Appendix A
Scoping Summary

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Scoping Summary

date October 10, 2019

to Fiona Sanchez, Director of Water Resources, Irvine Ranch Water District
Kellie Welch, Water Resources Manager, Irvine Ranch Water District
Jo Ann Corey, Environmental Compliance Specialist, Irvine Ranch Water District

from Jennifer Jacobus, CEQA Project Manager, ESA

subject Syphon Reservoir Improvement Project California Environmental Quality Act Public Scoping Summary

Introduction

Irvine Ranch Water District (IRWD), as the Lead Agency, is proposing the Syphon Reservoir Improvement Project (proposed project). The proposed project would involve increasing the capacity of Syphon Reservoir, which is an existing recycled water storage reservoir in unincorporated County of Orange, California. As part of the reservoir expansion, the existing engineered dam would be replaced with a new engineered dam that would meet and exceed the latest safety standards. The new dam would increase the recycled water reservoir capacity from approximately 500 acre-feet (AF) to 5,000 AF, and would allow IRWD to serve the seasonal and future water needs within its service area. The proposed project is located on the northeast side of Portola Parkway between Bee Canyon Access Road and State Route 133 (SR-133), where the majority of the property bounded by these thoroughfares is owned by IRWD.

Recycled water is vital to the community, serving as a reliable, affordable and drought-proof source in IRWD's water supply portfolio. Recycled water is used for irrigation, cooling office buildings, flushing toilets, mixing concrete, fighting regional wildfires, and other industrial uses. By making more recycled water available to the community, the proposed project would reduce IRWD's dependence on costly imported water and make the community more self-sufficient.

Notice of Preparation

The Notice of Preparation (NOP) was prepared pursuant to Section 15082 of the California Environmental Quality Act (CEQA) Guidelines, to notify interested parties that IRWD will be preparing an Environmental Impact Report (EIR) to evaluate potential environmental impacts of the proposed project (see Attachment 1). The NOP was mailed on August 2, 2019 to interested parties, including local, state, and federal agencies; local tribes; and other groups or individuals who had previously expressed interest in the project. The NOP also was posted by the County Clerk in Orange County (see Attachment 1). A Notice of Completion (NOC) was also prepared by IRWD and sent to the State Clearinghouse (see Attachment 2). The proposed project was given a State Clearinghouse number of SCH# 2019080009, and the project information was posted in the CEQAnet Database

(see Attachment 2). Copies of the NOP were made available for public review at Irvine/Heritage Park Library (14361 Yale Ave, Irvine CA 92604) and online at the IRWD website (https://www.irwd.com/construction/syphon-reservoir-improvement-project).

Scoping Period

The 45-day project scoping period began with the distribution of the NOP on August 2, 2019 and remained open through September 16, 2019 at 4:00 p.m. During the scoping period, one scoping meeting was held on August 21, 2019 at IRWD headquarters (15600 Sand Canyon Avenue, Irvine CA 92618). Public notices of the scoping meeting were placed in the Orange County Register newspaper (see Attachment 3). Public notices of the scoping meeting were also mailed directly to interested homeowners' associations (HOAs), and to residents within the Stonegate Village, Stonegate East, Woodbury Community, and Woodbury East communities (see Attachment 4).

At the scoping meetings, ESA gave a presentation on the proposed project and the CEQA process (see Attachment 5). Aside from ESA and IRWD staff, approximately twenty-two (22) meeting participants attended the August 21, 2019 scoping meeting at the IRWD headquarters. Participant questions and comments were recorded and comment cards were also available for participants to fill out at the meeting or to send in at a later date. The sign-in sheet from the August 21, 2019 public scoping meeting is included as Attachment 6.

Comments

During the scoping period, IRWD received a total of thirty-five (35) comment letters on the proposed project via mail and e-mail (see Attachment 7). Table 1 below includes a list of the agencies and individuals that submitted comments during the 30-day project scoping period. IRWD also received verbal comments during the scoping meeting, which have been recorded as Attachment 8. CEQA does not require IRWD to formally respond to these comments, but rather to consider these comments during preparation of the EIR.

TABLE 1:
LIST OF COMMENTERS

Comment Number	Commenter	Date Received (2019)
Agencies		
1	Orange County Fire Authority	August 8
2	Native American Heritage Commission	August 15
3	California Department of Water Resources	August 15
4	Crean Lutheran High School	August 29
5	California Department of Fish and Wildlife	August 30
6	South Coast Air Quality Management District	September 10
7	City of Irvine Community Development	September 12
8	Transportation Corridor Agencies	September 13
9	California Department of Transportation	September 13
10	Orange County Public Works	September 17

Comment Number	Commenter	Date Received (2019)
11	Peer A. Swan, Board Member, IRWD Board of Directors	September 16, 18
Local Residents		
12	Alice Lin	August 21
13	Adrienne Escoe	September 4
14	Valerie Gebhardt	September 5
15	Lawrence Gebhardt	September 10
16	Michele Jacknik	September 10
17	Mark O'Brien	September 11
18	Jie Gao	September 13
19	Zhong Xiong	September 13
20	Richard Zeng	September 13
21	Yongfeng Wang	September 13
22	Jessie Tsai	September 16
23	Vivian Qian	September 16
24	Noura Abdelmaaboud	September 16
25	Mike Qiao	September 16
26	Ahmed Sidky	September 16
27	Yun Yun Kang	September 16
28	Guoshan Lai, Yanna Lai	September 16
29	Joe Yan	September 16
30	Amy Pham	September 16
31	Justin Choi	September 16
32	Yun Pan	September 16
33	Lina Guo	September 16
34	Pei Yang	September 16
35	Amanda Scott-Yu	September 16

The next formal opportunity for public comments will be associated with the release of the Draft Environmental Impact Report.

List of Attachments

This Scoping Summary contains documents pertinent to the scoping process. The following items are included:

Attachment 1: Notice of Preparation
Attachment 2: Notice of Completion
Attachment 3: Public Notice of Scoping Meeting
Attachment 4: Letters to Local Community
Attachment 5: Scoping Meeting Presentation
Attachment 6: Scoping Meeting Sign-in Sheets
Attachment 7: Comment Letters Received by IRWD
Attachment 8: Scoping Meeting Verbal Comments

Attachment 1: Notice of Preparation

POSTED

AUG 02 2019

ORANGE COUNTY CLERK-RECORDER DEPARTMENT

BY: _____ DEPUTY

NOTICE OF PREPARATION OF AN ENVIRONMENTAL IMPACT REPORT

DATE: August 2, 2019

TO: Responsible Agencies, Trustee Agencies, Interested Parties

LEAD AGENCY: Irvine Ranch Water District

PROJECT TITLE: Syphon Reservoir Improvement Project

PUBLIC REVIEW PERIOD: August 2, 2019 through September 16, 2019

This Notice of Preparation (NOP) has been prepared to notify agencies and interested parties that Irvine Ranch Water District (IRWD), as the lead agency, will prepare an Environmental Impact Report (EIR) pursuant to the California Environmental Quality Act (CEQA) for the Syphon Reservoir Improvement Project (proposed project). The proposed project would increase the capacity of the existing recycled water reservoir to serve the community's seasonal and future water needs. As a part of the reservoir expansion, the existing engineered dam would be replaced with a new engineered dam that would meet and exceed the latest safety standards. The new engineered dam would increase the reservoir capacity from approximately 500 acre-feet (AF) to 5,000 AF.

Recycled water is vital to the community, serving as a reliable, affordable and drought-proof source in IRWD's water supply portfolio. Recycled water is used for irrigation, cooling office buildings, flushing toilets, mixing concrete, fighting regional wildfires and other industrial uses. By making more recycled water available to the community, the proposed project would reduce IRWD's dependence on costly imported water and make the community more self-sufficient. Additional information about the proposed project and a discussion of potential environmental impacts are included in **Attachment A** to this NOP.

PROJECT LOCATION: The proposed project would be built within the IRWD service area at the site of the existing Syphon Reservoir, which is currently a recycled water storage reservoir. Syphon Reservoir is located in unincorporated County of Orange, California, on the northeast side of Portola Parkway between Bee Canyon Access Road and State Route 133 (SR-133), where the majority of the property bounded by these thoroughfares is owned by IRWD (see **Figure 1**).

PUBLIC REVIEW AND COMMENTS: IRWD is soliciting comments from responsible and trustee agencies as well as interested parties as to the scope and content of the environmental information to be included in the EIR. In accordance with CEQA, agencies are requested to review the project description provided in this NOP and provide comments on environmental issues related to the statutory responsibilities of the agency. The EIR will be used by IRWD when considering approval of the proposed project as well as any related discretionary approvals. All comments to the NOP are due no later than

4:00 p.m. on **September 16, 2019**. Please send your comments to the mailing address or email address shown below. Include a return address or email address and a contact name for your agency or party with your comments.

CONTACT PERSON:

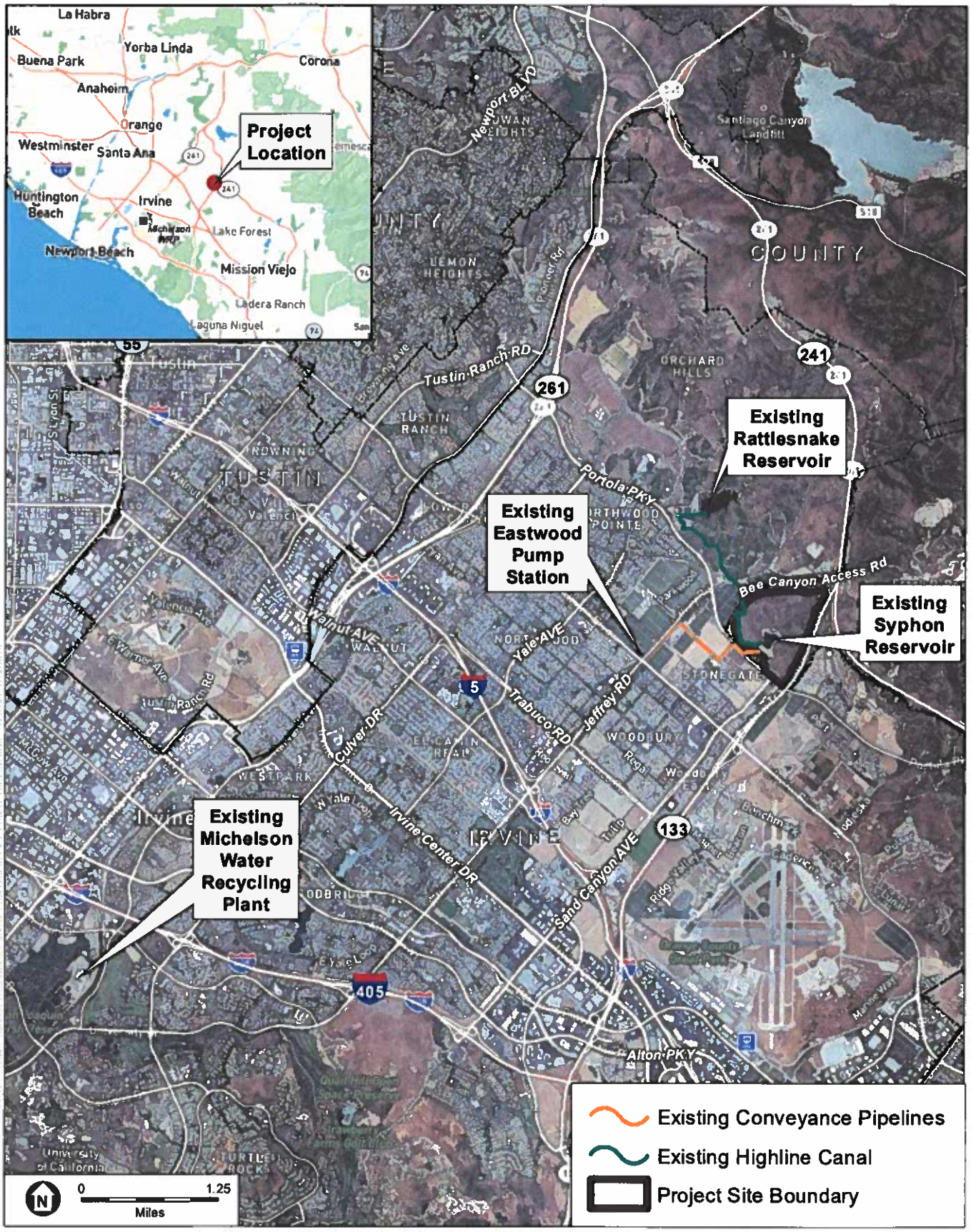
Irvine Ranch Water District
Water Resources & Policy Department
15600 Sand Canyon Avenue
P.O. Box 57000
Irvine, California 92619-7000
Attn: Jo Ann Corey, Environmental Compliance Specialist
SyphonEIR@irwd.com
Phone: 949-453-5300

DOCUMENT AVAILABILITY: Copies of the NOP are available at the Heritage Park Library, 14361 Yale Ave, Irvine CA 92604; and online at the IRWD Web Site (http://www.irwd.com/doing-business/environmental-documents).

SCOPING MEETING: IRWD will hold a public meeting to receive comments and suggestions about the issues to be included in the EIR. The scoping meeting will include a brief presentation, providing an overview of the proposed project. After the presentation, public comments will be accepted either orally or in writing at the scoping meeting. Comment forms will be supplied for those who wish to submit comments in writing at the scoping meeting; written comments may also be submitted anytime during the 45-day NOP review period. The scoping meeting will be held as follows:

Wednesday, August 21, 2019, 6:00 p.m.
Irvine Ranch Water District
Multi-Purpose Conference Room
15600 Sand Canyon Avenue
Irvine, California 92618

POSTED
AUG 02 2019
ORANGE COUNTY CLERK-RECORDER DEPARTMENT
BY: _____ DEPUTY



SOURCE: ESRI, 2016; OC LAFCO, 2018

IRWD Syphon Reservoir Improvement Project

Figure 1
Project Location

ESA

ATTACHMENT A

Introduction

Irvine Ranch Water District (IRWD), as the lead agency pursuant to CEQA, is proposing to implement the Syphon Reservoir Improvement Project (proposed project). The proposed project would increase the capacity of the existing Syphon Reservoir and replace the existing engineered dam with a new and larger engineered dam that would meet and exceed the latest safety standards. The proposed project would be able to store additional recycled water to meet the seasonal demand of customers and will enhance IRWD's water supply reliability.

Project Background

District Overview

Established in 1961 as a California Water District under the provisions of the State of California Water Code, IRWD is a non-profit, independent special district serving central Orange County, California. IRWD provides drinking water, reliable sewage collection and treatment, recycled water and urban runoff treatment to approximately 422,000 residents. As an independent public agency, IRWD is governed by a five-member publicly-elected Board of Directors that are responsible for the District's policies and decision-making. Day-to-day operations are supervised by the General Manager and District staff.

IRWD has a diverse water supply that includes local groundwater, recycled water, imported water, and local surface water. Approximately 54 percent of the IRWD water supply comes from 26 local groundwater wells in the Orange County Groundwater Basin; approximately 18 percent of the District's water supply is imported from the Metropolitan Water District of Southern California (MWD); and roughly 26 percent of the District's water demands are met with recycled water. IRWD produces recycled water at its Michelson Water Recycling Plant (WRP) located in Irvine, CA and at its Los Alisos WRP located in Lake Forest, CA. Recycled water is provided to customers primarily for irrigation of public landscaping such as street medians, parks and golf courses as well as agricultural irrigation. It is also used in industrial processes such as mixing concrete, office building uses such as toilet flushing and cooling towers, as well as for firefighting. When recycled water production exceeds seasonal demands, recycled water is stored at Syphon Reservoir, as well as other recycled water storage reservoirs operated by IRWD, including San Joaquin, Rattlesnake, and Sand Canyon Reservoirs.

Existing Syphon Reservoir

The existing Syphon Reservoir is formed by a 59-foot high, engineered dam with a crest width of approximately 12-feet. An engineered dam is built by compacting successive layers of earth, using the most impervious materials. Syphon Reservoir was constructed in 1949 and was acquired by IRWD in 2010 from the Irvine Company, which previously used the reservoir to store water for agricultural irrigation. In 2012, IRWD converted the facilities at Syphon Reservoir for storage of recycled water, by adding strainer and disinfection facilities, as well as constructing a pipeline and pump station to connect the reservoir to IRWD's existing recycled water distribution system.

The tertiary-treated recycled water stored in the Syphon Reservoir originates from IRWD's Michelson WRP. Recycled water is currently conveyed to the Syphon Reservoir via a portion of the Highline Canal

from IRWD's Rattlesnake Reservoir into Syphon Reservoir. Syphon Reservoir's existing outlet facilities include a series of underground pipes that convey flows through the strainer and disinfection facilities and then to IRWD's recycled water system for distribution to customers. Alternatively, the existing reservoir can be drawn down through an existing 48-inch pipeline that discharges to the storm drain at Portola Parkway (see **Figure 1** and **Figure 2**).

IRWD directly controls the water into and out of Syphon Reservoir and can lower the water surface to allow for storage of minor amounts of runoff during storm events. The reservoir does not receive water from rivers or streams. The existing reservoir also includes a spillway structure that protects the dam from overtopping by conveying recycled water to the existing storm drain in Portola Parkway. The reservoir includes a small watershed that is not capable of generating significant amounts of runoff that need to be managed through the use of the spillway.

Project Location

The proposed project would be constructed within the IRWD service area at the site of the existing Syphon Reservoir, which is located on the northeast side of Portola Parkway between Bee Canyon Access Road and State Route 133 (SR-133) in the County of Orange (see **Figure 1** and **Figure 2**). IRWD owns the majority of the property bounded by these thoroughfares. Crean Lutheran High School's Athletic Complex is located between Portola Parkway and the toe of the existing dam. Residential neighborhoods are located on the southwest side of Portola Parkway. The ground surrounding the reservoir, which dominates the Syphon site, is hilly with ridgelines and terraced slopes. Ground surface elevations at the site range from about 675 feet above mean sea level (amsl) in the northeast corner to about 319 feet amsl at Portola Parkway immediately downstream of the existing reservoir. Syphon Reservoir is surrounded by sensitive upland and wetland vegetation communities that are protected under local, state and federal environmental regulatory requirements, as well as school recreation facilities and residential neighborhoods.

The Syphon Reservoir is located within the Central and Coastal Natural Community Conservation Plan/Habitat Conservation Plan (NCCP/HCP) and is included as an operating reservoir allowed within the NCCP/HCP Reserve. Implementation of expanded seasonal storage for recycled water purposes was anticipated and identified as a permitted use in the NCCP/HCP.

Project Purpose and Objectives

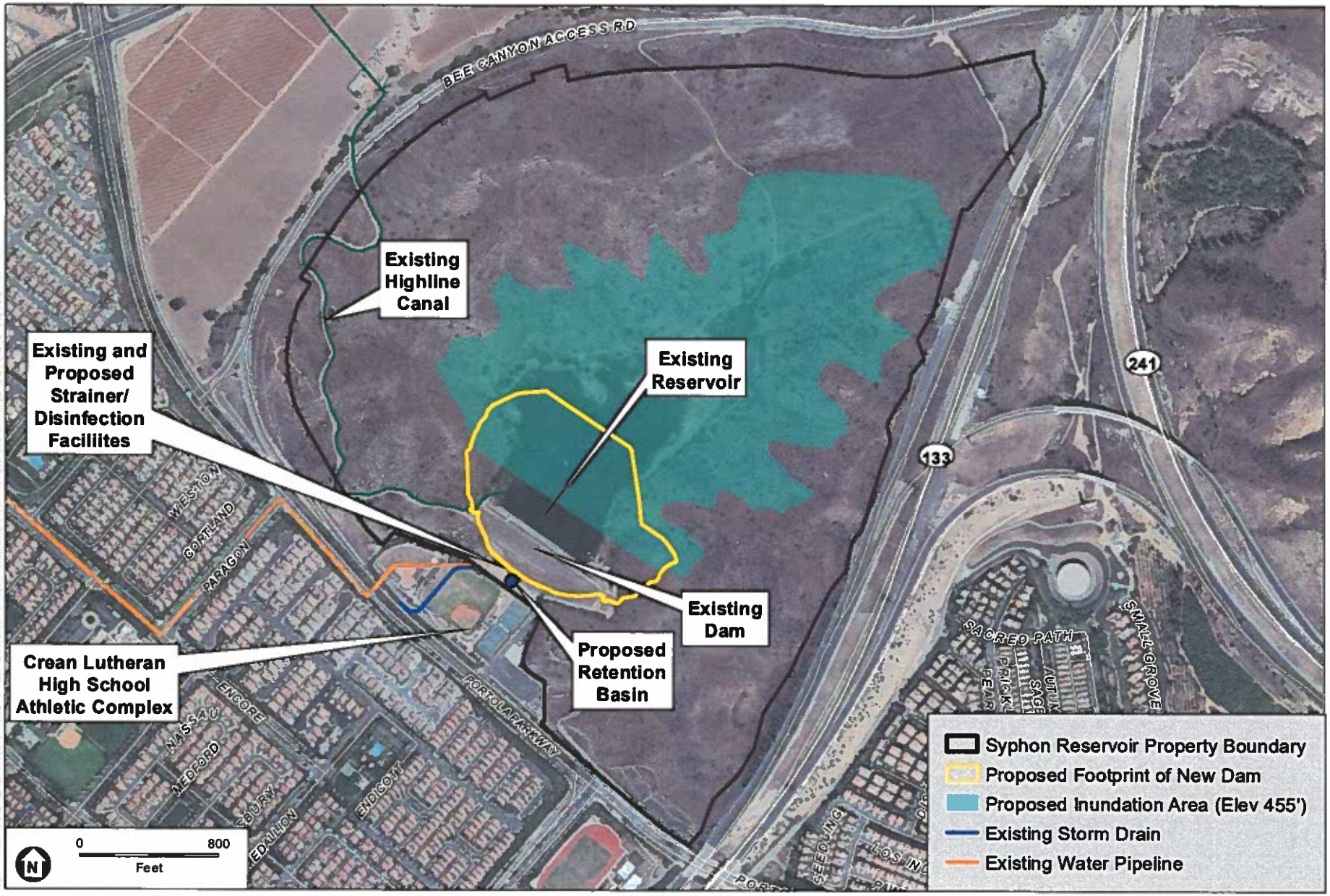
The purpose of the proposed project is to increase the recycled water storage capacity of Syphon Reservoir by replacing and enlarging the existing reservoir facilities to meet the seasonal demands of recycled water customers and to enhance IRWD's water supply reliability. Currently, once IRWD's existing recycled water storage reservoirs are filled to capacity in winter months, IRWD sewage is either diverted around the Michelson WRP to the Orange County Sanitation District (OCSD) or recycled water produced at the Michelson WRP is discharged to the ocean. During peak summer months, IRWD is left short of recycled water to meet the demands of IRWD's recycled water customers and IRWD must then purchase costly supplemental imported water from MWD.

POSTED

AUG 02 2019

ORANGE COUNTY CLERK-RECORDER DEPARTMENT

BY: _____ DEPUTY



SOURCE: ESRI, 2016

IRWD Syphon Reservoir Improvement Project

Figure 2

Project Site and Proposed Project

ESA

Based on projected demands and supplies, IRWD estimates that it will need an additional 4,500 AF of recycled water seasonal storage capacity by the year 2030. The expansion of Syphon Reservoir would allow the storage of recycled water that is currently lost to the ocean or that could have been produced at Michelson WRP absent any diversion of sewage to OCSD. The additional stored recycled water could then be used to meet the projected seasonal recycled water demands within IRWD's service area.

The proposed project would allow the storage of additional recycled water produced at the Michelson WRP during periods of low demand (winter months) for use during periods of high demand (summer months). The expansion of the reservoir's storage capacity from the current 500 AF to approximately 5,000 AF would help IRWD become more self-sufficient by reducing its dependence on costly and less reliable imported water during summer months, and support the increased use of recycled water for public landscaping, agricultural, business and industrial uses. Increased use of recycled water for these non-drinking water purposes would make more drinking water available to the region to better withstand future water shortages. The recycled water available for use by IRWD's customers as a result of the proposed project would not be subject to water shortages and would therefore increase IRWD's water supply reliability.

The objectives of the proposed project are as follows:

- Improve local water supply reliability by reducing the need to purchase less reliable imported water from MWD by storing and using additional recycled water;
- Reduce diversions of sewage to OCSD;
- Promote additional recycling of water while reducing effluent discharges to the ocean; and
- Ensure the new dam and reservoir continue to meet or exceed the latest safety standards, including the standards of the California Department of Water Resources (DWR), Division of Safety of Dams requirements (DSOD).

Project Components

Dam Replacement

The proposed project would involve replacement of the existing 59-foot high engineered dam with a new 136-foot high engineered dam with a 20-foot wide crest. The new dam would be constructed primarily from on-site impermeable materials, although the importation of some specialty materials is anticipated. During removal of the existing dam, materials would be stockpiled for reuse to the extent feasible. In addition, new borrow areas would be identified onsite, where material would be excavated for use as fill for the new dam. IRWD recently approved the Syphon Reservoir Geotechnical Investigations Project, which will be completed prior to designing the proposed new dam. The Geotechnical Investigations Project will help to determine the amount and type of specialty materials that would need to be imported to the site, as well as help to define the limits of disturbance to minimize impacts. The total volume of all materials comprising the dam would be approximately 2.3 million cubic yards.

The new reservoir would include the same small watershed as the existing reservoir and would not be capable of generating significant amounts of runoff that would need to be managed through the use of the spillway. Similar to the existing dam, it is a requirement of DSOD that a spillway be included with the new dam to protect the dam from overtopping. The new spillway would be constructed and lined with reinforced concrete to prevent erosion of the abutment and embankment materials. The spillway would be

designed to meet and exceed the latest safety standards. Flows through the spillway would discharge into a channel lined with grouted rip-rap (concrete grout placed in void spaces between rip-rap pieces), and then into a partially below-grade retention basin designed to dissipate the energy of the flow. Water would exit the retention basin into the existing 48-inch pipeline to the storm drain at Portola Parkway.

Slope protection for the new dam would consist of rip-rap on the upstream slope and vegetation on the downstream slope. The rip-rap on the upstream slope would provide erosion protection from small wave action resulting from water in the reservoir. The vegetation on the downstream slope would provide erosion protection from rainfall runoff.

Reservoir Enlargement

The replacement dam would result in an increase in the reservoir's maximum water surface elevation from 376 feet amsl to 456 feet amsl and increase the reservoir's capacity from approximately 500 AF to 5,000 AF. The proposed project would expand the reservoir's shoreline and inundate up to approximately 82 acres upstream of the dam that currently support upland and wetland vegetation communities, some of which are within the NCCP/HCP Reserve area and deed restricted lands. **Figure 2** shows the preliminary footprint of the proposed dam and reservoir inundation area.

Similar to existing operations, with implementation of the proposed project, water levels at Syphon Reservoir would fluctuate seasonally. Water would be stored in winter when recycled water supplies exceed demands, and the reservoir would be drawn down in summer when demands exceeds supply. The estimated minimum operating capacity of the reservoir would be about 180 AF to maintain water quality.

IRWD would develop an annual operating plan for the enlarged Syphon Reservoir to set targets for the volume of water to be contained in the reservoir on a daily, monthly, annual, or seasonal basis. Reservoir operations would vary with time and would need to consider a wide variety of factors, such as: seasonal storage needs, water quality considerations, rainfall projections, and operational compatibility with the IRWD recycled water system. Reservoir operations would be adjusted by IRWD during the year based on changes in projected demands and other factors.

Conveyance Facilities and Other Project Components

The conveyance and inlet facilities that would deliver recycled water from the Michelson WRP to Syphon Reservoir are sufficiently sized to accommodate the proposed project and would not require modification. Under the proposed project, water would be delivered to Syphon Reservoir via an existing 36-inch recycled water pipeline and the Eastwood Recycled Water Pump Station, which is located off-site and currently under construction. The Highline Canal would be abandoned in place and no longer used to deliver water to Syphon Reservoir from Rattlesnake Reservoir.

As stated previously, Syphon Reservoir's existing outlet facilities include a series of underground pipes that convey flow through the strainer and disinfection facilities and then into IRWD's recycled water system for distribution to customers. In the event of an emergency, the existing reservoir can also be drawn down through an existing 48-inch pipeline that discharges to the existing storm drain in Portola Parkway (see **Figures 1 and 2**). Under normal operating conditions, all flow in or out of the reservoir would be conveyed through the existing 36-inch inlet/outlet pipeline. With the exception of the strainer and disinfection facilities, these existing outlet conveyance facilities are sufficiently sized to accommodate the proposed project and would not require modification (see **Figure 2**).

The expanded strainer and disinfection facilities would be relocated at the toe of future dam in the same general vicinity of the existing facility (see **Figure 2**) and would continue to use sodium hypochlorite to disinfect water stored in the reservoir. The new facility would also include sodium bisulfite storage and associated metering pumps to de-chlorinate the future inlet flow to Syphon Reservoir.

Other operational systems that would likely be part of the proposed project include (1) an internal seepage control system within the new dam; and (2) a circulation/aeration system for the enlarged reservoir. In addition, during project design, IRWD will consider recreational opportunities that may be compatible with the project site. Recreational opportunities that will be reviewed include public walking trails, potential restrooms, shade structure, benches, and interpretive signs.

Project Construction Schedule

Construction of the proposed project is estimated to require approximately 36 months, depending on weather conditions and other variables. Construction is currently anticipated to begin in the fall of 2022.

Potential Environmental Impacts

The EIR will assess and disclose the reasonably foreseeable direct, indirect, and cumulative impacts that would likely result from the construction and operation of the proposed project. Potential impacts to resources listed in Appendix G of the CEQA Guidelines, as amended on December 28, 2018, are summarized below. The EIR will identify mitigation measures if necessary to avoid, minimize, and offset potentially significant impacts of the project. The EIR also will describe the alternatives screening analysis conducted for the proposed project, and evaluate alternatives to the proposed project that would avoid, minimize, and offset potentially significant impacts of the project while attempting to meet the objectives of the proposed project.

Aesthetics

The project area is not officially designated as a scenic vista; however, open space and conservation areas are considered important scenic resources within the County of Orange and the adjacent City of Irvine. Replacing the dam and enlarging the reservoir would alter the views of the project site from surrounding public vantage points, including the Crean Lutheran High School Athletic Complex immediately below the reservoir and the adjacent residential areas, parks, and roadways. Potential direct and indirect visual impacts could occur both during construction and after the reservoir is enlarged and infrastructure is built and operational. The EIR will identify the visible changes to scenic resources, scenic vistas, and visual character of the project area due to the reservoir enhancement and development of ancillary facilities associated with the proposed project within the viewshed. Further, the EIR will evaluate the potential increase in light and glare from the proposed project on motorists traveling along Portola Parkway, SR-133 and neighboring sensitive receptors.

Agriculture and Forestry Resources

The project site includes the existing Syphon Reservoir and surrounding open space area. While the project site is zoned as General Agriculture by the County of Orange, the General Agricultural District allows for low-intensity uses that have predominantly open space character, such as Syphon Reservoir. The EIR will analyze the potential impacts of project implementation on farmland or forestry resources, as well as conflicts with zoning designations for such land uses.

Air Quality

The project site is located within the South Coast Air Basin, which is under the jurisdiction of the South Coast Air Quality Management District (SCAQMD). Deconstruction of the existing reservoir and construction of a new reservoir and ancillary facilities would generate temporary emissions from construction equipment exhaust, earth movement, construction workers' commute, and material hauling. Operational activities associated with the proposed project could generate air pollutants from employee commuting, truck deliveries and operation of stationary equipment. The EIR will evaluate the generation of air pollutants during construction and operational activities associated within the proposed project. Conflicts or obstructions with the implementation of the SCAQMD Air Quality Plan will also be discussed in the EIR. Furthermore, the exposure of sensitive receptors to pollutant concentrations or other emissions such as odors will be analyzed.

Biological Resources

Sensitive biological resources at the project site could be significantly affected by construction of the proposed project and the long-term seasonal water elevation changes that would result during operation of an enlarged reservoir. The EIR will evaluate the potential for construction and operation of the proposed project to affect biological resources and will discuss local ordinances, as well as state and federal regulations governing biological resources. In particular, consistency with the NCCP/HCP will be discussed in the EIR. Such analysis will incorporate updated spatial data from the California Natural Diversity Database, the proposed project's Biological Resources Technical Report, various surveys conducted at the project site for rare plants, natural communities, and special-status species, and will address recent changes to the status of federal and State listed species.

A large portion of the project site was previously used by the Transportation Corridor Agencies (TCA) for mitigation lands for impacts associated with the Eastern Transportation Corridor Project. When IRWD acquired Syphon Reservoir from the Irvine Company, the Conveyance Agreement included a Grant Deed with use restrictions that provide for the conservation of biological resources associated with that mitigation. The EIR will evaluate the impacts associated with biological resources within areas included in the Grant Deed. IRWD will continue ongoing consultation with both U.S. Fish and Wildlife Service and California Department of Fish and Wildlife regarding consistency with both the NCCP/HCP and the Grant Deed and appropriate mitigation. A modification to the Grant Deed could be pursued consistent with these consultations.

Cultural Resources

The analysis included in the EIR will document and evaluate the existing dam and associated facilities, which would be deconstructed as part of the project. Constructed in 1949, the existing facilities are over 45 years of age and therefore meet the California Office of Historic Preservation's threshold for consideration as a historical resource. The proposed project also would include excavation activities that could uncover previously known or unknown historical or archaeological resources, or unknown human burial resources. The EIR will assess the potential effects on cultural resources in the project area as a result of the proposed dam replacement, reservoir enlargement and construction of ancillary facilities.

Energy

The proposed project could require significant amounts of energy during construction and operation of the proposed facilities. The EIR will quantitatively evaluate energy demand from construction equipment, haul trucks, vendor trucks, and construction workers. The EIR will also quantify the Project's anticipated operational energy needs, including direct consumption of electricity to pump recycled water and fuel needed for maintenance operations. Any construction of new or expanded energy related facilities could result in environmental effects. The EIR will assess the potential impacts of the proposed project on energy use.

Geology and Soils

The project site is located in a seismically active region. Active or potentially active faults that could potentially affect Syphon Reservoir include the San Joaquin Hills, Chino, Elsinore, Newport-Inglewood, Puente Hills, San Jacinto, and San Andreas faults; the closest is Puente Hills, which is located 4.3 miles away from the project site. Previous studies indicate that two faults are located within the project site, one of which runs directly beneath the existing reservoir and dam.[1] Neither fault is considered active or potentially active. The proximity of these faults places the project area at potential risk for geological hazards. IRWD recently approved the Syphon Reservoir Geotechnical Investigations Project, which will be completed prior to designing the proposed project. The Geotechnical Investigations Project will characterize the geologic and geotechnical conditions of the Syphon Reservoir site and verify the location and historic activity of the onsite faults. The Geotechnical Investigations Project will also help develop criteria for the proposed project that will be used to design for potential geologic hazards.

Construction and operation of the proposed project could be subject to potential seismic hazards including surface fault rupture, strong seismic shaking, soil liquefaction, and geologic hazards such as subsidence, soil erosion, ground collapse, and expansive soil. The EIR will evaluate the potential seismic and geologic hazards that could affect the proposed facilities. The proposed project and its appurtenant facilities would be designed to safely accommodate these potential hazards and the structures would meet and exceed the latest state and federal safety standards.

Greenhouse Gas Emissions

In addition to air emissions, the proposed project would result in the emission of greenhouse gases from construction and operational activities. Construction activities could generate greenhouse gas emissions from equipment exhaust, construction workers' commutes, and material hauling. Operational activities could generate emissions from employee commuting, truck deliveries, and stationary equipment. The EIR will evaluate the contribution of construction and operational greenhouse gas emissions to global climate change. The EIR will evaluate the proposed project's consistency with state and local regulatory requirements and regulations.

Hazards and Hazardous Materials

A database search of hazardous materials sites using the online Department of Toxic Substances Control's EnviroStor and State Water Resources Control Board (SWRCB) GeoTracker databases showed that Syphon Reservoir is not located on a hazardous materials site. However, construction activities associated with the proposed project could result in the release of hazardous materials. Additionally, the proposed disinfection facilities could result in use, storage and/or transport of potentially hazardous materials to and

[1] GEI Consultants, Inc. 2012. Syphon Reservoir Expansion Engineering Feasibility Study, Constructability Analysis.

from the project site. The proposed project would be designed to safely store any potentially hazardous materials. The EIR will assess the potential for storing and transporting hazardous materials associated with the operation of proposed facilities, and the upset/accident condition involving the release of hazardous materials into the environment, including the emission of hazards within 0.25 mile of a school. Further, the proposed project may result in increased truck load intensities that could increase traffic and physically interfere with an adopted emergency response plan. The EIR will also evaluate the potential for interference with an adopted emergency response plan to occur and wildland fire threats due to project implementation.

Hydrology and Water Quality

The proposed project may change local drainage patterns at the project site, which could impact water quality, volume, and surface runoff, as well as groundwater resources. The EIR will describe relevant federal, state, and local regulations and agencies, including provisions of the federal Clean Water Act and the permitting and regulatory authority of the Regional Water Quality Control Board and the SWRCB. The EIR will identify potential seiche and dam inundation hazard zones in the project area, as well as stormwater quality protection measures required during construction and operation of proposed project.

Land Use and Planning

The project site is designated as Open Space Reserve and is zoned as General Agriculture by the County of Orange. The project area contains specialized development requirements as required by various regulatory agencies and the City of Irvine. The EIR will evaluate the proposed project's potential to conflict with all applicable plan, policies, and regulations as well as any deed restrictions imposed on surrounding mitigation lands as described above under Biological Resources.

Mineral Resources

While the project site is not identified as a known mineral resource area and does not have a history of mineral extraction uses, the EIR will include an evaluation of the project's potential to result in the loss of availability of a known mineral resource.

Noise

Implementation of the proposed project would require construction and operation of project components that would generate noise and vibration. Construction activities could be a significant source of temporary noise and vibration from trucking operations and the use of heavy construction equipment (e.g., drill rigs, graders, cranes, and frontend loaders). During project operation, fixed sources of noise could be established. The EIR will describe the local noise policies and ordinances. The EIR will quantify potential noise and vibration levels associated with construction and operation of the proposed project for comparison to standards and thresholds established in local noise policies and ordinances.

Population and Housing/Growth Inducement

The proposed project does not include the construction of new housing. As such, the proposed project would not directly induce population growth. The proposed project will be built to enable IRWD to meet the community's needs for recycled water. The proposed project is not expected to indirectly result in construction of new housing or increase the local population; the workforce for construction of the proposed project is anticipated to derive form the existing labor pool in Orange County, and operation of the proposed project is not expected to create new long-term employment opportunities. However, the

EIR will address the proposed project's potential to induce indirect population growth due to expansion of water storage capacity and the corresponding ability to store recycled water at Syphon Reservoir. The EIR will evaluate the proposed project's potential to indirectly induce growth in the region.

Public Services

The proposed project would construct a new recycled water storage facility but is unlikely to affect demand for other public services or to require other new or expanded public facilities. The EIR will assess the potential for the proposed project to affect police and fire protection services, schools, and parks.

Recreation

In the project vicinity, the City of Irvine and Orange County Parks (OC Parks) maintain parks and provide recreational services. The nearest recreational facility is the Crean Lutheran High School Athletic Complex and Mockingbird Park located adjacent and approximately 0.25-mile south of the project site, respectively. The EIR will analyze potential impacts to existing local recreational resources. The EIR also will evaluate any potential recreational opportunities that may be compatible with the project site and implemented as a component of the proposed project.

Traffic and Transportation

Construction of the proposed project could affect traffic on local roadways as a result of vehicle trips associated with hauling of material and equipment, increased demand for parking to serve construction workers, and increase in traffic hazards caused by construction activities. In addition, operation of the proposed project could introduce vehicle trips to the project area for delivery of disinfection materials and operation and maintenance vehicles. The EIR will evaluate the potential impact to traffic and circulation due to construction-related vehicle trips and operational vehicle trips on local and regional roadways.

Tribal Cultural Resources

IRWD is conducting AB 52 tribal consultation with the following three Native American Tribes who have requested to be informed of activities initiated by IRWD: San Gabriel Band of Mission Indians, Gabrieleño Band of Mission Indians – Kizh Nation, and Juaneño Band of Mission Indians/Acjachemen Nation. There is a potential for the proposed project to affect tribal cultural resources during ground-disturbing activities associated with construction of the proposed project. The EIR will evaluate potential impacts to tribal cultural resources and incorporate the results of AB 52 consultations into the analysis.

Utilities and Service Systems

The EIR will evaluate whether construction and operation of the proposed project could result in impacts to existing public utilities, such as water or sewage treatment, storm water drainage, and solid waste disposal. The proposed project would not require additional water facilities beyond those identified in the project description; however, development of the proposed project may modify the mix of water supplies used within the IRWD service area. The proposed project is not anticipated to increase impervious surfaces that can result in increases in storm water runoff, and the existing storm drain in Portola Parkway has sufficient capacity for discharges from the proposed enlarged reservoir as described previously. As such, additional storm water drainage facilities would not be required. Construction activities associated with the proposed project could increase construction waste that could be required to be placed in a landfill, subject to solid waste regulations.

Wildfire

The project site is located within an undeveloped and vegetated open space area. The project site area is located within a State/Federal Responsibility Area, Very High Fire Hazard Severity Zone. The project site includes slopes that surround the existing reservoir and are susceptible to prevailing winds. During construction, equipment and on-site diesel fuel could pose a risk to wildfire with possible ignition sources such as internal combustion engines, gasoline-powered tools, and equipment that could produce a spark, fire, or flame. The use of spark-producing construction machinery within fire risk areas such as the project area could expose temporary project workers and contractors to pollutant concentrations from a wildfire or the uncontrolled spread of wildfire. Additional water available for firefighting would be available as a result of the additional recycled water stored in the proposed enlarged reservoir. The EIR will evaluate potential impacts of wildfires due to implementation of the proposed project.

Attachment 2: Notice of Completion

2019080009

Notice of Completion & Environmental Document Transmittal

Mail to: State Clearinghouse, P. O. Box 3044, Sacramento, CA 95812-3044 (916) 445-0613
For Hand Delivery/Street Address: 1400 Tenth Street, Sacramento, CA 95814

SCH # _____

Project Title: Syphon Reservoir Improvement Project

Lead Agency: Irvine Ranch Water District | Contact Person: Jo Ann Corey
Mailing Address: 15600 Sand Canyon Avenue | Phone: 949-453-5300
City: Irvine | Zip: 92618 | County: Orange

Project Location: County: Orange | City/Nearest Community: Irvine
Cross Streets: Portola Parkway and Bee Canyon Access Road | Zip Code: 92620
Lat. / Long.: 33 ° 42 ' 38 " N/ -117 ° 43 ' 52 " W | Total Acres: 266
Assessor's Parcel No.: 104-118-34 | Section: | Twp.: | Range: | Base:
Within 2 Miles: State Hwy #: 133 | Waterways: Syphon Reservoir, Bee Canyon Wash
Airports: N/A | Railways: N/A | Schools: Stonegate Elementary, Crean Lutheran High School, Eastwood Elementary

Governor's Office of Planning & Research
AUG 01 2019
STATE CLEARINGHOUSE

Document Type:

CEQA: ☒ NOP ☐ Early Cons ☐ Neg Dec ☐ Mit Neg Dec ☐ Draft EIR ☐ Supplement/Subsequent EIR (Prior SCH No.) _____ ☐ Other _____
NEPA: ☐ NOI ☐ EA ☐ Draft EIS ☐ FONSI
Other: ☐ Joint Document ☐ Final Document ☐ Other _____

Local Action Type:

☐ General Plan Update ☐ General Plan Amendment ☐ General Plan Element ☐ Community Plan
☐ Specific Plan ☐ Master Plan ☐ Planned Unit Development ☐ Site Plan
☐ Rezone ☐ Prezone ☐ Use Permit ☐ Land Division (Subdivision, etc.)
☐ Annexation ☐ Redevelopment ☐ Coastal Permit ☐ Other _____

Development Type:

☐ Residential: Units _____ Acres _____
☐ Office: Sq.ft. _____ Acres _____ Employees _____
☐ Commercial: Sq.ft. _____ Acres _____ Employees _____
☐ Industrial: Sq.ft. _____ Acres _____ Employees _____
☐ Educational _____
☐ Recreational _____
☒ Water Facilities: Type Reservoir Expansion AF 5,000
☐ Transportation: Type _____
☐ Mining: Mineral _____
☐ Power: Type _____ MW _____
☐ Waste Treatment: Type _____ MGD _____
☐ Hazardous Waste: Type _____
☐ Other: _____

Project Issues Discussed in Document:

☒ Aesthetic/Visual
☒ Agricultural Land
☒ Air Quality
☒ Archeological/Historical
☒ Biological Resources
☐ Coastal Zone
☒ Drainage/Absorption
☐ Economic/Jobs
☐ Fiscal
☒ Flood Plain/Flooding
☒ Forest Land/Fire Hazard
☒ Geologic/Seismic
☒ Minerals
☒ Noise
☒ Population/Housing Balance
☒ Public Services/Facilities
☒ Recreation/Parks
☒ Schools/Universities
☒ Septic Systems
☒ Sewer Capacity
☒ Soil Erosion/Compaction/Grading
☒ Solid Waste
☒ Toxic/Hazardous
☒ Traffic/Circulation
☒ Vegetation
☒ Water Quality
☒ Water Supply/Groundwater
☒ Wetland/Riparian
☒ Wildlife
☒ Growth Inducing
☒ Land Use
☒ Cumulative Effects
☐ Other _____

Present Land Use/Zoning/General Plan Designation:

Orange County GP: Open Space Reserve; Unincorporated Orange County Zoning: A1 (General Agriculture); Orange County NCCP Reserve

Project Description: *(please use a separate page if necessary)*

The proposed Syphon Reservoir Improvement Project (proposed project) would increase the capacity of the existing recycled water reservoir to serve the community's seasonal and future recycled water needs. The reservoir capacity would increase from approximately 500 acre-feet (AF) to 5,000 AF. As a part of the reservoir expansion, the existing engineered dam would be replaced with a new engineered dam that would meet and exceed the latest safety standards.

Note: The state Clearinghouse will assign identification numbers for all new projects. If a SCH number already exists for a project (e.g. Notice of Preparation or previous draft document) please fill in.

Syphon Reservoir Improvement Project

Summary

SCH Number	2019080009
Lead Agency	Irvine Ranch Water District
Document Title	Syphon Reservoir Improvement Project
Document Type	NOP - Notice of Preperation
Received	8/1/2019
Present Land Use	Orange County GP: Open Space Reserve; Unincorporated Orange County Zoning: A1 (General Agriculture); Orange County NCCP Reserve
Document Description	The proposed Syphon Reservoir Improvement Project (proposed project) would increase the capacity of the existing recycled water reservoir to serve the community's seasonal and future recycled water needs. The reservoir capacity would increase from approximately 500 acre-feet (AF) to 5,000 AF. As a part of the reservoir expansion, the existing engineered dam would be replaced with a new engineered dam that would meet and exceed the latest safety standards.

Contact Information

Jo Ann Corey
Irvine Ranch Water District
15600 Sand Canyon Avenue
Irvine, CA 92618
Phone : (949) 453-5300

Location

Coordinates	33°42'38"N 117°43'52"W
Cities	Irvine
Counties	Orange
Cross Streets	Portola Parkway and Bee Canyon Access Road
Zip	92620
Total Acres	266
Parcel #	104-118-34
State Highways	133
Schools	Stonegate Elementary, Crean Lutheran Highschool,
Waterways	Syphon Reservoir, Bee Canyon Washcess Road
Other Location Info	Schools: Eastwood Elementary

Notice of Completion

Review Period Start	8/1/2019
Review Period End	9/16/2019
Development Type	Water Facilities (Reservoir Expansion)(5,000 MGD)
Project Issues	

Aesthetic/Visual | Agricultural Land | Air Quality | Archaeologic-Historic | Biological Resources | Drainage/Absorption | Flood Plain/Flooding | Forest Land/Fire Hazard | Geologic/Seismic | Minerals | Noise | Population/Housing Balance | Public Services | Recreation/Parks | Schools/Universities | Septic System | Sewer Capacity | Soil Erosion/Compaction/Grading | Solid Waste | Toxic/Hazardous | Traffic/Circulation | Vegetation | Water Quality | Water Supply | Wetland/Riparian | Wildlife | Growth Inducing | Land Use | Cumulative Effects

Reviewing Agencies

Air Resources Board, Major Industrial Projects | Cal Fire | California Department of Parks and Recreation | California Highway Patrol | Caltrans, Division of Transportation Planning | Department of Conservation | Department of Toxic Substances Control | Office of Emergency Services, California | Office of Historic Preservation | Resources Agency | Resources, Recycling and Recovery | State Water Resources Control Board, Division of Water Quality | Native American Heritage Commission | Department of Water Resources | Department of Fish and Wildlife, Region 5 | Caltrans, District 12

Attachments

Environmental Document

NOP PDF 3537 K

NOC

Letter PDF 169 K

NOC PDF 1733 K

State Comments

2019080009_CDFW_Syphon Reservoir NOP comments PDF 2064 K

2019080009_DOT_2019-01193 Syphon Reservoir Improvment Cmnt PDF 98 K

2019080009_DWR_DSOD Comment_Syphon Reservoir Improvement Project PDF 87 K

2019080009_NAHC_NOP Syphon Reservoir Improvement Project 8 PDF 167 K

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Attachment 3: Public Notice of Scoping Meeting

Notice of Preparation of an Environmental Impact Report
for the Syphon Reservoir Improvement Project

This Notice of Preparation (NOP) has been prepared to notify agencies and interested parties that Irvine Ranch Water District (IRWD), as the lead agency, will prepare an Environmental Impact Report (EIR) pursuant to the California Environmental Quality Act (CEQA) for the Syphon Reservoir Improvement Project (proposed project). The proposed project would be built within the IRWD service area at the site of the existing Syphon Reservoir, which is currently a recycled water storage reservoir. Syphon Reservoir is located in unincorporated County of Orange, California, on the northeast side of Portola Parkway between Bee Canyon Access Road and State Route 133, where the majority of the property bounded by these thoroughfares is owned by IRWD. The proposed project would increase the capacity of the existing recycled water reservoir to serve the community's seasonal and future water needs. As a part of the reservoir expansion, the existing engineered dam would be replaced with a new engineered dam that would meet and exceed the latest safety standards. The new engineered dam would increase the reservoir capacity from approximately 500 acre-feet (AF) to 5,000 AF.

IRWD is soliciting comments from responsible and trustee agencies as well as interested parties as to the scope and content of the environmental information to be included in the EIR. In accordance with CEQA, agencies are requested to review the project description provided in the NOP and provide comments on environmental issues related to the statutory responsibilities of the agency. The EIR will be used by IRWD when considering approval of the proposed project as well as any related discretionary approvals.

A 45-day public review period for the NOP begins on **August 2, 2019** and ends **September 16, 2019**. Copies of the NOP are available at Heritage Park Library located at 14361 Yale Ave, Irvine CA 92604; and online at the IRWD Web Site (http://www.irwd.com/doing-business/environmental-documents).

IRWD will hold a public scoping meeting on **August 21, 2019, 6:00 p.m.** at IRWD's Main Office (15600 Sand Canyon Avenue Irvine, CA 92618, Multi-Purpose Room) to receive comments and suggestions about the issues to be included in the EIR. The scoping meeting will include a brief presentation, providing an overview of the proposed project. After the presentation, public comments will be accepted either orally or in writing at the scoping meeting. Comment forms will be supplied for those who wish to submit written comments at the meeting; written comments will also be accepted by IRWD anytime during the 45-day review period until the **4:00 p.m. deadline on September 16, 2019.** Please send your comments to the mailing address or email address shown below. Include a return address or email address and a contact name for your agency or party with your comments.

Irvine Ranch Water District
Water Resources & Policy Department
15600 Sand Canyon Avenue
P.O. Box 57000
Irvine, California 92619-7000
Attn: Jo Ann Corey, Environmental Compliance Specialist
SyphonEIR@irwd.com
Phone: 949-453-5300

Aviso de Preparación de un Reporte de Impacto Ambiental para el Proyecto de Mejora de la Reserva Syphon

Este Aviso de Preparación (NOP, por sus siglas en inglés) ha sido preparado para notificar a las agencias y partes interesadas acerca de que el Irvine Ranch Water District (IRWD) (Distrito de Agua Irvine Ranch), como agencia líder, preparará un Reporte de Impacto Ambiental (EIR, por sus siglas en inglés) de acuerdo con la Ley de Calidad Ambiental de California (CEQA, por sus siglas en inglés) para el Proyecto de Mejora de la Reserva Syphon (proyecto propuesto). El proyecto propuesto se construiría dentro del área de servicio del IRWD en el sitio donde se encuentra la Reserva Syphon, que actualmente es una reserva de almacenamiento de agua reciclada. La Reserva Syphon se encuentra en el Condado no incorporado de Orange, California, en el lado Noreste de Portola Parkway entre Bee Canyon Access Road y State Route 133, donde la mayor parte de la propiedad delimitada por estas carreteras es propiedad del IRWD. El proyecto propuesto aumentaría la capacidad de la reserva de agua reciclada existente para atender las necesidades de agua futuras y estacionales de la comunidad. Como parte de la expansión de la reserva, la represa existente sería reemplazada por una represa nuevamente diseñada que cubriría y excedería las últimas normas de seguridad. La nueva represa aumentaría la capacidad de la reserva de unos 500 acres-pies (AF, por sus siglas en inglés) a 5.000 AF.

El IRWD solicita comentarios de agencias responsables y administradoras así como de partes interesadas respecto del alcance y contenido de la información ambiental para incluir en el EIR. De acuerdo con la CEQA, las agencias deben revisar la descripción del proyecto provista en el NOP y ofrecer comentarios sobre asuntos ambientales relacionados con las responsabilidades legales de la agencia. El EIR será utilizado por el IRWD al considerar la aprobación del proyecto propuesto así como aprobaciones discrecionales relacionadas.

El período de revisión pública de 45 días para el NOP comienza el **2 de agosto de 2019** y termina el **16 de septiembre de 2019**. Hay disponibles copias del NOP en la Biblioteca Heritage Park ubicada en 14361 Yale Ave, Irvine CA 92604; y en línea en el sitio web del IRWD (http://www.irwd.com/doing-business/environmental-documents).

El IRWD realizará una reunión pública el **21 de agosto de 2019 a las 6:00 p.m.** en la Oficina Central del IRWD (15600 Sand Canyon Avenue Irvine, CA 92618, Salón de Usos Múltiples) para recibir comentarios y sugerencias acerca de los asuntos para incluir en el EIR. La reunión incluirá una breve presentación, que brindará una descripción general del proyecto propuesto. Tras la presentación, se aceptarán comentarios públicos en forma oral o escrita. A quienes deseen brindar comentarios escritos en la reunión se les proporcionarán formularios para comentarios; también el IRWD aceptará comentarios escritos en cualquier momento durante el período de revisión de 45 días, hasta las **4:00 p.m. del 16 de septiembre de 2019.** Envíe sus comentarios a la dirección postal o por correo electrónico a la dirección que se indica a continuación. Incluya una dirección de retorno o dirección de correo electrónico y nombre de contacto de su agencia o grupo con sus comentarios.

Irvine Ranch Water District
Water Resources & Policy Department
15600 Sand Canyon Avenue

P.O. Box 57000
Irvine, California 92619-7000
Attn: Jo Ann Corey, Environmental Compliance Specialist
SyphonEIR@irwd.com
Teléfono: 949-453-5300

사이펀 저수지 개선 프로젝트에 대한
환경영향보고서 준비 통지서

본 준비 통지서(NOP)는 주도 기관인 어바인 랜치 수도국에서 캘리포니아 환경보존법(CEQA)에 따라 사이펀 저수지 개선 프로젝트(개발 프로젝트)에 대한 환경영향보고서(EIR)를 작성하는 데 대하여 기관들과 이해 관계자들에게 통지하기 위하여 작성되었습니다. 개발 프로젝트는 현재 재활용 상수저수지로 사용되고 있는 기존의 사이펀 저수지 부지에 위치한 IRWD 서비스 지역 이내에 건설 될 것입니다. 사이펀 저수지는 캘리포니아 주 지치체로서 인가되지 않은 오렌지 카운티의 Bee Canyon Access Road와 State Route 133 사이에 있는 Portola Parkway 의 북동쪽에 위치하여 있고 이처럼 주요 도로로 가로막힌 대부분의 부지는 IRWD 의 소유입니다. 지역 사회의 계절 수요와 향후 상수수요를 공급하기 위해 개발 프로젝트의 기존 재활용 저수지 용량을 늘일 것입니다. 저수지 확장의 일환으로 최근 안전 기준을 맞추거나 능가하는 새로운 공학적 댐으로 기존의 공학적 댐을 교체할 것입니다. 새로운 공학적 댐은 저수지의 용량을 약 500 에이커 피트(AF)로부터 5,000 에이커 피트(AF)까지 늘이게 됩니다.

IRWD는 EIR에 포함시킬 환경 정보의 범위와 내용에 대하여 이해 관계자들과 책임자는 기관과 신탁 기관들로부터 의견을 요청하고 있습니다. 기관들은 CEQA에 근거하여 NOP에 제공된 프로젝트 설명을 검토해 보고 해당 기관들의 법적 책임에 관련된 환경 문제에 대하여 의견을 제출해야 합니다. IRWD는 개발 프로젝트의 승인과 관련 제량 승인을 고려하는 측면에서 EIR을 이용합니다.

NOP 공공 검토는 45일 동안 진행되며 **2019년 8월 2**일에 시작하여 **2019년 9월 16**일에 마무리 됩니다. 14361 Yale Ave, Irvine CA 92604 에 위치한 역사공원도서관(Heritage Park Library)에서 NOP 사본을 얻으실 수 있으며 온라인에서 IRWD 웹사이트 (http://www.irwd.com/doing-business/environmental-documents)에서도 NOP 사본을 구하실 수 있습니다.

EIR에 포함시킬 문제에 대한 의견과 제안을 받게 위해, IRWD는 **2019년 8월 21일 오후 6시**에 IRWD의 본사(15600 Sand Canyon Avenue Irvine, CA 92618, 다용도실/Multi-Purpose Room)에서 공공 검사 회의를 열 것입니다. 검사 회의는 간단한 프레젠테이션을 포함하여 개발 프로젝트의 개요를 제공합니다. 프레젠테이션을 마친 후 검사 회의에서 구두 또는 서면 형식으로 공공 의견을 받게 됩니다. 회의에서 서면 의견을 제출하려는 분들을 위하여 의견 양식을 제공해 드립니다. 또한, 서면 의견은 마감일인 **2019년 9월 16일 오후 4시**까지 45일 동안의 검토 기간 중 언제든지 접수가 가능합니다. 우편 주소 또는 아래의 이메일 주소로 소중한 의견을 보내주시기 바랍니다. 회신 주소 또는 이메일 주소와 기관 또는 관계자 연락처 이름도 의견과 함께 보내주세요.

Irvine Ranch Water District (어바인 랜치 수도)
Water Resources & Policy Department (수자원 및 정책본부)
15600 Sand Canyon Avenue
P. O. Box 57000
Irvine, California 92619-7000
Attn: Jo Ann Corey, Environmental Compliance Specialist (환경 준수 전문가 귀하)
이메일: SyphonEIR@irwd.com
전화번호: 949-453-5300

虹吸水庫(Syphon Reservoir)改善項目
環境影響報告內容界定通知

此**項目準備通知** (NOP) 旨在通知各個機構及相關單位，爾灣農場水務局(IRWD) 作為領導機構，即將遵照《加州環境品質法》(CEQA) 的要求，籌備**虹吸水庫**(Syphon Reservoir)改善**項目**（擬議計劃）製作一份環境影響報告 (EIR)。擬議**計劃**將在 IRWD 服務區範圍內的**虹吸水庫**現址**建造**。**虹吸水庫**目前是**回收**水的儲水庫，位於加州橘縣的非建制地區，地處 Bee Canyon 聯絡道和 133 號州道之間的 Portola 公路東北面，在這裡，由主要幹線圍起的地產大部分屬於 IRWD 所有。擬議**計劃**將擴大現有的循環水水庫的容量，以便滿足社區季節性的用水需求以及未來的用水需求。作為水庫擴建的一部分，現有的工程水壩將由符合並超越最新安全標準的全新工程水壩取代。新建的工程水壩將把水庫容量從大約 500 英畝呎 (AF) 提升到 5,000 英畝呎(AF)。

IRWD 當前正在召集負責機構、委託機構和相關各方的意見，以便確定 EIR 的涵蓋範圍以及將納入在 EIR 中的環境資訊內容。根據 CEQA 的規定，機構需要審查 NOP 中提供的專案說明，並針對與本機構相關職責問題的法定職責提供意見。IRWD 將在考慮是否批准擬議專案以及相關決權時用到 EIR。

NOP 將有 45 天的公審期，於 **2019 年 8 月 2 日**開始，並在 **2019 年 9 月 16 日**結束。您可前往 14361 Yale Ave, Irvine CA 92604 的 Heritage Park 圖書館索取 NOP 副本，或造訪 IRWD 網站，在 IRWD 網站上在線收取文檔 (http://www.irwd.com/doing-business/environmental-documents)。

IRWD 將在 **2019 年 8 月 21 日下午 6 點**，在 IRWD 的辦公室（15600 Sand Canyon Avenue Irvine, CA 92618，多功能室）舉行**內容**界定公聽會，聽取各方就 EIR 應該涵蓋哪些問題提出的意見和建議。範圍界定會議將提供簡短的展示，並接受專家作出概述。在展示過後，範圍界定會議將收取公眾提出的口頭或書面意見。IRWD 將提供公眾提供意見表格給在會議上有意提交書面意見的參與者；IRWD 也將在 **2019 年 9 月 16 日下午 4 點**截止的 45 天公眾評審期內的期間收取書面意見。請將您的意見寄送至以下通信地址或發送至以下電子郵箱。並請在提交意見時隨附您所屬的機構、各方的回郵地址或電郵地址以及聯絡人資訊。

爾灣農場水務局
水資源及政策部門
15600 Sand Canyon Avenue
P.O. Box 57000
Irvine, California 92619-7000
Attn: Jo Ann Corey, Environmental Compliance Specialist
SyphonEIR@irwd.com
電話：949-453-5300

اعلان آمادسازی یک گزارش تأثیر زیست‌محیطی
برای پروژه بهبود مخزن سیفون

این اعلان آمادسازی (NOP) تهیه شده است تا به آژانس‌ها و شرکای ذینفع اطلاع داده شود منطقه آب مزرعه اروین (IRWD)، به عنوان آژانس اصلی، یک گزارش تأثیر زیست‌محیطی (EIR) پیرو قانون کیفیت زیست‌محیطی کالیفرنیا (CEQA) برای پروژه بهبود مخزن سیفون (پروژه پیشنهادی) آماده خواهد کرد. پروژه پیشنهادی در ناحیه خدمات‌رسانی IRWD در محل فعلی مخزن سیفون، که در حال حاضر یک مخزن نگهداری آب بازیافتی است، ساخته خواهد شد. مخزن سیفون در استان ثبت نشده ارنج در کالیفرنیا در سمت شمال شرقی پورتولا پارکوی بین جاده بی کانیون اکسس و جاده ایالتی 133 واقع شده است. بیشتر املاک احاطه شده توسط این شاهراه‌ها در تملک IRWD است. پروژه پیشنهادی، ظرفیت مخزن آب بازیافتی فعلی را افزایش خواهد داد تا پاسخگوی نیازهای آبی فصلی و آتی جامعه باشد. سد مهندسی‌شده فعلی، به عنوان بخشی از گسترش مخزن، با یک سد مهندسی‌شده جدید که از آخرین استانداردهای ایمنی برخوردار بوده و بالاتر از آن‌ها باشد، جایگزین خواهد شد. سد مهندسی‌شده جدید ظرفیت مخزن را از حدود 500 اکر بر فوت (AF) به 5000 اکر بر فوت افزایش خواهد داد.

IRWD از آژانس‌های مسئول و مورد اعتماد و همچنین شرکای ذینفع درخواست کرده است که نظرات خود را درباره حدود و محتوای اطلاعات زیست‌محیطی که لازم است در EIR گنجانده شود، اعلام کنند. در رابطه با CEQA، از آژانس‌ها درخواست شده است که شرح پروژه مندرج در NOP را بررسی کرده و نظرات خود را درباره مسائل مرتبط با مسئولیت‌های قانونی آن آژانس اعلام کنند. EIR هنگام بررسی موافقت با پروژه پیشنهادی و همچنین هرگونه موافقت مرتبط در صورت صلاحدید، توسط IRWD استفاده خواهد شد.

دوره بررسی عمومی 45 روزه برای NOP از **2 اگوست 2019** آغاز شده و در **16 سپتامبر 2019** پایان می‌پذیرد. رونوشت‌هایی از NOP در کتابخانه هریتج پارک واقع در 14361 Yale Ave, Irvine CA 92604 و همچنین به صورت آنلاین در وبسایت IRWD در دسترس هستند (http://www.irwd.com/doing-business/environmental-documents).

IRWD جهت دریافت نظرات و پیشنهادات درباره مسائلی که لازم است در EIR گنجانده شوند، در روز **21 اگوست 2019 ساعت 6:00 ب.ظ** یک جلسه عمومی تعیین حدود در دفتر اصلی IRWD (15600 خیابان سند کانیون اروان، کالیفرنیا 92618، اتاق چندمنظوره) برگزار می‌کند. جلسه تعیین حدود شامل یک ارائه کوتاه می‌شود که مروری کلی بر پروژه پیشنهادی خواهد داشت. پس از ارائه، نظرات عموم مردم به صورت شفاهی یا کتبی در جلسه تعیین حدود دریافت خواهد شد. فرم‌های نظرخواهی به کسانی که تمایل دارند نظرات خود را به صورت کتبی در جلسه اعلام کنند ارائه خواهد شد. به علاوه، IRWD همواره نظرات کتبی را در طول دوره بررسی 45 روزه تا پایان **آخرین مهلت: یعنی 4:00 ب.ظ. 16 سپتامبر 2019**، دریافت خواهد کرد. لطفاً نظرات خود را به نشانی پستی یا نشانی ایمیل درج شده در پایین ارسال کنید. به همراه نظرات خود، یک نشانی بازگشت یا نشانی ایمیل و یک نام مخاطب برای آژانس یا طرف دریافت‌کننده نظرات قید کنید.

منطقه آب مزرعه اروین
دپارتمان منابع و سیاست‌گذاری آب
15600 خیابان سند کانیون
صندوق پستی 57000
اروین، کالیفرنیا 92619-7000
برسد به دست: جو آن کوری، متخصص تطابق با قوانین زیست‌محیطی
SyphonEIR@irwd.com
تلفن: 949-453-5300

Thông Báo Về Việc Lập Báo Cáo Đánh Giá Tác Động Môi Trường
cho Dự Án Cải Thiện Hồ Chứa Nước Syphon

Thông Báo Về Việc Chuẩn Bị (NOP) này nhằm thông báo cho các cơ quan và các bên liên quan rằng Thủy Cục Irvine Ranch (IRWD), với vai trò là cơ quan đứng đầu, sẽ chuẩn bị một Báo Cáo Đánh Giá Tác Động Môi Trường (EIR) theo Đạo Luật về Chất Lượng Môi Trường California (CEQA) cho Dự Án Cải Thiện Hồ Chứa **Nước** Syphon (sau đây được gọi tắt là dự án đề xuất). Dự án đề xuất sẽ được xây dựng trong khu vực phục vụ của IRWD tại vị trí hiện tại của Hồ Chứa **Nước** Syphon, một hồ chứa nước tái chế. Hồ Chứa **Nước** Syphon nằm tại phần chưa thành lập chính thức của Quận Orange, California , ở phía đông bắc của Portola Parkway giữa Đường Bee Canyon và Xa lộ Tiểu bang 133, nơi phần lớn tài sản trong phạm vi các đường phố này thuộc sở hữu của IRWD. Dự án đề xuất sẽ giúp tăng công suất của hồ chứa nước tái chế hiện tại để phục vụ các nhu cầu nước theo mùa và trong tương lai của cộng đồng. Trong công việc mở rộng hồ chứa, đập nước hiện tại sẽ được thay thế bằng một đập nước mới đáp ứng và vượt các tiêu chuẩn an toàn mới nhất. Đập nước mới sẽ làm tăng công suất của hồ chứa từ 500 mẫu-feet (AF) lên 5.000 AF.

IRWD đang lấy ý kiến từ các cơ quan có trách nhiệm và ủy thác cũng như các bên liên quan về phạm vi và nội dung của các thông tin môi trường được đưa vào EIR. Theo CEQA, các cơ quan được yêu cầu xem xét mô tả dự án được nêu trong NOP và đưa ra ý kiến về các vấn đề môi trường liên quan đến trách nhiệm theo luật định của cơ quan. EIR sẽ được IRWD sử dụng khi xem xét phê duyệt dự án đề xuất cũng như mọi phê duyệt liên quan theo nhiệm ý của IRWD.

Thời hạn xem xét NOP công khai trong 45 ngày được bắt đầu từ ngày **02 tháng 8 năm 2019** và kết thúc vào ngày **16 tháng 9 năm 2019**. Các bản sao NOP hiện có sẵn tại Thư viện Heritage Park ở địa chỉ 14361 Yale Ave, Irvine CA 92604; và được đăng trực tuyến trên trang web của IRWD (http://www.irwd.com/doing-business/environmental-documents).

IRWD sẽ tổ chức một cuộc họp đánh giá công khai vào lúc **6 giờ chiều ngày 21 tháng 8 năm 2019** tại Trụ sở Văn phòng IRWD (Phòng Đa năng, 15600 Sand Canyon Avenue Irvine, CA 92618) để tiếp nhận các ý kiến và gợi ý về các vấn đề được nêu trong EIR. Cuộc họp đánh giá sẽ có một bản trình bày ngắn với các thông tin tổng quan về dự án đề xuất. Sau khi trình bày, chúng tôi sẽ tiếp nhận các ý kiến của người dân trực tiếp hoặc bằng văn bản tại cuộc họp đánh giá. Những người muốn gửi ý kiến bằng văn bản tại cuộc họp sẽ được cung cấp các mẫu văn bản trình bày ý kiến. Các ý kiến bằng văn bản cũng sẽ được IRWD chấp nhận vào bất kỳ lúc nào trong thời hạn xem xét 45 ngày cho tới **4:00 chiều ngày 16 tháng 9 năm 2019.** Quý vị hãy gửi ý kiến của mình cho chúng tôi theo địa chỉ bưu tín hoặc email dưới đây. Hãy ghi địa chỉ nhận thư trả lời hoặc địa chỉ email và tên người liên lạc của cơ quan hoặc nhóm của quý vị hoặc cùng với ý kiến của mình.

Irvine Ranch Water District
Water Resources & Policy Department
15600 Sand Canyon Avenue
P.O. Box 57000
Irvine, California 92619-7000
Attn: Jo Ann Corey, Environmental Compliance Specialist
SyphonEIR@irwd.com
Phone: 949-453-5300

Attachment 4: Letters to Local Community

Irvine Ranch
WATER DISTRICT

August 8, 2019

Mr. Rick Zarski
General Manager
Associa
27051 Towne Centre Drive, Suite 200
Foothill Ranch, CA 92610
via email rick.zarski@associa.us

Re: Stonegate Village Community Association

Dear Mr. Zarski,

We wanted the Stonegate Village Community Association Board of Directors to be among the first to know about our plans to increase the recycled water supply for the Irvine Ranch Water District service area. Recycled water is an important part of IRWD's water portfolio as it benefits all IRWD customers. In fact, we have successfully recycled water in this community for more than 50 years. It's a reliable, drought-proof source of non-drinking water that makes up about one-fourth of our water supply.

Recycled water is used to:

- Keep parks, medians, school athletic fields, public landscaping, and other open space areas green and beautiful;
- Provide additional water to fight wildfires throughout the region; and
- Supply commercial and industrial needs such as mixing concrete and cooling office buildings.

And because recycled water can be used for these purposes, more drinking water is available for all IRWD customers.

We are just now beginning the environmental review process for the long-planned Syphon Reservoir Improvement Project. This project will increase the recycled water storage capacity in the reservoir from 535 acre-feet to a proposed 5,000 acre-feet (1.6 billion gallons), allowing IRWD to use nearly 100% of the recycled water that we produce. You can follow our progress at syphonreservoirproject.com.

The first opportunity for the community to learn about the project and provide feedback is at an upcoming open house for what is known as the Notice of Preparation Scoping Meeting for the Environmental Impact Report (EIR). This is where you can let us know what you would like to be included in our analysis for the EIR.

Syphon Reservoir Improvement Project: Public Scoping Meeting Open House
Wednesday, August 21, 2019 at 6 p.m.
Irvine Ranch Water District in the Multi-Purpose Room
15600 Sand Canyon Avenue, Irvine, CA 92618

There will be additional opportunities to provide input on the project as well – when the draft EIR and final EIR are circulated for public comment and when the EIR is submitted to the IRWD Board for consideration of acceptance.

We would welcome the opportunity to make a presentation to the Stonegate Village Community Association Board, before the August 21 Public Scoping Meeting, so we can inform your directors about the project and answer any questions they may have.

To schedule a presentation for the Stonegate Village Community Association Board of Directors, please contact Beth Beeman, Public Affairs Director, at 949-453-5300 or info@irwd.com. We hope to hear from you.

Sincerely,

Paul Cook, P.E.
General Manager

Irvine Ranch
WATER DISTRICT

August 8, 2019

Ms. Jessica Roberson
Crummack Huseby Property Management
25531 Commercentre Drive, Suite 100
Lake Forest, CA 92630
via email jessica@ch-pm.com

Re: Stonegate East Community Association

Dear Ms. Roberson,

We wanted the Stonegate East Community Association Board of Directors to be among the first to know about our plans to increase the recycled water supply for the Irvine Ranch Water District service area. Recycled water is an important part of IRWD's water portfolio as it benefits all IRWD customers. In fact, we have successfully recycled water in this community for more than 50 years. It's a reliable, drought-proof source of non-drinking water that makes up about one-fourth of our water supply.

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Syphon Reservoir Improvement Project: Public Scoping Meeting Open House
Wednesday, August 21, 2019 at 6 p.m.
Irvine Ranch Water District in the Multi-Purpose Room
15600 Sand Canyon Avenue, Irvine, CA 92618

There will be additional opportunities to provide input on the project as well – when the draft EIR and final EIR are circulated for public comment and when the EIR is submitted to the IRWD Board for consideration of acceptance.

We would welcome the opportunity to make a presentation to the Stonegate East Community Association Board, before the August 21 Public Scoping Meeting, so we can inform your directors about the project and answer any questions they may have.

To schedule a presentation for the Stonegate East Community Association Board of Directors, please contact Beth Beeman, Public Affairs Director, at 949-453-5300 or info@irwd.com. We hope to hear from you.

Sincerely,



Paul Cook, P.E.
General Manager

Irvine Ranch
WATER DISTRICT

August 8, 2019

Ms. Susan Seifen
Property Manager
Keystone Pacific Property Management
108 Lamplighter
Irvine, CA 92620
via email sseifen@keystonepacific.com

Re: Woodbury Community Association

Dear Ms. Susan Seifen,

We wanted the Woodbury Community Association Community Association Board of Directors to be among the first to know about our plans to increase the recycled water supply for the Irvine Ranch Water District service area. Recycled water is an important part of IRWD's water portfolio as it benefits all IRWD customers. In fact, we have successfully recycled water in this community for more than 50 years. It's a reliable, drought-proof source of non-drinking water that makes up about one-fourth of our water supply.

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The first opportunity for the community to learn about the project and provide feedback is at an upcoming open house for what is known as the Notice of Preparation Scoping Meeting for the Environmental Impact Report (EIR). This is where you can let us know what you would like to be included in our analysis for the EIR.

Syphon Reservoir Improvement Project: Public Scoping Meeting Open House
Wednesday, August 21, 2019 at 6 p.m.
Irvine Ranch Water District in the Multi-Purpose Room
15600 Sand Canyon Avenue, Irvine, CA 92618

There will be additional opportunities to provide input on the project as well – when the draft EIR and final EIR are circulated for public comment and when the EIR is submitted to the IRWD Board for consideration of acceptance.

We would welcome the opportunity to make a presentation to the Woodbury Community Association Board, before the August 21 Public Scoping Meeting, so we can inform your directors about the project and answer any questions they may have.

To schedule a presentation for the Woodbury Community Association Board of Directors, please contact Beth Beeman, Public Affairs Director, at 949-453-5300 or info@irwd.com. We hope to hear from you.

Sincerely,

Paul Cook, P.E.
General Manager

Irvine Ranch
WATER DISTRICT

August 8, 2019

Ms. Danielle Salinas
Property Manager
Keystone Pacific Property Management
16775 Von Karman Avenue, Suite #100
Irvine, CA 92606
via email dsalinas@keystonepacific.com

Re: Woodbury East Master Association

Dear Ms. Salinas,

We wanted the Woodbury East Master Association Board of Directors to be among the first to know about our plans to increase the recycled water supply for the Irvine Ranch Water District service area. Recycled water is an important part of IRWD's water portfolio as it benefits all IRWD customers. In fact, we have successfully recycled water in this community for more than 50 years. It's a reliable, drought-proof source of non-drinking water that makes up about one-fourth of our water supply.

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- Supply commercial and industrial needs such as mixing concrete and cooling office buildings.

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We are just now beginning the environmental review process for the long-planned Syphon Reservoir Improvement Project. This project will increase the recycled water storage capacity in the reservoir from 535 acre-feet to a proposed 5,000 acre-feet (1.6 billion gallons), allowing IRWD to use nearly 100% of the recycled water that we produce. You can follow our progress at syphonreservoirproject.com.

The first opportunity for the community to learn about the project and provide feedback is at an upcoming open house for what is known as the Notice of Preparation Scoping Meeting for the Environmental Impact Report (EIR). This is where you can let us know what you would like to be included in our analysis for the EIR.

Syphon Reservoir Improvement Project: Public Scoping Meeting Open House
Wednesday, August 21, 2019 at 6 p.m.
Irvine Ranch Water District in the Multi-Purpose Room
15600 Sand Canyon Avenue, Irvine, CA 92618

There will be additional opportunities to provide input on the project as well – when the draft EIR and final EIR are circulated for public comment and when the EIR is submitted to the IRWD Board for consideration of acceptance.

We would welcome the opportunity to make a presentation to the Woodbury East Master Association Board, before the August 21 Public Scoping Meeting, so we can inform your directors about the project and answer any questions they may have.

To schedule a presentation for the Woodbury East Master Association Board of Directors, please contact Beth Beeman, Public Affairs Director, at 949-453-5300 or info@irwd.com. We hope to hear from you.

Sincerely,

Paul Cook, P.E.
General Manager

Irvine Ranch
WATER DISTRICT

August 8, 2019

Dear Neighbor,

We wanted you to be among the first to know about our plans to increase the recycled water supply for the Irvine Ranch Water District service area. Recycled water is an important part of IRWD's water portfolio as it benefits all IRWD customers. In fact, we have successfully recycled water in this community for more than 50 years. It's a reliable, drought-proof source of non-drinking water that makes up about one-fourth of our water supply.

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We are just now beginning the environmental review process for the long-planned Syphon Reservoir Improvement Project. This project will increase the recycled water storage capacity in the reservoir from 535 acre-feet to a proposed 5,000 acre-feet (1.6 billion gallons), allowing IRWD to use nearly 100% of the recycled water that we produce.

The first opportunity for you to learn about the project and provide feedback is at an upcoming open house for what is known as the Notice of Preparation Scoping Meeting for the Environmental Impact Report (EIR). This is where you can let us know what you would like to be included in our analysis for the EIR.

Syphon Reservoir Improvement Project: Public Scoping Meeting Open House
Wednesday, August 21, 2019 at 6 p.m.
Irvine Ranch Water District in the Multi-Purpose Room
15600 Sand Canyon Avenue, Irvine, CA 92618

There will be additional opportunities to provide input on the project as well – when the draft EIR and final EIR are circulated for public comment and when the EIR is submitted to the IRWD Board for consideration of acceptance.

Irvine Ranch Water District has one of the most technologically advanced and safe recycled water systems in the nation. If you would like to learn more or to view a video about our recycled water system, visit **www.irwd.com/services/recycled-water**.

We are committed to a safe, high-quality project that ensures enough recycled water to meet the needs of our customers. You can also follow our progress at **www.syphonreservoirproject.com** and sign up for notifications. If you have any questions, please email us at info@irwd.com or call us at 949-453-5500.

