equipment inspection and maintenance. Site inspections will survey the grounds and exterior appearance, exercise the active and standby electrical equipment, maintain the instrumentation conduct performance testing. The treatment systems will require periodic maintenance to include filter bag and cartridge replacements and GAC replacement. Once operation of the proposed Project is completed, project facilities will be decommissioned, equipment removed, underground facilities capped, filled, or destroyed.

2.5.5 Adaptive Management

During operations, the operation of the proposed Project may be modified using adaptive management. Adaptive management is a planned iterative process of decision making that uses monitoring data to evaluate the response of a system to the operation of a project. Adaptive management is based on an ongoing learning process that adjusts the parameters of a system to improve long-run treatment outcomes while avoiding undesirable results.

As previously discussed, the extraction facilities and monitoring wells will be monitored for groundwater flow direction, hydraulic gradient, and COCs concentrations in groundwater. The groundwater flow directions and hydraulic gradients will be periodically assessed to verify that the GETS is operating as planned and designed. In the event that groundwater flow directions and hydraulic gradients in an area do not respond to the GETS as predicted by the numerical groundwater flow model, and if the variation may result in an adverse effect on individual Source Sites (OU1) and their treatment system (see Section 2.5.2, *Remedy Design*, for discussion of undesirable effects), the operation of the GETS will be modified to avoid the undesirable effect. Modifications may include reducing the pumping rate of the particular extraction facility and/or relocating extraction facility components (i.e., wells, trenches, or drains). The changes will be designed to prevent drawing contaminated groundwater through portions of the aquifer that are less contaminated.

2.6 Project Alternatives

According to CEQA Guidelines Section 15126.6, an EIR must describe a reasonable range of alternatives to a proposed project that would feasibly attain most of the basic project objectives and would avoid or substantially lessen any of the proposed Project's significant environmental effects. Alternatives to the proposed Project were developed and analyzed in the FS and are summarized below. A detailed description and analysis of these project alternatives is provided in Section 4.

Alternative 1 – No Project Alternative. This alternative correlates with FS Alternative 1 and is included as a baseline alternative and does not include active remediation, institutional controls, sealing Legacy Water Supply Wells, or monitoring of groundwater quality or groundwater elevations within OU2.

Alternative 2 – In-Situ Treatment of Relatively High Concentration and Leading-Edge Areas Using Chemical Oxidation. This alternative correlates with FS Alternative 5 and would include installation of injection wells screened in all or portions of the aquifer layers within the Shallow Aquifer System and periodic application of In-Situ Chemical Oxidation (ISCO) using persulfate. This alternative will be referred to in this Draft PEIR as the ISCO Alternative. Dissolution of sodium persulfate results in the formation of the persulfate anion ($S_2O_8^{2-}$) and two sodium ions (Na^+). The persulfate anion is a strong oxidant, which itself can degrade many environmental contaminants or it can be catalyzed with various reactants to form the more powerful sulfate radical. This alternative would be applied at select and accessible locations within higher concentration and leading-edge areas of the plumes. ISCO would be applied in transects within relatively high COC concentration area to decrease lateral and vertical migration of high concentration COCs into zones with lower concentrations within OU2; decrease the threat of COC migration from the Shallow Aquifer System to the Principal Aquifer System through Legacy Water Supply Wells that cannot be located or properly destroyed; and begin to treat and reduce the concentration of COCs in OU2 groundwater. ISCO would be applied in leading-edge areas to control the spread of OU2 COCs and minimize discharge of COCs exceeding ecological risk-based concentration from the Shallow Aquifer System to surface water channels. Groundwater monitoring would be conducted to evaluate water quality, maintain compliance with permits, plans, or Orders, and to evaluate remediation progress.

Alternative 3 – Containment and Treatment of Relatively High Concentration and Leading-Edge Areas Using Groundwater Extraction and Treatment with Injection to the Basal Sand (GETS and Injection Alternative). This alternative correlates with FS Alternative 4 and would include installation of groundwater extraction wells screened in all or portions of the aquifer layers within the Shallow Aquifer System; installation of injection wells screened in Basal Sand within the Shallow Aquifer System; and construction of one aboveground treatment system(s) within the Project Area to treat all of the extracted groundwater prior to injection into the Basal Sand. This alternative will be referred to in this Draft PEIR as the GETS and Injection Alternative. This alternative would have extraction facilities and monitoring wells at the same locations with effectively the same performance as the proposed Project. It will differ from the proposed Project as it will have one centralized treatment plant and treated water would be reinjected into the Shallow Aquifer System. Extracted groundwater would initially be treated using UV light and hydrogen peroxide technology to reduce 1,4-dioxane to required treatment levels. Groundwater would then be passed through granular activated carbon (GAC) to treat the remaining COCs. Additional treatment to reduce total dissolved solids may also be performed. Treated water would then be injected into the Basal Sand which underlies the contaminated portions of the Shallow Aquifer System. Groundwater monitoring would be conducted to evaluate water quality, maintain compliance with permits, plans, or Orders, and to evaluate remediation progress.

2.7 Discretionary Actions

Regulatory agencies that may have approval authority over various proposed Project components are identified in **Table 2-2**.

TABLE 2-2
REGULATORY AUTHORIZATIONS

Agency	Type of Approval	Needed for
Caltrans District 12	Encroachment Permit	Conveyance pipelines under freeway overpasses
DTSC	Approval of IRAP	National Contingency Plan 40 Code of Federal Regulations [CFR], Part 300
Santa Ana RWQCB	NPDES Construction Stormwater Permit Stormwater Pollution Prevention Plan (SWPPP)	Construction on greater than one-acre, Clean Water Act State-wide General Construction Stormwater NPDES
	Approval of IRAP	National Contingency Plan 40 Code of Federal Regulations [CFR], Part 300
Orange County Health Care Agency	Well Permit	Well drilling
Cities of Irvine, Tustin and Santa Ana	Planning and Building Permit Encroachment Permit Public Works	Wells/pipelines/treatment
Orange County Sanitation District	Special Purposes Discharge Permit	Discharge groundwater to OC San
Orange County Flood Control District	Special Purposes Access and Discharge Permits	Access to and Discharge groundwater to County flood control facilities

CHAPTER 3
Environmental Setting, Impact Analysis, and Mitigation Measures

3.0 Introduction to the Analysis

In compliance with CEQA Guidelines Sections 15125 and 15126, Chapter 3 of this Draft PEIR provides an analysis of the significant environmental effects of the South Basin Groundwater Protection Project (proposed Project) with respect to existing baseline conditions. The baseline environmental conditions for the analysis included within this Draft PEIR are generally from October 2023 when the NOP was published, except where otherwise noted in each environmental section. The following environmental topics are assessed in detail in this chapter in accordance with CEQA Guidelines Appendix G:

- Aesthetics
- Air Quality
- Biological Resources
- Cultural Resources
- Energy
- Geology and Soils
- Greenhouse Gas Emissions
- Hazards and Hazardous Materials
- Hydrology and Water Quality
- Land Use and Planning
- Noise
- Transportation
- Tribal Cultural Resources
- Utilities and Service Systems

CEQA Guidelines Section 15128 requires that an EIR "contain a statement briefly indicating the reasons that various possible significant effects of a project were determined not to be significant and therefore were not discussed in detail in the EIR." The following environmental topics from CEQA Guidelines Appendix G are not discussed in detail in this Draft PEIR because no significant impacts could occur because of implementation of the proposed Project:

- Agricultural and Forestry Resources
- Mineral Resources
- Population and Housing
- Public Services
- Recreation
- Wildfire

The effects found not to be significant associated with these environmental topics are explained further below in Section 3.0.2, *Effects Found Not to Be Significant*.

3.0.1 Format of the Environmental Analysis

This Draft PEIR provides analysis of impacts for those environmental topics where it was determined in the NOP, or through subsequent analysis, that the proposed Project would result in "potentially significant impacts." Sections 3.1 through 3.15 discuss the environmental impacts that may result with approval and implementation of the proposed Project. The format of the environmental analysis for each environmental topic included in Sections 3.1 through 3.15 includes an environmental setting, regulatory framework summary, impact analysis and mitigation measures (if required), cumulative analysis and references.

"Significant effect" is defined by the CEQA Guidelines Section 15382 as "a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project including land, air, water, minerals, flora, fauna, ambient noise, and objects of historic or aesthetic significance. An economic or social change by itself shall not be considered a significant effect on the environment. A social or economic change related to a physical change may be considered in determining whether the physical change is significant."

Determining the severity of a project's impacts is fundamental to achieving the objectives of CEQA. The level of significance for each impact examined in this Draft PEIR was determined by considering the predicted magnitude of the impact to baseline environmental conditions against the applicable threshold. Thresholds were developed using criteria from the CEQA Guidelines and Appendix G Checklist; state, federal, and local schemes; local/regional plans and ordinances; accepted practice; consultation with recognized experts; and other professional opinions.

The assessment of each issue area begins with any relevant baseline setting information that is needed to provide context for the impact analysis that follows. Extraneous setting information that does not shed light on the impact analysis is not included in this Draft PEIR.

The impact analysis includes any necessary description of methodologies used and the "significance thresholds," which are those criteria adopted by the State, County, City, or other agencies, universally recognized, or developed specifically for this analysis to determine whether potential effects are significant. Each effect under consideration for an issue area is separately listed with the discussion of the effect and its significance following. Each potentially significant impact includes a numbered impact statement and significance determination.

Following each environmental effect discussion is a list of mitigation measures (if required) and the residual effects or level of significance remaining after the implementation of the measures. In those cases, where the mitigation measure for an impact could have a significant environmental impact in another issue area, this impact is discussed as a residual effect.

Environmental Setting and Baseline

In accordance with CEQA Guidelines Section 15125(a), the environmental setting contains a description of the regional and local physical environmental conditions in the proposed Project vicinity at the time of the publication of the NOP. This environmental setting constitutes the baseline physical condition against which the implementation of the proposed Project is assessed to determine whether an environmental

impact would occur (CEQA Guidelines Section 15126.2(a)). Individual resource sections may use alternative baselines, as discussed in each respective section.

Regulatory Framework

Where the Project Area and/or surrounding area falls within the jurisdiction of federal, state, and local regulatory agencies, the proposed Project would be subject to the laws, rules, regulations, and policies of those agencies. These regulations are intended to guide development, reduce adverse effects on sensitive resources, and/or offer general guidance on the protection of such resources. The regulatory framework section summarizes the applicable laws, rules, regulations, and policies for the proposed Project. These rules may also set the standards, in the form of significance criteria or thresholds of significance as discussed below, by which the potential impacts of the proposed Project are evaluated.

Impact Analysis and Mitigation Measures

Significance Criteria and Methodology

This section presents the significance criteria against which potential impacts are evaluated. As defined by CEQA Guidelines Section 15064.7(a), thresholds of significance are an identifiable quantitative, qualitative, or performance standard for the assessment of a particular environmental impact. Significance criteria are included for each environmental topic.

Impact Analysis

This section provides an analysis of the potential environmental impacts that could result from implementation of the proposed Project. This Draft PEIR addresses the direct, indirect, short-term, long-term, and cumulative impacts associated with implementation of the proposed Project.

The level of significance for each environmental impact examined in this Draft PEIR was determined by considering the predicted magnitude of the impact in relation to baseline environmental setting and the applicable regulatory requirements, measured against the significance criterion. Based on the significance criterion, the significance of each potential environmental impact is determined according to the following categories:

- **Significant and Unavoidable:** A significant and unavoidable impact is a substantial adverse effect on the environment that cannot be reduced to below a significance threshold given reasonably available and feasible mitigation measures. A project with significant and unavoidable impacts could still proceed, but OCWD would be required to prepare a Statement of Overriding Considerations, pursuant to CEQA Guidelines Section 15093, explaining why OCWD would proceed with the proposed Project despite the potential for a significant environmental impact.
- **Less than Significant Impact with Mitigation:** A potentially significant impact occurs if the proposed Project could result in a potentially substantial adverse change in the physical conditions of the environmental topic being evaluated. If such a determination is made, reasonably available and feasible mitigation measures must be considered if they would avoid or substantially reduce the significant impact. An impact that can be reduced to below the significance threshold with such mitigation measures is considered less than significant with mitigation. Such an impact requires findings to be made under CEQA Guidelines Section 15091.

- **Less than Significant Impact:** A less than significant impact is an impact that may be adverse but does not exceed the significance threshold and does not require mitigation measures. However, mitigation measures that could further lessen the environmental effect may be suggested if readily available and easily achievable.
- **No Impact:** A no impact determination would occur if the proposed Project would not result in a substantive change to the environmental topic that is being evaluated.
- **Beneficial Impact:** An effect that would enhance existing environmental conditions or reduce existing environmental problems or hazards.

Mitigation Measures and Significance Determination

Mitigation measures are recommended for any identified potentially significant impacts because of the proposed Project. The significance determination provides the level of significance after the implementation of recommended mitigation measures, if applicable, based on the categories described above.

References

References used for the analysis of each environmental topic addressed in this Draft PEIR are included at the end of each subsection.

3.0.2 Effects Found Not to Be Significant

Agriculture and Forestry Resources

The Project Area is not located on land designated as Prime Farmland, Unique Farmland, Farmland of Statewide Importance; land zoned for agricultural use, forest land, timber land; or land under a Williamson Act Contract. The proposed Project would be constructed on land designated by the California Department of Conservation's (DOC) Farmland Mapping and Monitoring Program (FMMP) as Urban/Built Up Land. Therefore, the proposed Project would not result in a significant impact to Agricultural and Forestry Resources. No impact would occur.

Mineral Resources

According to the General Plans of the cities of Santa Ana, Tustin, and Irvine, the Project Area is not identified as a known mineral resource zone and does not have a history of mineral extraction uses. Therefore, the proposed Project would not result in a significant impact to Mineral Resources. No Impact would occur.

Population and Housing

The proposed Project is a groundwater remedial project and does not include the construction of new housing. As such, the proposed Project would not directly induce population growth that is not accounted for by the cities of Santa Ana, Tustin, and Irvine and would not induce population growth or displace people or housing. No impact would occur.

Public Services

The proposed Project would not result, directly or indirectly, in an unplanned increase in population. Because the proposed Project is a groundwater remedial project that would not include any habitable structures, the proposed Project would not require the construction or expansion of public facilities which might have an adverse physical effect on the environment. No impact would occur.

Recreation

As discussed above, the proposed Project would not result, directly or indirectly, in an unplanned increase in population. In addition, no above ground facilities would be proposed within areas with recreational facilities that would permanently remove an existing recreational facility. Because the proposed Project is a groundwater remedial project, the proposed Project would not require the construction or expansion of additional recreational facilities which might have an adverse physical effect on the environment. No impact would occur.

Wildfire

The General Plans of the cities of Santa Ana, Tustin, and Irvine do not identify the Project Area as being within a Fire Hazard Severity Zone in a State Responsibility Area and does not have a history of wildfire events. Therefore, no impact would occur because of Wildfire.

3.0.3 Cumulative Impacts

This section includes a list of the projects used as the basis for the discussions of cumulative impacts throughout Chapter 3 of this Draft EIR. CEQA Guidelines Sections 15126 and 15130 provide that EIRs consider the significant environmental effects of a project, as well as "cumulative impacts." Cumulative impacts are two or more individual effects that may not individually represent a significant impact, but which may, when considered together, be considerable or compound or increase other environmental impacts (CEQA Guidelines Section 15355). In accordance with CEQA Guidelines Section 15130, discussion of cumulative impacts should be guided by standards of practicality and reasonableness and could include any of the following:

- A list of past, present, and probable future projects producing related or cumulative impacts, including, if necessary, those projects outside the control of the agency; or
- A summary of projections contained in an adopted general plan or related planning document, or in a prior environmental document which has been adopted or certified, which described or evaluated regional or area wide conditions contributing to the cumulative impact.

For the purposes of the cumulative impacts analysis for the proposed Project, OCWD has opted to use the list approach for evaluating cumulative effects. **Table 3-1**, *Cumulative Projects*, provides a list of projects identified as potentially relevant for study in this Draft PEIR. This list includes 61 proposed, recently approved, under construction, and/or reasonably foreseeable projects that could combine to cause a cumulative impact on the local environment and is based on information on file at the OCWD, County of Orange, as well as the Cities of Irvine, Santa Ana, and Tustin. The projects in the list include a variety of land uses including commercial/retail, residential, office, warehouse, medical, educational, and industrial uses. An analysis of the cumulative impacts associated with these projects and the proposed Project is

provided in the cumulative impact discussion under each individual impact category in Chapter 3 of this Draft PEIR.

TABLE 3-1
CUMULATIVE PROJECTS

Project Name or Number Address/Location	Project Status	Land Use Data	
		Land Use	Size
Orange County Water District (OCWD)			
PFAS treatment systems design	Proposed	Public Works/ Infrastructure	N/A
MF West Concrete Ceiling Spall Repairs	Proposed	Public Works/ Infrastructure	N/A
Inspection Services Construction of OCWD BS29 Monitoring Well Cluster	Proposed	Public Works/ Infrastructure	N/A
2024 Shallow Aquifer Monitoring Wells	Proposed	Public Works/ Infrastructure	N/A
Construction of OCWD-BS29 Monitoring Well Cluster	Proposed	Public Works/ Infrastructure	N/A
Destruction of Monitoring Wells, GBM-2024-1	Proposed	Public Works/ Infrastructure	N/A
Talbert Barrier Well Redevelopment, TAL-2024-1	Proposed	Public Works/ Infrastructure	N/A
County of Orange (OC)			
N/A	N/A	N/A	N/A
City of Irvine (I)			
Congregate Care Facility	Approved	Care Facility	424,113 GSF
Diamond Jamboree Expansion	Approved	Retail/Parking Structure	23,016 GSF with 477 parking spaces
Infinity Community Base Services/17702 Cowan	Approved	Care Facility	N/A
McGaw Residential	Approved	Residential	184 units
15 Degrees South	Approved	Residential	150 apartments on 3.7 acres
Home 2 by Hilton Hotel	Approved	Hotel	172 rooms
17850 Von Karman	Approved	Commercial Office	240,856 GSF
Towneplace Hotel	Approved	Hotel	165 rooms
Park Place Office Building	Approved	Commercial Office	199,000 GSF
Elements Sign Program Modification	Approved	Sign Modification	N/A
Landmark	Approved	Hotel and Office Building	386 room hotel and 448,000 GSF office
2152–2182 Alton	Under Construction	Residential	357 units on 10.2 acres
Pistoia Apts	Under Construction	Residential	371 units on 4.8 acres
2525 Main Street	Under Construction	Residential	272 apartments on 3.6 acres
2055 Main Street	Under Construction	Residential	178 Apartments on 2.2 acres
17822 Gillette	Under Construction	Residential	137 condominiums on 6 acres
Central Park West	Under Construction	Residential	1,275 condominiums

Project Name or Number Address/Location	Project Status	Land Use Data	
		Land Use	Size
Elements Phase 1A (Wood Building)	Under Construction	Mixed Use	1,600 units, 8,500-17,000 GSF of retail/restaurant uses, and 8,000-22,000 GSF of retail and commercial uses
Milani Apartments	Under Construction	Residential	287 apartments on 3.7 acres
Volar Residential	Under Construction	Residential	876 apartments on 12.6 acres
BrightView Manufactured Structure	Proposed	Manufacturer	1,400 GSF manufactured structure
FSE LA Automotive Repair	Proposed	Automotive	N/A
Harbor Freight Tools	Proposed	Retail	14,800 GSF
Westcliff Early Learning Academy	Proposed	Childcare	N/A
Mankind Physical Therapy	Proposed	Health Care	N.A
Chapman Baseball Compound	Proposed	Health Care	N/A
Camden Apartments Sign Program Modification	Proposed	Sign Modification	Sign program
Pacific Care Sign Program Modification	Proposed	Sign Modification	Wall sign
Boden Autohaus	Proposed	Automotive	N/A
Mandir Cultural Center	Proposed	Worship	N/A
Brainy Actz Escape Room	Proposed	Commercial	N/A
Radiant Health Centers	Proposed	Health Care	N/A
Irvine Concourse Sign Program Modification	Proposed	Sign Modification	Monument sign
Intersect Office Complex Restaurant	Proposed	Retail Restaurant	3,750 GSF
Concourse Sign Program Modification	Proposed	Sign Modification	Sign program
Park Place Program Modification	Proposed	Sign program	Sign program
Quartz Office Building Master Plan	Proposed	Commercial Office	16,538 GSF
Chick-fil-A	Proposed	Restaurant	N/A
2151 Michelson Sign Program	Proposed	Sign Modification	Master sign program
Cooley Alternative Health Care	Proposed	Health Care	N/A
The Alignment Studio	Proposed	Health Care	N/A
City of Santa Ana (SA)			
Standard-McFadden Park (Gerardo Mouet)	Under Construction	Park	N/A
SR-55 Widening Water Location Improvements	Under Construction	Public Works/ Infrastructure	N/A
Misc. Storm Drain Repairs	Under Construction	Public Works/ Infrastructure	N/A
Grand Ave Rehabilitation Warner – Edinger	Under Construction	Public Works/ Infrastructure	N/A
Misc. Storm Drain Repairs	Under Construction	Public Works/ Infrastructure	N/A
Traffic Calming Improvements PH1	Under Construction	Public Works/ Infrastructure	N/A
Warner Avenue Improvements from (Main to Oak)	Under Construction	Public Works/ Infrastructure	N/A

Project Name or Number Address/Location	Project Status	Land Use Data	
		Land Use	Size
Misc. Storm Drain Repairs FY-22-23	Under Construction	Public Works/ Infrastructure	7 storm drains
Main St Rehabilitation from MacArthur – Dyer	Under Construction	Public Works/ Infrastructure	N/A
Warner Redhill Mixed-Use Development (Formerly The Bowery)	Under Construction	Industrial, Office	14.58 acres, 212,121 GSF of industrial, warehousing, office buildings, parking areas, landscaping
Garry Avenue Business Park	Proposed	Industrial	91,500 GSF industrial warehouse
Park 55 Industrial Redevelopment Project	Proposed	Industrial	Three industrial buildings; 69,300 GSF, 47,300 GSF, and 59,400 GSF
Legado at the Met	Proposed	Residential	278 units, 612–1,783 GSF
City of Tustin (T)			
PFAS Treatment Facility	Under Construction	Public Works/ Infrastructure	Prospect Ave to East Main St

SOURCES: OCWD, Orange County Public Works Department, City of Irvine Building and Safety Department, City of Santa Ana Public Works Department, and City of Tustin Planning Department

ABBREVIATION: GSF = gross square feet

3.1 Aesthetics

This section addresses the aesthetics impacts associated with construction and implementation of the proposed Project. This section includes a description of the existing aesthetics conditions at the Project Area; a summary of applicable regulations related to aesthetics; and an evaluation of the potential impacts of the proposed Project related to aesthetics at the Project Area and in the surrounding area, including cumulative impacts.

3.1.1 Environmental Setting

Regional Setting

The proposed Project is in OCWD's service area in the County of Orange. Orange County encompasses approximately800 square miles of land, surrounded by Los Angeles County to the west-northwest, San Bernardino County to the north, Riverside County to the east, and San Diego County to the southeast. The Project Area covers an approximately 5.6-square-mile area within Orange County in the cities of Irvine, Santa Ana, and Tustin. The Project Area is bordered by the Puente and Chino Hills on the north, the Santa Ana Mountains on the east, and the San Joaquin Hills on the south (see Figure 2-1). The Pacific Ocean lies to the southwest. Visual resources consist of natural landscapes and scenic views, including landforms, vegetation, and water features, as well as unique or historic elements of the built environment. Long-range scenic views are provided from many public vantage points within Orange County.

Local Setting and Local Visual Character

The Project Area, which contains portions of the cities of Irvine, Santa Ana, and Tustin, is characterized by urbanized development, including residential, mixed land, commercial, and industrial uses. The proposed Project includes extraction facilities and monitoring wells, groundwater treatment plants, and conveyance pipelines throughout the Project Area. The visual character of areas surrounding the proposed Project is described generally below.

Extraction Facilities and Monitoring Wells

The proposed Project would include the construction of extraction wells, monitoring wells and trenches and or drain facilities (extraction facilities) within eight extraction alignments within the Project Area. The exact number and location of the extraction facilities and monitoring wells will be determined after further detailed hydrogeologic investigations are performed along each proposed extraction facilities alignment and land availability evaluations are conducted as determined during the Remedy Design Phase. The temporary construction area for extraction facilities and monitoring wells would be approximately 15 feet wide by 150 feet long. The permanent area required for the final extraction facility and monitoring well would be approximately 5 feet by 5 feet, depending on location the monitoring wells would be either at grade or between 2 and 4 feet above grade. In addition to the extraction facilities, approximately 84 monitoring wells would be constructed to monitor the groundwater levels and quality in the areas of the extraction facilities and in the surrounding Project Area and not just confined to the groundwater treatment alignments. The exact number and location of the monitoring wells are not currently known until further detailed hydrogeologic investigations are performed along each proposed extraction facilities alignment and land availability evaluations are conducted as determined during the Remedy Design Phase. Figure 2-7 shows a picture of a typical extraction well.

It is anticipated that each well's construction duration would be approximately 10 to 15 days but would not exceed 60 days. Well locations will be selected based on monitoring and extraction needs and may be in public and/or private property. These potential future well sites are located in areas with commercial and industrial development.

Local Groundwater Treatment Plants

The proposed Project would include the construction of local groundwater treatment plants. It is anticipated that each extraction facility alignment will have one groundwater treatment plant located within the alignment, except for the alignment in the vicinity MacArthur Boulevard of which will have two treatment plants. Each treatment system's footprint would be between approximately 10 feet by 10 feet and 20 feet by 20 feet. The treatment plants will include a secure enclosure to protect the units from vandalism. A roof may be necessary in certain circumstances if requested by property owner or to screen views from surrounding land uses. Figure 2-8 shows a picture of a typical treatment plant. Truck and personnel ingress and egress will be required for each treatment plant for operation and maintenance.

Conveyance Pipelines

The proposed Project would include the construction of conveyance pipelines to collect and convey groundwater pumped from the extraction facilities to the local groundwater treatment plants and then to the sanitary sewer. Conveyance pipelines would primarily be underground with some piping occurring above ground at the entry points to the treatment plant. Pipelines would be installed primarily within existing roadway rights-of-way to the extent feasible. It is possible that some pipelines would be implemented within undeveloped land or open areas.

Scenic Vistas

The City of Irvine Draft General Plan Update and Environmental Impact Report, Aesthetics Element (2024) defines scenic vistas as a view of undisturbed natural lands exhibiting a unique or unusual feature that comprises an important or dominant portion of the viewshed, and may also be represented by a particular distant view that provides visual relief from less attractive views of nearby features. Some prominent landforms in the city include the Santiago Hills, northern flatlands, central flatlands, and San Joaquin Hills. The Santiago and San Joaquin Hills have ridgelines that can be seen from various vantage points within Irvine, while views of the flatlands and the Pacific Ocean can be seen from the higher elevations (City of Irvine 2024). Some notable natural resources and landforms discussed in the Santa Ana General Plan Program Environmental Impact Report, Aesthetics section (2021) include certain stretches of Santiago Creek and the Santa Ana River. There are no scenic vistas or resources that are officially identified or designated within the City of Tustin; however, the Conservation/Open Space/Recreation Element of the General Plan notes that consideration will be given to protecting public views along the ridge lines, inland mountains, and along scenic transportation corridors as new development is considered (City of Tustin 2018).

Scenic Highways and Routes

There are no Officially Designated Scenic Highways within the Project Area (Caltrans 2024). The nearest Scenic Highway is State Route (SR) 91, approximately 8 miles north of the Project Area. The Irvine General Plan Conservation and Open Space Element has identified several roads in the community as

having rural or natural scenic qualities, as well as urban scenic characteristics. For instance, SR-241 and SR-261 in Irvine offer picturesque views while portions of Sand Canyon Avenue, Jeffrey Road/University Drive, Laguna Canyon Road/Laguna Freeway, Bonita Canyon Road/Shady Canyon Road, and Culver Drive are scenic in nature (City of Irvine 2024). There are no scenic highways within the City of Irvine in or near the Project Area. The City of Santa Ana General Plan identified several scenic corridors, including 1st/4th Street, Main Street/Broadway, MacArthur Boulevard, 17th Street, Edinger Avenue, Bristol Street, the Santa Ana Rier, Santiago Creek, Harbor Boulevard, Fairview Street, SR-55, SR-22, and Interstate 5 (City of Santa Ana 2021). The Project Area includes SR-55 and Main Street. The City of Tustin General Plan Circulation Element can identify standards for roadways and scenic highways (City of Tustin 2018). However, there are no scenic highways that are officially designated or are eligible for designation within the city of Tustin.

Light and Glare

There are two primary anthropogenic sources of light: light emanating from building interiors passing through windows, and light originating from exterior sources (e.g., street lighting, building illumination, security lighting, parking lot lighting, landscape lighting, and signage). Anthropogenic sources of light can be a nuisance to adjacent residential areas, diminish the view of the clear night sky, and if uncontrolled, can cause disturbances for motorists traveling in the area. Land uses such as residences and hotels are considered light sensitive, since occupants have expectations of privacy during evening hours and may be subject to disturbances by bright light sources.

Light that falls beyond the intended area is referred to as light trespass. Types of light trespass include spill light and glare. Nighttime lighting is necessary to provide and maintain safe, secure, and attractive environments; however, these lights have the potential to produce spill light and glare, and if designed incorrectly, could be considered unattractive. Spill light can adversely affect light sensitive uses at nighttime, especially residences. Light dissipates with increased distance from the source.

Glare is caused by the reflection of sunlight or artificial light by highly polished surfaces such as window glass or reflective materials and, to a lesser degree, from broad expanses of light-colored surfaces or vehicle headlights. Perceived glare is the unwanted and potentially objectionable sensation as observed by a person as they look directly into the light source of a luminaire. Daytime glare generation in urban areas is typically associated with buildings with exterior facades largely or entirely comprised of highly reflective glass. Glare can also be produced during evening and nighttime hours by the reflection of artificial light sources, such as automobile headlights. Glare generation is typically related to either moving vehicles or sun angles, although glare resulting from reflected sunlight can occur regularly at certain times of the year. Glare-sensitive uses include residences, and transportation corridors. Potentially affected viewers in the local viewshed include motorists, residents, and recreational visitors.

3.1.2 Regulatory Framework

Federal

National Scenic Byways Program

The National Scenic Byways Program is part of the U.S. Department of Transportation, Federal Highway Administration. The program was established under the Intermodal Surface Transportation Efficiency Act

of 1991, and was reauthorized in 1998 under the Transportation Equity Act for the 21st Century. Under the program, the U.S. Secretary of Transportation recognizes certain roads as National Scenic Byways or All-American Roads based on their archaeological, cultural, historic, natural, recreational, and scenic qualities. The only National Scenic Byway located within Southern California is the Arroyo Seco Historic Parkway – Route 110 in Los Angeles County, which is not located near the Project Area.

State

State Scenic Highway Program

In 1963, the California legislature created the Scenic Highway Program to protect scenic highway corridors from changes that could diminish the aesthetic value of lands adjacent to the highways. The state regulations and guidelines governing the Scenic Highway Program are found in the Streets and Highways Code, Section 260 et seq. A highway is designated under this program when a local jurisdiction adopts a scenic corridor protection program, applies to the California Department of Transportation (Caltrans) for scenic highway approval, and receives notification from Caltrans that the highway has been designated as a scenic highway. When a city or county nominates an eligible scenic highway for official designation, it defines the scenic corridor, which is land generally adjacent to and visible to a motorist on the highway.

Local

County of Orange General Plan

The following is a selected list of General Plan goals, objectives, and policies that are applicable to the proposed Project respective to land use (County of Orange 2022).

Transportation Element

Policy 1.2: Offer of Dedication. Where necessary to preserve unique or special visual features, impose conditions on development within a scenic highway corridor to require dedication of scenic easements consistent with the adopted corridor plan.

Policy 1.3: Addition to the Scenic Highway Plan. Preserve scenic routes which have exceptional or unique visual features, but are not necessarily designated as arterial highways on the County Circulation Plan, by placing them on the Scenic Highways Plan. Development of scenic highways shall be in conformance with a Specific Plan prepared in accordance with the Scenic Highway Implementation Planning Guidelines (Appendix IV-5).

Resources Element

Policy 5: Landforms. To protect the unique variety of significant landforms in Orange County through environmental review procedures and community and corridor planning activities.

Policy 1.1: To guide and regulate development of the unincorporated areas of the County to ensure that the character and natural beauty of Orange County is retained.

Policy 4.1. To plan for the acquisition, development, maintenance, operation, and financing of open space lands which provide recreational, scenic, aesthetic, scientific, and educational opportunities.

City of Irvine General Plan

The following is a selected list of General Plan goals, objectives, and policies that are applicable to the proposed Project respective to land use (City of Irvine 2015).

Land Use Element

A-1 (Policy (a)). Develop identifiable City edges, pathways, entry points, and landmarks, and conserve visual resources along scenic corridors which characterize Irvine.

City of Santa Ana General Plan

The following is a selected list of General Plan goals, objectives, and policies that are applicable to the proposed Project respective to land use (City of Santa Ana 2022).

Mobility Element

Policy 4.5: Land Use Development Design. Ensure that building placement and design features create a desirable and active streetscape.

Policy 5.3: Travel Views. Promote the undergrounding of utilities and the reduction of visual clutter along travel ways.

Conservation Element

Policy 2.4: Scenic Preservation. Ensure that development, open space and travel ways surrounding key destinations, historic sites, recreational areas, and open space protects visual corridors, community aesthetics, and scenic preservation.

Urban Design Element

Policy 1.1: Design Quality. Ensure all developments feature high quality design, materials, finishes, and construction.

Policy 1.7: Visual Clutter. Promote the beautification and accessibility of the public realm through the undergrounding of utility lines and aboveground equipment.

Policy 3.1: Landscaped Travel ways. Promote visually appealing and sustainable landscaping along freeway corridors, roadway medians, and parkways.

City of Tustin General Plan

The following is a selected list of General Plan goals, objectives, and policies that are applicable to the proposed Project respective to land use (City of Tustin 2018).

Land Use Element

Policy 4.1. Mitigate traffic congestion and unacceptable levels of noise, odors, dust and light and glare which affect residential areas and sensitive receptors.

Policy 9.6. Retain natural landscape to the maximum extent possible, and incorporate planting in new development areas compatible with the character and quality of the natural surrounding environment.

Circulation Element

Policy 1.14. Enhance the important role that streetscapes play in defining the character of the City by expanding street planning and design procedure to include aesthetic and environmental concerns, as well as traffic considerations. Develop a circulation system which highlights environmental amenities and scenic areas.

3.1.3 Impact Analysis and Mitigation Measures

Thresholds of Significance

The following criteria from CEQA Guidelines Appendix G are used as thresholds of significance to determine the impacts of the proposed Project as related to aesthetics. The proposed Project would have a significant impact if it would:

1. Have a substantial adverse effect on a scenic vista.
2. Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway.
3. 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 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.
4. Create a new source of substantial light or glare which would adversely affect sensitive day or nighttime views in the area.
5. Result in cumulatively considerable impacts to aesthetics.

Impact Analysis

Scenic Vistas

Impact 3.1-1: The proposed Project could have a substantial adverse effect on a scenic vista.

The construction of all proposed Project facilities: extraction facilities and monitoring wells, local groundwater treatment plants, and conveyance pipelines would require temporary ground disturbance within the Project Area. The presence of construction equipment and materials would be visible from public vantage points such as open space areas, sidewalks, and streets, but would not permanently affect designated scenic views or vistas. Given the short-term and temporary presence of construction

equipment and materials, impacts to scenic vistas due to construction of the proposed Project would be less than significant.

As described in Section 2.4, the proposed Project would include the construction of extraction facilities, monitoring wells, local groundwater treatment plants, and conveyance pipelines. The exact number and location of the extraction wells and/or trenches/drains will be determined during the Remedy Design phase after further detailed hydrogeologic investigations are performed along each proposed extraction alignment and land availability evaluations are conducted, see Section 2.5.1.

Extraction Facilities and Monitoring Wells

The proposed, monitoring wells and extraction facilities would primarily be installed underground and in some circumstances above ground and may be located in public and/or private property. Each extraction facility and monitoring well would be contained in an above-grade or below-grade well box or vault. Above ground facilities would be between 2 and 4 feet above grade. There are no above ground facilities within the Main Street or SR-55 corridors. The facilities and wells would therefore not have a significant effect on views from publicly accessible vantage points. As there would be no above ground facilities within the Main Street or SR-55 scenic corridors, impacts to scenic vistas as a result of operation of extraction facilities would be less than significant.

Local Groundwater Treatment Plants

The proposed groundwater treatment plants would be installed within or near the proposed extraction alignments. The treatment system's footprint would be between approximately 10 feet by 10 feet and 20 feet by 20 feet. The treatment systems will include a secure enclosure to protect the units from vandalism. A roof may be necessary in certain circumstances if requested by property owner or to screen views from surrounding land uses. The roof would consist of corrugated metal that would not exceed 12 feet. Once in operation, the Proposed facilities would be visible from public vantage points; however, the proposed groundwater treatment plants would be less than one single story in height and would not exceed 12 feet and located within an urban environment and would therefore be consistent with the height of other structures on neighboring parcels and would not affect views from publicly accessible vantage points. In addition, there are no treatment plants proposed in the Main Street or SR-55 Corridor. Therefore, impacts to scenic vistas would be less than significant.

Conveyance Pipelines

The proposed conveyance pipelines associated with the proposed Project would be constructed to connect the newly installed groundwater extraction facilities to the local groundwater treatment plant and the existing sewer. Once constructed, the disturbed area would be restored to pre-construction conditions, and the proposed pipelines would be located underground primarily within existing roadway rights-of-way to the extent feasible. There will be no pipelines constructed within the Main Street or SR-55 right of way. Pipelines would therefore not affect views from publicly accessible vantage points. No impacts to scenic vistas would occur.

Mitigation Measures

None Required.

Significance Determination

Less than Significant Impact.

Scenic Resources

Impact 3.1-2: The proposed Project could substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway.

Extraction Facilities, Monitoring Wells, Local Groundwater Treatment Plants, and Conveyance Pipelines

There are no officially designated state scenic highways or eligible state scenic highways within the Project Area (Caltrans 2018). However, the City of Irvine has identified several roads in the community as having rural or natural scenic qualities which the proposed Project would not impact. The closest road is Culver Drive located over 2 miles east of G-7. Further, the City of Santa Ana identified several scenic corridor areas with Grand Avenue potentially being impacted by components within G-2, G-5 and G-8 and areas near SR-55 potentially being impacted by components within G-5; however, the proposed wells and pipelines would be installed underground, while the groundwater treatment plants would have a limited footprint between approximately 10 feet by 10 feet and 20 feet by 20 feet and would not significantly change the visual resources along Grand Avenue. Once constructed, the proposed facilities would either be underground or less than one single story in height and located within an urban developed environment and would therefore be consistent with the height of other structures on neighboring parcels and would not be visible from any state scenic highway. Therefore, the proposed Project would not impact scenic resources within a state scenic highway corridor.

Mitigation Measures

None Required.

Significance Determination

No Impact.

Visual Character or Quality

Impact 3.1-3: The proposed Project could substantially degrade the existing visual character or quality of public views of the site and its surroundings.

Construction activities associated with the proposed Project would result in short-term impacts to the visual character of the Project Area. Construction activities would require the use of construction equipment and storage of materials within the Project Area for some proposed Project components. Excavated areas, stockpiled soils and other materials generated during construction could present negative aesthetic elements to the existing visual landscape. However, these effects would be temporary and would not permanently affect the existing visual character of the surrounding area. All impacts from construction-related activities would be less than significant.

As described in Section 2.4, the proposed Project would include the construction of extraction facilities, monitoring wells, local groundwater treatment plants, and conveyance pipelines. The exact number and location of the extraction wells and/or trenches/drains will be determined during the Remedy Design phase after further detailed hydrogeologic investigations are performed along each proposed extraction alignment and land availability evaluations are conducted, see Section 2.5.1.

Extraction Facilities and Monitoring Wells

Well locations would be selected based on monitoring and extraction needs and may be in public and/or private property. Construction logistics and long-term monitoring and maintenance logistics would be considered during the well site selection process. Wells located in Santa Ana, Tustin or Irvine would be subject to any applicable city ordinances and regulations. Prior to mobilization, the contractor would be required to obtain mandatory Well Construction Permits from the Orange County Healthcare Agency and encroachment permits from the city. Construction activities would have a short-term visual impact associated with temporary ground disturbance from drilling and well construction and installation. Once constructed, the proposed extraction facilities and monitoring wells would be installed underground. Extraction facilities and monitoring well heads would be contained in a below-grade well box or vault, except in certain conditions where an above ground facility is needed. The above ground facility would stick up 2 to 4 feet. The wells would therefore not permanently impact the visual quality of the surrounding area. As such, operation of the proposed wells would have no impact on the visual character or quality of the Project Area.

Local Groundwater Treatment Plants

The proposed groundwater treatment plants would be installed within or near the proposed well alignments. The treatment system's footprint would be between approximately 10 feet by 10 feet and 20 feet by 20 feet. The treatment plants would include a secure enclosure to protect the units from vandalism. A roof may be necessary in certain circumstances if requested by property owner or to screen views from surrounding land uses. The treatment plant would then include a corrugated metal roof that would not exceed 12 feet and would be enclosed with chain-link fencing for security. Once in operation, the Proposed facilities would be visible from public vantage points; however, the proposed groundwater treatment plants would be less than one single story in height and would not exceed 12 feet and would therefore be consistent with the height of other structures on neighboring parcels. The facilities would be located within existing Business Parks or Commercial parking lots, were feasible. There are no treatment plants within the Main Street or SR-55 Scenic Corridors. As a result, the treatment plants would not affect the visual character and quality of their sites and immediate surroundings. Impacts to visual character and quality would be less than significant.

Conveyance Pipelines

The proposed conveyance pipelines associated with the proposed Project would be constructed between the newly installed groundwater extraction facilities and the existing sewer. Pipelines would be installed primarily within existing roadway rights-of-way to the extent feasible. There will be no pipelines constructed within Main Street or SR-55 right of way. Construction activities would have a short-term visual impact associated with temporary ground disturbance from trenching and pipeline installation. Once constructed, the disturbed area would be restored to pre-construction conditions, and the pipelines would not impact the visual quality of the surrounding area. As such, operation of the proposed pipelines would have no impact on the visual character or quality of the Project Area.

Mitigation Measures

None Required.

Significance Determination

Less than Significant.

Light or Glare

Impact 3.1-4: The proposed Project could create a new source of substantial light or glare which would adversely affect day or nighttime views in the area.

Extraction Facilities and Monitoring Wells

While construction and work activity will primarily be during daylight hours, there may be a need for night work in some cases to accommodate local encroachment permit requirements. It is anticipated that each well's construction duration would be approximately 10 to 15 days but would not exceed 60 days. Nighttime construction would require security lighting in addition to construction lighting that may impact surrounding sensitive receptors. However, with the implementation of **Mitigation Measure AES-1** requiring that all permanent lighting be directed downward to be focused on the immediate areas and avoid light spillover onto surrounding areas would reduce impact to the surrounding sensitive receptors. Furthermore, the proposed Project would comply with the appropriate lighting ordinance for City in which the project components are constructed. In addition, the wells would be constructed underground and would not create a new glare impact. Therefore, with the implementation of Mitigation Measures AES-1 and compliance with local policies, any impacts from light or glare would be reduced to less than significant levels.

Local Groundwater Treatment Plants

The proposed groundwater treatment plants would be installed within or near the proposed well alignments. The treatment plants will include a secure enclosure to protect the units from vandalism. A roof may be necessary in certain circumstances if requested by property owner or to screen views from surrounding land uses. The treatment plant would then include a corrugated metal roof that could create a glare if the sun reflects off it. However, the treatment plant structures would be painted with non-glare earth tone colors to match the surrounding areas. Further, the facilities would include lighting for security purposes. Nighttime security lighting may impact surrounding sensitive receptors. However, with the implementation of Mitigation Measure AES-1 requiring that all permanent lighting be directed downward to be focused on the immediate areas and avoid light spillover onto surrounding areas would reduce impact to the surrounding sensitive receptors. Furthermore, the proposed Project would comply with the appropriate lighting ordinance for the City in which the project components are constructed. Therefore, with the implementation of Mitigation Measures AES-1 and compliance with local policies, any impacts from light or glare would be reduced to less than significant levels.

Conveyance Pipelines

The proposed conveyance pipelines associated with the proposed Project would be constructed between the newly installed groundwater extraction facilities and the existing sewer. Pipelines would be installed underground primarily within existing roadway rights-of-way to the extent feasible. No lighting would be

required for the pipelines. In addition, the pipelines would not include any above ground components that would create a new source of glare. As a result, no impact would occur.

Mitigation Measures

AES-1: Nighttime Construction. For future construction or work activity implemented under the proposed Project, all nighttime construction lighting and temporary or permanent security lighting installed on new facilities shall be shielded and directed downward to avoid light spill onto neighboring properties.

Significance Determination

Less than Significant with Mitigation.

Cumulative Impacts

Impact 3.1-5: Concurrent construction and operation of the proposed Project and related projects in the geographic scope could result in cumulative short-term and long-term impacts to aesthetics.

Extraction Facilities, Monitoring Wells, Local Groundwater Treatment Plants, and Conveyance Pipelines

The Project Area and immediate area is mostly urbanized with residential, commercial, and industrial development. As the Project Area continues to develop, the addition of more residential, commercial, and industrial development as shown in Table 3-2, could eliminate portions of any remaining natural areas that are within the Project Area. With regard to the overall visual and scenic character of the Project Area, cumulative development would result in more alterations of the existing visual quality of the city and could result in cumulatively significant impacts to existing scenic vistas. Additionally, cumulative development could result in increased lighting and glare within the city. However, cumulative development would need to occur directly adjacent to the Project Area in order to result in a cumulatively considerable impact.

The proposed Project facilities would include the construction of extraction facilities and monitoring wells underground that may be located in public and/or private property, while the conveyance pipelines would be installed underground and primarily within existing roadway rights-of-way to the extent feasible. Although groundwater treatment plants would be installed aboveground, any potential impacts to aesthetics would be reduced to less than significant levels with implementation of mitigation measures. Because potential impacts to aesthetics associated with the implementation of the proposed Project would be less than significant with implementation of Mitigation Measures AES-1 and the proposed Project securing applicable city permits, the proposed Project's contribution to potential cumulative aesthetics impacts would be less than cumulatively considerable. As a result, a less than significant cumulative aesthetics impact would occur.

Mitigation Measures

Implement Mitigation Measures AES-1.

Significance Determination

Less than Significant Impact with Mitigation.

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3.2 Air Quality and Greenhouse Gas Emissions

This section addresses the air quality and greenhouse gas emissions impacts associated with implementation of the proposed Project. This section includes: a description of the existing air quality and greenhouse gas emissions conditions at the Project Area; a summary of applicable regulations related to air quality and greenhouse gas emissions; and an evaluation of the potential impacts of the proposed Project related to air quality and greenhouse gas emissions at the Project Area and in the surrounding area, including cumulative impacts.

3.2.1 Environmental Setting

Regional Context

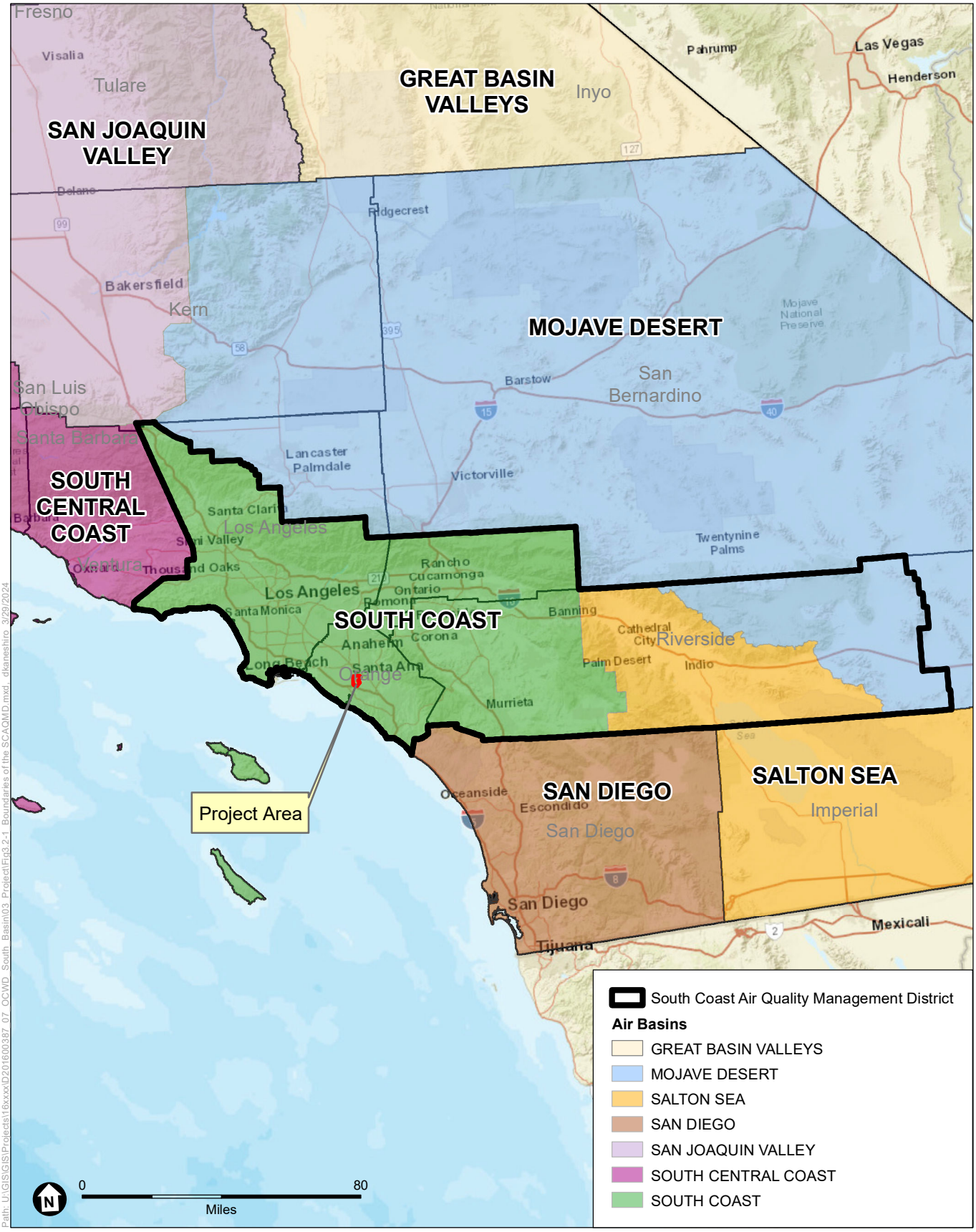
The proposed Project is located within the southeastern part of the South Coast Air Basin (Air Basin) and includes an approximately 5.6-square-mile area in the cities of Santa Ana, Irvine, and Tustin, within the Coastal Plain of Orange County, California (**Figure 3.2-1**). The Air Basin includes all of Orange County, and portions of Los Angeles County, Riverside County, and San Bernardino County. The South Coast Air Quality Management District (SCAQMD) is the local air district with jurisdiction over air pollution sources in the cities of Santa Ana, Irvine, and Tustin and unincorporated portions of Orange County where the proposed Project is located. The Air Basin is an approximately 6,745-square-mile area bounded by the Pacific Ocean to the west and the San Gabriel, San Bernardino, and San Jacinto Mountains to the north and east. The Air Basin is a subregion within the western portion of the SCAQMD jurisdiction. While air quality in the Air Basin has improved in recent decades, the Air Basin requires continued diligence to meet the air quality standards.

Criteria Air Pollutants

Certain air pollutants have been recognized to cause notable health problems and consequential damage to the environment either directly or in reaction with other pollutants, due to their presence in elevated concentrations in the atmosphere. Such pollutants have been identified and regulated as part of the overall endeavor to prevent further deterioration and facilitate improvement in air quality. The following pollutants are regulated by the United States Environmental Protection Agency (USEPA) and are subject to emissions control requirements adopted by federal, state, and local regulatory agencies. These pollutants are referred to as "criteria air pollutants" as a result of the specific standards, or criteria, which have been adopted for them. A description of the health effects of these criteria air pollutants is provided below.

Ozone (O_3)

Ozone is a secondary pollutant formed by the chemical reaction of volatile organic compounds (VOCs) and nitrogen oxides (NO_X) in the presence of sunlight under favorable meteorological conditions, such as high temperature and stagnation episodes. Ozone concentrations are generally highest during the summer months when direct sunlight, light wind, and warm temperature conditions are favorable. According to the USEPA, ozone can cause the muscles in the airways to constrict potentially leading to wheezing and shortness of breath (USEPA 2023a).



SOURCE: California Air Resources Board, March 2004

South Basin Groundwater Protection Project

Figure 3.2-1
Boundaries of the South Coast
Air Quality Management District and Basin

ESA

Ozone can make it more difficult to breathe deeply and vigorously; cause shortness of breath and pain when taking a deep breath; cause coughing and sore or scratchy throat; inflame and damage the airways; aggravate lung diseases such as asthma, emphysema and chronic bronchitis; increase the frequency of asthma attacks; make the lungs more susceptible to infection; continue to damage the lungs even when the symptoms have disappeared; and cause chronic obstructive pulmonary disease (USEPA 2023a). Long-term exposure to ozone is linked to aggravation of asthma and is likely to be one of many causes of asthma development and long-term exposures to higher concentrations of ozone may also be linked to permanent lung damage, such as abnormal lung development in children (USEPA 2023a). According to the California Air Resources Board (CARB), inhalation of ozone causes inflammation and irritation of the tissues lining human airways, causing and worsening a variety of symptoms and exposure to ozone can reduce the volume of air that the lungs breathe in and cause shortness of breath (CARB 2024a).

The USEPA states that people most at risk from breathing air containing ozone include people with asthma, children, older adults, and people who are active outdoors, especially outdoor workers (USEPA 2024a). Children are at greatest risk from exposure to ozone because their lungs are still developing and they are more likely to be active outdoors when ozone levels are high, which increases their exposure (USEPA 2024a). According to CARB, studies show that children are no more or less likely to suffer harmful effects than adults; however, children and teens may be more susceptible to ozone and other pollutants because they spend nearly twice as much time outdoors and engaged in vigorous activities compared to adults (CARB 2024a). Children breathe more rapidly than adults and inhale more pollution per pound of their body weight than adults and are less likely than adults to notice their own symptoms and avoid harmful exposures. Further research may be able to better distinguish between health effects in children and adults.

Volatile Organic Compounds

VOCs are organic chemical compounds of carbon and are not "criteria" pollutants themselves; however, they contribute with NO_X to form ozone, and are regulated to prevent the formation of ozone (USEPA 2023b). According to CARB, some VOCs are highly reactive and play a critical role in the formation of ozone, other VOCs have adverse health effects, and in some cases, VOCs can be both highly reactive and have adverse health effects (CARB 2024b). VOCs are typically formed from combustion of fuels and/or released through evaporation of organic liquids, internal combustion associated with motor vehicle usage, and consumer products (e.g., architectural coatings, etc.) (CARB 2024b).

Nitrogen Dioxide (NO_2) and Nitrogen Oxides

NO_X is a term that refers to a group of compounds containing nitrogen and oxygen. The primary compounds of air quality concern include nitrogen dioxide (NO_2) and nitric oxide (NO). Ambient air quality standards have been promulgated for NO_2, which is a reddish-brown, reactive gas (CARB 2024c). The principle form of NO_X produced by combustion is NO, but NO reacts quickly in the atmosphere to form NO_2, creating the mixture of NO and NO_2 referred to as NO_X (CARB 2024c). Major sources of NO_X include emissions from cars, trucks and buses, power plants, and off-road equipment (USEPA 2023c). The terms NO_X and NO_2 are sometimes used interchangeably. However, the term NO_X is typically used when discussing emissions, usually from combustion-related activities, and the term NO_2 is typically used when discussing ambient air quality standards. Where NO_X emissions are discussed in the context of the thresholds of significance or impact analyses, the discussions are based on the conservative assumption

that all NO_X emissions would oxidize in the atmosphere to form NO_2. According to the USEPA, short-term exposures to NO_2 can potentially aggravate respiratory diseases, particularly asthma, leading to respiratory symptoms (such as coughing, wheezing or difficulty breathing), hospital admissions and visits to emergency rooms while longer exposures to elevated concentrations of NO_2 may contribute to the development of asthma and potentially increase susceptibility to respiratory infections (USEPA 2023c). According to CARB, controlled human exposure studies that show that NO_2 exposure can intensify responses to allergens in allergic asthmatics (CARB 2024c). In addition, a number of epidemiological studies have demonstrated associations between NO_2 exposure and premature death, cardiopulmonary effects, decreased lung function growth in children, respiratory symptoms, emergency room visits for asthma, and intensified allergic responses (CARB 2024c). Infants and children are particularly at risk from exposure to NO_2 because they have disproportionately higher exposure to NO_2 than adults due to their greater breathing rate for their body weight and their typically greater outdoor exposure duration. Adults risk is to people who have chronic respiratory diseases, such as asthma and chronic obstructive pulmonary disease (CARB 2024c).

Carbon Monoxide (CO)

Carbon monoxide (CO) is primarily emitted from combustion processes and motor vehicles due to the incomplete combustion of fuel, such as natural gas, gasoline, or wood, with the majority of outdoor CO emissions from mobile sources (CARB 2024d). According to the USEPA, breathing air with a high concentration of CO reduces the amount of oxygen that can be transported in the blood stream to critical organs like the heart and brain and at very high levels, which are possible indoors or in other enclosed environments. CO can cause dizziness, confusion, unconsciousness and death (USEPA 2023d). Very high levels of CO are not likely to occur outdoors; however, when CO levels are elevated outdoors, they can be of particular concern for people with some types of heart disease since these people already have a reduced ability for getting oxygenated blood to their hearts and are especially vulnerable to the effects of CO when exercising or under increased stress (USEPA 2023d). In these situations, short-term exposure to elevated CO may result in reduced oxygen to the heart accompanied by chest pain also known as angina (USEPA 2023d). According to CARB, the most common effects of CO exposure are fatigue, headaches, confusion, and dizziness due to inadequate oxygen delivery to the brain (USEPA 2023d). Unborn babies, infants, elderly people, and people with anemia or with a history of heart or respiratory disease are most likely to experience health effects with exposure to elevated levels of CO (USEPA 2023d).

Sulfur Dioxide (SO_2)

According to the USEPA, the largest source of sulfur dioxide (SO_2) emissions in the atmosphere is the burning of fossil fuels by power plants and other industrial facilities while smaller sources of SO_2 emissions include industrial processes such as extracting metal from ore; natural sources such as volcanoes; and locomotives, ships and other vehicles and heavy equipment that burn fuel with a high sulfur content (USEPA 2023e). In 2006, California phased-in the ultra-low-sulfur diesel regulation limiting vehicle diesel fuel to a sulfur content not exceeding 15 parts per million, down from the previous requirement of 500 parts per million, substantially reducing emissions of sulfur from diesel combustion (CARB 2004). According to the USEPA, short-term exposures to SO_2 can harm the human respiratory system and make breathing difficult (USEPA 2023e). According to CARB, health effects at levels near the State one-hour standard are those of asthma exacerbation, including bronchoconstriction accompanied by symptoms of respiratory irritation such as wheezing, shortness of breath and chest tightness, especially

during exercise or physical activity and exposure at elevated levels of SO_2 (above 1 part per million (ppm)) results in increased incidence of pulmonary symptoms and disease, decreased pulmonary function, and increased risk of mortality (USEPA 2023e). Children, the elderly, and those with asthma, cardiovascular disease, or chronic lung disease (such as bronchitis or emphysema) are most likely to experience the adverse effects of SO_2 (CARB 2024e; USEPA 2023e).

Particulate Matter (PM10 and PM2.5)

Particulate matter air pollution is a mixture of solid particles and liquid droplets found in the air (USEPA 2023f). Some particles, such as dust, dirt, soot, or smoke, are large or dark enough to be seen with the naked eye while other particles are so small they can only be detected using an electron microscope (USEPA 2023f). Particles are defined by their diameter for air quality regulatory purposes: inhalable particles with diameters that are generally 10 micrometers and smaller (PM10); and fine inhalable particles with diameters that are generally 2.5 micrometers and smaller (PM2.5) (USEPA 2023f). Thus, PM2.5 comprises a portion or a subset of PM10. Sources of PM10 emissions include dust from construction sites, landfills and agriculture, wildfires and brush/waste burning, industrial sources, and wind-blown dust from open lands (CARB 2024f). Sources of PM2.5 emissions include combustion of gasoline, oil, diesel fuel, or wood (CARB 2024f). PM10 and PM2.5 may be either directly emitted from sources (primary particles) or formed in the atmosphere through chemical reactions of gases (secondary particles) such as SO_2, NO_X, and certain organic compounds (CARB 2024f).

According to CARB, both PM10 and PM2.5 can be inhaled, with some depositing throughout the airways; PM_{10} is more likely to deposit on the surfaces of the larger airways of the upper region of the lung while PM2.5 is more likely to travel into and deposit on the surface of the deeper parts of the lung, which can induce tissue damage, and lung inflammation (CARB 2024f). Short-term (up to 24 hours' duration) exposure to PM10 has been associated primarily with worsening of respiratory diseases, including asthma and chronic obstructive pulmonary disease, leading to hospitalization and emergency department visits (CARB 2024f). The effects of long-term (months or years) exposure to PM10 are less clear, although studies suggest a link between long-term PM10 exposure and respiratory mortality. The International Agency for Research on Cancer published a review in 2015 that concluded that particulate matter in outdoor air pollution causes lung cancer (CARB 2024f). Short-term exposure to PM2.5 has been associated with premature mortality, increased hospital admissions for heart or lung causes, acute and chronic bronchitis, asthma attacks, emergency room visits, respiratory symptoms, and restricted activity days; long-term exposure to PM2.5 has been linked to premature death, particularly in people who have chronic heart or lung diseases, and reduced lung function growth in children (CARB 2024f). According to CARB, populations most likely to experience adverse health effects with exposure to PM10 and PM2.5 include older adults with chronic heart or lung disease, and children (CARB 2024f).

Lead (Pb)

Major sources of lead emissions include ore and metals processing, piston-engine aircraft operating on leaded aviation fuel, waste incinerators, utilities, and lead-acid battery manufacturers (USEPA 2023g). In the past, leaded gasoline was a major source of lead emissions; however, the removal of lead from gasoline has resulted in a decrease of lead in the air by 98 percent between 1980 and 2014 (USEPA 2023d). Lead can adversely affect the nervous system, kidney function, immune system, reproductive and developmental systems and the cardiovascular system, and affects the oxygen carrying capacity of blood

(USEPA 2023g). The lead effects most commonly encountered in current populations are neurological effects in children, such as behavioral problems and reduced intelligence, anemia, and liver or kidney damage (CARB 2024g). Excessive lead exposure in adults can cause reproductive problems in men and women, high blood pressure, kidney disease, digestive problems, nerve disorders, memory and concentration problems, and muscle and joint pain (CARB 2024g).

Other Criteria Pollutants (California Only)

The California Ambient Air Quality Standards (CAAQS) regulate the same criteria pollutants as the NAAQS but in addition, regulate State-identified criteria pollutants, including sulfates, hydrogen sulfide, visibility-reducing particles, and vinyl chloride (CARB 2024h). With respect to the State-identified criteria pollutants (i.e., sulfates, hydrogen sulfide, visibility reducing particles, and vinyl chloride), the proposed Project would either not emit them (i.e., hydrogen sulfide and vinyl chloride), or they would be accounted for as part of the pollutants estimated in this analysis (i.e., sulfates and visibility reducing particles). For example, visibility reducing particles are associated with particulate matter emissions and sulfates are associated with SO2 emissions. Both particulate matter and SO2 are included in the emissions analysis for the proposed Project.

Toxic Air Contaminants

In addition to criteria pollutants, the SCAQMD periodically assesses levels of toxic air contaminants (TACs) in the Air Basin. A TAC is defined by California Health and Safety Code Section 39655:

> *"Toxic air contaminant" means an air pollutant which may cause or contribute to an increase in mortality or in serious illness, or which may pose a present or potential hazard to human health. A substance that is listed as a hazardous air pollutant pursuant to subsection (b) of Section 112 of the federal act (42 U.S.C. Sec. 7412(b)) is a toxic air contaminant.*

Diesel particulate matter, which is emitted in the exhaust from diesel engines, was listed by the State as a toxic air contaminant in 1998. Most major sources of diesel emissions, such as ships, trains, and trucks operate in and around ports, railyards, and heavily traveled roadways. These areas are often located near highly populated areas resulting in greater health consequences for urban areas than rural areas (CARB 2024i). Diesel particulate matter has historically been used as a surrogate measure of exposure for all diesel exhaust emissions. Diesel particulate matter consists of fine particles (fine particles have a diameter <2.5 μm), including a subgroup of ultrafine particles (ultrafine particles have a diameter <0.1 μm). Collectively, these particles have a large surface area which makes them an excellent medium for absorbing organics. The visible emissions in diesel exhaust include carbon particles or "soot." Diesel exhaust also contains a variety of harmful gases and cancer-causing substances.

Exposure to diesel particulate matter may be a health hazard, particularly to children whose lungs are still developing and the elderly who may have other serious health problems. Diesel particulate matter levels and resultant potential health effects may be higher in proximity to heavily traveled roadways with substantial truck traffic or near industrial facilities. According to CARB, diesel particulate matter exposure may lead to the following adverse health effects: aggravated asthma; chronic bronchitis;

increased respiratory and cardiovascular hospitalizations; decreased lung function in children; lung cancer; and premature deaths for people with heart or lung disease (CARB 2024i).

Odorous Emissions

Though offensive odors from stationary sources rarely cause any physical harm, they still remain unpleasant and can lead to public distress generating citizen complaints to local governments. The occurrence and severity of odor impacts depend on the nature, frequency and intensity of the source; wind speed and direction; and the sensitivity of receptors. Generally, increasing the distance between the receptor and the source will mitigate odor impacts.

Greenhouse Gas Emissions

Global climate change refers to changes in average climatic conditions on Earth as a whole, including changes in temperature, wind patterns, precipitation and storms. Historical records indicate that global climate changes have occurred in the past due to natural phenomena; however, current data increasingly indicate that the current global conditions differ from past climate changes in rate and magnitude. Global climate change attributable to anthropogenic (human) greenhouse gas (GHG) emissions is currently one of the most important and widely debated scientific, economic and political issues in the United States and the world. The extent to which increased concentrations of GHGs have caused or will cause climate change and the appropriate actions to limit and/or respond to climate change are the subject of significant and rapidly evolving regulatory efforts at the federal and state levels of government.

GHGs are those compounds in the Earth's atmosphere which play a critical role in determining temperature near the Earth's surface. GHGs include CO_2, CH_4, nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulfur hexafluoride (SF_6), and nitrogen trifluoride (NF_3).[1] More specifically, these gases allow high-frequency shortwave solar radiation to enter the Earth's atmosphere, but retain some of the low-frequency infrared energy, which is radiated back from the Earth towards space, resulting in a warming of the atmosphere. Not all GHGs possess the same ability to induce climate change; as a result, GHG contributions are commonly quantified in the units of equivalent mass of carbon dioxide (CO_2e). Mass emissions are calculated by converting pollutant specific emissions to CO_2e emissions by applying the proper global warming potential (GWP) value.[2] These GWP ratios are available from the Intergovernmental Panel on Climate Change (IPCC). Historically, GHG emission inventories have been calculated using the GWPs from the IPCC's Second Assessment Report (SAR) (IPCC 1995). The IPCC updated the GWP values based on the latest science in its Fourth Assessment Report (AR4) (IPCC 2007). The updated GWPs in the IPCC AR4 have begun to be used in recent GHG emissions inventories. By applying the GWP ratios, project-related CO_2e emissions can be tabulated in metric tons per year. Typically, the GWP ratio corresponding to the warming potential of CO_2 over a 100-year period is used as a baseline.

[1] As defined by California Assembly Bill (AB) 32 and Senate Bill (SB) 104.

[2] GWPs and associated CO_2e values were developed by the Intergovernmental Panel on Climate Change (IPCC), and published in its Second Assessment Report (SAR) in 1996. Historically, GHG emission inventories have been calculated using the GWPs from the IPCC's SAR. The IPCC updated the GWP values based on the latest science in its Fourth Assessment Report (AR4). The California Air Resources Board (CARB) has begun reporting GHG emission inventories for California using the GWP values from the IPCC AR4.

Compounds that are regulated as GHGs are discussed below.

- **Carbon Dioxide (CO_2):** CO_2 is the most abundant GHG in the atmosphere and is primarily generated from fossil fuel combustion from stationary and mobile sources. CO_2 is the reference gas (GWP of 1) for determining the GWPs of other GHGs (IPCC 2007).
- **Methane (CH_4):** CH_4 is emitted from biogenic sources (i.e., resulting from the activity of living organisms), incomplete combustion in forest fires, landfills, manure management, and leaks in natural gas pipelines. The GWP of CH_4 is 21 in the IPCC SAR and 25 in the IPCC AR4 (IPCC 1995 and 2007).
- **Nitrous Oxide (N_2O):** N_2O produced by human-related sources including agricultural soil management, animal manure management, sewage treatment, mobile and stationary combustion of fossil fuel, adipic acid production, and nitric acid production. The GWP of N_2O is 310 in the IPCC SAR and 298 in the IPCC AR4 (IPCC 1995 and 2007).
- **Hydrofluorocarbons (HFCs):** HFCs are fluorinated compounds consisting of hydrogen, carbon, and fluorine. They are typically used as refrigerants in both stationary refrigeration and mobile air conditioning systems. The GWP of HFCs ranges from 140 for HFC-152a to 11,700 for HFC-23 in the IPCC SAR and 124 for HFC-152a to 14,800 for HFC-23 in the IPCC AR4 (IPCC 1995 and 2007).
- **Perfluorocarbons (PFCs):** PFCs are fluorinated compounds consisting of carbon and fluorine. They are primarily created as a byproduct of aluminum production and semiconductor manufacturing. The GWPs of PFCs range from 6,500 to 9,200 in the IPCC SAR and 7,390 to 17,700 in the IPCC AR4 (IPCC 1995 and 2007).
- **Sulfur Hexafluoride (SF_6):** SF_6 is a fluorinated compound consisting of sulfur and fluoride. It is a colorless, odorless, nontoxic, nonflammable gas. It is most commonly used as an electrical insulator in high voltage equipment that transmits and distributes electricity. SF_6 has a GWP of 23,900 in the IPCC SAR and 22,800 in the IPCC AR4 (IPCC 1995 and 2007).
- **Nitrogen Trifluoride (NF_3):** NF3 is a fluorinated compound consisting of nitrogen and fluoride. It is an inorganic, colorless, non-flammable, toxic gas with a slightly musty odor. NF_3 is used as a replacement for SF_6 in the electronics industry. It is typically used in plasma etching and chamber cleaning during the manufacturing of semi-conductors and liquid crystal display (LCD) panels (Greenhouse Gas Protocol 2013). NF_3 has a GWP of 17,200 in the IPCC AR4, and 16,100 in the IPCC AR5 (IPCC 1995 and 2007).

Worldwide man-made emissions of GHGs are approximately 49,000 million metric tons of carbon dioxide equivalent ($MMTCO_2e$) annually including ongoing emissions from industrial and agricultural sources and emissions from land use changes (e.g., deforestation) (IPCC 2014). Emissions of CO_2 from fossil fuel use and industrial processes account for 73 percent of the total while CO_2 emissions from all sources account for 88 percent of the total. Methane emissions account for 19 percent and N_2O emissions for 5 percent. In 2020, the United States was the world's second largest emitter of carbon dioxide at 5,640 $MMTCO_2e$ (China was the largest emitter of carbon dioxide at 14,300 $MMTCO_2e$) (PBL 2022).

CARB compiles the State's GHG emissions inventory. Based on the 2021 GHG inventory data (i.e., the most updated inventory for which data are available from CARB), California emitted 381.3 million metric

tons of CO_2e ($MMTCO_2e$) including emissions resulting from imported electrical power (CARB 2024j). Between 1990 and 2023, the population of California grew by approximately 32 percent (from 29.8 to 38.9 million) (USCB 1995; CDF 2024). In addition, the California economy, measured as gross state product, grew from approximately $773 billion in 1990 to $3.6 trillion in 2022, representing an increase of approximately five times the 1990 gross state product (CDF 2023).[3] Despite the population and economic growth, California's net GHG emissions were reduced to below 1990 levels in 2016 and have continued to decline. According to CARB, the declining trend coupled with the State's GHG reduction programs (such as the Renewables Portfolio Standard [RPS], Low Carbon Fuel Standard [LCFS], vehicle efficiency standards, and declining caps under the Cap-and-Trade Program) demonstrate that California is on track to meet the 2030 GHG reduction target of 40 percent below 1990 levels codified in Executive Order B-30-15.

Existing Conditions

The extent and severity of pollutant concentrations in the Air Basin are a function of the area's natural physical characteristics (weather and topography) and man-made influences (development patterns and lifestyle). Factors such as wind, sunlight, temperature, humidity, rainfall, and topography all affect the accumulation and dispersion of pollutants throughout the Air Basin, making it an area of high pollution potential. The Air Basin's meteorological conditions, in combination with regional topography, are conducive to the formation and retention of ozone, which is a secondary pollutant that forms through photochemical reactions in the atmosphere. Thus, the worst air pollution conditions throughout the Air Basin typically occur from June through September. These conditions are generally attributed to the seasonally light winds and shallow vertical atmospheric mixing, which reduce the potential for the dispersal of air pollutant emissions, thereby causing elevated air pollutant levels. Pollutant concentrations in the Air Basin vary with location, season, and time of day. Concentrations of ozone, for example, tend to be lower along the coast, higher in the near inland valleys, and lower in the far inland areas of the Air Basin and adjacent desert (SCAQMD 2022). **Table 3.2-1** shows the attainment status of the South Coast Air Basin for each criteria pollutant for the Orange County portion of the Air Basin.

As shown in Table 3.2-1, the Air Basin is designated under federal or state ambient air quality standards as nonattainment for ozone, PM10, and PM2.5. As detailed in the Air Quality Management Plan (AQMP), the major sources of air pollution in the Air Basin are divided into four major source classifications: point, area stationary sources, and on-road and off-road mobile sources. Point and area sources are the two major subcategories of stationary sources (SCAQMD 2022). Point sources are permitted facilities that contain one or more emission sources at an identified location (e.g., power plants, refineries, emergency generator exhaust stacks). Area sources consist of many small emission sources (e.g., residential water heaters, architectural coatings, consumer products, and permitted sources such as large boilers) which are distributed across the region. Mobile sources consist of two main subcategories: On-road sources (such as cars and trucks) and off-road sources (such as heavy construction equipment).

[3] Amounts are based on current dollars as of the date of the report (June 2023).

TABLE 3.2-1
SOUTH COAST AIR BASIN ATTAINMENT STATUS (ORANGE COUNTY PORTION)

Pollutant	National Standards (NAAQS)	California Standards (CAAQS)
O_3 (1-hour standard)	N/A[a]	Non-attainment
O_3 (8-hour standard)	Non-attainment – Extreme	Non-attainment
CO	Attainment/Unclassifiable	Attainment
NO_2	Attainment/Unclassifiable	Attainment
SO_2	Attainment/Unclassifiable	Attainment
PM10	Attainment/Maintenance	Non-attainment
PM2.5	Non-attainment	Non-attainment
Lead (Pb)	Attainment/Unclassifiable	Attainment
Visibility Reducing Particles	N/A	Unclassified
Sulfates	N/A	Attainment
Hydrogen Sulfide	N/A	Unclassified
Vinyl Chloride[b]	N/A	N/A

SOURCEs: USEPA, The Green Book Non-Attainment Areas for Criteria Pollutants, https://www.epa.gov/green-book; CARB, Area Designations Maps/State and National, https://ww2.arb.ca.gov/resources/documents/maps-state-and-federal-area-designations

ABBREVIATIONS: N/A = not applicable

a. The NAAQS for 1-hour ozone was revoked on June 15, 2005, for all areas except Early Action Compact areas.
b. In 1990, the California Air Resources Board identified vinyl chloride as a toxic air contaminant and determined that it does not have an identifiable threshold. Therefore, the California Air Resources Board does not monitor or make status designations for this pollutant.

The SCAQMD maintains a network of air quality monitoring stations located throughout the Air Basin to measure ambient pollutant concentrations. The proposed Project would be located near one monitoring station, the Anaheim Monitoring Station, located in SRA 17. The Anaheim monitoring station is most representative of the Project Area, located at 1630 Pampas Lane Anaheim, CA 92802. Criteria pollutants monitored at the Anaheim station include ozone, nitrogen dioxide, carbon monoxide, PM10, and PM2.5. The most recent data available from the SCAQMD for these monitoring stations are from years 2020 to 2022 (SCAQMD 2020, 2021, 2022). The pollutant concentration data for these years are summarized in **Table 3.2-2**. Concentrations of SO_2 are not monitored in the Orange County Planning Area and are not reported in SRA 17. As shown in Table 3.2-2, the CAAQS and NAAQS were not exceeded in the Project Area vicinity for all pollutants between 2020 and 2022, except for O_3, PM10, and PM2.5.

Sensitive Receptors

Land uses, such as schools, hospitals, and convalescent homes are considered to be sensitive to poor air quality conditions because infants, children, the elderly, and people with health afflictions (especially respiratory ailments), are more susceptible to respiratory infections and other air-quality-related health problems than the general public. Residential areas are also considered to be sensitive to air pollution because residents (including children and the elderly) tend to be at home for extended periods of time, resulting in sustained exposure to any pollutants present. Recreational land uses are considered moderately sensitive to air pollution. Exercise places a high demand on respiratory functions, which can be impaired by air pollution, even though exposure periods during exercise are generally short.

TABLE 3.2-2
AMBIENT AIR QUALITY IN THE PROJECT VICINITY (ANAHEIM STATION)

Pollutant/Standard	2020	2021	2022
Ozone, O_3 (1-hour)			
Maximum Concentration (ppm)	0.142	0.089	1.02
Days > CAAQS (0.09 ppm)	6	0	1
Ozone, O_3 (8-hour)			
Maximum Concentration (ppm)	0.097	0.068	0.076
4th High 8-hour Concentration (ppm)	0.079	0.063	0.060
Days > CAAQS (0.070 ppm)	15	0	1
Days > NAAQS (0.070 ppm)	15	0	1
Nitrogen Dioxide, NO_2 (1-hour)			
Maximum Concentration (ppm)	0.071	0.067	0.053
Days > CAAQS (0.18 ppb)	0	0	0
98th Percentile Concentration (ppm)	0.052	0.053	0.048
Days > NAAQS (0.100 ppm)	0	0	0
Nitrogen Dioxide, NO_2 (Annual) (Anaheim Station)			
Annual Arithmetic Mean (0.030 ppm)	0.013	0.012	0.012
Carbon Monoxide, CO (1-hour)			
Maximum Concentration (ppm)	2.3	2.1	2.4
Days > CAAQS (20 ppm)	0	0	0
Days > NAAQS (35 ppm)	0	0	0
Carbon Monoxide, CO (8-hour)			
Maximum Concentration (ppm)	1.7	1.5	1.4
Days > CAAQS (9.0 ppm)	0	0	0
Days > NAAQS (9.0 ppm)	0	0	0
Respirable Particulate Matter, PM10 (24-hr) (Anaheim Station)			
Maximum Concentration (µg/m³)	120	115	90
Samples > CAAQS (50 µg/m³)	13	12	7
Samples > NAAQS (150 µg/m³)	0	0	10
Respirable Particulate Matter, PM10 (Annual) (Anaheim Station)			
Annual Arithmetic Mean (20 µg/m³)	23.9	22.9	22.3
Fine Particulate Matter, PM2.5 (24-hour)			
Maximum Concentration (µg/m³)	41.4	54.4	33.1
98th Percentile Concentration (µg/m³)	27.1	36.7	22.1
Samples > NAAQS (35 µg/m³)	1	9	0
Fine Particulate Matter, PM2.5 (Annual)			
Annual Arithmetic Mean (12 µg/m³)	11.27	11.44	9.87

SOURCE: SCAQMD, Historical Data by Year, 2020, 2021, 2022, accessed March 2024, http://www.aqmd.gov/home/air-quality/air-quality-data-studies/historical-data-by-year

ABBREVIATIONS: ppm = parts per million; µg/m³ = micrograms per cubic meter

The Project Area includes an approximately 5.6-square-mile area within Orange County in the cities of Irvine, Santa Ana, and Tustin. The Project Area is characterized primarily by urbanized land uses with residential, commercial, and industrial development. The proposed well Alignment G-3, along East Warner Avenue, includes residential uses located west of Standard Avenue and the Santa Ana Unified School District Monroe Elementary School is located west of Halladay Street. There are two schools near Alignments G-1, G-2, and G-4 consisting of Ricca Children's Learning Center at 1510 Brookhollow

Drive and Orange County Head Start at 2501 Pullman Street in Santa Ana. The proposed well Alignment G-7 is along MacArthur Blvd. in the city of Irvine. There are four high-density residential complexes in or near this alignment. MDL Irvine consisting of 137 residential units, City Square consisting of 44 units, LUX consisting of 39 units and Aurum consisting of 178 units. The residential and school uses would be considered sensitive land uses for air pollutant emissions. In this analysis, it was assumed the nearest receptor would be a residence located adjacent to an extraction or treatment facility.

3.2.2 Regulatory Framework

Federal

Air Quality

Clean Air Act

The federal CAA was enacted in 1955 and has been amended numerous times in subsequent years, with the most recent amendments occurring in 1990 (42 USC 7401 et seq.). The CAA is the comprehensive federal law that regulates air emissions in order to protect public health and welfare (USEPA 2023h). The USEPA is responsible for the implementation and enforcement of the CAA, which establishes federal NAAQS, specifies future dates for achieving compliance, and requires USEPA to designate areas as attainment, nonattainment, or maintenance. The CAA also mandates that each state submit and implement a State Implementation Plan (SIP) for each criteria pollutant for which the state has not achieved the applicable NAAQS. The SIP includes pollution control measures that demonstrate how the standards for those pollutants will be met. The sections of the CAA most applicable to the proposed Project include Title I (Nonattainment Provisions) and Title II (Mobile Source Provisions) (USEPA 2023i)[4]

Title I requirements are implemented for the purpose of attaining NAAQS for criteria air pollutants. The NAAQS were amended in July 1997 to include an 8-hour standard for ozone and to adopt a NAAQS for PM2.5. The NAAQS were also amended in September 2006 to include an established methodology for calculating PM2.5, as well as to revoke the annual PM10 threshold. **Table 3.2-3** shows the NAAQS currently in effect for each criteria pollutant. The NAAQS and the CAAQS for the California criteria air pollutants (discussed below) have been set at levels considered safe to protect public health, including the health of sensitive populations such as asthmatics, children, and the elderly with a margin of safety; and to protect public welfare, including against decreased visibility and damage to animals, crops, vegetation, and buildings (USEPA 2024). In addition to criteria pollutants, Title I also includes air toxics provisions which require USEPA to develop and enforce regulations to protect the public from exposure to airborne contaminants that are known to be hazardous to human health. In accordance with Section 112, USEPA establishes National Emission Standards for Hazardous Air Pollutants. The list of hazardous air pollutants (HAPs), or air toxics, includes specific compounds that are known or suspected to cause cancer or other serious health effects.

[4] Mobile sources include on-road vehicles (e.g., cars, buses, motorcycles) and non-road vehicles (e.g., aircraft, trains, construction equipment). Stationary sources are comprised of both point and area sources. Point sources are stationary facilities that emit large amount of pollutants (e.g., municipal waste incinerators, power plants). Area sources are smaller stationary sources that alone are not large emitters but combined can account for large amounts of pollutants (e.g., consumer products, residential heating, dry cleaners).

TABLE 3.2-3
AMBIENT AIR QUALITY STANDARDS

Pollutant	Average Time	California Standards[a]		National Standards[b]		
		Concentration[c]	Method[d]	Primary[c,e]	Secondary[c,f]	Method[g]
O_3[h]	1 Hour	0.09 ppm (180 µg/m^3)	Ultraviolet Photometry	—	Same as Primary Standard	Ultraviolet Photometry
	8 Hour	0.070 ppm (137 µg/m^3)		0.070 ppm (137 µg/m^3)		
NO_2[i]	1 Hour	0.18 ppm (339 µg/m^3)	Gas Phase Chemi-luminescence	100 ppb (188 µg/m^3)	None	Gas Phase Chemi-luminescence
	Annual Arithmetic Mean	0.030 ppm (57 µg/m^3)		53 ppb (100 µg/m^3)	Same as Primary Standard	
CO	1 Hour	20 ppm (23 mg/m^3)	Non-Dispersive Infrared Photometry (NDIR)	35 ppm (40 mg/m^3)	None	Non-Dispersive Infrared Photometry (NDIR)
	8 Hour	9.0 ppm (10mg/m^3)		9 ppm (10 mg/m^3)		
	8 Hour (Lake Tahoe)	6 ppm (7 mg/m^3)		—	—	
SO_2[j]	1 Hour	0.25 ppm (655 µg/m^3)	Ultraviolet Fluorescence	75 ppb (196 µg/m^3)	—	Ultraviolet Fluorescence; Spectrophotometry (Pararosaniline Method)
	3 Hour	—		—	0.5 ppm (1300 µg/m^3)	
	24 Hour	0.04 ppm (105 µg/m^3)		0.14 ppm (for certain areas)[j]	—	
	Annual Arithmetic Mean	—		0.030 ppm (for certain areas) [j]	—	
PM10[k]	24 Hour	50 µg/m^3	Gravimetric or Beta Attenuation	150 µg/m^3	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	20 µg/m^3		—		
PM2.5[k]	24 Hour	No Separate State Standard		35 µg/m^3	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	12 µg/m^3	Gravimetric or Beta Attenuation	12.0 µg/m^3 [k]	15 µg/m^3	
Lead[l,m]	30 Day Average	1.5 µg/m^3	Atomic Absorption	—	—	High Volume Sampler and Atomic Absorption
	Calendar Quarter	—		1.5 µg/m^3 (for certain areas)[m]	Same as Primary Standard	
	Rolling 3-Month Average m	—		0.15 µg/m^3		
Visibility Reducing Particles[n]	8 Hour	Extinction coefficient of 0.23 per kilometer — visibility of 10 miles or more (0.07–30 miles or more for Lake Tahoe) due to particles when relative humidity is less than 70 percent. Method: Beta Attenuation and Transmittance through Filter Tape.		No Federal Standards		

Pollutant	Average Time	California Standards[a]		National Standards[b]		
		Concentration[c]	Method[d]	Primary[c,e]	Secondary[c,f]	Method[g]
Sulfates (SO_4)	24 Hour	25 µg/m^3	Ion Chromatography			
Hydrogen Sulfide	1 Hour	0.03 ppm (42 µg/m^3)	Ultraviolet Fluorescence			
Vinyl Chloride[l]	24 Hour	0.01 ppm (26 µg/m^3)	Gas Chromatography			

SOURCE: California Air Resources Board, Ambient Air Quality Standards (5/4/16), accessed March 2024, https://ww2.arb.ca.gov/resources/documents/ambient-air-quality-standards-0; USEPA, NAAQS Table, 2024, accessed March 2024, https://www.epa.gov/criteria-air-pollutants/naaqs-table

NOTES:

a California standards for ozone, carbon monoxide (except 8-hour Lake Tahoe), sulfur dioxide (1 and 24 hour), nitrogen dioxide, and particulate matter (PM_{10}, $PM_{2.5}$, and visibility reducing particles), are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.

b National standards (other than ozone, particulate matter, and those based on annual arithmetic mean) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest 8-hour concentration measured at each site in a year, averaged over three years, is equal to or less than the standard. For PM10, the 24-hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 micrograms/per cubic meter (µg/m^3) is equal to or less than one. For $PM_{2.5}$, the 24 hour standard is attained when 98 percent of the daily concentrations, averaged over three years, are equal to or less than the standard.

c Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based upon a reference temperature of 25°C and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.

d Any equivalent procedure which can be shown to the satisfaction of the California Air Resources Board to give equivalent results at or near the level of the air quality standard may be used.

e National Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health.

f National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

g Reference method as described by the USEPA. An “equivalent method” of measurement may be used but must have a “consistent relationship to the reference method” and must be approved by the USEPA.

h On October 1, 2015, the national 8-hour ozone primary and secondary standards were lowered from 0.075 to 0.070 ppm.

i To attain the 1-hour national standard, the 3-year average of the annual 98th percentile of the 1-hour daily maximum concentrations at each site must not exceed 100 ppb. Note that the national 1-hour standard is in units of parts per billion (ppb). California standards are in units of parts per million (ppm). To directly compare the national 1-hour standard to the California standards the units can be converted from ppb to ppm. In this case, the national standard of 100 ppb is identical to 0.100 ppm.

j On June 2, 2010, a new 1-hour SO_2 standard was established and the existing 24-hour and annual primary standards were revoked. To attain the 1-hour national standard, the 3-year average of the annual 99th percentile of the 1-hour daily maximum concentrations at each site must not exceed 75 ppb. The 1971 SO_2 national standards (24-hour and annual) remain in effect until one year after an area is designated for the 2010 standard, except that in areas designated non-attainment for the 1971 standards, the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standards are approved.

k On December 14, 2012, the national annual $PM_{2.5}$ primary standard was lowered from 15 µg/m^3 to 12.0 µg/m^3.

l The California Air Resources Board has identified lead and vinyl chloride as 'toxic air contaminants' with no threshold level of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.

m The national standard for lead was revised on October 15, 2008, to a rolling three-month average. The 1978 lead standard (1.5 µg/m^3 as a quarterly average) remains in effect until one year after an area is designated for the 2008 standard, except that in areas designated non-attainment for the 1978 standard, the 1978 standard remains in effect until implementation plans to attain or maintain the 2008 standard are approved.

n In 1989, the California Air Resources Board converted both the general statewide 10-mile visibility standard and the Lake Tahoe 30-mile visibility standard to instrumental equivalents, which are "extinction of 0.23 per kilometer" and "extinction of 0.07 per kilometer" for the statewide and Lake Tahoe Air Basin standards, respectively.

Title II requirements pertain to mobile sources, such as cars, trucks, buses, and planes. Reformulated gasoline, automobile pollution control devices, and vapor recovery nozzles on gas pumps are a few of the mechanisms the USEPA uses to regulate mobile air emission sources. The provisions of Title II have resulted in tailpipe emission standards for vehicles, which have been strengthened in recent years to improve air quality. For example, the standards for NO_X emissions have been lowered substantially, and the specification requirements for cleaner burning gasoline are more stringent.

Greenhouse Gases

Clean Air Act

In *Massachusetts v. Environmental Protection Agency* (2007) 549 U.S. 497, the U.S. Supreme Court held in April of 2007 that the USEPA has statutory authority under Section 202 of the CAA to regulate GHGs. The court did not hold that the USEPA was required to regulate GHG emissions; however, it indicated that the agency must decide whether GHGs cause or contribute to air pollution that is reasonably anticipated to endanger public health or welfare. On December 7, 2009, the USEPA Administrator signed two distinct findings regarding GHGs under Section 202(a) of the CAA. The USEPA adopted a Final Endangerment Finding for the six defined GHGs (CO_2, CH_4, N_2O, HFCs, PFCs, and SF_6) on December 7, 2009. The Endangerment Finding is required before USEPA can regulate GHG emissions under Section 202(a)(1) of the CAA consistently with the United States Supreme Court decision. The USEPA also adopted a Cause or Contribute Finding in which the USEPA Administrator found that GHG emissions from new motor vehicle and motor vehicle engines are contributing to air pollution, which is endangering public health and welfare. These findings do not, by themselves, impose any requirements on industry or other entities. However, these actions were a prerequisite for implementing GHG emissions standards for vehicles.

Executive Order 13432

In response to the *Massachusetts v. Environmental Protection Agency* ruling, the president signed Executive Order 13432 on May 14, 2007, directing the USEPA, along with the Departments of Transportation, Energy, and Agriculture, to initiate a regulatory process that responds to the Supreme Court's decision. Executive Order 13432 was codified into law by the 2009 Omnibus Appropriations Law signed on February 17, 2009. The order sets goals in the areas of energy efficiency, acquisition, renewable energy, toxics reductions, recycling, sustainable buildings, electronics stewardship, fleets, and water conservation.

Energy Independence and Security Act

The Energy Independence and Security Act of 2007 (EISA) facilitates the reduction of national GHG emissions by requiring the following:

- Increasing the supply of alternative fuel sources by setting a mandatory Renewable Fuel Standard (RFS) that requires fuel producers to use at least 36 billion gallons of biofuel in 2022;
- Prescribing or revising standards affecting regional efficiency for heating and cooling products, procedures for new or amended standards, energy conservation, energy efficiency labeling for consumer electronic products, residential boiler efficiency, electric motor efficiency, and home appliances;
- Requiring approximately 25 percent greater efficiency for light bulbs by phasing out incandescent light bulbs between 2012 and 2014; requiring approximately 200 percent greater efficiency for light bulbs, or similar energy savings, by 2020; and
- While superseded by the USEPA and the National Highway Traffic Safety Administration (NHTSA) actions described above, (i) establishing miles per gallon targets for cars and light trucks and (ii) directing the NHTSA to establish a fuel economy program for medium- and heavy-duty trucks and create a separate fuel economy standard for trucks.

Additional provisions of EISA address energy savings in government and public institutions, promote research for alternative energy, additional research in carbon capture, international energy programs, and the creation of green jobs.[5]

Light-Duty Vehicle Fuel Efficiency Standards

In response to the *Massachusetts v. Environmental Protection Agency* ruling, President George W. Bush issued Executive Order 13432 in 2007, directing the USEPA, the U.S. Department of Transportation (USDOT), and the U.S. Department of Energy (USDOE) to establish regulations that reduce GHG emissions from motor vehicles, non-road vehicles, and non-road engines by 2008. The National Highway Traffic Safety Administration (NHTSA) subsequently issued multiple final rules, known as the Corporate Average Fuel Economy (CAFE)[6] standards, regulating fuel efficiency for, and GHG emissions from, cars and light-duty trucks for model year 2011 and later for model years 2012–2016 and 2017–2021. In April 2020, the USDOT and the USEPA issued the final Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule, which amends existing CAFE standards and tailpipe carbon dioxide emissions standards for passenger cars and light trucks and establishes new standards covering model years 2021 through 2026 (USEPA 2020). These standards set a combined fleet wide average of 33.2 to 37.1 for the model years affected (USEPA 2020).

In February 2022, the USEPA issued the Revised 2023 and Later Model Year Light-Duty Vehicle Greenhouse Gas Emissions Standards (USEPA 2021a). This final rule revises current GHG standards beginning for vehicles in model year 2023 and through model year 2026 and establishes the most stringent GHG standards ever set for the light-duty vehicle sector that are expected to result in average fuel economy label values of 40 mpg, while the standards they replace (the SAFE rule standards) would achieve only 32 mpg in model year 2026 vehicles (USEPA 2021b).

On July 28, 2023, the NHTSA proposed new CAFE standards for passenger cars and light trucks for model years 2027 through 2032, and new fuel efficiency standards for heavy-duty pickup trucks and vans for model years 2030 through 2035. The proposed rule would require an industry fleet-wide average of approximately 58 mpg for passenger cars and light trucks in model year 2032, by increasing fuel economy by 2 percent year over year for passenger cars and 4 percent year over year for light trucks (NHTSA 2023). For heavy-duty pickup trucks and vans, the proposed rule would increase fuel efficiency by 10 percent year over year (NHTSA 2023).

Heavy-Duty Engines and Vehicle Fuel Efficiency Standards

In addition to the regulations applicable to cars and light-duty trucks described above, in 2011 the NHTSA announced fuel economy and GHG standards for medium- and heavy-duty trucks for model years 2014–2018 (NHTSA 2011). The standards for CO_2 emissions and fuel consumption are tailored to three main vehicle categories: combination tractors, heavy-duty pickup trucks and vans, and vocational vehicles. According to the USEPA, this regulatory program would reduce GHG emissions and fuel consumption

[5] A green job, as defined by the United States Department of Labor, is a job in business that produces goods or provides services that benefit the environment or conserve natural resources.

[6] The Corporate Average Fuel Economy standards are regulations in the United States, first enacted by Congress in 1975, to improve the average fuel economy of cars and light trucks. The U.S Department of Transportation has delegated the National Highway Traffic Safety Administration as the regulatory agency for the Corporate Average Fuel Economy standards.

for the affected vehicles by 6 to 23 percent over the 2010 baselines. Building on the first phase of standards, in August 2016, the NHTSA finalized Phase 2 standards for medium and heavy-duty vehicles through model year 2027 that will improve fuel efficiency and cut carbon pollution (NHTSA 2016). The Phase 2 standards are expected to lower CO_2 emissions by approximately 1.1 billion metric tons (NHTSA 2016). On April 12, 2023, the NHTSA proposed Phase 3 of the GHG Emissions Standards for heavy-duty vehicles beginning in model year 2027 which would set new, more stringent standards for model years 2028 through 2032 (USEPA 2023). The Phase 3 greenhouse gas standards would apply to heavy-duty vocational vehicles (such as delivery trucks, refuse haulers, public utility trucks, transit, shuttle, school buses, etc.) and tractors (such as day cabs and sleeper cabs on tractor-trailer trucks). Specifically, the Phase 3 rule proposes stronger CO_2 standards for model year 2027 heavy-duty vehicles that go beyond the current Phase 2 standards and is proposing an additional set of CO_2 standards that would begin to apply in model year 2028, with progressively lower standards each model year through 2032 (USEPA 2023).

Paris Agreement

During the Leaders' Summit on Climate in April 2021, President Biden fulfilled his promise to rejoin the Paris Agreement and set a course for the United States to tackle the climate crisis at home and abroad, reaching net zero emissions economy-wide by no later than 2050. Additionally, as part of reentering the Paris Agreement, the United States established a new 2030 GHG emissions target, known as the "nationally determined contribution," which is a formal submission to the United Nations Framework Convention on Climate Change. The United States' nationally determined contribution target aims for a 50–52 percent reduction in GHG emissions from 2005 levels by 2030 (White House Briefing Room 2021b). To achieve these goals, the United States has committed to all the following actions:

- Achieve 100 percent carbon pollution-free electricity by 2035.
- Support efficiency upgrades and electrification in buildings.
- Reduce carbon pollution from the transportation sector.
- Reduce emissions from forests and agriculture and enhance carbon sinks.
- Address carbon pollution from industrial process.
- Reduce non-CO_2 GHGs, including methane, hydrofluorocarbons, and other potent short-lived climate pollutants.

State

Air Quality

California Clean Air Act

The California Clean Air Act, signed into law in 1988, requires all areas of the state to achieve and maintain the CAAQS by the earliest practical date. CARB, a part of the California Environmental Protection Agency (CalEPA), is responsible for the coordination and administration of both State and federal air pollution control programs within California. In this capacity, CARB conducts research, sets the CAAQS, compiles emission inventories, develops suggested control measures, and provides oversight of local programs. CARB establishes emissions standards for motor vehicles sold in California, consumer products, and various types of commercial equipment. It also sets fuel specifications to further reduce

vehicular emissions. Table 3.2-3 includes the CAAQS currently in effect for each of the criteria pollutants, as well as other pollutants recognized by the state. As shown in Table 3.2-3, the CAAQS have more stringent standards than the NAAQS. The Air Basin fails to meet State standards for O_3, PM10, and PM2.5 and, therefore, is considered "non-attainment" for these pollutants.

California Code of Regulations

The California Code of Regulations (CCR) is the official compilation and publication of regulations adopted, amended or repealed by the state agencies pursuant to the Administrative Procedure Act. The CCR includes regulations that pertain to air quality emissions. Specifically, Section 2485 in Title 13 of the CCR states that the idling of all diesel-fueled commercial vehicles (weighing over 10,000 pounds) during construction shall be limited to five minutes at any location. In addition, Section 93115 in Title 17 of the CCR states that operations of any stationary, diesel-fueled, compression-ignition engines shall meet specified fuel and fuel additive requirements and emissions standards.

California Air Resources Board On-Road and Off-Road Vehicle Rules

CARB has adopted numerous regulations to reduce emissions from on-road and off-road vehicles. These include the Airborne Toxic Control Measure (ATCM) which limits heavy-duty diesel motor vehicle idling in order to reduce public exposure to diesel PM and other TACs (Title 13 California Code of Regulations [CCR], Section 2485); the Truck and Bus regulation which reduces NO_X, PM10, and PM2.5 emissions from existing diesel vehicles operating in California (13 CCR, Section 2025); and the Advanced Clean Trucks (ACT) regulation which mandates zero-emission vehicle (ZEV) sales requirements for truck manufacturers and a one-time reporting requirement for large entities and fleets (CARB 2024k). The ACT regulation is designed to accelerate widespread adoption of ZEVs in the medium- and heavy-duty truck sector to reduce on-road mobile source emissions on the path to carbon neutrality by 2045 (EO B-55-18). Starting in 2024, zero-emission powertrain certification will be required. Most recently, in September 2020, Governor Gavin Newsom announced Executive Order N-79-20 stating that 100 percent of new passenger cars and 100 percent of operations for drayage trucks and off-road vehicles and equipment shall be ZE by 2035. By 2045, 100 percent of operations of medium- and heavy-duty vehicles shall be ZE (JD Supra 2020).

In addition to limiting exhaust from idling trucks, CARB promulgated emission standards for off-road diesel construction equipment of greater than 25 horsepower such as bulldozers, loaders, backhoes and forklifts, as well as many other self-propelled off-road diesel vehicles, which aims to reduce emissions by the installation of diesel soot filters and encouraging the retirement, replacement, or repower of older, dirtier engines with newer emission-controlled models (13 CCR, Section 2449).

Toxic Air Contaminants

The California Air Toxics Program was established in 1983, when the California Legislature adopted Assembly Bill (AB) 1807 to establish a two-step process of risk identification and risk management to address potential health effects from exposure to toxic substances in the air. In the risk identification step, CARB and the Office of Environmental Health Hazard Assessment (OEHHA) determine if a substance should be formally identified, or "listed," as a TAC in California. Since the inception of the program, a number of such substances have been listed (https://ww2.arb.ca.gov/resources/documents/carb-identified-toxic-air-contaminants). In 1993, the California Legislature amended the program to identify the 189 federal HAPs as TACs. The SCAQMD has not adopted guidance applicable to land use projects that requires a quantitative health risk assessment be performed for construction exposures to TAC emissions

(SCAQMD 2016b). The SCAQMD states that: "SCAQMD currently does not have guidance on construction Health Risk Assessments" (SCAQMD 2016b).

The AB 1807 program is supplemented by the AB 2588 Air Toxics "Hot Spots" program, which was established by the California Legislature in 1987. Under this program, facilities are required to report their air toxics emissions, assess health risks, and notify nearby residents and workers of significant risks if present. In 1992, the AB 2588 program was amended by Senate Bill (SB) 1731 to require facilities that pose a significant health risk to the community to reduce their risk through implementation of a risk management plan.

Greenhouse Gases

Executive Order S-3-05

Executive Order S-3-05 set forth the following targets for progressively reducing statewide GHG emissions (Office of the Governor 2005):

- By 2010, California shall reduce GHG emissions to 2000 levels;
- By 2020, California shall reduce GHG emissions to 1990 levels; (CARB 2022) and
- By 2050, California shall reduce GHG emissions to 80 percent below 1990 levels.

The executive order directed the Secretary of CalEPA to coordinate a multi-agency effort to reduce GHG emissions to the target levels. The Secretary is also mandating that biannual reports be submitted to the California Governor and Legislature describing the progress made toward the emissions targets, the impacts of global climate change on California's resources, and mitigation and adaptation plans to combat these impacts. To comply with the executive order, the secretary of CalEPA created the California Climate Action Team (CAT), made up of members from various state agencies and commissions. The first CAT Report to the Governor and the Legislature in 2006 contained recommendations and strategies to help meet the targets in EO S-3-05. The most recent 2022 State Agency Greenhouse Gas Reduction Report Card documents the effectiveness of measures to reduce GHG emissions in California and GHG emissions from state agencies' operations. This report card documents reductions of 1.157 $MMTCO_2e$ that occurred in 2021 (CalEPA 2023). In 2016, GHG emissions were 429 $MMTCO_2e$, showing that California reached its 2020 emissions target (431 $MMTCO_2e$) four years early and emissions are continuing to decline.

Executive Order B-30-15

In 2015, Executive Order B-30-15, promulgated the following targets and measures (Office of the Governor 2015):

- Established a new interim statewide reduction target to reduce GHG emissions to 40 percent below 1990 levels by 2030.
- Ordered all State agencies with jurisdiction over sources of GHG emissions to implement measures to achieve reductions of GHG emissions to meet the 2030 and 2050 reduction targets.
- Directed CARB to update the Climate Change Scoping Plan to express the 2030 target in terms of million metric tons of carbon dioxide equivalent.

Executive Order B-55-18

EO B-55-18 was signed by Governor Edmund G. Brown Jr. on September 10, 2018 (Office of the Governor 2018). The order establishes an additional statewide policy to achieve carbon neutrality by 2045 and maintain net negative emissions thereafter. As per EO B-55-18, CARB is directed to work with relevant state agencies to develop a framework for implementation and accounting that tracks progress toward this goal and to ensure future Climate Change Scoping Plans identify and recommend measures to achieve the carbon neutrality goal. California is making progress towards the 2045 goal, however the pathway to carbon neutrality is still under development. According to CARB, there will be a strong reliance on energy efficiency, electrification, low carbon fuels (including low-carbon electricity), and CO_2 removal in future policies and strategies for reaching the ambitious goal. The path to carbon neutrality lies in striving for zero emissions from all new sources and maximum sequestration to offset existing sources.

Executive Order N-79-20

Executive Order N-79-20 was signed by Governor Newsom on September 23, 2020. The order directs CARB to develop and propose regulations that would require a ramp up to 100 percent in-state sales of new zero-emissions passenger vehicles (cars and trucks) and drayage trucks by 2035. The Executive Order further directs CARB to promulgate regulations that would require a ramp up to 100 percent in-state sales of medium- and heavy-duty trucks by 2045 "for all operations where feasible." The Executive Order also instructs CARB to develop and propose "strategies" (as opposed to regulations) to achieve zero emissions from off-road vehicles and equipment operations in the state by 2035. The order also directs State agencies to take a number of actions focused on the oil and gas industry, including, but not limited to, a direction to CARB to strengthen and extend the Low Carbon Fuel Standard program beyond 2030.

Assembly Bill 32 (California Global Warning Solutions Act of 2006)

In 2006, the California Legislature adopted Assembly Bill (AB) 32 (codified in the California Health and Safety Code [HSC], Division 25.5, California Global Warming Solutions Act of 2006), which focuses on reducing GHG emissions in California to 1990 levels by 2020. AB 32 defines GHGs as CO_2, CH_4, N_2O, HFCs, PFCs, and SF_6 and represents the first enforceable statewide program to limit emissions of these GHGs from all major industries with penalties for noncompliance. The law further requires that reduction measures be technologically feasible and cost effective. Under AB 32, CARB has the primary responsibility for reducing GHG emissions. AB 32 required CARB to adopt rules and regulations directing state actions that would achieve GHG emissions reductions equivalent to 1990 statewide levels by 2020.

Senate Bill 32 and Assembly Bill 197

In 2016, the California Legislature adopted Senate Bill (SB) 32 and its companion bill AB 197. SB 32 and AB 197 amended Health and Safety Code Division 25.5 and established a new climate pollution reduction target of 40 percent below 1990 levels by 2030, with provisions included to ensure that the benefits of state climate policies reach into vulnerable communities.

Assembly Bill 1279 (California Climate Crisis Act)

The Legislature enacted AB 1279 (CLI 2022), The California Climate Crisis Act, on September 16, 2022. AB 1279 establishes the policy of the State to achieve net zero GHG emissions, carbon neutrality,[7] as soon as possible, but no later than 2045 and to achieve and maintain net negative GHG emissions thereafter. Additionally, AB 1279 ensures that by 2045 Statewide anthropogenic greenhouse gas emissions are reduced at least 85 percent below 1990 levels. SB 1279 also requires CARB to ensure that the Scoping Plan identifies and recommends measures to achieve carbon neutrality, and to identify and implement policies and strategies for carbon dioxide removal solutions and carbon capture, utilization, and storage technologies. It also requires CARB to submit an annual report on progress in achieving the Scoping Plan's goals.

2022 Scoping Plan for Achieving Carbon Neutrality

The *2022 Scoping Plan for Achieving Carbon Neutrality* (2022 Scoping Plan), adopted by CARB in December 2022, expands on prior scoping plans. The 2022 Scoping Plan Update is the most comprehensive and far-reaching Scoping Plan developed to date. This plan responds to more recent legislation, outlining a technologically feasible, cost-effective, and equity-focused path to achieve the state's climate target of reducing anthropogenic emissions to 85 percent below 1990 levels by 2045, while also assessing the progress California is making toward the 40 percent below 1990 levels by 2030, and achieving carbon neutrality by 2045 or earlier (CARB 2022a). The 2030 target is an interim but important steppingstone along the critical path to the broader goal of deep decarbonization by 2045. The 2022 Scoping Plan outlines the strategies the state will implement to achieve carbon neutrality by reducing GHG emissions to meet the anthropogenic target, and by expanding actions to capture and store carbon through the state's natural and working lands and using a variety of mechanical approaches. A summary of the GHG emissions reductions and targets set forth under the 2022 Scoping Plan Update is provided in **Table 3.2-4**.