Sincerely,

Paul Cook, P.E.
General Manager

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Attachment 5: Scoping Meeting Presentation



SYPHON RESERVOIR IMPROVEMENT PROJECT

CEQA PUBLIC SCOPING MEETING

August 21, 2019

PRESENTATION OVERVIEW

- Purpose of Meeting
- California Environmental Quality Act (CEQA) Overview
- Irvine Ranch Water District (IRWD) Overview
- Project Description
- CEQA Process and Schedule
- Public Comments



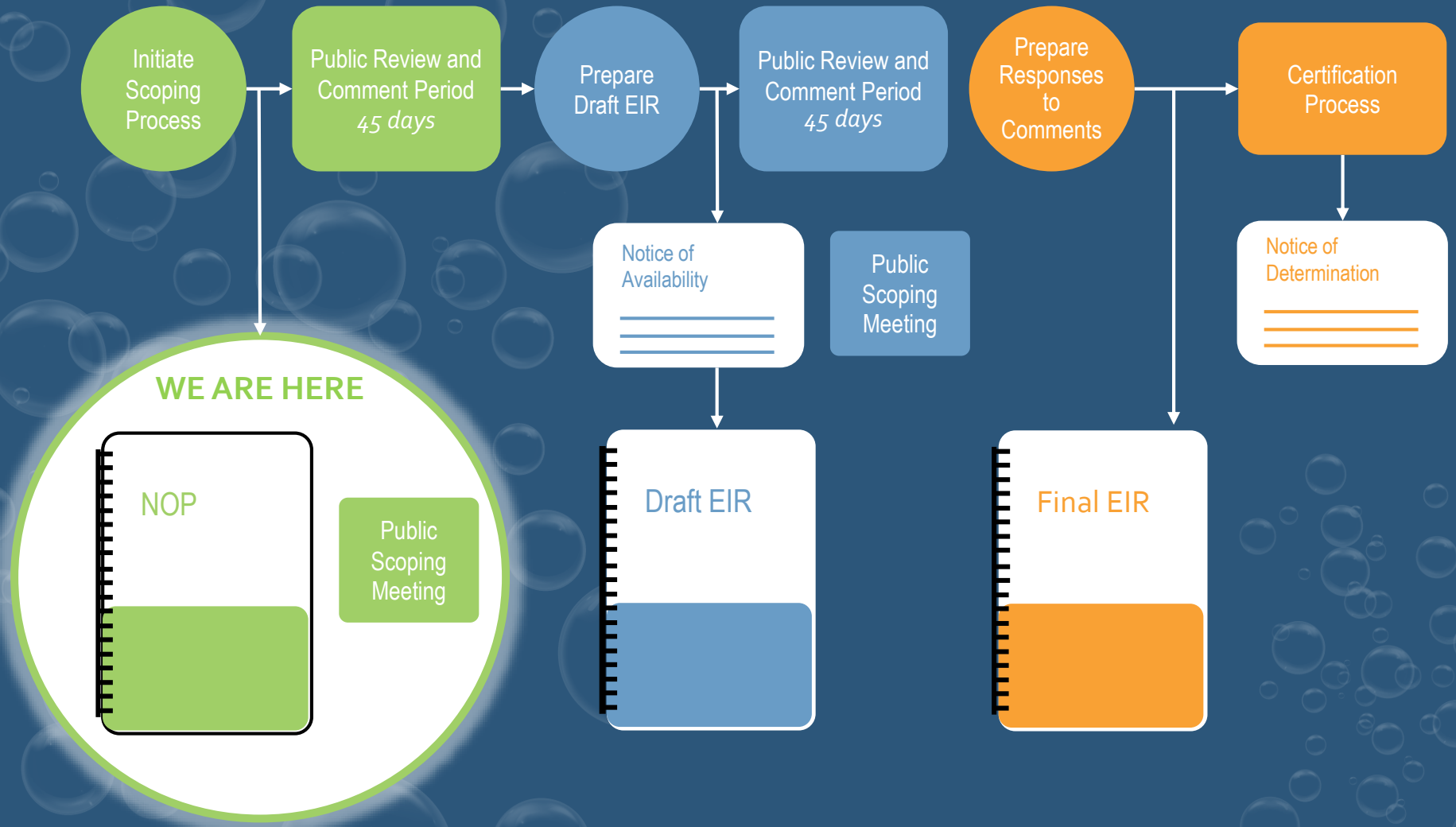
PURPOSE OF MEETING

- Initiate the CEQA Process
  - The Notice of Preparation published on August 2, 2019, initiated the environmental review process for the environmental impact report (EIR).
  - 45-day public review and comment period.
- Public Scoping
  - Scoping is early public consultation.
  - Scoping is used to identify potential issues to address in the EIR.
- Describe the Project
  - Increase the capacity of the existing Syphon Reservoir.
  - Increase recycled water storage from approximately 500 to 5,000 acre-feet, to serve the community's seasonal and future water needs.

CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA)



CEQA PROCESS FOR THE SYPHON RESERVOIR EIR



IRVINE RANCH WATER DISTRICT OVERVIEW

- Current Water Supply Sources
- 21% = treated groundwater
- 29% = clear groundwater
- 6% = local surface water
- 18% = imported surface water
- 26% = recycled water

- Recycled Water Production
- Michelson Water Recycling Plant
- Los Alisos Water Recycling Plant

- Recycled Water Storage
  - Storage is used when supply exceeds demand in winter months.
  - When storage is full, recycled water is discharged to the ocean.



IRWD RECYCLED WATER RESERVOIRS IN THE COMMUNITY



RATTLESNAKE RESERVOIR

Built 1959

1,480 AF capacity



SAN JOAQUIN RESERVOIR

Built 1966

3,036 AF capacity



SAND CANYON RESERVOIR

Built 1912

960 AF capacity



SYPHON RESERVOIR

Built 1949

578 AF capacity

5,000 AF (proposed)

ESA

Irvine Ranch WATER DISTRICT

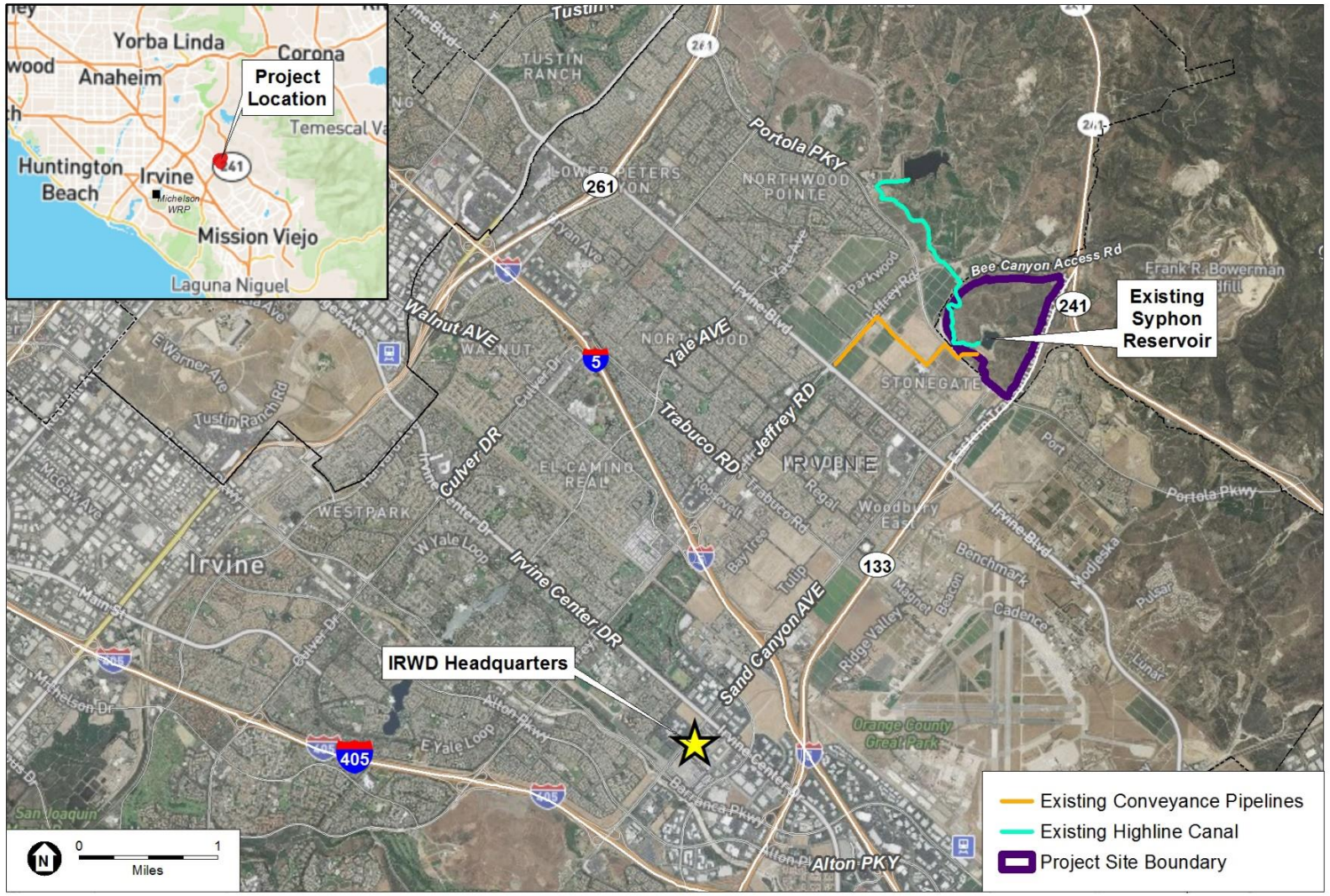
EXISTING SYPHON RESERVOIR



Existing capacity = approx. 500 acre-feet.

Water levels fluctuate seasonally to balance recycled water supply and demand.

PROJECT LOCATION MAP

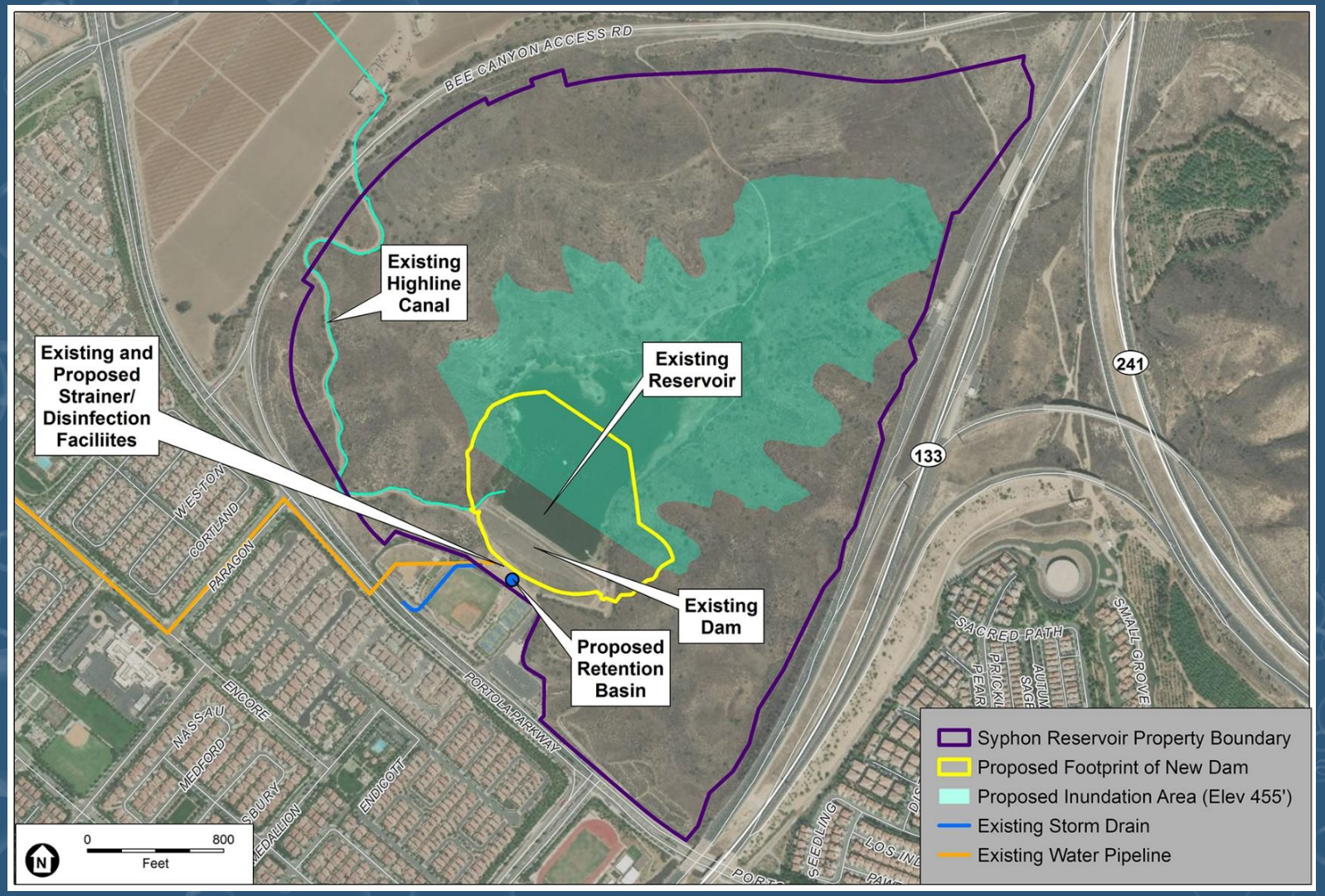


PROJECT OBJECTIVES

- **Improve local water supply reliability**
  - Store and use additional recycled water
  - Reduce purchases of more expensive, less-reliable imported water and make the community more self-sufficient.
- **Use 100% of recycled water produced by IRWD**
  - Reduce discharges of recycled water to the ocean.
  - Prepare for the future by storing more drought-proof water.
  - Keep parks, medians, athletic fields, public landscaping and golf courses green and beautiful.
- **Meet or exceed the latest safety standards**
  - Facilities are regulated by California Department of Water Resources, Division of Safety of Dams.



PROJECT SITE & PROPOSED PROJECT



DAM REPLACEMENT

- Replacement of the existing 59-foot-high engineered dam with a new 136-foot-high engineered dam with a 20-foot-wide crest.
- The new dam would be constructed primarily from on-site impermeable materials, although the importation of some specialty materials is anticipated.
- New dam would meet or exceed the latest safety standards.
- Project design will be peer reviewed through a rigorous process overseen by a technical advisory panel of respected reservoir experts.



RESERVOIR ENLARGEMENT

- The replacement dam would result in an increase in the reservoir's maximum water surface elevation from 376 feet to 456 feet above mean sea level and increase the reservoir's capacity from approximately 500 acre-feet (AF) to 5,000 AF.
- Expand the reservoir's shoreline and water surface area up to approximately 82 acres upstream of the dam.



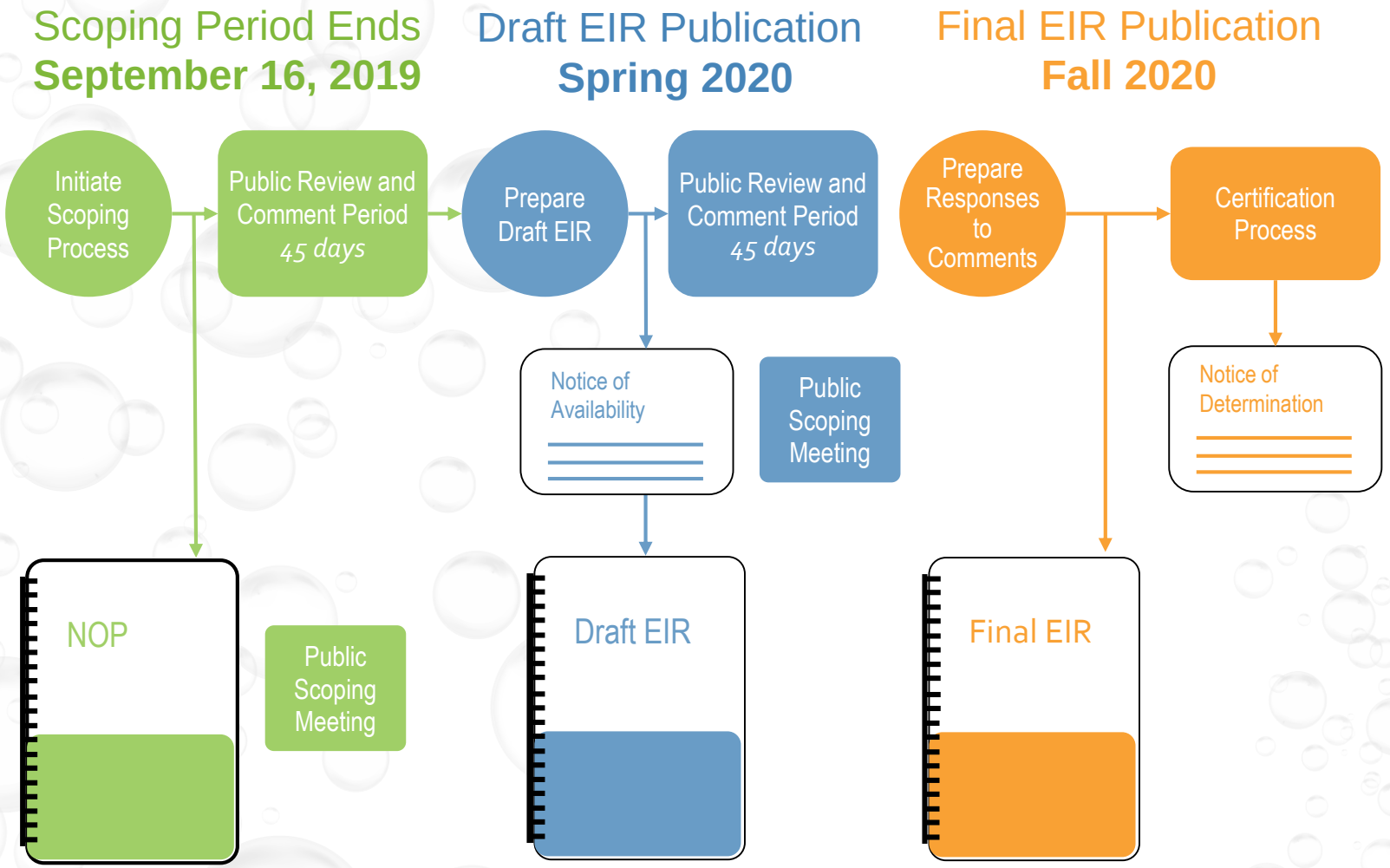
ESA

Irvine Ranch WATER DISTRICT

TOPICS TO BE ANALYZED IN THE EIR

- Environmental resources required by CEQA
  - Aesthetics
  - Agriculture & Forestry Resources
  - Air Quality
  - Biological Resources
  - Cultural Resources
  - Energy
  - Geology & Soils
  - Greenhouse Gas Emissions
  - Hazards & Hazardous Materials
  - Hydrology & Water Quality
  - Land Use & Planning
  - Mineral Resources
  - Noise
  - Population & Housing
  - Public Services
  - Recreation
  - Traffic & Transportation
  - Tribal Cultural Resources
  - Utilities & Service Systems
  - Wildfire
- Growth Inducement
- Alternatives

CEQA SCHEDULE – NEXT STEPS

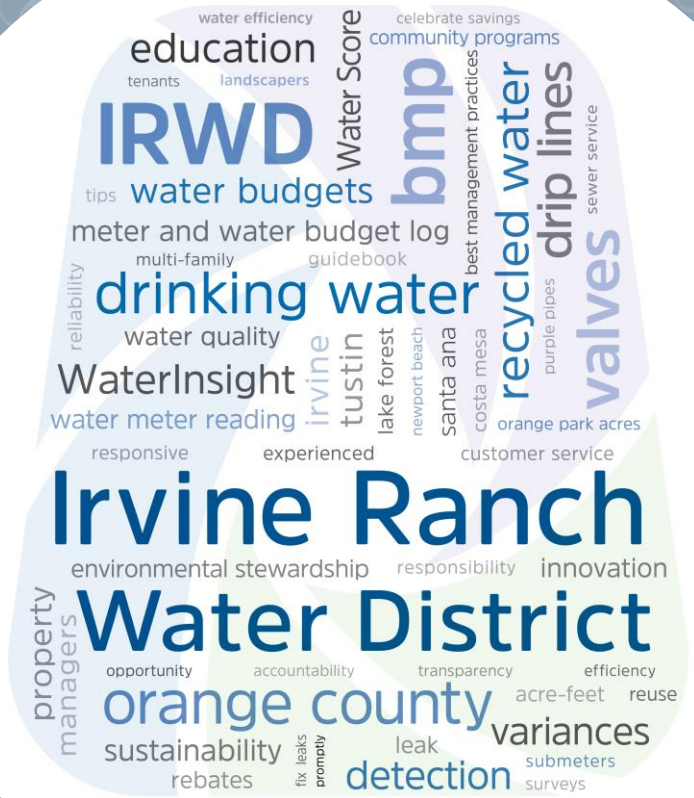


PUBLIC SCOPING COMMENTS

- NOP Availability
  - Heritage Park Library, 14361 Yale Ave, Irvine CA 92604
  - Online at the IRWD Web Site
    - **www.irwd.com/doing-business/environmental-documents**
- Comment period ends **September 16, 2019**
- Submit comments tonight or e-mail/mail comments to:

  Irvine Ranch Water District
  Attn: Jo Ann Corey, Environmental Compliance Specialist
  P.O. Box 57000
  Irvine, California 92619-7000
  SyphonEIR@irwd.com

- Project information & updates:
  www.syphonreservoirproject.com



PUBLIC COMMENTS

Attachment 6: Scoping Meeting Sign-in Sheets

Sign-in Sheet

Irvine Ranch Water District Office
15600 Sand Canyon Avenue
Irvine, CA 92618
Wednesday, August 21, 2019 | 6:00pm

Irvine Ranch Water District
Syphon Reservoir Improvement Project

The signing, registering, or completion of this document is voluntary. All persons may attend this meeting regardless of whether they sign, register, or complete this document.

Name: Jeffrey Beavers, CEO
Affiliation/Organization: Crean Lutheran High School
Address: 12500 Sand Canyon
Email: beavers@creanlutheran.org
Do you want future notices regarding this project? ☒ yes ☐ no

Name: Robin Leftwich
Affiliation/Organization:
Address: 12441 Eveningside Dr. Tustin CA
Email: rleftwich1@mac.com
Do you want future notices regarding this project? ☐ yes ☐ no

Name: JOSEPH L JOSEPH
Affiliation/Organization: HEARTLAND
Address: 1291 E. DYER RD S.A
JOSEPH.JOSEPH@HEARTLAND.COM.
Email:
Do you want future notices regarding this project? ☐ yes ☐ no

Name: Michele Jacknik
Affiliation/Organization:
Address: 46 Diamond Irvine CA 92620
Email:
Do you want future notices regarding this project? ☒ yes ☐ no

Name: Cindy Zhu
Affiliation/Organization: Realtor
Address: 115 Yellow Pine, Irvine
Email: jianhzhu@gmail.com
Do you want future notices regarding this project? ☐ yes ☐ no

Name:
Affiliation/Organization:
Address:
Email:
Do you want future notices regarding this project? ☐ yes ☐ no

Name:
Affiliation/Organization:
Address:
Email:
Do you want future notices regarding this project? ☐ yes ☐ no

Name:
Affiliation/Organization:
Address:
Email:
Do you want future notices regarding this project? ☐ yes ☐ no

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Irvine Ranch Water District
Syphon Reservoir Improvement Project

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Name: Tim Cheng
Affiliation/Organization: AASCSC
Address:
Email: Tim.Cheng@aascsc.org
Do you want future notices regarding this project? ☐ yes ☐ no

Name: Vivian Qian
Affiliation/Organization:
Address:
Email: xy.qian@gmail.com
Do you want future notices regarding this project? ☑ yes ☐ no

Name: Bruce Aird
Affiliation/Organization: Sea and Saga Audubon
Address:
Email: bruceaird@gmail.com
Do you want future notices regarding this project? ☑ yes ☐ no

Name: Christine Tischer
Affiliation/Organization:
Address:
Email: clmukai13@gmail.com
Do you want future notices regarding this project? ☐ yes ☐ no

Name: Mohammed Islam
Affiliation/Organization:
Address:
Email: MISLAM100@Hotmail.com
Do you want future notices regarding this project? ☐ yes ☐ no

Name: Stephanie Tsuy
Affiliation/Organization:
Address:
Email: iksha@gmail.com
Do you want future notices regarding this project? ☑ yes ☐ no

Name: Alice Lin
Affiliation/Organization:
Address:
Email: linyansh99@gmail.com
Do you want future notices regarding this project? ☑ yes ☐ no

Name:
Affiliation/Organization:
Address:
Email:
Do you want future notices regarding this project? ☐ yes ☐ no

Sign-in Sheet

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Irvine Ranch Water District
Syphon Reservoir Improvement Project

The signing, registering, or completion of this document is voluntary. All persons may attend this meeting regardless of whether they sign, register, or complete this document.

Name: Darrell Wilson
Affiliation/Organization:
Address: 48 Foxhill
714-401-7852
Email: darrellwilson@cox.net
Do you want future notices regarding this project? ☐ yes ☐ no

Name: ALICE LEI
Affiliation/Organization: AWE
Address: 9070 Irvine Center Dr
Irvine
Email: nofech@Verizon.net
Do you want future notices regarding this project? ☐ yes ☐ no

Name: IRIS MCCAMMON
Affiliation/Organization:
Address: 106 Ridge Valley
Email: imccammon@yahoo.com
Do you want future notices regarding this project? ☑ yes ☐ no

Name: NATE KRETZMANN
Affiliation/Organization: CREAN LUTHERAN HS
Address: 12500 SAND CANYON
IRVINE
Email: kretzmann@creanlutheran.org
Do you want future notices regarding this project? ☒ yes ☐ no

Name: Gregg LaGuinins
Affiliation/Organization: Home owner
Address: 74 Woodhill
Irvine CA 92620
Email: GreggLa@me.com
Do you want future notices regarding this project? ☑ yes ☐ no

Name: Richard Zeng
Affiliation/Organization: Home Owner
Address: 66 Dublin
Irvine, CA 92620
Email:
Do you want future notices regarding this project? ☑ yes ☐ no

Name: JERRY CHANG
Affiliation/Organization: IZCSA
Address: ~~29 Columbus PL~~ 567 SAN LEON
~~RANCHO SANTA MAR~~ IRVINE CA 92606
Email: jerrychang2@cox.NOT
Do you want future notices regarding this project? ☐ yes ☐ no

Name:
Affiliation/Organization:
Address:
Email:
Do you want future notices regarding this project? ☐ yes ☐ no

Sign-in Sheet

Irvine Ranch Water District Office
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Irvine Ranch Water District
Syphon Reservoir Improvement Project

The signing, registering, or completion of this document is voluntary. All persons may attend this meeting regardless of whether they sign, register, or complete this document.

Name: Mary Anne Foo
Affiliation/Organization: OCAPICA
Address: 12912 Brookhurst St Ste 410 Garden Grove CA 92840
Email: mafoo@ocapica.org
Do you want future notices regarding this project? ☒ yes ☐ no

Name: Jennifer S Wang
Affiliation/Organization: AASCSC
Address:
Email: jennifer.s.wang@aascsc.org
Do you want future notices regarding this project? ☐ yes ☐ no

Name: VALARIE MCFALL
Affiliation/Organization: TCA
Address: 125 Pacifica Irvine 92618
Email: VMCFALL@thetollroads.com
Do you want future notices regarding this project? ☑ yes ☐ no

Name:
Affiliation/Organization:
Address:
Email:
Do you want future notices regarding this project? ☐ yes ☐ no

Name:
Affiliation/Organization:
Address:
Email:
Do you want future notices regarding this project? ☐ yes ☐ no

Name:
Affiliation/Organization:
Address:
Email:
Do you want future notices regarding this project? ☐ yes ☐ no

Name:
Affiliation/Organization:
Address:
Email:
Do you want future notices regarding this project? ☐ yes ☐ no

Name:
Affiliation/Organization:
Address:
Email:
Do you want future notices regarding this project? ☐ yes ☐ no

Name:
Affiliation/Organization:
Address:
Email:
Do you want future notices regarding this project? ☐ yes ☐ no

Attachment 7: Comment Letters Received by IRWD

Jo Ann Corey - Notice of Preparation of an Environmental Impact Report Project Syphon Reservoir Improvement Project

From: "Rivers, Tamy" <TamyRivers@ocfa.org>
To: "SyphonEIR@irwd.com" <SyphonEIR@irwd.com>
Date: 8/8/2019 3:14 PM
Subject: Notice of Preparation of an Environmental Impact Report Project Syphon Reservoir Improvement Project

Thank you for the opportunity to review the subject document. OCFA has no comments.

Have a great day!

Tamera Rivers
Management Analyst
Orange County Fire Authority
Office: 714-573-6199
tamyrivers@ocfa.org

We visualize problems and solutions through the eyes of those we serve.

NATIVE AMERICAN HERITAGE COMMISSION
Cultural and Environmental Department
1550 Harbor Blvd., Suite 100
West Sacramento, CA 95691 Phone: (916) 373-3710
Email: nahc@nahc.ca.gov
Website: http://www.nahc.ca.gov

WATER RESOURCES
AUG 15 2019
IRVINE RANCH
WATER DISTRICT

August 9, 2019

Jo Ann Corey
Irvine Ranch Water District
15600 Sand Canyon Avenue
Irvine, CA 92618

RE: SCH# 2019080009, Syphon Reservoir Improvement Project, Orange County

Dear Ms. Corey:

The Native American Heritage Commission (NAHC) has received the Notice of Preparation (NOP) for the project referenced above. The California Environmental Quality Act (CEQA) (Pub. Resources Code §21000 et seq.), specifically Public Resources Code §21084.1, states that a project that may cause a substantial adverse change in the significance of a historical resource, is a project that may have a significant effect on the environment. (Pub. Resources Code § 21084.1; Cal. Code Regs., tit.14, §15064.5 (b) (CEQA Guidelines §15064.5 (b)). If there is substantial evidence, in light of the whole record before a lead agency, that a project may have a significant effect on the environment, an Environmental Impact Report (EIR) shall be prepared. (Pub. Resources Code §21080 (d); Cal. Code Regs., tit. 14, § 5064 subd.(a)(1) (CEQA Guidelines §15064 (a)(1)). In order to determine whether a project will cause a substantial adverse change in the significance of a historical resource, a lead agency will need to determine whether there are historical resources within the area of potential effect (APE).

CEQA was amended significantly in 2014. Assembly Bill 52 (Gatto, Chapter 532, Statutes of 2014) (AB 52) amended CEQA to create a separate category of cultural resources, "tribal cultural resources" (Pub. Resources Code §21074) and provides that a project with an effect that may cause a substantial adverse change in the significance of a tribal cultural resource is a project that may have a significant effect on the environment. (Pub. Resources Code §21084.2). Public agencies shall, when feasible, avoid damaging effects to any tribal cultural resource. (Pub. Resources Code §21084.3 (a)). **AB 52 applies to any project for which a notice of preparation, a notice of negative declaration, or a mitigated negative declaration is filed on or after July 1, 2015.** If your project involves the adoption of or amendment to a general plan or a specific plan, or the designation or proposed designation of open space, on or after March 1, 2005, it may also be subject to Senate Bill 18 (Burton, Chapter 905, Statutes of 2004) (SB 18). **Both SB 18 and AB 52 have tribal consultation requirements**. If your project is also subject to the federal National Environmental Policy Act (42 U.S.C. § 4321 et seq.) (NEPA), the tribal consultation requirements of Section 106 of the National Historic Preservation Act of 1966 (154 U.S.C. 300101, 36 C.F.R. §800 et seq.) may also apply.

The NAHC recommends consultation with California Native American tribes that are traditionally and culturally affiliated with the geographic area of your proposed project as early as possible in order to avoid inadvertent discoveries of Native American human remains and best protect tribal cultural resources. Below is a brief summary of portions of AB 52 and SB 18 as well as the NAHC's recommendations for conducting cultural resources assessments.

Consult your legal counsel about compliance with AB 52 and SB 18 as well as compliance with any other applicable laws.

AB 52

AB 52 has added to CEQA the additional requirements listed below, along with many other requirements:

1. Fourteen Day Period to Provide Notice of Completion of an Application/Decision to Undertake a Project: Within fourteen (14) days of determining that an application for a project is complete or of a decision by a public agency to undertake a project, a lead agency shall provide formal notification to a designated contact of, or tribal representative of, traditionally and culturally affiliated California Native American tribes that have requested notice, to be accomplished by at least one written notice that includes:
   a. A brief description of the project.
   b. The lead agency contact information.
   c. Notification that the California Native American tribe has 30 days to request consultation. (Pub. Resources Code §21080.3.1 (d)).
   d. A "California Native American tribe" is defined as a Native American tribe located in California that is on the contact list maintained by the NAHC for the purposes of Chapter 905 of Statutes of 2004 (SB 18). (Pub. Resources Code §21073).

2. Begin Consultation Within 30 Days of Receiving a Tribe's Request for Consultation and Before Releasing a Negative Declaration, Mitigated Negative Declaration, or Environmental Impact Report: A lead agency shall begin the consultation process within 30 days of receiving a request for consultation from a California Native American tribe that is traditionally and culturally affiliated with the geographic area of the proposed project. (Pub. Resources Code §21080.3.1, subds. (d) and (e)) and prior to the release of a negative declaration, mitigated negative declaration or Environmental Impact Report. (Pub. Resources Code §21080.3.1(b)).
   a. For purposes of AB 52, "consultation shall have the same meaning as provided in Gov. Code §65352.4 (SB 18). (Pub. Resources Code §21080.3.1 (b)).

3. Mandatory Topics of Consultation If Requested by a Tribe: The following topics of consultation, if a tribe requests to discuss them, are mandatory topics of consultation:
   a. Alternatives to the project.
   b. Recommended mitigation measures.
   c. Significant effects. (Pub. Resources Code §21080.3.2 (a)).

4. Discretionary Topics of Consultation: The following topics are discretionary topics of consultation:
   a. Type of environmental review necessary.
   b. Significance of the tribal cultural resources.
   c. Significance of the project's impacts on tribal cultural resources.
   d. If necessary, project alternatives or appropriate measures for preservation or mitigation that the tribe may recommend to the lead agency. (Pub. Resources Code §21080.3.2 (a)).

5. Confidentiality of Information Submitted by a Tribe During the Environmental Review Process: With some exceptions, any information, including but not limited to, the location, description, and use of tribal cultural resources 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, consistent with Government Code §6254 (r) and §6254.10. Any information submitted by a California Native American tribe during the consultation or environmental review process 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. (Pub. Resources Code §21082.3 (c)(1)).

6. Discussion of Impacts to Tribal Cultural Resources in the Environmental Document: If a project may have a significant impact on a tribal cultural resource, the lead agency's environmental document shall discuss both of the following:
   a. Whether the proposed project has a significant impact on an identified tribal cultural resource.
   b. Whether feasible alternatives or mitigation measures, including those measures that may be agreed to pursuant to Public Resources Code §21082.3, subdivision (a), avoid or substantially lessen the impact on the identified tribal cultural resource. (Pub. Resources Code §21082.3 (b)).

7. Conclusion of Consultation: Consultation with a tribe shall be considered concluded when either of the following occurs:
    a. The parties agree to measures to mitigate or avoid a significant effect, if a significant effect exists, on a tribal cultural resource; or
    b. A party, acting in good faith and after reasonable effort, concludes that mutual agreement cannot be reached. (Pub. Resources Code §21080.3.2 (b)).

8. Recommending Mitigation Measures Agreed Upon in Consultation in the Environmental Document: Any mitigation measures agreed upon in the consultation conducted pursuant to Public Resources Code §21080.3.2 shall be recommended for inclusion in the environmental document and in an adopted mitigation monitoring and reporting program, if determined to avoid or lessen the impact pursuant to Public Resources Code §21082.3, subdivision (b), paragraph 2, and shall be fully enforceable. (Pub. Resources Code §21082.3 (a)).

9. Required Consideration of Feasible Mitigation: If mitigation measures recommended by the staff of the lead agency as a result of the consultation process are not included in the environmental document or if there are no agreed upon mitigation measures at the conclusion of consultation, or if consultation does not occur, and if substantial evidence demonstrates that a project will cause a significant effect to a tribal cultural resource, the lead agency shall consider feasible mitigation pursuant to Public Resources Code §21084.3 (b). (Pub. Resources Code §21082.3 (e)).

10. Examples of Mitigation Measures That, If Feasible, May Be Considered to Avoid or Minimize Significant Adverse Impacts to Tribal Cultural Resources:
    a. Avoidance and preservation of the resources in place, including, but not limited to:
        i. Planning and construction to avoid the resources and protect the cultural and natural context.
        ii. Planning greenspace, parks, or other open space, to incorporate the resources with culturally appropriate protection and management criteria.
    b. Treating the resource with culturally appropriate dignity, taking into account the tribal cultural values and meaning of the resource, including, but not limited to, the following:
        i. Protecting the cultural character and integrity of the resource.
        ii. Protecting the traditional use of the resource.
        iii. Protecting the confidentiality of the resource.
    c. Permanent conservation easements or other interests in real property, with culturally appropriate management criteria for the purposes of preserving or utilizing the resources or places.
    d. Protecting the resource. (Pub. Resource Code §21084.3 (b)).
    e. Please note that a federally recognized California Native American tribe or a non-federally recognized California Native American tribe that is on the contact list maintained by the NAHC to protect a California prehistoric, archaeological, cultural, spiritual, or ceremonial place may acquire and hold conservation easements if the conservation easement is voluntarily conveyed. (Civ. Code §815.3 (c)).
    f. Please note that it is the policy of the state that Native American remains and associated grave artifacts shall be repatriated. (Pub. Resources Code §5097.991).

11. Prerequisites for Certifying an Environmental Impact Report or Adopting a Mitigated Negative Declaration or Negative Declaration with a Significant Impact on an Identified Tribal Cultural Resource: An Environmental Impact Report may not be certified, nor may a mitigated negative declaration or a negative declaration be adopted unless one of the following occurs:
    a. The consultation process between the tribes and the lead agency has occurred as provided in Public Resources Code §21080.3.1 and §21080.3.2 and concluded pursuant to Public Resources Code §21080.3.2.
    b. The tribe that requested consultation failed to provide comments to the lead agency or otherwise failed to engage in the consultation process.
    c. The lead agency provided notice of the project to the tribe in compliance with Public Resources Code §21080.3.1 (d) and the tribe failed to request consultation within 30 days. (Pub. Resources Code §21082.3 (d)).

The NAHC's PowerPoint presentation titled, "Tribal Consultation Under AB 52: Requirements and Best Practices" may be found online at: http://nahc.ca.gov/wp-content/uploads/2015/10/AB52TribalConsultation_CalEPAPDF.pdf

SB 18

SB 18 applies to local governments and requires local governments to contact, provide notice to, refer plans to, and consult with tribes prior to the adoption or amendment of a general plan or a specific plan, or the designation of open space. (Gov. Code §65352.3). Local governments should consult the Governor's Office of Planning and Research's "Tribal Consultation Guidelines," which can be found online at: https://www.opr.ca.gov/docs/09_14_05_Updated_Guidelines_922.pdf.

Some of SB 18's provisions include:

1. Tribal Consultation: If a local government considers a proposal to adopt or amend a general plan or a specific plan, or to designate open space it is required to contact the appropriate tribes identified by the NAHC by requesting a "Tribal Consultation List." If a tribe, once contacted, requests consultation the local government must consult with the tribe on the plan proposal. **A tribe has 90 days from the date of receipt of notification to request consultation unless a shorter timeframe has been agreed to by the tribe.** (Gov. Code §65352.3 (a)(2)).
2. No Statutory Time Limit on SB 18 Tribal Consultation. There is no statutory time limit on SB 18 tribal consultation.
3. Confidentiality: Consistent with the guidelines developed and adopted by the Office of Planning and Research pursuant to Gov. Code §65040.2, the city or county shall protect the confidentiality of the information concerning the specific identity, location, character, and use of places, features and objects described in Public Resources Code §5097.9 and §5097.993 that are within the city's or county's jurisdiction. (Gov. Code §65352.3 (b)).
4. Conclusion of SB 18 Tribal Consultation: Consultation should be concluded at the point in which:
    a. The parties to the consultation come to a mutual agreement concerning the appropriate measures for preservation or mitigation; or
    b. Either the local government or the tribe, acting in good faith and after reasonable effort, concludes that mutual agreement cannot be reached concerning the appropriate measures of preservation or mitigation. (Tribal Consultation Guidelines, Governor's Office of Planning and Research (2005) at p. 18).

Agencies should be aware that neither AB 52 nor SB 18 precludes agencies from initiating tribal consultation with tribes that are traditionally and culturally affiliated with their jurisdictions before the timeframes provided in AB 52 and SB 18. For that reason, we urge you to continue to request Native American Tribal Contact Lists and "Sacred Lands File" searches from the NAHC. The request forms can be found online at: http://nahc.ca.gov/resources/forms/

NAHC Recommendations for Cultural Resources Assessments

To adequately assess the existence and significance of tribal cultural resources and plan for avoidance, preservation in place, or barring both, mitigation of project-related impacts to tribal cultural resources, the NAHC recommends the following actions:

1. Contact the appropriate regional California Historical Research Information System (CHRIS) Center (http://ohp.parks.ca.gov/?page_id=1068) for an archaeological records search. The records search will determine:
    a. If part or all of the APE has been previously surveyed for cultural resources.
    b. If any known cultural resources have already been recorded on or adjacent to the APE.
    c. If the probability is low, moderate, or high that cultural resources are located in the APE.
    d. If a survey is required to determine whether previously unrecorded cultural resources are present.

2. If an archaeological inventory survey is required, the final stage is the preparation of a professional report detailing the findings and recommendations of the records search and field survey.
    a. The final report containing site forms, site significance, and mitigation measures should be submitted immediately to the planning department. All information regarding site locations, Native American human remains, and associated funerary objects should be in a separate confidential addendum and not be made available for public disclosure.
    b. The final written report should be submitted within 3 months after work has been completed to the appropriate regional CHRIS center.

3. Contact the NAHC for:
    a. A Sacred Lands File search. Remember that tribes do not always record their sacred sites in the Sacred Lands File, nor are they required to do so. A Sacred Lands File search is not a substitute for consultation with tribes that are traditionally and culturally affiliated with the geographic area of the project's APE.
    b. A Native American Tribal Consultation List of appropriate tribes for consultation concerning the project site and to assist in planning for avoidance, preservation in place, or, failing both, mitigation measures.

4. Remember that the lack of surface evidence of archaeological resources (including tribal cultural resources) does not preclude their subsurface existence.
    a. Lead agencies should include in their mitigation and monitoring reporting program plan provisions for the identification and evaluation of inadvertently discovered archaeological resources per Cal. Code Regs., tit. 14, §15064.5(f) (CEQA Guidelines §15064.5(f)). In areas of identified archaeological sensitivity, a certified archaeologist and a culturally affiliated Native American with knowledge of cultural resources should monitor all ground-disturbing activities.
    b. Lead agencies should include in their mitigation and monitoring reporting program plans provisions for the disposition of recovered cultural items that are not burial associated in consultation with culturally affiliated Native Americans.
    c. Lead agencies should include in their mitigation and monitoring reporting program plans provisions for the treatment and disposition of inadvertently discovered Native American human remains. Health and Safety Code §7050.5, Public Resources Code §5097.98, and Cal. Code Regs., tit. 14, §15064.5, subdivisions (d) and (e) (CEQA Guidelines §15064.5, subds. (d) and (e)) address the processes to be followed in the event of an inadvertent discovery of any Native American human remains and associated grave goods in a location other than a dedicated cemetery.

If you have any questions or need additional information, please contact me at my email address: Andrew.Green@nahc.ca.gov.

Sincerely,

Andrew Green

Andrew Green
Staff Service Analyst

cc: State Clearinghouse

DEPARTMENT OF WATER RESOURCES
1416 NINTH STREET, P.O. BOX 942836
SACRAMENTO, CA 94236-0001
(916) 653-5791

WATER RESOURCES
AUG 15 2019
IRVINE RANCH
WATER DISTRICT

AUG 12 2019

Ms. Jo Ann Corey, Environmental Compliance
Irvine Ranch Water District
15600 Sand Canyon Avenue
Irvine, California 92618

Environmental Document Transmittal for the Syphon Reservoir Improvement Project
SCH2019080009
Orange County

Dear Ms. Corey:

The Division of Safety of Dams (DSOD) has reviewed the Notice of Preparation for the Syphon Reservoir Improvement Project Environmental Impact Report which describes a proposed enlargement of the existing reservoir by replacing the existing dam with a new approximately 150-foot tall dam. The project will increase the recycled water storage capacity from 500 acre-feet to 5,000 acre-feet on the subject parcels.

As defined in Sections 6002 and 6003, Division 3, of the California Water Code, dams 25 feet or higher with a storage capacity of more than 15 acre-feet, and dams higher than 6 feet with a storage capacity of 50 acre-feet or more are subject to State jurisdiction. The dam height is the vertical distance measured from the maximum possible water storage level to the downstream toe of the barrier.

The proposed construction of the new dam is subject to State jurisdiction, and a construction application, together with plans, specifications, and the appropriate filing fee must be filed with DSOD for this project. All dam safety related issues must be resolved prior to approval of the application, and the work must be performed under the direction of a Civil Engineer registered in California. Erik Malvick, our Design Engineering Branch Chief, is responsible for the application process and can be reached at (916) 565-7840.

If you have any questions or need additional information, you may contact Field Engineer Ashley Moran at (909) 214-1503, or me at (916) 565-7827.

Sincerely,

Rick G. Draeger, Regional Engineer
Southern Region
Field Engineering Branch
Division of Safety of Dams

cc: Governor's Office of Planning and Research
State Clearinghouse
state.clearinghouse@water.ca.gov

From: Jo Ann Corey
Sent: Thursday, August 29, 2019 9:46 AM
To: Jeffrey Beavers
Subject: Re: Public Scoping Comments

Jeff...

Thank you for submitting these comments. I will share these with both the IRWD team as well as IRWD's environmental consultant, ESA who is preparing the project's environmental impact report.

Regards,

Jo Ann Corey, MPA
Environmental Compliance Specialist
Water Resources & Policy Department
Irvine Ranch Water District
15600 Sand Canyon Avenue
Irvine, CA 92619-7000
(949) 453-5326 - Direct
corey@irwd.com

>>> "Beavers, Jeffrey" <beavers@creanlutheran.org> 8/29/2019 8:19 AM >>>
Public Scoping Comments from Wednesday August 21, 2019 at 6pm meeting:

Comments from Jeffrey Beavers, CEO, Crean Lutheran High School. A not-for-profit high recognized service organization (RSO) private parochial high school located at 12500 Sand Canyon Avenue, which both shares a land border (athletic complex, and student parking lot), and is located adjacent to the Syphon Reservoir Proposed Expansion Project.

1. Top concerns are that of safety for both the athletic complex and the high school
2. Daily school operations and student safety and impact during exploration and construction, should the project move forward
    1. Including access to athletic complex, and parking
    2. Including path of travel for students on sidewalk at Sand Canyon and Portola intersection
    3. If IRWD adds additional public recreation features to this project, how might that impact our operations? And could there be an opportunity to add additional shared use parking?
3. On a positive note, we believe the project will make the 1070's dam structurally safer and are excited about that

1. With more water capacity we will want to closely monitor groundwater at the Athletic Complex
2. IRWD added a french drain on the North side of our property that we believe has helped with groundwater, we hope that with additional acreage of water it continues to keep ground water at a minimum

4. With additional acreage of water we hope consumers like us, with a split system domestic/recycled, may benefit from the possibilities of price reduction?
5. We appreciate the opportunity and communications from IRWD to know and discuss updates on this matter, including being able to help in updating the Emergency Evacuation Plan for the reservoir.

Please let me know if there are any questions about these comments. They shouldn't be a surprise, as we've had a pre meeting discussing each of these in more detail, thank you.

His peace,

Jeffrey S. Beavers, M.A., LMFT
Executive Director | Chief Executive Officer

CREAN LUTHERAN HIGH SCHOOL

Proclaiming Jesus Christ through Excellence in Education!

CLHS 2019-20 Theme Verse:

Jesus said, "I am the way, and the truth, and the life. No one comes to the Father except through me." John 14:6

Crean Lutheran High School | 12500 Sand Canyon Avenue | Irvine, CA 92618

Office phone: 949.387.1199 (x2412) | 949.387.1200 fax

EMAIL CONFIDENTIALITY NOTICE

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State of California – Natural Resources Agency
DEPARTMENT OF FISH AND WILDLIFE
South Coast Region
3883 Ruffin Road
San Diego, CA 92123
(858) 467-4201
www.wildlife.ca.gov

GAVIN NEWSOM, Governor
CHARLTON H. BONHAM, Director

August 30, 2019

Ms. Jo Ann Corey
Irvine Ranch Water District
Water Resources and Policy Department
15600 Sand Canyon Avenue
Irvine, CA 92618

Subject: Comments on the Notice of Preparation of a Draft Environmental Impact Report for the Syphon Reservoir Improvement Project (SCH # 2019080009)

Dear Ms. Corey:

The Department of Fish and Wildlife (Department) has reviewed the above-referenced Notice of Preparation (NOP) of a Draft Environmental Impact Report (DEIR) for the Syphon Reservoir Improvement Project, located in the unincorporated County of Orange, California. The following statements and comments have been prepared pursuant to the Department's authority as Trustee Agency with jurisdiction over natural resources affected by the project (California Environmental Quality Act [CEQA] Guidelines § 15386) and pursuant to our authority as a Responsible Agency under CEQA Guidelines section 15381 over those aspects of the proposed project that come under the purview of the California Endangered Species Act (Fish and Game Code § 2050 et seq.) and Fish and Game Code section 1600 et seq. The Department also administers the Natural Community Conservation Planning (NCCP) program. The Irvine Ranch Water District (IRWD) participates in the NCCP program through its role as a Participating Landowner under the County of Orange Central and Coastal Subregion NCCP/HCP (NCCP/HCP).

The proposed project would be built within the IRWD service area at the site of the existing Syphon Reservoir, located on the northeast side of Portola Parkway between Bee Canyon Access Road and State Route 133. The project would expand the reservoir's recycled water storage capacity from its current 500 acre-feet capacity to approximately 5,000 acre-feet by replacing the current 59-foot-high earthen engineered dam with a 136-foot-high dam of similar construction. The resulting increased recycled water storage capacity is expected to allow IRWD to meet the projected seasonal recycled water demands within its service area and decrease its dependence on imported water. Approximately 82 acres of upland and wetland vegetation communities would be inundated by the reservoir's expanded footprint. A large portion (precise acreage still to be determined) of the expansion area is located within the habitat Reserve System (Reserve) established by the NCCP/HCP and/or protected by use restrictions in the January 4, 2010, Grant Deed that originally conveyed the property to IRWD (IRWD Doc. D0204).

In advance of the proposed project, IRWD will conduct a geotechnical investigation to characterize the geologic and geotechnical baseline conditions of the site. The Department and the U.S. Fish and Wildlife Service (collectively the Wildlife Agencies) submitted comments on the Mitigated Negative Declaration that was completed for the geotechnical investigations project, and IRWD worked closely with the Wildlife Agencies to address concerns regarding impacts to biological resources protected by the Grant Deed and the Reserve. We anticipate similar close coordination among our agencies during the evaluation and review of this current project.

In order to assist IRWD in avoiding and minimizing potential project impacts on biological resources and maintaining consistency with the NCCP/HCP, the Department offers the following comments and recommendations based on its review of the NOP, its past project discussions with IRWD, and its knowledge of the habitat and resources present on site.

1. Recent surveys conducted between April 10 and July 8, 2019, documented that the habitat within and surrounding the proposed project area was occupied by up to 16 individual least Bell's vireo (*Vireo bellii pusillus*), a state and federally endangered species. In addition, the federally threatened coastal California gnatcatcher (*Polioptila californica californica*; gnatcatcher) has been historically documented breeding on site and were detected during the 2019 surveys, as were two California Species of Special Concern, the yellow breasted chat (*Icteria virens*) and the yellow warbler (*Setophaga petechia*). IRWD has initiated early discussions with the Wildlife Agencies to begin the process of identifying appropriate mitigation for potential impacts to sensitive species and their habitats that would ensure the proposed project is consistent with the NCCP/HCP and accounts for any past restoration and protection commitments associated with the Grant Deed. It is anticipated that discussions between our agencies will continue in advance of the finalization of the DEIR and that the final mitigation plan may involve (but is not limited to) some combination of off-site conservation and/or restoration of habitat as well as the utilization of take credits established through the NCCP/HCP. We look forward to these continued discussions and working with IRWD to develop an agreeable mitigation plan that is consistent with the requirements of the NCCP/HCP and minimizes impacts to sensitive biological resources within the project area. We recommend having a draft mitigation plan in place prior to the release of the DEIR to allow for public input during the review process. The Department is available to assist in facilitating any necessary meetings to achieve this outcome.

2. The NOP indicates the DEIR will evaluate the potential for compatible recreational opportunities to be implemented as a component of the proposed project. During past coordination meetings, the Department has agreed it is appropriate to evaluate potential recreational opportunities within the project site provided that they are consistent with the NCCP/HCP and the allowable uses in the Reserve. We recommend that any review of potential recreational

opportunities examine the impact the proposed uses could have on sensitive species and important biological resources on site, including gnatcatcher and least Bell's vireo, as well as evaluate the compatibility of recreation with the use restrictions in the Grant Deed. The restrictions currently stipulate that the land conveyed by the Grant Deed shall be used for (i) the protection of threatened and endangered species, (ii) preservation, restoration, and enhancement of the habitat for these species, and (iii) open space preservation and other related environmental purposes compatible with the uses described in (i) and (ii), and for no other purpose whatsoever beyond the specified use exceptions. These exceptions allow for the installation and maintenance of infrastructure, continuation of existing operations and maintenance activities, and the potential for reservoir improvements described by the NOP with appropriate approvals.

While not expressly prohibited, recreational use is not currently described as acceptable use of the Grant Deed property. Given the sensitive nature of the biological resources present and the conservation-based objectives of the overlying Grant Deed, the Department recommends limiting consideration of recreational opportunities to passive uses such as hiking and nature viewing (NCCP/HCP Section 5.3, pp. II-294). If, following thorough evaluation of the potential impacts to sensitive biological resources, it is determined that limited passive recreational use could be compatible and would not interfere with the conservation purposes of the property, it is the Department's understanding that an amendment to the Grant Deed language would be required to establish the recreation activity as an excepted and allowable use. This would require consent of the Foothill/Eastern Transportation Corridor Agency and the U.S. Fish and Wildlife Service in accordance with Section 7.2 of the Grant Deed. Any impacts incurred from trail creation or other impacts associated with recreational activity would also require appropriate mitigation and would need to account for the past restoration efforts and adequately replace any lost habitat that is protected by the Grant Deed.

3. The Department has responsibility for wetland and riparian habitats. It is the policy of the Department to strongly discourage development in wetlands or conversion of wetlands to uplands. We oppose any development or conversion that would result in a reduction of wetland acreage or wetland habitat values, unless, at a minimum, project mitigation assures there will be "no net loss" of either wetland habitat values or acreage. Mitigation measures to compensate for impacts to riparian habitat should be included in the DEIR to compensate for the loss of function and value of the impacted habitat.

    a. The Department also has regulatory authority over activities in streams and/or lakes that will divert or obstruct the natural flow, or change the bed, channel, or bank (which may include associated riparian resources) of any river, stream, or lake or use material from a river, stream, or lake. For any such activities, the project applicant (or "entity") must provide written

notification to the Department pursuant to section 1600 et seq. of the Fish and Game Code. Based on this notification and other information, the Department determines whether a Lake and Streambed Alteration Agreement (LSAA) with the applicant is required prior to conducting the proposed activities. The Department's issuance of a LSAA for a project that is subject to CEQA will require CEQA compliance actions by the Department as a Responsible Agency. The Department as a Responsible Agency under CEQA may consider the Lead Agency's Environmental Impact Report for the project. To minimize additional requirements by the Department pursuant to section 1600 et seq. and/or under CEQA, the document should fully identify the potential impacts to riparian resources and provide adequate avoidance, mitigation, monitoring, and reporting commitments for issuance of the LSAA. The Department recommends including this information as a component of the overall mitigation plan to be developed for this project (see Comment 1 above).

The Department appreciates the opportunity to comment on the NOP and IRWD's ongoing communication during this process. We look forward to our continued relationship and the development of an agreeable mitigation plan that appropriately addresses project impacts and ensures project consistency with the NCCP/HCP. If you have any questions or comments regarding this letter, please contact Kyle Rice at (858) 467-4250, or kyle.rice@wildlife.ca.gov.

Sincerely,

Gail K. Sevrens
Environmental Program Manager
South Coast Region

ec: State Clearinghouse
Jonathan Snyder, U.S. Fish and Wildlife Service

South Coast
Air Quality Management District
21865 Copley Drive, Diamond Bar, CA 91765-4178
(909) 396-2000 • www.aqmd.gov

SENT VIA USPS AND E-MAIL: September 10, 2019
SyphonEIR@irwd.com
Jo Ann Corey, Environmental Compliance Specialist
Irvine Ranch Water District, Water Resources & Policy Department
15600 San Canyon Avenue
P.O. Box 57000
Irvine, CA 92619

Notice of Preparation of an Environmental Impact Report for the Proposed Syphon Reservoir Improvement Project

South Coast Air Quality Management District (South Coast AQMD) staff appreciates the opportunity to comment on the above-mentioned document. South Coast AQMD staff's comments are recommendations regarding the analysis of potential air quality impacts from the Proposed Project that should be included in the Environmental Impact Report (EIR). Please send South Coast AQMD a copy of the EIR upon its completion. Note that copies of the EIR that are submitted to the State Clearinghouse are not forwarded to South Coast AQMD. Please forward a copy of the EIR directly to South Coast AQMD at the address shown in the letterhead. **In addition, please send with the EIR all appendices or technical documents related to the air quality, health risk, and greenhouse gas analyses and electronic versions of all air quality modeling and health risk assessment files[1]. These include emission calculation spreadsheets and modeling input and output files (not PDF files). Without all files and supporting documentation, South Coast AQMD staff will be unable to complete our review of the air quality analyses in a timely manner. Any delays in providing all supporting documentation will require additional time for review beyond the end of the comment period.**

Air Quality Analysis

South Coast AQMD adopted its California Environmental Quality Act (CEQA) Air Quality Handbook in 1993 to assist other public agencies with the preparation of air quality analyses. South Coast AQMD recommends that the Lead Agency use this Handbook as guidance when preparing its air quality analysis. Copies of the Handbook are available from South Coast AQMD's Subscription Services Department by calling (909) 396-3720. More guidance developed since this Handbook is also available on South Coast AQMD's website at: http://www.aqmd.gov/home/regulations/ceqa/air-quality-analysis-handbook/ceqa-air-quality-handbook-(1993). South Coast AQMD staff also recommends that the Lead Agency use the CalEEMod land use emissions software. This software has recently been updated to incorporate up-to-date state and locally approved emission factors and methodologies for estimating pollutant emissions from typical land use development. CalEEMod is the only software model maintained by the California Air Pollution Control Officers Association (CAPCOA) and replaces the now outdated URBEMIS. This model is available free of charge at: www.caleemod.com.

South Coast AQMD has also developed both regional and localized significance thresholds. South Coast AQMD staff requests that the Lead Agency quantify criteria pollutant emissions and compare the results

[1] Pursuant to the CEQA Guidelines Section 15174, the information contained in an EIR shall include summarized technical data, maps, plot plans, diagrams, and similar relevant information sufficient to permit full assessment of significant environmental impacts by reviewing agencies and members of the public. Placement of highly technical and specialized analysis and data in the body of an EIR should be avoided through inclusion of supporting information and analyses as appendices to the main body of the EIR. Appendices to the EIR may be prepared in volumes separate from the basic EIR document, but shall be readily available for public examination and shall be submitted to all clearinghouses which assist in public review.

to South Coast AQMD's CEQA regional pollutant emissions significance thresholds to determine air quality impacts. South Coast AQMD's CEQA regional pollutant emissions significance thresholds can be found here at: http://www.aqmd.gov/docs/default-source/ceqa/handbook/scaqmd-air-quality-significance-thresholds.pdf. In addition to analyzing regional air quality impacts, South Coast AQMD staff recommends calculating localized air quality impacts and comparing the results to localized significance thresholds (LSTs). LSTs can be used in addition to the recommended regional significance thresholds as a second indication of air quality impacts when preparing a CEQA document. Therefore, when preparing the air quality analysis for the Proposed Project, it is recommended that the Lead Agency perform a localized analysis by either using the LSTs developed by South Coast AQMD staff or performing dispersion modeling as necessary. Guidance for performing a localized air quality analysis can be found at: http://www.aqmd.gov/home/regulations/ceqa/air-quality-analysis-handbook/localized-significance-thresholds.

The Lead Agency should identify any potential adverse air quality impacts that could occur from all phases of the Proposed Project and all air pollutant sources related to the Proposed Project. Air quality impacts from both construction (including demolition, if any) and operations should be calculated. Construction-related air quality impacts typically include, but are not limited to, emissions from the use of heavy-duty equipment from grading, earth-loading/unloading, paving, architectural coatings, off-road mobile sources (e.g., heavy-duty construction equipment) and on-road mobile sources (e.g., construction worker vehicle trips, material transport trips). Operation-related air quality impacts may include, but are not limited to, emissions from stationary sources (e.g., boilers), area sources (e.g., solvents and coatings), and vehicular trips (e.g., on- and off-road tailpipe emissions and entrained dust). Air quality impacts from indirect sources, such as sources that generate or attract vehicular trips, should be included in the analysis.

In the event that the Proposed Project generates or attracts vehicular trips, especially heavy-duty diesel-fueled vehicles, it is recommended that the Lead Agency perform a mobile source health risk assessment. Guidance for performing a mobile source health risk assessment ("*Health Risk Assessment Guidance for Analyzing Cancer Risk from Mobile Source Diesel Idling Emissions for CEQA Air Quality Analysis*") can be found at: http://www.aqmd.gov/home/regulations/ceqa/air-quality-analysis-handbook/mobile-source-toxics-analysis. An analysis of all toxic air contaminant impacts due to the use of equipment potentially generating such air pollutants should also be included.

In addition, guidance on siting incompatible land uses can be found in the California Air Resources Board's *Air Quality and Land Use Handbook: A Community Health Perspective*, which can be found at: http://www.arb.ca.gov/ch/handbook.pdf. CARB's Land Use Handbook is a general reference guide for evaluating and reducing air pollution impacts associated with new projects that go through the land use decision-making process. Guidance[2] on strategies to reduce air pollution exposure near high-volume roadways can be found at: https://www.arb.ca.gov/ch/rd_technical_advisory_final.PDF.

Mitigation Measures

In the event that the Proposed Project generates significant adverse air quality impacts, CEQA requires that all feasible mitigation measures that go beyond what is required by law be utilized during project construction and operation to minimize these impacts. Pursuant to CEQA Guidelines Section 15126.4 (a)(1)(D), any impacts resulting from mitigation measures must also be discussed. Several resources are available to assist the Lead Agency with identifying potential mitigation measures for the Proposed Project, including:

[2] In April 2017, CARB published a technical advisory, *Strategies to Reduce Air Pollution Exposure Near High-Volume Roadways: Technical Advisory*, to supplement CARB's Air Quality and Land Use Handbook: A Community Health Perspective. This technical advisory is intended to provide information on strategies to reduce exposures to traffic emissions near high-volume roadways to assist land use planning and decision-making in order to protect public health and promote equity and environmental justice. The technical advisory is available at: https://www.arb.ca.gov/ch/landuse.htm.

- Chapter 11 "Mitigating the Impact of a Project" of South Coast AQMD'S *CEQA Air Quality Handbook* South Coast AQMD's CEQA web pages available here: http://www.aqmd.gov/home/regulations/ceqa/air-quality-analysis-handbook/mitigation-measures-and-control-efficiencies
- South Coast AQMD's Rule 403 – Fugitive Dust, and the Implementation Handbook for controlling construction-related emissions and Rule 1403 – Asbestos Emissions from Demolition/Renovation Activities
- South Coast AQMD's Mitigation Monitoring and Reporting Plan (MMRP) for the 2016 Air Quality Management Plan (2016 AQMP) available here (starting on page 86): http://www.aqmd.gov/docs/default-source/Agendas/Governing-Board/2017/2017-mar3-035.pdf
- CAPCOA's *Quantifying Greenhouse Gas Mitigation Measures* available here: http://www.capcoa.org/wp-content/uploads/2010/11/CAPCOA-Quantification-Report-9-14-Final.pdf

Alternatives

In the event that the Proposed Project generates significant adverse air quality impacts, CEQA requires the consideration and discussion of alternatives to the project or its location which are capable of avoiding or substantially lessening any of the significant effects of the project. The discussion of a reasonable range of potentially feasible alternatives, including a "no project" alternative, is intended to foster informed decision-making and public participation. Pursuant to CEQA Guidelines Section 15126.6(d), the EIR shall include sufficient information about each alternative to allow meaningful evaluation, analysis, and comparison with the Proposed Project.

Responsible Agency, South Coast AQMD Permits, and Rules

It is important to note that generally, operation of portable engines and portable equipment units of 50 horsepower or greater that emit particulate matter require a permit from South Coast AQMD or registration under the Portable Equipment Registration Program (PERP) through the California Air Resources Board (CARB)[3]. The Lead Agency should consult with South Coast AQMD's Engineering and Permitting staff to determine if there is any diesel-powered equipment during implementation that will require a South Coast AQMD permit or if the equipment will need to be registered under the PERP through CARB. If a permit from South Coast AQMD is required, South Coast AQMD should be identified as a Responsible Agency for the Proposed Project in the EIR. Any assumptions used in the Air Quality Analysis in the EIR will be used as the basis for permit conditions and limits for the Proposed Project. If there is any information in the permitting process suggesting that the Proposed Project would result in significant adverse air quality impacts not analyzed in the EIR or substantially more severe air quality impacts than those analyzed in the EIR, the Lead Agency should commit to reevaluating the Proposed Project's air quality impacts through a CEQA process (CEQA Guidelines Section 15162). For more information on permits and rules, please visit South Coast AQMD's webpage at: http://www.aqmd.gov/home/permits. Questions on permits can be directed to South Coast AQMD's Engineering and Permitting staff at (909) 396-3385. For more information on the PERP Program, please contact CARB at (916) 324-5869 or visit CARB's webpage at: https://ww2.arb.ca.gov/our-work/programs/portable-equipment-registration-program-perp.

Data Sources

South Coast AQMD rules and relevant air quality reports and data are available by calling South Coast AQMD's Public Information Center at (909) 396-2039. Much of the information available through the Public Information Center is also available at South Coast AQMD's webpage at: http://www.aqmd.gov.

[3] South Coast AQMD. *Portable Equipment Registration Program (PERP)*. Accessed at: http://www.aqmd.gov/home/permits/equipment-registration/perp

South Coast AQMD staff is available to work with the Lead Agency to ensure that project's air quality and health risk impacts are accurately evaluated and mitigated where feasible. If you have any questions regarding this letter, please contact me at lsun@aqmd.gov.

Sincerely,

Lijin Sun

Lijin Sun, J.D.
Program Supervisor, CEQA IGR
Planning, Rule Development & Area Sources

LS
ORC190802-03
Control Number

Community Development
1 Civic Center Plaza, Irvine, CA 92606-5208
cityofirvine.org
949-724-6000

WATER RESOURCES
SEP 12 2019
IRVINE RANCH
WATER DISTRICT

September 12, 2019

Ms. Jo Ann Corey
Water Resources Department
Irvine Ranch Water District
15600 Sand Canyon Avenue
Irvine, CA 92618

Subject: **Notice of Preparation (NOP) for an Environmental Impact Report (EIR) for Syphon Reservoir Improvement Project**

Dear Ms. Corey:

Staff is in receipt of an NOP for an EIR for the Irvine Water Ranch District's (IRWD) Syphon Reservoir Improvement Project. The site is located on the northeast side of Portola Parkway between Bee Canyon Access Road and SR - 133. The project consists of increasing the reservoir's existing recycled water capacity to serve the community's water needs. To accomplish this, IRWD will replace an existing dam with one that increases reservoir capacity from approximately 500 acre-feet to 5,000 acre-feet.

The City staff has reviewed the NOP and has no comments. We look forward to reviewing the EIR when it is available. If you have any questions, you may contact me at 949-724-6364 or at jequina@cityofirvine.org.

Sincerely,

Justin Equina
Associate Planner

ec: Kerwin Lau, Manager of Planning Services
Marika Poynter, Principal Planner

San Joaquin Hills
Transportation
Corridor Agency

Chair:
Fred Minagar
Laguna Niguel

Transportation Corridor Agencies™

Foothill/Eastern
Transportation
Corridor Agency

Chair:
Christina Shea
Irvine

September 12, 2019

Via Email: SyphonEIR@IRWD.com

Jo Ann Corey
Environmental Compliance Specialist
Irvine Ranch Water District
Water Resources & Policy Department
15600 Sand Canyon Avenue
P.O. Box 57000
Irvine, California 92619-7000

WATER RESOURCES

SEP 13 2019

IRVINE RANCH
WATER DISTRICT

Re: Notice of Preparation of an Environmental Impact Report for the Syphon Reservoir Improvement Project

Dear Ms. Corey:

The Foothill/Eastern Transportation Corridor Agency ("F/ETCA") has received and reviewed the Notice of Preparation of an Environmental Impact Report ("Notice") prepared in connection with the Syphon Reservoir Improvement Project ("Project"). As the Irvine Ranch Water District ("IRWD") acknowledges in the Notice, the Project site is subject to various restrictions ("CC&Rs") as listed in that certain Grant Deed, dated January 4, 2010 and recorded in the Official Records of Orange County on January 4, 2010 as Instrument No. 2010000000111 ("Grant Deed"). Pursuant to Section 6 of the Grant Deed, the F/ETCA is an intended third-party beneficiary of the CC&Rs. Further, Section 7.2 of the Grant Deed provides that no termination, amendment, modification or extension of any provision of the CC&Rs can be made without the prior written consent of the F/ETCA.

Further, pursuant to that certain Grant Deed dated January 4, 2010 and recorded in the Official Records of Orange County on January 4, 2010 as Instrument No. 2010000000110 from the F/ETCA to the Irvine Company LLC, the F/ETCA has a permanent easement on and across the Project site together with the right of ingress and egress over the property for purposes of monitoring and related activities. Please be advised that the F/ETCA requires continued access onto the Project site in order to comply with its ongoing permitting obligations.

We request IRWD to provide the undersigned with notice of any public meeting or proposed action by IRWD regarding the Project or the CC&Rs, and notice and copies of any draft amendment or modification of the Grant Deed or the CC&Rs, along with any other forthcoming documentation for the Project.

If you have questions or require additional information, please do not hesitate to contact me at 949.754.3475 or via email (vmcfall@thetollroads.com).

Sincerely,

for Valarie McFall
Chief Environmental Planning Officer
Transportation Corridor Agencies

DEPARTMENT OF TRANSPORTATION
DISTRICT 12
1750 EAST FOURTH STREET, SUITE 100
SANTA ANA, CA 92705
PHONE (657) 328-6310
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Making Conservation a California Way of Life.

WATER RESOURCES

SEP 13 2019

IRVINE RANCH WATER DISTRICT

September 13, 2019

Jo Ann Corey
Irvine Ranch Water District
15600 Sandy Canyon Avenue
Irvine, CA 92618

File: IGR/CEQA
SCH#: 2019080009
IGR Log # 2019-01193
SR133 PM 12.906; SR 241 PM 27.496

Dear Ms. Corey:

Thank you for including the California Department of Transportation (Caltrans) in the review of the Notice of Preparation (NOP) of a Draft Environmental Impact Report (DEIR) for the Syphon Reservoir Improvement Project. The mission of Caltrans is to provide a safe, sustainable, and integrated efficient transportation system to enhance California's economy and livability.

The proposed project would increase the capacity of the existing recycled water reservoir to serve the community's seasonal and future recycled water needs. The reservoir capacity would increase from approximately 500 acre-feet (AF) to 5,000 AF. As part of the reservoir expansion, the existing engineered dam would be replaced with a new engineered dam that would meet and exceed the latest safety standards. The proposed project is located on the northeast side of Portola Parkway between Bee Canyon Access Road and State Route (SR) 133 in the County of Orange. The nearest State facility to the project site are SR-133 and SR-241.

Caltrans is a responsible agency on this project and has the following comments:

1. The Environmental Impact Report (EIR) should evaluate the potential impact to traffic and circulation during the construction phase that include: related vehicle trips and operational vehicle trips on local and regional roadways, particularly both SR-241 and SR-133.

2. Traffic assessment for the project requires a Traffic Impact Study (TIS). The following intersections on Caltrans right of way should be included in the TIS:
   - Northbound SR-133 and Irvine Boulevard on/off-ramps
   - Southbound SR-133 and Irvine Boulevard on/off-ramps
   - Northbound SR-241 and Portola Parkway on/off-ramps
   - Southbound SR-241 and Portola Parkway on/off-ramps

3. Prior to the construction stage, please include a Traffic Management Plan (TMP) to Caltrans for review and approval.

4. Caltrans wishes to caution that deeply buried archaeological resources have been discovered in the vicinity of the current project area, making the deployment of archaeological monitors during construction especially important for this undertaking.

5. Please be advised that Caltrans Encroachment Permit prohibits the discharge of groundwater onto State facilities. All State drainage facilities should be protected during construction and the existing flow pattern shall be maintained. Final construction plans will be reviewed by Caltrans Hydraulics Branch during Encroachment Permit Process.

6. In the event of any activity on Caltrans right of way an encroachment permit will be required. For specific details on Encroachment Permits procedure, please refer to Encroachment Permits Manual at: https://dot.ca.gov/programs/traffic-operations/ep

Please continue to keep us informed of this project and any future developments that could potentially impact State transportation facilities. If you have any questions or would like to meet with us regarding these comments, please do not hesitate to call Maryam Molavi at (657) 328-6280.

Sincerely,

Scott Shelley
Branch Chief, Regional-IGR-Transit Planning
District 12

OC Public Works
Integrity, Accountability, Service, Trust
Shane L. Silsby, Director

September 17, 2019

NCL-19-034

Jo Ann Corey, Environmental Compliance Specialist
Irvine Ranch Water District
Water Resources & Policy Department
15600 San Canyon Avenue
Irvine, California, 92619

WATER RESOURCES
SEP 17 2019
IRVINE RANCH
WATER DISTRICT

Subject: Notice of Preparation of an Environmental Impact Report for The Syphon Reservoir Improvement Project

Dear Ms. Corey,

Thank you for the opportunity to comment on the Notice of Preparation of an Environmental Impact Report for The Syphon Reservoir Improvement Project. The County of Orange offers the following comments for your consideration.

North OC Watershed Management Area

1. In Section 4.10 *Hydrology and Water Quality* (page 76) the document discusses discharge methods of effluent water generated as a component of geotechnical boring activities. One method discussed describes effluent water discharged to a local storm drain and the associated NPDES discharge permit from the Santa Ana Regional Water Quality Control Board. The Irvine Ranch Water District also may require permit coverage if the discharge is to an Orange County Flood Control District right of way. Information on this permit can be found at https://myoceservices.ocgov.com/. In addition, the document should discuss specifically which storm drain would likely be designated to incur effluent water.

If you have any questions regarding these comments, please contact Matt Tucker at (714) 955-0669 in North OC Watershed Management Area or Cindy Salazar at (714) 667-8870 in OC Development Services.

Sincerely,

Richard Vuong, Manager, Planning Division
OC Public Works Service Area/OC Development Services
601 North Ross Street
Santa Ana, California 92701
Richard.Vuong@ocpw.ocgov.com

cc: Matt Tucker, North OC Watershed Management Area

To: JoAnn Corey Corey@IRWD.com

Scoping for the proposed EIR for the Enlargement of Syphon Reservoir

Please address the following concerns during the EIR process for the proposed enlargement of Syphon Reservoir:

1. In each of the next 30 years please project the amount of capacity needed for storage of recycled water based on the hydrology during the past 20 years and projected flows to Michaelson Reclamation plant using the 50 gal per person per day water use.

2. Taking the above information and using the same hydrology project the amount of purchased MWD water needed without a project taking into consideration the native water in Irvine Lake during each year.

3. Calculate the cost of Tertiary treatment and the cost of Pumping recycled water to the enlarged Syphon Reservoir versus the cost of MWD untreated water.

4. Evaluate the cost of an alternative project which specifically delivers winter surplus water to the Green Acres Project owned by the Orange County Water District (OCWD) and during non-storm periods to the OCWD GWRS project headworks, and when necessary to a blow-off value to be constructed where the Green Acres conveyance line crosses the Santa Ana River. Further evaluate the revenue receivable from OCWD to IRWD for water delivered to the Green Acres customers along with half the treatment savings derived by OCWD for using IRWD recycled water instead of Orange County Sanitation District (OCSD) Plant 2 water during non-storm events. Evaluate the cost of delivery through the existing pipelines (mostly owned by OCWD), potential revenue to be gained from OCWD for cost reductions caused by the deliveries, the reduced cost by NOT pumping water this water to the enlarged Syphon Reservoir versus the added purchase of MWD untreated water less the use of native water from Irvine Lake. Compare operation costs delta to the cost of building the proposed Enlargement to Syphon Reservoir using a twenty year payback. Assume that MWD rates do not increase over 3% on average over the 20 year period.

5. Evaluate other alternative projects that may eliminate the need for the proposed project as well as alternative sites such as enlarging Big Peters Reservoir.

6. Evaluate if necessary construction a parallel pipeline to the Green Acres pipeline to increase flows using the above assumptions.

7. Evaluate the impact on property values on the recently built homes in the vicinity of the proposed project.

8. Evaluate the cost and other impacts to the playing fields of Crean High School due to the proposed construction.

9. In evaluating the proposed expansion calculate the added weight impacts on the stability of the surrounding land, evaluate the likely hood of slides caused by the maximum credible earthquake and the dollar impacts to the community of a failure.

Thank you for this opportunity to add to the scope of the proposed project EIR. I look forward to getting answers to the above from the consultant that I have been sadly otherwise unable to get from the staff that advocates for this project.

Sincerely Yours,

Peer A. Swan

Member of the Board of Directors, IRWD

September 16, 2019

To: JoAnn Corey Corey@IRWD.com

Scoping for the proposed EIR for the Enlargement of Syphon Reservoir

JoAnn, I talked to Paul Weghorst this morning and he said he would accept added comments and concerns the proposed enlargement of Syphon Reservoir:

Evaluate over a twenty year period the amount of low cost ground water that may be pumped from the Orange County Basin by decreasing the amount of recycled water use within IRWD and increasing MWD untreated usage in my item # 4 alternative project outlined in my prior submission. Add these savings to overall savings of the alternative outlined in my prior item #4.

Sincerely Yours,

Peer A. Swan

Member of the Board of Directors, IRWD

WATER RESOURCES

SEP 18 2019

IRVINE RANCH
WATER DISTRICT

September 17, 2019

Comment card

Irvine Ranch Water District
SYPHON RESERVOIR IMPROVEMENT PROJECT

Mail comments using this postage-paid card. Or email comments to **syphoneir@irwd.com**. Comments must be received by 4 p.m. on Monday, Sept. 16, 2019.

Your name (required): Alice Loh Organization:

Address (required): 38 Somerton, CA 92620 Phone: 949-590-0291

Comments:

1. I want to see how this project will impact neighborhood safety. My children went to the high school close by. Also I'm concerned about my home's safety

2. I'm also curious if the project will impact my insurance cost and home value

syphonreservoirproject.com 949-453-5500

Comment card

Irvine Ranch Water District
SYPHON RESERVOIR IMPROVEMENT PROJECT

Mail comments using this postage-paid card. Or email comments to **syphoneir@irwd.com**.
Comments must be received by 4 p.m. on Monday, Sept. 16, 2019.

Your name (required): Adrienne Escoe Organization: NA

Address (required): 48 Diamond, Irvine 92620 Phone: 949-825-7415

Comments: I could not attend the meeting 08/21/2019. Please consider the following in your plans:

1. Contingency tunnels or channels for spillage in the event of an earthquake, air crash, or terrorist damage that might cause dam failure.
2. The potential cost and availability of flood insurance for Stonegate Village homeowners.
3. Alternative sites that are not immediately above major residential areas.

Thank you.

syphonreservoirproject.com 949-453-5500

Comment card

Irvine Ranch Water District
SYPHON RESERVOIR IMPROVEMENT PROJECT

Mail comments using this postage-paid card. Or email comments to **syphoneir@irwd.com**. Comments must be received by 4 p.m. on Monday, Sept. 16, 2019.