The 2022 Scoping Plan Update reflects existing and recent direction in the Governor's Executive Orders and State Statutes, which identify policies, strategies, and regulations in support of and implementation of the Scoping Plan. Among these include Executive Order B-55-18 and AB 1279 (The California Climate Crisis Act), which identify the 2045 carbon neutrality and GHG reduction targets required for the Scoping Plan. **Table 3.2-5** provides a summary of major climate legislation and executive orders issued since the adoption of the 2017 Scoping Plan.

The 2022 Scoping Plan Update identifies the need to accelerate AB32's 2030 target, from 40 percent to 48 percent below 1990 levels. Cap-and-Trade regulation continues to play a large factor in the reduction of near-term emissions for meeting the 2030 reduction target. Every sector of the economy will need to begin to transition in this decade to meet these GHG reduction goals and achieve carbon neutrality no later than 2045. The 2022 Scoping Plan Update approaches decarbonization from two perspectives, managing a phasedown of existing energy sources and technologies, as well as increasing, developing, and deploying alternative clean energy sources and technology.

[7] *Carbon neutrality* means "net zero" emissions of GHGs. In other words, it means that GHG emissions generated by sources such as transportation, power plants, and industrial processes must be less than or equal to the amount of carbon dioxide that is stored, both in natural sinks and through mechanical sequestration. AB 1279 uses the terminology net zero and the 2022 Scoping Plan uses the terminology carbon neutrality or carbon neutral. These terms mean the same thing and are used interchangeably.

TABLE 3.2-4
ESTIMATED STATEWIDE GREENHOUSE GAS EMISSIONS REDUCTIONS IN THE 2022 SCOPING PLAN

Emissions Scenario	GHG Emissions ($MMTCO_2e$)
2019	
2019 State GHG Emissions	404
2030	
2030 BAU Forecast	312
2030 GHG Emissions without Carbon Removal and Capture	233
2030 GHG Emissions with Carbon Removal and Capture	226
2030 Emissions Target Set by AB 32 (i.e., 1990 level by 2030)	260
Reduction below Business-As-Usual necessary to achieve 1990 levels by 2030	52 (16.7%)a
2045	
2045 BAU Forecast	266
2045 GHG Emissions without Carbon Removal and Capture	72
2045 GHG Emissions with Carbon Removal and Capture	(3)

SOURCE: CARB, *Final 2022 Scoping Plan for Achieving Carbon Neutrality*, 2022, accessed March 2024, https://ww2.arb.ca.gov/sites/default/files/2023-04/2022-sp.pdf.

ABBREVIATION: $MMTCO_2e$ = million metric tons of carbon dioxide equivalents; parenthetical numbers represent negative values.

NOTE:

a. 312 – 260 = 52 /312 = 16.7%

TABLE 3.2-5
MAJOR CLIMATE LEGISLATION AND EXECUTIVE ORDERS ENACTED SINCE THE 2017 SCOPING PLAN

Bill/Executive Order	Summary
Assembly Bill 1279 (AB 1279) (Muratsuchi, Chapter 337, Statutes of 2022) *The California Climate Crisis Act*	AB 1279 establishes the policy of the state to achieve carbon neutrality as soon as possible, but no later than 2045; to maintain net negative GHG emissions thereafter; and to ensure that by 2045 statewide anthropogenic GHG emissions are reduced at least 85 percent below 1990 levels. The bill requires CARB to ensure that Scoping Plan updates identify and recommend measures to achieve carbon neutrality, and to identify and implement policies and strategies that enable CO_2 removal solutions and carbon capture, utilization, and storage (CCUS) technologies. This bill is reflected directly in 2022 Scoping Plan Update.
Senate Bill 905 (SB 905) (Caballero, Chapter 359, Statutes of 2022) *Carbon Capture, Removal, Utilization, and Storage Program*	SB 905 requires CARB to create the Carbon Capture, Removal, Utilization, and Storage Program to evaluate, demonstrate, and regulate CCUS and carbon dioxide removal (CDR) projects and technology. The bill requires CARB, on or before January 1, 2025, to adopt regulations creating a unified state permitting application for approval of CCUS and CDR projects. The bill also requires the Secretary of the Natural Resources Agency to publish a framework for governing agreements for two or more tracts of land overlying the same geologic storage reservoir for the purposes of a carbon sequestration project. The 2022 Scoping Plan Update modeling reflects both CCUS and CDR contributions to achieve carbon neutrality.
Senate Bill (SB 1020) (Laird, Chapter 361, Statutes of 2022) *Clean Energy, Jobs, and Affordability Act of 2022*	SB 1020 adds interim renewable energy and zero carbon energy retail sales of electricity targets to California end-use customers set at 90 percent in 2035 and 95 percent in 2040. It accelerates the timeline required to have 100 percent renewable energy and zero carbon energy procured to serve state agencies from the original target year of 2045 to 2035. This bill requires each state agency to individually achieve the 100 percent goal by 2035 with specified requirements. This bill requires the CPUC, CEC, and CARB, on or before December 1, 2023, and annually thereafter, to issue a joint reliability progress report that reviews system and local reliability. The bill also modifies the requirement for CARB to hold a portion of its Scoping Plan workshops in regions of the state with the most significant exposure to air pollutants by further specifying

Bill/Executive Order	Summary
	that this includes communities with minority populations or low-income communities in areas designated as being in extreme federal non-attainment. The 2022 Scoping Plan Update describes the implications of this legislation on emissions.
Senate Bill 1075 (SB 1075) (Skinner, Chapter 363, Statutes of 2022) *Hydrogen: Green Hydrogen: Emissions of Greenhouse Gases*	SB 1075 requires CARB, by June 1, 2024, to prepare an evaluation that includes: policy recommendations regarding the use of hydrogen, and specifically the use of green hydrogen, in California; a description of strategies supporting hydrogen infrastructure, including identifying policies that promote the reduction of GHGs and short-lived climate pollutants; a description of other forms of hydrogen to achieve emission reductions; an analysis of curtailed electricity; an estimate of GHG and emission reductions that could be achieved through deployment of green hydrogen through a variety of scenarios; an analysis of the potential for opportunities to integrate hydrogen production and applications with drinking water supply treatment needs; policy recommendations for regulatory and permitting processes associated with transmitting and distributing hydrogen from production sites to end uses; an analysis of the life-cycle GHG emissions from various forms of hydrogen production; and an analysis of air pollution and other environmental impacts from hydrogen distribution and end uses. This bill would inform the production of hydrogen at the scale called for in the 2022 Scoping Plan Update.
Assembly Bill 1757 (AB 1757) (Garcia, Chapter 341, Statutes of 2022) *California Global Warming Solutions Act of 2006: Climate Goal: Natural and Working Lands*	AB 1757 requires the California Natural Resources Agency (CNRA), in collaboration with CARB, other state agencies, and an expert advisory committee, to determine a range of targets for natural carbon sequestration, and for nature-based climate solutions, that reduce GHG emissions in 2030, 2038, and 2045 by January 1, 2024. These targets must support state goals to achieve carbon neutrality and foster climate adaptation and resilience. This bill also requires CARB to develop standard methods for state agencies to consistently track GHG emissions and reductions, carbon sequestration, and additional benefits from natural and working lands over time. These methods will account for GHG emissions reductions of CO_2, methane, and nitrous oxide related to natural and working lands and the potential impacts of climate change on the ability to reduce GHG emissions and sequester carbon from natural and working lands, where feasible. This 2022 Scoping Plan Update describes the next steps and implications of this legislation for the natural and working lands sector.
Senate Bill 1206 (SB 1206) (Skinner, Chapter 884, Statutes of 2022) *Hydrofluorocarbon gases: sale or distribution*	SB 1206 mandates a stepped sales prohibition on newly produced high- global warming potential (GWP) hydrofluorocarbons (HFCs) to transition California's economy toward recycled and reclaimed HFCs for servicing existing HFC-based equipment. Additionally, SB 1206 also requires CARB to develop regulations to increase the adoption of very low-, i.e., GWP < 10, and no-GWP technologies in sectors that currently rely on higher-GWP HFCs.
Senate Bill 27 (SB 27) (Skinner, Chapter 237, Statutes of 2021) *Carbon Sequestration: State Goals: Natural and Working Lands: Registry of Projects*	SB 27 requires CNRA, in coordination with other state agencies, to establish the Natural and Working Lands Climate Smart Strategy by July 1, 2023. This bill also requires CARB to establish specified CO_2 removal targets for 2030 and beyond as part of its Scoping Plan. Under SB 27, CNRA is to establish and maintain a registry to identify projects in the state that drive climate action on natural and working lands and are seeking funding. CNRA also must track carbon removal and GHG emission reduction benefits derived from projects funded through the registry. This bill is reflected directly in 2022 Scoping Plan Update as CO_2 removal targets for 2030 and 2045 in support of carbon neutrality.
Senate Bill 596 (SB 596) (Becker, Chapter 246, Statutes of 2021) *Greenhouse Gases: Cement Sector: Net-Zero Emissions Strategy*	SB 596 requires CARB, by July 1, 2023, to develop a comprehensive strategy for the state's cement sector to achieve net-zero emissions of GHGs associated with cement used within the state as soon as possible, but no later than December 31, 2045. The bill establishes an interim target of 40 percent below the 2019 average GHG intensity of cement by December 31, 2035. Under SB 596, CARB must: Define a metric for GHG intensity and establish a baseline from which to measure GHG intensity reductions. • Evaluate the feasibility of the 2035 interim target (40 percent reduction in GHG intensity) by July 1, 2028. • Coordinate and consult with other state agencies. • Prioritize actions that leverage state and federal incentives. • Evaluate measures to support market demand and financial incentives to encourage the production and use of cement with low GHG intensity. The 2022 Scoping Plan Update modeling is designed to achieve these outcomes.

Bill/Executive Order	Summary
Executive Order N-82-20	Governor Newsom signed Executive Order N-82-20 in October 2020 to combat the climate and biodiversity crises by setting a statewide goal to conserve at least 30 percent of California's land and coastal waters by 2030. The Executive Order also instructed the CNRA, in consultation with other state agencies, to develop a Natural and Working Lands Climate Smart Strategy that serves as a framework to advance the state's carbon neutrality goal and build climate resilience. In addition to setting a statewide conservation goal, the Executive Order directed CARB to update the target for natural and working lands in support of carbon neutrality as part of this Scoping Plan, and to take into consideration the NWL Climate Smart Strategy. CO_2 Executive Order N-82-20 also calls on the CNRA, in consultation with other state agencies, to establish the California Biodiversity Collaborative (Collaborative). The Collaborative shall be made up of governmental partners, California Native American tribes, experts, business and community leaders, and other stakeholders from across the state. State agencies will consult the Collaborative on efforts to: • Establish a baseline assessment of California's biodiversity that builds upon existing data and can be updated over time. • Analyze and project the impact of climate change and other stressors in California's biodiversity. • Inventory current biodiversity efforts across all sectors and highlight opportunities for additional action to preserve and enhance biodiversity. CNRA also is tasked with advancing efforts to conserve biodiversity through various actions, such as streamlining the state's process to approve and facilitate projects related to environmental restoration and land management. The California Department of Food and Agriculture (CDFA) is directed to advance efforts to conserve biodiversity through measures such as reinvigorating populations of pollinator insects, which restore biodiversity and improve agricultural production. The Natural and Working Lands Climate Smart Strategy informs 2022 Scoping Plan Update.
Executive Order N-79-20	Governor Newsom signed Executive Order N-79-20 in September 2020 to establish targets for the transportation sector to support the state in its goal to achieve carbon neutrality by 2045. The targets established in this Executive Order are: • 100 percent of in-state sales of new passenger cars and trucks will be zero-emission by 2035. • 100 percent of medium- and heavy-duty vehicles will be zero-emission by 2045 for all operations where feasible, and by 2035 for drayage trucks. • 100 percent of off-road vehicles and equipment will be zero-emission by 2035 where feasible. The Executive Order also tasked CARB to develop and propose regulations that require increasing volumes of zero- electric passenger vehicles, medium- and heavy-duty vehicles, drayage trucks, and off-road vehicles toward their corresponding targets of 100 percent zero-emission by 2035 or 2045, as listed above. The 2022 Scoping Plan Update modeling reflects achieving these targets.
Executive Order N-19-19	Governor Newsom signed Executive Order N-19-19 in September 2019 to direct state government to redouble its efforts to reduce GHG emissions and mitigate the impacts of climate change while building a sustainable, inclusive economy. This Executive Order instructs the Department of Finance to create a Climate Investment Framework that: • Includes a proactive strategy for the state's pension funds that reflects the increased risks to the economy and physical environment due to climate change. • Provides a timeline and criteria to shift investments to companies and industry sectors with greater growth potential based on their focus of reducing carbon emissions and adapting to the impacts of climate change. • Aligns with the fiduciary responsibilities of the California Public Employees' Retirement System, California State Teachers' Retirement System, and the University of California Retirement Program. Executive Order N-19-19 directs the State Transportation Agency to leverage more than $5 billion in annual state transportation spending to help reverse the trend of increased fuel consumption and reduce GHG emissions associated with the transportation sector. It also calls on the Department of General Services to leverage its management and ownership of the state's 19 million square feet in managed buildings, 51,000 vehicles, and other physical assets and goods to minimize state government's carbon footprint. Finally, it tasks CARB with accelerating progress toward California's goal of five million ZEV sales by 2030 by: • Developing new criteria for clean vehicle incentive programs to encourage manufacturers to produce clean, affordable cars.

Bill/Executive Order	Summary
	• Proposing new strategies to increase demand in the primary and secondary markets for ZEVs. • Considering strengthening existing regulations or adopting new ones to achieve the necessary GHG reductions from within the transportation sector. The 2022 Scoping Plan Update modeling reflects efforts to accelerate ZEV deployment.
Executive Order B-55-18	Governor Brown signed Executive Order B-55-18 in September 2018 to establish a statewide goal to achieve carbon neutrality as soon as possible, and no later than 2045, and to achieve and maintain net negative emissions thereafter. Policies and programs undertaken to achieve this goal shall: • Seek to improve air quality and support the health and economic resiliency of urban and rural communities, particularly low-income and disadvantaged communities. • Be implemented in a manner that supports climate adaptation and biodiversity, including protection of the state's water supply, water quality, and native plants and animals. This Executive Order also calls for CARB to: • Develop a framework for implementation and accounting that tracks progress toward this goal. • Ensure future Scoping Plans identify and recommend measures to achieve the carbon neutrality goal. The 2022 Scoping Plan Update is designed to achieve carbon neutrality no later than 2045 and the modeling includes technology and fuel transitions to achieve that outcome.
Senate Bill 100 (SB 100) (De León, Chapter 312, Statutes of 2018) *California Renewables Portfolio Standard Program: emissions of greenhouse gases*	Under SB 100, the CPUC, CEC, and CARB shall use programs under existing laws to achieve 100 percent clean electricity. The statute requires these agencies to issue a joint policy report on SB 100 every four years. The first of these reports was issued in 2021. The 2022 Scoping Plan Update reflects the SB 100 Core Scenario resource mix with a few minor updates.
Assembly Bill 2127 (AB 2127) (Ting, Chapter 365, Statutes of 2018) *Electric Vehicle Charging Infrastructure: Assessment*	This bill requires the CEC, working with CARB and the CPUC, to prepare and biennially update a statewide assessment of the electric vehicle charging infrastructure needed to support the levels of electric vehicle adoption required for the state to meet its goals of putting at least 5 million zero-emission vehicles on California roads by 2030 and of reducing emissions of GHGs to 40 percent below 1990 levels by 2030. The bill requires the CEC to regularly seek data and input from stakeholders relating to electric vehicle charging infrastructure. This bill supports the deployment of ZEVs as modeled in 2022 Scoping Plan Update.
Senate Bill 30 (SB 30) (Lara, Chapter 614, Statutes of 2018) *Insurance: Climate Change*	This bill requires the Insurance Commissioner to convene a working group to identify, assess, and recommend risk transfer market mechanisms that, among other things, promote investment in natural infrastructure to reduce the risks of climate change related to catastrophic events, create incentives for investment in natural infrastructure to reduce risks to communities, and provide mitigation incentives for private investment in natural lands to lessen exposure and reduce climate risks to public safety, property, utilities, and infrastructure. The bill requires the policies recommended to address specified questions.
Assembly Bill 2061 (AB 2061) (Frazier, Chapter 580, Statutes of 2018) *Near-Zero-Emission and Zero-Emission Vehicles*	Existing state and federal law sets specified limits on the total gross weight imposed on the highway by a vehicle with any group of two or more consecutive axles. Under existing federal law, the maximum gross vehicle weight of that vehicle may not exceed 82,000 pounds. AB 2061 authorizes a near-zero- emission vehicle or a zero-emission vehicle to exceed the weight limits on the power unit by up to 2,000 pounds. This bill supports the deployment of cleaner trucks as modeled in this 2022 Scoping Plan Update.

Achieving the targets described in the 2022 Scoping Plan Update will require continued commitment to and successful implementation of existing policies and programs, and identification of new policy tools and technical solutions to go further, faster. California's Legislature and state agencies will continue to collaborate to achieve the state's climate, clean air, equity, and broader economic and environmental protection goals. It will be necessary to maintain and strengthen this collaborative effort, and to draw upon the assistance of the federal government, regional and local governments, tribes, communities, academic institutions, and the private sector to achieve the state's near-term and longer-term emission

reduction goals and a more equitable future for all Californians. The Scoping Plan acknowledges that the path forward is not dependent on one agency, one state, or even one country. However, the State can lead by engaging Californians and demonstrating how actions at the state, regional, and local levels of governments, as well as action at community and individual levels, can contribute to addressing the challenge.

Appendix D, *Local Actions*, of the 2022 Scoping Plan Update includes "recommendations intended to build momentum for local government actions that align with the State's climate goals, with a focus on local GHG reduction strategies (commonly referred to as climate action planning) and approval of new land use development projects, including through environmental review under the California Environmental Quality Act (CEQA)." Appendix D is intended to provide clarification on challenges local jurisdictions face when implementing GHG reduction strategies or approving much-needed housing projects (CARB 2022a).

Aligning local jurisdiction action with state-level priorities to tackle climate change and the outcomes called for in the 2022 Scoping Plan Update is critical to achieving the statutory targets for 2030 and 2045. The 2022 Scoping Plan Update discusses the role of local governments in meeting the State's GHG reductions goals. Local governments have the primary authority to plan, zone, approve, and permit how and where land is developed to accommodate population growth, economic growth, and the changing needs of their jurisdictions. They also make critical decisions on how and when to deploy transportation infrastructure, and can choose to support transit, walking, bicycling, and neighborhoods that do not force people into cars. Local governments also have the option to adopt building ordinances that exceed statewide building code requirements and play a critical role in facilitating the rollout of ZEV infrastructure. As a result, local government decisions play a critical role in supporting state-level measures to contain the growth of GHG emissions associated with the transportation system and the built environment—the two largest GHG emissions sectors over which local governments have authority.

Regional

South Coast Air Quality Management District (SCAQMD)

The SCAQMD is primarily responsible for planning, implementing, and enforcing air quality standards for the Air Basin which includes all of Orange County, and most of Los Angeles County, San Bernardino County, and Riverside County. The Air Basin is an approximately 6,745-square-mile area bounded by the Pacific Ocean to the west and the San Gabriel, San Bernardino, and San Jacinto Mountains to the north and east. The Air Basin is a subregion within the western portion of the SCAQMD jurisdiction. While air quality in the Air Basin has improved, the Air Basin requires continued diligence to meet the air quality standards.

Air Quality Management Plan

To meet the NAAQS and CAAQS, the SCAQMD has adopted a series of Air Quality Management Plans (AQMPs), which serve as a regional blueprint to develop and implement an emission reduction strategy that will bring the Air Basin into attainment with the standards in a timely manner. The most current AQMP is the *2022 Air Quality Management Plan* (2022 AQMP), which was adopted on December 2, 2022 (SCAQMD 2022). The goal of the 2022 AQMP is to provide a regional roadmap to help the Air Basin achieve the USEPA's NAAQS 2015 8-hour ozone standard (70 parts per billion).

On January 26, 2023, CARB adopted Resolution 23-4, which directs the CARB Executive Officer to submit the 2022 AQMP to the USEPA for inclusion in the California SIP to be effective, for purposes of federal law, after notice and public hearing as required by Section 110(l) of the Clean Air Act and 40 Code of Federal Regulations Section 51.102 and approval by the USEPA. USEPA approval has not yet occurred.

The 2022 AQMP builds upon measures already in place from previous AQMPs. It also includes a variety of additional strategies such as regulation, accelerated deployment of available cleaner technologies (e.g., zero emissions technologies, when cost-effective and feasible, and low NOx technologies in other applications), best management practices, co-benefits from existing programs (e.g., climate and energy efficiency), incentives, and other CAA measures to achieve the 2015 8-hour ozone standard.

The 2022 AQMP incorporates the transportation strategy and transportation control measures from Southern California Association of Governments (SCAG) Connect SoCal 2020 (*2020–2045 Regional Transportation Plan/Sustainable Communities Strategy* [2020–2045 RTP/SCS]) (SCAG 2020). SCAG is the regional planning agency for Los Angeles, Orange, Ventura, Riverside, San Bernardino, and Imperial Counties, and addresses regional issues relating to transportation, the economy, community development and the environment. SCAG coordinates with various air quality and transportation stakeholders in Southern California to ensure compliance with the federal and state air quality requirements. Pursuant to California Health and Safety Code Section 40460, SCAG has the responsibility of preparing and approving the portions of the AQMP relating to the regional demographic projections and integrated regional land use, housing, employment, and transportation programs, measures, and strategies. SCAG is required by law to ensure that transportation activities "conform" to, and are supportive of, the goals of regional and state air quality plans to attain the NAAQS. The RTP/SCS includes transportation programs, measures, and strategies generally designed to reduce vehicle miles traveled (VMT), which are contained in the AQMP. The 2022 AQMP forecasts future emissions inventories with growth based on SCAG's 2020–2045 RTP/SCS.

Noteworthy control strategies for mobile sources in the AQMP with potential applicability to reducing short-term emissions from construction activities associated with the project include strategies denoted in the 2022 AQMP as MOB-06, MOB-11, and MOB-15, which are intended to reduce emissions from on-road and off-road heavy-duty vehicles and equipment.[8] Descriptions of measures MOB-06, MOB-11, and MOB-15 are provided below:

- **MOB-06 – Accelerated Retirement of Older On-Road Heavy-Duty Vehicles:** This measure seeks additional emission reductions from existing heavy-duty vehicles with GVWR greater than 8,500 lbs through an accelerated vehicle replacement program with zero or low NO_X emission vehicles.
- **MOB-11 – Emission Reductions from Incentive Programs:** This control measure seeks to quantify and take credit for the emission reductions achieved through the implementation of SCAQMD administered incentive programs for SIP purposes. The South Coast AQMD has been implementing a variety of incentive programs including, but not limited to, Carl Moyer Memorial Air Quality Standards Attainment Program, Proposition 1B, Lower Emission School Bus, Community Air Protection Program, and Volkswagen Environmental Mitigation Trust. Examples of projects funded by these programs include heavy-duty vehicle/equipment replacements, installation of retrofit units,

[8] SCAQMD, 2022 Air Quality Management Plan, pages 4-21 through 4-30, 2022.

and engine repowers. These incentive programs result in substantial emission reductions that are typically not eligible for credit in plans to attain ozone standards because they are not required by regulation. However, actual emission reductions that are realized and quantified may qualify for credit.

- **MOB-15 – Zero Emission Infrastructure for Mobile Sources:** This control measure is intended to support and accelerate the deployment of zero emission infrastructure needed for the widespread adoption of zero emission vehicles and equipment. AB 2127 estimated that the State will need 157,000 electric vehicle charging stations for medium and heavy-duty vehicles by 2030. AB 8 assessed the fueling needs for hydrogen fuel cell vehicles and found that 1,700 hydrogen stations will be needed to support 1.8 million fuel cell electric vehicles (FCEVs) statewide by 2035. The proposed measure seeks to address these concerns and identify the unique challenges and opportunities for zero emission infrastructure development in the South Coast Air Basin, particularly as it relates to zero emission medium and heavy vehicle deployments.

SCAQMD Air Quality Guidance Documents

The SCAQMD published the *CEQA Air Quality Handbook* to provide local governments with guidance for analyzing and mitigating project-specific air quality impacts (SCAQMD 1993). The *CEQA Air Quality Handbook* provides standards, methodologies, and procedures for conducting air quality analyses in EIRs and was used extensively in the preparation of this analysis. However, the SCAQMD is currently in the process of replacing the *CEQA Air Quality Handbook* with the *Air Quality Analysis Guidance Handbook*. While this process is underway, the SCAQMD recommends that lead agencies avoid using the screening tables in Chapter 6 (Determining the Air Quality Significance of a project) and the on-road mobile source emission factors in Table A9-5-J1 through A9-5 of the *CEQA Air Quality Handbook* as they are outdated.

The SCAQMD instead recommends using other approved models to calculate emissions from land use projects, such as the California Emissions Estimator Model (CalEEMod) software, which is a model developed for California Air Pollution Control Officers Association (CAPCOA) in collaboration with the California Air Districts, which is a Statewide land use emissions computer model designed to provide a uniform platform for government agencies, land use planners, and environmental professionals to quantify potential criteria pollutant and greenhouse gas (GHG) emissions from a variety of land use projects.

The SCAQMD has also adopted land use planning guidelines in its *Guidance Document for Addressing Air Quality Issues in General Plans and Local Planning*, which considers impacts to sensitive receptors from facilities that emit TAC emissions (SCAQMD 2005). SCAQMD's general land use siting distance recommendations are the same as those provided by CARB (e.g., a 500-foot siting distance for sensitive land uses proposed in proximity to freeways and high-traffic roads, a 1,000-foot siting distance for sensitive land uses proposed in proximity to a major service and maintenance rail yard, and the same siting criteria for distribution centers and dry-cleaning facilities). The SCAQMD's document introduces land use-related policies that rely on design and distance parameters to minimize emissions and lower potential health risk. SCAQMDs guidelines are voluntary initiatives recommended for consideration by local planning agencies.

The SCAQMD has published a guidance document called the *Final Localized Significance Threshold Methodology* for CEQA Evaluations that is intended to provide guidance when evaluating the localized

effects from mass emissions during construction (SCAQMD 2008). The SCAQMD adopted additional guidance regarding PM2.5 emissions in a document called *Final Methodology to Calculate Particulate Matter (PM)2.5 and PM2.5 Significance Thresholds* (SCAQMD 2006). This latter document has been incorporated by the SCAQMD into its CEQA significance thresholds and *Final Localized Significance Threshold Methodology*.

SCAQMD has adopted two rules to limit cancer and non-cancer health risks from facilities located within its jurisdiction. Rule 1401 (New Source Review of Toxic Air Contaminants) regulates new or modified facilities, and Rule 1402 (Control of Toxic Air Contaminants from Existing Sources) regulates facilities that are already operating. Rule 1402 incorporates the requirements of the AB 2588 program, including implementation of risk reduction plans for significant risk facilities.

The SCAQMD adopted a "Policy on Global Warming and Stratospheric Ozone Depletion" on April 6, 1990. The policy commits the SCAQMD to consider global impacts in rulemaking and in drafting revisions to the Air Quality Management Plan. In March 1992, the SCAQMD Governing Board reaffirmed this policy and adopted amendments to the policy to include the following directives (SCAQMD 1993):

- Phase out the use and corresponding emissions of chlorofluorocarbons, methyl chloroform (1,1,1-trichloroethane or TCA), carbon tetrachloride, and halons by December 1995;
- Phase out the large quantity use and corresponding emissions of hydrochlorofluorocarbons by the year 2000;
- Develop recycling regulations for hydrochlorofluorocarbons (e.g., SCAQMD Rules 1411 and 1415);
- Develop an emissions inventory and control strategy for methyl bromide; and
- Support the adoption of a California GHG emission reduction goal.

In 2008, SCAQMD released draft guidance regarding interim CEQA GHG significance thresholds (SCAQMD 2008a, 2008b).[9] Within its October 2008 document, SCAQMD proposed the use of a percent emission reduction target to determine significant for commercial/residential projects that emit greater than 3,000 $MTCO_2e$ per year. Under this proposal, commercial/residential projects that emit fewer than 3,000 $MTCO_2e$ per year would be assumed to have a less-than-significant impact on climate change. The SCAQMD's proposed 3,000 $MTCO_2e$ per year target was developed before 2020 and has never been considered for adoption and, thus, does not apply. On December 5, 2008, the SCAQMD Governing Board adopted the staff proposal for an interim GHG significance threshold of 10,000 $MTCO_2e$ for stationary source/industrial projects where the SCAQMD is the Lead Agency. A GHG Significance Threshold Working Group was formed to further evaluate potential GHG significance thresholds (SCAQMD 2008c). The aforementioned Working Group has been inactive since 2011 and the SCAQMD has never formally adopted any GHG significance threshold for land use development projects.

[9] The performance standards primarily focus on energy efficiency measures beyond Title 24. The SCAQMD adopted a GHG significance threshold of 10,000 $MTCO_2e$ per year for industrial stationary source projects for which the SCAQMD is the lead agency.

Southern California Association of Governments (SCAG)

SCAG is the regional planning agency for Los Angeles, Orange, Ventura, Riverside, San Bernardino and Imperial Counties, and addresses regional issues relating to transportation, the economy, community development and the environment. SCAG is the federally designated Metropolitan Planning Organization (MPO) for the majority of the Southern California region and is the largest MPO in the nation.

Pursuant to Health & Safety Code Section 40460, SCAG is responsible for preparing and approving the portions of the AQMP relating to regional demographic projections and integrated regional land use, housing, employment and transportation programs, measures and strategies (SCAQMD 2016a). With regard to air quality planning, SCAG adopted the *2020–2045 Regional Transportation Plan/Sustainable Communities Strategy* (2020–2045 RTP/SCS) in September 2020, which contains such regional development and growth forecasts. These regional development and growth forecasts form the basis for the land use and transportation control portions of the 2022 AQMP, and its growth forecasts were utilized in the preparation of the air quality forecasts and consistency analysis included in the 2022 AQMP (SCAQMD 2022). Both the RTP/SCS and the AQMP are based on projections that originate with local jurisdictions.

SCAG is required to adopt an SCS along with its RTP pursuant to Senate Bill (SB) 375 (Chapter 728, Statutes of 2008), which required the development of regional targets for reducing passenger vehicle GHG emissions. Under SB 375, CARB is required, in consultation with the state's MPOs, to set regional GHG reduction targets for the passenger vehicle and light-duty truck sector for 2020 and 2035. In February 2011, CARB adopted the final GHG emissions reduction targets for SCAG, within whose jurisdiction the OCWD facilities are located. SCAG's target is a per capita reduction of 8 percent for 2020 and 19 percent for 2035 compared to the 2005 baseline (CARB 2024l).

SCAQMD Rules and Regulations

The SCAQMD has adopted many rules and regulations to regulate sources of air pollution in the Air Basin and to help achieve air quality standards. The proposed Project may be subject to the following SCAQMD rules and regulations:

Regulation IV – Prohibitions: This regulation sets forth the restrictions for visible emissions, odor nuisance, fugitive dust, various air emissions, fuel contaminants, start-up/shutdown exemptions and breakdown events. The following is a list of rules which apply to the proposed Project:

Rule 401 – Visible Emissions: This rule states that a person shall not discharge into the atmosphere from any single source of emission whatsoever any air contaminant for a period or periods aggregating more than three minutes in any one hour which is as dark or darker in shade as that designated No. 1 on the Ringelmann Chart or of such opacity as to obscure an observer's view.

Rule 402 – Nuisance: This rule states that 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.

Rule 403 – Fugitive Dust: This rule requires projects to prevent, reduce or mitigate fugitive dust emissions from a site. Rule 403 restricts visible fugitive dust to the project property line, restricts the net PM10 emissions to less than 50 micrograms per cubic meter ($\mu g/m^3$) and restricts the tracking out of bulk materials onto public roads. Additionally, projects must utilize one or more of the best available control measures (identified in the tables within the rule). Control measures may include adding freeboard to haul vehicles, covering loose material on haul vehicles, watering or using non-toxic chemical stabilizers to prevent the generation of visible dust plumes, limiting vehicle speeds to 15 miles per hour on unpaved surfaces, and/or ceasing all activities. Finally, a contingency plan may be required if so determined by USEPA.

Regulation XI – Source Specific Standards: Regulation XI sets emissions standards for specific sources. The following is a list of rules which may apply to the project:

Rule 1113 – Architectural Coatings: This rule requires manufacturers, distributors, and end users of architectural and industrial maintenance coatings to reduce VOC emissions from the use of these coatings, primarily by placing limits on the VOC content of various coating categories.

Rule 1186 – PM10 Emissions from Paved and Unpaved Roads, and Livestock Operations: This rule applies to owners and operators of paved and unpaved roads and livestock operations. The rule is intended to reduce PM10 emissions by requiring the cleanup of material deposited onto paved roads, use of certified street sweeping equipment, and treatment of high-use unpaved roads (see also Rule 403).

Regulation XIV – Toxics and Other Non-Criteria Pollutants: Regulation XIV sets requirements for new permit units, relocations, or modifications to existing permit units which emit toxic air contaminants or other non-criteria pollutants.

Rule 1403 – Asbestos Emissions from Demolition/Renovation Activities: This rule requires owners and operators of any demolition or renovation activity and the associated disturbance of asbestos-containing materials, any asbestos storage facility, or any active waste disposal site to implement work practice requirements to limit asbestos emissions from building demolition and renovation activities, including the removal and associated disturbance of asbestos-containing materials.

Rule 1470 – Requirements for Stationary Diesel-Fueled Internal Combustion and Other Compression Ignition Engines: This rule applies to stationary compression ignition (CI) engines greater than 50 brake horsepower, such as emergency generators, and sets limits on emissions and operating hours. In general, new stationary emergency standby diesel-fueled engines greater than 50 brake horsepower are not permitted to operate more than 50 hours per year for maintenance and testing.

Local

County of Orange General Plan

The County of Orange first adopted its original General Plan in 1946. Amended sections of the General Plan have been adopted as of September 2022. The County of Orange has adopted goals, objectives, and policies related to air pollution and helping to achieve air quality standards and reduce GHG emissions. The existing General Plan includes the following goals, objectives, and policies related to air quality and GHG emissions:

Transportation Element

Goal 5. Manage peak hour traffic congestion to achieve an acceptable level of service (LOS) on existing and future circulation plan facilities in the unincorporated areas of the County.

Objective 5.3. Reduce Vehicle Miles Traveled in an effort to reduce greenhouse gas (GHG), pursuant to SB 743. See "Guidelines for Evaluating Vehicle Miles Traveled Under CEQA" and "2020 Updated Transportation Implementation Manual."

Goal 6. Implement transportation demand management (TDM) and transportation systems management (TSM) strategies which reduce peak hour vehicle travel demand and minimize single-occupant vehicles and trip length on the unincorporated County roadway system.

Objective 6.1. Develop and promote a transportation system and strategies that are consistent with Rule 2202 of the South Coast Air Quality Management District (SCAQMD) and the County Transportation Demand Management (TDM) Ordinance (Ordinance No. 3820).

Policy 6.4. Assist businesses in County unincorporated areas in the implementation of the policies of the County Transportation Demand Management (TDM) Ordinance.

Resources Element

Energy Resources Component Goal 1. Maximize the conservation and wise use of energy resources in all residences, businesses, public institutions, and industries in Orange County.

Objective 1.1. Achieve a reduction in projected per capita energy demand and consumption by the year 2005.

Energy Resources Component Goal 3. Maximize the conservation of energy resources in all future land use and transportation planning decisions.

Objective 3.3. To maintain a community leadership role with respect to conservation of nonrenewable resources and assist existing utility conservation programs.

Policy 3: Energy Conservation. To encourage and actively support the utilization of energy conservation measures in all new and existing structures in the County.

Water Resources Component Goal 1. Ensure an adequate dependable supply of water of acceptable quality for all reasonable uses.

Objective 1.2. To achieve a reduction in per capita water consumption by the year 2020.

Objective 1.3. To reduce dependence on imported water supplies through both conservation and local water resource development.

Policy 2: Conservation. To reduce per capita and total water consumption through conservation and reclamation programs and the support of new technologies.

Air Resources Component Goal 1. Promote optimum sustainable environmental quality standards for air resources.

Objective 1.1. To the extent feasible, attainment of federal and state air quality standards by the year 2007.

Policy 1.1. To develop and support programs which improve air quality or reduce air pollutant emissions.

City of Irvine General Plan

The City of Irvine first adopted its original General Plan in 1973. Amended sections of the General Plan have been adopted as of August 2015. The City of Irvine has adopted goals, objectives, and policies related to air pollution and helping to achieve air quality standards and reduce GHG emissions. The existing General Plan includes the following objectives and policies related to air quality and GHG emissions:

Circulation Element

Objective B-1: Roadway Development Plan. Provide and maintain an integrated vehicular circulation system to accommodate projected local and regional needs.

Policy (e). Cooperate with state, county, and local governments to assure orderly development.

Integrated Waste Management Element

Objective H-1: Solid Waste. Cooperate in guiding the development and improvement of a solid waste disposal system within the County of Orange that will meet the needs of the City and protect the City from damage by unplanned disposal of refuse.

Policy (g). Require, to the extent necessary to comply with state law, during discretionary application review, solid waste reduction and recycling efforts for residential, commercial, industrial, institutional and recreational land uses to reduce the amount of waste disposed at landfills.

Require businesses which intend to handle or store hazardous substances (waste and materials) to obtain all necessary permits and comply with all regulations and standards administered by the

California Environmental Protection Agency (Cal/EPA) – Department of Toxic Substances Control, Orange County Health Care Agency, Santa Ana Regional Water Quality Control Board, South Coast Air Quality Management District, Orange County Fire Authority and the City of Irvine Zoning, Building, and Public Safety Codes.

Energy Element

Objective I-1: Energy Conservation. Maximize energy efficiency through land use and transportation planning.

Policy (b). Encourage and promote incorporation of energy conservation measures. The measures should be developed in conjunction with the applicant and may include:

- Active solar water and/or space heating.
- Passive design features for heating and cooling.
- Use of energy efficient devices.

Policy (i). Monitor the federal, state, regional, other local governments, the utility companies, Irvine Ranch Water District (IRWD), and other private and public agencies energy programs and regulations and:

- Explore opportunities and limitations on use of renewable sources.
- Obtain information and technical assistance for energy programs.
- Implement federal and state energy programs.
- Support continuation of tax credits for alternative renewable sources and conservation measures.
- Allocate available federal funds and grants such as Community Development Block Grant (CDBG) for energy programs for low income and senior housing development.
- Inform developers and the general public of recent available energy programs, regulations, technical, and economic data (e.g., cost effectiveness).

As of March 2024, the City of Irvine has published their Draft City of Irvine 2045 General Plan. The City of Irvine has scheduled an adoption hearing for Summer/Fall 2024.

City of Santa Ana General Plan

The City of Santa Ana City Council adopted the General Plan Update, *Golden City Beyond*. The new General Plan went into effect on Thursday, May 26, 2022. The City of Santa Ana has adopted goals, objectives, and policies related to air pollution and helping to achieve air quality standards and reduce GHG emissions. The existing General Plan includes the following goals, objectives, and policies related to air quality and GHG emissions:

Conservation Element

Goal CN-1. Air Quality and Climate Protect air resources, improve regional and local air quality, and minimize the impacts of climate change.

Policy CN-1.1: Regional Planning Efforts. Coordinate air quality planning efforts with local and regional agencies to meet or exceed state and federal ambient air quality standards in order to educate the community on and protect all residents from the health effects of air pollution.

Policy CN-1.2: Climate Action Plan. Consistency with emission reduction goals highlighted in the Climate Action Plan shall be considered in all major decisions on land use and investments in public infrastructure.

Policy CN-1.4: Development Standards. Support new development that meets or exceeds standards for energy-efficient building design and site planning.

Policy CN-1.5: Sensitive Receptor Decisions. Study the impacts of stationary and non-stationary emission sources on existing and proposed sensitive uses and opportunities to minimize health and safety risks. Develop and adopt new regulations avoiding the siting of facilities that potentially emit increased pollution near sensitive receptors within environmental justice area boundaries.

Policy CN-1.11: Public Investment in Low- or Zero-Emission Vehicles. Continue to invest in low-emission or zero-emission vehicles to replace the City's gasoline powered vehicle fleet and to transition to available clean fuel sources such as bio-diesel for trucks and heavy equipment.

Policy CN-1.13: City Contract Practices. Support businesses and contractors that use reduced emissions equipment for city construction projects and contracts for services, as well as businesses that practice sustainable operations.

Policy CN-1.16: Indirect Source Rules. Support the development of regional legislation such as the drayage truck rule, advanced clean truck route, and heavy-duty low NOx rule by the South Coast Air Quality Management District

Goal CN-3: Energy Resources. Reduce consumption of and reliance on nonrenewable energy, and support the development and use of renewable energy sources.

Policy CN-3.1: Interagency Coordination. Consult with regional agencies and utility companies to pursue energy efficiency goals and expand renewable energy strategies.

Policy CN-3.4: Site Design. Encourage site planning and subdivision design that incorporates the use of renewable energy systems.

Policy CN-3.8: Energy-Efficient Public Facilities. Promote and encourage efficient use of energy and the conservation of available resources in the design, construction, maintenance, and operation of public facilities, infrastructure, and equipment.

Policy CN-3.10: Energy Conservation in Public Projects. Work with businesses and contractors that use energy-efficient practices in the provision of services and equipment for city construction projects.

Goal CN-4: Water Resources. Conserve and replenish existing and future water resources

Policy CN-4.3: Recycled Water Systems. Continue to coordinate with the Orange County Water District, Orange County Sanitation District, and developers for opportunities to expand use of reclaimed water systems.

Mobility Element

Goal M-1: Comprehensive Circulation. A comprehensive and multimodal circulation system that facilitates the safe and efficient movement of people, enhances commerce, and promotes a sustainable community.

Policy M-1.7: Proactive Mitigation. Proactively mitigate existing and new potential air quality, noise, congestion, safety, and other impacts from the transportation network on residents and business, especially in environmental justice communities.

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

Goal M-4: Transportation, Land Use, and Design. Coordinated transportation planning efforts with land use and design strategies that encourage sustainable development and achieve broader community goals.

Policy M-4.9: Air Pollution Mitigation. Utilize land use, building, site planning, and technology solutions to mitigate exposure to transportation-related air pollution, especially in environmental justice focus areas.

Goal M-5: Sustainable Transportation Design. A transportation system that is attractive, safe, state-of-the-art, and supports community, environmental, and conservation goals.

Policy M-5.6: Clean Fuels and Vehicles. Encourage the use of alternative fuel vehicles and mobility technologies through the installation of supporting infrastructure.

Public Services Element

Goal PS-1: Public Facilities. Provide quality and efficient facilities that are adequately funded, accessible, safe, and strategically located.

Policy PS-1.7: Sustainable and Resilient Practices. Require the development or rehabilitation of any public facility or capital improvement to incorporate site design and building practices that promote sustainability, energy efficiency, and resiliency.

City of Santa Ana Climate Action Plan

The City of Santa Ana adopted its first-ever climate action plan, also known as the Climate and Adaptation Plan (CAAP) in December 2015. The CAAP provides a framework for creating or updating policies, programs, practices, and incentives for Santa Ana residents and businesses to reduce the City's GHG footprint, and ensure the community and physical assets are better protected from the impacts of climate change. Engaging those who live, work, and play in Santa Ana is essential to creating an effective and successful CAAP. Residents, business owners, students, and other community stakeholders are encouraged to get involved by providing input and sharing ideas, priorities, and solutions to help establish and achieve the City's climate goals.

The reduction of GHG emissions is one of the primary objectives of the CAAP with a target of 30% below the baseline year 2008 by 2035 for community-wide emissions. The City developed a production inventory that analyzes emissions from local activities such as building energy use, vehicle travel, and waste disposal. The following sources within the City account for the majority of GHG emissions of its baseline year; transportation at 48 percent, commercial/industrial energy use at 29 percent, residential energy use at 13 percent, water, waste, and other sources at 10 percent. The following CAP measures aim at reducing emissions from the City's inventory and are applicable to the proposed Project:

Sector: Municipal Operations Transportation and Land Use

Measure: Alternative Fuel Vehicle Fleet.

Sector: Municipal Operations Energy. The City is in the process of replacing fleet vehicles with hybrid, CNG, electric, and propane fueled vehicles as replacement is needed. These replacements have been supported by grant funds from the Mobile Source Air Pollution Reduction Review Committee. For this measure, replacement of fleet vehicles will continue with all vehicles expected to be hybrid, CNG, electric, or propane fueled by 2035.

Sector: Municipal Operations Energy

Measure: Water Pump Retrofits. This measure would continue efficiency retrofits of motors at City water wells, completing conversion of all remaining pumping stations to variable frequency drives. The Santa Ana groundwater wells are known for producing some of the best tasting water in the country and do so with less environmental impact.

City of Tustin General Plan

The City of Tustin first adopted its General Plan in 1966. Amended sections of the General Plan have since been adopted as of November 2018. The City of Tustin has adopted goals, objectives, and policies related to air pollution and helping to achieve air quality standards and reduce GHG emissions. The existing General Plan includes the following goals, objectives, and policies related to air quality and GHG emissions:

Conservation, Open Space, and Recreation Element

Goal 1. Reduce air pollution through proper land use, transportation and energy use planning.

Policy 1.1. Cooperate with the South Coast Air Quality Management District and the Southern California Association of Governments in their effort to implement provisions of the region's Air Quality Management Plan, as amended.

Policy 1.6. Cooperate and participate in regional air quality management plans, programs, and enforcement measures.

Goal 2. Improve air quality by influencing transportation choices of mode, time of day, or whether to travel and to establish a jobs/housing balance.

Policy 2.11. Promote state and federal legislation which would improve vehicle/transportation technology and cleaner fuels.

Goal 3. Reduce particulate emissions to the greatest extent feasible.

Policy 3.1. Adopt incentives, regulations, and/or procedures to minimize particulate emissions from paved and unpaved roads, agricultural uses, parking lots, and building construction.

Goal 4. Reduce emissions through reduced energy consumption.

Policy 4.1. Promote energy conservation in all sectors of the City including residential, commercial, and industrial.

Goal 11. Conserve energy resources through use of available energy technology and conservation practices.

Policy 11.1. Encourage the use of new technologies and innovative building design, site design and orientation techniques which minimize energy use by taking advantage of sun/shade patterns, prevailing winds, landscaping, and building materials.

Circulation Element

Goal 4. Maximize the efficiency of the circulation system through the use of transportation system management and demand management strategies.

Policy 4.3. Encourage the implementation of employer Transportation Demand Management (TDM) requirements, which were included in the Southern California Air Quality Management District's Regulation 2202 of the 1997 Air Quality Management Plan and as required by Proposition 111 as part of the Congestion Management Program (CMP) and participate in regional efforts to implement TDM requirements.

Land Use Element

Goal 4. Assure a safe, healthy, and aesthetically pleasing community for residents and businesses.

Policy 4.1. Mitigate traffic congestion and unacceptable levels of noise, odors, dust and light and glare which affect residential areas and sensitive receptors.

Goal 14. Continue to implement the Specific Plan/Reuse Plan for MCAS Tustin which maximizes the appeal of the site as a mixed use, master planned development and that includes the following qualities seeking to create results that are very special and worthy of the site's present and historical importance.

Policy 14.1. Promote new uses and design which will peacefully coexist with surrounding residences and businesses in Tustin and adjacent cities, minimizing impacts on noise, air quality, traffic, and other environmental features wherever possible.

3.2.3 Impact Analysis and Mitigation Measures

Thresholds of Significance

Air Quality

The following criteria from CEQA Guidelines Appendix G are used as thresholds of significance for air quality and GHG emissions to determine the impacts of the proposed Project.

The proposed Project would have a significant impact related to air quality if it would:

1. Conflict with or obstruct implementation of the applicable air quality plan.
2. 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.
3. Expose sensitive receptors to substantial pollutant concentrations.
4. Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people.
5. Result in cumulatively considerable impacts to air quality.

Pursuant to State CEQA Guidelines Section 15064.7, a lead agency may consider using significance criteria established by the applicable air quality management district or air pollution control district when making determinations of significance. The measures and actions of the Draft PEIR, if approved, would be implemented within the boundaries of the SCAQMD. SCAQMD has established air quality significance thresholds in its *CEQA Air Quality Handbook*. These thresholds are based on the recognition that the Air Basin is distinct geographic areas with critical air pollution problems for which ambient air quality standards have been promulgated to protect public health (SCAQMD 2022c). Air quality impacts in this Draft PEIR are evaluated according to the most recent thresholds adopted by the SCAQMD in

connection with its *CEQA Air Quality Handbook*, Air Quality Analysis Guidance Handbook, and subsequent SCAQMD guidance.[10]

Conflict with or Obstruct Implementation of the Applicable Air Quality Plan

CEQA Guidelines Section 15125 requires an analysis of project consistency with applicable governmental plans and policies. In accordance with the SCAQMD's CEQA Air Quality Handbook, the following criteria were used to evaluate the proposed Project's consistency with the applicable air quality plan:

- Criterion 1: Will the proposed Project result in any of the following:
  - An increase in the frequency or severity of existing air quality violations; or
  - Cause or contribute to new air quality violations; or
  - Delay timely attainment of air quality standards or the interim emission reductions specified in the AQMP.
- Criterion 2: Will the proposed Project exceed the assumptions utilized in preparing the AQMP.

Cumulatively Considerable Net Increase in Criteria Pollutants

A significant impact may occur if a project would add a cumulatively considerable contribution of a federal or state non-attainment pollutant. The Air Basin is currently in non-attainment for ozone, PM10, and PM2.5. SCAQMD methodology recommends that significance thresholds be used to determine the potential cumulative impacts to regional air quality along with a project's consistency with the current AQMP.

The SCAQMD has established numerical significance thresholds for construction and operational activities. The numerical thresholds are based on the recognition that the Air Basin is a distinct geographic area with a critical air pollution problem for which ambient air quality standards have been promulgated to protect public health (SCAQMD 1993). Given that construction impacts are temporary and limited to the construction phase, the SCAQMD has established numerical significance thresholds specific to construction activity. For determining the significance of operational emissions, the SCAQMD has established numerical indicators as significance thresholds based, in part, on Section 182(e) of the CAA, which sets 10 tons per year of VOC as a significance level for stationary source emissions in extreme non-attainment areas for ozone (SCAQMD 1993). As shown in **Table 3.2-6** the Air Basin is designated as extreme non-attainment for ozone. The SCAQMD converted this significance level to pounds per day for ozone precursor emissions (10 tons per year × 2,000 pounds per ton ÷ 365 days per year = 55 pounds per day). The numeric indicators for other pollutants are also based on federal stationary source significance levels. Based on the thresholds in the SCAQMD CEQA Air Quality Handbook (SCAQMD 2019), the proposed Project would potentially result in a significant impact of a federal or state non-attainment pollutant if emissions of ozone precursors (VOC and NO_X), PM10, or PM2.5 would exceed the values shown in Table 3.2-6.

[10] While the SCAQMD CEQA Air Quality Handbook contains significance thresholds for lead, future development facilitated by adoption of the ESGVAP would not include sources of lead emissions and would not exceed the established thresholds for lead. Unleaded fuel and unleaded paints have virtually eliminated lead emissions from commercial and residential land use projects. As a result, lead emissions are not further evaluated.

TABLE 3.2-6
SCAQMD REGIONAL EMISSIONS THRESHOLDS (POUNDS PER DAY)

Activity	VOC	NO_X	CO	SO_2	PM10	PM2.5
Construction	75	100	550	150	150	55
Operation	55	55	550	150	150	55

SOURCE: SCAQMD, Air Quality Significance Thresholds, 2023

Localized Emission Impacts on Sensitive Receptors

The SCAQMD has developed a methodology to assess the potential for localized emissions to cause an exceedance of applicable ambient air quality standards or ambient concentration limits. Impacts would be considered significant if the following would occur:

- Maximum daily localized emissions of NO_X and/or CO during construction or operation are greater than the applicable localized significance thresholds, resulting in predicted ambient concentrations in the vicinity of the proposed Project greater than the most stringent ambient air quality standards for NO_2 and/or CO.[11]
- Maximum daily localized emissions of PM10 and/or PM2.5 during construction are greater than the applicable localized significance thresholds, resulting in predicted ambient concentrations in the vicinity of the proposed Project to exceed 10.4 $\mu g/m^3$ over 24 hours (SCAQMD Rule 403 control requirement).
- Maximum daily localized emissions of PM10 and/or PM2.5 during operation are greater than the applicable localized significance thresholds, resulting in predicted ambient concentrations in the vicinity of the proposed Project to exceed 2.5 $\mu g/m^3$ over 24 hours (SCAQMD Rule 1303 allowable change in concentration).
- The following conditions would occur at an intersection or roadway within one-quarter mile of a sensitive receptor:
  - The proposed Project would cause or contribute to an exceedance of the CAAQS 1-hour or 8-hour CO standards of 20 or 9.0 parts per million (ppm), respectively.
  - Where the CO standard is exceeded at the intersection, the Project would result in a significant impact if the incremental increase due to the Project is equal to or greater than 1.0 ppm for the California 1-hour CO standard, or 0.45 ppm for the 8-hour CO standard.

Based on the SCAQMD thresholds, the Project would cause a significant impact by exposing sensitive receptors to toxic air contaminants if any of the following would occur:[12]

- The Project emits carcinogenic materials or TACs that exceed the maximum incremental cancer risk of ten in one million or a cancer burden greater than 0.5 excess cancer cases (in areas greater than or equal to 1 in 1 million) or an acute or chronic hazard index of 1.0.

[11] SCAQMD, Final Localized Significance Threshold Methodology, June 2003 and revised July 2008.
[12] SCAQMD, CEQA Air Quality Handbook, April 1993.

Objectionable Odors and Other Emissions

With respect to other emissions, such as odors, the proposed Project's impacts would be considered significant if it created objectionable odors affecting a substantial number of people. In addition, based on the thresholds in the SCAQMD CEQA Air Quality Handbook,[13] the proposed Project would potentially result in a significant impact for other emissions of an attainment, maintenance, or unclassified pollutant if emissions of CO or SO_2 would exceed the values shown in Table 3.2-6.

Greenhouse Gas Emissions

The proposed Project would have a significant impact related to greenhouse gas emissions if it would:

1. Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment.
2. Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases.
3. Result in cumulatively considerable impacts to GHG emissions.

In December 2008, the SCAQMD adopted a 10,000 $MTCO_2e$ per year significance threshold for industrial facilities for projects in which the SCAQMD is the lead agency. Although SCAQMD has not formally adopted a significance threshold for GHG emissions generated by a project for which SCAQMD is not the lead agency, or a uniform methodology for analyzing impacts related to GHG emissions on global climate change, in the absence of any industry-wide accepted standards applicable to this project, the SCAQMD's significance threshold of 10,000 $MTCO_2e$ per year for industrial projects is the most relevant GHG significance threshold and is used as a benchmark for the proposed Project. It should be noted that the SCAQMD's significance threshold of 10,000 $MTCO_2e$ per year for industrial projects is intended for long-term operational GHG emissions. The SCAQMD has developed guidance for the determination of the significance of GHG construction emissions that recommends that total emissions from construction be amortized over an assumed project lifetime of 30 years and added to operational emissions and then compared to the threshold (SCAQMD 2008).

Methodology

Air Quality

Construction Emissions

Construction of the proposed Project has the potential to generate temporary criteria pollutant emissions through the phases of extraction and monitoring wells, groundwater treatment plants, and installation of conveyance pipelines. Point sources are inclusive of but not limited to use of heavy-duty construction equipment, such as drill rigs and backhoes, and through vehicle trips generated from worker trips, haul trucks, and vendor/material supply trucks traveling to and from the project areas. In addition, fugitive dust emissions would result from demolition, excavation, and various soil-handling activities. Evaporative emissions of VOCs result from the application of asphalt and architectural/industrial coatings and vary depending on the amount of asphalt and coatings applied on a daily basis. Construction emissions can vary substantially from day to day, depending on the level of activity, the specific type of construction

[13] SCAQMD, Air Quality Significance Thresholds, April 2019.

activity, and prevailing weather conditions. In addition, construction of the various project facilities may overlap in scheduling. The assessment of construction air quality impacts considers each of these potential sources of emissions.

The proposed Project is a program-level document, and, as such, there are no specific project construction dates and minimal specific construction plans identified. Therefore, quantification of emissions associated with buildout cannot be specifically determined at this time. Therefore, the analysis will be based on the qualitative potential for construction emissions to exceed threshold values in the context of development intensity and compliance with regulatory emissions standards. Future project-level CEQA analysis will be performed when the Remedy Design phase is completed, and specific implementing actions are identified.

Operational Emissions

Emissions produced from the operation of the proposed Project would be analyzed as an increase from existing conditions of the facility. There are no known or expected new sources of stationary emission sources. During operation of the proposed Project, there are minimal expected amounts of emissions that could be generated from the pumps and maintenance operations, including routine cleaning and from periodic visits from service vehicles. Site inspections would survey the grounds and exterior appearance, exercise the active and standby electrical equipment, maintain the instrumentation and radio equipment, and conduct performance testing. The treatment systems would require periodic maintenance to include filter bag and cartridge replacements and GAC replacement. Therefore, minimal additional emissions would be generated from vehicle trips by worker staff for periodic inspections or maintenance purposes.

During long-term operations of the project, TACs could be emitted as part of periodic maintenance operations, routine cleaning, periodic painting, etc., and from periodic visits from service vehicles. However, these events are expected to be occasional and result in minimal emissions exposure to offsite sensitive receptors; therefore, the proposed Project would not include any sources of substantial TAC emissions. Thus, a qualitative analysis is appropriate for assessing the project's operational emissions.

As discussed above, the proposed Project is a program-level document, and, as such, there are no specific project operation plans identified. Therefore, quantification of emissions associated with operations cannot be specifically determined at this time. Therefore, the analysis will be based on the qualitative potential for construction emissions to exceed threshold values in the context of development intensity and compliance with regulatory emissions standards. Future project-level CEQA analysis will be performed when the project design phase is completed, and specific implementing actions are identified.

In addition to regional pollutant emissions, localized impacts on sensitive receptors must also be addressed from operational activities. Localized impacts are analyzed onsite or around the immediate vicinity of the Project Area. Proposed Project operational activities consist strictly of offsite emission sources (mobile sources and indirect sources) of criteria pollutants, so any localized impacts from mobile sources during operations would not occur. Therefore, this analysis includes a qualitative discussion of associated localized impacts as they relate to the increase electrical energy consumption associated with the project buildout.

Sensitive Receptor Exposure to Pollutants

Land uses, such as schools, hospitals, and convalescent homes are considered to be sensitive to poor air quality conditions because infants, children, the elderly, and people with health afflictions (especially respiratory ailments), are more susceptible to respiratory infections and other air-quality-related health problems than the general public. Residential areas are also considered to be sensitive to air pollution because residents (including children and the elderly) tend to be at home for extended periods of time, resulting in sustained exposure to any pollutants present. Recreational land uses are considered moderately sensitive to air pollution. Exercise places a high demand on respiratory functions, which can be impaired by air pollution, even though exposure periods during exercise are generally short.

The Project Area includes an approximately 5.6-square-mile area within Orange County in the cities of Irvine, Santa Ana, and Tustin. The Project Area is characterized primarily by urbanized land uses with residential, commercial, and industrial development. The proposed well alignment, G-4 along East Warner Avenue includes residential uses located west of Standard Avenue and the Santa Ana Unified School District Monroe Elementary School is located west of Halladay Street. The proposed well alignment, G-7 is along MacArthur Blvd. in the city of Irvine. There are four (4) high density residential complexes in or near this alignment. MDL Irvine consisting of 137 residential units, City Square consisting of 44 units, LUX consisting of 39 units and Aurum consisting of 178 units. The residential and school uses would be considered sensitive land uses for air pollutant emissions. In this analysis, it was assumed the nearest receptor would be a residence located adjacent to an extraction or treatment facility.[14]

CO Hotspots

In addition, emissions of CO are produced in greatest quantities from motor vehicle combustion and are usually concentrated at or near ground level because they do not readily disperse into the atmosphere, particularly under cool, stable (i.e., low or no wind) atmospheric conditions. Localized areas where ambient concentrations exceed state and/or federal standards are termed CO hotspots. The potential for the proposed Project to cause or contribute to the formation of offsite CO hotspots are evaluated based on prior dispersion modeling of the four busiest intersections in the Air Basin that has been conducted by the SCAQMD for its CO Attainment Demonstration Plan in the AQMP. The analysis compares the intersections with the greatest peak-hour traffic volumes that would be impacted by the proposed Project to the intersections modeled by the SCAQMD. Project impacted intersections with peak-hour traffic volumes that are lower than the intersections modeled by the SCAQMD, in conjunction with lower background CO levels, would result in lower overall CO concentrations compared to the SCAQMD modeled values in its AQMP.

TAC Emissions

The greatest potential for TAC emissions during construction would be related to DPM emissions associated with heavy-duty equipment during demolition, excavation and grading activities. Construction activities associated with the proposed Project would be sporadic, transitory, and short term in nature. The OEHHA is responsible for developing and revising guidelines for performing health risk assessments (HRAs) under the State's Air Toxics Hot Spots Program Risk Assessment (AB 2588) regulation. In March

[14] SCAQMD's Localized Significance Threshold Methodology (refer to page 3-3) states for project boundaries located closer than 25 meters (82 feet) to the nearest receptor, such as the proposed project where the nearest receptors are assumed to be located adjacent to the Project Area, should use the LSTs for receptors located at 25 meters.

2015, OEHHA adopted revised guidelines that update the previous guidance by incorporating advances in risk assessment with consideration of infants and children using Age Sensitivity Factors (ASF). The analysis of potential construction TAC impacts considers the OEHHA revised guidelines as well as the duration of construction, level of construction activity, scale of the proposed Project, and compliance with regulations that would minimize construction TAC emissions.

A qualitative analysis of TAC emissions from operational activities is also included since the proposed Project is not expected to include large and continuously operating stationary sources of TACs. Some types of stationary sources would be subject to SCAQMD's rules, regulations and permitting. Thus, during the permitting process SCAQMD would analyze such sources (e.g., health risk assessment) based on their potential to emit TACs. If it is determined that the sources would emit TACs in excess of SCAQMD's applicable significance threshold, the SCAQMD would deny the operating permit.

Objectionable Odors

Potential odor impacts are evaluated by conducting a screening-level analysis followed by a more detailed analysis as necessary. The screening-level analysis consists of reviewing the proposed Project's site plan and project description to identify new or modified odor sources. If it is determined that the proposed Project would introduce a potentially significant new odor source, or modify an existing odor source, then downwind sensitive receptor locations are identified and a site-specific analysis is conducted to determine impacts.

Greenhouse Gas Emissions

As noted above, the increased concentration of GHGs in the atmosphere has been linked to global warming, which can lead to climate change. Construction and operation of the proposed Project would incrementally contribute to GHG emissions along with past, present, and future activities. As such, impacts of GHG emissions are analyzed here on a cumulative basis.

As discussed above, the proposed Project is a program-level document, and, as such, there are no specific project plans identified. Therefore, quantification of GHG emissions associated with buildout cannot be specifically determined at this time. Therefore, the analysis will be based on the qualitative potential for construction emissions to exceed threshold values in the context of development intensity and compliance with regulatory emissions standards. Future project-level CEQA analysis will be performed when the project design phase is completed, and specific implementing actions are identified.

Consistency with Greenhouse Gas Reduction Plans, Policies, and Regulations

The proposed Project's GHG emissions are also evaluated by assessing consistency with applicable GHG reduction strategies. As discussed previously, the GHG regulations have been adopted primarily at the federal and state levels to reduce emissions of GHGs from proposed Project sources, such as trucks and energy, under the Clean Air Act and the State's GHG regulatory framework under HSC Division 25.5 (i.e., AB 32 and SB 32). Impacts are evaluated based on consistency with these applicable regulations.

Impact Analysis

Conflict with or Obstruct Air Quality Plans

Impact 3.2-1: The proposed Project could conflict with or obstruct implementation of the applicable air quality plan.

Extraction Facilities, Monitoring Wells, Local Groundwater Treatment Plants, and Conveyance Pipelines

Construction

To evaluate consistency with the AQMP, the SCAQMD recommends that lead agencies evaluate whether a project is consistent with the land use assumptions upon which the AQMP is based. The proposed Project is within OCWD's service area and is in the cities of Santa Ana, Irvine, and Tustin and an unincorporated area of Orange County. Emissions control strategies for construction activities outlined in the 2022 AQMP include MOB-06, MOB-11, and MOB-15, which are intended to reduce emissions from on-road and off-road heavy-duty vehicles and equipment by accelerating the replacement of older, emissions-prone engines with newer engines that meet more stringent emission standards and would be applicable to the proposed Project. Implementation of the proposed Project would also be subject to CARB requirements for construction activities to minimize short-term emissions from on-road and off-road diesel equipment. Construction activities would also be subject to SCAQMD regulations for controlling fugitive dust pursuant to SCAQMD Rule 403, such as the requirement to apply water spray/mists or similar suppressant (e.g., SoilSeal) at least 3 times per day on active areas of disturbance and unpaved roads, and limit truck speed to 15 miles per hour or less on unpaved roads to minimize dust on unpaved roads at the construction site. Compliance with these regulations would ensure that the proposed Project emissions are consistent with the AQMP requirements for control strategies intended to reduce emissions from construction equipment and activities.

The proposed Project is a groundwater remedial project and does not include the construction of residential or commercial development. Construction activities associated with the proposed Project would be sporadic, transitory, and short term in nature. As such, implementation of the proposed Project would not induce any additional unplanned population or employment growth within the service area during the construction period. The proposed Project would generate short-term construction jobs, but these jobs would not necessarily bring new construction workers or their families into the region, since construction workers are typically drawn from an existing regional pool of construction workers who travel among construction sites within the region as individual projects are completed and are not typically brought from other regions to work on developments such as the proposed Project. Therefore, the proposed Project would not generate a substantial increase in workers and would not conflict with the long-term employment projections upon which the 2022 AQMP is based.

The proposed Project would be subject to regulations requiring control strategies intended to reduce emissions from construction equipment and would not conflict with growth projections for the region; therefore, construction associated with the proposed Project would not conflict with or obstruct implementation of the AQMP, and impacts would be less than significant.

Operation

Implementation of the extraction facilities, soil borings, monitoring wells, groundwater treatment plants, and conveyance pipelines would result in minimal long-term regional emissions of criteria air pollutants and ozone precursors. Energy consumption would occur from the increase in electricity usage associated with the use of additional electric pumps, meters, and electrical infrastructure, such as high and low voltage wiring, transformers, switchgear, motor control centers, variable frequency drives, motor actuated valves, lighting and various conduits. Electrical energy associated with the operation of the proposed Project would not result in direct emissions of criteria pollutants. During operation of the proposed Project, minimal amounts of emissions would be generated from maintenance operations and periodic maintenance of equipment. Site inspections would survey the grounds and exterior appearance, exercise the active and standby electrical equipment, maintain the instrumentation and radio equipment, and conduct performance testing. The treatment systems would require periodic maintenance to include sediment filters and GAC replacements. Pipelines would be contained entirely underground and would require minimal maintenance. Therefore, the proposed Project would not generate a substantial increase in workers and would not conflict with the long-term employment projections upon which the AQMP is based.

As discussed in the *Methodology* section above, a project is deemed to not conflict with the applicable air quality plan if it is consistent with the existing land use plan that was used to generate the growth forecast and does not increase dwelling unit density, vehicle trips, and vehicle miles traveled due to zoning changes, specific plans and general plan amendments. The proposed Project would not include residential or commercial development. Implementation of the proposed Project would not induce unplanned population or employment growth within the service area. Therefore, implementation of the proposed Project would not conflict with growth projections in the 2022AQMP. As such, the proposed Project would not conflict with, or obstruct, implementation of the AQMP, and this impact would be less than significant.

Mitigation Measures

None Required.

Significance Determination

Less than Significant Impact.

Cumulatively Considerable Net Increase of Criteria Pollutants

Impact 3.2-2: The proposed Project could result in a cumulatively considerable net increase of any criteria pollutant for which the project region is nonattainment under an applicable federal or state ambient air quality standard.

Ozone, NO_2 and VOC (as ozone precursors), PM10, and PM2.5 are pollutants of concern, as the Air Basin has been designated as a nonattainment area for state ozone, PM10, and PM2.5 and as a federal nonattainment area for ozone and PM2.5. The Air Basin is currently in attainment for state and federal CO, SO_2, and NO_2 and federal attainment for PM10. SCAQMD has established numerical significance thresholds for regional emissions during construction and operation. The numerical significance

thresholds are based on the recognition that the Air Basin is a distinct geographic area with a critical air pollution problem for which ambient air quality standards have been promulgated to protect public health. Facilities developed under the proposed Project would potentially cause or contribute to an exceedance of an ambient air quality standard if emissions would exceed the SCAQMD regional significance thresholds during construction or operation. Construction and operational impacts are discussed below.

The proposed Project plans to establish up to 100 extraction wells, up to 4 trenches and or drain facilities, up to 200 monitoring wells, up to 9 groundwater treatment plants, and up to 25,000 feet of pipeline within the Project Area. Although Chapter 2, *Project Description*, generally discusses construction equipment, the proposed Project is a planning-level document, and, as such, there are no full comprehensive equipment list currently proposed and there is no knowledge as to timing of construction, specific location or the exact nature of facilities. As such, analysis of construction emissions would involve some level of speculation. Nonetheless, information provided in Chapter 2, *Project Description*, regarding generalized construction schedules and anticipated construction equipment are available to conduct modeling analyses that would be generally representative of emissions from constructing an extraction facilities, soil borings, monitoring wells, groundwater treatment plants, and conveyance pipelines segments.

Extraction Facilities and Monitoring Wells

Construction

Construction of the extraction facilities and monitoring wells has the potential to create regional air quality impacts through the use of heavy-duty construction equipment, which includes but is not limited to a truck mounted drill rig, backhoe/ track hoe, dump truck, air compressors, pumps, concrete saws, and welders. Air quality would also be impacted through vehicle trips generated by construction workers and haul trips traveling to and from each specific Project Area. In addition, fugitive dust emissions would result from construction activities. During the finishing phase, the application of architectural coatings (i.e., paints) and other building materials would release VOCs. Construction emissions can vary substantially from day to day, depending on the level of activity, the specific type of operation and, for dust, the prevailing weather conditions. As discussed above, a modeling analysis was conducted to provide generally representative emissions.

As shown in **Table 3.2-7**, emissions from construction of an extraction facility or monitoring well would not exceed the SCAQMD thresholds of significance. However, it is possible that finalized proposed Project plans could be large enough in scale and/or intensity or include the construction of multiple facilities and/or wells concurrently such that many pieces of heavy-duty construction equipment and/or heavy-duty trucks may be required.

TABLE 3.2-7
EXTRACTION FACILITIES AND MONITORING WELLS CONSTRUCTION – ESTIMATED MAXIMUM DAILY EMISSIONS (POUNDS PER DAY)

Construction Phases	VOC	NO_X	CO	SO_2	PM10[a]	PM2.5[a]
Drilling (24 hours)	0.38	4.48	7.43	<0.1	0.23	0.17
Building Construction	0.96	7.36	8.45	<0.1	0.34	0.27
Maximum Daily Construction Emissions	**0.96**	**7.36**	**8.45**	**<0.1**	**0.34**	**0.27**
SCAQMD Regional Significance Threshold	75	100	550	150	150	55
Exceeds Threshold?	**No**	**No**	**No**	**No**	**No**	**No**

SOURCE: ESA 2024
NOTES:
Totals may not add up exactly due to rounding in the modeling calculations. Detailed emissions calculations are provided in Exhibit A.
a. Emissions include fugitive dust control measures consistent with SCAQMD Rule 403.

The exact locations and construction schedule of the extraction facilities and monitoring wells are not known at this time. The precise location, number, and configuration for each facility component (e.g., wells, pipelines, and treatment facilities) will be determined during the project design phase. The proposed Project would be required to comply with SCAQMD rules and regulations as well as conduct their own applicable CEQA analysis when the project design phase is completed, and specific implementing actions are identified. Furthermore, construction activities under the proposed Project would be required to comply with the CARB Air Toxics Control Measure, which limits diesel powered equipment and vehicle idling to no more than five minutes at a location, and the CARB In-Use Off-Road Diesel Vehicle regulation, CARB Truck and Bus regulation, and CARB ACT regulation, which all require construction equipment and vehicle fleet operators to repower or replace higher-emitting equipment with less polluting models, including zero- and near-zero-emissions on-road truck technologies as they become developed and commercially available. Additionally, construction activities would be required to comply with SCAQMD rules and regulations including Rule 403 for the control of fugitive dust and Rule 1113 for the control of VOC emissions from architectural coatings. Mandatory compliance with these CARB and SCAQMD rules and regulations would reduce emissions, particularly for NO_X, PM10, and PM2.5, during proposed construction activities.

Even with mandatory compliance with CARB and SCAQMD rules and regulations, it is possible that finalized proposed Project plans could be large enough in scale and/or intensity such that many pieces of heavy-duty construction equipment and/or heavy-duty trucks may be required. In addition, construction of the groundwater treatment plants and conveyance pipelines could also occur at the same time and in the vicinity of the wells and may cumulatively contribute to significant emittance of criteria pollutants exceeding SCAQMD thresholds. Therefore, the proposed Project-related construction activities could result in a potentially significant regional air quality impact. However, with the implementation of **Mitigation Measure AQ-1** requiring an air quality analysis to be performed once the proposed Project construction phases have been determined would reduce the impact to less than significant.

Local Groundwater Treatment Plants

Construction

It is assumed that a total of 9 groundwater treatment plants would be required, one each for 7 of the conceptual groundwater containment alignments (G-1 through G-5, G-7, and G-8) and two for the longest alignment along MacArthur Boulevard (G-6 and G-7). The treatment system's footprint would be between approximately 10 feet by 10 feet and 20 feet by 20 feet. Construction of the groundwater treatment plants has the potential to create regional air quality impacts through the use of heavy-duty construction equipment and through vehicle trips generated by construction workers and haul trips traveling to and from each specific Project Area. In addition, fugitive dust emissions would result from construction activities. During the finishing phase, the application of architectural coatings (i.e., paints) and other building materials would release VOCs. Construction emissions can vary substantially from day to day, depending on the level of activity, the specific type of operation and, for dust, the prevailing weather conditions. As discussed above, a modeling analysis was conducted to provide generally representative emissions.

As shown in **Table 3.2-8**, emissions from construction of a groundwater treatment plant would not exceed the SCAQMD thresholds of significance. However, it is possible that finalized proposed Project plans could be large enough in scale and/or intensity or include the construction of multiple treatment plant concurrently such that many pieces of heavy-duty construction equipment and/or heavy-duty trucks may be required.

TABLE 3.2-8
GROUNDWATER TREATMENT PLANTS – ESTIMATED MAXIMUM DAILY EMISSIONS (POUNDS PER DAY)

Construction Phases	VOC	NO_X	CO	SO_2	PM10[a]	PM2.5[a]
Site Preparation	0.26	2.42	3.86	0.32	0.18	0.12
Grading	0.42	4.53	6.00	<0.1	0.48	0.23
Building Construction	0.62	5.05	6.11	<0.1	0.23	0.18
Paving	0.30	2.38	3.31	<0.1	0.20	0.12
Architectural Coating	11.78	1.22	1.63	<0.1	<0.1	0.05
Maximum Daily Construction Emissions	**11.78**	**5.05**	**6.11**	**0.32**	**0.48**	**0.23**
SCAQMD Regional Significance Threshold	75	100	550	150	150	55
Exceeds Threshold?	**No**	**No**	**No**	**No**	**No**	**No**

SOURCE: ESA 2024
NOTES:
Totals may not add up exactly due to rounding in the modeling calculations. Detailed emissions calculations are provided in Exhibit A.
a. Emissions include fugitive dust control measures consistent with SCAQMD Rule 403.

The proposed groundwater treatment plants would be located within and adjacent to various land uses throughout the unincorporated areas of Orange County and the cities of Irvine and Santa Ana, and Tustin and would be constructed within or near the proposed well alignments as described above and shown on Figure 2-5. Similarly, the construction activities are required to comply with CARB and SCAQMD rules and regulations. However, construction of the groundwater treatment plants, as well as contemporaneous construction of extraction facilities and monitoring wells and conveyance pipelines in the Project Area could generate construction emissions that may exceed the significance thresholds. Thus, construction air

quality impacts from construction of the groundwater treatment plant facilities could be potentially significant and mitigation measures are provided. However, with the implementation of Mitigation Measure AQ-1 requiring an air quality analysis to be performed once the proposed Project construction phases have been determined would reduce the impact to less than significant.

Conveyance Pipelines

Construction

On average, 100 to 500 feet of pipeline would be installed per day, totaling an estimated 1,000 to 25,000 feet of pipeline. Construction of the conveyance pipelines would generate emittance associated with both construction worker commutes and material and equipment hauling, and fugitive emissions. Construction methods would include open-trench installation, possibly horizontal directional drilling, or micro tunneling and could result in exceedance of criteria pollutants. Pipelines will be constructed according to all best practices and standards. For open-trench installations in paved areas, pavement will be replaced according to City standards. Work includes installation of all pipeline fittings, valves and appurtenances which includes underground vaults for operation and maintenance access. The construction equipment required to install the conveyance pipelines would include but is not limited to excavator, backhoe/ track hoe, dump truck, paving equipment, rollers, and concrete saws. As discussed above, a modeling analysis was conducted to provide generally representative emissions.

As shown in **Table 3.2-9**, emissions from construction of a pipeline segments would not exceed the SCAQMD thresholds of significance. However, it is possible that finalized proposed Project plans could be large enough in scale and/or intensity or include the construction of multiple pipeline segments concurrently such that many pieces of heavy-duty construction equipment and/or heavy-duty trucks may be required.

TABLE 3.2-9
CONVEYANCE PIPELINE SEGMENTS – ESTIMATED MAXIMUM DAILY EMISSIONS (POUNDS PER DAY)

Construction Phases	VOC	NO_X	CO	SO_2	PM10[a]	PM2.5[a]
Pavement Demolition	0.43	12.52	6.68	<0.1	2.499	0.786
Grading	0.11	0.85	1.13	<0.1	<0.1	<0.1
Building Construction	0.11	0.81	0.65	<0.1	<0.1	<0.1
Paving	0.36	2.29	3.08	<0.1	0.136	0.106
Architectural Coating	0.13	1.21	2.03	<0.1	<0.1	<0.1
Trenching	0.13	1.21	2.03	<0.1	<0.1	<0.1
Maximum Daily Construction Emissions[b]	**1.49**	**17.70**	**13.68**	**0.07**	**2.87**	**1.03**
SCAQMD Regional Significance Threshold	75	100	550	150	150	55
Exceeds Threshold?	**No**	**No**	**No**	**No**	**No**	**No**

SOURCE: ESA 2024

NOTES:

Totals may not add up exactly due to rounding in the modeling calculations. Detailed emissions calculations are provided in Exhibit A.

a. Emissions include fugitive dust control measures consistent with SCAQMD Rule 403.
b. To be conservative, construction phases are assumed to occur on the same day as each pipeline segment is built, therefore, maximum daily construction emissions total all construction phases.

The proposed conveyance pipelines would be located within and adjacent to various land uses throughout the unincorporated areas of Orange County and the cities of Irvine, Santa Ana, and Tustin and would be constructed within or near the proposed well alignments as described above. Similarly, the construction activities are required to comply with CARB and SCAQMD rules and regulations. However, construction of the conveyance pipelines, as well as contemporaneous construction of extraction facilities, monitoring wells and groundwater treatment plants could generate construction emissions that may exceed the significance thresholds. Thus, construction air quality impacts from construction of the conveyance pipelines could be potentially significant and mitigation measures are provided. However, with the implementation of Mitigation Measure AQ-1 requiring an air quality analysis to be performed once the proposed Project construction phases have been determined would reduce the impact to less than significant.

Extraction Facilities, Monitoring Wells, Local Groundwater Treatment Plants, and Conveyance Pipelines

Operation

As discussed in Impact 3.2-1, the operation of electric-powered equipment would not result in direct emissions of criteria pollutants. All electrical and instrumentation equipment will be installed according to all best practices and standards (e.g., National Electrical Manufacturers Association, Institute of Electrical and Electronics Engineers, etc.) and will be installed in weather resistant enclosures or small buildings. Minimal amounts of emissions would be generated from periodic maintenance operations and periodic maintenance and testing for equipment. Periodic site inspections would survey the grounds and exterior appearance, exercise the active and standby electrical equipment, maintain the instrumentation and radio equipment, and conduct performance testing, which would not generate a substantial number of vehicles trips or emissions. Pipelines would be contained entirely underground and would require minimal maintenance. Although the pipelines would involve the transportation or storage of water, the proposed Project does not directly use water. Implementation of the proposed facilities would not result in large numbers of new employees because the facilities are highly automated. As a result, maintenance and inspection of facilities would result in minimal site visits. Therefore, operation activities would have less than significant emission of criteria pollutants that exceed SCAQMD air quality significance thresholds and therefore would not violate a regional air quality standard. Thus, operation of these facilities would result in a less than significant impact.

Mitigation Measures

AQ-1: Air Quality Analysis. Prior to approval, construction and operation of the PDI Workplan and Remedy Construction (subsequent phases of the Project) OCWD shall conduct an air quality analysis to determine whether the Project phase would exceed applicable significance thresholds. If the thresholds are not exceeded, no further mitigation is needed. If a threshold would be exceeded, OCWD shall require performance standards to achieve emission reductions to below the corresponding threshold. Performance standards may include, but are not limited to, one or more of the following, as applicable to the individual project phase:

- The use of equipment that meets the Tier 4 interim and/or final off-road emission standards.
- The use of alternative-fueled or zero-emissions equipment in place of fossil-fueled equipment.

- Phase the Project implementation to limit construction of Project components from overlapping or occurring concurrently to avoid exceeding local or regional air quality thresholds, where feasible.

Significance Determination

Less than Significant with Mitigation.

Sensitive Receptors

Impact 3.2-3: The proposed Project could expose sensitive receptors to substantial pollutant concentrations.

Localized Emissions

Extraction Facilities, Monitoring Wells, Local Groundwater Treatment Plants, and Conveyance Pipelines

Construction

Construction of the proposed Project would occur along alignments, as shown on Figure 2-5, located within and adjacent to various land uses throughout the unincorporated areas of Orange County and the cities of Irvine, Santa Ana, and Tustin, although exact locations have not yet been determined. Furthermore, construction of one or more individual components could occur at the same time and in the vicinity of each other and may contribute to combined emissions during a construction workday; however, it is not known how many individual components would be constructed at the same time. The majority of the alignments are located in areas with land uses consisting of Industrial/Flex-Medium, Industrial/Flex-Low, District Center-Medium, and District Center-Low land uses, which are not air quality-sensitive receptors. Thus, air quality impacts from construction of the proposed Project near these land uses would be less than significant.

The proposed extraction alignment along East Warner Avenue (G-3) includes residential uses at the far western end of the alignment, west of Standard Avenue, and the Santa Ana Unified School District Monroe Elementary School west of Halladay Street. The proposed well alignment, G-7 is along MacArthur Blvd. in the city of Irvine. There are four (4) high density residential complexes in or near this alignment. MDL Irvine consisting of 137 residential units, City Square consisting of 44 units, LUX consisting of 39 units and Aurum consisting of 178 units. Construction of the extraction facilities, monitoring wells, groundwater treatment plans, and/or conveyance pipelines in the vicinity of the western portion of alignment G-3 along East Warner Avenue and alignment G-7 along MacArthur Blvd, near the residential or school uses could generate construction emissions that may exceed the localized significance threshold for air quality-sensitive receptors. Thus, localized construction air quality impacts from construction of the extraction facilities, monitoring wells, groundwater treatment plans, and/or conveyance pipelines along the far western portion of the East Warner Avenue and along MacArthur Blvd alignments would be potentially significant. However, with the implementation of Mitigation Measure AQ-1, impacts would be reduced to less than significant.

Operation

Implementation of extraction facilities, monitoring wells, groundwater treatment plants, and conveyance pipelines would not require new large and continuously operating stationary emissions sources. As discussed in Impact 3.2-1, the operation of electric-powered equipment would not result in direct emissions of criteria pollutants. During operation of the proposed Project, minimal amounts of emissions would be generated from maintenance operations periodic maintenance and testing for equipment. Periodic site inspections would survey the grounds and exterior appearance, exercise the active and standby electrical equipment, maintain the instrumentation and radio equipment, and conduct performance testing, which would not generate a substantial number of vehicles trips or emissions. Pipelines would be contained entirely underground and would require minimal maintenance. Although the pipelines would involve the transportation or storage of water, the proposed Project does not directly use water. The proposed Project is not a land use project which typically would have emissions associated with ongoing daily travel from mobile sources. Mobile sources associated with the proposed Project would only occur from occasional and periodic vehicle trips by workers for inspection and maintenance purposes.

Thus, operation of the proposed Project would not generate localized emissions that would exceed the SCAQMD thresholds of significance and impacts related to an increase in localized emissions for all facilities would therefore be less than significant.

Mitigation Measures

Implement Mitigation Measure AQ-1.

Significance Determination

Less than Significant with Mitigation.

CO Hotspots

Extraction Facilities, Monitoring Wells, Local Groundwater Treatment Plants, and Conveyance Pipelines

Construction

As shown previously in Table 3.2-2, above, CO levels in the Project Area are substantially below the federal and state standards. Maximum CO levels in recent years are 2.4 ppm (one-hour average) and 1.7 ppm (eight-hour average) compared to the thresholds of 20 ppm (one-hour average) and 9.0 ppm (eight-hour average). No exceedances of CO have been recorded at the SRA 17 monitoring stations in the last three years for which there is data (2022, 2021, 2020), as shown in Table 3.3-2, and the Air Basin is currently designated as a CO attainment area for both the CAAQS and NAAQS. Thus, it is not expected that CO levels at project-impacted intersections would rise to the level of an exceedance of these standards.

Construction would generate vehicle trips from construction workers commuting to the work sites and truck trips for hauling debris, soil, and construction materials and supplies. The number of construction workers would be relatively small and extensive excavation is not anticipated minimizing haul truck trips. Furthermore, construction workers would typically not travel at the same times as haul trucks – workers would arrive at the start of the work day and leave at the end of the work day, with trucks traveling to and from the work sites between the work day start and end times. As such, the proposed Project would not be

anticipated to generate a substantial number of trips through roadway intersections within the OCWD service area. Therefore, the proposed Project would not expose sensitive receptors to substantial CO pollutant concentrations and impacts would be less than significant.

Operation

During operation of the proposed Project, minimal amounts of CO emissions would be generated from maintenance operations, including periodic visits from service vehicles. The limited number of vehicle trips associated with operation of the proposed Project would not contribute considerably to the formation of CO hotspots. Furthermore, CO concentrations are substantially below the air quality standards. Therefore, the proposed Project would result in less than significant impacts with respect to CO hotspots as it would not expose sensitive receptors to substantial CO pollutant concentrations.

Mitigation Measures

None Required.

Significance Determination

Less than Significant Impact.

Toxic Air Contaminants

Extraction Facilities, Monitoring Wells, Local Groundwater Treatment Plants, and Conveyance Pipelines

Construction

Temporary TAC emissions associated with diesel particulate matter emissions from heavy construction equipment would occur during construction activities. According to OEHHA guidance manual and the SCAQMD's Health Risk Assessment Guidance for Analyzing Cancer Risks from Mobile Source Diesel Idling Emissions for CEQA Air Quality Analysis,[15] health effects from TACs are described in terms of individual cancer risk based on a lifetime (i.e., 30-year) resident exposure duration. Construction activities associated with the proposed Project would occur at various locations within the 5.6-square-mile site construction activities occur as close as 25 feet from a sensitive receptor. As discussed previously, construction of the facilities would occur along alignments located within and adjacent to various land uses throughout the unincorporated areas of Orange County and the cities of Irvine, Santa Ana, and Tustin. While specific locations have not yet been determined, the majority of the alignments are located in areas with land uses consisting of Industrial/Flex-Medium, Industrial/Flex-Low, District Center-Medium, and District Center-Low land uses, which are not air quality-sensitive receptors. The proposed well alignment along East Warner Avenue (G-3) includes residential uses at the far western end of the alignment, west of Standard Avenue, and the Santa Ana Unified School District Monroe Elementary School west of Halladay Street. The proposed well alignment, G-7 is along MacArthur Blvd. in the city of Irvine. There are four (4) high density residential complexes in or near this alignment. MDL Irvine consisting of 137 residential units, CitySquare consisting of 44 units, LUX consisting of 39 units and Aurum consisting of 178 units. Construction of the extraction facilities, monitoring wells, groundwater treatment plans, and/or conveyance pipelines in the vicinity of the western portion of the G-3 alignment

[15] SCAQMD, Health Risk Assessment Guidance for Analyzing Cancer Risks from Mobile Source Diesel Idling Emissions for CEQA Air Quality Analysis, August 2003, accessed September 2023, http://www.aqmd.gov/docs/default-source/ceqa/handbook/mobile-source-toxics-analysis.doc?sfvrsn=2.

along East Warner Avenue and the G-7 alignment along MacArthur Blvd, near the residential or school uses could generate construction TAC emissions in the vicinity of sensitive receptors. However, construction at any one specific location would be temporary and short-term. Construction of the proposed Project would not result in the exposure of any one specific sensitive receptor to substantial or long-term (i.e., lifetime or 30-year) TAC emissions. Additionally, construction contractors would be required to comply with regulations that limit diesel emissions, such as the CARB Air Toxics Control Measure that limits diesel vehicle idling to no more than five minutes. Pipeline construction activities would not be concentrated at any one location but would occur linearly as pipeline segments are constructed. As a result, health risk impacts at specific sensitive receptors would not be anticipated due to the movement of construction activities around the proposed Project area and the generally short-term duration near any single sensitive receptor. Therefore, the proposed Project would not expose sensitive receptors to substantial TAC emissions and impacts would be less than significant.

Operation

The SCAQMD recommends that operational health risk assessments be conducted for substantial sources of operational diesel particulate matter (e.g., truck stops, warehouse distribution centers, transit centers) and has provided guidance for analyzing mobile source diesel emissions (SCAQMD 2003). The proposed Project is not a land use project and would not have substantial sources of operational diesel particulate matter or other TAC emissions.

As discussed in Impact 3.2-1, the operation of electric-powered equipment would not result in direct emissions of criteria pollutants. During operation of the proposed Project, minimal amounts of emissions could be generated from maintenance operations, including from routine cleaning and periodic visits from service vehicles. As a result, toxic or carcinogenic air pollutants are not expected to occur in any substantial amounts in conjunction with operation of the proposed Project facilities. Based on the uses expected at the sites of the proposed Project's facilities, potential long-term operational impacts associated with the release of TACs would be minimal, regulated, and controlled, and would not be expected to exceed the SCAQMD significance thresholds. Thus, operation of the proposed Project would not expose sensitive receptors to substantial toxic air contaminant concentrations, and operation-related health impacts would be less than significant.

Mitigation Measures

None Required.

Significance Determination

Less than Significant Impact.

Fugitive Dust and Particulate Matter

Extraction Facilities, Monitoring Wells, Local Groundwater Treatment Plants, and Conveyance Pipelines

Construction

The proposed Project would generate exhaust particulate matter emissions (primarily PM10 and PM2.5 exhaust emissions) and fugitive dust emissions (primarily PM10 fugitive dust) particularly during construction from site grading and earth-moving activities. Fugitive dust emissions are primarily associated with earth disturbance and grading activities, and vary as a function of soil silt content, soil

moisture, wind speed, acreage of disturbance area, and miles traveled by vehicles on- and off-site. During demobilization for each site, the contractor will dispose of all materials generated in accordance with all application laws and regulations.

The proposed Project would be required to comply with SCAQMD Rule 403, which includes implementation of all applicable and required dust control measures specified in the rule. Dust control measures include but are not limited to: watering or pre-watering of disturbed soils, watering or pre-watering soils while loading or unloading, limiting vehicular traffic and disturbances on soils, limiting on-site vehicle speeds to 15 miles per hour, using tarps or other enclosures on haul trucks, using wheel washers or other such devices to remove soil material from vehicle tires to prevent dust track-out onto off-site streets, and other similar dust control measures. Regulatory compliance and dust control measures would ensure that fugitive dust and particulate matter impacts would be less than significant.

Operation

Implementation of extraction and monitoring wells, groundwater treatment plants, conveyance pipelines would not include new substantial sources of fugitive dust and particulate matter emissions. As discussed previously, operation of the proposed Project would generate minimal regional and localized emissions that would not exceed the SCAQMD significance thresholds. Therefore, operational impacts related to fugitive dust and particulate matter would be less than significant.

Mitigation Measures

None Required.

Significance Determination

Less than Significant Impact.

Other Emissions

Impact 3.2-4: The proposed Project could result in other emissions (such as those leading to odors) adversely affecting a substantial number of people.

Extraction Facilities, Monitoring Wells, Local Groundwater Treatment Plant, and Conveyance Pipelines

Construction

During the construction phase of the proposed Project, exhaust emissions from construction equipment may generate odors typical of most construction sites; however, such other emissions and odors would be temporary. As discussed previously, construction at any one specific location would be temporary and short-term, and the majority of the alignment areas are surrounded by non-sensitive land uses. Pipeline construction activities would not be concentrated at any one location but would occur linearly as pipeline segments are constructed. The proposed Project would comply with the applicable provisions of the CARB ATCM regarding idling limitations for diesel trucks minimizing the potential to adversely affect a substantial number of people. Through mandatory compliance with SCAQMD rules and regulations, the temporary and short-term nature of construction, and the distributed nature of Project construction, the proposed Project's construction activities and use of materials would not result in other emissions,

including those leading to objectionable odors, affecting a substantial number of people. Therefore, construction impacts related to other emissions such as those leading to odors would be less than significant.

Operation

According to the SCAQMD's CEQA Air Quality Handbook, land uses associated with odor complaints typically include agricultural uses, wastewater treatment plants, food processing plants, chemical plants, composting, refineries, landfills, dairies, and fiberglass molding. The proposed Project would involve the movement of groundwater with contaminates of concern, which is locally treated, then discharged to the existing sanitary sewer system. As such the operation of the proposed Project pipelines would involve the storage and conveyance of water. The pipelines would be buried underground with some piping occurring above ground at the entry points to the treatment plant and would not generate odors. However, implementation of the proposed Project would not result in the introduction of any new processes that are considered to have a high odor-generation potential beyond existing conditions and would not result in substantial changes to treatment processes that are of primary concern with regard to odor generation. Therefore, objectionable odor impacts affecting a substantial number of people from the proposed Project would not occur from the operation of these facilities and would be less than significant.

Mitigation Measures

None Required.

Significance Determination

Less than Significant Impact.

Greenhouse Gas Emissions

Impact 3.2-5: The proposed Project could generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment.

Extraction Facilities, Monitoring Wells, Local Groundwater Treatment Plants, and Conveyance Pipelines

Construction

Construction of the proposed Project facilities would result in one-time GHG emissions and would cease once construction activities cease. As stated in Chapter 2, *Project Description*, construction of the extraction facilities, wells and local groundwater treatment plants would require the use of equipment such as a truck mounted drill rig, backhoe/track hoe, dump truck, air compressors, pumps, concrete saws, and welders. Construction of the pipelines would require equipment such as an excavator, backhoe/track hoe, dump truck, paving equipment, rollers, and concrete saws. Because construction GHG emissions are a one-time occurrence, and as GHG emission impacts are typically based on on-going annual GHG emissions, a project's total construction GHG emissions are typically amortized over the life of a project, which the SCAQMD has defined as a 30-year lifetime as a default assumption.

Table 3.2-10 provides the total GHG emissions from construction of up to 100 extraction facilities, 200 monitoring wells, 9 groundwater treatment plants, and 25,000 feet of pipeline.

TABLE 3.2-10
ESTIMATED CONSTRUCTION GHG EMISSIONS

Emissions Source	Project (MTCO2e/ year)
Extraction Facilities and Monitoring Wells	4,082
Groundwater Treatment Plants	96
Conveyance Pipelines	1,135
Total Construction Emissions	***5,313***
Amortized Construction Emissions[a]	177
GHG Significance Threshold	10,000
Exceeds Significance Threshold?	**No**

SOURCE: ESA 2024

a. The total construction GHG emissions were amortized over 30 years.

Due to the temporary nature of construction and when considered over an assumed 30-year amortized lifetime, GHG emissions from construction of the proposed Project are not expected to result in an exceedance of the SCAQMD's suggested significance threshold of 10,000 $MTCO_2e$ per year for industrial activities and facilities. Therefore, impacts would be less than significant.

Operation

The operation of the proposed Project would generate indirect GHG emissions from equipment energy consumption and periodic maintenance and inspection to ensure the site and equipment are functioning properly. Electrical infrastructure may include installation of high and low voltage wiring, transformers, switchgear, motor control centers, variable frequency drives, motor actuated valves, lighting and various conduits. Operation of additional pipelines would involve additional energy usage to transmit water in the Project Area; however, these activities are not expected to result in substantial GHG emissions. The proposed Project is not a land use project which typically would have GHG emissions associated with ongoing daily travel from mobile sources. As previously stated, routine site inspections would survey the grounds and exterior appearance, exercise the active and standby electrical equipment, maintain the instrumentation and radio equipment, and conduct performance testing; however, this is not anticipated to be a significant contributor to GHG emissions. Therefore, operational GHG emissions of the proposed Project, when also considered with amortized construction GHG emissions, would result in a less than significant impact.

Mitigation Measures

None Required.

Significance Determination

Less than Significant Impact.

Greenhouse Gas Emissions Plans

Impact 3.2-6: The proposed Project could conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases.

Extraction Facilities, Monitoring Wells, Local Groundwater Treatment Plants, and Conveyance Pipelines

Construction

The primary source of GHG emissions generated by project implementation would occur during construction, which would be temporary in nature. The proposed Project would utilize contractors that would comply with regulations including the USEPA Heavy Duty Vehicle Greenhouse Gas Regulation, CARB ACTM that limits heavy-duty diesel motor vehicle idling, and the low carbon fuel standard. Compliance with these regulations would limit construction-related GHG emissions. Therefore, construction of the proposed Project would not conflict with applicable plans, policies or regulations adopted for the purpose of reducing GHG emissions and impacts would be less than significant.

Operation

As discussed in Chapter 2, *Project Description*, the purpose of the proposed Project is to protect human health by preventing human ingestion of groundwater containing contaminants of concern (COCs) exceeding maximum contaminant levels (MCLs)/risk-based standards and to protect the environment decreasing further degradation of the groundwater resource due to plume expansion and maintaining surface water COC concentrations to levels that are protective of potential ecological receptors. The proposed Project would install necessary and appropriately-sized equipment and would be electric-powered. Equipment would be obtained from manufacturers and suppliers in compliance with applicable equipment energy efficiency requirements. The use of electric-powered equipment, with electricity supplied by SCE for the proposed Project, would provide a clean electricity mix with an increasing proportion provided by renewable energy sources, as required by the State's RPS, which sets continuously escalating renewable energy procurement requirements. Consequently, the implementation of the proposed Project would not generate substantial amounts of GHG emissions that would impede the future statewide GHG emission reductions goals. CARB has outlined a number of potential strategies for achieving the 2030 reduction target of 40 percent below 1990 levels. These potential strategies include renewable resources for half of the State's electricity by 2030, reducing petroleum use in cars and trucks, and reducing the carbon content of transportation fuels. The proposed Project would not conflict with these future regulations, as promulgated by the USEPA, CARB, CEC, or other agencies. As a result, the proposed Project would be expected to exhibit declining GHG emissions trajectory in-line with future State GHG reductions goals codified in HSC Division 25.5 for 2030. Therefore, impacts would be less than significant.

Mitigation Measures

None Required.

Significance Determination

Less than Significant Impact.

Cumulative Impacts: Air Quality

Impact 3.2-7: Concurrent construction and operation of the proposed Project and related projects in the geographic scope could result in cumulative short-term and long-term impacts to air quality.

Extraction Facilities, Monitoring Wells, Local Groundwater Treatment Plants, and Conveyance Pipelines

Construction

This section presents an analysis of the cumulative effects of the proposed Project in combination with approved, under construction, or proposed development projects within one mile of the proposed Project that could cause cumulatively considerable impacts. The geographic scope of the analysis for cumulative air quality impacts is the Air Basin. Chapter 3, *Environmental Setting; Impact Analysis and Mitigation Measures*, describes the overall approach to the cumulative analysis; a full list of cumulative projects is provided in Table 3-1, *Cumulative Projects*. The Project Area is urbanized with residential, commercial, and industrial development. As land use within the OCWD service area continues to develop the addition of more residential, commercial, and industrial development, as shown in Table 3-1, is expected to substantially increase emission of criteria pollutants and GHGs within the service area. Additionally, Cumulative Future Infrastructure Projects, which would include infrastructure projects to be implemented through the year 2050, would be implemented to support future development, and could interfere with traffic patterns within the area. As discussed in Impact 3.2-2 and Impact 3.2-3, the proposed Project's construction emissions would result in a potentially significant impact for regional emissions and localized emissions. However, with the implementation of Mitigation Measure AQ-1, impacts would be less than significant.

Operation

Operation of the proposed Project would not result in operational emissions that would exceed the significance thresholds and operational impacts would be less than significant. As previously discussed, the proposed Project is not expected to produce any new permanent and ongoing daily vehicle trips or other sources of direct emissions and would result in periodic and minimal emissions from maintenance and testing activities. Therefore, operation of the proposed Project would not result in the potential for the proposed Project, in conjunction with other potential planned projects, to result in a cumulatively considerable impact. Operational impacts would be less than significant.

Mitigation Measures

Implement Mitigation Measure AQ-1.

Significance Determination

Less than Significant with Mitigation (Construction).

Less than Significant Impact (Operations).

Cumulative Impacts: Greenhouse Gas Emissions

Impact 3.2-8: Concurrent construction and operation of the proposed Project and related projects in the geographic scope could result in cumulative short-term and long-term impacts to greenhouse gas emissions.

Extraction Facilities, Monitoring Wells, Local Groundwater Treatment Plants, and Conveyance Pipelines

Future cumulative development shown in Table 3-1, *Cumulative Projects*, of Chapter 3, *Environmental Setting; Impact Analysis and Mitigation Measures*, includes a list of projects identified as potentially relevant for study in this Draft PEIR. The projects in the list include a variety of land uses including commercial/retail, residential, office, warehouse, medical, educational, and industrial uses. Each future cumulative development that requires discretionary approval and is not exempt from CEQA would be required to evaluate impacts related to GHG emissions and provide mitigation if required. Because the proposed Project would not generate substantial GHG emissions that may have a significant impact on the environment and would not conflict with applicable GHG reduction plans, policies, and regulations, the proposed Project's contribution to cumulative GHG impacts would not be cumulatively considerable. Therefore, the proposed Project's cumulative impact would be less than significant.

Mitigation Measures

None Required.

Significance Determination

Less than Significant Impact.

3.3 Biological Resources

This section analyzes the potential for the proposed Project to impact biological resources. This section includes a description of the existing biological resources conditions within the Project Area. A summary of applicable regulations related to biological resources, an evaluation of the potential impacts of the proposed Project, and proposed mitigation to reduce impacts to less than significant, are presented in this section.

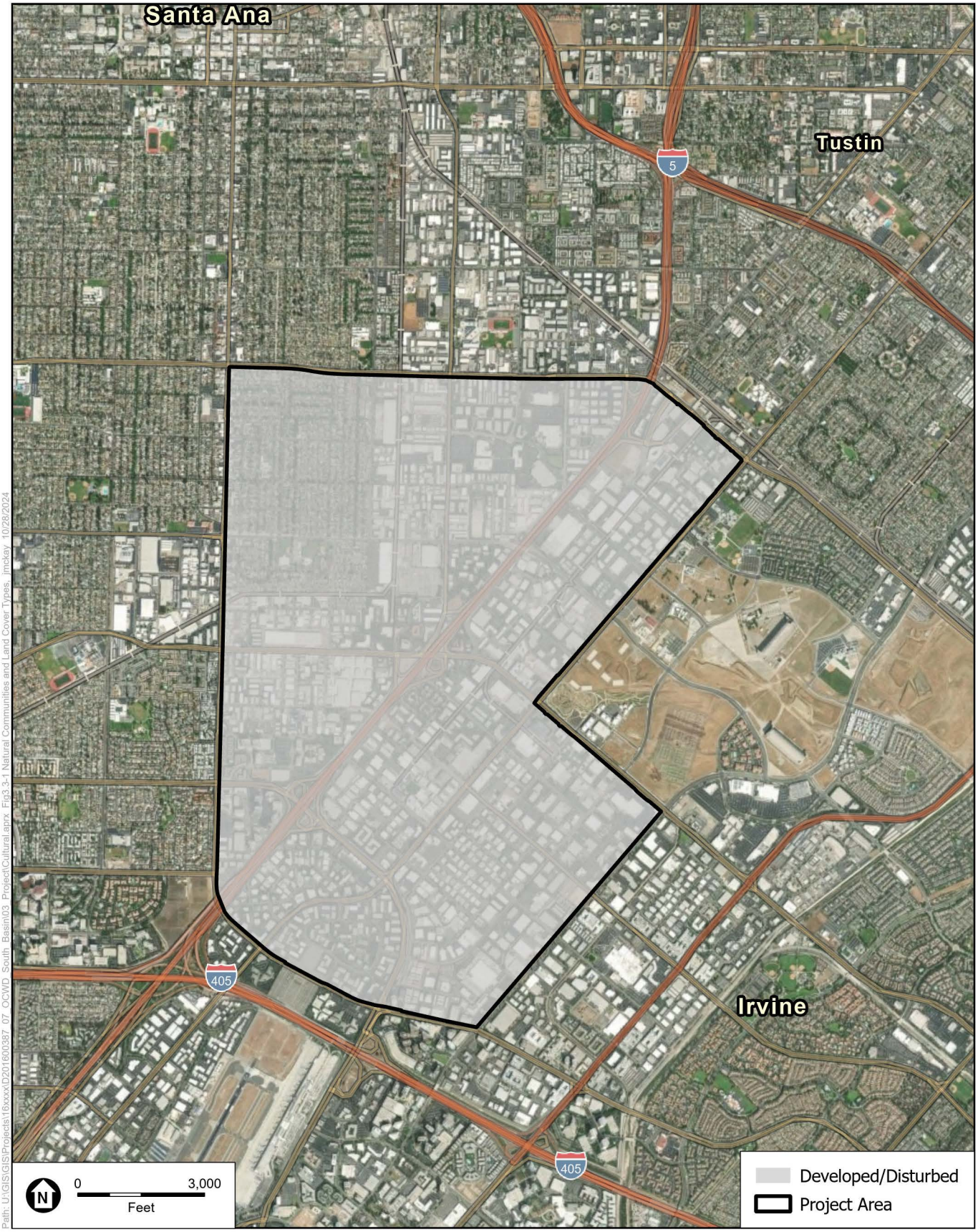
Literature review included the query of the following databases and resources:

- CDFW (California Department of Fish and Wildlife). 2024a. California Natural Diversity Data Base (CNDDB). The database was queried for special-status species records in the Tustin U.S. Geological Survey (USGS) 7.5-minute quadrangle and seven surrounding quadrangles, including Anaheim, Orange, Black Star Canyon, Newport Beach, El Toro, Laguna Beach, and San Juan Capistrano. Accessed April 2, 2024. https://www.wildlife.ca.gov/Data/CNDDB/Maps-and-Data.
- CDFW. 2024b. Sensitive Natural Communities. Sacramento, CA: CDFW, Natural Heritage Division, 2021. Accessed April 2, 2024. https://wildlife.ca.gov/Data/VegCAMP/Natural-Communities.
- California Department of Fish and Wildlife (CDFW). 2024a. CDFW's connectivity mapper. Accessed April 2, 2024. https://www.wildlife.ca.gov/Data/CNDDB/Maps-and-Data.
- CNPS (California Native Plant Society). 2024. Inventory of Rare and Endangered Vascular Plants of California. Database was queried for special-status species records in the Tustin U.S. Geological Survey (USGS) 7.5-minute quadrangle and seven surrounding quadrangles, including Anaheim, Orange, Black Star Canyon, Newport Beach, El Toro, Laguna Beach, and San Juan Capistrano. Accessed April 2, 2024. http://rareplants.cnps.org/.
- USFWS (U.S. Fish and Wildlife Service). 2024. Critical Habitat Portal. Accessed April 2, 2024. https://fws.maps.arcgis.com/home/webmap/viewer.html?webmap=9d8de5e265ad4fe09893cf75b8dbfb77.
- USFWS. 2024. Information for Planning and Consultation. Accessed April 2, 2024. https://ipac.ecosphere.fws.gov/.
- USFWS. 2024c. National Wetland Inventory. Accessed April 2, 2024. https://www.fws.gov/wetlands/data/Mapper.html.
- USGS (U.S. Geological Service). 2024. National Hydrography Dataset. Accessed April 2, 2024. https://www.usgs.gov/media/images/nhdplus-hr-status-map-0.

3.3.1 Environmental Setting

Natural Communities and Land Cover Types

Natural communities and land cover types were identified and delineated throughout the review of aerial imagery and digitized on aerial maps using a Geographic Information System software (ArcGIS). One land cover type, Developed/disturbed, was mapped within the Project Area classified within the Project boundary and immediate surroundings (**Figure 3.3-1**). The entire Project Area is characterized by developed/disturbed land. No locations within the boundary host natural communities of vegetation. The developed/disturbed land cover type is described further below.



SOURCE: ESA, 2024

South Basin Groundwater Protection Project

Figure 3.3-1
Natural Communities and Land Cover Types

ESA

Developed/Disturbed

Developed lands are areas that have been constructed on or otherwise physically altered to the extent that natural vegetation is limited or no longer supported at all. This land cover is characterized by permanent or semi-permanent structures, pavement or hardscape, and/or maintained landscaping interspersed with undeveloped disturbed areas. Disturbed areas support a mixture of landscaped ornamental vegetation and sparse weedy cover dominated by non-native annual grass and forb communities.

CDFW Sensitive Natural Communities and Habitats

CDFW has defined sensitive natural communities and habitats as those that have a reduced range and/or are endangered by human development (e.g., residential, agricultural, industrial), or the presence of invasive and other problematic species. NatureServe's Heritage Methodology evaluates vegetation communities based on their known range, distribution, and ecological integrity. This ranking occurs for both global (natural range within and outside of California [G]) and subnational (state level for California [S]) status ranks, each ranked from 1 ("critically imperiled" or very rare and threatened) to 5 (demonstrably secure). Natural communities and habitats ranked S1–S3 are considered sensitive natural communities and may require review during evaluation of environmental impacts. Communities marked NR have not been ranked by NatureServe (NatureServe 2023).

Based on review of aerial imagery, it does not appear that natural communities meeting the criteria for "sensitive" (i.e., 1–3) are present within the Project Area.

Special-Status Species

Special-status species are those plants and animals that, because of their recognized rarity or vulnerability to habitat loss or population decline, are recognized by federal, state, or other agencies. Some of these species receive specific protection that is defined by federal or state endangered species legislation. Others have been designated as "sensitive" on the basis of adopted policies and expertise of state resource agencies or organizations with acknowledged expertise, or policies adopted by local governmental agencies such as counties, cities, and special districts to meet local conservation objectives. These species are referred to collectively as "special-status species" and include the following categories:

- Plants or animals listed or proposed for listing as threatened or endangered under the federal Endangered Species Act (FESA) (50 Code of Federal Regulations [CFR] 17.12 [listed plants], 17.11 [listed animals] and various notices in the Federal Register [FR] [proposed species])
- Plants or animals that are candidates for possible future listing as threatened or endangered under FESA (61 FR 40, February 28, 1996)
- Plants or animals listed or proposed for listing by the State of California (State) as threatened or endangered under the California Endangered Species Act (CESA) (14 California Code of Regulations [CCR] 670.5)
- Plants listed as rare or endangered under the California Native Plant Protection Act (California Fish and Game Code Section 1900 et seq.)
- Plants that meet the definitions of rare and endangered under the California Environmental Quality Act (CEQA) (CEQA Guidelines Section 15380)

- Plants considered under the California Native Plant Society (CNPS) to be "rare, threatened or endangered in California" (Lists 1A, 1B, and 2 in CNPS 2014)
- Plants listed by CNPS as plants about which more information is needed to determine their status and plants of limited distribution (Lists 3 and 4 in CNPS 2014), which may be included as special-status species on the basis of local significance or recent biological information
- Animals fully protected in California (California Fish and Game Code Sections 3511 [birds], 4700 [mammals], and 5050 [reptiles and amphibians])
- Plants or animals covered by a locally or state adopted species conservation plan, including sensitive plants and animals and narrow endemic plants that have reasonable potential to occur on-site

The database search identified 23 plant species and 27 wildlife species within the 8-quad search area (CNDDB 2024; CNPS 2024; USFWS IPaC 2024). Given the developed nature of the Project Area and absence of suitable habitat, special-status species are not expected to occur; **Appendices C1 and C2** of this Draft EIR contain lists of special-status species identified in the database query.

Protected Trees

Trees protected by local jurisdictions may occur within the Project Area and may be impacted by the proposed Project.

Irvine, CA Public Trees

Pursuant to Irvine, California, Municipal Code Sections 5-7-401 through 5-7-415, public trees, including eucalyptus windbreaks, street trees, park trees, or other common area trees, or trees within non-residential private properties shall not be topped or removed without prior authorization through issuance of the relevant permit.

Santa Ana, CA Public Trees

Pursuant to Santa Ana Municipal Code Sections 33-181 through 33-193, the damage, topping, removal, and dumping of waste on or near public trees is prohibited without prior authorization through issuance of the relevant permit.

Tustin, CA Public Trees

Pursuant to Tustin, California, Municipal Code Chapter 3, Sections 7301 through 7309, the damage, trimming, and removal of public trees is prohibited.

Critical Habitat

Under FESA, the USFWS and National Marine Fisheries Service are required to designate critical habitat for endangered and threatened species to the extent possible. These critical habitats designate areas that are suitable habitat that are critical for the continued survival and recovery of endangered and threatened species. This protects the physical and biological resources that these species utilize: include areas for breeding, movement/migration, feeding, roosting, cover and shelter. Thus, critical habitat requires special management and protection of resources, water quality, host animals and plants, and so forth.

No USFWS-designated critical habitat overlaps with the Project Area.

Aquatic Resources

Aquatic resources are those that may be subject to the regulatory jurisdiction of the U.S. Army Corps of Engineers (USACE) pursuant to federal Clean Water Act (CWA) Section 404; the Los Angeles Regional Water Quality Control Board (RWQCB) pursuant to federal CWA Section 401 and the Porter-Cologne Water Quality Control Act; and the California Department of Fish and Wildlife (CDFW) pursuant to California Fish and Game Code Section 1600 et seq. Review of aerial imagery in combination with information presented in the National Wetlands Inventory (NWI) and National Hydrography Dataset (NHD) revealed that various aquatic features, including concrete-lined drainages and freshwater ponds, occur within the Project Area (**Figure 3.3-2**) (Google Earth 2024; USFWS 2024c; USGS 2024).

Wildlife Movement and Habitat Linkages

Habitat linkages are contiguous areas of open space that connect two larger habitat areas, and corridors are linear linkages between two or more habitat patches that provide for movement and dispersal, but do not necessarily include habitat capable of supporting all life history requirements of a species. Linkages provide both diffusion and dispersal areas for a variety of species within the landscape, and corridors can serve as primary habitat for some smaller species. Wildlife movement through linkages and corridors is critical for the survivorship of ecological systems. Crucially, these movement pathways connect populations to additional water, food, and cover resources while enabling genetic exchange between different populations; thereby, linkages and corridors maintain genetic variability and adaptability to maximize the success of wildlife responses to changing environmental conditions. This is especially critical for small populations subject to loss of variability from genetic drift and effects of inbreeding. The nature of corridor use and wildlife movement patterns varies greatly among species.

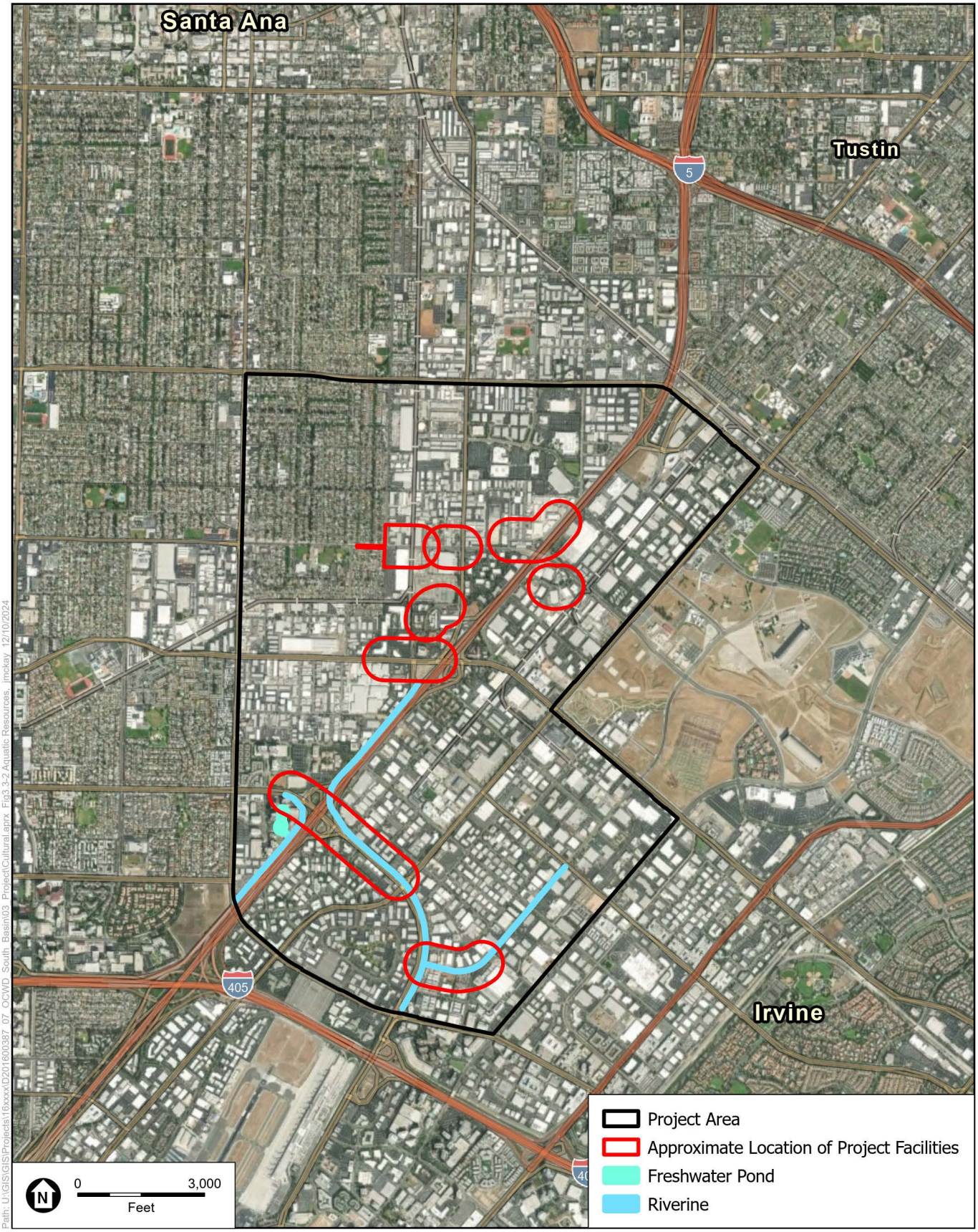
The Project Area has not been formally designated as a wildlife corridor or habitat linkage, and the Project facilities will be in a developed urban setting that lacks suitable habitat for many species. The concrete-lined channels that bisect the Project Area may support wildlife movement to a limited degree; however, are not expected to support largescale wildlife movement.

3.3.2 Regulatory Framework

Federal

Federal Endangered Species Act (FESA)

FESA provides a framework for conserving federally listed species and their associated ecosystems. FESA Section 9 prohibits “take” of federally listed endangered or threatened species and the destruction of their habitat, unless authorized by federal regulations (e.g., incidental take permit). Section 9 also has additional protective measures to prevent impacts to endangered and threatened plant species.



SOURCE: ESA, 2024

South Basin Groundwater Protection Project

Figure 3.3-2
Aquatic Resources

ESA

The Migratory Bird Treaty Act of 1918 (MTBA)

The MBTA prohibits the take of native birds: which includes pursuing, hunting, wounding, trapping, capturing or killing migratory birds, unless permitted by USFWS regulations. This also protects any nests and eggs—in addition to the birds themselves. Migratory birds include all native birds in the United States, except non-migratory game species (e.g., quail, turkey): which are managed by individual states.

Federal Clean Water Act (33 USC 1251 through 1376)

The United States Army Corps of Engineers (USACE) regulates "discharge of dredged or fill material" into "waters" of the United States, which includes tidal waters, interstate waters, and "all other waters, interstate lakes, rivers, streams (including ephemeral drainages), mud flats, sand flats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes or natural ponds, the use, degradation, or destruction of which could affect interstate or foreign commerce or which are tributaries to waters subject to the ebb and flow of the tide" (33 C.F.R. 328.3[a]), pursuant to provisions of CWA Section 404. The CWA also excludes certain features from this regulation, including "wastewater recycling facility constructed on dry land" (see 33 CFR Section 230.3[o][2][vii]). Waste treatment systems, including treatment ponds or lagoons designed to meet the requirements of CWA (other than cooling ponds as defined in 40 CFR 423.11[m] which also meet the criteria of this definition) are not considered waters of the United States.

The 2023 Supreme Court ruling in *Sackett v. Environmental Protection Agency* sharply limited the scope of the federal CWA's protection for the "waters of the U.S." As a result, EPA and USACE issued a final rule that amends the "Revised Definition of 'Waters of the United States'" to conform key aspects of the regulatory text to the U.S. Supreme Court's decision (88 *Federal Register* 61964–61969, September 8, 2023).

Fish and Wildlife Conservation Act

The Fish and Wildlife Conservation Act declares that fish and wildlife are of ecological, educational, esthetic, cultural, recreational, economic, and scientific value to the United States. The purposes of this Act are to encourage all federal departments and agencies to utilize their statutory and administrative authority, to the maximum extent practicable and consistent with each agency's statutory responsibilities, to conserve and to promote conservation of non-game fish and wildlife and their habitats. Another purpose is to provide financial and technical assistance to the states for the development, revision, and implementation of conservation plans and programs for nongame fish and wildlife.

Protection of Wetlands, Executive Order No. 11990, as Amended by Executive Order No. 12608

Under this Executive Order No. 11990, each federal agency takes action to minimize the destruction, degradation, or modification of wetlands and enhance the natural and beneficial values of wetlands. The Executive Order also directs the avoidance of direct or indirect support of new construction in wetlands and public involvement throughout the decision-making process.

State

California Endangered Species Act (CESA)

CESA is administered by CDFW and prevents state agencies from approving projects that jeopardize a species' presence if there are reasonable alternatives that would avoid the impact to the species. Unlike its federal counterpart, CESA applies the take prohibitions to not only listed threatened and endangered species, but also to state candidate species for listing. California Fish and Game Code Section 86 defines "take" as "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill." The CDFG maintains lists for Candidate-Endangered Species and Candidate-Threatened Species, which have the same protection as listed species. Under CESA, the term "endangered species" is defined as a species of plant, fish, or wildlife, which is "in serious danger of becoming extinct throughout all, or a significant portion of its range" and is limited to species or subspecies native to California.

Clean Water Act Section 401/Porter-Cologne Act

The State of California regulates water quality related to discharge of dredge or fill material into waters of the state pursuant to CWA Section 401. Section 401 compliance is a federal mandate regulated by the State. The local Regional Water Quality Control Boards (RWQCB) have jurisdiction over all those areas defined as jurisdictional under CWA Section 404. In addition, the RWQCBs regulate water quality for all waters of the State, which may also include isolated wetlands, as defined by the California Porter-Cologne Water Quality Control Act (Porter Cologne; California Water Code, Division 7, Section 13000 et seq.). The RWQCB regulates discharges that can affect water quality of both waters of the U.S. and waters of the State. If there is no significant nexus to a traditional navigable water body and thus no USACE jurisdiction over waters of the U.S., then the RWQCB regulates water quality of waters of the State through a Waste Discharge Permit, as required to comply with the Porter-Cologne Water Quality Control Act when a Section 401 water quality certification would not apply.

Section 1602 Lake and Streambed Alteration Agreement

Jurisdictional authority of the CDFW over the bed, bank, or channel of a river, stream, or lake is established under California Fish and Game Code Section 1600 et seq., which pertains to activities that would disrupt the natural flow or alter the channel, bed, or bank of any lake, river, or stream. The California Fish and Game Code stipulates that it is unlawful to substantially divert or obstruct the natural flow or substantially change the bed, channel or bank of any river, stream, or lake resulting in a substantial effect on a fish or wildlife resource without notifying the CDFW and completing the Streambed Alteration Agreement process.

California Environmental Quality Act Guidelines Section 15380

CEQA Guidelines Section 15380(b) states that species that are not listed under FESA or CESA may be considered rare or endangered if they meet specific criteria, based on definitions outlined in FESA and California Fish and Game Code. This section allows public agencies to review potential impacts to candidate species federal and state listing consideration. Section 15380(b) also encourages the protection of locally or regionally significant resources such as natural communities, which lack legal protections. An assessment is required to determine potential significant impacts to natural communities. Natural communities listed as sensitive in CNDDB are considered significant resources by CDFW and thus fall under CEQA Guidelines to address impacts made to these ecosystems.

California Fish and Game Code Sections 3503 and 3513

California Fish and Game Code Section 3503 prohibits the killing of birds and the destruction of the bird nests. California Fish and Game Code Section 3503.5 protects birds of prey: prohibiting the take, possession, or destruction of birds, including their nests and eggs.

California Fish and Game Code Section 3513 prohibits the take or possession of migratory nongame birds as described in MBTA, unless federal regulations allow.

Native Plant Protection Act (California Fish and Game Code Sections 1900 through 1913)

The Native Plant Protection Act requires all state agencies to use their authority to carry out programs to conserve endangered and rare native plants. Provisions of the Native Plant Protection Act prohibit the taking of listed plants from the wild and require notification of CDFW at least 10 days in advance of any change in land use. This allows CDFW to salvage listed plant species that would otherwise be destroyed. The project operator is required to conduct botanical inventories and consult with CDFW during project planning to comply with the provisions of this act and sections of CEQA that apply to rare or endangered plants.

Local

Orange County Natural Community Conservation Plan

The Orange County Natural Community Conservation Plan/Habitat Conservation Plan (NCCP/HCP) sets forth a proposed Conservation Strategy that would be implemented by the County of Orange in cooperation with State and federal agencies and Participating Landowners in Orange County. The proposed Conservation Strategy focuses on long-term protection and management of multiple natural communities that provide habitat essential to the survival of a broad array of wildlife and plant species. The Project Area is situated within the Orange County NCCP/HCP; however, the OCWD is not a Participating Landowner. Additionally, Target Species and their associated coastal sage scrub habitat identified in the NCCP/HCP does not occur within the Project Area and will not be impacted by proposed Project activities.

Tree Protection Ordinances

City of Irvine

Pursuant to Irvine, California, Municipal Code Sections 5-7-401 through 5-7-415, public trees, including eucalyptus windbreaks, street trees, park trees, or other common area trees, or trees within non-residential private properties shall not be topped or removed without prior authorization through issuance of the relevant permit.

City of Santa Ana

Pursuant to Santa Ana Municipal Code Sections 33-181 through 33-193, the damage, topping, removal, and dumping of waste on or near public trees is prohibited without prior authorization through issuance of the relevant permit.

City of Tustin

Pursuant to Tustin, California, Municipal Code Chapter 3, Sections 7301 through 7309, the damage, trimming, and removal of public trees is prohibited.

3.3.3 Impact Analysis and Mitigation Measures

Thresholds of Significance

The following criteria from CEQA Guidelines Appendix G are used as thresholds of significance to determine the impacts of the proposed Project as related to aesthetics. The proposed Project would have a significant impact if it would:

1. 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.
2. 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.
3. 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.
4. 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.
5. Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance.
6. Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan.
7. Result in cumulatively considerable impacts to biological resources.

Methodology

This section describes the potential effects of the proposed Project on biological resources that may occur because of Project implementation. Direct, indirect, temporary, and/or permanent effects to biological resources may occur as a result of Project implementation, as defined below:

- **Direct Impacts:** Any alteration, disturbance, or destruction of biological resources that would result from project-related activities is considered a direct effect. Examples include loss of individual species and/or their associated plant communities, diversion of surface water flows, and encroachment into wetlands. Direct effects are defined as the immediate effects of a project on a species or its habitat, including construction noise disturbance, sedimentation, or habitat loss.
- **Indirect Impacts:** Biological resources may also be affected in an indirect manner as a result of project-related activities. An example of indirect impacts may include irrigation runoff from a developed area into surrounding natural vegetation. Indirect effects could also include increased wildfire frequency as a result of power line failures.
- **Temporary Impacts:** Any effects on biological resources that are considered reversible can be viewed as temporary. Examples include the generation of fugitive dust during construction activities.

- **Permanent Impacts:** All impacts that result in the irreversible removal of biological resources are considered permanent. Examples include constructing a building or permanent road on an area with native vegetation, such that the native vegetation is permanently removed and replaced with a developed structure.

Operation of the proposed Project would not change from existing conditions since the extraction facilities, monitoring wells and conveyance pipelines would be underground and the treatment plants would be located within developed highly urbanized areas; therefore, no impact to biological resources would occur. Operations is not discussed further in this section.

Impacts and Mitigation Measures

Species Impacts

Impact 3.3-1: The proposed Project could 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 Game or U.S. Fish and Wildlife Service.

Extraction Facilities, Monitoring Wells, Local Groundwater Treatment Plants, and Conveyance Pipelines

Suitable habitat for birds and raptors occurs within the Project Area. Birds/raptors may forage and breed in the various parks, street trees, and built structures that occur within 500 feet of the Project Area and the proposed construction may disrupt nesting through the direct removal of an active nest or by causing nest failure because of construction noise and spillage of nighttime lighting into adjacent habitat. Implementation of **Mitigation Measure BIO-1** would require pre-construction nesting bird surveys and the delineation of nest avoidance buffers to reduce impacts to nesting birds to a less than significant level. Mitigation Measure AES-1 would ensure that nighttime construction lighting or temporary/permanent security lighting is shielded and directed downward to avoid light spillage into adjacent areas.

Mitigation Measures

BIO-1: Nesting Birds and Raptors. To prevent impacts to nesting birds and raptors, work activities within 500 feet of suitable nesting habitat shall be timed to avoid the season when nests may be active (i.e., January 15 to September 15). If work activities occur within the nesting season, a qualified biologist shall conduct a focused survey within 30 days of the anticipated start date, and no less than 3 days prior to ground disturbance, to identify any active nests within 500 feet of the development footprint. If an active nest is found, the nest shall be avoided, and a suitable buffer zone shall be delineated in the field where no impacts shall occur until the chicks have fledged the nest or the nest has otherwise been deemed inactive by a qualified biologist. Construction buffers shall be 300 feet for passerines or up to 500 feet for raptors; however, avoidance buffers may be reduced at the discretion of the biologist, depending on the location of the nest and species tolerance to human presence and construction-related noises and vibrations.

Significance Determination

Less than Significant Impact with Mitigation.

Sensitive Natural Communities

Impact 3.3-2: The proposed Project could 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.

Extraction Facilities, Monitoring Wells, Local Groundwater Treatment Plants, and Conveyance Pipelines

No Critical Habitat, riparian vegetation or CDFW sensitive natural communities have been identified within the Project Area; therefore, impacts to these sources during proposed Project activities is not expected.

Mitigation Measures

None Required.

Significance Determination

Less than Significant Impact.

Wetlands

Impact 3.3-3: The proposed Project could 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.

Extraction Facilities, Monitoring Wells, Local Groundwater Treatment Plants, and Conveyance Pipelines

Review of aerial imagery in combination with information presented in the National Wetlands Inventory (NWI) and National Hydrography Dataset (NHD) revealed that various aquatic resources, including concrete-lined drainages and freshwater ponds, occur within the Project Area However, the extraction facilities, monitoring wells, treatment plants and conveyance pipelines would be located within public rights-of-way or existing parking lots, and proposed Project components would not be situated within an aquatic resource. As a result, impacts to aquatic resources would be less than significant.

Mitigation Measures

None Required.

Significance Determination

Less than Significant Impact.

Wildlife Corridors

Impact 3.3-4: The proposed Project could 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.

Extraction Facilities, Monitoring Wells, Local Groundwater Treatment Plants, and Conveyance Pipelines

The Project Area has not been formally designated as a wildlife corridor or habitat linkage, and the Project Area is in a developed urban setting and lacks suitable habitat for many species. The concrete-lined channels that bisect the Project Area may support wildlife movement to a limited degree; however, are not expected to support largescale wildlife movement. Therefore, impacts to wildlife corridors are expected to be less than significant.

Mitigation Measures

None Required.

Significance Determination

Less than Significant Impact.

Local Policies and Ordinances

Impact 3.3-5: The proposed Project could conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance.

Extraction Facilities, Monitoring Wells, Local Groundwater Treatment Plants, and Conveyance Pipelines

The proposed Project may impact or result in the removal of trees protected within the Cities of Irvine, Santa Ana and Tustin; however, compliance with the Municipal Code requirements (e.g., survey, obtain permits) for these cities would reduce impacts to less than significant.

Mitigation Measures

None Required.

Significance Determination

Less than Significant Impact.

Habitat Conservation Plan

Impact 3.3-6: The proposed Project could conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan.

Extraction Facilities, Monitoring Wells, Local Groundwater Treatment Plants, and Conveyance Pipelines

The Project Area is situated within the Orange County NCCP/HCP; however, the OCWD is not a Participating Landowner. Additionally, Target Species and their associated coastal sage scrub habitat identified in the NCCP/HCP does not occur within the Project Area and will not be impacted by proposed Project activities.

Mitigation Measures

None Required.

Significance Determination

No Impact.

Cumulative Impacts

Impact 3.3-7: Concurrent construction and operation of the proposed Project and related projects in the geographic scope could result in cumulative short-term and long-term impacts to biological resources.

Extraction Facilities, Monitoring Wells, Local Groundwater Treatment Plants, and Conveyance Pipelines

The proposed Project Area is heavily urbanized and provides little value to biological resources. With the exception of nesting birds/raptors and locally protected trees, impacts to biological resources will be limited. With the implementation of Mitigation Measure BIO-1 and compliance with tree protection regulations within the Irvine, Santa Ana, and Tustin Municipal Codes, impacts to biological resources will be reduced to less than significant and the proposed Project will not be expected to contribute to cumulative biological impacts within the region.

Mitigation Measures

Implement Mitigation Measure BIO-1.

Significance Determination

Less than Significant Impact with Mitigation.

3.4 Cultural Resources

This section evaluates the potential impacts on cultural resources. The analysis is based on a records search at the South-Central Coastal Information Center, housed at California State University Northridge; a California Office of Historic Preservation Built Environment Resource Directory (BERD) search, a Sacred Lands File search conducted by the California Native American Heritage Commission (NAHC); and a cultural resources assessment of the Project Area. This section is based on the South Basin Groundwater Protection Project Cultural Resources Assessment Report prepared by ESA dated August 2024. The Cultural Resources Assessment can be found in **Appendix D1** of this Draft Program Environmental Impact Report (PEIR).

3.4.1 Environmental Setting

Prehistoric Setting

The chronology of coastal Southern California is typically divided into three general time periods: the Early Holocene (11,000 to 8,000 Before Present [B.P.]), the Middle Holocene (8,000 to 4,000 B.P.), and the Late Holocene (4,000 B.P. to A.D. 1769). Within this timeframe, the archaeology of Southern California is generally described in terms of cultural "complexes." A complex is a specific archaeological manifestation of a general mode of life, characterized archaeologically by particular technologies, artifacts, economic systems, trade relationships, burial practices, and other aspects of culture.

Early Holocene (11,000 to 8,000 B.P.)

While it is not certain when humans first came to California, their presence in Southern California by about 11,000 B.P. has been well documented. At Daisy Cave, on San Miguel Island, cultural materials have been radiocarbon dated to between 11,100 and 10,950 years B.P. (Byrd and Raab 2007). On the mainland, radiocarbon evidence confirms occupation of the Orange County and San Diego County coast by about 9,000 B.P., primarily in lagoon and river valley locations (Gallegos 2002). In western Riverside County, few Early Holocene sites are known to exist. One exception is site CA-RIV-2798, which contains deposits dating to as early as 8,580 cal. B.P. (Grenda 1997). During the Early Holocene, the climate of Southern California became warmer and more arid and the human population, residing mainly in coastal or inland desert areas, began exploiting a wider range of plant and animal resources (Byrd and Raab 2007).

The primary Early Holocene cultural complex in coastal Southern California was the San Dieguito Complex, occurring between approximately 10,000 and 8,000 B.P. The people of the San Dieguito Complex inhabited the chaparral zones of southwestern California, exploiting the plant and animal resources of these ecological zones (Warren 1967). Leaf-shaped and large-stemmed projectile points, scraping tools, and crescentics are typical of San Dieguito Complex material culture.

Middle Holocene (8,000 to 4,000 B.P.)

During the Middle Holocene, there is evidence for the processing of acorns for food and a shift toward a more generalized economy in coastal and inland Southern California. The processing of plant foods, particularly acorns, increased, a wider variety of animals were hunted, and trade with neighboring regions intensified (Byrd and Raab 2007).

The Middle Holocene La Jolla Complex (8,000–4,000 B.P.) is essentially a continuation of the San Dieguito Complex. La Jolla groups lived in chaparral zones or along the coast, often migrating between the two. Coastal settlement focused on the bays and estuaries of coastal Orange and San Diego Counties. La Jolla peoples produced large, coarse stone tools, but also produced well-made projectile points and milling slabs. The La Jolla Complex represents a period of population growth and increasing social complexity, and it was also during this time period that the first evidence of the exploitation of marine resources and the grinding of seeds for flour, as indicated by the abundance of millingstones in the archaeological record, appears (Byrd and Raab 2007).

Contemporary with the La Jolla Complex, the Pauma Complex has been defined at inland sites in San Diego and Riverside Counties (True 1958). The Pauma Complex is similar in technology to the La Jolla Complex; however, evidence of coastal subsistence is absent from the Pauma Complex sites (Moratto 1984). The Pauma and La Jolla Complexes may either be indicative of separate inland and coastal groups with similar subsistence and technological adaptations, or, alternatively, may represent inland and coastal phases of one group's seasonal rounds. The latter hypothesis is supported by the lack of hidden and deeply buried artifacts at Pauma sites, indicating that these sites may have been temporary camps for resource gathering and processing.

Late Holocene (4,000 B.P. to A.D. 1769)

During the Late Holocene, native populations of Southern California were becoming less mobile and populations began to gather in small sedentary villages with satellite resource-gathering camps. Evidence indicates that the overexploitation of larger, high-ranked food resources may have led to a shift in subsistence towards a focus on acquiring greater amounts of smaller resources, such as shellfish and small-seeded plants (Byrd and Raab 2007). In coastal Southern California, conditions became drier and many lagoons were transformed into saltwater marshes. Because of this, populations abandoned mesa and ridge tops to settle nearer to permanent freshwater resources (Gallegos 2002). Trading reached its zenith during this time period, with asphaltum (tar), seashells and steatite being exchanged from Southern California to the Great Basin.

Ethnographic Setting

The Project Area is located within a region traditionally occupied by two Native American groups; the Gabrielino (including the Tongva and Kizh) and Juaneño-Acjachemen. The terms Tongva, Kizh, and Acjachemen are preferred by many descendant groups over the Spanish words that have historically been used to describe them. Each group is described below.

The main sources of historical information on the Gabrielino (Tongva and Kizh) include Hugo Reid (see Heizer 1968), Zephyrin Engelhardt, Alfred Kroeber, John P. Harrington, Bernice E. Johnston, Thomas C. Blackburn, and C. Hart Merriam. The main sources of historical information on the Juaneño (or Acjachemen) include Fray Gerónimo de Boscana (Robinson 1846; Harrington 1933, 1934), Alfred Kroeber, and John P. Harrington (other accounts describing Luiseño groups may also be applicable). In 1978, the Smithsonian Institution compiled the *Handbook of North American Indians*—a 20-volume encyclopedia summarizing the work of previous ethnographers and what was known about the prehistory, history, and culture of indigenous North American groups. *Volume 8: California* serves as the primary source material for the information presented in this section. Where possible, this information has been

supplemented with information gleaned from other published sources (such as McCawley 1996 and O'Neil and Evans 1980). The following summaries are not intended to provide a comprehensive account of these groups but are instead brief historical overviews based on available information. However, tribes are the authority on their cultural history.

It should be noted that the information presented herein is related to living tribes who still reside in Los Angeles and Orange counties and who maintain a vested interest in their history, culture, practices, customs, and beliefs. Currently, there are five Gabrielino (Tongva and Kizh) and three Juaneño-Acjachemen groups that are recognized by the State as California Native American Tribes (as indicated by the California Native American Heritage Commission (NAHC)): Gabrieleño Band of Mission Indians – Kizh Nation; Gabrielino Tongva Indians of California Tribal Council; Gabrieleno-Tongva San Gabriel Band of Mission Indians; Gabrielino-Tongva Tribe; Gabrielino/Tongva Nation; Juaneño Band of Mission Indians, Acjachemen Nation – Belardes; Juaneño Band of Mission Indians, Acjachemen Nation – Romero; Juaneño Band of Mission Indians. These tribes are living communities who actively participate in the preservation of their culture and tribal resources.

Juaneño Acjacheme

The Juaneño spoke a language belonging to the Cupan group of the Takic subfamily of the Uto-Aztecan language family. The Juaneño people were so called because of their association with Mission San Juan Capistrano, although some contemporary Juaneño identify themselves by the indigenous term *Acjachemen*. The term Acjachemen is the name of the main village and was used by Fray Gerónimo de Boscana describe the indigenous group associated with the Mission San Juan Capistrano. During his time at San Juan Capistrano, Boscana complied an ethnographic account of the Acjachemen, including an account of the belief system centered around *Chingichngish*, as described above.

The Juaneño were linguistically and culturally related to the neighboring Luiseño (with whom they are often grouped) (Bean and Shipek 1978), Cahuilla, and Cupeño. Juaneño territory extended from just above Aliso Creek in the north to San Onofre Canyon in the south and inland from the Pacific Ocean to Santiago Peak and the ridges above Lake Elsinore (Bean and Shipek 1978).

The Juaneño lived in sedentary autonomous villages located in diverse ecological zones. Each settlement claimed specific fishing and collecting regions. Typically, villages were located in valley bottoms, along coastal strands and streams, and near mountain foothills. Villages were usually sheltered in coves or canyons, on the side of slopes near water and in good defensive spots. The are no reported ethnographic Juaneño village in the vicinity of the program area; the closest village sites are more than 20 miles south of the program area (O'Neil and Evans 1980).

Trails, hunting sites, temporary hunting camps, quarry sites, and ceremonial and gaming locations were communally owned, while houses, gardens, tools, ritual equipment, and ornamentation were owned by individuals or families. Most groups had fishing and gathering sites along the coast that they visited annually from January to March when inland supplies were scarce. October to November was acorn-gathering time, when most of the village would settle in the mountain oak groves. Houses were conical in form, partially subterranean, covered with thatch, reeds, brush, or bark. Sweathouses were round and earth covered. Each village was enclosed with a circular fence and had a communal ceremonial structure at the center (Bean and Shipek 1978).

Tongva

The term "Gabrielino" is a general term that refers to those Native Americans who were sent by the Spanish to the Mission San Gabriel Arcángel. The term first appears, spelled Gabrieleños, in an 1876 report by Oscar Loew (Bean and Smith 1978). Two indigenous terms are commonly used by tribal groups to refer to themselves and are preferred by descendant groups: Tongva and Kizh. The term Tongva was recorded by ethnographer C. Hart Merriam in 1903 (Heizer 1968). The term Kizh was first published by ethnologist Horatio Hale in 1846 (Heizer 1968). Since there are two terms that are used by different groups to refer to themselves, the term Gabrielino is used in this section to encompass both Tongva and Kizh groups.

Prior to European colonization, the Gabrielino occupied a diverse area that included the watersheds of the Los Angeles, San Gabriel, and Santa Ana rivers; the Los Angeles basin; and the islands of San Clemente, San Nicolas, and Santa Catalina (Bean and Smith 1978). Their neighbors included the Chumash and Tataviam to the north, the Juaneño to the south, and the Serrano and Cahuilla to the east. The Gabrielino are reported to have been second only to the Chumash in terms of population size and regional influence (Bean and Smith 1978). The Gabrielino language was part of the Takic branch of the Uto-Aztecan language family.

The Gabrielino Indians were hunter-gatherers and lived in permanent communities located near the presence of a stable food supply with one such village, *Pasbengna*, having been documented north of the Project Area along the Santa Ana River within the vicinity of the city of Santa Ana (McCawley 1996). Subsistence in these communities consisted of hunting, fishing, and gathering. Small terrestrial game was hunted with deadfalls, rabbit drives, and by burning undergrowth, while larger game such as deer were hunted using bows and arrows. Fish were taken by hook and line, nets, traps, spears, and poison (Bean and Smith 1978). The primary plant resources were the acorn, gathered in the fall and processed in mortars and pestles, and various seeds that were harvested in late spring and summer and ground with manos and metates. The seeds included chia and other sages, various grasses, and islay or holly-leafed cherry. Community populations generally ranged from 50 to 100 inhabitants, although larger settlements may have existed. The Gabrielino are estimated to have had a population numbering around 5,000 in the pre-contact period (Kroeber 1925).

The Late Prehistoric period, spanning from approximately 1,500 years B.P. to the mission era, is the period associated with the florescence of the Gabrielino (Wallace 1955). Coming ashore near Malibu Lagoon or Mugu Lagoon in October 1542, Juan Rodriguez Cabrillo was the first European to make contact with the Gabrielino Indians.

Historic Setting

The first European presence in what is now Southern California came in 1542, when Juan Rodriguez Cabrillo led an expedition along the coast. Europeans did not return until 1769, when the expedition of Gaspar de Portola traveled overland from San Diego to San Francisco. Juan Bautista de Anza is credited with the discovery of an inland route from Sonora to the northern coast of California in 1774, bringing him through much of present-day Riverside and San Bernardino counties (Greene 1983; Rolle 2003). With the opening of the overland route, Spanish pueblos were established, evolving into the Spanish system of governance.

In the late 18th century, the Spanish began establishing missions in California and forcibly relocating and converting native peoples (Horne and McDougall 2003). The purpose of the missions was to encourage, by any means necessary, the assimilation of Native populations to adopt the Spanish customs, language, and religion. Based on San Gabriel Mission baptismal register, thirteen baptisms occurred at the aforementioned Gabrielino village of *Pasbengna* between 1776 and 1807 (McCawley 1996, 60). The mission strategy relied upon an agricultural economy and as such, locations selected for the construction of a mission depended upon three factors: arable soil for crops, an adequate supply of fresh water, and a large local Indian population for labor (Rolle 2003).

In 1821, Mexico, which included much of present-day California, became independent from Spain, and during the 1820s and 1830s the California missions were secularized. Mission property was supposed to have been held in trust for the Native Californians, but instead was handed over to civil administrators and then into private ownership as land grants. After secularization, many former Mission Indians were forced to leave the Missions and seek employment as laborers, ranch hands, or domestic servants (Horne and McDougall 2003). Many ranchos continued to be used for cattle grazing by settlers during the Mexican Period. Hides and tallow from cattle became a major export for Californios (native Hispanic Californians), many of whom became wealthy and prominent members of society.

As a result of the Mexican American War (1846–1848) Mexico ceded California to the United States as part of the Treaty of Guadalupe Hildalgo in 1848. While the treaty recognized the right of Mexican citizens to retain ownership of land granted to them by Spanish or Mexican authorities, the claimant was required to prove their right to the land before a patent was given. The process was lengthy and generally resulted in the claimant losing at least a portion of their land to attorney's fees and other costs associated with proving ownership (Starr 2007). California officially was admitted to the Union and became a part of the United States in 1850.

When the discovery of gold in Northern California was announced in 1848, a huge influx of settlers from other parts of North America flooded into California. The increased population provided an additional market for the cattle industry that was established during the Spanish and Mexican periods. However, a devastating flood in 1861, followed by droughts in 1862 and 1864, led to a rapid decline of the cattle industry; over 70 percent of cattle perished during this period (McWilliams 1946; Dinkelspiel 2008). These droughts, coupled with the burden of proving ownership of their lands, caused many Hispanic-Californian landowners to lose their lands during this period (McWilliams 1946). Former ranchos were subsequently subdivided and sold for agriculture and residential settlement.

The first transcontinental railroad, known as the Pacific Railway, was completed in 1869 by the Union Pacific and Central Pacific railroads. It connected San Francisco with the eastern United States, and newcomers poured into Northern California. Southern California experienced a trickle-down effect, as many of these new inhabitants made their way south. The Southern Pacific Railroad (originally Central Pacific) extended their line from San Francisco to Los Angeles in 1876. The second transcontinental line, the Santa Fe, was completed to Los Angeles in 1887 and caused a fare war, driving ticket prices to an unprecedented low, from $125 per ticket from Chicago to Los Angeles down to a single, solitary dollar. Settlers flooded into Southern California and the demand for property skyrocketed, boosting the population of Los Angeles from roughly 11,000 in 1880 to at least 50,000 by 1890. The populations of dozens of other nearby cities such as Pasadena, San Bernardino and Riverside shot up with it. As real estate prices

soared, land that had been farmed for decades outlived its agricultural value and was sold to become residential communities, and a new word "Boom!" appeared to capture the real estate explosion (Sedgwick 2021). The subdivision of the large ranchos took place during this time (McWilliams 1946; Meyer 1981).

3.4.2 Regulatory Framework

Federal

Numerous laws and regulations require federal, state, and local agencies to consider the effects a project may have on cultural resources. These laws and regulations stipulate a process for compliance, define the responsibilities of the various agencies proposing the action, and prescribe the relationship among other involved agencies.

National Register of Historic Places

The National Register was established by the National Historic Preservation Act (NHPA) of 1966, as "an authoritative guide to be used by federal, State, and local governments, private groups and citizens to identify the Nation's historic resources and to indicate what properties should be considered for protection from destruction or impairment" (36 CFR 60.2) (U.S. Department of the Interior 2002). The National Register recognizes a broad range of cultural resources that are significant at the national, state, and local levels and can include districts, buildings, structures, objects, prehistoric archaeological sites, historic-period archaeological sites, traditional cultural properties, and cultural landscapes. As noted above, a resource that is listed in or eligible for listing in the National Register is considered "historic property" under NHPA Section 106.

To be eligible for listing in the National Register, a property must be significant in American history, architecture, archaeology, engineering, or culture. Properties of potential significance must meet one or more of the following four established criteria:

A. Are associated with events that have made a significant contribution to the broad patterns of our history;

B. Are associated with the lives of persons significant in our past;

C. Embody the distinctive characteristics of a type, period, or method of construction or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or

D. Have yielded, or may be likely to yield, information important in prehistory or history.

In addition to meeting one or more of the criteria of significance, a property must have integrity. Integrity is defined as "the ability of a property to convey its significance." The National Register recognizes seven qualities that, in various combinations, define integrity. The seven factors that define integrity are location, design, setting, materials, workmanship, feeling, and association. To retain historic integrity a property must possess several, and usually most, of these seven aspects. Thus, the retention of the specific aspects of integrity is paramount for a property to convey its significance.

Ordinarily religious properties, moved properties, birthplaces or graves, cemeteries, reconstructed properties, commemorative properties, and properties that have achieved significance within the past

50 years are not considered eligible for the National Register unless they meet one of the Criteria Considerations (a–g) below, in addition to meeting at least one of the four significance criteria A–D above, and retaining integrity (U.S. Department of the Interior 2002):

a) A religious property deriving primary significance from architectural or artistic distinction or historical importance; or

b) A building or structure removed from its original location but that is significant primarily for architectural value, or that is the surviving structure most importantly associated with a historic person or event; or

c) A birthplace or grave of a historical figure of outstanding importance if there is no appropriate site or building directly associated with his productive life.

d) A cemetery which derives its primary significance from graves of persons of transcendent importance, from age, from distinctive design features, or from association with historic events; or

e) A reconstructed building when accurately executed in a suitable environment and presented in a dignified manner as part of a restoration master plan, and when no other building or structure with the same association has survived; or

f) A property primarily commemorative in intent if design, age, tradition, or symbolic value has invested it with its own exceptional significance; or

g) A property achieving significance within the past 50 years if it is of exceptional importance.

State

California Environmental Quality Act

CEQA is the principal statute governing environmental review of projects occurring in the state and is codified at Public Resources Code (PRC) Section 21000 et seq. CEQA requires lead agencies to determine if a proposed Project would have a significant effect on the environment, including significant effects on historical or unique archaeological resources. Under CEQA (Section 21084.1), a project that may cause a substantial adverse change in the significance of an historical resource is a project that may have a significant effect on the environment.

The CEQA Guidelines (Title 14 California Code of Regulations [CCR] Section 15064.5) recognize that historical resources include (1) a resource listed in, or determined to be eligible by the State Historical Resources Commission, for listing in the California Register of Historical Resources (CRHR); (2) a resource included in a local register of historical resources, as defined in PRC Section 5020.1(k) or identified as significant in a historical resource survey meeting the requirements of PRC Section 5024.1(g); and (3) any object, building, structure, site, area, place, record, or manuscript which a lead agency determines to be historically significant or significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California by the lead agency, provided the lead agency's determination is supported by substantial evidence in light of the whole record. The fact that a resource does not meet the three criteria outlined above does not preclude the lead agency from determining that the resource may be an historical resource as defined in PRC Sections 5020.1(j) or 5024.1.

If a lead agency determines that an archaeological site is a historical resource, the provisions of CEQA Section 21084.1 and CEQA Guidelines Section 15064.5 apply. If an archaeological site does not meet the criteria for a historical resource contained in the CEQA Guidelines, then the site may be treated in accordance with the provisions of Section 21083, which is as a unique archaeological resource. As defined in CEQA Section 21083.2 a "unique" archaeological resource is an archaeological artifact, object, or site, about which it can be clearly demonstrated that without merely adding to the current body of knowledge, there is a high probability that it meets any of the following criteria:

- Contains information needed to answer important scientific research questions and there is a demonstrable public interest in that information;
- Has a special and particular quality such as being the oldest of its type or the best available example of its type; or,
- Is directly associated with a scientifically recognized important prehistoric or historic event or person.

If an archaeological site meets the criteria for a unique archaeological resource as defined in Section 21083.2, then the site is to be treated in accordance with the provisions of Section 21083.2, which state that if the lead agency determines that a project would have a significant effect on unique archaeological resources, the lead agency may require reasonable efforts be made to permit any or all of these resources to be preserved in place (Section 21083.1(a)). If preservation in place is not feasible, mitigation measures shall be required. The CEQA Guidelines note that if an archaeological resource is neither a unique archaeological nor a historical resource, the effects of the project on those resources shall not be considered a significant effect on the environment (CEQA Guidelines Section 15064.5(c)(4)).

A significant effect under CEQA would occur if a project results in a substantial adverse change in the significance of a historical resource as defined in CEQA Guidelines Section 15064.5(a). Substantial adverse change is defined as "physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of a historical resource would be materially impaired" (CEQA Guidelines Section 15064.5(b)(1)). According to CEQA Guidelines Section 15064.5(b)(2), the significance of a historical resource is materially impaired when a project demolishes or materially alters in an adverse manner those physical characteristics that:

A. Convey its historical significance and that justify its inclusion in, or eligibility for, inclusion in the CRHR; or
B. Account for its inclusion in a local register of historical resources pursuant to Section 5020.1(k) of the Public Resources Code or its identification in a historical resources survey meeting the requirements of Section 5024.1(g) of the Public Resources Code, unless the public agency reviewing the effects of the project establishes by a preponderance of evidence that the resource is not historically or culturally significant; or
C. Convey its historical significance and that justify its eligibility for inclusion in the CRHR as determined by a Lead Agency for purposes of CEQA.

In general, a project that complies with the *Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring, and Reconstructing*

Historic Buildings (Standards) (Grimer 2017) is considered to have mitigated its impacts to historical resources to a less than significant level (CEQA Guidelines Section 15064.5(b)(3)).

California Register of Historical Resources

The CRHR is "an authoritative listing and guide to be used by State and local agencies, private groups, and citizens in identifying the existing historical resources of the State and to indicate which resources deserve to be protected, to the extent prudent and feasible, from substantial adverse change" (PRC Section 5024.1[a]). The criteria for eligibility for the CRHR are based upon NRHP criteria (PRC Section 5024.1[b]). Certain resources are determined by the statute to be automatically included in the CRHR, including California properties formally determined eligible for, or listed in, the NRHP.

To be eligible for the CRHR, a prehistoric or historic-period property must be significant at the local, state, and/or federal level under one or more of the following four criteria:

1. Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage;
2. Is associated with the lives of persons important in our past;
3. Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values; or
4. Has yielded, or may be likely to yield, information important in prehistory or history.

A resource eligible for the CRHR must meet one of the criteria of significance described above, and retain enough of its historic character or appearance (integrity) to be recognizable as a historical resource and to convey the reason for its significance. It is possible that a historic resource may not retain sufficient integrity to meet the criteria for listing in the NRHP, but it may still be eligible for listing in the CRHR.

Additionally, the CRHR consists of resources that are listed automatically and those that must be nominated through an application and public hearing process. The CRHR automatically includes the following:

- California properties listed on the NRHP and those formally determined eligible for the NRHP;
- California Registered Historical Landmarks from No. 770 onward; and,
- Those California Points of Historical Interest that have been evaluated by the OHP and have been recommended to the State Historical Commission for inclusion on the CRHR.

Other resources that may be nominated to the CRHR include:

- Historical resources with a significance rating of Category 3 through 5 (those properties identified as eligible for listing in the NRHP, the CRHR, and/or a local jurisdiction register);
- Individual historical resources;
- Historical resources contributing to historic districts; and,
- Historical resources designated or listed as local landmarks, or designated under any local ordinance, such as an historic preservation overlay zone.

California Health and Safety Code Section 7050.5

California Health and Safety Code Section 7050.5 requires that in the event human remains are discovered, the County Coroner be contacted to determine the nature of the remains. In the event the remains are determined to be Native American in origin, the Coroner is required to contact the California Native American Heritage Commission (NAHC) within 24 hours to relinquish jurisdiction.

California Public Resources Code Section 5097.98

California PRC Section 5097.98, as amended by Assembly Bill 2641, provides procedures in the event human remains of Native American origin are discovered during project implementation. PRC Section 5097.98 requires that no further disturbances occur in the immediate vicinity of the discovery, that the discovery is adequately protected according to generally accepted cultural and archaeological standards, and that further activities take into account the possibility of multiple burials. PRC Section 5097.98 further requires the NAHC, upon notification by a County Coroner, designate and notify a Most Likely Descendant (MLD) regarding the discovery of Native American human remains. Once the MLD has been granted access to the site by the landowner and inspected the discovery, the MLD then has 48 hours to provide recommendations to the landowner for the treatment of the human remains and any associated grave goods.

In the event that no descendant is identified, or the descendant fails to make a recommendation for disposition, or if the land owner rejects the recommendation of the descendant, the landowner may, with appropriate dignity, reinter the remains and burial items on the property in a location that will not be subject to further disturbance.

Local

County of Orange General Plan

The following is a selected list of General Plan goals, objectives, and policies that are applicable to the proposed Project respective to Cultural and Historic Resources (County of Orange 2022).

Resources Element

The following policies addressing archaeological, paleontological, and historical resources shall be implemented at appropriate stage(s) of planning, coordinated with the processing of a project application, as follows:

- Identification of resources shall be completed at the earliest stage of project planning and review such as general plan amendment or zone change.
- Evaluation of resources shall be completed at intermediate stages of project planning and review such as site plan review, subdivision map approval, or at an earlier stage of project review.
- Final preservation actions shall be completed at final stages of project planning and review such as grading, demolition, or at an earlier stage of project review.

Archaeological Resources Policies:

1. To identify archaeological resources through literature and records research and surface surveys.
2. To evaluate archaeological resources through subsurface testing to determine significance and extent.
3. To observe and collect archaeological resources during the grading of a project.
4. To preserve archaeological resources by:
    a. Maintaining them in an undisturbed condition, or
    b. Excavating and salvaging materials and information in a scientific manner.

Paleontological Resources Policies:

1. To identify paleontological resources through literature and records research and surface surveys.
2. To monitor and salvage paleontological resources during the grading of a project.
3. To preserve paleontological resources by maintaining them in an undisturbed condition.

Historic Resources Policies:

1. To identify historic resources through literature and records research and/or on-site surveys.
2. To evaluate historic resources through comparative analysis or through subsurface or materials testing.
3. To preserve significant historic resources by one or a combination of the following alternatives, as agreed upon by RDMD and the project sponsor:
    a. Adaptive reuse of historic resource.
    b. Maintaining the historic resource in an undisturbed condition.
    c. Moving the historic resource and arranging for its treatment.
    d. Salvage and conservation of significant elements of the historic resources.
    e. Documentation (i.e., research narrative, graphics, photography) of the historic resource prior to destruction.

City of Santa Ana

General Plan

The City of Santa Ana's updated General Plan Update (GPU) (October 2021) specifies, under Chapter 5.4, the following policies addressing archaeological, paleontological, and historical resources shall be implemented at appropriate stage(s) of planning, coordinated with the processing of a project application, as follows:

Policy 1.4: Protecting Resources. Support land use plans and development proposals that actively protect historic and cultural resources. Preservation tribal, archeological, and paleontological resources for their cultural importance to communities as well as their research and educational potential

In addition, the PEIR for the city's GPU states that development consistent with the GPU could impact archaeological resources and therefore the following mitigation measures have been established to reduce these impacts to a less than significant level:

CUL-4: For projects with ground disturbance—e.g., grading, excavation, trenching, boring, or demolition that extend below the current grade—prior to issuance of any permits required to conduct ground-disturbing activities, the City shall require an Archaeological Resources Assessment be conducted under the supervision of an archaeologist that meets the Secretary of the Interior's Professionally Qualified Standards in either prehistoric or historic archaeology. Assessments shall include a California Historical Resources Information System records search at the South Central Coastal Information Center and of the Sacred Land Files maintained by the Native American Heritage Commission. The records searches will determine if the proposed Project area has been previously surveyed for archaeological resources, identify and characterize the results of previous cultural resource surveys, and disclose any cultural resources that have been recorded and/or evaluated. If unpaved surfaces are present within the project area, and the entire project area has not been previously surveyed within the past 10 years, a Phase I pedestrian survey shall be undertaken in proposed Project areas to locate any surface cultural materials that may be present.

CUL-5: If potentially significant archaeological resources are identified, and impacts cannot be avoided, a Phase II Testing and Evaluation investigation shall be performed by an archaeologist who meets the Secretary of the Interior's Standards to determine significance prior to any ground-disturbing activities. If resources are determined significant or unique through Phase II testing, and site avoidance is not possible, appropriate site-specific mitigation measures shall be undertaken. These might include a Phase III data recovery program implemented by a qualified archaeologist and performed in accordance with the Office of Historical Preservation's "Archaeological Resource Management Reports (ARMR): Recommended Contents and Format" (OHP 1990) and "Guidelines for Archaeological Research Designs" (OHP 1991).

CUL-6: If the archaeological assessment did not identify archaeological resources but found the area to be highly sensitive for archaeological resources, a qualified archaeologist and a Native American monitor approved by a California Native American Tribe identified by the Native American Heritage Commission as culturally affiliated with the project area shall monitor all ground-disturbing construction and pre-construction activities in areas of high sensitivity. The archaeologist shall inform all construction personnel prior to construction activities of the proper procedures in the event of an archaeological discovery. The training shall be held in conjunction with the project's initial on-site safety meeting and shall explain the importance and legal basis for the protection of significant archaeological resources. The Native American monitor shall be invited to participate in this training. In the event that archaeological resources (artifacts or features) are exposed during ground-disturbing activities, construction activities in the immediate

vicinity of the discovery shall be halted while the resources are evaluated for significance by an archaeologist who meets the Secretary's Standards. This will include tribal consultation and coordination with the Native American monitor in the case of a prehistoric archaeological resource or tribal resource. If the discovery proves to be significant, the long-term disposition of any collected materials should be determined in consultation with the affiliated tribe(s), where relevant; this could include curation with a recognized scientific or educational repository, transfer to the tribe, or respectful reinternment in an area designated by the tribe.

CUL-7: If an Archaeological Resources Assessment does not identify potentially significant archaeological resources but the site has moderate sensitivity for archaeological resources (Mitigation Measure CUL-4), an archaeologist who meets the Secretary's Standards shall be retained on call. The archaeologist shall inform all construction personnel prior to construction activities about the proper procedures in the event of an archaeological discovery. The pre-construction training shall be held in conjunction with the project's initial on-site safety meeting and shall explain the importance and legal basis for the protection of significant archaeological resources. In the event that archaeological resources (artifacts or features) are exposed during ground-disturbing activities, construction activities in the immediate vicinity of the discovery shall be halted while the on-call archaeologist is contacted. The resource shall be evaluated for significance and tribal consultation shall be conducted, in the case of a tribal resource. If the discovery proves to be significant, the long-term disposition of any collected materials should be determined in consultation with the affiliated tribe(s), where relevant.

Historic Preservation Ordinance

The Santa Ana City Council adopted an ordinance in August of 1998 creating a Historic Resources Commission, which is a nine-member board that works to emphasize and support historic preservation in the city of Santa Ana. This same ordinance also created the Santa Ana Register of Historic Places, which is a list of historically significant properties within city limits. To add a property to the list, interested owners or citizens submit a city-specific application form to the Planning Division of City of Santa Ana Planning and Building Agency. The Planning Division presents the application to the Historic Resources Commission in a public hearing and formulates a recommendation as to the status of the building.

To be listed on Santa Ana's Register of Historic Places, a building must meet at least one of the criteria for significance that the City has deemed important:

- Structure has distinguishing characteristics of an architectural style or period
- Structure that exemplifies a particular architectural style or design features
- Work of notable architect, builder, or designer whose style influenced the city's architectural development
- Rare structures of original designs
- Buildings of historical significance:
  - Where important events occurred
  - Associated with famous people, original settlers, renowned organizations, and businesses

  - That were originally present when the city was founded
  - That served as important centers for political, social, economic, and cultural activity
- Sites of archaeological importance
- Buildings that were connected with a business or use that was once common but is now rare

City of Irvine

General Plan, Cultural Resources Element, Element E

The City of Irvine General Plan identifies the goals, objectives, and policies relevant to archaeological resources. These are provided below.

Goal. Ensure the proper disposition of historical, archaeological, and paleontological resources to minimize adverse impacts, and to develop an increased understanding and appreciation for the community's historic and prehistoric heritage, and that of the region.

Objective E-1: Historical, Archaeological, Paleontological Surveys. Identify and obtain information on the existence and significance of historical, archaeological, and paleontological sites and encourage land use planning which incorporates this information.

The following policies support Objective E-1:

Policy (a). Require appropriate surveys and necessary site investigations in conjunction with the earliest environmental document prepared for a project, in accordance with California Environmental Quality Act (CEQA) and the City's CEQA procedures.

Policy (b). Require surveys, prior to discretionary approval, for areas where the possibility of encountering sites exists. Additional specific site investigations may also be required in order to obtain sufficient information to determine the site's significance. The project sponsor shall fund this level of investigation.

Policy (c). Require a written report be submitted to the City following a survey or investigation describing the findings and making recommendations as to the site's significance, future disposition, and the amount of further investigation which should be undertaken. Copies of site survey records and reports shall be filed with the appropriate clearinghouse.

Policy (d). Encourage, if appropriate, removal of all materials collected during the survey/investigation to local museums, universities, or other depositories providing access for public review or scientific research.

Policy (e): Funding of Archaeological Excavations. Use the following in the case of archaeological salvage excavations: 75 percent project sponsor; 25 percent City or other public or quasipublic agency or organization. The costs of other mitigation measures may also be shared by the landowner or developer, the City, and other agencies or organizations.

Policy (f). Maintain information on areas surveyed, numbers of sites located, their status and the names and addresses of individuals or organizations knowledgeable of the sites.

Policy (g). Maintain specific locations of unprotected sites as confidential information to avoid vandalism and the resultant irretrievable loss of the historic and prehistoric record of the community.

Policy (h). Determine the proper disposition of each historical site prior to approval of zoning or discretionary development applications. Disposition determinations shall be based upon a detailed historical report, including an inventory form, a written evaluation, and slides documenting the building and its location. This information shall be reviewed by staff and the approval authority for discretionary development cases. Each historical report shall be filed at the Irvine Historical Museum and the City of Irvine Community Development Department.

Policy (i). Buffer and protect the integrity of an historic site and/or resources contained therein, if the Planning Commission, during review of a discretionary development case, determines preservation is required.

The City of Irvine does not have a historic preservation ordinance; however, Element E of the City of Irvine General Plan contains a list of historical and archaeological landmarks (Figure E-1) and a map of paleontological sensitivity zones (Figure E-2).

City of Tustin

General Plan

The City of Tustin General Plan identifies the goals and policies relevant to historic, archaeological, and paleontological resources. These are provided below.

Conservation/Open Space/Recreation Element: Historic, Cultural, Archaeologic, and Paleontological Resources (2017):

Tustin possesses important cultural resources which provide a sense of history and origin. These resources can be conserved through proper recognition and planning.

Goal 12. Maintain and enhance the City's unique culturally and historically significant building sites or features.

The following policies support Goal 12:

Policy 12.1. Identify, designate, and protect facilities of historical significance, where feasible.

Policy 12.2. Retain and protect significant areas of archaeological, paleontological, or historical value for education and scientific purposes.

Policy 12.3. Development adjacent to a place, structure or object found to be of historic significance should be designed so that the uses permitted and the architectural design will protect the visual setting of the historical site.

Goal 13. Preserve Tustin's archaeological and paleontological resources.

The following policies support Goal 13:

Policy 13.1. Require a site inspection by certified archaeologists or paleontologists for new development in designated sensitive areas.

Policy 13.2. Require mitigation measures where development will affect archaeological or paleontological resources.

Cultural Resource District (Historic Preservation Ordinance)

From the 2021 Tustin Citywide Historic Resources Survey Update Report, prepared by Architectural Resources Group:

> *Tustin administers its own designation program for historic landmarks within the city. The designation of resources at the local level is governed by Tustin City Code §9252, "Cultural Resource District," adopted in 1988. Although this ordinance focuses on the Old Town Tustin Cultural Resource District, it explicitly allows for the designation of cultural resources and cultural districts citywide through City Council resolution. In practice, very few properties have been individually designated; instead, the City operates an honorary building plaque program that does not carry official designation or regulation protections.*

The ordinance identifies seven eligibility criteria for historic landmark designation of a property or group of properties:

1) It exemplifies or reflects special elements of the City's cultural, architectural, aesthetic, social, economic, political, artistic, engineering and or architectural heritage; or
2) It is identified with persons, a business use or events significant in local, state, or national history; or
3) It embodies distinctive characteristics of style, type, period, or method of construction, or is a valuable example of the use of indigenous materials or craftmanship; or
4) It is representative of the notable work of a builder, designer, or architect; or
5) Its unique location or singular physical characteristic represents an established and familiar visual feature of a neighborhood, community or the City; or
6) Its integrity as a natural environment or feature strongly contributes to the wellbeing of residents of the City or the wellbeing of a neighborhood within the City; or
7) It is a geographically definable area possessing a concentration or continuity of site, buildings, structures or objects as unified by past events or aesthetically by plan or physical development.

While it is possible for a property to be eligible under multiple criteria, only one must be satisfied to merit designation as a City of Tustin Cultural Resource.

3.4.3 Impact Analysis and Mitigation Measures

Thresholds of Significance

The following criteria from CEQA Guidelines Appendix G are used as thresholds of significance to determine the impacts of the proposed Project as related to cultural resources. The proposed Project would have a significant impact if it would:

1. Cause a substantial adverse change in the significance of a historical resource pursuant to Section 15064.5.
2. Cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5.
3. Disturb any human remains, including those interred outside of dedicated cemeteries.
4. Result in cumulatively considerable impacts to cultural resources.

Methodology

On April 16, 2023, ESA archaeologist Claudia Camacho-Trejo, B.A., conducted an archaeological windshield and pedestrian survey of the Project Area targeting the facility locations G-1 to G-8. Preparation of the study also involved a review of the National Register of Historic Places and its annual updates, the California Register of Historical Resources, the BERD maintained by the State Office of Historic Preservation (OHP), and the California Historical Resources Information System South Central Coastal Information Center (SCCIC) housed at University of California, Fullerton. Sources were used to identify previously recorded properties within or near the subject property.

Records Search

A records search for the Project was conducted on March 26 and 28, 2024, at the California Historical Resources Information System (CHRIS) South Central Coastal Information Center (SCCIC) housed at California State University, Fullerton. The records search included a review of all recorded archaeological resources, previous studies, and historic architectural resources within the Project Area and a 0.5-mile radius. Additional review of archaeological resources was also conducted for areas in the immediate vicinity of the 0.5-mile radius in order to get a better understanding of the archaeological resources in the area.

The following paragraphs summarize the records search results for each of the three Project components (i.e., extraction facilities, monitoring wells, groundwater treatment plants, and the conveyance pipelines).

Previous Cultural Resources Investigations

The records search results indicate that 121 cultural resources studies have been previously conducted within a 0.50-mile radius of the Project Area. Of the 121 previous studies, 52 studies (00134, 00246, 00305, 00609, 00760, 00808, 00847, 00864, 01099, 01413, 01491, 01492, 01493, 01526, 01815, 01940a#, 01940b#, 02013, 02173, 02200, 02225, 02237, 02242, 02247, 02444, 02455, 02498, 02534, 03177, 03178, 03179, 03181, 03189, 03198, 03201, 03250, 03284, 03315, 03373, 03559, 03720, 03724, 03930, 03986, 03998, 04018, 04020, 04053, 04067, 04158, 04159, 04233) overlap the Project Area as shown in **Table 3.4-1**. Approximately 55 percent of the Project Area records search radius has been included in previous cultural resources assessments.

TABLE 3.4-1
PREVIOUS CULTURAL RESOURCES INVESTIGATIONS WITHIN 0.5 MILES OF THE PROJECT AREA

SCICC (OR)	Author	Title	Year	Type of Study
*00134	Desautels, Roger J.	Archaeological Survey Report on a Four Acre Parcel of Land Located in the Irvine Industrial Area, Irvine, California	1976	Archaeological, Field study
*00246	Cottrell, Marie G.	Report of Archaeological Resources Assessment Conducted for the Irvine Industrial Complex-west	1978	Archaeological, Field study
00289	Van Horn, David M.	Sakioka Property Archaeological Survey Report	1978	Archaeological, Field study
*00305	Schroth, Adella	The History of Archaeological Research on Irvine Ranch Property: the Evolution of a Company Tradition	1979	Literature search
00314	Desautels, Roger J.	Archaeological Survey Report on 2.875 Acres Located on Main Street, Irvine, County of Orange	1978	Archaeological, Field study
00438	Mabry, Theo N.	Historic Property Survey Moulton Parkway/Irvine Center Drive Cities of Tustin and Irvine	1979	Archaeological, Architectural/Historical, Field study
00441	Mabry, Theo N.	Archaeological Records Search and Reconnaissance Survey Main Street/jamboree Road, Irvine, California	1979	Archaeological, Field study
00518	Brock, James P.	Archaeological Test Excavation Report: the Sakioka Site, Near South Coast Plaza, Costa Mesa, Orange County, California	1980	Excavation
*00609	Desautels, Mark	Cultural Resources Report on 5 Proposed Hazardous Waste Storage Sites Located in Northern Orange County, California	1981	Archaeological, Field study
00684	Cottrell, Marie G.	A Cultural Resources Assessment Conducted for Three Potential Residential Development Areas Included in the El Toro Environmental Assessment	1983	Archaeological, Field study
*00760	Romani, John F.	Archaeological Survey Report for the Route 5/Route 55 Interchange in the Cities of Tustin and Santa Ana, Orange County, California PM 29.0/31.0; R8.8/ R10.6	1982	Archaeological, Field study
*00808	Unknown	Final Environmental Impact Report Regional Domestic Water Storage and Transmission Facilities From Diemer/Sac and Wellfield Systems to Existing Distribution Network	1979	Archaeological, Management/planning
*00847	Padon, Beth	Archaeological Resource Inventory City of Irvine and its Sphere of Influence	1985	Archaeological, Field study
*00864	Bissell, Ronald M.	Cultural Resources and Paleontological Reconnaissance of the Mac Arthur Place Property, Santa Ana, Orange County, California	1987	Archaeological, Field study
00969	Jertberg, Patricia R.	Cultural Resource Assessment Jamboree Road Widening	1989	Archaeological, Field study
*01099	Cooley, Theodore G.	Archaeological Resources Assessment Conducted for Proposed Irvine Ranch Water District Pipeline Right of Ways	1979	Archaeological, Field study
01355	Cottrell, Marie	A Cultural Resources Assessment Conducted for the Extension of Project Site a Marine Corps Air Station (h) Tustin	1984	Archaeological, Field study
01356	Sperry, Pat	Site Survey Report US Marine Helicopter Base; Tustin, California. 1971–1972	1972	Archaeological, Field study

SCICC (OR)	Author	Title	Year	Type of Study
01357	White, Robert S. and Laura S. White	An Extended Literature and Records Search Addressing Prehistorical Archaeological Resources Located Within the Boundaries of the US Marine Corps Air Station (MCAS), Tustin Orange County, California	1993	Literature search
*01413	Whitney-Desautels, Nancy A. and David A. Kice	Cultural Resources Assessment of the Irvine Ranch Water District Alternate Aqueous Waste Disposal Facility Sites, Orange County, California	1993	Archaeological, Field study
*01491	McLean, Deborah K.	Historic Property Survey Report - Negative Findings Newport/ State Route-55 Project, City of Tustin, Orange County, CA	1996	Archaeological, Architectural/Historical, Other research
*01492	McLean, Deborah K.	Negative Archaeological Survey Report Newport/state Route-55 Project, City of Tustin, Orange County, CA	1996	Archaeological, Field study
*01493	Casser, George	Historic Architectural Survey Report - Mou Short Form California Department of Transportation	1996	Architectural/historical, Evaluation
*01526	Demcak, Carol R.	Report of Archaeological Survey for L.A. Cellular Site #185, 17731 Cowan, Irvine, Orange County	1996	Archaeological, Field study
01527	Demcak, Carol R.	Report of Archaeological Survey for L.A. Cellular Site #475.2, 1001 1/2, Edinger, Tustin, Orange County	1996	Archaeological, Field study
01656	Brechbiel, Brant A., Roger D. Mason, and Richard Cerreto	Cultural Resources Survey Report for a Pacific Bell Mobile Services Telecommunications Facility: CM 004-23, in the City of Costa Mesa, California	1997	Archaeological, Field study
01703	Macko, Michael E.	Results of an Archaeological Resource Literature Review, Field Survey, and Report for the AT&T Anaheim to Mission Veijo Lightguide System, Santa Ana P.o.p. Diversity	1994	Archaeological, Field study
01783	Bonner, Wayne H.	Cultural Resources Records Search and Literature Review Report for a Pacific Bell Mobile Services Telecommunications Facility: Cm 099-04 in the City of Santa Ana, California	1998	Archaeological, Literature search
01784	Brechbiel, Brant A.	Cultural Resources Records Search and Literature Review Report for a Pacific Bell Mobile Services Telecommunications Facility: Cm 092-26 in the City of Irvine, California	1998	Literature search
*01815	McKenna, Jeanette A.	Historic Property Survey Report: Negative Findings Alton Avenue/state Route 55 Improvements, Cities of Santa Ana and Irvine, Orange County, California	1995	Archaeological, Architectural/Historical, Field study
*01940a#	Huey, Gene and Lois M. Webb	Historic Property Survey 07-ora 5/55 P.m. 29.0/31.0; R8.8/r10.6 Tustin and Santa Ana Orange County California 07209 479401	1979	Archaeological, Evaluation, Field study
*01940b#	Snyder, John W.	Evaluations Of Standard Bridges and Culverts On 07-Ora, La-5 Santa Ana Transit Corridor	1982	Evaluation
01942	Padon, Beth	Archaeological Resource Archival Review and Monitoring for the Lake Shore Towers Project	1999	Archaeological, Monitoring
*02013	Wlodarski, Robert J.	Negative Archaeological Survey Report on the Construction of a Transitway in the Median of Interstate 405	1990	Archaeological, Field study
*02173	Lapin, Philippe	Cultural Resource Assessment for Pacific Bell Wireless Facility Cm 514-02, County of Orange, California	2000	Archaeological, Literature search
02175	Duke, Curt	Cultural Resource Assessment for AT&T Wireless Services Facility Number C940.1, County of Orange, California	2000	Archaeological, Literature search

SCICC (OR)	Author	Title	Year	Type of Study
02176	Lapin, Philippe	Cultural Resource Assessment for Pacific Bell Wireless Facility Cm 416-01, County of Orange, California	2000	Archaeological, Field study
*02200	Atchley, Sara M.	Cultural Resources Investigation for the Nextlink Fiber Optic Project, Los Angeles and Orange Counties, California	2000	Archaeological, Field study
*02225	Strozier, Hardy	The Irvine Company Planning Process and California Archaeology- A Review and Critique	1978	Management/planning
*02237	Duke, Curt	Cultural Resource Assessment for AT&T Wireless Services Facility Number C580.4, County of Orange, California	2000	Archaeological, Field study
*02242	Duke, Curt	Cultural Resource Assessment for AT&T Wireless Services Facility Number C956.1, County of Orange, California	2000	Archaeological, Field study
*02247	Alcock, Gwyn	Cultural Resources Investigation for the Nextlink Fiber Optic Project, Los Angeles and Orange Counties, California (First Addendum); Nextlink Project Number: 17033-2	2000	Archaeological, Field study
02256	Demcak, Carol R.	Cultural Resources Assessments for Orange County Sanitation Districts	1999	Archaeological, Field study
02260	Duke, Curt	Cultural Resources Assessment for AT&T Wireless Services Facility Number R133.1, County of Orange, California	2000	Archaeological, Field study
02266	Demcak, Carol R.	Report of Archaeological Survey of 21-Acre Parcel (tract 10950), Costa Mesa, Orange County, California	1999	Archaeological, Field study
02443	Duke, Curt	Cultural Resource Assessment AT&T Wireless Services Facility No. 13074b Orange County, California	2002	Literature search
*02444	Duke, Curt	Cultural Resource Assessment AT&T Wireless Services Facility No. 13318a Orange County, California	2002	Literature search
*02455	Dice, Michael H.	An Archaeological Resource Assessment of the Edinger Avenue Resurfacing Project, City of Santa Ana, California	2002	Archaeological, Field study
02467	Duke, Curt	Cultural Resource Assessment AT&T Wireless Services Facility No. D463a Orange County, California	2002	Literature search
02476	Duke, Curt	Cultural Resource Assessment Cingular Wireless Facility No. Sc 033-01 Orange County, California	2001	Archaeological, Literature search
02483	Duke, Curt	Cultural Resource Assessment AT&T Wireless Services Facility No. 13316 Orange County, California	2002	Archaeological, Literature search
02493	Billat, Lorna	Nextel Communications Wireless Telecommunications Service Facility-Orange County	2000	Archaeological, Field study
*02498	Dice, Michael H.	An Archaeological Resource Assessment of the Warner Avenue Resurfacing Project, City of Santa Ana, California	2002	Archaeological, Field study
02533	Webb, Lois M. and Gene Huey	07-ORA-405 PM 7.4 Overcrossing, Historic Property Survey, 07210-249011	1977	Literature search
*02534		Annual Report to The Irvine Company from Archaeological Research, Inc.	1976	Archaeological, Other research

SCICC (OR)	Author	Title	Year	Type of Study
02636	Brown, Joan C.	A Cultural Resources Literature Study and Field Reconnaissance for the Natural Treatment System Master Plan Facilities, Orange County, California	2003	Archaeological, Field study
*03177	Bonner, Wayne H.	Cultural Resource Records Search and Site Visit Results for Cingular Telecommunications Facility Candidate Cm-514-01 (oc-034-01) Reynolds, 1562 Reynolds Avenue, Irvine, Orange County, California	2005	Archaeological, Field study
*03178	Bonner, Wayne H.	Cultural Resources Records Search Results and Site Visit for Cingular Wireless Candidate Oc-034-01 (Reynolds) 1562 Reynolds Avenue, Irvine, Orange County, California	2005	Archaeological, Field study
*03179	Kyle, Carolyn E.	Cultural Resource Assessment for Cingular Wireless Facility Sc071-02 City of Santa Ana Orange County, California	2002	Archaeological, Literature search
*03181	Kyle, Carolyn E.	Cultural Resource Assessment for Cingular Wireless Facility Sc099-03 City of Irvine Orange County, California	2002	Archaeological, Literature search
*03189	Bonner, Wayne H.	Cultural Resource Records Search and Site Visit Results for Cingular Telecommunications Facility Candidate Sc-451-03 (Madison Park) Edinger Avenue at Standard Avenue, Santa Ana, Orange County, California	2004	Archaeological, Field study
*03198	Bonner, Wayne H.	Cultural Resources Records Search Results and Site Visit for Cingular Wireless Candidate Oc-0053-02 (Performance Equipment) 1902 McGaw, Avenue, Irvine, Orange County, California	2005	Archaeological, Field study
*03201	Bonner, Wayne H.	Cultural Resources Records Search Results and Site Visit for Cingular Wireless Candidate OC-0029-01 (Recycling Center) 2134 Grand Avenue, Santa Ana, Orange County, California	2005	Archaeological, Field study
03203	Bonner, Wayne H.	Cultural Resource Records Search and Site Visit Results for Cingular Telecommunications Facility Candidate CM-092-01 (OC-005-01) Schiffman Enterprises, 17462 Von Karman Avenue Irvine, Orange County, California	2005	Archaeological, Field study
03231	Fulton, Phil and Terri Fulton	Cultural Resource Assessment Verizon Wireless Services Airway Facility City of Costa Mesa, Orange County, California	2005	Literature search
03234	Dice, Michael H.	A Cultural Resources Assessment: the Main Street Resurfacing Project, Warner to Columbine, City of Santa Ana, California	2003	Archaeological, Field study
03240	Anonymous	An Economically Viable Developer Expression for the Hangar 29 Complex; Adaptive Re-use @ Tustin Legacy a Proposed Conversion to a Public/Private Indoor Motorcycles Training Center	2005	Architectural/historical, Management/planning
03241	Anonymous	Request for Developer Expressions of Interest and Proposals Southerly Hangar at the Former MCAS Tustin City of Tustin, California	2005	Architectural/Historical, Evaluation, Management/planning
*03250	Bonner, Wayne H.	Cultural Resources Records Search Results and Site Visit for T-Mobile Candidate La02874 (sc163 the Broe Companies), 1821 East Dyer Road, Santa Ana, Orange County, California	2006	Archaeological, Field study
03256	Scott, Kim, Julie Scrivner Broadie, Brian Glenn, and Sherri Gust	Cultural Resources Monitoring Report for the Tustin Villas Project, City of Tustin, California	2005	Archaeological, Monitoring

SCICC (OR)	Author	Title	Year	Type of Study
03277#	Casen, George A., John F. Romani, and Lois M. Webb	The Proposed Project Is the Widening and General Improvement of Interstate Route 5 Between Route 405 and Route 55 in Orange County, California	1985	Archaeological, Architectural/Historical, Evaluation, Field study
03277#	Webb, Lois M. and John W. Snyder	Historic Architectural Evaluation 07 Ora 5 Route 405 to Route 55	1985	Architectural/Historical, Evaluation, Field study
*03284	Fulton, Terri and Deborah McLean	Cultural Resources Assessment for the Santa Ana West and East Pump Stations Project City of Santa Ana, County of Orange, California	2006	Archaeological, Field study
*03315	Underbrink, Susan and Pam Daly	Archaeological Survey Report for the Red Hill Avenue Grade Separation Project, City of Tustin, County of Orange, California, Federal Project Number: Stpl: 5271 (014), Ea: 965100	2006	Archaeological, Field study
*03373	Arrington, Cindy and Nancy Sikes	Cultural Resources Final Report of Monitoring and Findings for the Qwest Network Construction Project State of California: Volumes I and II	2006	Archaeological, Field study, Monitoring, Other research
03409	Smith, Brooks R. and Deborah McLean	Archaeological Mitigation Monitoring Report, Orange County Regional Sheriff Training Facility, City of Tustin, Orange County, California	2006	Archaeological, Monitoring
03476	Bonner, Wayne H.	Cultural Resource Records Search and Site Visit Results for Royal Street Communications, LLC Candidate La2512a (Murphy & Corporate Park), 2802 Barranca Park Way, Irvine, Orange County, California	2007	Archaeological, Field study
03486	Baker, Cindy and Mary L. Maniery	Cultural Resource Inventory and Evaluation of United States Army Reserve 63d Regional Readiness Command Facilities	2007	Archaeological, Evaluation, Field study
03500	Demcak, Carol R. and Hugh M. Wagner	Report of Archaeological and Paleontological Monitoring of Tustin Legacy Project Site, Former Marine Corps Air Station, Tustin, California	2006	Archaeological, Monitoring
03555	Bonner, Wayne H.	Cultural Resources Records Search and Site Visit Results for Royal Street Communications California, LLC Candidate LA2824A (Public Storage McFadden), 2200 East McFadden Avenue, Santa Ana, Orange County, California	2008	Archaeological, Field study
*03559	Billat, Lorna	New Tower (“NT”) Submission Packet: Cartel Industries, LA2795C	2009	Archaeological, Field study
03676	Bonner, Wayne H.	Cultural Resources Records Search and Site Visit Results for T-Mobile Candidate LA12867B (Santa Ana Combined Facility), 1444 McFadden Avenue, Santa Ana, Orange County, California	2007	Archaeological, Field study
*03720	Bonner, Wayne H.	Cultural Resources Records Search and Site Visit Results for T-Mobile Candidate LA23636D (Trico Building), 1212 McGaw Avenue, Irvine, Orange County, California	2007	Archaeological, Field study
*03724	Billat, Scott	New Tower Submission: S. Main & Dyer, LA-2821A	2007	Literature search
03831	Wlodarski, Robert	A Record Search and Field Reconnaissance for the Proposed Bechtel Wireless Telecommunications Site OC0227 (Doffo Auto), Located at 1606 South Main Street, Santa Ana, Orange County, California 92707	2009	Archaeological, Field study
*03930	Bonner, Wayne	Cultural Resources Records Search and Site Visit Results for T-Mobile USA Candidate LA02483A (CM483-12 Go Properties), 2220 Ritchey Street, Santa Ana, Orange County, California	2010	Archaeological, Field study
03949	Billat, Lorna	St. Anne’s Catholic Church, CA-ORC5141D - Collocation Submission Packet	2010	Archaeological, Literature search

SCICC (OR)	Author	Title	Year	Type of Study
03950	Billat, Lorna	Hotel Furniture Liquidators, CA-ORC4024C, Collocation Submission Packet	2010	Archaeological, Architectural/Historical, Field study
03950	Johnson, Brent	Direct APE Historic Architectural Assessment for Clear Wireless, LLC CA-ORC4024C / Hotel Furniture Liquidators 1947 S. Main Street, Santa Ana, California 92707	2010	Architectural/Historical, Field study
03972	Kim, Steve	Proposed Federal Aviation Administration (FAA) Airport Surface Detection Equipment, Model X (ASDE-X) System to Serve John Wayne--Orange County Airport (SNA), Santa Ana, California	2007	Archaeological, Field study
*03986	Underbrink, Susan and Pam Daly	Archaeological Survey Report for the Red Hill Avenue Grade Separation Project, City of Tustin, County of Orange, California Federal Project Number: STPL : 5271(014)	2006	Archaeological, Architectural/Historical, Field study
*03998	Bray, Madeleine	Addendum Report No.1 for the Irvine Ranch Water District Wells 21 and 22 and Tustin Legacy Well 1 (TL-1) Projects, Phase I Cultural Resources Assessment	2011	Archaeological, Field study
04000	Strauss, Monica, Ehringer, Candace, and Bray, Madeleine	Irvine Ranch Water District Wells 21 and 22 and Tustin Legacy Well 1 (TL-1) Projects, Phase I Cultural Resources Assessment	2010	Archaeological, Field study
*04018	Fulton, Phil	Cultural Resource Assessment, Verizon Wireless Services Occidental Facility, City of Santa Ana, Orange County, California	2011	Archaeological, Literature search
04019	Bonner, Wayne H. and Arabesque Said	Cultural Resource Records Search and Site Visit Results for T-Mobile USA Candidate LA33517-E (Mt. Hebron), 2023 South Main Street, Santa Ana, Orange County, California	2010	Archaeological, Field study
*04020	Bonner, Wayne H.	Cultural Resources Records Search and Site Visit Results for AT&T Mobility, LLC Candidate LAC580 (Edinger and Red Hill/USID #15975), 1421 Edinger Avenue, Tustin, Orange County, California	2011	Archaeological, Field study
*04053	Fulton, Phil	Cultural Resource Assessment - Verizon Wireless Services Tech Center Facility, City of Santa Ana, Orange County, California	2009	Other research
*04067	Johnson, Brent	Cultural Resources Records Search and Site Visit for T-Mobile USA Inc. LA33836B / Delhi Park 730 E. Warner Avenue, Santa Ana, Orange County, California 92707	2010	Archaeological, Field study
04136	Weitze, Karen and Christy Dolan	Historic American Building Survey for the Marine Corps Air Station, Tustin Lighter-Than-Air Ship Hangars (HABS No. CA-2707), Orange County, California	2000	Other research
04137	RBF Consulting and Petrone Communications	The Tustin Hangars: Titans of History - An Historical Account of the MCAS Tustin Hangars	2008	Architectural/historical
04144	McKenna, Jeanette A.	A Cultural Resources Investigation for the Proposed McFadden/Orange Park site in the City of Santa Ana, Orange County, California	2011	Archaeological, Field study
*04158	Stone, Mitchel R.	Historic Property Survey Report, Alton Avenue Overcrossing at SR-55	2003	Archaeological, Architectural/Historical, Field study
*04159	Anderson, Carson	Alton Avenue Overcrossing at State Route 55 Historical Resources Evaluation Report Orange County, California	2010	Archaeological, Architectural/historical, Evaluation, Field study

SCICC (OR)	Author	Title	Year	Type of Study
04172	Chasteen, Carrie	Historic Property Survey Report San Diego Freeway (I-405) Improvement Project SR-73 to I-605, Orange and Los Angeles Counties	2011	Other research
04220	Helton, Clint	Cultural Resources Analysis for the Tustin US Army Reserve Center Proposed Military Construction Project	2012	Archaeological, Field study
04223	Flynn, Chris	Notification of Finding of No Adverse Effect with Standard Conditions for the Bridge Deck Maintenance and Sealing at 30 Locations Throughout Orange County, California	2011	Architectural/Historical, Field study, Management/planning
*04233	Bonner, Wayne	Cultural Resources Records Search and Site Visit Results for T-Mobile USA Candidate LA33836-D (Delhi Park), 730 East Warner Ave, Santa Ana, Orange County, California	2012	Archaeological, Field study
04265	Brown, Joan, Deering, Mark, and Sawyer, William	Archaeological Resource Monitoring During Excavation Activities for Tustin Legacy Expansion, City of Tustin, County of Orange, California	2013	Monitoring
04353	Bissell, Ronald M.	Cultural Resources Reconnaissance of Three Small Parcels on the Marine Corps Air Station, Tustin, Orange County, California	1990	Archaeological, Field study, Literature search
04400	Bonner, Diane, Carrie Wills, and Kathleen Crawford	Cultural Resources Records Search and Site Visit Results for T-Mobile West, LLC Candidate LA33517E (Mt. Hebron), 2023 South Main Street, Santa Ana, Orange County, California	2014	Archaeological, Field study
04401	Bonner, Diane and Carrie Wills	Cultural Resources Records Search and Site Visit Results for AT&T Mobility, LLC Candidate CLV1583 (Sandpointe Park) 3700 South Birch Street, Santa Ana, Orange County, California CASPR No. 3551699451	2014	Archaeological, Field study
04487	Underbrink, Susan	Archaeological Survey Report for Improvement of Access Road at Airport Storm Channel Project Costa Mesa Orange County, California	2016	Field study
04543	Bonner, Diane F., Carrie D. Willis and Kathleen A. Crawford	Cultural Resources Records Search and Site Visit Results for Verizon Wireless Candidate Gillette, 1851 Reynolds Avenue, Irvine, Orange County, California	2014	Archaeological, Architectural/Historical, Field study
04543	Bonner, Wayne H. and Kathleen A. Crawford	Direct APE Historic Architectural Assessment for Verizon Wireless Candidate Gillette, 1851 Reynolds Avenue, Irvine, Orange County, California		Architectural/Historical, Evaluation
04552	Billat, Lorna	Public Storage/CLV6392, 2200 East McFadden Avenue, Santa Ana, Orange County, CA, New Tower	2014	Archaeological, Architectural/Historical, Field study
04579	Roland, Jennifer	Phase I Investigation for the Crown Castle LA2867 SCE Sana Comb Faci Antenna Installation Project, Santa Ana, Orange County, California	2016	Archaeological, Field study
04530	Kay, Michael	CULTURAL RESOURCES MONITORING REPORT, TUSD PHASE I LEGACY, City of Tustin, Orange County, California	2017	Archaeological, Monitoring
02235	Duke, Curt	Revised Cultural Resource Assessment for AT&T Wireless Services Facility Number C940.1, County of Orange, California	2000	Archaeological, Literature search
00997	Jertberg, Patricia R.	Archaeological Monitoring for Tentative Parcel No. 88-151, Lots 1, A, 3, 4, and 5	1990	Archaeological, Excavation, Field study, Monitoring

SCICC (OR)	Author	Title	Year	Type of Study
02495	Ellis, Robert R.	(Duplicate of OR-353) Report Archaeological Test Excavations at Site ORA-121 Orange County, California	1973	Excavation
03183	Kyle, Carolyn E.	Cultural Resource Assessment for Cingular Wireless Facility Sc082-03 City of Irvine Orange County, California	2002	Archaeological, Literature search

SOURCE: SCCIC 2024

\# Reports are combined under the same SSCIC designation, a & b were added by ESA to differentiate between reports for the purpose of this table
* Indicates study overlapping Project Site

Previously Recorded Archaeological Resources

The records search results indicate that thirty-two cultural resources have been previously recorded within the 0.50-mile radius. Of the thirty-two resources, three prehistoric sites (P-30-000381, 001538, 001725), eight prehistoric isolates (P-30-100191, 100194, 100195, 100196, 100197, 100198, 100199, 100200), one historic site (P-30- 001726), two historic isolates (P-30-100192, 100193) and eighteen historic built environment (P-30-176663, 176837, 177044, 177120, 177121, 177122, 177123, 177124, 177125, 177126, 177127, 177128, 177129, 177130, 177131, 177132, 177133, 177521) as shown in **Table 3.4-2** and **Table 3.4-3**. None of the archaeological resources is located within the Project Area.

TABLE 3.4-2
PREVIOUSLY RECORDED ARCHAEOLOGICAL RESOURCES WITHIN THE 0.5-MILE RADIUS OF THE PROJECT AREA

P-Number (P-30-)	Permanent Trinomial (CA-ORA)	Description	Date Recorded	Eligibility Status	Within or outside Project Area
000381	000381	Prehistoric Site	1972	Unknown	Outside
001538	001538	Prehistoric Site: Light Shell scatter	1978; 1999	Unknown	Outside
001725	001725	Prehistoric Site: Ground stone and a cache feature	2013	Unknown	Outside
001726	001726H	Historic Site: privies	2013	Unknown	Outside
100191		Prehistoric Isolate: Point	2013	Unknown	Outside
100192		Historic Isolate	2013	Unknown	Outside
100193		Historic Isolate	2013	Unknown	Outside
100194		Prehistoric Isolate Ground stone	2013	Unknown	Outside
100195		Prehistoric Isolate: Bifacial Mano Fragment	2013	Unknown	Outside
100196		Prehistoric Isolate: Bifacial Mano Fragment	2013	Unknown	Outside
100197		Prehistoric Isolate: Bifacial Mano Fragment	2013	Unknown	Outside
100198		Prehistoric Isolate: Laevicardium Elatum	2013	Unknown	Outside
100199		Prehistoric Isolate: Volcanic Shallow Metate Fragment	2013	Unknown	Outside
100200		Prehistoric Isolate: complete andesitic shallow to medium basin	2013	Unknown	Outside

SOURCE: SCCIC 2024

Previously Recorded Built Environment Resources

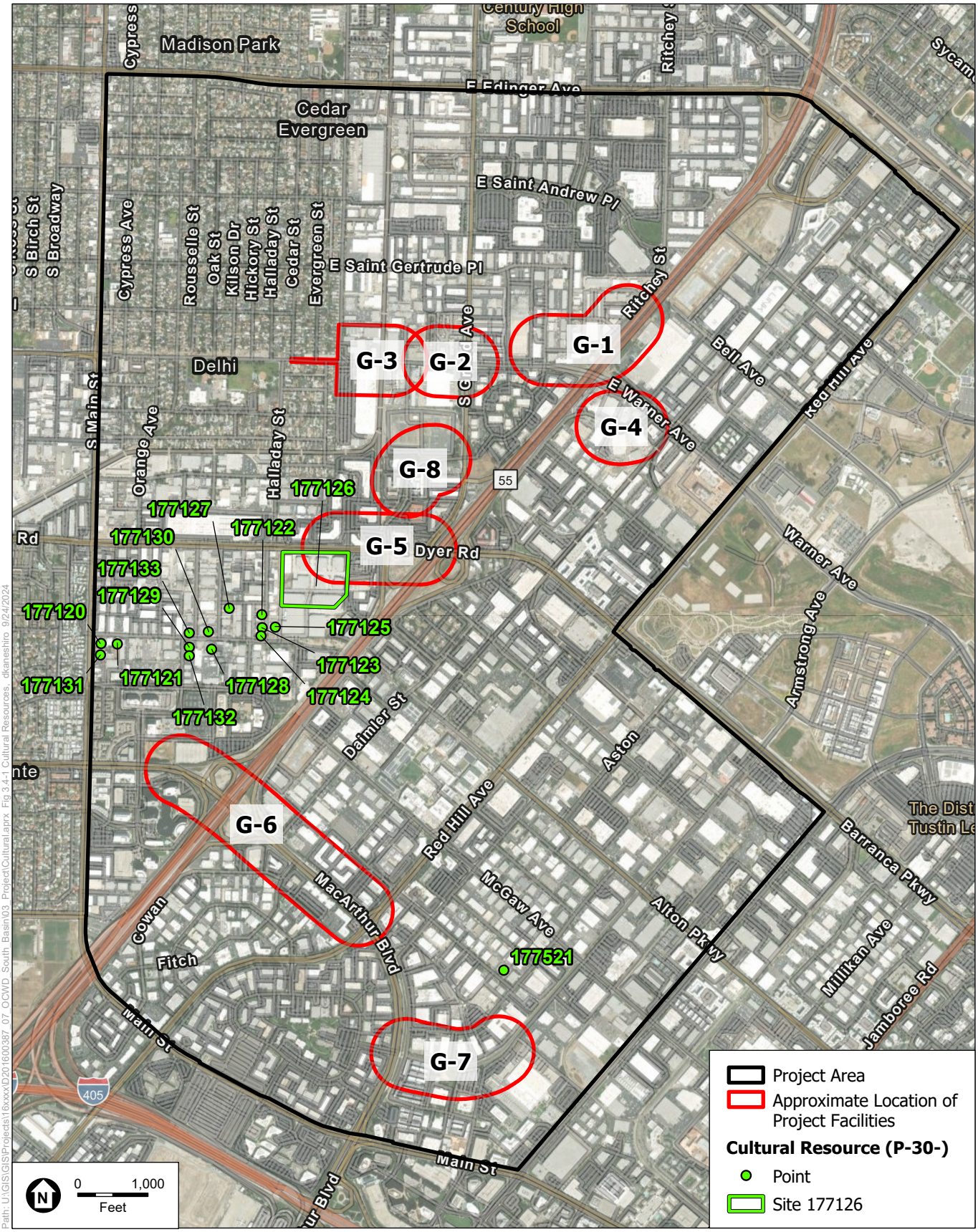
The SCCIC results indicated eighteen historic built environments (P-30-176663, 176837, 177044, 177120, 177121, 177122, 177123, 177124, 177125, 177126, 177127, 177128, 177129, 177130, 177131, 177132, 177133, 177521) are located within the 0.50-mile radius of the Project area. Of the eighteen resources, sixteen cultural resources are also located within the Project area. The sixteen resources are historic built environment resources (P-30-177044, 177120, 177121, 177122, 177123, 177124, 177125, 177126, 177127, 177128, 177129, 177130, 177131, 177132, 177133,177521) Only resources located within the proposed Project are discussed below (**Table 3.4-3** and **Figure 3.4-1**).

TABLE 3.4-3
PREVIOUSLY SCCIC RECORDED BUILT ENVIRONMENT RESOURCES WITHIN THE 0.5-MILE RADIUS OF THE PROJECT AREA

P-Number (P-30-)	Permanent Trinomial (CA-ORA)	Description	Date Recorded	Eligibility Status	Within or outside Project Area
176663		Historic: The site consists of an approximately 14.7-mile segment of the Burlington Northern Santa Fe (formerly Atchison, Topeka and Santa Fe) Railway.	2002; 2002; 2003; 2007; 2012; 2016; 2016; 2018	Not Eligible for NRHP	Outside
176837		Historic Building: two buildings (military property)	2006	Not Eligible for NRHP	Outside
177044		Historic Commercial Building Mayfair Market 1947 S. Main Street Santa Ana Date of Construction: 1946	2010	Not Eligible for NRHP	Within
177120		Historic Family Residence 110 E. Alton Avenue Santa Ana Date of Construction: ca. 1949	2001	Not Eligible for NRHP	Within
177121		Historic Commercial Building 3201 South Main Street Santa Ana Date of Construction: 1956	2001	Not Eligible for NRHP	Within
177122		Historic Commercial Building Hunter Tool-Die 3102 S. Halladay Street Santa Ana Date of Construction: 1956	2010	Not Eligible for NRHP or CRHR	Within
177123		Historic Commercial Building Santa Ana Screw Products 3106 S. Halladay Street Santa Ana Date of Construction: 1960	2010	Not Eligible for NRHP or CRHR	Within
177124		Historic Commercial Building 3122 S. Halladay Street Santa Ana Date of Construction: 1960	2010	Not Eligible for NRHP or CRHR	Within
177125		Historic Commercial Building 3111–3113 S. Halladay Street Santa Ana Date of Construction: 1957	2010	Not Eligible for NRHP or CRHR	Within
177126		Historic Industrial Building ITT Canon Electric 666 Dyer Road Santa Ana Date of Construction: 1957	2010	Not Eligible for NRHP or CRHR	Within

P-Number (P-30-)	Permanent Trinomial (CA-ORA)	Description	Date Recorded	Eligibility Status	Within or outside Project Area
177127		Historic Industrial Building 3023 & 3025 S. Kilson Drive 603-605 E. Alton Avenue Santa Ana Date of Construction: 1960	2010	Not Eligible for NRHP or CRHR	Within
177128		Historic Industrial Building 502-528 E. Alton Avenue Santa Ana Date of Construction: 1959	2010	Not Eligible for NRHP or CRHR	Within
177129		Historic Industrial Building Graham Air Craft 424 E. Alton Avenue Santa Ana Date of Construction: 1958	2010	Not Eligible for NRHP or CRHR	Within
177130		Historic Commercial Building 3121 S. Oak Street & 3126 S. Kilson Drive Santa Ana Date of Construction: 1956, 1959	2010	Not Eligible for NRHP or CRHR	Within
177131		Historic Commercial Building Santa Ana Lodge Hotel 3321 S. Main Street Santa Ana Date of Construction: 1953	2010	Not Eligible for NRHP or CRHR	Within
177132		Historic Commercial Building 3221 S. Main Street Santa Ana Date of Construction: 1960	2010	Not Eligible for NRHP or CRHR	Within
177133		Historic Commercial Building 414 E. Alton Avenue Santa Ana Date of Construction: 1957	2010	Not Eligible for NRHP or CRHR	Within
177521		Historic Commercial Building Quality Packaging 1851 Reynolds Avenue Irvine Date of Construction: ca. 1968	2014	Not Eligible for NRHP or CRHR	Within

SOURCE: SCCIC 2024



SOURCE: ESA, 2024.

South Basin Groundwater Protection Project

Figure 3.4-1
Resources within 0.5-Mile Radius of Project Area

ESA

P-30-177044

This property, also known as Mayfair Market, is located at 1947 S. Main Street in Santa Ana at the northwest edge of the Project boundary and more than 0.7 miles from the nearest Alignment G-3. It is a commercial building divided into two parts, covering 10,350 square feet, on a 0.43-acre plot. The building has a unique design, with a triangular cupola on one corner, and a staggered parapet with rounded corners. The roof is a wooden barrel vault dome supported by concrete block walls. The exterior appears to have plaster panels, which are smooth and give the building a refined look. The building has window walls that run along the entire 110-foot length of the building, along S. Main Street, and have a pent roof to protect from the elements. The entrance is surrounded by uncut stone, and the upper level has rectangular glass block windows, some of which have been walled over. The building's appearance is much the same as it was when built in 1946. After reviewing its historical significance, the property does not qualify for the NRHP under Criteria A, B, C, and D, and is not considered a historic resource for the NHPA (Ballester 2010).

P-30-177120

This historic charming house, located at 110 E. Alton Avenue and built in 1949 boasts a small one-story stucco-clad structure with a rectangular shape and a medium-pitched roof facing the side. The western gable end features vertical ship-lap siding that adds to the elegant design of the house. The house is surrounded by a six-foot wooden fence that ensures privacy and limits visibility from the street. The property is situated in an area with commercial and industrial development, dating back to the 1950s through 1970s. This property represents the last remaining fragment of the 15-acre Alton Ranch, a small sugar beet, bean, and dairy farm located in the southern section of Santa Ana, historically known as Delhi. The house served as the residence for Joseph and Frances Alton for about 20 years, from the 1950s through 1970s. The Alton family was comprised of small family farmers and ranchers who played a significant role in the local agricultural economy of Santa Ana during the first half of the 20th century. While the historical literature does not suggest any notable contributions made by the Alton family to the area's agricultural development, the house remains a testament to their legacy. Despite its historical significance, this property does not meet the criteria for being listed on the National Register of Historic Places under Criterion A (events) or Criterion B (individuals) (Stone 2001a).

P-30-177121

This is a one-story commercial building, located at 17750 S. Main Street and built in 1956 made of concrete blocks with a rectangular plan and a flat or low-pitched roof that is hidden behind a parapet. The site is not within a proposed Project Alignment. The elevations have no special features, except for a garage door opening and two pairs of aluminum entrance doors on the central western elevation. Medrano Motors built this commercial building in 1956 on a portion of James and Hannah Alton's ranch. The northern elevation has only two fixed multipaned steel windows as the only architectural features. The building is in good condition and appears to be unaltered. However, it has no association with significant historical events or individuals and, therefore, is not eligible for listing on the National Register of Historic Places under Criterion A (events) or Criterion B (Stone 2001b).

P-30-177122

3102 South Halladay Street is a one-story industrial building built in 1956 that was designed in the Modern style. The site is not within a proposed Project Alignment. It has a rectangular shape and is made of concrete blocks with a flat roof. The main entrance is in the center, and it has a metal door. The

building is separated into three sections, with the southern section having a drive-through bay opening and the northern section having a large bay with multipane windows. There is a small parking lot in front of the building, with some shrubbery and palm trees. This building is not eligible to be listed as a historic place in the National Register or California Register (Hilton 2010a).

P-30-177123

3106 South Halladay Street is a single-story industrial building built in 1960 that features a Modern architectural style. The site is not within a proposed Project Alignment. It was constructed using concrete and has a flat roof that slightly overhangs the parapet cap. The main or eastern façade is divided asymmetrically and has two bays, each framed by a concrete pilaster. Currently, the building is used for industrial purposes, and it does not meet the eligibility criteria for listing in the National Register of Historic Places or the California Register of Historical Resources (Hilton 2010b).

P-30-177124

3122 South Halladay Street is an industrial building built in 1960 that follows the utilitarian expression of the Modern style. The building is not within a proposed Project Alignment. It has a rectangular shape and is made of concrete with a flat roof that features a slightly overhanging parapet cap. The main façade is symmetrically divided into two bays, which are separated by a concrete pilaster. Currently, the building is being used for industrial purposes and it is not deemed eligible to be listed in the National Register of Historic Places or the California Register of Historical Resources (Hilton 2010c).

P-30-177125

3111–3113 South Halladay Street is a one-story industrial building in built in 1957 that features a practical treatment of the Modern style. The building is not within a proposed Project Alignment. The building has a rectangular plan, concrete construction, and a flat roof with metal coping. The primary (west) façade is symmetrically divided into four bays. Two primary entrances are located on the façade, consisting of a metal and glass door flanked by a large single-pane window. The entrances are highlighted by a concrete pilaster that frames the outer edge of the entrance and is connected above the entrance bays by a concrete belt course. This building is not eligible for listing under any criteria in the National Register of Historic Places or the California Register of Historical Resources (Hilton 2010d).

P-30-177126

666 East Dyer Road is a large complex of industrial buildings, built in 1957 that were built over several decades for ITT Canon Electric. The site is not within a proposed Project Alignment. The property is heavily obscured by a tall concrete block fence with a metal gate that bounds the property line off Alton Avenue, making it difficult to see and access. The buildings are separated from the street by a significant setback, which accommodates a large asphalt parking lot. They are all one-story and rectangular in plan, made of concrete, corrugated metal, or wood frame with stucco construction. The buildings feature hipped, or gable roofs with slightly overhanging eaves. However, the grouping of buildings of disparate design and size does not appear eligible for listing in the National Register of Historic Places or California Register of Historical Resources under any criteria (Hilton 2010e).

P-30-177127

There are ten industrial buildings on this parcel that are located within the APE; however, only six buildings are 50 years of age or older: 3023–3025 South Kilson Drive (two buildings), 603 East Alton

Avenue (two buildings), and 605 East Alton Avenue (two buildings). 3023 and 3025 South Kilson Drive are two rectangular-shaped buildings located on the northwest corner of tile parcel. The site is not located within a proposed Project Alignment. Both are one-story industrial buildings designed in the Modern style. Of concrete construction, they have flat roofs with metal coping. 603 and 605 Alton Avenue are a group of four rectangular buildings that mirror each other. These buildings are composed of concrete construction with pilasters dividing each bay and a flat roof with slightly overhanging eaves. The street (south) façade is asymmetrically composed and punctuated by two raised multipane metal windows. None of the buildings previously mentioned appears eligible for listing in the National Register of Historic Places or California Register of Historical Resources under any criteria (Hilton 2010f).

P-30-177128

The industrial building situated at 502–528 East Alton Avenue was built in 1959 and is a substantial structure that follows the Modern architectural style. The site is not located within a proposed Project Alignment. It has a rectangular plan and is constructed of concrete with brick, wood, and tile veneer used to cover the projecting section of the façade. Although the building shares some similarities with other Modern industrial structures, it lacks the architectural significance and character-defining features that are usually associated with noteworthy examples of this style. Therefore, the buildings do not qualify for listing on the National Register of Historic Places under Criterion C or the California Register of Historical Resources under Criterion 3, within the context of mid-20th-century industrial architecture and the Modern style (Hilton 2010g).

P-30-177129

424 East Alton Avenue is a one-story industrial building was built in 1958 that follows a utilitarian expression of the Modern style. It is not located within a proposed Project Alignment. It has a rectangular plan and is made up of tilt-up concrete panels with a flat roof featuring metal coping. The building is composed of three bays on the primary (north) façade, with the primary entrance located in the westernmost bay. Two of the three bays are blind. The design of 424 East Alton Avenue is quite commonplace and features practical design elements that were typical of many mid-20th-century industrial buildings in the Modern style. However, it lacks the quality of significance of architecture and does not exhibit the character-defining features that are intrinsic to noteworthy examples of the modern style. Therefore, it appears to be ineligible for listing on the National Register of Historic Places under Criterion C or the California Register of Historical Resources under Criterion 3 (Hilton 2010h).

P-30-177130

3121 South Oak Street is a major building located at the northeast corner of Oak Street and Alton Avenue. It was built in 1956. The site is not located in a proposed Project Alignment. It has a rectangular shape made of concrete and has a flat roof with metal coping. The primary (west) façade is not symmetrical and is composed of multiple bays. The façade has four pairs of raised multipane metal windows north of the main entryway. 3126 South Kilson Drive is an industrial building designed in the Modern style. It is a one-story building with a rectangular shape made of concrete and has a flat roof with metal coping. The primary (east) elevation is symmetrical and has six bays. Neither of the buildings qualify for listing on the National Register of Historic Places under Criterion C or the California Register of Historical Resources under Criterion 3 within the context of mid-20th-century industrial architecture and the Modern style (Hilton 2010i).