Your name (required): Valerie Gebhardt Organization: retired

Address (required): 40 Diamond Irvine 92620 Phone: 949-932-0421

Comments: I am opposed to the expansion of the syphon reservoir. Putting residents and students at increased risk is not an improvement. What is the scenario if the expanded reservoir has a catastrophic structural failure? What is the projected area of flooding? What size area would have to be evacuated? For insurance purposes, what area is reclassified as being in a flood zone? How much would this insurance cost? How much would this negative impact effect the values of homes in the area? What impact on businesses in area? We do need water storage areas, but not in locations where it jeopardizes the safety of the community. Valerie Gebhardt

syphonreservoirproject.com 949-453-5500

Comment card

Irvine Ranch Water District
SYPHON RESERVOIR IMPROVEMENT PROJECT

Mail comments using this postage-paid card. Or email comments to **syphoneir@irwd.com**. Comments must be received by 4 p.m. on Monday, Sept. 16, 2019.

Your name (required): Lawrence Gebhardt Organization: Retired

Address (required): 40 Diamond Irvine 92620 Phone: 949-932-0421

Comments: As a homeowner in Stonegate Village and a member of the HOA Board, I vehemently oppose this project. It is completely ludicrous to think our IRWD would put the entire Stonegate Village, including homes and schools, in harms way if an unforeseen disaster (earthquake, 100 yr. flood, etc.) occurs. The Village of Montecito, CA did not expect their flood disaster in Jan. '18 caused by rain and mud Rolling down hill! Please consider a more carefully planned Reservoir in another location. As a former OC Grand Jury Member 2018-19, I will ask the current panel to investigate the EIR and supporting docs for this project.

syphonreservoirproject.com 949-453-5500

Respectfully, Lawrence Gebhardt

Comment card

Irvine Ranch Water District
SYPHON RESERVOIR IMPROVEMENT PROJECT

Mail comments using this postage-paid card. Or email comments to **syphoneir@irwd.com**. Comments must be received by 4 p.m. on Monday, Sept. 16, 2019.

Your name (required): Michele Jacknik Organization: homeowner

Address (required): 46 Diamond, Irvine Phone:

Comments:

I oppose the proposed reservoir expansion because it would endanger Stonegate lives, property and 2 schools directly in the path of being inundated by a potential dam break. An 8.0 earthquake is a reality in the near future, as are other smaller, yet damaging seismic events. A failure due to natural causes or faulty construction poses a serious risk. Residents should not be forced to live with that threat or its consequences. A huge body of water above our homes is a disclosure that would affect property values and increase insurance rates. This site is not safe/ appropriate for expansion!

SyphonEIR - Syphon Reservoir Public Comments

From: Mark OBrien <mark.r.obrien@gmail.com>
To: <SyphonEIR@irwd.com>
Date: 9/11/2019 1:59 PM
Subject: Syphon Reservoir Public Comments

Hello Jo Ann Corey,

Thank you for an opportunity to respond to the Syphon Reservoir project proposal.

The Syphon Reservoir NOP (page 11) references a Geotechnical Investigations Project to evaluate potential geological or seismic hazards and their impact to the proposed Syphon reservoir facilities and dam.

Responding as a Stonegate Village homeowner, please consider for future discussion:

1. A potential for partial or catastrophic failure of the dam (however caused, but especially resulting from earthquakes), and any subsequent disaster response plans to imminent flood hazards and impact to downhill or topographically down gradient residential properties and schools, as well as any risk mitigation proposals such as spillways or water diversion capabilities.

2. Community-level financial impact for potential damages resulting from sudden and significant water release from a failure of the dam (however caused, but especially resulting from earthquakes), noting homeowner, earthquake, or flood insurance policies commonly exclude coverage for a reservoir breach or acts of God, or that homeowners and HOAs may incur costs of premium to attain flood coverage if available.

Best Regards,
Mark O'Brien
58 Rossmore, Irvine, 92620

Jo Ann Corey - Stonegate against Syphon Expansion

WATER RESOURCES
SEP 13 2019
IRVINE RANCH
WATER DISTRICT

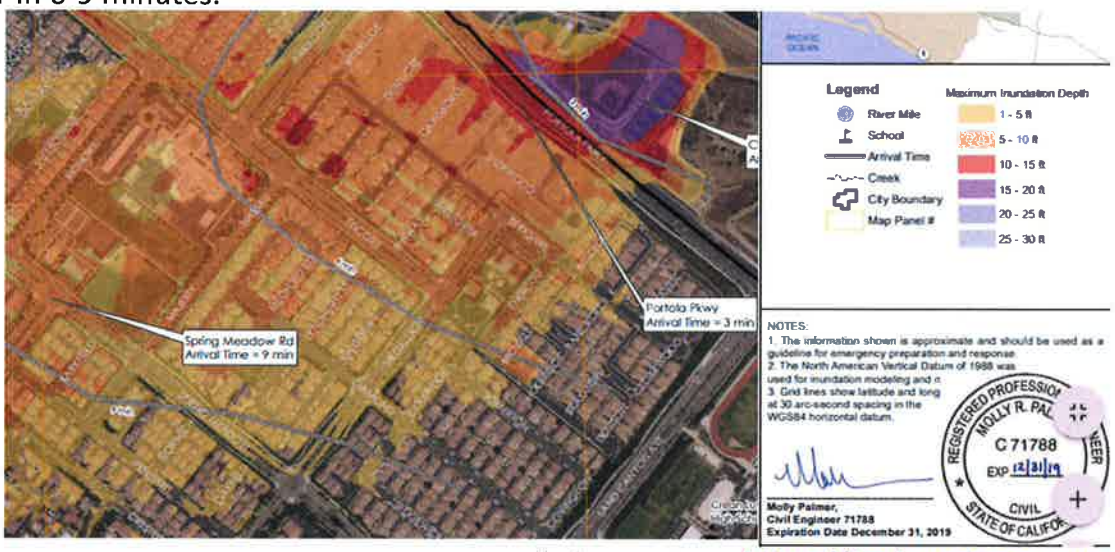
From: "georgia.gao@gmail.com" <georgia.gao@gmail.com>
To: SyphonEIR <SyphonEIR@irwd.com>
Date: 9/13/2019 12:39 PM
Subject: Stonegate against Syphon Expansion

Irvine Ranch Water
District
13, 2019
Water Resources & Policy Department
15600 Sand Canyon Avenue
P.O. Box 57000
Irvine, CA 92619-7000

September

Re: IRWD Syphon Reservoir Improvement Project
Attn: Jo Ann Corey, Environmental Compliance Specialist

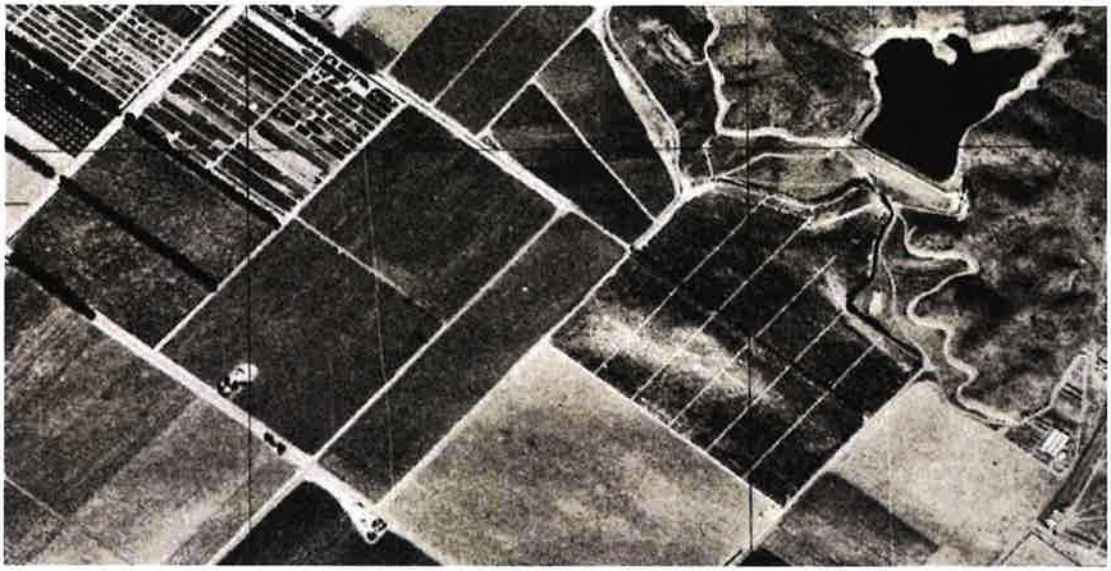
This letter is to provide our comments as requested by the public scoping meeting and express concern about the planned expansion of Syphon Reservoir by the Irvine Ranch Water District. The main concern is safety of the surrounding community.
Current inundation maps show two schools directly in the flood path. In the situation of a damn failure, the Crean Lutheran Athletic Complex is currently projected to be under 15-20 ft of water in less than 3 minutes. Stonegate Elementary School is projected to be under 5-10 feet of water in 6-9 minutes.



[adapted from https://fmds.water.ca.gov]

The projected increase in reservoir capacity from approximately 500 acre-feet (AF) to 5,000 AF would significantly worsen the scenario to the schools in case of a damn failure. This further increases the risk to the children of our community.
There is currently no document that illustrates the potential increased risk of flood to the surrounding community that would be expected from increasing the reservoir volume 10 times. The document "Notice of Preparation of an Environmental Impact Report" provided by Irvine Ranch Water District on August 2, 2019 conveniently avoids mentioning the hazard of dam failure. In case of a dam failure, there does not appear to be a viable spillway to divert water from schools and homes.
The current reservoir was constructed in 1949 at a time when the surrounding area did not have homes and schools, as seen the attached 1974 photo. Irvine's landscape has changed

considerably within the last few decades with an increased population near the existing reservoir's flood path.



[adapted from https://ngmdb.usgs.gov]

Specific questions that we demand to be addressed prior to building of the damn is
(1) How can IRWD guarantee our children's and community's safety with 5,000 AF of water at higher elevation so close homes and schools?
(2) What emergency response plan can be expected to save hundreds of lives in a few minutes in the setting of a catastrophic failure during an earthquake?
(3) Will IRWD provide compensation to homeowners for flood insurance and potential diminished property values as a result of the reservoir expansion?

Given that the current state of downstream hazard at Syphon Reservoir is "Extremely High" according to the California Department of Water Resources, we demand not only to stop plans for expanding Syphon Reservoir, but also to use funds appropriated for the expansion to fortify the existing damn to bring it up to current code. Further, we demand distribution of up to date inundation maps and projected inundation maps to current community members. Lastly, we demand that the Environmental Impact Report (EIR) address the potential of loss of life and property in a dam failure.



[adapted from https://fmds.water.ca.gov]

The following list of residents have assembled to provide the comments stated herein, which we hereby submit to be part of the EIR for the Syphon Reservoir Improvement Project.

Jie Gao 60 Weston, Irvine, Ca 92620 9493818680

Yu Fang 60 Weston, Irvine, Ca 92620

georgia.gao@gmail.com

Jo Ann Corey - From a concerned resident living in Stonegate community

From: Zhong Xiong <zhongxiong@gmail.com>
To: <syphonEIR@irwd.com>
Date: 9/13/2019 1:59 PM
Subject: From a concerned resident living in Stonegate community

WATER RESOURCES
SEP 13 2019
IRVINE RANCH
WATER DISTRICT

Attn: Jo Ann Corey, Environmental Compliance Specialist

This letter is to provide our comments as requested by the public scoping meeting and express concern about the planned expansion of Syphon Reservoir by the Irvine Ranch Water District. The main concern is safety of the surrounding community.

Current inundation maps show two schools directly in the flood path. In the situation of a damn failure, the Crean Lutheran Athletic Complex is currently projected to be under 15-20 ft of water in less than 3 minutes. Stonegate Elementary School is projected to be under 5-10 feet of water in 6-9 minutes. The projected increase in reservoir capacity from approximately 500 acre-feet (AF) to 5,000 AF would significantly worsen the scenario to the schools in case of a damn failure. This further increases the risk to the children of our community.

There is currently no document that illustrates the potential increased risk of flood to the surrounding community that would be expected from increasing the reservoir volume 10 times. The document "Notice of Preparation of an Environmental Impact Report" provided by Irvine Ranch Water District on August 2, 2019 conveniently avoids mentioning the hazard of dam failure. In case of a dam failure, there does not appear to be a viable spillway to divert water from schools and homes.

The current reservoir was constructed in 1949 at a time when the surrounding area did not have homes and schools, as seen the attached 1974 photo. Irvine's landscape has changed considerably within the last few decades with an increased population near the existing reservoir's flood path. Specific questions that we demand to be addressed prior to building of the damn is (1) How can IRWD guarantee our children's and community's safety with 5,000 AF of water at higher elevation so close homes and schools? (2) What emergency response plan can be expected to save hundreds of lives in a few minutes in the setting of a catastrophic failure during an earthquake? (3) Will IRWD provide compensation to homeowners for flood insurance and potential diminished property values as a result of the reservoir expansion?

Given that the current state of downstream hazard at Syphon Reservoir is "Extremely High" according to the California Department of Water Resources, we demand not only to stop plans for expanding Syphon Reservoir, but also to use funds appropriated for the expansion to fortify the existing damn to bring it up to current code. Further, we demand distribution of up to date inundation maps and projected inundation maps to current community members. Lastly, we demand that the Environmental Impact Report (EIR) address the potential of loss of life and property in a dam failure.

A concerned resident living in Stonegate Community

--
Zhong (John) Xiong

Jo Ann Corey - Oppose the Syphon Project

WATER RESOURCES

SEP 1 3 2019

IRVINE RANCH
WATER DISTRICT

From: Hongjian Zeng <zeng106@mail.chapman.edu>
To: <SyphonEIR@irwd.com>
Date: 9/13/2019 2:01 PM
Subject: Oppose the Syphon Project

Dear Board Members,

I am a resident of Stonegate Village and the homeowner. I and my wife living in Stonegate Village with my 3 kids for 3 years. We enjoyed the beautiful and peaceful surroundings of our community for the past years, until we heard about the Syhpon project proposed.

With this proposed project, the reservoir just across the Portola Springs Parkway will be extended 10 times bigger, and the dam will be 80 feet higher. This will post huge threat and danger to our property, our lives, and our community if something goes wrong. If some kind of disaster happened, our community would be flooded into water in minutes, including our house and the elementary school. Think about that possibility would waken me up in the night. I just couldn't imagine how this will affect our life in the future.

Though I understand this project would benefit the city of Irvine with more water supply available, I just do not want it so close to my property and community. When the Syphon Reservoir was built decades ago, it was far from the city, with not much population around it to minimize the possible damage. Now with the highly populated communities around, why don't you consider some other place to put this reservoir? You put great value to people's life and property decades ago, and I believe you will do the same now.

With the above thoughts, I strongly oppose the extension of Syphon Reservoir. I suggest the city choose another place to build this project.

Best regards,

Richard Zeng
Homeowner of
66 Dublin
Stonegate Village

From: Yongfeng Wang <ywangb13@gmail.com>
To: <syphonEIR@irwd.com>
Date: 9/13/2019 12:40 PM
Subject: No to this project

Hi, Jo

I am a resident living in stonegate!

I would like you to just answer only the following two questions with regard to syphon reservoir improvement project?

If you live at Stonegate, will you say yes to this project?
If you kids or grandchildren are studying at stonegate elementary Scholl, will you say yes to this project?

Thanks

Sent from my iPhone

WATER RESOURCES
SEP 13 2019
IRVINE RANCH
WATER DISTRICT

From: "jessie tsai (laxsv)" <jessie_tsai@morrisonexpress.com>
To: <syphoneir@irwd.com>
Date: 9/15/2019 9:55 PM
Subject: Syphon Reservoir Improvements Project

Name: Jessie Tsai
Organization: Stonegate Resident
Address: 52 Norwich, Irvine, CA 92620
Tel: (310) 955-0804
Comments: I strongly disagreed to expend the Syphon Reservoir. It's harmful to the Stonegate residence! Do not let this project pass! Thank you.

Sent from my iPhone

WATER RESOURCES

SEP 16 2019

IRVINE RANCH
WATER DISTRICT

Jo Ann Corey - Comments for IRWD Syphon Reservoir Improvement Project

From: xiaoyan Qian <xy.qian@gmail.com>
To: <SyphonEIR@irwd.com>
Date: 9/15/2019 11:54 PM
Subject: Comments for IRWD Syphon Reservoir Improvement Project
Cc: xiaoyan Qian <xy.qian@gmail.com>

WATER RESOURCES

SEP 16 2019

IRVINE RANCH
WATER DISTRICT

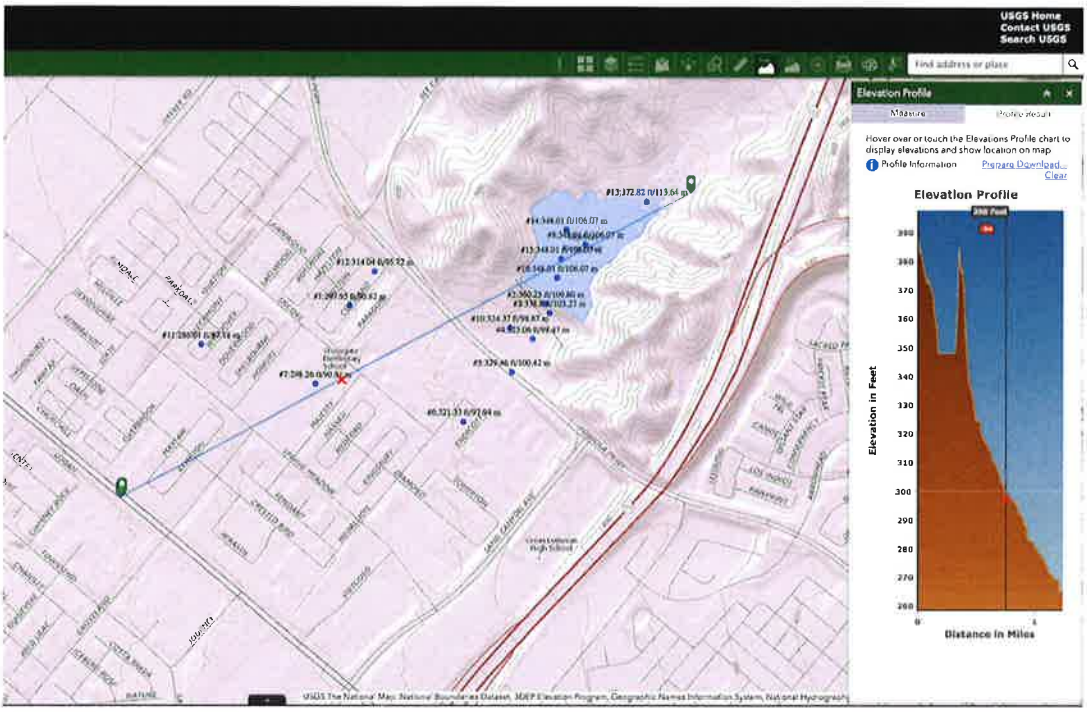
Re: IRWD Syphon Reservoir Improvement Project
Attn: Jo Ann Corey, Environmental Compliance Specialist

This letter is to provide my comments as requested by the public scoping meeting on August 21st and express strong concern about the
planned expansion of Syphon Reservoir by the Irvine Ranch Water District. The main concern is safety of the surrounding community and schools.

With the current Syphon Reservoir, based on the https://fmds.water.ca.gov/, the Downstream hazard is already "Extremely High". As screenshot below.



The current Syphon Reservoir was built on 1949, by then, there was no community close to the reservoir. But things changed dramatically since the past 30 years, Stonegate, Woodbury, Cypress Village, Eastwood are all the new high density community surrounding Syphon reservoir, even more dangerous is the Crean Lutheran High School Athletic Complex, which is directed under the dam in less then 400 ft, and also Stonegate elementary school is also less then 0.4 miles away from the dam. In case of a catastrophic failure, it could put over 1000 elementary school student's life into danger in less than 5 minutes.
The current Syphon reservoir's water surface is 376ft, and the basin of the reservoir is 348ft, so the depth of the water is 28 ft. However, the water surface of the newly proposed reservoir is 456 ft, which means the depth of the water will be 108 ft. In case of a catastrophic failure, no one will be able to survive such high flood wave.



Though it is good to hear that the "new dam would meet or exceed the latest safety standards" in the presentation, still no one can guarantee the new dam will never fail. It could be a super earthquake, or a mud slide after the wild fire, or even a terrorist attack. No one can ease the peace of mind for the resident live next to the new dam.

We all want to see a more green, more beautiful Irvine because we all live here, and it is our home. But we could not put thousands of Irvine residence's life in danger to get this, no matter what's the benefit it will bring.

In summary, I have a high concern for the surrounding communities and schools. We need further understand the safety assurance before move the project to the next phase.

Best regards,

Vivian Qian (Stonegate resident)

Sept 15th, 2019

Jo Ann Corey - Re: IRWD Syphon Reservoir Improvement Project

From: Noura Alaa <nouraalaa@gmail.com>
To: <SyphonEIR@irwd.com>
Date: 9/15/2019 8:10 PM
Subject: Re: IRWD Syphon Reservoir Improvement Project

September 15, 2019
Irvine Ranch Water District
Water Resources & Policy Department
15600 Sand Canyon Avenue
P.O. Box 57000
Irvine, CA 92619-7000

WATER RESOURCES
SEP 16 2019
IRVINE RANCH
WATER DISTRICT

Re: IRWD Syphon Reservoir Improvement Project

Attn: Jo Ann Corey, Environmental Compliance Specialist

This letter is to provide our comments as requested by the public scoping meeting and express concern about the planned expansion of Syphon Reservoir by the Irvine Ranch Water District. The main concern is safety of the surrounding community.

Current inundation maps show two schools directly in the flood path. In the situation of a damn failure, the Crean Lutheran Athletic Complex is currently projected to be under 15-20 ft of water in less than 3 minutes. Stonegate Elementary School is projected to be under 5-10 feet of water in 6-9 minutes.

The projected increase in dam height from 59 feet to 136 feet and reservoir capacity from approximately 500 acre-feet (AF) of water to 5,000 AF of water would significantly worsen the scenario to the schools in case of a damn failure. This further increases the risk to the children of our community.

There is currently no document that illustrates the potential increased risk of flood to the surrounding community that would be expected from increasing the reservoir volume 10 times. The document "Notice of Preparation of an Environmental Impact Report" provided by Irvine Ranch Water District on August 2, 2019 conveniently avoids mentioning the hazard of dam failure. In case of a dam failure, there does not appear to be a viable spillway to divert water from schools and homes. The scenario of dam failure must be considered as reservoir is located in a seismically active area with the Puente Hills fault located just 4.3 miles away.

The current reservoir was constructed in 1949 at a time when the surrounding area did not have homes and schools, as seen the attached 1974 photo. Irvine's landscape has changed considerably within the last few decades with an increased population near the existing reservoir's flood path.

Specific questions that we demand to be addressed prior to building of the damn is (1) How can IRWD guarantee our children's and community's safety with 5,000 AF of water at higher elevation

so close homes and schools? (2) What emergency response plan can be expected to save thousands of lives in a few minutes in the setting of a catastrophic failure during an earthquake? (3) Will IRWD provide compensation to homeowners for flood insurance and potential diminished property values as a result of the reservoir expansion?

Given that the current state of downstream hazard at Syphon Reservoir is "Extremely High" according to the California Department of Water Resources, we demand not only to stop plans for expanding Syphon Reservoir, but also to use funds appropriated for the expansion to fortify the existing damn to bring it up to current code.

Further, we demand distribution of up to date inundation maps and projected inundation maps to current community members. Lastly, we demand that the Environmental Impact Report (EIR) address the potential of loss of life and property in a dam failure.

Please submit these comments to be part of the EIR for the Syphon Reservoir Improvement Project.

Noura Abdelmaaboud
Stonegate Resident

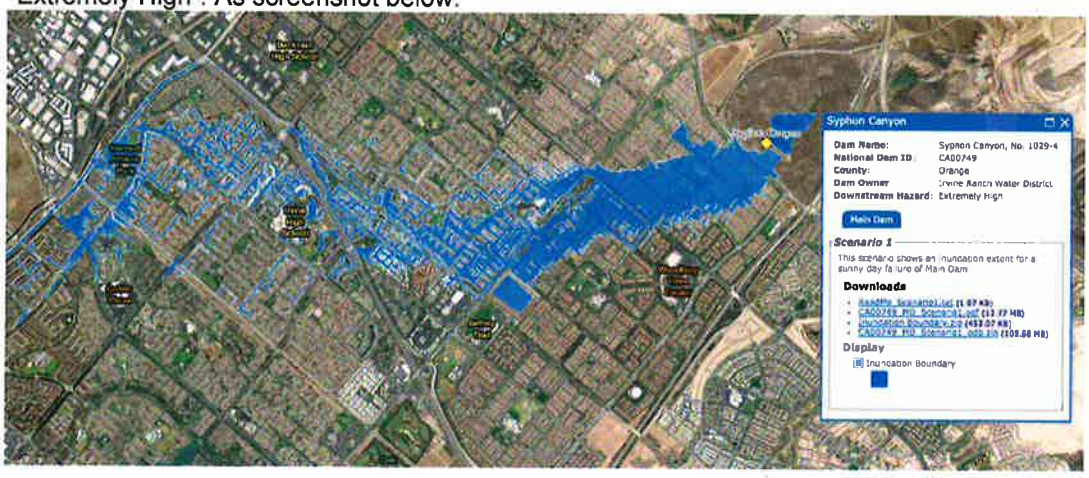
Jo Ann Corey - Comments for IRWD Syphon Reservoir Improvement Project Inbox x

From: chongming Qiao <chongmingqiao2010@gmail.com>
To: <SyphonEIR@irwd.com>
Date: 9/15/2019 11:57 PM
Subject: Comments for IRWD Syphon Reservoir Improvement Project Inbox x
Cc: chongming Qiao <chongmingqiao2010@gmail.com>

Re: IRWD Syphon Reservoir Improvement Project
Attn: Jo Ann Corey, Environmental Compliance Specialist

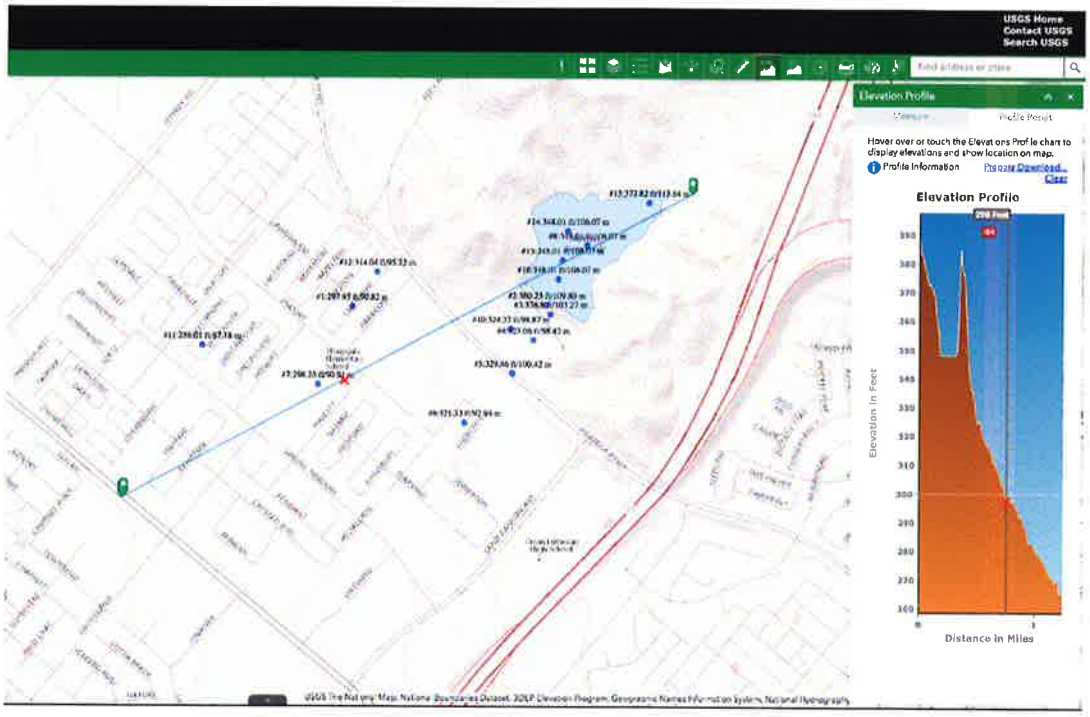
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planned expansion of Syphon Reservoir by the Irvine Ranch Water District. The main concern is safety of the surrounding community and schools.

With the current Syphon Reservoir, based on the https://fmds.water.ca.gov/, the Downstream hazard is already "Extremely High". As screenshot below.



The current Syphon Reservoir was built on 1949, by then, there was no community close to the reservoir. But things changed dramatically since the past 30 years, Stonegate, Woodbury, Cypress Village, Eastwood are all the new high density community surrounding Syphon reservoir, even more dangerous is the Crean Lutheran High School Athletic Complex, which is directed under the dam in less then 400 ft, and also Stonegate elementary school is also less then 0.4 miles away from the dam. In case of a catastrophic failure, it could put over 1000 elementary school student's life into danger in less than 5 minutes.
The current Syphon reservoir's water surface is 376ft, and the basin of the reservoir is 348ft, so the depth of the water is 28 ft. However, the water surface of the newly proposed reservoir is 456 ft, which means the depth of the water will be 108 ft. In case of a catastrophic failure, no one will be able to survive such high flood wave.

WATER RESOURCES
SEP 16 2019
IRVINE RANCH
WATER DISTRICT



Though it is good to hear that the "new dam would meet or exceed the latest safety standards" in the presentation, still no one can guarantee the new dam will never fail. It could be a super earthquake, or a mud slide after the wild fire, or even a terrorist attack. No one can ease the peace of mind for the resident live next to the new dam.

We all want to see a more green, more beautiful Irvine because we all live here, and it is our home. But we could not put thousands of Irvine residence's life in danger to get this, no matter what's the benefit it will bring.

In summary, I have a high concern for the surrounding communities and schools. We need further understand the safety assurance before move the project to the next phase.

Best regards,

Mike Qiao (Stonegate resident)

Sept 15th, 2019

Jo Ann Corey - Re: IRWD Syphon Reservoir Improvement Project

From: Ahmed Sidky <asidky@gmail.com>
To: <SyphonEIR@irwd.com>
Date: 9/15/2019 8:09 PM
Subject: Re: IRWD Syphon Reservoir Improvement Project

WATER RESOURCES

SEP 16 2019

IRVINE RANCH
WATER DISTRICT

September 15, 2019
Irvine Ranch Water District
Water Resources & Policy Department
15600 Sand Canyon Avenue
P.O. Box 57000
Irvine, CA 92619-7000

Re: IRWD Syphon Reservoir Improvement Project

Attn: Jo Ann Corey, Environmental Compliance Specialist

This letter is to provide our comments as requested by the public scoping meeting and express concern about the planned expansion of Syphon Reservoir by the Irvine Ranch Water District. The main concern is safety of the surrounding community.

Current inundation maps show two schools directly in the flood path. In the situation of a damn failure, the Crean Lutheran Athletic Complex is currently projected to be under 15-20 ft of water in less than 3 minutes. Stonegate Elementary School is projected to be under 5-10 feet of water in 6-9 minutes.

The projected increase in dam height from 59 feet to 136 feet and reservoir capacity from approximately 500 acre-feet (AF) of water to 5,000 AF of water would significantly worsen the scenario to the schools in case of a damn failure. This further increases the risk to the children of our community.

There is currently no document that illustrates the potential increased risk of flood to the surrounding community that would be expected from increasing the reservoir volume 10 times. The document "Notice of Preparation of an Environmental Impact Report" provided by Irvine Ranch Water District on August 2, 2019 conveniently avoids mentioning the hazard of dam failure. In case of a dam failure, there does not appear to be a viable spillway to divert water from schools and homes. The scenario of dam failure must be considered as reservoir is located in a seismically active area with the Puente Hills fault located just 4.3 miles away.

The current reservoir was constructed in 1949 at a time when the surrounding area did not have homes and schools, as seen the attached 1974 photo. Irvine's landscape has changed considerably within the last few decades with an increased population near the existing reservoir's flood path.

Specific questions that we demand to be addressed prior to building of the damn is (1) How can IRWD guarantee our children's and community's safety with 5,000 AF of water at higher elevation

so close homes and schools? (2) What emergency response plan can be expected to save thousands of lives in a few minutes in the setting of a catastrophic failure during an earthquake? (3) Will IRWD provide compensation to homeowners for flood insurance and potential diminished property values as a result of the reservoir expansion?

Given that the current state of downstream hazard at Syphon Reservoir is "Extremely High" according to the California Department of Water Resources, **we demand not only to stop plans for expanding Syphon Reservoir, but also to use funds appropriated for the expansion to fortify the existing damn to bring it up to current code.**

Further, we demand distribution of up to date inundation maps and projected inundation maps to current community members. Lastly, we demand that the Environmental Impact Report (EIR) address the potential of loss of life and property in a dam failure.

Please submit these comments to be part of the EIR for the Syphon Reservoir Improvement Project.

Ahmed Sidky, Ph, D.
Stonegate Resident

Jo Ann Corey - STOP Syphon Reservoir Improvement Project

From: Iris Kang <k_yrys@hotmail.com>
To: "syphoneir@irwd.com" <syphoneir@irwd.com>
Date: 9/16/2019 11:26 AM
Subject: STOP Syphon Reservoir Improvement Project

Hi Jo Ann Corey,

My name is YUN YUN KANG, I am a Stonegate resident at 39 Norwich. I am writing to ask you please STOP the Syphon Reservoir Improvement Project. Thank you.

YUN YUN

WATER RESOURCES

SEP 16 2019

IRVINE RANCH
WATER DISTRICT

Jo Ann Corey - Fwd: Syphon reservoir project located in a liquefaction and landslides overlap zone. Deadline comment submit 9/16/19 4pm

---

From: Yanna Cheng <yannaangel99@gmail.com>
To: <syphoneir@irwd.com>
Date: 9/16/2019 10:41 AM
Subject: Fwd: Syphon reservoir project located in a liquefaction and landslides overlap zone. Deadline comment submit 9/16/19 4pm
Attachments: Image-1.jpg; Stonegate against Syphon Expansion.docx

---

Subject: Syphon reservoir project located in a liquefaction and landslides overlap zone. Need to reconsider safty for having it around big commiuntiy and schools

Dear Jo Ann Corey,

We are very worried about our safety and we not only strongly oppose this project with the comment as attached document s below, but also would like to ask if we need to stop using it.
We understand the purpose to expand but the safety to our kids and our popular communities is a top priority.
Please do not expand it and also need to consider if it needs to stop using it since it is located in a liquefaction and landslides overlap zone.
There is no such big community in this area about 70 years ago. Thank you.
sincerely.
Guoshan Lai
Yanna Lai
103 Doverwood
Irvine, Ca 92620

Sent from my iPhone

WATER RESOURCES

SEP 16 2019

IRVINE RANCH
WATER DISTRICT

Irvine Ranch Water District
Water Resources & Policy Department
15600 Sand Canyon Avenue
P.O. Box 57000
Irvine, CA 92619-7000

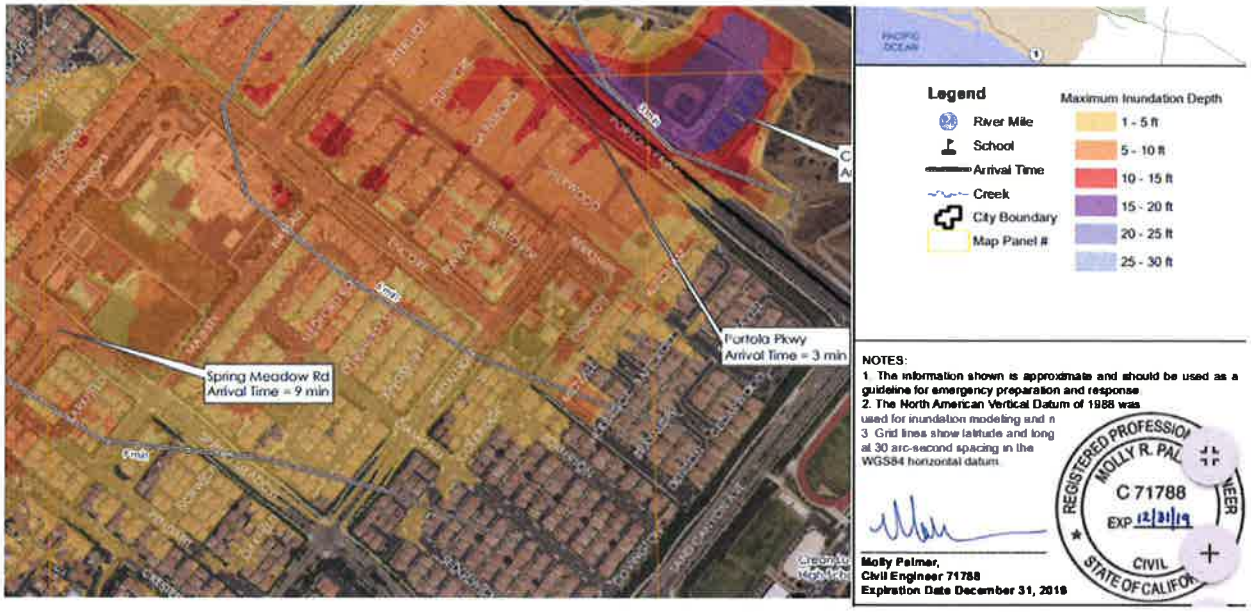
September 13, 2019

Re: IRWD Syphon Reservoir Improvement Project

Attn: Jo Ann Corey, Environmental Compliance Specialist

This letter is to provide our comments as requested by the public scoping meeting and express concern about the planned expansion of Syphon Reservoir by the Irvine Ranch Water District. The main concern is safety of the surrounding community.

Current inundation maps show two schools directly in the flood path. In the situation of a damn failure, the Crean Lutheran Athletic Complex is currently projected to be under 15-20 ft of water in less than 3 minutes. Stonegate Elementary School is projected to be under 5-10 feet of water in 6-9 minutes.

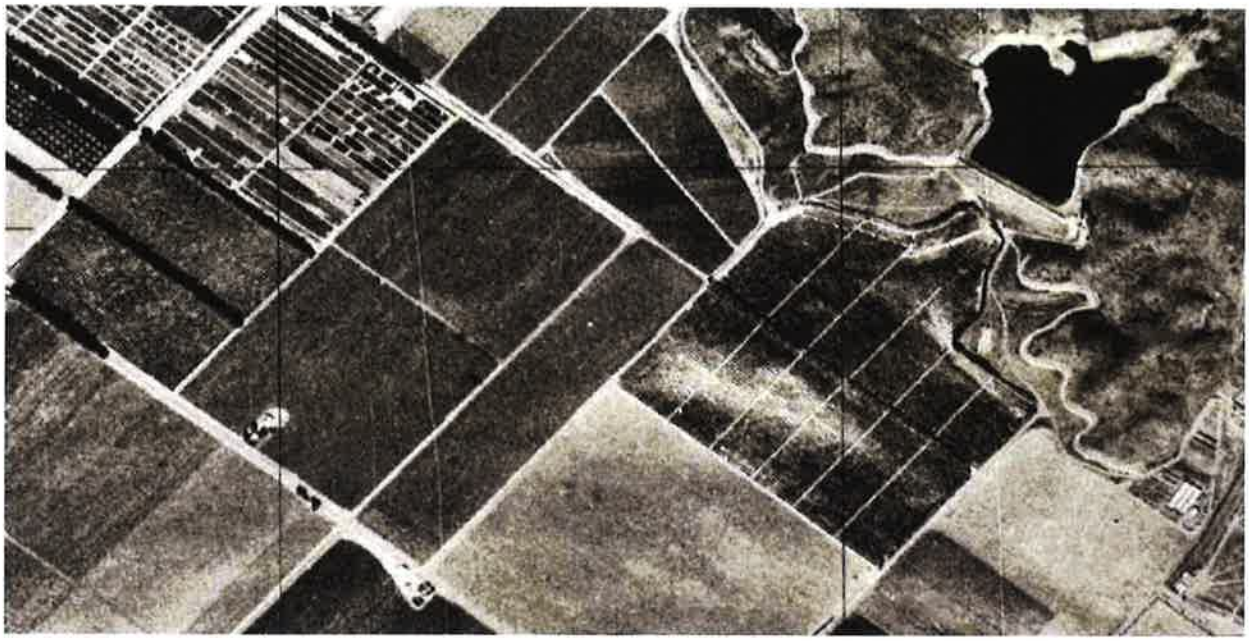


[adapted from https://fmds.water.ca.gov]

The projected increase in dam height from 59 feet to 136 feet and reservoir capacity from approximately 500 acre-feet (AF) of water to 5,000 AF of water would significantly worsen the scenario to the schools in case of a damn failure. This further increases the risk to the children of our community.

There is currently no document that illustrates the potential increased risk of flood to the surrounding community that would be expected from increasing the reservoir volume 10 times. The document "Notice of Preparation of an Environmental Impact Report" provided by Irvine Ranch Water District on August 2, 2019 conveniently avoids mentioning the hazard of dam failure. In case of a dam failure, there does not appear to be a viable spillway to divert water from schools and homes. The scenario of dam failure must be considered as reservoir is located in a seismically active area with the Puente Hills fault located just 4.3 miles away.

The current reservoir was constructed in 1949 at a time when the surrounding area did not have homes and schools, as seen the attached 1974 photo. Irvine's landscape has changed considerably within the last few decades with an increased population near the existing reservoir's flood path.



[adapted from https://ngmdb.usgs.gov]

Specific questions that we demand to be addressed prior to building of the damn is (1) How can IRWD guarantee our children's and community's safety with 5,000 AF of water at higher elevation so close homes and schools? (2) What emergency response plan can be expected to save thousands of lives in a few minutes in the setting of a catastrophic failure during an earthquake? (3) Will IRWD provide compensation to homeowners for flood insurance and potential diminished property values as a result of the reservoir expansion?

Given that the current state of downstream hazard at Syphon Reservoir is "Extremely High" according to the California Department of Water Resources, we demand not only to stop plans for expanding Syphon Reservoir, but also to use funds appropriated for the expansion to fortify the existing damn to bring it up to current code. Further, we demand distribution of up to date inundation maps and projected inundation maps to current community members. Lastly, we demand that the Environmental Impact Report (EIR) address the potential of loss of life and property in a dam failure.



[adapted from https://fmds.water.ca.gov]

Jo Ann Corey - 329 Signatures Against Syphon Reservoir Expansion Plan

---

From: Joe Yan <zujieyan@gmail.com>
To: "COREY@irwd.com" <COREY@IRWD.COM>
Date: 9/16/2019 3:55 PM
Subject: 329 Signatures Against Syphon Reservoir Expansion Plan
Cc: "SYPHONeir@irwd.com" <SYPHONeir@IRWD.COM>
Attachments: AgainstSyphonReservoirExpansionPlan.pdf; Syphon Reservoir Expansion Plan.pdf

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Attn: Jo Ann Corey

My name is Joe Yan and I am a resident of Stonegate Village. Along with other residents in our community, we are greatly concerned about the expansion plan of the Syphon Reservoir.

Attached you will find the names, addresses, and signatures of 329 other residents who are also concerned with the safety of their homes, families and schools due to this expansion project.

Sincerely,

Joe Yan
Resident of Stonegate

WATER RESOURCES
SEP 16 2019
IRVINE RANCH
WATER DISTRICT

Against Syphon Reservoir Expansion Plan Signature

Note: If you already signed this form somewhere else, please don't sign it again. Thank you.

Name (Print)	Home Address(required)	Community	Signature
Pei Yang	105 Beechmont	Stonegate	
		"	
Linghua Jia	105 Beechmont	"	
JIE DENG	105 Beechmont	Stonegate	
B. Bayati	113 Beechmont	Stonegate	
D. RAY	107 Beechmont		
Savitha, T	109 Beechmont	Stonegate	
Pawanna L.	103 Beechmont	Stonegate	
Dimitra S.	103 Beechmont	Stonegate	
Casey McCracken	101 Beechmont	Stonegate	
Allison McCracken	101 Beechmont	Stonegate	
Sheng Miao	202 Wyndover	Stonegate	
Hemo Li	80 Thornhurst	Stonegate	
Stella Liu	80 Thornhurst	Stonegate	
Troy Liu	80 Thornhurst	Stonegate	
Sandy Chen	113 Cordial	Eastwood	
Lenny Chen	113 Cordial	Eastwood	
Lily Miao	76 Hazelton	Stonegate	
Vincent Lai	76 Hazelton	Stonegate	
Jack Shi	202 Wyndover	Stonegate	
Alex Miao	202 Wyndover	Stonegate	
Ruzhen He	208 Wyndover	Stonegate	
Zejian Tao	208 Wyndover	Stonegate	
Christina Wang	210 Wyndover	Stonegate	
Rosamelia	210 Wyndover	Stonegate	

V

Against Syphon Reservoir Expansion Plan Signature

Note: If you already signed this form somewhere else, please don't sign it again. Thank you.

Name (Print)	Home Address(required)	Community	Signature
Si Jian Tong	212 wyndover	Stonegate	
Cicy Shen	212 wyndover	Stonegate	
Christine Wen	205 Parkdale	Stonegate	
Richard Wen	205 Parkdale	Stonegate	
Seongnam oh	102 Beechmont	Stonegate	
KYUNG YUN	207 PARKDALE	Stonegate	
DANIEL O'HARA	204 PARKDALE	STONEGATE	
Jeff Lo	211 WYNDOVER	STONEGATE	
AMY LO	211 Wyndover	Stonegate	
Dong Xu	207 wyndover	Stonegate	
Yi Jin Ye	207 wyndover	"	
Su Qin Kapla	202 Parkdale	Stonegate	
Kerry Kapla	202 Parkdale	Stonegate	
Jean Feng	88 Melville	stonegate	
David Li	88 Melville	stonegate	
Vito Ferrante	39 Diamond	Stonegate	
Lisa Strength	29 Flowerstalk	Stonegate	
Sonali Pare	8202 Mirasol	Stonegate	
SUMIT RAY	31 FLOWERSTALK	Stonegate	
Simon Dagan	7202 Mirasol Irvine 92614	Stonegate	
Yelia Ornshtein	7308 Mirasol	Stonegate	
TOUSIF KHAN	19205 MIRASOL, IRVINE	STONEGATE	
Jennifer Kim	107 Gemstone	Stonegate	
Sareh Salamp	1623 Crested Dnd	Stonegate	
Kaelan Qu	100 Saybrook	STG	

Against Syphon Reservoir Expansion Plan Signature

Note: If you already signed this form somewhere else, please don't sign it again. Thank you.

Name (Print)	Home Address(required)	Community	Signature
Gary G.	37 Dryhouse	Stonegate	
Billy R.	35 Dryhouse	Stonegate	
Jean J.	419 Clayhouse	Stonegate	
[illegible]	106 Devonshire	Stonegate	
Tim Chen	23 Mayfair	Stonegate	
[illegible] Jessa Hill	136 Brumblet	Pirtola	
James Hyun	175 Clyde Brush	Pirtola	
Jack Lee	38 Norwhich	Stonegate	
Emily Kim	39 Norwich	Stonegate	
YANBIN XU	113 Ovation	Stonegate	
Jing Zhang	113 Ovation	Stonegate	
Ping Wang	113 Ovation	Stonegate	
[illegible]	212 Overbrook	Stonegate	
Michael	76 Weston	Stonegate	
Cindy Zhou	206 Wyndover	Stonegate	
Kemy	82 Weston	Stonegate	
John Gao	200 Overbrook	Stonegate	
Fengyan Qi	231 Hampton	Stonegate	
MARSA	76 CORTLAND	-	
Jeff Coley	~~2775 Santa Marg. Pkwy~~ 31 Somerton	~~Renton~~ Stonegate	
NADEEM	47 Ashdale	Stonegate	
Sung Moon	147 OVERBROOK	Stonegate	
Yihong Zhang	88 Rossmore	Stonegate	
Joseph Kimmy	205 Middale	Stonegate	

Against Syphon Reservoir Expansion Plan Signature

City: Irvine Zipcode: CA 92620

Note: If you already signed this form somewhere else, please don't sign it again. Thank you.

Name (Print)	Home Address(required)	Community	Signature
Sridhar Venkatesan	111 DOVERWOOD	STONEGATE	
Indu Raghuram	111 Doverwood	Stonegate	
Sherman Chen	201 Parkdale	Stonegate	
Yajun Wang	127 Doverwood	Stonegate	
XIAOJUN JIANG	129 Doverwood	Stonegate	Xiaojun Jiang
Pallab Halder	133 Doverwood	Stonegate	
SUDESHNA HALDER	133 DOVERWOOD	Stonegate	
SOHINI HALDER	133 Doverwood	Stonegate	
Tae Hwang	135 Doverwood	Stonegate	
MIN KIM	135 Doverwood	stonegate	
JACK CHAO	14 DOVERWOOD	Stonegate	
Brian Stark	246 Shelbourne	Stonegate	
Yuan Tang	224 shelbourne	stonegate	
Xiaowei Wu	224 shelbourne	stonegate	
~~Yi Hee~~ Lily Xue	214 shelbourne	stongate	
ARNEL KASHALY	212 Shelbourne	stonegate	
Farah Shahram	210 shelbourne	stongate	
Selmane Gouws	200 Shelbourne	Stonegate	
Riaan Gouws	200 Shelbourne	Stonegate	
Shaoha	105 DOVERWOOD	Stongate	
Xiangyi Zhu	101 Doverwood	Stonegate	
Jun Lu	101 Doverwood	stongate	

Against Syphon Reservoir Expansion Plan

Signature

Note: If you already signed this form somewhere else, please don't sign it again. Thank you.

Name (Print)	Home Address(required)	Community	Signature
Sdmaz	8202 Mirasol	stonegate	
Helen Lee	72 Melville	Stonegate	
Young Han	76 Somerton	Stonegate	
Suvesh Sivu	89 Devonshire	Stonegate	
Jennifer Liu	59 Gainsborough	Stonegate	Liu
Zhimin Hu	50 Durham	Stonegate	Zhimin Hu
Mingxia Chen	103 Overbrook	Stonegate	
Frank Lee	214 Wyndam	Stonegate	
Abbe Wong	206 Denison	Stonegate	
Abdo.	6305 Mirasol	Stonegate	
M Stokes	31 Oakfield	Stonegate	M Stokes
Rumina Zaman	62 Dublin	Stonegate	
Lina	31 Sedgewick	Stonegate	

Against Syphon Reservoir Expansion Plan Signature

Note: If you already signed this form somewhere else, please don't sign it again. Thank you.

Name (Print)	Home Address(required)	Community	Signature
Zujie Yan	78 Ashdale	Stonegate	
Lily Wei	129 overbrook	STG	Lily Wei
XiuhuanXu	58 Interlude	STG	
HUA HOU	51 Sedgewicks	Stonegate	
Vivian Qian	63 Cortland	STG	
Shelly Han	91 Devonshire	STG	
Xiaoling Guo	159 overbrook		Xiaoling Guo
Wen Geng	81 Woodhill		
Lily Lin	34 Kingsbury	STG	
yun pan	60 Devonshire	STG	
peter	65 sherwood	STG	
Shuyu Wang	72 Sedgewick	STG	
Jie Gao	60 Weston	STG	
William Ding	204 shelbourne	STG	
Jasmine Ge	66 Interlude	STG	
Zichen Wang	256 Kempton	STG	
Qingyun Li	218 Kempton	STG	
sisi Gong	67 Interlude	STG	
Xuemei Li	24 Lacebark	STG	Xuemei Li
Shirley Li	60 Steinway	STG	
Shunsuke Li	36 OVATION	STG	
Songnia Xiao	76 Haviland	STG	
Guo zhang	87. KIMBAL	STG	
Annie Gu	62 Hazelton	STG	
QingshanQian	62 Hazelton	STG	

Against Syphon Reservoir Expansion Plan Signature

Note: If you already signed this form somewhere else, please don't sign it again. Thank you.

Name (Print)	Home Address(required)	Community	Signature
Yuanyu Jin	244 Shelbourne Irvine	Stonegate	Yuanyu Jin
Bei Fan	84 Nassau	"	Bei Fan
Jichun Zhang	209 Bamsft	"	
John Kim	178 Overbrook	Stonegate	
Joan Kumar	82 Melville	"	
Na An	55 Haviland	"	
Hua Yue	67 Elmdale	"	
Baojun Yue	67 Elmdale	"	
Fengqin Zhao	67 Elmdale	"	
Chuli Weng	75 Hearst	"	
Nan Ma	53 Sherwood		
Bingbing Ma	53 Sherwood		
Xia Yin	53 Sherwood		
Li Ma	53 sherwood		
LiLi Wu	82 Rembrandt	"	
Yiqi Wang	187 overbrook.		
BoBo	53 Tallwood		BoBo
Florah	91 NASA		
Zhuo Zhang	65 Birmingham		
HuiLin Wang	119 Beechmont		
Qi Lou	209 WYNDOVER		
Yuan Ren	79 Kimbal		
Lisheng Chen	79 kimbal		
Jing Huang	71 kimbal		
Guo Zhang	71. kimbal		

59 77 76. 74 71

Against Syphon Reservoir Expansion Plan Signature

Note: If you already signed this form somewhere else, please don't sign it again. Thank you.

Name (Print)	Home Address(required)	Community	Signature
Karim Bouhaw	124 Pendant	Stonegate	
Lamiaa Khayat	124 Pendant	Stonegate	
Xiliang Zhou	187 Overbrook	Stongate	Xiliang Zhou
Ningyuan Liu	74 Sedgewick	Stonegate	
ALTAAF Murdjee	53 Hearst	Stonegate	
Guang Li	61 Ashdale	"	
Warasa Chotiranu	170 Overbrook	Stonegate	
Thanvirat Chotiranu	170 Overbrook	Stonegate	
Ming Lin	61 Durham	"	Ming Lin
Yingzhe Wang	58 Durham		王莫荻
YINGMAN LI	62 Durham		李英男
Jie Chen	62 Durham		陈洁
Zimei Li	62 Durham		李紫薇
YuYingGao	62 Durham		高玉英
Vanessa Jia	64 Doverwood	Stonegate	
Stephanie Tsang	64 Interlude	"	
Quan Chen	103 Doverwood, Irvine CA92620		
Min Jiang	78 Hazelton	Stonegate	
Yisheng Sun	78 Hazelton	Stonegate	
Xiyun Sun	78 Hazelton	Stonegate	
Eric Zhou	46 Larkfield	stonegate	Eric
Steven Zg.	46 Larkfield	Stonegate	Steven
Xiaoxia Wu	71 Crestwick	Stonegate	
William Ma	36 Somerton	Stonegate	
Ting Bu	129 overbrook	Stonegate	Ting Bu

Against Syphon Reservoir Expansion Plan Signature

Note: If you already signed this form somewhere else, please don't sign it again. Thank you.

Name (Print)	Home Address(required)	Community	Signature
YONGFENG WANG	118 Saybrook	Mendocino	
Jianing Yang	118 saybrook	Mendocino	
Bo Pan	88 Medford	Stonegate	
Sha Lin	85 Elmdale	Stonegate	
Xueou Xia	50 Haviland	Stonegate	
Peter Hu	120 saybrook	Stonegate	
Yongzhen Yang	74 Ashdale	"	
FRANK Wang	104 Saybrook	"	
C. Cheng	106 Saybrook	"	
Peimei Ding	67 Crestwick	Stonegate	
Feng Xu	65 Ashdale	Stonegate	
Wenyi Tang	84 Mdville	Stonegate	
~~Jing Chen~~	43 Lyndhurst	Stonegate	
Jennifer So	56 Rossmore	Stonegate	
NING HUANG	221 kenyton	Stonegate	
Zena Tan	55 Rossmore	Stonegate	
Sheng Li	62 Ashdale.	Stonegate	
Dan Chen	51 Sherwood	Stonegate	
Weiwei Yin	53 Rexford	Stonegate	
Behzad Nouraei	117 Saybrook	~	
Jiang Li	68 Rossmore	Stonegate	
Kuki Gu	28 Sedgewick	Stonegate	
Zhong Ying	37 Diamond	Stonegate	
Irene Wan	84 cortland	Stonegate	
Hongmei Chen	80 Ashdale	STG	

Against Syphon Reservoir Expansion Plan Signature

Note: If you already signed this form somewhere else, please don't sign it again. Thank you.

Name (Print)	Home Address(required)	Community	Signature
Jin Yu	34 Lyndhurst	Stonegate	
Annie Chou	27 Lydhurst	StoneGate	Annie Chou
JAMES KUO	31 LYNDHURST	STONEGATE	
LINDA KUO	31 LYNDHURST	STONGATE	
Tao Wang	37 Lyndhurst	Stonegate	
Hong Li	37 ~~Lyn~~ Lyndhurst	Stonegate	
Jun Zhang	43 Lyndhurst	Stongate	Jun Zhang
Jing Zhou	43 Lyndhoarse	Stongte	Jing Zhou
Jie Wu	42 Lyndhurst	stonegate	
LINA AI	42 Lyndhurst	stonegate	
Wu Kun	88 Nassau	Stonegate	
Minzhang	34 Lyndhurst	Stonegate	
Haoru Zhang	34 Lyndhurst	Stonegate	

Against Syphon Reservoir Expansion Plan Signature

Note: If you already signed this form somewhere else, please don't sign it again. Thank you.

Name (Print)	Home Address(required)	Community	Signature
SHU WANG	52 Fenway	Stonegate	Shu Wang
YINGYU LI	52 Fenway	Stonegate	Y. Li
Hui-mei Lin	63 Fenway	Stonegate	
Linlin Guan	51 Westover	Stonegate	
Binglin	51 Westover	stonegate	
AngelaLiu	51 Westover	stonegate	Angela Liu
9499236 0042 Hosuk Choi	53 Westover	Stonegate	
Thomas	70 Sherwood	stonegate	
Sophia	70 sherwood	stonegate	
Yan Zhang	71 Sherwood	Stonegate	
Kai Kidd	64 Sherwood	stonegate	
~~sha sha wang~~	60 Sherwood	~~Stonegate~~	Sha Sha Wang
Youngmi Choi	54 Sherwood	Stonegate	
Hong Shan	51 Stuart Way		Hong Shan
Bandon Chang	51 Fenway	Stonegate	
Wenguang Liu	58 sherwood	stonegate	Wenguang Liu
Jia Liu	79 Fenway	stonegate	

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Against Syphon Reservoir Expansion Plan Signature

Note: If you already signed this form somewhere else, please don't sign it again. Thank you.

Name (Print)	Home Address(required)	Community	Signature
Xuesong Zhang	74 Fenway.	STG	
Haiyun wang	42 Norwich	STG	
Yun Liu	36 Somerton	Stonegate	Yun Liu
Yanna Cheng	103 Doverwood, Irvine,	Stonegate	
Dixuan Fan	65 rexford		
Lihuang Yu	127 Doverwood, Irvine	stonegate	Lihua Yu
Songhua Ye	103 Doverwood, Irvine	stonegate	Songhua Ye
WeiFengLiang	67 rexford	stonegate	
Kai Liu	113 Fair haven	Stonegate	
Guang Yu Ma	36 Somerton	Guang Yu Ma	Guang Yu Ma
Minzhong	34 Lyndhurst	stonegate	
Jin Yu	34 Lyndhurst	stonegate	
Pingping Wu	68 weston	stonegate	Pingping Wu
Shunquan Wang	63 Weston	stonegate	Shunquan Wang

Against Syphon Reservoir Expansion Plan Signature

Note: If you already signed this form somewhere else, please don't sign it again. Thank you.

Name (Print) Home Address(required) Community Signature

Name (Print)	Home Address	Community	Signature
Kristine Li	52 Hearst, Irvine 92620	Stonegate	
ROBERT Tyler	52 Hearst, IRVINE 92620	Stonegate	
Weibing Zhang	59 Dublin, Irvine 92620	Stonegate	
Xiaolan Zhang	59 Dublin Irvine 92620	Stonegate	
Hengying Jia	60 Walden, Irvine 92620	"	
Honggang Song	"	"	
Yitian Song	"	"	
Angela Chow	99 Coleridge Irvine 92620		
CAL NGUYEN	34 LACEBARK, IRVINE, CA 92618	"	
Gurhan TORUAER	19108 Mirasol, Irvine 92620	Stonegate	
Katie Hong	77 Walden Irvine CA	Stonegate	
Vicky Chan	80 Walden Irvine CA	Stonegate	
Smitha Kanchark	21 Lacebark, Irvine CA	stonegate east	K Smither
GOKULAKANNAN	23208 VIRTUOSO, IRVINE CA	Stonegate east	

Against Syphon Reservoir Expansion Plan

Signature

Note: If you already signed this form somewhere else, please don't sign it again. Thank you.

Name (Print)	Home Address(required)	Community	Signature
Lei Shi	65 Interlude	STG	

Against Syphon Reservoir Expansion Plan Signature

Note: If you already signed this form somewhere else, please don't sign it again. Thank you.

Name (Print)	Home Address(required)	Community	Signature
Nana Huang	42 somerton	Stonegate	Nana Huang
ZIFENG MEI	42 somerton	Stonegate	

Syphon Reservoir Improvement Project

The following list of residents have assembled to provide the comments stated herein, which we hereby submit to be part of the EIR for the Syphon Reservoir Improvement Project.

Name (required)	Address (required)
THEODORE LEE	73 WOODHILL
[illegible]	79 WOODHILL
Julie Nakagawa	79 Woodhill
Kevin Feng	75 Woodhill
Su Cui	75 Woodhill
Sandra Hu	78 Woodhill
Tony Tsai	80 Woodhill
Leo Yu	34 Lynelhurst
Junkyu Choi	50 Dunmore
Joseph Du	95 Coleridge

Against Syphon Reservoir Expansion Plan Signature

Note: If you already signed this form somewhere else, please don't sign it again. Thank you.

Name (Print)	Home Address(required)	Community	Signature
Feng Wang	27 Norwich	stonegate	Feng Wang
Yue Yuan	123 Beechmont	Stonegate	
Jiang Wu	123 Beechmont	Stonegate	

Against Syphon Reservoir Expansion Plan

Signature

Note: If you already signed this form somewhere else, please don't sign it again. Thank you.

Name (Print)	Home Address(required)	Community	Signature
Jinmin Lian	54 Gainsboro	STG	Jinmin Lian
Yujing Nie	74 Diamond	STG	
Linda Dong	35 Kingsbury	STG	Linda Dong
Dongyu Cui	31 Coleridge	STG	

Against Syphon Reservoir Expansion Plan Signature

Irvine, ~~CA 92620 Stonegate~~ CA 92620

Note: If you already signed this form somewhere else, please don't sign it again. Thank you.

Name (Print)	Home Address(required)	Community	Signature
Yin Yue	218 Shelbourne	Stonegate	Yin Yue
Yajing Yang	11308 Hiawatha		Yajing Yang
Amy Lee	242 Mayfair	"	Amy Lee
Pasupuk	55 Sedgewick		
Li Qian Yang	27 Diamond	"	Li Qian Yang

Against Syphon Reservoir Expansion Plan Signature

Note: If you already signed this form somewhere else, please don't sign it again. Thank you.

Name (Print)	Home Address(required)	Community	Signature
Liese Yu	34 Lyndhurst	stonegate	[illegible]

1

Against Syphon Reservoir Expansion Plan Signature

Note: If you already signed this form somewhere else, please don't sign it again. Thank you.

Name (Print) Home Address(required) Community Signature

Name (Print)	Home Address	Community	Signatur
Layla Sun	58 Elmdale Irvine 92620	Stonegate	
Hoyoung Kwak	58 pendant Irvine 92620	Stonegate	
Joshua Ralls	28 Diamond Irvine, CA 92620	Stonegate	
Christiana Thadgi	107 Churchill, Irvine, CA 92620	Stonegate	
DALYS KOVACIC	118 FAIRHAVEN, IRVINE CA	STONEGATE	
Chiuwen L. Cheng	54 Diamond. Irvine 92620	Stonegate	
Dennis Kush	842 Brookshire Ave TUSTIN CA	stonegate	
Kaylee Shi	5303 Virtuoso Irvine	Stonegate	
Youna Choi	1925 Crested Bird, Irvine	Stonegate	

Against Syphon Reservoir Expansion Plan Signature

Note: If you already signed this form somewhere else, please don't sign it again. Thank you.

Name (Print) Home Address(required) Community Signature

Name (Print)	Home Address	Community	Signature
Anna Gao	58 Elmdale, Irvine 92620	Stonegate	
Yitian Song	59 Dublin, Irvine	Stonegate	

Against Syphon Reservoir Expansion Plan Signature

Note: If you already signed this form somewhere else, please don't sign it again. Thank you.

Name (Print)	Home Address(required)	Community	Signature
Maria Sung	8201 Mirasol Irvine 92620	Stonegate	
Chen Xiao Ding	113 saybrook Irvine, 92620	Stonegate	
Yang Hahm	28 Somerton Irvine 92620	〃	
Vanessa Santos	202 Tokay	〃	

Against Syphon Reservoir Expansion Plan

Signature

Note: If you already signed this form somewhere else, please don't sign it again. Thank you.

Name (Print)	Home Address(required)	Community	Signature
Helen Cho	52 Steinway Irvine	Stonegate	
J. Tean	6C Carrington	Stonegate	
Zhuo Zhang	65 Burmingham Irvine	"	
CHOI, TOOKSU	6H4 Peadmont	"	
TRACEY CHU	573 STANZA, IRVINE	"	
ShangYun Lee	40 Somerton Irvine, CA92620	"	
Rosario Patricio	53 Rembrandt	"	
CHEUK YAN YUNG	46 CORALWOOD, IRVINE, CA92618	STONEGATE EAST	
Mindy Chu	60 Diamond, Irvine 92620	Stonegate	
Sasa Bahadori	77 Nassau, 92620	Stonegate	
Negar Tolimi	106 Oasis, Irvine, CA 92620	Stonegate	

Against Syphon Reservoir Expansion Plan Signature

Note: If you already signed this form somewhere else, please don't sign it again. Thank you.

Name (Print) Home Address(required) Community Signature

Name (Print)	Home Address	Community	Signature
Josephine Cheung	219 Cedarwood	Stonegate	
Michelle	68 Interlude	Georgetown	
[illegible]	119 FAIRHAVEN	Stonegate	[illegible]
Jina Kim	1320 Virtuoso		
GRACE SNEAD	71 Flower stalk	Stonegate East	
Meng Yuan	79 Fenway	Stonegate	
Sachin Chandramohan	109 Oasis	Stonegate	Sachin
Ramlah Farooq	131 Thornhurst	Stonegate	
Jiaima Kan	21 Oakfield	Stonegate	
Susan Cho	22 Bancroft	Stonegate	
[illegible]	56 Cumming	Stonegate	
Anna Gao	58 Elmdale	Stonegate	

Jo Ann Corey - No to Syphon reservoir

From: Amy P <amyuyen777@gmail.com>
To: <SyphonEir@irwd.com>
Date: 9/16/2019 9:16 AM
Subject: No to Syphon reservoir

To Whom It May Concern:
I am a resident of Stonegate and am writing to voice my concern about the planned expansion of Syphon Reservoir by the Irvine Ranch Water District in regard to safety of our surrounding community and the financial implications from dam failure.
It has been brought to my attention that Stonegate Elementary School, which my daughter currently attends, is one of the two schools directly in the flood path should the dam be compromised. Within a matter of less than 10 minutes, give or take, our school will be be under 5-10 feet of water while Crean Lutheran Athletic Complex is projected at less than 5 minutes should this happen. What are the current measures being taken should this happen or to prevent it?
To me, it doesn't make sense to build a reservoir 10 times bigger when we currently haven't addressed these current issues. Count me as a no to building the Syphon reservoir.

--
Warmest regards,

Amy Pham
310-692-5225

WATER RESOURCES
SEP 16 2019
IRVINE RANCH
WATER DISTRICT

Jo Ann Corey - Objection against 10 x extension of reserve

From: Justin Choi <JChoi@mercuryinsurance.com>
To: "syphoneir@irwd.com" <syphoneir@irwd.com>
Date: 9/16/2019 8:23 AM
Subject: Objection against 10 x extension of reserve

All Korean who leaves in Stonegate community has concerns about earth quake related flood.

Please stop or explain what kind of countermeasures you will place.

Thank you.
Justin Choi

This e-mail message, including any attachments, is for the sole use of the intended recipient, and may contain material that is privileged or confidential and legally protected from disclosure. If you are not the intended recipient or have received this message in error, you are not authorized to copy, distribute, or otherwise use this message or its attachments. Please notify the sender immediately by return e-mail and permanently delete this message and any attachments.

WATER RESOURCES

SEP 16 2019

IRVINE RANCH
WATER DISTRICT

Jo Ann Corey - Strongly disagree with the Syphon Reservoir Improvement Project

From: YP <yunpan2000@gmail.com>
To: <syphoneir@irwd.com>
Date: 9/16/2019 1:23 PM
Subject: Strongly disagree with the Syphon Reservoir Improvement Project

To whom who concerns,

As a Stonegate resident, we strongly disagree the extension of Syphon Reservoir project.

This will put our children and residents at risk in our densely populated areas. The current reservoir was constructed in 1949 at a time when the surrounding area did not have homes and schools, Irvine's landscape has changed considerably within the last few decades with an increased population near the existing reservoir's flood path.

So the first thing to do is to close it off instead of expanding.

Name: Yun Pan

Address: 60 Devonshire, Irvine CA 92620

Yun Pan

9/16/2019 1:22pm

WATER RESOURCES

SEP 16 2019

IRVINE RANCH
WATER DISTRICT

From: guo lina <lnguo@hotmail.com>
To: "syphoneir@irwd.com" <syphoneir@irwd.com>
Date: 9/16/2019 8:05 AM
Subject: Strongly against the extension of Syphone Reserviror

To whom who concerns,

As a Stonegate resident, we strongly disagree the project proposal for the extension of Syphone Reserviror. It will increase flood risk and put the community and elementary school to a dangerous place. Therefore, we strongly against this project and Please choose another place if need.

Thanks for your attention,
Best regards,
Lina Guo

55 Filbert, Irvine, 92620

Sent from my iPhone

WATER RESOURCES

SEP 16 2019

IRVINE RANCH
WATER DISTRICT

Jo Ann Corey - Concerned about Syphon Reservoir expansion

From: Pei Yang <yangpei@hotmail.com>
To: "syphoneir@irwd.com" <syphoneir@irwd.com>
Date: 9/16/2019 9:06 AM
Subject: Concerned about Syphon Reservoir expansion

Hello,

I'm emailing to express my, and all of our neighbor's deep concern of the expansion plan for the Syphon Reservoir near Stonegate community. It's great threat to the safety of our elementary school kids and the entire community. Please build it somewhere else where it's not so close to residential area and schools!

Thank you for listening to the residents voice!

Pei Yang (Stonegate resident)

WATER RESOURCES

SEP 16 2019

IRVINE RANCH
WATER DISTRICT

Jo Ann Corey - Community concerns about Syphon reservoir & dam expansion. ATTN Jo Ann Corey, Environmental Compliance Specialist

---

From: Amanda Yu <aescott83@gmail.com>
To: <SyphonEIR@irwd.com>
Date: 9/16/2019 11:55 AM
Subject: Community concerns about Syphon reservoir & dam expansion. ATTN Jo Ann Corey, Environmental Compliance Specialist
Attachments: Stonegate against Syphon Expansion.docx; syphon reservoir expansion 9_2019 sig & ltr.pdf; CA00749_MD_Scenario1 (1).pdf; IRWD Petition

---

Good afternoon Mrs. Jo Ann Corey,

Attached is a word document letter & pdf supplemental with resident signatures as well as enlarged graphics detailing our neighborhood concerns regarding the Syphon reservoir & dam expansion.

There is also a pdf from a petition on change.org that has been circulating. Please refer to the word docx I have attached for our most recent updated version of the letter.

You have likely received more emails and letters sent from others in the community with additional signatures.

There may also be additional comment cards arriving this week, post marked prior to the Sept 16 4pm deadline.

I appreciate IRWD seriously taking into account the community & neighborhood's concern.

Cordially,
Amanda Scott-Yu

WATER RESOURCES
SEP 16 2019
IRVINE RANCH
WATER DISTRICT

Irvine Ranch Water District
Water Resources & Policy Department
15600 Sand Canyon Avenue
P.O. Box 57000
Irvine, CA 92619-7000

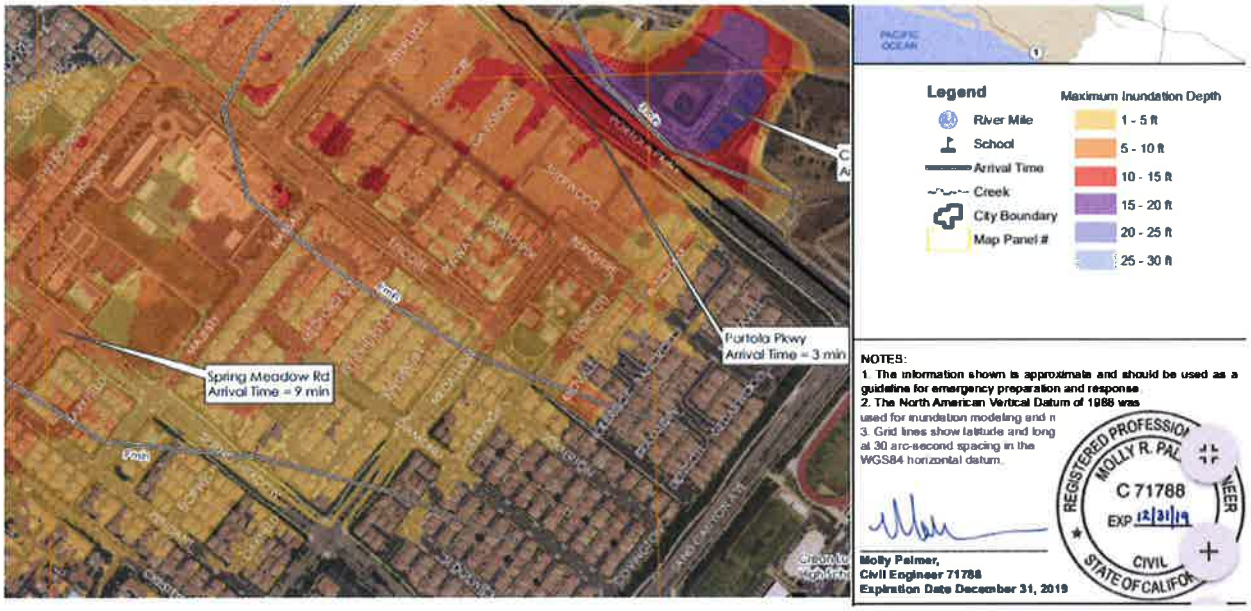
September 13, 2019

Re: IRWD Syphon Reservoir Improvement Project

Attn: Jo Ann Corey, Environmental Compliance Specialist

This letter is to provide our comments as requested by the public scoping meeting and express concern about the planned expansion of Syphon Reservoir by the Irvine Ranch Water District. The main concern is safety of the surrounding community.

Current inundation maps show two schools directly in the flood path. In the situation of a damn failure, the Crean Lutheran Athletic Complex is currently projected to be under 15-20 ft of water in less than 3 minutes. Stonegate Elementary School is projected to be under 5-10 feet of water in 6-9 minutes.

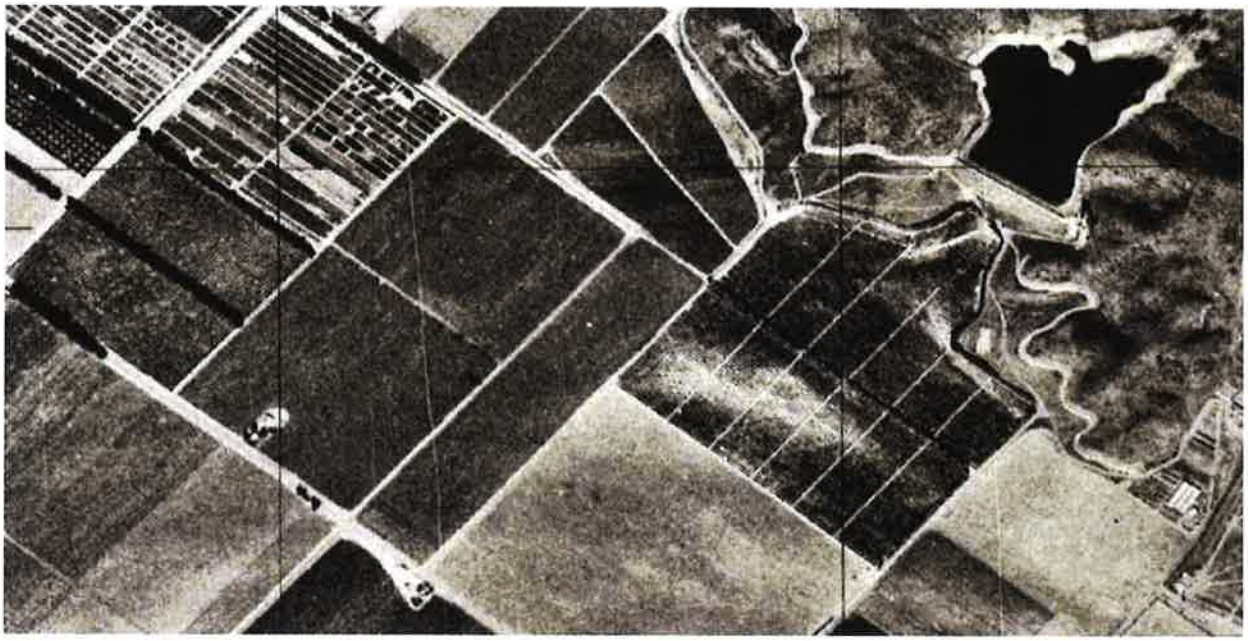


[adapted from https://fmds.water.ca.gov]

The projected increase in dam height from 59 feet to 136 feet and reservoir capacity from approximately 500 acre-feet (AF) of water to 5,000 AF of water would significantly worsen the scenario to the schools in case of a damn failure. This further increases the risk to the children of our community.

There is currently no document that illustrates the potential increased risk of flood to the surrounding community that would be expected from increasing the reservoir volume 10 times. The document "Notice of Preparation of an Environmental Impact Report" provided by Irvine Ranch Water District on August 2, 2019 conveniently avoids mentioning the hazard of dam failure. In case of a dam failure, there does not appear to be a viable spillway to divert water from schools and homes. The scenario of dam failure must be considered as reservoir is located in a seismically active area with the Puente Hills fault located just 4.3 miles away.

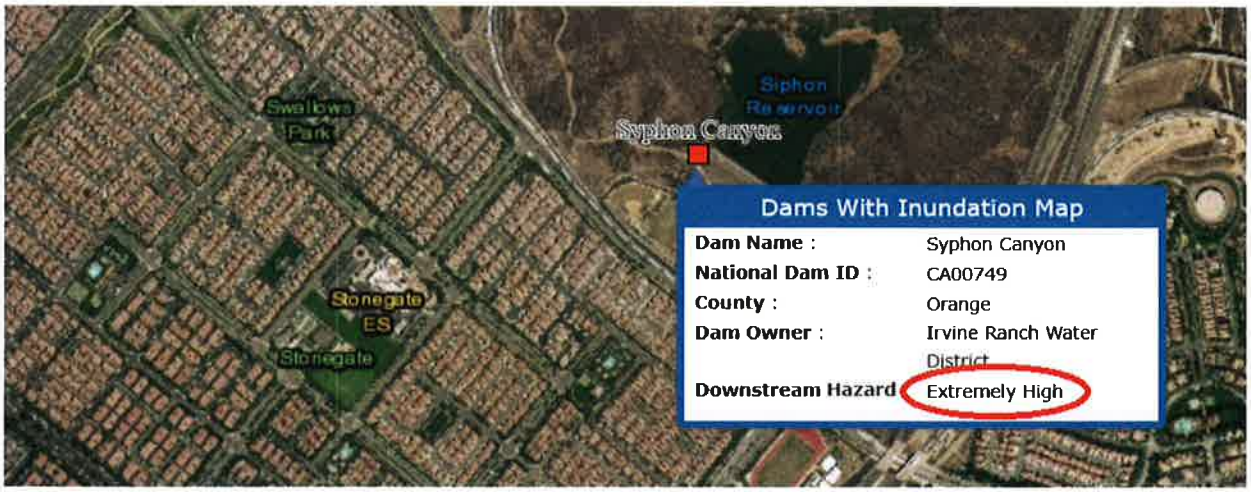
The current reservoir was constructed in 1949 at a time when the surrounding area did not have homes and schools, as seen the attached 1974 photo. Irvine's landscape has changed considerably within the last few decades with an increased population near the existing reservoir's flood path.