P-30-177131

The Santa Ana Lodge Motel, at 3221 South Main Street, was built in 1953 and is located on the east side of Main Street, three parcels south of Alton Avenue. The site is located on the western edge of the Project Area and not with any proposed Project Alignment. The Lodge is comprised of six detached and semi-detached buildings: five one-story multi-unit motel residences and a detached garage. The buildings do not appear eligible for listing under any criteria in the National Register of Historic Places or the California Register of Historical Resources (Hilton 2010j).

P-30-177132

The property located at 414 East Alton Avenue is a one-story industrial building built in 1960 designed in the Modern style. The site is not located in a proposed Project Alignment. The building is set to have a rectangular shape and will be made up of tilt-up concrete exterior panels with a flat roof. It has a symmetrical design, being one bay wide and divided down the middle. The primary entrance of the building is centrally located and features metal and glass doors, which are topped with a transom. The building's design is simple and typical of numerous Modern industrial buildings. However, it lacks the unique features and characteristics that make notable examples of the Modern style stand out. As a result, it does not appear to meet the criteria for being listed in the National Register of Historic Places or California Register of Historical Resources (Hilton 2010k).

P-30-177133

The building located at 411 East Alton Avenue is not located in a proposed Project Alignment and is a large industrial warehouse built in the Modern style. It was built in 1957. It has a rectangular shape with scored concrete elevations and a flat roof with metal coping. The front side of the building is divided asymmetrically into six bays. Although this building has a commonplace design with a simple rectangular plan, it lacks the unique and defining features that are typically seen in Modern industrial buildings. Therefore, it does not seem to meet the necessary criteria for being listed in the National Register of Historic Places or the California Register of Historical Resources (Hilton 2010l).

P-30-177521

The property located at 1851 Reynolds Avenue and built in 1975 is a single-story, rectangular-shaped, asymmetrical commercial manufacturing building with a Modern architectural style. It has a sturdy concrete foundation, stucco exteriors over a concrete exterior, and a flat roofing system. The building is located in a large industrial park with other similar buildings. It has metal entrance doors but no windows. The exterior of the building was constructed using large panels, and vertical detailing is simple. The corner of the building has vertical brick detailing around it. The building is in good condition, and no significant alterations have been noted. Based on the criteria for the National Register of Historic Places, the property does not qualify as a historic resource for the NHPA. It has not been assessed for eligibility under the California Register or the local Irvine Register eligibility (Crawford 2014).

Built Environment Resources Directory (BERD)

The BERD record search results concluded an additional eleven built environment resources are located within 0.25 miles of the Project Area. Three of the eleven built environment resources (2231 Ritchey Street Santa Ana, 1601 Warner Ave Santa Ana, and 2231 Ritchey Street Santa Ana) are within Project Area (**Table 3.4-4** and see **Figure 3.4-2**).

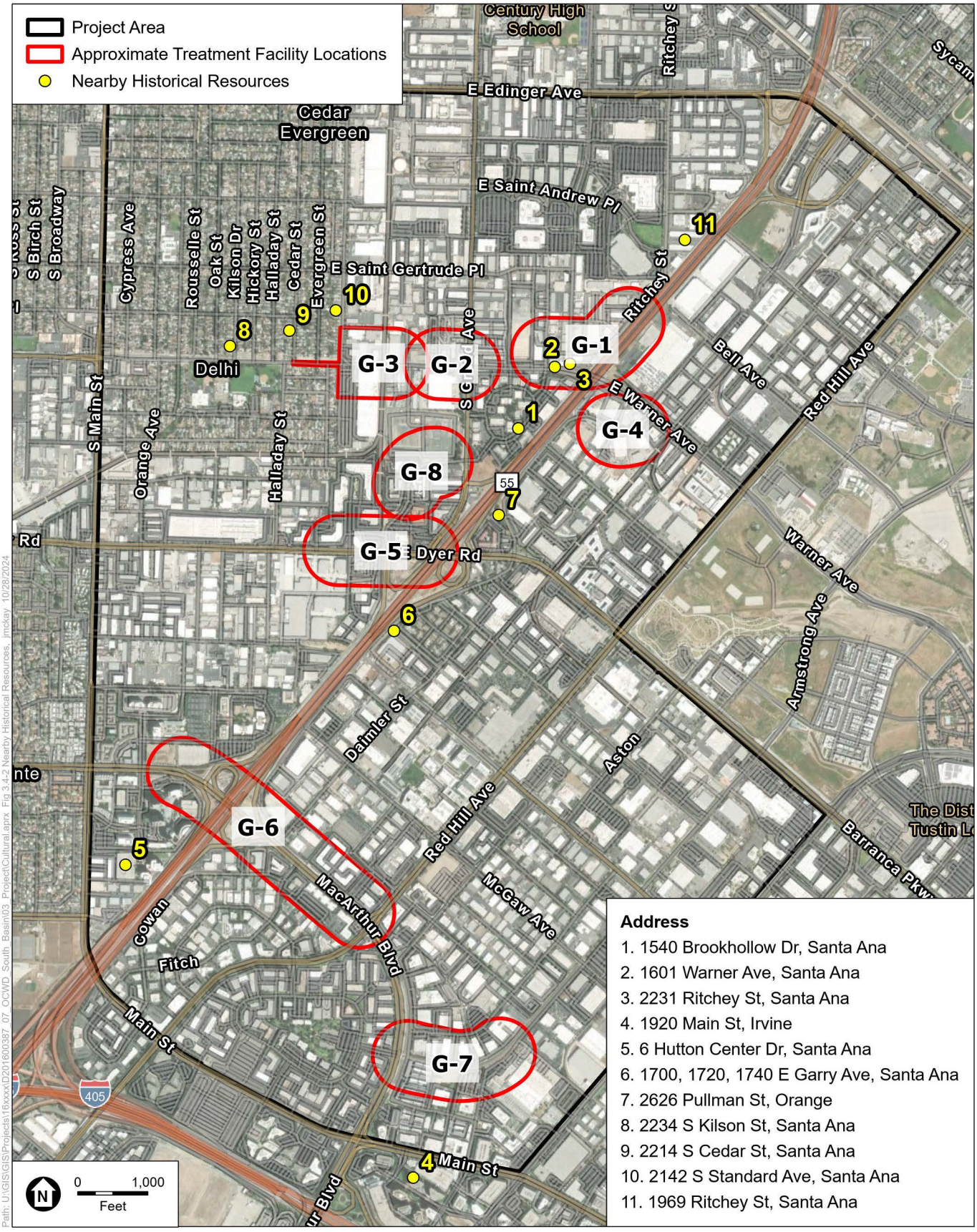
TABLE 3.4-4
NEARBY HISTORICAL RESOURCES RECORDED WITHIN 0.25 MILES OF THE PROJECT AREA

Address/Name	Date of Construction	Status Code^	Within Project Area?	Distance from Project Area	Source	Evaluation Information
*1540 Brookhollow Drive Santa Ana	1972	6Y	Y	--	BERD	2/20/2020, FHWA_2020_0124_001
*1601 Warner Ave Santa Ana	1960	6Y	Y	--	BERD	
*2231 Ritchey Street Santa Ana	1962	6Y	Y	--	BERD	11/12/2015, FHWA_2015_1013_001
1920 Main Street Irvine	1987	6Y	N	0.22 mi	BERD	04/04/2012, FDIC120403A
SoCal Bank 6 Hutton Center Dr Santa Ana	--	6Y	N	0.19 mi	BERD	08/12/2016, FDIC_2016_077_001
1700, 1720, 1740 E Garry Ave Santa Ana	1973	6Y	N	0.15 mi	BERD	2/20/2020, FHWA_2020_0124_001
2626 Pullman St Orange	1966	6Y	N	0.12 mi	BERD	11/12/2015, FHWA_2015_1013_001
R. Pena House 2234 S Kilson	1946	6Y	N	0.17 mi	BERD	11/12/2015, FHWA_2015_1013_001
2214 S Cedar Santa Ana	1952	6Y	N	0.09 mi	BERD	08/09/2012, HUD120726A
2142 S. Standard Ave Santa Ana	1952	6Y	N	0.05 mi	BERD	11/19/2003. DOE-30-03-0016-0000, 11/19/2003, HUD031029E
1969 Ritchey Santa Ana	1966	6Y	N	0.17 mi	BERD	11/12/2015, FHWA_2015_1013_001

SOURCE: BERD 2024

* Indicates study overlapping of the Project Area

Table 3.4-4 summarizes properties within 0.25 miles of the Project Area which were listed in the Built Environment Resource Directory (BERD) maintained by the California Office of Historic Preservation. All properties were assigned the California Historic Resource Status Code of 6Y, meaning they were determined ineligible for listing on the National Register Historic Places through the Section 106 process, but were not evaluated for the California Register or local listing.



SOURCE: Orange County Water District, 2024; ESA, 2024.

South Basin Groundwater Protection Project

Figure 3.4-2
Nearby Historical Resources

Archival Research and Historic Map and Aerial Review

Historic Setting

The eight planned wells span three incorporated municipalities in Orange County including the City of Irvine, the City of Santa Ana, and the City of Tustin. Wells G-2, G-3, G-5, G-6, and G-8 are entirely within the city limits of Santa Ana. Wells G-1 and G-4 are within both the City of Santa Ana and the City of Tustin. G-7 is entirely within the City of Anaheim. The history and development of these three cities are found below, followed by the development of the Project Area and the Surrounding Area.

City of Irvine

The following history and development of the City of Irvine below has been adapted from the "History of the City" by the City of Irvine (City of Irvine, n.d.).

> *In 1769, the Spanish explorer Gaspar de Portola arrived in the San Joaquin Valley. Upon their arrival, the Spanish divided lands for the missions and a few large private land grants. However, in 1831, after the Mexican government gained independence from Spain, it secularized the missions and distributed ranchos to Mexican citizens who applied for grants. Specifically, the Project Area is located in the former Rancho San Joaquin area which was granted to Don Jose Sepulveda in 1837. In 1846, Rancho Lomas de Santiago was granted to Teodosio Yorba. In 1864, James Irvine, Thomas Flint, and Llewellyn Bixby purchased Rancho San Joaquin from Sepulveda. In 1866, Irvine, Flint and Bixby acquired Rancho Lomas de Santiago, and shortly after, in 1868, Rancho Santiago de Santa Ana was purchased and divided among the three owners (Figure 3).*
>
> *The land purchased by Irvine, Flint and Bixby was combined to form Irvine Ranch, and was devoted to sheep grazing primarily in the early days, and tenant farming was allowed in the 1870s. In 1878, Irvine acquired his partners' shares for $150,000 and owned 110,000 acres of land from the Pacific Ocean to the Santa Ana River and labeled on maps as Irvine's Subdivision. Irvine passed away in 1886, and in 1893, his son James Irvine Jr., took possession of the rancho, incorporating the land into The Irvine Company a year later. James Irvine Jr. shifted the rancho's operations from cattle ranching into agricultural activities. James Irvine Jr. sold land to the government during World War II and one of the Marine Corp air facilities constructed during those years is directly west of the Project Area at Barranca Road (later Parkway).*
>
> *When James Irvine Jr. passed away in 1947, his son Myford took over and started opening small sections of the ranch for urban development. Myford passed away in 1959, and it was at this time the University of California purchased land from The Irvine Company to construct a new school campus. Renowned architect William Pereira was responsible for the planning and design of the campus which is located to the southeast of the Project Area. Pereira also worked with Irvine Company architects and planners to design the city around the campus which incorporated residential planned communities with recreational and educational centers, commercial centers, and greenbelts. The Irvine Industrial Complex (now the Irvine Business Complex) developed by the Irvine Company developed around the university. It was not until 1971 that the City of Irvine was incorporated.*

City of Santa Ana

In July 1769, the valley in which Santa Ana is located was discovered during a Franciscan expedition led by Don Gaspar Portola. The explorers christened the valley Rancho Santiago de Santa Ana in honor of Saint Anne (City-Data.com, n.d.). In 1810, a member of the expedition, Antonio Yorba, and his nephew, Juan Peralta, received a grant from the Spanish governor of California for all the land extending from the foothills of Santa Ana Canyon to the ocean (City-Data.com, n.d.). They used the land to graze cattle and later developed irrigation systems fed by water from the Santa Ana River. The land was quite fertile and, with the establishment of several ranches in the valley, the area soon became an agricultural center.

When Mexico broke away from Spain in 1821, the California territory experienced minimal development. When the Mexican American War concluded in 1848, Mexico ceded the land to the United States, and two years later, California became the 31st state in the Union (California Department of Parks and Recreation 2022). Santa Ana appeared as a township of Los Angeles County in the 1860 and 1870 censuses. In 1869, William H. Spurgeon purchased 70 acres from the Yorba heirs and drew up a town plan, and the community was officially laid out later that year (City-Data.com, n.d.). Santa Ana evolved as a commercial center because of its central location in the valley, becoming a natural marketplace for crops produced in the surrounding region that is now Orange County. Agriculture continued to be the major industry throughout Orange County and Santa Ana until the second half of the 20th century.

Rail travel was a major factor in the development and expansion of Santa Ana. The Southern Pacific Railroad connected Santa Ana to Los Angeles in 1877, with the line running down from Norwalk much as Interstate 5 does today (Brigandi 2019). In 1887, the California Central Railway broke the Southern Pacific Railroad's local monopoly on rail travel and began to offer service between Los Angeles and San Diego with Santa Ana as an intermediate station (*Los Angeles Times* 2015). In 1886, Santa Ana was incorporated, and three years later Orange County was separated from Los Angeles County and Santa Ana was named the county seat (Orange County Historical Society, n.d.). 1900, the population of Orange County was almost 20,000, and Santa Ana accounted for approximately one-fourth of that number (US Census Bureau 1900).

During World War II, the United States Armed Forces built a variety of bases and infrastructure in and around Santa Ana, including the Army, the Air Force, the Marine Corps, and the Coast Guard (Brigandi 2019). The most well-known of these bases include the El Toro Marine Corps Air Station, the Seal Beach Naval Weapons Station, and the Los Alamitos Joint Forces Training Base (Orange County Historical Society, n.d.). The relocation of soldiers, pilots, and captains, along with their families and civilian employees, account for much of Orange County's development during the preparations for World War II and throughout the war.

In the city of Santa Ana, the Santa Ana Army Air Base was built as a training center for the United States Army Air Forces. Without planes, hangers, or runways, the facility served as a basic training camp where newly inducted soldiers were given 9 weeks of training to determine what specialties they would pursue. The base was responsible for continued population growth in Santa Ana and Orange County, as many veterans moved to the area to raise families after the war ended. World War II brought further development as industry moved into the area. By 1950, the population of Santa Ana was nearly 46,000 residents, and a city charter, providing for a council-manager form of government, was adopted in 1952 (California Military Museum 2016). Since World War II, Santa Ana has become a financial and

governmental center of Orange County. The site of the former Santa Ana Army Air Base was converted into a campus for Orange Coast College.

While Santa Ana was incorporated early, its population remained fairly small until the post-war boom, when it jumped by nearly 50,000 residents every decade between 1960 and 1980. Freeway construction in Orange County began in the 1950s with the opening of the Santa Ana (I-5) Freeway. The expansion of this freeway allowed Orange County to become a "bedroom community" for Los Angeles. Many families were able to purchase a house in Orange County and easily commute to the blossoming industries of manufacturing and tourism in the greater Los Angeles metropolis. The construction of I-5 progressed from north to south, which, generally, is also how housing and retail construction developed in Orange County (Kao 2008).

As the agricultural industry in Orange County was declining, the population was increasing, so much of the former farmland was redeveloped cheaply and easily as tract housing. From 1953 to 1962, ten cities in Orange County voted to incorporate, including Buena Park, Cost Mesa, Cypress, Fountain Valley, Garden Grove, La Palma, Los Alamitos, San Juan Capistrano, Villa Park, and Westminster, and by 1963 the county's population totaled slightly over a million people. These typical post-war suburbs followed the pattern of "discount stores and quickie-marts, factories and warehouses" (Emmons 1985) The county received another major boost of tourism benefits and associated fiscal benefits when Disneyland opened in neighboring Anaheim in 1955 (Eamons 1985).

Most of the southern third of Orange County was held by a few large developers, including the Irvine Company, which began building multiple master planned communities in the 1960s and 1970s (Orange County Historical Society, n.d.). Part of the development of southern Orange County included a new branch of the University of California that was planned in 1959 and opened in 1965. At the time, the city of Irvine, where the college was located, did not exist (Eamons 1985). Examples of these first planned communities include Irvine, Mission Viejo, and Laguna Niguel, which were developed along the I-5 corridor between Los Angeles and San Diego (Teaford 2006).

Over time, Santa Ana drew large commercial sectors, including manufacturing, industrial, technology, and aerospace. Efforts began in the 1980s to restore and revitalize the city of Santa Ana, especially its downtown. As a result, the city has become known for its historic downtown and MainPlace shopping center, which created thousands of jobs in the heart of the city. Santa Ana residents of the 21st century enjoy cultural and ethnic diversity as well as continuing status as the financial and governmental center of Orange County (City-Data.com).

In 2015, Santa Ana had a population of 335,264, a number that has continued to grow. In 2017, Santa Ana became an immigrant sanctuary city. The ordinance requires the city to implement policies that include "prohibiting the use of city resources for immigration enforcement, protecting sensitive information, preventing biased-based policing, and directing law enforcement officials to exercise discretion to cite and release individuals instead of detaining them at a local facility or county jail based on the nature of the alleged crime" (Kwong 2017). The city has also continued to diversify in recent years, with four-fifths of voters identifying as Latino electing an all-Latino city council in 2016 (Nagourney and Medina 2016).

City of Tustin

The following has been adapted from "Tustin History" by the City of Tustin (n.d.):

> *The first Spanish explorers to cross what is now the City of Tustin were members of the Anza Expedition in 1776, who referred to the area as a Sycamore Grove and commented on the large number of white-barked trees that were in the area. The trees were the result of a dependable water source within natural aquifers. These water sources were known and frequented by the Indigenous peoples of the area, who were known as Gabrielino Indians, as the land and the Native Peoples of the area were under the jurisdiction of the San Gabriel Mission.*
>
> *In 1810, Juan Pablo Grijalva was granted a rancho by the Spanish government for ranching – the only Spanish rancho in what would become Orange County. The land passed between members of the Grijalva family until 1868, when a family dispute over ownership caused the land to be partitioned and sold. Columbus Tustin and Nelson Stafford purchased 1,300 acres of land to start "Tustin City" however, slow sales combined with Southern Pacific Railroad choosing to place their terminus at Santa Ana resulted in a slow growing city that was largely agricultural until the early 1900s. Originally, farmers in the area grew apricots and walnuts, which were replaced by the more profitable Valencia orange by 1900. Tustin, a small town centered around agriculture that was most known for its public school system, incorporated in 1927.*
>
> *World War II brought significant change to all of Orange County, through the development of a network of military bases and the growth of manufacturing to support the growing US military. The establishment of the Santa Ana Army Air Base, the El Toro Marine Corps Air Station, and the Navy's Lighter-Than-Air base brought more residents to Tustin throughout World War II. Following the war, orange groves gave way to tract housing as the population of Tustin and Orange County ballooned. This population growth was accelerated by the construction of the I-405 Freeway, which linked Los Angeles to San Diego and ran directly through Tustin. The geographic footprint of the City of Tustin grew 410% between 1955 and 1965 via multiple annexations of unincorporated land; at the same time, the population grew 1012%. The City annexed more land in the 1970s and 1980 while major shopping centers were developed. Today, Tustin maintains its largely residential character.*

Development of the Surrounding Area and Project Area

The subject property is located at the intersection of three Spanish land grants—the Rancho San Joaquin, granted to Don Jose Sepulveda in 1837, the Rancho Lomas de Santiago, granted to Teodosio Yorba in 1846, and Rancho Santiago de Santa Ana, granted to Jose Antionio Yorba in 1810. From 1864 to 1868, James Irvine, Thomas Flint, and Llewellyn Bixby purchased these three ranchos and divided the land amongst the three owners (Figure 3).

After Irvine acquired his partners' shares of the land grants in 1878, as described above, Irvine Ranch was formed, which included the Project Area. 1888, Irvine began extensive efforts to drain "much of the land in order to make it suitable for cattle grazing. In 1889, the Newport Wharf and Lumber Company

constructed an 11.71-mile railway from the company's wharf in Newport Beach to Santa Ana to access the national rail work. Southern Pacific acquired this line in 1892 under the name of the Santa Ana and Newport Railway (AbandonedRails.com, n.d.). An 1899 USGS Historical Topographic Map shows that the area surrounding the Project Area is sparsely developed. The Santa Ana and Newport Railway runs through the Project Area, following the current alignment of CA-55. The Atchison Topeka Rail Line runs north of the Project Area (Figure 4).

USGS topographical maps from 1899, 1901, 1907, 1915, 1925, and 1932 show that there was no significant development in the vicinity of the Project Area through the first few decades of the 1900s other than increasing street density to the north and northwest of the Project Area. This north and northwestern development was a community known as Delhi, one of the only places where Mexicans were permitted to purchase land in this region of Orange County during the early 20th century. The expanding neighborhood was incorporated into the City of Santa Ana in 1929 (Delhi Center, n.d.).

By 1935, the USGS Historical Topographical Map shows that the Twenty Ranch Gun Club—a collection of small buildings along a private roadway—had been developed to the southwest of the Project Area. The Southern Pacific Railway had abandoned the rail line which ran through Newport to Santa Ana in 1933 (AbandonedRails.com, n.d.). The previous railway alignment has been replaced by a roadway in the 1935 Topographic Map (Figure 5).

The same map shows the initial appearance of Eddie Martin Airport, to the southwest of the Project Area at the intersection of Main Street and Newport Road. This would eventually become the Orange County Airport and is listed as a site of historical interest in the Irvine General Plan. A few other structures were visible on the 1935 Topographical map which were located along private roadways. These were likely part of the Irvine Ranch agricultural operations.

In 1943, the Santa Ana Naval lighter-than-air base to the west of the Project Area was constructed on land purchased from the Irvine Ranch by the U.S. Navy. It was developed with two hangars to store blimps or "airships" and was one of ten such sites in the United States (National Park Service, n.d.). This is first seen in an aerial photograph from 1946, which also shows the replacement of the former Newport RR alignment with a road (present-day CA-55) (Figure 6).

When James Irvine Jr. passed away in 1947, his son Myford took over the company. Productive agricultural fields had been sold to the military and agricultural operations were passed to another staff member; Myford started dividing small sections of the ranch for urban development (Irvine Historical Society, n.d.). The Project Area was still private property and owned by the Irvine Company. By 1952, aerial photographs show an increasing density of development to the west of the Project Area in Santa Ana and an initial subdivision of sections to the north of the Project Area in the City of Tustin. In 1951, the decommissioned Naval Station Santa Ana was reactivated by the Marines and utilized for helicopter operations. It was known as a Marine Corps Air Facility until the 1970s, when the base was renamed Marine Corps Air Station Tustin (Freeman, n.d.).

Agricultural and grazing land of Irvine Ranch continued to be developed for residential and commercial uses into the 1960s. As mentioned in the history of Irvine above, a master design plan was developed with Irvine Company professionals and William Pereira, which included land sold from the Irvine Ranch for a

future University of California campus, approximately 4 miles to the south of the Project Area. An aerial photograph from 1963 shows that the land to the north and west of the Project Area is densely developed. The "lighter-than-air" base has also increased in size. However, the land southeast of the Project Area, between the base, is largely undeveloped until the early 1970s. An aerial photograph from 1972 shows the initial development of the Irvine Business Complex (IBC) to the southeast and east of the Project Area (Figure 7).

Aerial photographs from 1980 and 1985 show continued development of the IBC to the southwest of the Project Area and continued residential infill to the northwest of the Project Area. Aerial photographs from 1992, 1993, 1994, 1995, 1996, 1997, 1998, 1999, 2000, 2002, and 2003 show the area surrounding the Project Area maintains a residential character to the northwest of CA-55 and an industrial character to the SW.

Marine Corps Air Station Tustin was decommissioned in 1991 and ceased operations in 1999 (Freeman, n.d.). As a part of the decommissioning, most structures on the base were demolished. Since 2002, 1,606 acres of the former MCAS Tustin has been redeveloped by the City of Tustin as a planned neighborhood known as Tustin Legacy (PlaceWorks 2017). The Blimp Hangars, listed as a Historic Civil Engineer Landmark by the American Society of Civil Engineers, were to be the only remaining structures. The North Hangar suffered significant damage in a 2023 fire and was subsequently demolished. Aerial photographs from 2005, 2009, 2010, 2012, 2014, 2016, 2018, 2020, and current satellite imaging show the area surrounding the Project Area maintains a residential character to the northwest of CA-55 and an industrial character to the SW with gradual development of the former MCAS Tustin site in the 2010s.

Geological Map Review

The geology of the Project Area is presented on the Morton and Miller (2006) map. The vast majority of the Project Area lies within Young Alluvial Fan deposits (Qyf), while Young Alluvial Valley deposits (Qya) can be found at the Project Area at its center as well as its western and eastern limits. Both the Qyf and Qya geologic map units correlate to the Holocene to the late Pleistocene (i.e., 15,000 years ago).

Sacred Lands File Search

The 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 February 20, 2024, to request a search of the SLF. The NAHC responded to the request in a letter dated March 4, 2024, indicating that the results were negative and provided a list of Native American Tribes who could be contacted for additional information regarding cultural resources within the Project Area (Appendix D1).

Survey Results

ESA archaeologists survey focused on the proposed well sites (Alignments G-1 through G-8) locations. Given the area's urban development, ground visibility was obstructed in 75 percent of the Project Area. The eight extraction alignments are located in heavily disturbed commercial and residential areas. During the windshield survey, the built environment resources within the extraction alignments G-1 through G-8 were relocated in good standing condition. The relocated built environment resources, three within wellsite Alignment G-1 (2231 Ritchey Street Santa Ana, 1601 Warner Ave Santa Ana, and 1540 Brookhollow Drive) and one within wellsite Alignment G-5 (P-30-177126), were all observed in prime

condition. These well sites are located within highly urbanized industrial and commercial complexes with zero ground visibility due to paved roads with manicured landscapes and built environments.

Additionally, an intensive pedestrian survey was conducted in the open areas of the southeast region of Alignment G-5. The ground surface of this area was composed of light brown silty sand mixed with angular gravel and modern debris, covered in some areas with piles of gravel and construction material. During the survey, a homeless encampment was also encountered in this area. No unknown cultural resources were encountered during the pedestrian and windshield survey.

Impact Analysis

Historic Resources

Impact 3.4-1: The proposed Project could cause a substantial adverse change in the significance of a historical resource pursuant to Section 15064.5.

Under CEQA, "historic resources" include both historical-period built environment resources and archaeological resources that are listed in or eligible for listing in the CRHR or a local register, or that have been determined eligible by the lead agency, and analysis of both historical-period built environment resources and archaeological resources is included under Impact 3.4-1.

Extraction Facilities and Monitoring Wells

The Project would include the installation and operation of below ground groundwater extraction facilities, monitoring wells and trenches and or drains. The exact locations of the extraction wells have not been identified, although they would approximately be within Alignments G-1 through G-8 areas with their depths not anticipated to exceed 130 feet below ground surface (bgs). The proposed Project includes excavation trenches up to 12 feet in depth.

Archaeological Resources

Geologic Map review situates the Project Area and its broader vicinity within Young Alluvial Fan (Qyf) and Young Alluvial Valley deposits (Qya), both of which are geologic map units which correlate to the Holocene to the late Pleistocene (i.e., 15,000 years ago) (Morton and Miller 2006). Middle to late Holocene sediments are considered more sensitive for buried, intact cultural resources. The fourteen previously recorded archaeological resources identified from the 0.5-mile radius SCCIC records search are all located outside Project Area and within the boundary of the former Marine Corps Air Station Tustin and have not been evaluated for their eligibility for inclusion in the NRHP and CRHR. Previously recorded prehistoric sites P-30-000381, P-30-001538, and P-30-001725, as well as the eight prehistoric isolates (P-30-100191, 100194, 100195, 100196, 100197, 100198, 100199, 100200), evidence past use of the Project Area vicinity by descendants of the local Native American community. Additionally, several Gabrielino/Tongva villages are known to have been in the vicinity of the Project Area, with one in particular, *Pasbengna*, being in proximity to City of Sana Ana. The nearest source of water was San Diego Creek which originates east of the Project Area in the nearby Santa Ana Mountains and extends around its eastern boundary, before trending southwest and emptying into the constructed San Joaquin Marsh and Upper Newport Bay.

Archival research reveals the proposed Project vicinity as being utilized exclusively for agricultural purposes by ranchos such as Rancho San Joaquin, Rancho Lomas de Santiago, and Rancho Santiago de Santa Ana in the 19th century. James Irvine ultimately became the primary landowner of the proposed Project vicinity after first acquiring these Ranchos along with three business partners between 1864 and 1868, and then after buying out their interests in the landholdings in 1878. After Irvine acquired his partners' shares of the land grants in 1878, the Irvine Ranch corporation was formed, which included the Project Area. In 1888, James Irvine began extensive efforts to drain much of the land to make it suitable for cattle grazing. Following the death of Irvine in 1947, the agricultural use of the proposed Project Area reached its zenith, when Myford Irvine, the son of James Irvine, began selling off parcels of land to municipalities, developers, and the US military, thereby ushering in an era of urban, commercial, industrial, and military development for the region (Irvine Historical Society, n.d.). Agricultural activity such as plowing combined with commercial development-related mechanical trenching and grading has resulted in the proposed Project Area being heavily disturbed which, in turn, diminishes the sensitivity of the Project Area for intact buried archaeological resources.

Both the historic period site and two historic period isolates identified by the SCCIC records search were also located outside the Project Area and within the boundary of the former Marine Corps Air Station Tustin (P-30-001726, P-30-100192, and P-30-100193). Resource P-30-001726, however, is an archaeological site containing material culture representative of early- to-mid-20th-century domestic activities performed near the Project Area prior to the area's transformation into a fully developed commercial and industrial zone.

Although the likelihood of encountering intact buried archaeological deposits within Alignments G-1 through G-8 areas during ground disturbance related to extraction facilities and monitoring wells for the proposed Project is moderate, there remains the possibility that unknown intact buried archaeological deposits that qualify as historical resources could be encountered within these areas. If such resources were encountered, the proposed Project would have a potentially significant impact on those resources; however, implementation of **Mitigation Measure CUL-1**, which would avoid and/or substantially lessen the above impact by ensuring that any unanticipated archaeological resources that qualify as unique archaeological resources pursuant to CEQA are appropriately identified, documented, evaluated, and treated promptly, so they are not inadvertently damaged or destroyed. Impacts would be less than significant with mitigation.

Historic Architectural Resources

A total of four historical-period built environment resources were identified in the SCCIC records search and BERD search as being present within Alignments G-1 through G-8 of the Project Area (P-30-177126 [G-5], 1540 Brookhollow Drive [G-1], 1601 Warner Ave [G-1], and 2231 Ritchey Street [G-1]). Review of the 1896, 1899, 1901, 1907, 1915, 1925, 1932, and 1945 USGS historic topographic maps identified an alignment of the historic Santa Ana and Newport Railway as intersecting the Project Area within portions of Alignments G-3, G-5, G-6, and G-8.

An additional 15 historic built environment resources are located within the vicinity of the Alignments G-1 through G-8 within the Project area. (P-30-177044, P-30-177120, P-30-177121, P-30-177122, P-30-177123, P-30-177124, P-30-177125, P-30-177127, P-30-177128, P-30-177129, P-30-177130, P-30-177131, P-30-177132, P-30-177133, and P-30-177521). P-30-177521 is located approximately 650 feet north of the eastern boundary of the Alignment G-7 while the remaining 13 previously recorded historic built

environment resources are collectively situated up to 0.5 miles from the southwestern corner of the Alignment G-5 and P-30-177126. Review of the 1896, 1899, 1901, 1907, 1915, 1925, 1932, and 1945 USGS historic topographic maps identified an alignment of the historic Santa Ana and Newport Railway as intersecting the Project Area within portions of the Alignments G-3, G-5, G-6, and G-8.

Built environment resources P-30-177122, P-30-177123, P-30-177124, P-30-177125, P-30-177126, P-30-177127, P-30-177128, P-30-177129, P-30-177130, P-30-177131, P-30-177132, P-30-177133, and P-30-177521 were recommended not eligible for listing in both the NRHP and CRHR. The remaining five previously recorded historic built environment resources (P-30-177044, P-30-177120, P-30-177121, 1540 Brookhollow Drive, 1601 Warner Avenue, and 2231 Ritchey Street) were also recommended not eligible for listing in the NRHP; however, they were not evaluated for their eligibility for inclusion in the CRHR and may qualify as a historic resource under CEQA. None of the 19 resources has been previously evaluated for their eligibility at a local level, i.e., for their inclusion on the Santa Ana Register of Historic Places or as an Irvine Historic Resource.

Each historic built environment resource was surveyed during survey fieldwork conducted on April 16, 2024. Owing to the highly urbanized and industrial setting of the Alignments G-1 through G-8, most of the footprint of these areas were only subjected to windshield survey for this analysis; and only an accessible portion of the Alignment G-5 located at the southeastern intersection of SR 55 and McArthur Boulevard exhibiting surface visibility was examined by means of pedestrian survey.

A full evaluation of all resources for their eligibility for inclusion on the California Register and for local eligibility is beyond the scope of this study; however, ESA reviewed the DPR forms for all resources obtained from the SCCIC search and performed a desktop survey of the three properties listed in the OHP's BERD within the Project Area. ESA assessed all 19 identified resources for their potential eligibility on a local register based on the historic integrity of the property: 18 in Santa Ana and one in Tustin. For the six properties that have not been evaluated for inclusion on the CR, ESA evaluated the likelihood of potential CR eligibility based on the historic integrity of the property (**Table 3.4-5**).

Based on the above analysis, ESA finds that there is potential for the proposed Project to impact historical resources. While full evaluations were not within the scope of this proposed Project, ESA finds that three resources (P-30-177044, -177120, -177131) appear likely to be recommended eligible for the CR and/or for listing at a local level on the Santa Ana Register of Historic Places. Should the proposed Project be implemented within or near these properties, visual and/or vibrational impacts are possible or likely. The implementation of **Mitigation Measures CUL-5 and CUL-6** will reduce potential impacts to potential historical resources to less than significant levels under CEQA.

The extraction facilities and monitoring well components of the proposed Project has the potential to impact the five previously recorded built environment resources that may qualify as a historic resource under CEQA (1540 Brookhollow Drive [G-1], 1601 Warner Ave [G-1], 2231 Ritchey Street [G-1], and P-30-177120 [SW of G-5], and P-30-177121 [SW of G-5]). As such, the proposed Project has the potential to significantly impact possible historical resources within or in proximity to the anticipated locations of the extraction facilities and monitoring well components within the Project Area. If ground disturbance were proximal to these resources, the proposed Project would have a potentially significant impact on those

resources, which would be mitigated to a less than significant level through implementation of Mitigation Measures CUL-5 and CUL-6.

TABLE 3.4-5
LIKELIHOOD OF CR AND LOCAL-LEVEL ELIGIBILITY

P-Number (P-30-)	Address and City	Likelihood of CR Eligibility	Likelihood of Local -Level Eligibility	Redesign, or Setback to Avoid Impact?
177044	1947 S. Main Street Santa Ana	Moderate	High	Yes
177120	110 E. Alton Avenue Santa Ana	Low	High	Yes
177121	3201 S. Main Street Santa Ana	Low	Low	No
177122	3102 S. Halladay Street Santa Ana	Not Eligible	Low	No
177123	3106 S. Halladay Street Santa Ana	Not Eligible	Low	No
177124	3122 S. Halladay Street Santa Ana	Not Eligible	Low	No
177125	3111–3113 S. Halladay Street Santa Ana	Not Eligible	Low	No
177126	666 Dyer Road Santa Ana	Not Eligible	Low	No
177127	3023 & 3025 S. Kilson Drive 603–605 E. Alton Avenue Santa Ana	Not Eligible	Low	No
177128	502–528 E. Alton Avenue Santa Ana	Not Eligible	Low	No
177129	424 E. Alton Avenue Santa Ana	Not Eligible	Low	No
177130	3121 S. Oak Street & 3126 S. Kilson Drive Santa Ana	Not Eligible	Low	No
177131	3221 S. Main Street Santa Ana	Not Eligible	Moderate	Yes
177132	414 E. Alton Avenue Santa Ana	Not Eligible	Low	No
177133	411 E. Alton Avenue Santa Ana	Not Eligible	Low	No
177521	1851 Reynolds Avenue Irvine	Not Eligible	Low	No
—	1540 Brookhollow Drive Santa Ana	Low	Low	No
—	1601 Warner Avenue Santa Ana	Low	Low	No
—	2231 Ritchey Drive Santa Ana	Low	Low	No

Local Groundwater Treatment Plants

The proposed Project would include local groundwater treatment plants; however, their exact locations have not been identified. One groundwater treatment plant would be in proximity to each of the extraction facility alignments within G-1 through G-5, G-7, and G-8 of the Project Area. G-6, however, would have two treatment plants: one at each end of the alignment on either side of SR 55.

Archaeological Resources

Geologic Map review situates the Project Area and its broader vicinity within Young Alluvial Fan (Qyf) and Young Alluvial Valley deposits (Qya), both of which are geologic map units which correlate to the Holocene to the late Pleistocene (i.e., 15,000 years ago) (Morton and Miller 2006). Middle to late Holocene sediments are considered more sensitive for buried, intact cultural resources. The fourteen previously recorded archaeological resources identified from the 0.5-mile radius SCCIC records search are all located outside Project Area within the boundary of the former Marine Corps Air Station Tustin and have not been evaluated for their eligibility for inclusion in the NRHP and CRHR. Previously recorded prehistoric sites P-30-000381, P-30-001538, and P-30-001725, as well as the eight prehistoric isolates (P-30-100191, 100194, 100195, 100196, 100197, 100198, 100199, 100200), evidence past use of the Project Area vicinity by descendants of the local Native American community. Additionally, several Gabrielino/Tongva villages are known to have been in the vicinity of the Project Area, with one in particular, *Pasbengna*, being in proximity to City of Sana Ana. The nearest source of water was San Diego Creek which originates east of the Project Area in the nearby Santa Ana Mountains and extends around its eastern boundary, before trending southwest and emptying into the constructed San Joaquin Marsh and Upper Newport Bay.

Archival research reveals the proposed Project vicinity as being utilized exclusively for agricultural purposes by ranchos such as Rancho San Joaquin, Rancho Lomas de Santiago, and Rancho Santiago de Santa Ana in the 19th century. James Irvine ultimately became the primary landowner of the proposed Project vicinity after first acquiring these Ranchos along with three business partners between 1864 and 1868, and then after buying out their interests in the landholdings in 1878. After Irvine acquired his partners' shares of the land grants in 1878, the Irvine Ranch corporation was formed, which included the Project Area. In 1888, James Irvine began extensive efforts to drain much of the land to make it suitable for cattle grazing. Following the death of Irvine in 1947, the agricultural use of the Project Area reached its zenith, when Myford Irvine, the son of James Irvine, began selling off parcels of land to municipalities, developers, and the US military, thereby ushering in an era of urban, commercial, industrial, and military development for the region (Irvine Historical Society, n.d.). Agricultural activity such as plowing combined with commercial development-related mechanical trenching and grading has resulted in the Project Area being heavily disturbed which, in turn, diminishes the sensitivity of the Project Area for intact buried archaeological resources.

Both the historic period site and two historic period isolates identified by the SCCIC records search were also located outside the Project Area and within the boundary of the former Marine Corps Air Station Tustin (P-30-001726, P-30-100192, and P-30-100193). Resource P-30-001726, however, is an archaeological site containing material culture representative of early-to-mid 20th century domestic activities performed near the Project Area prior to the area's transformation into a fully developed commercial and industrial zone.

Although the likelihood of encountering intact buried archaeological deposits within and immediately surrounding the G-1 through G-8 buffers during ground disturbance related to groundwater treatment plants for the proposed Project is moderate, there remains the possibility that unknown intact buried archaeological deposits that qualify as historical resources could be encountered within these areas. If such resources were encountered, the proposed Project would have a potentially significant impact on those resources, which would be mitigated to a less than significant level through implementation of Mitigation Measure CUL-1.

Historic Architectural Resources

A total of four historical-period built environment resources were identified in the SCCIC records search and BERD search as being present within Alignments G-1 through G-8 of the proposed Project (P-30-177126 [G-5], 1540 Brookhollow Drive [G-1], 1601 Warner Ave [G-1], and 2231 Ritchey Street [G-1]). An additional 14 historic built environment resources are located within the vicinity of the G-1 through G-8 buffered areas within the Project Area. (P-30-177120, P-30-177121, P-30-177122, P-30-177123, P-30-177124, P-30-177125, P-30-177127, P-30-177128, P-30-177129, P-30-177130, P-30-177131, P-30-177132, P-30-177133, and P-30-177521). P-30-177521 is located approximately 650 feet north of the eastern boundary of Alignment G-7 while the remaining 13 previously recorded historic built environment resources are collectively situated up to 0.5 miles from the southwestern corner of Alignment G-5 and P-30-177126. Review of the 1896, 1899, 1901, 1907, 1915, 1925, 1932, and 1945 USGS historic topographic maps identified an alignment of the historic Santa Ana and Newport Railway as intersecting the Project Area within portions of Alignments G-3, G-5, G-6, and G-8.

Built environment resources P-30-177122, P-30-177123, P-30-177124, P-30-177125, P-30-177126, P-30-177127, P-30-177128, P-30-177129, P-30-177130, P-30-177131, P-30-177132, P-30-177133, and P-30-177521 were recommended not eligible for listing in both the NRHP and CRHR. The remaining five previously recorded historic built environment resources (P-30-177044, P-30-177120, P-30-177121, 1540 Brookhollow Drive, 1601 Warner Avenue, and 2231 Ritchey Street) were also recommended not eligible for listing in the NRHP; however, they were not evaluated for their eligibility for inclusion in the CRHR and may qualify as a historic resource under CEQA. None of the 19 resources has been previously evaluated for their eligibility at a local level, i.e., for their inclusion on the Santa Ana Register of Historic Places or as an Irvine Historic Resource.

Each historic built environment resource was surveyed during survey fieldwork conducted on April 16, 2024. Owing to the highly urbanized and industrial setting of the Alignments G-1 through G-8, most of the footprint of these areas were only subjected to windshield survey for this analysis; and only an accessible portion of the Alignment G-5 located at the southeastern intersection of SR 55 and McArthur Boulevard exhibiting surface visibility was examined by means of pedestrian survey.

A full evaluation of all resources for their eligibility for inclusion on the California Register and for local eligibility is beyond the scope of this study; however, ESA reviewed the DPR forms for all resources obtained from the SCCIC search and performed a desktop survey of the three properties listed in the OHP's BERD within the Project Area. ESA assessed all 19 identified resources for their potential eligibility on a local register based on the historic integrity of the property: 18 in Santa Ana and one in Tustin. For the six properties that have not been evaluated for inclusion on the CR, ESA evaluated the likelihood of potential CR eligibility based on the historic integrity of the property, as shown in previously reference Table 3.4-5.

Based on the above analysis, ESA finds that there is potential for the proposed Project to impact historical resources. While full evaluations were not within the scope of this project, ESA finds that three resources (P-30-177044, -177120, -177131) appear likely to be recommended eligible for the CR and/or for listing at a local level on the Santa Ana Register of Historic Places. Should the proposed Project be implemented within or near these properties, visual and/or vibrational impacts are possible or likely. Implementation of Mitigation Measures CUL-5 and CUL-6 would reduce potential impacts to potential historical resources to less than significant levels under CEQA.

The groundwater treatment plant component of the proposed Project has the potential to impact the five previously recorded built environment resources that may qualify as a historic resource under CEQA (1540 Brookhollow Drive [G-1], 1601 Warner Ave [G-1], 2231 Ritchey Street [G-1], and P-30-177120 [SW of G-5], and P-30-177121 [SW of G-5]). As such, the proposed Project has the potential to significantly impact possible historical resources within or in proximity to the anticipated locations of the groundwater treatment plants within the Project Area. If such resources were encountered, the proposed Project would have a potentially significant impact on those resources, which would be mitigated to a less than significant level through implementation of Mitigation Measures CUL-5 and CUL-6.

Conveyance Pipelines

The locations of the conveyance pipelines for the proposed Project have not been determined. However, it is anticipated that the main pipelines would be installed primarily within existing roadway rights-of-way to the extent feasible. Moreover, pipeline laterals connecting the extraction facilities and treatment units to the main pipelines are anticipated to be installed within locations contingent on the placement of extraction facilities and treatment units.

Archaeological Resources

Geologic Map review situates the Project Area and its broader vicinity within Young Alluvial Fan (Qyf) and Young Alluvial Valley deposits (Qya), both of which are geologic map units that correlate to the Holocene to the late Pleistocene (i.e., 15,000 years ago) (Morton and Miller 2006). Middle to late Holocene sediments are considered more sensitive for buried, intact cultural resources. The fourteen previously recorded archaeological resources identified from the 0.5-mile radius SCCIC records search are all located outside Project Area within the boundary of the former Marine Corps Air Station Tustin and have not been evaluated for their eligibility for inclusion in the NRHP and CRHR. Previously recorded prehistoric sites P-30-000381, P-30-001538, and P-30-001725, as well as the eight prehistoric isolates (P-30-100191, 100194, 100195, 100196, 100197, 100198, 100199, 100200), evidence past use of the Project Area vicinity by descendants of the local Native American community. Additionally, several Gabrielino/Tongva villages are known to have been in the vicinity of the Project Area, with one in particular, *Pasbengna*, being in proximity to City of Sana Ana. The nearest source of water was San Diego Creek which originates east of the Project Area in the nearby Santa Ana Mountains and extends around its eastern boundary, before trending southwest and emptying into the constructed San Joaquin Marsh and Upper Newport Bay.

Archival research reveals the proposed Project vicinity as being utilized exclusively for agricultural purposes by ranchos such as Rancho San Joaquin, Rancho Lomas de Santiago, and Rancho Santiago de Santa Ana in the 19th century. James Irvine ultimately became the primary landowner of the Project Area after first acquiring these Ranchos along with three business partners between 1864 and 1868, and then

after buying out their interests in the landholdings in 1878. After Irvine acquired his partners' shares of the land grants in 1878, the Irvine Ranch corporation was formed, which included the Project Area. In 1888, James Irvine began extensive efforts to drain much of the land to make it suitable for cattle grazing. Following the death of Irvine in 1947, the agricultural use of the Project Area reached its zenith, when Myford Irvine, the son of James Irvine, began selling off parcels of land to municipalities, developers, and the US military, thereby ushering in an era of urban, commercial, industrial, and military development for the region (Irvine Historical Society, n.d.). Agricultural activity such as plowing combined with commercial development-related mechanical trenching and grading has resulted in the Project Area being heavily disturbed which, in turn, diminishes the sensitivity of the Project Area for intact buried archaeological resources.

Both the historic period site and two historic period isolates identified by the SCCIC records search were also located outside the Project Area and within the boundary of the former Marine Corps Air Station Tustin (P-30-001726, P-30-100192, and P-30-100193). Resource P-30-001726, however, is an archaeological site containing material culture representative of early-to-mid 20th century domestic activities performed near the Project Area prior to the area's transformation into a military base.

Although the likelihood of encountering archaeological deposits within Alignments G-1 through G-8, including existing roadway rights-of-way, during ground disturbance related to conveyance pipelines for the proposed Project is moderate, there remains the possibility that unknown buried archaeological deposits that qualify as historical resources could be encountered within these areas. If such resources were encountered, the proposed Project would have a potentially significant impact on those resources, which would be mitigated to a less than significant level through implementation of Mitigation Measure CUL-1.

Historic Architectural Resources

A total of four historical-period built environment resources were identified in the SCCIC records search and BERD search as being present within Alignments G-1 through G-8 of the proposed Project (P-30-177126 [G-5], 1540 Brookhollow Drive [G-1], 1601 Warner Avenue [G-1], and 2231 Ritchey Street[G-1]). An additional 14 historic built environment resources are located within the vicinity of Alignments G-1 through G-8 within the Project Area (P-30-177521, P-30-177120, P-30-177121, P-30-177122, P-30-177123, P-30-177124, P-30-177125, P-30-177127, P-30-177128, P-30-177129, P-30-177130, P-30-177131, P-30-177132, and P-30-177133). P-30-177521 is located approximately 650 feet north of the eastern boundary of Alignment G-7 while the remaining 13 previously recorded historic built environment resources are collectively situated up to 0.5 miles from the southwestern corner of Alignment G-5 and resource P-30-177126. Review of the 1896, 1899, 1901, 1907, 1915, 1925, 1932, and 1945 USGS historic topographic maps identified an alignment of the historic Santa Ana and Newport Railway as intersecting the Project Area within portions of Alignments G-3, G-5, G-6, and G-8. Notably, none of the previously recorded historic resources is located within existing roadway right-of-way, while comparison of USGS historic topographic maps with historic maps and aerial imagery reveal the historic Santa Ana and Newport Railway alignment was situated where current paved roads are located within Alignments G-5 and G-6.

Built environment resources P-30-177122, P-30-177123, P-30-177124, P-30-177125, P-30-177126, P-30-177127, P-30-177128, P-30-177129, P-30-177130, P-30-177131, P-30-177132, P-30-177133, and P-30-177521 were recommended not eligible for listing in both the NRHP and CRHR. The remaining five previously recorded historic built environment resources (P-30-177044, P-30-177120, P-30-177121, 1540

Brookhollow Drive, 1601 Warner Avenue, and 2231 Ritchey Street) were also recommended not eligible for listing in the NRHP; however, they were not evaluated for their eligibility for inclusion in the CRHR and may qualify as a historic resource under CEQA. None of the 19 resources has been previously evaluated for their eligibility at a local level, i.e., for their inclusion on the Santa Ana Register of Historic Places or as an Irvine Historic Resource.

Each historic built environment resource was surveyed during survey fieldwork conducted on April 16, 2024. Owing to the highly urbanized and industrial setting of the Alignments G-1 through G-8, most of the footprint of these areas were only subjected to windshield survey for this analysis; and only an accessible portion of the Alignment G-5 located at the southeastern intersection of SR 55 and McArthur Boulevard exhibiting surface visibility was examined by means of pedestrian survey.

A full evaluation of all resources for their eligibility for inclusion on the California Register and for local eligibility is beyond the scope of this study; however, ESA reviewed the DPR forms for all resources obtained from the SCCIC search and performed a desktop survey of the three properties listed in the OHP's BERD within the Project Area. ESA assessed all 19 identified resources for their potential eligibility on a local register based on the historic integrity of the property: 18 in Santa Ana and one in Tustin. For the six properties that have not been evaluated for inclusion on the CR, ESA evaluated the likelihood of potential CR eligibility based on the historic integrity of the property, as shown in previously reference Table 3.4-5.

Based on the above analysis, ESA finds that there is potential for the Project to impact historical resources. While full evaluations were not within the scope of this proposed Project, ESA finds that three resources (P-30-177044, -177120, -177131) appear likely to be recommended eligible for the CR and/or for listing at a local level on the Santa Ana Register of Historic Places. Should the Project be implemented within or near these properties, visual and/or vibrational impacts are possible or likely. Mitigation Measures CUL-5 to CUL-6 (as seen below) are recommended to reduce potential impacts to potential historical resources to less than significant levels under CEQA.

The conveyance pipeline components of the proposed Project is assumed to be located within roadway right-of-way within the Project Area and therefore is unlikely to impact historic built environment resources within the Project Area. If ground disturbance related to the placement of conveyance pipelines were proximal to these resources, the proposed Project would have a potentially significant impact on those resources, which would be mitigated to a less than significant level through implementation of Mitigation Measures CUL-5 and CUL-6.

Indirect Impacts

Indirect impacts were analyzed to determine if the proposed Project would result in a substantial material change to the integrity of historical resources located within the 0.25-mile study area of the Project Area that would detract from their ability to convey their significance. A 0.25-mile radius is a standard distance for considering nearby historic resources in a dense, urban environment such as the Project Area, and is also used in the impacts analysis that follows to assess potential indirect impacts from the Project on these resources.

A review of the BERD indicated that there are eight previously recorded historic resources within 0.25 miles of the Proposed Project vicinity: 2142 S. Standard Ave., Santa Ana; 2214 S. Cedar, Santa Ana; 2626 Pullman Street, Orange; 1700, 1720, 1740 E. Garry Ave, Santa Ana, 2234 S. Kilson, Santa Ana; 1969 Ritchey, Santa Ana; 6 Hutton Center Dr, Santa Ana; 1920 Main Street, Irvine. All eight resources were assigned the status code of 6Y, which means the resources were found ineligible for the NR but were not evaluated for the CR or for local designation. Out of an abundance of caution, these eight properties will be treated as historical resources for the purposes of the indirect impact analysis.

Even though it is presently impossible to know the final locations of all facilities components of the proposed Project, the level of construction required for this proposed Project has a low chance of resulting in substantial adverse indirect impacts on historical resources. The built environment resources surrounding the proposed well locations are located within a dense urban area. The resources are separated from the public right-of way within the proposed well sites by various parking lots, buildings, and roads, including SR 55.

The dense mixed-use neighborhood surrounding the vicinity of the proposed well sites is a result of the transition from unimproved agricultural fields to a dense urbanized commercial zone. Any proposed Project components that are located within the public right of way (i.e., within the roadway) would be separated from any built environment resources by a variety of dense urban improvements, including other buildings, parking lots, and roads, including SR 55. Therefore, these components, and any located underground would not change the setting of any of the historic resources. Components of the proposed Project which are underground or within the public right-of-way would not introduce a substantial new scale or massing to the existing built environment and would not detract from the visibility or prominence of any historic resources within the built environment and therefore would not impact the integrity of setting, feeling, or association of any historic resources.

There would be no impact of the views either to or from any historic resources from any proposed Project components located underground or within the public right of way, and therefore the proposed Project would not result in any substantial material changes to the integrity of any historic resources or the immediate surroundings, therefore any historic resources would continue to be able to convey their significance. Proposed components located within the public right of way will be located far enough away from any historic resources that impacts related to construction vibration would be less than significant.

Any aboveground components have the potential to introduce views either to or from the historic resource which could change the setting of any historic resource. Aboveground components may also introduce a new scale or massing which may detract from the visibility or prominence of any historic resources within the built environment and may potentially impact the integrity of setting, feeling, or association of any historic resource. Ground disturbing activities and components have the potential to materially impair historical resources via construction vibration. Because the proposed Project is still awaiting the Remedy Design Phase, **Mitigation Measure CUL-5** is required to reduce potential impacts to previously unknown and identified historic resources to less than significant levels under CEQA.

Mitigation Measure

CUL-1: Retention of a Qualified Archaeologist and WEAP Training. OCWD shall retain an archaeologist who meets the Secretary of the Interior's Professional Qualifications Standards for Archaeology (Qualified Archaeologist). The qualified archaeologist and representative from the consulting Native American Tribe(s), shall conduct construction worker archaeological resources sensitivity training at the Project kick-off meeting with OCWD's Project General Contractor prior to the start of the first ground disturbing activities (including vegetation removal, pavement removal, etc.) for the proposed Project. In the event construction crews are phased or rotated, additional training shall be conducted by the Project General Contractor for new construction personnel working on ground-disturbing activities. The General Contractor shall inform construction workers of the types of prehistoric and historic archaeological resources that may be encountered, and of the proper procedures to be enacted in the event of an inadvertent discovery of archaeological resources or human remains, and safety precautions to be taken when working with archaeological monitors. Documentation shall be retained by the qualified archaeologist demonstrating that the appropriate construction personnel attended the training.

CUL-2: Unanticipated Archaeological Discovery. The retained Qualified Archaeologist shall instruct construction personnel as part of ground disturbing activities, including excavation, grading, and drilling to halt or redirect activities if any materials are uncovered that are suspected of being associated with historical or prehistoric occupation. In the event potentially significant archaeological resources are encountered during earthmoving activities, the construction contractor shall cease such activity within 50 feet of the affected area and notify OCWD and the retained Qualified archaeologist, the latter of which who shall evaluate the find in accordance with the provisions of CEQA Guidelines Section 15064.5(c)(f). If the find appears to be prehistoric in origin, evaluation will be performed with involvement from Native American Tribal representatives identified by the Native American Heritage Commission as culturally affiliated with the Project Area. Personnel of the proposed Project shall not collect or move any archaeological materials and associated materials. Demolition activities shall not resume until the qualified archaeologist has made a determination on the significance of the resource.

If it is determined that the discovered archaeological resource constitutes a historical resource or unique archaeological resource pursuant to CEQA, avoidance and preservation in place shall be the preferred manner of mitigation. Preservation in place maintains the important relationship between artifacts and their archaeological context and also serves to avoid conflict with traditional and religious values of groups who may ascribe meaning to the resource. Preservation in place may be accomplished by, but is not limited to, avoidance, incorporating the resource into open space, capping, or deeding the site into a permanent conservation easement.

In the event that preservation in place is determined to be infeasible and data recovery through excavation is the only feasible mitigation available, an Archaeological Resources Treatment Plan shall be prepared and implemented by the qualified archaeologist that provides for the adequate recovery of the scientifically consequential information contained in the archaeological resource. The OCWD shall consult with appropriate Native American tribal representatives in determining treatment for prehistoric or Native American resources to ensure cultural values ascribed to the resources, beyond those that are scientifically important, are considered. Lastly, the long-term

disposition of any materials collected as a result of treatment plan implementation should be determined in consultation with the affiliated tribe(s), where relevant, and may include onsite reburial, curation at a public, non-profit institution, or donation to a local Native American Tribe, school, public agency, or historical society.

CUL-3: Monitoring Report. At the conclusion of archaeological monitoring, the Qualified Archaeologist shall prepare a final monitoring report. The report shall include a summary of monitoring results, description of resources unearthed, if any, significance evaluation and treatment of the resources, and the results of the artifact processing, analysis, and research. Appropriate California Department of Parks and Recreation 523 Forms shall be appended to the report, as necessary. The report shall be submitted to OCWD to signify the satisfactory completion of the proposed Project and required mitigation measures. The Qualified Archaeologist shall submit a copy of the final report to the South-Central Coastal Information Center within 30 days of its acceptance by OCWD. Additionally, as applicable, copies of the final report shall also be filed at the Irvine Historical Museum and the City of Irvine Community Development Department as applicable.

CUL-4: Discovery of Unanticipated Human Remains. If human remains are encountered, the OCWD or its contractor shall halt work in the vicinity (within 100 feet) of the discovery and contact the Orange County Coroner in accordance with Public Resources Code Section 5097.98 and Health and Safety Code Section 7050.5, which requires that no further disturbance shall occur until the County Coroner has made the necessary findings as to origin and disposition pursuant to Public Resources Code Section 5097.98. If the remains are determined to be of Native American descent, the coroner has 24 hours to notify the Native American Heritage Commission (NAHC). The NAHC shall then identify the person(s) thought to be the Most Likely Descendent (MLD). The MLD may, with the permission of the landowner, or his or her authorized representative, inspect the site of the discovery of the Native American remains and may recommend to the owner or the person responsible for the excavation work means for treating or disposing, with appropriate dignity, the human remains and any associated grave goods. The MLD shall complete their inspection and make their recommendation within 48 hours of being granted access by the landowner to inspect the discovery. The recommendation may include the scientific removal and nondestructive analysis of human remains and items associated with Native American burials. Upon the discovery of the Native American remains, the landowner shall ensure that the immediate vicinity, according to generally accepted cultural or archaeological standards or practices, where the Native American human remains are located, is not damaged or disturbed by further development activity until the landowner has discussed and conferred, as prescribed in this mitigation measure, with the MLD regarding their recommendations, if applicable, taking into account the possibility of multiple human remains. The landowner shall discuss and confer with the MLD on all reasonable options regarding their preferences for treatment. If the NAHC is unable to identify an MLD, or the MLD identified fails to make a recommendation, or the landowner rejects the recommendation of the MLD and the mediation provided for in Subdivision (k) of Section 5097.94, if invoked, fails to provide measures acceptable to the landowner, the landowner or his or her authorized representative shall inter the human remains and items associated with Native American human remains with

appropriate dignity on the facility property in a location not subject to further and future subsurface disturbance.

CUL-5: Project Redesign. If subsequent Project Phases result in Infrastructure Alignments being located within any of the previously identified historic resources or a property over 45-years of age, then the proposed Project shall be redesigned to avoid any on-site proposed Project work on any of the previously identified historic resources or a property over 45-years of age. For the 16 resources (P-30-177121, -177122, -177123, -177124, -177125, -177126, -177127, -177128, -177129, -17730, -177132, -177133, -177521, 1540 Brookhollow Drive, 1601 Warmer Avenue, and 2231 Ritchey Drive) with a low likelihood of being recommended eligible for listing in the CR and/or at the local level, proposed Project work may be visible from these properties but shall be located at least 100 feet from the property. For the three resources (P-30-177044, -177120, -177131) that have a moderate or high likelihood of being recommended eligible for listing in the CR and/or at the local level, no proposed Project work should be visible from the property.

If proposed Project work occurs on-site at any previously identified historic resources or property over 45 years of age or is visible from P-30-177044, P-30-177120, or P-30-177131, then Mitigation Measure CUL-6 is recommended to reduce potential impacts to previously unknown and identified historical resources to less than significant levels under CEQA.

CUL-6: Historic Resources Assessment. If Infrastructure Alignments change in subsequent Project Phases and include areas that contain properties that are more than 45 years old, the proposed Project proponent shall retain a qualified architectural historian, defined as meeting the Secretary of the Interior's Professional Qualification Standards for architectural history, to conduct a historic resources assessment including: a records search at the South-Central Coastal Information Center; a review of pertinent archives, databases, and sources; a pedestrian field survey; recordation of all identified historic resources on California Department of Parks and Recreation 523 forms; and preparation of a technical report documenting the methods and results of the assessment. All identified historic resources will be assessed for the proposed Project's potential to result in direct and/or indirect effects on those resources and any historic resource that may be affected shall be evaluated for its potential significance under national and state criteria prior to OCWD's approval of proposed Project plans and publication of subsequent CEQA documents. The qualified architectural historian shall provide recommendations regarding additional work, treatment, or mitigation for affected historical resources to be implemented prior to their demolition or alteration. Impacts on historical resources shall be analyzed using CEQA thresholds to determine if a proposed Project would result in a substantial adverse change in the significance of a historical resource. If a potentially significant impact would occur, Orange County Water District shall require appropriate mitigation to lessen the impact to the degree feasible.

Significance Determination

Less than Significant with Mitigation.

Archaeological Resources

Impact 3.4-2: The proposed Project could cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5.

Under CEQA, archaeological resources can be either "historical resources" (resources that are listed in or eligible for listing in the CRHR or a local register, or that have been determined eligible by the lead agency) or "unique archaeological resources" (an archaeological artifact, object, or site that (1) contains information needed to answer important scientific research questions and there is a demonstrable public interest in that information, (2) has a special and particular quality such as being the oldest of its type or the best available example of its type, or (3) is directly associated with a scientifically recognized important prehistoric or historic event or person). If an archaeological resource does not meet the criteria to qualify as a historical resource, it is then considered for its potential qualification as a unique archaeological resource. Impacts to archaeological resources as "historical resources" are addressed under Impact 3.4-1. Impacts to archaeological resources as "unique archaeological resources" are addressed under Impact 3.4-2.

Review of previous investigations undertaken in the vicinity of the Project Area, as well as review of the prehistoric context for the area, provides an understanding of the potential for encountering prehistoric archaeological resources in the Project Area during construction. When completing analysis of subsurface archaeological sensitivity, important factors to consider include elevation, soil conditions, proximity to water, proximity to raw materials, and ethnographic and historic information. It is also necessary to evaluate the historic land use and past development and disturbances on the Project Area in determining the possibility for the preservation of subsurface prehistoric and historical-period archaeological materials.

Geologic Map review situates the Project Area and its broader vicinity within Young Alluvial Fan (Qyf) and Young Alluvial Valley deposits (Qya), both of which are geologic map units which correlate to the Holocene to the late Pleistocene (i.e., 15,000 years ago) (Morton and Miller 2006). Middle to late Holocene sediments are considered more sensitive for buried, intact cultural resources. Additionally, several Gabrielino/Tongva villages are known to have been in the vicinity of the Project Area, with one in particular, Pasbengna, being in proximity to City of Sana Ana. The nearest source of water was San Diego Creek which originates east of the Project Area in the nearby Santa Ana Mountains and extends around its eastern boundary, before trending southwest and emptying into the constructed San Joaquin Marsh and Upper Newport Bay.

Archival research reveals the Project vicinity as being utilized exclusively for agricultural purposes by ranchos such as Rancho San Joaquin, Rancho Lomas de Santiago, and Rancho Santiago de Santa Ana in the 19th century. James Irvine ultimately became the primary landowner of a portion of the Project Area after first acquiring these Ranchos along with three business partners between 1864 and 1868, and then after buying out their interests in the landholdings in 1878. After Irvine acquired his partners' shares of the land grants in 1878, the Irvine Ranch corporation was formed, which included the Project Area. In 1888, James Irvine began extensive efforts to drain much of the land to make it suitable for cattle grazing. Following the death of Irvine in 1947, the agricultural use of the Project Area reached its zenith, when Myford Irvine, the son of James Irvine, began selling off parcels of land to municipalities, developers, and

the US military, thereby ushering in an era of urban, commercial, industrial, and military development for the region (Irvine Historical Society, n.d.).

Despite human occupation of the Project Area dating back to precontact times, and as discussed above under Impact 3.4-1, no archaeological resources have been previously recorded within the Project Area, and ESA's April 16, 2024, windshield survey of the Project Area yielded negative results for archaeological resources. However, three prehistoric sites, eight prehistoric isolates, one historical-period site, and two historic isolates were identified by the SCCIC 0.5-mile radius records search as being present east of the Project Area within the boundary of the former Marine Corps Air Station Tustin and outside of the proposed Project Alignments. None of the three prehistoric sites or the historic site has been evaluated for their eligibility to qualify as a unique archaeological resource under CEQA. Due to their isolated nature and lack of clear cultural context, the previously recorded prehistoric and historic isolates do not qualify as a unique archaeological resource pursuant to CEQA.

Extraction Facilities, Monitoring Wells, Local Groundwater Treatment Plants, and Conveyance Pipelines

No known significant or unique archaeological resources were identified within Alignments G-1 through G-8 within the Project Area. However, as discussed under Impact 3.4-2, there is a potential for the proposed Project to significantly impact unknown archaeological resources during construction of the extraction facilities, monitoring wells, local groundwater treatment plants, and conveyance pipelines that could qualify as unique archaeological resources and if disturbed as a result of the proposed Project, would be a potentially significant impact. However, implementation of **Mitigation Measures CUL-1, CUL-2, and CUL-3** would avoid and/or substantially lessen the above impact by ensuring that any unanticipated archaeological resources that qualify as unique archaeological resources pursuant to CEQA are appropriately identified, documented, evaluated, and treated promptly, so they are not inadvertently damaged or destroyed. Impacts would be less than significant with mitigation.

Mitigation Measure

Implementation of Mitigation Measures CUL-1, CUL-2, and CUL-3.

Significance Determination

Less than Significant with Mitigation.

Human Remains

Impact 3.4-3: The proposed Project could disturb any human remains, including those interred outside of dedicated cemeteries.

There is no indication that the Project Area has been used for human burial purposes in the recent or distant past; however, the known prehistoric and historic activity in the area, and the general sensitivity of the area for buried prehistoric and historic resources means that there is a possibility of uncovering human remains during proposed Project implementation. In the event that human remains are discovered during project construction, including those interred outside of formal cemeteries, the human remains could be inadvertently disturbed, which would be a potentially significant impact; however, implementation of

Mitigation Measure CUL-4, requiring notification of the County Coroner in the event of the unanticipated discovery of human remains, would reduce impact to less than significant.

Extraction Facilities, Monitoring Wells, Local Groundwater Treatment Plants, and Conveyance Pipelines

No human remains were identified during the survey of the Project Area, and no known human remains have been recorded within the Project Area or a 0.5-mile radius. The overall sensitivity of the Project Area with respect to archaeological resources, including human remains, is moderate to low. In absence of a completed geotechnical report, it should be assumed that ground disturbance associated with the extraction facilities, monitoring wells, local groundwater treatment plants, and conveyance pipelines for the proposed Project could extend into previously undisturbed subsurface areas or other locations where there is some possibility to encounter buried human remains. As a result, although unlikely, construction related activities may disturb human remains, including those interred outside of dedicated cemeteries, which would be a potentially significant impact. However, implementing Mitigation Measure CUL-4 would reduce impact to less than significant.

Mitigation Measures

Implementation of Mitigation Measure CUL-4.

Significance Determination

Less than Significant with Mitigation.

Cumulative Impacts

The cumulative setting for archaeological and historic resources varies by resource type, as is described below. The Project Area encompasses residential, commercial, and industrial developments in southeastern Santa Ana, Alignment G-3 and Alignment G-7 in the Irvine Business Complex in Irvine, as well as commercial and industrial developments in western Tustin. Moreover, the extraction facilities, monitoring wells, groundwater treatment plants, and the conveyance pipeline components of the proposed Project are anticipated to be located within and in proximity to the Alignments G-1, G-2, G-4, G-5, G-6, and G-8 of the Project Area and are notably all exclusively commercial and industrial zones. Geologically, the Project Area is situated within Young Alluvial Fan (Qyf) and Young Alluvial Valley deposits (Qya), containing Holocene sediments. The area is within the ethnographic territory of the Tongva (Gabrielino) and Juaneño (Acjachemen) Tribes. The nearest source of water was San Diego Creek which originates east of the Project Area in the nearby Santa Ana Mountains and extends around its eastern boundary, before trending southwest and emptying into the constructed San Joaquin Marsh and Upper Newport Bay.

In addition to the proposed Project, there are 63 projects that have been taken into consideration when developing the cumulative context, although the context varies by resource type (see Chapter 3, Table 3-1). There are 42 cumulative projects in the City of Irvine 13 cumulative projects in the City of Santa Ana, one cumulative project in the City of Tustin, and an additional 7 cumulative projects within lands own and/or managed by OCWD which intersect the aforementioned three cities (see Chapter 3, Table 3-1). Several of these cumulative projects are located within the proposed Project Area and include

residential, hotel, public works infrastructure, commercial development projects that are either proposed, approved, or currently under construction. All are considered in the program-level analysis above.

Impact 3.4-4: Concurrent construction and operation of the proposed Project and related projects in the geographic scope could result in cumulative short-term and long-term impacts to cultural resources.

Extraction Facilities, Monitoring Wells, Local Groundwater Treatment Plants, and Conveyance Pipelines

As discussed above, although the likelihood of encountering prehistoric and/or historic-period archaeological deposits is moderate, there remains the possibility that Project-related ground disturbance, which could extend to depths of 130 feet bgs, could encounter intact archaeological deposits that qualify as historical resources or unique archaeological resources. In addition, the construction related activities for extraction facilities and monitoring wells may disturb human remains, including those interred outside of dedicated cemeteries. If such resources were encountered, the proposed Project would have a potentially significant impact on those resources. Given the proximity of other cumulative projects and the sensitivity for encountering such resources, the proposed Project could contribute to cumulative impacts. Based on the above considerations, the proposed Project, in conjunction with cumulative development within the Project vicinity, implementation of the proposed Project could result in cumulatively considerable impacts to historical resources. Therefore, the cumulative impact would be potentially significant; however, implementation of Mitigation Measures CUL-1, CUL-2, CUL-3, and CUL-4 would reduce the impact to less than significant.

Mitigation Measures

Implementation of Mitigation Measures CUL-1, CUL-2, CUL-3, and CUL-4.

Significance Determination

Less than Significant with Mitigation.

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3.5 Energy

This section addresses the energy-related impacts associated with implementation of the proposed Project. This section includes: a description of the existing energy resources conditions at the Project Area; a summary of applicable regulations related to energy resources; and an evaluation of the potential impacts of the proposed Project related to energy resources at the Project Area and in the surrounding area, including cumulative impacts.

3.5.1 Environmental Setting

Electricity

Electricity, a consumptive utility, is a human-made resource. The production of electricity requires the consumption or conversion of energy resources, including water, wind, oil, gas, coal, solar, geothermal, and nuclear resources, into energy. The delivery of electricity involves several system components, for distribution and use. The electricity generated is distributed through a network of transmission and distribution lines commonly called a power grid.

Energy capacity, or electrical power, is generally measured in watts (W) while energy use is measured in watt-hours (Wh). For example, if a light bulb has a capacity rating of 100 W, the energy required to keep the bulb on for 1 hour would be 100 watt-hours. If ten 100 W bulbs were on for 1 hour, the energy required would be 1,000 Wh or 1 kilowatt-hour (kWh). On a utility scale, a generator's capacity is typically rated in megawatts (MW), which is 1 million watts, while energy usage is measured in megawatt-hours (MWh) or gigawatt-hours (GWh), which is 1 billion Wh.

Southern California Edison (SCE) is the electrical utility provider for the Project Area and provides electrical services to approximately 15 million people, 15 counties (including the County of Orange), 180 incorporated cities, 5,000 large businesses, and 280,000 small businesses throughout its 50,000-square-mile service area, across central, coastal and Southern California, an area bounded by Mono County to the north, Ventura County to the west, San Bernardino County to the east, and Orange County to the south (SCE 2024). SCE produces and purchases energy from a mix of conventional and renewable generating sources.

SCE generates power from a variety of energy sources, including large hydropower (greater than 30 MW), coal, gas, nuclear sources, and renewable resources, such as wind, solar, small hydropower (less than 30 MW), and geothermal sources. In 2022, the SCE power system experienced a peak demand of 24,345 MW (the most recent year for which data are available) (SCE 2023a). Approximately 45 percent of the SCE 2022 electricity purchases were from renewable sources, which is higher than the approximate 36 percent statewide percentage of electricity purchases from renewable sources (SCE 2023a; CEC 2023a). The annual electricity sale to customers in 2022 was approximately 84,218 GWh (SCE 2023b).

SCE produces and purchases its energy from a mix of conventional and renewable generating sources. **Table 3.5-1** displays the electric power mix that was delivered to retail customers compared to the statewide power mix for 2022, the most recent year in which data is available.

TABLE 3.5-1
SCE ELECTRIC POWER MIX DELIVERED TO RETAIL CUSTOMERS IN 2022

Energy Resource	SCE Power Mix	SCE Green Rate 50% Option	SCE Green Rate 100% Option	Statewide Power Mix
Total Sales/Total Usage (million kilowatt-hours)	**84,218**			**277,764**
Eligible Renewable:	**33.2%**	**66.7%**	**100%**	**35.8%**
Biomass & bio-waste[a]	*0.1%*	*0.0%*	*0.0%*	*2.1%*
Geothermal	*5.7%*	*2.9%*	*0.0%*	*4.7%*
Small hydroelectric	*0.5%*	*0.3%*	*0.0%*	*1.1%*
Solar	*17.0%*	*58.6%*	*100%*	*17.0%*
Wind	*9.8%*	*4.9%*	*0.0%*	*10.8%*
Coal	**0.0%**	0.0%	0.0%	2.1%
Large Hydroelectric	**3.4%**	1.7%	0.0%	9.2%
Natural Gas	**24.7%**	12.3%	0.0%	36.4%
Nuclear	**8.3%**	4.2%	0.0%	9.2%
Other	**0.1%**	**0.0%**	0.0%	**0.1%**
Unspecified sources of power[b]	**30.3%**	**15.1%**	0.0%	**7.1%**
Total	***100%***	***100%***	***100%***	***100%***

SOURCES: CEC 2024a, accessed March 2024, https://www.energy.ca.gov/filebrowser/download/6072

a. The Eligible Renewables category is further delineated into the specific sources: biomass & waste, geothermal, small hydroelectric, solar, and wind.
b. "Unspecified sources of power" means electricity from transactions that are not traceable to specific generation sources.

Natural Gas

Natural gas is a combustible mixture of simple hydrocarbon compounds (primarily methane) that is used as a fuel source. Natural gas consumed in California is obtained from naturally occurring reservoirs but relies upon out-of-state imports for nearly 90 percent of its natural gas supply (CEC 2023b). A majority of natural gas consumed in California is for electricity generation, along with the industrial, residential, and commercial sections (CEC 2023b). Among energy commodities consumed in California, natural gas accounts for approximately 31 percent of total energy consumption (CEC 2023c). Natural gas is measured in terms of both cubic feet (cf) or British thermal units (Btu).

Natural gas is used for cooking, space heating, water heating, electricity generation, and as an alternative transportation fuel. The proposed Project is within the service area of Southern California Gas Company (SoCalGas), which is the principal distributor of natural gas in Southern California, serving residential, commercial, and industrial markets. SoCalGas serves approximately 21.1 million customers in more than 500 communities encompassing approximately 24,000 square miles throughout central and Southern California, from the City of Visalia to the Mexican border (SCG 2024).

SoCalGas receives gas supplies from several sedimentary basins in the western U.S. and Canada, including supply basins located in New Mexico (San Juan Basin), West Texas (Permian Basin), the Rocky Mountains, and Western Canada as well as local California supplies (CGEU 2023). The traditional, southwestern U.S. sources of natural gas will continue to supply most of SoCalGas' natural gas demand. The Rocky Mountain supply is available but is used as an alternative supplementary supply source, and the use of Canadian sources provide only a small share of SoCalGas supplies due to the high cost of

transport (CGEU 2023). Overall, SoCalGas predicts a decrease in natural gas demand in future years due to a decrease in per capita usage, energy efficiency policies, and the State's transition to renewable energy displacing fossil fuels including natural gas (CGEU 2023). The annual natural gas sale to customers in 2022 was approximately 897,170 million cf (CGEU 2023).[16]

Transportation Energy

According to the California Energy Commission (CEC), fossil gas accounted for approximately 31 percent of California's total energy consumption in 2021 based on a carbon dioxide equivalent basis (CEC 2023c). In 2022 (the most recent year for which data are available), California consumed 13.6 billion gallons of gasoline and 3.1 billion gallons of diesel fuel (CEC 2024b). Petroleum-based fuels account for 89 percent of California's transportation fuel use.[17] California has implemented several policies, rules, and regulations to improve vehicle efficiency, increase the development and use of alternative fuels, reduce air pollutants and greenhouse gases (GHGs) from the transportation sector, and reduce vehicle miles traveled (VMT). Additionally, California is transitioning to zero-carbon, renewable sources of power while rapidly electrifying large segments of the economy. The CEC predicts that the demand for gasoline and transportation fossil fuels in general will continue to decline as the sales of electric vehicles increases. New zero-emission vehicle sales grew from less than 8 percent in 2020 to more than 25 percent in the third quarter of 2023 (CEC 2023d). According to fuel sales data from the CEC, fuel consumption in Orange County was approximately 1,176 million gallons of gasoline and 104 million gallons of diesel fuel in 2022 (CEC 2024b).[18] The State is now working on developing flexible strategies to reduce petroleum use. Accordingly, diesel and gasoline consumption in California has declined.

3.5.2 Regulatory Framework

Federal

Energy Policy Act of 1992

The Energy Policy Act set goals, created mandates, and amended utility laws to increase clean energy use and improve overall energy efficiency in the United States. It established regulations requiring certain federal, state, and alternative fuel provider fleets to build an inventory of alternative fuel vehicles. It was amended several times in the Energy Conservation and Reauthorization Act of 1998 and in 2005 via the Energy Policy Act in 2005, which emphasized alternative fuel use and infrastructure development.

Energy Policy Act of 2005

The Energy Policy Act of 2005 includes provisions for renewed and expanded tax credits for electricity generated by qualified energy sources, such as landfill gas; provides bond financing, tax incentives, grants, and loan guarantees for clean renewable energy and rural community electrification; and establishes a federal purchase requirement for renewable energy. The Renewable Fuel Standard (RFS)

[16] Daily natural gas usage in 2022 was 2,458 million cf; annual value derived by multiplying daily values by 365 days.

[17] California Energy Commission. 2023e. 2021–2023 Investment Plan Update for the Clean Transportation Program. December 17, 2021.

[18] Diesel is adjusted to account for retail (63.6 percent) and non-retail (36.4 percent) diesel sales.

program was created under the Energy Policy Act of 2005 and established the first renewable fuel volume mandate in the United States.

Energy Independence and Security Act of 2007

The Energy Independence and Security Act of 2007 (EISA) facilitates the reduction of national GHG emissions by requiring the following:

- Increasing the supply of alternative fuel sources by setting mandatory Renewable Fuel Standards (RFS) that requires fuel producers to use at least 36 billion gallons of biofuel in 2022;
- Prescribing or revising standards affecting regional efficiency for heating and cooling products, procedures for new or amended standards, energy conservation, energy efficiency labeling for consumer electronic products, residential boiler efficiency, electric motor efficiency, and home appliances;
- Requiring approximately 25 percent greater efficiency for light bulbs by phasing out incandescent light bulbs between 2012 and 2014; requiring approximately 200 percent greater efficiency for light bulbs, or similar energy savings, by 2020; and
- While superseded by the USEPA and the NHTSA actions described above (refer to United States Department of Transportation, United States Department of Energy, and United States Environmental Protection Agency, above) (i) establishing miles per gallon targets for cars and light trucks and (ii) directing the NHTSA to establish a fuel economy program for medium- and heavy-duty trucks and create a separate fuel economy standard for trucks.

Additional provisions of EISA address energy savings in government and public institutions, promote research for alternative energy, additional research in carbon capture, international energy programs, and the creation of "green jobs."[19]

United States Department of Transportation, United States Department of Energy, and United States Environmental Protection Agency

On the federal level, the United States Department of Transportation (USDOT), United States Department of Energy (USDOE), and United States Environmental Protection Agency (USEPA) are three agencies with substantial influence over energy policies related to transportation fuels consumption. Generally, federal agencies influence transportation energy consumption through establishment and enforcement of fuel economy standards for automobiles and light trucks through funding energy-related research and development projects, and through funding for transportation infrastructure projects.

Established by the U.S. Congress in 1975, the Corporate Average Fuel Economy (CAFE) Standards (49 CFR Parts 531 and 533) reduce energy consumption by increasing the fuel economy of cars and light trucks. The National Highway Traffic Safety Administration (NHTSA) and USEPA jointly administer the CAFE standards. The U.S. Congress has specified that CAFE standards must be set at the "maximum feasible level" with consideration given for (1) technological feasibility; (2) economic practicality; (3) effect of other standards on fuel economy; and (4) need for the nation to conserve energy. When these

[19] A "green job," as defined by the United States Department of Labor, is a job in business that produces goods or provides services that benefit the environment or conserve natural resources.

standards are raised, automakers respond by creating a more fuel-efficient fleet. In 2012, NHTSA established final passenger car and light truck CAFE standards for model years 2017 through 2021, which the agency projects will require in model year 2021, on average, a combined fleet-wide fuel economy of 40.3 to 41.0 miles per gallons (mpg). Fuel efficiency standards for medium- and heavy-duty trucks have been jointly developed by USEPA and NHTSA. The Phase 1 heavy-duty truck standards apply to combination tractors, heavy-duty pickup trucks and vans, and vocational vehicles for model years 2014 through 2018, and result in a reduction in fuel consumption from 6 to 23 percent over the 2010 baseline, depending on the vehicle type (USEPA 2011). USEPA and NHTSA have also adopted the Phase 2 heavy-duty truck standards, which cover model years 2021 through 2027 and require the phase-in of a 5 to 25 percent reduction in fuel consumption over the 2017 baseline depending on the compliance year and vehicle type (USEPA 2016).

In March 2020, USDOT and USEPA issued the final Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule, which amends existing CAFE standards and tailpipe carbon dioxide emissions standards for passenger cars and light trucks and establishes new standards covering model years 2021 through 2026 (USEPA 2020). These standards set a combined fleet wide average of 36.9 to 37 miles per gallon (mpg) for the model years affected (USEPA 2020). On January 20, 2021, President Biden issued Executive Order 13990 ‘‘Protecting Public Health and the Environment and Restoring Science To Tackle the Climate Crisis’’ directing USEPA to consider whether to propose suspending, revising, or rescinding the standards previously revised under the SAFE Vehicles Rule for Model Years 2021–2026. In February 2022, USEPA issued the Revised 2023 and Later Model Year Light-Duty Vehicle Greenhouse Gas Emissions Standards (USEPA 2021). This final rule revises current GHG standards beginning for vehicles in model year 2023 through model year 2026 and establishes the most stringent GHG standards ever set for the light-duty vehicle sector that are expected to result in average fuel economy label values of 40 mpg, while the standards they replace (the SAFE rule standards) would achieve only 32 mpg in model year 2026 vehicles (USEPA 2021).

In addition to the regulations applicable to cars and light-duty trucks described above, in 2011 USEPA and NHTSA announced fuel economy and GHG standards for medium- and heavy-duty trucks for model years 2014–2018. The standards for carbon dioxide (CO_2) emissions and fuel consumption are tailored to three main vehicle categories: combination tractors, heavy-duty pickup trucks and vans, and vocational vehicles. According to USEPA, this regulatory program would reduce GHG emissions and fuel consumption for the affected vehicles by 6 to 23 percent over the 2010 baselines. Building on the first phase of standards, in August 2016, USEPA and NHTSA finalized Phase 2 standards for medium and heavy-duty vehicles through model year 2027 that will improve fuel efficiency and cut carbon pollution. The Phase 2 standards are expected to lower CO_2 emissions by approximately 1.1 billion metric tons.

On July 28, 2023, the NHTSA proposed new CAFE standards for passenger cars and light trucks for model years 2027 through 2032, and new fuel efficiency standards for heavy-duty pickup trucks and vans for model years 2030 through 2035. The proposed rule would require an industry fleet-wide average of approximately 58 mpg for passenger cars and light trucks in model year 2032, by increasing fuel economy by 2 percent year over year for passenger cars and 4 percent year over year for light trucks (NHTSA 2023). For heavy-duty pickup trucks and vans, the proposed rule would increase fuel efficiency by 10 percent year over year (NHTSA 2023).

State

California Building Standards Code (Title 24, Parts 6 and 11)

The California Building Energy Efficiency Standards for Residential and Nonresidential Buildings (California Code of Regulations [CCR], Title 24, Part 6) were adopted to ensure that building construction and system design and installation achieve energy efficiency and preserve outdoor and indoor environmental quality. The current California Building Energy Efficiency Standards (Title 24 standards) are the 2022 Title 24 standards, which became effective January 1, 2023. The 2022 Title 24 standards include efficiency improvements to the residential standards for attics, walls, water heating, and lighting; and efficiency improvements to the non-residential standards include alignment with the American Society of Heating and Air-Conditioning Engineers (ASHRAE) 90.1-2019 national standards (CEC 2022a).

The California Green Building Standards Code (CCR, Title 24, Part 11), commonly referred to as the CALGreen Code, became effective in 2023. The 2022 CALGreen Code includes mandatory measures for non-residential development related to site development, energy efficiency, water efficiency and conservation; material conservation and resource efficiency; and environmental quality (CEC 2022b). For example, the standards encourage efficient electric heat pumps, establish electric-ready requirements for new homes, expands solar photovoltaic and battery storage standards, strengthens ventilation standards, and more.

Renewables Portfolio Standard

The State has adopted regulations to increase the proportion of electricity from renewable sources. In 2008, Executive Order S-14-08 expanded the State's Renewable Portfolio Standard (RPS) goal to 33 percent renewable power by 2020. In 2009, Executive Order S-21-09 directed CARB (under its Assembly Bill [AB] 32 authority) to enact regulations to help the State meet the 2020 goal of 33 percent renewable energy. The 33 percent by 2020 RPS goal was codified with the passage of Senate Bill (SB) X1-2. This new RPS applied to all electricity retailers in the state, including publicly owned utilities (POUs), investor-owned utilities, electricity service providers, and community choice aggregators. SB 350 (Chapter 547, Statues of 2015) further increased the RPS to 50 percent by 2030, including interim targets of 40 percent by 2024 and 45 percent by 2027. In 2018, SB 100 further increased California's RPS and requires retail sellers and local POUs to procure eligible renewable electricity for 44 percent of retail sales by the end of 2024, 52 percent by the end of 2027, and 60 percent by the end of 2030; and requires that CARB should plan for 100 percent eligible renewable energy resources and zero-carbon resources by the end of 2045.

The California Public Utilities Commission (CPUC) and the CEC jointly implement the RPS program. The CPUC's responsibilities include (1) determining annual procurement targets and enforcing compliance, (2) reviewing and approving each investor-owned utility's renewable energy procurement plan, (3) reviewing contracts for RPS-eligible energy, and (4) establishing the standard terms and conditions used in contracts for eligible renewable energy.

Senate Bill 1389

Senate Bill (SB) 1389 (Public Resources Code Sections 25300–25323) requires the CEC to prepare a biennial integrated energy policy report that assesses major energy trends and issues facing the state's electricity, natural gas, and transportation fuel sectors and provides policy recommendations to conserve resources; protect the environment; ensure reliable, secure, and diverse energy supplies; enhance the state's economy; and protect public health and safety (Public Resources Code Section 25301[a]). The Integrated Energy Policy Report, the latest published report from CEC, provides the results of the CEC's assessments related to energy sector trends, building decarbonization and energy efficiency, zero-emissions vehicles, energy equity, climate change adaptation, electricity reliability in Southern California, natural gas assessment, and electricity, natural gas, and transportation energy demand forecasts.

California Assembly Bill 1493 (AB 1493, Pavley)

In response to the transportation sector's large share of California's CO_2 emissions, AB 1493 (commonly referred to as the Pavley regulations), enacted on July 22, 2002, requires CARB to set GHG emission standards for new passenger vehicles, light duty trucks, and other vehicles manufactured in and after 2009 whose primary use is non-commercial personal transportation. Phase I of the legislation established standards for model years 2009–2016 and Phase II established standards for model years 2017–2025 (CARB 2023a; USEPA 2012). As discussed above, in September 2019, the USEPA published the SAFE Vehicles Rule in the federal register (*Federal Register* Vol. 84, No. 188, Friday, September 27, 2019, Rules and Regulations, 51310–51363) that maintains the vehicle miles per gallon standards applicable in model year 2020 for model years 2021 through 2026. On January 20, 2021, President Biden issued Executive Order 13990 ‘‘Protecting Public Health and the Environment and Restoring Science To Tackle the Climate Crisis’’ directing USEPA to consider whether to propose suspending, revising, or rescinding the standards previously revised under the SAFE Vehicles Rule for Model Years 2021–2026. In February 2022, USEPA issued the Revised 2023 and Later Model Year Light-Duty Vehicle Greenhouse Gas Emissions Standards (USEPA 2021). This final rule revises current GHG standards beginning for vehicles in model year 2023 and through model year 2026 and establish the most stringent GHG standards ever set for the light-duty vehicle sector that are expected to result in average fuel economy label values of 40 mpg, while the standards they replace (the SAFE rule standards) would achieve only 32 mpg in model year 2026 vehicles (USEPA 2021).

California Health and Safety Code (HSC), Division 25.5/California Global Warming Solutions Act of 2006

In 2006, the California State Legislature adopted AB 32 (codified in the California Health and Safety Code [HSC], Division 25.5 – California Global Warming Solutions Act of 2006), which focuses on reducing GHG emissions in California to 1990 levels by 2020. Under HSC Division 25.5, CARB has the primary responsibility for reducing the State's GHG emissions; however, AB 32 also tasked the CEC and the CPUC with providing information, analysis, and recommendations to CARB regarding strategies to reduce GHG emissions in the energy sector.

In 2016, the California State Legislature adopted SB 32 and its companion bill AB 197; both were signed by Governor Brown. SB 32 and AB 197 amend HSC Division 25.5 and establish a new climate pollution reduction target of 40 percent below 1990 levels by 2030 and include provisions to ensure that the benefits of state climate policies reach into disadvantaged communities.

Senate Bill 350

SB 350, signed October 7, 2015, is the Clean Energy and Pollution Reduction Act of 2015. SB 350 is the implementation of some of the goals of Executive Order B-30-15. Building off AB 32, SB 350 established California's 2030 GHG reduction target of 40 percent below 1990 levels. To achieve this goal, SB 350 set ambitious 2030 targets for energy efficiency and renewable electricity, among other actions aimed at reducing GHG emissions. SB 350 increased California's renewable electricity procurement goal from 33 percent by 2020 to 50 percent by 2030 prior to the current goals set by SB 100. In addition, SB 350 requires the State to double statewide energy efficiency savings in electricity and natural gas end uses by 2030.

California Air Resources Board

Advanced Clean Car Program

The Advanced Clean Cars emissions-control program was approved by CARB in 2012 and is closely associated with the Pavley regulations (CARB 2017). The program requires a greater number of zero-emission vehicle models for years 2015 through 2025 to control smog, soot and GHG emissions. This program includes the Low-Emissions Vehicle (LEV) regulations to reduce criteria pollutants and GHG emissions from light- and medium-duty vehicles; and the Zero-Emissions Vehicle (ZEV) regulations to require manufacturers to produce an increasing number of pure ZEV's (meaning battery and fuel cell electric vehicles) with the provision to produce plug-in hybrid electric vehicles (PHEV) between 2018 and 2025.

The primary mechanism for achieving the ZEV target for passenger cars and light trucks is CARB's Advanced Clean Cars II (ACC II) Program. The ACC II regulations will focus on post-2025 model year light-duty vehicles, as requirements are already in place for new vehicles through the 2025 model year.

Advanced Clean Trucks Program

The Advanced Clean Trucks (ACT) regulations were approved on June 25, 2020, and require that manufacturers sell zero-emissions or near-zero-emissions trucks as an increasing percentage of their annual California sales beginning in 2024. The goal of this proposed strategy is to achieve nitrogen oxide (NOx) and GHG emission reductions through advanced clean technology, and to increase the penetration of the first wave of zero-emissions heavy-duty technology into applications that are well suited to its use. According to CARB, "Promoting the development and use of advanced clean trucks will help CARB achieve its emission reduction strategies as outlined in the State Implementation Plan (SIP), Sustainable Freight Action Plan, SB 350, and AB 32" (CARB 2023b)

Airborne Toxic Control Measure to Limit Diesel-Fueled Commercial Motor Vehicle Idling

In 2004, CARB adopted an Airborne Toxic Control Measure to Limit Diesel-Fueled Commercial Motor Vehicle Idling in order to reduce public exposure to diesel particulate matter emissions (Title 13 California Code of Regulations [CCR] Section 2485 and Title 17 CCR Section 93115). The measure applies to diesel-fueled commercial vehicles with gross vehicle weight ratings greater than 10,000 pounds that are licensed to operate on highways, regardless of where they are registered. This measure does not allow diesel-fueled commercial vehicles to idle for more than five minutes at any given location. While the goal of this measure is primarily to reduce public health impacts from diesel emissions, compliance with the regulation also results in energy savings in the form of reduced fuel consumption from unnecessary idling.

Regulation to Reduce Emissions of Diesel Particulate Matter, Oxides of Nitrogen and other Criteria Pollutants, from In-Use Heavy-Duty Diesel-Fueled Vehicles.

Because off-road vehicles that are used in construction and other related industries can last 30 years or longer, most of those that are in service today are still part of an older fleet that do not have emission controls. In 2007, CARB approved the "In-Use Off-Road Diesel Fueled Fleets Regulation" to reduce emissions from existing (in-use) off-road diesel vehicles that are used in construction and other industries. This regulation sets an anti-idling limit of five minutes for all off-road vehicles 25 horsepower and up. It also establishes emission rates targets for the off-road vehicles that decline over time to accelerate turnover to newer, cleaner engines and require exhaust retrofits to meet these targets. Revised in October 2016, the regulation enforced off-road restrictions on fleets adding vehicles with older tier engines and started enforcing beginning July 1, 2014. By each annual compliance deadline, a fleet must demonstrate that it has either met the fleet average target for that year or has completed the Best Available Control Technology requirements (BACT). Large fleets have compliance deadlines each year from 2014 through 2023, medium fleets each year from 2017 through 2023, and small fleets each year from 2019 through 2028. While the goal of this regulation is primarily to reduce public health impacts from diesel emissions, compliance with the regulation also results in energy savings in the form of reduced fuel consumption from the use of more fuel-efficient engines.

Regional

Southern California Association of Governments

SB 375 requires each Metropolitan Planning Organization to prepare a Sustainable Communities Strategy (SCS) in their regional transportation plan. In general, the SCS outlines a development pattern for the region, which, when integrated with the transportation network and other transportation measures and policies, would reduce vehicle miles traveled from automobiles and light duty trucks and thereby reduce GHG emissions from these sources. For the SCAG region, the 2020–2045 RTP/SCS, adopted on September 3, 2020, is the current RTP/SCS and is an update to the 2016–2040 RTP/SCS.

The 2020–2045 RTP/SCS focuses on the continued efforts of the previous RTP/SCS plans for an integrated approach in transportation and land use strategies in development of the SCAG region through horizon year 2045. The 2020–2045 RTP/SCS projects that the SCAG region will meet the GHG per capita reduction targets established for the SCAG region of 8 percent by 2020 and 19 percent by 2035. Additionally, its implementation is projected to reduce VMT per capita for the year 2045 by 4.1 percent compared to baseline conditions for the year. Rooted in the 2008 and 2012 RTP/SCS plans, the 2020–2045 RTP/SCS includes "Core Vision" that centers on maintaining and better managing the transportation network for moving people and goods while expanding mobility choices by location housing, jobs, and transit closer together, and increasing investments in transit and complete streets.

South Coast Air Quality Management District

As discussed in Section 3.2, *Air Quality and Greenhouse Gas Emissions*, of this EIR, the South Coast Air Quality Management District (SCAQMD) is responsible for air quality planning in the South Coast Air Basin (where the project is located) and developing rules and regulations to bring the Air Basin into attainment of the ambient air quality standards. As part of its efforts to reduce local air pollution, SCAQMD has promoted a number of programs to promoted energy conservation, low-carbon fuel

technologies (natural gas vehicles; electric-hybrids, hydraulic-hybrids, and battery-electric vehicles), renewable energy, VMT reduction programs, and market incentive programs.

Local

County of Orange General Plan

The County of Orange first adopted its original General Plan in 1946. Amended sections of the General Plan have been adopted as of September 2022. The existing General Plan includes the following goals, objectives, and policies related to energy:

Transportation Element

Goal 5. Manage peak hour traffic congestion to achieve an acceptable level of service (LOS) on existing and future circulation plan facilities in the unincorporated areas of the County.

Objective 5.3. Reduce Vehicle Miles Traveled in an effort to reduce greenhouse gas (GHG), pursuant to SB 743. See "Guidelines for Evaluating Vehicle Miles Traveled Under CEQA" and "2020 Updated Transportation Implementation Manual."

Goal 6. Implement transportation demand management (TDM) and transportation systems management (TSM) strategies which reduce peak hour vehicle travel demand and minimize single-occupant vehicles and trip length on the unincorporated County roadway system.

Objective 6.1. Develop and promote a transportation system and strategies that are consistent with Rule 2202 of the South Coast Air Quality Management District (SCAQMD) and the County Transportation Demand Management (TDM) Ordinance (Ordinance No. 3820).

Policy 6.4. Assist businesses in County unincorporated areas in the implementation of the policies of the County Transportation Demand Management (TDM) Ordinance.

Resources Element

Energy Resources Component Goal 1. Maximize the conservation and wise use of energy resources in all residences, businesses, public institutions, and industries in Orange County.

Objective 1.1. Achieve a reduction in projected per capita energy demand and consumption by the year 2005.

Energy Resources Component Goal 3. Maximize the conservation of energy resources in all future land use and transportation planning decisions.

Objective 3.3. To maintain a community leadership role with respect to conservation of nonrenewable resources and assist existing utility conservation programs.

Policy 3: Energy Conservation. To encourage and actively support the utilization of energy conservation measures in all new and existing structures in the County.

Policy 6: Alternative Energy Systems. To encourage the use of alternative energy systems and, to the extent feasible, remove the regulatory barriers to their implementation.

Policy 7: Solar Access. To support and encourage voluntary efforts to provide solar access opportunities in new developments.

Water Resources Component Goal 1. Ensure an adequate dependable supply of water of acceptable quality for all reasonable uses.

Objective 1.2. To achieve a reduction in per capita water consumption by the year 2020.

Objective 1.3. To reduce dependence on imported water supplies through both conservation and local water resource development.

Policy 2: Conservation. To reduce per capita and total water consumption through conservation and reclamation programs and the support of new technologies.

Policy 3: Groundwater Resources. To support groundwater management efforts that are conducted by County water agencies.

Policy 5: Water Quality. Protect and improve water quality through continued management, enforcement, and reporting requirements.

City of Irvine General Plan

The City of Irvine first adopted its original General Plan in 1973. Amended sections of the General Plan have been adopted as of August 2015. The existing General Plan includes the following objectives and policies related to energy:

Circulation Element

Objective B-1: Roadway Development Plan. Provide and maintain an integrated vehicular circulation system to accommodate projected local and regional needs.

Policy (e). Cooperate with state, county, and local governments to assure orderly development.

Energy Element

Objective I-1. Energy Conservation. Maximize energy efficiency through land use and transportation planning.

Policy (b). Encourage and promote incorporation of energy conservation measures. The measures should be developed in conjunction with the applicant and may include:

- Active solar water and/or space heating.
- Passive design features for heating and cooling.
- Use of energy efficient devices.

Policy (e). Facilitate the participation of industries in the following conservation programs where cost effective:

- Cogeneration (process heat/steam/electricity).
- Reclaiming waste products (biomass, solid waste, waste water).
- Recycling (aluminum, paper, glass and steel).
- Carpooling.
- Mass Transportation.

Policy (i). Monitor the federal, state, regional, other local governments, the utility companies, Irvine Ranch Water District (IRWD), and other private and public agencies energy programs and regulations and:

- Explore opportunities and limitations on use of renewable sources.
- Obtain information and technical assistance for energy programs.
- Implement federal and state energy programs.
- Support continuation of tax credits for alternative renewable sources and conservation measures.
- Allocate available federal funds and grants such as Community Development Block Grant (CDBG) for energy programs for low income and senior housing development.
- Inform developers and the general public of recent available energy programs, regulations, technical, and economic data (e.g., cost effectiveness).

Objective I-3: Municipal Conservation. Maximize energy efficiency of the City's facilities and operations by use of recycled materials, renewable sources, and conservation measures.

Policy (c). Use the following renewable sources for municipal facilities where cost effective:

- Solar water and pool heating.
- Photovoltaics (e.g., solar panels).
- Cogeneration

Policy (e). Develop an energy plan coordinated with utilities, local and regional government agencies.

As of March 2024, the City of Irvine has published their Draft City of Irvine 2045 General Plan. The City of Irvine has scheduled an adoption hearing for summer/fall 2024.

City of Santa Ana General Plan

The City of Santa Ana City Council adopted the General Plan Update, *Golden City Beyond*. The new General Plan went into effect on Thursday, May 26, 2022. The existing General Plan includes the following goals, objectives, and policies related to energy:

Conservation Element

Goal CN-3: Energy Resources. Reduce consumption of and reliance on nonrenewable energy, and support the development and use of renewable energy sources.

Policy CN-3.1: Interagency Coordination. Consult with regional agencies and utility companies to pursue energy efficiency goals and expand renewable energy strategies.

Policy CN-3.4: Site Design. Encourage site planning and subdivision design that incorporates the use of renewable energy systems.

Policy CN-3.8: Energy-Efficient Public Facilities. Promote and encourage efficient use of energy and the conservation of available resources in the design, construction, maintenance, and operation of public facilities, infrastructure, and equipment.

Policy CN-3.10: Energy Conservation in Public Projects. Work with businesses and contractors that use energy-efficient practices in the provision of services and equipment for city construction projects.

Goal CN-4: Water Resources. Conserve and replenish existing and future water resources.

Policy CN-4.3: Recycled Water Systems. Continue to coordinate with the Orange County Water District, Orange County Sanitation District, and developers for opportunities to expand use of reclaimed water systems.

Mobility Element

Goal M-5: Sustainable Transportation Design. A transportation system that is attractive, safe, state-of-the-art, and supports community, environmental, and conservation goals.

Policy M-5.6: Clean Fuels and Vehicles. Encourage the use of alternative fuel vehicles and mobility technologies through the installation of supporting infrastructure.

Public Services Element

Goal PS-1: Public Facilities. Require the development or rehabilitation of any public facility or capital improvement to incorporate site design and building practices that promote sustainability, energy efficiency, and resiliency.

Policy PS-1.7: Sustainable and Resilient Practices. Require the development or rehabilitation of any public facility or capital improvement to incorporate site design and building practices that promote sustainability, energy efficiency, and resiliency.

City of Santa Ana Climate Action Plan

The City of Santa Ana adopted its first-ever climate action plan, also known as the Climate and Adaptation Plan (CAAP) in December 2015. The CAAP provides a framework for creating or updating policies, programs, practices, and incentives for Santa Ana residents and businesses to reduce the City's GHG footprint, and ensure the community and physical assets are better protected from the impacts of climate change. Engaging those who live, work, and play in Santa Ana is essential to creating an effective

and successful CAAP. Residents, business owners, students, and other community stakeholders are encouraged to get involved by providing input and sharing ideas, priorities, and solutions to help establish and achieve the City's climate goals.

The reduction of GHG emissions is one of the primary objectives of the CAAP with a target of 30% below the baseline year 2008 by 2035 for community-wide emissions. The City developed a production inventory that analyzes emissions from local activities such as building energy use, vehicle travel, and waste disposal. The following sources within the City account for the majority of GHG emissions of its baseline year; transportation at 48 percent, commercial/industrial energy use at 29 percent, residential energy use at 13 percent, water, waste, and other sources at 10 percent. The following CAP measures aim at reducing emissions from the City's inventory and are applicable to the proposed Project:

Sector: Municipal Operations Transportation and Land Use

Measure: Alternative Fuel Vehicle Fleet.

Sector: Municipal Operations Energy. The City is in the process of replacing fleet vehicles with hybrid, CNG, electric, and propane fueled vehicles as replacement is needed. These replacements have been supported by grant funds from the Mobile Source Air Pollution Reduction Review Committee. For this measure, replacement of fleet vehicles will continue with all vehicles expected to be hybrid, CNG, electric, or propane fueled by 2035.

Sector: Municipal Operations Energy

Measure: Water Pump Retrofits. This measure would continue efficiency retrofits of motors at City water wells, completing conversion of all remaining pumping stations to variable frequency drives. The Santa Ana groundwater wells are known for producing some of the best tasting water in the country and do so with less environmental impact.

City of Tustin General Plan

The City of Tustin first adopted its General Plan in 1966. Amended sections of the General Plan have been adopted as of November 2018. The existing General Plan includes the following goals, objectives, and policies related to energy:

Conservation, Open Space, and Recreation Element

Goal 1. Reduce air pollution through proper land use, transportation and energy use planning.

Policy 1.1. Cooperate with the South Coast Air Quality Management District and the Southern California Association of Governments in their effort to implement provisions of the region's Air Quality Management Plan, as amended.

Policy 1.6. Cooperate and participate in regional air quality management plans, programs, and enforcement measures.

Goal 2. Improve air quality by influencing transportation choices of mode, time of day, or whether to travel and to establish a jobs/housing balance.

Policy 2.11. Promote state and federal legislation which would improve vehicle/transportation technology and cleaner fuels.

Goal 3. Reduce particulate emissions to the greatest extent feasible.

Policy 3.1. Adopt incentives, regulations, and/or procedures to minimize particulate emissions from paved and unpaved roads, agricultural uses, parking lots, and building construction.

Goal 4. Reduce emissions through reduced energy consumption.

Policy 4.1. Promote energy conservation in all sectors of the City including residential, commercial, and industrial.

Goal 11. Conserve energy resources through use of available energy technology and conservation practices.

Policy 11.1. Encourage the use of new technologies and innovative building design, site design and orientation techniques which minimize energy use by taking advantage of sun/shade patterns, prevailing winds, landscaping, and building materials.

Circulation Element

Goal 4. Maximize the efficiency of the circulation system through the use of transportation system management and demand management strategies.

Policy 4.3. Encourage the implementation of employer Transportation Demand Management (TDM) requirements, which were included in the Southern California Air Quality Management District's Regulation 2202 of the 1997 Air Quality Management Plan and as required by Proposition 111 as part of the Congestion Management Program (CMP) and participate in regional efforts to implement TDM requirements.

Land Use Element

Goal 4. Assure a safe, healthy, and aesthetically pleasing community for residents and businesses.

Policy 4.1. Mitigate traffic congestion and unacceptable levels of noise, odors, dust and light and glare which affect residential areas and sensitive receptors.

Goal 14. Continue to implement the Specific Plan/Reuse Plan for MCAS Tustin which maximizes the appeal of the site as a mixed use, master planned development and that includes the following

qualities seeking to create results that are very special and worthy of the site's present and historical importance.

Policy 14.1. Promote new uses and design which will peacefully coexist with surrounding residences and businesses in Tustin and adjacent cities, minimizing impacts on noise, air quality, traffic, and other environmental features wherever possible.

3.5.3 Impact Analysis and Mitigation Measures

Thresholds of Significance

The following criteria from CEQA Guidelines Appendix G are used as thresholds of significance to determine the impacts of the proposed Project as related to energy. The proposed Project would have a significant impact if it would:

1. Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation.
2. Conflict with or obstruct a state or local plan for renewable energy or energy efficiency.
3. Result in cumulatively considerable impacts to energy.