[adapted from https://ngmdb.usgs.gov]

Specific questions that we demand to be addressed prior to building of the damn is (1) How can IRWD guarantee our children's and community's safety with 5,000 AF of water at higher elevation so close homes and schools? (2) What emergency response plan can be expected to save thousands of lives in a few minutes in the setting of a catastrophic failure during an earthquake? (3) Will IRWD provide compensation to homeowners for flood insurance and potential diminished property values as a result of the reservoir expansion?

Given that the current state of downstream hazard at Syphon Reservoir is "Extremely High" according to the California Department of Water Resources, we demand not only to stop plans for expanding Syphon Reservoir, but also to use funds appropriated for the expansion to fortify the existing damn to bring it up to current code. Further, we demand distribution of up to date inundation maps and projected inundation maps to current community members. Lastly, we demand that the Environmental Impact Report (EIR) address the potential of loss of life and property in a dam failure.



[adapted from https://fmds.water.ca.gov]

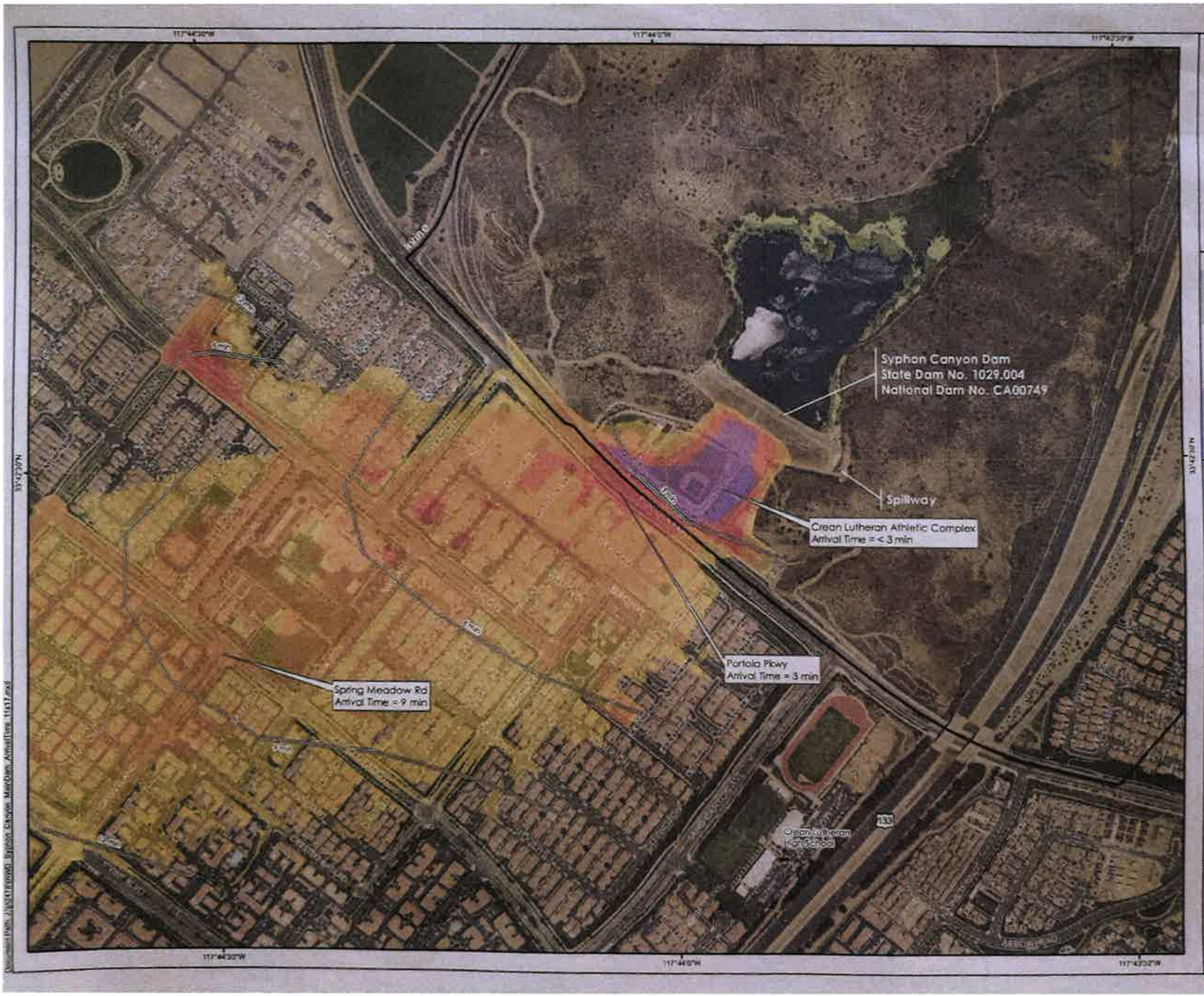
The following list of residents have assembled to provide the comments stated herein, which we hereby submit to be part of the EIR for the Syphon Reservoir Improvement Project.

Syphon Reservoir Improvement Project

The following list of residents have assembled to provide the comments stated herein, which we hereby submit to be part of the EIR for the Syphon Reservoir Improvement Project.

Name (required)	Address (required)
RAJNI JOSHI	51 FILBERT, IRVINE, 92620
Amanda + Mike Yu	53 Filbert Irvine 92620
Lina Guo	55 Filbert, Irvine, 92620
Sojung Lee	50 Filbert Irvine 92620
Tina Anderson	52 ~~Filbert~~ Irvine 92620
SRI & KANTHI GUNTURI	54 FILBERT IRVINE 92620
Faiseel Al Ghabaeei	58 Silbert Irvine 92620
Kyong Chol Kim	60 Filbert Irvine 92620
TANVIR MAHTAB	62 DUBLIN IRVINE 92620
Avery Tang	81 Walden, Irvine, 92620
Chong Liu	81 Walden, Irvine, 92620
VEENA NANJWANI	50 DUBLIN, IRVINE, 92620
Yuan Feng + Jian Li	44 Dublin Irvine 92620
JEFF AND CATHY MURAI	51 HEARST, IRVINE, CA 92620
RYAN TRAN	57 FILBERT IRVINE 92620
Bonnie Hui-Callahan	79 Diamond, Irvine, CA 92620.
Tim Callahan	79 Diamond, Irvine, CA 92620.
Qing Jian Xu	
Jin zhang	
Mohammed bakali	64 gainsboro
Hongyu Li	81 Devonshire, Irvine.
Kevin Long	25 Lyndhurst, Irvine, CA 92620
Kwang Kwok	
Ken Hammond	110 Gemstone 92620
CHAKRI KUNDAKADDY	


Earthquake Zones of Required Investigation
CGS Homepage
Esri World Geocoder
Irvine Blvd
Jeffrey Rd
Woodbury
Eastern-Trans-Corr-SB
Eastern-Trans-Corr-NB
Legend
Colors may vary due to transparency and overlapping data.
Fault Traces
Accurately Located
Approximately Located
Approximately Located, Queried
Inferred
Inferred, Queried
Concealed
Concealed, Queried
Aerial Photo Lineament
Fault Zone
Liquefaction Zone
Landslide Zone
Liquefaction Landslide Overlap Zone
Area Not Evaluated for Liquefaction or Landslides
Parcels
Parcel is in an Earthquake Fault Zone, a Liquefaction Zone, and a Landslide Zone



SYPHON CANYON DAM
MAIN DAM SUNNY DAY FAILURE
FLOOD ARRIVAL TIME AND MAX DEPTH

STATE DAM NO. 1029.004
NATIONAL DAM NO. CA00749
ORANGE COUNTY, CALIFORNIA

DAM OWNER
IRVINE RANCH WATER DISTRICT
PO BOX 57000
IRVINE, CA 92619-7000
(949) 453-5300

MODEL SIMULATION DATE: 8/4/2018
MAP PREPARATION DATE: 10/9/2018



Legend

- River Mile
- School
- Arrival Time
- Creek
- City Boundary
- Map Panel #

Maximum Inundation Depth

- 1 - 5 ft
- 5 - 10 ft
- 10 - 15 ft
- 15 - 20 ft
- 20 - 25 ft
- 25 - 30 ft

NOTES:
1. The information shown is approximate and should be used as a guideline for emergency preparation and response.
2. The North American Vertical Datum of 1988 was used for inundation modeling and n
3. Grid lines show latitude and long at 30 arc-second spacing in the WGS84 horizontal datum.

REGISTERED PROFESSIONAL ENGINEER
MOLLY R. PALMER
C 71788
EXP 12/31/19
CIVIL
STATE OF CALIFORNIA

Molly Palmer,
Civil Engineer 71788
Expiration Date December 31, 2019

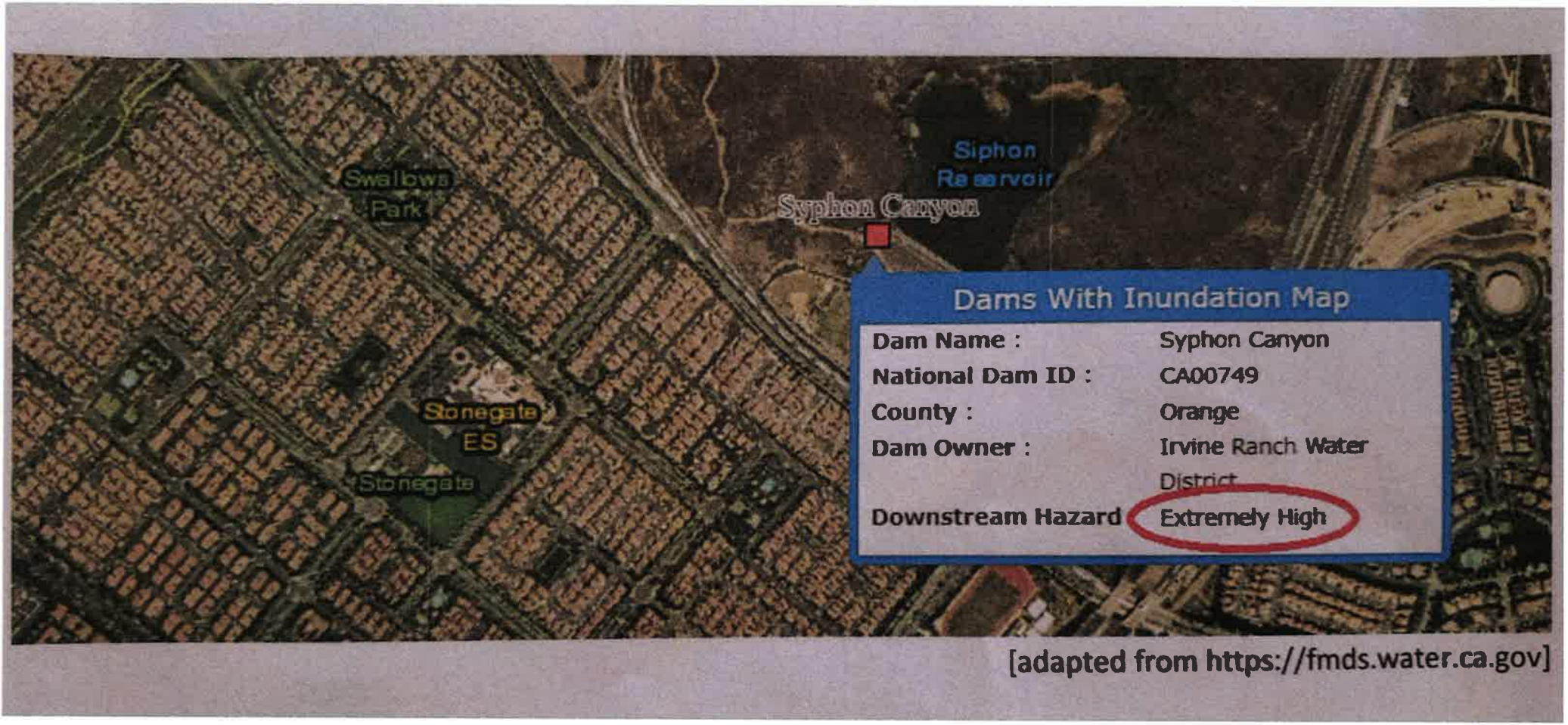
STETSON ENGINEERS INC.

PANEL 1 of 8

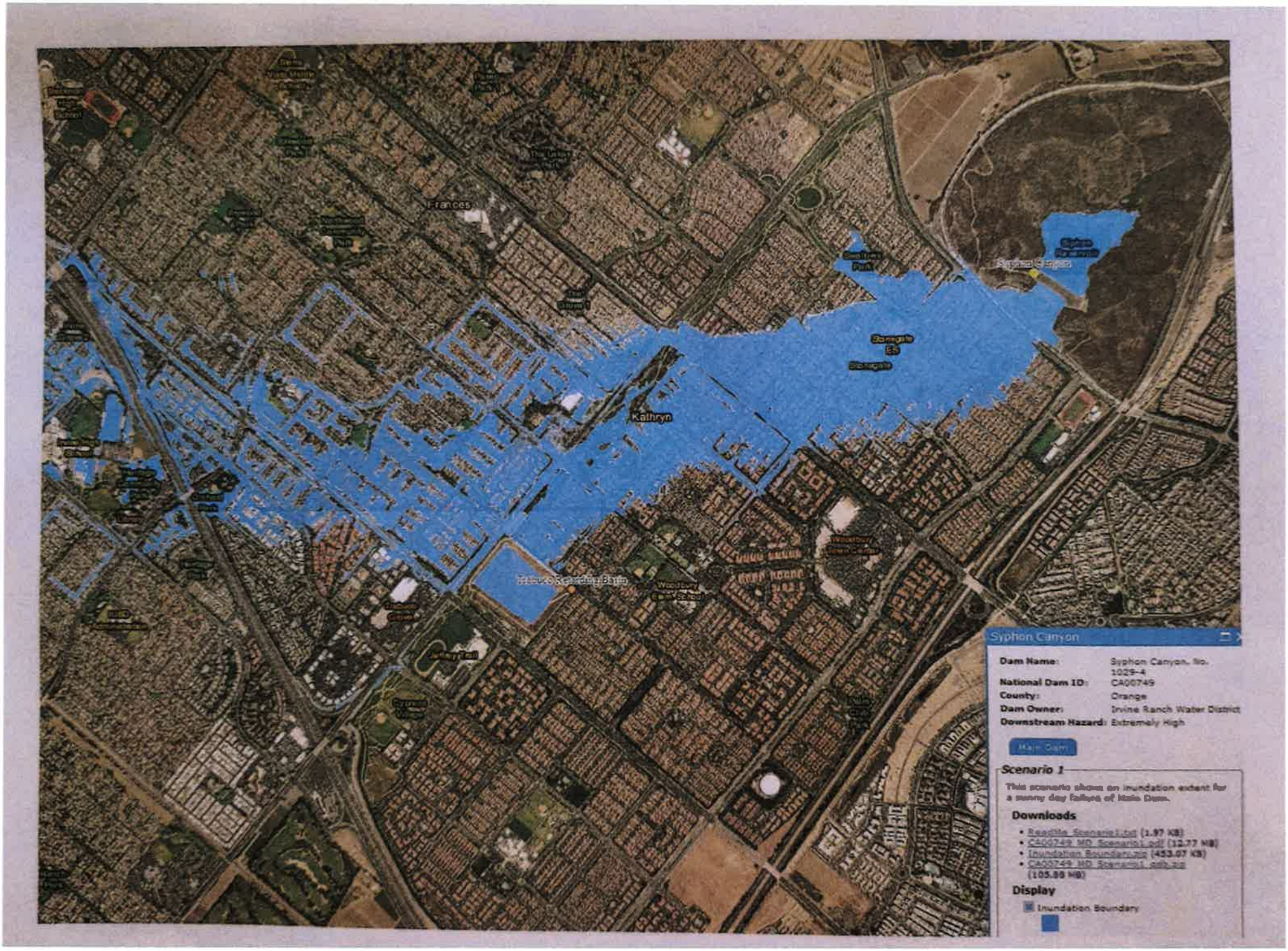
Scale 1:6,000

N

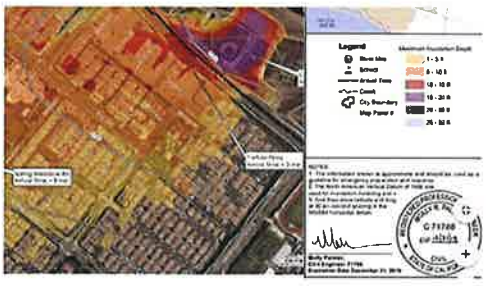
0 250 500 750 Feet
0 100 200 Meters



[adapted from https://fmds.water.ca.gov]


Frances
Kathryn
Stonegate
Stonegate
Stonegate Park
Woodbury Elementary School
Woodbury Park
Syphon Canyon
Dam Name: Syphon Canyon, No. 1029-4
National Dam ID: CA00749
County: Orange
Dam Owner: Irvine Ranch Water District
Downstream Hazard: Extremely High
Main Dam
Scenario 1
This scenario shows an inundation extent for a sunny day failure of Main Dam.
Downloads
Readme_Scenario1.txt (1.97 KB)
CA00749_MD_Scenario1.pdf (12.77 MB)
Inundation_Boundary.zip (453.07 KB)
CA00749_MD_Scenario1_gdb.zip (105.89 MB)
Display
Inundation Boundary

Stonegate against Syphon Reservoir



S G started this petition to Irvine ranch water district

The construction of IRWD Syphon Reservoir presents a huge flooding risk to two school areas (Stonegate Elementary & Crean Lutheran Athletic Complex) and hundreds of homes in the Stonegate Community.

The projected increase in reservoir capacity from approximately 500 acre-feet (AF) to 5,000 AF (by raising the dam height from **59 feet to 136 feet)** would significantly worsen the scenario to the schools in case of a dam failure.

In the situation of a dam failure, the Crean Lutheran Athletic Complex is currently projected to be **under 15-20 ft of water in less than 3 minutes.** Stonegate Elementary School is projected to be **under 5-10 feet of water in 6-9 minutes.**

DEMAND THAT IRWD ENVIRONMENTAL IMPACT REPORT (EIR) ADDRESS THE POTENTIAL OF LOSS OF LIFE AND PROPERTY IN A DAM FAILURE SCENARIO.

More Information available at http://stonegatefloodrisk.info

175 have signed. Let's get to 200!

Irvine Ranch Water District: Stonegate against Syphon...

Share on Facebook

Send a Facebook message

Send an email to friends

Tweet to your followers

Copy link

Show this petition to more potential supporters

Promote this petition

Updates

Post an update

Keep your supporters engaged with a news update. Every update you post will be sent as a separate email to signers of your petition.

100 supporters 2 days ago

S G started this petition 3 days ago

Reasons for signing

I'm signing because...

Jyoti Rezdan · 3 days ago

You cannot endanger schools and communities living close to this dam

♡ 1

Avi Rai · 3 days ago

Safety of the communities close by.

♡ 1

View all reasons for signing

Signatures

Name	Location	Date
Sri Gunturi	Irvine, CA	2019-09-13
Jake Gerrity	Irvine, CA	2019-09-13
Tom Kwolik	Irvine, CA	2019-09-13
Rachel Wong	Irvine, CA	2019-09-13
Lina Guo	Irvine, CA	2019-09-13
Carrie Gleason	Sedalia, US	2019-09-13
Amy Bui	La Habra, CA	2019-09-13
Cindy On	Irvine, CA	2019-09-13
Michael Yu	Irvine, CA	2019-09-13
Frank Wang	Irvine, CA	2019-09-13
Rajnj Joshi	Lakeside, CA	2019-09-13
Angela Huang	Irvine, CA	2019-09-13
rajani kumar	irvine, CA	2019-09-13
Joe Yan	Irvine, CA	2019-09-13
Shraddha Uphale	Irvine, CA	2019-09-13
Wei Chen	Irvine, CA	2019-09-13
CHUNLI weng	Irvine, CA	2019-09-13
Jason Zhang	Irvine, CA	2019-09-13
Shelly Han	Gardena, CA	2019-09-13
Smitha Kancharla	Irvine, US	2019-09-13

Name	Location	Date
Jie Gao	Irvine, CA	2019-09-13
Nirupama Krishnaiah	Irvine, CA	2019-09-13
Avi Rai	Irvine, CA	2019-09-13
Raj Yerapotini	Irvine, CA	2019-09-13
Ying Yu	Irvine, CA	2019-09-13
Na An	Irvine, CA	2019-09-13
JEAN Fen	Irvine, CA	2019-09-13
David li	Irvine, CA	2019-09-13
Yun Pan	Irvine, CA	2019-09-13
Vic Li	Irvine, CA	2019-09-13
Vani Juvvala	Irvine, CA	2019-09-13
Srini Kancharla	Irvine, US	2019-09-14
Vicky Yu	Irvine, CA	2019-09-14
Gargee Parikh	Mira Loma, CA	2019-09-14
Purvi Dave	Irvine, CA	2019-09-14
Bhuvana Nidadavolu	Irvine, CA	2019-09-14
Kiran Chalasani	Riverside, CA	2019-09-14
Narmada Gummadi	Irvine, US	2019-09-14
Manisha Prasad	Irvine, CA	2019-09-14
Tina Anderson	Irvine, CA	2019-09-14
Monica Bhagat	Irvine, CA	2019-09-14
shylesh nadig	Irvine, CA	2019-09-14

Name	Location	Date
Ritu Arora	Irvine, CA	2019-09-14
Jyoti Razdan	Irvine, CA	2019-09-14
ritu Taneja	Irvine, CA	2019-09-14
Lovely Goyal	Irvine, CA	2019-09-14
Hina Naita	Irvine, CA	2019-09-14
Anamika Bhattacharya	Irvine, CA	2019-09-14
Divya Sankhala	Irvine, CA	2019-09-14
Vidya Malepati	Costa Mesa, US	2019-09-14
Suma Gowdru	Irvine, CA	2019-09-14
Shiva Subramanya	Irvine, CA	2019-09-14
Manasi Pitkar	Irvine, CA	2019-09-14
Umesh Satyanarayana	Tustin, CA	2019-09-14
Div Swamy	Arcadia, CA	2019-09-14
Vidhi Laddha	Irvine, CA	2019-09-14
Uma Lakshmanan	Irvine, CA	2019-09-14
Amanda Yu	Irvine, CA	2019-09-14
Yolanda Chang	Irvine, CA	2019-09-14
Anand Karri	Irvine, CA	2019-09-14
Kavita Fatehpuria	Irvine, CA	2019-09-14
Appi reddy Kandikonda	Irvine, CA	2019-09-14
Srilatha Kandikonda	Irvine, CA	2019-09-14
Chetan Bhatnagar	Irvine, CA	2019-09-14

Name	Location	Date
Megh Govindu	Irvine, CA	2019-09-14
Yamini Krishnaswamy	Irvine, CA	2019-09-14
Subhankar BHATTACHARYA	Irvine, CA	2019-09-14
Mahesh Panchrapula	Irvine, CA	2019-09-14
Ben Singh	Irvine, CA	2019-09-14
Nikki Lienau	Irvine, CA	2019-09-14
Anamika Bhatia	Irvine, CA	2019-09-14
Alagiri Venkatachalapathy	Irvine, CA	2019-09-14
Jayanthi Thiruvengadam	Pomona, US	2019-09-14
Si Gilbert	Irvine, CA	2019-09-14
Rajani Pancharapula	Irvine, CA	2019-09-14
Ning Huang	Irvine, CA	2019-09-14
Michael Liao	Irvine, CA	2019-09-14
Joyce Lee	Irvine, CA	2019-09-14
Jiayi Huang	Irvine, CA	2019-09-14
yun liu	Irvine, CA	2019-09-14
Sukho Lee	Irvine, CA	2019-09-14
Shu An	Irvine, CA	2019-09-14
Cathy zhang	Irvine, CA	2019-09-14
Payal Kadakia	Irvine, CA	2019-09-14
Chong Liu	Irvine, CA	2019-09-14
nana huang	Irvine, CA	2019-09-14

Name	Location	Date
Srinivas Thetakali	Irvine, CA	2019-09-14
Ananth Raghavendra	Irvine, CA	2019-09-14
Mathew P	Mountain View, CA	2019-09-14
Wei yu	Irvine, CA	2019-09-14
Namrata Mansu	Irvine, CA	2019-09-14
Sanjay Dhar	Irvine, CA	2019-09-14
Sanjay Dhar	Irvine, CA	2019-09-14
John Wu	Irvine, CA	2019-09-14
Daniel Ohara	Irvine, CA	2019-09-14
Loc Vu	Irvine, CA	2019-09-14
Minh Huynh	Irvine, CA	2019-09-14
Paul Foucart	Irvine, CA	2019-09-14
YANBIN XU	Fontana, CA	2019-09-14
Aadra Lee	Irvine, CA	2019-09-14
Shafi Shaik	Irvine, CA	2019-09-14
Seema Shukla	Irvine, CA	2019-09-14
Qichen Wang	Irvine, CA	2019-09-14
xiao chen	Irvine, US	2019-09-14
Elena Cheng	Irvine, CA	2019-09-14
Vera Wang	Irvine, CA	2019-09-14
Derek Li	Irvine, CA	2019-09-14
Satish Natla	Irvine, CA	2019-09-14

Name	Location	Date
Kun Yang Kim	Irvine, CA	2019-09-14
Shirley Li	Irvine, CA	2019-09-14
Nan Ma	Irvine, CA	2019-09-14
Jiang Li	Irvine, CA	2019-09-14
rajeswari Dhurjati	Irvine, CA	2019-09-14
Sarah Hwang	Irvine, CA	2019-09-14
Deepa Agrawal	Irvine, CA	2019-09-14
fang xie	Irvine, CA	2019-09-14
Amit P	Irvine, CA	2019-09-14
Leon Chen	Irvine, CA	2019-09-14
Xia Yin	Irvine, CA	2019-09-14
Maggie Wong	San Clemente, CA	2019-09-14
Sudhakar Peddi	Irvine, CA	2019-09-14
Sachin ChandraMohan	Irvine, CA	2019-09-14
Hongwu Ren	Devonshire › Irvine, CA	2019-09-14
Sridevi Mallela	Irvine, CA	2019-09-14
Jimmy Wang	Irvine, CA	2019-09-15
Lawrence Hsu	Irvine, CA	2019-09-15
linda sexton	Poulsbo, US	2019-09-15
Maunil Mehta	Irvine, CA	2019-09-15
Joanne Vu	Irvine, CA	2019-09-15
Caroline Kelly	Tuscaloosa, US	2019-09-15

Name	Location	Date
Mathew Dickinson	Spokane Valley, US	2019-09-15
karyn Kronz	Anchorage, US	2019-09-15
Zahid Mehmood	Brooklyn, US	2019-09-15
Minh Tong	Irvine, CA	2019-09-15
Samreen Manjra	Irvine, CA	2019-09-15
Sadia Moinuddin	Anaheim, CA	2019-09-15
Yihong Zhang	Irvine, US	2019-09-15
Vanessa Jia	Irvine, CA	2019-09-15
KEVIN LIU	Irvine, CA	2019-09-15
Christine Bowe	Irvine, US	2019-09-15
Jing Liu	Irvine, CA	2019-09-15
Marie Myrlande Alfred	Miramar, US	2019-09-15
Cicy Shen	Irvine, CA	2019-09-15
James Chen	Irvine, CA	2019-09-15
Afsheen Manjra	Irvine, CA	2019-09-15
Bo Yao	Irvine, CA	2019-09-15
Jeff Murai	Irvine, CA	2019-09-15
Joy Lu	Irvine, CA	2019-09-15
Robert Tyler	Irvine, CA	2019-09-15
Bob Pan	Irvine, CA	2019-09-15
Kristine Li	Irvine, CA	2019-09-15
Jolly Jain	Irvine, CA	2019-09-15

Name	Location	Date
John Zhang	Irvine, CA	2019-09-15
Wenny Weng	Dana Point, CA	2019-09-15
yihe wang	Irvine, CA	2019-09-15
Sasa Bahadori	Oceanside, CA	2019-09-15
Annette Kim	Irvine, CA	2019-09-15
Carol Seto	Irvine, CA	2019-09-15
Martin Kim	Irvine, CA	2019-09-15
Susie Ergun	Irvine, CA	2019-09-16
Crystal Schreck	Irvine, CA	2019-09-16
Wayne Lee	Irvine, CA	2019-09-16
Yi-Ling Hsieh	Irvine, CA	2019-09-16
Kenneth Anderson	Irvine, CA	2019-09-16
Jia Zheng	Irvine, CA	2019-09-16
chongming Qiao	Irvine, CA	2019-09-16
Vivian Qian	Irvine, CA	2019-09-16
Wendy Ke	Irvine, CA	2019-09-16



SYPHON CANYON DAM
MAIN DAM SUNNY DAY FAILURE
FLOOD ARRIVAL TIME AND MAX DEPTH

STATE DAM NO. 1029.004
NATIONAL DAM NO. CA00749
ORANGE COUNTY, CALIFORNIA

DAM OWNER
IRVINE RANCH WATER DISTRICT
PO BOX 57000
IRVINE, CA 92619-7000
(949) 453-5300

MODEL SIMULATION DATE: 8/4/2018
MAP PREPARATION DATE: 10/9/2018



Legend

- River Mile
- School
- Arrival Time
- Creek
- City Boundary
- Map Panel #

Maximum Inundation Depth

- 1 - 5 ft
- 5 - 10 ft
- 10 - 15 ft
- 15 - 20 ft
- 20 - 25 ft
- 25 - 30 ft

NOTES:
1. The information shown is approximate and should be used as a guideline for emergency preparation and response.
2. The North American Vertical Datum of 1988 was used for inundation modeling and m
3. Grid lines show latitude and long at 30 arc-second spacing in the WGS84 horizontal datum.

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Civil Engineer 71788
Expiration Date December 31, 2019

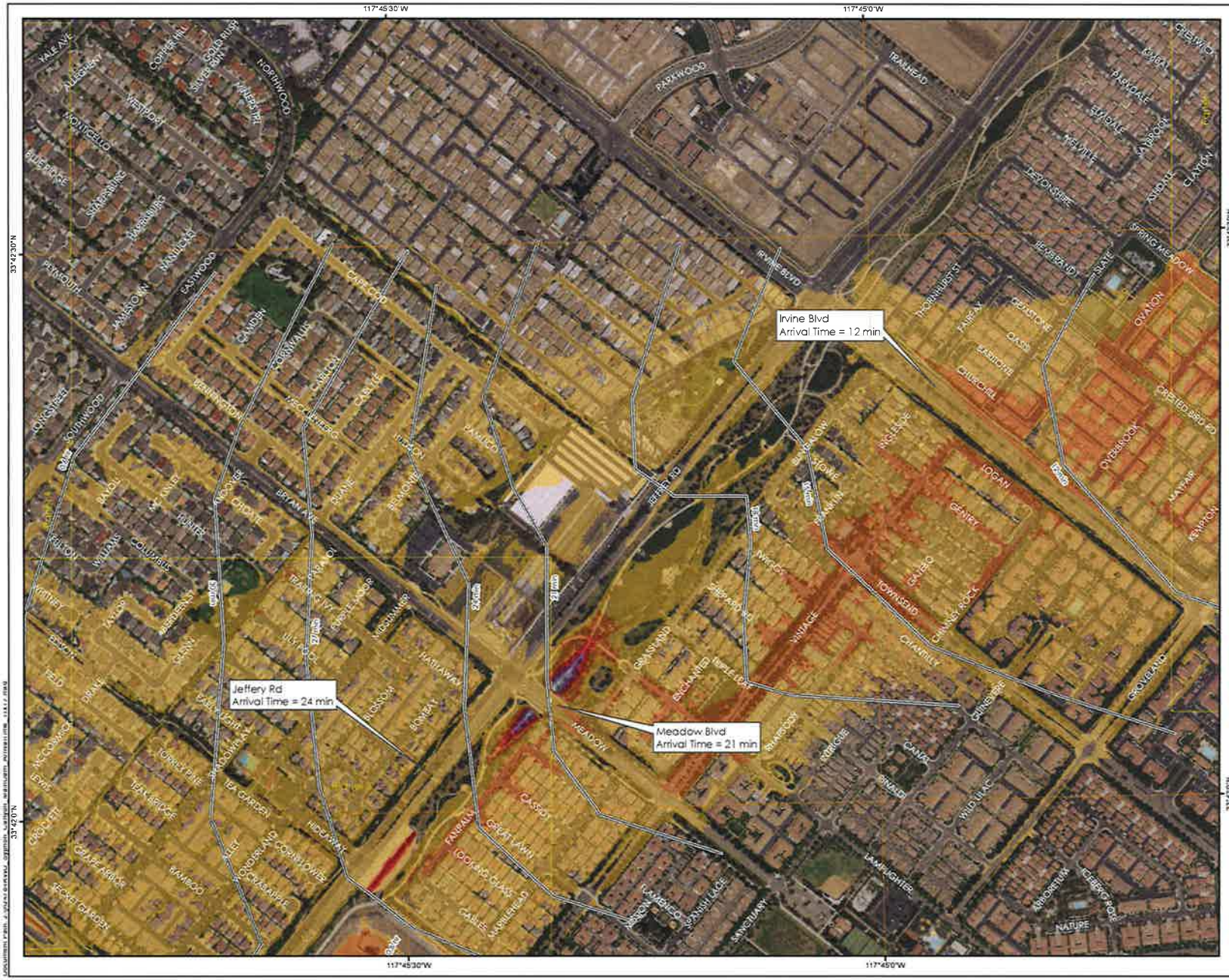
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MOLLY R. PALMER
C 71788
EXP 12/31/19
CIVIL
STATE OF CALIFORNIA

STETSON ENGINEERS INC.

PANEL 1 of 8

Scale 1:6,000

0 250 500 750 Feet
0 100 200 Meters



SYPHON CANYON DAM
MAIN DAM SUNNY DAY FAILURE
FLOOD ARRIVAL TIME AND MAX DEPTH

STATE DAM NO. 1029.004
NATIONAL DAM NO. CA00749
ORANGE COUNTY, CALIFORNIA

DAM OWNER
IRVINE RANCH WATER DISTRICT
PO BOX 57000
IRVINE, CA 92619-7000
(949) 453-5300

MODEL SIMULATION DATE: 8/4/2018
MAP PREPARATION DATE: 10/9/2018



Legend

- River Mile
- Arrival Time
- Creek
- City Boundary
- Map Panel #

Maximum Inundation Depth

- 1 - 5 ft
- 5 - 10 ft
- 10 - 15 ft
- 15 - 20 ft
- 20 - 25 ft
- 25 - 30 ft

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CIVIL
STATE OF CALIFORNIA

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PANEL 2 of 8

Scale 1:6,000

N

0 250 500 750 Feet
0 100 200 Meters



SYPHON CANYON DAM
MAIN DAM SUNNY DAY FAILURE
FLOOD ARRIVAL TIME AND MAX DEPTH

STATE DAM NO. 1029.004
NATIONAL DAM NO. CA00749
ORANGE COUNTY, CALIFORNIA

DAM OWNER
IRVINE RANCH WATER DISTRICT
PO BOX 57000
IRVINE, CA 92619-7000
(949) 453-5300

MODEL SIMULATION DATE: 8/4/2018
MAP PREPARATION DATE: 10/9/2018



Legend

- River Mile
- School
- Arrival Time
- Creek
- City Boundary
- Map Panel #

Maximum Inundation Depth

- 1 - 5 ft
- 5 - 10 ft
- 10 - 15 ft
- 15 - 20 ft
- 20 - 25 ft
- 25 - 30 ft

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PANEL 3 of 8

Scale 1:6,000

N

0 250 500 750 Feet

0 100 200 Meters



SYPHON CANYON DAM
MAIN DAM SUNNY DAY FAILURE
FLOOD ARRIVAL TIME AND MAX DEPTH

STATE DAM NO. 1029.004
NATIONAL DAM NO. CA00749
ORANGE COUNTY, CALIFORNIA

DAM OWNER
IRVINE RANCH WATER DISTRICT
PO BOX 57000
IRVINE, CA 92619-7000
(949) 453-5300

MODEL SIMULATION DATE: 8/4/2018
MAP PREPARATION DATE: 10/9/2018



Legend

- River Mile
- Fire Station
- School
- Arrival Time
- Creek
- City Boundary
- Map Panel #

Maximum Inundation Depth

- 1 - 5 ft
- 5 - 10 ft
- 10 - 15 ft

NOTES:
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PANEL 4 of 8

Scale 1:6,000

N

0 250 500 750 Feet

0 100 200 Meters



SYPHON CANYON DAM
MAIN DAM SUNNY DAY FAILURE
FLOOD ARRIVAL TIME AND MAX DEPTH

STATE DAM NO. 1029.004
NATIONAL DAM NO. CA00749
ORANGE COUNTY, CALIFORNIA

DAM OWNER
IRVINE RANCH WATER DISTRICT
PO BOX 57000
IRVINE, CA 92619-7000
(949) 453-5300

MODEL SIMULATION DATE: 8/4/2018
MAP PREPARATION DATE: 10/9/2018



Legend

- River Mile
- Fire Station
- School
- Arrival Time
- Creek
- City Boundary
- Map Panel #

Maximum Inundation Depth

- 1 - 5 ft
- 5 - 10 ft
- 10 - 15 ft

NOTES:
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STATE OF CALIFORNIA

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Expiration Date December 31, 2019

STETSON ENGINEERS INC.

PANEL 5 of 8

Scale 1:6,000

N

0 250 500 750 Feet

0 100 200 Meters



SYPHON CANYON DAM
MAIN DAM SUNNY DAY FAILURE
FLOOD ARRIVAL TIME AND MAX DEPTH

STATE DAM NO. 1029.004
NATIONAL DAM NO. CA00749
ORANGE COUNTY, CALIFORNIA

DAM OWNER
IRVINE RANCH WATER DISTRICT
PO BOX 57000
IRVINE, CA 92619-7000
(949) 453-5300

MODEL SIMULATION DATE: 8/4/2018
MAP PREPARATION DATE: 10/9/2018



Legend

- River Mile
- School
- Arrival Time
- Creek
- City Boundary
- Map Panel #

Maximum Inundation Depth

- 1 - 5 ft
- 5 - 10 ft
- 10 - 15 ft

NOTES
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PANEL 6 of 8

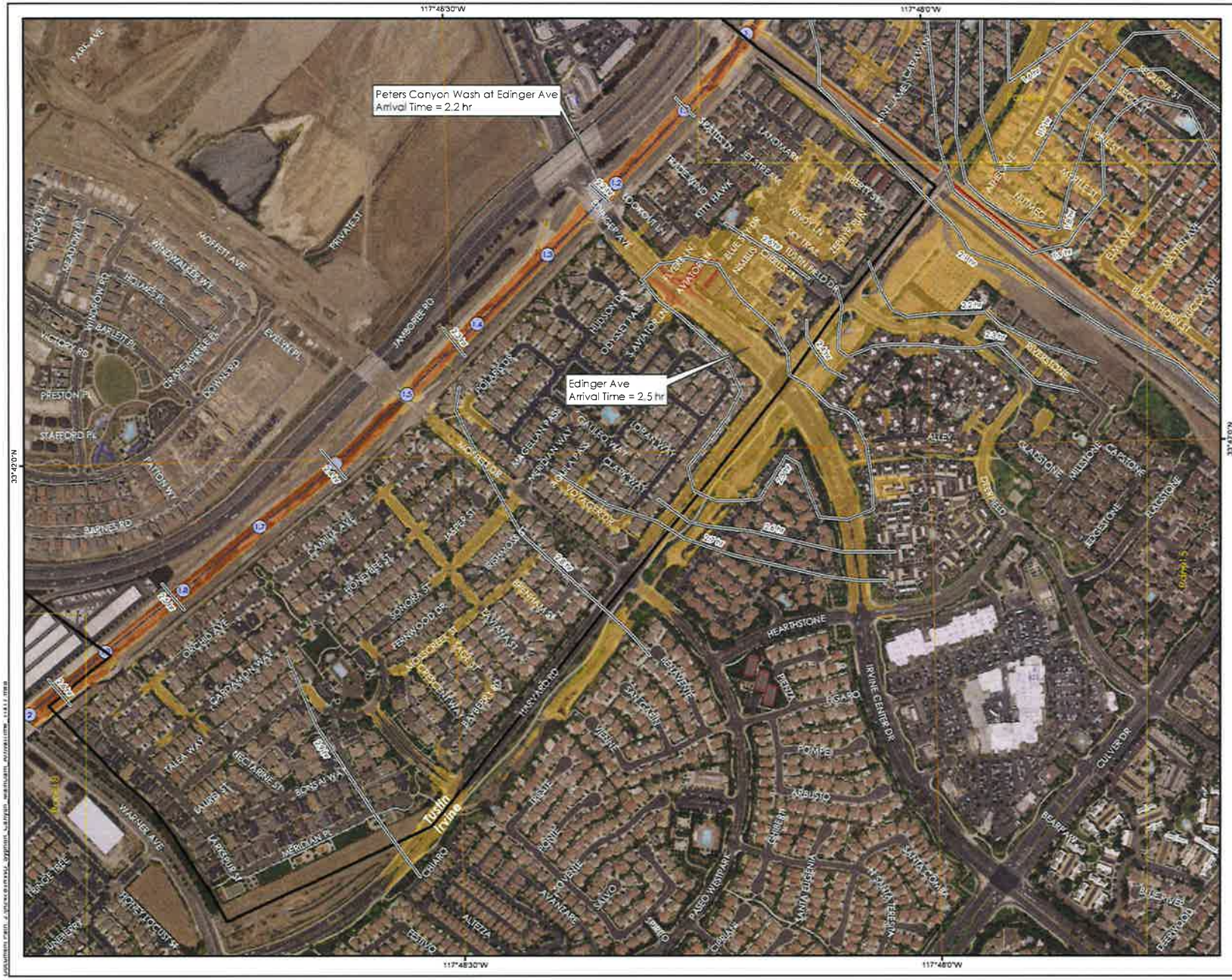
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STETSON ENGINEERS INC.

N

0 250 500 750 Feet

0 100 200 Meters



SYPHON CANYON DAM
MAIN DAM SUNNY DAY FAILURE
FLOOD ARRIVAL TIME AND MAX DEPTH

STATE DAM NO. 1029.004
NATIONAL DAM NO. CA00749
ORANGE COUNTY, CALIFORNIA

DAM OWNER
IRVINE RANCH WATER DISTRICT
PO BOX 57000
IRVINE, CA 92619-7000
(949) 453-5300

MODEL SIMULATION DATE: 8/4/2018
MAP PREPARATION DATE: 10/9/2018



Legend

- River Mile
- Arrival Time
- Creek
- City Boundary
- Map Panel #

Maximum Inundation Depth

- 1 - 5 ft
- 5 - 10 ft
- 10 - 15 ft

NOTES:
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EXP 12/31/19
CIVIL
STATE OF CALIFORNIA

STETSON ENGINEERS INC.

PANEL 7 of 8

Scale 1:6,000

N

0 250 500 750 Feet
0 100 200 Meters



SYPHON CANYON DAM
MAIN DAM SUNNY DAY FAILURE
FLOOD ARRIVAL TIME AND MAX DEPTH

STATE DAM NO. 1029.004
NATIONAL DAM NO. CA00749
ORANGE COUNTY, CALIFORNIA

DAM OWNER
IRVINE RANCH WATER DISTRICT
PO BOX 57000
IRVINE, CA 92619-7000
(949) 453-5300

MODEL SIMULATION DATE: 8/4/2018
MAP PREPARATION DATE: 10/9/2018



Legend

- River Mile
- Fire Station
- Police Station
- School
- Arrival Time
- Creek
- City Boundary
- Map Panel #

Maximum Inundation Depth
- 1 - 5 ft
- 5 - 10 ft
- 10 - 15 ft

NOTES:
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Molly Palmer,
Civil Engineer 71788
Expiration Date December 31, 2019

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MOLLY R. PALMER
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CIVIL
STATE OF CALIFORNIA

STETSON ENGINEERS INC.

PANEL 8 of 8

Scale 1:6,000

N

0 250 500 750 Feet
0 100 200 Meters

Attachment 8: Scoping Meeting Verbal Comments

IRWD Scoping Meeting – Syphon Reservoir Improvement Project
Public Comment Notes

Gregg La Cagnina, Stonegate resident

- Expresses understanding of project benefits
- Primary concern is safety of children in the Stonegate neighborhood, at Stonegate Elementary, and at Crean Lutheran High School
- States concern for lack of inundation zone mapping in the Notice of Preparation, and its impact on the community's ability to fully understand project impacts
- Flooding: How would the project affect home values and cost of insurance?
- States that flood risks associated with the project would add to the existent fire risks in the community
- Requests explanation for selection of project location, project size, lack of inundation map

Richard Zeng, Stonegate homeowner

- States agreement with concerns raised by Gregg La Cagnina
- States concern about costs and burdens associated with the project
- Requests that first evaluation of the project includes data that will allow the community to understand the costs and other effects on the community

Michele Jacknik

- Will the project trigger a requirement for flood insurance?

Jeffrey Beavers, Exec Officer, Crean Lutheran High School

- Looks forward to continuing dialogue with IRWD
- States concern for safety of students, families, faculty, and staff at Crean Lutheran high school
- Looks forward to learning more information about the safety features being implemented, and potentially learning about lower water rates as a result of using recycled water as part of a split water system

Tim Cheng, co-president, Asian American Senior Citizens Service Center (AASCSC)

- Asks if the reservoir will be open/accessible for public recreation after project completion, similar to the San Joaquin Marsh Reservoir

IRWD Scoping Meeting – Syphon Reservoir Improvement Project
Public Comment Notes

Jeffrey Beavers Exec Officer, Crean Lutheran High School (x2)

- Expresses appreciation for notices sent by IRWD regarding participation in the emergency evacuation planning process

Michele Jacknick (X2)

- States concern about project impacts to traffic on Sand Canyon Avenue during construction and onward

Vivien Chen, Stonegate homeowner

- Requests specifications for the dam (new length and width)
- Earthquake risks: How will safety features of the dam guarantee disaster prevention?
- States that water bills have increased dramatically over the past few years
- Requests information about additional water costs, and how the project will be funded

Appendix B

Air Quality and Greenhouse Gas Emissions Technical Report

ESA

SYPHON RESERVOIR IMPROVEMENT PROJECT

Air Quality and Greenhouse Gas Technical Report

Prepared for
Irvine Ranch Water District
15600 Sand Canyon Ave.
Irvine, CA 92618

March 2021

ESA

SYPHON RESERVOIR IMPROVEMENT PROJECT

Air Quality and Greenhouse Gas Technical Report

Prepared for
Irvine Ranch Water District
15600 Sand Canyon Ave.
Irvine, CA 92618

March 2021

2121 Alton Parkway
Suite 100
Irvine, CA 92606
949.753.7001
esassoc.com

Bend
Camarillo
Delray Beach
Destin
Irvine
Los Angeles
Oakland
Orlando
Pasadena
Petaluma
Portland
Sacramento
San Diego
San Francisco
Santa Monica
Sarasota
Seattle
Tampa

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ACRONYMS AND ABBREVIATIONS

Acronym	Description
AAQS	Ambient Air Quality Standards
AB	Assembly Bill
AF	Acre feet
amsl	above mean sea level
AQMP	Air Quality Management Plan
BACT	Best available control technology
CAA	Clean Air Act
CAAQS	California Ambient Air Quality Standards
CAPCOA	California Air Pollution Control Officers
CARB	California Air Resources Board
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CH_4	Methane
City	City of Irvine
CNRA	California Natural Resources Agency
CO	Carbon monoxide
CO_2e	Carbon dioxide equivalent
COG	Council of Governments
County	County of Orange
CPF	Cancer Potency Factor
DMV	Department of motor vehicles
DPM	Diesel Particulate Matter
GDP	Gross domestic product
GHG	Greenhouse Gas
GWP	Global warming potential
HAP	Hazardous air pollutants
HFC	hydrofluorocarbons
HI	Hazard Index
H_2S	Hydrogen Sulfide
I	Interstate
IPCC	Intergovernmental Panel on Climate Change
IRWD	Irvine Ranch Water District
kWh	Kilowatt hour
LCFS	Low Carbon Fuel Standard
$MTCO_2e$	Metric tons carbon dioxide equivalent

Acronym	Description
MMT	Million metric tons
NAAQS	National Ambient Air Quality Standards
NHTSA	National highway traffic safety administration
N_2O	Nitrous Oxide
NO	Nitric oxide
NO_2	Nitrogen dioxide
NOx	Oxides of nitrogen
OEHHA	Office of Environmental Health Hazard Assessment
Pavley	AB 1493
Pb	lead
PFC	perfluorocarbons
PM2.5	Particulate matter of 2.5 micrometers or less
PM10	Particulate matter of 10 micrometers or less
ppb	Parts per billion
ppm	Parts per million
Project	Syphon Reservoir Improvement Project
PVC	Polyvinyl chloride
REL	Recommended Exposure Level
ROG	Reactive organic gasses
RTP	Regional Transportation Plan
SAFE	Safer Affordable Fuel-Efficient vehicle rule
SB	Senate Bill
SCAG	Southern California Association of Governments
SCAQMD	South Coast Air Quality Management District
SCS	Sustainable Communities Strategy
SF_6	Sulfur hexafluoride
SIP	State implementation plan
SJVAPCD	San Joaquin Valley Air Pollution Control District
SO_2	Sulfur dioxide
SO_4^{2-}	sulfates
SRA	Source receptor area
TAC	Toxic air contaminant
URF	Unit Risk Factor
USEPA	U.S. Environmental Protection Agency
VMT	Vehicle miles traveled
VOC	Volatile organic compounds
ZEV	Zero-emission vehicles

EXECUTIVE SUMMARY

The purpose of this Air Quality and Greenhouse Gas Technical Report is to assess and discuss the impacts of potential air quality and greenhouse gas (GHG) emission impacts that may occur with the implementation of the proposed Syphon Reservoir Improvement Project (proposed project) located in unincorporated County of Orange and within the City of Irvine's (City) sphere of influence. The Syphon Reservoir is an existing recycled water storage reservoir in Irvine Ranch Water District's (IRWD's) service area. The proposed project would increase the capacity of the existing Syphon Reservoir and replace the existing engineered dam with a new and larger engineered dam. The proposed project would allow the storage of additional recycled water produced at the Michelson Water Recycling Plant (WRP) during periods of low demand (winter months) for use during periods of high demand (summer months).

The analysis describes the existing air quality and GHG environment in the vicinity of the project limits, estimates future air pollutant and GHG emissions resulting from construction and operation of the project, and identifies the potential for significant air quality and GHG emission impacts based on applicable threshold of significance. Air pollutant and GHG emissions calculation worksheets and technical data used in this analysis are provided in Appendices A through F of this report. The findings of the analyses are as follows:

- The incremental increase in regional emissions from construction of the project would exceed the regional significance thresholds for nitrogen oxides (NO_X) emissions set forth by the South Coast Air Quality Management District (SCAQMD). With implementation of mitigation measures, NO_X emissions would be reduced to below the regional NO_X significance threshold. Thus, construction of the Project with implementation of mitigation would not result in a regional violation of applicable air quality standards or jeopardize the timely attainment of such standards in the South Coast Air Basin (the Air Basin).
- The increase in on-site emissions from construction of the Project would exceed the localized significance threshold for NO_X emission set forth by the SCAQMD. With implementation of mitigation measures, NO_X emissions would be reduced to below the localized NO_X significance threshold. Thus, construction of the Project with implementation of mitigation would not result in a localized violation of applicable air quality standards or expose off-site receptors to substantial levels of regulated air contaminants.
- The incremental increase in regional emissions from operation of the Project would not exceed the regional significance thresholds set forth by the SCAQMD. Thus, operation of the Project would not result in a regional violation of applicable air quality standards or jeopardize the timely attainment of such standards in the Air Basin.
- The increase in on-site emissions from operation of the Project would not exceed the localized significance thresholds set forth by the SCAQMD. Thus, operation of the Project would not result in a localized violation of applicable air quality standards or expose off-site receptors to substantial levels of regulated air contaminants.

- Emissions from the increase in traffic due to operation of the Project would not have a significant impact upon 1-hour or 8-hour local carbon monoxide (CO) concentrations due to mobile source emissions. Thus, the Project would not result in a localized violation of CO air quality standards or expose off-site receptors to substantial levels of CO emissions.
- Construction of the Project would not generate emissions of toxic air contaminants (TAC) that would exceed the SCAQMD health risk significance threshold of an incremental increase in cancer risk of 10 in one million. However, with implementation of mitigation measures required to reduce regional and local emissions, TAC emissions would be further reduced. Thus, construction of the Project would not expose off-site receptors to substantial levels of regulated air contaminants.
- Operation of the Project would not generate TAC emissions that would exceed the SCAQMD health risk significance threshold of an incremental increase in cancer risk of 10 in one million. Thus, operation of the Project would not expose off-site receptors to substantial levels of regulated air contaminants.
- Construction and operation of the Project would not result in the generation of odors affecting a substantial number of people. Therefore, odor impacts would be less than significant.
- The Project would not conflict with applicable strategies in the SCAQMD Air Quality Management Plan and would not exceed growth projections for the area. The Project would not result in a significant cumulative air quality impact.
- The Project would not result in the generation of GHG emissions that would have a significant impact and would not conflict with applicable plans, policies and strategies to reduce GHG emissions. The Project would not result in significant GHG emission impacts.

SECTION 1
Introduction

The Syphon Reservoir is an existing recycled water storage reservoir in IRWD's service area. The proposed project would increase the capacity of the existing Syphon Reservoir and replace the existing engineered dam with a new and larger engineered dam. The proposed project would allow the storage of additional recycled water produced at the Michelson WRP during periods of low demand (winter months) for use during periods of high demand (summer months).

This Air Quality and GHG Technical Report evaluates the Syphon Reservoir Improvement Project's potential air quality impacts and GHG emissions, as well as its potential cumulative impacts. The Air Quality analysis describes and evaluates the pollutant emission and related air quality impacts that could result from construction and operation of the proposed project. The report contains: (1) a description of the existing land uses as they pertain to air emissions; (2) a summary of the federal, State, and local regulations related to air quality, including those set forth within the SCAQMD Air Quality Management Plan (AQMP), and applicable County of Orange (County) plans; and (3) an analysis of the potential impacts related to air quality associated with the implementation of the proposed project, as well as identification of potentially feasible measures that could mitigate significant impacts.

The GHG analysis addresses the potential impacts of GHG emissions from the proposed project. The section contains: (1) a summary of the relationship between GHG emissions and global climate change; (2) an overview of applicable plans, policies, and regulations related to GHG emissions; (3) an assessment of current GHG emissions at the County, State, national, and global levels; (4) a quantitative analysis of future GHG emissions associated with construction and operation of the proposed project; and (5) an analysis of the consistency of the proposed project with applicable regulations, plans, and policies to reduce GHGs as set forth by the State of California, SCAQMD, Southern California Association of Governments (SCAG) and the County of Orange.

The objectives of this air quality and GHG report are to:

1. Describe the existing air quality and GHG environment and regulatory framework for the Project;
2. Evaluate the project's construction and operational-related air quality and GHG emissions and the potential for significant impacts;
3. For identified significant impacts, provide feasible mitigation measures to reduce impacts.

The analysis was developed based on project-specific construction and operational characteristics of the proposed project as provided by IRWD and included in Appendix A. Calculations and modeling outputs are included in Appendix B through F.

The assumptions and GHG modeling included in this analysis is used in detail to inform the modeling of the Energy Impacts for the Draft EIR. While the energy impacts are discussed separately in the Energy section of the Draft EIR, the additional modeling and summary results of the energy analysis are included as Appendix G to this document.

1.1 Project Location

The proposed project would be implemented within IRWD's service area at the location of the existing Syphon Reservoir, northeast of Portola Parkway between Bee Canyon Access Road and State Route 133 (SR-133) in the County of Orange. The Crean Lutheran High School Athletic Complex is located between Portola Parkway and the toe of the existing dam. Residential neighborhoods are located on the southwest side of Portola Parkway. The ground surrounding the reservoir is hilly with ridgelines and terraced slopes.

1.2 Existing Site Conditions

The existing engineered dam is comprised of compacted on-site geologic materials, approximately 59 feet high, with a crest length of 843 feet and width of 10 to 12 feet. The surface area of the existing reservoir is approximately 28 acres when filled to capacity, and the current capacity of the reservoir below the existing spillway crest is approximately 535 acre-feet (AF). The 2011 topography survey of the dam indicates its crest is at an elevation of 387.7 feet above mean sea level (amsl).

The existing dam spillway was constructed as a 12-foot wide, broad-crested weir, located at the left abutment of the dam with a crest at 380 feet amsl. The reservoir would not receive water from rivers or streams. The reservoir includes a small watershed that is approximately 205 acres and not capable of generating significant amounts of runoff that need to be managed through the use of the spillway.

1.3 Project Description

The proposed project primarily involves the expansion of three on-site facilities: Syphon Reservoir Dam, Syphon Reservoir, and the Syphon Treatment Facilities. Other operational design features would include an internal seepage control system within the new engineered dam; a circulation/aeration system for the reservoir; new onsite access and maintenance roads; a wetland mitigation area; and potential recreational facilities.

The delivery of recycled water to and from Syphon Reservoir would be accomplished with existing offsite facilities. Modifications to offsite facilities would be limited to the addition of pumps within the existing structures as further described below. Existing offsite conveyance facilities would be used to deliver tertiary-treated recycled water from the Michelson WRP to the Eastwood Recycled Water Pump Station, and then to Syphon Reservoir via an existing 36-inch recycled water pipeline. The pump station structure is currently under construction. When completed, the Eastwood Recycled Water Pump Station can accommodate the Syphon Reservoir Improvement Project with additional pump equipment. Installation of the additional pump equipment would be coordinated as a separate "equipping project" in parallel to the construction of the proposed Syphon Reservoir

improvements. The existing Highline Canal would be abandoned in place and no longer used to deliver water to Syphon Reservoir from IRWD's Rattlesnake Reservoir. Under normal operating conditions, all flow out of Syphon Reservoir would be conveyed back to Eastwood Recycled Water Pump Station through the same 36-inch recycled water pipeline, for connection to IRWD's recycled water distribution system.

1.3.1 Dam Replacement

The proposed project would replace the existing engineered dam with a new engineered dam, which would be an earth-fill embankment with upstream and downstream slopes. Onsite materials would be obtained from excavation of the existing earthen embankment dam and spillway, excavation below the new dam footprint and borrow excavations within the existing and proposed reservoir area. The proposed project would require an estimated 2.3 million cubic yards of fill, of which approximately 2.2 million cubic yards would be available onsite. Approximately 0.1 million cubic yards (100,000 cubic yards) of material would be imported from offsite sources, including rock, gravel and other materials required to construct portions of the dam. Similar to the existing dam, it is a requirement of the California Department of Water Resources, Division of Safety of Dams requirements that a spillway be included with the new dam to protect the reservoir from overtopping. The new spillway would be constructed and lined with reinforced concrete to prevent erosion of the abutment and embankment materials.

1.3.2 Reservoir Enlargement

The replacement dam would increase the reservoir's capacity from approximately 500 AF to approximately 5,000 AF. The existing reservoir ground surface would be excavated non-uniformly to obtain approximately 2.2 million cubic yards of material to construct the new engineered dam.

A new approximately 42-inch inlet/outlet conduit would be constructed to connect two proposed inlet/outlet ports along the north-facing reservoir slope to the existing onsite 36-inch inlet/outlet pipeline that ends near the toe of the existing dam. Similar to the existing reservoir, the proposed project would require a water circulation/aeration system to maintain water quality within the reservoir. The water circulation/aeration system will be detailed during final design, but would likely consist of a compressed air distribution system or surface mixer/aeration system.

1.3.3 Treatment Facilities

The existing strainer and disinfection facilities would be demolished, reconstructed and expanded at the toe of the new dam to provide filtration, chlorination and de-chlorination facilities (treatment facilities). The treatment facilities could be constructed at one of two locations, both of which are located close to the toe of the existing dam. The layout would consist of an enclosed masonry building. The footprint of the proposed treatment facilities would be determined during the detailed design, but is anticipated to be approximately 40 feet by 160 feet. A masonry block wall building would house the storage tanks, metering pumps, and control system.

1.3.4 Access and Maintenance Roads

The primary access point for construction traffic and future IRWD operation and maintenance is anticipated to be from the intersection at Portola Parkway and Sand Canyon Avenue. As part of the proposed project, the existing intersection and associated traffic lights would be modified to allow construction and future IRWD access through the intersection into the District's property. Construction vehicles and IRWD vehicles would also leave the site through the same intersection. Cross walks and associated pedestrian signals would also be modified to allow safe pedestrian crossing in both directions.

An unpaved road currently exists on the District's property in the vicinity of the intersection at Portola Parkway and Sand Canyon Avenue, which was used to access and maintain the existing Highline Canal. As part of the proposed project, this dirt road would be utilized and improved to allow two lanes (one in each direction) for ingress and egress for the construction and IRWD operation traffic. As part of the access road improvements, it is anticipated that excavation into the existing slope and construction of a retaining wall may be necessary to allow trucks to make the left turn onto the existing highline canal road after passing through the intersection. Potential secondary construction access may be considered through existing IRWD maintenance roads off of Bee Canyon Access Road. If used, these roads would be considered as one-way access points and limited to specific construction activities as further determined during the detailed design phase.

1.3.5 On-Site Wetland and Riparian and Mitigation Areas

At least 12.3 acres of riparian/wetland habitat consisting of native woody riparian vegetation and freshwater marsh habitat is proposed to be established onsite to replace habitat displaced by construction. Both freshwater marsh and woody riparian vegetation are proposed to be placed within a large patch at the northeast end of the proposed reservoir. Also, much of the woody riparian replacement habitat would be situated within a strip that would extend around the proposed reservoir at the same elevation as the planned water surface elevation when the reservoir is full. A shallow trough would be constructed around the reservoir perimeter (excluding the dam face), which would support native trees and shrubs (e.g., willows, mulefat, etc.) forming a belt of riparian vegetation around the upper edge of the artificial lake. In addition to reserving a strip around the edge of the expanded reservoir for woody riparian habitat, an approximately 6- to 8-acre wetland area would also be established within a flat area extending northeast of the expanded reservoir.

1.3.6 Recreational Facilities

During project design, IRWD would consider passive recreational facilities compatible with the project site. Recreational facilities could include a walking trail along existing access roads at the project site. This proposed walking trail could be located in the south and west portions of the project site, beginning at the new permanent access road at Portola Parkway and Sand Canyon Avenue and traveling along that route, across the dam crest, and following the alignment of the existing Highline Canal, which would be abandoned with implementation of the proposed project. Offsite recreational facilities are not part of this project and would be analyzed under separate environmental review if/when future offsite recreational facilities are established. Final design

would determine the appropriateness and location of the proposed walking trail on existing access roads and any other optional recreational facilities.

1.3.7 Additional Geotechnical Investigations

IRWD previously completed a comprehensive geotechnical investigation of the site from which the resulting data would be used during final design to develop the detailed construction documents. During the design phase, additional geotechnical investigations may need to be performed. If additional investigations are deemed necessary, the investigations may include the performance of exploratory test pits, soil borings, packer testing, and/or non-intrusive geologic investigations and observations. The additional geotechnical investigations, if needed, would remain within the proposed limits of disturbance defined by the project and would be mitigated as part of the overall project.

1.3.8 Technical Advisory Group

During the design phase, IRWD intends to establish an independent Technical Advisory Group (TAG) comprised of nationally recognized industry experts in the disciplines of dam geology/site characterization, seismic analysis, hydrology/hydraulics, dam construction, and potential failure mode analysis and RIDM. The purpose of the TAG is to provide an independent assessment of the design development including, but not limited to, review of design criteria, design details, technical approach, and other aspects of the design engineer's work to confirm the project design is in full compliance with governing standards and requirements.

1.4 Project Construction

Construction of the proposed project is estimated to require a total of 41 months. The preconstruction activities would begin in the fall of 2022 and would involve approximately 5 months of access road improvements. Preconstruction would be followed by approximately 36 months for construction of the new dam, reservoir, and associated facilities, depending on weather conditions and other variables. Construction is currently anticipated to begin in 2023. Most construction activities would be limited to 7:00 a.m. to 7:00 p.m. Monday through Friday and 9:00 am to 6:00 p.m. on Saturday. If construction work is conducted outside of these hours, IRWD would secure a variance/waiver from the appropriate entity. Construction of the proposed project would include activities implemented in phases as outlined below, which may involve overlap. Construction of the proposed project would include activities implemented in phases as outlined below in **Table 1**, which may involve overlap.

TABLE 1
CONSTRUCTION SCHEDULE

Phases	Start Date	End Date
Preconstruction Activities		
Drain Reservoir[a]	9/12/2022	2/24/2023
Vegetation Clearing	9/12/2022	11/4/2022
Access Routes/Intersection Improvements	9/12/2022	1/27/2023
Excavation of Sediment/Existing Dam		
Mobilization, site prep/Staging Areas	1/30/2023	3/24/2023
Upstream Excavation and Foundation Treatment	3/27/2023	8/11/2023
Dam Excavation and Foundation Treatment	8/14/2023	11/3/2023
Construction of Dam/Spillway/Reservoir		
Install Inlet/Outlet	9/25/2023	11/10/2023
Install Embankment to Bottom of Blanket Drain	11/13/2023	1/5/2024
Install Blanket Drain	1/8/2024	3/29/2024
Install Chimney/Remaining Embankment	4/1/2024	2/28/2025
Spillway Construction	12/9/2024	4/25/2025
Construction of Filtration/Chlor/Dechlor Facility	3/3/2025	1/30/2026
Wetlands/Riparian Installation	3/3/2025	5/23/2025
Installation of Recreation Facilities	4/2/2025	7/18/2025
Demobilization	2/2/2026	3/13/2026

Notes:
a) This phase was not modeled as it is remote activity that requires no on-site work.

Source: IRWD, 2020

1.5 Air Quality and Greenhouse Gas Fundamentals

1.5.1 Air Quality

Criteria Pollutants

Elevated concentrations of certain air pollutants in the atmosphere have been recognized to cause notable health problems and consequential damage to the environment either directly or in reaction with other pollutants. In the United States, such pollutants have been identified and are 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 pertaining to them. The USEPA established the National Ambient Air Quality Standards (NAAQS) to "provide public health protection, including protecting the health of 'sensitive' populations such as asthmatics, children, and the elderly," (USEPA 2016a) allowing "an adequate margin of safety" (42 USC Section 7409;

CAA Section 109). California Ambient Air Quality Standards (CAAQS) were "established to protect the health of the most sensitive groups in our communities" and "defines the maximum amount of a pollutant averaged over a specified period of time that can be present in outdoor air without any harmful effects on people or the environment" (CARB 2020a). NAAQS and CAAQS for each of the monitored pollutants and their effects on health are discussed below.

Ozone: 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 certain 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 2019a). 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 2019a).

Long-term exposure to ozone is linked to aggravation of asthma and is likely to be one of many causes of asthma development. Long-term exposures to higher concentrations of ozone may also be linked to permanent lung damage, such as abnormal lung development in children (USEPA 2019a). 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 2020b).

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 2019a). 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 2019a). 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 2020b). 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 (CARB 2020b). Further research may be able to better distinguish between health effects in children and adults (CARB 2020b).

Volatile Organic Compounds: VOCs are organic chemical compounds of carbon and are not "criteria" air pollutants themselves; however, in combination with NO_X they form ozone, and are regulated to prevent the formation of ozone (USEPA 2017a). According to CARB, some VOCs are highly reactive and play a critical role in the formation of ozone. Potential health effects of ozone

exposure are discussed above. Other VOCs can result in adverse health effects from direct exposure and are classified by the State of California as toxic air contaminants or Hazardous Air Pollutants (HAPs) by the USEPA (CARB 2020c; USEPA 2018a). The health effects of VOCs, as Toxic Air contaminants/Hazardous Air Pollutants (TACs/HAPs), are discussed more thoroughly below.

VOCs are typically formed from combustion of fuels and/or released through evaporation of organic liquids. Fuel combustion can occur in internal combustion sources, such as motor vehicle usage, landscape and other portable equipment, and stationary generators, or external combustion, such as for water and space heating. Evaporation sources include fueling operations, consumer products (e.g., cleaning solutions), and architectural coatings (USEPA 2017b).

Nitrogen Dioxide (NO_2) and Nitrogen Oxide: NO_X is a term that refers to a group of compounds containing nitrogen and oxygen. As mentioned above, NO_X combines with VOCs to form ozone. The health effects associated with the formation of ozone were discussed above under Ozone. The primary compounds of air quality concern include NO_2 and nitric oxide (NO). Ambient air quality standards have been promulgated for NO_2, which is a reddish-brown, reactive gas (CARB 2020d).

The principal 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. Major sources of NO_X include emissions from cars, trucks and buses, power plants, and off-road equipment. 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 2016b). According to CARB, controlled human exposure studies that show that NO_2 exposure can intensify responses to allergens in allergic asthmatics (CARB 2020d).

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 2020d). 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 while in adults, the greatest risk is to people who have chronic respiratory diseases, such as asthma and chronic obstructive pulmonary disease (CARB 2020d).

CARB states that much of the information on distribution in air, human exposure and dose, and health effects is specifically for NO_2 and there is only limited information for NO and NO_X, as well as large uncertainty in relating health effects to NO or NO_X exposure (CARB 2020d).

Carbon Monoxide (CO): 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 2020e).

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 2016c). 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 2016c). 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 2016c).

According to CARB, the most common effects of CO exposure are fatigue, headaches, confusion, and dizziness due to inadequate oxygen delivery to the brain (CARB 2020e). For people with cardiovascular disease, short-term CO exposure can further reduce their body's already compromised ability to respond to the increased oxygen demands of exercise, exertion, or stress; inadequate oxygen delivery to the heart muscle leads to chest pain and decreased exercise tolerance (CARB 2020e). 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 (CARB 2020e).

Sulfur Dioxide (SO_2): According to the USEPA, the largest source of 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 emission include industrial processes such as extracting metal from ore; natural sources such as volcanoes; and locomotives, ships and other vehicle and heavy equipment that burn fuel with a high sulfur content (USEPA 2019b). 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 2019b). 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 parts per million [ppm]) results in increased incidence of pulmonary symptoms and disease, decreased pulmonary function, and increased risk of mortality (CARB 2020f). 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 2020f; USEPA 2019b).

Particulate Matter (PM10 and PM2.5): Particulate matter air pollution is a mixture of solid particles and liquid droplets found in the air (USEPA 2018b). 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 2018b). Particles are defined by their diameter for air quality regulatory purposes: inhalable particles with diameters that are generally 10 micrometers and smaller (PM10); inhalable particles with diameters that are 2.5 micrometers or less (PM2.5) (USEPA 2018b). 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 2020g). Sources of PM2.5 emissions include combustion of gasoline, oil, diesel fuel, or wood (CARB 2020g). 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 2020g).

According to CARB, both PM10 and PM2.5 can be inhaled, with some depositing throughout the airways; PM10 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 2020g). 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 2020g). 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 2020g).

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 2020g). 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, children, and asthmatics. Children and infants are more susceptible to harm from inhaling pollutants such as PM10 and PM2.5 compared to healthy adults because they inhale more air per pound of body weight than do adults, spend more time outdoors, and have developing immune systems (CARB 2020g).

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 2017c). 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 2017c).

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 2017c). 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 2020h). 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 2020h).[1]

Other Criteria Pollutants (California Only)

The California Ambient Air Quality Standards 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 202a). With respect to the State-identified criteria pollutants (i.e., sulfates, hydrogen sulfide, visibility reducing particles, and vinyl chloride), the 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 SO_2 emissions. Both particulate matter and SO_2 are included in the emissions estimates for the project. A description of the health effects of the State-identified criteria air pollutants is provided below.

Sulfates (SO_4^{2-}): Sulfates in the environment occur as a result of SO_2 (sulfur dioxide) being converted to SO_4^{2-} compounds in the atmosphere where sulfur is first oxidized to SO_2 during the combustion process of sulfur containing, petroleum-derived fuels (e.g., gasoline and diesel fuel) (CARB 2020i). Exposure to SO_4^{2-}, which are part of PM2.5, results in health effects similar to those from exposure to PM2.5 including reduced lung function, aggravated asthmatic symptoms, and increased risk of emergency department visits, hospitalizations, and death in people who have chronic heart or lung diseases (CARB 2020i). Population groups with higher risks of experiencing adverse health effects with exposure to SO_4^{2-} include children, asthmatics, and older adults who have chronic heart or lung diseases (CARB 2020i).

Hydrogen Sulfide (H_2S): H_2S is a colorless gas with a strong odor of rotten eggs. The most common sources of H_2S emissions are oil and natural gas extraction and processing, and natural emissions from geothermal fields. Industrial sources of H_2S include petrochemical plants and kraft paper mills. H_2S is also formed during bacterial decomposition of human and animal wastes, and is present in emissions from sewage treatment facilities and landfills (CARB 2020j). Exposure to H_2S can induce tearing of the eyes and symptoms related to overstimulation of the sense of smell, including headache, nausea, or vomiting; additional health effects of eye irritation have only been reported with exposures greater than 50 ppm, which is considerably higher than the odor threshold (CARB 2020j). H_2S is regulated as a nuisance based on its odor detection level; if the standard were based on adverse health effects, it would be set at a much higher level (CARB 2020j). According

[1] While the SCAQMD CEQA Air Quality Handbook contains a thresholds of significance of significance for lead, project construction and operation would not include sources of lead emissions and would not exceed the thresholds of significance for lead. Unleaded fuel and unleaded paints have virtually eliminated lead emissions from commercial land use projects such as the Project. As a result, lead emissions are not further evaluated.

to CARB, there are insufficient data available to determine whether or not some groups are at greater risk than others (CARB 2020j).

Visibility-Reducing Particles: Visibility-reducing particles are any particles in the atmosphere that obstruct the range of visibility by creating haze (CARB 2020k). These particles vary in shape, size and chemical composition, and come from a variety of natural and manmade sources including windblown metals, soil, dust, salt, and soot. Other haze-causing particles are formed in the air from gaseous pollutant (e.g., sulfates, nitrates, organic carbon particles) which are the major constituents of fine PM, such as PM2.5 and PM10, and are caused from the combustion of fuel. CARB's standard for visibility reducing particles is not based on health effects, but rather on welfare effects, such as reduced visibility and damage to materials, plants, forests, and ecosystems. The health impacts associated with PM2.5 and PM10 are discussed above under Particulate Matter.

Vinyl Chloride: Vinyl chloride is a colorless gas with a mild, sweet odor. Most vinyl chloride is used to make polyvinyl chloride (PVC) plastic and vinyl products and are generally emitted from industrial processes and other major sources of vinyl chloride have been detected near landfills, sewage plants, and hazardous waste sites, due to microbial breakdown of chlorinated solvents (CARB 2020l). Short-term health of effects of exposure to high levels of vinyl chloride in the air include central nervous system effects, such as dizziness, drowsiness, and headaches while long-term exposure to vinyl chloride through inhalation and oral exposure causes liver damage and has been shown to increase the risk of angiosarcoma, a rare form of liver cancer in humans (CARB 2020l). Most health data on vinyl chloride relate to carcinogenicity; thus, the people most at risk are those who have long-term exposure to elevated levels, which is more likely to occur in occupational or industrial settings; however, control methodologies applied to industrial facilities generally prevent emissions to the ambient air (CARB 2020l).

Air Toxics

Toxic Air Contaminants (TACs): TACs, or hazardous air pollutants (HAPs) as defined by the USEPA, are defined as those contaminants that are known or suspected to cause serious health problems, but do not have a corresponding ambient air quality standard (USEPA 2017d). For consistency within this document they will be referred to as TACs. TACs are also defined as an air pollutant that may increase a person's risk of developing cancer and/or other serious health effects. TACs are emitted by a variety of industrial processes such as petroleum refining, electric utility and chrome plating operations, commercial operations such as gasoline stations and motor vehicle exhaust. TACs may exist as PM10 and PM2.5 or as vapors (gases). TACs include metals, other particles, gases absorbed by particles, and certain vapors from fuels and other sources. The emission of a TAC does not automatically create a health hazard. Other factors, such as the amount of the TAC, its toxicity, how it is released into the air, the weather, and the terrain, all influence whether the emission could be hazardous to human health. Emissions of TACs into the air can be damaging to human health and to the environment. Human exposure to TACs at sufficient concentrations and durations can result in cancer, poisoning, and rapid onset of sickness, such as nausea or difficulty in breathing. Other less measurable effects include immunological, neurological, reproductive, developmental, and respiratory problems. TACs deposited onto soil or into lakes and streams affect ecological systems and eventually human health through consumption of contaminated food. The carcinogenic potential of TACs is a particular public health concern because many scientists

currently believe that there is no "safe" level of exposure to carcinogens. Any exposure to a carcinogen poses some risk of contracting cancer (CARB 2020m).

The public's exposure to TACs is a significant public health issue in California. The Air Toxics "Hotspots" Information and Assessment Act is a State law requiring facilities to report emissions of TACs to air districts (CARB 2020n). The program is designated to quantify the amounts of potentially HAPs released, the location of the release, the concentrations to which the public is exposed, and the resulting health risks. The State Air Toxics Program (AB 2588) identified over 200 TACs, including the 188 TACs identified in the Clean Air Act (CAA) (CARB 2020m).

The USEPA has assessed this expansive list and identified 21 TACs as Mobile Source Air Toxics (MSATs) (USEPA 2004). MSATs are compounds emitted from highway vehicles and non-road equipment. Some toxic compounds are present in fuel and are emitted to the air when the fuel evaporates or passes through the engine unburned. Other toxics are emitted from the incomplete combustion of fuels or as secondary combustion products. Metal air toxics also result from engine wear or from impurities in oil or gasoline. USEPA also extracted a subset of these 21 MSAT compounds that it now labels as the nine priority MSATs: 1,3-butaidene, acetaldehyde, acrolein, benzene, diesel particulate matter (DPM)/diesel exhaust organic gases, ethylbenzene, naphthalene, and polycyclic organic matter (POM). While these nine MSATs are considered the priority transportation toxics, USEPA stresses that the lists are subject to change and may be adjusted in future rules (USDOT 2016).

Diesel Exhaust: According to the California Almanac of Emissions and Air Quality, the majority of the estimated health risks from TACs can be attributed to relatively few compounds, the most important being particulate matter from the exhaust of diesel-fueled engines, i.e., DPM (CARB 2020o). DPM differs from other TACs in that it is not a single substance, but rather a complex mixture of hundreds of substances.

Diesel exhaust is composed of two phases, gas and particle, and both phases contribute to the health risk. The gas phase is composed of many of the urban HAPs, such as acetaldehyde, acrolein, benzene, 1,3-butadiene, formaldehyde and polycyclic aromatic hydrocarbons. The particle phase is also composed of many different types of particles by size or composition. Fine and ultra-fine diesel particulates are of the greatest health concern and may be composed of elemental carbon with adsorbed compounds such as organic compounds, sulfate, nitrate, metals and other trace elements. Diesel exhaust is emitted from a broad range of diesel engines; the on-road diesel engines of trucks, buses and cars and the off-road diesel engines that include locomotives, marine vessels and heavy-duty equipment. Although DPM is emitted by diesel-fueled internal combustion engines, the composition of the emissions varies depending on engine type, operating conditions, fuel composition, lubricating oil, and whether an emission control system is present.

The most common exposure to DPM is breathing air that contains diesel exhaust. The fine and ultra-fine particles are respirable (similar to PM2.5), which means that they can avoid many of the human respiratory system defense mechanisms and enter deeply into the lung. Exposure to DPM comes from both on-road and off-road engine exhaust that is either directly emitted from the engines or lingering in the atmosphere.

Diesel exhaust causes health effects from long-term chronic exposures. The type and severity of health effects depends upon several factors including the amount of chemical exposure and the duration of exposure. Individuals also react differently to different levels of exposure. There is limited information on exposure to only DPM, but there is enough evidence to indicate that inhalation exposure to diesel exhaust causes chronic health effects as well as having cancer-causing potential.

Because it is part of PM2.5, DPM also contributes to the same non-cancer health effects as PM2.5 exposures. These effects include premature death, hospitalizations and emergency department visits for exacerbated chronic heart and lung disease, including asthma, increased respiratory symptoms, and decreased lung function in children. Several studies suggest that exposure to DPM may also facilitate development of new allergies. Those most vulnerable to non-cancer health effects are children whose lungs are still developing and the elderly who often have chronic health problems (CARB 2020o).

1.5.2 Greenhouse Gases

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) 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 is the subject of significant and rapidly evolving regulatory efforts at the federal and state levels of government.

GHGs are compounds in the Earth's atmosphere that play a critical role in determining temperature near the Earth's surface. 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 that otherwise is radiated back from the Earth towards space, resulting in a warming of the atmosphere.