Methodology

Construction of the new extraction facilities and monitoring wells, groundwater treatment plants, and conveyance pipeline components would have the potential to increase energy consumption through the use of heavy-duty construction equipment, such as excavators, cranes, and forklifts, and through vehicle trips generated from workers and haul trucks traveling to and from the Project Area. Once operational, the components would require periodic maintenance and inspection to ensure the site and equipment are functioning properly. The installed electrical infrastructure, which may include installation of high and low voltage wiring, transformers, switchgear, motor control centers, variable frequency drives, motor actuated valves, lighting and various conduits, would require energy to operate.

The proposed Project is a planning-level document, and, as such, there are no specific projects, project construction dates, specific construction plans, or operational equipment specifications identified. Therefore, quantification of energy consumption associated with buildout cannot be specifically determined at this time. Therefore, the analysis will be based on the potential for construction and operational energy consumption to exceed thresholds in the context of development intensity and compliance with regulatory standards.

Impact Analysis

Energy Consumption

Impact 3.5-1: The proposed Project could result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation.

Extraction Facilities, Monitoring Wells, Local Groundwater Treatment Plants, and Conveyance Pipeline

Construction

During construction of the new extraction facilities and monitoring wells, groundwater treatment plants, and conveyance pipeline components, energy would be consumed in the form of electricity on a limited basis for powering lights, electronic equipment, or other construction activities necessitating electrical power. Construction would also consume energy in the form of petroleum-based fuels associated with the use of off-road construction vehicles and equipment, construction workers traveling to and from development sites, and delivery and haul truck trips (e.g., hauling of demolition material to off-site reuse and disposal facilities).

Electricity

Construction electricity would be consumed, on a limited basis, to power lighting and security lighting, electric equipment, and supply and convey water for dust control. During construction of the new extraction facilities, monitoring wells, groundwater treatment plants, and conveyance pipeline components, the electricity demand at any given time would vary throughout the construction period based on the construction activities being performed, and would cease upon completion of construction. Electricity use from construction would be short-term, limited to working hours, and used for necessary construction-related activities. When not in use, electric equipment would be powered off to avoid unnecessary energy consumption. Therefore, the impact from construction electrical demand would be less than significant and would not result in the wasteful, inefficient, and unnecessary consumption of energy.

Natural Gas

Construction activities, including the construction of the new extraction facilities, monitoring wells, groundwater treatment plants, and conveyance pipeline components, typically do not involve the consumption of natural gas. Accordingly, natural gas would generally not be supplied to support construction activities; thus, there would be no expected demand generated by future construction of the proposed Project. If natural gas is used during construction, it would be in limited amounts and on a temporary basis and would specifically be used to replace or offset diesel-fueled equipment and as such would not result in substantial on-going demand. Therefore, the impact from construction natural gas demand would be less than significant and would not result in the wasteful, inefficient, and unnecessary consumption of energy.

Transportation Energy

Transportation fuels (gasoline and diesel) are produced from crude oil, which can be supplied domestically or imported from various regions around the world. Based on current proven reserves, crude oil production would be sufficient to meet over 50 years of worldwide consumption.[20]

Construction of the new extraction facilities, monitoring wells, groundwater treatment plants, and conveyance pipeline components would utilize fuel-efficient equipment consistent with state and federal regulations, such as the fuel efficiency regulations in accordance with the Advanced Clean Cars and Advanced Clean Truck Program, which would result in more efficient use of transportation fuels (lower consumption). Construction equipment and vehicles would also be required to comply with anti-idling regulations in accordance with Section 2485 in Title 13 of the CCR, and fuel requirements in accordance with Section 93115 in Title 17 of the CCR. As such, construction of new development would comply with regulatory measures to reduce the inefficient, wasteful, and unnecessary consumption of energy, such as petroleum-based transportation fuels. While some of these regulations are intended to reduce construction emissions, compliance with the anti-idling and emissions regulations discussed above would also result in fuel savings from the use of more fuel-efficient engines.

Based on the analysis above, construction would utilize energy only for necessary on-site activities and to transport construction materials and demolition debris to, from, and within the city. As discussed above, idling restrictions and the use of cleaner, energy-efficient equipment and fuels would result in less fuel combustion and energy consumption, and thus minimize construction-related energy use. Therefore, construction of the new extraction facilities, monitoring wells, groundwater treatment plants, and conveyance pipeline components would not result in the wasteful, inefficient, and unnecessary consumption of energy, and this impact would be less than significant.

Operations

Once operational, the components would require periodic maintenance and inspection to ensure the site and equipment are functioning properly. Site inspections would survey the grounds and exterior appearance, exercise the active and standby electrical equipment, maintain the instrumentation and radio equipment, and conduct performance testing. However, operation of these components would not result in the need for new or expanded electric power or natural gas facilities. Operation would also not generate a noticeable number of vehicular trips and would not result in substantial demand for transportation fuels.

The proposed Project would require electricity to support operation of the components. Electrical infrastructure may include installation of high and low voltage wiring, transformers, switchgear, motor control centers, variable frequency drives, motor actuated valves, lighting and various conduits. All electrical and instrumentation equipment will be installed according to all best practices and standards (e.g., National Electrical Manufacturers Association, Institute of Electrical and Electronics Engineers, etc.) and will be installed in weather resistant enclosures or small buildings. As discussed in Chapter 2, *Project Description*, the purpose of the proposed Project is to protect human health by preventing human ingestion of groundwater containing contaminants of concern (COCs) exceeding maximum contaminant levels (MCLs)/risk-based standards and to protect the environment decreasing further degradation of the

[20] BP, 2021. Statistical Review of World Energy 2021, 70th edition, https://www.bp.com/content/dam/bp/business-sites/en/global/corporate/pdfs/energy-economics/statistical-review/bp-stats-review-2021-full-report.pdf. Accessed January 2024.

groundwater resource due to plume expansion and maintaining surface water COC concentrations to levels that are protective of potential ecological receptors. The proposed Project would install necessary and appropriately-sized equipment and would be electric-powered. Equipment would be obtained from manufacturers and suppliers in compliance with applicable equipment energy efficiency requirements. The use of electric-powered equipment, with electricity supplied by the electric utility provider for the proposed Project, SCE, would provide a clean electricity mix with an increasing proportion provided by renewable energy sources, as required by the State's RPS, which sets continuously escalating renewable energy procurement requirements. Thus, the proposed Project would result in a less than significant impact with respect to wasteful, inefficient, or unnecessary consumption of energy resources.

Mitigation Measures

None Required.

Significance Determination

Less than Significant Impact.

Energy Efficiency Plans

Impact 3.5-2: The proposed Project could conflict with or obstruct a state or local plan for renewable energy or energy efficiency.

Extraction Facilities, Monitoring Wells, Local Groundwater Treatment Plants, and Conveyance Pipelines

Construction

The construction of the new extraction facilities, monitoring wells, groundwater treatment plants, and conveyance pipeline components would utilize construction contractors who must demonstrate compliance with applicable regulations. Contractors would need to ensure that construction equipment used for development would comply with federal, state, and regional requirements where applicable. With respect to truck fleet operators, the USEPA and NHSTA have adopted fuel-efficiency standards for medium- and heavy-duty trucks that will be phased in over time. Phase 1 heavy-duty truck standards apply to combination tractors, heavy-duty pickup trucks and vans, and vocational vehicles for model years 2014 through 2018 and result in a reduction in fuel consumption from 6 to 23 percent over the 2010 baseline, depending on the vehicle type.[21] The USEPA and NHTSA also adopted the Phase 2 heavy-duty truck standards, which cover model years 2021 through 2027 and require the phase-in of a 5 to 25 percent reduction in fuel consumption over the 2017 baseline depending on the compliance year and vehicle type.[22] These regulations would have an overall beneficial effect on reducing fuel consumption from trucks over time as older trucks are replaced with newer models that meet the standards.

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[21] U. S. Environmental Protection Agency (USEPA), 2011. Fact Sheet: EPA and NHTSA Adopt First-Ever Program to Reduce Greenhouse Gas Emissions and Improve Fuel Efficiency of Medium- and Heavy-Duty Vehicles, 2011. https://www.nhtsa.gov/sites/nhtsa.gov/files/detailed-fact-sheet.pdf. Accessed January 2024.

[22] USEPA, 2016. Federal Register / Vol. 81, No. 206, Greenhouse Gas Emissions and Fuel-Efficiency Standards for Medium- and Heavy-Duty Engines and Vehicles—Phase 2, 2016.

In addition, construction equipment and trucks are required to comply with CARB regulations regarding heavy-duty truck idling limits of five minutes per occurrence and location. Additionally, CARB regulations regarding in-use off-road equipment require older, less efficient equipment to be replaced or repowered with newer, more efficient models or engines. These regulations would result in an increase in energy savings in the form of reduced fuel consumption from more fuel-efficient engines. Although these requirements are intended to reduce criteria pollutant emissions, compliance with the anti-idling and emissions regulations would also result in the efficient use of construction-related energy. Thus, based on the information above, construction of the new extraction facilities, monitoring wells, groundwater treatment plants, and conveyance pipeline components would not conflict with or obstruct energy standards and the impact would be **less than significant**.

Operations

During operation, the proposed Project would result in a minimal increase in operation-related vehicle trips; therefore, the proposed Project would not result in unplanned growth in VMT and would thus not result in adverse impacts to transportation energy consumption. The proposed Project would require electricity to support operation of the facilities. Electrical infrastructure may include installation of high and low voltage wiring, transformers, switchgear, motor control centers, variable frequency drives, motor actuated valves, lighting and various conduits. The electric utility provider for the proposed Project, SCE, would be required to comply with the State's RPS which sets continuously escalating renewable energy procurement requirements for the State's load-serving entities. The RPS requires retail sellers and local publicly owned electric utilities to procure eligible renewable electricity for 44 percent of retail sales by December 31, 2024, 52 percent by December 31, 2027, and 60 percent by December 31, 2030, and that the CARB should plan for 100 percent eligible renewable energy resources and zero-carbon resources by December 31, 2045. Therefore, the proposed Project would not conflict with or obstruct energy standards and impacts from operation would be less than significant.

Mitigation Measures

None Required.

Significance Determination

Less than Significant Impact.

Cumulative Impacts

Impact 3.5-3: Concurrent construction and operation of the proposed Project and related projects in the geographic scope could result in cumulative short-term and long-term impacts to energy.

Extraction Facilities, Monitoring Wells, Local Groundwater Treatment Plants, and Conveyance Pipelines

This section presents an analysis of the cumulative effects of the proposed Project in combination with other past, present, and reasonably foreseeable future projects that could cause cumulatively considerable impacts. Significant cumulative impacts related to energy could occur from the incremental impacts of the proposed Project combined with the incremental impacts of one or more cumulative projects. Cumulative

projects are listed in Table 3-1 of Chapter 3, *Environmental Setting, Impact Analysis, and Mitigation Measures*.

Electricity

The geographic context for the cumulative analysis of electricity is SCE's service area. Any cumulative projects would have electricity supplied by SCE. Growth within this geography is anticipated to increase the demand for electricity and the need for infrastructure. Future development under the proposed Project would result in the increased use of electricity resources. However, the use of such resources would be minor compared to existing supply and infrastructure within the SCE service area and would be consistent with growth expectations (SCE 2023a). Additionally, it is expected that SCE would continue to expand delivery capacity as necessary to meet demand increases within its service area. Furthermore, other cumulative developments would be required to incorporate energy conservation features in order to comply with applicable mandatory regulations including the Title 24 standards, CALGreen Code, the County's and cities' General Plan, and Climate Action Plan as applicable. As such, the proposed Project's contribution to cumulative impacts due to wasteful, inefficient, and unnecessary consumption of energy would be less than cumulatively considerable.

Natural Gas

The geographic context for the cumulative analysis of natural gas is the SoCalGas service area. All cumulative projects would have natural gas supplied by SoCalGas. Cumulative development projects in the SoCalGas service area could result in the use of natural gas resources, however the use of such resources would be consistent with regional and local growth expectations for the SoCalGas service area. Further, SoCalGas expects overall natural gas demand to decline through 2035, even accounting for population and economic growth, with efficiency improvements and the State's transition away from fossil fuel-generated electricity to increased renewable energy. Future development projects would be required to incorporate energy conservation features in order to comply with applicable mandatory regulations including the Title 24 standards, CALGreen Code, the County's and cities' General Plan, and the CAP as applicable. As such, since the proposed Project does not consume any natural gas, its contribution to cumulative impacts due to wasteful, inefficient, and unnecessary consumption of energy would be less than cumulatively considerable.

Transportation Energy

The geographic context for the cumulative analysis of transportation energy is Orange County. Growth within this area is anticipated to increase the demand for transportation and the need for infrastructure, such as new or expanded facilities. Most of the cumulative projects would increase the demand for transportation and the need for expanded infrastructure. Transportation fuels (gasoline and diesel) are produced from crude oil, which can be domestic or imported from various regions around the world. Based on current petroleum production and consumption and future trends, oil production and consumption will grow through 2050 (USEIA 2023). However, domestic consumption of petroleum and other liquids does not increase through 2040. Therefore, supply should be sufficient (USEIA 2023).

Buildout of cumulative projects would be expected to increase overall VMT; however, the effect on transportation fuel demand would be reduced by future improvements to vehicle fuel economy pursuant to federal and state regulations which would increase current vehicle miles per gallon standards. Buildout of the proposed Project, as well as cumulative projects, would cumulatively increase the demand for

transportation-related fuel in the state and region. However, as discussed above, the proposed Project would not conflict with the energy efficiency policies emphasized by the 2020–2045 RTP/SCS since the proposed Project would result in minimal operational vehicle trips. Since the proposed Project would not conflict with the 2020–2045 RTP/SCS with respect to energy use, the proposed Project's contribution to cumulative impacts with respect to potentially significant environmental impacts due to conflicts with or obstruction of a state or local plan for transportation energy efficiency would be less than cumulatively considerable.

Mitigation Measures

None Required.

Significance Determination

Less than Significant Impact.

3.6 Geology and Soils

This section addresses the geology and soils impacts associated with implementation of the proposed Project. This section includes: a description of the existing geology and soil conditions in the Project Area; a summary of applicable regulations related to geology and soils; and an evaluation of the potential impacts of the proposed Project related to geology and soils in the Project Area, including cumulative impacts. The paleontological resource discussion is based on the South Basin Groundwater Protection Project Paleontological Resources Assessment Report prepared by ESA dated August 2024. The Paleontological Resources Assessment can be found in **Appendix D2** of this Draft PEIR.

3.6.1 Environmental Setting

Regional and Local Geology

The Project Area is located within the Peninsular Ranges geomorphic province, comprising a series of ranges separated by northwest trending valleys, subparallel to faults branching from the San Andreas Fault (CGS 2002).[23] The tectonics of the San Andreas Fault and other major faults in the western part of California have played a major role in the geologic history of the area, driven by the interaction of the Pacific and North American Tectonic Plates. The region is marked by northwest-trending elongated ranges and valleys that roughly parallel the coast and the San Andreas Fault Zone.

The trend of topography is similar to the Coast Ranges, but the geology is more like the Sierra Nevada, with granitic rock intruding the older metamorphic rocks. The Project Area is located within the Coastal Plain of Orange County Groundwater Basin 8-001 (the Basin), which is bounded by the Santa Ana Mountains, Chino Hills, and Puente Hills along the northeast, sloping along the coastal plain to the Pacific Ocean along the southwest (OCWD 2017). The Project Area lies at the eastern edge of a broad coastal plain that is entirely developed urban land that slopes gently southwestward to the Pacific Ocean. The Project Area is essentially flat with elevations ranging from about 90 feet above mean sea level (MSL) near Edinger Avenue to about 35 feet above MSL at the southern portion of the Project Area.

The Basin has been divided into three major aquifer systems based largely on geologic data and vertical potentiometric head differences between wells constructed at different depth intervals within the aquifer systems (EA 2023). From shallow to deep, the three aquifer systems are the Shallow Aquifer System, the Principal Aquifer System, and the Deep Aquifer System. Although individually identified, the aquifer systems are known to be hydraulically connected as groundwater flows between them by way of discontinuities in the aquitards or leakage through the intervening aquitards.

The Shallow Aquifer System consists of a heterogeneous mixture of sediments from near land surface to depths ranging from about 83 feet below ground surface (bgs) in the south-central portion of the Project Area to about 162 feet bgs in the north-central portion of the Project Area. The heterogeneous complex of unconsolidated sediments that comprise the Shallow Aquifer System within the Project Area is generally characterized by various thicknesses of interfingered layers, lenses, interbeds, laminations, and mixtures of clays, silts, sands, and gravels of varying lateral extents. The Shallow Aquifer System is distinguished from the upper portions of the underlying Principal Aquifer System by variable thicknesses of generally

[23] A geomorphic province is a regional area that possesses similar bedrock, structure, history, and age.

finer-grained lower permeability sediments that tend to restrict, but do not preclude, hydraulic communication between the two aquifer systems.

The Principal Aquifer System consists of coarser-grained material, which is generally over 1,000 feet thick throughout much of the Basin (OCWD 2015). The Principal Aquifer System is largely separated from the overlying Shallow Aquifer System by an extensive aquitard in the coastal and mid-Basin areas. Over 90 percent of groundwater production from within the Basin occurs from wells that are screened within the Principal Aquifer System at depths between 200 and 1,300 feet, which underlies the Shallow Aquifer System and is up to 2,000 feet deep in the center of the Basin (OCWD 2017).

Underlying the Principal Aquifer System is the Deep Aquifer System, which reaches depths of up to 4,000 feet (OCWD 2015). The Deep Aquifer System is generally confined throughout the Basin and is separated from the overlying Principal Aquifer System by an extensive aquitard that thins somewhat in the Forebay area (roughly the northern half of the Basin) but remains laterally extensive. The Deep Aquifer System contains amber-colored groundwater in the coastal area due to natural organic material from ancient, buried, plant and wood material that gives the water an amber tint and a sulfur odor (OCWD 2017). Although this water is of high quality, its color and odor produce negative aesthetic qualities that require treatment before use as drinking water.

The Project Area lies within a broad valley directly north of the Peninsular Ranges in the southern Los Angeles basin (Yerkes et al. 1965). This largely northwest-trending basin started forming in the Late Cretaceous but ramped up tectonic movement in the Miocene (Sylvester and O-Black Gans 2016). As the surrounding mountain ranges rose up (Peninsular Ranges and Transverse Ranges), the basin floor was infilled with detritus eroded from the adjacent uplands.

Seismic Hazards

Surface Fault Rupture

The State Alquist-Priolo Earthquake Fault Zoning Act (Alquist-Priolo Act) prohibits the development of structures for human occupancy across active fault traces. Under this Act, the California Geological Survey (CGS) has established “Zones of Required Investigation” on either side of an active fault that delimits areas susceptible to surface fault rupture. The zones are referred to as Earthquake Fault Zones (EFZs) and are shown on official maps published by the CGS. Surface rupture occurs when the ground surface is broken due to a fault movement during an earthquake; typically, these types of hazards occur within 50 feet of an active fault.

The Project Area lies within a region that is seismically active. However, based on a review of the California Earthquake Hazards Zone Application (EQ Zapp) of available earthquake hazard zone data, there are there are no Holocene-active[24] faults that cross the Project Area (CGS 2024). The nearest Holocene-active faults are the North Branch of the Newport-Inglewood-Rose Canyon Fault Zone about 6 miles to the west and the Whittier Fault within the Elsinore Fault Zone about 15 miles to the northeast.

[24] Holocene-active faults show evidence of displacement within the Holocene Epoch, or the last 11,700 years are considered active (CGS 2008).

Seismic Ground-shaking

Ground shaking occurs due to a seismic event and can cause extensive damage to life and property and may affect areas hundreds of miles away from the earthquake's epicenter. The extent of the damage varies by event and is determined by several factors, including but not limited to magnitude and depth of the earthquake, distance from epicenter, duration and intensity of the shaking, underlying soil and rock types, and integrity of structures.

The Southern California region, including the Project Area, could be subject to strong ground shaking as a result of significant earthquakes generated from local active faults. The 2014 Working Group on California Earthquake Probabilities (WGCEP)[25] concluded that there is a 60 percent probability that a magnitude (M_W) 6.7 earthquake or higher could occur in the Los Angeles region over the next 30 years (WGCEP 2015).

Liquefaction

Liquefaction is a phenomenon in which unconsolidated, water saturated sediments become unstable due to the effects of strong seismic shaking. During an earthquake, these sediments can behave like a liquid, potentially causing severe damage to overlying structures. Lateral spreading is a variety of minor landslide that occurs when unconsolidated liquefiable material breaks and spreads due to the effects of gravity, usually down gentle slopes. Liquefaction-induced lateral spreading is defined as the finite, lateral displacement of gently sloping ground as a result of pore-pressure buildup or liquefaction in a shallow underlying deposit during an earthquake. The occurrence of this phenomenon is dependent on many complex factors, including the intensity and duration of ground shaking, particle-size distribution, and density of the soil.

The potential damaging effects of liquefaction include differential settlement, loss of ground support for foundations, ground cracking, heaving and cracking of structure slabs due to sand boiling, and buckling of deep foundations due to ground settlement. Dynamic settlement (i.e., pronounced consolidation and settlement from seismic shaking) may also occur in loose, dry sands above the water table, resulting in settlement of and possible damage to overlying structures. In general, a relatively high potential for liquefaction exists in loose, sandy soils that are within 50 feet of the ground surface and are saturated (below the groundwater table). Lateral spreading can move blocks of soil, placing strain on buried pipelines that can lead to leaks or pipe failure.

According to the EQ Zapp, the Project Area is entirely within an established liquefaction zone (CGS 2024).

Geologic Hazards

Landslides and Erosion

Landslides are one of the various types of downslope movements in which rock, soil, and other debris are displaced due to the effects of gravity. The potential for material to detach and move down slope depends on multiple factors including the type of material, water content, and steepness of terrain. Generally,

[25] Also referred to as WGCEP 2014, this is a working group comprised of seismologists from the U.S. Geological Survey (USGS), CGS, Southern California Earthquake Center (SCEC), and California Earthquake Authority (CEA).

earthquake-induced landslides occur within deposits of a moderate to high landslide potential when ground shaking triggers slope failures during or as a result of a nearby earthquake.

The urbanized, developed areas of the Project Area have a very low landslide potential due to the relatively flat topography and lack of slopes and hills. According to the EQ Zapp, the Project Area is not within any established landslide zone (CGS 2024).

Soil Types and Expansiveness

The Project Area is entirely developed and urbanized and is underlain with imported fill and disturbed native materials. Where present, native materials consist of Chino silty clay loam and Omni clay (NRCS 2023).

Expansive soils are soils that possess a "shrink-swell" characteristic, also referred to as linear extensibility. Shrink-swell is the cyclic change in volume (expansion and contraction) that occurs in fine-grained clay sediments from the process of wetting and drying; the volume change is reported as a percent change for the whole soil. Changes in soil moisture can result from rainfall, landscape irrigation, utility leakage, roof drainage, and/or perched groundwater.[26] This cyclical change in soil volume is measured using the coefficient of linear extensibility (COLE) (NRCS 2023a). The Natural Resources Conservation Service (NRCS) relies on linear extensibility measurements to determine the shrink-swell potential of soils. If the linear extensibility percent is more than 3 percent (COLE=0.03), shrinking and swelling may cause damage to buildings, roads, and other structures. Structural damage may occur incrementally over a long period of time, usually as a result of inadequate soil and foundation engineering or the placement of structures directly on expansive soils.

The northern proposed Project facility locations from East Dyer Rad to Bell Alignments G-1 through G-5 and G-8; see Figure 2-5) are identified as having a moderate potential for expansive soil; the southern proposed Project facility locations Alignments G-6 and G-7 are identified as having a high potential for expansive soils (NRCS 2023b). However, this is based on the underlying soil types. The shallow surface materials where well pads, treatment systems and pipelines would be located are likely on fill and disturbed materials. The actual potential for expansive soils is uncertain.

Subsidence

Land subsidence can be caused by the lowering of groundwater levels, and resultant reduction of pore water pressure, due to extraction of groundwater at rates that exceed recharge. OCWD manages the extraction of groundwater within the OCWD Management Area, which includes the Project Area (OCWD 2017). Management of the Basin by maintaining storage levels within the established operating range has minimized land subsidence. Within the OCWD Management Area, which includes the Project Area, there is no evidence of long-term inelastic land subsidence nor any land subsidence that has interfered with surface uses.

[26] Perched groundwater is a local saturated zone above the water table that typically exists above an impervious layer (such as clay) of limited extent.

Land subsidence can also be caused by the extraction of crude oil. The Project Area is not located in a crude oil production field (CalGEM 2024). The nearest crude oil production fields (Huntington Beach and Newport) are located at least 5 miles west of the Project Area.

Paleontological and Unique Geologic Features

Paleontological resources are the mineralized (fossilized) remains of prehistoric plants and animals, including body fossils, such as bones, bark or wood, and shells, as well as trace fossils, such as shell, leaf, skin, or feather impressions, footprints, burrows, or other evidence of an organism's life or activity. These resources are located within sedimentary rocks or alluvium and are considered to be nonrenewable.

In its "Standard Procedures for the Assessment and Mitigation of Adverse Impacts to Paleontological Resources," the Society of Vertebrate Paleontology (SVP) defines four categories of paleontological potential for rock units: high, low, undetermined, and no potential: High Potential, rock units from which vertebrate or significant invertebrate, plant, or trace fossils have been recovered are considered to have a high potential for containing additional significant paleontological resources; Low Potential, rock units that are poorly represented by fossil specimens in institutional collections, or based on general scientific consensus only preserve fossils in rare circumstances and the presence of fossils is the exception not the rule; Undetermined Potential, rock units for which little information is available concerning their paleontological content, geologic age, and depositional environment; and No Potential, rock units like high-grade metamorphic rocks and igneous rocks that will not preserve fossil resources (SVP 2010).

Paleontological Literature Review

Geologic Map and Literature Review

Based on the detailed surficial geological map of Bedrossian et al. (2012), the Project lies mostly upon young alluvial fan deposits (Qyf) with some sections upon young, alluvial valley deposits (Qya). These geologic units are found in the center of the valley and the mountain piedmonts are fringed by older fan deposits (Qof) that are unlikely to be encountered at depth. Alluvium is to be expected in this area because the Project occupies the ancestral confluence of several drainages before exiting to the ocean at Newport Bay. While older, fossiliferous units are exposed in the hills to the south of the Project, those units are anticipated to be deep in the Project Area.

Natural History Museum of Los Angeles County Records Search

A paleontological resources database search was conducted by the Natural History Museum of Los Angeles County (LACM) on February 25, 2024. The search entailed an examination of current geologic maps and known fossil localities within the Project Area and vicinity. The purpose of the records search was to (1) determine whether any previously recorded fossil localities occur in the Project Area or vicinity; (2) assess the potential for disturbance of these localities during construction; and (3) assist in evaluating the paleontological sensitivity of the Project Area.

Results of the paleontological resources records search conducted by the LACM indicated that no fossil localities lie directly within the Project Area; however, several fossil localities (LACM IP 4695, LACM VP 7713, LACM VP 7867, LACM VP 3977, 3978, 3986; LACM IP 5092, 5867) were identified nearby from the same sedimentary deposits that may occur in the Project Area (Bell 2024).

Fossil invertebrates including clams (Saxidomas) and bryozoan (Bryozoa, indet; Conopeum) were identified at locality LACM IP 4695 at unknown depths. A sloth (Mylodontidae?) was found at locality LACM VP 7713 at an unknown depth. Fossil rodents (Rodentia) were reported at LACM VP 7867 at a depth of 25 feet bgs. Turkey family (Meleagridae) and Artiodactyla fossils were all reported at LACM VP 3977, 3978, and 3986 in a roadcut 11 to 25 feet above the roadbed, while invertebrate (brachiopods, molluscs) fossils were identified at LACM IP 5092 at similar depths. Lastly, school shark (Galeorhinus), eagle ray (Myliobatus), goby (Lepidogobius, Leptocottus), midshipmen (Porichthys), croaker (Seriphus), flatfish (Citharichthys), cusk-eel (Otophidium), skate (Raja), angelshark (Squatina), sculpin (Cottidae) fossils were identified at LACM VP 7657–7659.

Paleontological Sensitivity

Paleontological sensitivity is defined as the potential for a geologic unit to produce scientifically significant fossils. This is determined by rock type, past history of the geologic unit in producing significant fossils, and fossil localities recorded from that unit. Paleontological sensitivity is derived from the known fossil data collected from the entire geologic unit, not just from a specific survey. In its "Standard Guidelines for the Assessment and Mitigation of Adverse Impacts to Non-renewable Palaeontologic Resources," the SVP (2010) defines four categories of paleontological sensitivity (potential) for rock units: high, low, undetermined, and no potential:

- **High Potential.** Rock units from which vertebrate or significant invertebrate, plant, or trace fossils have been recovered are considered to have a high potential for containing additional significant paleontological resources. Rocks units classified as having high potential for producing paleontological resources include, but are not limited to, sedimentary formations and some volcaniclastic formations (e. g., ashes or tephras), and some low-grade metamorphic rocks which contain significant paleontological resources anywhere within their geographical extent, and sedimentary rock units temporally or lithologically suitable for the preservation of fossils (e. g., middle Holocene and older, fine-grained fluvial sandstones, argillaceous and carbonate-rich paleosols, cross-bedded point bar sandstones, fine-grained marine sandstones, etc.).
- **Low Potential.** Reports in paleontological literature or field surveys by a qualified professional paleontologist may allow determination that some rock units have low potential for yielding significant fossils. Such rock units will be poorly represented by fossil specimens in institutional collections, or based on general scientific consensus only preserve fossils in rare circumstances and the presence of fossils is the exception not the rule, e. g. basalt flows or Recent colluvium. Rock units with low potential typically will not require impact mitigation measures to protect fossils.
- **Undetermined Potential.** Rock units for which little information is available concerning their paleontological content, geologic age, and depositional environment are considered to have undetermined potential. Further study is necessary to determine if these rock units have high or low potential to contain significant paleontological resources. A field survey by a qualified professional paleontologist to specifically determine the paleontological resource potential of these rock units is required before a paleontological resource impact mitigation program can be developed. In cases where no subsurface data are available, paleontological potential can sometimes be determined by strategically located excavations into subsurface stratigraphy.

- **No Potential.** Some rock units have no potential to contain significant paleontological resources, for instance high-grade metamorphic rocks (such as gneisses and schists) and plutonic igneous rocks (such as granites and diorites). Rock units with no potential require no protection nor impact mitigation measures relative to paleontological resources.

For geologic units with high potential, full-time monitoring is generally recommended during any Project-related ground disturbance. For geologic units with low potential, protection or salvage efforts will not generally be required. For geologic units with undetermined potential, field surveys by a qualified vertebrate paleontologist should be conducted to specifically determine the paleontologic potential of the rock units present within the Project Area.

The results of the LACM records search and geologic map review (Bedrossian et al. 2012) indicate that the Project Area has a low potential for paleontological resources at depths up to approximately 25 feet below ground surface that increases to high potential below 25 feet in depth. If excavations exceed the thickness of the young fans and alluvium, Pleistocene fan deposits may be encountered, and they may contain fossils. However, the precise depth to the Pleistocene is currently unknown beneath the components of the Project.

3.6.2 Regulatory Framework

Federal

Clean Water Act

The federal Clean Water Act (CWA) and subsequent amendments, under the enforcement authority of the U.S. Environmental Protection Agency (USEPA), was enacted "to restore and maintain the chemical, physical, and biological integrity of the Nation's waters." The purpose of the CWA is to protect and maintain the quality and integrity of the nation's waters by requiring states to develop and implement state water plans and policies. The CWA gave the USEPA the authority to implement pollution control programs such as setting wastewater standards for industry. In California, implementation and enforcement of the National Pollutant Discharge Elimination System (NPDES) program is conducted through the California State Water Resources Control Board (SWRCB) and the nine Regional Water Quality Control Boards (RWQCBs). The CWA also sets water quality standards for surface waters and established the NPDES program to protect water quality through various sections of the CWA, including Sections 401 through 404 and 303(d) that are implemented and regulated by the SWRCB and the nine RWQCBs. CWA Section 402 would apply to the proposed Project because construction at the proposed Project would be required to control discharges of pollutants from point sources, as discussed below (see *National Pollutant Discharge Elimination System (NPDES) Construction General Permit* below).

State

Alquist-Priolo Earthquake Fault Zoning Act

The Alquist-Priolo Earthquake Fault Zoning Act was passed in 1972 to protect structures for human occupancy from the hazard of surface faulting. In accordance with the act, the State Geologist has established regulatory zones—called earthquake fault zones—around the surface traces of active faults and has published maps showing these zones. Buildings for human occupancy cannot be constructed

across surface traces of faults that are determined to be active. Because many active faults are complex and consist of more than one branch that may experience ground surface rupture, earthquake fault zones extend approximately 200 to 500 feet on either side of the mapped fault trace.

Seismic Hazards Mapping Act

The Seismic Hazards Mapping Act was passed in 1990 following the Loma Prieta earthquake to reduce threats to public health and safety and to minimize property damage caused by earthquakes. This act requires the State Geologist to delineate various seismic hazard zones, and cities, counties, and other local permitting agencies to regulate certain development projects within these zones. For projects that would locate structures for human occupancy within designated Zones of Required Investigation, the Seismic Hazards Mapping Act requires project applicants to perform a site-specific geotechnical investigation to identify the potential site-specific seismic hazards and corrective measures, as appropriate, prior to receiving building permits. The CGS *Guidelines for Evaluating and Mitigating Seismic Hazards* (Special Publication 117A) provides guidance for evaluating and mitigating seismic hazards (CGS 2008).

California Building Code (CBC)

The California Building Code (CBC), which is codified in Title 24 of the California Code of Regulations, Part 2, was promulgated to safeguard the public health, safety, and general welfare by establishing minimum standards related to structural strength, means of egress to facilities (entering and exiting), and general stability of buildings. The purpose of the CBC is to regulate and control the design, construction, quality of materials, use/occupancy, location, and maintenance of all buildings and structures within its jurisdiction. Title 24 is administered by the California Building Standards Commission, which, by law, is responsible for coordinating all building standards. Under State law, all building standards must be centralized in Title 24 or they are not enforceable. The provisions of the CBC apply to the construction, alteration, movement, replacement, location, and demolition of every building or structure or any appurtenances connected or attached to such buildings or structures throughout California.

The CBC is updated triennially; the 2022 edition of the CBC was published by the California Building Standards Commission on July 1, 2022, and took effect starting January 1, 2023. The 2022 CBC contains California amendments based on the American Society of Civil Engineers (ASCE) Minimum Design Standard ASCE/SEI 7-16, Minimum Design Loads for Buildings and Other Structures, provides requirements for general structural design and includes means for determining earthquake loads as well as other loads (such as wind loads) for inclusion into building codes. Seismic design provisions of the building code generally prescribe minimum lateral forces applied statically to the structure, combined with the gravity forces of the dead and live loads of the structure, which the structure then must be designed to withstand. The prescribed lateral forces are generally smaller than the actual peak forces that would be associated with a major earthquake. Consequently, structures should be able to (1) resist minor earthquakes without damage; (2) resist moderate earthquakes without structural damage but with some nonstructural damage; and (3) resist major earthquakes without collapse, but with some structural as well as nonstructural damage. Conformance to the current building code recommendations does not constitute any kind of guarantee that significant structural damage would not occur in the event of a maximum magnitude earthquake; however, it is reasonable to expect that a structure designed in accordance with the seismic requirements of the CBC should not collapse in a major earthquake.

The earthquake design requirements take into account the occupancy category of the structure, site class, soil classifications, and various seismic coefficients, all of which are used to determine a seismic design category (SDC) for a project. The SDC is a classification system that combines the occupancy categories with the level of expected ground motions at the site; SDC ranges from A (very small seismic vulnerability) to E/F (very high seismic vulnerability and near a major fault). Seismic design specifications are determined according to the SDC in accordance with CBC Chapter 16. CBC Chapter 18 covers the requirements of geotechnical investigations (Section 1803), excavation, grading, and fills (Section 1804), load-bearing of soils (Section 1806), as well as foundations (Section 1808), shallow foundations (Section 1809), and deep foundations (Section 1810). For Seismic Design Categories D, E, and F, Chapter 18 requires analysis of slope instability, liquefaction, and surface rupture attributable to faulting or lateral spreading, plus an evaluation of lateral pressures on basement and retaining walls, liquefaction and soil strength loss, and lateral movement or reduction in foundation soil-bearing capacity. It also addresses measures to be considered in structural design, which may include ground stabilization, selecting appropriate foundation type and depths, selecting appropriate structural systems to accommodate anticipated displacements, or any combination of these measures. The potential for liquefaction and soil strength loss must be evaluated for site-specific peak ground acceleration magnitudes and source characteristics consistent with the design earthquake ground motions.

Requirements for geotechnical investigations are included in Appendix J, CBC Section J104, *Engineered Grading Requirements*. As outlined in Section J104, applications for a grading permit are required to be accompanied by plans, specifications, and supporting data consisting of a soils engineering report and engineering geology report. Additional requirements for subdivisions requiring tentative and final maps and for other specified types of structures are in California Health and Safety Code Sections 17953 to 17955 and in 2013 CBC Section 1802. Testing of samples from subsurface investigations is required, such as from borings or test pits. Studies must be done as needed to evaluate slope stability, soil strength, position and adequacy of load-bearing soils, the effect of moisture variation on load-bearing capacity, compressibility, liquefaction, differential settlement, and expansiveness.

National Pollutant Discharge Elimination System (NPDES) Construction General Permit

Construction associated with projects that would disturb more than one acre of land surface affecting the quality of stormwater discharges into waters of the U.S. are subject to the *NPDES General Permit for Stormwater Discharges Associated with Construction and Land Disturbance Activities* (Order 2022-0057-DWQ, NPDES No. CAS000002). The Construction General Permit regulates discharges of pollutants in stormwater associated with construction activity to waters of the U.S. from construction sites that disturb one acre or more of land surface, or that are part of a common plan of development or sale that disturbs more than one acre of land surface. The permit regulates stormwater discharges associated with construction or demolition activities, such as clearing and excavation; construction of buildings; and linear underground projects, including installation of water pipelines and other utility lines.

The Construction General Permit requires that construction sites be assigned a Risk Level of 1 (low), 2 (medium), or 3 (high), based both on the sediment transport risk at the site and the receiving waters risk during periods of soil exposure (e.g., grading and site stabilization). The sediment risk level reflects the relative amount of sediment that could potentially be discharged to receiving water bodies and is based on

the nature of the construction activities and the location of the site relative to receiving water bodies. The receiving waters risk level reflects the risk to the receiving waters from the sediment discharge. Depending on the risk level, the construction projects could be subject to the following requirements:

- Effluent standards;
- Good site management "housekeeping;"
- Non-stormwater management;
- Erosion and sediment controls;
- Run-on and runoff controls;
- Inspection, maintenance, and repair; or
- Monitoring and reporting requirements.

The Construction General Permit requires the development and implementation of a Stormwater Pollution Prevention Plan (SWPPP) that includes specific best management practices (BMPs) designed to prevent sediment and pollutants from contacting stormwater from moving off site into receiving waters. The BMPs fall into several categories, including erosion control, sediment control, waste management and good housekeeping, and are intended to protect surface water quality by preventing the off-site migration of eroded soil and construction-related pollutants from the construction area. Routine inspection of all BMPs is required under the provisions of the Construction General Permit. In addition, the SWPPP is required to contain a visual monitoring program, a chemical monitoring program for non-visible pollutants, and a sediment monitoring plan if the site discharges directly to a water body listed on the 303(d) list for sediment.

The SWPPP must be prepared before construction activities begin. The SWPPP must contain a site map(s) that delineates the construction work area, existing and proposed buildings, parcel boundaries, roadways, stormwater collection and discharge points, general topography both before and after construction, and drainage patterns across the project area. The SWPPP must list BMPs and the placement of those BMPs that the applicant would use to protect stormwater runoff. Additionally, the SWPPP must contain a visual monitoring program; a chemical monitoring program for "non-visible" pollutants to be implemented if there is a failure of BMPs; and a sediment monitoring plan if the site discharges directly to a water body listed on the 303(d) list for sediment. Examples of typical construction BMPs include scheduling or limiting certain activities to dry periods, installing sediment barriers such as silt fence and fiber rolls, and maintaining equipment and vehicles used for construction. Non-stormwater management measures include installing specific discharge controls during certain activities, such as paving operations, vehicle and equipment washing and fueling. The Construction General Permit also sets post-construction standards (i.e., implementation of BMPs to reduce pollutants in stormwater discharges from the site following construction).

In the Project Area, the Construction General Permit is implemented and enforced by the Santa Ana RWQCB, which administers the stormwater permitting program. Dischargers must electronically submit a notice of intent and permit registration documents to obtain coverage under this Construction General Permit. Dischargers are to notify the RWQCB of violations or incidents of non-compliance and submit

annual reports identifying deficiencies in the BMPs and explaining how the deficiencies were corrected. The risk assessment and SWPPP must be prepared by a State Qualified SWPPP Developer, and implementation of the SWPPP must be overseen by a State Qualified SWPPP Practitioner. A legally responsible person, who is legally authorized to sign and certify permit registration documents, is responsible for obtaining coverage under the permit.

California Excavation Notification Requirements

California Code of Regulations Section 4216 requires that construction contractors report a project that involves excavation 48 hours prior to breaking ground. This program allows owners of buried installations to identify and mark the location of its facilities before any nearby excavation projects commence. Adherence to this law by contractors of projects reduces the potential of inadvertent pipeline and utility damage and leaks.

California Occupational Safety and Health Administration Regulations

Occupational safety standards exist in federal and state laws to minimize worker safety risks from both physical and chemical hazards in the workplace. In California, the California Division of Occupational Safety and Health (Cal/OSHA) and the federal OSHA are the agencies responsible for ensuring worker safety in the workplace.

The OSHA Excavation and Trenching standard (29 CFR 1926.650), described above in Section 4.2.2.1, *Federal Regulations*, covers requirements for excavation and trenching operations, which are among the most hazardous construction activities. OSHA requires that all excavations in which employees could potentially be exposed to cave-ins be protected by sloping or benching the sides of the excavation, supporting the sides of the excavation, or placing a shield between the side of the excavation and the work area. Cal/OSHA is the implementing agency for both state and federal OSHA standards.

Paleontological Resources

Paleontological resources are limited, nonrenewable resources of scientific, cultural, and educational value that are afforded protection under state laws and regulations. The following section summarizes the applicable state laws and regulations, as well as professional standards provided by the Society of Vertebrate Paleontology (SVP 2010).

Public Resources Code Section 5097.5 and Section 30244

Requirements for paleontological resource management are included in Public Resources Code Section 5097.5 and Section 30244. These statutes prohibit the removal of any paleontological site or feature from public lands without permission of the jurisdictional agency, define the removal of paleontological sites or features as a misdemeanor, and require reasonable mitigation of adverse impacts on paleontological resources from developments on public (state, county, city, district) lands.

Society of Vertebrate Paleontology Guidelines

The SVP has established standard guidelines that outline professional protocols and practices for conducting paleontological resource assessments and surveys, monitoring and mitigation, data and fossil recovery, sampling procedures, and specimen preparation, identification, analysis, and curation (SVP 2010). Most practicing professional vertebrate paleontologists adhere closely to the SVP's assessment,

mitigation, and monitoring requirements as specifically provided in its standard guidelines. Most state regulatory agencies with paleontological resource-specific Laws, Ordinances, Regulations, and Standards (LORS) accept and use the professional standards set forth by the SVP.

Paleontological Resources Significance Criteria

As defined by the SVP, significant nonrenewable paleontological resources are (SVP 2010, 11):

> *Fossils and fossiliferous deposits, here defined as consisting of identifiable vertebrate fossils, large or small, uncommon invertebrate, plant, and trace fossils, and other data that provide taphonomic, taxonomic, phylogenetic, paleoecologic, stratigraphic, and/or biochronologic information. Paleontological resources are considered to be older than recorded human history and/or older than middle Holocene (i.e., older than about 5,000 radiocarbon years).*

As defined by the SVP, significant fossiliferous deposits are (SVP 2010):

> *A rock unit or formation which contains significant nonrenewable paleontological resources, here defined as comprising one or more identifiable vertebrate fossils, large or small, and any associated invertebrate and plant fossils, traces, and other data that provide taphonomic, taxonomic, phylogenetic, ecologic, and stratigraphic information (ichnites and trace fossils generated by vertebrate animals, e.g., trackways, or nests and middens which provide datable material and climatic information). Paleontological resources are considered to be older than recorded history and/or older than 5,000 years BP [before present].*

Based on the significance definitions of the SVP, all identifiable vertebrate fossils are considered to have significant scientific value (SVP 2010). This position is adhered to because vertebrate fossils are relatively uncommon, and only rarely will a fossil locality yield a statistically significant number of specimens of the same genus. Therefore, every vertebrate fossil found has the potential to provide significant new information on the taxon it represents, its paleoenvironment, and/or its distribution. Furthermore, all geologic units in which vertebrate fossils have previously been found are considered to have high sensitivity. Identifiable plant and invertebrate fossils are considered significant if found in association with vertebrate fossils or if defined as significant by project paleontologists, specialists, or local government agencies.

A geologic unit known to contain significant fossils is considered "sensitive" to adverse impacts if there is a high probability that earth-moving or ground-disturbing activities in that rock unit will either directly or indirectly disturb or destroy fossil remains. Paleontological sites indicate that the containing sedimentary rock unit or formation is fossiliferous. The limits of the entire rock formation, both areal and stratigraphic, therefore define the scope of the paleontological potential in each case (SVP 2010).

Fossils are contained within surficial sediments or bedrock and are therefore not observable or detectable unless exposed by erosion or human activity. In summary, paleontologists cannot know either the quality or quantity of fossils prior to natural erosion or human-caused exposure. As a result, even in the absence of surface fossils, it is necessary to assess the sensitivity of rock units based on their known potential to produce significant fossils elsewhere within the same geologic unit (both within and outside of the Project

Area), a similar geologic unit, or based on whether the unit in question was deposited in a type of environment that is known to be favorable for fossil preservation. Monitoring by experienced paleontologists greatly increases the probability that fossils will be discovered during ground-disturbing activities and that, if these remains are significant, successful mitigation and salvage efforts may be undertaken in order to prevent adverse impacts on these resources.

Local

Orange County Well Ordinance

The Orange County Well Ordinance (County Ordinance No. 2607) requires that a permit be obtained prior to the construction or destruction of any well. Drilling procedures and well design and construction must be accomplished in a manner that prevents the spread of contamination and should be developed by an appropriate registered professional (California Professional Geologist or Certified Engineering Geologist or equivalent) with expertise in subsurface investigations. Well construction procedures and design must also be in accordance with California Well Standards (Bulletin 74-90) Reports that include logs of soil borings or any findings or conclusions relating to the subsurface must be signed by a properly registered professional.

County of Orange General Plan

The following is a selected list of General Plan goals, objectives, and policies that are applicable to the proposed Project respective to seismic safety and geologic hazards (County of Orange 2022).

Objective S-1. To identify natural hazards and determine the relative threat to people and property in Orange County.

Policy 5. To encourage establishment of seismic design criteria and standards for county facilities (e.g., transmission lines, water and sewage systems, and highways), any structures housing necessary mobile units and support equipment, and other vital resources which would be needed following an earthquake (e.g., "back-up" power generation facilities and water storage).

Policy 6. To periodically update maps of existing faults, slide areas, and other geographically unstable areas in and around Orange County.

Policy 7. To monitor, evaluate, and analyze existing seismic and geological data as it pertains to Orange County to determine future regulations and programs.

Policy 8. To establish development standards for land use, new construction, and proposed improvements to ensure proper design and location of structures.

Policy 9. To provide coordination to all agencies within the county to assist in the mitigation of geologic and seismic hazards and to educate those agencies in preparedness, response and recovery from a major earthquake.

Policy 10. To provide technical and policy information regarding geological and seismic hazards to developers, interested parties, and the general public through the Orange County Buyer Notification Program.

City of Irvine General Plan

The following is a selected list of General Plan goals, objectives, and policies that are applicable to the proposed Project respective to seismic hazards (City of Irvine 2015).

Objective D-1: Potential Hazards. Take potential environmental hazards into account in the General Plan.

Policy (a). Identify the locations of potential seismic hazards to minimize the effects of the potential hazard through special development constraints. Conduct a research program to develop more refined boundaries for seismic response areas, particularly for SRA 1. [Note: The Project Area is located in SRA-1]

Objective D-2: Response to Hazards. Require appropriate measures to protect public health and safety and to respond to seismic hazards in all public and private developments.

Policy (a). Use Figure D-3 during development review to minimize the effects of environmental hazards as follows: For development in Seismic Response Areas 1, 2, 3, and 4: Concurrent with submittal of applications for concept plans and zone changes, as well as the preparation of environmental impact reports, preliminary geotechnical reports are required for the following uses:

1. All planning area level proposals.
2. Community/regional level shopping centers.
3. Major commercial/office centers.
4. Major public facilities.
5. Major public utilities.
6. Major transportation linkages.
7. Any facility critical to emergency response (i.e., hospitals, police and fire stations, municipal government centers, transportation linkages, and designated emergency centers).

Policy (d). Require detailed site studies to determine the potential for seismic hazards for facilities which are critical in an emergency. These facilities include but are not limited to:

- Police and fire stations.
- Municipal government centers.
- Transportation infrastructure.
- Major public utilities (electrical, gas and
- water facilities).

- Designated emergency centers.
- Buildings greater than 15 stories in heights:

City of Santa Ana General Plan

The following is a selected list of General Plan goals, objectives, and policies that are applicable to the proposed Project respective to safety (City of Santa Ana 2022).

Goal S-3: Geologic and Seismic Hazards. Provide a safe environment for all Santa Ana residents and workers while minimizing risk of injury, loss of life, property damage, and social and economic impacts caused by geologic and seismic hazards.

Policy S-3.2: Hazard Identification: Seismic and Geotechnical Standards. Ensure that all new development abides by the current City and state seismic and geotechnical requirements and that projects located in areas with potential for geologic or seismic hazards prepare a hazards study.

Policy S-3.3: Key Public Facilities and Systems. Coordinate with relevant utility service providers to ensure that major utility systems remain resilient in the event of a major earthquake and are seismically upgraded.

Policy LU-3.9. Improve the health of residents, students, and workers by limiting the impacts of construction activities and operation of noxious, hazardous, dangerous, and polluting uses that are in close proximity to sensitive receptors, with priority given to discontinuing such uses within environmental justice area boundaries.

City of Tustin General Plan

The following is a selected list of General Plan goals, objectives, and policies that are applicable to the proposed Project respective to public safety (City of Tustin 2018).

Goal 3. Reduce the risk to the community from geologic and seismic hazards.

Policy 3.1. Require review of soil and geologic conditions by a State Licensed Engineering Geologist to determine stability prior to the approval of development where appropriate.

Policy 3.5. Ensure that structures for human occupancy, critical structures, and vital emergency facilities are designed to minimize damage from potential geologic/seismic hazards and avoid functional impairment.

3.6.3 Impact Analysis and Mitigation Measures

Thresholds of Significance

The following criteria from CEQA Guidelines Appendix G are used as thresholds of significance to determine the impacts of the proposed Project as related to geology and soils. The proposed Project would have a significant impact if it would:

1. Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:
   - 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.
   - Strong seismic ground shaking.
   - Seismic-related ground failure, including liquefaction.
   - Landslides.
2. Result in substantial soil erosion or the loss of topsoil.
3. 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.
4. Be located on expansive soil[27] creating substantial direct or indirect risks to life or property.
5. Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water.
6. Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature.
7. Result in cumulatively considerable impacts to geology and soils.

Methodology

This environmental analysis of the potential impacts related to geology and soils is based on a review of the results of the review of literature and database research (geologic, seismic, and soils reports and maps), and relevant sections of the County and city general plans.

The proposed Project would be regulated by the various laws, regulations, and policies summarized above in Section 3.6.2, *Regulatory Framework*. Compliance by the proposed Project with applicable federal, state, and local laws and regulations is assumed in this analysis and local and state agencies would be expected to continue to enforce applicable requirements to the extent that they do so now. Note that compliance with many of the regulations is a condition of permit approval.

After considering the implementation of the proposed Project described in Chapter 2, *Project Description*, and compliance with the required regulatory requirements, the environmental analysis below identifies if

[27] The CBC no longer includes a Table 18-1-B. Instead, CBC Section 1803.5.3 describes the criteria for analyzing expansive soils.

the defined significance thresholds are exceeded and, therefore, a significant impact would occur. For those impacts considered to be significant, mitigation measures are proposed to the extent feasible to reduce the identified impacts.

The structural elements of the proposed Project would undergo appropriate design-level geotechnical evaluations prior to final design and construction. Implementing the regulatory requirements in the CBC, local ordinances, and the state and county well construction standards and ensuring that all buildings and structures constructed in compliance with the law is the responsibility of the project engineers and building officials. The geotechnical engineer, as a registered professional with the State of California, is required to comply with the CBC and local codes while applying standard engineering practice and the appropriate standard of care for the particular region in California.[28] The California Professional Engineers Act (Building and Professions Code Sections 6700–6799), and the Codes of Professional Conduct, as administered by the California Board of Professional Engineers, Land Surveyors, and Geologists, provides the basis for regulating and enforcing engineering practice in California. The local Building Officials are typically with the local jurisdiction and are responsible for inspections and ensuring CBC compliance prior to approval of the building permit.

Criteria Not Analyzed

Based on the proposed Project location, there would no impact related to the following topics for the reasons described below:

- **Earthquake Faults:** As discussed in Section 3.6.1, *Environmental Setting*, there are no active faults that pass through the Project Area. Therefore, there would be no impact relative to the proposed Project being located on an active fault and this topic will not be evaluated further in this section.
- **Landslides:** As discussed in Section 3.6.1, *Environmental Setting*, there are no landslides within the Project Area. Therefore, there would be no impact relative to the proposed Project being located on a landslide and this topic will not be evaluated further in this section.
- **Septic tanks or alternative wastewater disposal systems:** As discussed in Chapter 2, *Project Description*, the proposed Project does not include the use or construction of septic tanks or alternative wastewater disposal systems. Therefore, there would be no impact relative to the proposed Project relative to septic tanks or alternative wastewater disposal systems and this topic will not be evaluated further in this section.

[28] A geotechnical engineer (GE) specializes in structural behavior of soil and rocks. GEs conduct soil investigations, determine soil and rock characteristics, provide input to structural engineers, and provide recommendations to address problematic soils.

Impact Analysis

Seismic Ground Shaking and Seismic-Related Ground Failure, including Liquefaction

Impact 3.6-1: The proposed Project could directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving strong seismic ground shaking or seismic-related ground failure, including liquefaction.

Extraction Facilities, Monitoring Wells, Local Groundwater Treatment Plants, and Conveyance Pipelines

There are no Holocene-active faults within the Project Area. However, the Newport-Inglewood-Rose Canyon and Elsinore Fault Zones are in relatively close proximity to the Project Area and are likely sources for strong seismic ground shaking in the event of an earthquake from any of these fault zones. Due to the proximity to the active fault zones, the proposed Project components would be subject to strong seismic ground shaking in the event of an earthquake originating from nearby fault zones. The intensity of such an event would depend on the causative fault and the distance to the epicenter, the magnitude, the duration of shaking, and the nature of the geologic materials on which the project components would be constructed. Intense ground shaking and high ground accelerations would affect the entire area. The primary and secondary effects of ground shaking and seismically induced ground failures could damage structural foundations, distort or break pipelines, and place people at risk of injury or death. Strong seismic ground shaking has historically caused damage, injury, and loss of life; these hazards could potentially result in damage to project components, resulting in loss, injury, or death.

Construction

Until constructed, the components of the proposed Project would not be susceptible to damage from seismic shaking and there would be no impact.

Operation

As required by California law, new development would be subject to the seismic design criteria of the CBC, local building codes, and well construction standards which require that all improvements be constructed to withstand anticipated ground shaking from regional fault sources. Grading permits (pads for treatment systems, trenches for pipelines) and well permits would be required prior to the issuance of individual permits. Treatment pads and pipelines would be designed and installed by a licensed engineer; wells would be designed and installed by a licensed professional engineer, professional geologist, or certified engineering geologist. The CBC standards, local codes, and well construction standards require the proposed Project components to be designed consistent with an established standards. Adherence to the applicable CBC requirements, local codes, and well standards would ensure that the proposed Project would not directly or indirectly cause substantial adverse effects, including the risk of loss, injury, or death involving strong seismic ground shaking. The impact would be less than significant.

Mitigation Measures

None Required.

Significance Determination

Less than Significant Impact.

Soil Erosion

Impact 3.6-2: The proposed Project could result in substantial soil erosion or the loss of topsoil.

Proposed Project construction would include ground disturbance activities, such as site clearing, grading, or excavation that could contribute to substantial soil erosion or the loss of topsoil. Erosion of exposed soils can occur as a result of the forces of wind or water and could be worsened during ground disturbance activities.

Extraction Facilities, Monitoring Wells, Local Groundwater Treatment Plants, and Conveyance Pipelines

Construction

Construction of the proposed Project would require disturbance of one or more acres of ground and thus would be required to apply for coverage under the Construction General Permit. As discussed in Section 3.6.2, *Regulatory Framework*, *State*, the Construction General Permit requires the preparation and implementation of a SWPPP, which would include BMPs designed to control and reduce soil erosion. The BMPs may include storm water runoff quality control measures such as silt fences, straw wattles, detention basins, and other runoff control measures; watering for dust control; and other BMPs. Compliance with the Construction General Permit requirements to control runoff would ensure that impacts related to erosion and soil loss would be less than significant.

Operation

Once constructed, wells and pipelines would be underground and no further ground disturbance would occur. Impacts related to erosion and soil loss during operations would be less than significant.

Mitigation Measures

None Required.

Significance Determination

Less than Significant Impact.

Unstable Geologic Soils

Impact 3.6-3: The proposed Project could be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the proposed Project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse.

Extraction Facilities, Monitoring Wells, Local Groundwater Treatment Plants, and Conveyance Pipelines

Construction and Operation

The Project Area is not susceptible to landslides. Although liquefaction and lateral spreading can occur without seismic shaking, they are more commonly associated with seismic shaking and are analyzed above in Impact 3.7-1.

Subsidence and collapse are associated with the injection or extraction of large amounts of groundwater and/or petroleum oil and/or natural gas. The groundwater that would be extracted would be treated for contaminants and then recharged back into the underlying aquifer, resulting in no significant change in groundwater supplies. The proposed Project does not include the extraction of petroleum oil and/or natural gas. Therefore, impacts relative to unstable geologic units or soil would be less than significant.

Mitigation Measures

None Required.

Significance Determination

Less than Significant Impact.

Expansive Soils

Impact 3.6-4: The proposed Project could be located on expansive soil creating substantial direct or indirect risks to life or property.

Extraction Facilities, Monitoring Wells, Local Groundwater Treatment Plants, and Conveyance Pipelines

Construction and Operation

As discussed in Section 3.6.1, *Environmental Setting*, moderately to highly expansive soils are present underlying the Project Area. Analysis of expansive soils is standard during geotechnical investigations, as the CBC outlines specific soil engineering parameters to identify and address expansive soils. If expansive soils are detected during the geotechnical investigation, further laboratory testing would be required to determine the nature and extent of the affected soils, followed by recommendations to remove or treat the expansive soils.

Compliance with the CBC and local codes requirement to determine the potential for expansive soils would ensure that all problematic soils are identified, and soil engineering requirements are implemented. Soil engineering is used to adjust the existing problematic properties of certain soils so that they are suitable for new developments. Adherence to the requirements of the CBC and local codes would avoid impacts resulting from potentially expansive soils. Compliance with CBC and local code requirements, including implementation of recommendations provided in site-specific geotechnical reports would reduce or avoid impacts related to expansive soils and impacts would be less than significant.

Mitigation Measures

None Required.

Significance Determination

Less than Significant Impact.

Paleontological Resources

Impact 3.6-5: The proposed Project could directly or indirectly destroy a unique paleontological resource or site or unique geologic feature.

Extraction Facilities, Monitoring Wells, Local Groundwater Treatment Plants, and Conveyance Pipelines

Based on the LACM paleontological records search, the entirety of the proposed Project components, including extraction and monitoring wells, groundwater treatment plants, and conveyance pipelines, are underlain by surficial deposits consisting of younger Quaternary alluvium (Qyf and Qya) that typically do not contain significant paleontological resources in the uppermost layers due to the young age of the sediments. These geologic units are found in the center of the valley where the proposed Project is situated, and the surrounding mountain piedmonts are fringed by older fan deposits (Qof) that are unlikely to be encountered at depth. The Qyf and Qya alluvium is to be expected as the Project occupies the ancestral confluence of several drainages before exiting the sea at Newport Bay. While older, fossiliferous units are exposed in the hills to the south of the Project, those units are anticipated to be quite deep in the Project Area. Thus, older Quaternary deposits with the potential to yield significant paleontological resources can underlie recent deposits at a deeper depth. Ground disturbance associated with the extraction facilities and monitoring well component of the proposed Project is assumed to not exceed a depth of 130 feet. However as discussed above, the Project Area has a low potential for paleontological resources at depths up to approximately 25 feet below ground surface that increases to high potential at greater depth. If excavations or drilling for wells exceed the thickness of the young fans and alluvium, Pleistocene fan deposits may be encountered, and they may contain fossils. As a result, any excavation or drilling for wells of more than 25 feet could result in a significant impact to paleontological resources. However, implementation of the **Mitigation Measure GEO-1** would reduce the potential impacts to paleontological resources.

Mitigation Measure

GEO-1:Retention of a Qualified Paleontologist. Prior to the start of ground disturbance, the OCWD shall retain a Qualified Paleontologist meeting the Society of Vertebrate Paleontology (SVP 2010) standards. The Qualified Paleontologist shall attend any pre-grade construction meetings to determine when and where excavations will occur below a depth of 25 feet below the existing ground surface.

(a) Prior to any ground disturbance activities the OCWD Project Manager shall retain a qualified paleontologist to prepare a Worker's Environmental Awareness Program (WEAP) which shall include a training meeting(s) for all construction personnel prior to the start of any ground disturbing activities. The WEAP training shall include, at a minimum, the following information: review of local and State laws and regulations pertaining to paleontological resources; types of fossils that could be encountered if ground disturbing activity reaches the Pleistocene alluvium; photos of example fossils based on the regional LACM collections that could occur on site for reference; and

(b) In the event an unanticipated fossil discovery is made during ground disturbing activities, construction activities shall halt in a radius of 50 feet of the fossil, and the qualified professional paleontologist retained by the OCWD shall be notified to evaluate the discovery,

determine its significance, and evaluate whether additional mitigation or treatment is warranted. If paleontological resources are encountered during augering or drilling, excavation may continue if a new spoils mound can be established while the find is properly documented by a paleontological monitor. In either scenario, work in the area of the discovery shall resume once the find is properly documented and authorization is given by the qualified paleontologist to resume construction work. Any significant paleontological resources found shall be prepared, identified, analyzed, and permanently curated in an approved regional museum repository.

Significance Determination

Less than Significant with Mitigation

Cumulative Impacts

Impact 3.6-6: Concurrent construction and operation of the proposed Project and related projects in the geographic scope could result in cumulative short-term and long-term impacts to geology and soils.

Extraction Facilities, Monitoring Wells, Local Groundwater Treatment Plants, and Conveyance Pipelines

This section presents an analysis of the cumulative effects of the proposed Project in combination with other past, present, and reasonably foreseeable future projects that could cause cumulatively considerable impacts. Significant cumulative impacts related to geology, soils, and paleontological resources could occur if the incremental impacts of the proposed Project combined with the incremental impacts of one or more cumulative projects. Cumulative projects are listed on Table 3-1.

As discussed above, in Section 3.6.3, *Impacts Analysis and Mitigation Measures*, there would be no impacts associated with surface fault rupture, landslides, or soils that can adequately support septic systems or alternate wastewater disposal systems. Therefore, these topics would not contribute to cumulative impacts, and will not be discussed in a cumulative context.

The geographic area affected by the proposed Project and its potential to contribute to cumulative impacts varies based on the environmental resource under consideration. The geographic scope of analysis for cumulative geology and soils impacts encompasses and is limited to the proposed Project Monitoring Wells and treatment plants within the Project Area and immediate adjacent to these areas. This is because impacts relative to geology and soils are generally site-specific and depend on the nature and extent of the geologic hazard, and existing and future soil and groundwater conditions. For example, the effect of erosion would tend to be limited to the localized area of a project and could only be cumulative if erosion occurred as the result of two or more adjacent projects that spatially overlapped.

The timeframe during which the proposed Project could contribute to cumulative geology and soils effects includes the construction phases. For the proposed Project, the operations phase would only include maintenance activities. However, similar to the geographic limitations discussed above, it should be noted that impacts relative to geology and soils are generally time-specific. Geology and soils effects

could only be cumulative if two or more geologic hazards occurred at the same time, as well as overlapping at the same location.

Geology and Soils

Construction

As discussed in Section 3.6.1, *Environmental Setting*, seismically induced ground shaking, liquefaction and lateral spreading, and expansive soils could cause structural damage or pipeline leaks or ruptures. Inadequate design of stormwater control features could result in erosion.

State and local building regulations and well construction standards, described in the Section 3.6.2, *Regulatory Framework*, have been established to address seismic and unstable geologic unit and soils conditions. The proposed Project and related cumulative projects would be required to comply with same applicable provisions of the CBC, local codes, and well construction standards. Through compliance with these requirements, the potential for impacts would be prevented. As explained in the Regulatory Framework, the purpose of the CBC, local codes, and well construction standards is to regulate and control the design, construction, quality of materials, use/occupancy, location, and maintenance of all buildings and structures within its jurisdiction; by design, it is intended to reduce the cumulative risks from buildings and structures. Therefore, based on compliance with these requirements, the incremental impacts of the proposed Project combined with impacts of other projects in the area would not cause a significant cumulative impact related to seismically induced ground shaking, liquefaction and lateral spreading, expansive soils, or erosion, and the proposed Project's contribution in combination with related cumulative projects to cumulative effects would not be cumulatively considerable.

The state Construction General Permit would require each project to prepare and implement a SWPPP. The SWPPPs would describe BMPs to control runoff and prevent erosion for each project. Through compliance with this requirement, the potential for erosion impacts would be reduced. The Construction General Permit has been developed to address cumulative conditions arising from construction throughout the state and is intended to maintain cumulative effects of projects subject to this requirement below levels that would be considered significant. For example, two adjacent construction sites would be required to implement BMPs to reduce and control the release of sediment and/or other pollutants in any runoff leaving their respective sites. The runoff water from both sites would be required to achieve the same action levels, measured as a maximum amount of sediment or pollutant allowed per unit volume of runoff water. Thus, even if the runoff waters were to combine after leaving the sites, the sediments and/or pollutants in the combined runoff would still be at concentrations (amount of sediment or pollutants per volume of runoff water) below action levels and would not be cumulatively considerable.

Operation

Once constructed, the proposed Project would only include maintenance activities which would have no impacts relative to seismically induced ground shaking, liquefaction and lateral spreading, and expansive soils. The proposed Project contribution in combination with cumulative projects to cumulative effects would not be cumulatively considerable.

Mitigation Measures

None Required.

Significance Determination

Less than Significant Impact.

Paleontological Resources

Construction

The majority of the current and future development projects considered for cumulative impacts presented in Chapter 3, Table 3-1, include subsurface disturbances for the construction of foundations and utilities, which increases the likelihood that paleontological resources could be uncovered, and it is therefore possible that cumulative development would result in the demolition or destruction of significant paleontological resources. This potential loss of resources is considered a significant cumulative impact. The proposed Project could contribute to this impact if paleontological resources are located beneath the Project Area and damaged or destroyed during the excavation process. As a result, the proposed Project contribution to the significant cumulative impact would be cumulatively considerable and impacts would be potentially significant.

Implementation of Mitigation Measure GEO-1 would lessen the proposed Project contribution to the loss of paleontological resources by requiring that work stop if such resources are discovered until the resource can be evaluated, collected, properly treated, and curated with an accredited repository. In compliance with paleontological resources regulations, current and future development projects that include deeper excavations that may encounter paleontological resources would also be required to implement mitigation to reduce impacts to paleontological resources. With implementation of paleontological resources mitigation measures, the proposed Project contribution to the cumulative loss of paleontological resources would be less than cumulatively considerable, and, therefore, this cumulative impact would be less than significant.

Operation

Once constructed, the Project would have no impacts relative to paleontological resources. The Project operational contribution to cumulative effects would not be cumulatively considerable.

Mitigation Measure

Implementation of Mitigation Measure GEO-1

Significance Determination

Less than Significant with Mitigation.

3.7 Hazards and Hazardous Materials

This section addresses the hazards and hazardous materials impacts associated with implementation of the proposed Project. This section includes: a description of the existing hazards and hazardous materials in and around the Project Area; a summary of applicable regulations related to hazards and hazardous materials; and an evaluation of the potential impacts of the proposed Project related to hazards and hazardous materials at the sites of the proposed facilities in the Project Area and in the surrounding area, including cumulative impacts.

3.7.1 Environmental Setting

Existing Hazardous Materials

As discussed in Section 2.1, *Background*, and documented in recent investigation reports (OCWD 2015, 2017; EA 2023), groundwater contamination from industrial and manufacturing activities, underground storage tank leaks, waste disposal practices, and many other sources exist throughout Orange County. Contamination from these sources is typically isolated to the shallow portions of the groundwater system (Shallow Aquifer System). As discussed in Section 3.8, *Hydrology and Water Quality*, the Shallow Aquifer System is distinguished from the upper portions of the underlying Principal Aquifer System, from which drinking water supply wells pump, by variable thicknesses of generally finer-grained lower permeability sediments that tend to restrict, but do not preclude, hydraulic communication between the two aquifer systems. As discussed in the FS (EA 2023), two active water supply wells in the Principal Aquifer have been contaminated by VOCs, hence the reason for this proposed Project to prevent further contamination from reaching the Principal Aquifer. In some areas of the Basin where densely spaced industrial properties have been present for decades and have released chemicals to the groundwater, the groundwater contamination from these sites has migrated off the individual source sites and merged to form commingled plumes of contamination. The contamination of groundwater in the Project Area is located within the southeastern part of the Basin and includes an approximately 5.6-square-mile area in the cities of Santa Ana, Irvine, and Tustin, and some unincorporated areas of Orange County, California, as shown on Figure 2-4. Most of the contaminants are volatile organic compounds (VOCs). Based investigations to date, the Chemicals of Concern (COCs) include the following:

- Perchloroethene (PCE)
- Trichloroethene (TCE)
- 1,1-dichloroethene (1,1-DCE)
- 1,1-dichloroethane (1,1-DCA)
- 1,2-dichloroethane (1,2-DCA)
- Cis-1,2-dichloroethene (cis-1,2-DCE)
- 1,1,2-trichloroethane (1,1,2-TCA)
- 1,4-dioxane
- Perchlorate

- Hexavalent chromium (Cr^{+6})
- Vinyl chloride

Other organic and inorganic compounds that have been detected in Shallow Aquifer System groundwater are generally detected less frequently, less broadly distributed, and occur at lower concentrations within the commingled plume (see Section 3.8, *Hydrology and Water Quality*, for discussion of aquifer systems).

In addition to the sources of the comingled plumes, additional smaller hazardous materials release sites are also within the commingled plumes, as documented in the State Water Resources Control Board (SWRCB) GeoTracker and Department of Toxic Substance Control (DTSC) EnviroStor websites that track hazardous materials release sites. These databases comprise the Government Code § 65962.5 list of hazardous materials release sites, also referred to as the Cortese list. Three leaking underground storage tank (UST) sites are also located within the footprint of the extraction alignments, as listed below (SWRCB-DTSC 2024). Surface and shallow soil may be contaminated with fuel and/or motor oil on these sites.

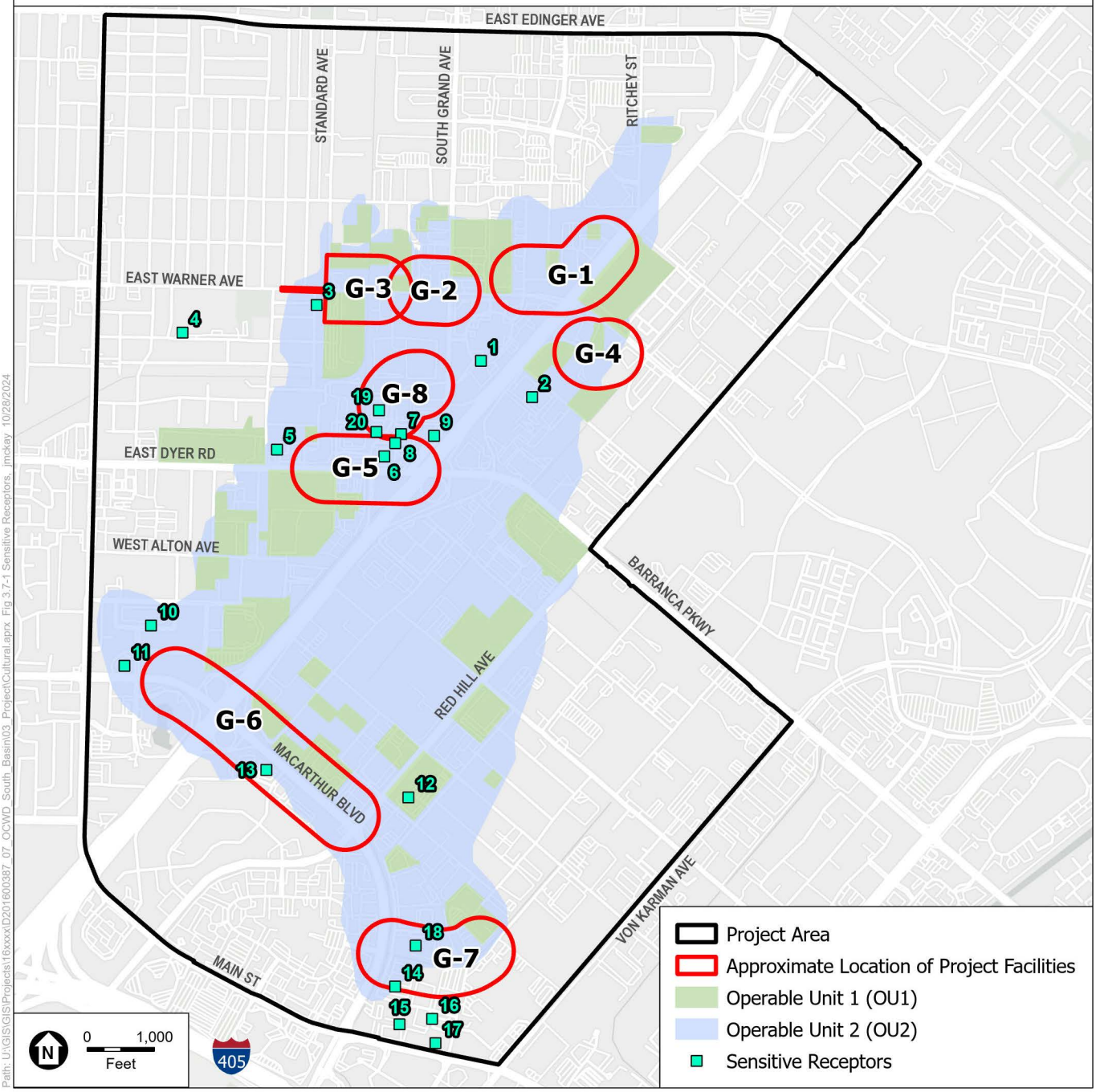
- Chevron #9-6405, 17561 MacArthur Boulevard, Irvine (see farthest southern extraction facility G-7 on Figure 2-5)
- Exxon #7-3515 17551 MacArthur Boulevard, Irvine (see farthest southern extraction facility G-7 on Figure 2-5)
- Orco Tools And Equipment,2100 Ritchey Street, Santa Ana (see farthest north extraction facility G-1 on Figure 2-5)

Sensitive Receptors

There are several sensitive receptors located within and adjacent to the extraction well Alignments G-1 through G-8 (**Figure 3.7-1**), as listed below:

- **G-1** – The proposed extraction alignment along Ritchey Street includes Industrial, Industrial/Flex-Low, and Industrial/Flex-Medium land uses. Located in the vicinity of Alignment G-1 are Ricca Children's Learning Center at 1510 Brookhollow Drive and Orange County Head Start at 2501 Pullman Street.
- **G-2** – The proposed extraction alignment along South Grand Avenue includes Industrial/Flex-Low and Industrial/Flex-Medium land uses. Located in the vicinity of Alignment G-2 are Ricca Children's Learning Center at 1510 Brookhollow Drive and Orange County Head Start at 2501 Pullman Street.
- **G-3** – The proposed extraction alignment along East Warner Avenue includes Industrial/Flex-Medium land uses. Along Warner Avenue and in the vicinity of Alignment G-3 are residential uses are located west of Standard Avenue and the Santa Ana Unified School District Monroe Elementary School is located west of Halladay Street at 417 E. Central Avenue.
- **G-4** – The proposed extraction alignment along Pullman Street includes Industrial and Industrial/Flex-Low land uses. Located in the vicinity of Alignment G-4 are Ricca Children's Learning Center at 1510 Brookhollow Drive and Orange County Head Start at 2501 Pullman Street.

1. Ricca Children's Learning Center - 1510 Brook Hollow Drive, Santa Ana
2. Orange County Head Start - 2501 Pullman Street, Santa Ana
3. Residential Uses - 2311 Evergreen Street, Santa Ana
4. Monroe Elementary School - 417 E Central Avenue, Santa Ana
5. Montessori International Academy - 2717 S Halladay Street, Santa Ana
6. Embassy Suites Hotel - 1325 E Dyer Road, Santa Ana
7. La Quinta Inn - 2721 Hotel Terrace, Santa Ana
8. Hotel Terras - 2721 Hotel Terrace, Santa Ana
9. Holiday Inn - 2726 S Grand Avenue, Santa Ana
10. Courtyard Santa Ana Orange County - 8 MacArthur Place, Santa Ana
11. Hotel Zessa - 201 East MacArthur Boulevard, Santa Ana
12. Homewood Suites by Hilton Irvine - 17370 Red Hill Avenue, Irvine
13. Spring Hill Suites - 17601 Fitch, Irvine
14. MDL Irvine - 101 Placemark, Irvine
15. Citysquare - 100 Citysquare Irvine
16. The LUX - 101-161 Schick, Irvine
17. Aurum - 2055 Main Street, Irvine
18. Element Irvine Hotel - 17662 Armstrong Avenue, Irvine
19. Best Western - 2700 Hotel Terrace, Santa Ana
20. Hampton Inn - 2720 Hotel Terrace, Santa Ana



Path: U:\GIS\GIS\Projects\16xxxx\D201600387_07_OCWD_South_Basin\03_Project\Cultural.aprx Fig 3.7-1 Sensitive Receptors_ jmckay 10/28/2024

SOURCE: Orange Count Water District, 2024; ESA, 2024

South Basin Groundwater Protection Project

Figure 3.7-1
Sensitive Receptors

ESA

- **G-5** – The proposed extraction alignment along East Dyer Road includes General Commercial-Medium High and Industrial/Flex-Medium land uses. The Montessori International Academy is located at 2717 South Halladay Street in Santa Ana within Alignment G-5. There are five hotels located in Alignment G-5, The Embassy Suites Hotel is located at 1325 E. Dyer Road, La Quinta Inn located at 2721 Hotel Terrace, Hotel Terras is located at 2721 Hotel Terrace and Holiday Inn is located at 2726 S. Grand Avenue.
- **G-6** – The proposed extraction alignment along MacArthur Blvd. includes General Commercial-Medium High and Industrial/Flex-Medium land uses. There are four hotels in Alignment G-6, Courtyard located at 8 Macarthur Place, Hotel Zessa located at 201 E MacArthur Blvd., Homewood Suites by Hilton Irvine located at 17370 Red Hill Avenue and Spring Hill Suites located at 17601 Fitch in the city of Irvine.
- **G-7** – The proposed extraction alignment along MacArthur Boulevard includes Industrial/Flex-Medium, District Center-Medium, and District Center-Low land uses. There are four high density residential complexes within the vicinity of the southern Alignment G-7 in the Irvine Business Complex near MacArthur Avenue. The residential use consists of MDL Irvine at 101 Placemark with 137 residential units, Citysquare at 100 Citysquare consisting of 44 units, the LUX 101-161 Schick consisting of 38 units and Aurum at 2055 Main consisting of 178 units. There is one hotel in Alignment G-7. Element Irvine Hotel at 17662 Armstrong Avenue.
- **G-8** – The proposed extraction alignment along a channel east of MacArthur Boulevard includes Industrial/Flex-Medium land uses. Located in the vicinity of Alignment G-8 are Ricca Children's Learning Center at 1510 Brookhollow Drive and Orange County Head Start at 2501 Pullman Street. The Best Western located at 2700 Hotel Terrace and Hampton Inn located at 2720 Hotel Terrace.

There are no hospitals located within 0.25 mile of the proposed Project. The nearest hospital is the Foothill Regional Medical Center at 14662 Newport Avenue in Tustin, about one mile northeast of the proposed well alignment along Ritchey Street (see extraction alignment area G-1 on Figure 2-5).

Airports

The southernmost Alignments G-5, G-6 and G-7 shown on Figure 2-5 are located within two miles of the north end of the John Wayne Airport. The Orange County Airport Land Use Commission (ALUC) developed and implements the *Land Use Plan for the Environs of John Wayne Airport* (Orange County ALUC 2008), referred to as the Airport Environs Land Use Plan (AELUP). The AELUP applies to areas that are located within the Airport Influence Area (AIA) boundary established and defined by the AELUP, which define areas where height, noise, overflight, safety standards, policies, and criteria are applied to certain proposed land use policy actions.

Federal Regulation 49, Code of Federal Regulations (CFR) Title 14 Part 77 establishes standards and notification requirements for objects affecting navigable airspace. In particular, CFR Title 14 Part 77.13 requires that anyone who intends to perform any construction or alterations to structures that exceed 200 feet in height above ground level must obtain project approval from the Federal Aviation Administration (FAA). Airport Part 77, Subpart C, establishes obstruction standards for the airspace around airports including approach zones, conical zones, transitional zones, and horizontal zones known as "imaginary surfaces." The FAA considers any objects penetrating these surfaces, whether buildings, trees or vehicles

travelling on roads and railroads, as obstructions to air navigation. The ALUC has mapped the critical aeronautical surfaces that protect the airspace required for flight procedures. Depending on where the exact extraction facility and treatment systems are placed, the two southernmost well alignments, Alignments G-6 and G-7, along MacArthur Boulevard, could be within the airport's safety compatibility zone. The height restriction in this area is 100 feet.

Emergency Response

The Orange County Operational Area Emergency Operations Center (OC OA/EOC) manages disaster response and recovery for the County (County of Orange 2022). The Standardized Emergency Management System (SEMS) is the state mandated framework for emergency response and recovery. In accordance with SEMS, the EOC serves as the central point for coordination of operational, administrative and support needs of the emergency workers. Designated officials gather and process information to and from County agencies and departments, school and special districts, business and industry, volunteer organizations, individuals, and state and federal governments. Incidents involving hazardous materials are responded to by the Orange County Environmental Health Hazardous Materials Team.

Wildland Fires

A wildland fire is any non-structure fire that occurs in vegetation or natural fuels. The proposed Project Area is in a highly urbanized setting with no nearby wildlands. According to the California Department of Forestry and Fire Protection (CAL FIRE) Fire Hazard Severity Zone web-based viewer, the Project Area is not located within or near a very high fire hazard severity zone (CAL FIRE 2024).

3.7.2 Regulatory Framework

Federal

The primary federal agencies with responsibility for hazards and hazardous materials management include the US Environmental Protection Agency (USEPA), US Department of Labor Occupational Safety and Health Administration (Fed/OSHA), and the US Department of Transportation (DOT). Federal laws, regulations, and responsible agencies are summarized in **Table 3.7-1**.

State

The primary State agencies with responsibility for hazardous materials management in the region include the DTSC and the RWQCB within the California Environmental Protection Agency (Cal EPA), California Occupational Safety and Health Administration (Cal/OSHA), California Department of Health Services (CDHS), California Highway Patrol (CHP), and the California Department of Transportation (Caltrans). State laws, regulations, and responsible agencies are summarized in **Table 3.7-2**.

TABLE 3.7-1
FEDERAL LAWS AND REGULATIONS RELATED TO HAZARDOUS MATERIALS MANAGEMENT

Classification	Federal Law or Responsible Federal Agency	Description
Hazardous Waste Handling	Resource Conservation and Recovery Act of 1976 (RCRA)	Under RCRA, the US EPA regulates the generation, transportation, treatment, storage, and disposal of hazardous waste from "cradle to grave."
	Hazardous and Solid Waste Act	Amended RCRA in 1984, affirming and extending the "cradle to grave" system of regulating hazardous wastes. The amendments specifically prohibit the use of certain techniques for the disposal of some hazardous wastes.
	Toxic Substances Control Act (TSCA)	Code of Federal Regulations Title 40 Chapter 1, Subchapter R – Toxic Substances Control Act – Part 761 Polychlorinated Biphenyls (PCBs) – covers the identification and sampling requirements for PCBs for disposal purposes.
Hazardous Materials Management	Community Right-to-Know Act of 1986 (also known as Title III of the Superfund Amendments and Reauthorization Act (SARA)	Imposes requirements to ensure that hazardous materials are properly handled, used, stored, and disposed of and to prevent or mitigate injury to human health or the environment in the event that such materials are accidentally released.
Hazardous Materials Transportation	U.S. Department of Transportation Hazardous Materials Regulations (Title 49 CFR Parts 100–185)	The U.S. Department of Transportation (DOT) Hazardous Materials Regulations cover all aspects of hazardous materials packaging, handling, and transportation. Referred to as the Hazardous Materials Transportation Act, Parts 173 ("Packaging Requirements"), 177 ("Highway Transportation"), 178 ("Packaging Specifications"), and 180 ("Packaging Maintenance") would apply to the proposed Project activities. Additional potentially applicable parts include Part 171 ("General Information, Regulations and Definitions") and Part 172 ("Hazardous Materials Table, Special Provisions, Hazardous Materials Communications, Emergency Response Information, Training Requirements, and Security Plans").
	US Department of Transportation (DOT)	DOT has the regulatory responsibility for the safe transportation of hazardous materials. Under DOT regulations, a hazardous material is "a substance or material that the Secretary of Transportation has determined is capable of posing an unreasonable risk to health, safety, and property when transported in commerce, and has designated as hazardous under section 5103 of federal hazardous materials transportation law (49 U.S.C. 5103)." The term includes hazardous substances, hazardous wastes, marine pollutants, elevated temperature materials, and materials designated as hazardous in the Hazardous Materials Table (49 CFR 172.101). DOT classifies hazardous materials into nine primary classes: explosives, gases, flammable liquids, other flammable substances, oxidizing substances and organic peroxides, toxic (poisonous) and infectious substances, radioactive materials, corrosives, and miscellaneous dangerous goods. Some have subclasses. The DOT regulations govern all means of transportation except packages shipped by mail (49 CFR).
	US Postal Service (USPS)	USPS regulations govern the transportation of hazardous materials shipped by mail.
Occupational Safety	Occupational Safety and Health Act of 1970	Fed/OSHA sets standards for safe workplaces and work practices, including the reporting of accidents and occupational injuries (29 CFR).
Structural and Building Components (Hazardous Building Materials [ACM, LBP, and PCBs])	Toxic Substances Control Act	Regulates the use and management of hazardous building materials, and sets forth detailed safeguards to be followed during the disposal of such items.
	USEPA	The USEPA monitors and regulates hazardous materials used in structural and building components and their effects on human health.
Federal Regulation 49 CFR Part 77, Objects Affecting Navigable Airspace	Federal Aviation Administration (FAA)	Proximity to John Wayne Airport triggers the application of Federal Aviation Regulation (FAR) Part 77, Objects Affecting Navigable Airspace, which sets forth criteria and requirements for proposed structures to be filed with the FAA for airspace safety review. The FAA review determines whether the proposed structures would constitute an obstruction or hazard to aircraft.

TABLE 3.7-2
STATE LAWS AND REGULATIONS RELATED TO HAZARDOUS MATERIALS MANAGEMENT

Classification	Law or Responsible State Agency	Description
Hazardous Materials Management	Unified Hazardous Waste and Hazardous Materials Management Regulatory Program (Unified Program); CUPA (Health and Safety Code Sections 25404 et seq)	Cal EPA adopted regulations in January 1996 that implemented the Unified Program at the local level. The agency responsible for implementation of the Unified Program is called the Certified Unified Program Agency (CUPA), which for Orange County is the Orange County Environmental Health Division (OCEHD).
	California Fire Code, Title 24, Chapter 9, California Code of Regulations and California Building Code, Part 2	The California Fire Code regulates the storage and handling of hazardous materials, including the requirement for secondary containment, separation of incompatible materials, and preparation of spill response procedures.
Hazardous Waste Handling	California Hazardous Materials Release Response Plan and Inventory Law of 1985; CUPA	The California Hazardous Materials Release Response Plan and Inventory Law of 1985 (Business Plan Act) requires that businesses that store hazardous materials onsite prepare a Hazardous Materials Business Plan (HMBP) and submit it to the local CUPA, which in this case is the OCEHD.
	California Hazardous Waste Control Act; California Health and Safety Code, Division 20, Chapter 6.5, Article 2, Section 25100 et seq.; DTSC	Under the California Hazardous Waste Control Act, DTSC regulates the generation, transportation, treatment, storage, and disposal of hazardous waste in California. The hazardous waste regulations establish criteria for identifying, packaging, and labeling hazardous wastes; dictate the management of hazardous waste; establish permit requirements for hazardous waste treatment, storage, disposal, and transportation; and identify hazardous wastes that cannot be disposed of in landfills. DTSC is also the administering agency for the California Hazardous Substance Account Act. California Health and Safety Code, Division 20, Chapter 6.8, Sections 25300 et seq., also known as the State Superfund law, providing for the investigation and remediation of hazardous substances pursuant to State law.
Hazardous Materials Transportation	Titles 13, 22, and 26 of the California Code of Regulations	Regulates the transportation of hazardous waste originating in and passing through the state, including requirements for shipping, containers, and labeling.
	CHP and Caltrans, California Vehicle Code, Chapter 5, Sections 31303–31309	These two state agencies are primary responsibility for enforcing federal and state regulations and responding to hazardous materials transportation emergencies.
Occupational Safety	Cal/OSHA regulations (Title 8 CCR)	Cal/OSHA has primary responsibility for developing and enforcing workplace safety regulations in California. Because California has a federally approved OSHA program, it is required to adopt regulations that are at least as stringent as those found in Title 29 of the Code of Federal Regulations (CFR). Cal/OSHA standards are generally more stringent than federal regulations. Requires employee safety training, safety equipment, accident and illness prevention programs, hazardous substance exposure warnings, and emergency action and fire prevention plan preparation.
Construction Storm Water General Permit (Construction General Permit; Order 2022-0057-DWQ, NPDES No. CAS000002)	RWQCB	Dischargers whose project disturbs one or more acres of soil or where projects disturb less than one acre but are part of a larger common plan of development that in total disturbs one of more acres, are required to obtain coverage under the *NPDES General Permit for Stormwater Discharges Associated with Construction and Land Disturbance Activities* (Construction General Permit; Order 2022-0057-DWQ, NPDES No. CAS000002). Construction activity subject to this permit includes clearing, grading, grubbing, and other disturbances to the ground such as excavation and stockpiling but does not include regular maintenance activities performed to restore the original line, grade, or capacity of a facility. The Construction General Permit requires the development and implementation of a Stormwater Pollution Prevention Plan (SWPPP) that includes specific Best Management Practices (BMPs) designed to prevent sediment and pollutants from contacting stormwater from moving offsite into receiving waters. The BMPs fall into several categories, including erosion control, sediment control, waste management and good housekeeping, and are intended to protect surface water quality by preventing the off-site migration of eroded soil and construction-related pollutants from the construction area.

Classification	Law or Responsible State Agency	Description
Underground Infrastructure	California Code of Regulations Sections 4216-4216.9	Sections 4216–4216.9 "Protection of Underground Infrastructure" requires an excavator to contact a regional notification center (e.g., Underground Services Alert or Dig Alert) at least two days prior to excavation of any subsurface installations. Any utility provider seeking to begin a project that could damage underground infrastructure can call Underground Service Alert, the regional notification center for Southern California. Underground Service Alert will notify the utilities that may have buried lines within 1,000 feet of the project. Representatives of the utilities are then notified and are required to mark the specific location of their facilities within the work area prior to the start of project activities in the area.

Local

Orange County Well Ordinance

The Orange County Well Ordinance (County Ordinance No. 2607) requires that a permit be obtained prior to the construction or destruction of any well. Well permits must be obtained prior to beginning exploratory borings, as well as the construction of wells. Drilling procedures and well design and construction must be accomplished in a manner that prevents the spread of contamination and should be developed by an appropriate registered professional (California Professional Geologist or Certified Engineering Geologist or equivalent) with expertise in subsurface investigations. Well construction procedures and design must also be in accordance with California Well Standards (Bulletin 74-90) Reports that include logs of soil borings or any findings or conclusions relating to the subsurface must be signed by a properly registered professional.

County of Orange General Plan

The following is a selected list of General Plan goals, objectives, and policies that are applicable to the proposed Project respective to safety (County of Orange 2022).

Objective S-1. To identify natural hazards and determine the relative threat to people and property in Orange County.

Hazardous Materials Policy 1. To provide consultation, assistance and education to the public, industries, and other agencies regarding the applicable laws and regulations of hazardous materials (including underground storage tanks), hazardous waste, medical waste, and nuclear materials.

Hazardous Materials Policy 2. To respond to all emergency incidents to oversee and ensure that these incidents involving hazardous waste, and medical waste are properly mitigated.

Hazardous Materials Policy 4. To inspect, evaluate, and maintain an adequate surveillance of hazardous materials, hazardous waste, and medical waste in order to ensure full compliance with the laws and regulations.

Hazardous Materials Policy 6. To implement and administer all mandated laws, regulations, and ordinances relating to hazardous materials, hazardous waste, and medical waste.

Hazardous Materials Policy 9. To implement the Orange County Emergency Plan particularly sections addressing hazardous waste, medical waste, and nuclear materials incidences. This will help to foster participation in countywide planning efforts.

Hazardous Materials Policy 10. To support regional efforts as needed to plan for and facilitate the establishment of regional treatment facilities to manage the hazardous and medical waste which are generated within this County.

City of Irvine General Plan

The following is a selected list of General Plan goals, objectives, and policies that are applicable to the proposed Project respective to safety (City of Irvine 2015).

Objective J-1: Hazard Occurrence. Identify actions that the City, in concert with other jurisdictions, must take to reduce the probability of hazard occurrence.

Policy (d): Use the most current available Airport Environs Land Use Plan (AELUP) as a planning resource for evaluating aircraft operations, land use compatibility and land use intensity.

Objective J-2: Disaster Response. Identify actions that the City, in conjunction with other jurisdictions, must take to reduce the severity of disasters.

Policy (b): Ensure that each development will have adequate emergency ingress and egress.

City of Santa Ana General Plan

The following is a selected list of General Plan goals, objectives, and policies that are applicable to the proposed Project respective to safety (City of Santa Ana 2022).

Goal S-2: Hazard Materials: Protect residents and environmental resources from contaminated hazardous material sites and minimize risks associated with the use, production, storage, transport, and disposal of hazardous materials.

Policy S-2.1: Regional Collaboration: Consult and collaborate with federal, state, and regional agencies to identify and regulate the use, storage and disposal of hazardous materials, prevent the illegal transportation and disposal of hazardous waste, and facilitate the cleanup of contaminated sites.

Policy S-3.3: Key Public Facilities and Systems: Coordinate with relevant utility service providers to ensure that major utility systems remain resilient in the event of a major earthquake and are seismically upgraded.

City of Tustin General Plan

The following is a selected list of General Plan goals, objectives, and policies that are applicable to the proposed Project respective to public safety (City of Tustin 2018).

Goal 4: Reduce the risk to the community's inhabitants from exposure to hazardous materials and wastes.

Policy 4.1: Cooperate with the County to implement applicable portions of the County's proposed Hazardous Waste Management Plan.

Policy 4.4: Cooperate fully with other local, State, and federal agencies to efficiently regulate the management of hazardous material and hazardous waste.

Policy 4.10: Regulations governing the discharge of hazardous waste into sewer systems will be strictly enforced.

3.7.3 Impact Analysis and Mitigation Measures

Thresholds of Significance

The following criteria from CEQA Guidelines Appendix G are used as thresholds of significance to determine the impacts of the proposed Project as related to hazards and hazardous materials. The proposed Project would have a significant impact if it would:

1. Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials.
2. 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.
3. Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within 0.25 miles of an existing or proposed school.
4. Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code § 65962.5 and, as a result, would it create a significant hazard to the public or the environment.
5. For a project located within an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area.
6. Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan.
7. Expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires.
8. Result in cumulatively considerable impacts to hazards and hazardous materials.

Methodology

This environmental analysis of the potential impacts related to hazards and hazardous materials from the construction and operation of the proposed Project is based on a review of the results of the site-specific investigations, a review of literature and database research, local general plans, and information regarding proposed Project construction details.

The proposed Project would be regulated by the various laws, regulations, and policies summarized above in Section 3.7.2, *Regulatory Framework*. Compliance by the proposed Project with applicable federal, state, and local laws and regulations is assumed in this analysis and local and state agencies would be expected to continue to enforce applicable requirements to the extent that they do so now. Note that compliance with many of the regulations is a condition of permit approval.

A significant impact would occur if, after considering the features described in in Chapter 2, *Project Description*, and the required compliance with regulatory requirements, a significant impact would occur. For those impacts considered to be significant, mitigation measures are proposed to the extent feasible to reduce the identified impacts.

Criteria Not Analyzed

Based on the proposed Project location, there would be no impact related to the following topics for the reasons described below:

- **Wildland Fires:** As discussed in Section 3.7.1, *Environmental Setting*, *Wildland Fires*, the proposed Project components are not located within areas susceptible to wildland fires. Therefore, there would be no impact relative to wildland land fires and this topic will not be evaluated further in this section.

Impact Analysis

Transport and Release of Hazardous Materials

Impact 3.7-1: The proposed Project could create a significant hazard to the public or the environment through the routine transport, use, disposal of hazardous materials, or the upset and accident conditions involving the release of hazardous materials into the environment.

Significance criteria the topics of hazardous materials routine use and accidental spills are discussed together in Impact 3.7-1 as many of the same applicable regulations apply to both criteria.

Extraction Facilities, Monitoring Wells, Local Groundwater Treatment Plants, and Conveyance Pipelines

Construction

As discussed in Section 2.4, *Project Components*, the proposed Project would include the construction of extraction facilities and monitoring wells, the excavation of trenches for the construction of conveyance pipelines, and the grading of pads for the treatment systems to be constructed next to pipeline alignments. As discussed in Section 3.7.1, *Environmental Setting*, *Existing Hazardous Materials*, investigations to date have identified comingled plumes of groundwater contaminated with COCs (i.e., VOCs, Cr^{+6}) and other organic and inorganic compounds. Extraction facilities and monitoring wells would be installed to extract contaminated groundwater and monitor the progress of treatment, respectively. The construction

of the extraction facilities and monitoring wells would generate soils from the contaminated zones that are anticipated to be contaminated with COCs. In addition, fill and soil graded and trenched for the construction of subsurface conveyance pipelines and pads for the treatment plants may also be contaminated. Finally, the construction activities would require the use of construction equipment and materials would include fuels, oils and lubricants, solvents and cleaners, cements and adhesives, paints and thinners, degreasers, cement and concrete, and asphalt mixtures, which are all commonly used in construction. The routine use or an accidental spill of hazardous materials could result in inadvertent releases, which could adversely affect construction workers, the public, and the environment.

Construction activities would be required to comply with numerous hazardous materials regulations described in in Section 3.7.2, *Regulatory Framework*, designed to ensure that hazardous materials would be transported, used, stored, and disposed of in a safe manner to protect worker safety, and to reduce the potential for a release of construction-related fuels or other hazardous materials into the environment, including stormwater and downstream receiving water bodies. Contractors would be required to prepare and implement Hazardous Materials Business Plans (HMBPs) that would require that hazardous materials used for construction would be used properly and stored in appropriate containers with secondary containment to contain a potential release. The California Fire Code would also require measures for the safe storage and handling of hazardous materials.

As summarized in Section 3.7.2, *Regulatory Framework*, construction contractors would be required to prepare a SWPPP for construction activities in compliance with the NPDES Construction General Permit requirements. The SWPPP would list the hazardous materials (including petroleum products) proposed for use during construction; describe spill prevention measures, equipment inspections, equipment and fuel storage; establish protocols for responding immediately to spills; and describe BMPs for controlling site runoff. The management of stormwater during construction in accordance with the Construction General Permit during construction would control runoff, and the migration of sediment and other pollutants from the proposed sites of construction in the Project Area.

The transportation of hazardous materials would be regulated by the USDOT, Caltrans, and the CHP. Together, federal and state agencies determine driver-training requirements, load labeling procedures, and container specifications designed to minimize the risk of accidental release. This would include the containing, transportation, and disposal of the contaminated drill cuttings at a licensed disposal facility permitted to accept the waste.

Extraction and monitoring swells would be constructed in compliance with well construction standards in the County of Orange Well Ordinance. Compliance with the well construction standards would ensure that the wells are properly constructed and do not cross connect aquifers.

Finally, in the event of an accidental spill that could release hazardous materials during construction activities within the Project Area, a coordinated response would occur at the federal, state, and local levels, including, but not limited to, the Orange County Environmental Health Hazardous Materials Team, which is the countywide hazardous materials response team, and local fire police departments, to respond to and assess the situation, as needed.

The required compliance with the numerous laws and regulations discussed above that govern the transportation, use, handling, and disposal of hazardous materials would limit the potential for creation of hazardous conditions due to the use or accidental release of hazardous materials and would render this impact less than significant.

Operation

Once operational, the proposed Project would extract contaminated groundwater and pump that water through above ground pipes to the groundwater treatment plant located next to the extraction alignment pipelines (see Section 2.4.3, *Local Groundwater Treatment Plants*, for description of treatment systems). Routine maintenance would include visually inspecting the system for leaks. The groundwater treatment plant would remove the contaminants from the groundwater, trapping the contaminants in the GAC. The treated water from the GAC cannisters are routinely tested to indicate when the GAC has reached its capacity to capture contaminants. The treated water would no longer be hazardous and would be discharged to the local sewer system that feeds to OC San Plant No. 1 wastewater treatment plant in Fountain Valley for further treatment before being recharged back into the Basin. The GAC canisters would periodically be replaced and the contaminated GAC canisters returned to the manufacturer for removal of the contaminants and recycling of the canisters. Section 3.8, *Hydrology and Water Quality*, provides further analysis regarding impacts to water quality. With the proper handling of the GAC canisters in accordance with manufacturers specifications, the impact would be less than significant.

Mitigation Measures

None Required.

Significance Determination

Less than Significant Impact.

Emit Hazardous Materials Near Sensitive Receptors

Impact 3.7-2: The proposed Project could emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within 0.25 miles of an existing or proposed sensitive receptors, such as schools, day care centers, or hospitals.

Extraction Facilities, Monitoring Wells, Local Groundwater Treatment Plants, and Conveyance Pipelines

Construction

Construction of the proposed Project would require the short-term use of various hazardous materials, as discussed above in Impact 3.7-1. The transport of the hazardous materials could use haul routes that pass by the sensitive receptors listed above in Section 3.7.1, *Environmental Setting*, *Sensitive Receptors*. During the construction activities, construction equipment and materials may include fuels, oils and lubricants, solvents and cleaners, cements and adhesives, paints and thinners, degreasers, cement and concrete, and asphalt mixtures, which are all commonly used in construction. The construction materials, which are not considered acutely hazardous, would be transported, used, and disposed of during construction. The routine use or an accidental spill of hazardous materials could result in inadvertent releases in proximity to nearby sensitive receptors, which could adversely affect the public.

As described above under Impact 3.7-1, construction activities would be required to comply with numerous hazardous materials regulations designed to ensure that hazardous materials are transported, used, stored, and disposed of in a safe manner to protect worker safety, and to reduce the potential for a release of construction-related fuels or other hazardous materials into the environment, including in proximity to sensitive receptors.

The required compliance with the numerous laws and regulations discussed above that govern the transportation, use, handling, and disposal of hazardous materials during construction of the proposed Project would reduce the potential risks to sensitive receptors within 0.25 miles of the sites of construction in the Project Area, related to emitting and handling hazardous substances; the impact would be less than significant.

Operation

The operation of the proposed Project would result in the routine transport of contaminated groundwater to the groundwater treatment plant that would be placed next to the pipeline alignments. As described above in Impact 3.7-1, the contaminated groundwater would be treated by the groundwater treatment plants and the treated groundwater would no longer be hazardous. With the treatment of the contaminated groundwater, the impact would be reduced to less than significant.

Mitigation Measures

None Required.

Significance Determination

Less than Significant Impact.

Hazardous Materials Sites

Impact 3.7-3: The proposed Project could be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code § 65962.5 and, as a result, would create a significant hazard to the public or the environment.

Extraction Facilities, Monitoring Wells, Local Groundwater Treatment Plants, and Conveyance Pipelines

Construction and Operation

As discussed in Section 3.7.1, *Environmental Setting*, *Existing Hazardous Materials*, all of the sources of contamination are listed on the Government Code § 65962.5 (also known as the Cortese List). The proposed Project, in and of itself, is not listed on the Cortese List. As explained in Section 2.3, *Project Objectives*, the purpose of the proposed Project is to treat the contaminated groundwater that has migrated beyond the listed source sites and return the treated water to the aquifer. Components of the proposed Project would not be inside the boundaries of the Cortese List sites. Treatment of the contaminated groundwater will assist the listed sites in groundwater cleanup and will eventually assist the listed sites in being removed from the Cortese List. The impact would be less than significant.

Mitigation Measures

None Required.

Significance Determination

Less than Significant Impact.

Airports

Impact 3.7-4: The proposed Project could result in a safety hazard for people residing or working in the proposed Project Area within an airport land use plan or 2 miles of a public airport or public use airport.

Extraction Facilities, Monitoring Wells, Local Groundwater Treatment Plants, and Conveyance Pipelines

Construction and Operation

As discussed in Section 3.7.1, *Environmental Setting*, *Airports*, the southernmost portions of the Project Area are within 2 miles of John Wayne Airport. The height limitation for structures just north of the airport at the locations of the well alignments is 100 feet. However, the tallest structure that would be used for the proposed Project would be the drilling rigs used to construct the extraction and monitoring wells. The maximum height of a typical drill rig is about 50 feet, at most. This height would not penetrate the navigable airspace of the airport. Therefore, the impact relative to airports would be less than significant.

Mitigation Measures

None Required.

Significance Determination

Less than Significant Impact.

Emergency Response or Evacuation Plan

Impact 3.7-5: The proposed Project could impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan.

Extraction Facilities, Monitoring Wells, Local Groundwater Treatment Plants, and Conveyance Pipelines

Construction

As discussed in Section 3.11, *Transportation*, Impact 3.11-1, some construction activities could impede traffic flow because a large portion of the proposed pipelines would be installed within rights-of-ways to the extent feasible and could temporarily require partial or complete road closures. Such road restrictions or closures could interfere with emergency vehicles (e.g., police, fire, or ambulances). However, the cities of Santa Ana, Irvine, and Tustin all require encroachment Permits with traffic control plans for projects that will require road closures or restrictions. Traffic control plans would provide traffic control, flagging,

and signage, would provide measures to minimize lane closures, and would ensure that emergency vehicles could pass through the area if needed. As a result, impacts relative to emergency response would be less than significant.

Operation

As discussed in Section 3.11, *Transportation*, Impact 3.11-1, once constructed, the proposed extraction facilities and monitoring wells, conveyance pipelines, and groundwater treatment plants would require periodic maintenance to ensure the system is operating as planned. The operations and maintenance would not require road restrictions of closures and relative to emergency response there would be no impact.

Mitigation Measures

None Required.

Significance Determination

Less than Significant Impact.

Cumulative Impacts

Impact 3.7-6: Concurrent construction and operation of the proposed Project and related projects in the geographic scope could result in cumulative short-term and long-term impacts to hazards and hazardous materials.

This section presents an analysis of the cumulative effects of the proposed Project in combination with other past, present, and reasonably foreseeable future projects that could cause cumulatively considerable impacts. Significant cumulative impacts related to hazards and hazardous materials could occur if the incremental impacts of the proposed Project combined with the incremental impacts of one or more of the cumulative projects. The cumulative projects considered in this Draft PEIR are listed on Table 3-1.

As previously discussed, the Project Area is not located within or near a fire hazard severity zone. Accordingly, the proposed Project would not contribute to cumulative impacts related to wildland fires and this topic is not discussed further.

The geographic area affected by the proposed Project and its potential to contribute to cumulative impacts varies based on the environmental resource under consideration. The geographic scope of analysis for cumulative hazards and hazardous materials impacts encompasses and is limited to the Project Area and its immediately adjacent area. This is because impacts relative to hazards and hazardous materials are generally site-specific and depend on the nature and extent of the hazardous materials release, and existing and future soil and groundwater conditions. For example, hazardous materials incidents tend to be limited to a smaller and more localized area surrounding the immediate spill location and extent of the release and could only be cumulative if two or more hazardous materials releases spatially overlapped.

The timeframe during which the proposed Project could contribute to cumulative hazards and hazardous materials effects includes the construction and operations phases. For the proposed Project, the operations phase is about 30 years. However, similar to the geographic limitations discussed above, it should be noted that impacts relative to hazardous materials are generally time-specific. Hazardous materials events

could only be cumulative if two or more hazardous materials releases occurred at the same time, as well as overlapping at the same location.

Extraction Facilities, Monitoring Wells, Groundwater Treatment Plants, and Conveyance Pipelines

Construction

Significant cumulative impacts related to hazards and hazardous materials could occur if the incremental impacts of the proposed Project combined with the incremental impacts of one or more of the cumulative projects discussed above to substantially increase risk that people or the environment would be exposed to hazardous materials. As listed and shown, there are no cumulative projects under consideration adjacent to the proposed sites of construction in the Project Area.

The construction activities for all cumulative projects would be subject to the same regulatory requirements discussed for the proposed Project for compliance with existing hazardous materials regulations, including spill response during construction and being located on sites with residual contamination from previous land uses. Cumulative projects that have spills of hazardous materials and/or residual contamination from previous land uses would be required to remediate their respective sites to the same established regulatory standards as the proposed Project. This would be the case regardless of the number, frequency, or size of the release(s). The responsible party associated with each spill would be required to remediate site conditions to the same established regulatory standards. The residual less-than-significant effects of the proposed Project that would remain after mitigation would not combine with the potential residual effects of cumulative projects to cause a potential significant cumulative impact because residual impacts would be highly site-specific, would not spatially overlap, and would be below regulatory standards. Accordingly, no significant cumulative impact with respect to the use of hazardous materials would result. For the above reasons, the proposed Project in combination with cumulative projects would not cause or contribute to a cumulatively considerable impact with respect to the use of hazardous materials, and impacts would be less than significant.

Construction for two or more projects that occur at the same time and use the same roads could cause interference with emergency access. However, all construction sites (i.e., the Project Area and related cumulative project sites) that could cause lane closures would be required to apply for an encroachment permit. The encroachment permit would require the preparation and implementation of a traffic control plan that would manage the movement of vehicles to maintain traffic flow and prevent interference with emergency access. The proposed Project in combination with related cumulative projects would not cause or contribute to a cumulatively significant impact with respect to emergency access, and impacts would be less than significant.

Operations

Significant cumulative impacts related to operational hazards could occur if the incremental impacts of the proposed Project combined with those of one or more of the related cumulative projects were to cause a substantial increase in risk that people or the environment would be exposed to hazardous materials used or encountered during the operations phase.

It is assumed that the operations of related cumulative projects would store, use, and dispose of variable quantities of hazardous materials. Similar to the proposed Project, related cumulative projects would also

be required to comply with all of the same hazardous materials regulatory requirements as detailed in Section 3.7.2, *Regulatory Framework*, which includes the storage, use, and disposal of hazardous materials and waste, which would minimize the potential for adverse health effects related to hazardous materials and waste. Therefore, the proposed Project in combination with cumulative projects would not cause or contribute to a cumulatively significant impact with respect to the use of hazardous materials, and impacts would be less than significant.

Mitigation Measures

None Required.

Significance Determination

Less than Significant Impact.

3.8 Hydrology and Water Quality

This section addresses the hydrology and water quality impacts associated with implementation of the proposed Project. This section includes a description of the existing hydrology and water quality conditions in and around the Project Area; a summary of applicable regulations related to hydrology and water quality; and an evaluation of the potential impacts of the proposed Project related to hydrology and water quality at the Project Area and in the surrounding area, including cumulative impacts.

3.8.1 Environmental Setting

The proposed Project does not involve the use of or impacts to surface water supplies or surface water quality.

Regional Groundwater Basin

The Project Area is located within the approximately 350-square-mile Coastal Plain of Orange County Groundwater Basin 8-1 (the Basin) (OCWD 2017). The basin is bounded by the Santa Ana Mountains, Chino Hills, and Puente Hills along the northeast, sloping along the coastal plain to the Pacific Ocean along the southwest. The Basin underlies the lower Santa Ana River watershed and a portion of the Coyote Creek Watershed (Coyote Creek is a tributary to the San Gabriel River). The Basin formed in a synclinal, northwest-trending trough that deepens as it continues beyond the Orange-Los Angeles county line.[29] The Newport-Inglewood fault zone, San Joaquin Hills, Puente Hills, and Santa Ana Mountains form the uplifted margins of the syncline. The total thickness of sedimentary rocks in the Basin surpasses 20,000 feet, of which only the upper 2,000 to 4,000 feet contain fresh water. In the southeastern area underlying the City of Irvine and along the Basin margins, the thickness of fresh water-bearing sediments is less than 1,000 feet.

Aquifer System

The Basin has been divided into three major aquifer systems based largely on geologic data and vertical potentiometric head (groundwater levels) differences between wells constructed at different depth intervals within the aquifer systems (EA 2023, provided in Appendix E of this Draft PEIR). From shallow to deep, the three aquifer systems are the Shallow Aquifer System, the Principal Aquifer System, and the Deep Aquifer System. Although individually identified, the aquifer systems are known to be hydraulically connected as groundwater flows between them by way of discontinuities in the aquitards or leakage through the intervening aquitards. Because of the groundwater basin's synclinal and faulted structure, the Shallow Aquifer System extends over a larger area than the underlying Principal and Deep Aquifer Systems.

The Shallow Aquifer System consists of a heterogeneous mixture of sediments from near land surface to depths ranging from about 83 feet below ground surface (bgs) in the south-central portion of the Project Area to about 162 feet bgs in the north-central portion of the Project Area. The heterogeneous complex of unconsolidated sediments that comprise the Shallow Aquifer System within the Project Area is generally characterized by various thicknesses of interfingered layers, lenses, interbeds, laminations, and mixtures of clays, silts, sands, and gravels of varying lateral extents. The Shallow Aquifer System is distinguished

[29] A syncline is a downward arc or curve in rock layers that can create a basin.

from the upper portions of the underlying Principal Aquifer System by variable thicknesses of generally finer-grained lower permeability sediments that tend to restrict, but do not preclude, hydraulic communication between the two aquifer systems. First-encountered groundwater in the Shallow Aquifer System is at depths as shallow as a few feet bgs.

The Principal Aquifer System consists of coarser-grained material, which is generally over 1,000 feet thick throughout much of the Basin (OCWD 2015). The Principal Aquifer is largely separated from the overlying Shallow Aquifer System by an extensive aquitard in the coastal and mid-Basin areas. Over 90 percent of groundwater production from within the Basin occurs from wells that are screened within the Principal Aquifer system at depths between 200 and 1,300 feet, which underlies the Shallow Aquifer system and is up to 2,000 feet deep in the center of the Basin (OCWD 2017).

Underlying the Principal Aquifer System is the Deep Aquifer System, which reaches depths of up to 4,000 feet (OCWD 2015, 2017). The Deep Aquifer System is generally confined throughout the entire Basin and is separated from the overlying Principal Aquifer System by an extensive aquitard that thins somewhat in the in the northern half of the Basin but remains laterally extensive. The Deep Aquifer System contains amber-colored groundwater in the coastal area due to natural organic material from ancient buried plant and wood material that gives the water an amber tint and a sulfur odor (OCWD 2017). Although this water is of high quality, its color and odor produce negative aesthetic qualities that require treatment before use as drinking water.

Groundwater Quality

There are numerous contaminant source areas within the Project Area that have comingled into several larger contaminant plumes in the Shallow Aquifer System, as shown on Figure 2-4 (EA 2023, provided in Appendix E of this Draft PEIR). Most of the contaminants are volatile organic compounds (VOCs). Based investigations to date, the Chemicals of Concern (COCs) include the following:

- Perchloroethene (PCE)
- Trichloroethene (TCE)
- 1,1-dichloroethene (1,1-DCE)
- 1,1-dichloroethane (1,1-DCA)
- 1,2-dichloroethane (1,2-DCA)
- Cis-1,2-dichloroethene (cis-1,2-DCE)
- 1,1,2-trichloroethane (1,1,2-TCA)
- 1,4-dioxane
- Perchlorate
- Hexavalent chromium (Cr^{+6})
- Vinyl chloride

Other organic and inorganic compounds that have been detected in Shallow Aquifer System groundwater are generally detected less frequently, less broadly distributed, and occur at lower concentrations within the footprints of the primary COC plumes.

Advection[30] of COCs in OU2 groundwater is anticipated to be the predominant contaminant transport process, primarily through coarser zones (i.e., sands and gravels). Legacy water supply wells in the Project Area may also act as conduits for the transport of groundwater containing COCs from the Shallow Aquifer System downward into the underlying Principal Aquifer System.

The Shallow Aquifer System is distinguished from the upper portions of the underlying Principal Aquifer System by variable thicknesses of generally finer-grained lower permeability sediments that tend to restrict, but do not preclude, hydraulic communication between the two aquifer systems.

The Shallow and Principal Aquifer Systems are components of the Orange and Irvine Groundwater Management Zones which are defined in the Water Quality Control Plan for the Santa Ana River Basin (Basin Plan). The Basin Plan designates beneficial uses for the Orange and Irvine Groundwater Management Zones, including the Domestic and Municipal (MUN) beneficial use.

The Principal Aquifer System is used extensively for domestic water supply and has good water quality. As discussed in the FS (EA 2023), two active water supply wells in the Principal Aquifer have been contaminated by VOCs. As discussed in Chapter 2, *Project Description*, one of the remedial action objectives of the proposed Project is to prevent contaminants in the overlying Shallow Aquifer System from migrating downward into the underlying Principal Aquifer System.

Flood Hazards

Flooding is inundation of normally dry land as a result of a rise in surface water levels or rapid accumulation of stormwater runoff during storm events. The Federal Emergency Management Agency (FEMA), through its Flood Insurance Rate Mapping (FIRM) program, designates areas where urban flooding could occur during 100-year and 500-year flood events. A 100-year flood event has a one-percent probability of occurring in a single year. A 100-year flood can occur in consecutive years or periodically throughout a decade. A 500-year flood event has a 0.2 percent probability of occurring in a single year. The FEMA's National Flood Hazard website indicates the flood control channel along the north and east side of MacArthur Boulevard is mapped within the 100-year flood plain (Zone A) (FEMA 2009), and includes the southernmost extraction alignments, G-6 and G-7. However, the flood map also states that this flood channel has "flood discharge contained infrastructure," meaning levees are present to contain flood flows to the channel. The remaining portions of the Project Area are mapped within an area of minimal flood hazard (Zone X).

Tsunami and Seiche Hazards

Tsunamis are a series of waves generated by vertical movement of the sea floor, normally associated with earthquakes or volcanic eruptions. According to the Tsunami Hazard Area Map published by the

[30] Advection refers to the movement of solutes caused by the flow of groundwater.

California Geological Survey (CGS), the areas susceptible to tsunamis do not extend as far inland as Interstate (I-)405. The Project Area is not within the Tsunami Hazard Area (CGS 2024).

Seiches are oscillations of enclosed or semi-enclosed bodies of water that result from seismic events, wind stress, volcanic eruptions, underwater landslides, and local basin reflections of tsunamis. The key requirement for the formation of a seiche is that a body of water be at least partially bounded, allowing for a standing wave to form. The Project Area is not located near any large water bodies and would not be subject to impacts from a seiche.

3.8.2 Regulatory Framework

Federal

Clean Water Act

The federal Clean Water Act (CWA) and subsequent amendments, under the enforcement authority of the U.S. Environmental Protection Agency (USEPA), was enacted "to restore and maintain the chemical, physical, and biological integrity of the Nation's waters." The purpose of the CWA is to protect and maintain the quality and integrity of the nation's waters by requiring states to develop and implement state water plans and policies. The CWA gave the USEPA the authority to implement pollution control programs such as setting wastewater standards for industry. In California, implementation and enforcement of the National Pollutant Discharge Elimination System (NPDES) program is conducted through the California State Water Resources Control Board (SWRCB) and the nine Regional Water Quality Control Boards (RWQCBs). The CWA also sets water quality standards for surface waters and established the NPDES program to protect water quality through various sections of the CWA, including Sections 401 through 404 and 303(d) that are implemented and regulated by the SWRCB and the nine RWQCBs. CWA Section 402 would apply to the proposed Project because construction at the Project Area would be required to control discharges of pollutants from point sources, as discussed below (see *Construction General Permit* below).

National Pollutant Discharge Elimination System Program

The NPDES permit program is administered in the state of California by the SWRCB and RWQCBs under the authority of the USEPA to control water pollution by regulating point sources that discharge pollutants into waters of the United States. If discharges from industrial, municipal, and other facilities go directly to surface waters, those project applicants must obtain permits. An individual NPDES permit is specifically tailored to a discharge to waters of the United States. A general NPDES permit covers multiple facilities within a specific activity category such as construction activities. A general permit applies with same or similar conditions to all dischargers covered under the general permit.

CWA Section 402 regulates stormwater discharges to surface waters through the NPDES program. In California, the USEPA authorizes the SWRCB to oversee the NPDES program through the RWQCBs. The RWQCBs, under the guidance of the USEPA, issue NPDES permits to any construction project over 1 acre that are not covered by an individual NPDES permit, as discussed below in *Construction General Permit*.

Federal Emergency Management Agency (FEMA)

Under Executive Order 11988, the FEMA is responsible for management of floodplain areas defined as the lowland and relatively flat areas adjoining inland and coastal waters subject to a 1 percent or greater chance of flooding in any given year (the 100-year floodplain). FEMA's overall mission is to support citizens and first responders to ensure that the United States builds, sustains, and improves capabilities to prepare for, protect against, respond to, recover from, and mitigate all hazards. With regard to flooding, FEMA provides information, guidance, and regulation associated with flood prevention, mitigation, and response. Under Executive Order 11988, FEMA requires that local governments covered by the federal flood insurance program pass and enforce a floodplain management ordinance that specifies minimum requirements for any construction within the 100-year floodplain. Through its Flood Insurance and Mitigation Administration, FEMA manages the National Flood Insurance Program (NFIP), which includes flood insurance, floodplain management, and flood hazard mapping functions. FEMA determines flood elevations and floodplain boundaries and distributes the FIRM maps used in the NFIP. These maps identify the locations of special flood hazard areas, including 100-year floodplains.

Federal regulations governing development in a floodplain are set forth in the Code of Federal Regulations (CFR) Title 44, Part 60. Those regulations enable FEMA to require municipalities participating in the NFIP to adopt certain flood hazard reduction standards for construction and development in 100-year floodplains.

Floodplain Management, Executive Order No. 11988

Executive Order 11988 requires federal agencies avoid, to the extent possible, the long and short-term adverse impacts associated with the occupancy and modification of flood plains and to avoid direct and indirect support of floodplain development wherever there is a practicable alternative. If a project has a potential impact to or be located within a floodplain, there is an eight-step process that agencies can carry out during their decision-making process on the project. The eight-step process includes the following: (1) determine if a proposed action is in the base floodplain or area that has a 1 percent or greater chance of flooding in any given year, (2) conduct early public review, (3) identify and evaluate practicable alternatives to locating in the base floodplain, (4) identify impacts of the proposed action, (5) develop measures to minimize the impacts and restore and preserve the floodplain if impacts cannot be avoided, (6) re-evaluate the alternatives, (7) present the findings and a public explanation, and (8) implement the action.

State

Porter-Cologne Water Quality Act

The Porter-Cologne Water Quality Control Act, also known as the California Water Code, is California's statutory authority for the protection of water quality. Under this act, the State must adopt water quality policies, plans, and objectives that protect the state's waters. The act sets forth the obligations of the SWRCB and RWQCBs pertaining to the adoption of Basin Plans and establishment of water quality objectives. Unlike the federal CWA, which regulates only surface water, the Porter-Cologne Act regulates both surface water and groundwater and this authority serves as the basis for Waste Discharge Requirements issued to municipal sewage treatment facilities by the RWQCBs. The Porter-Cologne Water

Quality Act is promulgated in the California Code of Regulations Title 22. Title 22 includes treatment and reuse requirements for recycled water projects throughout California.

Anti-Degradation Policy

The SWRCB's Anti-Degradation Policy, otherwise known as Resolution No. 68-16, sets specific restrictions for surface and groundwater that have higher than the required quality in order to avoid degradation of those water bodies. Requirements of this policy must be included within all Water Quality Control Plans throughout California (discussed below). Under this policy, actions that would lower the water quality in designated water bodies would only be allowed: if the action would provide a maximum benefit to the people of California, if it will not unreasonably affect beneficial uses, and if it will not lower water quality below applicable standards.

Construction General Permit

Construction associated with projects that would disturb more than 1 acre of land surface affecting the quality of stormwater discharges into waters of the United States are subject to the *NPDES General Permit for Stormwater Discharges Associated with Construction and Land Disturbance Activities* (Order 2022-0057-DWQ, NPDES No. CAS000002). The Construction General Permit regulates discharges of pollutants in stormwater associated with construction activity to waters of the United States from construction sites that disturb 1 acre or more of land surface, or that are part of a common plan of development or sale that disturbs more than 1 acre of land surface. The permit regulates stormwater discharges associated with construction or demolition activities, such as clearing and excavation; construction of buildings; and linear underground projects, including installation of water pipelines and other utility lines.

The Construction General Permit requires that construction sites be assigned a Risk Level of 1 (low), 2 (medium), or 3 (high), based both on the sediment transport risk at the site and the receiving waters risk during periods of soil exposure (e.g., grading and site stabilization). The sediment risk level reflects the relative amount of sediment that could potentially be discharged to receiving water bodies and is based on the nature of the construction activities and the location of the site relative to receiving water bodies. The receiving waters risk level reflects the risk to the receiving waters from the sediment discharge. Depending on the risk level, the construction projects could be subject to the following requirements:

- Effluent standards;
- Good site management "housekeeping;"
- Non-stormwater management;
- Erosion and sediment controls;
- Run-on and runoff controls;
- Inspection, maintenance, and repair; or
- Monitoring and reporting requirements.

The Construction General Permit requires the development and implementation of a Stormwater Pollution Prevention Plan (SWPPP) that includes specific best management practices (BMPs) designed to prevent

sediment and pollutants from contacting stormwater from moving off site into receiving waters. The BMPs fall into several categories, including erosion control, sediment control, waste management and good housekeeping, and are intended to protect surface water quality by preventing the off-site migration of eroded soil and construction-related pollutants from the construction area. Routine inspection of all BMPs is required under the provisions of the Construction General Permit. In addition, the SWPPP is required to contain a visual monitoring program, a chemical monitoring program for non-visible pollutants, and a sediment monitoring plan if the site discharges directly to a water body listed on the 303(d) list for sediment.

The SWPPP must be prepared before construction activities begin. The SWPPP must contain a site map(s) that delineates the construction work area, existing and proposed buildings, parcel boundaries, roadways, stormwater collection and discharge points, general topography both before and after construction, and drainage patterns across the Project Area. The SWPPP must list BMPs and the placement of those BMPs that the applicant would use to protect stormwater runoff. Additionally, the SWPPP must contain a visual monitoring program; a chemical monitoring program for "non-visible" pollutants to be implemented if there is a failure of BMPs; and a sediment monitoring plan if the site discharges directly to a water body listed on the 303(d) list for sediment. Examples of typical construction BMPs include scheduling or limiting certain activities to dry periods, installing sediment barriers such as silt fence and fiber rolls, and maintaining equipment and vehicles used for construction. Non-stormwater management measures include installing specific discharge controls during certain activities, such as paving operations, vehicle and equipment washing and fueling. The Construction General Permit also sets post-construction standards (i.e., implementation of BMPs to reduce pollutants in stormwater discharges from the site following construction).

In the Project Area, the Construction General Permit is implemented and enforced by the Santa Ana RWQCB, which administers the stormwater permitting program. Dischargers must electronically submit a notice of intent and permit registration documents to obtain coverage under this Construction General Permit. Dischargers are to notify the RWQCB of violations or incidents of non-compliance and submit annual reports identifying deficiencies in the BMPs and explaining how the deficiencies were corrected. The risk assessment and SWPPP must be prepared by a State Qualified SWPPP Developer, and implementation of the SWPPP must be overseen by a State Qualified SWPPP Practitioner. A legally responsible person, who is legally authorized to sign and certify permit registration documents, is responsible for obtaining coverage under the permit.

Water Recycling Policy and Salt and Nutrient Management Plans

In February 2009, the SWRCB adopted Resolution No. 2009-0011, which established a statewide Recycled Water Policy. Draft amendments to the Recycled Water Policy were released in 2012 and 2013. The Recycled Water Policy encourages increased use of recycled water and local stormwater. It also requires local water and wastewater entities, together with local salt/nutrient contributing stakeholders to develop a Salt and Nutrient Management Plan (SNMP) for each groundwater basin and subbasin in California.

Sustainable Groundwater Management Act

In 2014, the California State Legislature approved a combination of bills that together formed the Sustainable Groundwater Management Act (SGMA). SGMA requires the formation of local Groundwater Sustainability Agencies (GSAs) that must develop Groundwater Sustainability Plans (GSPs) for medium or high priority groundwater basins in California by 2022. These plans must quantify basin characteristics and supplies and must establish management actions and projects to achieve basin sustainability within 20 years of implementation (by 2042). The SGMA imposes many new monitoring and reporting requirements, and other procedural and substantive mandates related to groundwater management. In the case of the Coastal Plain of Orange County Groundwater Basin 8-1, OCWD, City of La Habra, and Irvine Ranch Water District had already been managing the Basin for years. In place of a GSP, they submitted the Basin 8-1 Alternative as their GSP to the DWR for review and approval (OCWD 2017).

Recycled Water Groundwater Recharge Projects

On June 18, 2014, new regulations were adopted covering groundwater recharge for potable reuse with recycled water. The new regulations (CWC Sections 13500–13529.4) outline permit requirements for recharging groundwater with recycled water for potable reuse in California. The regulations cover surface recharge and subsurface injection and transfer permitting responsibilities from the CDPH to the SWRCB Division of Drinking Water (DDW). The regulations include protocols to provide for source control, water quality control, retention time, emergency response planning, monitoring programs, operational plans, management plans, reporting requirements, and public review requirements.

California Water Code Section 1211

California Water Code Section 1211 requires that (1) the owner of any wastewater treatment plant obtain the approval of the SWRCB before making any change in the point of discharge, place of use, or purpose of use of treated wastewater where changes to the discharge or use of treated wastewater have the potential to decrease the flow in any portion of a watercourse and (2) the SWRCB review the proposed changes pursuant to the provisions of Water Code Section 1700; In order to approve the proposed change, the SWRCB must determine that the proposed change will not operate to the injury of any legal user of the water involved.

Local

Orange County Well Ordinance

The Orange County Well Ordinance (County Ordinance No. 2607) requires that a permit be obtained prior to the construction or destruction of any well. Well permits must be obtained prior to beginning exploratory borings, as well as the construction of wells. Drilling procedures and well design and construction must be accomplished in a manner that prevents the spread of contamination and should be developed by an appropriate registered professional (California Professional Geologist or Certified Engineering Geologist or equivalent) with expertise in subsurface investigations. Well construction procedures and design must also be in accordance with California Well Standards (Bulletin 74-90) Reports that include logs of soil borings or any findings or conclusions relating to the subsurface must be signed by a properly registered professional.

County of Orange General Plan

The following is a selected list of General Plan goals, objectives, and policies that are applicable to the proposed Project respective to public services and facilities (County of Orange 2022).

Goal 1. Encourage the planning and development of a water conveyance and distribution system to meet the County's future demand.

Objective 1-1. To achieve desired water system service levels through the coordination of land use and water system planning.

Objective 1.2. To implement state, regional, and local facility plans for water delivery to Orange County.

Objective 1.3. To increase storage and delivery capacity for water supplies in Orange County.

City of Santa Ana General Plan

The following is a selected list of General Plan goals, objectives, and policies that are applicable to the proposed Project respective to public services (City of Santa Ana 2022).

Goal PS-1: Public Facilities. Provide quality and efficient facilities that are adequately funded, accessible, safe, and strategically located.

Policy 1-7: Infrastructure Master Plans. Perform periodic (approximately every 10 years) water/sewer resource studies and master plans to identify deficiencies and deferred maintenance for the city's infrastructure systems, including cost estimates; develop nexus calculations to determine new development's fair share cost to upgrade infrastructure systems.

Goal PS-3: Utility Infrastructure. Supply, maintain, and expand City services and infrastructure improvements through innovative funding options and sustainable practices.

Policy 3-1: Stormwater Management. Require all new development and significant redevelopment projects within the city to incorporate best management practices for stormwater capture and treatment per municipal NPDES (National Pollutant Discharge Elimination System) permit requirements.

Policy 3-12: Infrastructure Funding. Continue to pursue grant funding and low-cost loans for improving and upgrading the water and sewer systems.

City of Tustin General Plan

The following is a selected list of General Plan goals, objectives, and policies that are applicable to the proposed Project respective to land use and conservation (City of Tustin 2018).

Goal 5. Protect water quality and conserve water supply.

Policy 5.4. Support the expansion of reclaimed water production and use wherever possible and economically feasible.

Policy 5.7. Reduce and eliminate contamination of water supply from industrial operations.

Goal 14. Continue to implement the Specific Plan/Reuse Plan for MCAS Tustin which maximizes the appeal of the site as a mixed use, master planned development and that includes the following qualities seeking to create results that are very special and worthy of the site's present and historical importance.

Policy 14.9. Ensure that land and water are clean and safe to use and that other environmental considerations are taken into account during design.

City of Irvine General Plan

The following is a selected list of General Plan goals, objectives, and policies that are applicable to the proposed Project respective to integrated waste management (City of Irvine 2015).

Objective H-3. Control wastewater and storm runoff in a manner to minimize impact on adjacent existing or planned land uses.

Policy (b). Require developers of new projects located adjacent to or upstream of natural water courses to develop surface drainage systems which will direct low flows (those which carry the most pollutants) away from natural water source into an area designed to remove pollutants. Require evidence be provided that any proposed development will have adequate sewer service, including assurance that collection and treatment capacity can be accommodated.

Policy (c). Require a National Pollution Discharge Elimination System (NPDES) permit to be obtained from the State Water Resources Control Board whenever surface water is collected anywhere for discharge as a point source, or if a point source discharge is contemplated, a NPDES permit must be obtained from the State Water Resources Control Board. Encourage the use of alternative Best Management Practices (BMPs) to control and minimize urban pollutant runoff.

Policy (d). Limit disturbance of natural water bodies and drainage systems; conserve natural areas; protect slopes and channels; and minimize impacts from stormwater and urban runoff on the biological integrity of natural drainage systems and water bodies.

Policy (c). Require a National Pollution Discharge Elimination System (NPDES) permit to be obtained from the State Water Resources Control Board whenever surface water is collected anywhere for discharge as a point source, or if a point source discharge is contemplated, a NPDES permit must be obtained from the State Water Resources Control Board.

3.8.3 Impact Analysis and Mitigation Measures

Thresholds of Significance

The following criteria from CEQA Guidelines Appendix G are used as thresholds of significance to determine the impacts of the proposed Project as related to hydrology and water quality. The proposed Project would have a significant impact if it would:

1. Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or groundwater quality.
2. Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the Basin.
3. 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:
    a) Result in substantial erosion or siltation on- or off-site;
    b) Substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite;
    c) 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
    d) Impede or redirect flood flows.
4. In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation.
5. Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan.
6. Result in a cumulatively considerable impact to hydrology and water quality.

Methodology

This environmental analysis of the potential impacts related to hydrology and water quality from the construction and operation of the proposed Project is based on a review of the results of the site-specific investigations, a review of literature and database research, local general plans, and information regarding proposed Project construction details.

The proposed Project would be regulated by the various laws, regulations, and policies summarized above in Section 3.8.2, *Regulatory Framework*. Compliance by the proposed Project with applicable federal, state, and local laws and regulations is assumed in this analysis and local and state agencies would be expected to continue to enforce applicable requirements to the extent that they do so now. Note that compliance with many of the regulations is a condition of permit approval.

A significant impact would occur if, after considering the features described in in Chapter 2, *Project Description*, and the required compliance with regulatory requirements, a significant impact would occur. For those impacts considered to be significant, mitigation measures are proposed to the extent feasible to reduce the identified impacts.

Criteria Not Analyzed

Based on the Project Area location, there would no impact related to the following topics for the reasons described below:

- **Tsunami or seiche zones:** As discussed in Section 3.8.1, *Environmental Setting*, the proposed Project components are not located within areas susceptible to tsunamis or seiches. Therefore, there would be no impact relative tsunamis or seiches and these topics will not be evaluated further in this section.

Impact Analysis

Water Quality

Impact 3.8-1: The proposed Project could violate water quality standards or waste discharge requirements or otherwise substantially degrade surface or groundwater quality.

Extraction Facilities, Monitoring Wells, Local Groundwater Treatment Plants, and Conveyance Pipelines

Construction

Proposed Project construction would involve ground-disturbing earthwork including soil boring and well drilling, grading for treatment plant pads, and trenching for conveyance pipelines. These activities could increase the susceptibility of soils on the Project Area to erosion by wind or water. During construction, heavy equipment such as drilling rigs, graders, earth movers, heavy trucks, trenching equipment, and other machinery would be used. Such machinery could contribute pollutants to stormwater runoff in the form of sediment and other pollutants such as fuels, oil, lubricants, hydraulic fluid, or other contaminants. Sediment, construction debris, and other pollutants, if mobilized during construction, could be transported to the storm drain system and receiving waters such as San Diego Creek Bay and the Pacific Ocean.

Construction of the proposed Project would require disturbance of 1 acre or more of ground and thus would be required to apply for coverage under the Construction General Permit. As discussed in Section 3.6.2, *Regulatory Framework*, *State*, the Construction General Permit requires the preparation and implementation of a SWPPP, which would include BMPs designed to control and reduce soil erosion. The BMPs may include stormwater runoff quality control measures such as silt fences, straw wattles, detention basins, and other runoff control measures; watering for dust control; and other BMPs, as appropriate. Compliance with the Construction General Permit requirements to control runoff would ensure that impacts related to water quality and waste discharge requirements would be less than significant.

Operation

Once constructed, extraction facilities, monitoring wells, and conveyance pipelines would be underground and no further ground disturbance would occur.

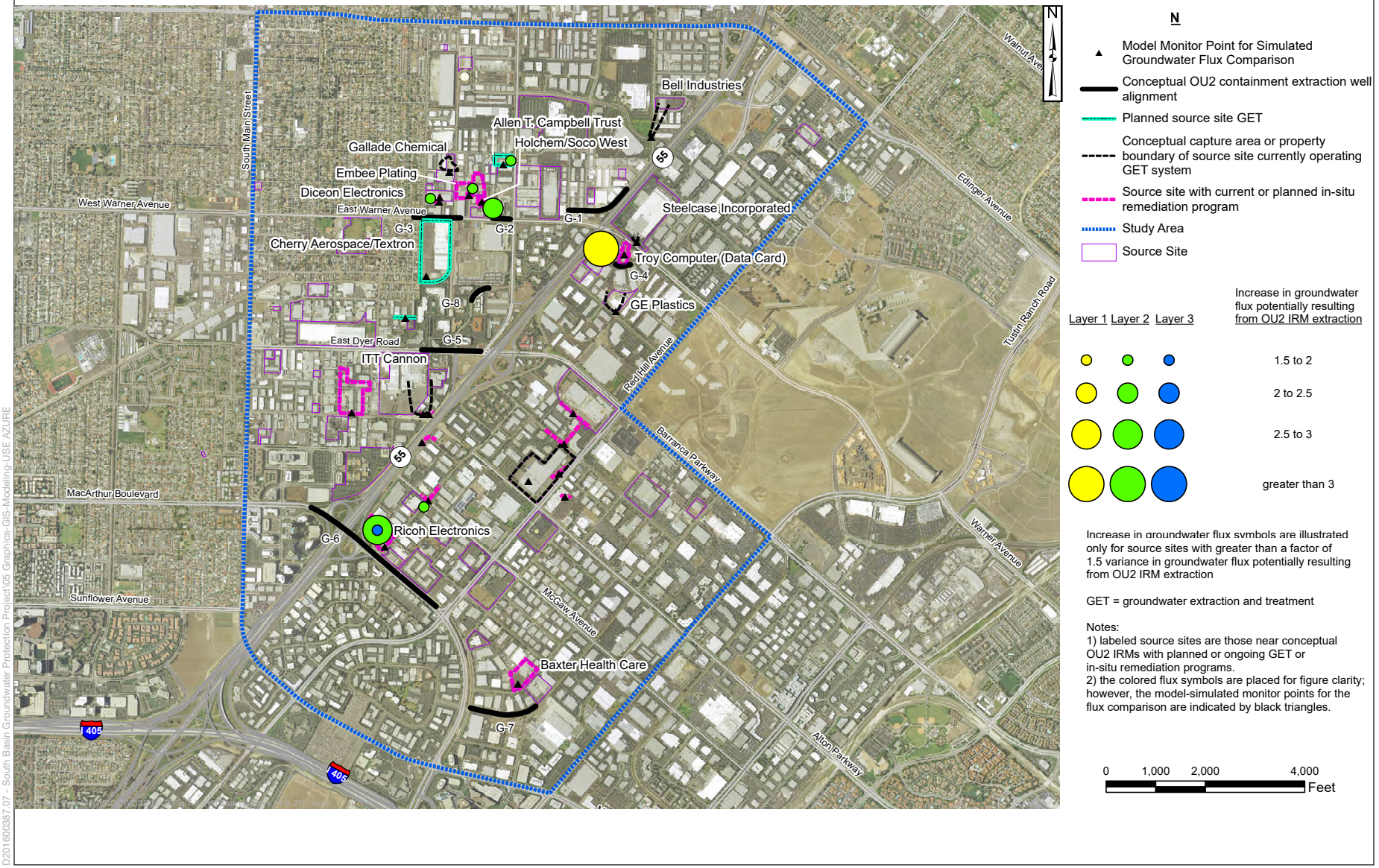
As discussed in Section 2,3, *Project Objectives*, the purpose of the proposed Project is to protect groundwater resources from further degradation of water quality by the source sites shown in Figure 2-2 (note: source sites are the green OU1 sites shown on the figure). The approximate extent of COCs in groundwater in 2019 is depicted in Figure 2-4. The proposed Project components are described in Section 2.4, *Project Components*. Once constructed, the operation of the proposed Project would extract groundwater contaminated with the previously listed COCs from extraction facilities installed in

extraction Alignments G-1 through G-8, which would be placed in areas downgradient of source sites with elevated concentrations of COCs, as shown on Figure 2-5. The extracted contaminated groundwater would be treated at new local groundwater treatment plants placed at the each of the extraction alignments, then conveyed through new underground piping to the existing underground sanitary sewer system to the existing OC San Plant No. 1 in Fountain Valley for further treatment. Once treated at OC San Plant No. 1, the treated water would be conveyed through underground piping to be further treated at the existing Groundwater Replenishment System treatment facility in Fountain Valley. The treated water would then be returned to the Basin at the recharge facilities shown in Figure 2-1. Therefore, the water would be treated three times, which would remove COCs from the groundwater, resulting in a beneficial impact to water quality.

As discussed in the Feasibility Study, a groundwater flow model was used to simulate the changes that would occur during groundwater extraction (EA 2023 and provided in Appendix E of this Draft PEIR). This modeling effort was conducted to inform the proposed Project design and model groundwater flow rates and paths. Particle tracking was used to track groundwater flow paths and estimate groundwater extraction rates necessary to contain and capture groundwater. Particle tracking maps show the flow path of a particle of water over time. In forward tracking, a particle is placed at a specific location (cell) in the model domain and the model then simulates the path the particle of water will take through other cells as model time moves forward. In reverse tracking, the model simulates the path of where the particle came from to identify its source. Both forward and reverse tracking were used to evaluate groundwater flow. The particle track maps are provided as Figures 7-7A through 7-19B in the Feasibility Study (Appendix E of this Draft PEIR).

In addition to informing the proposed Project design, the particle tracking results were used to assess the potential to affect ongoing or proposed treatment systems at the existing source sites shown on **Figure 3.8-1**. The Feasibility Study defined adverse effects as changes in groundwater flow direction and hydraulic gradient (the rate of change in total head per unit distance of flow in a particular direction; in other words, the slope of the water table) that reduce the effectiveness of source site treatment systems. As shown on the particle flow maps (see Figures 7-7A through 7-19B of the Feasibility Study, Appendix E of this Draft PEIR), the proposed Project would locate the extraction well Alignments G-1 through G-8 downgradient of the source sites to capture contaminated groundwater that has migrated to offsite areas downgradient of the source sites. The particle tracking maps indicate that the proposed Project would not significantly change groundwater flow directions at the source sites. In other words, existing and proposed source site treatment systems would still be able to capture and treat contaminated groundwater still on the source sites.

The groundwater flow model also estimated changes to the hydraulic gradient. The range of naturally occurring fluctuations in the hydraulic gradient were evaluated and revealed a factor of 1.5 that indicates naturally occurring fluctuations (e.g., seasonal fluctuations). Modeled fluctuations greater than 1.5 were concluded to be due to the extraction proposed by the Project. As shown on Figure 7-6 in the Feasibility Study (Appendix E of this Draft PEIR), there are three locations where the proposed Project is anticipated to steepen the water table at that source site, such that groundwater would be drawn from the source site at a rate faster than the existing flow rate. The source sites include Troy Computer, Holchem/Soco West, and Ricoh Electronics, as discussed below.



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SOURCE: Engineering Analytics, Inc., 2023

South Basin Groundwater Protection Project

Figure 3.8-1

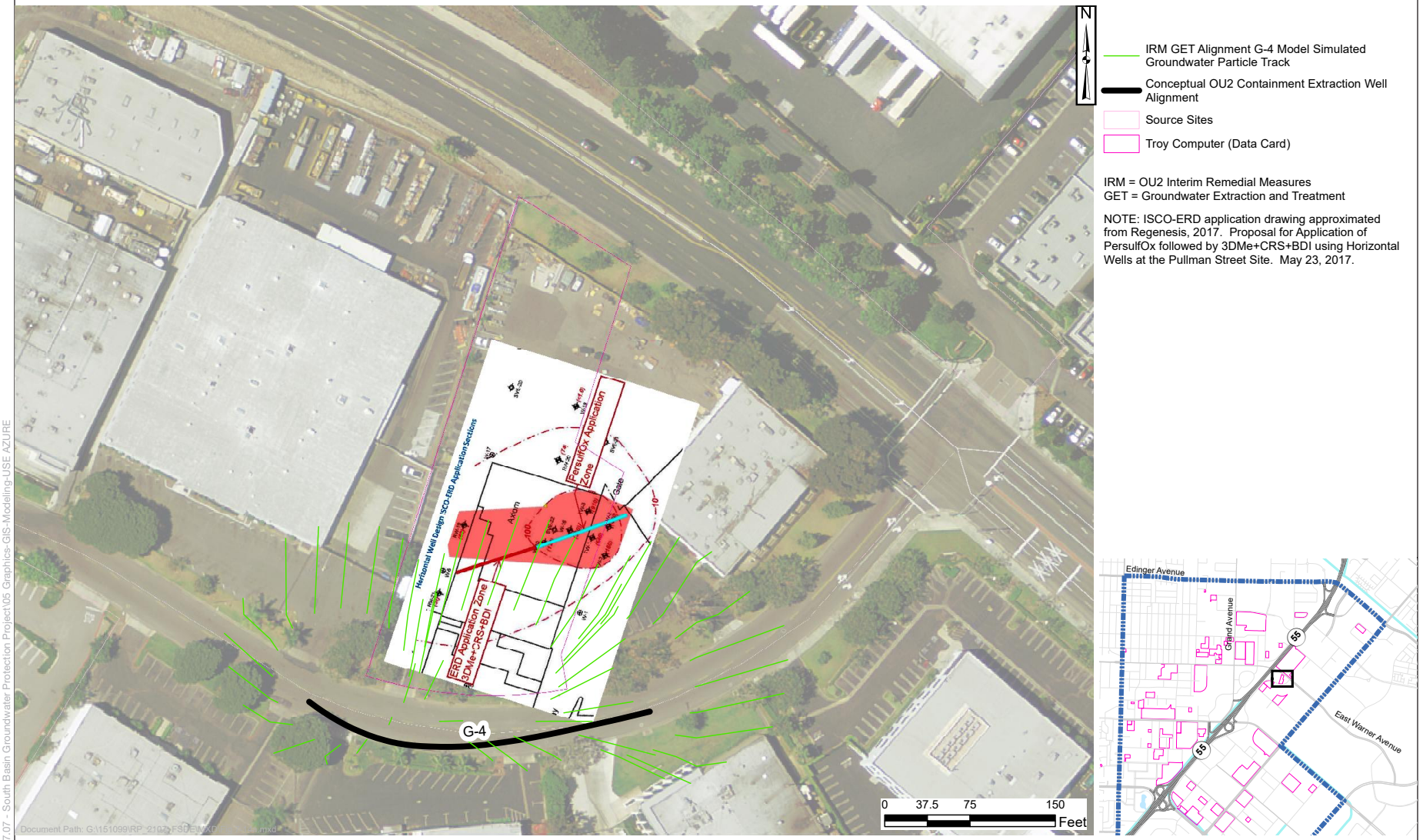
Model Simulated changes in Groundwater Flux Values Resulting from OU2 IRM Extraction

ESA

Troy Computer – The Troy Computer source site (RWQCB Case #2080186) has proposed enhanced in-situ bioremediation (EISB) as the treatment method for their onsite contaminated groundwater. EISB is a groundwater treatment method where chemicals are added to groundwater (in this case, hydrogen) to stimulate naturally occurring microbes present in the subsurface that break down volatile COCs into inert constituents. However, the RWQCB, the regulatory agency overseeing cleanup for this source site, has indicated that the potential selection and implementation of a groundwater remedy is on hold, pending further groundwater investigation and a feasibility study. As shown on, **Figure 3.8-2** and **Figure 3.8-3**, the G-4 extraction facility would be located about 40 feet downgradient and across the street from the Troy Computer source site. This extraction facility would capture contaminated groundwater not treated by the onsite EISB system that migrates from the source site to downgradient offsite areas. In addition and as shown on **Figure 3.8-4**, the area from the Troy Computer source site to the G-4 extraction facility and then beyond is currently already contaminated. Therefore, the operation of the G-4 extraction facility would not result in drawing contaminated groundwater through areas that are less or not contaminated. The operation of the G-4 extraction facility would capture and treat contaminated groundwater that the source site treatment system does not treat, which would be a beneficial impact.

Holchem/Soco West – (DTSC Case #80001779). The Holchem/Soco West source site is proposing to implement a surface cap, monitored natural attenuation (MNA), slurry walls, and EISB using injection wells, and a Permeable Reactive Barrier (PRB) north of Warner Avenue. The EISB treatment method is described above in the Troy Computer discussion. PRB is a treatment technology designed to intercept and treat contaminants where they are placed along linear alignments constructed perpendicular to the direction of groundwater flow. In this case, the treatment media would be a reducing agent (amendment) such as zero valent iron. As discussed in the Feasibility Study, the groundwater flow model was refined in response to comments from Holchem/Soco West consultants to incorporate source site data into the OCWD groundwater flow model to better model the effects of extraction facilities G-2 and G-3 (**Figure 3.8-5**). The OCWD groundwater flow model was rerun and the resulting particle flow paths are shown on **Figure 3.8-6** and **Figure 3.8-7**. The groundwater flow model results indicate a small increase in the hydraulic gradient that is not expected to adversely affect the proposed onsite treatment proposed for the source site. The operation of the G-2 and G-3 extraction facility alignments would capture and treat contaminated groundwater that the source site treatment system does not treat, which would be a beneficial impact.

Ricoh Electronics – (RWQCB Case # 2080133) The former Ricoh Electronics facility implemented in situ chemical oxidation (ISCO) using potassium permanganate and reportedly is planning to implement EISB pilot testing using lactate. Extraction facility G-6 would be located downgradient of this source site. As shown on **Figure 3.8-8** and **Figure 3.8-9**, the G-6 extraction facility would be located downgradient and immediately adjacent to the Ricoh source site. Although the proposed Project would increase the hydraulic gradient at the Ricoh source site, the operation of the G-6 extraction facility would capture contaminated groundwater at the downgradient border of the source and therefore would not result in drawing contaminated groundwater through areas that are less or not contaminated. The operation of the G-6 extraction facility would capture and treat contaminated groundwater that the source site treatment system does not treat, which would be a beneficial impact.



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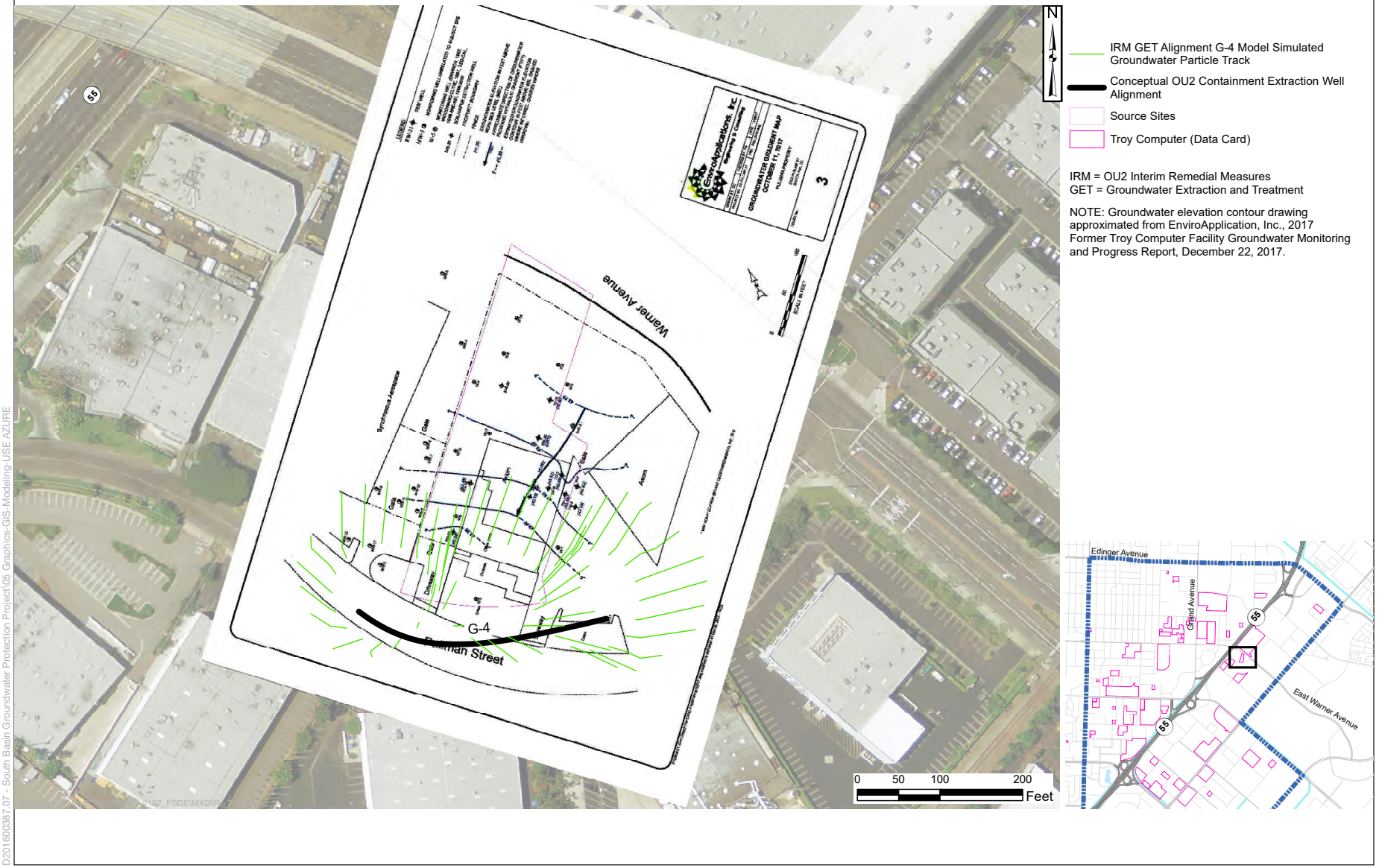
SOURCE: Engineering Analytics, Inc., 2023

South Basin Groundwater Protection Project

Figure 3.8-2

Troy Computer Proposed Horizontal Well Design ISCO-ERD Application Sections and OCWD Model Simulated Groundwater Particle Tracks

ESA



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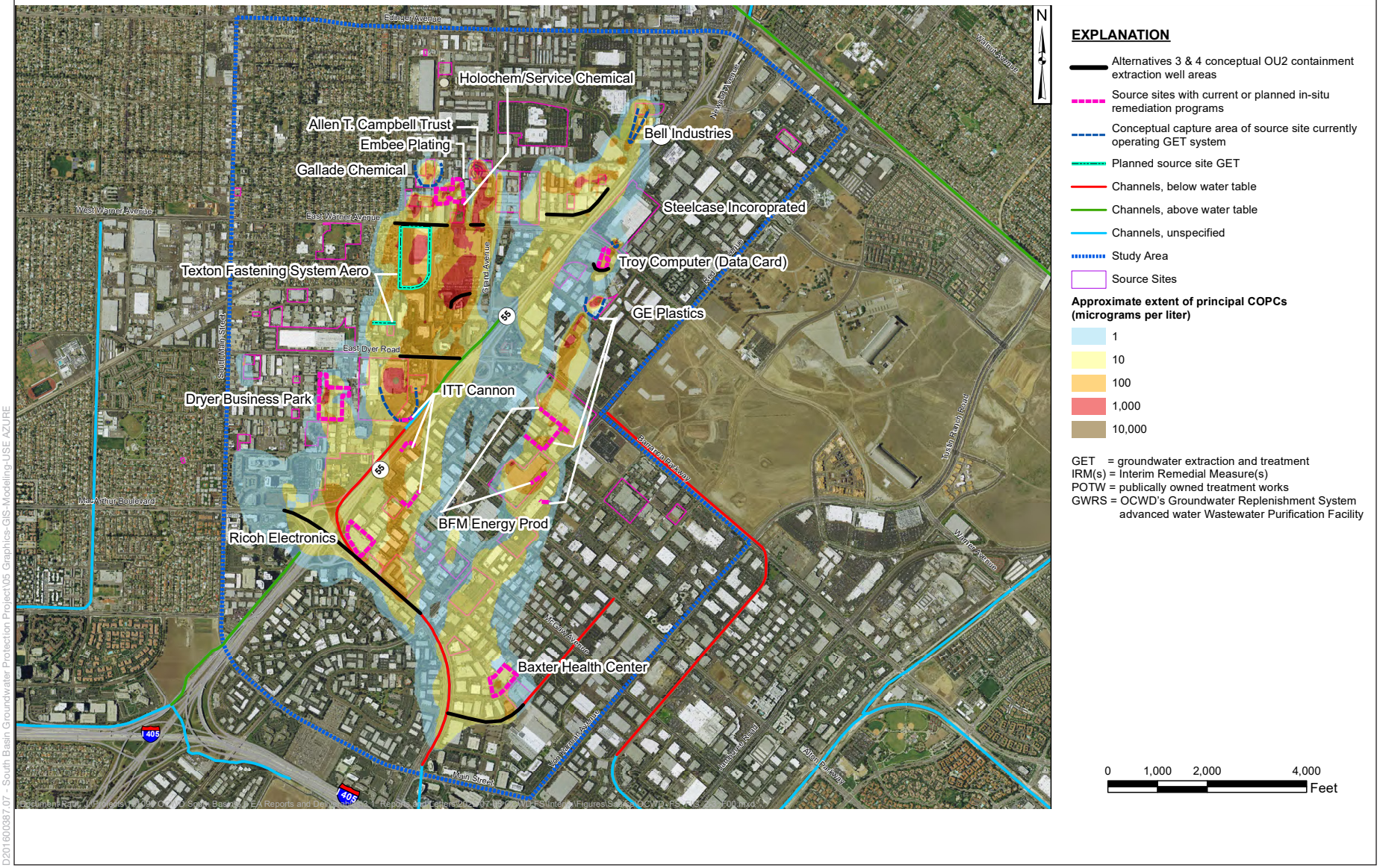
SOURCE: Engineering Analytics, Inc., 2023

South Basin Groundwater Protection Project

Figure 3.8-3

Comparison of OCWD Model Simulated Groundwater Particle Tracks Versus Published Groundwater Elevation Contours, Troy Computer

ESA



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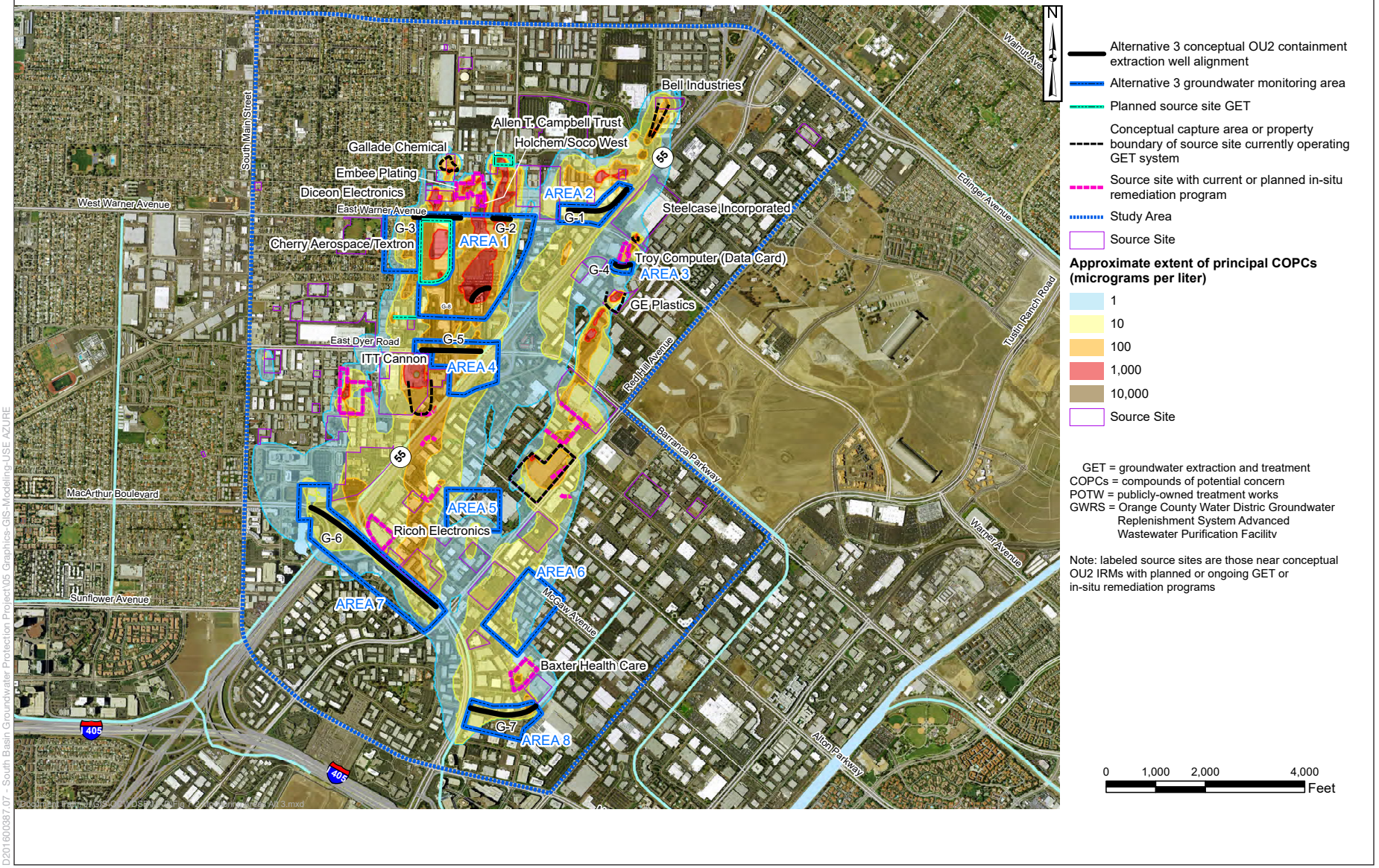
SOURCE: Engineering Analytics, Inc., 2023

South Basin Groundwater Protection Project

Figure 3.8-4

Approximate Areas of OU2 Targeted for IRMS - Alternatives 3 And 4: Containment and Treatment of Relatively High Concentration and Leading-Edge Areas Using Groundwater and Treatment with Discharge to POTW/GWRS or Reinjection

ESA



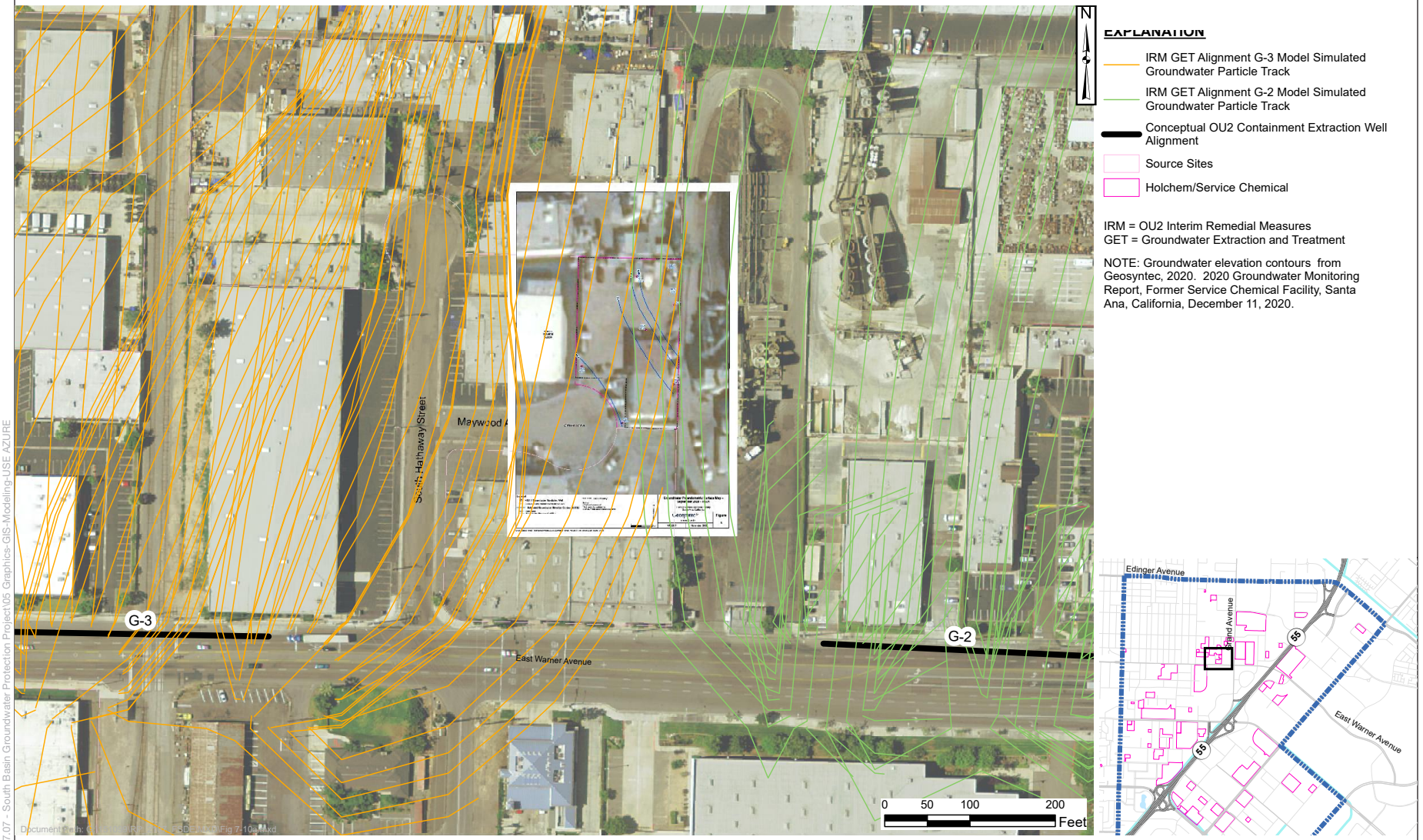
SOURCE: Engineering Analytics, Inc., 2023

South Basin Groundwater Protection Project

Figure 3.8-5

Groundwater Monitoring Areas - Alternative 3: Containment and Treatment of Relatively High Concentration and Leading-Edge Areas using Groundwater Extraction and Treatment with Discharge to POTW and GWRS

ESA



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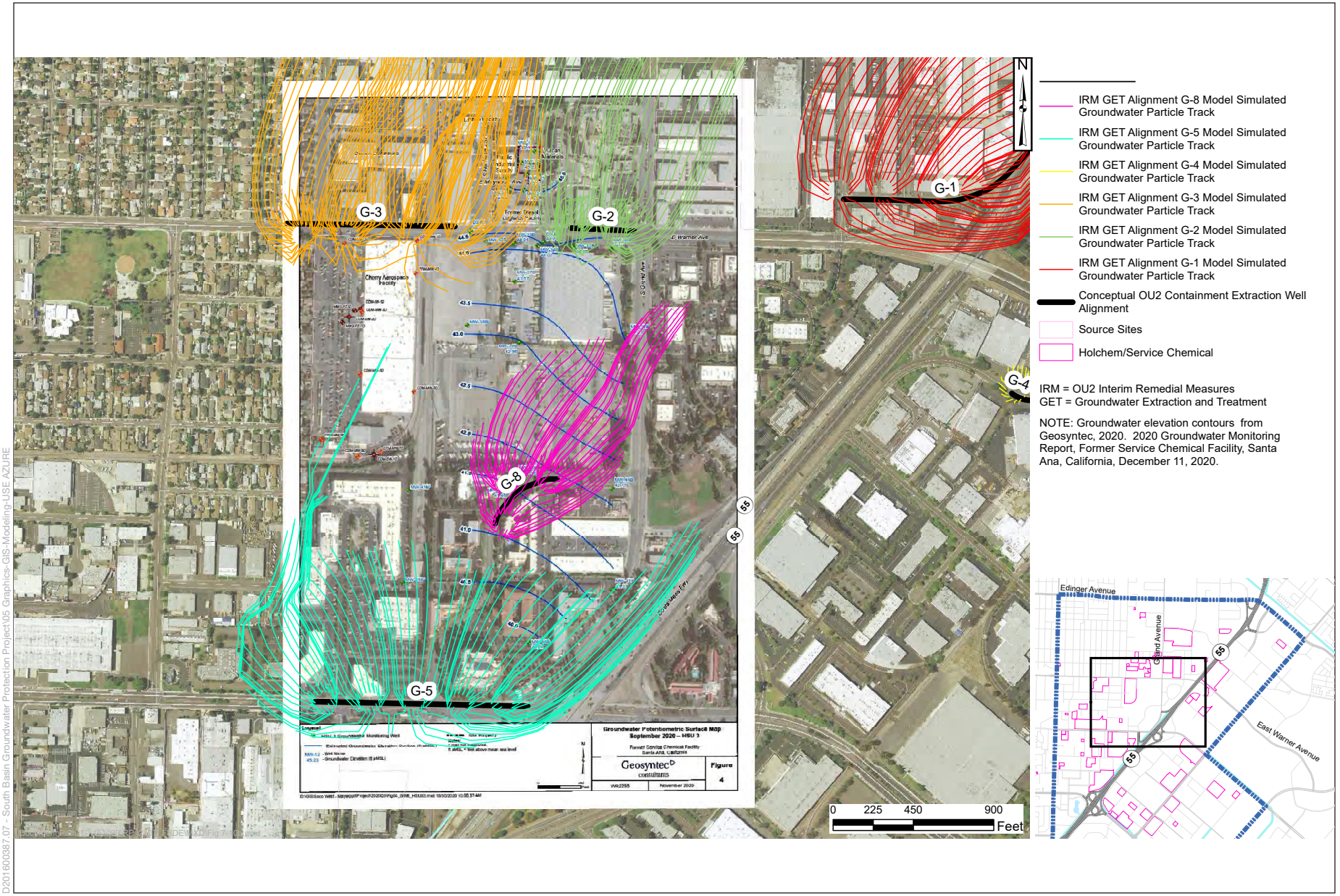
SOURCE: Engineering Analytics, Inc., 2023

South Basin Groundwater Protection Project

Figure 3.8-6

Comparison of OCWD Model Simulated Groundwater Particle Tracks Versus Published HSU 1 Groundwater Elevation Contours, Soco West, Inc., Former Services Chemical

ESA



D2016003B7.07 - South Basin Groundwater Protection Project\05 Graphics-GIS-Modeling-USE AZURE

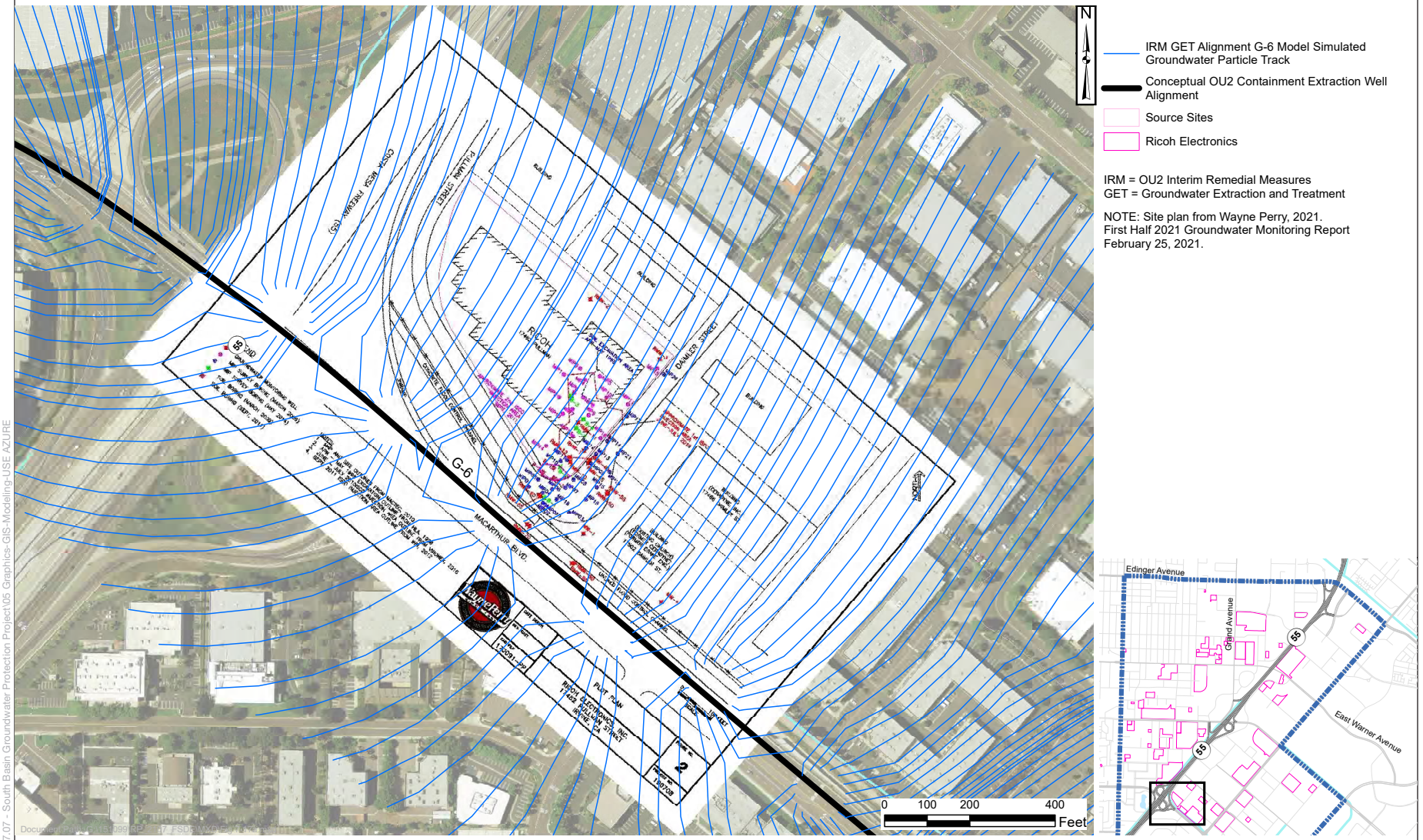
SOURCE: Engineering Analytics, Inc., 2023

South Basin Groundwater Protection Project

Figure 3.8-7

Comparison of OCWD Model Simulated Groundwater Particle Tracks Versus Published HSU 3 Groundwater Elevation Contours, Soco West, Inc., Former Services Chemical

ESA



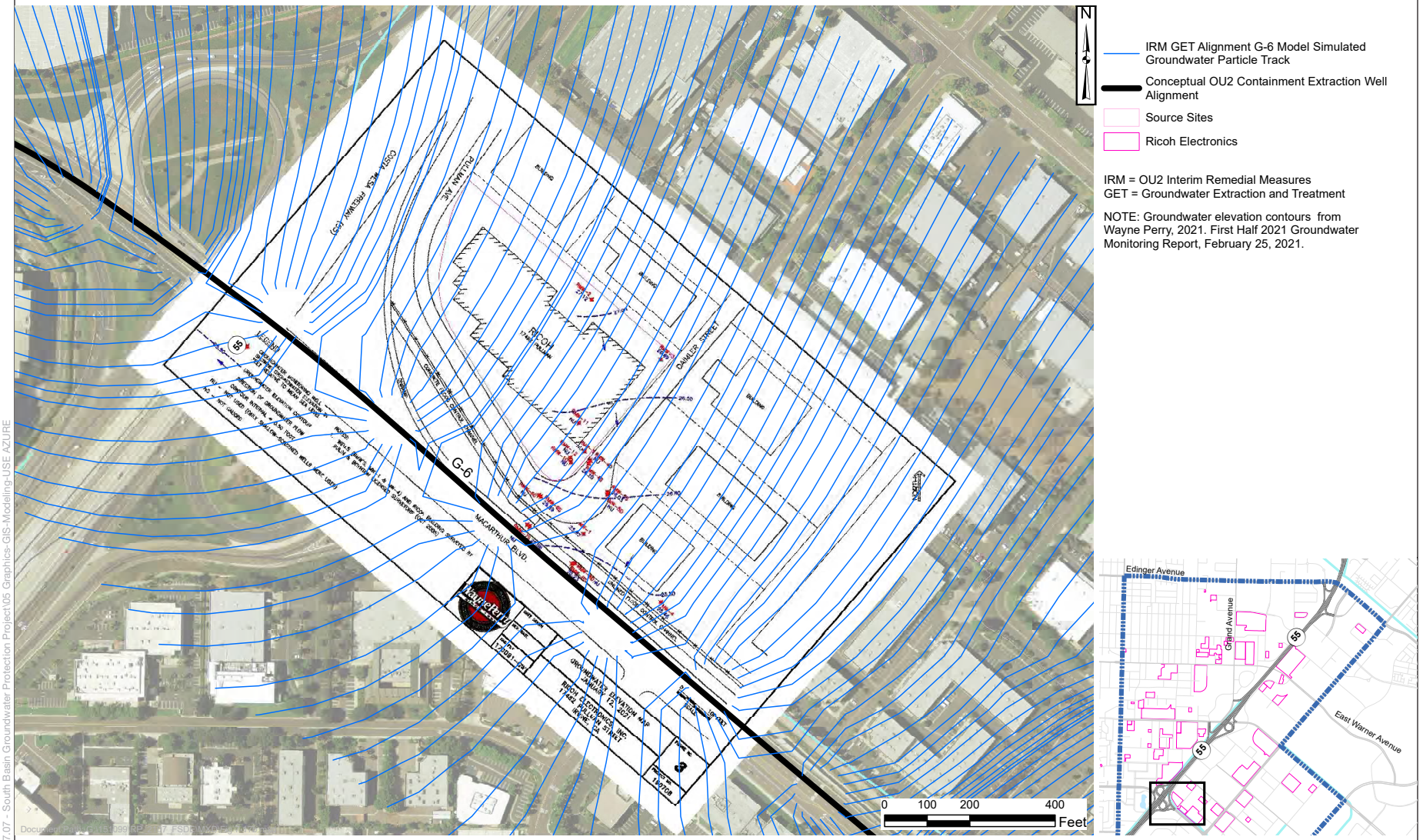
SOURCE: Engineering Analytics, Inc., 2023

South Basin Groundwater Protection Project

Figure 3.8-8

Ricoh Plot Plan and OCWD Model Simulated Groundwater Particle Tracks

ESA



SOURCE: Engineering Analytics, Inc., 2023

South Basin Groundwater Protection Project

Figure 3.8-9

Comparison of OCWD Model Simulated Groundwater Particle Tracks Versus Published Groundwater Elevation Contours, Former Ricoh Electronics Facility

ESA

As discussed in the Feasibility Study (EA 2023), the extraction of contaminated groundwater from the Shallow Aquifer System would reduce the vertical hydraulic gradient from the Shallow Aquifer System to the Principal Aquifer System in the vicinity of the extraction wells. This would be a beneficial impact because the reduction in the vertical hydraulic gradient would reduce the migration of contaminants from the Shallow Aquifer System to the Principal Aquifer System.

Finally, as discussed in Section 2.5.2, *Remedy Design*, and Section 2.5.5, *Adaptive Management*, the operation of the proposed Project would include Adaptive Management that would monitor the response of the aquifer and make adjustments, as needed. The monitoring wells for both the source sites and the proposed Project would be routinely monitored to evaluate the response of groundwater flow. If adverse effects are noted, the pumping rate of the extraction facility would be reduced to reduce the effect on the source site.

With the implementation of the extraction and treatment of contaminated groundwater, adjusted as need through adaptive management, the proposed Project would result in a beneficial impact.

Mitigation Measures

None Required.

Significance Determination

Beneficial Impact.

Groundwater Supplies

Impact 3.8-2: The proposed Project could substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the Basin.

Extraction Facilities, Monitoring Wells, Local Groundwater Treatment Plants, and Conveyance Pipelines

Construction

As discussed in Section 3.13, *Utilities and Service Systems*, more than half of the water supply of the OCWD is provided from local groundwater. Construction of the proposed Project components would require minimal water for making concrete for well seals and treatment system pads, along with minimal water for dust control. All water supplies required for construction would be supplied by onsite water trucks or existing water connections and would come from the local municipal water supply. However, the volume of water would be minimal and within the OCWD and local water suppliers available water supply. As discussed in Chapter 2, *Project Description*, the treatment systems would be placed on concrete pads with footprints between approximately 10 feet by 10 feet and 20 feet by 20 feet. The Project Area is almost entirely paved and proposed Project components would be constructed almost entirely within existing paved areas. Therefore, the proposed Project would not change the existing amount of paved area and would not significantly change the existing amount of local groundwater recharge. Rain falling on the treatment systems would flow onto existing hardscape and flow into the local storm drain system, as it does now.

As a result, proposed Project construction would not substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that it may impede sustainable groundwater management of the Basin. Impacts would be less than significant.

Operation

Once operational, the contaminated groundwater described in Section 3.8.1, *Environmental Setting*, *Groundwater Quality*, would be conveyed to the existing OC San WWTP, where the water would be treated to tertiary-treatment levels and then returned to the Shallow and Principal Aquifer Systems. The treatment of the contaminated groundwater and recharge would result in creating clean water from impaired water, thereby increasing groundwater supplies in the Basin, resulting in a beneficial impact.

Mitigation Measures

None Required.

Significance Determination

Beneficial Impact.

Drainage Patterns

Impact 3.8-3: The proposed Project could 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: result in substantial erosion or siltation on- or off-site; substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site; 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; impede or redirect flood flows.

Extraction Facilities, Monitoring Wells, Local Groundwater Treatment Plants, and Conveyance Pipelines

Construction and Operation

The proposed Project components would be constructed in a developed urban area. The proposed Project components would not be constructed in waterways, streams, or rivers, and would not alter drainage patterns. The only above ground components would be well pads and treatment system pads, neither of which would alter drainage patterns. All conveyance pipelines would be underground and would not affect drainage patterns. Impacts related to drainage patterns would be less than significant.

Mitigation Measures

None Required.

Significance Determination

Less than Significant Impact.

Release Pollutants in Flood Hazard Zone

Impact 3.8-4: The proposed Project could be located in flood hazard, tsunami, or seiche zones, and risk release of pollutants due to project inundation.

As previously stated above in *Criteria not Analyzed*, the proposed Project components are located in areas susceptible to tsunamis or seiches.

Extraction Facilities, Monitoring Wells, Local Groundwater Treatment Plants, and Conveyance Pipelines

Construction and Operation

As described in Section 3.8.1, *Environmental Setting*, *Flood Hazards*, the two southernmost extraction facilities would be located in an area that includes the flood control channel along the north and east side of MacArthur Boulevard, which is mapped within the 100-year flood plain. However, the flood map also states that this flood channel has "flood discharge contained infrastructure", meaning levees are present to contain flood flows to the channel. In addition, the proposed Project components would not be constructed within the flood channel; conveyance pipelines from the treatment systems would be plumbed into the nearest existing sanitary sewer pipeline. The remaining portions of the Project Area are mapped within an area of minimal flood hazard. Impacts relative to flood hazards would be less than significant.

Mitigation Measures

None Required.

Significance Determination

Less than Significant Impact.

Water Plans

Impact 3.8-5: The proposed Project could conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan.

Extraction Facilities, Monitoring Wells, Local Groundwater Treatment Plants, and Conveyance Pipelines

Construction and Operation

As discussed in Section 2.3, *Project Objectives*, the purpose of the proposed Project is to treat contaminated groundwater and prevent further degradation of groundwater quality. The protection and improvement of groundwater quality would be consistent with the Basin Plan and the Alternative GSP and would result in a beneficial impact.

Mitigation Measures

None Required.

Significance Determination

Beneficial Impact.

Cumulative Impacts

Impact 3.8-6: Concurrent construction and operation of the proposed Project and related projects in the geographic scope could result in cumulative short-term and long-term impacts to hydrology and water quality.

This section presents an analysis of the cumulative effects of the proposed Project in combination with other approved, proposed, and reasonably foreseeable future projects that could cause cumulatively considerable impacts. Significant cumulative impacts related to hydrology and water quality could occur if the incremental impacts of the proposed Project are combined with the incremental impacts of one or more of the cumulative projects. The cumulative projects considered in this PEIR are listed on Table 3-1.

As discussed above, in Section 3.8.3, *Impacts Analysis and Mitigation Measures*, there would be no impacts associated with tsunamis or seiches. In addition, the proposed Project is consistent with the Basin Plan and the Alternate GSP. Therefore, these topics would not contribute to cumulative impacts, and will not be discussed in a cumulative context.

The geographic area affected by the proposed Project and its potential to contribute to cumulative impacts varies based on the environmental resource under consideration. The geographic scope of analysis for cumulative hydrology and water quality impacts encompasses and is limited to the Project Area and its immediately adjacent area. This is because impacts relative to hydrology and water quality impacts are generally site-specific. For example, the effect of erosion would tend to be limited to the localized area of a project and could only be cumulative if erosion occurred as the result of two or more adjacent projects that spatially overlapped.

The timeframe during which the proposed Project could contribute to cumulative hydrology and water quality impacts includes the construction and operations phases. For the proposed Project, the operations phase is estimated to be about 30 years. However, similar to the geographic limitations discussed above, it should be noted that impacts relative to hydrology and water quality are generally time-specific. Hydrology and water quality impacts could only be cumulative if two or more impacts occurred at the same time, as well as overlapping at the same location.

Extraction Facilities, Monitoring Wells, Local Groundwater Treatment Plants, and Conveyance Pipelines

Construction and Operation

Significant cumulative impacts related to hydrology and water quality could occur if the incremental impacts of the proposed Project combined with the incremental impacts of cumulative development would adversely affect water quality or water supply. As discussed in Impact 3.8-1 above, compliance with the Construction General Permit regulations would prevent substantial degradation in water quality during construction of proposed Project development and would be effective in ensuring that construction activities would result in a less than significant impact to water quality. Construction activities for all related cumulative development would be subject to the same regulatory requirements discussed for the proposed Project, ensuring compliance with existing hydrology and water quality regulations, including preparation and implementation of SWPPPs in compliance with the state Construction General Permit

and local erosion control regulations. With compliance with existing regulations, proposed Project construction would not cause or contribute to a cumulatively considerable impact with respect to hydrology and water quality impacts, and therefore, the impact would be less than significant.

The proposed Project does not discharge to the municipal stormwater system and is therefore not subject to municipal stormwater regulations (i.e., municipal separate storm sewer systems [MS4s]). However, related cumulative projects that discharge stormwater to the municipal stormwater system and/or would create new impervious surface would be subject to MS4 requirements, including capturing and treating stormwater falling on their sites, and Low-Impact Development (LID) design standards. Such projects would be required to demonstrate in their stormwater control plans that run off from such disturbance is adequately controlled to prevent erosion or impacts to water quality. With compliance with existing regulations, the proposed Project in combination with related cumulative projects would not cause or contribute to a cumulatively considerable impact with respect to hydrology and water quality, and impacts would be less than significant.

Mitigation Measures

None Required.

Significance Determination

Beneficial Impact.

3.9 Land Use and Planning

This section addresses the land use and planning impacts associated with implementation of the proposed Project. This section includes: a description of the existing land use and planning conditions in and around the Project Area; a summary of applicable regulations related to land use and planning; and an evaluation of the potential impacts of the proposed Project related to land use and planning in the Project Area and in the surrounding area, including cumulative impacts.

3.9.1 Environmental Setting

Regional Land Use

The Project Area includes an approximately 5.6-square-mile area within Orange County in the cities of Irvine, Santa Ana, and Tustin. The County of Orange and cities of Irvine, Santa Ana, and Tustin have independent planning documents that guide the development of rural, urban, and commercial land uses within their jurisdictional boundaries.

The County of Orange includes a total of 798 square miles and stretches approximately 40 miles along the coast of the Pacific Ocean and extends inland approximately 20 miles. The County of Orange General Plan includes all unincorporated areas that are not located within a city. All 34 cities in Orange County have general plans that address their individual jurisdictions.

The City of Irvine is located approximately 2 miles inland from the Pacific Ocean and covers approximately 66 square miles. The City of Irvine's area will increase to 74 square miles with annexation of the sphere of influence (City of Irvine 2024). Irvine is accessible along Interstate (I-)5 and I-405, with State Highways 261, 55, and 133 passing through the City. Neighboring cities include Newport Beach and Laguna Beach to the south; Costa Mesa, Santa Ana, and Tustin to the west; the City of Orange and unincorporated areas of Orange County to the north; and the Cities of Lake Forest and Laguna Hills to the east.

The City of Santa Ana is located approximately 10 miles inland from the Pacific Ocean and covers approximately 27 square miles. The City of Santa Ana is located in a central location within Orange County and contains over 60 neighborhoods (City of Santa Ana 2022). Santa Ana is accessible via I-5 and I-405 and State Highways 22 and 55. Neighboring cities include Costa Mesa to the south; Westminster and Garden Grove to the west; Anaheim and Orange to the north; and Tustin and Irvine to the east.

The City of Tustin is located approximately 10 miles inland from the Pacific Ocean and covers approximately 11 square miles. The City of Tustin is located in central Orange County and does not include the unincorporated area of North Tustin. Tustin is accessible via I-5 and State Highway 55. Neighboring cities include Irvine to the south; Santa Ana to the west; Orange and unincorporated areas of Orange County to the north; and unincorporated areas of Orange County to the east.

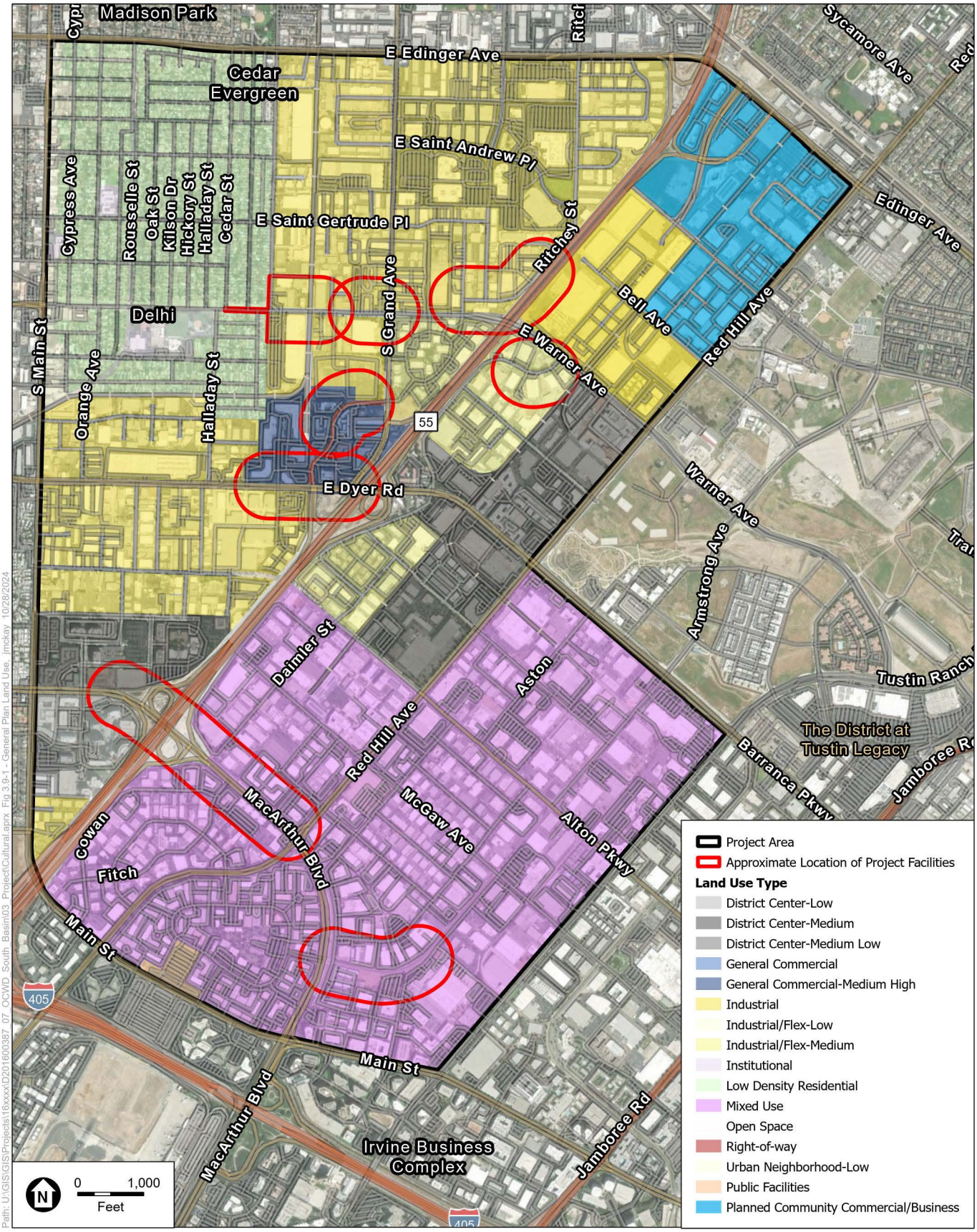
Existing Land Use Designations

The Project Area is characterized primarily by urbanized land uses with residential, commercial, and industrial development. As discussed above, there are four agencies with land use jurisdiction over the Project Area: Orange County (unincorporated), City of Irvine, City of Santa Ana, and City of Tustin. The land use designations for the proposed Project within the Project Area are shown in **Figure 3.9-1**.

Extraction Facilities and Monitoring Wells

The proposed groundwater extraction facilities and monitoring wells would be located within and adjacent to various land uses throughout the unincorporated areas of Orange County and the cities of Irvine, Santa Ana, and Tustin. As discussed in Section 2.5, additional site-specific hydrogeologic data within the Project Area is needed to prepare the Remedy Design and will include the collection of soil and groundwater samples by direct-push, auger, and/or rotary-sonic drilling methods. The PDI phase will include drilling soil borings, constructing test extraction facilities, and monitoring wells. The proposed Project would include extractions wells, trenches and or drains, and monitoring wells within the Project Area. The proposed well alignments, Alignments G-1 through G-8, include various land use designations, including the following:

- Proposed extraction Alignment G-1, along Ritchey Street, includes Industrial, Industrial/Flex-Low, and Industrial/Flex-Medium land uses.
- Proposed extraction Alignment G-2, along South Grand Avenue, includes Industrial/Flex-Low and Industrial/Flex-Medium land uses.
- Proposed extraction Alignment G-3, along East Warner Avenue, includes Industrial/Flex-Medium land uses.
- Proposed extraction Alignment G-4, along Pullman Street includes Industrial and Industrial/Flex-Low land uses.
- Proposed extraction Alignment G-5, along East Dyer Road, includes General Commercial-Medium High and Industrial/Flex-Medium land uses.
- Proposed extraction Alignment G-6, along MacArthur Boulevard, includes Industrial/Flex-Medium, District Center-Medium, and District Center-Low land uses.
- Proposed extraction Alignment G-7, along Armstrong channel east of MacArthur Boulevard, includes four high density residential buildings and Office, Industrial/Flex-Medium land uses.
- Proposed extraction Alignment G-8, along Hotel Terrace, includes General Commercial-Medium High and Industrial/Flex-Medium land uses.



SOURCE: ESA, 2023

South Basin Groundwater Protection Project

Figure 3.9-1
General Plan Land Use Map

ESA

Local Groundwater Treatment Plants

The proposed local groundwater treatment plants would be located within and adjacent to various land uses throughout the unincorporated areas of Orange County and the cities of Irvine, Santa Ana, and Tustin. As described above, these plants would be constructed within or near the proposed extraction alignments, Alignments G-1 through G-8, and would include the same land use designations.

Conveyance Pipelines

The proposed underground conveyance pipelines would be located within and adjacent to various land uses throughout the unincorporated areas of Orange County and the cities of Irvine, Santa Ana, and Tustin. The conveyance pipelines would be installed between the newly installed groundwater extraction facilities and the existing sanitary sewer and would primarily be underground with some piping occurring above ground at the entry points to the local groundwater treatment plants within Alignments G-1 through G-8, and would include the same land use designations. Pipelines would be installed primarily within existing roadway rights-of-way to the extent feasible.

3.9.2 Regulatory Framework

State

California Government Code Section 53091

California Government Code Section 53091 specifies that water supply facilities such as those associated with the proposed Project, are exempt from zoning restrictions. Specifically, Section 53091 states (State of California Legislative Council 2003):

> *(d) Building ordinances of a county or city shall not apply to the location or construction of facilities for the production, generation, storage, treatment, or transmission of water, wastewater, or electrical energy by a local agency.*
>
> *(e) Zoning ordinances of a county or city shall not apply to the location or construction of facilities for the production, generation, storage, treatment, or transmission of water.*

Regional

Southern California Association of Governments

The Southern California Association of Governments (SCAG) is the federally mandated Metropolitan Planning Organization representing six counties: Los Angeles, Imperial, Orange, Riverside, San Bernardino, and Ventura. The SCAG Regional Comprehensive Plan addresses important regional issues such as housing, traffic/transportation, water, and air quality and serves as an advisory planning document to support and encourage local agencies in their planning efforts.

Local

County of Orange General Plan

The following is a selected list of General Plan goals, objectives, and policies that are applicable to the proposed Project respective to land use (County of Orange 2022).

Policy 1: Balance Land Use. The purpose of the Balanced Land Use Policy is to ensure that communities at all levels are developed in a manner whereby residential, industrial, commercial, and public land uses are proportionally balanced and well-connected, accommodating all modes of travel. This balance is intended to aid in developing a sense of community by distributing the various land uses and employment base more evenly throughout the County, reducing the impacts on the County's transportation system, making it easier and safer for people to walk, bike and use transit, and positively affecting air quality. This policy does not require completely self-contained communities.

Policy 2: Phased Development. The purpose of the Phased Development Policy is to ensure that development coincides with the adequacy of public services and facilities, especially where the public health, safety, and welfare are concerned. Proper phasing of new development within the designated General Plan capacity through the provision of public services and facilities is necessary to ensure that new development will not overload the existing facilities or be allowed to be completed without adequate facilities. Phasing should be a basic minimum requirement for land use intensification.

Policy 7: New Development Compatibility. The purpose of the New Development Compatibility Policy is to ensure that new development is compatible with adjacent areas and the character of local streets and that it provides either a land use buffer or transition to reduce the effects of one land use on the other. Sensitive treatment is required where one urban use transitions to another and where an urban use is introduced into an essentially undeveloped area. New development within the Foothill-Trabuco Specific Plan planning area shall be designed to maintain a buffer between urban development and the Cleveland National Forest, to be compatible with the area, and to reflect the goals and objectives of that Plan. Within airport planning areas, all new development will comply with Orange County Airport Environs Land Use Plan compatibility criteria.

Policy 9: Enhancement of Environment. The purpose of the Enhancement of Environment Policy is to ensure that all land use activities seek to enhance the physical environment, including the air, water, sound levels, landscape, and plant and animal life. This policy does not mean that environmental enhancement precludes development. It recognizes the need to improve both the manmade and natural environments. Where aspects of the natural environment are deemed to be truly significant, this policy requires measures be taken to preserve these aspects.

Policy 12: Hazardous Waste Management Facilities. The purpose is to provide for sufficient and appropriate treatment and transfer facilities to accommodate and manage Orange County's fair share of the hazardous waste management burden, in accordance with identified facility needs and public safety considerations and to encourage private sector development of needed

hazardous waste management facilities. Siting criteria for offsite hazardous waste facilities have been established for use by facility developers in locating suitable facility sites and designing appropriate facilities, and for use by city and county land use authorities and local communities in evaluating proposed sites and facility projects for local permits. These criteria are identified in the Regional Hazardous Waste Management Plan maintained by the County of Orange Health Care Agency, Environmental Health Division. A summary of topics addressed by the siting criteria are as follows: (a) Protect the residents of Orange County, (b) Ensure the structural stability of the facility, (c) Protect surface and groundwater quality, (d) Protect air quality, (e) Protect environmentally sensitive areas, (f) Ensure safe transportation of hazardous waste, and (g) Protect the social and economic goals of the community.

Policy 13: Recycling/Materials Recovery. The purpose of the Recycling/Materials Recovery Policy is to develop measures that will help facilitate the establishment of recycling and materials recovery facilities within Orange County. The California Integrated Waste Management Act of 1989 (AB 939) requires that local jurisdictions reduce their waste going to landfills by 25 percent by 1995 and 50 percent by the year 2000. AB 939 further mandates that each jurisdiction prepare a Source Reduction and Recycling Element (SRRE) in which specific program alternatives are identified, evaluated, and selected to achieve AB 939 diversion mandates. The County's OC Waste and Recycling is charged with the development and implementation of the County's SRRE document and is responsible for compliance with its provisions. Procedures and guidelines are in place in the Orange County Zoning Code in order to facilitate establishment of recycling or materials recovery facilities within Orange County. Enhancing coordination between the County's OC Waste and Recycling and the California Integrated Waste Board Management (CIWMB) will continue to be a priority in order to address the mandate of AB 939.

City of Irvine General Plan

The following is a selected list of General Plan goals, objectives, and policies that are applicable to the proposed Project respective to land use (City of Irvine 2015).

Objective LU-4. To achieve a balanced and sustainable distribution of land uses throughout the City by implementing equitable and inclusive land use policies that optimize the efficient use of land, promote environmental stewardship, and enhance the quality of life for all residents.

Policy (h). Ensure infrastructure, such as roadways, public facilities, and other services, is provided to meet demand as development occurs.

Objective LU-6. To establish cohesive and harmonious land use patterns throughout the City by implementing integrated planning strategies that promote connectivity, sustainability, and community well-being while respecting the unique character and identity of different neighborhoods.

Policy (e). Coordinate with the County, landowners, and other cities and agencies in developing compatible land uses for areas adjacent to the City boundary.

City of Santa Ana General Plan

The following is a selected list of General Plan goals, objectives, and policies that are applicable to the proposed Project respective to land use (City of Santa Ana 2022).

Goal LU-1. Provide a land use plan that improves quality of life and respects our existing community.

Policy LU-1.1. Foster compatibility between land uses to enhance livability and promote healthy lifestyles.

Goal LU-3. Preserve and improve the character and integrity of existing neighborhoods and districts.

Policy LU-3.8. Avoid the development of industry and sensitive receptors in close proximity to each other that could pose a hazard to human health and safety due to the quantity, concentration, or physical or chemical characteristics of the hazardous materials utilized, or the hazardous waste an operation may generate or emit.

Policy LU-3.9. Improve the health of residents, students, and workers by limiting the impacts of construction activities and operation of noxious, hazardous, dangerous, and polluting uses that are in close proximity to sensitive receptors, with priority given to discontinuing such uses within environmental justice area boundaries.

Goal LU-4. Support a sustainable Santa Ana through improvements to the built environment and a culture of collaboration.

Policy LU-4.3. Encourage land uses and strategies that reduce energy and water consumption, waste and noise generation, soil contamination, air quality impacts, and light pollution.

City of Tustin General Plan

The following is a selected list of General Plan goals, objectives, and policies that are applicable to the proposed Project respective to land use (City of Tustin 2018).

Goal 3. Ensure that new development is compatible with surrounding land uses in the community, the City's circulation network, availability of public facilities, existing development constraints and the City's unique characteristics and resources.

Policy 3.1. Coordinate and monitor the impact and intensity of land uses in adjacent jurisdictions on Tustin's transportation and circulation systems to provide for the efficient movement of people and goods with the least interference.

Policy 3.6. Regulate development in identifiable hazardous areas or in areas that are environmentally sensitive.

Goal 8. Ensure that necessary public facilities and services should be available to accommodate development proposed on the Land Use Policy Map.

Policy 8.3. Coordinate and collaborate with other agencies providing public utility service to Tustin to define areawide and regional needs, projects and responsibilities.

Policy 8.4. Coordinate the construction of all public utilities to minimize disruption of vehicular traffic and negative impacts on roadways.

Policy 8.8. Maintain and improve, where necessary, the City's infrastructure and facilities.

3.9.3 Impact Analysis and Mitigation Measures

Thresholds of Significance

The following criteria from CEQA Guidelines Appendix G are used as thresholds of significance to determine the impacts of the proposed Project as related to land use and planning. The proposed Project would have a significant impact if it would:

- Physically divide an established community.
- 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.
- Result in a cumulatively considerable impact to land use and planning.

Impact Analysis

Divide an Established Community

Impact 3.9-1: The proposed Project could physically divide an established community.

Extraction Facilities, Monitoring Wells, Local Groundwater Treatment Plants, and Conveyance Pipelines

The physical division of an established community generally refers to the construction of features that would impact mobility within an existing community or between a community and outlying area, such as an interstate highway, railroad tracks, or permanent removal of a means of access, such as a local road or bridge. The proposed extraction facilities and monitoring wells associated with the proposed Project are not aboveground linear features that would create a barrier or physically divide an established community. Extraction facilities and monitoring well locations would be selected based on monitoring and extraction needs and may be in public and/or private property. However, there are no features of these proposed facilities that would create a barrier within public roadways or physically divide an established community. As a result, no impact would occur.

The proposed groundwater treatment plans associated with the proposed Project would be constructed aboveground within or near the proposed extraction alignments. The treatment system's footprint would have a small footprint be between approximately 10 feet by 10 feet and 20 feet by 20 feet. There are no features of these proposed facilities that would create a barrier within public roadways or physically divide an established community. As a result, no impact would occur.

The proposed conveyance pipelines associated with the proposed Project would be constructed between the newly installed groundwater extraction alignments and the existing sewer. Pipelines would be installed primarily within existing roadway rights-of-way to the extent feasible. Although the proposed pipelines are linear features, they would be installed underground and as such would not permanently divide an established community. As a result, no impact would occur.

Mitigation Measures

None Required.

Significance Determination

No Impact.

Plans and Policies

Impact 3.9-2: The proposed Project could 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.

Extraction Facilities and Monitoring Wells

As part of the PDI, soil borings will be drilled to gather soil and groundwater data within Alignments G-1 through G-8. Locations of test extraction facilities and associated monitoring wells will be identified based on the results of the soil boring data. Following completion of the PDI field work and analysis, a Remedy Design will be prepared and would identify the specific proposed Project facilities, including the number and location. The proposed extraction facilities and monitoring wells would be located within and adjacent to various land uses throughout the unincorporated areas of Orange County and the cities of Irvine, Santa Ana, and Tustin, as described above in the existing setting and shown on Figure 3.9-1. The proposed extraction alignments include various designations such as Mixed Use Residential, Industrial, Industrial/Flex-Low, Industrial/Flex-Medium land, General Commercial-Medium High, District Center-Medium, and District Center-Low land uses. It should be noted that proposed Project facilities may be constructed in areas with land use designations that are different from the ones mentioned prior as the well alignments would be selected based on monitoring and extraction needs. However, the land use designations for any soil borings, extraction facilities, and monitoring well sites would remain consistent within Alignments G-1 through G-8. Per Government Code Section 53091, building ordinances of local cities or counties do not apply to the location or construction of facilities for the projection, generation, storage, treatment, or transmission of water or wastewater. Therefore, any proposed extraction facilities and monitoring wells would not be subject to a conditional use permit or general plan amendment. Furthermore, the construction of utilities fundamentally supports the vitality of communities, and these developments are recognized generally within local General Plans as essential development features needed to support all land uses throughout the communities. As a result, there would be no conflict with the Cities or County land use plan, policy, or regulation. Therefore, impacts would be less than significant.

Local Groundwater Treatment Plants

The proposed groundwater treatment plants would be located within and adjacent to various land uses throughout the unincorporated areas of Orange County and the cities of Irvine, Santa Ana, and Tustin, as described above in the existing setting and shown on Figure 3.9-1. The groundwater treatment plants would be constructed within or near the proposed extraction alignments, which include the same land use designations as discussed above. It should be noted that proposed Project facilities may be constructed in areas with land use designations that are different from the ones mentioned prior as the well alignments will be selected based on monitoring and extraction needs. Per Government Code Section 53091, building ordinances of local cities or counties do not apply to the location or construction of facilities for the projection, generation, storage, treatment, or transmission of water or wastewater. Therefore, the proposed local groundwater treatment plants would not be subject to a conditional use permit or general plan amendment. Furthermore, the construction of utilities fundamentally supports the vitality of communities and these developments are recognized generally within local General Plans as essential development features needed to support all land uses throughout the communities. As a result, there would be no conflict with the City or County land use plan, policy, or regulation. Therefore, impacts would be less than significant.

Conveyance Pipelines

The proposed conveyance pipelines would be located within and adjacent to various land uses throughout the unincorporated areas of Orange County and the cities of Irvine, Santa Ana, and Tustin, as described above in the existing setting. Conveyance pipelines would primarily be underground with some piping occurring above ground at the entry points to the treatment plants. Pipelines would be installed primarily within existing roadway rights-of-way to the extent feasible and would not conflict with land use designations or be incompatible with neighboring land uses. Therefore, impacts would be less than significant.

Mitigation Measures

None Required.

Significance Determination

Less than Significant Impact.

Cumulative Impacts

Impact 3.9-3: Concurrent construction and operation of the proposed Project and related projects in the geographic scope could result in cumulative short-term and long-term impacts to land use and planning.

Extraction Facilities, Monitoring Wells, Local Groundwater Treatment Plants, and Conveyance Pipelines

This section presents an analysis of the cumulative effects of the proposed Project in combination with other past, present, and reasonably foreseeable future projects that could cause cumulatively considerable impacts. Significant cumulative impacts related to land use and planning could occur if the incremental

impacts of the proposed Project combined with the incremental impacts of one or more of the cumulative projects. The cumulative projects considered in this EIR are listed on Table 3-1.

As discussed above, in Section 3.9.3, *Impacts Analysis and Mitigation Measures*, there would be no impacts associated with dividing an established community. Per Government Code Section 53091, building ordinances of local cities or counties do not apply to the location or construction of facilities for the projection, generation, storage, treatment, or transmission of water or wastewater. The proposed Project would not be subject to a conditional use permit or general plan amendment. However, cumulative development within the Project Area could result in significant cumulative environmental effects due to land use incompatibilities and conflicts with land use plans, policies, or regulations. However, because the potential land use impacts associated with the implementation of the proposed Project would be less than significant, the proposed Project's contribution to cumulative land use impacts would be less than cumulatively considerable and thus a less than significant cumulative land use impact would occur.

Mitigation Measures

None Required.

Significance Determination

Less than Significant Impact.

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3.10 Noise

This section addresses the noise and vibration impacts associated with implementation of the proposed Project. This section includes: a description of the existing noise and vibration conditions in and around the Project Area; a summary of applicable regulations related to noise and vibration; and an evaluation of the potential impacts of the proposed Project related to noise and vibration within the Project Area and in the surrounding area, including cumulative impacts.

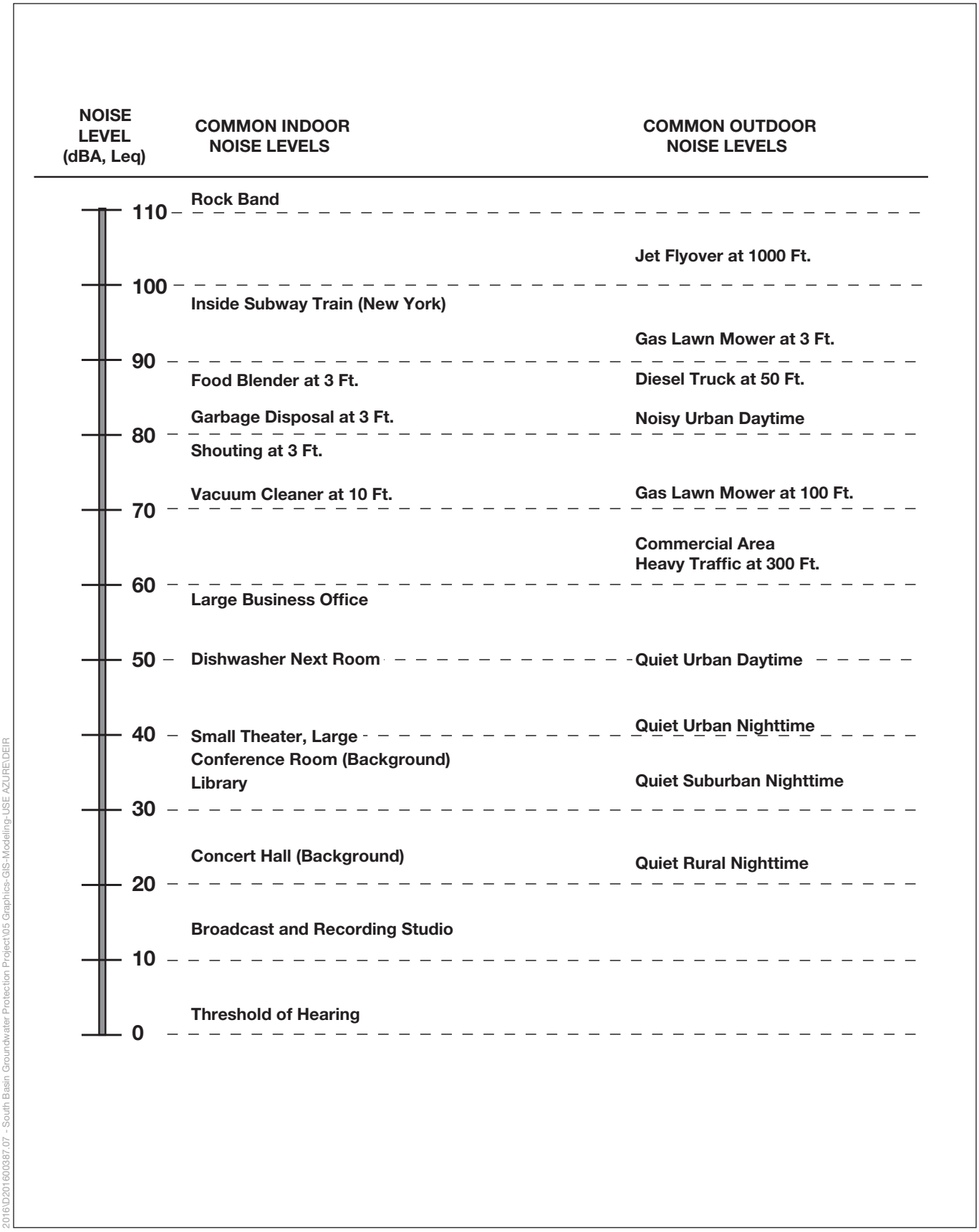
3.10.1 Environmental Setting

Noise Principals and Descriptors

Noise is generally defined as unwanted sound, traveling in the form of waves from a source and exerting a sound pressure level (referred to as sound level) that is measured in decibels (dB), which is the standard unit of sound amplitude measurement. The dB scale is a logarithmic scale that describes the physical intensity of the pressure vibrations that make up any sound, with 0 dB corresponding roughly to the threshold of human hearing and 120 to 140 dB corresponding to the threshold of pain. Pressure waves traveling through air exert a force registered by the human ear as sound.