Not all GHGs possess the same capacity to induce atmospheric warming; as a result, the warming contribution of a GHG is commonly quantified in the common unit of carbon dioxide equivalent (CO_2e) over a 100-year period, by applying the appropriate global warming potential (GWP) value.[2] By using the applicable GWP for each GHG, Project-related emissions can be tabulated in the common unit of metric tons per year CO_2e. GWP ratios are provided by the Intergovernmental Panel on Climate Change (IPCC). Historically, GHG emission inventories were calculated using the GWPs from the IPCC's Second Assessment Report (SAR), published in 1996. The IPCC has since updated the GWP values based on the latest science in its Fourth Assessment Report (IPCC AR4) and Fifth Assessment Report (IPCC AR5), published in 2007 and 2014, respectively (IPCC

[2] GWPs and associated CO_2e values were developed by the 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 AR4. The CARB reports GHG emission inventories for California using the GWP values from the IPCC AR4.

2007; IPCC 2014). California Air Resources Board (CARB) uses the AR4 GWPs in the statewide GHG emissions inventory, in the current Climate Change Scoping Plan, and in the current version of the California Emissions Estimator Model (CalEEMod®) that is used to calculate CO_2e values for construction as well as operations for existing and proposed project build-out conditions. Compounds that are regulated as GHGs are discussed below (CARB 2019; CARB 2017a; CAPCOA 2017).

Carbon Dioxide (CO_2): CO_2 is the most abundant anthropogenic 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. CO_2 accounted for approximately 83 percent of anthropogenic GHG emissions (CO_2e) in California in 2016.

Methane (CH_4): CH_4 is emitted from biogenic sources (i.e., resulting from the activity of living organisms), incomplete combustion in forest fires, anaerobic decomposition of organic matter in landfills, manure management, and leaks in natural gas pipelines. The GWP of CH_4 is 25 in the IPCC AR4. CH_4 accounted for approximately 9 percent of anthropogenic GHG emissions (CO_2e) in California in 2016.

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 298 in the IPCC AR4. N_2O emissions accounted for approximately 3 percent of anthropogenic GHG emissions (CO_2e) in California in 2016.

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 GWPs of HFCs range from 124 for HFC-152a to 14,800 for HFC-23 in the IPCC AR4. HFCs and PFCs (see below) combined accounted for approximately 5 percent of anthropogenic GHG emissions (CO_2e) in California in 2016.

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 7,390 to 17,700 in the IPCC AR4.

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 22,800 in the IPCC AR4. SF_6 emissions accounted for less than 1 percent of anthropogenic GHG emissions (CO_2e) in California in 2016.

Effects of Global Climate Change

The scientific community's understanding of the fundamental processes responsible for global climate change has improved over the past decade, and its predictive capabilities are advancing. However, there remain scientific uncertainties in, for example, predictions of local effects of climate change, occurrence, frequency, and magnitude of extreme weather events, effects of

aerosols, changes in clouds, shifts in the intensity and distribution of precipitation, and changes in oceanic circulation. Due to the complexity of and inability to accurately model Earth's climate system, the uncertainty surrounding climate change may never be completely eliminated. Nonetheless, the IPCC's AR5 states that it is extremely likely that the dominant cause of the observed warming since the mid-20th century is the anthropogenic increase in GHG concentrations (IPCC 2014). A report from the National Academy of Sciences concluded that 97 to 98 percent of the climate researchers most actively publishing in the field support the tenets of the IPCC in that climate change is very likely caused by human (i.e., anthropogenic) activity (Anderegg 2010).

The IPCC's AR4, found that the potential impacts in California due to global climate change include: loss in snow pack; sea-level rise; more extreme heat days per year; more high ozone days; more extreme forest fires; more severe droughts punctuated by extreme precipitation events; increased erosion of California's coastlines and sea water intrusion into the Sacramento and San Joaquin Deltas and associated levee systems; and increased pest infestation (OPR 2018). The Fourth Assessment's findings are consistent with climate change studies published by the California Natural Resources Agency (CNRA) since 2009, starting with the *California Climate Adaptation Strategy* as a response to the Governor's Executive Order S-13-2008. In 2014, the CNRA rebranded the first update of the 2009 adaptation strategy as the *Safeguarding California Plan* (CNRA 2009; CNRA 2014). The 2018 update to *Safeguarding California Plan* identifies hundreds of ongoing actions and next steps state agencies are taking to safeguard Californians from climate impacts within a framework of 81 policy principles and recommendations (CNRA 2018).

In 2016, the CNRA released *Safeguarding California: Implementation Action Plans* in accordance with Executive Order B-30-15, identifying a lead agency to lead adaptation efforts in each sector. In accordance with the 2009 *California Climate Adaptation Strategy*, the California Energy Commission (CEC) was directed to develop a website on climate change scenarios and impacts that would be beneficial for local decision makers. The website, known as Cal-Adapt, became operational in 2011 (Cal-adapt 2020). The information provided on the Cal-Adapt website represents a projection of potential future climate scenarios comprised of local average values for temperature, sea-level rise, snowpack and other data representative of a variety of models and scenarios, including potential social and economic factors.

Below is a summary of some of the potential effects that could be experienced in California as a result of global warming and climate change.

Temperature Increase

The primary effect of adding GHGs to the atmosphere has been a rise in the average global temperature. The impact of human activities on global temperature is readily apparent in the observational record. Since 1895, the contiguous United States has observed an average temperature increase of 1.5°F per century (NOAA 2019). The 5-year period between 2014 and 2018) is the warmest on record for the contiguous United States (NOAA 2019). The average temperature for the contiguous United States was 52.7 degrees Fahrenheit placing it at 0.7 degrees higher than the 20th century average and ranking 2019 within the warmest third of the 125 years of record with the 20 warmest years have occurred over the past 22-year period (NOAA 2020).

The Fourth Assessment indicates that average temperatures in California could rise 5.6°F to 8.8°F by the end of the century, depending on the global trajectory of GHG emissions (OPR 2018). According to the Cal-Adapt website, the portion of the state in which the project site is located could result in an average increase in temperature of approximately 4.2° to 6.9°F by 2070–2090, compared to the baseline period of 1961–1990.

With climate change, extreme heat conditions and heat waves are predicted to impact larger areas, last longer, and have higher temperatures. Heat waves, defined as three or more days with temperatures above 90°F, are projected to occur more frequently by the end of the century. Extreme heat days and heat waves can negatively impact human health. Heat-related illness includes a spectrum of illnesses ranging from heat stress, cardiovascular and respiratory complications, kidney disease, to severe heat exhaustion and life-threatening heat stroke (C2ES n.d.).

Wildfires

The hotter and dryer conditions expected with climate change will make forests more susceptible to extreme wildfires. One study found that, if GHG emissions continue to rise, the frequency of extreme wildfires burning over approximately 25,000 acres would increase by nearly 50 percent, and the average area burned statewide each year would increase by 77 percent, by the year 2100. In the areas that have the highest fire risk, wildfire insurance is estimated to see costs rise by 18 percent by 2055 and the fraction of property insured would decrease (Westerling 2018).

Air Quality

Higher temperatures, conducive to air pollution formation, could worsen air quality in California and make it more difficult for the state to achieve air quality standards. Climate change may increase the concentration of ground-level ozone in particular, which can cause breathing problems, aggravate lung diseases such as asthma, emphysema, chronic bronchitis, and cause chronic obstructive pulmonary disease but the magnitude of the effect, and therefore, its indirect effects, are uncertain. Emissions from wildfires can lead to excessive levels of particulate matter, ozone, and volatile organic compounds (Kenward 2013). Additionally, severe heat accompanied by drier conditions and poor air quality could increase the number of heat-related deaths, illnesses, and asthma attacks throughout the state (USEPA 2017e).

Precipitation and Water Supply

There is a high degree of uncertainty with respect to the overall impact of global climate change on future water supplies in California. Studies indicate considerable variability in predicting precise impacts of climate change on California hydrology and water resources. Increasing uncertainty in the timing and intensity of precipitation will challenge the operational flexibility of California's water management systems. Warmer, wetter winters would increase the amount of runoff available for groundwater recharge; however, this additional runoff would occur at a time when some basins are either being recharged at their maximum capacity or are already full. Conversely, reductions in spring runoff and higher evapotranspiration because of higher temperatures could reduce the amount of water available for recharge (CNRA 2014).

Hydrology and Sea-Level Rise

As discussed above, climate changes could potentially affect: the amount of snowfall, rainfall and snowpack; the intensity and frequency of storms; flood hydrographs (flash floods, rain or snow events, coincidental high tide and high runoff events); sea-level rise and coastal flooding; coastal erosion; and the potential for saltwater intrusion. Sea-level rise can be a product of global warming through two main processes: expansion of seawater as the oceans warm, and melting of ice over land. A rise in sea levels could result in coastal flooding and erosion and could jeopardize California's water supply. Sea level could rise as much as 2 feet along most of the U.S. coastline. Increased storm intensity and frequency could affect the ability of flood-control facilities, including levees, to handle storm events (CNRA 2014).

Agriculture

California has a massive agricultural industry that represents 11.3 percent of total US agricultural revenue. Higher CO_2 levels can stimulate plant production and increase plant water-use efficiency. However, a changing climate presents significant risks to agriculture due to "potential changes to water quality and availability; changing precipitation patterns; extreme weather events including drought, severe storms, and floods; heat stress; decreased chill hours; shifts in pollinator lifecycles; increased risks from weeds, pest and disease; and disruptions to the transportation and energy infrastructure supporting agricultural production (CNRA 2014)."

Ecosystems and Wildlife

Increases in global temperatures and the potential resulting changes in weather patterns could have ecological effects on a global and local scale. Increased concentrations of GHGs are likely to accelerate the rate of climate change. Scientists expect that the average global surface temperature could rise by 2–11.5°F (1.1–6.4°C) by 2100, with significant regional variation (NRC 2010). Soil moisture is likely to decline in many regions, and intense rainstorms are likely to become more frequent. With climate change, ecosystems and wildlife will be challenged by the spread of invasive species, barriers to species migration or movement in response to changing climatic conditions, direct impacts to species health, and mismatches in timing between seasonal life-cycle events such as species migration and food availability (CNRA 2014).

1.6 Regulatory Framework

This section provides a summary of pertinent federal, State, and local statutes, regulations, plans, and policies that have been adopted that address air quality.

1.6.1 Federal

Clean Air Act

The 1963 CAA was the first federal legislation regarding air pollution control and has been amended numerous times in subsequent years, with the most recent amendments occurring in 1990. At the federal level, USEPA is responsible for implementation of certain portions of the CAA including mobile source requirements.

The CAA establishes federal air quality standards and specifies future dates for achieving compliance. The CAA also mandates that the State submit and implement a State Implementation Plan (SIP) for areas not meeting these standards. SIPs must include pollution control measures that demonstrate how the NAAQS will be met. The 1990 amendments to the CAA identify specific emission reduction goals for areas not meeting the NAAQS. These amendments require both a demonstration of reasonable further progress toward attainment and incorporation of additional sanctions for failure to attain or to meet interim milestones. The sections of the CAA that are most applicable to the proposed project include Title I (Nonattainment Provisions).

Title I requirements are implemented for the purpose of attaining NAAQS for the following criteria air pollutants: ozone; NO_2; CO; SO_2; PM10; and lead. 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 revoking the annual PM10 threshold. **Table 2** shows the NAAQS currently in effect for each criteria air pollutant.

In *Massachusetts v. Environmental Protection Agency*, 549 U.S. 497 (2007), twelve states and cities, including California, together with several environmental organizations, sued to require the USEPA to regulate GHGs as pollutants under the CAA. The United States Supreme Court ruled that GHGs fit within the CAA's definition of a pollutant and the USEPA had the authority to regulate GHGs.

TABLE 2
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]
ozone [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)		—	—	

Pollutant	Average Time	California Standards [a]		National Standards [b]		
		Concentration[c]	Method[d]	Primary[c,e]	Secondary[c,f]	Method[g]
SO_2 [j]	1 Hour	0.25 ppm (655 µg/m^3)	Ultraviolet Fluorescence	75 ppb (196 µg/m^3)	—	Ultraviolet Fluorescence; Spectro-photometry (Pararosaniline Method)[9]
	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 ten miles or more due to particles when relative humidity is less than 70 percent.		**No Federal Standards**		
Sulfates (SO_4)	24 Hour	25 µg/m^3	Ion Chroma-tography	**No Federal Standards**		
Hydrogen Sulfide	1 Hour	0.03 ppm (42 µg/m^3)	Ultraviolet Fluorescence	**No Federal Standards**		
Vinyl Chloride [l]	24 Hour	0.01 ppm (26 µg/m^3)	Gas Chroma-tography	**No Federal Standards**		

- [a] California standards for ozone, carbon monoxide (except 8-hour Lake Tahoe), sulfur dioxide (1 and 24 hour), nitrogen dioxide, and particulate matter (PM10, PM2.5, 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 PM2.5, 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 U.S. EPA. An “equivalent method” of measurement may be used but must have a “consistent relationship to the reference method” and must be approved by the U.S. EPA.
- [h] On October 1, 2015, the national 8-hour ozone primary and secondary standards were lowered from 0.075 to 0.070 ppm.

Pollutant	Average Time	California Standards [a]		National Standards [b]		
		Concentration[c]	Method[d]	Primary[c,e]	Secondary[c,f]	Method[g]

- [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.
- [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 PM2.5 primary standard was lowered from 15 µg/m^3 to 12.0 µg/m^3.
- [l] CARB 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 3-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, CARB 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.

SOURCE: CARB 2016a; CARB 2020a-c; CARB 2020d-l

On December 7, 2009, the USEPA Administrator signed two distinct findings regarding GHGs under CAA section 202(a):

- **Endangerment Finding:** The current and projected concentrations of the six key GHGs—CO_2, CH_4, N_2O, HFCs, PFCs, and SF_6—in the atmosphere threaten the public health and welfare of current and future generations.
- **Cause or Contribute Finding:** The combined emissions of these GHGs from new motor vehicles and new motor vehicle engines contribute to the GHG pollution that threatens public health and welfare.

These findings did not, by themselves, impose any requirements on industry or other entities. However, these actions were a prerequisite for implementing GHG emissions standards for motor vehicles.

On-Road Vehicle Rules

Heavy-Duty Vehicles

GHG emissions and fuel efficiency standards for medium- and heavy-duty trucks have been jointly developed by the USEPA and the National Highway Traffic Safety Administration (NHTSA). For vocational vehicles, which consist of a variety of work vehicles including dump trucks, the Phase 1 Heavy-Duty Vehicle Greenhouse Gas Regulation started with model year 2014 and the standard requires up to a 10 percent reduction in CO_2 emissions by model year 2017 over the 2010 baseline. The Phase 2 standards start in model year 2021 and require the phase-in of a 12 to 24 percent reduction in CO_2 emission reduction from vocational vehicles by model year 2027 over the 2017 baseline.

Light-Duty Vehicles

In August 2018, the USEPA and NHTSA proposed the Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule that would, if adopted, maintain the CAFE and CO_2 standards applicable in model

year 2020 for model years 2021 through 2026. The estimated CAFE and CO_2 standards for model year 2020 are 43.7 mpg and 204 grams of CO_2 per mile for passenger cars and 31.3 mpg and 284 grams of CO_2 per mile for light trucks, projecting an overall industry average of 37 mpg, as compared to 46.7 mpg under the standards issued in 2012. In September 2019, the USEPA published the final rule in the Federal Register (Federal Register, Vol. 84, No. 188, Friday, September 27, 2019, Rules and Regulations, 51310-51363). The USEPA also published the final rule for the One National Program on Federal Preemption of State Fuel Economy Standards that finalizes critical parts of the SAFE Vehicles Rule and makes clear that federal law preempts state and local tailpipe GHG emissions standards as well as zero emission vehicle (ZEV) mandates. In November 2019, California and 23 other states, environmental groups, and the cities of Los Angeles and New York, filed a petition with the U.S. Court of Appeals for the District of Columbia Circuit, for the EPA to reconsider the published rule. On March 31, 2020, USEPA and NHTSA issued the SAFE Vehicles Rule, setting fuel economy and carbon dioxide standards that increase 1.5 percent in stringency each year from model years 2021 through 2026 (see 85 Federal Register 24174). On February 8, 2021, the United States Court of Appeals for the District of Columbia Circuit issued an order granting the Biden Administration's motion to stay litigation over Part 1 of SAFE Rule. Consistent with President Biden's executive order on Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis, USEPA and NHTSA are now evaluating whether and how to replace the SAFE Rule.

1.6.2 State

California has promulgated a series of executive orders, laws, and regulations aimed at reducing both the level of air pollutants and GHGs in the atmosphere and emissions of pollutants from commercial and private activities within the state. The major components of California's initiatives are reviewed below.

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. The CAAQS are established to protect the health of the most sensitive groups and apply to the same criteria air pollutants as the federal CAA and also includes State-identified criteria air pollutants, which are sulfates, visibility-reducing particles, hydrogen sulfide, and vinyl chloride (CARB 2020a). Table 2, provided above, shows the CAAQS currently in effect for each of the federally identified criteria air pollutants as well as state recognized pollutants, such as sulfates, visibility-reducing particles, hydrogen sulfide, and vinyl chloride.

California Greenhouse Gas Reduction Targets

Through executive order, California governors have established long-term GHG reduction goals for the state.

Executive Order S-3-05

On June 1, 2005, Governor Schwarzenegger announced Executive Order S-3-05, which established the following GHG emission reduction targets:

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

Executive Order B-30-15

On April 29, 2015, Governor Brown issued Executive Order B-30-15, in which, the Governor:

- 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; and
- Directed CARB to update the Climate Change Scoping Plan to express the 2030 target in terms of million metric tons of carbon dioxide equivalent.

California Health and Safety Code, Division 25.5 – California Global Warming Solutions Act of 2006 (AB 32)

Following the issuance of Executive Order S-3-05, in 2006, the California State Legislature adopted the California Global Warming Solutions Act of 2006 (passed as Assembly Bill [AB] 32 and codified in the California Health and Safety Code [HSC], Division 25.5), which focuses on reducing GHG emissions in California to 1990 levels by 2020. HSC Division 25.5 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 HSC Division 25.5, CARB has the primary responsibility for reducing GHG emissions. CARB is required to adopt rules and regulations directing state actions that would achieve GHG emissions reductions equivalent to 1990 statewide levels by 2020.

Senate Bill 32

In 2016, Senate Bill (SB) 32 and its companion bill AB 197, augmented AB 32 and amended HSC Division 25.5, establishing a new climate pollution reduction target of 40 percent below 1990 levels by 2030 and including provisions to ensure the benefits of state climate policies reach into disadvantaged communities.

2008 and 2014 Climate Change Scoping Plans

A specific requirement of AB 32 was the preparation of a Climate Change Scoping Plan for achieving the maximum technologically feasible and cost-effective GHG emission reduction by 2020. CARB developed and approved the initial Scoping Plan in 2008, outlining the regulations, market-based approaches, voluntary measures, policies, and other emission reduction programs that would be needed to meet the 2020 statewide GHG emission limit and initiate the transformations needed to achieve the state's long-range climate objectives (CARB 2008).

The First Update to the Scoping Plan was approved by CARB in May 2014 and built upon the initial Scoping Plan with new strategies and recommendations. In 2014, CARB revised the target using the GWP values from the IPCC AR4 and determined that the 1990 GHG emissions inventory and 2020 GHG emissions limit is 431 million metric tons of carbon dioxide equivalents ($MMTCO_2e$). CARB also updated the state's 2020 emissions estimate to account for the effect of the 2007–2009 economic recession, new estimates for future fuel and energy demand, and the reductions required by regulation that were adopted for motor vehicles and renewable energy (CARB 2014).

2017 Climate Change Scoping Plan Update

In response to SB 32 and the 2030 GHG reduction target, CARB approved the 2017 Climate Change Scoping Plan Update (2017 Scoping Plan Update) in December 2017 (CARB 2017a). The 2017 Scoping Plan Update outlines the proposed framework of action for achieving the 2030 GHG target of 40 percent reduction in GHG emissions relative to 1990 levels (CARB 2017a). The 2017 Scoping Plan Update identifies key sectors of the state's implementation strategy, which includes improvements in low-carbon energy, industry, transportation sustainability, natural and working lands, waste management, and water. Through a combination of data synthesis and modeling, CARB determined that the target statewide 2030 emissions limit is 260 $MMTCO_2e$, and that further commitments will need to be made to achieve an additional reduction of 50 $MMTCO_2e$ beyond current policies and programs. The cornerstone of the 2017 Scoping Plan Update is an expansion of the Cap-and-Trade Program (discussed further below) to meet the aggressive 2030 GHG emissions goal and ensure achievement of the 2030 limit set forth by E.O. B-30-15.

The 2017 Scoping Plan Update's strategy for meeting the state's 2030 GHG target incorporates the full range of legislative actions and state-developed plans that have relevance to the year 2030, including the following, described elsewhere in this section:

- Extending the low-carbon fuel standard (LCFS) beyond 2020 and increasing the carbon intensity reduction requirement to 18 percent by 2030;
- SB 350, which increases the Renewables Portfolio Standard (RPS) to 50 percent by 2030 and requires the CEC to establish annual targets for statewide energy efficiency savings and demand reduction that will achieve a cumulative doubling of statewide energy efficiency savings in electricity and natural gas final end uses of retail customers by 2030. These targets may be achieved through energy efficiency savings and demand reductions from a variety of programs, including but not limited to appliance and building energy efficiency standards and a comprehensive program to achieve greater energy efficiency standards in existing buildings;
- The 2016 Mobile Source Strategy is estimated to reduce emissions from mobile sources including an 80 percent reduction in smog-forming emissions and a 45 percent reduction in diesel particulate matter from 2016 levels in the Air Basin, a 45 percent reduction in statewide GHG emissions (from both on-road and off-road mobile sources) and a 50 percent reduction in statewide consumption of petroleum-based fuels;
- The Sustainable Freight Action Plan to improve freight efficiency and transition to zero emission freight handling technologies (described in more detail below);
- SB 1383, which requires a 50 percent reduction in anthropogenic black carbon and a 40 percent reduction in hydrofluorocarbon and methane emissions below 2013 levels by 2030; and

- AB 398, which extends the state Cap-and-Trade Program through 2030.

In the 2017 Scoping Plan Update, CARB recommends statewide targets of no more than six MT CO_2e per capita by 2030 and no more than two metric tons CO_2e per capita by 2050. CARB acknowledges that because the statewide per capita targets are based on the statewide GHG emissions inventory that includes all emissions sectors in the state (including large industrial sources covered under the state's cap and trade program), they are not applicable for use at the local level. Rather, it is appropriate for local jurisdictions to derive evidence-based local per-capita goals based on local emissions sectors and growth projections.

To demonstrate how a local jurisdiction can achieve their long-term GHG goals at the community plan level, CARB recommends developing a geographically specific GHG reduction plan (i.e., climate action plan) consistent with the requirements of CEQA Guidelines section 15183.5(b). A so-called "CEQA-qualified" GHG reduction plan, once adopted, can provide local governments with a streamlining tool for project-level environmental review of GHG emissions, provided there are adequate performance metrics for determining project consistency with the plan. Absent conformity with such a plan, CARB recommends "that projects incorporate design features and GHG reduction measures, to the degree feasible, to minimize GHG emissions. Achieving no net additional increase in GHG emissions, resulting in no contribution to GHG impacts, is an appropriate overall objective for new development (CARB 2017a)."

On-Road and Off-Road Vehicle and Equipment Rules

Heavy-Duty Vehicles and Equipment

In 2004, CARB adopted an Airborne Toxic Control Measure to limit heavy-duty diesel motor vehicle idling in order to reduce public exposure to diesel PM and other TACs. 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 5 minutes at any given time.

In 2008 CARB approved the Truck and Bus Regulation to reduce NO_X, PM10, and PM2.5 emissions from existing diesel vehicles operating in California. The requirements were amended in December 2010 and apply to nearly all diesel fueled trucks and busses with a gross vehicle weight rating greater than 14,000 pounds. For the largest trucks in the fleet (i.e., those with a gross vehicle weight rating greater than 26,000 pounds), there are two methods to comply with the requirements. The first method is for the fleet owner to retrofit or replace engines, starting with the oldest engine model year, to meet 2010 engine standards, or better. This is phased over eight years, starting in 2015 and would be fully implemented by 2023, meaning that all trucks operating in the State subject to this option would need to meet or exceed the 2010 engine emission standards for NO_X and PM by 2023. The second option, if chosen, requires fleet owners, starting in 2012, to retrofit a portion of their fleet with diesel particulate filters achieving at least 85 percent removal efficiency, so that by January 1, 2016, their entire fleet is equipped with diesel particulate filters. However, diesel particulate filters do not typically lower NO_X emissions. Thus, fleet owners choosing the second method must still comply with the 2010 engine emission standards for their trucks and busses by 2020. Beginning January 1, 2020, this requirement is enforced by the California Department of Motor Vehicles (DMV). Senate Bill 1 (SB1), the Road Repair and Accountability Act of 2017, was

signed into law on April 28, 2017. SB1 authorizes the DMV to check that vehicles are compliant with or exempt from CARB's Truck and Bus Regulation. Effective January 1, 2020, if a vehicle is not compliant with the rule, DMV will no longer register that vehicle.

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. The regulation adopted by CARB on July 26, 2007, aims to reduce emissions by installation of diesel soot filters and encouraging the retirement, replacement, or repower of older, dirtier engines with newer emission-controlled models. Implementation is staggered based on fleet size (which is the total of all off-road horsepower under common ownership or control), with the largest fleets to begin compliance by January 1, 2014. Each fleet must demonstrate compliance through one of two methods. The first option is to calculate and maintain fleet average emissions targets, which encourages the retirement or repowering of older equipment and rewards the introduction of newer cleaner units into the fleet. The second option is to meet the Best Available Control Technology (BACT) requirements by turning over or installing Verified Diesel Emission Control Strategies (e.g., engine retrofits) on a certain percentage of its total fleet horsepower. The compliance schedule requires that BACT turn overs or retrofits be fully implemented by 2023 in all equipment in large and medium fleets and across 100 percent of small fleets by 2028.

Light-Duty Vehicles

In 2002, Governor Davis signed AB 1493 (Pavley), which required CARB to set GHG emission standards for passenger vehicles, light duty trucks, and other vehicles whose primary use is non-commercial personal transportation manufactured in and after 2009. Because the Pavley standards (named for the bill's author, state Senator Fran Pavley) would impose stricter standards than those under the CAA, California applied to the USEPA for a waiver under the CAA. In 2009, the USEPA granted the waiver. The waiver has been extended consistently since 2009; however, in 2018 the USEPA and NHTSA indicated their intent to revoke California's waiver, and prohibit future state emissions standards enacted under the CAA. In response to the Federal SAFE Vehicles Rules and the One National Program on Federal Preemption of State Fuel Economy Standards, in November 2019 California and 23 other states, environmental groups, and the cities of Los Angeles and New York, filed a petition with the U.S. Court of Appeals for the District of Columbia Circuit, for the EPA to reconsider the published rule. As noted above, consistent with President Biden's executive order on Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis, USEPA and NHTSA are now evaluating whether and how to replace the SAFE Rule.

Low Carbon Fuel Standard

In January 2007, Governor Schwarzenegger enacted Executive Order S-01-07, which mandates that the state: (1) establish a statewide goal to reduce the carbon intensity of California's transportation fuels by at least 10 percent by 2020; and (2) adopt a Low Carbon Fuel Standard (LCFS) for transportation fuels in California. The overall goal of the LCFS is to lower the carbon intensity of California transportation fuel. The 2017 Scoping Plan Update calls for the LCFS to reduce fuel carbon intensity by at least 18 percent by 2030. In September 2018, CARB extended

the LCFS program to 2030, making significant changes to the design and implementation of the Program including a doubling of the carbon intensity reduction to 20 percent by 2030.

Energy Sector

Title 24 Building Energy Efficiency Standards

CCR Title 24 establishes California's Building Energy Efficiency Standards; Part 11 is referred to as the California Green Building Standards (CALGreen) Code. The purpose of the CALGreen Code is to "improve public health, safety and general welfare by enhancing the design and construction of buildings through the use of building concepts having a positive environmental impact and encouraging sustainable construction practices in the following categories: (1) planning and design; (2) energy efficiency; (3) water efficiency and conservation; (4) material conservation and resource efficiency; and (5) environmental air quality (CBSC 2010)." In 2016, the CALGreen Code was updated to include new mandatory measures for residential and nonresidential buildings, and the new measures took effect on January 1, 2017. The CALGreen Code was most recently updated in 2018 with new measures taking effect on January 1, 2020 (CBSC 2019).

1.6.3 Regional

South Coast Air Quality Management District

SCAQMD has jurisdiction over air quality planning for all of County of Orange, Los Angeles County except for the Antelope Valley, the non-desert portion of western San Bernardino County, and the western and Coachella Valley portions of Riverside County. The Air Basin is a subregion within SCAQMD jurisdiction. While air quality in the Air Basin has improved, the Air Basin requires continued diligence to meet the air quality standards.

SCAQMD adopted a "Policy on Global Warming and Stratospheric Ozone Depletion" on April 6, 1990. The policy commits 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:

- 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). Within its October 2008 document, SCAQMD proposed the use of a percent emission reduction target to determine significance for commercial/residential projects that emit greater than 3,000 metric tons of carbon dioxide equivalents ($MTCO_2e$) per year. On December 5, 2008, the SCAQMD Governing Board adopted the staff proposal for an interim GHG significance

threshold for stationary source/industrial projects where SCAQMD is the lead agency. However, SCAQMD did not adopt a GHG significance threshold for land use development projects (e.g., mixed-use/commercial projects) and formed a GHG Significance Threshold Working Group to further evaluate potential GHG significance thresholds. This Working Group has been inactive since 2011 and SCAQMD has not formally adopted any GHG significance threshold guidance for land use development projects.

Air Quality Management Plan

SCAQMD has adopted a series of AQMPs to meet the CAAQS and NAAQS, the 2012 and the 2016 AQMPs. While the 2016 AQMP is the most recent and was adopted by SCAQMD and CARB, it has not received full USEPA approval for inclusion in the SIP. Therefore, until such time as the 2016 AQMP is completely approved by the USEPA, the 2012 AQMP remains the applicable AQMP; however, this analysis considers both the 2012 and 2016 AQMPs as appropriate.

The 2012 AQMP includes a comprehensive strategy aimed at controlling pollution from all sources, including stationary sources, and on-road and off-road mobile sources. It highlights the significant amount of emission reductions needed and the urgent need to identify additional strategies, especially in the area of mobile sources, to meet all federal criteria air pollutant standards within the timeframes allowed under the CAA (SCAQMD 2013).

The key undertaking of the 2012 AQMP is to bring the Air Basin into attainment with the NAAQS for the 24-hour PM2.5 standard. It also intensifies the scope and pace of continued air quality improvement efforts toward meeting the 2024 8-hour ozone standard deadline with new measures designed to reduce reliance on the CAA section 182(e)(5) long-term measures for NO_X and VOC reductions. SCAQMD expects exposure reductions to be achieved through implementation of new and advanced control technologies as well as improvement of existing technologies.

The SCAQMD Governing Board adopted the 2016 AQMP on March 3, 2017 (SCAQMD 2017a). CARB approved the 2016 AQMP on March 23, 2017. Key elements of the 2016 AQMP include implementing fair-share emissions reductions strategies at the federal, state, and local levels; establishing partnerships, funding, and incentives to accelerate deployment of ZE and near-zero-emissions (NZE) technologies; and taking credit from co-benefits from greenhouse gas, energy, transportation and other planning efforts (SCAQMD 2017a). The strategies included in the 2016 AQMP are intended to demonstrate attainment of the NAAQS for the national non-attainment pollutants ozone and PM2.5 (SCAQMD 2018). The strategies that are particularly relevant to the project include the following:

MOB-08 – Accelerated Retirement of Older On-Road Heavy-Duty Vehicles: This measure seeks to replace up to 2,000 heavy-duty vehicles per year with newer or new vehicles that at a minimum, meet the 2010 on-road heavy-duty NO_X exhaust emissions standard of 0.2 grams per brake horsepower-hour (g/bhp-hr).

MOB-10 – Extension of the SOON Provision for Construction/Industrial Equipment: This measure continues the Surplus Off-Road Option for NO_X (SOON) provision of the Statewide In-Use Off-Road Fleet Vehicle Regulation through the 2031 timeframe.

Air Quality Guidance Documents

SCAQMD's CEQA guidelines are voluntary initiatives recommended for consideration by local planning agencies. The *CEQA Air Quality Handbook* (Handbook) published by SCAQMD provides local governments with guidance for analyzing and mitigating project-specific air quality impacts (SCAQMD 1993). SCAQMD is currently updating some of the information and methods in the Handbook, such as the screening tables for determining the air quality significance of a project and the on-road mobile source emission factors. While this process is underway, SCAQMD recommends using other approved models to calculate emissions from land use projects, such as CalEEMod (SCAQMD 2020a).

The SCAQMD *Guidance Document for Addressing Air Quality Issues in General Plans and Local Planning* considers impacts to air quality sensitive receptors from TAC-emitting facilities (SCAQMD 2005). SCAQMD's siting distance recommendations are the same as those provided by CARB (e.g., a 500-foot siting distance for air quality sensitive receptors proposed in proximity to freeways and high-traffic roads).

The SCAQMD Final Localized Significance Threshold Methodology and Final Methodology to Calculate Particulate Matter (PM) 2.5 and PM2.5 Significance Thresholds provides guidance when evaluating the localized effects of emissions in the CEQA evaluation (SCAQMD 2008b; SCAQMD 2006). These guidance documents were promulgated by the SCAQMD Governing Board as a tool to assist lead agencies to analyzed localized impacts associated with project-specific level proposed projects. The guidance documents establish mass emission rate "look up tables" as significance thresholds for projects that are five acres or less. For projects that are larger than five acres, such as the proposed project, it is recommended that project-specific air quality dispersion modeling is completed to determine localized air quality.

Toxic Air Contaminants

At the local level, air pollution control or management districts may adopt and enforce CARB control measures. Under SCAQMD Regulation XIV (Toxics and Other Non-Criteria Pollutants), and in particular Rule 1401 (New Source Review), all sources that possess the potential to emit TACs are required to obtain permits from SCAQMD. Permits may be granted to these operations if they are constructed and operated in accordance with applicable regulations, including new source review standards and air toxics control measures. SCAQMD limits emissions and public exposure to TACs through a number of programs. SCAQMD prioritizes TAC-emitting stationary sources based on the quantity and toxicity of the TAC emissions and the proximity of the facilities to sensitive receptors.

In 2000, The Air Toxics Control Plan (revised in 2004) examined the overall direction of SCAQMD's air toxics control program. It includes development and implementation of strategic initiatives to monitor and control air toxics emissions. Control strategies that are deemed viable and are within SCAQMD's jurisdiction will each be brought to the SCAQMD Board for further consideration through the normal public review process. Strategies that are to be implemented by other agencies will be developed in a cooperative effort, and the progress will be reported back to the Board periodically.

In 2015, SCAQMD completed the Multiple Air Toxics Exposure Study IV (MATES IV) (SCAQMD 2015a), which is a monitoring and evaluation study conducted in the Air Basin. MATES IV is a follow up to the 2008 MATES III study and consists of several elements including a monitoring program, an updated emissions inventory of toxic air contaminants, and a modeling effort to characterize risk across the Air Basin (SCAQMD 2008c). MATES IV focuses on the carcinogenic risk from exposure to air toxics. However, it does not estimate mortality or other health effects from particulate exposures. SCAQMD is currently in the process of updating the MATES studies series with MATES V; however, the analysis has not yet been completed.

Rules and Regulations

The SCAQMD has adopted many rules and regulations to regulate sources of air pollutant emission sin the Air Basin. With respect to GHG emissions, the proposed project may be subject to the following SCAQMD rules and regulations. While the focus of these rules and regulations are on criteria pollutants and toxic air contaminants, they would nonetheless control GHG emissions as co-benefits:

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, using chemical stabilizers and/or ceasing all activities. Finally, a contingency plan may be required if so determined by USEPA. As a large site, the proposed project would also be required to comply with subsection (e) of Rule 403 which includes additional requirements for large operations.

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 proposed 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. The following is a list of rules which may apply to the proposed project:

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 engine greater than 50 brake horsepower 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.

Southern California Association of Governments

The Southern California Association of Governments (SCAG) is the Metropolitan Planning Organization for the region in which the County of Orange and City of Irvine are located. In May 2020, SCAG adopted the *2020-2045 Regional Transportation Plan/Sustainable Communities Strategy* (RTP/SCS), also referred to as *ConnectSoCal*, which is an update to the previous 2016-2040 RTP/SCS (SCAG 2020).

The 2020-2045 RTP/SCS provides a vision for transportation throughout the region for the next several decades by considering the role of transportation in the broader context of economic, environmental, and quality-of-life goals for the future, identifying regional transportation strategies to address mobility needs. The 2020-2045 RTP/SCS describe how the region can attain the GHG emission-reduction targets set by CARB by achieving an 8 percent reduction in per capita transportation GHG emissions by 2020 and a 19 percent reduction in per capita transportation GHG emissions by 2035 compared to the 2005 level on a per capita basis. Compliance with and implementation of the 2020-2045 RTP/SCS policies and strategies would have co-benefits of reducing per capita criteria air pollutant emissions (e.g. nitrogen dioxide, carbon monoxide, etc.) associated with reduced per capita vehicle miles traveled (VMT) (SCAG 2020).

1.6.4 Local

Local jurisdictions, such as the County of Orange (County) and the City of Irvine (City), have the authority and responsibility to reduce air pollution and GHG emissions through their land use decision-making authority.

Orange County General Plan

The County is responsible for the assessment and mitigation of pollutant emissions resulting from its land use decisions. The County's General Plan Resource Element sets forth the goals, objectives, and policies which guide the County in its implementation of its air quality improvement programs and strategies. A number of these goals, objectives, and policies are relevant to the proposed project, and relate to minimizing particulate emissions from construction activities, managing traffic congestion during peak hours, and increasing energy efficiency in private developments.

The Resource Element establishes the following air quality goal pertaining to the proposed project: Promote optimum sustainable environmental quality standards for air resources.

The Resource Element establishes the following goal pertaining to the proposed project's energy use: Goal 3: Maximize the conservation of energy resources in all future land use and transportation planning decisions.

City of Irvine General Plan

The City is responsible for the assessment and mitigation of pollutant emissions resulting from its land use decisions. The City's General Plan Energy Element sets forth the objectives and policies which guide the City in its implementation of its energy improvement programs and strategies. Reduction of energy use results in a reduction in GHG emissions and therefore is relevant to the GHG analysis. The Energy Element establishes the following objectives pertaining to the proposed project energy use: Goal I-1: Maximize energy efficiency through land use and transportation planning.

1.7 Environmental Setting

1.7.1 Regional Air Quality

The Air Basin's meteorological conditions, in combination with regional topography, are conducive to the formation and retention of ozone. 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 2017a). The worst air pollution conditions throughout the Air Basin typically occur from June through September.

California Health and Safety Code section 39607(e) requires CARB to establish and periodically review area designation criteria. As shown in **Table 3**, the Air Basin is designated under federal or State ambient air quality standards as nonattainment for ozone, PM10, and fine particulate matter PM2.5. It is noteworthy to mention that air quality in the Air Basin has improved substantially over

the years, primarily due to the impacts of air quality control programs at the federal, State and local levels. The ozone and PM levels have fallen significantly compared to the worst years and are expected to continue to trend downward in the future despite increases in the economy and population in the Air Basin.

With respect to the State-identified criteria air pollutants (sulfates, hydrogen sulfide, visibility reducing particles, and vinyl chloride) present in Table 3, the proposed project would either not use these pollutants in the day to day operations or during construction and therefore would not have emissions of those pollutants (hydrogen sulfide, vinyl chloride, and lead), or such emissions would be accounted for as part of the pollutants estimated in this analysis (visibility reducing particles are associated with particulate matter emissions, and sulfates are associated with SO_2). Vinyl chloride is used in the process of making PVC plastic and vinyl products and is primarily emitted from industrial processes (CARB 2020l). Vinyl chloride would not be emitted directly during operations or during construction; therefore, there would be no project emissions of vinyl chloride. In addition, CARB determined there is not sufficient scientific evidence available to support the identification of a threshold exposure level for vinyl chloride, therefore, CARB does not monitor or make status designations for this pollutant (CARB 2020p).

TABLE 3
SOUTH COAST AIR BASIN ATTAINMENT STATUS (ORANGE COUNTY)

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

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] Partial Non-attainment designation – Los Angeles County portion of the Air Basin only for near-source monitors. Orange County is designated as attainment.

[c] 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.

SOURCE: USEPA 2020a; CARB 2020q.

As detailed in the AQMP, the major sources of air pollution in the Air Basin are divided into four major source classifications: point and area stationary sources, and on-road and off-road mobile sources. Point and area sources are the two major subcategories of stationary sources (SCAQMD 2017a). 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, restaurant charbroilers 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). The main source associated with the proposed project is mobile source use during construction activities.

1.7.2 Local Air Quality

Existing Ambient Air Quality

SCAQMD maintains monitoring stations within district boundaries that monitor air quality and compliance with associated ambient standards. The project area is located in the Inland County of Orange general forecast area and specifically within the Saddleback Valley source receptor area. Currently, the nearest monitoring station to the project area is the Mission Viejo Station (26081 Via Pera Mission Viejo, CA 92691 – SCAQMD Station Number 3812). This station monitors ambient concentrations of CO, ozone, PM10 and PM2.5. The nearest monitoring station that monitors for NO_2 is the Anaheim station (SRA 17, Central County of Orange Station Number 3176). There are no stations within the Inland County of Orange general forecast area that monitor for SO_2. Historical data of ambient ozone, NO_2, CO, PM10 and PM2.5 concentrations from these monitoring stations for the most recent three years of available data (2017–2019) are shown in **Table 4**.

TABLE 4
AMBIENT AIR QUALITY IN THE PROJECT VICINITY

Pollutant/Standard [a]	2017	2018	2019
Ozone, (1-hour) – Mission Viejo			
Maximum Concentration (ppm)	0.103	0.121	0.106
Days > CAAQS (0.09 ppm)	3	2	3
Ozone, (8-hour) – Mission Viejo			
Maximum Concentration (ppm)	0.083	0.088	0.087
4th High 8-hour Concentration (ppm)	0.082	0.074	0.082
Days > CAAQS (0.070 ppm)	25	9	11
Days > NAAQS (0.070 ppm)	25	9	11
Nitrogen Dioxide, NO_2 (1-hour) - Anaheim			
Maximum Concentration (ppm)	0.081	0.066	0.059
Days > CAAQS (0.18 ppm)	0	0	0
98th Percentile Concentration (ppm)	0.064	0.055	0.049
Days > NAAQS (0.100 ppm)	0	0	0
Nitrogen Dioxide, NO_2 (Annual)			
Annual Arithmetic Mean (0.030 ppm)	0.014	0.014	0.013

Pollutant/Standard [a]	2017	2018	2019
Carbon Monoxide, CO (1-hour) – Mission Viejo			
Maximum Concentration (ppm)	1.4	1.2	1.0
Days > CAAQS (20 ppm)	0	0	0
Days > NAAQS (35 ppm)	0	0	0
Carbon Monoxide, CO (8-hour)			
Maximum Concentration (ppm)	0.9	0.09	0.8
Days > CAAQS (9.0 ppm)	0	0	0
Days > NAAQS (9 ppm)	0	0	0
Respirable Particulate Matter, PM10 (24-hour) – Mission Viejo			
Maximum Concentration (µg/m^3)	58	55	45
Samples > CAAQS (50 µg/m^3)	1	1	0
Samples > NAAQS (150 µg/m^3)	0	0	0
Respirable Particulate Matter, PM10 (Annual)			
Annual Arithmetic Mean (20 µg/m^3)	18.4	19.0	16.6
Fine Particulate Matter, PM2.5 (24-hour) – Mission Viejo			
Maximum Concentration (µg/m^3)	19.5	20.80	20.80
98th Percentile Concentration (µg/m^3)	15.0	18.50	14.70
Samples > NAAQS (35 µg/m^3)	0	0	0
Fine Particulate Matter, PM2.5 (Annual)			
Annual Arithmetic Mean (12 µg/m^3)	8.11	8.31	7.11

[a] ppm = parts per million; µg/m^3 = micrograms per cubic meter

SOURCE: SCAQMD 2020b.

Existing Area Health Risk

Between July 2012 and June 2013, the SCAQMD conducted the Multiple Air Toxics Exposure Study IV (MATES IV), which focuses on the carcinogenic risk from exposure to air toxics. The MATES IV Final Report was issued in May 2015. The study, based on actual monitored data throughout the Air Basin, consisted of several elements, which included a monitoring program, an updated emissions inventory of TACs, and a modeling effort to characterize carcinogenic risk across the Air Basin from exposure to TACs. As part of the MATES IV study, the SCAQMD has prepared a series of maps that show regional trends in estimated outdoor inhalation cancer risk from toxic emissions, as part of an ongoing effort to provide insight into relative risks. The maps represent the estimated number of potential cancers per million people associated with a lifetime of breathing air toxics (24 hours per day outdoors for 70 years). The background potential cancer risk per million people in the proposed project area using the updated Office of Environmental Health Hazard Assessment (OEHHA) methodology is estimated at 587 in one million (compared to an overall Air Basin-wide risk of 1,023 in one million for the average of 10 fixed monitoring sites) (SCAQMD 2015b). Generally, the risk from air toxics is lower near the coastline and increases inland, with higher risks concentrated near large diesel sources (e.g., freeways, airports, and ports).

Existing Site Emissions

The existing Syphon Reservoir activities result in negligible mobile source emissions from maintenance trips and current recreational activities. The number of maintenance and recreational

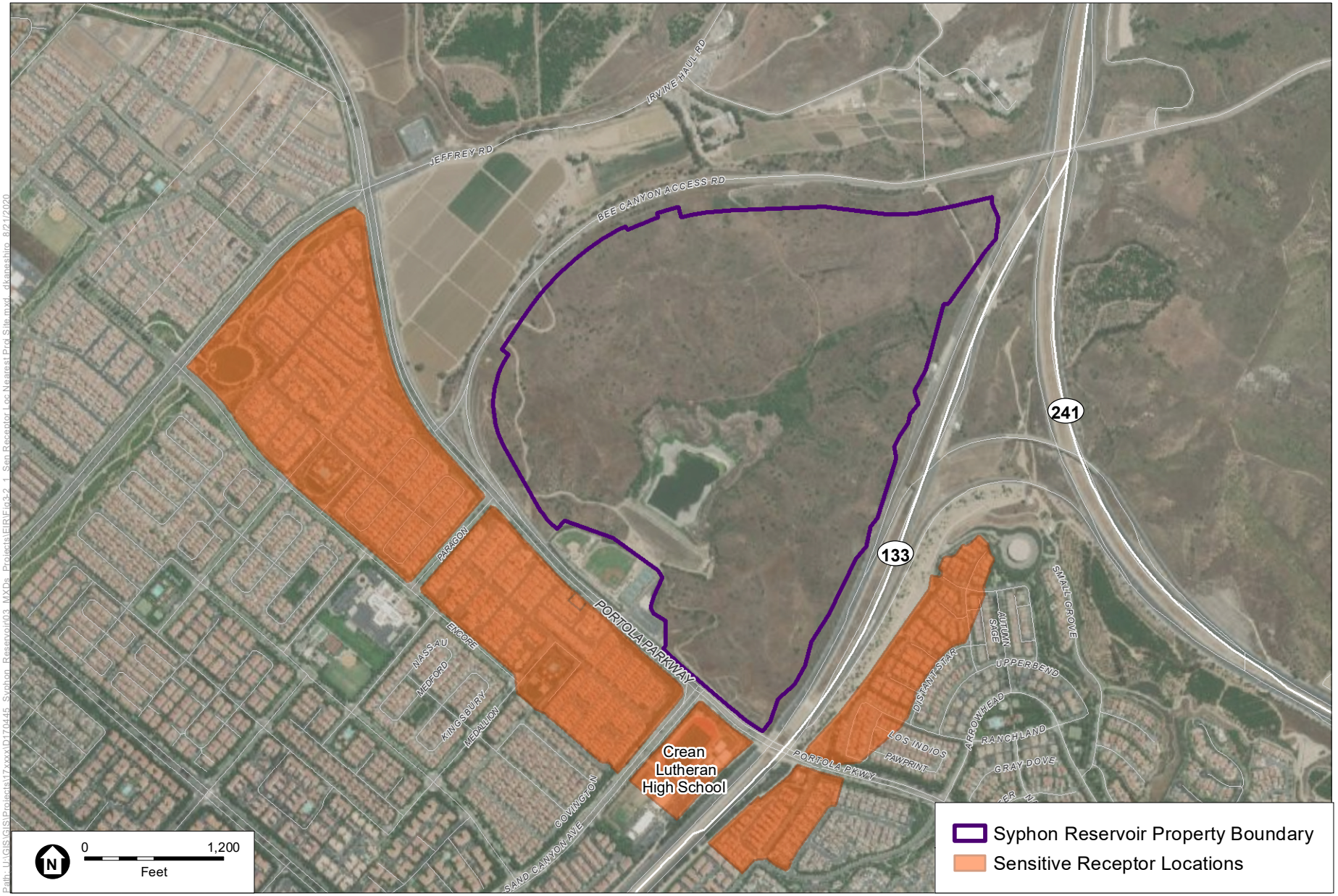
trips are nominal and are not anticipated to change with the improvements to the reservoir. Therefore, existing emissions were not modeled, and the proposed project's air quality emissions would all be considered new emissions.

Sensitive Receptors and Locations

Certain population groups, such as children, elderly, and acutely and chronically ill persons (especially those with cardio-respiratory diseases), are considered more sensitive to the potential effects of air pollution than others. As a result, certain land uses that are occupied by these population groups, such as residences, hospitals and schools, are considered to be air quality-sensitive land uses. The proposed project site is bordered to the north and west by predominantly open space, agricultural (including a residence), and commercial/industrial uses. The proposed project site is bordered to the south by Portola Parkway with residential and school land uses directly south. The proposed project is bordered to the east by SR-133 followed by residential land uses. The nearest land uses are the residential neighborhoods approximately 180 feet southwest of the intersection of Portola Parkway and Sand Canyon Ave, which is the proposed project site entrance. The Crean Lutheran High School is located approximately 140 feet southeast of the project site at the intersection of Portola Parkway and San Canyon Road.[3] Residences to the east of SR-133 are approximately 1,000 feet from onsite construction activities. Sensitive receptor locations are shown **Figure 1**.

All other air quality-sensitive uses are located at greater distances from the proposed project site and would experience lower air pollutant impacts from potential sources of pollutants from the proposed project site due to atmospheric dispersion effects.

[3] While the Crean Lutheran High School Athletic Complex is located adjacent to the project site area, the athletic complex itself is not considered a sensitive receptor as it would only be occupied for a limited amount of time, similar to that of a local gym, park, or other commercial establishment. The majority of student time would be spent at the main school site and therefore that would be the closest school associated sensitive receptor.



SOURCE: ESA, 2019; ESRI, 2019.

Syphon Reservoir Improvement Project

Figure 1
Sensitive Receptor Locations Nearest to the Project Site

ESA

1.7.3 Greenhouse Gases

Global Emissions Inventory

Global GHG estimates are based on country inventories developed as part of programs of the United Nations Framework Convention on Climate Change (UNFCCC). Worldwide man-made emissions of GHGs were approximately 49 billion metric tons CO_2e in 2010, including ongoing emissions from industrial and agricultural sources and emissions from land use changes (e.g., deforestation). Emissions of CO_2, primarily from fossil fuel use and industrial processes, account for 76 percent of total GHG (CO_2e) emissions. Methane emissions account for 16 percent and N_2O emissions for 6.2 percent. For comparison, worldwide emissions of GHGs in 1970 were 27 billion metric tons of CO_2e per year (IPCC 2014).

United States Emissions Inventory

In 2018, the United States emitted about 6,677 million metric tons (MMT) of CO_2e, with 75.4 percent of those emissions coming from fossil fuel combustion. Of the major sectors nationwide, transportation accounts for the highest amount of GHG emissions (approximately 28 percent), followed by electricity (27 percent), industry (22 percent), agriculture (10 percent), commercial and residential buildings (12 percent) (. Between 1990 and 2018, total US GHG emissions rose by 3.7 percent, but emissions have generally decreased since peaking in 2005. GHG emissions in 2018 are approximately 10 percent below 2005 levels. Since 1990, U.S. emissions of GHGs have increased at an average annual rate of 0.2 percent; however, GHG emissions have been decreasing at an average annual rate of 0.7 percent since 2005 (USEPA 2020b).

California Greenhouse Gas Emissions Inventory

CARB compiles GHG inventories for the state. Based on the 2017 GHG inventory data (i.e., the latest year for which data are available from CARB), California emitted 424 $MMTCO_2e$ including emissions resulting from imported electrical power (CARB 2019). CARB's 2017 statewide inventory indicated that California's net GHG emissions in 2017 were 7 $MMTCO_2e$ below 1990 levels, which is the 2020 GHG reduction target codified in AB 32. The overall trends in the inventory demonstrate that the carbon intensity of California's economy is declining and has decreased by 41 percent from 2001 peak emissions while increasing the gross domestic product (GDP) by 52 percent (CARB 2019).[4] The GDP grew 3.6 percent in 2017 while emissions per GDP declined by 4.5 percent compared to 2016. **Table 5** identifies and quantifies statewide anthropogenic GHG emissions and sinks (e.g., carbon sequestration due to forest growth) in 1990 and 2017. As shown in the table, the transportation sector is the largest contributor to statewide GHG emissions at approximately 40 percent (CARB 2019).

[4] Carbon intensity of California's economy is the amount of carbon pollution per million dollars of gross domestic product.

TABLE 5
STATE OF CALIFORNIA GREENHOUSE GAS EMISSIONS

Category	Total 1990 Emissions Using IPCC SAR ($MMTCO_2e$)	Percent of Total 1990 Emissions	Total 2017 Emissions Using IPCC AR4 ($MMTCO_2e$)	Percent of Total 2017 Emissions
Transportation	150.7	35%	169.9	40%
Electric Power	110.6	26%	62.4	15%
Commercial Use	14.4	3%	15.1	4%
Residential	29.7	7%	26.0	6%
Industrial	103.0	24%	89.4	21%
Recycling and Waste[a]	–	–	8.9	2%
High GWP/Non-Specified[b]	1.3	<1%	20.0	5%
Agriculture/Forestry	23.6	6%	32.4	8%
Forestry Sinks	-6.7	-2%	—[c]	—
Net Total (IPCC SAR)	**426.6**	**100%**[e]	—	—
Net Total (IPCC AR4)[d]	**431**	**100%**[e]	**424.1**	**100%**[e]

NOTES:
[a] Included in other categories for the 1990 emissions inventory.
[b] High GWP gases are not specifically called out in the 1990 emissions inventory.
[c] Revised methodology under development (not reported for 2012).
[d] CARB revised the state's 1990 level GHG emissions using GWPs from the IPCC AR4.
[e] Total of individual percentages may not add up to 100% due to rounding
SOURCES: CARB 2017b; CARB 2019.

Existing Site Emissions

The existing Syphon Reservoir activities result in minimal mobile source emissions from maintenance trips. The number of maintenance are not anticipated to change with the proposed improvements to the reservoir, therefore existing emissions were not modeled and the proposed project's GHG emissions would be considered net new emissions. The existing operations on the site result in annual electrical consumption of 217,273 kilowatt hours (kWh) annually. Because the current facility at the site would be removed, the electricity would no longer be consumed. Emissions associated with the existing electrical consumption onsite were not quantified, instead net new electrical consumption was analyzed.

SECTION 2
Thresholds of Significance

The significance thresholds below are derived from the Environmental Checklist questions in Appendix G of the State CEQA Guidelines. Accordingly, a significant impact associated with air quality would occur based on the following thresholds described below:

AIR-1: Conflict with or obstruct implementation of the applicable air quality plan;

AIR-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;

AIR-3: Expose sensitive receptors to substantial pollutant concentrations; or

AIR-4: Result in other emissions (such as those leading to odors) affecting a substantial number of people.

A significant impact associated with GHG emissions would occur based on the following thresholds described below:

GHG-1: Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment; or

GHG-2: Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of GHGs.

In addition to the Appendix G significant impacts listed above, cumulative impacts with respect to air quality and GHGs are also addressed as part of the analysis.

Pursuant to the CEQA Guidelines (Section 15064.7), a lead agency may consider using, when available, significance thresholds established by the applicable air quality management district or air pollution control district when making determinations of significance. For purposes of this analysis, the potential air quality impacts of the proposed project are assessed in accordance with 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, as discussed below.[5]

[5] While the SCAQMD CEQA Air Quality Handbook contains significance thresholds for lead, project construction and operation would not include sources of lead emissions and would not exceed the significance thresholds for lead. Unleaded fuel and unleaded paints have virtually eliminated lead emissions from projects. As a result, lead emissions are not further evaluated.

2.1 Regional Criteria Air Pollutant Emissions Thresholds

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 (SCAQMD 1993).

Given that construction impacts are temporary, SCAQMD has established significance thresholds specific to construction activity. Based on the thresholds of significance in the SCAQMD CEQA Air Quality Analysis Handbook, the proposed project would potentially cause or contribute to an exceedance of an ambient air quality standard if the following would occur (SCAQMD 2020c).

Regional construction emissions from both direct and indirect sources would exceed any of the following SCAQMD prescribed daily emissions thresholds (SCAQMD 2020c):

- 75 pounds a day for VOC,
- 100 pounds per day for NO_X,
- 550 pounds per day for CO,
- 150 pounds per day for SO_X,
- 150 pounds per day for PM10, and
- 55 pounds per day for PM2.5

SCAQMD has also established numeric significance thresholds for operations. SCAQMD has established significance thresholds in part based on CAA section 182(e), which identifies 10 tons per year of VOC and NO_X as a significance level for stationary source emissions in extreme non-attainment areas for ozone. The numeric significance thresholds for other pollutants are also based on federal major source thresholds, which vary depending on regional attainment status. For example, the Air Basin is in attainment for carbon monoxide, which yields a corresponding major source threshold of 100 tons per year, or 550 pounds per day (USEPA 2017f). These "major source" significance thresholds were developed under the Federal Title V Operating Permit Program (SCAQMD 2020d). SCAQMD converted these significance levels to pounds per day. The attainment status designation is based on the healthfulness of air quality and the corresponding significance thresholds are intended to be health protective (CARB 2020q).

A similar approach is applied to PM2.5, where the daily limit of 55 pounds per day is based on the USEPA proposed rule to implement a PM2.5 NAAQS, with a significant emission rate of 10 tons per year (SCAQMD 2006).

The proposed project would potentially cause or contribute to an exceedance of an ambient air quality standard if regional operational emissions exceed any of the following SCAQMD prescribed daily emissions thresholds (SCAQMD 2019):

- 55 pounds a day for VOC,

- 55 pounds per day for NO_X,
- 550 pounds per day for CO,
- 150 pounds per day for SO_X,
- 150 pounds per day for PM10, and
- 55 pounds per day for PM2.5.

SCAQMD has set its CEQA significance threshold for NO_X and VOC at 10 tons per year (expressed as 55 pounds per day). because the federal CAA defines a major stationary source for extreme ozone nonattainment areas such as SCAQMD as one emitting 10 tons/year (42 U.S.C. §§ 75lla(e), 7511a(f); CAA §§ 182(e), 182(f)). Under the federal CAA, such sources are subject to enhanced control requirements (42 U.S.C. §§ 7502(c)(5), 7503; CAA §§ 172(c)(5), 173), so SCAQMD determined that 55 lb/day was an appropriate threshold for making a CEQA significance finding and requiring feasible mitigation. As, SCAQMD has stated:

> *"… a project source that emits 10 tons/year of NO_X or VOC is small enough that its regional impact on ambient ozone levels may not be detected in the regional air quality models that are currently used to determine ozone levels. Thus, in this case it would not be feasible to directly correlate project emissions of VOC or NO_X with specific health impacts from ozone."(SCAQMD 2015c.)*

Therefore, lead agencies that use SCAQMD thresholds of significance may determine that projects have a significant air quality impact and correspondingly are required to implement all feasible mitigation measures, yet are not able to correlate the project impact to quantifiable health effects.

2.2 Localized Significance Thresholds

SCAQMD published its Final Localized Significance Threshold Methodology in June 2003, (revised July 2008) and Final Methodology to Calculate Particulate Matter (PM) 2.5 and PM2.5 Significance Thresholds in October 2006, recommending that all air quality analyses include a localized assessment of both construction and operational impacts on the air quality of nearby air quality sensitive receptors (SCAQMD 2008). LSTs represent the maximum emissions from a project site that are not expected to result in an exceedance of a NAAQS or CAAQS. LSTs are based on the ambient concentrations of that pollutant within the Source Receptor Area (SRA) where a project is located and the distance to the nearest air quality sensitive receptor. LSTs are only applicable to the following criteria air pollutants: NO_X, CO, PM10, and PM2.5. The proposed project site is located in the central portion of SRA 19 (Saddleback Valley) (SCAQMD 2020e).

The Basin is in attainment for NO_2 and CO, meaning their ambient concentrations are below their respective air quality standards. When evaluating localized impacts for NO_2 and CO, the local ambient concentrations and the proposed project related concentrations are summed and then compared to the NAAQS and CAAQS. If the sum of the ambient concentrations and proposed project concentrations are greater than the air quality standard, this would result in a significant impact.

The Basin is in nonattainment for PM10 and PM2.5, meaning their ambient concentrations are above their respective air quality standards. If ambient levels already exceed a NAAQS or CAAQS,

then project impacts may be considered significant if they increase ambient concentrations in excess of the allowable increase established by SCAQMD. This would apply to PM10 and PM2.5, both of which are nonattainment pollutants in the Basin. For these latter two pollutants, the significance criteria are the pollutant concentration thresholds presented in SCAQMD Rules 403 and 1301. The Rule 403 threshold of 10.4 µg/m^3 applies to construction emissions (and may apply to operational emissions at aggregate handling facilities). The Rule 1301 threshold of 2.5 µg/m^3 applies to non-aggregate handling operational activities.

SCAQMD recommends that sites larger than 5 acres perform air dispersion modeling to determine localized air quality (SCAQMD 2008b). While the proposed project site is greater than 5 acres, the individual phases of construction are localized to smaller portions of the site on any given day (i.e. construction at the toe of the dam would not be occurring at the same time as the access road near the intersection of Sand Canyon Avenue and Portola Parkway). Based on the daily areas of disturbance, the onsite areas are analyzed as either one-acre sites or five-acre sites and screening level LSTs are used to determine significance. Operational emissions would be centralized around the proposed Treatment Facility, which is conservatively assumed to be 328 feet (100 meters) from the nearest sensitive receptor. **Table 6** shows the threshold levels used for a one-acre site located within 164 feet (50 meters) of the nearest sensitive receptor and for a five-acre site located within 164 feet of the proposed project.

TABLE 6
LOCALIZED SCREENING LEVELS

Source	NO_X	CO	PM10	PM2.5
Construction - 1-acre site at 164 feet (50 meters)	52	883	11	4
Construction - 5-acre site at 328 feet (100 meters)	112	2,763	49	16
Operational – 1-acre site at 328 feet (100 meters)	60	1,234	6	2

SOURCE: SCAQMD 2008b.

2.3 Toxic Air Contaminants

Based on the criteria set forth by SCAQMD, the proposed project would expose air quality sensitive receptors to substantial concentrations of TACs if the proposed project emits carcinogenic materials or TACs that exceed the maximum incremental cancer risk of 10 in one million or a non-cancer hazard index of 1.0. Similarly, the proposed project would result in a potentially significant impact if cancer burden corresponds to an increase in more than 0.5 excess cancer cases in areas where the proposed project-related increase in individual cancer risk exceeds 1 in one million (SCAQMD 2019).

2.4 Health Impacts

In Sierra Club v. County of Fresno (S219783) (Sierra Club) the Supreme Court held that CEQA requires lead agencies to either (i) make a "reasonable effort" to substantively connect the estimated amount of a given air pollutant a project will produce and the health effects associated with that

pollutant, or (ii) explain why such an analysis is infeasible (6 Cal.5th at 1165-66). However, the Court also clarified that that CEQA "does not mandate" that EIRs include "an in-depth risk assessment" that provides "a detailed comprehensive analysis … to evaluate and predict the dispersion of hazardous substances in the environment and the potential for exposure of human populations and to assess and quantify both the individual and population wide health risks associated with those levels of exposure (Sierra Club v. County of Fresno. 6 Cal.5th 502, 517-522 (2018))."

USEPA and CARB have established AAQS at levels above which concentrations could be harmful to human health and welfare, with an adequate margin of safety. Further, California air districts, like SCAQMD, have established emission-based thresholds that provide project-level estimates of criteria air pollutant quantities that air basins can accommodate without affecting the attainment dates for the AAQS, and therefore, providing thresholds of significance for regional and localized air quality impacts from both construction and operation of projects. SCAQMD thresholds take into account that the Air Basin is a distinct geographic area that has critical air pollution problems for which AAQS have been established to protect human health and welfare (SCAQMD 2008a).

Typically, the health effect of a particular criteria pollutant is analyzed by air districts on a regional scale based on how close the area is to attaining the NAAQS. As shown by the attainment plan emissions data, it takes a large amount of additional precursor emissions to demonstrate a modeled increase in ambient levels over an entire region. Because air districts' attainment plans and supporting air model tools are regional in nature, they are not typically used to evaluate the impacts to ambient concentrations of criteria air pollutants, or to correlate those impacts to the potential resultant impacts to public health effects, from an individual project. The complex nature of criteria air pollutant dispersion and the complex atmospheric chemistry that occurs (especially in the case of ozone and fine particulate matter) limits the usefulness of applying the available models to predict health effects at a project-level. Therefore, correlating a project's criteria air pollutant emissions to specific health effects, particularly with respect to ozone, is speculative.

Generally, models that correlate criteria air pollutant concentrations with specific health effects focus on regulatory decision-making that will apply throughout an entire air basin or region. These models focus on the region-wide health effects of pollutants so that regulators can assess the costs and benefits of adopting a proposed regulation that applies to an entire category of air pollutant sources, rather than the health effects related to emissions from a specific proposed project or source. Because of the scale of these analyses, any one project is likely to have only very small incremental effects which may be difficult to differentiate from the effects of air pollutant concentrations in an entire air basin. In addition, such modeling efforts are costly, and the value of a project-specific analysis may be modest in relation to that cost. Furthermore, the results, while costly to produce, may not be particularly useful. For regional pollutants, it is difficult to trace a particular project's criteria air pollutant emissions to a specific health effect. Moreover, the modeled results may be misleading because the margin of error in such modeling is large enough that, even if the modeled results report a given health effect, the model is sufficiently imprecise that the actual effect may differ from the reported results; that is, the modeled results suggest precision, when in fact available models cannot be that precise on a project level.

Writing as amicus curiae in Sierra Club, the SJVAPCD explained that "[r]unning the photochemical grid model used for predicting ozone attainment with emissions solely from one project would thus not be likely to yield valid information given the relative scale involved" (SJVAPCD 2015). Ozone is not directly emitted into the air, but is instead formed as ozone precursors undergo complex chemical reactions through sunlight exposure (SJVAPCD 2015). Given the complex nature of this process, and the fact that ozone can be transported by wind over long distances, "a specific tonnage amount of NOx or ROGs emitted in a particular area does not equate to a particular concentration of ozone in that area" (SJVAPCD 2015). For this reason, the photochemical analysis for ozone is done on a regional scale, and it is inappropriate to analyze ozone impacts at a local or project-level basis because a localized analysis would at most be speculative, and at worst be misleading.

Speculative analysis is not required by CEQA. The SJVAPCD stated that even a project with criteria pollutant emissions above its CEQA thresholds does not necessarily cause localized human health effects as, even with relatively high levels of emissions, the SJVAPCD cannot determine "whether and to what extent emissions from an individual project directly impact human health in a particular area" (SJVAPCD 2015). The SCAQMD also, as amicus curiae in Sierra Club, made similar points, reiterating that "an agency should not be required to perform analyses that do not produce reliable or meaningful results" (SCAQMD 2015c). With regard to particulate matter, the SCAQMD noted that while the CARB has created a methodology to predict expected mortality from large amount of PM2.5, the primary author of the methodology has reported that it "may yield unreliable results due to various uncertainties" and CARB staff has been directed by its Governing Board to reassess and improve it, which factor "also counsels against setting any hard-and-fast rule" about conducting this type of analysis (SCAQMD 2015c). SCAQMD agrees that it is very difficult to quantify health effects, opining that the only possible means of successfully doing so is for a project so large that emissions would essentially equate to levels comparable to all combined regional emission increases (SCAQMD 2015c). Because the proposed project would not emit that magnitude of daily emissions, the usage of photochemical modeling to determine specific health effects of this individual project is not warranted.

The mass emissions thresholds developed by the SCAQMD and used by CEQA lead agencies throughout the SCAQMD to determine potential significance of project-related regional changes in the environment are not directly indicative of exceedances of applicable ambient air standards. Meteorology, the presence of sunlight, and other complex chemical factors all combine to determine the ultimate concentration and location of ozone or PM. The effects on ground-level ambient concentrations of pollutants that may be breathed by people are also influenced by the spatial and temporal patterns of the emission sources. In other words, the effect on ozone and PM concentrations from a given mass of pollutants emitted in one location may vary from the effect if that same mass of pollutants was emitted in an entirely different location in the Air Basin. The same effect may be observed when the daily and seasonal variation of emissions is taken into account. Regional-scale photochemical modeling, typically performed only for NAAQS attainment demonstration and rule promulgation, account for these changes in the spatial, temporal, and chemical nature of regional emissions.

As an example of the relationship between modeled regional mass emissions and modeled air basin pollutant concentrations, the most recent EPA-approved SCAQMD basin-wide emissions inventory shows VOC emissions at 162.4 tons per day and NOx emissions at 293.1 tons per day for the baseline year of 2012 (SCAQMD 2017a). SCAQMD's AQMP shows that reducing the baseline 2008 NO_X and VOC emissions by 432 tons per day and 187 tons per day respectively, would only reduce ozone levels at the monitor stations with the greatest ozone concentrations by 9 parts per billion (ppb) (SCAQMD 2013). Additionally, SCAQMD modeling that accounts for increases in emissions due to new or modified sources within the SCAQMD between 2010 and 2030 show an increase of 6,620 pounds per day of NOx and 89,947 pounds per day of VOC. The results of this analysis show that this level of daily pollutant increase would only increase ozone concentrations in the Air Basin by 2.6 ppb and less than 1 ppb of NO_2 (SCAQMD 2011).

Currently, the health impact of a particular criteria air pollutant is analyzed by air districts on a regional scale based on how close the area is to attaining the NAAQS. Such an analysis has generally not been performed at the project level. The SCAQMD states that an exceedance of the significance thresholds does not necessarily cause localized human health effects as, even with relatively high levels of emissions. However, the Air Basin is a distinct geographic area that has critical air pollution problems for which AAQS have been established to protect human health and welfare. Therefore, analyzing a project against these thresholds conservatively assesses whether these emissions directly contribute to regional or local exceedances of AAQS and assesses their potential to be harmful to human health. Thus, in order to determine the potential for adverse health effects, project emissions are compared to the SCAQMD's regional emissions thresholds of significance.

2.5 General Conformity Determination

A conformity determination is required for each criteria pollutant or precursor where the total of direct emissions of the criteria pollutant or precursor in a federal non-attainment or maintenance area would equal or exceed specified annual emission rates, referred to as "de minimis" thresholds." These de minimis thresholds are provided in 40 CFR 93.153(b)(1) and (2). For ozone precursor emissions, the de minimis thresholds depend on the severity of the non-attainment classification. In an extreme ozone non-attainment area, the de minimis thresholds are 10 tons per year for both NO_X and VOC. In a federal serious non-attainment area, the de minimis threshold is 70 tons per year for PM2.5. In a federal attainment-maintenance area, the de minimis threshold is 100 tons per year for CO, and PM10. Effective June 13, 2012, the USEPA designated the South Coast Air Basin as extreme non-attainment for the 1997 ozone standard. In 2012, the USEPA designated the Air Basin as extreme non-attainment for the 2008 ozone standard. The Air Basin is also attainment-maintenance for the federal CO and PM10 standards. and serious non-attainment for the federal PM2.5 standards. Thus, based on the present attainment status of the Air Basin, a federal action would conform to the SIP if its annual emissions remain below 10 tons of VOC or NO_X, 100 tons of CO or PM10, and 70 tons of PM2.5.

2.6 Greenhouse Gas Emissions Thresholds

CEQA Guidelines section 15064.4 gives lead agencies the discretion to determine whether to assess the significance of GHG emissions quantitatively or qualitatively. Section 15064.4 recommends considering certain factors, among others, when determining the significance of a project's GHG emissions, including the extent to which the proposed project may increase or reduce GHG emissions as compared to the existing environment; whether the proposed project exceeds an applicable significance threshold; and extent to which the proposed project complies with regulations or requirements adopted to implement a reduction or mitigation of GHGs. None of the amendments establishes a threshold of significance; rather, so long as any threshold selected is supported by substantial evidence (see section 15064.7(c)), lead agencies are granted discretion to establish significance thresholds for their respective jurisdictions, including by looking to thresholds developed by other public agencies, such as air districts, or suggested by experts, such as the California Air Pollution Control Officers Association (CAPCOA).

The California Natural Resources Agency's *Final Statement of Reasons for Regulatory Action* from December 2009 similarly provides that project-level quantification of emissions should be conducted where it would assist in determining the significance of emissions, even where no numeric threshold applies. In such cases, CNRA's guidance provides that qualitative thresholds can be utilized to determine the ultimate significance of project-level impacts based on a project's consistency with plans, which can include applicable regional transportation plans. Even when using a qualitative threshold, quantification can inform "the qualitative factors" and indicate "whether emissions reductions are possible, and, if so, from which sources (CNRA 2009)."

Neither CARB nor the County of Orange has adopted quantitative significance thresholds for assessing project-level impacts related to GHG emissions. As a method for determining significance under CEQA, SCAQMD developed a draft tiered flowchart in 2008 for determining significance thresholds for GHGs for industrial projects where SCAQMD is acting as the lead agency. In December 2008, SCAQMD adopted a 10,000 $MTCO_2e$/year threshold for industrial facilities, but only with respect to for projects in which SCAQMD is the lead agency. SCAQMD has not adopted a threshold of significance for residential or commercial projects. Additionally, SCAQMD formed a GHG Significance Threshold Working Group to evaluate potential GHG significance thresholds and had proposed, but not adopted, a 3,000 $MTCO_2e$/year screening level for land use development projects. However, the aforementioned Working Group has been inactive since 2011 and no screening levels drafted by the Working Group have been formally adopted for land use development projects. Nonetheless, while the proposed project is an infrastructure project and does not fit neatly into a category (industrial, commercial, or residential/), in the absence of a formally adopted threshold applicable to this proposed project, the more stringent of the two quantitative thresholds discussed above (i.e., 3,000 $MTCO_2e$/year) is used to evaluate the significance for this proposed project.

2.7 Greenhouse Gas Reduction Plans, Policies and Regulations

A significant impact would occur if the proposed project would conflict with applicable regulations, plans and policies that were adopted to reduce GHG emissions that contribute to global climate change. For the proposed project, as an infrastructure project, this analysis considers the proposed project's potential to conflict with the following applicable plans, policies and regulations to reduce GHG emissions:

- The 2017 Climate Change Scoping Plan Update, CARB's plan for achieving a 40 percent reduction on GHG emissions from 1990 levels by 2030, statewide, as mandated by SB 32; and
- The SCAG 2020-2045 RTP/SCS, the regional plan for achieving sustainable land use patterns that reduce passenger vehicle GHG emissions, as mandated by SB 375.

SECTION 3
Impact Analysis

3.1 Methodology

The evaluation of potential impacts to regional and local air quality that may result from the construction and long-term operations of the proposed project is discussed below.

3.1.1 Construction Impacts

Regional Construction Emissions

Project construction activities that would have the potential to create regional air quality impacts including vehicle trips generated by construction workers, vendor trucks, and haul trucks traveling to and from the proposed project site and building activities such as the application of paint and other surface coatings. The proposed project's daily regional criteria pollutant emissions during construction have been estimated by assuming a conservative scenario for construction activities (i.e., assuming all construction occurs at the earliest feasible date) and applying the mobile source and fugitive dust emissions factors.

The emissions have been estimated using the CalEEMod software, an emissions inventory software program recommended by the SCAQMD for off-road construction equipment emissions.[6] On-road mobile source emissions were estimated using the 2017 CARB on-road vehicle emissions factor model (EMFAC) and incorporating the adjustment factors for the Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule Part I: One National Program (SAFE Rule Part I).

Project construction is estimated to start in 2022 and continue for approximately 41 months, ending in 2026. Construction phasing would include vegetation clearing, mobilization and creation of access road/intersection improvements, excavation of sediments and the existing dam, construction of the dam, spillway and reservoir, construction of the treatment facilities, creation of wetlands/riparian habitat, installation of recreational components (non-paved hiking trails), and demobilization. The proposed project would import approximately 100,000 cubic yards of soil with a maximum of 66 haul trucks accessing the site per day. The remaining soil needed for the new dam construction would come from soils excavated onsite. No soil removal is estimated. An

6 CalEEMod was developed in collaboration with the air districts of California and is recommended by SCAQMD for evaluating GHG emissions for projects under CEQA. Regional data (e.g., emission factors, trip lengths, meteorology, source inventory, etc.) were provided by the various California air districts to account for local requirements and conditions. According to the California Air Pollution Control Officers Association, the model is an established, accurate and comprehensive tool for quantifying air quality and GHG impacts from land use projects throughout California.

estimated 420,000 cubic yards of vegetation would be removed from the project site with a maximum of 78 haul trucks per day. One daily fuel delivery per day is estimated during construction activities. Worker and vendor deliveries vary by phase with a maximum of 114 worker vehicles and 29 vendor trucks accessing the site daily.[7]

The input values used in this analysis were adjusted to be proposed project-specific based on provided equipment types and the construction schedule. Haul truck trips and concrete truck trips estimates were based on information obtained from IRWD. Haul and concrete truck trip VMT were based on a 28-mile one-way trip. Worker trip and vendor truck trip estimates were based on default calculation methodologies in CalEEMod (worker trips equal 14.7 miles and vendor trips equal 6.9 miles).

Additional geotechnical work may or may not occur and the intensity of any geotechnical work is unknown. There are three potential geotechnical tests that could occur: borings, test pits, or trenches. Because the intensity of any work that will occur is unknown, the analysis determines the maximum intensity of geotechnical work that can occur concurrently and independent from the reservoir work. The *Irvine Ranch Water District Syphon Reservoir Geotechnical Investigations Project Initial Study/Mitigated Negative Declaration* was used to determine the equipment and workers that would be used to conduct the additional geotechnical investigations.

Emissions from proposed project construction activities were estimated based on the construction phase in which the activity would be occurring. The maximum daily emissions estimate the worst-case day and do not represent the emissions that would occur for every day of proposed project construction. The maximum daily emissions are compared to SCAQMD daily regional thresholds of significance. A detailed discussion of the proposed project's construction phasing and equipment list is available in Appendix A of this technical report. Emissions calculations and modeling output are included in Appendices B, D and E of this technical report.

Localized Construction Emissions

Proposed project construction activities that would have the potential to create local air quality impacts including fugitive dust from grading, demolition, and building activities such as the application of paint and other surface coatings. The localized effects from the on-site portion of the proposed project's construction emissions were evaluated at the nearby sensitive receptor locations that would be potentially impacted by proposed project construction in accordance with the SCAQMD's *Final Localized Significance Threshold Methodology* (June 2003, revised July 2008). The localized significance thresholds only address NO_X, CO, PM10, and PM2.5 emissions. The SCAQMD has established screening criteria that can be used to determine the maximum allowable daily emissions that would satisfy the localized significance thresholds and therefore not cause or contribute to an exceedance of the applicable ambient air quality standards without the need for proposed project-specific dispersion modeling. The localized analysis for the proposed project is based on this SCAQMD screening criteria. The maximum daily onsite emissions from construction

[7] It is unknown how many additional geotechnical tests would be required for completion of the project. The 114 maximum workers is based on the maximum geotechnical work that can occur with non-geotechnical work. Geotechnical activities would require between 9 to 12 workers per activity.

of the proposed project were compared to these screening criteria. Emissions calculations and modeling output are included in Appendices B, D, and E of this technical report.

Health Impact Assessment

Health impacts associated with the proposed project are assessed based on the estimated project's regional emissions, as discussed above for regional construction and operational emissions, in comparison to the SCAQMD regional emissions thresholds of significance.

Greenhouse Gas Emissions

The evaluation of potential impacts to GHG emissions that may result from the construction of the proposed project is consistent with CEQA Guidelines section 15064.4(a) and recent related guidance from OPR. This analysis considered GHG emissions resulting from construction activities associated with the proposed project as detailed under Regional Construction Emissions above. Because potential impacts resulting from GHG emissions would be long-term rather than acute, GHG emissions were calculated on an annual basis. In accordance with SCAQMD guidance, GHG emissions from construction have been amortized (i.e., averaged annually) over the lifetime of the proposed project. SCAQMD defines the lifetime of a project as 30 years. Therefore, the proposed project's total construction GHG emissions are divided by 30 to determine an annual construction emissions estimate comparable to operational emissions.

GHG quantification methods rely on guidance from State and regional agencies with scientific expertise in quantifying GHG emissions, including CARB and SCAQMD. Along with the air quality emissions, GHG emissions were estimated using CalEEMod Version 2016.3.2 for off-road construction equipment and Safe Rule 1 adjusted EMFAC2017 emissions for on-road vehicles as detailed above. Emissions calculations and modeling output are included in Appendices C through E of this technical report.

3.1.2 Operational Impacts

Regional Operational Emissions

The proposed project's operational activities would have minimal changes from the existing scenario. There are no new permanent maintenance or recreational trips associated with the reservoir improvements, and no natural gas emissions, water use or solid waste generation anticipated. Maintenance of the wetland/riparian area would be required for approximately 5 years after construction is complete to ensure success of the vegetated areas, and would result in infrequent trips to the project site. Operational vehicle trips during the first five years of maintenance would equal 12 to 24 round trips for 30 to 40 days per year. However, these trips would not result in substantial daily or annual emissions.

The main operational emissions associated with air quality impacts would occur from consumer product use associated with onsite maintenance activities. While electrical consumption will increase, electrical consumption does not result in direct air quality impacts and therefore are not addressed in the regional or localized air quality emissions analysis. Assumptions, calculations and modeling output are included in Appendices A, B, D and E of this technical report.

Localized Operational Emissions

The localized effects from the on-site portion of the maximum daily emissions from proposed project operation were evaluated at the nearby sensitive receptor locations that would be potentially impacted by operation of the proposed project according to the SCAQMD's Final Localized Significance Threshold Methodology (June 2003, revised July 2008). The localized impacts from operation of the proposed project were assessed similar to the construction emissions, as discussed previously. For further explanation, please see Appendices B, D and E of this report.

Carbon Monoxide Hotspots

The greatest quantities of CO are produced 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." As the operation of the proposed project would not result in any new mobile source emissions, the project would not result in CO hotspots. Therefore, CO hotspots are not discussed further in this analysis.

Greenhouse Gas Emissions

Existing operations at the proposed project site generate GHG emissions from electrical consumption. The proposed project would not result in new or increased use of motor vehicles, water or natural gas consumption, or wastewater or solid waste generation. The proposed project would result in the consumption of 1,300,000 kWh annually. The existing operations consist of approximately 217,273 kWh annually, therefore the annual increase in electrical consumption is approximately 1,082,727 kWh. The increase in electrical consumption was used to quantify annual operational GHG emissions. Emissions from annual electrical consumption are added to the amortized construction emissions and compared to the SCAQMD's quantitative screening level. For further explanation, please see Appendix C of this report.

3.1.3 Toxic Air Contaminant Impacts (Construction and Operation)

The proposed project would emit TACs during construction, exposure to which may result in an increase in carcinogenic and non-carcinogenic health risks on the residents and other air quality sensitive receptors in the vicinity. A Health Risk Assessment (HRA) was prepared to evaluate the risk of potential negative health outcomes (cancer, or other acute or chronic conditions) related to TACs exposure from airborne emissions during proposed project construction activities. Incremental increase in lifetime cancer risk is assessed over longer exposure time periods (i.e., 30-year for residential receptors).

The HRA followed the procedure and methods provided in the *Guidance Manual for Preparation of Health Risk Assessments* issued by OEHHA in 2015. as well as the methods the SCAQMD's *Risk Assessment Procedures for Rule 1401, 1401.1, and 212, version 8.1*, used in conjunction with the associated *SCAQMD Permit Application Package "N (OEHHA 2015; SCAQMD 2017b; SCAQMD 2017c)."* The procedure involved emission quantification, modeling of environmental transport, evaluation of environmental fate, identification of exposure routes, identification of

exposed populations, and estimation of short-term (e.g., 1-hour maximum), 8-hour average, and long-term (annual) exposure levels. The revised 2015 OEHHA Guidance takes into account the sensitivity of children to TAC emissions, breathing rates, and time spent at home since children have higher breathing rate compared to adults and would likely spend more time at home resulting in longer exposure durations.

For construction, the potential TAC emission sources of DPM are diesel-fueled heavy-duty equipment, and on-road travel and idling emissions from diesel-fueled haul and vendor trucks. Since DPM has cancer and non-cancer health effects, the impacts of being exposed to these emissions during construction were evaluated on a short term and annual basis.

Air dispersion model runs were conducted to simulate annual air concentrations at air quality sensitive receptors for the duration of construction of the proposed project. Annual air concentrations were adjusted for OEHHA's Cancer Potency Factor (CPF) to evaluate the incremental increase in lifetime cancer risk and Recommended Exposure Level (REL) to evaluate chronic health effects. The maximum incremental increase in lifetime cancer risk is compared to the SCAQMD threshold of 10 in one million and the maximum hazard index is compared to the SCAQMD threshold for Chronic Hazard Indices (1.0). The SCAMD's thresholds for incremental increases in lifetime cancer risk and Hazard Indices apply to all regions of the Basin, regardless of the existing risks posed by exposure to ambient levels of airborne TACs.

The process of assessing health risks and impacts includes a degree of uncertainty. The level of uncertainty depends on the availability of data and the extent to which assumptions must be relied upon in cases where the data are incomplete or unknown. All HRAs rely upon scientific studies to reduce the level of uncertainty; however, it is not possible to eliminate uncertainty from the analysis. Where assumptions are used to substitute for incomplete or unknown data, it is standard practice in performing HRAs to err on the side of health protection to avoid underestimating or underreporting the risk to the public. In general, sources of uncertainty that may lead to an overestimation or an underestimation of the risk include extrapolation of toxicity data in animals to humans and uncertainty in the exposure estimates. In addition to uncertainty, there exists "a natural range or variability in measured parameters defining the exposure scenario," and that "the greatest quantitative impact is variation among the human population in such properties as height, weight, food consumption, breathing rates, and susceptibility to chemical toxicants."[8] As mentioned previously, it is typical to err on the side of health protection by assessing risk on the most sensitive populations, such as children and the elderly, by modeling potential impacts based on high-end breathing rates, by incorporating age sensitivity factors, and by not taking into account exposure reduction measures, such as mechanical air filtration building systems.

Cancer Risk Calculation

The incremental increase in lifetime cancer risk values for TAC emissions consider exposure via the inhalation pathway. The potential exposure through other pathways (e.g., ingestion) requires

[8] Office of Environmental Health Risk Assessment, 2015. Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments, February 2015.

substance and site-specific data, and the specific parameters for DPM are not known for these pathways.[9] The OEHHA Guidance recommends the incorporation of several factors to quantify the carcinogenic compound dose via the inhalation pathway. Once determined, the dose is multiplied by the compound-specific inhalation cancer potency factor to derive the incremental increase in lifetime cancer risk estimate. The dose takes into account the concentration at an air quality sensitive receptor. The cancer potency factor is compound specific. In performing health risk calculations, carcinogenic compounds are not considered to have threshold levels (i.e., dose levels below which there are no risks). Any exposure, therefore, will have some associated risk.

Incremental health risks associated with exposure to carcinogenic compounds is defined in terms of the probability of developing cancer as a result of exposure to a chemical at a given concentration. Under a deterministic approach (i.e., point estimate methodology), the incremental increase in lifetime cancer risk probability is determined by multiplying the chemical's annual concentration by its unit risk factor (URF). For example, the URF for DPM recommended by the Scientific Review Panel[10] is 3.0 x 10^{-4} per microgram per cubic meter ($\mu g/m^3$). This value corresponds to a CPF of 1.1 per milligram/kilogram (body weight) per day (mg/kg(bw)-day). The URF for DPM means that for receptors with an annual average concentration of 1 $\mu g/m^3$ in the ambient air, the probability of contracting cancer over a lifetime of exposure is 300 in one million. This approach for calculating the incremental increase in lifetime cancer risk is intended to result in conservative (i.e., health protective) estimates of health impacts and is used for assessing risks to air quality sensitive receptors. The estimation of health risks is calculated as follows:

Equation 1: $Dose_{RESIDENT}$ (mg/kg/day) = $C_{AIR} \times DBR \times A \times EF \times CF$

where:

- C_{air}= concentration in air ($\mu g/m^3$)
- DBR= daily breathing rate normalized to body weight (L/kg body weight-day)
- A= inhalation absorption factor (1 for DPM, unitless)
- EF= exposure frequency (unitless) (days/365 days)
- CF= 10^{-6}, correction factor, micrograms to milligrams conversion, liters to cubic meters conversion

Equation 2: $Risk_{INH\text{-}RESIDENT}$ (in one million) = $Dose_{AIR} \times CPF \times ASF \times ED/AT \times FAH \times CCF$

where:

- $Dose_{AIR}$= daily inhalation dose (mg/kg-day)
- CPF= cancer potency factor $(mg/kg\text{-}day)^{-1}$
- ASF= age sensitivity factor (unitless)

9 California Air Resources Board, 1998. Report to the Air Resources Board on the Proposed Identification of Diesel Exhaust as a Toxic Air Contaminant, April 22, 1998.

10 The Scientific Review Panel is charged with evaluating the risk assessments of substances proposed for identification as TACs by CARB, OEHHA, and the Department of Pesticide Regulation (DPR), and the review of guidelines prepared by OEHHA.

- ED= exposure duration (years)
- AT= averaging time for lifetime cancer risk (years)
- FAH= fraction of time spent at home (unitless)
- CCF= 10^6, cancer conversion factor to represent risk in chances per million

Details of the exposure parameters used under this methodology as well as risk calculations and modeling output are included in Appendix F.

The estimated excess incremental increase in lifetime cancer risks for residential receptors (including the early-in-life exposure) were adjusted using the ASFs recommended in Cal/EPA OEHHA Technical Support Document and 2015 OEHHA guidance. This approach accounts for an "anticipated special sensitivity to carcinogens" of infants and children. The incremental increase in lifetime cancer risk estimates were weighted by a factor of 10 for exposures that occur from the third trimester of pregnancy to two years of age and by a factor of three for exposures that occur from 2 to 15 years of age. No weighting factor (i.e., an ASF equal to one, which is equivalent to no adjustment) is applied to ages 16 to 30 years. As a conservative risk estimate, the receptors at the Crean Lutheran High School located across Portola Parkway from the project site were analyzed as residential receptors.

Non-Cancer Health Impacts

Non-cancer effects of chronic (i.e., long- term) TAC exposures were evaluated using the Hazard Index (HI) approach consistent with the OEHHA guidance. The chronic HI was calculated by dividing the modeled annual average concentration by the Reference Exposure Level (REL). The REL is the concentration at or below which no adverse health effects are anticipated. The REL for were obtained from OEHHA and the REL for DPM is 5 for annual chronic impacts. DPM does not have an 8-hour or acute REL therefore only chronic annual impacts are discussed. SCAQMD guidance identifies a significant impact if a project would result in an incremental chronic and acute HI that is greater than 1.0. Details of the risk calculations and modeling output are included in Appendix F.

3.1.4 General Conformity Determination (Construction and Operation)

Under section 176(c)(1) of the federal CAA, federal agencies that "engage in, support in any way or provide financial assistance for, license or permit, or approve any activity" must demonstrate that such actions do not interfere with state and local plans to bring an area into attainment with the NAAQS (42 USC 7506(c)). Orange County is designated extreme non-attainment for the federal 8-hour ozone NAAQS; serious non-attainment for PM2.5; and attainment for the federal CO, NO_2, SO_2, and PM10 standards. The program by which a federal agency determines that its action would not obstruct or conflict with air quality attainment plans is called "General Conformity." The implementing regulations for General Conformity are found in 40 CFR 93(B) (75 FR 17254 (April 5, 2010, amended July 6, 2010).

Under the General Conformity regulations, both the direct and indirect emissions associated with a federal action must be evaluated. Direct emissions are defined as:

> *Those emissions of a criteria pollutant or its precursors that are caused or initiated by the federal action and originate in a nonattainment or maintenance area and occur at the same time and place as the action and are reasonably foreseeable (40 CFR 93.152 (as revised April 5, 2010, effective July 6, 2010; 75 FR 17273).*

Indirect emissions are defined as:

> *Those emissions of a criteria pollutant or its precursors:*
>
> 1. *That are caused or initiated by the federal action and originate in the same nonattainment or maintenance area, but occur at a different time or place as the action;*
> 2. *That are reasonably foreseeable;*
> 3. *That the agency can practically control; and*
> 4. *For which the agency has continuing program responsibility (40 CFR 93.152 (as revised April 5, 2010, effective July 6, 2010; 75 FR 17273).*

For purposes of this definition, even if a federal licensing, rulemaking, or other approving action is a required initial step for a subsequent activity that causes emissions, such initial steps do not mean that a federal agency can practically control any resulting emissions ((40 CFR 93.152 (as revised April 5, 2010, effective July 6, 2010; 75 FR 17273))).

When describing the 2010 revisions to the definition of indirect emissions, USEPA offered the following explanation:

> *EPA is revising the definition for indirect emissions to clarify that only indirect emissions originating in a nonattainment or maintenance area need to be analyzed for conformity with the applicable SIP. In addition, EPA is revising the definition of "indirect emissions" to clarify what is meant by "the agency can practically control" and "for which the agency has continuing program responsibility."*

This clarification represents USEPA's long standing position that Congress did not intend for conformity to apply to "cases where although licensing or approving action is a required initial step for a subsequent activity that causes emissions, the agency has no control over that subsequent activity, either because there is no continuing program responsibility or ability to practically control (40 CFR 93.152 (as revised April 5, 2010, effective July 6, 2010; 75 FR 17273))."

The General Conformity regulations incorporate a stepwise process, beginning with an applicability analysis. According to USEPA guidance, before any approval is given for a federal action to go forward, the regulating federal agency must apply the applicability requirements found at 40 CFR 93.153(b) to the federal action to evaluate whether, on a pollutant-by-pollutant basis, a determination of General Conformity is required. The guidance states that the applicability analysis can be (but is

not required to be) completed concurrently with the NEPA analysis. If the regulating federal agency determines that the General Conformity regulations do not apply to the federal action, no further analysis or documentation is required. If the General Conformity regulations do apply to the federal action, the regulating federal agency must next conduct a conformity evaluation in accordance with the criteria and procedures in the implementing regulations, publish a draft determination of General Conformity for public review, and then publish the final determination of General Conformity.

The General Conformity regulations require that a General Conformity determination analyze the following emissions scenarios: (1) the attainment year specified in the SIP, or if the SIP does not specify an attainment year, the latest attainment year possible under the Act; or (2) the last year for which emissions are projected in the maintenance plan; (3) the year during which the total of direct and indirect emissions from the action is expected to be the greatest on an annual basis; and (4) any year for which the applicable SIP specifies an emissions budget (40 CFR 93.159(d), as amended, effective July 6, 2010).

Each year of construction (2022 through 2026) are analyzed against the *de minimis* thresholds. Annual emissions for the construction activities are quantified for both the unmitigated and mitigated scenarios. Operational emissions are discussed qualitatively as there is a minimal operational component.

3.2 Air Quality Impacts

Threshold AIR-1 Conflict with or obstruct implementation of the applicable air quality plan.

Impact AIR-1: Implementation of the proposed project would not conflict with or obstruct implementation of the applicable air quality plan. (Less than Significant with Mitigation).

The proposed project is located within the Air Basin, which is under the jurisdiction of the SCAQMD. As such, SCAQMD's 2016 AQMP is the applicable air quality plan for the proposed project. Projects that are consistent with the regional population, housing, and employment forecasts identified by SCAG are considered to be consistent with the AQMP growth projections, since the forecast assumptions by SCAG forms the basis of the land use and transportation control portions of the AQMP. Additionally, because SCAG's regional growth forecasts are based upon, among other things, land uses designated in general plans, a project that is consistent with the land use designated in a general plan would also be consistent with the SCAG's regional forecast projections, and thus also with the AQMP growth projections.

The proposed project would result in an increase in short-term employment compared to existing conditions. Also, construction employees are typically employees of the construction firm and are not hired specifically for any one construction job. Being relatively small in number and temporary in nature, construction jobs under the project would not conflict with the long-term employment projections upon which the AQMP is based. Control strategies in the AQMP with applicability to short-term emissions from construction activities include strategies denoted in the 2016 AQMP as MOB-08 and MOB-10 and are intended to reduce emissions from on-road and off-road heavy-duty vehicles and equipment by accelerating replacement of older, emissions-prone engines with newer

engines meeting more stringent emission standards. Construction contractors would be required to comply with the CARB Air Toxic Control Measure that limits heavy duty diesel motor vehicle idling to no more than five minutes at any given location with certain limited exceptions defined in the regulation for equipment in which idling is integral to the function of the equipment or activity (such as concrete trucks and concrete pouring). In addition, contractors would be required to comply with required and applicable BACT and the CARB In-Use Off-Road Diesel Vehicle Regulation to use lower emitting equipment in accordance with the phased-in compliance schedule for equipment fleet operators. The proposed project would not conflict with implementation of these strategies. The proposed project is also required to comply with SCAQMD regulations for controlling fugitive dust pursuant to SCAQMD Rule 403. Compliance with these requirements is consistent with and meets or exceeds the AQMP requirements for control strategies intended to reduce emissions from construction equipment and activities.

Nonetheless, as discussed further below in the analysis for Impact AIR-2, even though the proposed project would be consistent with applicable strategies in the AQMP, local and state regulations, and other voluntary measures designed to reduce non-attainment pollutants, regional emissions during construction of the proposed project would exceed the significance threshold for NO_X. Therefore, impacts related to consistency with air quality plans during construction of the proposed project would be potentially significant.

As detailed in Impact AIR-2 below, construction-related daily emissions would be reduced to below the SCAQMD threshold of significance of significance for NO_X with the implementation of Mitigation Measure AIR-1. Implementation of mitigation would increase the emissions of CO, but would not result in CO emissions exceeding the SCAQMD's threshold of significance. For all other criteria pollutants, emission levels would remain below the applicable thresholds of significance. As the proposed project's maximum regional emissions from construction would not exceed the regional thresholds of significance with implementation of mitigation measures, the proposed project would be consistent with the AQMP, and impacts would be reduced to a less than significant level.

Mitigation:

AIR-1: IRWD shall require the construction contractor to implement construction equipment features for equipment operating at the project site during certain construction phases. Construction features will include the following: The proposed project shall utilize off-road diesel-powered construction equipment that meet or exceed CARB and USEPA Tier 4 off-road emissions standards for standard construction equipment rated at 50 horsepower (hp) or greater during project construction. Such equipment will be outfitted with BACT devices including a CARB certified Level 3 Diesel Particulate Filter or equivalent. At a minimum, this measure shall apply during implementation of the following construction sub-phases: upstream

Significance Determination: Less than Significant Impact with Mitigation.

Threshold AIR-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.

Impact AIR-2: Implementation of the proposed project would not result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard. (Less than Significant with Mitigation)

The proposed project would contribute to local and regional air pollutant emissions during construction (short-term or temporary) and operation (long-term).

Construction

Regional Emissions Analysis

Construction of the proposed project has the potential to generate temporary regional criteria pollutant emissions through the use of heavy-duty construction equipment, such as excavators and forklifts, through vehicle trips generated by workers and haul trucks traveling to and from the proposed project site, and through building activities such as the application of paint and other surface coatings. In addition, fugitive dust emissions would result from demolition and various soil-handling activities. Mobile source emissions, primarily NO_X, would result from the use of construction equipment such as dozers and loaders. Construction emissions can vary substantially from day to day, depending on the level of activity, the specific type of construction activity, and prevailing weather conditions.

The maximum daily construction emissions for the proposed project were estimated for each construction phase. Some individual construction phases could potentially overlap; therefore, the estimated maximum daily emissions include these potential overlaps by combining the relevant construction phase emissions. The maximum daily emissions are predicted values for a representative worst-case day, and do not represent the actual emissions that would occur for every day of construction, which would likely be lower on many days. As stated above, in order to provide a conservative emissions analysis, for modeling purposes, construction emissions were modeled beginning in 2022. Detailed emissions calculations are provided in Appendix B of this report.

The results of the criteria pollutant calculations are presented in **Table 7** and include dust control measures required to be implemented by SCAQMD Rule 403 (Control of Fugitive Dust), including subsection (e) – Additional Requirements for Large Operations, and fugitive VOC control measures required to be implemented by architectural coating emission factors based on SCAQMD Rule 1113 (Architectural Coatings). As shown in Table 7, construction-related daily emissions would exceed the SCAQMD threshold of significance for NO_X. For all other criteria pollutants, emission levels would be below the applicable thresholds of significance. As the proposed project's maximum regional emissions from construction would exceed the regional threshold of significance for NO_X, regional construction emissions impacts would be potentially significant.

TABLE 7
ESTIMATED MAXIMUM UNMITIGATED REGIONAL CONSTRUCTION EMISSIONS (POUNDS PER DAY) [a]

Source	VOC	NO_X	CO	SO_2	PM10[b]	PM2.5[b]
Preconstruction Activities	7	91	42	<1	14	8
Access Routes/Intersection Improvements	4	47	36	<1	5	2
Excavation of Sediment/Existing Dam	13	133	94	<1	16	10
Construction of Dam/Spillway/Reservoir	13	165	95	<1	19	11
Construction of Treatment Facility	5	26	21	<1	3	1
Wetlands/Riparian Installation	2	16	14	<1	2	1
Installation of Recreational Facilities	4	43	34	<1	3	2
Demobilization	3	22	20	<1	1	1
Max Geotechnical	20	177	198	<1	50	18
Overlapping Subphases						
Set-up & Geotechnical[c]	12	137	94	<1	27	13
Excavation & Geotechnical	19	180	145	<1	29	15
Construction & Geotechnical	18	211	147	<1	32	16
Maximum Reservoir Phase Overlap & Geotechnical	21	236	173	<1	35	17
Dam Excavation & Construction of Dam (Install Inlet/Outlet)	16	182	122	<1	21	12
Construction of Dam (Install Chimney) & Construction of Dam (Spillway)	15	189	121	<1	21	12
Construction of Dam (Spillway) & Construction of Treatment Facilities & Wetlands Installation	9	66	61	<1	7	3
Construction of Treatment Facilities & Wetlands Installation & Recreation Facilities Installation	11	84	70	<1	8	4
Maximum Daily Emissions	**21**	**236**	**198**	**1**	**50**	**18**
SCAQMD Thresholds of Significance	**75**	**100**	**550**	**150**	**150**	**55**
Exceeds Thresholds?	No	**Yes**	No	No	No	No

[a] Totals may not add up exactly due to rounding in the modeling calculations. Detailed emissions calculations are provided in Appendix B of this report.

[b] Emissions include fugitive dust control measures consistent with SCAQMD Rule 403, including subsection (e) – Additional Requirements for Large Operations.

[c] Set-up includes preconstruction activities and access routes/intersection improvement. Excavation includes excavation of sediment and excavation of dam. Construction includes Construction of Dam/Spillway/Reservoir, construction of facility, wetlands/riparian installation, recreational facilities installation, and demobilization.

SOURCE: ESA 2020.

The results of the mitigated criteria pollutant calculations are presented in **Table 8** and include dust control measures required to be implemented by SCAQMD Rule 403 (Control of Fugitive Dust), including subsection (e) – Additional Requirements for Large Operations and fugitive VOC control measures required to be implemented by architectural coating emission factors based on SCAQMD Rule 1113 (Architectural Coatings). As shown in Table 8, construction-related daily emissions would be reduced to below the SCAQMD threshold of significance for NOx with the implementation of Mitigation Measure AIR-1. Implementation of Mitigation Measure AIR-1 would slightly increase the emissions of CO due to the emissions control technology used, but would not result in CO emissions exceeding the SCAQMD's threshold of significance. For all other criteria pollutants, emission levels would remain below the applicable thresholds of significance. As the proposed project's maximum regional emissions from construction would not exceed the regional thresholds of significance with implementation of mitigation measures, the proposed project's regional construction emissions impacts would be less than significant.

General Conformity Determination

Annual emissions for unmitigated and mitigated emissions were compared to the General Conformity *de minimis* levels for NAAQS non-attainment areas (see **Table 9**). In the unmitigated scenario, annual construction emissions of NO_X, would exceed the 10 tons per year General Conformity threshold. With implementation of Mitigation Measure AIR-1, annual construction emissions of VOC, CO, NO_X, PM10, and PM2.5 would be below applicable General Conformity *de minimis* levels and thus would not conflict with implementation of the SIP. Additionally, short-term direct construction emissions associated with the project would not conflict with or obstruct implementation of applicable long-term air quality management plans. Therefore, no further conformity analysis is required for any of the pollutants because their emissions would be less than the conformity *de minimis* levels, and no significant adverse effect from the project would occur.

TABLE 8
ESTIMATED MAXIMUM MITIGATED REGIONAL CONSTRUCTION EMISSIONS (POUNDS PER DAY) [A]

Source	VOC	NO_X	CO	SO_2	PM10[b]	PM2.5[b]
Preconstruction Activities	3	45	51	<1	12	6
Access Routes/Intersection Improvements	1	9	47	<1	4	1
Excavation of Sediment/Existing Dam	5	33	112	<1	11	6
Construction of Dam/Spillway/Reservoir	4	51	106	<1	14	6
Construction of Treatment Facility	4	18	22	<1	2	1
Wetlands/Riparian Installation	2	14	16	<1	2	1
Installation of Recreational Facilities	1	5	45	<1	1	<1
Demobilization	2	13	25	<1	1	1
Max Geotechnical	10	97	139	<1	48	16
Overlapping Subphases						
Set-up & Geotechnical[c]	5	70	115	<1	25	10
Excavation & Geotechnical	8	59	176	<1	24	10
Construction & Geotechnical	8	76	170	<1	27	11
Maximum Reservoir Phase Overlap & Geotechnical	9	98	208	1	29	12
Dam Excavation & Construction of Dam (Install Inlet/Outlet)	7	72	144	<1	17	8
Construction of Dam (Install Chimney) & Construction of Dam (Spillway)	5	62	134	<1	16	7
Construction of Dam (Spillway) & Construction of Treatment Facilities & Wetlands Installation	7	43	66	<1	6	2
Construction of Treatment Facilities & Wetlands Installation & Recreation Facilities Installation	7	38	83	<1	6	2
Maximum Daily Emissions	**10**	**98**	**208**	**1**	**48**	**16**
SCAQMD Thresholds of Significance	**75**	**100**	**550**	**150**	**150**	**55**
Exceeds Thresholds?	No	**No**	No	No	No	No

[a] Totals may not add up exactly due to rounding in the modeling calculations. Detailed emissions calculations are provided in Appendix B of this report.

[b] Emissions include fugitive dust control measures consistent with SCAQMD Rule 403, including subsection (e) – Additional Requirements for Large Operations.

[c] Set-up includes preconstruction activities and access routes/intersection improvement. Excavation includes excavation of sediment and excavation of dam. Construction includes Construction of Dam/Spillway/Reservoir, construction of facility, wetlands/riparian installation, recreational facilities installation, and demobilization.

SOURCE: ESA 2020.

TABLE 9
GENERAL CONFORMITY[A]

Year	VOC	NO_X	CO	PM10[b]	PM2.5[b]
Unmitigated Emissions (tons/year)					
2022	<1	4	3	1	<1
2023	1	15	10	2	1
2024	1	19	11	2	1
2025	1	9	6	1	<1
2026	<1	1	1	<1	<1
Annual Emissions	1	19	11	2	1
***De minimis* Levels**	10	**10**	100	100	70
Exceeds *de minimis*?	No	**Yes**	No	No	No
Mitigated Emissions (tons/year)[c]					
2022	<1	1	3	<1	<1
2023	1	5	13	1	1
2024	<1	7	12	2	1
2025	<1	3	7	1	<1
2026	<1	1	1	<1	<1
Annual Emissions	1	7	13	2	1
***De Minimis* Levels**	10	10	100	100	70
Exceeds *de minimis*?	No	No	No	No	No

[a] Totals may not add up exactly due to rounding in the modeling calculations. Detailed emissions calculations are provided in Appendix B of this report.
[b] Emissions include fugitive dust control measures consistent with SCAQMD Rule 403, including subsection (e) – Additional Requirements for Large Operations.
[c] Incorporates Mitigation Measure AIR-1.

SOURCE: ESA 2020.

Operations

Regional Emissions Analysis

As discussed previously, operational activities would result in area source emissions and an increase in electrical consumption. No new permanent vehicle trips would occur as maintenance and recreational activities are anticipated to remain the same as the existing conditions. Operational vehicle trips during the first five years of maintenance would equal 12 to 24 round trips for 30 to 40 days per year. However, these trips would not result in substantial daily or annual emissions. Operational regional criteria pollutant emissions were calculated for the proposed project's buildout year of 2026 and emissions were assumed not to exceed 1 pound per day for all criteria pollutants during operational activities. Detailed emissions calculations are provided in Appendix B of this

report. The proposed project's operational-related daily emissions would not exceed the SCAQMD thresholds of significance for any criteria pollutants. As the proposed project's maximum regional emissions from operational activities would be below the regional thresholds of significance, regional operation-related emissions impacts would be less than significant.

General Conformity Analysis

Daily operational emissions are less than one pound per day for all criteria pollutants. Therefore, annual emissions would be less than 0.2 tons per year, well below any of the de minimis thresholds, thus in conformance with the SIPs. Additionally, operational emissions associated with the proposed project would not conflict with or obstruct implementation of applicable long-term air quality management plans. Therefore, no further conformity analysis is required for any of the pollutants because their emissions would be less than the conformity thresholds and no significant adverse effect from the project would occur.

Health Impact Assessment

NOx and VOC emissions from projects are directly related to the increase in ozone in the local area/region which aggravate respiratory diseases, leading to respiratory symptoms (such as coughing, wheezing or difficulty breathing), hospital admissions and visits to emergency rooms and may contribute to the development of asthma and potentially increase susceptibility to respiratory infections. As shown in Table 7, unmitigated project-related construction emissions would potentially exceed regional thresholds for NO_X. Accordingly, elevated levels of criteria air pollutants as a result of a project's emissions could cause adverse health effects associated with this pollutant. All other criteria pollutants would be below the thresholds of significance. Implementation of Mitigation Measure AIR-1 would reduce both localized (discussed in detail in Impact 3 below) and regional project generated construction emissions (with the exception of CO, which increases slightly with Mitigation Measure AIR-1 but still remains below the threshold of significance), and therefore would reduce the potential to result in regional health effects associated with ozone precursors (VOC and NO_X). As shown in Table 8, mitigated project construction emissions would not exceed the thresholds of significance. As a result, construction of the proposed project would not have the potential to result in additional quantifiable health impacts, and impacts would be reduced to a less than significant level with implementation of Mitigation Measure AIR-1.

As discussed under operational emissions above, unmitigated project-related operational emissions would not exceed regional thresholds for any criteria pollutant. Accordingly, levels of criteria air pollutants as a result of a project's emissions are not anticipated to cause adverse health effects. Impacts would be less than significant.

Mitigation:

Implement Mitigation Measure AIR-1.

Significance Determination: Less than Significant Impact with Mitigation.

Threshold AIR-3 Expose sensitive receptors to substantial pollutant concentrations.

Impact AIR-3: Implementation of the proposed project would not expose sensitive receptors to substantial pollutant concentrations. (Less than Significant with Mitigation)

Localized Construction

The maximum daily localized emissions for each of the construction phases and the localized significance thresholds are presented in **Table 10**. The same phasing, equipment assumptions, and compliance with SCAQMD Rule 403 and Rule 1113 were used as for the regional emissions calculations discussed above. As shown in Table 10, maximum localized construction emissions for sensitive receptors would exceed the localized threshold of significance for NO_X, therefore, with respect to localized construction emissions, impacts to sensitive receptors would be potentially significant. All other criteria pollutants of local concern (CO, PM10, and PM2.5) would not exceed the localized thresholds of significance. Detailed emissions calculations are provided in Appendix B of this report.

The results of the mitigated localized emissions calculations are presented in **Table 11**. And include dust control measures required to be implemented by SCAQMD Rule 403 (Control of Fugitive Dust), including subsection € – Additional Requirements for Large Operations and fugitive VOC control measures required to be implemented by architectural coating emission factors based on SCAQMD Rule 1113 (Architectural Coatings). As shown in Table 11, construction-related daily emissions would be reduced to below the SCAQMD threshold of significance of significance for NO_X with the implementation of Mitigation Measure AIR-1. Implementation of Mitigation Measure AIR-1 would slightly increase CO emissions due to the emissions control technology used, but would not result in CO emissions exceeding the SCAQMD's threshold of significance. For all other criteria pollutants, emissions levels would remain below the applicable thresholds of significance. As the proposed project's maximum localized emissions from construction would not exceed the localized thresholds of significance, localized construction emissions impacts would be less than significant with the incorporation of Mitigation Measure AIR-1.

TABLE 10
ESTIMATED MAXIMUM UNMITIGATED LOCALIZED CONSTRUCTION EMISSIONS (POUNDS PER DAY) [a]

Source	NO_X	CO	PM10[b]	PM2.5[b]
1 acre area – 164 feet (50 meters) from sensitive receptors				
Mobilization, site prep/Staging Areas	44	41	2	2
Access Routes/Intersection Improvements	42	33	5	2
Construction of Facility	9	11	0	0
Installation of Recreational Facilities	42	33	3	2
Demobilization	21	19	1	1
Spillway & Facilities & Wetlands	41	44	3	2
Facilities & Wetlands & Recreational	65	57	5	3
Maximum Localized (On-Site) Emissions	65	57	5	3
SCAQMD Thresholds of Significance	52	883	11	4
Exceed Thresholds?	**Yes**	No	No	No
5 acre area – 328 feet (100 meters) from sensitive receptors				
Preconstruction Activities	55	26	11	7
Excavation of Sediment/Existing Dam	**132**	91	15	10
Construction of Dam/Spillway/Reservoir	**128**	78	15	10
Wetlands/Riparian Installation	14	13	1	1
Dam Excavation & Inlet/Outlet	**144**	102	16	10
Chimney & Spillway Construction	**145**	98	15	10
Max Geotechnical	176	186	37	11
Maximum Localized (On-Site) Emissions	**176**	**186**	37	11
SCAQMD Thresholds of Significance	112	2,763	49	16
Exceed Thresholds?	**Yes**	No	No	No

[a] Totals may not add up exactly due to rounding in the modeling calculations. Detailed emissions calculations are provided in Appendix B of this report.

[B] Emissions include fugitive dust control measures consistent with SCAQMD Rule 403.

SOURCE: ESA 2020.

TABLE 11
ESTIMATED MAXIMUM MITIGATED LOCALIZED CONSTRUCTION EMISSIONS (POUNDS PER DAY) [a]

Source	NO_X	CO	PM10[b]	PM2.5[b]
1 acre area – 164 feet (50 meters) from sensitive receptors				
Mobilization, site prep/Staging Areas	20	50	1	1
Access Routes/Intersection Improvements	4	44	3	<1
Construction of Facility	2	12	<1	<1
Installation of Recreational Facilities	4	44	1	<1
Demobilization	13	24	<1	<1
Spillway & Facilities & Wetlands	18	50	2	1
Facilities & Wetlands & Recreational	19	70	3	1
Maximum Localized (On-Site) Emissions	20	70	3	1
SCAQMD Thresholds of Significance	52	883	11	4
Exceed Thresholds?	**No**	**No**	1	1
5 acre area – 328 feet (100 meters) from sensitive receptors				
Preconstruction Activities	8	35	9	5
Excavation of Sediment/Existing Dam	32	109	11	6
Construction of Dam/Spillway/Reservoir	14	88	10	5
Wetlands/Riparian Installation	13	14	1	<1
Dam Excavation & Inlet/Outlet	34	124	12	6
Chimney & Spillway Construction	17	111	10	5
Max Geotechnical	96	234	37	11
Maximum Localized (On-Site) Emissions	96	234	37	11
SCAQMD Thresholds of Significance	112	2,763	49	16
Exceed Thresholds?	**No**	**No**	**No**	**No**

[a] Totals may not add up exactly due to rounding in the modeling calculations. Detailed emissions calculations are provided in Appendix B of this report.
[b] Emissions include fugitive dust control measures consistent with SCAQMD Rule 403.

SOURCE: ESA 2020.

Localized Operations

The localized operational air quality analysis was conducted using the methodology prescribed in the SCAQMD Localized Significance Threshold Methodology (June 2003, revised July 2008). The screening criteria provided in the Localized Significance Threshold Methodology were used to determine the localized operational thresholds of significance for the proposed project. The maximum daily localized emissions would not exceed 1 pound per day and therefore would not

exceed localized significance thresholds. Detailed emissions calculations are provided in Appendix B of this report. As the proposed project's maximum localized operational emissions would not exceed the localized thresholds of significance for NO_X, CO, PM10, or PM2.5, operational emissions impacts to sensitive receptors would be less than significant.

Toxic Air Contaminants

Carcinogenic Health Risk

Excess lifetime cancer risk is estimated as the upper-bound incremental probability that an individual will develop cancer over a lifetime as a direct result of exposure to carcinogens. As the individual incremental increase in lifetime cancer risk is assessed over long exposure time periods (i.e., 30-year for residential receptors), the potential effects of proposed project-related carcinogenic TAC emissions must include the combination of exposure to construction-related activities and exposure to operation-related activities. For cancer risk, SCAQMD guidance identifies a significant impact if a project would result in an incremental cancer risk that is greater than 10 in one million for any receptor.

The TAC emissions of the proposed project would be generated from mobile sources including diesel-powered heavy-duty trucks and construction equipment. These sources generate DPM from combustion of diesel fuels. The analysis uses exhaust PM10 emissions associated with each construction phase as a surrogate for DPM emissions. The potential emission sources of DPM would be diesel-fueled heavy-duty equipment, on-road travel and idling emissions from diesel-fueled haul trucks. For operational activities the proposed project would not result in new TAC sources and therefore would not contribute to the cumulative health risk of the local sensitive receptors.

The maximum health risk impacts to exposed sensitive receptors was determined through placing receptor locations around the proposed project site and haul truck routs. The estimated incremental cancer risks for the proposed project's construction activities over a maximum 30-year exposure in line with OEHHA guidance starting with the first year of construction as analyzed. Cancer risk for the maximum impacted sensitive receptor is 11.16 per million which would exceed the SCAQMD's threshold of 10 per million. As the cancer risk would exceed the SCAQMD's significance thresholds, the lifetime cancer risk that would result from construction and operation of the proposed project would result in significant impacts without mitigation.

Implementation of Mitigation Measure AIR-1, would reduce DPM emissions from the proposed project's construction activities. The estimated incremental cancer risk for the proposed project's construction activities with implementation of Mitigation Measure AIR-1 would be between 1.43 per million and 3.44 per million depending on the level at which the mitigation is implemented. This range is below the significance threshold of 10 per million. Therefore, with mitigation impacts would be less than significant.

Non-carcinogenic Health Risk

As previously discussed, an HRA was prepared to evaluate the risk of potential non-carcinogenic negative health outcomes related to TACs exposure from airborne emissions during the

construction of the proposed project. For construction, the potential TAC emission sources were heavy-duty equipment and haul/vendor trucks used during the improvements to the reservoir. Non-cancer effects of chronic (i.e., long- term) exposure were evaluated using the HI approach consistent with the OEHHA and SCAQMD guidance.

A chronic HI equal to or greater than 1.0 represents a significant chronic health hazard. A chronic health effect could include irritation to eyes, throat, lungs or neurological damage. Construction of the proposed project would result in non-carcinogenic health risk of 0.02 under the unmitigated scenario and between 0.004 and 0.02 with implementation of mitigation. Both unmitigated and mitigated non-carcinogenic health risk would be below the significance threshold of a chronic HI of 1.0 for the maximum impacted receptor. Therefore, this this impact would be less than significant.

Mitigation:

Implement Mitigation Measure AIR-1.

Significance Determination: Less than Significant Impact with Mitigation.

Threshold AIR-4	Result in other emissions (such as those leading to odors) affecting a substantial number of people.

Impact AIR-4: Implementation of the proposed project would not result in other emissions (such as those leading to odors adversely affecting a substantial number of people). (Less than Significant)

Construction

Potential activities that may emit odors during the proposed project's construction include the use of architectural coatings and solvents, as well as the combustion of diesel fuel in on-and off-road equipment. SCAQMD Rule 1113 would limit the amount of VOCs in architectural coatings and solvents. In addition, the proposed project would comply with the applicable provisions of the CARB Air Toxics Control Measure regarding idling limitations for diesel trucks. Through mandatory compliance with SCAQMD Rules, no construction activities or materials are expected to create objectionable odors affecting a substantial number of people. Furthermore, as shown in Table 7, construction emissions would not exceed the SCAQMD regional significance thresholds for attainment, maintenance, or unclassifiable criteria air pollutants (i.e., CO and SO_2). Therefore, the proposed project's construction activities would result in less than significant impacts with respect to other emissions, including those leading to odors.

Operations

According to the SCAQMD *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 not include any uses identified by the SCAQMD as being associated with substantial odors. As a result, the proposed project is not expected to discharge contaminants into the air in quantities that would cause a nuisance, injury, or annoyance to the public or property pursuant to SCAQMD Rule 402. Furthermore, as discussed under Impact AIR-2 above, operational emissions would not exceed the SCAQMD regional significance thresholds for attainment, maintenance, or unclassifiable criteria air pollutants (i.e., CO and SO_2). Therefore, operation of the proposed project would result in less than significant impacts with respect to other emissions, including those leading to odors.

Mitigation: None required.

Significance Determination: Less Than Significant Impact.

3.3 Greenhouse Gas Impacts

Threshold GHG-1 Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment.

Impact GHG-1: Implementation of the proposed project would not generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment. (Less than Significant)

According to SCAQMD methodology, because GHG emissions are a cumulative impact, project significance is determined by the combined amortized construction and operational emissions. The proposed project's total estimated GHG emissions during construction are identified in **Table 12**. As shown, estimated GHG emissions would be approximately 9,567 $MTCO_2e$ over the entire lifetime of the project. This would equal approximately 319 $MTCO_2e$ per year after amortization over 30 years per SCAQMD methodology.

Operational GHG emissions result from area sources and the increased electrical use as a result of daily activities once the proposed improved reservoir is operational. **Table 13** shows the total annual GHG emissions associated with the combined construction and operation of the proposed project. As shown in Table 13, operational emissions result in 161 $MTCO_2e$ annually, which is attributed almost exclusively to increased electrical use.

TABLE 12
AMORTIZED ANNUAL CONSTRUCTION GHG EMISSIONS

Source	$MTCO_2e$
Vegetation Clearing	483
Access Routes/Intersection Improvements	434
Mobilization, site prep/Staging Areas	208
Upstream Excavation and Foundation Treatment	1,127
Dam Excavation and Foundation Treatment	689
Install Inlet/Outlet	308
Install Embankment to Bottom of Blanket Drain	643
Install Blanket Drain	546
Install Chimney/Remaining Embankment	3,856
Spillway Construction	152
Construction of Filtration/Chlor/Dechlor Facility	566
Wetlands/Riparian Installation	161
Installation of Recreation Facilities	288
Demobilization	97
Maximum Geotechnical (23 tests)	20
Total Project Construction Emissions	**9,567**
Amortized Project Construction Emissions	**319**

SOURCE: ESA 2020.

TABLE 13
ANNUAL OPERATIONAL GHG EMISSIONS

Source	$MTCO_2e$
Area	<1
Energy	157
Mobile Source	4
Waste	0
Water	0
Subtotal Operational Emissions	**161**
Amortized Project Construction Emissions	319
Total Project Emissions	**480**
District-wide energy savings	535
Total Net Emissions	(55)
Screening Level	3,000
Exceed Screening Level?	No

SOURCE: ESA 2020.

Furthermore, the objectives of the proposed project include reducing the need to purchase supplemental imported untreated water from MWD by storing recycled water that is already produced. Conveying imported untreated water from the State Water Project (SWP) and the Colorado River to Orange County requires a tremendous amount of energy for pumping. Replacing imported water with locally generated recycled water reduces the overall energy associated with imported water since there would be less energy needed for conveyance. Approximately 1,890 kWh per acre foot is required for water supply and conveyance in the IRWD service area due to importing water from outside of the region from the SWP and the Colorado River (IRWD 2019). Without the proposed project, approximately 4,500 AF of untreated water would be imported through MWD, resulting in approximately 8,505,000 kWh/year of electricity consumption. Under the proposed project, the provision of approximately 4,500 AF of locally-produced recycled water would result in approximately 4,806,000 kWh/year of electricity consumption, which is an approximate savings of 3,699,000 kWh annually.

The combined annual construction and operational emissions from the proposed project result in approximately 480 $MTCO_2e$. The district-wide savings in approximately 3,699,000 kWh annually results in a reduction in district emissions of approximately 535 MT CO_2e annually and results in a district wide reduction in GHG emissions of approximately 55 $MTCO_2e$ annually.[11] As the proposed project's annual GHG emissions would not exceed the threshold of significance, emissions impacts with respect to the generation of GHGs would be less than significant.

Mitigation: None required.

Significance Determination: Less Than Significant Impact.

Threshold GHG-2 Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of GHGs.

Impact GHG-2: Implementation of the proposed project would not conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of GHGs. (Less than Significant)

Consistency with the Climate Change Scoping Plan

The CARB Climate Change Scoping Plan was designed to reduce GHG emissions from new land use projects. The proposed project would be subject to the Scoping Plan requirements. The majority of the Scoping Plan measures target measures that reduce energy and transportation emissions from residential and commercial/industrial development and therefore the majority of the Scoping Plan measures are not applicable to the proposed project. Out of the Recommended Actions contained in CARB's Scoping Plan, the actions that are most applicable to the proposed program would be reducing diesel-fueled commercial motor vehicle idling, and reducing energy associated with water

[11] 1,082,727 kWh of net increase in electrical use results in 157 $MTCO_2e$ annually. 3,699,000 kWh of electric use results in approximately 535 $MTCO_2e$ annually. Project emissions (480 $MTCO_2e$) minus the district emissions (535 $MTCO_2e$) equals a 55 $MTCO_2e$ annual reduction in district emissions from the implementation of the project.

use. The proposed project would be designed to comply with the California regulations to limit idling of onsite vehicles to 5 minutes or less per location.

The objectives of the proposed project include reducing the need to purchase imported water from MWD by storing and using additional recycled water stored by the proposed project and maximize the use of recycled water produced by IRWD for the benefit of IRWD customers. Once operational, the proposed project would increase the amount of recycled water available within IRWD and therefore would reduce the emissions associated with the transport of non-potable water from other sources. Replacing purchased imported water with locally generated recycled water for use by local customers reduces the overall energy-related GHG emissions associated with the purchase of imported water since there would be less GHG emissions from water supply and conveyance. Approximately 1,890 kWh per acre foot is required for water supply and conveyance in the IRWD service area due to importing water from outside of the region from the SWP and the Colorado River (IRWD 2019). Without the proposed project approximately 4,500 AF of untreated water would be imported through MWD, resulting in approximately 8,505,000 kWh/year of electricity consumption district-wide. Treatment and transport of approximately 4,500 AF of locally-produced recycled water would result in approximately 4,806,000 kWh/year of district-wide electricity consumption, which is an approximate savings of 3,699,000 kWh annually. By providing IRWD customers with recycled water stored under the proposed project, electricity used for water supply and conveyance from imported water would be offset by the recycled water, thus reducing district-wide GHG emissions. The 2017 Climate Change Scoping Plan recognizes the nexus between water and energy consumption. The water-energy nexus provides opportunities for reducing energy demand and reducing emissions of GHGs. The 2017 Climate Change Scoping Plan, states that "recycled water has the potential to reduce GHGs if it replaces, and not merely serves as an alternative to, an existing, higher-carbon water supply" (CARB 2017a). Thus, the proposed project would be consistent with the Scoping Plan's strategy to reduce water-related GHG emissions.

As the proposed project would not increase traffic within the region, and would reduce the overall energy-related GHG emissions associated with the use of imported water, the proposed project would not conflict with the Scoping Plan. That combined with the reduction in vehicle idling, the proposed project would be consistent with the Scoping Plan measures applicable to the project. Therefore, the proposed project would result in less than significant impacts.

Consistency with SB 375

The key goal of the Sustainable Communities Standard is to achieve GHG emission reduction targets through integrated land use and transportation strategies. The focus of these reductions is on transportation and land use strategies that influence vehicle travel. The proposed project would not significantly or permanently increase vehicle traffic within the County or the region. While the proposed project would result in an increase in short-term employment compared to existing conditions, the project would not result in long-term employment growth in excess of regional projections by SCAG. Therefore, the proposed project would not conflict with the implementation of SB 375 nor the 2020-2045 RTP/SCS and impacts would be less than significant.

Consistency with Applicable Regulations

The Heavy-Duty Vehicle and Light-Duty vehicle rules have been established to reduce CO2 emissions from the combustion of fossil fuels. The proposed project would not involve the manufacture of vehicles or production of vehicle fuels. However, vehicles that are purchased and used within the project site would comply with any vehicle and fuel standards that the CARB adopts or has adopted. Therefore, the construction and operation of the proposed project would not conflict with these regulations.

CARB's ATCM limits heavy-duty diesel motor vehicle idling to reduce DPM and other TACs and applies to all the haul trucks, heavy duty vendor trucks, and construction equipment that would be used on the project site. CARB also implemented the Truck and Bus Regulation to further reduce NOx, PM10 and PM2.5 from on-road diesel operating vehicles. CARB has also promulgated emissions standards for off-road diesel construction equipment greater than 24 horsepower to reduce criteria pollutant emissions. The proposed project would operate both on- and off-road trucks and construction equipment. These vehicles would comply with all of the CARB regulations and onsite trucks and equipment would be monitored to ensure that idling would occur for only five minutes at any given time. Therefore, the proposed project would be consistent with the applicable regulations for heavy-duty, light-duty and off-road vehicles and equipment and impacts would be less than significant.

Mitigation: None required.

Significance Determination: Less Than Significant Impact.

3.4 Cumulative Air Quality Impacts

The following cumulative impact analysis is based on the recommendations provided by SCAQMD in the Potential Control Strategies to Address Cumulative Impacts from Air Pollution White Paper. SCAQMD's guidance for assessing a project's cumulative impacts recommends the use of two alternative methodologies: (1) that project-specific air quality impacts be used to determine the project's potential cumulative impacts to regional air quality; or (2) that a project's consistency with the AQMPs are used to determine its potential cumulative impacts.

Under SCAQMD's guidance, "[p]rojects that exceed the project-specific significance thresholds are considered by SCAQMD to be cumulatively considerable. This is the reason project-specific and cumulative significance thresholds are the same. Conversely, projects that do not exceed the project-specific thresholds are generally not considered to be cumulatively significant." Therefore, consistent with this guidance, the potential for the Proposed Project to results in cumulative impacts from regional emissions is assessed based on SCAQMD thresholds.

Consistency with AQMP

As described above under Impact AIR-1, construction of the proposed project would not be consistent with the AQMP as the proposed project would generate emissions of nonattainment pollutants or precursors (i.e., NO_X) that exceed the applicable significance thresholds. Based on

SCAQMD guidance, the exceedance of these thresholds indicates that the proposed project would have a considerable contribution to a significant impact. Construction-related daily emissions would be reduced to below the SCAQMD threshold of significance for NO_X with the implementation of Mitigation Measure AIR-1. Implementation of this mitigation measure would slightly increase the emissions of CO due to the emissions control technology used, but would not result in CO emissions exceeding the SCAQMD's threshold of significance. For all other criteria pollutants, emission levels would remain below the applicable thresholds of significance. As the proposed project's maximum regional emissions from construction would not exceed the regional thresholds of significance, the proposed project would be consistent with the AQMP and cumulative impacts would be less than significant.

Operation of the proposed project would be consistent with the AQMP as the proposed project would not generate emissions of nonattainment pollutants or precursors (i.e., VOC, NO_X, CO, SOx, PM10, and PM2.5) that exceed the applicable significance thresholds. Therefore, the proposed project would result in a less than significant cumulative operational impact.

Project-Specific Impacts

Construction

As described above under Impact AIR-2 and Impact AIR-3, regional and localized emissions during construction of the proposed project would exceed the SCAQMD significance threshold for NO_X. Thus, based on SCAQMD methodology, the proposed project construction emissions would represent a considerable contribution to a cumulative impact, resulting in a potentially significant cumulative impact. The proposed project's construction-related daily emissions would be reduced to below the SCAQMD regional and local thresholds of significance for NO_X with the implementation of Mitigation Measure AIR-1. Implementation of Mitigation Measure AIR-1 would slightly increase the emissions of CO due to the emissions control technology used, but would not result in CO emissions exceeding the SCAQMD's threshold of significance. As the proposed project's maximum mitigated regional emissions from construction would not exceed the regional thresholds of significance, the proposed project would not represent a considerable contribution to a cumulative impact, resulting in a less than cumulative impact.

Operation

As discussed under Impact AIR-2 and Impact AIR-3, above, regional and localized operational emissions of VOC, NO_X, CO, PM10, and PM2.5 would not exceed the SCAQMD significance thresholds. Thus, based on SCAQMD methodology, the proposed project operational emissions would not represent a considerable contribution to a cumulative impact, resulting in a less than significant cumulative impact.

Mitigation

Implement Mitigation Measure AIR-1.

Significance Determination: Less than Significant Impact with Mitigation

3.5 Cumulative GHG Impacts

The GHG emissions of the proposed project alone would not cause a direct physical change in the environment. According to CAPCOA, "GHG impacts are exclusively cumulative impacts; there are no non-cumulative GHG emission impacts from a climate change perspective. (CAPCOA 2008)" It is global GHG emissions in their aggregate that contribute to climate change, not any single source of GHG emissions alone. The impact analysis of the project's GHG emissions and consistency with existing plans and policies related to GHG emissions provided above for the proposed project serves as a cumulative impact analysis. Therefore, as discussed above, the proposed project would be consistent with applicable plans, policies or regulations adopted for the purpose of reducing GHG emissions and the proposed project would not generate GHG emissions that would have a significant impact on the environment. As such, the proposed project would result in a less than cumulatively considerable impact related to applicable GHG emissions and GHG reduction plans and policies and cumulative impacts would be less than significant.

Mitigation Measures

None required

Significance Determination: Less than Significant Impact

SECTION 4
References

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Appendix C

Biological Resources Technical Report

ESA

SYPHON RESERVOIR IMPROVEMENT PROJECT

Biological Resources Technical Report

Prepared for
Irvine Ranch Water District

March 2021

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Prepared for
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March 2021

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SYPHON RESERVOIR IMPROVEMENT PROJECT

Biological Resources Technical Report

1.0 Introduction

This report presents the findings of a biological resources assessment conducted by Environmental Science Associates (ESA) for the Syphon Reservoir Improvement Project (proposed project) within an approximately 265-acre study area ("study area") located in unincorporated Orange County, California. The Syphon Reservoir is an existing recycled water storage reservoir in Irvine Ranch Water District's (IRWD) service area. IRWD is limited in its ability to supply recycled water to its customers year-round with its existing recycled water storage capacity. The proposed project would increase the capacity of the existing Syphon Reservoir and replace the existing engineered dam with a new and larger engineered dam, while meeting or exceeding the current safety and design requirements. The proposed project would allow the storage of additional recycled water by expanding the reservoir's storage capacity from the current 500 acre-feet (AF) to approximately 5,000 AF, which would help IRWD become more self-sufficient and increase IRWD's water supply reliability by reducing its dependence on costly and less-reliable imported water.

This report documents the results of a literature review, biological surveys, and describes the environmental setting of the study area, including plant communities, habitats, and special-status biological resources that have been documented on-site or have the potential to occur on-site. In addition, the report includes an analysis of potential direct or indirect project-related impacts to special-status biological resources within the context of applicable environmental regulations and provides recommendations to mitigate these effects. The purpose of this study is to satisfy the requirements of the California Environmental Quality Act (CEQA), and to supplement subsequent regulatory processing pursuant to Section 1602 of the California Fish and Game Code (FGC) and potential coordination with State and federal agencies regarding Sections 404 and 401 of the Clean Water Act (CWA). Syphon Reservoir is located within the Orange County Central & Coastal Subregions Natural Community Conservation Plan/Habitat Conservation Plan (NCCP/HCP) and is recognized as an operating reservoir in the NCCP/HCP Reserve. Implementation of expanded seasonal storage for recycled water purposes was also anticipated and identified as a permitted use in the NCCP/HCP.

1.1 Project Location

The study area is located in central Orange County in southern California (**Figure 1**). Specifically, the study area is located northeast of Portola Parkway between Bee Canyon Access Road and State Route 133 (SR-133) (**Figure 2**). IRWD owns the majority of the property bounded by these thoroughfares. An athletic complex including tennis courts and parking area is also located between Portola Parkway and the base of the existing dam. Residential neighborhoods are located southwest of Portola Parkway. The land-form surrounding the reservoir is moderately hilly with ridgelines and terraced slopes. Elevations at the site range from approximately 320 feet above mean sea level (amsl) at Portola Parkway immediately below the existing reservoir to approximately 675 feet amsl in the northeast corner of the study area.

1.2 Project Purpose and Background

The purpose of the proposed project is to increase the recycled water storage capacity at Syphon Reservoir in order to meet the seasonal demand of recycled water customers and to enhance IRWD's water supply reliability. Water recycling is an essential component of IRWD's water supply portfolio, as any demand met with recycled water reduces the demand for high-quality drinking water. The expansion of Syphon Reservoir would assist in meeting projected demands within the service area by allowing the storage of additional recycled water produced at IRWD's Michelson Water Recycling Plant (WRP) during periods of low demand (winter months) for use during periods of high demand (summer months). Although IRWD's existing recycled water reservoirs provide some storage for recycled water, once the storage reservoirs are full to capacity in winter months, recycled water supplies are either diverted to Orange County Sanitation District (OCSD) or discharged to the ocean. During the dry summer season, when irrigation demands are highest, service area demand for recycled water depletes existing reservoir storage and exceeds the rate at which new recycled water is produced by the WRPs. IRWD must then purchase costly supplemental imported water from Metropolitan Water District of Southern California (MWD) to meet the seasonal demands of IRWD's recycled water customers. Based on projected demands and supplies, IRWD estimates that it will need 4,500 AF of additional recycled water storage capacity by the year 2030 to meet demand. The expansion of Syphon Reservoir's storage capacity from the current 500 AF to approximately 5,000 AF would help IRWD become more self-sufficient by reducing its dependence on costly and less-reliable imported water during summer months, and would increase the use of recycled water to maintain community landscaping, as well as agricultural, business, and industrial uses. IRWD produces up to 28 million gallons of recycled water every day at its WRPs. Every gallon of recycled water IRWD uses for these non-drinking water purposes saves a gallon of drinking water. The proposed project would prepare IRWD for the future by storing more drought-proof water, helping the region better withstand future water shortages. By expanding water recycling infrastructure, the proposed project would be consistent with California Water Code Section 13512, which states, "[i]t is the intention of the Legislature that the state undertake all possible steps to encourage development of water recycling facilities so that recycled water may be made available to help meet the growing water requirements of the state."

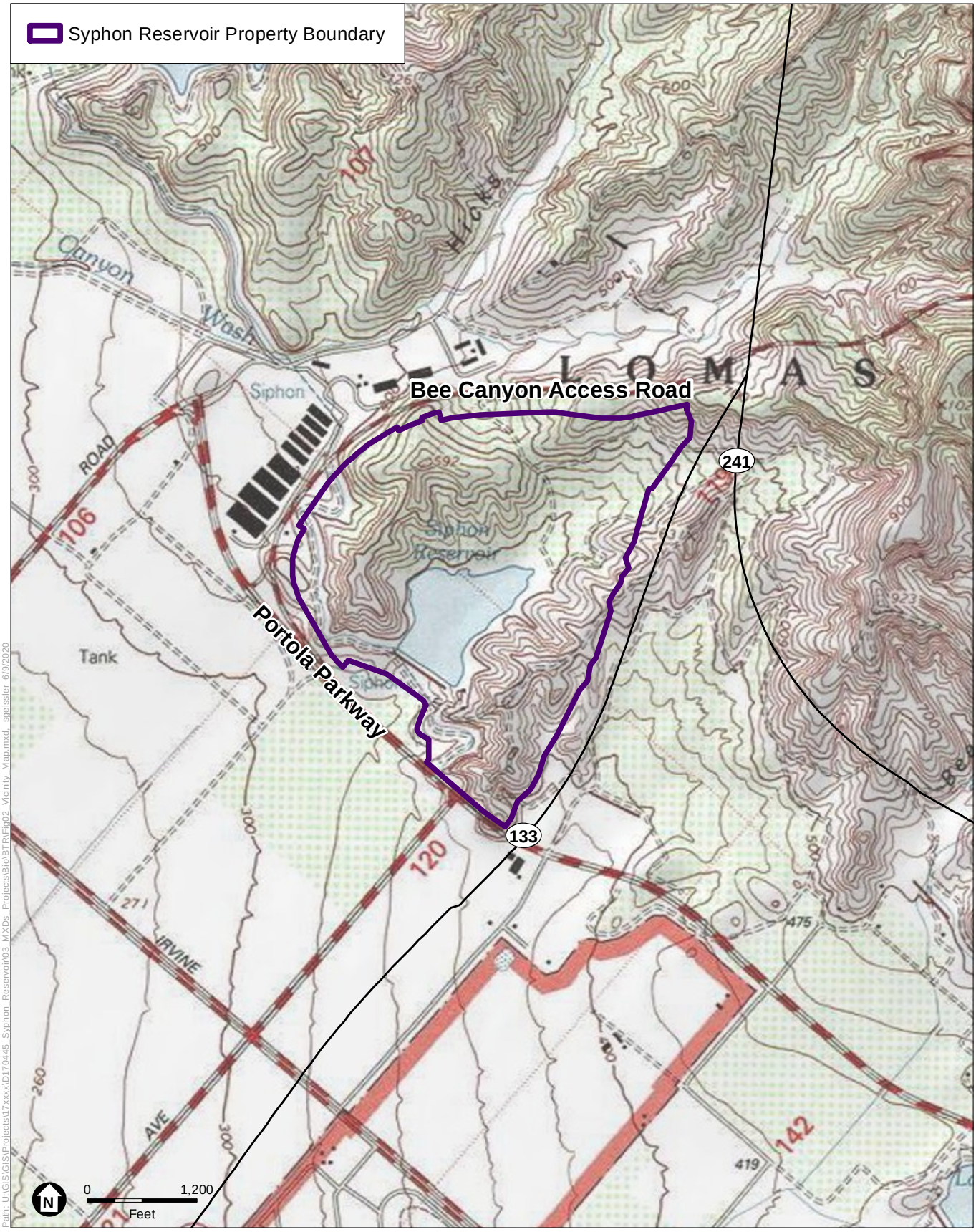


SOURCE: ESRI, 2016; OC LAFCO, 2018

Syphon Reservoir Improvement Project

Figure 1
Regional Map

ESA



SOURCE: ESRI, 2016; El Toro USGS 7.5 minute Quadrangle

Syphon Reservoir Improvement Project

Figure 2
Vicinity Map

ESA

IRWD acquired Syphon Reservoir in 2010 from the Irvine Company (TIC). Multiple studies and activities have occurred within the study area to support use of the reservoir to store recycled water. In 2012, IRWD prepared the Syphon Reservoir Expansion Engineering Feasibility Study (GEI 2012), which provided baseline geotechnical information for the study area. This study was limited in the location and number of borings conducted due to requirements to remain within existing roadways on-site and to avoid vegetation disturbance. In 2013, IRWD implemented the Syphon Reservoir Interim Facilities Project, which included minor improvements to integrate the reservoir into IRWD's recycled water system. In 2016, IRWD conducted a dry lakebed geotechnical exploration to obtain information on the extent and character of sediments that have accumulated in the reservoir over time (GEI 2016). In 2019, IRWD implemented the Syphon Reservoir Geotechnical Investigations Project, which provided details about the geologic and geotechnical baseline conditions at Syphon Reservoir in order to inform the design of an enlarged reservoir (ESA 2019b). The existing reservoir has been operated for many years based on the supply and demand for recycled water. Generally, this means water levels tend to be high in the winter months when demand is lower and the reservoir level is typically lower in the spring and summer as demand increases. Despite considerable fluctuation of water levels in the reservoir, this fairly typical operation where average water levels are higher in the winter and early spring, has resulted in the establishment of a substantial fringe of freshwater marsh and woody riparian habitat around the perimeter of the reservoir. It is important to recognize that the presence of natural habitat areas within this artificial system is completely incidental to the purpose of the reservoir, and may be considered an unintended benefit to wildlife in the area.

In addition, part of the area surrounding the reservoir was previously used by the Transportation Corridor Agencies (TCA) to mitigate impacts to natural areas associated with construction of part of the Eastern Transportation Corridor Project (Dudek 2012). Between 1995 and 2000, approximately 102 acres of the study area were preserved and 112 acres were restored to native coastal sage scrub habitat as mitigation for the TCA Eastern Transportation Corridor Project's impacts to coastal California gnatcatcher. Restoration activities involved removal of orchard trees, native coastal sage scrub planting, temporary irrigation, and monitoring. The revegetation was successfully completed in accordance with regulatory requirements and supported mature coastal sage scrub suitable for California gnatcatcher (Dudek 2012). When IRWD acquired Syphon Reservoir from TIC, the Conveyance Agreement included a Grant Deed over 219 acres of the property with use restrictions to provide for the conservation of biological resources associated with that mitigation. The Grant Deed includes provisions to "install, maintain, repair and replace improvements to enhance the safety or capacity of the Reservoir Facilities," that are "subject to receipt of approvals from applicable governmental agencies." Coordination with the third-party beneficiaries of the Grant Deed (i.e., TCA and U.S. Fish and Wildlife Service [USFWS]) is required. Since 2018, IRWD has been engaged with USFWS and CDFW regarding appropriate options that will satisfy these agencies with regard to mitigation for upland habitat in consideration of the Grant Deed provisions as well as the relevant NCCP/HCP requirements.

1.3 Project Description

The proposed project primarily involves the expansion of three on-site facilities: Syphon Reservoir Dam, Syphon Reservoir, and Syphon Reservoir Treatment Facilities (**Figure 3A**).

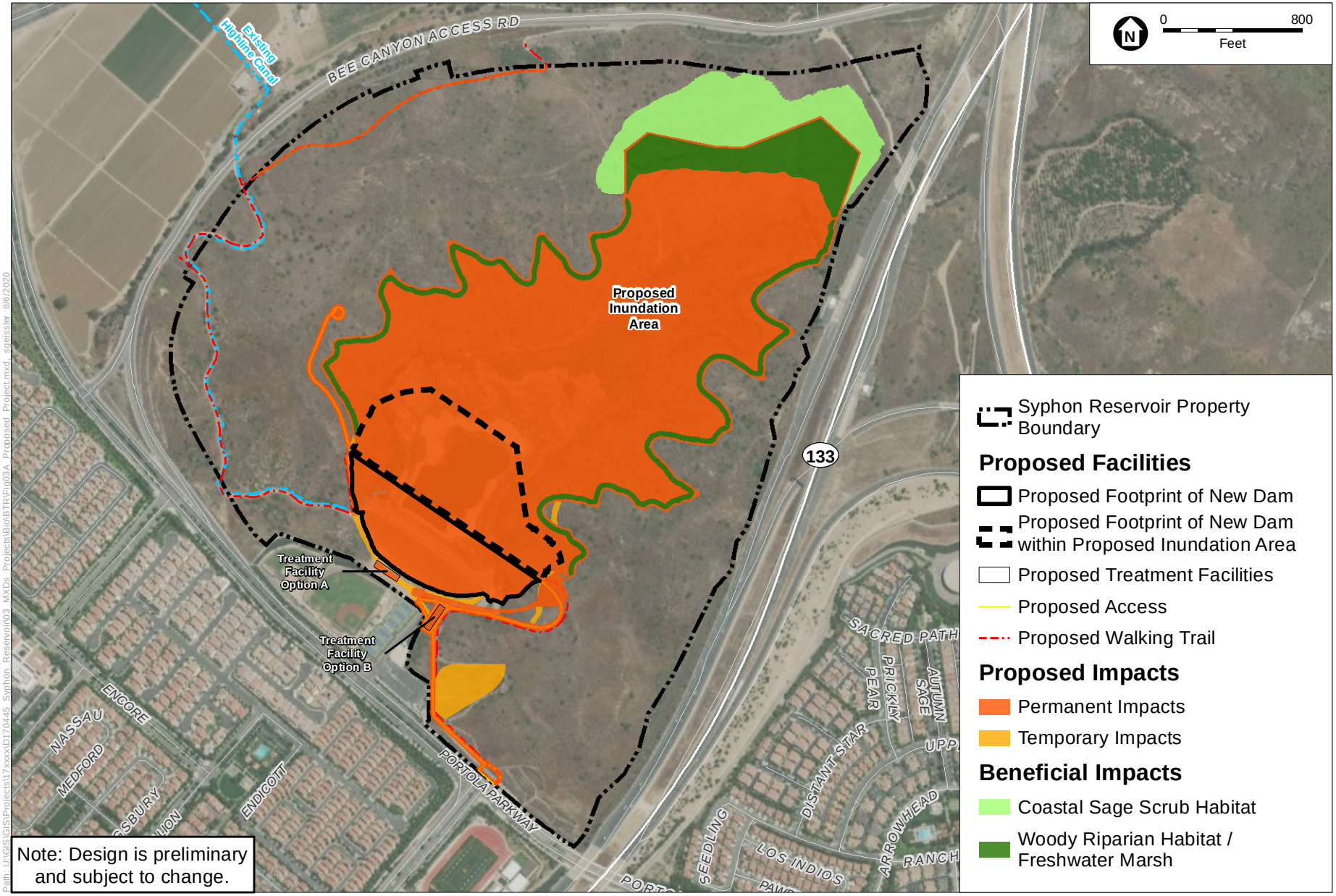
Other operational design features would include an internal seepage control system within the new engineered dam; a circulation/aeration system for the reservoir; new on-site access and maintenance roads; wetland and riparian mitigation areas; and potential recreational facilities. These proposed project facilities and components are described further below. It should be noted that sizes, dimensions, and locations of the various project components and configurations as further described herein, are based on feasibility-level evaluations and are subject to change with final design.

The delivery of recycled water to and from Syphon Reservoir would be accomplished with existing off-site facilities. Modifications to off-site facilities would be limited to the addition of pumps within the existing structures as further described below. The existing Highline Canal would be abandoned in place and no longer used to deliver water to Syphon Reservoir from IRWD's Rattlesnake Reservoir. Under normal operating conditions, all flow out of Syphon Reservoir would be conveyed back to the Eastwood Recycled Water Pump Station through the same 36-inch recycled water pipeline, for connection to IRWD's recycled water distribution system.

1.3.1 Dam Replacement

The proposed project would replace the existing engineered dam with a new engineered dam, increasing the existing 59-foot dam height to 136 feet and increasing the elevation of the dam crest from the existing 388 feet amsl to 466 feet amsl. The new dam would be an earthen fill embankment. The embankment slopes would provide adequate stability including for seismic loading conditions. The crest of the new dam would be approximately 20 feet wide and approximately 1,300 feet long. Figure 3A shows the preliminary footprint of the proposed dam, which would be constructed primarily from on-site materials, although the importation of some specialty materials is anticipated. On-site materials would be obtained from excavation of the existing earthen embankment dam and spillway, excavation below the new dam footprint and borrow excavations within the existing and proposed reservoir area. Slope protection for the new dam would consist of rip-rap on the upstream slope and vegetation on the downstream slope. The rip-rap on the upstream slope would provide erosion protection from wave action resulting from water in the reservoir. Similar to the existing dam, the vegetation on the downstream slope would consist of grass and would provide erosion protection from rainfall runoff.

The new proposed spillway would be designed to meet or exceed the current safety and design requirements established by the Department of Water Resources (DWR), Division of Safety of Dams (DSOD). The elevation of the spillway crest would be approximately 456 feet amsl, providing 10 feet of freeboard relative to the dam crest at 466 feet amsl and thus ensuring that overtopping of the dam would not occur. In addition, IRWD would operate the reservoir with additional freeboard below the spillway to ensure the water surface elevation remains safely below the spillway crest elevation at all times. Furthermore, IRWD's current and future operating procedures include monitoring the local weather forecasts, and in the event of a major storm event, IRWD will lower the reservoir's water surface by distributing the stored water throughout IRWD's recycled water system, or sending a controlled flow to the existing storm drain in advance of the predicted storm event.



SOURCE: ESA, 2020; ESRI, 2020.

Syphon Reservoir Improvement Project

Figure 3A
Proposed Project

ESA

1.3.2 Reservoir Enlargement

The replacement dam would result in an increase in the reservoir's maximum water surface elevation from 376 feet amsl to 456 feet amsl and increase the reservoir's capacity from approximately 500 AF to 5,000 AF. As shown in Figure 3A, the proposed project would expand the reservoir's shoreline and inundate up to approximately 82 acres upstream of the dam that currently support upland and wetland vegetation communities, some of which are within the NCCP/HCP Reserve area and grant deed restricted lands. The existing reservoir ground surface would be excavated non-uniformly to obtain approximately 2.2 million cubic yards of material to construct the new engineered dam. A seepage control drainage system would be constructed on the downstream side of the dam to safely route seepage through the dam and prevent erosion in the embankment area.

1.3.3 Treatment Facilities

The existing strainer and disinfection facilities would be demolished, reconstructed and expanded at the toe of the new dam to provide filtration, chlorination and de-chlorination. The potential locations of the treatment facilities, which would be determined during detailed design, are depicted in Figure 3A (labeled as Treatment Facility Option A and Option B). Only one treatment facility in one of the optional locations will be constructed for the proposed project. The layout would consist of an enclosed masonry building. The footprint of the proposed treatment facilities would be determined during the detailed design, but is anticipated to be approximately 40 feet by 160 feet. The purpose of the treatment facilities would be to de-chlorinate the recycled water as it enters the reservoir, filter the recycled water as it leaves the reservoir to remove algae and leaves, and chlorinate the recycled water as it leaves the reservoir to provide a chlorine residual as the water is delivered through the District's recycled water distribution system.

1.3.4 Access and Maintenance Roads

The primary access point for construction traffic and future IRWD operation and maintenance is anticipated to be from the intersection at Portola Parkway and Sand Canyon Avenue. The current intersection consists of a "T" intersection, where Sand Canyon Avenue ends at the intersection with Portola Parkway. As part of the proposed project, the intersection and associated traffic lights would be modified to allow construction and future IRWD operations access through the intersection, into the District's property. Construction vehicles and IRWD vehicles would also leave the site through the same intersection.

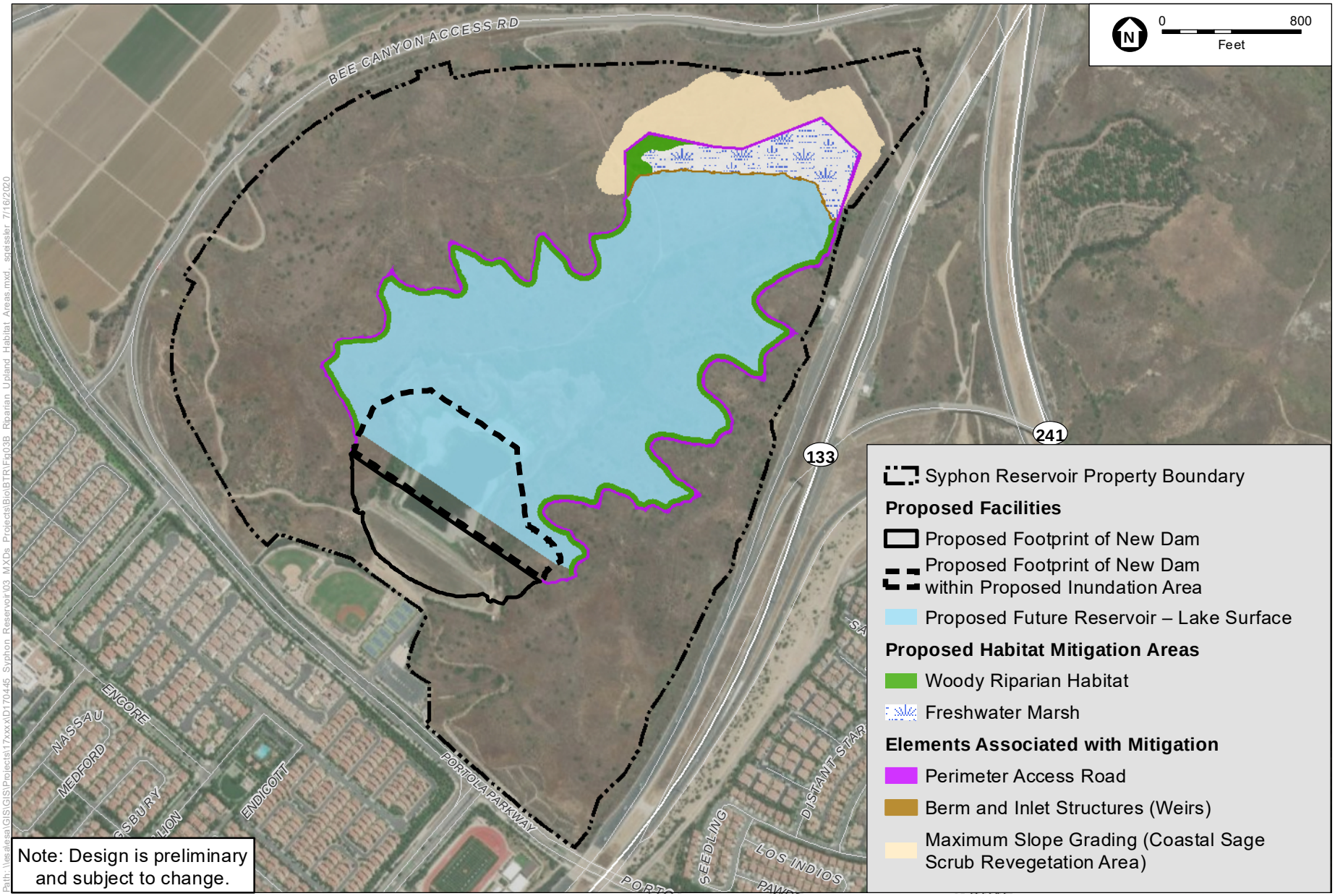
An unpaved road currently exists on the District's property in the vicinity of the intersection at Portola Parkway and Sand Canyon Avenue, which was previously used to access and maintain the existing Highline Canal. This portion of the Highline Canal in the area has since been abandoned. As part of the proposed project, this dirt road would be utilized and improved to allow two lanes (one in each direction) for ingress and egress for the construction and IRWD operation traffic. As part of the access road improvements, it is anticipated that excavation into the existing slope and construction of a retaining wall may be necessary to allow trucks to make the left turn onto the existing Highline Canal road after passing through the intersection. Figure 3A depicts the anticipated access road location.

1.3.5 On-Site Freshwater Wetland, Riparian, and Upland Habitat Replacement Areas

The displacement of the existing woody riparian and freshwater marsh communities resulting from expansion of the current facility would be offset on site at a 1:1 ratio, at minimum. At least 12.3 riparian/wetland habitat consisting of native woody riparian vegetation and freshwater marsh habitat is proposed to be established on-site to replace habitat displaced by construction. Both freshwater marsh and woody riparian vegetation are proposed to be placed within a large patch at the northeast end of the proposed reservoir. Also, much of the woody riparian replacement habitat would be situated within a strip that would extend around the proposed reservoir at the same elevation as the planned water surface elevation when the reservoir is full, as shown in **Figure 3B**. A shallow trough would be constructed around the reservoir perimeter (excluding the dam face), which would support native trees and shrubs (e.g., willows, mule fat, etc.) forming a belt of riparian vegetation around the upper edge of the artificial lake. The trough would be formed with fine clayey material to reduce permeability and help retain water when the reservoir is periodically drained.

In addition to reserving a strip around the edge of the expanded reservoir for woody riparian habitat, an approximately 6- to 8-acre wetland area would also be established within a flat area extending northeast of the expanded reservoir (Figure 3B). Like the perimeter trough for riparian habitat creation, this wetland area would be situated at an elevation just below the maximum water surface elevation of the reservoir. The underlying material in this area would consist of slowly permeable fine soil with very high clay content to retain water for extended periods when the reservoir is drained down. Freshwater marsh vegetation consisting primarily of tules (native cattail and bulrush species) would be planted or seeded in the area subject to periodic inundation. However, based on preliminary coordination with the wildlife agencies, additional woody riparian habitat and less freshwater marsh vegetation may be established in this flat area in order to increase habitat for State and federally endangered least Bell's vireo on-site.