Sound pressure fluctuations can be measured in units of hertz (Hz), which correspond to the frequency of a particular sound. Typically, sound does not consist of a single frequency, but rather a broad band of frequencies varying in levels of magnitude. When all the audible frequencies of a sound are measured, a sound spectrum is plotted consisting of a range of frequency spanning 20 to 20,000 Hz. The sound pressure level, therefore, constitutes the additive force exerted by a sound corresponding to the sound frequency/sound power level spectrum.

The typical human ear is not equally sensitive to all frequencies of the audible sound spectrum. Consequently, when assessing potential noise impacts, sound is measured using an electronic filter that deemphasizes the frequencies below 1,000 Hz and above 5,000 Hz in a manner corresponding to the human ear's decreased sensitivity to extremely low and extremely high frequencies. This method of frequency weighting is referred to as A-weighting and is expressed in units of A-weighted decibels (dBA). A-weighting follows an international standard methodology of frequency de-emphasis and is typically applied to community noise measurements. Some representative noise sources and their corresponding A-weighted noise levels are shown in **Figure 3.10-1**.



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SOURCE: State of California, Department of Transportation (Caltrans), Technical Noise Supplement (TeNS). October 1998. Available: http://www.dot.ca.gov/hq/env/noise/pub/Technical Noise Supplement.pdf

South Basin Groundwater Protection Project

Figure 3.10-1
Decibel Scale and Common Noise Sources

Noise Exposure and Community Noise

An individual's noise exposure is a measure of noise over a period of time. A noise level is a measure of noise at a given instant in time. The noise levels presented in Figure 3.10-1 are representative of measured noise at a given instant in time; however, they rarely persist consistently over a long period of time. Rather, community noise varies continuously over a period of time with respect to the contributing sound sources of the community noise environment. Community noise is primarily the product of many distant noise sources, which constitute a relatively stable background noise exposure, with the individual contributors unidentifiable. The background noise level changes throughout a typical day, but does so gradually, corresponding with the addition and subtraction of distant noise sources such as traffic. What makes community noise constantly variable throughout a day, besides the slowly changing background noise, is the addition of short duration, single-event noise sources (e.g., aircraft flyovers, motor vehicles, sirens), which are readily identifiable to the individual.

These successive additions of sound to the community noise environment change the community noise level from instant to instant, thus requiring that noise exposure be measured over a period of time to legitimately characterize a community noise environment and evaluate cumulative noise impacts. This time-varying characteristic of environmental noise is described using statistical noise descriptors. The most frequently used noise descriptors are summarized below:

L_{eq}: The L_{eq}, or equivalent sound level, is used to describe noise over a specified period of time in terms of a single numerical value; the L_{eq} of a time-varying signal and that of a steady signal are the same if they deliver the same acoustic energy over a given time. The L_{eq} may also be referred to as the average sound level.

L_{max}: The maximum, instantaneous noise level experienced during a given period of time.

L_{min}: The minimum, instantaneous noise level experienced during a given period of time.

L_{50}: The noise level that is exceeded 50 percent of the specified time period. The L_{50} represents the median sound level.

L_{90}: The noise level that is exceeded 90 percent of the specified time period. The L_{90} is generally considered to be representing the background or ambient level of a noise environment.

L_{dn}: Also termed the day-night average noise level (DNL), the L_{dn} is the average A-weighted noise level during a 24-hour day, obtained after an addition of 10 dBA to measured noise levels between the hours of 10 p.m. and 7 a.m. to account nighttime noise sensitivity.

CNEL: CNEL, or Community Noise Equivalent Level, is the average A-weighted noise level during a 24-hour day that is obtained after an addition of 5 dBA to measured noise levels between the hours of 7 p.m. and 10 p.m. and after an addition of 10 dBA to noise levels between the hours of 10 p.m. and 7 a.m. to account for noise sensitivity in the evening and nighttime, respectively.

Effects of Noise on People

Noise is generally loud, unpleasant, unexpected, or undesired sound that is typically associated with human activity that is a nuisance or disruptive. The effects of noise on people can be placed into four general categories:

- Subjective effects (e.g., dissatisfaction, annoyance)
- Interference effects (e.g., communication, sleep, and learning interference)
- Physiological effects (e.g., startle response)
- Physical effects (e.g., hearing loss)

Although exposure to high noise levels has been demonstrated to cause physical and physiological effects, the principal human responses to typical environmental noise exposure are related to subjective effects and interference with activities. Interference effects of environmental noise refer to those effects that interrupt daily activities and include interference with human communication activities, such as normal conversations, watching television, telephone conversations, and interference with sleep. Sleep interference effects can include both awakening and arousal to a lesser state of sleep. Regarding the subjective effects, the responses of individuals to similar noise events are diverse and are influenced by many factors, including the type of noise, the perceived importance of the noise, the appropriateness of the noise to the setting, the duration of the noise, the time of day and the type of activity during which the noise occurs, and individual noise sensitivity.

Overall, there is no completely satisfactory way to measure the subjective effects of noise, or the corresponding reactions of annoyance and dissatisfaction on people. A wide variation in individual thresholds of annoyance exists, and different tolerances to noise tend to develop based on an individual's past experiences with noise. Thus, an important way of predicting a human reaction to a new noise environment is the way it compares to the existing environment to which one has adapted (i.e., comparison to the ambient noise environment). In general, the more a new noise level exceeds the previously existing ambient noise level, the less acceptable the new noise level will be judged by those hearing it. Regarding increases in A-weighted noise level, the following relationships generally occur:

- Except in carefully controlled laboratory experiments, a change of 1 dBA cannot be perceived.
- Outside of the laboratory, a 3 dBA change in noise levels is considered to be a barely perceivable difference.
- A change in noise levels of 5 dBA is considered to be a readily perceivable difference.
- A change in noise levels of 10 dBA is subjectively heard as doubling of the perceived loudness.

These relationships occur in part because of the logarithmic nature of sound and the decibel system. The human ear perceives sound in a nonlinear fashion; hence, the decibel scale was developed. Because the decibel scale is based on logarithms, two noise sources do not combine in a simple additive fashion, but rather logarithmically. For example, if two identical noise sources produce noise levels of 50 dBA, the combined sound level would be 53 dBA, not 100 dBA.

Noise Attenuation

Stationary point sources of noise, including stationary mobile sources such as idling vehicles, attenuate (lessen) at a rate between 6 dBA for hard sites and 7.5 dBA for soft sites for each doubling of distance from the reference measurement (typically, 50 feet). Hard sites are those with a reflective surface between the source and the receiver, such as asphalt or concrete surfaces or smooth bodies of water. No excess ground attenuation is assumed for hard sites and the change in noise levels with distance (drop-off rate) is simply the geometric spreading of the noise from the source. Soft sites have an absorptive ground surface such as soft dirt, grass, or scattered bushes and trees. In addition to geometric spreading, an excess ground attenuation value of 1.5 dBA (per doubling distance) is normally assumed for soft sites. Line sources (i.e., vehicle traffic noise on roadways) attenuate at a rate between 3 dBA for hard sites and 4.5 dBA for soft sites for each doubling of distance from the reference measurement (Caltrans 1998).

Fundamentals of Vibration

As described in the Federal Transit Administration's (FTA's) *Transit Noise and Vibration Impact Assessment* (FTA 2018), groundborne vibration can be a serious concern for nearby neighbors of a transit system route or maintenance facility, causing buildings to shake and rumbling sounds to be heard. In contrast to airborne noise, groundborne vibration is not a common environmental problem. It is unusual for vibration from sources such as buses and trucks to be perceptible, even in locations close to major roads. Some common sources of groundborne vibration are trains, buses on rough roads, and construction activities such as blasting, pile-driving, and operation of heavy earthmoving equipment.

There are several different methods that are used to quantify vibration. The peak particle velocity (PPV) is defined as the maximum instantaneous peak of the vibration signal. The PPV is most frequently used to describe vibration impacts to buildings. The root mean square (RMS) amplitude is most frequently used to describe the effect of vibration on the human body. The RMS amplitude is defined as the average of the squared amplitude of the signal. Decibel notation (VdB) is commonly used to measure RMS. The relationship of PPV to RMS velocity is expressed in terms of the "crest factor," defined as the ratio of the PPV amplitude to the RMS amplitude. PPV is typically a factor of 1.7 to 6 times greater than RMS vibration velocity (FTA 2018). The decibel notation acts to compress the range of numbers required to describe vibration. Typically, groundborne vibration generated by man-made activities attenuates rapidly with distance from the source of the vibration. Sensitive receptors for vibration include structures (especially older masonry structures), people (especially residents, the elderly, and sick), and vibration-sensitive equipment.

The effects of groundborne vibration include movement of the building floors, rattling of windows, shaking of items on shelves or hanging on walls, and rumbling sounds. In extreme cases, the vibration can cause damage to buildings. Building damage is not a factor for most proposed Projects, with the occasional exception of blasting and pile-driving during construction. Annoyance from vibration often occurs when the vibration levels exceed the threshold of perception by only a small margin. A vibration level that causes annoyance will be well below the damage threshold for normal buildings. The FTA measure of the threshold of architectural damage for conventional sensitive structures is 0.2 in/sec (in/sec) PPV (FTA 2018).

In residential areas, the background vibration velocity level is typically approximately 50 VdB (approximately 0.0013 in/sec PPV). This level is well below the vibration velocity level threshold of perception for humans, which is approximately 65 VdB. A vibration velocity level of 75 VdB is the approximate dividing line between barely perceptible and distinctly perceptible levels for healthy human hearing (FTA 2018).

Project Area

Sensitive Receptors

Some land uses are considered more sensitive to noise than others due to the types of activities that typically occur at the receptor location. Noise-sensitive receptors are typically defined as land uses that are considered more sensitive to intrusive noise than others, such as residences, schools, motels and hotels, libraries, and hospitals, due to the land use activities typically occurri6ng at the receptor (i.e., sleeping, concentrating, and convalescing).

The Project Area includes an approximately 5.6-square-mile area within Orange County in the cities of Irvine, Santa Ana, and Tustin. The County of Orange and cities of Irvine, Santa Ana, and Tustin have noise ordinances and standards within their jurisdictional boundaries. The Project Area is characterized primarily by urbanized land uses with residential, commercial, and industrial development.

Extraction Facilities and Monitoring Wells

The proposed extraction facilities and monitoring wells would be located within and adjacent to various land uses throughout the cities of Irvine, Santa Ana, and Tustin (see Figure 3.7-1). The proposed well alignments include various designations, including the following, the majority of which are typically not noise-sensitive uses except for residential and school uses on Warner Avenue:

- **(G-1)** – The proposed extraction alignment along Ritchey Street includes Industrial, Industrial/Flex-Low, and Industrial/Flex-Medium land uses. Located in the vicinity of Alignment G-1 are Ricca Children's Learning Center at 1510 Brookhollow Drive and Orange County Head Start at 2501 Pullman Street
- **(G-2)** – The proposed extraction alignment along South Grand Avenue includes Industrial/Flex-Low and Industrial/Flex-Medium land uses. Located in the vicinity of Alignment G-2 are Ricca Children's Learning Center at 1510 Brookhollow Drive and Orange County Head Start at 2501 Pullman Street
- **(G-3)** – The proposed extraction alignment along East Warner Avenue includes Industrial/Flex-Medium land uses. Along Warner Avenue and in the vicinity of Alignment G-3 are residential uses are located west of Standard Avenue and the Santa Ana Unified School District Monroe Elementary School is located west of Halladay Street at 417 E. Central Avenue.
- **(G-4)** – The proposed extraction alignment along Pullman Street includes Industrial and Industrial/Flex-Low land uses. Located in the vicinity of Alignment G-4 are Ricca Children's Learning Center at 1510 Brookhollow Drive and Orange County Head Start at 2501 Pullman Street
- **(G-5)** – The proposed extraction alignment along East Dyer Road includes General Commercial-Medium High and Industrial/Flex-Medium land uses. The Montessori International Academy is located at 2717 South Halladay Street in Santa Ana within Alignment G-5. There are five hotels

located in Alignment G-5, The Embassy Suites Hotel is located at 1325 E. Dyer Road, La Quinta Inn located at 2721 Hotel Terrace, Hotel Terras is located at 2721 Hotel Terrace and Holiday Inn is located at 2726 S. Grand Avenue.

- **(G-6)** – The proposed extraction alignment along MacArthur Blvd. includes General Commercial-Medium High and Industrial/Flex-Medium land uses. There are four hotels in Alignment G-6, Courtyard located at 8 Macarthur Place, Hotel Zessa located at 201 E MacArthur Blvd., Homewood Suites by Hilton Irvine located at 17370 Red Hill Avenue and Spring Hill Suites located at 17601 Fitch in the city of Irvine.
- **(G-7)** – The proposed extraction alignment along MacArthur Boulevard includes Industrial/Flex-Medium, District Center-Medium, and District Center-Low land uses. There are four high density residential complexes within the vicinity of the southern Alignment G-7 in the Irvine Business Complex near MacArthur Avenue. The residential use consists of MDL Irvine at 101 Placemark with 137 residential units, City Square at 100 City Square consisting of 44 units, the LUX 101-161 Schick consisting of 38 units and Aurum at 2055 Main consisting of 178 units. There is one hotel in Alignment G-7. Element Irvine Hotel at 17662 Armstrong Avenue.
- **(G-8)** – The proposed extraction alignment along a channel east of MacArthur Boulevard includes Industrial/Flex-Medium land uses. Located in the vicinity of Alignment G-8 are Ricca Children's Learning Center at 1510 Brookhollow Drive and Orange County Head Start at 2501 Pullman Street. The Best Western located at 2700 Hotel Terrace and Hampton Inn located at 2720 Hotel Terrace

Local Groundwater Treatment Plants

The proposed local groundwater treatment plants would be located within and adjacent to various land uses throughout the cities of Irvine, Santa Ana, and Tustin. The groundwater treatment plants would be constructed within or near the proposed extraction alignments as shown on Figure 2-5 and would include the same land use designations. Noise-sensitive land uses may be in the vicinity of groundwater treatment plants.

Conveyance Pipelines

The proposed conveyance pipelines would be located within and adjacent to various land uses throughout the unincorporated areas of Orange County and the cities of Irvine, Santa Ana, and Tustin. The conveyance pipelines would be installed between the newly installed groundwater extraction wells, each local groundwater treatment plant, and the existing sanitary sewer and would primarily be underground with some piping occurring above ground at the entry points to the treatment plants. Pipelines would be installed primarily within existing roadway rights-of-way to the extent feasible and within private property where treatment plants may be. Noise-sensitive land uses may be in the vicinity of conveyance pipelines.

Existing Noise Sources

The primary noise sources of the Project Area are related to transportation including automobiles, trucks, motorcycles, buses, trains, helicopters, and planes. The predominant noise ambient sources include roadway traffic noise. Secondary noise sources include activities related to the operation of commercial and industrial businesses in the area including loading area/delivery truck activities, trash compaction,

and refuse collection; and periodic landscape maintenance and other occasional outdoor noise associated with residential uses.

Major highways through the Project Area include State Route (SR) 55. Interstate (I-)405 is located south of the Project Area.

Existing Vibration-Sensitive Sources

Aside from periodic construction work that may occur throughout the area, other sources of groundborne vibration in the Project Area include heavy-duty vehicular travel (e.g., refuse trucks, delivery trucks) on local roadways. Truck traffic at a distance of 50 feet typically generates groundborne vibration velocity levels of approximately 63 VdB (approximately 0.006 in/sec PPV). These levels could reach 72 VdB (approximately 0.016 in/sec PPV) where trucks pass over irregularities in the road surface.

Airport Noise

John Wayne Airport is located approximately 1,100 feet to the south of the Project Area, just south of I-405. John Wayne Airport has runways with a south/southwest to north/northeast orientation. A narrow portion of the Project Area is located within the 70 and 65 dBA CNEL contour for John Wayne Airport (John Wayne Airport 2022) and generally consists of the portion bounded by Main Street to the south, Deere Avenue to the north, Daimler Street to the west, and Red Hill Avenue and Sky Park Circle to the east. The uses within the 70 and 65 dBA CNEL contour consist of industrial and business/commercial uses.

3.10.2 Regulatory Framework

Detailed below is a discussion of the relevant noise regulatory setting, and the noise regulations, plans, and policies applicable to the proposed Project.

Federal

U.S. Environmental Protection Agency

Under the authority of the Noise Control Act of 1972, the United States Environmental Protection Agency (USEPA) established noise emission criteria and testing methods published in Parts 201 through 205 of Title 40 of the Code of Federal Regulations that apply to some transportation equipment (e.g., interstate rail carriers, medium trucks, and heavy trucks) and construction equipment. In 1974, USEPA issued guidance levels for the protection of public health and welfare in residential land use areas (USEPA 1974). The guidance levels specified an outdoor L_{dn} of 55 dBA and an indoor L_{dn} of 45 dBA. These guidance levels are not considered as standards or regulations and were developed without consideration of technical or economic feasibility. There are no federal noise standards that directly regulate environmental noise related to the construction or operation of the proposed Project.

National Institute for Occupational Safety and Health

NIOSH establishes Recommended Exposure Limits (REL) for noise based on the best available science and practice. The NIOSH REL for noise is 85 decibels, using the A-weighted frequency response (dBA) over an 8-hour average, usually referred to as Time-Weighted Average (TWA). Exposures at or above this level are considered hazardous.

Federal Transit Authority Vibration Standards

FTA has adopted vibration standards measured in Peak Particle Velocity (PPV) that are used to evaluate potential building damage impacts related to construction activities. The vibration damage criteria adopted by FTA are shown in **Table 3.10-1**.

TABLE 3.10-1
CONSTRUCTION VIBRATION DAMAGE CRITERIA

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

SOURCE: FTA 2018

In addition, FTA has also adopted standards associated with human annoyance for groundborne vibration impacts for the following three land-use categories: Vibration Category 1 – High Sensitivity, Vibration Category 2 – Residential, and Vibration Category 3 – Institutional. FTA defines Category 1 as buildings where vibration would interfere with operations within the building, including vibration-sensitive research and manufacturing facilities, hospitals with vibration-sensitive equipment, and university research operations. Vibration-sensitive equipment includes, but is not limited to, electron microscopes, high-resolution lithographic equipment, and normal optical microscopes. Category 2 refers to all residential land uses and any buildings where people sleep, such as hotels and hospitals. Category 3 refers to institutional land uses such as schools, churches, other institutions, and quiet offices that do not have vibration-sensitive equipment, but still have the potential for activity interference. The vibration thresholds associated with human annoyance for these three land-use categories are shown in **Table 3.10-2**. No thresholds have been adopted or recommended for commercial and office uses.

TABLE 3.10-2
GROUNDBORNE VIBRATION IMPACT CRITERIA FOR GENERAL ASSESSMENT

Land Use Category	Frequent Events[a]	Occasional Events[b]	Infrequent Events[c]
Category 1: Buildings where vibration would interfere with interior operations.	65 VdB[d]	65 VdB[d]	65 VdB[d]
Category 2: Residences and buildings where people normally sleep.	72 VdB	75 VdB	80 VdB
Category 3: Institutional land uses with primarily daytime use.	75 VdB	78 VdB	83 VdB

SOURCE: FTA 2018

NOTES:

a. "Frequent Events" is defined as more than 70 vibration events of the same source per day.
b. "Occasional Events" is defined as between 30 and 70 vibration events of the same source per day.
c. "Infrequent Events" is defined as fewer than 30 vibration events of the same kind per day.
d. This criterion is based on levels that are acceptable for most moderately sensitive equipment such as optical microscopes.

State

Noise

The State of California does not have statewide standards for environmental noise, but the California Department of Public Health (DPH) has established guidelines for evaluating the compatibility of various land uses as a function of community noise exposure (**Table 3.10-3**).

TABLE 3.10-3
COMMUNITY NOISE EXPOSURE – LDN OR CNEL (DBA)

Land Use Category	50	55	60	65	70	75	80
Residential – Low Density Single Family, Duplex, Mobile Home							
Residential – Multi-Family							
Transient Lodging – Motel/Hotel							
Schools, Libraries, Churches, Hospitals, Nursing Homes							
Auditorium, Concert Hall, Amphitheaters							
Sports Arena, Outdoor Spectator Sports							
Playgrounds, Neighborhood Parks							
Golf Courses, Riding Stables, Water Recreation, Cemeteries							
Office Buildings, Business, Commercial and Professional							
Industrial, Manufacturing, Utilities, Agriculture							

SOURCE: State of California, Governor's Office of Planning and Research, 2003.

Normally Acceptable	Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements
Conditionally Acceptable	New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features are included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning will normally suffice.
Normally Unacceptable	New construction or development should be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirement must be made and needed noise insulation features included in the design.
Clearly Unacceptable	New construction or development generally should not be undertaken.

The purpose of these guidelines is to maintain acceptable noise levels in a community setting for different land use types. Noise compatibility by different land use types is categorized into four general levels: "normally acceptable," "conditionally acceptable," "normally unacceptable," and "clearly unacceptable." For instance, a noise environment ranging from 50 dBA CNEL to 65 dBA CNEL is "normally acceptable" for multi-family residential uses, while a noise environment of 75 dBA CNEL or above for multi-family residential uses is considered to be "clearly unacceptable."

In addition, Per State of California Government Code Section 53091, building ordinances of local cities or counties do not apply to the location or construction of facilities for the proposed Projection, generation, storage, treatment, or transmission of water or wastewater. Specifically, Section 53091 states (State of California Legislative Council 2003):

> *(d) Building ordinances of a county or city shall not apply to the location or construction of facilities for the production, generation, storage, treatment, or transmission of water, wastewater, or electrical energy by a local agency.*
>
> *(e) Zoning ordinances of a county or city shall not apply to the location or construction of facilities for the production, generation, storage, treatment, or transmission of water.*

Vibration

There are no state vibration standards. Moreover, according to the California Department of Transportation's (Caltrans) *Transportation and Construction Vibration Guidance Manual*, there are no official Caltrans standards for vibration. However, this manual provides guidelines that can be used as screening tools for assessing the potential for adverse vibration effects related to structural damage and human annoyance. The manual is meant to provide practical guidance to Caltrans engineers, planners, and consultants who must address vibration issues associated with the construction, operation, and maintenance of Caltrans proposed Projects. The vibration criteria established by Caltrans for assessing structural damage and human are shown in **Table 3.10-4** and **Table 3.10-5**, respectively.

TABLE 3.10-4
CALTRANS VIBRATION DAMAGE POTENTIAL THRESHOLD CRITERIA

	Maximum PPV (inches/second)	
Structure and Condition	**Transient Sources**	**Continuous/Frequent Intermittent Sources**
Extremely fragile historic buildings, ruins, ancient monuments	0.12	0.08
Fragile buildings	0.2	0.1
Historic and some old buildings	0.5	0.25
Older residential structures	0.5	0.3
New residential structures	1.0	0.5
Modern industrial/commercial buildings	2.0	0.5

SOURCE: Caltrans 2013

NOTE: Transient sources create a single isolated vibration event, such as blasting or drop balls. Continuous/frequent intermittent sources include impact pile drivers, pogo-stick compactors, crack and-seat equipment, vibratory pile drivers, and vibratory compaction equipment.

TABLE 3.10-5
CALTRANS VIBRATION ANNOYANCE POTENTIAL CRITERIA

	Maximum PPV (inches/second)	
Structure and Condition	**Transient Sources**	**Continuous/Frequent Intermittent Sources**
Barely perceptible	0.04	0.01
Distinctly perceptible	0.25	0.04
Strongly perceptible	0.9	0.10
Severe	2.0	0.4

SOURCE: Caltrans 2013

NOTE: Transient sources create a single isolated vibration event, such as blasting or drop balls. Continuous/frequent intermittent sources include impact pile drivers, pogo-stick compactors, crack and-seat equipment, vibratory pile drivers, and vibratory compaction equipment.

Local

County of Orange

Noise Element of the General Plan

The Noise Element of the County of Orange General Plan has developed noise standards for mobile noise sources. The County specifies outdoor and indoor noise limits for residential uses, places of worship, educational facilities, hospitals, hotels/motels, and commercial and other land uses. The noise standard for exterior living areas is 65 dBA CNEL. The County prohibits new residential land uses within the 65 dBA CNEL contour from any noise sources, including highways. The indoor noise standard is 45 dBA CNEL, which is consistent with the standard in the California Noise Insulation Standard. The County also enforces building sound transmission and indoor fresh air ventilation requirements specified in Chapter 35 of the Uniform Building Code. In addition, the existing General Plan includes the following major policies related to noise:

1. Intergovernmental Cooperation: To cooperate with other County agencies and levels of government to bring about a comprehensive and coordinated effort to reduce noise levels.
2. Public Information and Notification: To disseminate public information regarding noise and programs to reduce noise levels and their impacts.
3. Transportation System Noise Control: To encourage the control of noise from transportation systems as the most efficient and effective means of reducing noise at the source.
4. Noise Monitoring and Abatement: To monitor noise levels and adopt and enforce noise abatement programs.
5. Noise/Land Use Planning Integration: To fully integrate noise considerations in land use planning to prevent new noise/land use conflicts.
6. Noise Sensitive Land Uses: To identify and employ mitigation measures to reduce the impact of noise levels and attain the standards established by the Noise Element, for both interior areas and outdoor living areas for noise sensitive land uses.

Noise Ordinance

The County's Standard Conditions of Approval require that all construction vehicles or equipment, fixed or mobile, operated within 1,000 feet of a dwelling shall be equipped with properly operating and maintained mufflers. All operations shall comply with Orange County Codified Ordinance Division 6 (Noise Control). Stockpiling and/or vehicle staging areas shall be located as far as practicable from dwellings. As specified in Orange County Code of Ordinances Section 4-6-7(e), construction activities are generally restricted to the hours between 7 a.m. and 8 p.m. from Monday through Saturday. No construction activity is permitted on Sundays and federal holidays. Construction noise during the allowed construction time periods is exempt from the noise level provisions in the Noise Control Ordinance.

Sections 4-6-4 and 4-6-5 of the Orange County Code of Ordinances provides exterior and interior noise standards, respectively, to the entire territory of Orange County, including incorporated and unincorporated territory. The County's noise standards for exterior and interior noise levels are provided in **Table 3.10-6**.

TABLE 3.10-6
COUNTY OF ORANGE NOISE STANDARDS

Noise Zone[a]	Location	Noise Level	Time Period
1	Exterior	55 dB(A)	7 a.m.–10 p.m.
		50 dB(A)	10 p.m.–7 a.m.
	Interior	55 dB(A)	7 a.m.–10 p.m.
		45 dB(A)	10 p.m.–7 a.m.

SOURCE: County of Orange 2020

NOTE:

a. The entire territory of Orange County, including incorporated and unincorporated territory, is hereby designated as "Noise Zone 1."

The following limits apply to the exterior standards in Table 3.10-6:

- Basic noise level for a cumulative period of not more than 30 minutes in any 1 hour (L50); or
- Basic noise level plus 5 dBA for a cumulative period of not more than 15 minutes in any 1 hour (L25); or
- Basic noise level plus 10 dBA for a cumulative period of not more than 5 minutes in any 1 hour (L8); or
- Basic noise level plus 15 dBA for a cumulative period of not more than 1 minutes in any 1 hour (L2); or
- Basic noise level plus 20 dBA for any period of time (Lmax).

The following limits apply to the interior standards in Table 3.10-6:

- Basic noise level for a cumulative period of not more than 5 minutes in any 1 hour (L8); or
- Basic noise level plus 5 dBA for a cumulative period of not more than 1 minutes in any 1 hour (L2); or
- Basic noise level plus 10 dBA for any period of time (Lmax).

If the ambient noise level exceeds any of the above noise limits, the cumulative period applicable to that category shall be increased to reflect that ambient noise level. It shall be unlawful for any person at any location within the unincorporated area of the County to create any noise or to allow the creation of any noise that causes the noise level to exceed the residential noise standards stated above. Each of the noise limits above shall be reduced by 5 dBA for noise consisting of impact noise, simple tone noise, speech, music, or any combination thereof.

Orange County Code of Ordinances Section 4-6-7 exempts certain activities from the provisions of the Noise Control Ordinance. Notable exemptions include the following (refer to Orange County Code of Ordinances Section 4-6-7 for complete list of exemptions):

- Activities conducted on any park or playground, provided such park or playground is owned and operated by a public entity.
- Any mechanical device, apparatus or equipment used, related to or connected with emergency machinery, vehicle or work.
- 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 p.m. and 7 a.m. on weekdays, including Saturday, or at any time on Sunday or a federal holiday.
- Noise sources associated with the maintenance of real property, provided said activities take place between 7 a.m. and 8 p.m. on any day except Sunday or a federal holiday, or between the hours of 9 a.m. and 8 p.m. on Sunday or a federal holiday.
- Any activity to the extent regulation thereof has been preempted by state or federal law.

City of Irvine

Noise Element of the General Plan

The Irvine's existing General Plan Noise Element (2000) establishes acceptable interior and exterior noise standards (Table F-1 of the Noise Element) by land use type and establishes acceptable noise levels by each land use category to ensure land use compatibility (Table F-2 of the Noise Element). The CNEL noise levels for specific land uses are classified into four categories: (Zone A) "clearly compatible" (Zone B) "normally compatible" (Zone C) "normally incompatible" and (Zone D) "clearly incompatible." A CNEL value of 70 dBA is considered the dividing line between a "normally compatible" and "normally incompatible" noise environment for noise sensitive land uses, including residences, transient lodgings, schools, and libraries. In addition, the existing General Plan includes the following objectives related to noise:

> ***Objective F-1: Mobile Noise.*** Ensure that City residents are not exposed to mobile noise levels in excess of the CNEL Interior and Exterior Noise Standards (Table F-1), and Single Event Noise Standard.
>
> ***Objective F-2: Stationary Noise.*** Ensure that City residents are not exposed to stationary noise levels in excess of the City Noise Ordinance standards.
>
> ***Objective F-3: Noise Abatement.*** Achieve maximum efficiency in noise abatement efforts through intergovernmental coordination and public information programs.

Noise Ordinance

The Irvine Municipal Code Section 6.8.205.A limits construction activities between the hours of 7 a.m. to 7 p.m. Mondays through Fridays, and 9 a.m. to 6 p.m. on Saturdays. No construction activities shall be permitted outside of these hours or on Sundays and federal holidays unless a temporary waiver is granted by the Chief Building Official or his or her authorized representative. Trucks, vehicles, and equipment that are making or are involved with material deliveries, loading, or transfer of materials, equipment service, maintenance of any devices or appurtenances for or within any construction proposed Project in Irvine shall not be operated or driven on Irvine streets outside of these hours or on Sundays and federal holidays unless a temporary waiver is granted by the Irvine. Any waiver granted shall take impact upon the community into consideration. No construction activity will be permitted outside of these hours except in emergencies including maintenance work on the Irvine rights-of-way that might be required.

Deliveries to or pickups from any commercial property sharing a property line with any residential property may occur between 7 a.m. and 10 p.m. daily. No deliveries to or pickups from any such properties shall occur outside of these hours.

The Irvine Municipal Code Section 6.8.205.B states that the maintenance of real property operations may exceed the noise standards between 7 a.m. and 7 p.m. on any day except Sundays, or between 9 a.m. and 6 p.m. on Sundays or a federal holiday.

Construction noise is also addressed in Irvine Municipal Code Zoning Ordinance Chapter 5, *Overlay Districts*, Chapter 5-8, *Irvine Business Complex Residential Mixed-Use Overlay District*, Section 5-8-4, which requires that, prior to issuance of grading permits, the proposed Project applicant shall incorporate the following measures as a note on the grading plan cover sheet to ensure that the greatest distance between noise sources and sensitive receptors during construction activities has been achieved. The following is also required:

- Construction equipment, fixed or mobile, shall be equipped with properly operating and maintained noise mufflers consistent with manufacturer's standards.
- Construction staging areas shall be located away from off-site sensitive uses during the later phases of proposed Project development.
- The proposed project contractor shall place all stationary construction equipment so that emitted noise is directed away from sensitive receptors nearest the proposed Project site, whenever feasible.
- For construction of sound walls that have been incorporated into the proposed Project design, prior to construction of the building foundation, installation of temporary sound blankets (fences typically composed of poly-vinyl-chloride-coated outer shells with adsorbent inner insulation) shall be placed along the boundary of the proposed project site during construction activities.

The Municipal Code Zoning Ordinance Chapter 5, *Overlay Districts*, Chapter 5-8, *Irvine Business Complex Residential Mixed-Use Overlay District*, Section 5-8-4, *Special Development Requirements*, states that proposed Projects involving vibration-intensive construction activities occurring near sensitive receptors must be evaluated for potential vibration impacts. The use of less vibration intensive equipment or methods must be implemented if the construction-related vibration exceeds the FTA vibration-annoyance criteria for 78 VdB during the daytime.

The Irvine regulates noise through the Irvine Municipal Code under Title 6, *Public Morals*, Division 8, *Pollution*, Chapter 2, *Noise*. All properties are assigned to the following Noise Zones with the noise standards shown in **Table 3.10-7**:

- Noise Zone 1: All hospitals, libraries, churches, schools and residential properties.
- Noise Zone 2: All professional office and public institutional properties.
- Noise Zone 3: All commercial properties excluding professional office properties.
- Noise Zone 4: All industrial properties.

TABLE 3.10-7
CITY OF IRVINE NOISE STANDARDS

			Noise Levels for a Period Not Exceeding (minutes/hour)				
Zone	**Location**	**Time Period**	**30**	**15**	**5**	**1**	**0 (anytime)**
Noise Zone 1: All hospitals, libraries, churches, schools, and residential properties.	Exterior	7 a.m.–10 p.m.	55	60	65[a]	70	75
		10 p.m.–7 a.m.	50	55	60	65[a]	70
	Interior	7 a.m.–10 p.m.	—	—	55	60	65
		10 p.m.–7 a.m.	—	—	45	50	55
Noise Zone 2: All professional office and public institutional properties.	Exterior	Anytime	55	60	65	70	75
	Interior	Anytime	—	—	55	60	65
Noise Zone 3: All commercial properties excluding professional office properties.	Exterior	Anytime	60	65	70	75	80
	Interior	Anytime	—	—	55	60	65
Noise Zone 4: All industrial properties.	Exterior	Anytime	70	75	80	85	90
	Interior	Anytime	—	—	55	60	65

SOURCE: City of Irvine 2020

NOTES:

a. This standard does not apply to multifamily residence private balconies. Multifamily developments with balconies that do not meet the 65 CNEL are required to provide occupancy disclosure notices to all future tenants regarding potential noise impacts.
b. It shall be unlawful for any person at any location within the City to create any noise or to allow the creation of any noise on property owned, leased, occupied or otherwise controlled by such person which causes the noise level when measured on any property within designated noise zones either within or without the City to exceed the applicable noise standard.
c. Each of the noise standards specified above shall be reduced by 5 dB(A) for impact, or predominant tone noise or for noises consisting of speech or music.
d. In the event that the noise source and the affected property are within different noise zones, the noise standards of the affected property shall apply.

In addition to the construction noise exemptions in Section 6.8.205.A and the maintenance noise exemptions in Section 6.8.205.B, the Irvine Municipal Code Section 6.8.205.D exempts certain activities from the provisions of the Noise Ordinance. Notable exemptions include the following (refer to Section 6.8.205.D of the Ordinance for complete list of exemptions):

- Activities otherwise lawfully conducted on public parks, public playgrounds and public or private school grounds.
- Any mechanical device, apparatus or equipment which is utilized for emergency work, pest control, and protection or harvest of agricultural crops during periods of potential or actual frost damage or other adverse weather conditions.

- Any activity or equipment to the extent that design regulation thereby has been preempted by state or federal law.

City of Santa Ana

Noise Element of the General Plan

The Noise Element of the Santa Ana General Plan identifies sources of noise in Santa Ana and provides objectives and policies that ensure that noise from various sources would not create an unacceptable noise environment. The Noise Element specifies interior and exterior noise limits for residential uses, institutional uses (hospitals, school classrooms and playgrounds, religious facilities, and libraries, and parks. The noise standard for exterior areas is 65 dBA CNEL (no limit specified for religious facilities and libraries). The noise standard for interior areas is 45 dBA CNEL (no limit specified for parks). In addition, the existing General Plan includes the following goals related to noise:

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

Goal N-2: Noise Generators. Reduce the impact of known sources of noise and vibration.

Goal N-3: Airport and Land Use Environs. Protect sensitive land uses from airport related noise impacts.

Noise Ordinance

The City of Santa Ana has adopted a Noise Ordinance (Chapter 18, Article VI, of the Santa Ana Municipal Code), which identifies exterior noise standards, specific noise restrictions, exemptions, and variances for sources of noise within the Santa Ana.

Under Municipal Code Section 18-314(e), construction activity noise sources are exempt from the Santa Ana Noise Ordinance standards so long that the activities do not take place between the hours of 8 p.m. and 7 a.m. on weekdays, including Saturday, or at any time on Sunday or a federal holiday.

Section 18-311 of the Santa Ana Municipal Code designates the entire city as Noise Zone 1 for exterior and interior noises. Section 18-312 of the Santa Ana Municipal Code establishes exterior noise levels for residential land uses. Section 18-313 of the Santa Ana Municipal Code establishes interior noise standards that apply to all residential properties within the designation Noise Zone 1. The exterior and interior noise standards established in Santa Ana's Noise Ordinance are identified in **Table 3.10-8**. If the ambient noise level is greater than the identified noise standards, the noise standard becomes the ambient noise level without the offending noise.

TABLE 3.10-8
CITY OF SANTA ANA NOISE STANDARDS

Land Use Category	7 a.m.–10 p.m.	10 p.m.–7 a.m.
Exterior Noise Standards		
30 minutes in any hour	55 dBA	50 dBA
15 minutes in any hour	60 dBA	55 dBA
5 minutes in any hour	65 dBA	60 dBA
1 minutes in any hour	70 dBA	65 dBA
Any Time	75 dBA	70 dBA
Interior Noise Standards		
5 minutes in any hour	55 dBA	45 dBA
1 minutes in any hour	60 dBA	50 dBA
Any Time	65 dBA	55 dBA

SOURCE: City of Santa Ana Municipal Code Sections 18-312 and 18-313

NOTE: If the ambient noise level is greater than the identified noise standards, the noise standard becomes the ambient noise level without the offending noise.

Section 18-314 of the Santa Ana Noise Ordinance provides special provisions which exempt certain activities from the standards established in the Noise Ordinance. Notable exemptions include the following (refer to Section 18-314 of the Ordinance for complete list of exemptions):

- Activities conducted on the grounds of any public or private nursery, elementary, intermediate, or secondary school or college.
- Activities conducted on any park or playground, provided such park or playground is owned and operated by a public entity.
- Any mechanical device, apparatus or equipment used, related to or connected with emergency machinery, vehicle or work.
- 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 p.m. and 7 a.m. on weekdays, including Saturday, or any time on Sunday or a federal holiday.
- Noise sources associated with the maintenance of real property, provided said activities take place between 7 a.m. and 8 p.m. on any day except Sunday or a federal holiday, or between the hours of 9 a.m. and 8 p.m. on Sunday or a federal holiday.
- Any activity to the extent regulation thereof has been preempted by state or federal law.

City of Tustin

Noise Element of the General Plan

The Tustin's General Plan Noise Element (City of Tustin 2012) has established exterior and interior noise standards as shown in Table C of the Noise Element. These noise standards apply to approved land uses for which mitigation may be required to achieve the Tustin's noise standards. As shown in Table C of the Tustin Noise Element, there is a noise standard of 65 dBA CNEL for exterior habitable areas and a

45 dBA CNEL noise standard for interior habitable areas for residential land uses. In addition, the existing Tustin General Plan includes the following goals related to noise:

Goal 1. Use noise control measures to reduce the impact from transportation noise sources.

Goal 2. Incorporate noise considerations into land use planning decisions.

Goal 3. Develop measures to control non-transportation noise impacts.

Noise Ordinance

Tustin Municipal Code Article 4, Chapter 6, establishes the maximum permissible noise level that may intrude into a neighbor's property. The Noise Ordinance establishes noise level standards for various land use categories affected by stationary noise sources.

Tustin Municipal Code Article 4, Chapter 6, limits the erection, demolition, alternation, repair, excavation, grading, paving or construction of any building or site to between the hours of 7 a.m. and 6 p.m. Monday through Friday and 9 a.m. and 5 p.m. on Saturdays. Construction is prohibited on Sundays and City-observed federal holidays. Trucks, vehicles and equipment that are making or are involved with material deliveries, loading or transfer of materials, equipment service, maintenance of any devices or appurtenances to any construction project in Tustin shall not be operated on or adjacent to said sites outside of the approved hours for construction activity. In addition, construction activities may be permitted outside of those limitations in the case of urgent necessity or upon a finding that such approval will not adversely impact adjacent properties and the health, safety and welfare of the community if a temporary exception is granted in writing by the Building Official for private property or by the Director of Public Works for public properties or their authorized representatives. All temporary waiver requests shall be made in writing and shall include the specific times, dates, and locations requested and a description of the type of activity that is proposed. In granting a temporary exception, conditions may be imposed on construction activities to protect the health, safety and welfare of the community. Any approval granted may be summarily revoked by the Building Official or Director of Public Works at the sole discretion of each official.

Land use categories in Tustin are defined by five noise zones, as listed below. **Table 3.10-9** provides the maximum noise standard based on the noise zone, the location of the noise (exterior/interior), and the time period.

- Noise Zone 1: All residential properties.
- Noise Zone 2: All commercial properties.
- Noise Zone 3: All industrial properties.
- Noise Zone 4: All special properties such as hospitals, convalescent homes, public and institutional schools, libraries and churches.
- Noise Zone 5: All mixed-use properties.

TABLE 3.10-9
CITY OF TUSTIN NOISE STANDARDS

			Noise Levels for a Period Not Exceeding (minutes/hour)				
Zone	**Location**	**Time Period**	**30**	**15**	**5**	**1**	**0 (anytime)**
Noise Zone 1: All residential properties.	Exterior	7 a.m.–10 p.m.	55	60	65	70	75
		10 p.m.–7 a.m.	50	55	60	65	70
	Interior	7 a.m.–10 p.m.	—	—	55	60	65
		10 p.m.–7 a.m.	—	—	45	50	55
Noise Zone 2: All commercial properties.	Exterior	Anytime	60	65	70	75	80
Noise Zone 3: All industrial properties.	Exterior	Anytime	70	75	80	85	90
Noise Zone 4: All special properties such as hospitals, convalescent homes, public and institutional schools, libraries and churches.	Exterior	Anytime	55	60	65	70	75
Noise Zone 5: All mixed-use properties.	Exterior	Anytime	60	65	70	75	80
	Interior (residential uses only)	7 a.m.–10 p.m.	—	—	55	60	65
		10 p.m.–7 a.m.	—	—	45	50	55

SOURCE: City of Tustin Municipal Code Sections 4614 and 4615

NOTES: It shall be unlawful for any person at any location within the incorporated area of the City of Tustin to create any noise or to allow the creation of any noise on property owned, leased, occupied or otherwise controlled by such person, when the foregoing causes the noise level, when measured on any other property to exceed. In the event the alleged offensive noise consists of impact noise, simple tone, speech, music, or any combination thereof, each of the above noise levels shall be reduced by 5 dBA. In the event the ambient noise level exceeds any of the first four noise limit categories, the cumulate period applicable to said category shall be increased to reflect said ambient noise level. In the event the ambient noise level exceeds the fifth noise limit category, the maximum allowable noise level under said category shall be increased to reflect the maximum ambient noise level.

Tustin Noise Ordinance Section 4617 provides provisions which exempt certain activities from the standards established in the Noise Ordinance. Notable exemptions include the following (refer to Section 4617 of the Ordinance for complete list of exemptions):

- Activities conducted on the grounds of any public or private nursery, elementary, intermediate or secondary school or college, public agency, and public utility.
- Activities conducted on any park or playground provided such park or playground is owned and operated by a public entity.
- Any mechanical device, apparatus or equipment used, related to or connected with emergency machinery, vehicle or work.
- Noise sources associated with construction, repair, remodeling, or grading of any real property between the hours of 7 a.m. and 6 p.m. Monday through Friday and the hours of 9 a.m. and 5 p.m. on Saturdays, excluding city observed federal holidays.
- Noise sources associated with maintenance of real property provided said activities take place between the hours of 7 a.m. and 6 p.m. on any day except Sunday or city observed federal holidays, or between the hours of 9 a.m. and 6 p.m. on Sunday or city observed federal holidays.

- Any activity to the extent regulation thereof has been preempted by state or federal law.
- Noise sources associated with the maintenance, repair, remodeling, grading and landscaping of residential real property performed by the owner, provided such activity does take place between the hours of 7 a.m. and 9 p.m. This section does not authorize noise sources performed by independent building trades contractors.
- Noise sources associated with the maintenance and repair of personal property performed by the owner on the owner's residential property, provided such activity takes place between the hours of 7 a.m. and 9 p.m. This section does not authorize noise sources by independent repairmen or technicians.

3.10.3 Impact Analysis and Mitigation Measures

Thresholds of Significance

The following criteria from CEQA Guidelines Appendix G are used as thresholds of significance to determine the impacts of the proposed Project as related to noise and vibration. The proposed Project would have a significant impact if it would result in the following:

1. Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the proposed Project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.
2. Generation of excessive groundborne vibration or groundborne noise levels.
3. For a proposed 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 proposed Project expose people residing or working in the proposed Project Area to excessive noise levels.
4. Result in a cumulatively considerable impact to noise and vibration.

Methodology

Construction Noise

For construction-related noise from implementation of the proposed Project, typical construction equipment noise levels recommended for noise impact assessments, based on a distance of 50 feet between the equipment and a noise receptor, are taken from the FHWA Roadway Construction Noise Model (RCNM) (FHWA 2006). Because the County and the cities of Irvine, Santa Ana, and Tustin have not adopted construction noise level limits, the potential for construction noise impacts is informed by using criteria from the FTA Transit Noise and Vibration Impact Assessment Manual (FTA 2018). The FTA's General Assessment Construction Noise Criteria is based on the composite noise levels of the two noisiest pieces of equipment per construction phase and has a daytime noise level standard of 80 dBA L_{eq} (8-hour) for residential uses.

Per California Government Code Section 53091, building ordinances of local cities or counties do not apply to the location or construction of facilities for the projection, generation, storage, treatment, or

transmission of water or wastewater. Nonetheless, the determination of impacts is also informed by local ordinances for construction.

Construction Vibration

Construction vibration impacts were evaluated using FTA methodology from the FTA Transit Noise and Vibration Impact Assessment Manual (FTA 2018). For industrial and commercial buildings, the thresholds for potential vibration architectural damage impacts are 0.5 in/sec PPV for reinforced-concrete, steel or timber (no plaster) buildings or 0.3 in/sec PPV for engineered concrete and masonry (no plaster) buildings, 0.2 in/sec PPV for non-engineered timber and masonry buildings (e.g., typical residential homes), and 0.12 in/sec PPV for buildings extremely susceptible to vibration damage (e.g., fragile historic buildings). In addition, for sensitive residential uses, the threshold for potential vibration human annoyance impacts is the FTA vibration-annoyance criteria for 78 VdB. Building or structure setback distances for preventing vibration damage are considered in the evaluation using reference vibration levels for specific construction equipment.

Operational Stationary Noise

Specific details on future mechanical equipment and layout are unknown at this time. Therefore, stationary and other noise source impacts are discussed on a qualitative basis.

Operational Mobile Noise

For traffic-related noise, if the proposed Project causes the ambient noise levels measured at the property line of affected uses to increase by 3 dBA CNEL to or within the “normally unacceptable” or “clearly unacceptable” categories; or the proposed Project causes the ambient noise levels measured at the property line of affected uses to increase by 5 dBA CNEL or more within the “normally acceptable” or “conditionally acceptable” categories, a significant impact would occur.

Airport Noise

The Federal Aviation Administration (FAA) is required to provide noise exposure and land use information from noise exposure maps prepared under Title 14 Code of Federal Regulations (CFR) Part 150. The FAA Part 150 Noise Exposure Map for John Wayne Airport (John Wayne Airport 2022) shows that the 70 and 65 dBA CNEL noise contour would include portions of the Project Area generally bounded by Main Street to the south, Deere Avenue to the north, Daimler Street to the west, and Red Hill Avenue and Sky Park Circle to the east. Impacts are evaluated based on proposed Project components that may be located within the John Wayne Airport 70 and 65 dBA CNEL noise contour and may expose people working in the Project Area to excessive noise levels.

Impact Analysis

Increase in Ambient Noise Levels

Impact 3.10-1: The proposed Project could generate a substantial temporary or permanent increase in ambient noise levels in the vicinity of the proposed Project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.

Extraction Facilities and Monitoring Wells

Construction

The proposed Project plans to construct extraction facilities, monitoring wells, and trenches and/or drains. Typical activities that could generate noise during construction include demolition and drilling or excavation. Work activity will primarily be during daylight hours, however, there may be a need for night work in some cases to accommodate local encroachment permit requirements. It is anticipated that each well and/or associated trench construction would be approximately 10 to15 days but would not exceed more than 60 days. The construction equipment required to develop and install a well includes but is not limited to a truck mounted drill rig or direct-push drilling equipment, backhoe/track hoe, dump truck, air compressors, pumps, concrete saws, and welders. The FHWA Roadway Construction Noise Model (FHWA 2006) provides noise levels for noise-generating equipment. Noise levels for equipment that could be used for the proposed Project as well as for other common types of construction equipment are shown in **Table 3.10-10**. Noise levels from construction equipment decrease at a rate of 6 dBA per doubling of distance from the equipment. For instance, a noise level of 86 dBA at 50 feet from the equipment would be reduced to 80 dBA at 100 feet and to 74 dBA at 200 feet from the equipment. As shown in Table 3.10-10, several construction equipment types generate average noise levels in excess of 80 dBA L_{eq} at 50 feet.

The exact locations and construction schedule of the extraction facilities and monitoring wells are not known at this time. Construction of the extraction wells and monitoring wells would occur along the extraction alignments depicted on Figure 2-5 located within and adjacent to various land uses throughout the unincorporated areas of Orange County and the cities of Irvine, Santa Ana, and Tustin. Construction of the groundwater treatment plants and conveyance pipelines could also occur at the same time and in the vicinity of the wells contributing to construction noise. The land use around the majority of the extraction alignments consists of -Residential, Industrial/Flex-Medium, Industrial/Flex-Low, District Center-Medium, and District Center-Low land uses. As described in Impact 3.10-1 above, each of the alignments have a mixture of either residential (G-3 and G-7) or schools and hotels (G-1, G-2, G-4, G-5, G-6, and G-8) within the vicinity of the alignments.

Construction of the extraction facilities and monitoring wells, in the vicinity of a sensitive receptor (e.g., residence, school, hotel) could generate construction noise levels that may exceed the significance threshold of 80 dBA L_{eq} for noise-sensitive uses if the activity occurs within 125 feet of the sensitive receptor as shown in **Table 3.10-11**. Therefore, construction noise impacts from construction of the extraction facilities and monitoring wells within 125 feet of a sensitive receptors would require the implementation of **Mitigation Measure NOI-1** requiring at a minimum using noise barriers to reduce construction noise. With implementation of Mitigation Measure NOI-1, impacts would be reduced to less than significant.

TABLE 3.10-10
TYPICAL NOISE LEVELS FROM CONSTRUCTION EQUIPMENT

Construction Equipment	Maximum Noise Level (dBA, L_{max} at 50 feet)	Average Noise Level (dBA, L_{eq} at 50 feet)[a]
Air Compressor	78	74
Backhoe	78	74
Chain Saw	84	77
Compactor (Ground)	83	76
Concrete Mixer Truck	79	75
Concrete Pump Truck	81	74
Concrete Saw	90	83
Crane	81	73
Dozer	82	78
Drill Rig	84	77
Dump Truck	77	73
Excavator	81	77
Flat-Bed Truck	74	70
Front End Loader	79	75
Generator	82	79
Grader	85	81
Jackhammer	89	82
Pavement Scarafier	90	83
Paver	77	74
Pneumatic Tool	85	82
Pumps	81	78
Roller	80	73
Scraper	84	80
Tractor	84	80
Vacuum Street Sweeper	82	72
Welder/Torch	74	70

SOURCE: FHWA 2018

NOTE:

a. The average noise levels for the construction equipment at 50 feet were calculated from the maximum noise levels using the usage factors for each piece of equipment provided in the FHWA's RCNM.

TABLE 3.10-11
CONSTRUCTION NOISE LEVELS L_{EQ}

Construction Activity Phase	Distance in Feet from Construction Activity to Sensitive Receptor	Nearest Off-Site Sensitive Receptor (e.g., residence, school, hotel)
Extraction Facilities and Monitoring Wells	125 feet	78.3
Exceeds 80 dBA L_{eq} Threshold?		**No**

SOURCE: ESA 2024

NOTE: Calculations performed with the FHWA RCNM software.

However, even with implementation of Mitigation Measure NOI-1, impacts could exceed the significance thresholds and impacts could be significant if extraction facilities and monitoring well construction overlaps with either groundwater treatment plant or conveyance pipelines construction at the same receptor location (**Table 3.10-12**). Nevertheless, implementation of **Mitigation Measure NOI-2** requiring scheduling construction activities to avoid overlapping or concurrent construction of multiple proposed Project components within the vicinity of sensitive receptors would reduce the impact to less than significant.

TABLE 3.10-12
MAXIMUM COMBINED CONSTRUCTION NOISE LEVELS L_{EQ}

Construction Activity Phase	Distance in Feet from Construction Activity to Sensitive Receptor	Nearest Off-Site Sensitive Receptor (e.g., residence, school, hotel)
Extraction Facilities and Monitoring Wells	25 to 100 feet	90
Maximum Combined Noise from Overlapping Project Phases dBA L_{eq}[a]		**94**
Exceeds 80 dBA L_{eq} Threshold?		**Yes**

SOURCE: ESA 2024

NOTES: Calculations performed with the FHWA RCNM software.

a. Combined noise from overlapping phases assumes overlapping construction activities for extraction facilities and monitoring wells, groundwater treatment plants, and conveyance pipelines.

Construction would generate vehicle trips from construction workers commuting to the work sites and truck trips for hauling debris, soil, and construction materials and supplies. The number of construction workers would be relatively small and extensive excavation is not anticipated minimizing haul truck trips. Furthermore, construction workers would typically not travel at the same times as haul trucks – workers would arrive at the start of the work day and leave at the end of the work day, with trucks traveling to and from the work sites between the work day start and end times. A doubling of traffic volumes on a roadway is required to generate a 3 dBA increase in noise. Construction is not anticipated to generate a doubling of traffic volumes. Thus, construction traffic noise would result in a less than significant impact.

Construction activities outside of the specified times of day in the County of Orange, City of Irvine, City of Santa Ana, or City of Tustin Noise Ordinances may be permitted in the case of urgent necessity or upon a finding that such approval will not adversely impact adjacent properties and the health, safety and welfare of the community. A temporary exception or variance may be granted in writing by the appropriate County or City official as specified in each jurisdiction's ordinance. Temporary waivers or variances requests typically require the specific times, dates, and locations requested and a description of the type of activity that is proposed and may include control measures or conditions to reduce noise to protect the health, safety and welfare of the community. If nighttime construction work is required for individual proposed Projects, OCWD will obtain a temporary waiver or variance, as required.

Operation

Operation of the proposed Project would include periodic vehicle trips for maintenance and inspection to ensure the site and equipment are functioning properly. Electrical infrastructure may include installation of high and low voltage wiring, transformers, switchgear, motor control centers, variable frequency drives, motor actuated valves, lighting and various conduits. Site inspections would survey the grounds

and exterior appearance, exercise the active and standby electrical equipment, maintain the instrumentation and radio equipment, and conduct performance testing. Equipment would be installed with standard manufacturer-supplied noise attenuating enclosures and mufflers, as appropriate. All well facilities would be designed in accordance with applicable noise ordinances of the city or county in which the facility is within, to ensure that noise thresholds at the property boundary do not exceed day and nighttime limitations for neighboring land uses. With respect to traffic noise, a doubling of traffic volumes on a roadway is required to generate a 3 dBA increase in noise. Implementation of the proposed facilities would not result in large numbers of new employees because the facilities are highly automated. As a result, maintenance and inspection of facilities would result in a minimal increase in traffic trips and would not result in the doubling of traffic volumes. Therefore, operational vehicle trip increases would not generate a substantial increase in noise along local roadways. Thus, operation of these facilities would result in a less than significant impact.

Local Groundwater Treatment Plants

Construction

The proposed groundwater treatment plants would be located within and adjacent to various land uses throughout the unincorporated areas of Orange County and the cities of Irvine, Santa Ana, and Tustin and would be constructed within or near the proposed well alignments as described above. The construction equipment required to develop and install a groundwater treatment plant includes but is not limited to a backhoe/track hoe, dump truck, air compressors, pumps, concrete saws, and welders.

The exact locations and construction schedule of the groundwater treatment plants are not known at this time. Construction of the groundwater treatment plants would occur along alignments located within and adjacent to various land uses throughout the unincorporated areas of Orange County and the cities of Irvine, Santa Ana, and Tustin. Construction of the extraction facilities and monitoring wells and conveyance pipelines could also occur at the same time and in the vicinity of the groundwater treatment plants contributing to construction noise. The groundwater treatment plants would occur in locations within the vicinity of Residential, Industrial/Flex-Medium, Industrial/Flex-Low, District Center-Medium, and District Center-Low land uses.

Construction of the groundwater treatment plants in the vicinity of a sensitive receptor (e.g., residence, school, hotel) could generate construction noise levels that may exceed the significance threshold of 80 dBA L_{eq} for noise-sensitive uses if the activities occurs within 150 feet of the sensitive receptor as shown in **Table 3.10-13**. Therefore, construction noise impacts from construction of the extraction facilities and monitoring wells within 150 feet of a sensitive receptors would require the implementation of **Mitigation Measure NOI-1** requiring at a minimum using noise barriers to reduce construction noise. With implementation of Mitigation Measure NOI-1, impacts would be reduced to less than significant.

However, even with implementation of Mitigation Measure NOI-1, impacts could exceed the significance thresholds and impacts could be significant if extraction facilities and monitoring well construction overlaps with either groundwater treatment plant or conveyance pipelines construction at the same receptor location (**Table 3.10-14**). Nevertheless, implementation of Mitigation Measure NOI-2 requiring scheduling construction activities to avoid overlapping or concurrent construction of multiple proposed Project components within the vicinity of sensitive receptor would reduce the impact to less than significant.

TABLE 3.10-13
CONSTRUCTION NOISE LEVELS L_{EQ}

Construction Activity Phase	Distance in Feet from Construction Activity to Sensitive Receptor	Nearest Off-Site Sensitive Receptor: R1 – Single-Family Residence west of (G-3) by 910 East Warner Avenue
Groundwater Treatment Plants	150 feet	79.6
Exceeds 80 dBA L_{eq} Threshold?		**No**

SOURCE: ESA 2024

NOTE: Calculations performed with the FHWA RCNM software.

TABLE 3.10-14
MAXIMUM COMBINED CONSTRUCTION NOISE LEVELS L_{EQ}

Construction Activity Phase	Distance in Feet from Construction Activity to Sensitive Receptor	Nearest Off-Site Sensitive Receptor: R1 – Single-Family Residence west of (G-3) by 910 East Warner Avenue
Groundwater Treatment Plants	25 to 120 feet	91
Maximum Combined Noise from Overlapping Project Phases dBA L_{eq}[a]		**94**
Exceeds 80 dBA L_{eq} Threshold?		**Yes**

SOURCE: ESA 2024

NOTES: Calculations performed with the FHWA RCNM software.

a. Combined noise from overlapping phases assumes overlapping construction activities for extraction facilities and monitoring wells, groundwater treatment plants, and conveyance pipelines.

Construction would generate vehicle trips from construction workers commuting to the work sites and truck trips for hauling debris, soil, and construction materials and supplies. The number of construction workers would be relatively small and extensive excavation is not anticipated minimizing haul truck trips. Construction workers would typically not travel at the same times as haul trucks. Therefore, construction vehicle trip increases would not generate a doubling of traffic volumes and would not increase traffic noise level by 3 dBA. Thus, construction traffic noise would result in a less than significant impact.

If nighttime construction work is required for proposed Project facilities outside of the specified times of day in the County of Orange, City of Irvine, City of Santa Ana, or City of Tustin Noise Ordinances, the proposed Project applicant will obtain a temporary waiver or variance, as required.

Operation

Operation of the proposed Project would include periodic vehicle trips for maintenance and inspection to ensure the site and equipment are functioning properly. Electrical infrastructure may include installation of high and low voltage wiring, transformers, switchgear, motor control centers, variable frequency drives, motor actuated valves, lighting and various conduits. Equipment would be installed with standard manufacturer-supplied noise attenuating enclosures and mufflers, as appropriate. All groundwater treatment plants would be designed in accordance with applicable noise ordinances of the City, whichever the facility site is located within, to ensure that noise thresholds at the property boundary do not exceed day and nighttime limitations for neighboring land uses. Implementation of the proposed facilities would

not result in large numbers of new employees because the facilities are highly automated. As a result, maintenance and inspection of facilities would result in a minimal increase in traffic trips and would not result in the doubling of traffic volumes. Therefore, operational vehicle trip increases would not generate a substantial increase in noise along local roadways and impacts would be less than significant.

Conveyance Pipelines

Construction

The proposed conveyance pipelines would be located within and adjacent to various land uses throughout the unincorporated areas of Orange County and the cities of Irvine, Santa Ana, and Tustin and would be installed between the newly installed groundwater extraction facilities and the existing sewer and would primarily be underground with some piping occurring above ground at the entry points to the treatment plants. Pipelines would be installed primarily within existing roadway rights-of-way to the extent feasible. The construction equipment required to install the conveyance pipelines would include but is not limited to excavator, backhoe/track hoe, dump truck, paving equipment, rollers, and concrete saws.

The exact locations and construction schedule of the conveyance pipelines are not known at this time. Construction of the conveyance pipelines would occur along alignments located within and adjacent to various land uses throughout the unincorporated areas of Orange County and the cities of Irvine, Santa Ana, and Tustin. Construction of the extraction facilities and monitoring wells and groundwater treatment plants could also occur at the same time and in the vicinity of the conveyance pipelines contributing to construction noise. Portions of the conveyance pipelines alignments would occur in locations with the vicinity of Residential, Industrial/Flex-Medium, Industrial/Flex-Low, District Center-Medium, and District Center-Low land uses. of -Residential, Industrial/Flex-Medium, Industrial/Flex-Low, District Center-Medium, and District Center-Low land uses. As described in Impact 3.10-1 above, each of the alignments have a mixture of either residential (G-3 and G-7) or schools and hotels (G-1, G-2, G-4, G-5, G-6, and G-8) within the vicinity of the alignments.

Construction of conveyance pipelines in the vicinity of a sensitive receptor (e.g., residence, school, hotel) could generate construction noise levels that may exceed the significance threshold of 80 dBA L_{eq} for noise-sensitive uses if the activities occurs within 125 feet of the sensitive receptor as shown in **Table 3.10-15**. Therefore, construction noise impacts from construction of conveyance pipelines within 125 feet of a sensitive receptors would require the implementation of **Mitigation Measure NOI-1** requiring at a minimum using noise barriers to reduce construction noise. With implementation of Mitigation Measure NOI-1, impacts would be reduced to less than significant.

TABLE 3.10-15
CONSTRUCTION NOISE LEVELS L_{EQ}

Construction Activity Phase	Distance in Feet from Construction Activity to Sensitive Receptor	Nearest Off-Site Sensitive Receptor
		R1 – Single-Family Residence west of (G-3) by 910 East Warner Avenue
Conveyance Pipelines	125 feet	79.6
Exceeds 80 dBA L_{eq} Threshold?		**No**

SOURCE: ESA 2024
NOTE: Calculations performed with the FHWA RCNM software.

However, even with implementation of Mitigation Measure NOI-1, impacts could exceed the significance thresholds and impacts could be significant if extraction facilities and monitoring well construction overlaps with either the extraction facilities and monitoring wells or groundwater treatment plant construction at the same receptor location (**Table 3.10-16**). Nevertheless, implementation of Mitigation Measure NOI-2 requiring scheduling construction activities to avoid overlapping or concurrent construction of multiple proposed Project components within the vicinity of sensitive receptor would reduce the impact to less than significant.

TABLE 3.10-16
MAXIMUM COMBINED CONSTRUCTION NOISE LEVELS L_{EQ}

		Nearest Off-Site Sensitive Receptor
Construction Activity Phase	**Distance in Feet from Construction Activity to Sensitive Receptor**	**R1 – Single-Family Residence west of (G-3) by 910 East Warner Avenue**
Conveyance Pipelines	25 to 200 feet	**86**
Maximum Combined Noise from Overlapping Project Phases dBA L_{eq}[a]	25 to 200 feet	**94**
Exceeds 80 dBA L_{eq} Threshold?		**Yes**

SOURCE: ESA 2024

NOTES: Calculations performed with the FHWA RCNM software.

a. Combined noise from overlapping phases assumes overlapping construction activities for extraction facilities and monitoring wells, groundwater treatment plants, and conveyance pipelines.

Construction would generate vehicle trips from construction workers commuting to the work sites and truck trips for hauling debris, soil, and construction materials and supplies. The number of construction workers would be relatively small and extensive excavation is not anticipated minimizing haul truck trips. Construction workers would typically not travel at the same times as haul trucks. Therefore, construction vehicle trip increases would not generate a doubling of traffic volumes and would not increase traffic noise level by 3 dBA. Thus, construction traffic noise would result in a less than significant impact.

If nighttime construction work is required for proposed Project facilities outside of the specified times of day in the County of Orange, City of Irvine, City of Santa Ana, or City of Tustin Noise Ordinances, the proposed Project applicant will obtain a temporary waiver or variance, as required.

Operation

Operation of the proposed Project would include periodic vehicle trips for maintenance and inspection to ensure the site and equipment are functioning properly. The operation of the conveyance pipelines would not generate operational noise. As a result, maintenance and inspection of facilities would result in a minimal increase in traffic trips and would not result in the doubling of traffic volumes. Therefore, operational vehicle trip increases would not generate a substantial increase in noise along local roadways and impacts would be less than significant.

Mitigation Measures

NOI-1: OCWD shall require the construction contractors to implement the following measures, as applicable, during construction of the proposed extraction facilities, monitoring wells and

conveyance pipelines are within 125 feet of a sensitive receptor and if construction of the groundwater treatment plants is within 150 feet of a sensitive receptor:

- Construction activities in the vicinity of noise-sensitive uses shall implement noise-reduction measures, as feasible, which may include, but are not limited to, one or more of the following, as applicable to the proposed Project:
  - Install temporary sound barriers for construction activities that occur adjacent to occupied noise-sensitive receptors.
  - Equip construction equipment with effective mufflers, sound-insulating hoods or enclosures, vibration dampers, and other Best Available Control Technology (BACT).
  - Limit non-essential idling of construction equipment to no more than five minutes per hour.
- OCWD shall designate a Noise Complaint Coordinator for the Project to be responsible for logging and responding to complaints regarding construction noise.

NOI-2: Prior to ground disturbance, OCWD shall prepare a construction schedule that phases the Project implementation to limit construction of multiple Project components from overlapping or occurring concurrently within 125 feet of sensitive receptors to avoid exceeding local noise thresholds.

Significance Determination

Less than Significant with Mitigation.

Groundborne Vibration and Noise

Impact 3.10-2: The proposed Project could generate excessive groundborne vibration or groundborne noise levels.

As described in Section 2.4, the proposed Project would include the construction of extraction facilities, monitoring wells, local groundwater treatment plants, and conveyance pipelines. The exact number and location of the extraction wells and/or trenches/drains will be determined during the Remedy Design phase after further detailed hydrogeologic investigations are performed along each proposed extraction alignment and land availability evaluations are conducted, see Section 2.5.1. However, the extraction alignments will be within the eight treatment facility locations G-1 through G-8 (Figure 2-5).

Typical activities that could generate groundborne vibration impacts during construction include demolition and drilling or excavation in proximity to structures. Work activity will primarily be during daylight hours, however, there may be a need for night work in some cases to accommodate local encroachment permit requirements.

Extraction Facilities and Monitoring Wells

The proposed well and/or associated trench construction is anticipated to be approximately 10 to15 days but would not exceed greater than 60 days. The construction equipment required to develop and install a

well includes but is not limited to a truck mounted drill rig or direct-push drilling equipment, backhoe/track hoe, dump truck, air compressors, pumps, concrete saws, and welders. The FTA Transit Noise and Vibration Impact Assessment Manual (FTA 2018) provides vibration levels for vibration-generating equipment. Vibration levels for equipment that could be used for the proposed Project are shown in **Table 3.10-17**. As shown, the use of heavy equipment during construction would generate vibration levels of up to 0.089 in/sec PPV or 87 VdB (drilling) at a representative distance of 25 feet. Vibration levels would be reduced as the distance from the vibration-generating equipment increases. Table 3.10-17 also shows vibration levels at representative distances of 50 feet, 100 feet, and 200 feet.

TABLE 3.10-17
VIBRATION VELOCITIES FOR CONSTRUCTION EQUIPMENT

	25 Feet		50 Feet		100 Feet		200 Feet	
Construction Equipment	**Inches per Second PPV**	**RMS (VdB)**	**Inches per Second PPV**	**RMS (VdB)**	**Inches per Second PPV**	**RMS (VdB)**	**Inches per Second PPV**	**RMS (VdB)**
Vibratory Roller (potentially for conveyance pipelines)	0.210	94	0.074	85	0.026	76	0.009	67
Drilling Rig	0.089	87	0.031	78	0.011	69	0.004	60
Large Bulldozer	0.089	87	0.031	78	0.011	69	0.004	60
Loaded Trucks	0.076	86	0.027	77	0.010	68	0.003	59
Jackhammer	0.035	79	0.012	70	0.004	61	0.002	52
Small Bulldozer	0.003	58	0.001	49	< 0.001	40	< 0.001	31

SOURCE: FTA 2018

NOTE: Vibration levels are calculated from the reference distance of 25 feet and assumes competent soils, which are most sands, sandy clays, silty clays, gravel, silts, and weathered rock (can dig with a shovel).

Construction of the extraction facilities and monitoring wells would occur along the extraction alignments depicted in Figure 2-5 within and adjacent to various land uses throughout the unincorporated areas of Orange County and the cities of Irvine, Santa Ana, and Tustin. Within the vicinity of the alignments, land uses include Residential Industrial/Flex-Medium, Industrial/Flex-Low, District Center-Medium, and District Center-Low land uses, which are not vibration-sensitive uses. As shown in Table 3.10-17, the vibration level of up to 0.089 in/sec PPV at 25 feet would not exceed the thresholds for potential vibration architectural damage impacts of 0.5 in/sec PPV for reinforced-concrete, steel or timber (no plaster) buildings or 0.3 in/sec PPV for engineered concrete and masonry (no plaster) buildings. Thus, groundborne vibration and groundborne noise impacts from construction of the extraction facilities and monitoring wells along the alignments consisting of Residential, Industrial/Flex-Medium, Industrial/Flex-Low, District Center-Medium, and District Center-Low land uses would be less than significant.

As described in Impact 3.10-1 above, each of the alignments have a mixture of either residential (G-3 and G-7) or schools and hotels (G-1, G-2, G-4, G-5, G-6, and G-8) within the vicinity of the alignments. As shown in Table 3.10-17, the vibration level of up to 0.089 in/sec PPV at 25 feet would not exceed the thresholds for potential vibration architectural damage impacts of 0.2 in/sec PPV for non-engineered timber and masonry buildings (e.g., typical residential homes), and 0.12 in/sec PPV for buildings extremely susceptible to vibration damage (e.g., fragile historic buildings). Thus, groundborne vibration and groundborne noise impacts for potential vibration architectural damage from construction of the extraction facilities and monitoring wells would be less than significant. However, the vibration level of

up to 87 VdB at 25 feet would exceed the threshold of potential human annoyance impacts of 78 VdB. Vibration levels would be reduced to 78 VdB at 50 feet. Thus, groundborne vibration and groundborne noise impacts for potential vibration human annoyance from construction of the extraction facilities and monitoring wells would be potentially significant if vibration-generating construction activities occur within 50 feet of vibration sensitive uses. However, with the implementation of **Mitigation Measure NOI-3**, vibration impacts would be less than significant.

Local Groundwater Treatment Plants

The proposed groundwater treatment plants would be located within and adjacent to various land uses throughout the unincorporated areas of Orange County and the cities of Irvine, Santa Ana, and Tustin and would be constructed within or near the Alignments as described above. The construction equipment required to develop and install a groundwater treatment plant includes but is not limited to a backhoe/ track hoe, dump truck, air compressors, pumps, concrete saws, and welders. As shown in Table 3.10-17, the vibration level of up to 0.089 in/sec PPV at 25 feet would not exceed the thresholds for potential vibration architectural damage impacts of 0.5 in/sec PPV for reinforced-concrete, steel or timber (no plaster) buildings or 0.3 in/sec PPV for engineered concrete and masonry (no plaster) buildings. Thus, groundborne vibration and groundborne noise impacts from construction of the extraction facilities and monitoring wells along the alignments consisting of Residential, Industrial/Flex-Medium, Industrial/Flex-Low, District Center-Medium, and District Center-Low land uses would be less than significant.

As described in Impact 3.10-1 above, each of the alignments have a mixture of either residential (G-3 and G-7) or schools and hotels (G-1, G-2, G-4, G-5, G-6, and G-8) within the vicinity of the alignments. As shown in Table 3.10-17, the vibration level of up to 0.089 in/sec PPV at 25 feet would not exceed the thresholds for potential vibration architectural damage impacts of 0.2 in/sec PPV for non-engineered timber and masonry buildings (e.g., typical residential homes), and 0.12 in/sec PPV for buildings extremely susceptible to vibration damage (e.g., fragile historic buildings). Thus, groundborne vibration and groundborne noise impacts for potential vibration architectural damage from construction of the groundwater treatment plants would be less than significant. However, the vibration level of up to 87 VdB at 25 feet would exceed the threshold of potential human annoyance impacts of 78 VdB. Vibration levels would be reduced to 78 VdB at 50 feet. Thus, groundborne vibration and groundborne noise impacts for potential vibration human annoyance from construction of the groundwater treatment plants would be potentially significant if vibration-generating construction activities occur within 50 feet of vibration sensitive uses and mitigation measures are provided. With implementation of **Mitigation Measure NOI-3**, impacts would be reduced to less than significant.

Conveyance Pipelines

The proposed conveyance pipelines would be located within and adjacent to various land uses throughout the unincorporated areas of Orange County and the cities of Irvine, Santa Ana, and Tustin and would be installed between the newly installed groundwater extraction facilities and the existing sewer and would primarily be underground with some piping occurring above ground at the entry points to the treatment plants. Pipelines would be installed primarily within existing roadway rights-of-way to the extent feasible. The construction equipment required to install the conveyance pipelines would include but is not limited to excavator, backhoe/track hoe, dump truck, paving equipment, rollers, and concrete saws.

As shown in Table 3.10-17, the vibration level of up to 0.210 in/sec PPV at 25 feet would occur if vibratory rollers are used or up to 0.076 in/sec PPV at 25 feet would occur if vibratory rollers are not used, which would not exceed the thresholds for potential vibration architectural damage impacts of 0.5 in/sec PPV for reinforced-concrete, steel or timber (no plaster) buildings or 0.3 in/sec PPV for engineered concrete and masonry (no plaster) buildings. Thus, groundborne vibration and groundborne noise impacts from construction of the extraction facilities and monitoring wells along the Alignments consisting of Residential, Industrial/Flex-Medium, Industrial/Flex-Low, District Center-Medium, and District Center-Low land uses would be less than significant.

As described in Impact 3.10-1 above, each of the alignments have a mixture of either residential (G-3 and G-7) or schools and hotels (G-1, G-2, G-4, G-5, G-6, and G-8) within the vicinity of the alignments (see Figure 3.7-1) As shown in Table 3.10-17, the vibration level of up to 0.210 in/sec PPV at 25 feet if vibratory rollers are used would exceed the thresholds for potential vibration architectural damage impacts of 0.2 in/sec PPV for non-engineered timber and masonry buildings (e.g., typical residential homes), and 0.12 in/sec PPV for buildings extremely susceptible to vibration damage (e.g., fragile historic buildings). Vibration from a vibratory roller would be reduced to below 0.2 in/sec PPV at 26 feet and below 12 in/sec PPV at 37 feet. The vibration level of up to 0.076 in/sec PPV at 25 feet if vibratory rollers are not used would not exceed the thresholds for potential vibration architectural damage impacts of 0.2 in/sec PPV for non-engineered timber and masonry buildings (e.g., typical residential homes), and 0.12 in/sec PPV for buildings extremely susceptible to vibration damage (e.g., fragile historic buildings). The only historic built resources can be found in Alignment G-3. The sites are located at 1601 Warner Ave, Santa Ana and 2231 Ritchey St, Santa Ana. The remaining alignment do not have any built resources (Figures 4.3-1 and 4.3-2).

Thus, groundborne vibration and groundborne noise impacts for potential vibration architectural damage from construction of the conveyance pipelines would be potentially significant for vibratory rollers, but less than significant if vibratory rollers are not used. With implementation of Mitigation Measure NOI-3, impacts would be reduced to less than significant.

The vibration level of up to 94 VdB at 25 feet if vibratory rollers are used or 86 VdB at 25 feet if vibratory rollers are not used would exceed the threshold of potential human annoyance impacts of 78 VdB. Vibration levels would be reduced to below 78 VdB at 86 feet for a vibratory roller and at 50 feet for loaded trucks. Thus, groundborne vibration and groundborne noise impacts for potential vibration human annoyance from construction of the conveyance pipelines would be potentially significant if vibration-generating construction activities occur within 50 feet of vibration sensitive uses and mitigation measures are provided. With implementation of Mitigation Measure NOI-2, impacts would be reduced to less than significant.

Mitigation Measures

NOI-3: OCWD shall require the construction contractor to implement the following measures, as applicable, during construction of proposed facilities that are required to use vibration-generating equipment:

- Sensitive receptors (residences, residential areas, schools, hotels and hospitals) within 100 feet of proposed Project construction activities shall be identified and notified prior to

initiation of vibration-generating construction activity. Sensitive receptors are defined as residences, schools, hotels, hospitals, and other uses that are sensitive to loud noise. Structures are defined as historic buildings, older residential buildings, and buildings that are sensitive to high vibration levels.

- Limit the use of vibratory rollers:
  - Vibratory rollers at least 86 feet from human sensitive receptors and 26 feet from sensitive residential structures, and 37 feet from sensitive historic structures and buildings that are sensitive to high vibration levels.
  - If vibratory rollers must be used within 86 feet from human sensitive receptors, limit the use within 86 feet to daytime hours as defined in the applicable ordinance of the County of Orange, City of Irvine, City of Santa Ana, or City of Tustin.
  - If vibratory rollers must be used within 26 feet from sensitive residential structures and 37 feet from sensitive historic structures and buildings that are sensitive to high vibration level as identified on Figures 3.4-1 and 3.4-2 of this draft PEIR, the construction contractor shall conduct crack surveys before paving to prevent potential architectural damage to nearby structures. The surveys shall be done by photographs, video tape, or visual inventory, and shall include inside as well as outside locations. All existing cracks in walls, floors, and driveways shall be documented with sufficient detail for comparison after construction to determine whether actual vibration damage occurred. A post-construction survey shall be conducted to document the condition of the surrounding buildings after the construction is complete.
- Limit the use of other vibration-generating equipment:
  - If other vibration-generating equipment must be used within 50 feet from sensitive human receptors, limit the use within 50 feet to daytime hours as defined in the applicable ordinance of the County of Orange, City of Irvine, City of Santa Ana, or City of Tustin.

Significance Determination

Less than Significant with Mitigation.

Airport Noise

Impact 3.10-3: The proposed Project could expose people residing or working in the proposed Project Area to excessive noise levels in the vicinity of a private airstrip or an airport land use plan.

Extraction Facilities, Monitoring Wells, Local Groundwater Treatment Plants, and Conveyance Pipelines

John Wayne Airport is located approximately 1,100 feet to the south of the Project Area, just south of I-405. A narrow portion of the Project Area is located within the 70 and 65 dBA CNEL contour for John Wayne Airport (John Wayne Airport 2022) and generally consists of the portion bounded by Main

Street to the south, Deere Avenue to the north, Daimler Street to the west, and Red Hill Avenue and Sky Park Circle to the east.

Because the proposed Project, consists of the construction of extraction facilities and monitoring wells, groundwater treatment plants, and conveyance pipelines, the proposed Project would not generate an increase in population residing or working in the Project Area to be exposed to excessive noise levels. Temporary construction workers would comply with existing Occupational Safety and Health Administration regulatory requirements and best management practices for hearing protection as needed. Future employees would perform maintenance and inspection at the facility sites, which would be minimal and periodic, and therefore, employees would not be subjected to excessive noise levels from an airport or airstrip. Therefore, implementation of the proposed Project would not expose people to excessive airport noise levels, and impacts would be less than significant.

Mitigation Measures

None Required.

Significance Determination

Less than Significant Impact.

Cumulative Impacts

Impact 3.10-4: Concurrent construction and operation of the proposed Project and related projects in the geographic scope could result in cumulative short-term and long-term impacts to noise and vibration.

Extraction Facilities, Monitoring Wells, Local Groundwater Treatment Plants, and Conveyance Pipelines

The cumulative analysis for impacts to noise and vibration involves the projected growth of the Project Area. Future cumulative development projects are identified in Table 3-1 of Chapter 3, *Environmental Setting, Impact Analysis, and Mitigation Measures*, and include a variety of residential, commercial, and industrial development projects. Future cumulative development within the Project Area would require noise-and-vibration-generating activities during construction and operation. Significant environmental effects to noise and vibration could result during the construction of these facilities, especially for some of the large-scale projects. Vibration impacts are by nature site specific and would not combine to be cumulatively considerable. Noise emissions do not affect ambient noise levels in an additive nature, but may increase up to approximately 3 dBA when combined in one location. The proposed Project's contribution to local noise levels in combination with other projects' noise emissions could result in increases in ambient noise levels during construction activities at certain locations. Implementation of Mitigation Measures NOI-1 and NOI-2 would minimize the proposed Project's contribution to cumulative noise impacts. Nonetheless, as the exact locations and construction schedule of the proposed Project components are not known at this time, even with implementation of noise mitigation, the proposed Project could potentially contribute to cumulative noise in excess of significance thresholds. As a result, cumulative noise emissions would be cumulatively considerable and a significant cumulative noise impact would occur.

Implementation of Mitigation Measure NOI-3 would minimize the proposed Project's contribution to cumulative vibration impacts. As a result, cumulative vibration would not be cumulatively considerable and a less than significant cumulative vibration impact would occur.

Mitigation Measures

Mitigation Measure NOI-1 through NOI-3.

Significance Determination

Less than Significant with Mitigation (Cumulative Noise).

Less than Significant with Mitigation (Cumulative Vibration).

3.11 Transportation

This section addresses the transportation impacts associated with implementation of the proposed Project. This section includes a description of the existing transportation conditions in and around the Project Area; a summary of applicable regulations related to transportation; and an evaluation of the potential impacts of the proposed Project related to transportation at the Project Area and in the surrounding area, including cumulative impacts.

3.11.1 Environmental Setting

Regional Setting

Orange County's transportation system is composed of freeways, transportation corridors, and five main arterial highway classifications: principal, major, primary, secondary, and commuter, in addition to Smartstreets (County of Orange 2020). The transit system includes public transit systems, common bus carriers, AMTRAK (intercity rail service), Metrolink (commuter rail service), and other local agency transit and paratransit services. The Orange County transportation system includes bicycle facilities and scenic highways (County of Orange 2020). In addition, the County of Orange owns and operates John Wayne Airport, the only commercial service airport in Orange County, and the service area includes more than three million people within 34 cities and unincorporated areas of Orange County (John Wayne Airport 2024).

The City of Irvine's transportation system consists of four different types of systems, including air, road, public transit, and trails (City of Irvine 2015). The air system is comprised of general aviation and commercial flights from John Wayne Airport. The road system is comprised of arterial highways with different designations, including freeways, transportation corridors, expressways, major highways, primary highways, secondary highways, and commuter highways. The public transit system includes bus service Orange County Transportation Authority (OCTA), trains (Amtrak and Metrolink) on the Los Angeles to San Diego Railroad right of way, and other local agency transit services. The trail system includes a single equestrian trail and numerous biking and hiking trails.

The City of Santa Ana's transportation system consists of streets and highways, bikeways, transit services and corridors, commuter rail, and OC Streetcar (City of Santa Ana 2022).

The City of Tustin's transportation system consists of streets and highways, transportation corridors, transit and rapid transit, railroads, paratransit, bicycle and pedestrian facilities, and commercial, general, and miliary airports (City of Tustin 2018).

Regional Circulation System

Details about the interstate and state highways and other major roadways found within the Project Area are described below and shown on Figure 2-2:

- **CA-55** is a north–south California state freeway, bisecting the Project Area, that provides a direct north–south connection between Central Orange County and the coastal region. Within the Project Area, the CA-55 has five travel lanes in each direction.

- **I-5** is a north–south interstate highway, north of the Project Area, that runs through the cities of Irvine and Tustin and connects Orange County to Los Angeles County and San Diego County. In the vicinity of the Project Area, the I-5 has six travel lanes in each direction.
- **I-405** is a north–south interstate highway, south of the Project Area, that runs from Irvine, California to Sylmar, California. In the vicinity of the Project Area, the I-405 has six travel lanes in each direction.

Some of the proposed facilities would be constructed near the state highways or interstates and vehicles that may access the Project Area would use these major arterials.

Local Circulation System

The Project Area's local transportation system is comprised of several arterials. These arterials represent the major carrying capacity for traffic to and within the Project Area and are described in more detail below and shown on Figure 2-5:

- East Edinger Avenue is an east–west arterial that extends along the northern portion of the Project Area from South Main Street to Red Hill Avenue. This roadway has three travel lanes in each direction.
- Red Hill Avenue is a north–south arterial that extends along the eastern portion of the Project Area from Edinger Avenue to Barranca Parkway. This roadway has three to four travel lanes in each direction.
- Barranca Parkway is an east–west arterial that extends along the eastern portion of the Project Area from Red Hill Avenue to Von Karman Avenue. This roadway has three to four travel lanes in each direction.
- Von Karman Avenue is a north–south arterial that extends along the eastern portion of the Project Area from Barranca Parkway to Main Street. This roadway has two travel lanes in each direction.
- Main Street is a north–south arterial that extends along the west-southwestern portion of the Project Area from Edinger Avenue to Von Karman Avenue. This roadway has three travel lanes in each direction.
- Ritchey Street is a north–south arterial that runs through the Project Area from South Wright Street to East Saint Andrew Place. This roadway is located within one of the proposed extraction alignments and has one travel lane in each direction.
- East Warner Avenue is an east–west arterial that runs through the Project Area in between the CA-55 and Red Hill Avenue. This roadway is located within one of the proposed extraction alignments and has three travel lanes in each direction.
- South Grand Avenue is a north–south arterial that runs through the Project Area by East Warner Avenue. This roadway is located within one of the proposed extraction alignments and has three travel lanes in each direction.

- East Dyer Road is an east–west arterial that runs through the Project Area in between the CA-55 and Tech Center Drive. This roadway is located within one of the proposed extraction alignments and has three travel lanes in each direction.
- MacArthur Boulevard is an east–west arterial that runs through the Project Area in between MacArthur Place and Red Hill Avenue. This roadway is located within one of the proposed extraction alignments and has three travel lanes in each direction.

Public Transit System

OCTA is the county transportation planning commission and is responsible for funding and implementing transit and capital projects, programs, and services for all 34 cities within Orange County. This includes bus and rail transit, rideshare, environmental programs, active transportation, and express lanes and freeways. Transit services within the Project Area are provided by OCTA in the Cities of Irvine, Santa Ana, and Tustin. The Cities of Irvine, Santa Ana, and Tustin all work to coordinate with OCTA to support and enhance transit services. Paratransit services, or services for the mobility-impaired, are provided by OCTA's Dial-A-Ride for senior citizens and the disabled in the City of Tustin (City of Tustin 2018). In addition, Irvine CONNEXT provides free shuttle service for community members and The City of Irvine's iShuttle provides morning and evening shuttle service during peak hours (City of Irvine 2024).

Bicycle and Pedestrian Facilities

Pedestrian facilities within the Project Area include sidewalks, walkways, bridges, crosswalks, bikeways, and riding and hiking trails. The Orange County Bikeways Plan defines a network of local bikeways that interfaces with adjacent local and regional bike routes (County of Orange 2020).

Bikeways fall into one of three classes: Class I, a paved off-road facility which is physically separated from a roadway and designated primarily for bicycles (bicycle trail); Class II, a facility featuring a striped lane on the paved area of a road for preferential use by bicycles (bicycle lane); and Class III, a facility defined by green and white "Bike Route" guide signing (bicycle route) (County of Orange 2020). The Project Area contains multiple Class I, II, and III bikeways.

3.11.2 Regulatory Framework

State

California Department of Transportation (Caltrans)

Caltrans manages interregional transportation, including management and construction of the California highway system. In addition, Caltrans is responsible for permitting and regulation of the use of state roadways. Caltrans has jurisdiction over state highways and sets maximum load limits for trucks and safety requirements for oversized vehicles that operate on highways. Caltrans' construction practices require temporary traffic control planning "when the normal function of a roadway, or private road open to public travel, is suspended."

The Project Area includes interconnected interstates and California state routes managed by Caltrans that provide critical access to Orange County. As such, the following Caltrans regulations apply to potential transportation and traffic impacts associated with the proposed Project.

- California Vehicle Code (CVC), Division 15, Chapters 1 through 5 (Size, Weight, and Load). Includes regulations pertaining to licensing, size, weight, and load of vehicles operated on highways.
- California Street and Highway Code Sections 660–711. Caltrans encroachment regulations would apply to construction of the proposed Project components within and immediately adjacent to roadways, as well as the transportation of construction crews and construction equipment throughout the Project Area. Caltrans requires that permits be obtained for transportation of oversized loads, certain materials, and construction-related traffic disturbance.

Senate Bill No. 743

Approved in 2013, Senate Bill (SB) 743 amended the CEQA Guidelines to provide an alternative to level of service (LOS) for evaluating transportation impacts. In accordance with SB 743, the new CEQA Guidelines Section 15064.3(b) was adopted in December 2018 by the California Natural Resources Agency. These revisions to the CEQA Guidelines criteria for determining the significance of transportation impacts are primarily focused on projects within transit priority areas and shift the focus from automobile delay to reduction of greenhouse gas emissions, creation of multimodal networks, and promotion of a mix of land uses. Automobile delay, as measured by LOS and other similar metrics, generally no longer constitutes a significant environmental effect under CEQA. The intent of this legislation is to balance the need for traffic LOS standards with the need to build infill housing and mixed-use commercial developments within walking distance of mass transit facilities, downtowns, and town centers. In doing so, this legislation aims to provide greater flexibility to local governments to balance these sometimes-competing needs. However, a jurisdiction may still adopt LOS as a performance standard for analyzing traffic conditions and maintaining throughput on its highway system. The Governor's Office of Planning and Research (OPR) has adopted changes to the CEQA Guidelines that identify vehicle miles traveled (VMT) as the most appropriate metric to evaluate a project's transportation impacts. VMT is a measure of the total number of miles driven to or from a development and is sometimes expressed as an average per trip or per person.

Regional

Connect SoCal 2024 – The 2024–2050 Regional Transportation Plan/Sustainable Communities Strategy

On May 7, 2020, the Southern California Association of Governments (SCAG) adopted its 2024–2050 Regional Transportation Plan (RTP) known as Connect SoCal 2024. Connect SoCal 2024 is a long-range visioning plan that balances future mobility and housing needs with economic and environmental and goals. Connect SoCal 2024 embodies a collective vision for the region's future based on input from local governments, county transportation commissions (CTCs), tribal governments, non-profit organizations, businesses and local stakeholders within the counties of Imperial, Los Angeles, Orange, Riverside, San Bernardino and Ventura.

Connect SoCal 2024 is an important planning document for the region, allowing project sponsors to qualify for federal funding. In addition, Connect SoCal 2024 identifies a combination of transportation and land use strategies that help the region achieve state greenhouse gas emission reduction goals and federal Clean Air Act requirements, preserve open space areas, improve public health and roadway safety, and support the vital goods movement industry.

Local

County of Orange General Plan

Policy 2.1. Coordinate with the following transportation planning agencies Caltrans (State), OCTA, the Transportation Corridor Agencies (County corridor planning and construction) and Orange County cities on various studies relating to freeway, tollway and transportation corridor planning, construction, and improvement in order to facilitate the planning and implementation of an integrated circulation system.

Policy 6.3. Work with adjacent jurisdictions to cooperatively implement needed measures that would provide high occupancy vehicle lanes, emergency lanes or additional travel lanes, necessary channelization, and/or bicycle lanes whenever warranted and feasible.

City of Irvine General Plan

Policy B-1 (g). Coordinate with state, county and local agencies to plan and construct public utilities to prevent impact on complete or planned roadways.

City of Santa Ana General Plan

Policy M-1.10. Collaborate with federal, state, SCAG, OCTA, rail authorities, and other agencies to fund and improve the regional transportation system.

Policy M-3.4. Coordinate development of the City's active transportation and transit network with adjacent jurisdictions, OCTA, and other appropriate agencies.

City of Tustin General Plan

Policy 1.3. Coordinate roadway improvements with applicable regional, state and federal transportation plans and proposals.

Policy 2.1. Provide primary truck routes and describe such routes on selected arterial streets to minimize the impacts of truck traffic on residential areas.

3.11.3 Impact Analysis and Mitigation Measures

Thresholds of Significance

The following criteria from CEQA Guidelines Appendix G are used as thresholds of significance to determine the impacts of the proposed Project as related to transportation. The proposed Project would have a significant impact if it would:

1. Conflict with a program plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities.
2. Conflict or be inconsistent with CEQA Guidelines Section 15064.3(b).
3. Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment).
4. Result in inadequate emergency access.
5. Result in a cumulatively considerable impact to transportation.

Impact Analysis

Circulation System

Impact 3.11-1: The proposed Project could conflict with a program plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities.

As described in Section 2.4, the proposed Project would include the construction of extraction facilities, monitoring wells, local groundwater treatment plants, and conveyance pipelines. The exact number and location of the extraction wells and/or trenches/drains will be determined during the Remedy Design phase after further detailed hydrogeologic investigations are performed along each proposed extraction alignment and land availability evaluations are conducted, see Section 2.5.1. However, the extraction alignments will be within the eight treatment facility locations G-1 through G-8 (see Figure 2-5).

Extraction Facilities and Monitoring Wells

Construction of all extraction facilities and monitoring wells would generate vehicle trips associated with both construction worker commutes and material and equipment hauling. These increases in trips per day on local and regional roadways could affect roadway capacity and circulation; slower movements and larger turning radii of construction trucks compared to passenger vehicles could also lessen roadway capacities. Due to the temporary, localized nature of construction that is proposed for each facility, it is not anticipated that construction activities would have the potential to result in substantial amounts of vehicle trips generated on roadways in the Project Area compared to existing traffic amounts. Since there are numerous local and regional roadways within the Project Area that have adequate capacity to support temporary increases in construction traffic, additional construction vehicle traffic would not result in the long-term degradation of circulation system conditions at the Project Area. Impacts would be less than significant.

Once operational, the extraction facilities and monitoring wells would require periodic maintenance and inspection to ensure the site and equipment are functioning properly. Site inspections would survey the

grounds and exterior appearance. The well site would be below ground, and the extraction facilities would be equipped with a small submersible pump, thus any exercising of the active and standby electrical equipment, maintenance of the instrumentation and radio equipment, and performance testing would not be conducted at well sites. Operation of these facilities would not generate a noticeable number of vehicular trips that would affect traffic volume or circulation on local or regional roadways. Impacts to the existing circulation system, including public transit and bicycles, associated with operation of the proposed facilities would be less than significant.

Local Groundwater Treatment Plants

Construction of all groundwater treatment plants would generate vehicle trips associated with both construction worker commutes and material and equipment hauling. These increases in trips per day on local and regional roadways could affect roadway capacity and circulation; slower movements and larger turning radii of construction trucks compared to passenger vehicles could also lessen roadway capacities. Due to the temporary, localized nature of construction that is proposed for each treatment plant, it is not anticipated that construction activities would have the potential to result in substantial amounts of vehicle trips generated on roadways in the Project Area compared to existing traffic amounts.

The local groundwater treatment plants would be located within or near the well alignments, which may be in public and/or private property. The treatment system's footprint would be between approximately 10 feet by 10 feet and 50 feet by 50 feet. The proposed treatment plants would not involve any roadway improvements or alterations, thus additional construction vehicle traffic would not result in the long-term degradation of circulation system conditions at the Project Area. Impacts would be less than significant.

Once operational, the treatment systems would require periodic maintenance to include filter bag and cartridge replacements and granular activated carbon (GAC) replacement. However, operation of these facilities would not generate a noticeable number of vehicular trips that would affect traffic volume or circulation on local or regional roadways. Impacts to the existing circulation system, including public transit and bicycles, associated with operation of the proposed groundwater treatment plants would be less than significant.

Conveyance Pipelines

Construction of the conveyance pipelines would generate vehicle trips associated with both construction worker commutes and material and equipment hauling. These increases in trips per day on local and regional roadways could affect roadway capacity and circulation; slower movements and larger turning radii of construction trucks compared to passenger vehicles could also lessen roadway capacities. Construction methods would include open-trench installation and possibly horizontal directional drilling or micro tunneling to avoid construction through busy intersections. Construction of pipelines could impede traffic flow because a large portion of the proposed pipelines would be installed within rights-of-ways to the extent feasible and could temporarily require partial or complete road closures. Additionally, construction of some of the proposed pipelines could disrupt the existing bus routes within the Project Area due to construction activities within roadway rights-of-way, which may result in partial lane closures, roadway closures and delays. Furthermore, construction of the proposed conveyance pipelines could result in bike pathway and sidewalk closures in the Project Area. However, the cities of Santa Ana, Irvine, and Tustin all require encroachment permits with traffic control plans for projects that will require road closures or restrictions. The traffic control plan would provide traffic control, flagging, signage,

construction site truck egress and ingress, haul routes and would provide measures to minimize lane closures. As a result, impacts would be less than significant.

Operation of the proposed conveyance pipelines would require periodic maintenance to ensure the system is operating as planned. However, operation of the conveyance pipelines would not generate a noticeable number of vehicular trips that would affect traffic volume or circulation on local or regional roadways. Impacts to the existing circulation system, including public transit and bicycles, associated with operation of the proposed facilities would be less than significant.

Mitigation Measures

None Required.

Significance Determination

Less than Significant Impact.

Vehicle Miles Traveled

Impact 3.11-2: The proposed Project could conflict or be inconsistent with CEQA Guidelines section 15064.3, subdivision (b).

Extraction Facilities, Monitoring Wells, Local Groundwater Treatment Plants, and Conveyance Pipelines

CEQA Guidelines Section 15064.3(b) includes criteria for determining the significance of transportation impacts that are primarily focused on projects within transit priority areas and shifts the focus from driver delay to reduction of GHG emissions, creation of multimodal networks, and promotion of a mix of land uses. The Governor's OPR has published the Technical Advisory on Evaluating Transportation Impacts in CEQA, and the recommended significance criteria for the operation of new projects is to generate 15 percent less VMT per capita (or per employee) compared to existing conditions (OPR 2018). The Governor's OPR has not adopted specific VMT metrics or thresholds of significance for construction-related traffic. Many jurisdictions in Southern California consider construction-related traffic to cause adverse but not lasting intersection deficiencies because, while sometimes inconvenient, construction-related traffic efforts are temporary. Since construction of the proposed Project would generate temporary vehicle trips, and since OPR has not established construction-related VMT thresholds, the proposed Project would result in a less than significant impact with respect to construction-related VMT. Operation and maintenance of the proposed Project would require periodic maintenance and inspection; however, operation of these facilities would not generate a noticeable number of vehicular trips that would affect traffic volume. Further, CEQA Guidelines Section 15064.3 suggests that the analysis of VMT impacts applies mainly to land use and transportation projects. Furthermore, projects that generate or attract fewer than 110 operational trips per day would generally be exempt from further consideration with respect to VMT and impacts are assumed to be less than significant. Per this guidance, since the proposed Project is neither a traffic generating land use nor a transportation project, and will generate very few operational trips, the proposed Project can be assumed to have a less than significant impact with respect to VMT. Impacts would be less than significant.

Mitigation Measures

None Required.

Significance Determination

Less than Significant Impact.

Traffic Hazards

Impact 3.11-3: The proposed Project could substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment).

Extraction Facilities, Monitoring Wells, Local Groundwater Treatment Plants, and Conveyance Pipelines

The proposed Project would not involve any roadway improvements or alterations and would thus not increase hazards due to a design feature like a sharp curve or dangerous intersections. The proposed Project would involve the hauling of heavy construction equipment. The use of oversize vehicles during construction could be an incompatible use and can create a hazard to the public by limiting motorist views on roadways by the obstruction of space. However, oversize loads associated with construction of the proposed Project would be required to comply with applicable California Vehicle Code and Caltrans requirements applicable to licensing, size, weight, load, and roadway encroachment of construction vehicles. Compliance with regulatory requirements to reduce hazards caused by incompatible roadway uses during construction would minimize the potential for hazards to other vehicles to less than significant levels. Once constructed, the extraction facilities, monitoring wells, and conveyance pipelines, would be located underground within public rights-of-way, where feasible. The groundwater treatment plants would be located within or near the well alignments, adjacent to public rights-of-way, where feasible. Operation and maintenance of the proposed Project would require periodic maintenance and inspection; however, operation of the wells and groundwater treatment plants would not generate a noticeable number of vehicular trips that would affect traffic volume and would not involve traffic hazards. Impacts would be less than significant.

Mitigation Measures

None Required.

Significance Determination

Less than Significant Impact.

Emergency Access

Impact 3.11-4: The proposed Project could result in inadequate emergency access.

Extraction Facilities, Monitoring Wells, Local Groundwater Treatment Plants, and Conveyance Pipelines

Fire protection, emergency medical services, and police services within the Project Area are provided by the Orange County Fire Authority, the Irvine Police Department, the Santa Ana Police Department, and

the Tustin Police Department. Construction of aboveground facilities adjacent to public rights-of-way would not disrupt emergency services. Depending upon the timing, location, and duration of construction activities, construction of the proposed conveyance pipelines could require lane closures which would result in delayed emergency vehicle response times or otherwise disrupt delivery of emergency services. However, the cities of Santa Ana, Irvine, and Tustin all require encroachment permits with traffic control plans for projects that will require road closures or restrictions. Traffic control plans would provide traffic control, flagging, signage, construction site truck egress and ingress, haul routes, and would provide measures to minimize lane closures, and would ensure that emergency vehicles could pass through the area if needed. As a result, impacts relative to emergency services would be less than significant.

Once constructed, the majority of the facilities, including extraction wells, monitoring wells, and conveyance pipelines, would be located underground within public rights-of-ways, which would consist of public roads and sidewalks. Local groundwater treatment plants would be located within or near the well alignments. Operation and maintenance of the proposed Project would not disrupt delivery of emergency services. Impacts would be less than significant.

Mitigation Measures

None Required.

Significance Determination

Less than Significant Impact.

Cumulative Impacts

Impact 3.11-5: Concurrent construction and operation of the proposed Project and related projects in the geographic scope could result in cumulative short-term and long-term impacts to transportation.

Extraction Facilities, Monitoring Wells, Local Groundwater Treatment Plants, and Conveyance Pipelines

This section presents an analysis of the cumulative effects of the proposed Project in combination with other approved, proposed, and reasonably foreseeable future development that could cause cumulatively considerable impacts (see Table 3-1, *Cumulative Projects*). The geographic scope of the analysis for cumulative transportation impacts is the transportation network serving the Project Area. Chapter 3, *Environmental Setting; Impact Analysis and Mitigation Measures*, describes the overall approach to the cumulative analysis. A full list of cumulative projects is provided in Table 3-1. The Project Area is urbanized with residential, commercial, and industrial development. As the area continues to develop, the addition of more residential, commercial, and industrial development is expected to increase traffic volumes on roadways within the Project Area. Constructing the proposed Project could result in intermittent and temporary traffic-related impacts in the cumulative context. Traffic impacts include temporary increases in traffic congestion and increased potential for traffic safety hazards. The proposed Project has the potential to contribute to potentially significant cumulative construction-related impacts as a result of (1) cumulative projects (such as land development projects) that generate increased traffic at the same time on the same roads as would the proposed Project, causing increased congestion and delays;

and (2) infrastructure projects in roads that would be used by proposed Project construction workers and trucks, which could delay project-generated vehicles past the work zones of those other projects.

The construction associated with the proposed Project would be constructed in the cities of Santa Ana, Tustin and Irvine. The proposed Project facilities, in combination with other current and planned projects would result in an increase in construction-related traffic levels, which would temporarily increase the levels of congestion on roadways in areas where a construction project would occur. However, each construction project would be subject to the applicable regulations (e.g., traffic control plans) established by their respective municipalities. Nonetheless, temporary increases in traffic would occur as a result of construction activities under the proposed Project along with other related project construction activities in the Cities. Where a related project is located in proximity to a proposed Project facility and is constructed concurrently with the proposed Project facility, the combined construction traffic levels could have a cumulative effect on nearby roadways. Thus, under circumstances where these simultaneous construction activities would occur in proximity to roads with existing congestion, the cumulative traffic impacts related to a substantial temporary or periodic increase in ambient traffic levels could be cumulatively considerable.

However, with implementation of traffic control plans for each cumulative project that has the potential to increase traffic, including circulation and detour plans, traffic control devices, and scheduling (to the extent feasible) truck trips outside of peak morning and evening commute hours the proposed Project's contribution to the cumulative impacts from construction would be minimal. Once constructed, no impacts to traffic would result. Therefore, the contribution of the proposed Project to cumulative traffic conditions is less than significant.

Mitigation Measures

None Required.

Significance Determination

Less than Significant Impact.

Intentionally Blank

3.12 Tribal Cultural Resources

This section addresses the tribal cultural resources impacts associated with implementation of the proposed Project. This section includes: a description of the existing tribal cultural resources in and around the Project Area; a summary of applicable regulations related to tribal cultural resources; and an evaluation of the potential impacts of the proposed Project related to tribal cultural resources at the Project Area and in the surrounding area, including cumulative impacts.

3.12.1 Environmental Setting

Ethnographic Setting

The Project Area is situated within territory occupied by the Juaneño and Gabrielino. Ethnographic information on these two groups is provided below.

Juaneño

The Juaneño spoke a language belonging to the Cupan group of the Tackic subfamily of the Uto-Aztecan language family. The Juaneño people were so called because of their association with Mission San Juan Capistrano, although some contemporary Juaneño identify themselves by the indigenous term *Acjachemen*. The Juaneño were linguistically and culturally related to the neighboring Luiseño (with whom they are often grouped) (Bean and Shipek 1978), Cahuilla, and Cupeño. Juaneño territory extended from just above Aliso Creek in the north to San Onofre Canyon in the south and inland from the Pacific Ocean to Santiago Peak and the ridges above Lake Elsinore (Bean and Shipek 1978).

The Juaneño lived in sedentary autonomous villages located in diverse ecological zones. Each settlement claimed specific fishing and collecting regions. Typically, villages were located in valley bottoms, along coastal strands and streams, and near mountain foothills. Villages were usually sheltered in coves or canyons, on the side of slopes near water and in good defensive spots. Trails, hunting sites, temporary hunting camps, quarry sites and ceremonial and gaming locations were communally owned, while houses, gardens, tools, ritual equipment, and ornamentation were owned by individuals or families (Bean and Shipek 1978). Most groups had fishing and gathering sites along the coast that they visited annually from January to March when inland supplies were scarce. October to November was acorn-gathering time, when most of the village would settle in the mountain oak groves. Houses were conical in form, partially subterranean, covered with thatch, reeds, brush, or bark. Sweathouses were round and earth covered. Each village was enclosed with a circular fence and had a communal ceremonial structure at the center.

Beginning with the Mission Period, Native Americans suffered severe depopulation and their traditional culture was radically altered. Nonetheless, Juaneño descendants still reside in the greater Los Angeles and Orange County areas and maintain an active interest in their heritage resources. The Juaneño Band of Mission Indians, *Acjachemen* Nation, is recognized by the State of California as a Native American tribe.

Gabrielino

The Project Area is also located in a region traditionally occupied by the Takic-speaking Gabrielino Indians and is evidenced by one of their villages, *Pasbengna*, having been documented in its vicinity (i.e., 5 miles to the north) and in proximity to City of Sana Ana. The term “Gabrielino” is a general term that

refers to those Native Americans who were administered by the Spanish at the Mission San Gabriel Arcángel. Prior to European colonization, the Gabrielino occupied a diverse area that included: the watersheds of the Los Angeles, San Gabriel, and Santa Ana rivers; the Los Angeles basin; and the islands of San Clemente, San Nicolas, and Santa Catalina (Kroeber 1925). Their neighbors included the Chumash and Tataviam to the north, the Juañeno to the south, and the Serrano and Cahuilla to the east. The Gabrielino are reported to have been second only to the Chumash in terms of population size and regional influence (Bean and Smith 1978). The Gabrielino language was part of the Takic branch of the Uto-Aztecan language family.