Significant grading would be necessary that would cut into the existing hill northeast of the future lake edge in order to create sufficient space for wetland and riparian habitat restoration in this area. This additional grading would occur in an area that is dominated by ruderal (weedy) vegetation and non-native grassland that provides relatively low wildlife habitat value. Once grading is completed, the graded slope would be seeded, planted and maintained to establish native coastal sage scrub habitat where none currently exists.



SOURCE: ESA, 2020; ESRI, 2020.

Syphon Reservoir Improvement Project

Figure 3B
Riparian and Upland Habitat Areas

ESA

1.3.6 Recreational Facilities

During project design, IRWD would consider passive recreational facilities compatible with the proposed project site. Recreational facilities could include a walking trail along existing access roads at the proposed project site. As shown on Figure 3A, this proposed walking trail could be located in the south and west portions of the proposed project site, beginning at the new permanent access road at Portola Parkway and Sand Canyon Avenue and traveling along that route, across the dam crest, and following the alignment of the existing Highline Canal, which would be abandoned with implementation of the proposed project. Final design would determine the appropriateness and location of the proposed walking trail on existing access roads and any other optional recreational facilities. Passive recreational uses on the proposed project site are allowed under the NCCP/HCP, which is referenced in the grant deed with respect to open space and habitat uses. A Recreation and Resources Management Plan (RRMP) would need to be prepared to demonstrate consistency with the NCCP/HCP allowed uses. Coordination with regulatory agencies, including USFWS and California Department of Fish and Wildlife (CDFW), would be required for on-site recreational components.

1.3.7 Additional Geotechnical Investigations

IRWD previously completed a comprehensive geotechnical investigation of the site from which the resulting data would be used during final design to develop the detailed construction documents. During the design phase, additional geotechnical investigations may need to be performed. If additional investigations are deemed necessary, the investigations may include the performance of exploratory test pits, soil borings, packer testing, and/or non-intrusive geologic investigations and observations. The additional geotechnical investigations, if needed, would remain within the proposed limits of disturbance defined by the project and would be mitigated as part of the overall project.

1.4 Project Construction

Construction of the proposed project is estimated to require a total of 41 months. The preconstruction activities would begin in the fall of 2022 and would involve approximately 5 months of access road improvements. Preconstruction would be followed by approximately 36 months for construction of the new dam, reservoir, and associated facilities, depending on weather conditions and other variables. Construction is currently anticipated to begin in the spring of 2023. Most construction activities would be limited to 7:00 a.m. to 7:00 p.m. Monday through Friday and 9:00 am to 6:00 p.m. on Saturday. If construction work is conducted outside of these hours, IRWD would secure a variance/waiver from the appropriate entity. Construction of the proposed project would include activities implemented in phases as outlined below, which may involve overlap.

1.4.1 Preconstruction Activities and Intersection Modification

Before active construction activities are initiated on-site, all water within the reservoir would be drained and vegetation cleared outside of the bird nesting season. In addition, the proposed access road would be constructed starting at the intersection of Portola Parkway and Sand Canyon Avenue. As part of the proposed project, the intersection of Portola Parkway and Sand Canyon Avenue and associated traffic lights would be modified to allow access for construction vehicles and future IRWD operation and maintenance vehicles through the intersection, into the District's property.

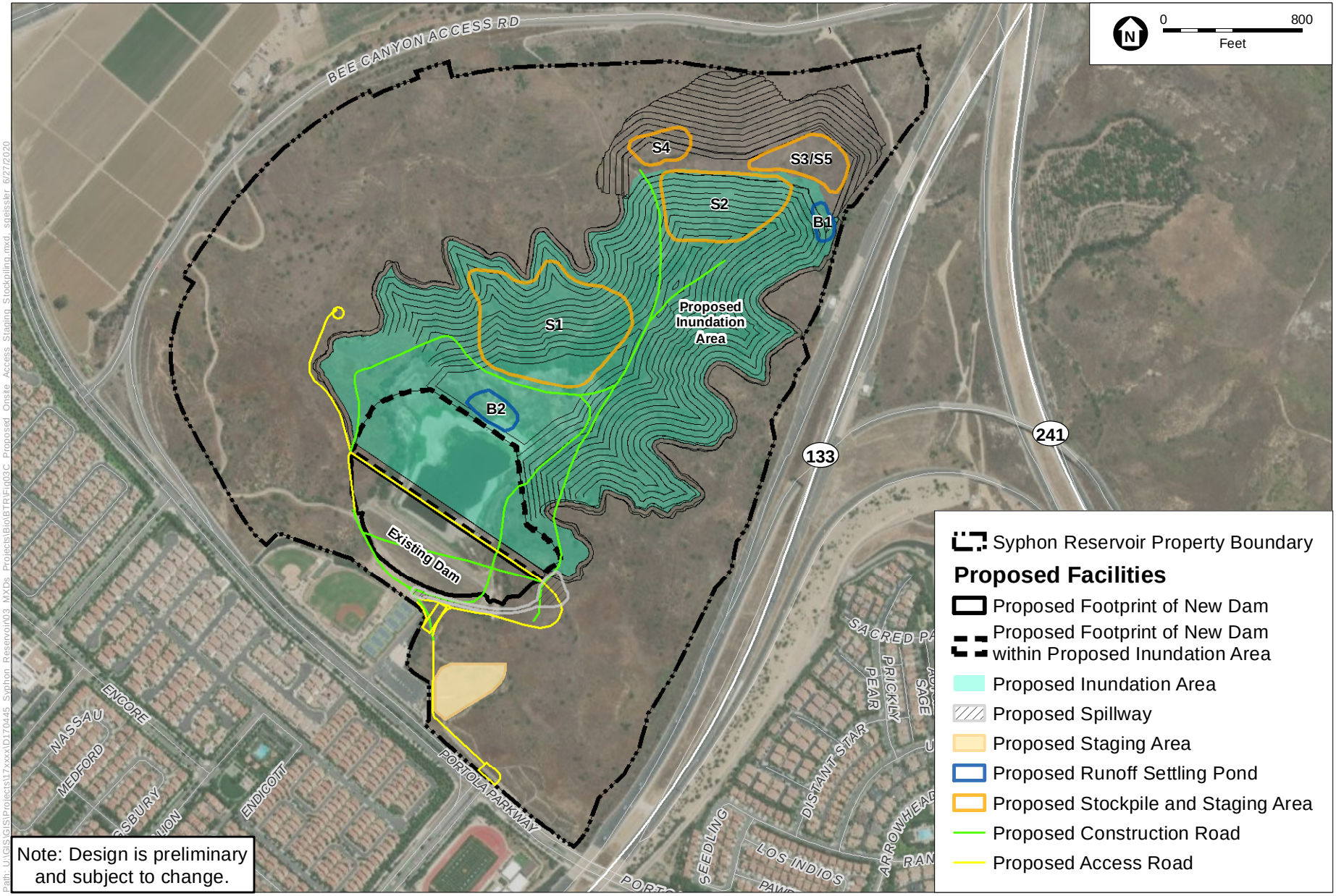
A dirt or paved road would be graded from the new intersection at Portola Parkway and Sand Canyon Avenue for ingress and egress for the construction and IRWD operations and maintenance traffic. As part of the access road improvements, it is anticipated that excavation into the existing slope and construction of a retaining wall may be necessary to allow trucks to make the left turn onto the existing Highline Canal road after passing through the intersection. Construction of the new access road would be completed within approximately 5 months and would require approximately 10 construction workers.

1.4.2 Construction Mobilization, Site Preparation and Staging Areas

Construction mobilization would involve initial mobilization of contractors, construction office trailers and equipment to the site, as well as initial site preparation. Stockpile and staging areas, runoff settling basins, as well as temporary construction access roads would be cleared and developed. The preliminary locations of these construction-related features are shown in **Figure 3C** and are subject to change during final project design. Initial construction areas proposed for work also would be cleared. Ingress and egress areas would be delineated, fenced, or marked so that, to the extent possible, the surrounding habitat and riparian areas would not be impacted.

The proposed stockpile/staging areas would hold reusable excavation materials, sediments, and topsoil, as well as material imported from off-site sources such as rock and gravel, and would be located primarily within the proposed reservoir inundation area to avoid disturbance to surrounding conservation lands in the NCCP/HCP. The proposed stockpile/staging areas could also be used for excavating borrow materials once stockpiles are removed. Some stockpile/staging areas could be outside the reservoir expansion area and could hold materials to be used beyond the inundation area. These stockpile/staging locations would primarily be sited in areas that would later be used for upland restoration.

The construction access roads shown in Figure 3A would be arterial roads used for the duration of the proposed project construction period, and have been designed to be located primarily within the limits of disturbance for the reservoir enlargement and the new dam. As the site is developed, and borrow excavation areas are developed, utilized, and exhausted, the location of the roads may change and additional roads would be constructed. In addition, some of the construction access roads may transition to permanent maintenance and access roads.



SOURCE: ESA, 2020; ESRI, 2020.

Syphon Reservoir Improvement Project

Figure 3C
Proposed Onsite Access, Staging, and Stockpiling

ESA

The runoff settling basins would be constructed on-site to capture sediment and runoff during construction, including nuisance flow, flows from the storm drain conduit below SR-133, and flows from dewatering operations. The basins also could be used as a water source for dust control and soil moisture conditioning.

A temporary office (trailer) would be established near the toe of the dam (see Figure 3C), which would be used by the contractor for the duration of construction. This location could also provide some level of site security since all vehicles entering and leaving the site would pass this point. Additional mobilization of equipment to distinct areas on-site may occur on an ongoing basis, for each construction phase described below, based on the particular activity occurring on-site.

1.4.3 Excavation of Material/Existing Dam and Dewatering

Approximately 2.3 million cubic yards of material would be excavated from within the proposed project site for use in construction of the proposed project components. These materials include topsoil, lake bottom sediments, alluvium, colluvium, slopewash, formational materials, as well as the existing dam. The majority of materials would be obtained from borrow excavations made within the enlarged reservoir inundation area; these reservoir area excavations also would contribute significantly to the capacity of the expanded reservoir.

During excavation activities, saturated materials and shallow groundwater would be encountered. Groundwater depth at the downstream toe of the existing dam is approximately three feet below ground surface. Groundwater relief trenches for dewatering would be installed in materials and into the alluvium as needed during excavation. The area downstream of the toe of the dam would also be dewatered.

The borrow excavation could be accomplished with large excavators and articulated trucks. This equipment is well suited to the wet and soft nature of materials in the excavated zones and stockpile areas. The processing of all excavated material would be done in the stockpile areas. Processing and drying of saturated materials would be accomplished using various methods, including use of discs and tractors to expose the material to sun and wind, and mixing drier and wetter borrow materials together. Wet materials transported to stockpile areas could be spread with a dozer, such as a low ground pressure bulldozer. The excavation phase of the proposed project would be completed within approximately 7 to 9 months.

1.4.4 Construction of New Dam, Spillway and Reservoir

The proposed new engineered dam would be an earthen fill embankment constructed primarily from on-site materials. The majority of materials for the embankment fill would be obtained from borrow excavations made in the reservoir area, as described above. Approximately 2.2 million cubic yards of compacted material would be reused on-site for construction of the new engineered dam. Approximately 0.1 million (100,000) cubic yards of material would be imported from off-site sources, including the rock, gravel and other materials required for the construction of portions of the dam, including riprap. A portion of the topsoil obtained during borrow excavation could be used on the downstream slope of the new dam to support the proposed vegetation for

downstream slope protection. However, topsoil would not be suitable for embankment fill. Lake bottom sediments would also not likely be suitable for embankment fill.

Once all sediment has been appropriately excavated, stockpiled, and processed, the new proposed embankment dam would be installed. Depending on weather conditions, approximately 12 months of work would be required to construct the embankment above elevation 340 feet amsl, up to the dam crest. Construction of the proposed embankment may be done with scrapers, or a large excavator and articulated trucks. The embankment would be spread with bulldozers and compacted with sheepsfoot and vibratory rollers, depending on the materials. Support equipment would include graders and water wagons.

The proposed new spillway would be constructed and lined with reinforced concrete to prevent erosion. The spillway would be constructed once the construction of the dam embankment is near completion (overlap may occur). Construction of the proposed dam, spillway and expanded reservoir would be completed within approximately 14 months, depending on weather conditions.

1.4.5 Construction of Treatment Facilities

The existing filtration and disinfection facilities would be demolished during construction of the new embankment dam, rebuilt and enlarged in one of the optional locations as part of the proposed project (i.e., either Treatment Facility Option A or Option B). Construction of the proposed new treatment facilities would occur once construction of the new dam embankment is largely complete and would require site preparation and grading, followed by installation of buried and exposed piping, mechanical, electrical/control, and structural facilities. Construction of the proposed new treatment facilities would last approximately 12 months, depending on weather conditions, and would require a crew of up to 16 construction workers. Construction equipment would include a front-end loader, backhoe, bobtail dump truck, transit mix concrete truck, vibratory walk-behind compactor and water truckIf water is encountered during excavation or trenching, it would be dewatered and discharged to the nearby existing Portola Parkway storm drain under a permit from the Regional Water Quality Control Board (RWQCB). Trench width would vary depending upon the size (diameter) of the pipeline but would generally be between 2 to 6 feet. Excavated soils would be placed back within the trench and spread over the site in other disturbed areas.

1.4.6 Construction of Wetland, Riparian, and Upland Areas

A minimum of approximately 12.3 acres of riparian/wetland on-site habitat consisting of at least 6.4 acres of native woody riparian vegetation, or more, with up to 5.9 acres of freshwater marsh habitat, would be established at the eastern end and around the perimeter of the reservoir. These areas would be graded and contoured at the same time excavation and grading occurs as described under Section 1.4.3. A shallow trough would be constructed around the reservoir perimeter and would be formed with fine clayey material to reduce permeability and help retain water when the reservoir is periodically drained. After installation of the trough, irrigation would be installed through a series of pipelines that are around the perimeter of the reservoir, which connect to the reservoir water source. Subsequent planting and seeding of native trees and shrubs would form a belt of riparian vegetation around the upper edge of the reservoir. Additionally, up

to a 10.47-acre of on-site coastal sage scrub area would be planted on the graded slope to the northeast of the riparian and wetland habitat area. Installation of the wetlands/riparian area would require up to 50 vehicle and equipment trips over the course of 12 months. Required equipment would include a skid steer loader, pick-up trucks, ATVs, and a water wagon.

1.4.7 Installation of Recreation Facility

A proposed recreation facility may consist of a walking trail installed for the most part on existing on-site roads and access points as shown on Figure 3A. For example, the existing Highline Canal could be backfilled for installation of the proposed walking trail. Construction of a trail would occur through grading and compacting of native material. No existing vegetation would be impacted by the installation of the trail along existing roads or the Highline Canal. A potential on-site trail extension may be installed east from the existing Highline Canal and would be located on ridges or other relative gradual-sloped terrain. Up to 10 workers would be required to install the on-site trail over the course of 3 months.

1.4.8 Site Restoration/Demobilization

Site restoration/demobilization would involve removal of all equipment, debris and personnel from the site. Site restoration would occur over the course of one month. Required equipment would include an excavator, rubber-tired loaders, a tool carrier, pick-up trucks, and a water truck.

1.4.9 Site Access, Workers, and Equipment Usage

As stated previously, the main access point to the proposed project site would be from the intersection of Sand Canyon Avenue and Portola Parkway. The majority of materials for the embankment fill would be obtained from borrow excavations made in the reservoir area (Figure 3C). Construction of the proposed project would involve the use of a variety of heavy construction machinery on-site. The majority of equipment and vehicles would be associated with the intensive earthwork and the structural and paving phases of construction. Large construction equipment such as backhoes, compactors, cranes, excavators, scrapers, haul trucks, pavers, and rollers would be used during the construction phase of the proposed project.

1.5 Operation and Maintenance

Once operational, all proposed project components would operate and be monitored via IRWD's Supervisory Control and Data Acquisition (SCADA) system. Similar to the current reservoir, operation of the proposed project would not require daily on-site staffing but, rather, would require only periodic maintenance. Water levels at Syphon Reservoir would fluctuate seasonally; water would be stored in winter when recycled water supply exceeds demand, and the reservoir would be drawn down in summer when recycled water demand exceeds supply. The estimated minimum operating capacity of the reservoir would be about 180 AF to maintain water quality. However, IRWD would develop an operating plan for Syphon Reservoir, updated each year to set targets for the volume of water to be contained in the reservoir on a daily, monthly, annual, or seasonal basis. Reservoir operations would vary with time, and would need to consider a wide variety of factors, such as: seasonal storage needs, water quality considerations, impound

requirements based on rainfall projections, and operational compatibility with the IRWD recycled water system.

As mentioned previously, during precipitation events, IRWD would maintain reservoir levels well below the spillway crest to create sufficient space for stormwater runoff to enter the reservoir and avoid the need for outflow through the spillway. The annual operating plan would identify a maximum water surface elevation that would ensure overtopping of reservoir and spillway would not occur due to stormwater inflow, wave action, or overfilling of the reservoir from IRWD's recycled water system. Reservoir operations would be adjusted by IRWD during the year based on changes in projected demands, and other factors as needed. Under normal operating conditions, all flow in or out of the reservoir would be conveyed through the existing 36-inch inlet/outlet pipeline. In the event of an emergency, IRWD can draw down the reservoir through the existing 48-inch pipeline that discharges the recycled water to the existing storm drain, located in Portola Parkway. IRWD Operations and Maintenance staff would continue to conduct daily safety and security checks of the site, similar to existing conditions.

Maintenance of the proposed wetland/riparian areas would be required for up to 5 years after construction is complete to ensure success of the vegetated areas. Approximately 2 crews of 6 workers each would be required 40 days per year for the first two years, with level of effort tapering off to approximately one crew, 30 days per year for the subsequent two to three years. The wetland/riparian areas would be irrigated as needed using the series of pipelines installed around the perimeter of the reservoir that connect to the reservoir water source.

If IRWD includes a recreational walking trail as part of the proposed project, hours of operation may be restricted to daily or seasonal use.

2.0 Methodology

2.1 Literature Review

Relevant literature resources were reviewed prior to conducting field surveys to determine if special-status biological resources occur within the study area or the surrounding vicinity. The California Natural Diversity Database (CNDDB), a CDFW species account database, was queried for information regarding known observations of special-status species and habitats within the study area and vicinity, which included the following U.S. Geological Survey (USGS) topographic quadrangles: Orange, Black Star Canyon, Corona South, Tustin, El Toro, Santiago Peak, Laguna Beach, San Juan Capistrano, and Canada Gobernadora (CDFW 2020). Species data provided by the USFWS Information for Planning and Consultation (IPaC) and the California Native Plant Society (CNPS) Inventory of Rare and Endangered Plants were also reviewed (USFWS 2020a, CNPS 2020). Other data sources reviewed included USFWS critical habitat maps (USFWS 2020b), National Wetland Inventory maps (USFWS 2020c), the United States Department of Agriculture Natural Resources Conservation Service (NRCS) soils mapping (2018), eBird (2012), current and historical aerial photographs (Google Earth 2018), and regional flora and fauna field guides to assist in the identification of species and suitable habitats.

Additional literature sources included the following references:

- *Syphon Reservoir Expansion Engineering Feasibility Study – Geotechnical Data Report* (GEI 2012)
- *Preliminary Draft Syphon Reservoir Environmental Regulatory Evaluation* (Dudek 2012)

A list of all relevant references reviewed is included in Section 7.0 of this report.

2.2 General Biological Surveys

A general biological survey, habitat assessment, and vegetation mapping to document natural communities and existing conditions of the study area was conducted by ESA biologists Maile Tanaka and Tommy Molioo on April 24 and 25, 2018, and by Maile Tanaka on April 26, 2018. Prior to the field visit, ESA reviewed the *Syphon Reservoir Environmental Regulatory Evaluation Preliminary Draft*, which included a reconnaissance-level vegetation map previously prepared by Dudek in January 2011 (Dudek 2012). This information was reviewed in conjunction with recent aerials available on Google Earth. Natural communities were then verified directly in the field, and from vantage points using binoculars for areas with limited accessibility, based on the presence of dominant plant species observed on-site following CDFW's *Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities* (CDFW 2018) and *Methods Used to Survey the Vegetation of Orange County Parks and Open Space Areas and The Irvine Company Property* (Jones & Stokes 1993). Natural communities were mapped directly in the field utilizing a 200-scale (1" = 200') aerial photograph.

Natural community classifications and descriptions follow *A Manual of California Vegetation, Second Edition* (Sawyer et al. 2009), and comparable names used in the Orange County Habitat Classification System (OCHCS) for the same communities were included in natural community descriptions (Gray and Bramlet 1992). After completing the fieldwork, the natural community polygons were digitized using Geographic Information System (GIS) technology to calculate acreages.

An inventory of all plant and wildlife species observed was compiled during the field surveys. Plant species observed during surveys were either identified in the field or collected and later identified using taxonomic keys. Plant taxonomy followed Baldwin et al. (2012). Common plant names, when not available from Baldwin, were taken from Calflora (2020). Wildlife species were identified during the field reconnaissance by sight and call or other evidence of presence, such as tracks, nests, scat, and remains, and with use of binoculars and taxonomic keys where appropriate. Vertebrate taxonomy followed Crother (2020), CalHerps (2020), and Stebbins (2003) for amphibians and reptiles, the American Ornithological Society for birds (AOS 2020), and Kaufman et al. (2004) for mammals. Because common names vary significantly between references, scientific names are included upon initial mention of each species; common names consistent throughout the report are employed thereafter.

During the surveys, a habitat evaluation was also conducted to determine the potential for each habitat area to support native species. Special attention was paid to habitats having the potential to support special-status biological resources (e.g., special-status plant and wildlife species and sensitive natural communities). Aerial photography and global positioning system (GPS)

technology was used to accurately locate and map any sensitive biological resources encountered. However, no focused protocol surveys were conducted during the general biological surveys.

In addition, the evaluation of potential wildlife habitat linkages (i.e., wildlife movement corridors) within or through the study area and immediate vicinity was based on the conditions documented during the field surveys, as well as information compiled from literature and analysis of physical barriers observed on aerial photographs. This information was used to identify whether the study area and immediate vicinity could function as an important wildlife movement corridor connecting large open space areas in the vicinity of the study area.

2.3 Jurisdictional Delineation

ESA conducted a jurisdictional delineation to identify features within the study area that may or may not be subject to U.S. Army Corps of Engineers (USACE), RWQCB, and CDFW jurisdiction and regulatory authority.

Prior to the field survey, ESA reviewed available background information pertaining to Syphon Reservoir and its geography and topography. The following resources were also reviewed prior to the field surveys:

- Color aerial photography for vegetative, topographic, and hydrologic features (Google Earth 2018);
- *El Toro, California* 7.5-minute topographic quadrangle map (USGS 1968);
- *Web Soil Survey*, queried to determine the soils mapped in the study area (NRCS 2018);
- *Hydric Soils List of California* (NRCS 2016);
- *National Wetlands Inventory* (USFWS 2018);
- *Preliminary Draft Syphon Reservoir Environmental Regulatory Evaluation* (Dudek 2012); and
- *Habitat Classification System, Natural Resources, Geographic Information System (GIS) Project* (Gray and Bramlet 1992).

Site maps were generated with available aerial photographs, and potentially jurisdictional features were identified and marked with lines and GPS coordinates to assist in field verification.

ESA biologists May Lau and Tommy Molioo conducted a site visit on April 24, 2018, to evaluate potential jurisdictional features within the study area. The limits of potential jurisdictional features were recorded in the field within accessible areas using aerial maps and a hand-held GPS with sub-foot accuracy. Vegetation communities were described using *A Manual of California Vegetation, Second Edition* (Sawyer et al. 2009). The delineation used the "Routine Determination Method" as described in the *1987 Corps of Engineers Wetland Delineation Manual*, hereafter called the "1987 Manual" (Environmental Laboratory 1987). The 1987 Manual was used in conjunction with the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0)*, hereafter called the "Arid West Supplement" (USACE 2008a). For areas where the 1987 Manual and the Arid West Supplement differ, the Arid West Supplement was followed. Wetlands and waters were classified using

commonly accepted habitat types; however, the Cowardin classification of each feature type was noted (Cowardin et al. 1979).

All features, including data points, wetland boundaries, and channels were recorded using a GPS unit (Trimble GeoXT) with real-time differential correction and an instrument-rated mapping accuracy of +/- 1 meter, or were delineated on aerial photography using GIS software (ArcGIS 10.2) and site-specific topographic data and aerial imagery.

In the office, data from data points and wetland boundaries were downloaded from the GPS unit and mapped using GIS software on an overlay of topographic contours and geo-referenced aerial photography. GPS-determined wetland boundaries and data points were visually confirmed. Acreage of wetland and waters of the U.S. polygons, and the length of linear features were determined using ArcGIS. Detailed field methods and data sheets are included in the Preliminary Jurisdictional Delineation Report provided in **Appendix A**.

2.4 Special-Status Species Surveys

2.4.1 Special-Status Plant Surveys

ESA biologists Maile Tanaka, Julie Stout, Alanna Sullivan, and Dale Hameister conducted focused special-status plant surveys on May 8, 11, and August 10, 2018. Due to the heavy rainy season from 2018-2019, focused special-status plant surveys were updated by ESA biologists Maile Tanaka and Doug Gordon-Blackwood on April 30, 2019 and by Daryl Koutnik and Maile Tanaka on May 24, 2019. Surveys were conducted using wandering transects, with special attention paid to areas of suitable habitat. Any observed plant species were recorded in the field, and the locations of any special-status plants observed were collected using a GPS unit.

2.4.2 Special-Status Wildlife Surveys

ESA conducted focused surveys for western spadefoot (*Spea hammondii*), least Bell's vireo (*Vireo bellii pusillus*), and southwestern willow flycatcher (*Empidonax traillii extimus*).

Western spadefoot is an upland species of toad that requires water for breeding purposes only. Although there is no formal survey protocol issued by CDFW, generally accepted survey methods were used by qualified biologists with experience surveying for this species. Surveys included two diurnal (day time) surveys of the water margins around the wetted surface of the reservoir to search for egg clusters, and two nocturnal (night time) surveys immediately after rain events to search for individuals detectable by calls or eye-shine and visual identification. On January 18, 2019, ESA biologists Lily Sam and Robert Sweet conducted a diurnal and nocturnal survey for western spadefoot after substantial rainfall occurred with nearly 1" of precipitation recorded in the area over the preceding 3 days. A second diurnal and nocturnal survey was conducted on March 7, 2019 by ESA biologists Lily Sam and Douglas Gordon-Blackwood, after another rain event with at least 0.4" of rain on March 6, 2019.

Surveys for least Bell's vireo were conducted by ESA biologists Maile Tanaka, Jaclyn Catino-Davenport, and/or Karl Fairchild on April 10, 22; May 3, 15; June 5, 17, 27; and on July 8, 2019 in conformance with USFWS *Least Bell's Vireo Survey Guidelines* (USFWS 2001). Surveys for southwestern willow flycatcher were also conducted by ESA biologist Karl Fairchild on May 29;

June 5, 17, 27; and July 8, 2019 in conformance with USFWS *A Natural History Summary and Survey Protocol for the Southwestern Willow Flycatcher* (Sogge et al. 2010).

Prior to the geotechnical investigations that commenced in September 2019 on the site, ESA also conducted pre-activity surveys for coastal California gnatcatcher (*Polioptila californica*) and coastal cactus wren (*Campylorhynchus brunneicapillus*) on August 29-30, 2019.

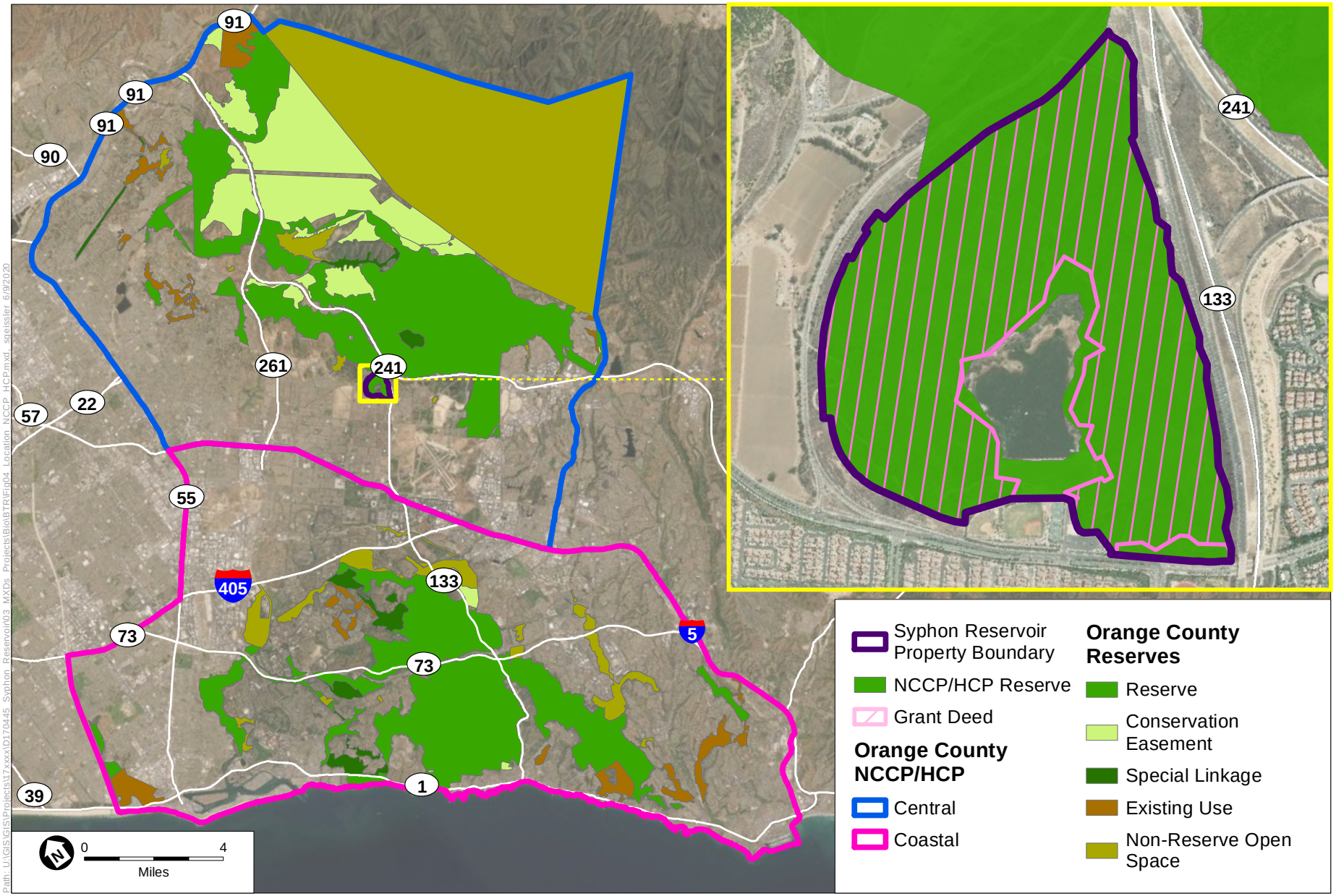
In addition, an inventory of all plant and wildlife species observed was compiled during all field surveys, including special-status wildlife species that were observed on-site. Biological resources data collected from recent surveys conducted by ESA in 2018 and 2019, as well as previous documentation of biological resources within the study area (Dudek 2012) are utilized in this analysis. In addition, focused protocol presence/absence surveys for coastal California gnatcatcher (*Polioptila californica*) were conducted by Dudek in 2011.

3.0 Environmental Setting

3.1 Regional Setting

The study area is located within central Orange County, California. The study area is within the Central Subregion of the County of Orange NCCP/HCP. Although the study area is located within the NCCP/HCP Reserve (**Figure 4**), the existing reservoir is not actually within the NCCP/HCP Reserve; rather, it is surrounded by it. Significant regional geographic features around the area include the Santa Ana Mountains to the northeast, the Tustin plain and the City of Irvine to the north and southwest. The study area is within the Newport Bay watershed. The climate in the region is Mediterranean, with dry summers and moderately wet winters; however, the region has experienced severe drought conditions in recent years.

The study area was previously part of the Irvine Ranch and was subject to disturbance in the 1940s for planting of orchards and construction of the reservoir to provide irrigation for agricultural uses. In the 1970s, agriculture was expanded within the eastern and northern portions of the study area, mainly for citrus orchards. Following construction of the dam, impounded water accumulated from direct runoff from the Highline Canal. Currently within the study area, a portion of the Highline Canal conveys recycled water flows from IRWD's Rattlesnake Reservoir into Syphon Reservoir. The Highline Canal located southwest of the Syphon Reservoir was historically used for irrigation but has been abandoned. Additionally, a culvert inlet in the northeast portion of the study area conveys stormwater runoff from a portion of the open space area east of the reservoir (under SR-133 and SR-241), and multiple culverts within the study area drain the upland portions of the reservoir. The central drainage supports riparian habitat and conveys intermittent flow through the center of the study area to the reservoir. With the exception of limited seasonal inflows from rain events, IRWD controls all flows in and out of the reservoir, as part of their recycled water storage and management. The reservoir currently drains through a series of underground pipes that convey flows through a strainer and chlorination facility, before being distributed to customers through IRWD's recycled water system.



SOURCE: ESRI, 2016

Syphon Reservoir Improvement Project

Figure 4

Study Area Location within NCCP/HCP

ESA

Between 1995 and 2000, approximately 102 acres of the study area were preserved and 112 acres were restored to native coastal sage scrub habitat as mitigation for the TCA Eastern Transportation Corridor Project's impacts to coastal California gnatcatcher. Restoration activities involved removal of orchard trees, native coastal sage scrub planting, temporary irrigation, and monitoring. The revegetation was successfully completed in accordance with regulatory requirements and supported mature coastal sage scrub suitable for California gnatcatcher (Dudek 2012). When IRWD acquired Syphon Reservoir from TIC, the Conveyance Agreement included a Grant Deed with use restrictions to protect biological resources within the area that was used for mitigation for the TCA (as shown in Figure 4).

Since completion of the restoration program in 2000, on-site management of biological resources was limited to annual cowbird trapping (which is required in perpetuity) and few additional studies, including a cactus transplantation and subsequent cactus wren monitoring in the northwest portion of the property. In October 2007, the entire study area burned in the Santiago Fire and was in post-fire succession (Dudek 2012). The study area supports native vegetation communities, restored coastal sage scrub, and some disturbed communities.

It should be noted that the majority of the proposed project site was burned again in the October 2020 Silverado Fire, and much of the vegetation on-site was destroyed by the fire. However, since native natural communities such as coastal sage scrub are adapted to fire, it is anticipated most of the vegetation should regrow to pre-fire conditions or similar, though it is possible the habitat quality may be degraded by opportunistic non-native invasive plant species. To provide a conservative assessment, this analysis presents the biological conditions at the time the Notice of Preparation (NOP) was published and analyzes proposed project impacts against those conditions.

3.2 Topography

The study area is characterized by steep topography of rolling hills, ridgelines and terraced slopes (from previous agricultural activities) surrounding the reservoir in the center of the study area. Within the study area, elevations range from 326 to 654 feet (99 to 200 meters) above mean sea level.

3.3 Soils

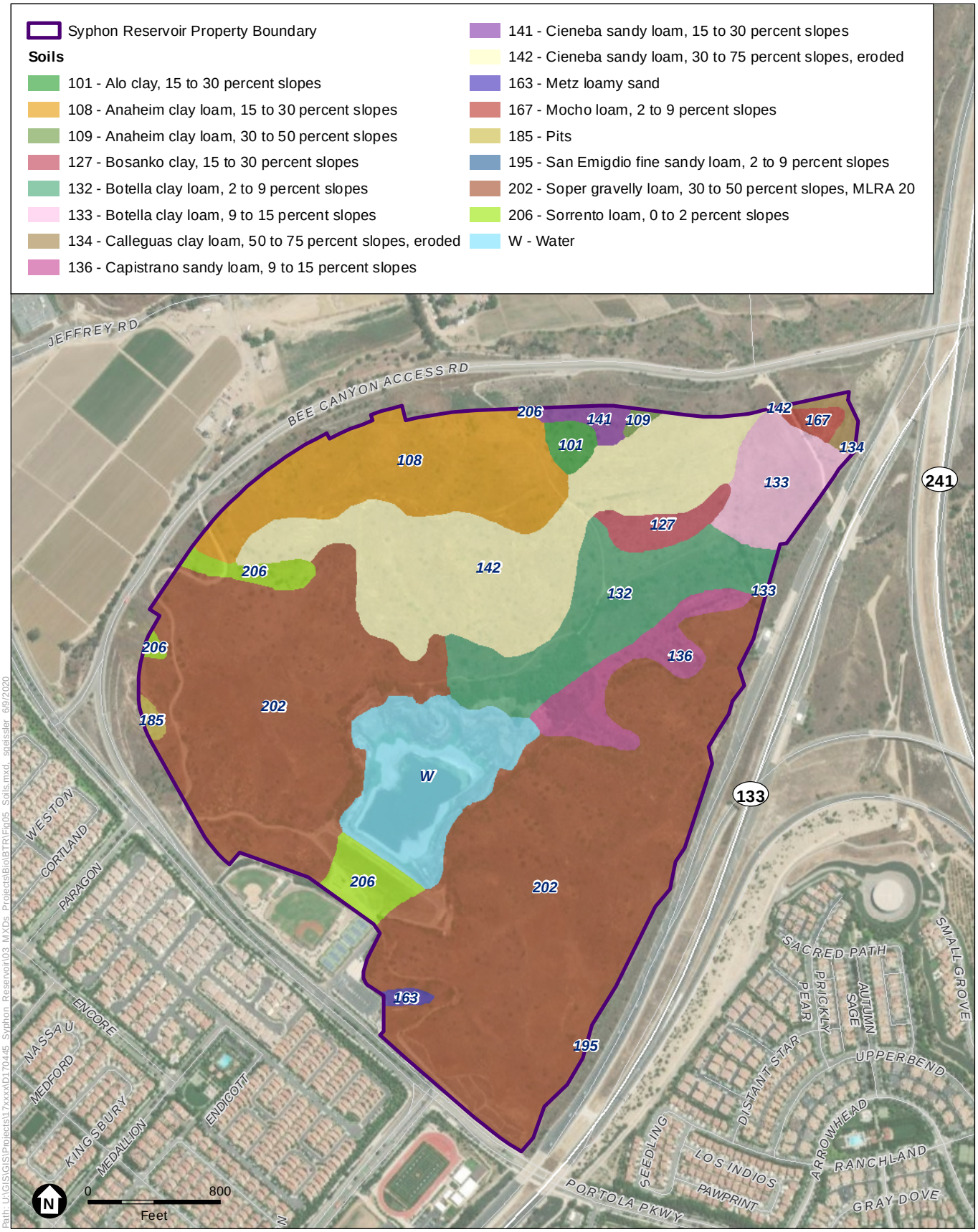
Based on review of the NRCS *Web Soil Survey* (2018), the study area contains 16 soil series (**Figure 5**). The following is a brief description of mapped soils within the study area.

3.3.1 Alo Clay

Alo clay, 15 to 30 percent slopes, is a well-drained soil that is unlikely to pond or flood with an average depth of over 80 inches to the water table. The profile consists of clay in the first 22 inches, and weathered bedrock from 22 to 59 inches. Alo clay loam is not considered hydric by the NRCS.

3.3.2 Anaheim Clay Loam

Anaheim clay loam, 15 to 30 percent slopes, is a well-drained soil that is unlikely to pond or flood with an average depth of over 80 inches to the water table. The profile consists of clay loam in the first 26 inches, and weathered bedrock from 26 to 59 inches. Anaheim clay loam is not considered hydric by the NRCS.



SOURCE: ESRI, 2016; USDA, 2018

Syphon Reservoir Improvement Project

Figure 5
Soils

ESA

Anaheim clay loam, 30 to 50 percent slopes, is a well-drained soil that is unlikely to pond or flood with an average depth of over 80 inches to the water table. The profile consists of clay loam in the first 26 inches, and bedrock from 26 to 59 inches. Anaheim clay loam is not considered hydric by the NRCS.

3.3.3 Bosanko Clay

Bosanko clay, 15 to 30 percent slopes, is a well-drained soil that is unlikely to pond or flood with an average depth of over 80 inches to the water table. The soil is slightly alkaline to moderately acidic. The profile consists of clay in the first 31 inches, and weathered bedrock from 31 to 59 inches. Bosanko clay is not considered hydric by the NRCS.

3.3.4 Botella Clay Loam

Botella clay loam, 2 to 9 percent slopes, is a well-drained soil that is unlikely to pond or flood with an average depth of over 80 inches to the water table. The soil is slightly alkaline to moderately acidic. The profile consists of clay loam in the first 8 inches, silty clay loam between 8 and 35 inches, and clay loam from 35 to 66 inches. Botella clay loam is not considered hydric by the NRCS.

Botella clay loam, 9 to 15 percent slopes, is a well-drained soil that is unlikely to pond or flood with an average depth of over 80 inches to the water table. The profile consists of clay loam in the first 8 inches, silty clay loam between 8 and 35 inches, and sandy clay loam from 35 to 66 inches. Botella clay loam is not considered hydric by the NRCS.

3.3.5 Calleguas Clay Loam

Calleguas clay loam, 50 to 75 percent slopes, is a well-drained soil that is unlikely to pond or flood with an average depth of over 80 inches to the water table. The profile consists of clay loam in the first 11 inches, very channery clay loam between 11 and 15 inches, and bedrock from 15 to 42 inches. Calleguas clay loam is not considered hydric by the NRCS.

3.3.6 Capistrano Sandy Loam

Capistrano sandy loam, 9 to 15 percent slopes, is a well-drained soil that is unlikely to pond or flood with an average depth of over 80 inches to the water table. The soil is neutral to medium acidic. The profile consists of sandy loam in the first 27 inches and fine sandy loam between 27 and 65 inches. Capistrano sandy loam is not considered hydric by the NRCS.

3.3.7 Cieneba Sandy Loam

Cieneba sandy loam, 15 to 30 percent slopes, is a somewhat excessively-drained soil that is unlikely to pond or flood with an average depth of over 80 inches to the water table. The profile consists of sandy loam in the first 17 inches, and weathered bedrock from 17 to 59 inches. Cieneba sandy loam is not considered hydric by the NRCS.

Cieneba sandy loam, 30 to 75 percent slopes, is a somewhat excessively drained soil that is unlikely to pond or flood with an average depth of over 80 inches to the water table. The soil is neutral to strongly acidic. The profile consists of sandy loam in the first 17 inches and weathered bedrock between 17 and 59 inches. Cieneba sandy loam is not considered hydric by the NRCS.

3.3.8 Metz Loamy Sand

Metz loamy sand is a somewhat excessively-drained soil that is unlikely to pond or flood with an average depth of over 80 inches to the water table. The profile consists of loamy sand in the first 17 inches, and stratified sand to fine sandy loam from 17 to 63 inches. Metz loamy sand is not considered hydric by the NRCS.

3.3.9 Mocho Loam

Mocho loam, 2 to 9 percent slopes, is a well-drained soil that is unlikely to pond or flood with an average depth of over 80 inches to the water table. The profile consists of loam in the first 60 inches. Mocho loam is not considered hydric by the NRCS.

3.3.10 Pits

Pits consist of concave igneous, metamorphic, and sedimentary rock. The profile consists of extremely gravelly coarse sand in the first 6 inches, and extremely gravelly sand, extremely gravelly coarse sand, or very gravelly coarse sand from 6 to 60 inches. Pits are not considered hydric by the NRCS.

3.3.11 San Emigdio Fine Sandy Loam

San Emigdio fine sandy loam, 2 to 9 percent slopes, is a well-drained soil that is unlikely to pond or flood with an average depth of over 80 inches to the water table. The profile consists of fine sandy loam in the first 7 inches, and stratified gravelly loamy coarse sand to fine sandy loam from 7 to 61 inches. San Emigdio fine sandy loam is not considered hydric by the NRCS.

3.3.12 Soper Gravelly Loam

Soper gravelly loam**,** 30 to 50 percent slopes, is a well-drained soil that is unlikely to pond or flood with an average depth of over 80 inches to the water table. The soil is mildly alkaline to slightly acidic. The profile consists of gravelly loam in the first 8 inches, gravelly clay loam between 8 and 29 inches, and bedrock from 29 to 79 inches. Soper gravelly loam is not considered hydric by the NRCS.

3.3.13 Sorrento Loam

Sorrento loam, 0 to 2 percent slopes, is a well-drained soil that is unlikely to pond or flood with an average depth of over 80 inches to the water table. The profile consists of loam in the first 12 inches, silty clay loam between 12 and 62 inches, and sandy loam from 62 to 72 inches. Sorrento loam is not considered hydric by the NRCS.

3.4 Natural Communities

The upland parts of the study area primarily exhibit forms of coastal sage scrub and non-native herbaceous communities with variable levels of native versus non-native plant species cover. The most prevalent forms include the California sagebrush alliance and non-native herbaceous cover/California sagebrush alliance (i.e., communities intermixed with both native and non-native species) in the upland areas. Woody riparian vegetation (e.g., arroyo willow and mule fat) and patches of tules (i.e., a form of freshwater marsh habitat dominated by cat tails and bulrushes) occur around the fringe of the existing reservoir in areas that are frequently inundated.

Natural communities are mapped in **Figure 6**. The natural communities are described below according to the *Methods Used to Survey the Vegetation of Orange County Parks and Open Space Areas and The Irvine Company Property* (Jones & Stokes Associates 1993), *Orange County Habitat Classification System* (Gray and Bramlet 1992) and California natural alliances described in *A Manual of California Vegetation, Second Edition* (Sawyer et al. 2009). Acreages of each natural community in the study area are summarized in **Table 1**. Alternate names for communities are indicated in parentheses. Natural communities considered that are identified as sensitive on the California Natural Community List (CDFW 2019b) are also noted as such.

TABLE 1
NATURAL COMMUNITIES

Natural Community	Acres	State Rank1
Riparian Communities		
Arroyo Willow Thicket*	0.24	S4
Black Willow Thicket*	4.13	S3
Mule Fat Scrub	2.25	S4
Freshwater Marsh	5.87	S4
Native Upland Communities		
Coyote Brush Scrub**	0.91	S5
Chaparral Bushmallow Scrub**	0.45	S4
Chaparral Bushmallow Scrub/Coyote Brush Scrub**	0.49	S4/S5
Chaparral Bushmallow Scrub/Non-Native Herbaceous Cover**	4.72	S4/None
Sumac Chaparral	1.63	S4
California Sagebrush Scrub**	91.74	S5
California Sagebrush Scrub**/Non-Native Herbaceous Cover	7.86	S5/None
Coast Prickly Pear Scrub*	0.69	S3
Non-Native Upland Communities		
Eucalyptus Woodland	2.78	None
Non-Native Grassland	5.27	None
Non-Native Herbaceous Cover	44.16	None
Non-Native Herbaceous Cover/California Sagebrush Scrub**	71.70	None/S5
Unvegetated Areas		
Open Water	13.93	None
Disturbed	6.92	None
Total	**265.74**	

* Asterisk indicates that an alliance/association is considered sensitive by CDFW.

** Double asterisk indicates that an alliance/association that is a covered habitat type under the NCCP/HCP and is therefore considered a sensitive natural community.

1 CDFW state rank denotes the rarity of a natural type within the state as follows:

S1 = Critically Imperiled – At very high risk of extirpation due to very restricted range, very few populations or occurrences, very steep declines, severe threats, or other factors.

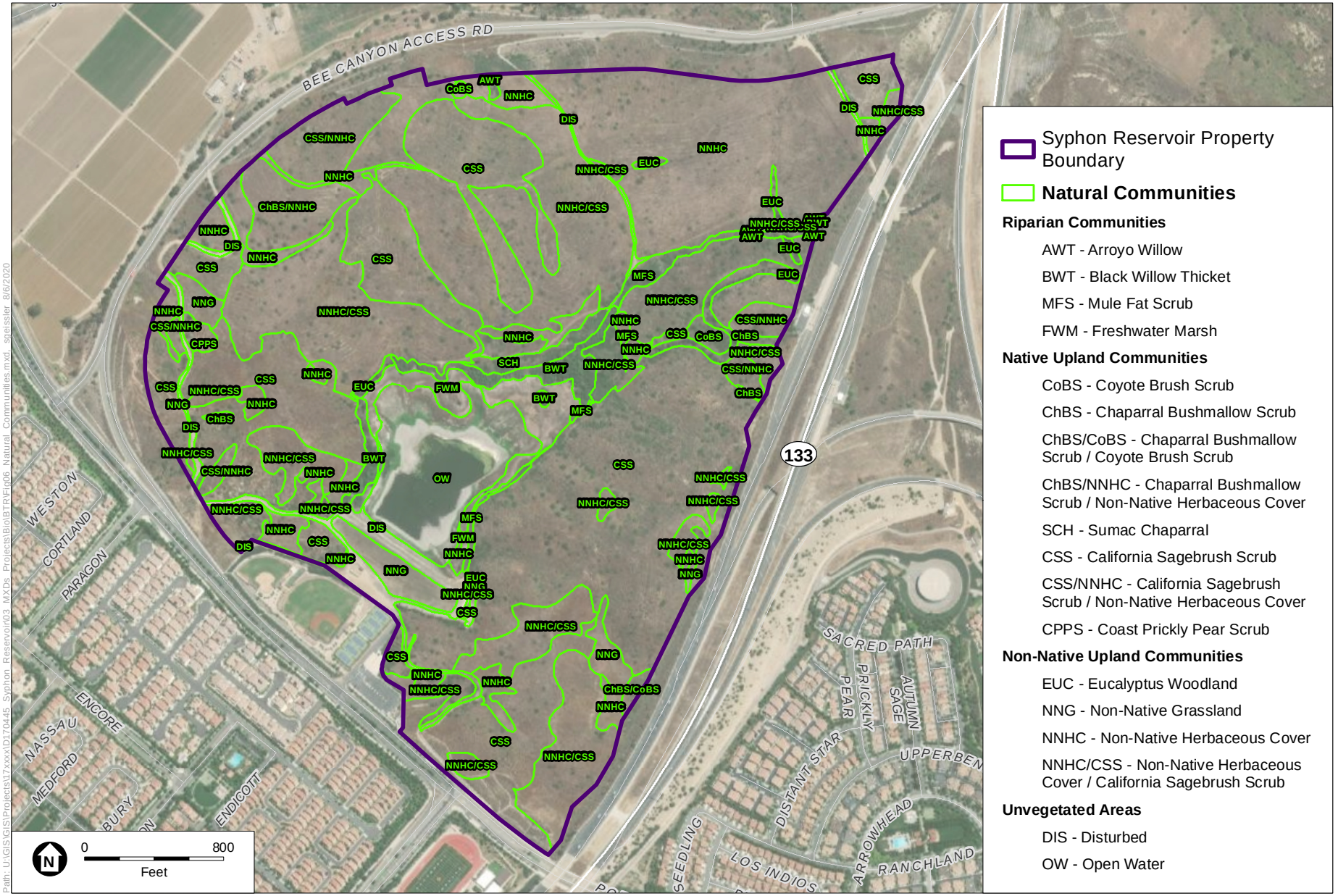
S2 = Imperiled – At high risk of extirpation due to restricted range,

few populations or occurrences, steep declines, severe threats, or other factors.

S3 = Vulnerable – At moderate risk of extirpation due to a fairly restricted range, relatively few populations or occurrences, recent and widespread declines, threats, or other factors.

S4 = Apparently Secure – At a fairly low risk of extirpation due to an extensive range and/or many populations or occurrences, but with possible cause for some concern as a result of local recent declines, threats, or other factors.

S5 = Secure - At very low or no risk of extirpation due to a very extensive range, abundant populations or occurrences, with little to no concern from declines or threats.



Path: U:\GIS\GIS\Projects\17xxxx\D170445_Syphon_Reservoir\03_MXDs_Projects\Bio\BTR\Fig06_Natural_Communities.mxd_sgeissler_8/6/2020

SOURCE: ESRI, 2016

Syphon Reservoir Improvement Project

Figure 6

Natural Communities

ESA

3.4.1 Arroyo Willow Thicket

Arroyo willow thicket (i.e., *Salix lasiolepis* Shrubland Alliance or Arroyo Willow Riparian Forest [OCHCS 7.6]) is characterized by a canopy cover dominated by mature arroyo willow (*Salix lasiolepis*) with an understory of smaller willows, and variable herbaceous layer. This alliance is typically found within stream banks and benches, slope seeps, and stringers along drainages (Sawyer et al. 2009). A total of 0.24 acre of arroyo willow thicket occurs primarily within the northern and northeastern portions of the study area.

Arroyo willow thicket is considered a sensitive natural community by CDFW (61.201.01 – *Salix lasiolepis*) (CDFW 2019b).

3.4.2 Black Willow Thicket

Black willow thicket (i.e., *Salix gooddingii* Woodland Alliance or Black Willow Riparian Forest [OCHCS 7.7]) is characterized by a canopy cover dominated by mature black willow (*Salix gooddingii*) with an understory of smaller willows, mule fat (*Baccharis salicifolia*), and variable herbaceous layer. This alliance is typically found on terraces along large rivers, canyons, and along rocky floodplains of small, intermittent streams, seeps, and springs (Sawyer et al. 2009). Species associated with this alliance include native arroyo willow and non-native tamarisk (*Tamarix ramosissima*) and red gum (*Eucalyptus camaldulensis*). A total of 4.13 acres of black willow thicket was mapped around the northern and northeastern perimeter of the reservoir within the center of the study area.

Black willow thicket is considered a sensitive natural community by CDFW (61.211.01 – *Salix gooddingii*) (CDFW 2019b).

3.4.3 Mule Fat Scrub

Mule fat scrub (i.e., mulefat thickets [*Baccharis salicifolia* Shrubland Alliance]; OCHCS 7.3) is characterized by large shrub cover dominated by mule fat and variable herbaceous layer. This alliance is typically found within canyon bottoms, floodplains, lake margins, and stream channels with soils of mixed alluvium (Sawyer et al. 2009). Species associated with this alliance include native black willow, California sagebrush (*Artemisia californica*), laurel sumac (*Malosma laurina*), cocklebur (*Xanthium strumarium*), and non-native Spanish false fleabane (*Pulicaria paludosa*), and black mustard (*Brassica nigra*). A total of 2.25 acres of black willow thicket were mapped around the northern and northeastern perimeter of the reservoir within the center of the study area.

Mule fat scrub is not considered a sensitive natural community by CDFW (63.510.01 – *Baccharis salicifolia*) (CDFW 2019b).

3.4.4 Freshwater Marsh

Freshwater marsh (i.e., California Bulrush Marsh [*Schoenoplectus californicus* Herbaceous Alliance]; OCHCS 6.4) is characterized by a dominance of dense stands of California bulrush (*Schoenoplectus californicus*) in the herbaceous layer. This alliance is typically found within freshwater or brackish marshes, shores, bars, and channels of river mouth estuaries, within areas

with soils that have a high organic contents and are poorly aerated (Sawyer et al. 2009). Dried cattails (*Typha* sp.) were also observed within this alliance. A total of 5.87 acres of freshwater marsh occur around the northern and northeastern perimeter of the reservoir in the center of the study area.

Freshwater marsh is not considered a sensitive natural community by CDFW (52.114.02 – *Schoenoplectus californicus*) (CDFW 2019b).

3.4.5 Coyote Brush Scrub

Coyote brush scrub (i.e., *Baccharis pilularis* Shrubland Alliance; Coyote Brush [OCHCS 2.3.9]) is characterized by a dominance of coyote brush (*Baccharis pilularis*) in the shrub layer. This alliance is typically found within river mouths, stream sides, terraces, open slopes, and ridges, within variable soils (Sawyer et al. 2009). A total of 0.91 acre of coyote brush scrub was mapped around the northern and northeastern portions of the study area.

Coyote brush scrub is not considered a sensitive natural community by CDFW (32.060.23 – *Baccharis pilularis*) (CDFW 2019b).

3.4.6 Chaparral Bushmallow Scrub

Chaparral bushmallow scrub (i.e., bush mallow scrub [*Malacothamnus fasciculatus* Shrubland Alliance]; Bush Mallow [OCHCS 2.3.11]) is dominated by chaparral bushmallow (*Malacothamnus fasciculatus*) in the shrub layer. This alliance is typically found within gentle to very steep slopes of variable aspect within loam or clay soils (Sawyer et al. 2009). Species associated with this alliance include native laurel sumac, California brittlebush (*Encelia californica*), California matchweed (*Gutierrezia californica*), giant wild rye (*Elymus condensatus*), and non-native short-podded mustard (*Hirschfeldia incana*). A total of 0.45 acre of chaparral bushmallow scrub was mapped around the northeastern and western portions of the study area.

Chaparral bushmallow scrub is not considered a sensitive natural community by CDFW (45.450.01 – *Malacothamnus fasciculatus*) (CDFW 2019b).

3.4.7 Chaparral Bushmallow Scrub/Coyote Brush Scrub

Chaparral bushmallow scrub/coyote brush scrub (OCHCS 2.3.11/2.3.9) is characterized by a shrub layer with a dominance of chaparral bushmallow and a sub-dominance of coyote brush. A total of 0.49 acre of chaparral bushmallow scrub/coyote brush scrub was mapped in the southern portion of the study area.

Chaparral bushmallow scrub/coyote brush scrub is not considered a sensitive natural community by CDFW (45.450.01 – *Malacothamnus fasciculatus*/32.060.23 – *Baccharis pilularis*) (CDFW 2019b).

3.4.8 Chaparral Bushmallow Scrub/Non-Native Herbaceous Cover

Chaparral bushmallow scrub/non-native herbaceous cover (OCHCS 2.3.11; *Brassica (nigra)* and Other Mustards [Semi-Natural Herbaceous Stand]; Ruderal [OCHCS 4.6]) is characterized by a shrub layer with a dominance of chaparral bushmallow and a sub-dominance of non-native

herbaceous cover. A total of 4.72 acres of chaparral bushmallow scrub/non-native herbaceous cover were mapped in the western portion of the study area.

Chaparral bushmallow scrub/non-native herbaceous cover is not considered a sensitive natural community by CDFW (45.450.01 – *Malacothamnus fasciculatus*) (CDFW 2019b).

3.4.9 Sumac Chaparral

Sumac chaparral (i.e., *Malosma laurina* Shrubland Alliance; Toyon-Sumac [OCHCS 3.12]) is characterized by large shrub cover dominated by laurel sumac with a variable understory of coastal sage scrub species and/or herbaceous grassy layer. This alliance is typically found on slopes, which are often steep, within soils that are shallow and fine-textured (Sawyer et al. 2009). Species associated with this alliance include native California sagebrush. A total of 1.63 acres of sumac chaparral were mapped throughout the eastern portion of the study area.

Sumac chaparral is not considered a sensitive natural community by CDFW (45.455.01 – *Malosma laurina*) (CDFW 2019b).

3.4.10 California Sagebrush Scrub

California sagebrush scrub (i.e., *Artemisia californica* Shrubland Alliance; Sagebrush [OCHCS 2.3.6]) is characterized by a dominance of by California sagebrush intermixed with coastal sage scrub species and a variable herbaceous layer. This alliance is typically found on slopes that are usually steep and rarely flooded within soils that are alluvial or colluvial derived shallow (Sawyer et al. 2009). Species associated with this alliance include native California buckwheat (*Eriogonum fasciculatum*), laurel sumac, California brittle bush, California matchweed, deerweed (*Acmispon glaber*), lemonadeberry (*Rhus integrifolia*), chaparral bushmallow, coast live oak (*Quercus agrifolia*), toyon (*Heteromeles arbutifolia*), Island false bindweed (*Calystegia macrostegia*), foothill needlegrass (*Stipa lepida*), black sage (*Salvia mellifera*), white sage (*Salvia apiana*), soap plant (*Chlorogalum pomeridianum*), prickly pear (*Opuntia littoralis*), common goldenstar (*Bloomeria crocea*), false rosinweed (*Osmadenia tenella*), California plantain (*Plantago erecta*), and Ladies' tobacco (*Pseudognaphalium californicum*), and non-native black mustard, foxtail chess (*Bromus madritensis*), Mexican fan palm (*Washingtonia robusta*), giant yucca (*Yucca gigantea*), oleander (*Nerium oleander*), Chinese elm (*Ulmus parvifolia*), and fountaingrass (*Pennisetum setaceum*). A total of 91.74 acres of California sagebrush scrub occurs throughout the study area.

California sagebrush scrub is not considered a sensitive natural community by CDFW (32.010.01 – *Artemisia californica*) (CDFW 2019b). However, this alliance is recognized as a covered habitat type within the Central & Coastal NCCP/HCP, and is therefore considered a sensitive natural community.

3.4.11 California Sagebrush Scrub/Non-Native Herbaceous Cover

California sagebrush scrub/non-native herbaceous cover (i.e., *Artemisia californica* Shrubland Alliance; Sagebrush [OCHCS 2.3.6]; *Brassica (nigra)* and Other Mustards [Semi-Natural Herbaceous Stand]; Ruderal [OCHCS 4.6]) is characterized by a dominance of California

sagebrush intermixed with a sub-dominance of non-native herbaceous cover primarily comprised of black mustard. Species associated with this alliance include native California buckwheat, chaparral bushmallow, fascicled tarweed (*Deinandra fasciculata*), black sage, prickly pear, splendid mariposa lily (*Calochortus spendens*), wishbone bush (*Mirabilis laevis*), golden yarrow (*Eriophyllum confertiflorum*), and non-native tocalote (*Centaurea melitensis*), slender oat (*Avena barbata*), Australian saltbush (*Atriplex semibaccata*). A total of 7.86 acres of California sagebrush scrub/non-native herbaceous cover occurs throughout the study area.

California sagebrush scrub/non-native herbaceous cover is not considered a sensitive natural community by CDFW (32.010.01 – *Artemisia californica*) (CDFW 2019b). However, this alliance is recognized as a covered habitat type within the Central & Coastal NCCP/HCP, and is therefore considered a sensitive natural community.

3.4.12 Coast Prickly Pear Scrub

Coast prickly pear scrub (i.e., *Opuntia littoralis* Shrubland Alliance; Southern Cactus [OCHCS 2.4]) is characterized by a dominance of by prickly pear intermixed with coastal sage scrub species. This alliance is typically found on south-facing slopes within soils that are shallow loams and clays that may be rocky (Sawyer et al. 2009). Species associated with this alliance include native laurel sumac, lemonadeberry, California sagebrush, California buckwheat, deerweed, blue elderberry (*Sambucus nigra* ssp. *caerulea*), and non-native fountaingrass and tree tobacco (*Nicotiana glauca*). A total of 0.69 acre of coast prickly pear scrub occurs within the western portion of the study area.

Coast prickly pear scrub is considered a sensitive natural community by CDFW (32.150.02 – *Opuntia littoralis* – mixed coastal sage scrub) (CDFW 2019b).

3.4.13 Eucalyptus Woodland

Eucalyptus woodland (i.e., eucalyptus groves [*Eucalyptus* Semi-Natural Woodland Stands]; Ornamental Landscaping [OCHCS 15.5]) is dominated of by planted rows of gum trees. Associated species include native coyote brush and laurel sumac. A total of 2.78 acres of eucalyptus woodland occurs within the central and northeastern portion of the study area.

Eucalyptus woodland is not considered a sensitive natural community by CDFW (CDFW 2019b).

3.4.14 Non-Native Grassland

Non-native grassland (i.e., *Bromus madritensis* [Semi-Natural Herbaceous Stands]; Annual [OCHCS 4.1]) is dominated of by foxtail chess with a mix of non-native and native grasses and forbs. Species associated with this alliance include native telegraph weed (*Heterotheca grandiflora*), Island false bindweed, California buckwheat, deerweed, Menzies' goldenbush (*Isocoma menziesii* var. *menziesii*), blue elderberry, prickly pear, fiddleneck (*Amsinckia* sp.), and non-native red-stemmed filaree (*Erodium cicutarium*), Russian thistle (*Salsola tragus*), castor bean (*Ricinus communis*), and fountaingrass. A total of 5.27 acres of non-native grassland occurs within the southern portion of the study area.

Non-native grassland is not considered a sensitive natural community by CDFW (CDFW 2019b).

3.4.15 Non-Native Herbaceous Cover

Non-native herbaceous cover (i.e., *Brassica (nigra)* and other mustard species [Semi-Natural Herbaceous Stand]; Ruderal [OCHCS 4.6]) is characterized by a dominance of by black mustard. This alliance is typically associated with fallow fields, grasslands, roadsides, disturbed scrublands, riparian areas, and waste places (Sawyer et al. 2009). Species associated with this alliance include native telegraph weed, laurel sumac, fascicled tarweed, Our Lord's candle (*Hesperoyucca whipplei*), foothill needlegrass, mule fat, western prickly pear (*Opuntia occidentalis*), and non-native foxtail chess, Peruvian pepper (*Schinus molle*), ripgut brome (*Bromus diandrus*), horehound (*Marrubium vulgare*), and tuna cactus (*Opuntia ficus-indica*). A total of 44.16 acres of non-native herbaceous cover coast occurs throughout the study area.

Non-native herbaceous cover is not considered a sensitive natural community by CDFW (CDFW 2019b).

3.4.16 Non-Native Herbaceous Cover/California Sagebrush Scrub

Non-native herbaceous cover/California sagebrush scrub (i.e., *Brassica (nigra)* and Other Mustards [Semi-Natural Herbaceous Stand]; Ruderal [OCHCS 4.6]; *Artemisia californica* Shrubland Alliance; Sagebrush [OCHCS 2.3.6]) is dominated by black mustard with a sub-dominance of intermixed coastal sage scrub species. A total of 71.70 acres of non-native herbaceous cover/California sagebrush scrub coast occurs throughout the study area.

Non-native herbaceous cover/California sagebrush scrub is not considered a sensitive natural community by CDFW (CDFW 2019b). Although California sagebrush scrub is recognized as a covered habitat type within the Central & Coastal NCCP/HCP and is considered to have value to covered species in that context, this non-native herbaceous cover/California sagebrush scrub community is predominantly disturbed and dominated by non-native herbaceous cover; thus, it is not considered a sensitive natural community.

3.4.17 Open Water

Open water (OCHCS 12.2) consists of the reservoir, and natural vegetation present within this area is negligible. A total of 13.93 acres of open water occurs within the study area.

Open water is not considered a sensitive natural community by CDFW (CDFW 2019b).

3.4.18 Disturbed

Disturbed (i.e., Disturbed or Barren [OCHCS 16.1]) includes lands that have been significantly disturbed as the result of human activity, and natural vegetation is very sparse or absent from these areas. Associated species found occasionally may include non-native foxtail chess, short-podded mustard, yellow sweetclover (*Melilotus officinalis*), Mexican sprangletop (*Leptochloa fusca* ssp. *uninervia*), fountaingrass, tree tobacco, red-stemmed filaree, and Mediterranean grass (*Schismus barbatus*). Disturbed areas within the study area include unpaved dirt trails that provide access around the perimeter of the reservoir and also include the earthen dam which is

actively maintained to limit any vegetation from becoming established. A total of 6.92 acres of disturbed areas occur within the study area.

Disturbed areas are not considered a sensitive natural community by CDFW (CDFW 2019b).

3.5 Jurisdictional Resources

The USACE issued an Approved Jurisdictional Determination letter (**Appendix B**), which confirmed the determination that waters of the U.S. do not occur within the study area since Syphon Reservoir is an intrastate isolated water with no apparent interstate or foreign commerce connection (USACE 2018). Thus, the study area only includes features potentially subject to the jurisdiction of the State (i.e., RWQCB wetlands and non-wetland waters of the State, and CDFW lakes, streams, and associated vegetation). **Table 2** and **Figures 7A and 7B** identify and quantify the areas regulated by the RWQCB and CDFW within the study area.

TABLE 2
POTENTIALLY JURISDICTIONAL AREAS

Jurisdiction Types	Acres
RWQCB Wetlands	4.33
RWQCB Non-Wetland Waters of the State	13.95
CDFW Lakes, Streams, and Associated Vegetation	26.55

SOURCE: ESA, 2018

3.5.1 RWQCB Wetlands and Waters of the State

3.5.1.1 Wetlands

The freshwater wetlands within the study area are largely dominated by native plant species including California bulrush (OBL[1]), black willow (FACW[2]), and yellow sweetclover (*Melilotus officinalis*, FACU[3]). This habitat also supports a range of non-native plant species including seaside heliotrope (*Heliotropium curassavicum*, FACU), spiny cocklebur (*Xanthium strumarium*, FAC), short-podded mustard (UPL[4]), and telegraph weed (UPL). The wetlands occur along the margins of Syphon Reservoir (Figure 7A). Although not mapped as hydric soils according to NRCS, hydric soil indicators were observed in the wetlands include the presence of muck, hydrogen sulfide, depleted below dark surface, redox dark surface, and sandy gleyed matrix. The wetland areas generally had very silty loam, clay soils, while sandy soils were encountered at one soil pit. Indicators of wetland hydrology include a high water table, saturation, biotic crust, and hydrogen sulfide odor.

1 OBL – obligate. Plant species with this wetland indicator status occur almost always under natural conditions in wetlands.

2 FACW – facultative wetland. Plant species with this wetland indicator status usually occur in wetlands but are occasionally found in non-wetlands.

3 FACU – facultative upland. Plant species with this wetland indicator status usually occur in non-wetlands but are occasionally found in wetlands.

4 UPL – upland. Plant species with this wetland indicator status occur in wetlands in another region, but occur almost always under natural conditions in non-wetlands in the Arid West Region.

3.5.1.2 Waters of the State

The OHWM of the reservoir was determined to be along the edge of the reservoir where surface water was observed at the time of the delineation, or based on physical characteristics of water fluctuation, such as downed emergent vegetation (**Figure 7A**). The water surface elevation of the reservoir is influenced by IRWD's management of the recycled water system. The reservoir functions as a seasonal recycled water storage facility; as such, the reservoir includes areas where open water persists throughout the year at a minimum water surface elevation but fluctuates seasonally up to a maximum water surface elevation based on demands for recycled water. The reservoir captures runoff from adjacent areas, including a primary drainage in the central portion of the study area that supports intermittent flows and riparian vegetation north of the reservoir and wetlands. However, there was no OHWM observed in this central drainage and the primary drainage was not mapped as potential waters of the State.

In addition, two ephemeral drainages (Ephemeral Drainage 1 and Ephemeral Drainage 2) were mapped north of the reservoir. These drainages convey stormwater runoff from upland areas to the central drainage via a culvert under the existing dirt road that runs along the west and north sides of the reservoir. The OHWM was an average of two feet wide, based on evidence of shelving. Ephemeral Drainage 1 supports a mix of non-native herbaceous cover and California sagebrush scrub, while Ephemeral Drainage 2 supports a mix of non-native herbaceous cover, California sagebrush scrub, and laurel sumac scrub. No surface water was observed in either drainage.

3.5.2 CDFW Lakes, Streams, and Associated Vegetation

Areas within CDFW jurisdiction typically refer to streambeds and associated wetland or riparian vegetation. Within the study area, the potential extent of CDFW limits was taken to the outer edge of the overhanging riparian or wetland vegetation adjacent to the reservoir, and to the top of bank for the ephemeral drainages (Figure 7B). Therefore, as shown in Table 2, approximately 26.55 acres of the study area are deemed to be subject to CDFW jurisdiction.

3.6 Plant Species

The study area currently supports native vegetation communities, restored coastal sage scrub, and natural communities that are moderately to substantially dominated by non-native species. A compendium of the plant species observed within the study area is included in **Appendix C**. Special-status plant species are discussed in Section 3.8.2.

3.7 Wildlife Species

The upland and riparian communities within the study area provide suitable habitat for a variety of wildlife species including reptiles, birds, and mammals, and many species were observed during surveys conducted in the study area. A compendium of the wildlife species observed within the study area is included in **Appendix C**. Special-status wildlife species are discussed in Section 3.8.2.

3.8 Special-Status Biological Resources

3.8.1 Sensitive Natural Communities

Sensitive natural communities are designated as such by various resource agencies, such as the CDFW, or in local policies and regulations. These communities are generally considered to have important functions or values for wildlife and/or are recognized as declining in extent or distribution and may be considered threatened enough to warrant some level of protection. Sensitive natural communities include those that are identified in the CDFW *California Natural Community List* (CDFW 2019b). The CDFW state rank denotes the rarity and endangerment of a vegetation type within the state as described below, with S1 through S3 considered to be a sensitive natural community by CDFW.

3.8.1.1 State Conservation Rank

S1 = Critically Imperiled – At very high risk of extirpation due to very restricted range, very few populations or occurrences, very steep declines, severe threats, or other factors.

S2 = Imperiled – At high risk of extirpation due to restricted range, few populations or occurrences, steep declines, severe threats, or other factors.

S3 = Vulnerable – At moderate risk of extirpation due to a fairly restricted range, relatively few populations or occurrences, recent and widespread declines, threats, or other factors.

S4 = Apparently Secure – At a fairly low risk of extirpation due to an extensive range and/or many populations or occurrences, but with possible cause for some concern as a result of local recent declines, threats, or other factors.

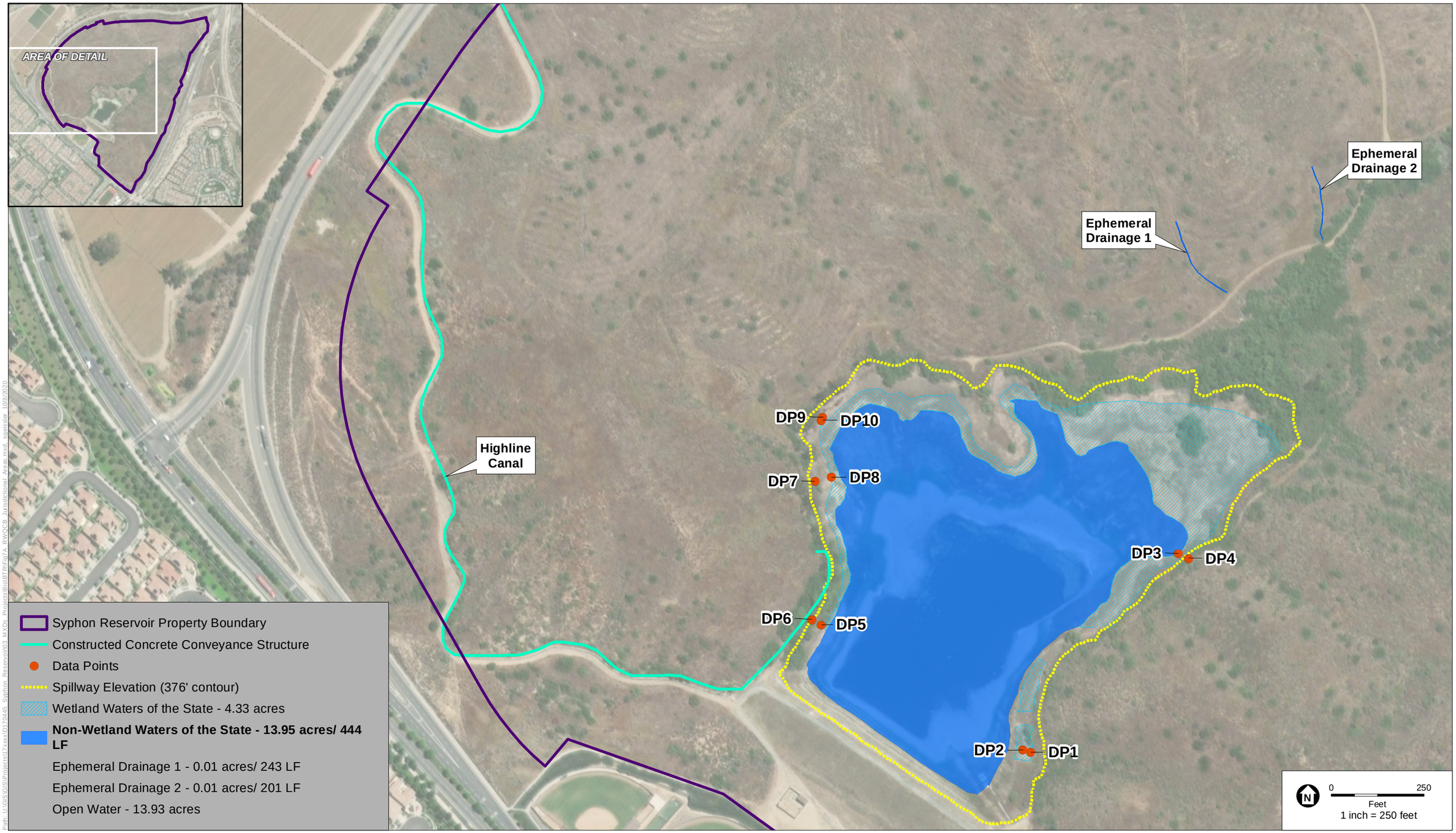
S5 = Secure - At very low or no risk of extirpation due to a very extensive range, abundant populations or occurrences, with little to no concern from declines or threats.

Based on the state ranks, ten sensitive natural communities occur within the study area: arroyo willow thicket, black willow thicket, coyote brush scrub, chaparral bushmallow scrub, chaparral bushmallow scrub/coyote brush scrub, chaparral bushmallow scrub/non-native herbaceous cover, California sagebrush scrub, California sagebrush scrub/non-native herbaceous cover, coast prickly pear scrub, and non-native herbaceous cover/California sagebrush scrub (**Figure 8**).

3.8.2 Special-Status Species

"Special-status" species are plants and animals that are listed under the California Endangered Species Act (CESA) or Federal Endangered Species Act (FESA), as well as species protected under other regulations and species that are considered sufficiently rare or sensitive by the scientific community to be considered rare. Special-status species are categorized as follows:

- Species listed or proposed for listing as threatened or endangered, or designated as candidates for possible future listing as threatened or endangered, under CESA or FESA.
- Species protected under the federal Bald and Golden Eagle Protection Act.
- Species that meet the definitions of rare or endangered under CEQA (State CEQA Guidelines § 15380).
- Plants designated as rare or endangered in accordance with the California Native Plant Protection Act (NPPA) (Fish and Game Code § 1900 et seq.).