The Gabrielino Indians were hunter-gatherers and lived in permanent communities located near the presence of a stable food supply. Subsistence consisted of hunting, fishing, and gathering. Small terrestrial game was hunted with deadfalls, rabbit drives, and by burning undergrowth, while larger game such as deer were hunted using bows and arrows. Fish were taken by hook and line, nets, traps, spears, and poison (Bean and Smith 1978). The primary plant resources were the acorn, gathered in the fall and processed in mortars and pestles, and various seeds that were harvested in late spring and summer and ground with manos and metates. The seeds included chia and other sages, various grasses, and islay or holly-leafed cherry. Community populations generally ranged from 50 to 100 inhabitants, although larger settlements may have existed. The Gabrielino are estimated to have had a population numbering around 5,000 in the pre-contact period (Kroeber 1925).

The Late Prehistoric Period, spanning from approximately 1,500 years BP to the mission era, is the period associated with the florescence of the Gabrielino (Wallace 1955). Coming ashore near Malibu Lagoon or Mugu Lagoon in October of 1542, Juan Rodriguez Cabrillo was the first European to make contact with the Gabrielino Indians. The Gabrielino are reported to have been second only to their Chumash neighbors in terms of population size, regional influence, and degree of sedentism (Bean and Smith 1978). Coming ashore on Santa Catalina Island in October of 1542, Juan Rodriguez Cabrillo was the first European explorer to make contact with the Gabrielino; and, later the 1769 expedition of Gaspar de Portolá also passed through Gabrielino territory (Bean and Smith 1978, 540). Similar to the Juaneño, Gabrielino descendants also still reside in the greater Los Angeles and Orange County areas and maintain an active interest in their heritage resources.

Identification of Tribal Cultural Resources

Sacred Lands File Search

The 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. On February 20, 2024, the NAHC was contacted by ESA to request a search of the SLF. The NAHC responded on March 4, 2024, indicating the SLFS resulted in negative findings. The NAHC also provided a list of the following seventeen Tribal contacts who may also have information on tribal cultural resources within the Project Area:

- Christina Swindall Martinez, Secretary, Gabrieleno Band of Mission Indians - Kizh Nation
- Andrew Salas, Chairperson, Gabrieleno Band of Mission Indians - Kizh Nation
- Anthony Morales, Chairperson, Gabrieleno/Tongva San Gabriel Band of Mission Indians

- Sandonne Goad, Chairperson, Gabrielino /Tongva Nation
- Robert Dorame, Chairperson, Gabrielino Tongva Indians of California Tribal Council
- Christina Conley, Cultural Resource Administrator, Gabrielino Tongva Indians of California Tribal Council
- Charles Alvarez, Chairperson, Gabrielino-Tongva Tribe
- Sam Dunlap, Cultural Resource Director, Gabrielino-Tongva Tribe
- Joyce Perry, Cultural Resource Director, Juaneño Band of Mission Indians Acjachemen Nation - Belardes
- Heidi Lucero, Chairperson, THPO, Juaneño Band of Mission Indians Acjachemen Nation 84A
- Isaiah Vivanco, Chairperson, Soboba Band of Luiseno Indians
- Shasta Gaughen, Tribal Historic Preservation Officer, Pala Band of Mission Indians
- Alexis Wallick, Assistant THPO, Pala Band of Mission Indians
- Christopher Nejo, Legal Analyst/Researcher, Pala Band of Mission Indians
- Lovina Redner, Tribal Chair, Santa Rosa Band of Cahuilla Indians
- Isaiah Vivanco, Chairperson, Soboba Band of Luiseno Indians
- Joseph Ontiveros, Tribal Historic Preservation Officer, Soboba Band of Luiseno Indians
- Jessica Valdez, Cultural Resource Specialist, Soboba Band of Luiseno Indians

Assembly Bill 52 Tribal Consultation

The OCWD submitted notification and request to consult letters to four individuals and organizations on April 30, 2024, and May 6, 2024, pursuant to AB 52. In particular, AB 52 letters were sent via electronic mail to the following California Native American tribes and individuals:

- Gabrieleno Band of Mission Indians - Kizh Nation
- Anthony Morales, Chairperson, Gabrieleno/Tongva San Gabriel Band of Mission Indians
- Sandonne Goad, Chairperson, Gabrielino /Tongva Nation
- Joyce Perry, Cultural Resource Director, Juaneño Band of Mission Indians Acjachemen Nation - Belardes

None of the four individuals or organizations receiving AB 52 notification and request to consult letters from OCWD provided a response within the 30-day response period pursuant to PRC Section 21080.3.1(b)(1). A copy of the AB 52 notification and request to consult letter is included in **Appendix G** of this Draft EIR.

3.12.2 Regulatory Framework

State

Native American Heritage Commission

Public Resources Code (PRC) Section 5097.91 established the Native American Heritage Commission (NAHC), the duties of which include inventorying places of religious or social significance to Native Americans and identifying known graves and cemeteries of Native Americans on private lands. PRC Section 5097.98 specifies a protocol to be followed when the NAHC receives notification of a discovery of Native American human remains from a county coroner.

Assembly Bill 52 and Related Public Resources Code Sections

AB 52 was approved by California State Governor Edmund Gerry "Jerry" Brown, Jr. on September 25, 2014. The act amended California PRC Section 5097.94, and added PRC Sections 21073, 21074, 21080.3.1, 21080.3.2, 21082.3, 21083.09, 21084.2, and 21084.3.

The primary intent of AB 52 is to include California Native American Tribes early in the environmental review process and to establish a new category of resources related to Native Americans that require consideration under CEQA, known as tribal cultural resources. PRC Section 21074(a)(1) and (2) defines tribal cultural resources as "sites, features, places, cultural landscapes, sacred places, and objects with cultural value to a California Native American Tribe" that are either included or determined to be eligible for inclusion in the California Register or included in a local register of historical resources, or a resource that is determined to be a tribal cultural resource by a lead agency, in its discretion and supported by substantial evidence. On July 30, 2016, the California Natural Resources Agency adopted the final text for tribal cultural resources update to CEQA Guidelines Appendix G, which was approved by the Office of Administrative Law on September 27, 2016.

PRC Section 21080.3.1 requires that within 14 days of a lead agency determining that an application for a project is complete, or a decision by a public agency to undertake a project, the lead agency provide formal notification to the designated contact, or a tribal representative, of California Native American Tribes that are traditionally and culturally affiliated with the geographic area of the project (as defined in PRC Section 21073) and who have requested in writing to be informed by the lead agency (PRC Section 21080.3.1(b)). Tribes interested in consultation must respond in writing within 30 days from receipt of the lead agency's formal notification and the lead agency must begin consultation within 30 days of receiving the tribe's request for consultation (PRC Sections 21080.3.1(d) and 21080.3.1(e)).

PRC Section 21080.3.2(a) identifies the following as potential consultation discussion topics: the type of environmental review necessary; the significance of tribal cultural resources; the significance of the project's impacts on the tribal cultural resources; project alternatives or appropriate measures for preservation; and mitigation measures. Consultation is considered concluded when either: (1) the parties agree to measures to mitigate or avoid a significant effect, if a significant effect exists, on a tribal cultural resource; or (2) a party, acting in good faith and after reasonable effort, concludes that mutual agreement cannot be reached (PRC Section 21080.3.2(b)).

If a California Native American tribe has requested consultation pursuant to Section 21080.3.1 and has failed to provide comments to the lead agency, or otherwise failed to engage in the consultation process, or if the lead agency has complied with Section 21080.3.1(d) and the California Native American tribe has failed to request consultation within 30 days, the lead agency may certify an EIR or adopt an MND (PRC Section 21082.3(d)(2) and (3)).

PRC Section 21082.3(c)(1) states that any information, including, but not limited to, the location, description, and use of the tribal cultural resources, that is submitted by a California Native American tribe during the environmental review process shall not be included in the environmental document or otherwise disclosed by the lead agency or any other public agency to the public without the prior consent of the tribe that provided the information. If the lead agency publishes any information submitted by a California Native American tribe during the consultation or environmental review process, that information shall be published in a confidential appendix to the environmental document unless the tribe that provided the information consents, in writing, to the disclosure of some or all of the information to the public.

3.12.3 Impact Analysis and Mitigation Measures

Thresholds of Significance

The following criteria from CEQA Guidelines Appendix G are used as thresholds of significance to determine the impacts of the proposed Project as related to tribal cultural resources. The proposed Project would have a significant impact if it would:

1. 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:
   - 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).
   - 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 Resources Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.
2. Result in a cumulatively considerable impact to tribal cultural resources.

Methodology

The analysis is based on a SLF search conducted by the NAHC and the result of the AB 52 consultation process between the OCWD and Native American individuals and organizations.

Impact Analysis

Tribal Cultural Resources

Impact 3.12-1: The proposed Project could 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 either 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), or is 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 Resources Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.

Extraction Facilities, Monitoring Wells, Local Groundwater Treatment Plants, and Conveyance Pipelines

The Project would include the installation and operation of below ground groundwater extraction facilities, monitoring wells, local groundwater treatment facilities, and conveyance pipelines. The exact locations of the wells have not been identified, although they would approximately be within Alignments G-1 through G-8 with their depths not anticipated to exceed 130 feet bgs.

The locations of conveyance pipelines for the proposed Project have not been determined. However, it is anticipated that the main pipelines would be installed primarily within existing roadway rights-of-way to the extent feasible. Construction methods will include open trench installation and possibly horizontal directional drilling or micro tunneling to avoid construction through busy intersections. Trenches are anticipated to measure approximately 4 to 6 feet wide by 6 to 12 feet deep with excavation depths varying depending on the location of existing utilities

The Project Area is within the ethnographic territory of the Gabrielino (Tongva) and Juaneño (Acjachemen) Tribes and Gabrielino/Tongva villages are known to have been in the vicinity of the Project Area, with one in particular, *Pasbengna*, being in proximity to City of Sana Ana. ESA contacted the NAHC on February 20, 2024, requesting a SLF search be conducted for the Project Area. On March 4, 2024, NAHC informed ESA the SLF search yielded negative results. The OCWD submitted notification and request to consult letters via electronic mail to Native American individuals and organizations on April 30, 2024, and May 6, 2024, and received no responses to them by the end of the 30-day response period. Consequently, as a result of the NAHC SLF search and OCWD's AB 52 consultation efforts, no known tribal cultural resources were identified within the Project Area.

Ground disturbance during the construction of proposed Project Infrastructure could encounter and impact intact archaeological deposits that qualify as tribal cultural resources pursuant to PRC Section 21074(a)(1) and (2). Construction of extraction facilities and monitoring wells could potentially impact tribal cultural resources. Implementation of **Mitigation Measures TCR-1, TCR-2, and TCR-3** would reduce any impacts to tribal cultural resources to a less than significant level.

Mitigation Measures

The following mitigation measures are also required to address potentially significant impacts to tribal cultural resources during Project construction:

TCR-1: Native American Monitor. Prior to ground disturbance, the OCWD shall retain a Native American Monitor from the AB 52 Tribal Contact list. The Native American Monitor shall be present during the following construction activities that have the potential for encountering tribal cultural resources: demolition, pavement removal, clearing/grubbing, drilling/augering, potholing, grading, trenching, excavation, tree removal or other ground disturbing activity associated with the Project, whether on the Project Area or in connection with Project off-site improvements (collectively "ground disturbing activities"). Notwithstanding the foregoing, Native American monitoring shall not be required for any moving of soils after they have been initially disturbed or displaced by Project-related construction. The OCWD shall prepare a monitoring agreement with the Native American Monitor that outlines the roles and responsibilities of the Native American Monitor prior to ground disturbance.

Prior to commencement ground disturbing activities, a Tribal Cultural Resources Sensitivity Training session shall be held for those construction personnel who will be directly involved in the ground disturbing activities. The training session shall be carried out by the Native American Monitor and shall focus on how to identify tribal cultural resources that may be encountered during ground disturbing activities and the procedures to be followed in such an event. If construction crews are phased, additional trainings shall be conducted for new personnel. The OCWD, or their contractors, shall ensure new construction personnel are made available for and attend the training. The OCWD shall retain documentation demonstrating attendance. If the Native American Monitor is not present at the Project Area on any given workday, the ground disturbing activities may continue if the workers involved in such activities attended the training session.

Full-time monitoring may be reduced to part-time inspections, or ceased entirely, if determined appropriate by the Native American Monitor in the event there appears to be little to no potential for impacting tribal cultural resources. Native American monitoring shall conclude no later than conclusion of ground disturbing activities.

TCR-2: Monitoring Logs. The Native American Monitor shall complete daily monitoring logs that 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 Tribe. Monitor logs shall 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. Copies of monitor logs shall be provided to the OCWD upon written request to the Tribe. The OCWD shall not be deemed to be out of compliance with this measure if the Native American Monitor fails to complete or submit any such monitoring logs.

TCR-3: Discovery of Potential Tribal Cultural Resources. In the event of a discovery of potential tribal cultural resources at the Project Area, the Qualified Archaeologist identified in Mitigation Measure CUL-1 (after consultation with the Native American Monitor) shall have the authority to temporarily divert, redirect, or halt ground-disturbance activities to allow identification, evaluation, and potential recovery of such potential resources. After consulting with the Native American Monitor and OCWD, the Qualified Archaeologist shall establish an appropriate buffer area in accordance with industry standards, reasonable assumptions regarding the potential for additional discoveries in the vicinity, and safety considerations for those making an evaluation and potential recovery of the discovery. This buffer area shall be established around the find where ground-disturbing activities shall not be allowed to continue. Work shall be allowed to continue outside of the buffer area.

Within three (3) business days of such discovery, a meeting shall take place between the OCWD, the Qualified Archaeologist, and the Tribe to discuss the significance of the find and whether it qualifies as a tribal cultural resource pursuant to Public Resources Code Section 21074(a). If, as a result of the meeting and after consultation with the Tribe, OCWD determines, based on substantial evidence, that the resource is in fact a tribal cultural resource, the Qualified Archaeologist shall develop a reasonable and feasible treatment plan, with input from the Tribe as necessary, and with the concurrence of the OCWD. The treatment measures in the treatment plan shall be in compliance with any applicable federal, State, or local laws, rules or regulations. The treatment plan shall also include measures regarding the curation of the recovered resources.

The OCWD may recommence ground disturbance activities inside of the specified radius of the discovery site only after it has complied with all of the recommendations developed and approved pursuant to the process set forth in the above paragraphs.

The recovered Native American resources may be placed in the custody of the Tribe, who may choose to use them for their educational purposes or they may be curated at a public, non-profit institution with a research interest in the materials. If neither the Tribe nor an institution accepts the resources, they may be donated to a local school or historical society in the area for educational purposes.

Notwithstanding the above paragraph, any information determined to be confidential in nature by OCWD, shall be excluded from submission to the South Central Coastal Information Center or the general public under the applicable provisions of the California Public Records Act, California Public Resources Code Section 6254(r).

Significance Determination

Less than Significant with Mitigation.

Cumulative Impacts

The Project Area encompasses residential, commercial, and industrial developments in Santa Ana, Irvine, and Tustin which, together, constitutes the cumulative setting for tribal cultural resources. Moreover, the

extraction facilities, monitoring wells, groundwater treatment plants, and the conveyance pipeline components of the proposed Project are anticipated to be located within Alignments G-1 through G-8 of the Project Area. The area is within the ethnographic territory of the Gabrielino (Tongva) and Juaneño (Acjachemen) Tribes and Gabrielino/Tongva villages are known to have been in the vicinity of the Project Area, with one in particular, *Pasbengna*, being in proximity to City of Sana Ana. The nearest source of water was San Diego Creek which originates east of the proposed Project Area in the nearby Santa Ana Mountains and extends around its eastern boundary, before trending southwest and emptying into the constructed San Joaquin Marsh and Upper Newport Bay.

In addition to the proposed Project, there are 63 projects that have been taken into consideration when developing the cumulative context, although the context varies by resource type (See Chapter 3; Table 3-1). There are 42 cumulative projects in the City of Irvine 13 cumulative projects in the City of Santa Ana, one cumulative project in the City of Tustin, and an additional 7 cumulative projects within lands own and/or managed by OCWD which intersect the aforementioned three cities (see Chapter 3; Table 3-1). Several of these cumulative projects are located within the proposed Project Area and include residential, hotel, public works infrastructure, commercial development projects that are either proposed, approved, or currently under construction. All are considered in the project-level analysis above.

Impact 3.12-2: Concurrent construction and operation of the proposed Project and related projects in the geographic scope could result in cumulative short-term and long-term impacts to tribal cultural resources.

Extraction Facilities, Monitoring Wells, Local Groundwater Treatment Plants, and Conveyance Pipelines

Prior to mitigation, the proposed Project would have a potentially significant impact on tribal cultural resources even though there are no resources listed or determined eligible for listing, on the national, State, or local register of historical resources, and the OCWD determined that no resources were identified during AB 52 tribal consultation that are eligible for listing under the criteria in PRC Section 5024.1(c). This significant impact finding is due to the potential to encounter tribal cultural resources at depth during construction. This potential exists due to the Project Area being located in the general vicinity of the Gabrielino village of *Pasbengna* (located approximately 5 miles north of the Project area) and near San Diego Creek.

Accordingly, in light of the Project's mitigation measures, the Project's contribution to cumulative impacts regarding tribal cultural resources would not be cumulatively considerable and cumulative impacts would be less than significant.

Mitigation Measures

None Required.

Significance Determination

Less than Significant Impact.

Intentionally Blank

3.13 Utilities and Service Systems

This section addresses the utilities and service systems impacts associated with implementation of the proposed Project. This section includes: a description of the existing utilities and service systems in and around the Project Area; a summary of applicable regulations related to utilities and service systems; and an evaluation of the potential impacts of the proposed Project related to utilities and service systems at the Project Area and in the surrounding area, including cumulative impacts.

3.13.1 Environmental Setting

The proposed Project is located within the southeastern part of the Basin and includes an approximately 5.6-square-mile area in the cities of Santa Ana, Irvine, and Tustin (see Figure 2-2). The information below is focused on utility services in the Project Area within OCWD's service area boundary.

Water Supply

OCWD is a public agency that manages three Southern California water supplies, including the Santa Ana River, the Orange County Groundwater Basin, and the Groundwater Replenishment System (GWRS). OCWD manages the groundwater Basin which provides water to over 2.5 million residents in northern and central Orange County, including the cities of Irvine, Santa Ana, Tustin, and more within the District boundary (see Figure 2-3). OCWD owns and manages a 6-mile stretch of the river, which is used to replenish the groundwater basin. The groundwater basin contains approximately 500,000 acre-feet (AF) of usable storage water and provides approximately 85 percent of the water supply to Orange County residents. The GWRS is a joint project between the OCWD and Orange County Sanitation District (OC San) that recycles and replaces the water that is pumped from wells, cities, and other groundwater uses by replenishing the underground aquifers.

In February 2023, OCWD submitted its Engineer's Report on the Groundwater Conditions, Water Supply and Basin Utilization in the Orange County Water District (OCWD 2023). The Engineer's Report has been used to inform existing water supply settings in this section. **Table 3.13-1** shows the existing and projected water demand in the OCWD service area taken from the Engineer's Report (OCWD 2023). Demand projections are based on projections provided by the retail water agencies within OCWD's service area.

As shown in Table 3.13-1, demand for both groundwater and recycled water is expected to increase through 2024. Total demands listed exclude any groundwater, supplemental water, and recycled water used by OCWD for groundwater recharge (OCWD 2023). According to the OCWD's 2023 Engineer's Report, populations within OCWD's service area is expected to increase from the current 2.43 million people to approximately 2.59 million people by the year 2035. The projected population growth is expected to increase water demands from 401,314 AF per year to 431,000 AF per year in 2050. In order to address and support increasing water demands, OCWD plans to increase basin production through the development of economically cost-effective local water supply projects (OCWD 2023).

TABLE 3.13-1
EXISTING AND PROJECTED WATER DEMANDS IN THE OCWD SERVICE AREA (AF)

Source	Groundwater	Imported Water	Santiago Creek Native Water	Recycled Water	Total
2021–22					
Non-Irrigation	256,165	119,693	2,037	—	383,567
Irrigation	756	0	—	22,663	23,425
Total	***256,921***	***119,693***	***2,037***	***22,663***	***401,314***
2022–23					
Non-Irrigation	262,200	112,800	2,200	—	377,200
Irrigation	800	—	—	23,000	23,800
Total	***263,000***	***112,800***	***2,200***	***23,000***	***401,000***
2023–24					
Non-Irrigation	279,200	84,800	2,200	—	366,200
Irrigation	800	—	—	23,000	23,800
Total	***280,000***	***84,800***	***2,200***	***23,000***	***390,000***

SOURCE: OCWD 2023, Table 5

Wastewater

OC San provides wastewater collection, treatment, and recycling for approximately 2.6 million people in Orange County, within its 479-square-mile service area. OC San operates two wastewater treatment facilities with Plant No. 1 receiving an estimated average daily flow of 120 million gallons per day (MGD) and Plant No. 2 receiving 59 MGD for a total of 179 MGD. According to the OC San Strategic Alignment Annual Report published in 2023, the completion of the GWRS in partnership with OCWD has allowed OC San to recycle 100 percent of its reclaimable flow. OC San can provide over 170 million gallons of treated wastewater to the GWRS daily, which is purified through a three-step process through the completion of the GWRS Final Expansion Project (OC SAN 2023) at the GWRS Advanced Water Purification as shown in Figure 2-1.

Stormwater

The proposed Project is located within the jurisdiction of the Orange County Flood Control District (OCFCD). Flood control is provided by a system of levees, canals, and pump stations. All stormwater runoff is transported by gravity through a system of drainage lines and canals into various pump stations, which is then pumped to a higher elevation into larger levees or the ocean (OC Public Works 2024). OCWD owns and manages a 6-mile stretch of the Santa Ana River, which is a major component of the Basin's water supply. "T" and "L" levees are constructed in the river to increase percolation, while inflatable rubber dams, levees, and valves divert the stormwater capture to recharge facilities.

Solid Waste Management

The closest landfill to the Project Area in Orange County is the Frank R. Bowerman Landfill located at 11002 Bee Canyon Access Road in Irvine, approximately 7 miles from the proposed Project Area. The landfill has a remaining capacity of 205,000,000 cubic yards (cy) as of 2008 and is expected to operate

until 2053 (CalRecycle 2024a). The second closest landfill is the Olinda Alpha Landfill located at 1942 North Valencia Avenue in Brea, approximately 14 miles from the Project Area. The landfill has a remaining capacity of 17,500,000 cy as of 2020 and is expected to operate until 2036 (CalRecycle 2022b).

Electric Power

Southern California Edison (SCE) is the electricity provider for the Cities of Irvine, Santa Ana, and Tustin. SCE provides electricity services to more than 15 million people in a 50,000-square-mile area of central, coastal, and Southern California. In 2023, SCE reported an estimated 79,256 million kilowatt-hours (kWh) in energy sales. SCE obtains energy from its own generating plants and through contracts with energy producers and sellers (Edison International 2023).

Natural Gas

The Project Area is within the service area of Southern California Gas Company (SoCalGas), which is the principal distributor of natural gas in Southern California, serving residential, commercial, and industrial markets. SoCalGas serves approximately 21.8 million customers in more than 500 communities encompassing approximately 24,000 square miles throughout central and Southern California (SoCalGas 2024). Gas supply available to SoCalGas from California sources averaged approximately 2,435 million cubic feet per day or 2,508,050 million Btu (MMBtu) in 2020, the most recent year for which data are available. This equates to an annual average of 888,775 million cubic feet per year or 915,438,250 MMBtu per year (California Gas and Electric Utilities 2020).

Telecommunication

Most telecommunication services in Orange County and the Cities of Irvine, Santa Ana, and Tustin are delivered by private service providers, including AT&T, Spectrum, T-Mobile, Verizon, ViaSat, and Cox Communications.

3.13.2 Regulatory Framework

Federal

Resource Conservation and Recovery Act

The Resource Conservation and Recovery Act (RCRA) (40 CFR, Part 258 Subtitle D) establishes minimum location standards for citing municipal solid waste landfills. In addition, because California laws and regulations governing the approval of solid waste landfills meet the requirements of Subtitle D, the U.S. EPA has delegated the enforcement responsibility to the State of California.

State

California Integrated Waste Management Act of 1989

The California Integrated Waste Management Act of 1989 (Public Resources Code [PRC] Division 30) enacted through Assembly Bill (AB) 939 emphasized conservation of natural resources through reduction, recycling, and reuse of solid waste. AB 939 requires that all cities and counties divert 25 percent of solid waste streams from landfills by 1995 and 50 percent by 2000. In accordance with AB 939, each local

agency must submit an annual report to the California Integrated Waste Management Board summarizing its progress in diverting solid waste disposal.

Protection of Underground Infrastructure

The California Government Code Section 4216–4216.9 "Protection of Underground Infrastructure" requires an excavator to contact a regional notification center at least two days prior to excavation of any subsurface installations. Within the Project Area, any utility provider seeking to begin a project that could damage underground infrastructure must call Underground Service Alert of Southern California (DigAlert®). DigAlert® will notify the utilities that may have buried lines within 1,000 feet of the project. Representatives of the utilities are then notified and are required to mark the specific location of their facilities within the work area prior to the start of project activities in the area.

Assembly Bill 341

Since the passage of AB 939 in 1989, State diversion rates are now equivalent to 65 percent, the statewide recycling rate is 50 percent, and the beverage container recycling rate is 80 percent. With the passage of AB 341 (Chesbro, Chapter 476, Statutes of 2011), the Governor and the Legislature established a policy goal for the State that a minimum of 75 percent of solid waste must be reduced, recycled, or composted by the year 2020. The State provided strategies to achieve that 75 percent goal:

1. Moving organics out of the landfill
2. Expanding the recycling/manufacturing infrastructure
3. Exploring new approaches for state and local funding of sustainable waste management programs
4. Promoting state procurement of post-consumer recycled content products
5. Promoting extended producer responsibility

To achieve these strategies, the State recommended legislative and regulatory changes including mandatory organics recycling, solid waste facility inspections, and revising packaging. With regard to construction and demolition, the State recommended an expansion of California Green Building Code standards that incentivize green building practices and increase diversion of recoverable construction and demolition materials. Current standards require 50 percent waste diversion on construction and some renovation projects, although this may be raised to 65 percent for nonresidential construction in upcoming changes to the standards. The State also recommends promotion of the recovery of construction and demolition materials suitable for reuse, compost or anaerobic digestion before residual wastes are considered for energy recovery (CalRecycle 2017c).

2008 California Energy Action Plan II

The California Energy Commission (CEC) prepared the California Energy Action Plan Update in February 2008, and it serves as the state's principal energy planning and policy document (CEC 2008). The plan identifies state-wide energy goals, describes a coordinated implementation plan for state energy policies, and identifies specific action areas to ensure that California's energy is adequate, affordable, technologically advanced, and environmentally sound. In accordance with this plan, the first priority actions to address California's increasing energy demands are energy efficiency and demand response (i.e., reduction of customer energy usage during peak periods in order to address system reliability and

support the best use of energy infrastructure). Additional priorities include the use of renewable sources of power and distributed generation (i.e., the use of relatively small power plants near or at centers of high demand). To the extent that these actions are unable to satisfy the increasing energy and capacity needs, clean and efficient fossil-fired generation is supported.

The State of California adopted standards to increase the percentage of electricity that retail sellers, including investor-owned utilities and community choice aggregators, must provide from renewable resources. The standards are referred to as the Renewables Portfolio Standards (RPS). The legislation requires utilities to increase the percentage of electricity obtained from renewable sources to 33 percent by 2020 and 50 percent by 2030. On September 10, 2018, Governor Jerry Brown signed SB 100, which further increased the California RPS and requires retail sellers and local publicly owned electric utilities to procure eligible renewable electricity for 44 percent of retail sales by December 31, 2024; 52 percent by December 31, 2027; and 60 percent by December 31, 2030.

Renewables Portfolio Standard

The California RPS was established in 2002 and required retail sellers of electricity, including investor-owned utilities and community choice aggregators, to provide at least 20 percent of their supply from renewable sources by 2013. California Senate Bill 350 (Chapter 547, Statues of 2015) is the most recent update to the state's RPS requirements. The RPS requires publicly owned utilities and retail sellers of electricity in California to procure 33 percent of their electricity sales from eligible renewable sources by 2020 and 50 percent by the end of 2030.

California Water Code Section 13260

California Water Code Section 13260 requires any person who discharges waste, other than into a community sewer system, or proposes to discharge waste that could affect the quality of waters of the State to submit a report of waste discharge to the applicable Regional Water Quality Control Board (RWQCB). Any actions of the proposed Project that would be applicable under California Water Code Section 13260 would be reported to the Santa Ana RWQCB.

California Urban Water Management Planning Act

Section 10610 of the California Water Code establishes the Urban Water Management Planning Act. The act states that every urban water service provider that serves 3,000 or more customers or that supplies over 3,000 AF of water annually should prepare an Urban Water Management Plan (UWMP) every 5 years. The goal of a UWMP is to ensure the appropriate level of reliability in its water service sufficient to meet the needs of its various categories of customers during normal, dry, and multiple dry years.

NPDES Construction General Permit

Construction associated with the proposed Project could disturb more than 1 acre of land surface for centralized and regional structural best management practices (BMPs) (and possibly for those distributed structural BMPs larger than 1 acre), affecting the quality of stormwater discharges into waters of the United States. If the proposed Project exceeds the 1-acre threshold for ground disturbance, the proposed Project would be subject to the National Pollutant Discharge Elimination System (NPDES) General Permit for Stormwater Discharges Associated with Construction and Land Disturbance Activities (Order 2022-0057-DWQ, NPDES No. CAS000002, Construction General Permit [CGP]). The CGP

regulates discharges of pollutants in stormwater associated with construction activity to waters of the United States from construction sites that disturb 1 acre or more of land surface, or that are part of a common plan of development or sale that disturbs more than 1 acre of land surface.

The CGP requires the development and implementation of a Stormwater Pollution Prevention Plan (SWPPP) that includes specific BMPs designed to prevent pollutants from contacting stormwater and keep all products of erosion from moving off-site into receiving waters. The SWPPP BMPs are intended to protect surface water quality by preventing the off-site migration of eroded soil and construction-related pollutants from the construction area. The CGP and SWPPPs are described in more detail in Section 3.8, *Hydrology and Water Quality*.

California Green Building Code Section 5.408

5.408.1 Construction waste diversion. Recycle and/or salvage for reuse a minimum of 65 percent of the nonhazardous construction and demolition waste in accordance with Section 5.408.1.1, 5.408.1.2, or 5.408.1.3; or meet a local construction and demolition waste management ordinance, whichever is more stringent.

> *5.408.1.1 Construction waste management plan. Where a local jurisdiction does not have a construction and demolition waste management ordinance that is more stringent, submit a construction waste management plan that: 1. Identifies the construction and demolition waste materials to be diverted from disposal by efficient usage, recycling, reuse on the project or salvage for future use or sale. 2. Indicates if construction and demolition waste materials will be sorted on-site (source separated) or bulk mixed (single stream). 3. Identifies diversion facilities where construction and demolition waste material collected will be taken. 4. Specifies that the amount of construction waste and demolition materials diverted shall be calculated by weight or volume, but not by both.*

Regional

Orange County California Green Building Code Integration

Orange County adopted the State of California Green Building Code Requirements (known as "CALGreen") that took effect January 1, 2011, which sets forth recycling requirements for construction and demolition projects in Orange County. The provisions of the Code apply to any project that requires a construction permit, demolition permit, and/or grading permit. According to the Code, non-residential construction projects consisting of commercial, industrial, or retail structures, irrespective of the square footage, must recycle a minimum of 65 percent of the debris generated by weight, which would apply to the proposed Project. The County requires the completion of a waste management plan to be submitted at plan check and compliance with the Orange County Mandatory Construction and Demolition Recycling Policy and Program.

3.13.3 Impact Analysis and Mitigation Measures

Thresholds of Significance

The following criteria from CEQA Guidelines Appendix G are used as thresholds of significance to determine the impacts of the proposed Project as related to utilities and service systems. The proposed Project would have a significant impact if it would:

- 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.
- Have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years.
- 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.
- 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.
- Comply with federal, state, and local management and reduction statutes and regulations related to solid waste.
- Result in a cumulatively considerable impact to utilities and service systems.

Impact Analysis

Relocation of Utilities

Impact 3.13-1: The proposed Project could 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.

As described in Section 2.4, the proposed Project would include the construction of extraction facilities, monitoring wells, local groundwater treatment plants, and conveyance pipelines. The exact number and location of the extraction wells and/or trenches/drains will be determined during the Remedy Design phase after further detailed hydrogeologic investigations are performed along each proposed extraction alignment and land availability evaluations are conducted, see Section 2.5.1. However, the extraction alignments will be within the eight treatment facility locations G-1 through G-8 (see Figure 2-5).

Extraction Facilities and Monitoring Wells

Prior to mobilization of drilling and trenching equipment, an underground service alert would be conducted to mark the approximate location of buried utilities adjacent to each location. Additionally, the contractor would conduct an air knife utility clearance at each borehole location before drilling starts. The air knife clearance would be completed to the diameter of the borehole and to a maximum depth of ten feet.

In addition to the extraction facilities, monitoring wells would be constructed to monitor the groundwater levels and quality in the areas of the extraction facilities. The exact number and location of the monitoring wells are not currently known until further detailed hydrogeologic investigations are performed along each proposed extraction facilities alignment and land availability evaluations are conducted as determined during the Remedy Design Phase. Well locations would be selected based on monitoring and extraction needs and may be in public and/or private property. As part of the site selection process, the City would be consulted and would have final approval. The monitoring wells and extraction facilities would be developed utilizing a combination of line swabbing, bailing, and pumping to remove sediment and turbidity. Upon completion of development of the extraction wells, pumping would occur to obtain aquifer hydraulic characteristics such as hydraulic conductivity (permeability). Each extraction facility and monitoring well head would be contained in an above- or below-grade well cover or vault that is compatible with the surrounding land uses and remedy design.

Utilities with underground or overhead service lines that could be impacted by the proposed Project would include but would not be limited to OCWD, OC San, SoCal Gas, Orange County, City of Irvine, City of Santa Ana, City of Tustin, Southern California Edison, and other private utility service providers. In order to ensure that existing utilities are not impacted by construction of the proposed Project, OCWD would implement **Mitigation Measure UTIL-1** for all pipelines and wells, which would require an underground utilities search and coordination with utility providers operating within proposed construction impact areas during the design phase and prior to construction. With implementation of Mitigation Measure UTIL-1, impacts would be less than significant.

Operation of the proposed extraction facilities and monitoring wells would not result in the relocation of utilities. No new or expanded wastewater, stormwater, electric power, telecommunications or natural gas facilities are proposed during operation. No impact would occur.

Local Groundwater Treatment Plants

The proposed Project would include the construction of groundwater treatment plants. Each extraction facilities alignment would have one groundwater treatment plant located near the alignment, except for the alignment in the vicinity MacArthur Boulevard of which would have two treatment plants. Each system would be located within or near the respective alignment and would consist of a fenced concrete pad area for a cartridge or bag-filter to treat for sediment, a GAC vessel to treat for VOCs, instrumentation and control panels, power drop and panel, and a tie-in to local sewer lateral (estimated at 100 feet length). The treatment system's footprint would be between approximately 10 feet by 10 feet and 20 feet by 20 feet. Construction and operation of the proposed groundwater treatment plants would not result in the relocation of utilities. No new or expanded wastewater, stormwater, electric power, telecommunications or natural gas facilities are proposed during operation. No impact would occur.

Conveyance Pipelines

The proposed Project would include the construction of collection and discharge piping to collect and convey groundwater pumped from the extraction facilities to the local treatment facility and then to the sanitary sewer. Conveyance pipelines would primarily be underground with some piping occurring above ground at the entry points to the treatment plant. Construction methods would include open-trench installation and possibly horizontal directional drilling or micro tunneling to avoid construction through busy intersections. Excavation depths would vary depending on the location of existing utilities. Pipelines

would be installed primarily within existing roadway rights-of-way to the extent feasible. Utilities with underground or overhead service lines that could be impacted by the proposed Project would include but would not be limited to OCWD, OC San, SoCalGas, Orange County, City of Irvine, City of Santa Ana, City of Tustin, SCE, and other private utility service providers. In order to ensure that existing utilities are not impacted by construction of the proposed Project, OCWD would implement Mitigation Measure UTIL-1 for all pipelines and wells, which would require an underground utilities search and coordination with utility providers operating within proposed construction impact areas during the design phase and prior to construction. With implementation of Mitigation Measure UTIL-1, impacts would be less than significant.

Operation of the proposed conveyance pipelines would not result in the relocation of utilities. No new or expanded wastewater, stormwater, electric power, telecommunications or natural gas facilities are proposed during operation. No impact would occur.

Mitigation Measures

UTIL-1: Underground Utilities Search. During design and prior to construction of proposed Project wells and conveyance pipelines, the OCWD Project Manager shall ensure that an underground utilities search is conducted and coordinate with all utility providers that operate in the same public rights-of-way impacted by construction activities. OCWD shall ensure that any temporary disruption in utility service caused by construction is immediately identified and that any affected parties are notified.

Significance Determination

Less than Significant with Mitigation.

Water Supplies

Impact 3.13-2: The proposed Project could have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years.

Extraction Facilities, Monitoring Wells, Local Groundwater Treatment Plants, and Conveyance Pipelines

Construction of the proposed Project would require minimal water for dust control, concrete production, and cleanup activities. All water supplies required for construction would be supplied by on-site water trucks or existing water connections. Water demand during construction would not require new or expanded water supply resources. Impacts would be less than significant.

Operation of the proposed Project facilities would extract, treat, and discharge the treated water to the sanitary sewer system, where it would then mix with other wastewater flows to OC San's Plant No. 1. The extracted groundwater would undergo further treatment before flowing to the OCWD's GWRS to undergo its final advanced treatment before being recharged back into the Basin. The OCWD facilities would provide the infrastructure necessary to meet the projected growth and water demand of the service area. No additional water supply resources or entitlements are required for implementation of the proposed Project. Impacts would be less than significant.

Mitigation Measures

None Required.

Significance Determination

Less than Significant Impact.

Wastewater Treatment

Impact 3.13-3: The proposed Project could result in a determination by the wastewater treatment provider which serves or may serve the proposed Project that it has adequate capacity to serve the proposed Project's projected demand in addition to the provider's existing commitments.

Extraction Facilities, Monitoring Wells, Local Groundwater Treatment Plants, and Conveyance Pipelines

Construction associated with the proposed Project would generate minor wastewater from worker portable toilet use that would be collected by a permitted entity and disposed of at an appropriate location. Impacts would be less than significant. Construction is not expected to generate other forms of wastewater requiring treatment. The volume of wastewater would be negligible compared to the local wastewater treatment capacities, resulting in a less than significant impact. Construction activities would generate negligible to no storm water runoff.

Operation of the proposed facilities would generate several hundred gallons per minute of wastewater discharged to the sanitary sewer depending on how many wells are installed and are in operation. Once the groundwater is treated by the local groundwater treatment plants the water would be conveyed to OC San's Plant No.1 for further treatment.

Extraction Facilities, Monitoring Wells and Local Groundwater Treatment Plants

Any construction-derived fluids associated with the proposed extraction facilities and monitoring wells would be contained on-site during construction and development. During demobilization for each site, the contractor would dispose of all materials generated in accordance with all application laws and regulations. As a result, impacts would be less than significant.

Operation of the wells would involve extracting groundwater that would be treated by the local groundwater treatment plants. It is anticipated that total groundwater flow through each treatment system would range from 1 to 100 gallons per minute, with the total combined flow from all treatment systems of between 10 and 1,000 gallons per minute. Once the local treatment is completed the groundwater would be discharged to the sewer for additional treatment at OC San's Plant No. 1 prior to being conveyed to GWRS and recharged back into the groundwater aquifer as treated recycled water. The proposed Project's contribution to the sanitary sewer is currently unknown. The number of wells and discharge volumes would be determined during the Remedy Design Phase. Once the number of wells and the discharge volumes required to accomplish the Project objectives are determined, a Will Serve Letter would be required from OC San prior to operation of proposed Project. As a result, impacts would be less than significant.

Conveyance Pipelines

Construction of the conveyance pipelines may involve localized trench and pipeline dewatering that could generate minimal amounts of wastewater. The collected wastewater may require treatment prior to discharge as it may contain elevated levels of contaminants. The wastewater would then be discharged to the nearest sewer manhole or stormwater system if no manhole is available. This may require issuance of a dewatering permit from the Santa Ana RWQCB for discharges to the stormwater system. As a result, impacts would be reduced to a less than significant level.

Operation of the conveyance pipelines would not involve wastewater generation or treatment. As a result, no impact would occur.

Mitigation Measures

None Required.

Significance Determination

Less than Significant Impact.

Solid Waste

Impact 3.13-4: The proposed Project could 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.

Extraction Facilities, Monitoring Wells, Local Groundwater Treatment Plants, and Conveyance Pipelines

Construction of the proposed Project facilities would generate solid waste requiring disposal at a landfill or recycling facility. The Frank R. Bowerman Sanitary Landfill has a remaining capacity of 205,000,000 cy as of February 2008 and is expected to operate until 2053 (CalRecycle 2022a). The Olinda Alpha Landfill has a remaining capacity of 17,500,000 cy as of 2020 and is expected to operate until 2036 (CalRecycle 2022b). Therefore, both facilities would be able to accommodate solid waste generated by the proposed Project. Further, all construction activities for the proposed Project would be required to divert construction waste from landfills per CALGreen construction waste diversion requirements. Orange County requires preparation of a waste management plan to demonstrate compliance with these State diversion requirements. Therefore, impacts related to sufficient landfill capacity during construction would be less than significant.

During operation, maintenance activities associated with extraction facilities, monitoring wells and groundwater treatment plants would generate minimal solid waste. Existing landfills in the proposed Project vicinity are anticipated to be able to accommodate waste associated with proposed Project operation. Therefore, impacts related to sufficient landfill capacity during operation would be less than significant.

Mitigation Measures

None Required.

Significance Determination

Less than Significant Impact.

Solid Waste Regulations

Impact 3.13-5: The proposed Project could comply with federal, state, and local management and reduction statutes and regulations related to solid waste.

Extraction Facilities, Monitoring Wells, Local Groundwater Treatment Plants, and Conveyance Pipelines

The proposed Project facilities would comply with Section 5.408.1.1 of the 2019 CALGreen Code, which requires recycling of at least 65 percent of the waste generated during construction. Additionally, the proposed Project would comply with the Orange County Mandatory Construction and Demolition Recycling Policy and Program, which requires identification of the expected material types, locations for recycling of construction and demolition waste resulting from the proposed Project and demonstrates the actual quantity of construction and demolition waste recycled.

The proposed Project facilities would generate minimal amounts of solid waste associated with the changing out of the bag filters, GAC, and equipment during operation of the proposed Project. Therefore, the proposed Project would comply with all applicable solid waste regulations during construction and operation, and impacts would be less than significant.

Mitigation Measures

None Required.

Significance Determination

Less than Significant Impact.

Cumulative Impacts

Impact 3.13-6: Concurrent construction and operation of the proposed Project and related projects in the geographic scope could result in cumulative short-term and long-term impacts to utilities and service systems.

Extraction Facilities, Monitoring Wells, Local Groundwater Treatment Plants, and Conveyance Pipelines

This section presents an analysis of the cumulative effects of the proposed Project in combination with other approved, proposed, and reasonably foreseeable future development that could cause cumulatively considerable impacts (see Table 3-1, *Cumulative Projects*). This cumulative development within the Project Area is forecast to require or result in the construction of water, wastewater treatment, storm water drainage, electric power, natural gas, and telecommunications facilities, as well as expansion of existing facilities. Chapter 3, *Environmental Setting, Impact Analysis, and Mitigation Measures*, describes the overall approach to the cumulative analysis. A full list of cumulative projects is provided in Table 3-1. The Project Area is urbanized with residential, commercial, and industrial development. The cumulative

need for additional and expanded utility facilities could result in significant environmental effects during the construction of these facilities, especially for some of the large-scale residential and commercial projects already in the planning stages. Because the potential impacts to utility relocation associated with the implementation of the proposed Project would be less than significant with implementation of Mitigation Measure UTIL-1, the proposed Project's contribution to cumulative utility impacts would be less than cumulatively considerable. As a result, a less than significant cumulative utility and service system impact would occur.

Mitigation Measures

Implement Mitigation Measure UTIL-1.

Significance Determination

Less than Significant with Mitigation.

Intentionally Blank

CHAPTER 4
Alternatives Analysis

4.1 Introduction

This chapter presents the discussion and analysis of alternatives to the proposed South Basin Groundwater Protection Project (proposed Project) as required by the California Environmental Quality Act (CEQA). The proposed Project has been described and analyzed in the previous chapters of this Draft Program Environmental Impact Report (PEIR). This chapter's purpose is to describe and analyze a reasonable of range alternatives that could feasibly attain most of the basic objectives of the proposed Project while avoiding or substantially lessening any significant effects of the proposed Project. This chapter restates the proposed Project's objectives, summarizes the significant impacts associated with the proposed Project, and provides information pertaining to the development of potentially feasible alternatives. It then evaluates the impacts for each alternative and compares the impacts of the alternatives with those of the proposed Project. Based on this analysis, this chapter also identifies the environmentally superior alternative.

4.2 CEQA Requirements for Alternatives Analysis

CEQA does not prescribe fixed rules governing the type of alternatives to a project that should be analyzed in an EIR; the nature of alternatives varies depending on the context of the project being analyzed. As expressed by the California Supreme Court: "CEQA establishes no categorical legal imperative as to the scope of alternatives to be analyzed in an EIR. Each case must be evaluated on its facts, which in turn must be reviewed in light of the statutory purpose" (*Citizens of Goleta Valley v. Board of Supervisors* (1990) 52 Cal.3d 553, 564).

CEQA Guidelines Section 15126.6(a) provides that:

> *[a]n EIR shall describe a range of reasonable alternatives to the project, or to the location of the project, which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project, and evaluate the comparative merits of the alternatives. An EIR need not consider every conceivable alternative to a project. Rather it must consider a reasonable range of potentially feasible alternatives that will foster informed decision making and public participation. An EIR is not required to consider alternatives which are infeasible. The lead agency is responsible for selecting a range of project alternatives for examination and must publicly disclose its reasoning for selecting those alternatives. There is no ironclad rule governing the nature or scope of the alternatives to be discussed other than the rule of reason.*

Under these principles, an EIR needs to describe and evaluate only those alternatives necessary to permit a reasonable choice and "to foster meaningful public participation and informed decision making" (CEQA Guidelines Section 15126.6[f]). Consideration of alternatives focuses on those that can either eliminate significant adverse environmental impacts or substantially reduce them; alternatives considered in this context may include those that are more costly and those that could impede to some degree the attainment of the project objectives (CEQA Guidelines Section 15126.6[b]). CEQA does not require the alternatives to be evaluated at the same level of detail as the proposed project. Rather, the discussion of alternatives must include sufficient information about each alternative to allow "meaningful evaluation, analysis, and comparison with the proposed project" (CEQA Guidelines Section 15126.6[d]).

The range of alternatives required in an EIR is therefore governed by a "rule of reason" that requires an EIR to set forth only those alternatives necessary to permit a reasoned choice (CEQA Guidelines Section 15126.6[f]). An EIR need not consider every conceivable alternative to a project. Alternatives may be eliminated from detailed consideration in the EIR if they fail to meet most of the basic project objectives, are not feasible, or do not avoid or substantially lessen any significant environmental effects (CEQA Guidelines Section 15126.6[c]). Moreover, under CEQA, a lead agency may structure its alternatives analysis around a reasonable definition of a fundamental underlying purpose and need not study alternatives that cannot achieve that basic goal (*In re Bay-Delta Programmatic Environmental Impact Report Coordinated Proceedings* [2008] 43 Cal.4th 1143, 1165).

CEQA also requires that alternatives evaluated in an EIR be potentially feasible. Feasible is defined in CEQA as "capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, social, and technological factors" (PRC Section 21061.1). The CEQA Guidelines elaborate that factors that may be considered when addressing the feasibility of alternatives include site suitability, economic viability, availability of infrastructure, other plans or regulatory limitations, and jurisdictional boundaries and whether the proponent can reasonably acquire, control, or otherwise have access to the alternative site (CEQA Guidelines Section 15126.6[f]). Finally, alternatives should also avoid or substantially lessen one or more significant environmental impact that would occur under the proposed project.

In addition to the requirements described above, CEQA requires evaluation of the "No Project Alternative," which analyzes the environmental effects that would occur if the project were not to proceed (CEQA Guidelines Section 15126.6[e]). The purpose of describing and analyzing the No Project Alternative is to compare the impacts of approving the proposed project with the impacts of not approving the proposed project. An EIR is also required to identify the environmentally superior alternative. "If the environmentally superior alternative is the No Project Alternative, the EIR shall also identify an environmentally superior alternative among the other alternatives" (CEQA Guidelines Section 15126.6[e]).

4.2.1 Project Objectives

The primary objectives of the proposed Project are to:

- Protect groundwater resources from further degradation by preventing lateral and vertical migration of high concentration of chemicals of concern (COCs) into zones with lower concentrations of COCs within OU2;

- Protect groundwater resources by preventing the potential for vertical migration of high concentration COCs from the upper/middle portions of the Shallow Aquifer System to the Principal Aquifer System through Legacy Water Supply Wells;
- Protect groundwater resources from further degradation by preventing the spread of COCs exceeding maximum contaminant levels (MCLs) in the Leading-Edge areas of the plume;
- Implement a reliable interim groundwater remedy(s) that is compatible with ongoing and planned remediation at source sites and associated off-property locations, where applicable;
- Prevent discharge of COCs exceeding ecological risk-based concentrations from the Shallow Aquifer System to surface water channels; and
- Prevent human exposure to contaminated groundwater with COC concentrations exceeding MCLs.

4.2.2 Key Impacts of the Proposed Project

Chapter 3 of this Draft PEIR identifies potential impacts associated with the proposed Project for each environmental issue area carried through for analysis from CEQA Guidelines Appendix G. Chapter 3 also addresses the environmental issues that are not discussed in detail in this Draft PEIR because no significant impacts could occur as a result of implementation of the proposed Project. Chapter 5 addresses impacts related to growth-inducement. Mitigation measures were identified to reduce the impacts to a less than significant level. A summary of the significance of the greatest impacts for each environmental resource analyzed is presented below in **Table 4-1**. Specific impacts and all mitigation measures are provided in Table ES-1 in the Executive Summary of this Draft PEIR.

TABLE 4-1
SUMMARY OF PROJECT IMPACT ANALYSIS

Environmental Resource	Significance Determination
Aesthetics	LSM
Air Quality and Greenhouse Gases	LSM
Biological Resources	LSM
Cultural Resources	LSM
Energy	LTS
Geology and Soils	LSM
Hazards and Hazardous Materials	LTS
Hydrology and Water Quality	LTS
Land Use	LTS
Noise	LSM
Transportation	LTS
Tribal Cultural Resources	LSM
Utilities and Service Systems	LSM

ABBREVIATIONS: LTS = Less than Significant; LSM = Less than Significant with Mitigation; SU = Significant and Unavoidable

4.3 Summary of Project Alternatives

A Feasibility Study (FS) has been prepared for OCWD in support of the proposed Project to address groundwater contamination in Operable Unit 2 (OU2) in the south-central portion of the Basin (Appendix E). As described in Chapter 2, *Project Description*, OU2 has groundwater contamination in the Shallow Aquifer System off-property of numerous groundwater contamination source sites located within the Project Area (Figure 2-2) where groundwater contaminant plumes emanating from individual source sites have migrated and commingled. The FS provides detailed evaluation and comparative analysis of remedial alternatives that were developed in the Feasibility Study Initial Screening Evaluation (FSISE) and the Feasibility Study Detailed Evaluation (FSDE) to address groundwater contamination in OU2.

This chapter considers a total of three alternatives to the proposed Project, including the "no project" alternative and two other "treatment" alternatives that are evaluated herein.

Under the No Project Alternative, OCWD would not install extraction facilities and would not create extraction barriers to prevent the existing contamination plume from migrating within the Shallow Aquifer System. Two additional alternatives were selected, with the goal of identifying ways to reduce or avoid impacts that would result from implementation of the proposed Project (see **Table 4-1**).

Based on the alternatives evaluated in the FS and the objectives established for the proposed Project (set forth above), the following alternatives[31] are evaluated:

1. No Project Alternative
2. In-Situ Treatment of Relatively High Concentration and Leading-Edge Areas Using Chemical Oxidation (ISCO Alternative)
3. Groundwater Extraction and Treatment with Injection into the Basal Sand (GETS and Injection Alternative)

The following sections describe each alternative, discuss each alternative's ability to meet the objectives of the proposed Project (see summary in **Table 4-2**), and provide a comparative evaluation of environmental impacts. As provided in CEQA Guidelines Section 15126.6(d), the significant effects of these alternatives are identified in less detail than the analysis of the proposed Project in Chapter 4 of this Draft PEIR. The two treatment alternatives consider different treatment technologies and methods in an effort to show a reasonable range of alternatives to accomplish a reduction in significant impacts.

[31] The alternatives evaluated herein are identified in the FS as follows: No Project Alternative (FS Alternative 1), In-Situ Treatment of Relatively High Concentration and Leading-Edge Areas Using Chemical Oxidation (FS Alternative 5), GETS and Injection Alternative (FS Alternative 4)

TABLE 4-2
ABILITY OF ALTERNATIVES TO MEET PROJECT OBJECTIVES

Objective	Proposed Project	Alternative 1: No Project Alternative	Alternative 2: ISCO Alternative	Alternative 3: GETS and Injection Alternative
• Protect groundwater resources from further degradation by preventing lateral and vertical migration of high concentration of chemicals of concern (COCs) into zones with lower concentrations of COCs within OU2.	Yes	No	Yes	Yes
• Protect groundwater resources by preventing the potential for vertical migration of high concentration COCs from the upper/middle portions of the Shallow Aquifer System to the Principal Aquifer System through Legacy Water Supply Wells.	Yes	No	Yes	Yes
• Protect groundwater resources from further degradation by preventing the spread of COCs exceeding maximum contaminant levels (MCLs) in the Leading-Edge areas of the plume.	Yes	No	Yes	Yes
• Implement a reliable interim groundwater remedy(s) that is compatible with ongoing and planned remediation at source sites and associated off-property locations, where applicable.	Yes	No	Yes	Yes
• Prevent discharge of COCs exceeding ecological risk-based concentrations from the Shallow Aquifer System to surface water channels.	Yes	No	No (1)	Yes
• Prevent human exposure to contaminated groundwater with COC concentrations exceeding MCLs.	Yes	No	Yes	Yes

(1) Alternative 2 (ISCO Alternative) has the potential for generation of hexavalent chromium in groundwater, which has the potential to flow with groundwater into surface water channels in the southern portion of the Project Area.

4.4 Alternatives to the Proposed Project

4.4.1 No Project Alternative

According to CEQA Guidelines Section 15126.6(e), discussion of the No Project Alternative must include a description of existing conditions and reasonably-foreseeable future conditions that would exist if the proposed Project were not approved. Under the No Project Alternative, OCWD would not implement the proposed South Basin Groundwater Protection Project. As a result, OCWD would not install extraction facilities and would not create extraction barriers to prevent the existing contamination plume from migrating within the Shallow Aquifer System. Further, under the No Project Alternative, the contaminated groundwater would not be extracted from the Shallow Aquifer System and treated, nor would groundwater contamination monitoring (sampling, analysis, and data interpretation/reporting) be conducted, leaving the migration and extent of the contamination undetermined.

Ability to Meet Project Objectives

Implementation of the No Project Alternative would not provide the benefits of removing COCs from the Shallow Aquifer System, protecting groundwater resources from further degradation, preventing discharge of COCs exceeding ecological risk-based concentrations from the Shallow Aquifer System to surface water channels, or preventing human exposure to contaminated groundwater with COC

concentrations exceeding MCLs within the South Basin. Implementation of the No Project Alternative would not meet any of the stated proposed Project objectives.

Impact Analysis

Aesthetics

The construction and operation of the extraction facilities, monitoring wells, treatment plants and conveyance pipelines would not occur under the No Project Alternative. The No Project Alternative would have no potential to impact scenic vistas, scenic resources, visual character, or light and glare in the Project Area since no new facilities would be built. Since the exact locations of the aboveground treatment plants are currently unknown for the proposed Project, there is a potential that the treatment plants would change the visual character of the areas and impacts would be less than significant with mitigation. Since the No Project Alternative would not include any structures, it would result in fewer aesthetic impacts than the proposed Project.

Air Quality and Greenhouse Gas Emissions

The No Project Alternative would not involve construction or operation of extraction facilities or treatment plants and would not construct monitoring wells and groundwater conveyance pipelines, and therefore would not generate emissions above baseline conditions that could impact air quality. The proposed Project would result in an increase of construction-related emissions; however, with the implementation of mitigation measures the emission would be less than significant. In addition, operations of the proposed Project would not result in emission that would exceed thresholds and therefore impacts would be less than significant. Mitigation would be needed to address the construction of the proposed Project; however, with the implementation of Mitigation Measure AQ-1, impacts would be less than significant. The No Project Alternative would not include the construction or operation of any facilities and therefore would not result in any air quality impacts.

The No Project Alternative would not involve any construction activities or operation of the proposed Project and therefore would not result in an increase in greenhouse gas emissions relative to existing conditions because no project would be implemented. The proposed Project would result in greenhouse gas emissions during construction and operation but not at significant levels. Because, the No Project Alternative would not impact air quality or produce greenhouse gas emission, it would therefore result in fewer air quality and greenhouse gas emissions impacts than the proposed Project.

Biological Resources

The No Project Alternative would not involve construction or operation of the proposed Project facilities and would therefore not alter the site conditions at the sites of the proposed facilities in the Project Area. The proposed Project would not have the potential to impact special-status species or wetlands; however, during construction the proposed Project has the potential to impact nesting birds in the immediate vicinity of the proposed Project facilities. The No Project Alternative would completely avoid potential impacts to special-status species and wetlands as a result of construction. However, the No Project Alternative would not remediate the COCs in the Shallow Aquifer System and the plume would continue to migrate and could eventually impact surface waters in surrounding channels, potentially exposing

wildlife to COCs. Therefore, the No Project Alternative would result in potentially more significant biological resource impacts than the proposed Project.

Cultural Resources

The No Project Alternative would not involve construction or operation of proposed Project facilities and therefore would not result in ground disturbance that would disrupt or affect archaeological resources, historic resources, or human remains. Although the proposed Project would not directly impact any known cultural resources, construction activities would involve excavation that could significantly impact undiscovered cultural resources. With implementation of mitigation measures, the proposed Project would result in less than significant impacts to cultural resources. Nevertheless, the No Project Alternative would result in no ground disturbance and therefore would have no potential to uncover any cultural resources. As a result, the No Project Alternative would result in fewer impacts to cultural resources than the proposed Project.

Energy

The No Project Alternative would not involve construction or operation of proposed Project facilities and would therefore not result in an increase in energy consumption relative to existing conditions. The proposed Project would result in an increased usage of electricity to operate proposed wells, treatment plants, and other infrastructure, but not at significant levels that would result in wasteful use of energy. The No Project Alternative would result in no change to energy consumption when compared to the proposed Project. As a result, the No Project Alternative would result in fewer impacts to energy than the proposed Project.

Geology and Soils

The No Project Alternative would not involve construction or operation of proposed Project facilities and would therefore not result in any geologic or soil-related impacts. The geologic effects of the proposed Project were determined to be less than significant, including for impacts due to ground shaking, soil erosion, unstable geologic units, and expansive soil. The Project Area does not include geological formation/units with potential for encountering significant fossils. As a result, since the No Project Alternative would not result in any ground disturbing activities or potential to uncover paleontological resources, it would result in fewer geological, soil, and paleontological impacts than the proposed Project.

Hazards and Hazardous Materials

The No Project Alternative would not involve construction or operation of the proposed Project facilities and would therefore not result in an increase in use or transport of hazardous materials above existing conditions. While the proposed Project would involve routine transport and use of potentially hazardous materials, compliance with existing State regulations would reduce all impacts to less than significant levels. The proposed Project would involve construction within rights-of-way that could impede emergency access; however, the cities of Santa Ana, Irvine, and Tustin all require Encroachment Permits with Traffic Control Plans for projects that will require road closures or restrictions and reducing impacts to evacuation routes. Similar to the No Project Alternative, the proposed Project would not be located within a very high fire severity zone. Further, the No Project Alternative would involve no additional transport of potentially hazardous fuels and lubricants or use of hazardous materials above what is currently used at existing project sites for water treatment, nor create new structures at risk of exposure to

existing hazardous materials sites or wildland fire. However, the No Project Alternative would allow known hazardous substances that were introduced into the Shallow Aquifer System in the Project Area as a result of industrial activities to remain in the groundwater at levels that exceed applicable MCLs and would allow those hazardous substances to migrate to other areas. As such, the No Project Alternative would result in more significant impacts to hazards and hazardous materials than the proposed Project.

Hydrology and Water Quality

The No Project Alternative would not involve construction or operation of any proposed Project facilities, and therefore would not result in ground disturbance that could impact surface water, associated drainage patterns, or modifications to downstream inundation risk. However, under the No Project Alternative the contaminated groundwater plume would continue to migrate and would continue to be a human health and environmental hazard. Under the proposed Project, construction of new facilities would involve ground-disturbing activities that could impact surface water quality due to polluted runoff from the soil stockpiling and construction sites. Such potential impacts would be lessened with implementation of regulatory requirements such as SWPPPs and BMPs. The No Project Alternative would not involve any ground-disturbing activities and would not have the potential for impacts to water quality during construction, but would allow groundwater contamination to remain. As a result, the No Project Alternative would result in more significant impacts to hydrology and water quality than the proposed Project since the groundwater contamination would not be removed and treated.

Land Use

The No Project Alternative would not involve construction or operation of any proposed Project facilities, and therefore would not result in division of an established community or any conflicts with land use plans or policies. While the proposed Project would involve construction of aboveground treatment plants, they would not create a barrier that would divide an established community or conflict with land use policy. The No Project Alternative would involve no construction or operation of new facilities and would therefore not divide an established community or conflict with any land use policy. As a result, impacts to land use would be fewer under the No Project Alternative when compared to the proposed Project.

Noise

The No Project Alternative would not involve construction or operation of any proposed Project facilities, and therefore would not involve activities that would generate noise or vibration above baselines conditions. The proposed Project would result in potentially significant impacts to sensitive receptors and ambient noise levels during construction; however, with the implementation of Mitigation Measure NOI-1 and NOI-2 impacts to noise would be reduced to less than significant. Because the No Project Alternative would not alter the existing noise environment, it would result in fewer impacts associated with noise and vibration than the proposed Project.

Transportation

The No Project Alternative would not involve construction or operation of any proposed Project facilities, and therefore would not result in transportation impacts. The proposed Project would result in temporary impacts to traffic and the circulation system due to increased vehicle trips and active work within rights-of-way during construction. Because the No Project Alternative would not involve any changes to the

transportation system, the No Project Alternative would result in fewer transportation impacts than the proposed Project.

Tribal Cultural Resources

Under the No Project Alternative, construction or operation of proposed Project facilities would not occur and as a result would not affect any known or unknown tribal cultural resources. According to record searches and tribal resource consultations, no tribal resources are present in the Project Area. As such, the proposed Project would not cause a substantial adverse change in the significance of a known tribal cultural resource. However, there always exists the potential that an unknown tribal cultural resource could be impacted by construction activities. For the proposed Project, this potential impact would be reduced to less than significant with implementation of mitigation measures. Nonetheless, the No Project Alternative would result in fewer potential impacts to tribal cultural resources than the proposed Project.

Utilities and Service Systems

The No Project Alternative would not result in construction or operation of any of the proposed Project facilities, and therefore would not result in impacts to utilities and service systems. The proposed Project would have the potential to disrupt existing underground utilities, which would be mitigated to a less than significant level with implementation of mitigation measures. Because the No Project Alternative would not involve any changes to the utility and service system, the No Project Alternative would result in fewer impacts to the utility and service system than the proposed Project.

4.4.2 In-Situ Treatment of Relatively High Concentration and Leading-Edge Areas Using Chemical Oxidation (ISCO Alternative)

This alternative would include installation of between 275 and 330 monitoring wells within the Project Area and between 1,297 and 1,946 injection wells screened in all or portions of the aquifer layers within the Shallow Aquifer System and periodic application of sodium persulfate to treat contaminants using In-Situ Chemical Oxidation (ISCO). Dissolution of sodium persulfate results in the formation of the persulfate anion ($S_2O_8^{2-}$) and two sodium ions (Na+). The persulfate anion is a strong oxidant, which itself can degrade many environmental contaminants or it can be catalyzed with various reactants to form the more powerful sulfate radical.

The ISCO Alternative would be applied at select and accessible locations within higher concentration and leading-edge areas of OU2. ISCO would be applied in transects within relatively high COC concentration areas to decrease lateral and vertical migration of high concentration COCs into zones with lower concentrations within OU2; decrease the threat of COC migration from the Shallow Aquifer System to the Principal Aquifer System through Legacy Water Supply Wells that cannot be located or properly destroyed; and begin to treat and reduce the concentration of COCs in OU2 groundwater. ISCO would be applied in leading-edge areas to control the spread of OU2 COCs and minimize discharge of COCs exceeding ecological risk-based concentration from the Shallow Aquifer System to surface water channels.

Unlike the proposed Project, this Alternative would not include extraction facilities, pipelines, or treatment facilities and would not convey treated groundwater to the sewer system for additional treatment. The construction and operational cost to implement the ISCO Alternative is approximately $483,000,000 (EA 2023). **Table 4-3** compares the proposed Project's range in the number of facilities to the ISCO Alternative.

TABLE 4-3
NUMBER OF FACILITIES FOR THE PROPOSED PROJECT AND THE ISCO ALTERNATIVE

Facility	Proposed Project	ISCO Alternative
Extraction Facilities	up to 100	0
Monitoring Wells	up to 200	275 up to 330
Injection Wells	0	1,297 up to 1,946
Pipelines (linear feet)	up to 25,000	0
Treatment Plants	up to 9	0

SOURCE: EA 2023, OCWD 2024

Ability to Meet Project Objectives

Implementation of the ISCO Alternative would meet most of the proposed Project objectives because the implementation of this alternative would protect human health and the environment with respect to the COCs in OU2. Protection of human health is accomplished by preventing human ingestion of groundwater containing COCs exceeding MCLs/risk-based standards, and protection of the environment is accomplished by decreasing further degradation of the groundwater resource due to plume expansion and maintaining surface water COC concentrations to levels that are protective of potential ecological receptors. However, this alternative has the potential to generate undesired byproducts, such as hexavalent chromium. Chromium is a redox-sensitive and toxic metal, the release of which poses considerable risk to human health and/or the environment (EA 2023). This alternative has the potential to generate groundwater contaminants that have the potential to migrate with groundwater flows and interact with surface flows in the southern portion of the Project Area.

Impact Analysis

Aesthetics

Under the ISCO Alternative, no extraction facilities, treatment plants, or groundwater conveyance pipelines would be built, and treated water would not be conveyed to the sewer system for additional treatment. This alternative could include installing between 275 and 330 monitoring wells within the Project Area and between 1,297 and 1,946 injection wells in high concentration areas and along leading-edge areas of the plume. Similar to the proposed Project, this alternative would have a less than significant impact to visual character because the wells will be constructed within underground vaults. The ISCO Alternative would not change the visual character of the surrounding areas once constructed. And, unlike the proposed Project, this alternative would not include aboveground local treatment plants that have the potential to change the surrounding visual character. As a result, the ISCO Alternative would have fewer impacts to visual character of the surrounding area when compared to the proposed Project.

Air Quality and Greenhouse Gases

Under the ISCO Alternative, no extraction facilities, treatment plants, or groundwater conveyance pipelines would be built, and treated water would not be conveyed to the sewer system for additional treatment. Although the same types of equipment would be used to construct the monitoring and injection wells as the proposed Project wells, the ISCO Alternative could construct up to 217 more monitoring wells and up to 1,946 more injection wells than the proposed Project. The operation of 2,276 wells would produce approximately 170,000 metric tons (MT) of GHG emissions compared to the proposed Project's 13,000 MT (EA 2023, Appendix E, *Feasibility Study*, of this Draft PEIR). As a result, the ISCO Alternative would have a greater impact on air quality and GHG emissions when compared to the proposed Project.

Biological Resources

Under the ISCO Alternative, up to 330 monitoring wells and up to 1,946 injection wells could be constructed as compared to the proposed Project. However, this alternative would not construct up to 113 extraction facilities, up to 23,730 linear feet of conveyance pipelines, or up to 10 treatment plants, included as part of the proposed Project. Similar to the proposed Project, this alternative would be constructed in the same area within the Project Area and would result in the same potential impacts to nesting birds during construction. The ISCO Alternative would include construction of more wells but would not include construction of the groundwater conveyance pipelines or local groundwater treatment plants that are included in the proposed Project. Nevertheless, the same mitigation measures would be required to reduce impacts to nesting birds during construction as would be required under the proposed Project. As a result, the impacts to biological resources would be less when compared to the proposed Project since the ISCO Alternative construction of the monitoring wells and injections wells would be sited in areas such as parking lots that are typically void of habitat unlike the proposed Project's linear construction of pipelines that have the potential to be adjacent to trees and scrubs that nesting birds could utilize. The proposed Project conveyance pipelines construction and local groundwater treatment plants would have the potential to impact adjacent median and sidewalk and private property landscaping along the alignment during nesting bird season. However, the treatment process associated with the ISCO Alternative includes the potential to generate undesirable byproducts such as hexavalent chromium, which if exposed to surface waters, could impact biological resources. As a result, the ISCO Alternative could have greater impacts to biological resources as compared to the proposed Project.

Cultural Resources

Under the ISCO Alternative, more wells would be constructed than the proposed Project. This alternative could result in construction of up to 2,276 injection and monitoring wells that require drilling and excavation activities that could unearth unknown resources. Similar to the proposed Project, this alternative has the potential to impact cultural resources. However, the ISCO Alternative would not include the construction of up to 23,730 linear feet of conveyance pipelines or up to 9 local groundwater treatment plants that would require open trenching and/or excavation to install. The same mitigation measures would be required to reduce impacts for the ISCO Alternative that would be required under the proposed Project, which would reduce impacts to unanticipated discovery of archaeological and historical resources, and human remains. As a result, the impacts to cultural resources would be less under the ISCO Alternative compared to the proposed Project.

Energy

This alternative could result in the construction of up to 2,050 more wells than the proposed Project, generating approximately 5,000,000 British thermal units (Btu) compared to the proposed Project's 530,000 Btu (EA 2023, Appendix E, *Feasibility Study*). As such, energy consumption would be approximately 10 times greater for the ISCO Alternative as compared to the proposed Project. However, although energy use under the ISCO Alternative would be greater, it would not be a wasteful use of energy or conflict with local plans since the goal of groundwater remediation would be achieved similar to the proposed Project.

Geology and Soils

The ISCO Alternative would not involve construction or operation of extraction wells, treatment plants or conveyance pipelines. This alternative could include construction of more injection and monitoring wells around the leading-edge areas of the plume within the same vicinity as the proposed Project. As discussed in Section 3.6, *Geology and Soils*, the proposed Project's impacts were determined to be less than significant, including for impacts due to ground shaking, soil erosion, unstable geologic units, and expansive soil. Further, the Project Area does not include geological formation/units with potential for encountering significant fossils. Since the ISCO Alternative is located within the Project Area, the impacts to geology and soils would be similar to those of the proposed Project. However, since the ISCO Alternative would not include the construction up to 23,730 linear feet of conveyance pipelines and up to 9 treatment plants, fewer impacts would occur to ground disturbing activities and the potential to uncover unknown paleontological resources. As a result, this alternative would result in fewer potential paleontological impacts when compared to the proposed Project.

Hazards and Hazardous Materials

Similar to the proposed Project, the ISCO Alternative would generally result in the same construction impacts associated with the release of hazardous materials, emission of hazardous materials near schools, inclusion of facilities near hazardous materials sites and airports, and risk of wildland fires. However, since the ISCO Alternative does not include construction of the conveyance pipelines and would include limited lane closures for well construction, opposed to long stretches of lanes requiring closure to accommodate the pipelines construction, the ISCO Alternative would result in fewer opportunities to interfere with an adopted emergency response plan or emergency evacuation plan. Further, during operations this alternative would require storage of more potentially hazardous materials that would be used to inject into groundwater to treat the plume that could be released to the environment during an accidental spill. Similar to the proposed Project, this alternative would be required to comply with the numerous laws and regulations discussed in Section 3.7, *Hazards and Hazardous Materials*, that govern the transportation, use, handling, and disposal of hazardous materials which would limit the potential for creation of hazardous conditions due to the use or accidental release of hazardous materials. As a result, impacts to hazards and hazardous materials would be similar; however, impacts associated with interfering with emergency response plans or evacuation plans would be less under the ISCO Alternative when compared to the proposed Project.

Hydrology and Water Quality

Under the ISCO Alternative, more wells would be constructed than the proposed Project. The injection and monitoring wells would be constructed and operated in the same vicinity as the proposed Project. Similar to the proposed Project, the ISCO Alternative would generally result in the same impacts associated with water quality standards and waste discharge requirements, groundwater supplies/plans, drainage patterns, and flood hazards. However, since the ISCO Alternative does not include open trenching to install the conveyance pipelines, the soils along the pipelines alignment during construction would not be exposed to erosion by wind or water. Both the proposed Project and the ISCO Alternative would have a beneficial impact on water quality associated with treating the COCs within the groundwater. However, the treatment process associated with the ISCO Alternative includes the potential to generate undesirable byproducts such as hexavalent chromium which, if exposed to surface waters, could impact the water quality. As a result, the ISCO Alternative would have more impacts to hydrology and water quality as compared to the proposed Project.

Land Use

Given that the ISCO Alternative would be located within the same area as the proposed Project, their impacts would generally be similar. Neither would divide an established community or conflict with local zoning. As a result, impacts to land use would be similar under the ISCO Alternative when compared to the proposed Project.

Noise

The ISCO Alternative and the proposed Project would implement the same construction techniques during construction. The ISCO Alternative could include up to 217 more monitoring wells and up to 1,946 more injection wells as compared to the proposed Project. However, this alternative would not include construction of up to 113 extraction facilities, up to 23,730 linear feet of conveyance pipelines, or up to 9 treatment plants, that are included as part of the proposed Project. Similar to the proposed Project, the ISCO Alternative would result in potentially significant impacts to sensitive receptors and ambient noise levels during construction; however, with the implementation of Mitigation Measure NOI-1 and NOI-2, impacts to noise would be reduced to less than significant. Because the ISCO Alternative could result in the construction of up to 2,050 more wells, which could require 24-hour drilling within close proximity of sensitive receptors, this alternative would result in greater impacts associated with noise and vibration when compared to the proposed Project.

Transportation

Under the ISCO Alternative, more wells could be constructed. The alternative would not include extraction facilities, treatment plants, or groundwater conveyance pipelines. The ISCO Alternative would have potential traffic impacts associated with injection and monitoring wells depending on the specific location and if lane closure are required for construction. Similar to the proposed Project, the ISCO Alternative would require an encroachment permit for any work within the cities' right-of-way. The cities of Santa Ana, Irvine, and Tustin all require encroachment permits with traffic control plans for projects that will require road closures or restrictions. Once in operation, the ISCO alternative would result in minor traffic impacts during water sampling and maintenance activities. As a result, the ISCO Alternative would result in fewer construction-related impacts to traffic and transportation when compared to the

proposed Project since the alternative does not include construction of between 1,000 and 25,000 linear feet of groundwater conveyance pipelines within roadways which could require lane closures and the potential to impact emergency access.

Tribal Cultural Resources

Under the ISCO Alternative, more wells could be constructed. The alternative would not include extraction facilities, treatment plants, or groundwater conveyance pipelines. However, the ISCO Alternative would include up to 217 more monitoring wells and up to 1,946 more injection wells as compared to the proposed Project. As a result, the ISCO Alternative would result in a smaller subsurface impact since the alternative does not include up to 23,730 linear feet of open trenching for the installation of the conveyance pipelines or up to 9 local groundwater treatment plants, reducing the potential to impact tribal cultural resources compared to the proposed Project. However, the same mitigation measures would be required to reduce impacts to unknown tribal cultural resources as result of ground disturbance, which would reduce impacts to tribal cultural resources. As a result, the impacts to tribal cultural resources would be fewer under the ISCO Alternative when compared to the proposed Project.

Utilities and Service Systems

The ISCO Alternative could include the construction of approximately 2,050 more wells than the proposed Project. However, the wells associated with the ISCO Alternative would not require a power source or underground work to connect to a power source that could have the potential of disrupting existing utility services. As a result, impacts to utilities and service systems would be fewer under the ISCO Alternative when compared to the proposed Project.

4.4.3 GETS and Injection Alternative

The GETS and Injection Alternative would include installation of up to 113 groundwater extraction facilities, and 113 monitoring wells within all or portions of the aquifer layers within the Shallow Aquifer System; installation of up to 15 injection wells screened in Layer 4 (Basal Sand) within the Shallow Aquifer System; construction of one aboveground groundwater treatment system; and up to 41,380 linear feet of conveyance pipelines. Extracted groundwater would be treated at one treatment plant located in a central area of the South Basin. The treatment plant will use filtration for sediment removal and GAC, reverse osmosis (RO), ultraviolet (UV) light and hydrogen peroxide to remove COCs to required treatment levels. Treated water would then be conveyed to new injection wells and injected into the Basal Sand. Under this Alternative, the treated groundwater would not be conveyed to the sewer for further treatment at OC San Plant No. 1 and GWRS. The construction and operational cost to implement the GETS and Injection Alternative is approximately $78,000,000 (EA 2023). **Table 4-4** compares the proposed Project's range in facilities to the alternative.

TABLE 4-4
FACILITIES RANGES FOR THE PROPOSED PROJECT AND GETS AND INJECTION ALTERNATIVE

Facility	Proposed Project	GETS and Injection Alternative
Extraction Facilities	up to 100	75 up to 113
Monitoring Wells	up to 200	94 up to 113
Injection Wells	0	10 up to 15
Pipelines (linear feet)	up to 25,000	29,700 up to 41,380
Treatment Plants	up to 9	1

SOURCE: EA 2023, OCWD 2024

Ability to Meet Project Objectives

Implementation of the GETS and Injection Alternative would meet all of the proposed Project objectives because the implementation of this alternative would protect human health and the environment with respect to the COCs that have migrated from multiple source properties and have commingled in the Project Area, forming a large, dissolved commingled contaminant plume. Protection of human health is accomplished by preventing human ingestion of groundwater containing COCs exceeding MCLs/risk-based standards, and protection of the environment is accomplished by decreasing further degradation of the groundwater resource due to plume expansion and maintaining surface water COC concentrations to levels that are protective of potential ecological receptors.

Impact Analysis

Aesthetics

The GETS and Injection Alternative would include the same number of monitoring wells and extraction facilities, and in approximately the same locations, as the proposed Project. The GETS and Injection Alternative would also include one approximately 2,200-square-foot groundwater treatment plant, 15 injection wells, and a network of up to 41,380 linear feet of pipelines which would convey the extracted groundwater to the central treatment plant for treatment, then to the injection wells for injection into the Basal Sand. Similar to the proposed Project, the wells would be constructed within subterranean vaults and would not change the visual character of the areas. The alternative would include one approximately 2,200-square-foot centralized treatment plant compared to up to nine approximately 144-square-foot treatment facilities associated with the proposed Project. As a result, the GETS and Injection Alternative would have greater impacts to aesthetics than the proposed Project as a result of the larger surface area of the above ground treatment facilities, within the Project Area.

Air Quality and Greenhouse Gases

The GETS and Injection Alternative would include the same number of monitoring wells and extraction facilities, and in approximately the same locations, as the proposed Project. The GETS and Injection Alternative would also include one approximately 2,200-square-foot groundwater treatment plant, 15 injection wells, and a network of up to 41,380 linear feet of pipelines which would convey the extracted groundwater to the central treatment plant for treatment, then to the injection wells for injection into the Basal Sand. Although the same types of equipment would be used to construct the wells and conveyance pipelines as the proposed Project, the GETS and Injection Alternative would construct approximately

17,650 linear feet more conveyance pipelines than the proposed Project. This alternative would construct and operate up to 15 injection wells and approximately eight fewer treatment facilities as compared to the proposed Project. The operation of the GETS and Injection Alternative facilities would produce approximately 670,000 MT of GHG emissions compared to the proposed Project's 13,000 MT (EA 2023, Appendix E of this Draft PEIR). As a result, the operation of the GETS and Injection Alternative would have a greater impact on air quality and GHG emissions compared with the proposed Project.

Biological Resources

The GETS and Injection Alternative would include the same number of monitoring wells and extraction facilities, and in approximately the same locations, as the proposed Project. The GETS and Injection Alternative would also include one approximately 2,200-square-foot groundwater treatment plant, 15 injection wells, and a network of up to 41,380 linear feet of pipelines that would convey the extracted groundwater to the central treatment plant for treatment, then to the injection wells for injection into the Basal Sand. This alternative could construct approximately 17,650 linear feet more conveyance pipelines, 1,000 square feet more treatment plant area and 15 injection wells as compared to the proposed Project. As a result, the GETS and Injection Alternative would have the potential to impact more nesting birds along the pipelines alignment during construction. Nevertheless, the same mitigation measures would be required to reduce impacts to nesting birds during construction as would be required under the proposed Project. The impacts to biological resources from the GETS and Injection Alternative would be greater when compared to the proposed Project, since this alternative could include approximately 17,650 linear feet more conveyance pipelines, a larger treatment plant, and 15 more injection wells.

Cultural Resources

The GETS and Injection Alternative would include the same number of monitoring wells and extraction facilities, and in approximately the same locations, as the proposed Project. The GETS and Injection Alternative would also include one approximately 2,200-square-foot groundwater treatment plant, 15 injection wells, and a network of up to 41,380 linear feet of pipelines which would convey the extracted groundwater to the central treatment plant for treatment, then to the injection wells for injection into the Basal Sand. This alternative would include approximately 17,650 linear feet more conveyance pipelines, 1,000 square feet more treatment plant area, and 15 extraction wells as compared to the proposed Project. The alternative would require much more ground disturbance which could impact unknown cultural resources during installation of the conveyance pipelines. Nevertheless, the same mitigation measures required under the proposed Project to reduce impacts would be required for the GETS and Injection Alternative. Implementing the mitigation measures would reduce impacts to unanticipated discovery of archaeological and historical resources, and human remains. As a result, the impacts to cultural resources would be greater under the GETS and Injection Alternative compared to the proposed Project since this alternative could include approximately 17,650 more linear feet of conveyance pipelines, 1,000 square feet more treatment plant area, and 15 extraction wells that require ground disturbance during construction.

Energy

This alternative could result in the operations of 15 more injection wells and could have approximately 17,650 linear feet more conveyance pipelines than the proposed Project. And, although there are eight less treatment plants for this alternative, the energy use of the one centralized treatment plan for the GETS and Injection Alternative would be greater than the proposed Project's combined treatment plant energy use.

This alternative would generate approximately 670,000 Btu compared to the proposed Project's approximately 530,000 Btu (EA 2023, Appendix E, *Feasibility Study*). As such, energy consumption would be greater for the GETS and Injection Alternative as compared to the proposed Project. However, although energy use would be greater for the GETS and Injection Alternative, it would not be a wasteful use of energy or found to be in conflict with local plans since the goal of groundwater remediation would be achieved similar to the proposed Project.

Geology and Soils

The GETS and Injection Alternative would include the same number of monitoring wells and extraction facilities, and in approximately the same locations, as the proposed Project. The GETS and Injection Alternative would also include one approximately 2,200-square-foot groundwater treatment plant, 15 injection wells, and a network of up to 41,380 linear feet of pipelines which would convey the extracted groundwater to the central treatment plant for treatment, then to the injection wells for injection into the Basal Sand. As discussed in Section 3.6, *Geology and Soils*, the proposed Project's impacts were determined to be less than significant, including for impacts due to ground shaking, soil erosion, unstable geologic units, and expansive soil. Further, the Project Area does not include geological formation/units with potential for encountering significant fossils. The GETS and Injection Alternative is located within the Project Area, the impacts to geology and soils would be similar to those of the proposed Project. However, the GETS and Injection Alternative would include more ground disturbance as result of approximately 17,650 linear feet more pipelines, 1,000 square feet more treatment plant area, and 15 extraction wells as compared to the proposed Project. Therefore, the GETS and Injection Alternative would result in potentially greater impacts to paleontological resources compared to the proposed Project.

Hazards and Hazardous Materials

The GETS and Injection Alternative would include the same number of monitoring wells and extraction facilities, and in approximately the same locations, as the proposed Project. The GETS and Injection Alternative would also include one approximately 2,200-square-foot groundwater treatment plant, 15 injection wells, and a network of up to 41,380 linear feet of pipelines which would convey the extracted groundwater to the central treatment plant for treatment, then to the injection wells for injection into the Basal Sand. Similar to the proposed Project, this alternative would generally result in the same impacts associated with inclusion of facilities near hazardous materials sites and airports, conflicts with emergency plans, and risk of wildland fires. However, because of construction equipment used during the construction of up to 17,650 linear feet more conveyance pipelines, 1,000 square feet more treatment plant area, and 15 extraction wells, the GETS and Injection Alternative could increase the potential for accidental spills, releases of hazardous materials, and potential for more lane closures as compared to the proposed Project. As a result, impacts to hazards and hazardous materials would be increased for the GETS and Injection Alternative when compared to the proposed Project.

Hydrology and Water Quality

The GETS and Injection Alternative would include the same number of monitoring wells and extraction facilities, and in approximately the same locations, as the proposed Project. The GETS and Injection Alternative would also include one approximately 2,200-square-foot groundwater treatment plant, 15 injection wells, and a network of up to 41,380 linear feet of pipelines which would convey the extracted groundwater to the central treatment plant for treatment, then to the injection wells for injection into the

Basal Sand. Similar to the proposed Project, the GETS and Injection Alternative would generally result in the same impacts associated with water quality standards and waste discharge requirements, groundwater supplies/plans, drainage patterns, and flood hazards. However, because the groundwater conveyance pipelines could include approximately 17,650 linear feet more pipelines, 1,000 square feet more treatment plant area, and 15 extraction wells than the proposed Project, the degree of impacts to water quality and the potential to expose soils to erosion by wind or water would be greater than under the proposed Project. Although both the proposed Project the GETS and Injection Alternative would have a beneficial water quality impact associated with treating the COCs within the groundwater, overall impacts to hydrology and water quality would be greater under the GETS and Injection Alternative.

Land Use

Given that the GETS and Injection Alternative would be located within the same area as the proposed Project, they would generally result in similar impacts. Neither would divide an established community or conflict with local zoning. As a result, impacts to land use would be similar under the proposed Project when compared to the GETS and Injection Alternative.

Noise

The Groundwater Extraction and Basal Sand Injection Alternative and the proposed Project would implement the same construction techniques during construction. However, the GETS and Injection Alternative could have an increased duration of construction to install the additional 17,650 linear feet of conveyance pipelines, larger and more complicated treatment plant, and 15 injection wells as compared to the proposed Project that potentially could impact sensitive receptors. Similar to the proposed Project, the GETS and Injection Alternative would result in potentially significant impacts to sensitive receptors and ambient noise levels during construction. However, with the implementation of Mitigation Measure NOI-1 and NOI-2, impacts to noise would be reduced to less than significant. Because the alternative could construct up to 17,650 linear feet more groundwater conveyance pipelines, a larger and more complicated treatment plant, and 15 injection wells, the GETS and Injection Alternative would result in greater impacts associated with noise and vibration when compared to the proposed Project.

Traffic and Transportation

The GETS and Injection Alternative would include the same number of monitoring wells and extraction facilities, and in approximately the same locations, as the proposed Project. The GETS and Injection Alternative would also include one approximately 2,200-square-foot groundwater treatment plant, 15 injection wells, and a network of up to 41,380 linear feet of pipelines which would convey the extracted groundwater to the central treatment plant for treatment, then to the injection wells for injection into the Basal Sand. This alternative could have potential traffic impacts associated with the construction of the wells, treatment plants and conveyance pipelines depending on the location and if lane closure is required for construction. Similar to the proposed Project, this alternative would require an encroachment permit for any work within the cities right-of-way. The cities of Santa Ana, Irvine, and Tustin all require encroachment permits with traffic control plans for projects that will require road closures or restrictions. Further, once in operation the GETS and Injection Alternative would result in minor traffic impacts similar to the proposed Project during groundwater sampling and well maintenance. As a result, the GETS and Injection Alternative would result in greater construction-related impacts to traffic and transportation when compared to the proposed Project since the alternative could include 17,650 linear feet more

conveyance pipelines, a larger and more complicated treatment plant, and 15 injection wells within roadways creating lane closures during construction.

Tribal Cultural Resources

Under the GETS and Injection Alternative, the conveyance pipeline components could include approximately 17,650 linear feet more conveyance pipelines, a larger and more complicated treatment plant, and 15 injection wells compared to the proposed Project. However, the same mitigation measures would be required to reduce impacts to unknown tribal cultural resources as a result of ground disturbance, which would reduce impacts to these resources. As a result, the impacts to tribal cultural resources would be greater under the GETS and Injection Alternative when compared to the proposed Project since the alternative includes 17,650 linear feet more conveyance pipelines, a larger and more complicated treatment plant, and 15 more injection wells.

Utilities and Service Systems

The GETS and Injection Alternative could include the construction of 15 more injection wells requiring a power source that either connects via underground conduit or overhead line and 17,650 linear feet more conveyance pipelines which could require the relocation of existing utilities with roadways. Similar to the proposed Project, any work underground could have the potential of disrupting existing utility services. As a result, mitigation measures to identify and avoid underground utilities would be as applicable to the GETS and Injection Alternative as it would be for the proposed Project. As a result, impacts to utilities and service systems would be greater under the GETS and Injection Alternative when compared to the proposed Project as the result of potentially needing to relocate underground utilities to accommodate the additional conveyance pipelines and injection wells.

4.5 Environmentally Superior Alternative

As stated above, the No Project Alternative would avoid many of the environmental impacts of the proposed Project but would not meet any of the proposed Project objectives, and would result in greater environmental impacts in the areas of Hazards and Hazardous Materials, and Hydrology and Water Quality. These greater environmental impacts in the areas of Hazards and Hazardous Materials, and Hydrology and Water Quality are qualitatively more significant than the impacts that would be reduced or avoided by the No Project Alternative, so the No Project Alternative is not environmentally superior. CEQA requires that an EIR identify the environmentally superior alternative of a project other than the No Project Alternative (CEQA Guidelines Section 15126.6(e)(2)).

A comparison of the proposed Project to the ISCO Alternative and the GETS and Injection Alternative presents a tradeoff between impacts to the environment. The ISCO Alternative would meet four of the Project objectives while the GETS and Injection Alternative would meet all six of the proposed Project objectives. The ISCO Alternative would not meet the “Prevent discharge of COCs exceeding ecological risk-based concentrations from the Shallow Aquifer System to surface water channels” objective and the “Prevent human exposure to contaminated groundwater with COC concentrations exceeding MCLs” objective due to the potential of generating hexavalent chromium as a byproduct of the treatment process.

The ISCO Alternative would result in less environmental impact to Aesthetics, Cultural Resources, Geology, Soils, Seismicity, Hazards and Hazardous Materials, Transportation, and Tribal Cultural Resources impacts and similar impacts to Land Use compared to the proposed Project. The ISCO Alternative would result in greater impacts to Air Quality and GHG, Biological Resources, Energy, Hydrology and Water Quality, Noise, and Utilities. These greater impacts are based on the large number of wells required to be built and operated compared to the proposed Project, the specific locations of those wells, and the potential of generating hexavalent chromium in the groundwater. Accordingly, the ISCO alternative is similar to the proposed Project in some areas, environmentally inferior to the proposed Project in other areas, and environmentally superior to the proposed Project in other areas. However, the most qualitatively significant of these impacts are the potential production of hexavalent chromium in groundwater as a byproduct of the ISCO Alternative, and the increased air quality and GHG impacts, because these impacts could create hazards to human health.

The GETS and Injection Alternative would result in similar impacts to Land Use as compared to the proposed Project. The GETS and Injection Alternative would have a greater impact to Aesthetics, Air Quality and GHG, Biological Resources, Cultural, Resources, Energy, Geology, Soils, Seismicity, Hazards and Hazardous Materials, Hydrology and Water Quality, Noise, Transportation, Tribal Cultural Resources and Utilities as compared to the proposed Project. These greater impacts are based in large part on the greater length of the conveyance pipelines to be built, the larger treatment plant area, and the addition of 15 injection wells, as compared to the proposed Project (**Table 4-5**).

As a result, the ISCO Alternative would reduce the number of impacts as compared to the proposed Project; however, this Alternative would not meet all of the proposed Project objectives and would result in the potential to produce hexavalent chromium in groundwater as a byproduct of the treatment process creating a hazard to human health and biological resources. As a result, the GETS and Injection Alternative is the environmentally superior alternative from amongst the alternatives since it meets all of the proposed Project objectives; however, and the proposed Project is environmentally superior to any of the alternatives since it would meet all of the objectives and would result in fewer environmental impacts as compared to both alternatives.

In addition, the cost to implement the ISCO Alternative would be approximately $483,000,000 compared to approximately $78,000,000 for the GETS and Injection Alternative, and approximately $46,000,000 for the proposed Project. The proposed Project is therefore the most cost-effective alternative that meets all of the proposed Project objectives, and it is environmentally superior because it does not have the potential of generating and releasing hexavalent chromium.

TABLE 4-5
COMPARISON ALTERNATIVES ANALYSIS RELATIVE IMPACTS TO THE PROPOSED PROJECT

Environmental Resource	Proposed Project	No Project Alternative	ISCO Alternative	GETS and Injection Alternative
Meets All Project Objectives?	Yes	No	No (1)	Yes
Environmental Impacts				
Aesthetics	LSM	–	–	+
Air Quality and Greenhouse Gas	LSM	–	+	+
Biological Resources	LSM	+	+	+
Cultural Resources	LSM	–	–	+
Energy	LTS	–	+	+
Geology and Soils	LSM	–	–	+
Hazards and Hazardous Materials	LTS	+	–	+
Hydrology and Water Quality	LTS	+	+	+
Land Use	LTS	–	0	0
Noise	LSM	–	+	+
Transportation	LTS	–	–	+
Tribal Cultural Resources	LSM	–	–	+
Utilities and Service Systems	LSM	–	–	+

SOURCE: ESA 2024

ABBREVIATIONS: LTS = less than significant; LSM = less than significant with mitigation; SU = Significant and Unavoidable; + = more severe/more intense than proposed Project; – = less severe/less intense than proposed Project; 0 = no change from proposed Project

NOTE:

(1) The ISCO Alternative has the potential for generation of hexavalent chromium in groundwater, which has the potential to flow with groundwater into surface water channels in the southern portion of the Project Area.

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CHAPTER 5
Growth Inducement

5.1 Introduction

The California Environmental Quality Act (CEQA) Guidelines (Section 15126.2(d)) require that an environmental impact report (EIR) include a discussion regarding the potential for project-related growth inducing impacts. The CEQA Guidelines provide the following guidance for the discussion and consideration of growth-inducing impacts:

> *Discuss the ways in which the proposed project could foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment. Included in this are projects which would remove obstacles to population growth (a major expansion of a wastewater treatment plant might, for example, allow for more construction in service areas). Increases in the population may tax existing community service facilities, requiring construction of new facilities that could cause significant environmental effects. Also discuss the characteristic of some projects which may encourage and facilitate other activities that could significantly affect the environment, either individually or cumulatively. It must not be assumed that growth in any area is necessarily beneficial, detrimental, or of little significance to the environment.*

A project can have direct and/or indirect growth inducement potential. An example of a project that is directly growth-inducing is one that involves construction of new housing. An example of an indirectly growth-inducing project is one that requires a substantial new permanent or temporary new employment demand that would then stimulate the need for additional housing and services. A project would also indirectly induce growth if it would remove an obstacle to additional growth and development, including a constraint on a required public service.

Based on the CEQA definition above, assessing the growth-inducement potential of the proposed Project involves answering the question: "Would implementation of the proposed Project directly or indirectly support economic expansion, population growth, or residential construction?" Treatment of groundwater is typically not one of the public services needed to support urban development; however, water supply is needed to support urban development. Additional water supply would play a role in supporting additional growth in the Project Area, but it would not be the single impetus to such growth. In addition, factors such as the General Plans and policies of the cities and Orange County (County) and/or the availability of wastewater disposal capacity, public schools, and transportation services also influence business and residential or population growth in the Project Area. Economic factors, in particular, greatly affect development rates and locations.

5.2 Methodology

In accordance with the CEQA Guidelines, implementation of the proposed Project could have an indirect growth inducement potential. As indicated in the CEQA Guidelines excerpt above, growth inducement itself is not necessarily an adverse impact. Rather, it is the potential consequences of growth, the secondary effects of growth, which may result in environmental impacts. Potential secondary effects of growth include increased demand on other public services; increased traffic and noise; degradation of air quality; loss of plant and animal habitats; and the conversion of agriculture and open space to developed uses. Growth inducement may result in adverse impacts if the growth is not consistent with local land use plans and growth management plans and policies for the area; this "disorderly" growth could indirectly result in additional adverse environmental impacts. Thus, it is important to assess the degree to which the growth accommodated by a project would or would not be consistent with applicable land use plans.

To determine direct growth-inducement potential, the proposed Project was evaluated to verify whether an increase in population or employment, or the construction of new housing would occur as a direct or indirect result of the proposed Project. If either of these scenarios occurred, the proposed Project could result in direct growth-inducement within the Project Area.

5.3 Growth-Inducement Potential and Significant and Irreversible Effects

The proposed Project intends to improve groundwater quality through groundwater extraction and treatment system within the South Basin that would extract contaminated groundwater from the Shallow Aquifer System, treat the water locally, then discharge the treated water to the sanitary sewer system. The treated groundwater would then mix with other wastewater flows in the sewer, which ultimately flow to Orange County Sanitation District's (OC San) reclamation plant No. 1. The extracted groundwater would undergo further treatment at the OC San facility before flowing to the OCWD's Groundwater Replenishment System (GWRS) where it would undergo its final advanced treatment before being recharged back into the Basin. Although there would be construction involved, the proposed Project facilities would be implemented in urbanized areas including streets, sidewalks, and parking lots.

Implementation of the proposed Project would not introduce new residential or commercial buildings or any other growth-inducing land uses. The extraction facilities, monitoring wells, treatment plants and conveyance pipelines would augment the physical structure of established communities, blending in as part of the existing landscape and enhancing the groundwater quality of existing communities. As a result, the proposed Project would not induce population growth.

The proposed Project would extract contaminated groundwater, treat and recharge treated groundwater into the Basin. The proposed Project would not include construction of residential or commercial buildings and thus would not increase the demand for or require new public services and utilities facilities (including water supply, fire protection and other emergency services, public education, and parks and recreation facilities). The nature of the proposed Project is to clean the groundwater of contaminates; such activities would not result in increased economic activity or population growth in the South Basin area.

5.4 Secondary Effects of Growth

Implementation of the proposed Project would not result in a direct or indirect increase in population or employment. The proposed Project itself, therefore, is not growth-inducing and would not induce secondary effects of growth. While one of the main goals of the proposed Project is to extract, treat and recharge groundwater back into the Basin, the proposed Project would not create a new source of water, rather it would extract contaminated water from the groundwater basin and treat it prior to recharging the treated water back into the same groundwater basin. The water recharged would not be a new source and would not indirectly support population growth and is not intended to support existing water supply needs. Therefore, there would be no secondary effects of growth.

5.5 Significant Irreversible Environmental Changes

CEQA Guidelines 21100(b) (2) and 15126.2(b) require that any significant effect on the environment that would be irreversible if the project is implemented must be identified. A project would generally result in a significant irreversible impact if:

- Primary and secondary impacts (such as roadway improvements that provide access to previously inaccessible areas, etc.) would commit future generations to similar uses.
- The project would involve a large commitment of nonrenewable resources.
- The project would involve uses in which irreversible damage could result from any potential environmental accidents associated with the project.

In accordance with CEQA Section 21100(b)(2)(B) and CEQA Guidelines Sections 15126(c) and 15126.2(c), the purpose of this section is to identify significant irreversible environmental changes that would be caused by implementation of the proposed Project. Construction and operational impacts associated with implementation of the proposed Project would result in an irretrievable and irreversible commitment of natural resources through the use of fossil fuels and construction materials. Operation of the proposed Project would incrementally increase power consumption associated with the operation of the wells and treatment facilities. The proposed Project's continued use of non-renewable resources would be on a relatively small scale and consistent with regional and local growth forecasts in the area, as well as State and local goals for reductions in the consumption of such resources. The Project Area contains no energy resources that would be precluded from future use through proposed Project implementation. The proposed Project would involve only minor incremental use of nonrenewable resources and would locate facilities on lands already developed. When completed, the proposed Project would have beneficial effect on the Basin by stopping the degradation of the groundwater, improving the groundwater quality, and preventing human exposure to groundwater contamination throughout the South Basin. Thus, the proposed Project's irreversible changes to the environment related to the consumption of non-renewable resources would not be significant.

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CHAPTER 6
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CHAPTER 7
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CHAPTER 8
Acronyms

Acronym/Abbreviation	Definition
AB	Assembly Bill
ACT	Advanced Clean Trucks
AELUP	Airport Environs Land Use Plan
AF	acre-feet
AIA	Airport Influence Area
ALUC	Orange County Airport Land Use Commission
AQMP	Air Quality Management Plan
ARMR	Archaeological Resource Management Report
ASCE	American Society of Civil Engineers
ASDE-X	Airport Surface Detection Equipment, Model X
ASF	Age Sensitivity Factor
ASHRAE	American Society of Heating and Air-Conditioning Engineers
ATCM	Airborne Toxic Control Measure
BACT	Best Available Control Technology
BERD	Built Environment Resource Directory
BMP	Best Management Practice
BTU	British thermal unit
CA-55	Costa Mesa Freeway
CAAP	Climate and Adaptation Plan
CAAQS	California Ambient Air Quality Standards
CAFE	Corporate Average Fuel Economy
CalEEMod	California Emissions Estimator Model
CalEPA	California Environmental Protection Agency
CAPCOA	California Air Pollution Control Officers Association
CARB	California Air Resources Board
CAT	California Climate Action Team
CBC	California Building Code
CCR	California Code of Regulations
CCUS	carbon capture, utilization, and storage
CDBG	Community Development Block Grant
CDFA	California Department of Food and Agriculture
CDFW	California Department of Fish and Wildlife
CDHS	California Department of Health Services
CDR	Carbon Dioxide Removal
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CFR	Code of Federal Regulations
CGS	California Geological Survey
CHP	California Highway Patrol
CHRIS	California Historical Resources Information System
CI	compression ignition

Acronym/Abbreviation	Definition
CIWMB	California Integrated Waste Board Management
CMP	Congestion Management Program
CNDDB	California Natural Diversity Data Base
CNPS	California Native Plant Society
CNRA	California Natural Resources Agency
CO	Carbon Monoxide
CO2	Carbon Dioxide
COC	chemicals of concern
COLE	coefficient of linear extensibility
CPT	cone penetrometer test
CPUC	California Public Utilities Commission
CRHR	California Register of Historical Resources
CTC	county transportation commissions
CUPA	Certified Unified Program Agency
CVC	California Vehicle Code
CWA	Clean Water Act
dB	decibels
dBA	A-weighted decibels
DDW	Division of Drinking Water
DNL	day-night average noise level
DOC	California Department of Conservation
DOT	US Department of Transportation
DPH	California Department of Public Health
DTSC	California Department of Toxic Substances Control
EFZ	Earthquake Fault Zone
EIR	environmental impact report
EISA	Energy Independence and Security Act of 2007
EISB	Enhanced In-Situ Bioremediation
FAA	Federal Aviation Administration
FAR	Federal Aviation Regulation
FCEV	fuel cell electric vehicle
FEMA	Federal Emergency Management Agency
FESA	Federal Endangered Species Act
FIRM	Flood Insurance Rate Mapping
FMMP	Farmland Mapping and Monitoring Program
FS	Feasibility Study
FSDE	Feasibility Study Detailed Evaluation
FSISE	Feasibility Study Initial Screening Evaluation
GAC	granular activated carbon
GETS	groundwater extraction and treatment system
GHG	greenhouse gas
GPU	General Plan Update
GSA	Groundwater Sustainability Agency
GSP	Groundwater Sustainability Plan
GWh	gigawatt-hours
GWP	global warming potential
GWRS	Groundwater Replenishment System
HAP	hazardous air pollutant
HDPE	high-density polyethylene
HFC	hydrofluorocarbon
HMBP	Hazardous Materials Business Plan
HRA	health risk assessment

Acronym/Abbreviation	Definition
HSC	California Health and Safety Code
IBC	Irvine Business Complex
IRAP	Interim Remedial Action Plan
IRM	Interim Remedial Measures
IRWD	Irvine Ranch Water District
ISCO	In-Situ Chemical Oxidation
kWh	kilowatt-hour
LACM	History Museum of Los Angeles County
LEV	Low-Emissions Vehicle
LID	Low-Impact Development
LORS	Laws, Ordinances, Regulations, and Standards
LOS	level of service
MCL	maximum contaminant levels
MGD	million gallons per day
MLD	Most Likely Descendent
MMBtu	million BTU
MMRP	Mitigation Monitoring and Reporting Program
MNA	monitored natural attenuation
MPO	Metropolitan Planning Organization
MSL	mean sea level
MT	metric tons
MTBA	Migratory Bird Treaty Act of 1918
MW	megawatts
MWh	megawatt-hours
NAHC	Native American Heritage Commission
NCP	Hazardous Substances Pollution Contingency Plan
NDIR	Non-Dispersive Infrared Photometry
NFIP	National Flood Insurance Program
NHD	National Hydrography Dataset
NHPA	National Historic Preservation Act
NHTSA	National Highway Traffic Safety Administration
NO	Nitric Oxide
NO2	Nitrogen Dioxide
NOD	Notice of Determination
NOP	Notice of Preparation
NOx	Nitrogen Oxide
NPDES	National Pollutant Discharge Elimination System
NRCS	The Natural Resources Conservation Service
NWI	National Wetlands Inventory
OCEHD	Orange County Environmental Health Division
OCFCD	Orange County Flood Control District
OCTA	Orange County Transportation Authority
OCWD	Orange County Water District
OEHHA	Office of Environmental Health Hazard Assessment
OHP	State Office of Historic Preservation
OPR	Governor’s Office of Planning and Research
OU	operable units
PCB	Polychlorinated Biphenyls
PCE	Perchloroethene
PDI	Preliminary Design Investigation
PEIR	Program Environmental Impact Report
PHEV	plug-in hybrid electric vehicles

Acronym/Abbreviation	Definition
PM`	Particulate Matter
PM10	Particulate Matter 10 micrometers and smaller
POTW	Public Owned Treatment Works
POU	publicly owned utilities
PPV	Peak Particle Velocity
PRB	Permeable Reactive Barrier
PRC	Public Resources Code
PVC	Polyvinyl Chloride
RAO	Remedial Action Objectives
RCNM	Roadway Construction Noise Model
RCRA	Resource Conservation and Recovery Act
REL	Recommended Exposure Limits
RFS	Renewable Fuel Standard
RI	Remedial Investigation
RMS	root mean square
RO	reverse osmosis
RPS	Renewable Portfolio Standard
RTP	Regional Transportation Plan
RWQCB	Regional Water Quality Control Board
SAFE	Safer Affordable Fuel-Efficient
SARA	Superfund Amendments and Reauthorization Act
SB	Senate Bill
SBGPP	South Basin Groundwater Protection Project
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
SDC	seismic design category
SEMS	Standardized Emergency Management System
SGMA	Sustainable Groundwater Management Act
SIP	State Implementation Plan
SLF	Sacred Lands File
SNMP	Salt and Nutrient Management Plan
SO2	Sulfur Dioxide
SO4	Sulfates
SOC	Statement of Overriding Considerations
SoCalGas	Southern California Gas Company
SR	State Route
SRRE	Source Reduction and Recycling Element
SVP	Society of Vertebrate Paleontology
SWPPP	Stormwater Pollution Prevention Plan
SWRCB	State Water Resources Control Board
TAC	technical advisory committee
TAC	toxic air contaminant
TCE	Trichloroethene
TDM	transportation demand management
TSCA	Toxic Substances Control Act
TSM	transportation systems management
TWA	Time-Weighted Average
USACE	United States Army Corps of Engineers
USDOE	United States Department of Energy

Acronym/Abbreviation	Definition
USDOT	United States Department of Transportation
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
USPS	US Postal Service
UST	underground storage tank
UV	ultraviolet
UWMP	Urban Water Management Plan
VdB	Decibel notation
VMT	vehicle miles traveled
VOC	volatile organic compound
WEAP	Worker's Environmental Awareness Program
WGCEP	Working Group on California Earthquake Probabilities
ZEV	Zero-Emissions Vehicle

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