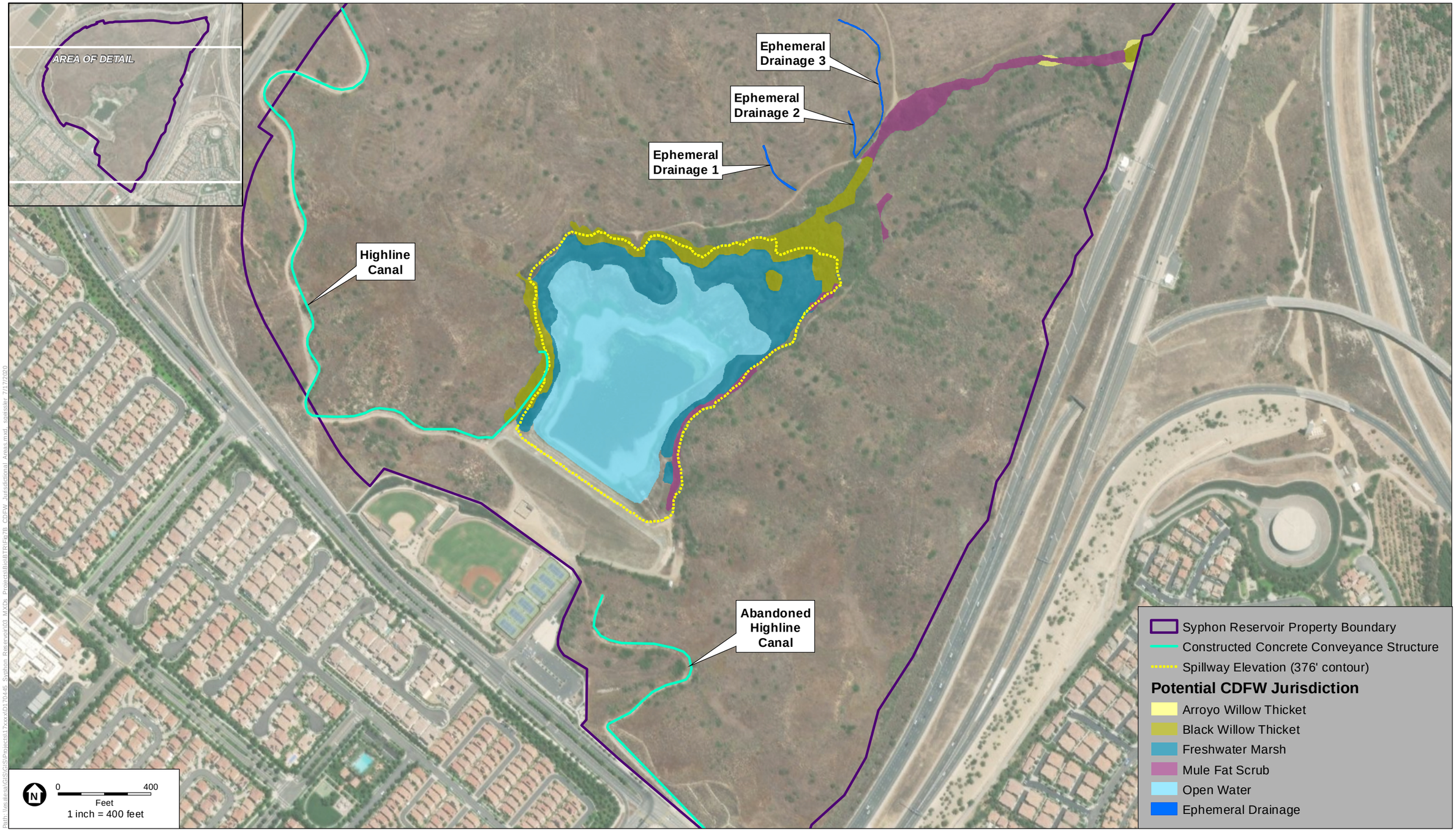
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SOURCE: ESRI, 2016

Syphon Reservoir Improvement Project

Figure 7A
RWQCB Jurisdictional Areas

ESA



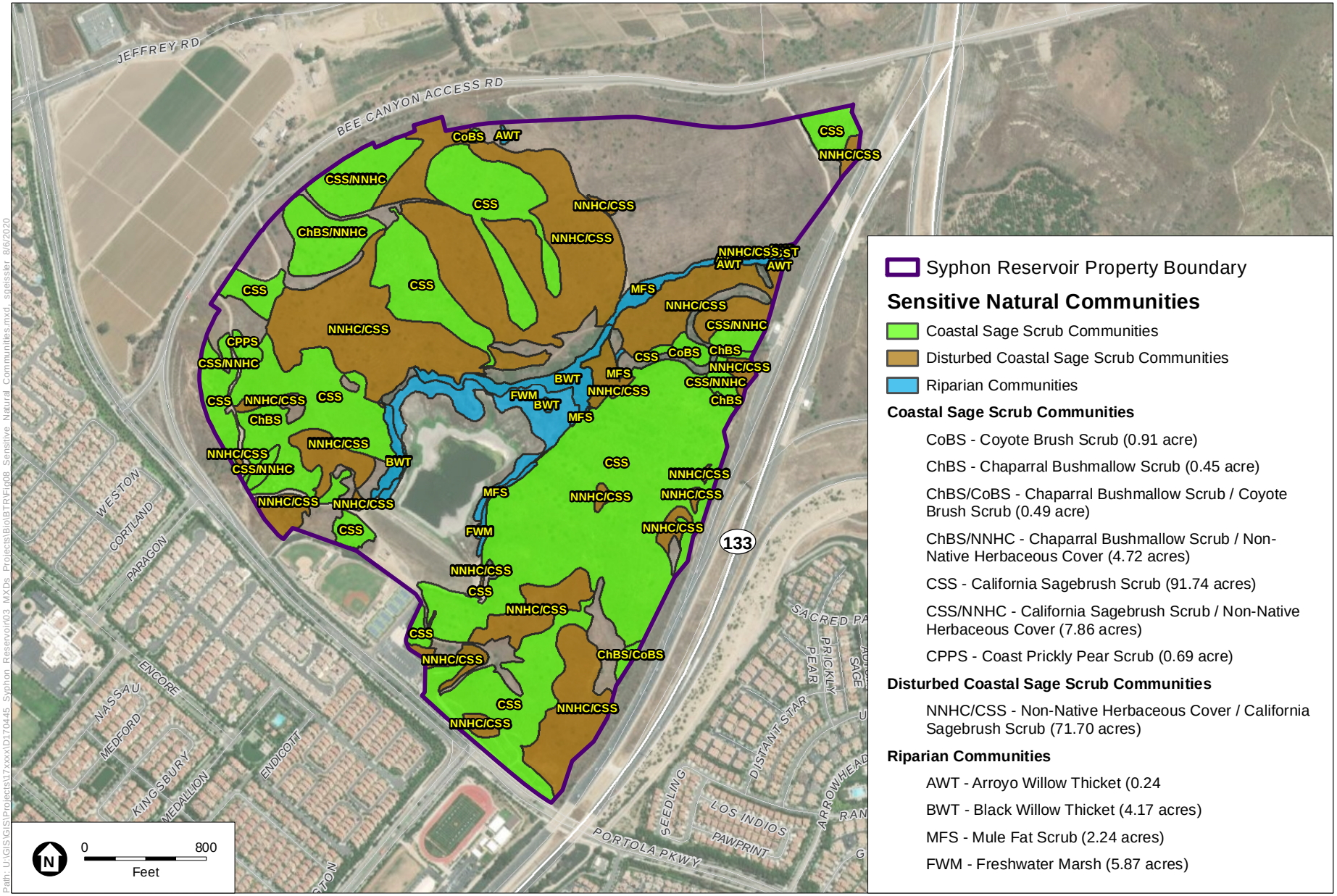
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SOURCE: ESRI, 2016

Syphon Reservoir Improvement Project

Figure 7B
CDFW Jurisdictional Areas

ESA



SOURCE: ESRI, 2016

Syphon Reservoir Improvement Project

Figure 8

Sensitive Natural Communities

ESA

- Plants considered by CDFW and the CNPS to be rare (California Rare Plant Ranks [CRPR] 1A, 1B, 2A, and 2B) in California.
- Species covered under an adopted Natural Community Conservation Plan (NCCP)/Habitat Conservation Plan (HCP).
- Species identified by CDFW and designated as Special Animals, including wildlife species designated as species of special concern in California (SC).
- Wildlife species listed as fully protected in California (California Fish and Game Code § 3511, 4700, and 5050).

Based on the literature review and field reconnaissance, special-status species were evaluated for their potential to occur within the study area or immediate vicinity, using the following definitions:

Unlikely: The study area or immediate vicinity do not support suitable habitat for a particular species, and therefore the species is unlikely to occur within the study area.

Low Potential: The study area or immediate vicinity only provide low-quality or very limited habitat for a particular species. In addition, the study area may lie outside the known geographic or elevational range for a particular species.

Moderate Potential: The study area or immediate vicinity provide suitable habitat for a particular species. However, the habitat or substrate may be limited or the desired vegetation assemblage or density is less than ideal.

High Potential: The study area or immediate vicinity provides high-quality suitable habitat conditions for a particular species. Additionally, known populations of the species may occur in the study area or immediate vicinity.

Present: The species was observed within the study area during relevant biological surveys or other project visits.

Based on the database search results, a list of potentially occurring special-status species was developed and evaluated for the study area. Special-status species with potential to occur were defined as those species whose geographic and elevational range include the study area and that require habitat similar to habitat present within the study area or immediate vicinity.

3.8.2.1 Special-Status Plant Species

Of the 56 special-status plant species considered for their potential to occur within the study area, 37 species are unlikely to occur and 15 species were assessed as having low potential to occur because the study area is outside of the known elevation range for these species and/or lacks suitable habitat to support these species. None of the special-status plant species with a low potential to occur were observed during focused surveys conducted in 2018 and 2019. Species determined to be unlikely or to have only a low potential to occur are included in **Appendix D**. These species are not discussed further in this analysis.

Four special-status plant species were observed within the study area during focused surveys in 2018 and 2019, including Catalina mariposa lily (*Calochortus catalinae*) (CRPR 4.2, NCCP/HCP Covered), intermediate mariposa lily (*Calochortus weedii* var. *intermedius*) (CRPR 1B.2), multi-stemmed dudleya (*Dudleya multicaulis*) (CRPR 1B.2), and San Diego County viguiera (*Bahiopsis laciniata*) (CRPR 4.3).

Approximately 309 Catalina mariposa lily individuals were observed on-site in the western and southeastern portions of the study area. This species was also observed on-site during previous surveys by Harmsworth Associates in 1998 (Dudek 2012). Approximately 19 intermediate mariposa lily individuals were observed on-site in the western portion of the study area. Approximately 109 multi-stemmed dudleya above-ground specimens were observed on-site in the western portion of the study area. San Diego County viguiera was not noted by the CNDDB and CNPS database searches as a plant with potential to occur; however, one individual was observed on-site in the easternmost portion of the study area.

Appendix D provides details of each special-status species, their habitat, and their potential to occur within the study area. Special-status species noted in the USFWS and CNDDB databases in the vicinity of the study area are shown in **Figures 9A and 9B**. Special-status plant species observed on-site are shown in **Figure 10A**.

3.8.2.2 Special-Status Wildlife Species

Of the 68 special-status wildlife species considered regarding their potential to occur within the study area, 37 species are deemed unlikely to occur due to the lack of any potentially suitable habitat and 14 species were assessed as having low potential to occur because the study area lacks suitable habitat to support these species and/or is outside of the known geographic or elevational range for these species. Species considered but determined to be unlikely or to have a low potential to occur are still included in **Appendix D**. It should be noted that coastal cactus wren (*Campylorhynchus brunneicapillus cousei*) (SC, NCCP/HCP Covered Species) was previously observed on-site in 1999 and reported in the CNDDB and also around 2000, prior to the Santiago Fire that burned the entire site in October 2007 (Dudek 2012). However, there are currently very limited, isolated coast prickly pear cactus plants on-site so this species has a low potential to occur due to presence of a negligible amount of cacti-dominated vegetation on-site or within the immediate vicinity. These species are not discussed further in this analysis.

ESA conducted focused surveys for western spadefoot, least Bell's vireo, and southwestern willow flycatcher in 2019. No western spadefoot (Species of Special Concern [SC], NCCP/HCP Covered Species) or southwestern willow flycatcher (Federally Endangered [FE], State Endangered [SE], NCCP/HCP Conditionally Covered) were detected during focused surveys.

Seven special-status species were observed within the study area during 2018 and/or 2019 surveys, including least Bell's vireo (FE, SE, NCCP/HCP Conditionally Covered Species), coastal California gnatcatcher (*Polioptila californica californica*) (Federally Threatened [FT], SC, NCCP/HCP Covered Species), yellow warbler (*Setophaga petechia*) (SC), yellow-breasted chat (*Icteria virens*) (SC), southern California rufous-crowned sparrow (*Aimophila ruficeps canescens*) (NCCP/HCP Covered Species), Vaux's swift (*Chaetura vauxi*) (SC), and orange-throated whiptail (*Aspidoscelis hyperythra*)

(NCCP/HCP Covered Species). In addition, coastal cactus wren and seven other special-status species have been observed within the study area during previous surveys or were reported in the CNDDB, including grasshopper sparrow (*Ammodramus savannarum*) (SC), red-shouldered hawk (*Buteo lineatus*) (NCCP/HCP Covered Species), northern harrier (*Circus cyaneus*) (SC, NCCP/HCP Covered Species), white-tailed kite (*Elanus leucurus*) (State Fully Protected [FP]), prairie falcon (*Falco mexicanus*) (NCCP/HCP Conditionally Covered Species), American peregrine falcon (*Falco peregrinus anatum*) (FP, NCCP/HCP Covered Species), and coyote (*Canis latrans*) (NCCP/HCP Covered Species) (Dudek 2012). It must be recognized that among the raptors (birds of prey) noted above, the prairie falcon and American peregrine falcon are noted as species that may soar above or occasionally forage in this area but that have a negligible potential to nest on-site.

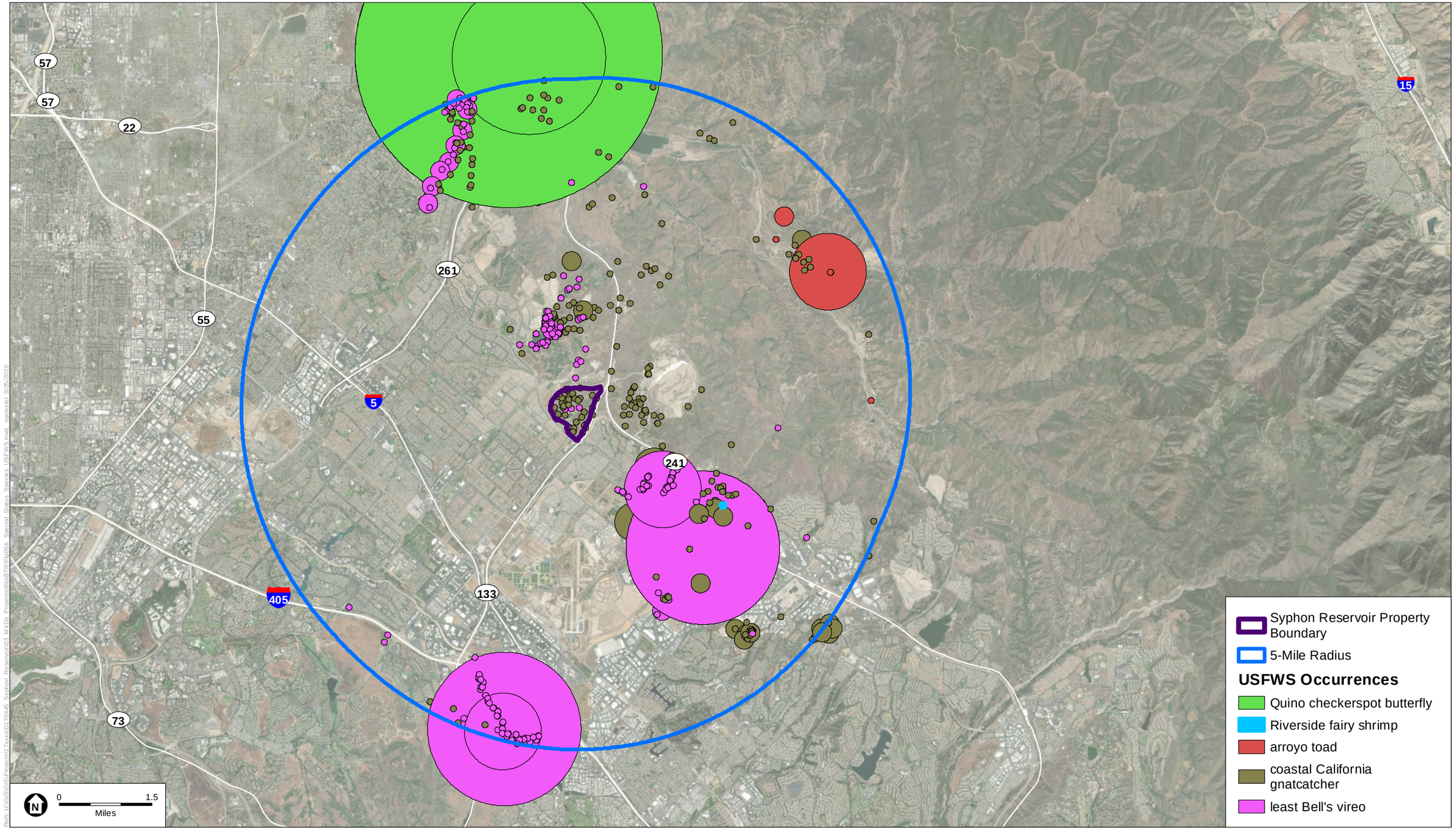
In addition, one special-status species, sharp-shinned hawk (*Accipiter striatus*) (NCCP/HCP Covered Species), has a high potential to occur. Two special-status species, coastal whiptail (*Aspidoscelis tigris stejnegeri*) (SC, NCCP/HCP Covered Species) and San Diego desert woodrat (*Neotoma lepida intermedia*) (SC, NCCP/HCP Covered Species), have a moderate potential to occur.

Appendix D provides details for each special-status species, their habitat associations, and a determination regarding their potential to occur within the study area. Special-status species occurrences from the USFWS and CNDDB occurrences databases within the vicinity of the study area are shown in Figures 9A and 9B. Special-status wildlife species observed on-site are shown in **Figure 10B**.

3.9 Critical Habitat

Under the FESA, when species are proposed for listing as Threatened or Endangered, the USFWS is required to consider whether there are geographic areas that contain essential features or areas that are essential to conserve the specie, and if so, USFWS may propose designating these areas as critical habitat. Critical habitat is defined as areas that contain the physical or biological features that are essential to the conservation of endangered and threatened species and that may need special management or protection. Critical habitat may also include areas that were not occupied by the species at the time of listing but are essential to its conservation. Critical habitat designations affect only Federal agency actions or federally funded or permitted activities. Critical habitat designations do not affect activities by private landowners if there is no Federal "nexus"—that is, no Federal funding or authorization (USFWS 2017).

The study area does not occur within or overlap any USFWS-designated critical habitat areas (USFWS 2020b). The nearest designated critical habitat areas are both located a bit more than 2 miles to the southeast, on the south side of the SR-241 where a very small area is designated as Critical Habitat for the Federally Endangered Riverside fairy shrimp (*Streptocephalus wootoni*) and larger area is designated for the Federally Threatened coastal California gnatcatcher.

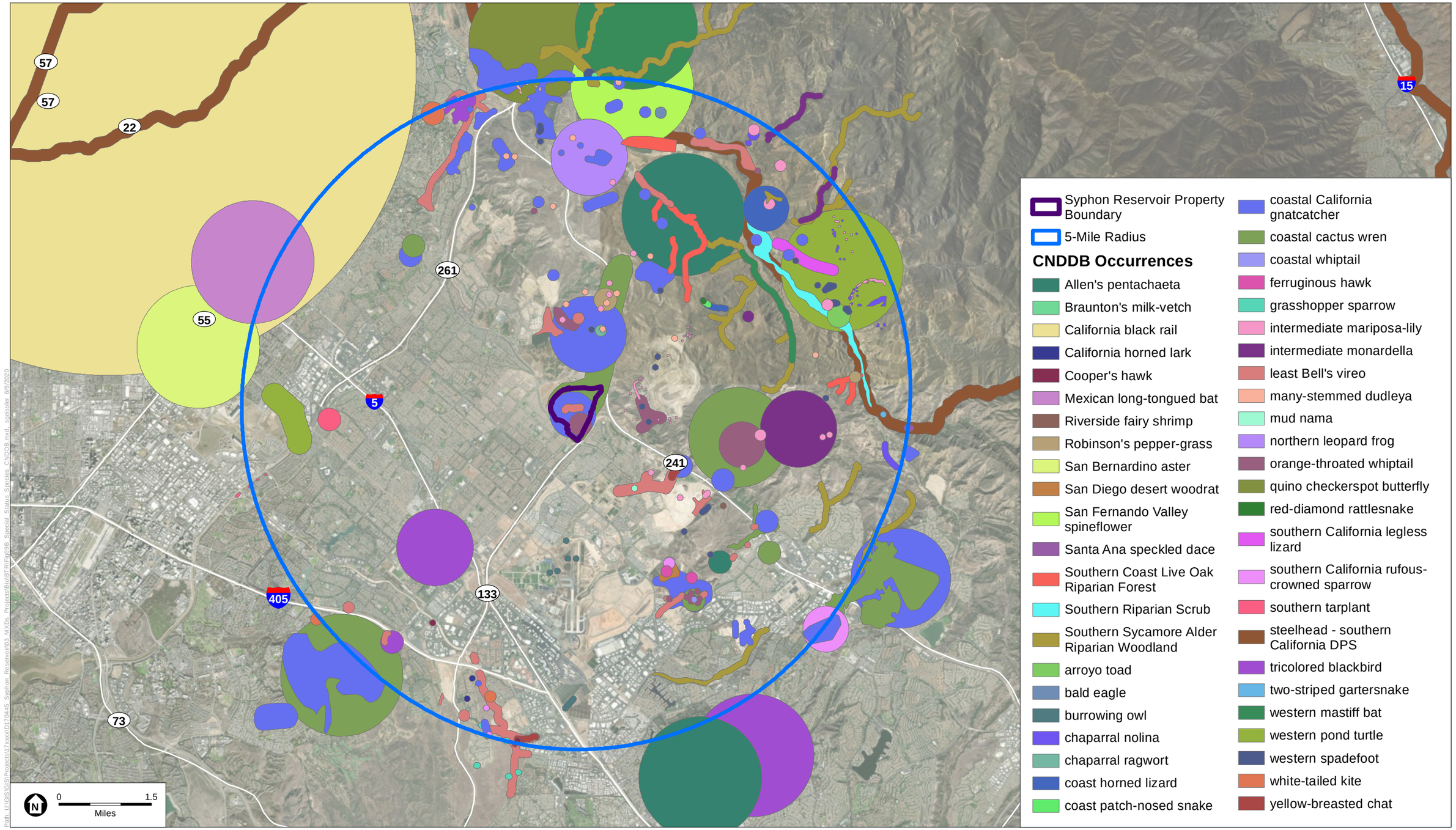


SOURCE: ESRI, 2016

Syphon Reservoir Improvement Project

Figure 9A
Special-Status Species Occurrences (USFWS)

ESA

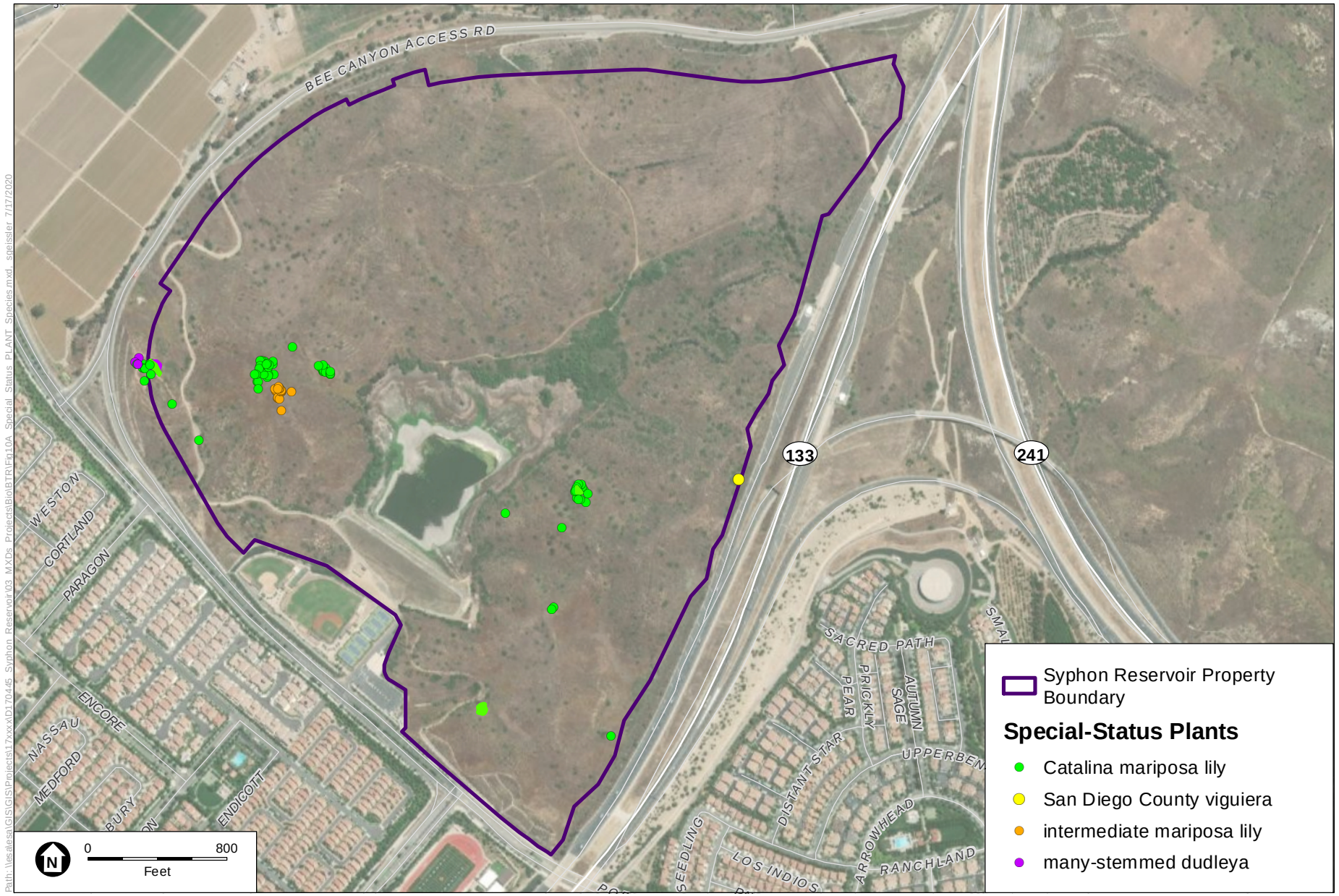


SOURCE: ESRI, 2016

Syphon Reservoir Improvement Project

Figure 9B
Special-Status Species Occurrences (CNDDB)

ESA



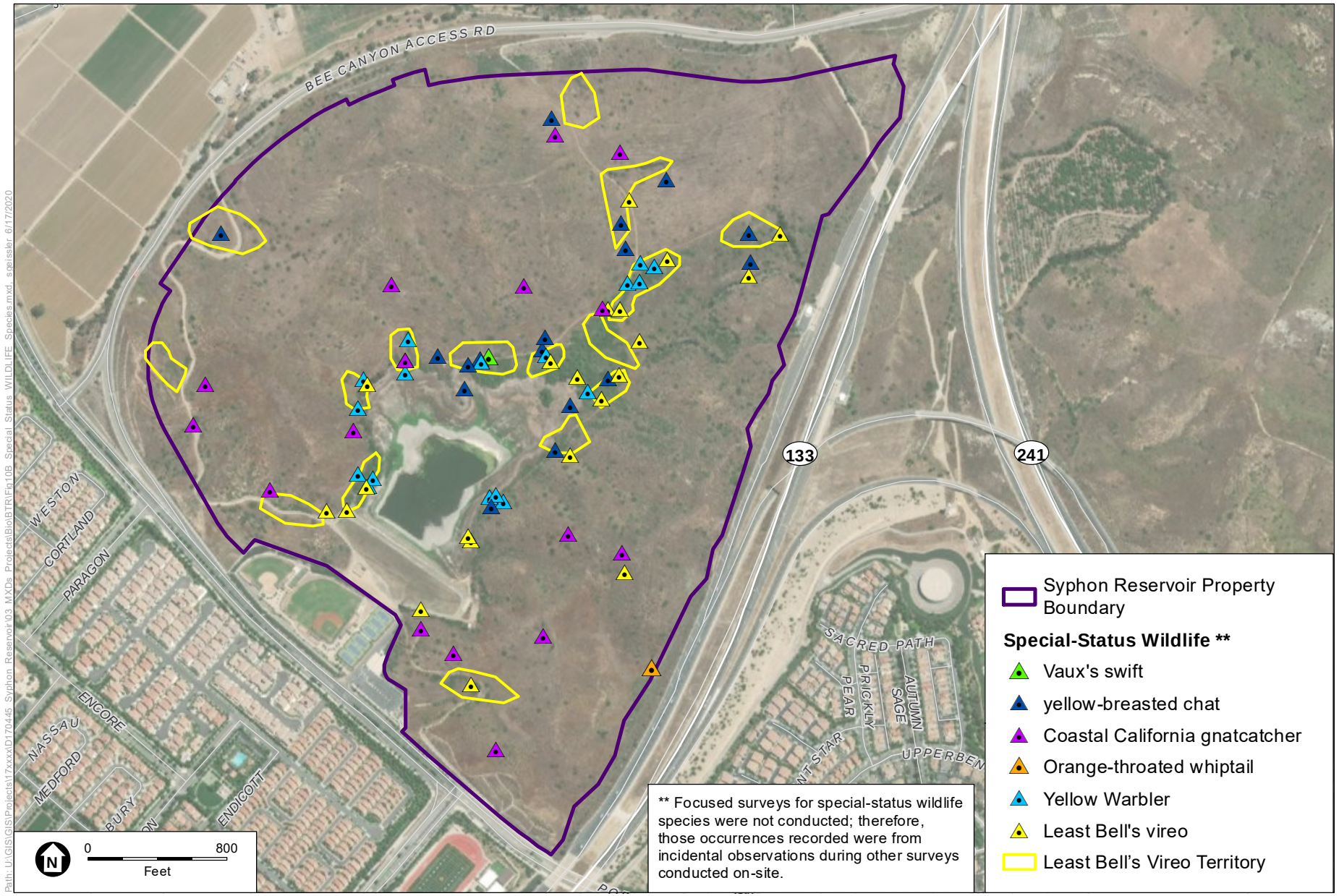
SOURCE: ESRI, 2016

Syphon Reservoir Improvement Project

Figure 10A

Special-Status Plant Species Observed Within the Study Area in 2018 and 2019

ESA



SOURCE: ESRI, 2016

Syphon Reservoir Improvement Project

Figure 10B

Special-Status Wildlife Species Observed Within the Study Area in 2018 and 2019

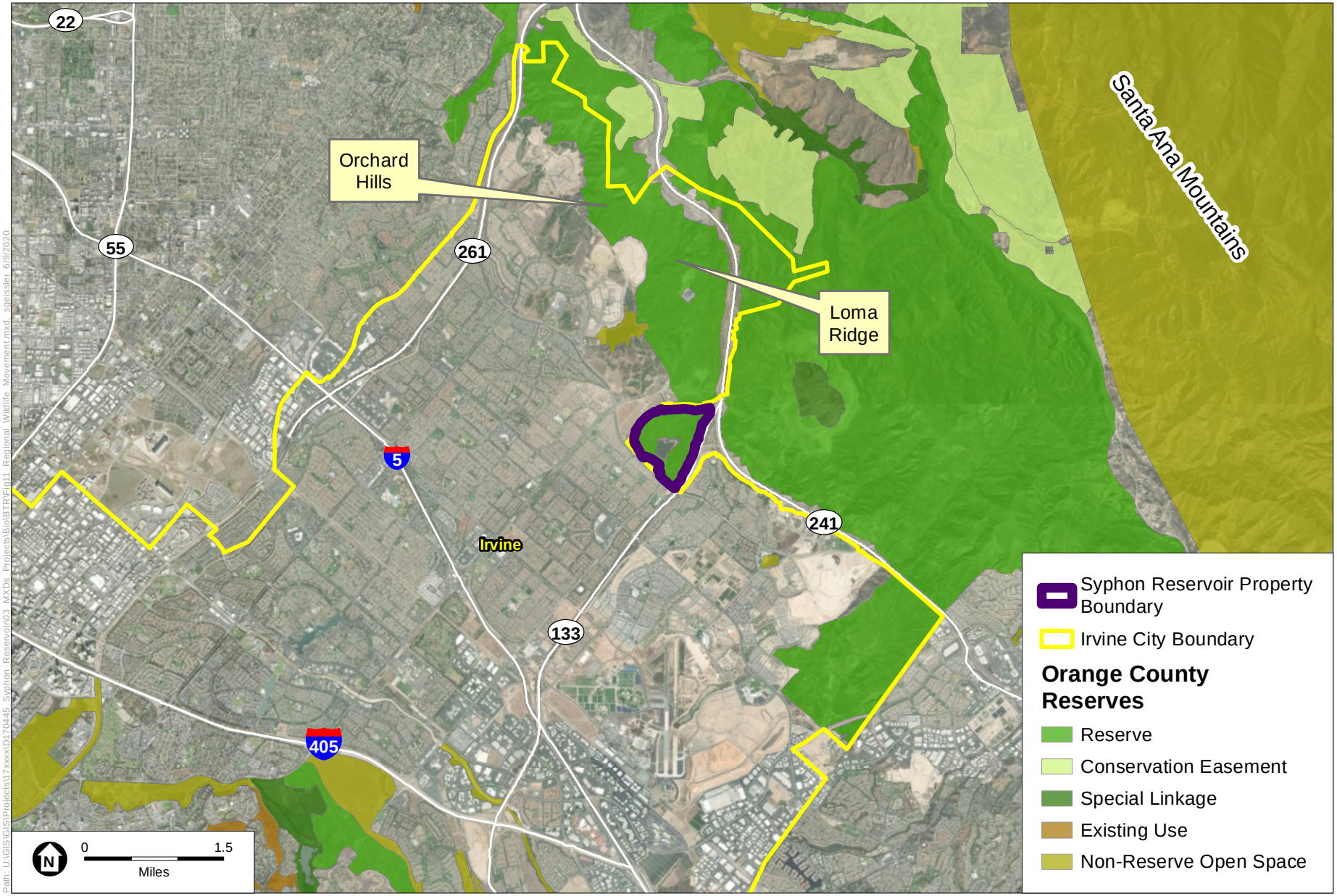
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3.10 Wildlife Movement

Effective wildlife movement is essential for dispersal, genetic exchange, migration, foraging, and breeding. Wildlife movement corridors or habitat linkages are linear habitat features that connect blocks of habitat that are otherwise disconnected. Functional wildlife movement corridors are especially important in highly fragmented habitat, such as developed or agricultural areas. Wildlife movement corridors are generally used by terrestrial animals, although they may also be important for aquatic species, avian dispersal, and as avenues for genetic exchange in plants. On a regional scale, movement corridors can include bird flyways, such as wetland areas that provide essential habitat to be used as a stopover for several days during migration.

The study area lies within central Orange County between the City of Irvine and the foothills of the Santa Ana Mountains. The study area is not identified as a Missing Linkage in the *South Coast Missing Linkages* report (South Coast Wildlands 2008). However, the study area is identified as a Small Natural Area in the California Essential Habitat Connectivity Project (CEHC) (CalTrans and CDFG 2010). CEHC is a CDFW and California Department of Transportation (CalTrans) project that ran a statewide assessment of essential habitat connectivity using spatial analyses and modeling techniques to identify large remaining blocks of intact habitat or natural landscape and model linkages between them that need to be maintained, particularly as corridors for wildlife.

The study area is located within the Central Subregion of the County of Orange NCCP/HCP, and the majority is located within the NCCP/HCP Reserve (i.e., the central portion of the reservoir is excluded from the Reserve) (**Figure 11**). Although the study area is bordered by dense residential development to the southwest and southeast, as well as by the SR-133 and SR-241 and interchange to the east and northeast, it is contiguous to agricultural and undeveloped areas to the west along Loma Ridge in the Orchard Hills planning area. Additionally, the study area includes upland and riparian habitat that provides important resources for wildlife, such as foraging habitat, potential nesting and denning sites, and cover. Although terrestrial wildlife movement through the study area is extremely restricted to the northeast, east, or south, the study area lies at the southeastern limit of a larger contiguous block of habitat that may be used by local terrestrial wildlife movement and provides a small part of regional habitat connectivity for avian species (e.g., dispersal habitat for coastal California gnatcatcher within this region). The reservoir is also an important regional water source that attracts a number of avian species. Thus, from a regional perspective, the study area functions as a part of a wildlife movement corridor, particularly for avian species.



SOURCE: ESRI, 2016

Syphon Reservoir Improvement Project

Figure 11

Regional Wildlife Movement

ESA

On a local scale, the study area provides live-in habitat for a variety of invertebrate, fish, amphibian, reptile, bird, and mammal species, and movement habitat for invertebrate, reptile, bird, and mammal species. Immediately surrounding the study area, the City of Irvine is located to the south, and human activity and dense development within these residential and commercial areas do not provide suitable habitat or resources for most native wildlife, with the exception of a few wide-ranging species that are adapted to urban environments (e.g., raccoon, skunk, coyote, some birds). In addition, the SR-133 and Bee Canyon Landfill Access Road, which is frequented by trucks hauling trash to the landfill, are hazards to wildlife. However, the study area is undeveloped, contains natural habitats, and wildlife movement is not restricted within the study area or to and from other undeveloped and agricultural areas to the north with the exception of a chain-link fence around the perimeter of the property. Thus, although some wildlife movement (e.g., more secretive wildlife that require larger home ranges, such as mountain lion and deer) may be deterred by the human activity and development nearby, these barriers to movement (e.g., development and roads) would not preclude smaller wildlife that are better adapted to urbanized areas from moving through the study area or the surrounding region.

In summary, the study area supports live-in and movement habitat for species on a local scale, and likely functions to facilitate movement for a number of avian species on a regional scale.

4.0 Regulatory Framework

The following provides a general description of the applicable regulatory requirements for the proposed project, including federal, state, and local policies and guidelines.

4.1 Federal

4.1.1 Endangered Species Act (USC, Title 16, § 1531 through 1543)

The FESA and subsequent amendments provides for the conservation and protection of wildlife and plant species that are listed or proposed for listing as endangered or threatened species and the ecosystems upon which they depend. The FESA also provides statutory framework for the conservation and recovery of threatened and endangered species as well as for the conservation of designated critical habitat that USFWS determines is required for the survival and recovery of these listed species.

Section 7 of the FESA requires federal agencies, in consultation with and assistance from the Secretary of the Interior or the Secretary of Commerce, as appropriate, to ensure that actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of threatened or endangered species or result in the destruction or adverse modification of critical habitat for these species. The USFWS and National Marine Fisheries Service (NMFS) share responsibilities for administering the FESA. Regulations governing interagency cooperation under Section 7 are found in CCR Title 50, Part 402. The opinion issued at the conclusion of consultation will include a statement authorizing “take” (to harass, harm, pursue, hunt, wound, kill, etc.) that may occur incidental to an otherwise legal activity. Although federal funding is not expected, if the proposed project were to receive federal funding the funding agency would be required to initiate a consultation with USFWS under Section 7. The consultation process would then lead to issuance

of a Biological Opinion from USFWS. In most cases, a Biological Opinion addresses the proposed project's potential to result in "take" of listed species (as defined below), and includes mandatory conditions that would allow for limited incidental take to occur subject to prescribed conditions.

Section 9 lists those actions that are prohibited under the FESA. Although take of a listed species is prohibited, it is allowed when it is incidental to an otherwise legal activity. Section 9 prohibits take of listed species of fish, wildlife, and plants without special exemption. The definition of "harm" includes significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns related to breeding, feeding, or shelter. "Harass" is defined as actions that create the likelihood of injury to listed species by disrupting normal behavioral patterns related to breeding, feeding, and shelter significantly.

Section 10 provides a means whereby a non-federal action with the potential to result in take of a listed species can be allowed under an incidental take permit which may be issued once a HCP is approved. Application procedures are found at 50 CFR 13 and 17 for species under the jurisdiction of USFWS and 50 CFR 217, 220, and 222 for species under the jurisdiction of NMFS.

In addition, a local regulatory program established by the NCCP/HCP and associated governing documents provides for regional conservation of many species while also allowing limited impacts to biological resources in association with planned development. The NCCP/HCP establishes an alternative pathway to the Section 10 and Section 7 procedures by which local projects in the Plan Area may receive both State and federal incidental take authorization for species identified as "covered" and "conditionally covered", based on compliance with relevant conditions set forth in the plan. Further details about the regional NCCP/HCP and its provisions for incidental take coverage are discussed in Section 4.3.1 below.

4.1.2 Migratory Bird Treaty Act (16 USC 703 through 711)

The Migratory Bird Treaty Act (MBTA) is the domestic law that affirms, or implements, a commitment by the U.S. to four international conventions (with Canada, Mexico, Japan, and Russia) for the protection of a shared migratory bird resource. The MBTA makes it unlawful at any time, by any means, or in any manner to pursue, hunt, take, capture, or kill migratory birds. ''Migratory bird'' means any bird protected by any of the treaties and currently includes 1,027 bird species in the United States (50 CFR 10.13), regardless of whether the particular species actually migrates. The law also applies to the removal of nests occupied by migratory birds during the breeding season. The MBTA makes it unlawful to take, pursue, molest, or disturb these species, their nests, or their eggs anywhere in the United States.

4.1.3 Federal Clean Water Act (33 USC 1251 through 1376)

The 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 intermittent streams), 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 Section 404 of the CWA. The CWA also excludes certain features from this regulation, including “wastewater recycling facility constructed on dry land” (see 33 CFR §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 U.S. The USACE determination stated that they do not consider the site to contain waters of the U.S. (Appendix B).

4.1.4 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 and 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.

4.2 State

4.2.1 California Endangered Species Act (California Fish and Game Code § 2050 et seq.)

CESA establishes the policy of the state to conserve, protect, restore, and enhance threatened or endangered species and their habitats. CESA mandates that state agencies should not approve projects that would jeopardize the continued existence of threatened or endangered species if reasonable and prudent alternatives are available that would avoid jeopardy. There are no state agency consultation procedures under CESA. For projects that would affect a listed species under both CESA and FESA, compliance with FESA would satisfy CESA if CDFW determines that the federal incidental take authorization is “consistent” with CESA under California Fish and Game Code Section 2080.1. For projects that would result in take of a species listed under the CESA only, the project operator would have to apply for a take permit under Section 2081(b). Further details about the regional NCCP/HCP are discussed in Section 4.3.1 below.

4.2.2 California Fish and Game Code § 1600 et seq.

CDFW is responsible for protecting and conserving fish and wildlife resources, and the habitats upon which they depend. Under Section 1600 of the California Fish and Game Code, CDFW administers the Lake and Streambed Alteration (LSA) Program and regulates all substantial diversions, obstructions, or changes to the natural flow or bed, channel, or bank of any river, stream, or lake (which typically include reservoirs), which supports fish or wildlife.

Applicants proposing changes to such regulated water resources must submit a Lake or Streambed Alteration Notification to CDFW for such projects. CDFW will then determine if the proposed activity may substantially adversely affect an existing fish or wildlife resource and will

issue a final agreement for the applicant's signature that includes reasonable measures necessary to protect the resource. Preliminary notification to, and project review by CDFW may occur during or after the CEQA environmental review process but prior to project implementation.

4.2.3 California Fish and Game Code §§ 2080 and 2081

Section 2080 of the California Fish and Game Code states that "No person shall import into this state [California], export out of this state, or take, possess, purchase, or sell within this state, any species, or any part or product thereof, that the Commission [State Fish and Game Commission] determines to be an endangered species or threatened species, or attempt any of those acts, except as otherwise provided in this chapter, or the Native Plant Protection Act, or the California Desert Native Plants Act." Pursuant to Section 2081, CDFW may authorize individuals or public agencies to import, export, take, or possess state-listed endangered, threatened, or candidate species. These otherwise prohibited acts may be authorized through Incidental Take permits or Memoranda of Understanding if the take is incidental to an otherwise lawful activity, impacts of the authorized take are minimized and fully mitigated, the permit is consistent with any regulations adopted pursuant to any recovery plan for the species, and the project operator ensures adequate funding to implement the measures required by CDFW, which makes this determination based on available scientific information and considers the ability of the species to survive and reproduce.

Since the NCCP/HCP provides coverage for take of some State-listed species, there would not be a need for an additional 2081 permit process unless a project does not comply with NCCP/HCP requirements and may result in take of a State-listed species or if a State-listed species not covered by the NCCP/HCP were to result in take. Further details about the regional NCCP/HCP are discussed in Section 4.3.1 below.

4.2.4 California Fish and Game Code §§ 3503 and 3503.5

Under these sections of the California Fish and Game Code, the project operator is not allowed to conduct activities that would result in the taking, possessing, or destroying of any birds of prey; the taking or possessing of any migratory nongame bird as designated in the MBTA; the taking, possessing, or needlessly destroying of the nest or eggs of any raptors or nongame birds protected by the MBTA; or the taking of any nongame bird pursuant to California Fish and Game Code Section 3800.

4.2.5 California Environmental Quality Act Guidelines, § 15380

Although threatened and endangered species are protected by specific federal and state statutes, CEQA Guidelines § 15380(b) provides that a species not listed on the federal or state list of protected species may be considered rare or endangered if the species can be shown to meet certain specified criteria. These criteria have been modeled after the definition in FESA and the section of the California Fish and Game Code dealing with rare or endangered plants or animals. This section was included in CEQA primarily to deal with situations in which a public agency is reviewing a project that may have a significant effect on, for example, a candidate species that has not been listed by either USFWS or CDFW. Thus, CEQA provides an agency with the ability to protect a species from the potential impacts of a project until the respective government

agencies have an opportunity to designate the species as protected, if warranted. CEQA also calls for the protection of other locally or regionally significant resources, including natural communities. Although natural communities do not at present have legal protection of any kind, CEQA calls for an assessment of whether any such resources would be affected and requires findings of significance if there would be substantial losses. Natural communities listed by CNDDB as sensitive are considered by CDFW to be significant resources and fall under the State CEQA Guidelines for addressing impacts. Local planning documents such as General Plans often identify these resources as well.

4.2.6 California Water Quality Control Act (Porter-Cologne California Water Code Section 13260)

The State Water Resources Control Board (SWRCB) and the RWQCB (together "Boards") are the principal State agencies with primary responsibility for the coordination and control of water quality. The Boards regulate activities pursuant to Section 401(a)(1) of the federal CWA as well as the Porter Cologne Water Quality Control Act (Porter-Cologne) (Water Code Section 13260). Section 401 of the CWA specifies that certification from the State is required for any applicant requesting a federal license or permit to conduct any activity including but not limited to the construction or operation of facilities that may result in any discharge into navigable waters. The certification shall originate from the State in which the discharge originates or will originate, or, if appropriate, from the interstate water pollution control agency having jurisdiction over the navigable water at the point where the discharge originates or will originate. Any such discharge will comply with the applicable provisions of Sections 301, 302, 303, 306, and 307 of the CWA.

In Porter-Cologne, the Legislature declared that the "State must be prepared to exercise its full power and jurisdiction to protect the quality of the waters in the State from degradation..." (California Water Code Section 13000). Porter-Cologne grants the Boards the authority to implement and enforce the water quality laws, regulations, policies and plans to protect the groundwater and surface waters of the State. It is important to note that enforcement of the State's water quality requirements is not solely the purview of the Boards and their staff. Other agencies (e.g., CDFW) have the ability to enforce certain water quality provisions in state law.

The State Wetland Definition and Procedures for Discharges of Dredged or Fill Material to Waters of the State (procedures), adopted by the State Water Resources Control Board on April 2, 2019, became effective May 28, 2020. Based on the procedures, artificial wetlands greater than or equal to one acre in size constructed for purposes of treatment, storage, or distribution of recycled water are not waters of the State unless specifically identified in a water quality control plan as a wetland or other water of the State. Since Syphon Reservoir is identified in the 1995 Water Quality Control Plan for the Santa Ana River Basin (most recently updated in June 2019; California Regional Water Quality Control Board 2019) as a water of the State, the wetlands would likely also be considered waters of the State.

4.3 Local

4.3.1 County of Orange Central & Coastal Subregion NCCP/HCP

In 1996, the Orange County Central & Coastal Subregion NCCP/HCP, a comprehensive natural resources conservation and management plan for central and coastal Orange County, was adopted. The purpose of the NCCP/HCP was to create a multiple-species and multiple-habitat reserve system and to implement a long-term conservation program on a subregional level to primarily protect coastal sage scrub and the species that use this habitat, while allowing for social and economic uses compatible with the protection of these resources.

The NCCP/HCP was prepared in cooperation with the UFSWS and CDFW, who are the agencies responsible for implementing the FESA and CESA, respectively. Implementation of the NCCP/HCP in accordance with the terms of the Implementation Agreement allows for the conservation of large, diverse areas of natural habitat, including habitat for the coastal California gnatcatcher and other federally-listed species; provides for the conservation, protection, and management of three "Target Species" and 36 "Identified Species" and their habitats; and satisfies federal and state mitigation requirements for designated development.

IRWD and the County of Orange, among others, are participating landowners of the Central & Coastal NCCP/HCP. As a participating landowner that contributed significant funding toward land acquisition, management, and the implementation of the NCCP/HCP Reserve System, IRWD was allotted 60 acres of Incidental Take Credits from within the NCCP/HCP Reserve and 27 acres of Incidental Take Credits outside of the NCCP/HCP Reserve (i.e., non-Reserve lands) for impacts to coastal sage scrub communities (Dudek 2012). An additional 9 acres of Incidental Take Credits from within the NCCP/HCP Reserve were acquired through IRWD's consolidation with Santiago County Water District (SCWD). For participating landowners, development activities and uses that are addressed by the NCCP/HCP are considered fully mitigated under the NCCP Act, FESA, and CESA for impacts to habitat occupied by listed and other species "identified" by the NCCH/HCP and Implementation Agreement. Satisfactory implementation of the NCCP/HCP under the terms of the Implementation Agreement means that no additional mitigation is required of the participating landowners for impacts to "identified" species and their habitat, or for species residing in specified non-coastal sage scrub habitats, or covered habitats.

The NCCP/HCP included provisions for IRWD to build a future reservoir "as a permitted use within the Reserve System" (R.J. Meade Consulting 1996a). At the time that the NCCP/HCP was prepared, IRWD was considering four alternative locations (including the Syphon Reservoir site) for seasonal recycled water storage reservoirs, all of which were located within the subregional Reserve System, though only one reservoir would ultimately be needed. The need for a future reservoir was identified as "a permitted use within the Reserve System in the event that public health, safety, and welfare require such a facility in the future. At the time such a facility is needed, IRWD will review the plans with appropriate agencies and propose a specific mitigation plan or pay fees adequate to mitigate the Incidental Take associated with the new reservoir" (R.J. Meade Consulting 1996a).

5.0 Potential Effects

This section describes the potential effects of the proposed project (Figures 3A, 3B, and 3C) on biological resources that may occur as a result of project implementation, including net ecological benefits. Direct, indirect, temporary, and/or permanent effects to biological resources may occur as a result of project implementation, as defined below:

- **Direct Effects:** 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. Under FESA, 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 Effects:** Biological resources may also be affected in an indirect manner as a result of project-related activities. Under FESA, indirect effects are defined as those effects that are caused by, or would result from, a proposed project but occur later in time and are reasonably certain to occur [50 C.F.R. §402-02]. An example of indirect effects 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 Effects:** Any effects to biological resources that are considered reversible can be viewed as temporary. Examples include the generation of fugitive dust during construction activities.
- **Permanent Effects:** All effects 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.

A project is generally considered to have a significant effect if it proposes or results in any of the effects or conditions described in the significance thresholds discussed below (in italics), absent specific evidence to the contrary. Conversely, if a project does not propose or result in any of the following effects or conditions, it would generally not be considered to have a significant effect on biological resources, absent specific evidence of such an effect. These significance thresholds are taken from Appendix G of the State CEQA Guidelines.

5.1 Special-Status Species

5.1.1 Significance Threshold

The project would have an 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.

5.1.2 Analysis of Project Effects

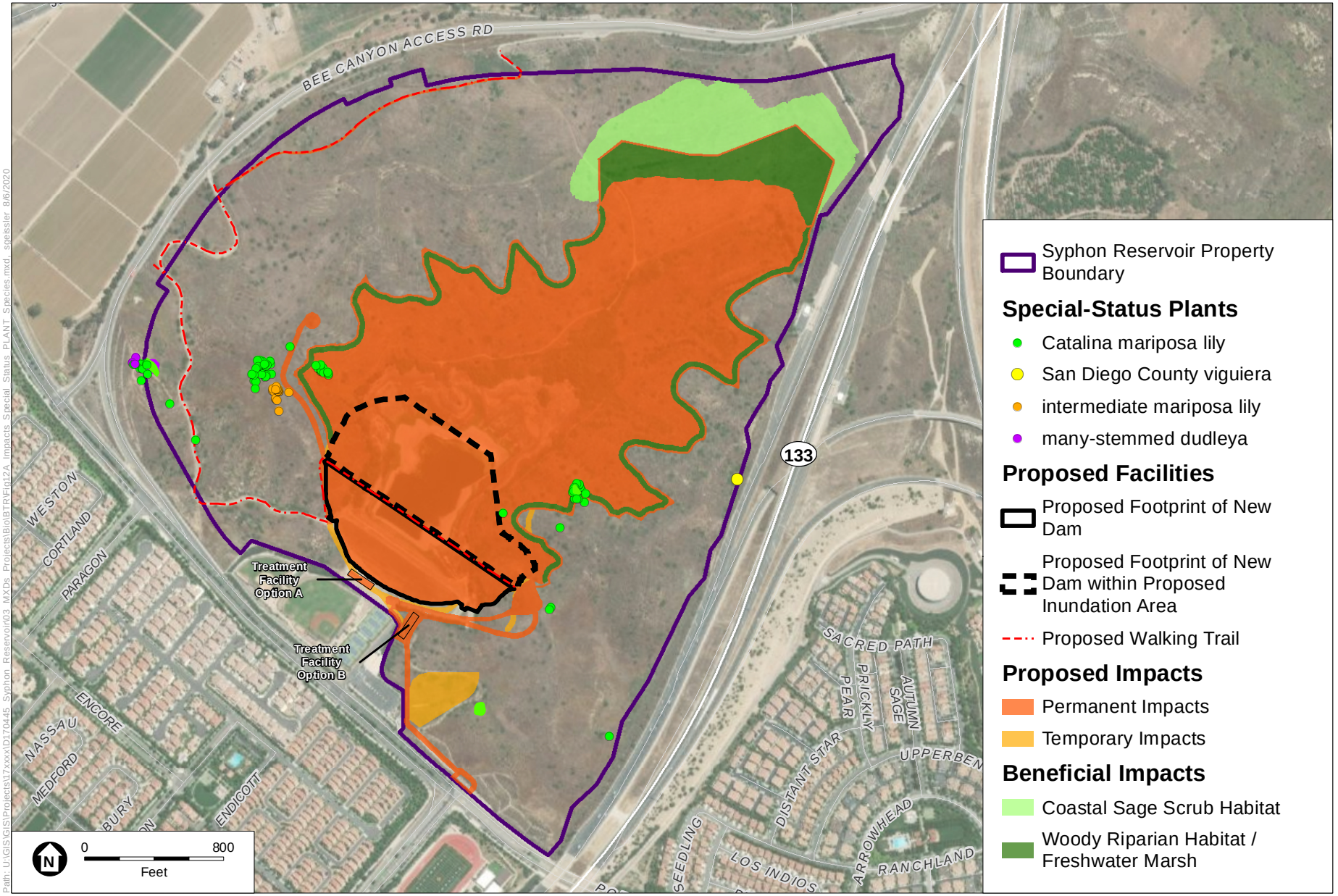
5.1.2.1 Special-Status Plant Species

Four special-status plant species, Catalina mariposa lily (CRPR 4.2, NCCP/HCP Covered), intermediate mariposa lily (CRPR 1B.2), multi-stemmed dudleya (CRPR 1B.2), and San Diego County viguiera (CRPR 4.3), were observed within the study area during focused surveys in 2018 and 2019. The proposed project will avoid removal or damage to any specimens of intermediate mariposa lily, multi-stemmed dudleya, and San Diego County viguiera. Therefore, the proposed project would not impact these special-status plant species, and no mitigation is required.

The proposed project will avoid more than 90 percent of the Catalina mariposa lily specimens identified on-site, and would remove approximately 24 of the total 309 Catalina mariposa lily individuals during construction (shown in **Figure 12A**). The number affected comprises less than 8 percent of the total population on-site. Impacts to 24 individuals is not considered a substantial loss for this species which is known to occur over a wide area in southern California. This loss would not threaten the existence of the on-site population, and would not be significant. Moreover, Catalina mariposa lily is a covered species under the NCCP/HCP provided that the proposed project complies with the NCCP/HCP provisions, and thus this species is considered conserved since the NCCP/HCP Reserve provides for the regional conservation for this and other covered species. Although the majority of the study area is within the NCCP/HCP Reserve and potential impacts to any Catalina mariposa lily would occur within the Reserve, at the time that the NCCP/HCP was prepared the NCCP/HCP included provisions for IRWD to build a future reservoir, and the proposed project is "a permitted use within the Reserve System" (R.J. Meade Consulting 1996a). Thus, even with potential impacts to this species within the Reserve, this species is considered adequately covered under the NCCP/HCP. Therefore, impacts to Catalina mariposa lily are less than significant, and no mitigation is required.

5.1.2.2 Special-Status Wildlife Species

Special-status wildlife species observed, or considered to have a moderate or high potential to occur within the study area, include the following NCCP/HCP Covered Species: coastal California gnatcatcher, orange-throated whiptail, southern California rufous-crowned sparrow, red-shouldered hawk, northern harrier, American peregrine falcon, sharp-shinned hawk, coastal whiptail, San Diego desert woodrat, and coyote. Two species that are Conditionally Covered under the NCCP/HCP, least Bell's vireo and prairie falcon, were also observed. Several other species that are not "covered species" under the NCCP/HCP were also identified, including yellow warbler, yellow-breasted chat, grasshopper sparrow, Vaux's swift, and the California fully protected white-tailed kite. It should be noted that the two falcons and Vaux's swift may fly over the site but have virtually no potential to nest on site. Likewise, white-tailed kite has only been observed foraging or flying over but is not known to nest in the study area. Locations where special-status wildlife species were observed in the study area in 2018 and 2019 are shown in **Figure 12B**.



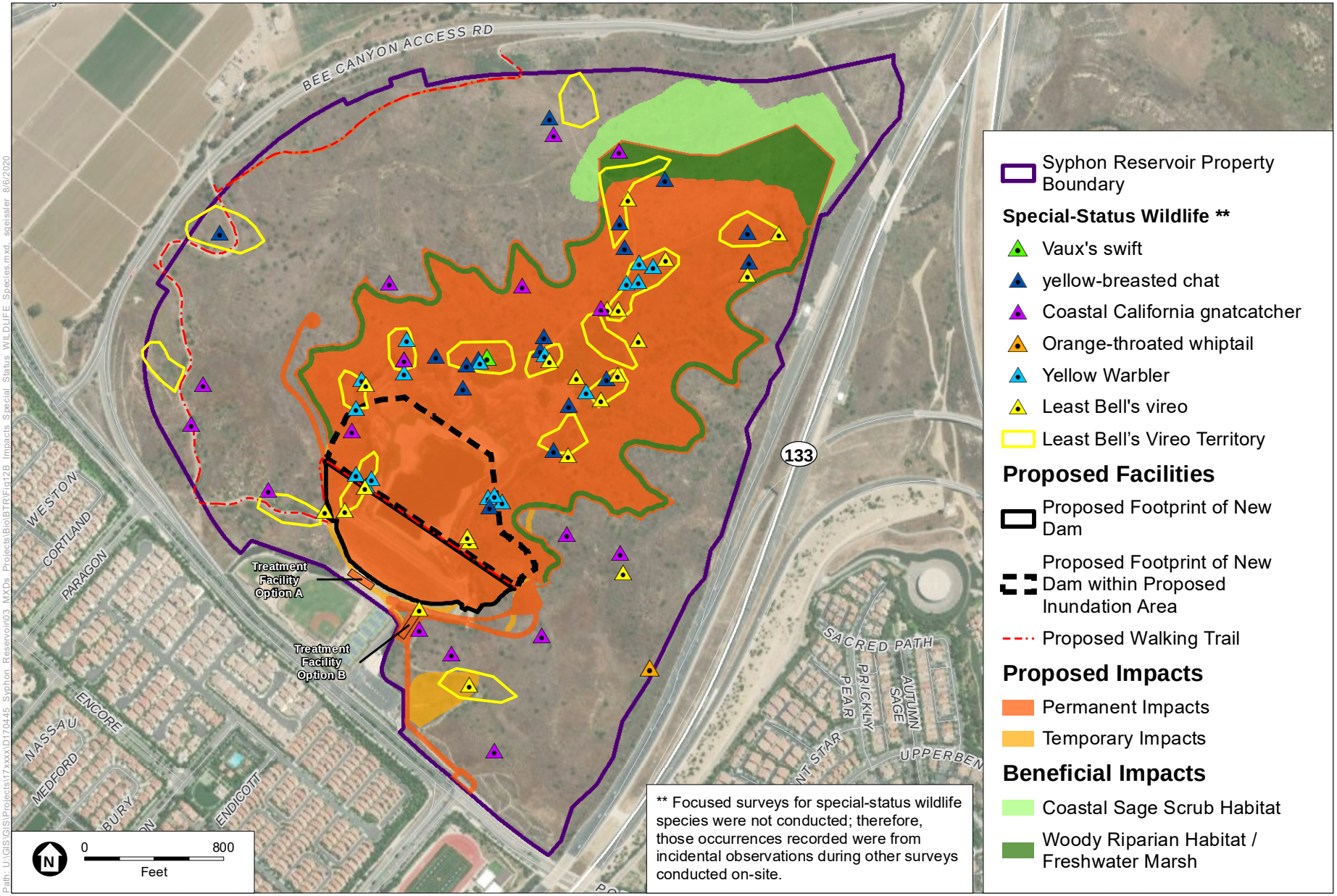
SOURCE: ESRI, 2016

Syphon Reservoir Improvement Project

Figure 12A

Impacts to Special-Status Plant Species Observed Within the Study Area in 2018 and 2019

ESA



SOURCE: ESRI, 2016

Syphon Reservoir Improvement Project

Figure 12B

Impacts to Special-Status Wildlife Species Observed Within the Study Area in 2018 and 2019

ESA

The coastal California gnatcatcher, orange-throated whiptail, southern California rufous-crowned sparrow, red-shouldered hawk, northern harrier, prairie falcon,[5] American peregrine falcon, sharp-shinned hawk, coastal whiptail, San Diego desert woodrat, and coyote, as covered species under the NCCP/HCP, are considered to be conserved within the NCCP/HCP region provided that the project complies with the NCCP/HCP provisions. As previously mentioned, although the majority of the study area is within the NCCP/HCP Reserve and potential impacts to NCCP/HCP Covered Species may occur within the Reserve, the NCCP/HCP included provisions for IRWD to build a future reservoir.

As a future infrastructure improvement that was originally recognized by the NCCP/HCP and for which IRWD has a credit allotment that can be "spent" or exchanged for the displacement of areas within the NCCP Reserve, the proposed project is considered a permitted use within the Reserve System. Potential impacts to Covered Species within the Reserve are considered adequately covered under the NCCP/HCP provided that the proposed project complies with relevant and applicable NCCP/HCP provisions. The proposed project would permanently impact a total of 28.37 acres (with Treatment Facility Option A[6])/28.49 acres (with Treatment Facility Option B) of coastal sage scrub communities.[7] The proposed project would temporarily impact 0.85 acre of California sagebrush scrub. Implementation of mitigation measure MM BIO-1 (to spend allotted Incidental Take Credits for participating landowners), MM BIO-2, and MM BIO-3, prescribed in Section 6.0 below, would reduce impacts to a less than significant level.

The least Bell's vireo is federal and state Endangered and is a Conditionally Covered species under the NCCP/HCP. This species is found in riparian habitat, and 17 least Bell's vireo individuals and/or territories were observed on-site in 2019 (point locations and territories are shown in Figure 12B). The proposed reservoir improvement project will include dam replacement, reservoir enlargement, and the installation of an on-site riparian and upland habitat area around the perimeter of the reservoir. The proposed project would displace approximately 6.41 acres of woody riparian communities (including 0.09 acre of arroyo willow thicket, 4.07 acres of black willow thicket, and 2.25 acres of mule fat scrub). However, the proposed project would also create at least 6.58 acres of on-site woody riparian habitat that would provide replacement nesting habitat for the least Bell's vireo and will also create up to approximately 5.88 acres consisting of additional on-site woody riparian vegetation and/or freshwater marsh habitat that would replace the other wetland habitat values impacted by construction. The new riparian and wetland habitat areas will be maintained with supplemental irrigation and will not depend on

5 Prairie falcon is a conditionally covered under the NCCP/HCP. Planned activities are authorized if the habitat is more than one-half mile from an active or historically active nesting site, and this species is currently not known to nest within Orange County, and have not occurred within the county for over a decade (CDFW 2020, Catino-Davenport 2019).

6 Indicates impact acreages for Treatment Facility Option A/Option B. The potential locations of the treatment facilities, which would be determined during detailed design, are depicted in Figure 12B (labeled as Treatment Facility Option A and Option B). Only one treatment facility in one of the optional locations will be built-out as part of the proposed project.

7 This total includes 26.37 acres (Treatment Facility Option A)/26.49 acres (Treatment Facility Option B) of California sagebrush scrub, 0.98 acre of California sagebrush scrub/non-native herbaceous cover, 0.06 acre of chaparral bushmallow scrub/non-native herbaceous cover, 0.19 acre of chaparral bushmallow scrub, and 0.77 acre of coyote brush scrub.

the reservoir being full or nearly full to be sustained. Woody riparian and freshwater marsh habitats around the larger reservoir perimeter, once established will provide both foraging and nesting opportunities that would benefit least Bell's vireo and other species.

Ultimately, there will be no net loss of woody riparian habitat for least Bell's vireo, and no net loss of any wetland habitat, with the creation of both riparian and wetland habitat areas on-site as part of the proposed project. IRWD is engaged with the Wildlife Agencies and is collaboratively developing a comprehensive program to address potential impacts to least Bell's vireo. Based on provision of acceptable mitigation, the Wildlife Agencies have indicated that the NCCP/HCP conditional coverage will apply for the proposed project's impacts to least Bell's vireo.[8] Nevertheless, there will be a temporary loss of these habitats until construction is completed and riparian habitat can be reestablished that the species can use again. This temporary loss would be potentially significant in terms of the temporary reduction to the amount of habitat available in the local region. Implementation of mitigation measures MM BIO-3 and MM BIO-4, prescribed in Section 6.0 below, would reduce impacts to a less than significant level.

The yellow warbler, yellow-breasted chat, and grasshopper sparrow are species of special concern, Vaux's swift, and white-tailed kite is a state fully protected species. The yellow warbler and yellow-breasted chat occur within the riparian habitat on-site; the grasshopper sparrow favors native grasslands on rolling hills with a mix of grasses, forbs, and scattered shrubs; Vaux's swift inhabits redwood and Douglas-fir habitat in northern California and the Sierra Nevada; and the white-tailed kite prefers grasslands, meadows, or marshes for foraging next to deciduous woodland with dense-topped trees for nesting and perching. Since Vaux's swift was observed flying over and likely a migrant that is not expected to nest on-site, it is not discussed further in this analysis.

For yellow warbler and yellow-breasted chat, which utilize woody riparian habitat similar to the least Bell's vireo, several of each species were observed on-site in 2019. The locations of yellow warbler and yellow-breasted chat observed within the study area are shown in Figure 12B; many of these are multiple point locations of the same individual taken on multiple dates, but based on the clustering of point locations, there are likely eight yellow warbler territories and nine yellow-breasted chat territories. The proposed project would have both impacts and benefits to the riparian and marsh habitat that supports these special-status species. As stated above, the proposed project would permanently impact 12.28 acres of woody riparian (6.37 acres) and freshwater marsh communities (5.88 acres). However, the proposed project would also create at least 6.58 acres of on-site woody riparian and will also provide approximately 5.88 acres of on-site woody riparian and/or freshwater marsh habitat that would be maintained to consistently provide habitat year-round. Construction of the larger reservoir would also expand the open water areas that may be used for foraging, which would also be a benefit to these and other species. As noted previously, although there will ultimately be no net loss of riparian habitat for these special-status species with the creation of riparian habitat areas on-site, the temporal loss of habitat for

[8] This determination was made over the course of extensive discussions between IRWD, ESA, and the Wildlife Agencies, which considered multiple factors to arrive at this determination, including but not limited to IRWD being a Participating Landowner, Syphon Reservoir being a man-made waterbody sustained by an artificial water source, consideration of least Bell's vireo population distribution within the NCCP/HCP plan area, and because impacts will be temporary as riparian habitat will be replaced on-site.

yellow warbler and yellow-breasted chat may be considered potentially significant as it would reduce the amount of available habitat for these species in the local region until an equivalent habitat area is reestablished. Implementation of mitigation measures MM BIO-3 and MM BIO-4, prescribed in Section 6.0 below, would reduce impacts to a less than significant level.

Grasshopper sparrow was previously observed on-site; however, there are no recent records or observations of this species during the numerous surveys conducted in 2018 and 2019. For grasshopper sparrow, which favors native grasslands with a mix of grasses, forbs, and scattered shrubs, the proposed project will impact 2.53 acres of non-native grassland but will avoid 2.74 acres. In addition, the proposed project will impact 27.25 acres of non-native herbaceous cover and 28.18 acres of non-native herbaceous cover/California sage scrub, but avoid 67.31 acres of mixed grass and forblands with scattered shrubs (16.91 acres of non-native herbaceous cover, 43.52 acres of non-native herbaceous cover/California sagebrush scrub, and 6.88 acres California sagebrush scrub/non-native herbaceous cover) that would remain available to this species within the approximately 265-acre study area. Given the potentially suitable habitat acreage that will be avoided by the proposed project, as well as natural areas within the surrounding vicinity, the limited potential impacts to foraging and/or nesting habitat for this species if still present on-site is not expected to threaten regional populations.

White-tailed kite was previously observed on-site; however, there were no recent records or observations of this species during the numerous surveys conducted in 2018 and 2019 and this species has not been documented to nest on-site. For white-tailed kite, which uses grasslands and marshes for foraging and isolated, dense-topped trees for nesting, the proposed project would impact 2.53 acres of non-native grassland, 5.87 acres of freshwater marsh, 0.09 acre of arroyo willow thicket, 4.07 acres of black willow thicket, and 2.67 acres of eucalyptus woodland. The proposed project would avoid 2.74 acres of non-native grassland, 0.15 acre of arroyo willow thicket, 0.06 acres of black willow thicket, and 0.11 acre of eucalyptus woodland, which would provide habitat for this species if still present on-site, as well as natural areas within the surrounding vicinity; thus, potential impacts to foraging and/or nesting habitat for these species are not expected to threaten regional populations. The proposed project would also create at least 6.58 acres of riparian woodland and an additional 5.88 acres of woody riparian and/or freshwater marsh wetland habitat.

Direct impacts to avian species during the non-breeding season would not be potentially significant as these species are mobile and would be expected to fly away from the construction area, if present. However, if construction and maintenance work cannot be scheduled outside of nesting season, impacts to nesting special-status bird species would be potentially significant. Implementation of mitigation measure MM BIO-3, prescribed in Section 6.0 below, would reduce impacts to a less than significant level.

In addition, a walking trail is proposed to be made available for passive recreation along the south and western sides of the study area. The trail will begin at the new permanent access road at Portola Parkway and Sand Canyon Avenue and traveling along that route, then across the dam crest. A large portion of the walking trail will then follow the existing dirt access road along the Highline Canal alignment, and an additional extension is being considered to continue northeast past the

Highline Canal to a northern access road. The proposed walking trail traverses through coastal sage scrub and disturbed coastal sage scrub communities. Three least Bell's vireo territories, three California gnatcatcher occurrences, and one yellow-breasted chat occurrence were observed during 2019 surveys along habitat areas immediately adjacent to the existing Highline Canal and the associated dirt access road. No special-status wildlife species were observed along the alignment of the portion of the proposed trail from the existing Highline Canal along the northwestern boundary of the study area to a northern access road. However, this area also contains coastal sage scrub and disturbed coastal sage scrub communities and, although not directly along the alignment, one least Bell's vireo territory, one California gnatcatcher occurrence, and one yellow-breasted chat occurrence were observed in the vicinity of the northern extent of the proposed walking trail during 2019 surveys. The property is currently closed to public use, so opening a walking trail would increase human use of the area. Noise from pedestrian use would be relatively minimal, and the northwestern boundary of the study area is already subject to considerable noise from truck traffic on the adjacent Bee Canyon Access Road. Nevertheless, pedestrians on the trail could indirectly impact special-status wildlife species and such impacts may occasionally be potentially significant. Implementation of mitigation measure MM BIO-5, prescribed in Section 6.0 below, would reduce impacts to a less than significant level.

Maintenance of the created riparian and upland habitat areas around the perimeter at the maximum fill level is expected to continue for up to 5 years after construction is complete for the proposed habitat areas to meet success criteria and provide good quality wildlife habitat. Approximately 2 crews of 6 workers each would be required 40 days per year for the first two years, with level of effort tapering off to one crew 30 days per year for the subsequent two to three years. The riparian and upland habitat areas would be irrigated as needed from a main supply line installed around the perimeter of the reservoir that connects to the reservoir water source. When maintenance of the riparian and upland habitat areas involves vegetation removal (e.g., weeding) and cannot be scheduled outside of nesting season, such work could impact nesting special-status bird species, which could be potentially significant. Implementation of Mitigation Measure BIO-3, prescribed in Section 6.0 below, would reduce impacts to a less than significant level.

It is anticipated that a strip of opportunistic herbaceous vegetation and some woody riparian species may develop intermittently just below the reservoir's upper inundation limit during periods when the reservoir is not full. If a fringe of incidental vegetation occasionally arises during periods when the reservoir is partly drained, such intermittent vegetation would be purely incidental and would not be associated with the proposed riparian woodland and freshwater marsh that are intended to be established around the perimeter of the reservoir. Any temporary habitat values provided by adventive vegetation below the "rim" of the filled reservoir would not be subject to protection or maintenance and are expected to be very short-lived since soils would not be expected to retain sufficient moisture for extended periods when the water level drops. Also, adventive vegetation below the upper fill level would disappear whenever the reservoir is completely refilled. As any vegetation that may develop around the fringe of the reservoir would not be maintained and is not expected to persist since soils will dry out quickly, it is not likely that such vegetation would provide suitable habitat for special-status species. However, it is possible that special-status birds, such as least Bell's vireo, yellow warbler, or yellow-breasted

chat, could use such incidental fringe vegetation. Due to its operational requirements, it will not be practical, and IRWD will be under no obligation, to manage or protect such areas, and removal of such vegetation to avoid creating potential nesting habitat will not be considered a "new" impact as this area is not meant to be vegetated and should not provide potentially suitable nesting habitat that, if occupied, might interfere with operational requirements.

IRWD's operations and maintenance of the expanded Syphon Reservoir may not be construed to result in a "take" of a listed species. Rather, any incidental vegetation that may be allowed to develop briefly during drawdown of the reservoir would be considered to be an unintended indirect benefit to special-status wildlife species.

With implementation of Mitigation Measures MM BIO-1, MM BIO-2, MM BIO-3, MM BIO-4, and MM BIO-5, impacts to special-status species would be less than significant.

5.2 Riparian Habitat or Sensitive Natural Communities

5.2.1 Significance Threshold

The project would not have a substantial adverse effect on riparian habitat or other sensitive natural communities identified in local or regional plans, policies, regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service.

5.2.2 Analysis of Project Effects

Table 3 summarizes the permanent and temporary impacts on natural communities from the proposed project (shown in **Figure 13**). Ten sensitive natural communities occur within the study area: arroyo willow thicket, black willow thicket, coyote brush scrub, chaparral bushmallow scrub, chaparral bushmallow scrub/coyote brush scrub, chaparral bushmallow scrub/non-native herbaceous cover, California sagebrush scrub, California sagebrush scrub/non-native herbaceous cover, coast prickly pear scrub, and non-native herbaceous cover/California sagebrush scrub (shown in **Figure 14**).

The proposed project would permanently impact 61.56 acres (with Treatment Facility Option A[9])/61.68 acres (with Treatment Facility Option B) acres of sensitive natural communities, including 0.09 acre of arroyo willow thicket, 4.07 acres of black willow thicket, 0.77 acre of coyote brush scrub, 0.19 acre of chaparral bushmallow scrub, 0.06 acre of chaparral bushmallow scrub/non-native herbaceous cover, 27.22 acres (with Option A)/27.34 acres (with Option B) of California sagebrush scrub, 0.98 acre of California sagebrush scrub/non-native herbaceous cover, and 28.18 acres of non-native herbaceous cover/California sagebrush scrub. The proposed project would temporarily impact 0.85 acre of California sagebrush scrub. The proposed project would avoid 121.37 acres (with Option A)/121.25 acres (with Option B) of sensitive natural communities (including 0.15 acre of arroyo willow thicket, 0.06 acre of black willow thicket, 0.14 acre of coyote brush scrub, 0.26 acre of chaparral bushmallow scrub, all 0.49 acre of

[9] The potential locations of the treatment facilities, which would be determined during detailed design, are depicted in Figures 13 and 14 (labeled as Treatment Facility Option A and Option B). Only one treatment facility in one of the optional locations will be built-out as part of the proposed project.

chaparral bushmallow scrub/coyote brush scrub, 4.66 acres of chaparral bushmallow scrub/non-native herbaceous cover, 64.52 acres [with Option A]/64.40 acres [with Option B] of California sagebrush scrub, 6.88 acres of California sagebrush scrub/non-native herbaceous cover, all 0.69 acre of coast prickly pear scrub, and 43.52 acres of non-native herbaceous cover/California sagebrush scrub within the study area.

TABLE 3
IMPACTS TO NATURAL COMMUNITIES

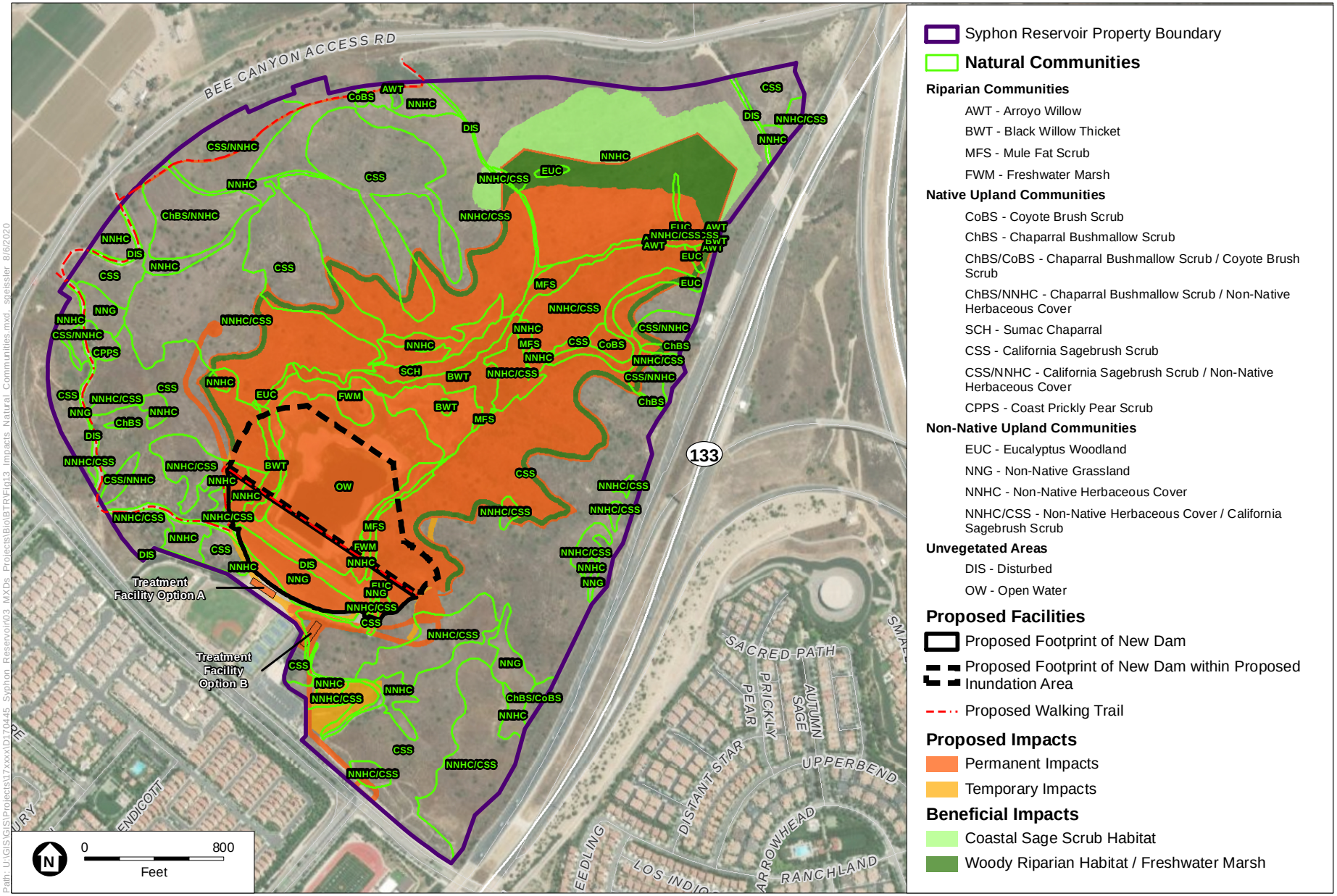
Natural Community	Existing (Acres)	Permanent Impacts (Acres)	Permanent Beneficial Impacts*** (Acres)	Temporary Impacts (Acres)	Total Impacts (Acres)	Avoided (Acres)
Riparian Communities						
Arroyo Willow Thicket*	0.24	0.07	0.02	-	0.09	0.15
Black Willow Thicket*	4.13	4.06	0.01	-	4.07	0.06
Mule Fat Scrub	2.25	2.23	0.02	-	2.25	-
Freshwater Marsh	5.87	5.87	-	-	5.87	-
Native Upland Communities						
Coyote Brush Scrub**	0.91	0.77	-	-	0.77	0.14
Chaparral Bushmallow Scrub**	0.45	0.14	0.05	-	0.19	0.26
Chaparral Bushmallow Scrub/Coyote Brush Scrub**	0.49	-	-	-	-	0.49
Chaparral Bushmallow Scrub/Non-Native Herbaceous Cover**	4.72	0.06	-	-	0.06	4.66
Sumac Chaparral	1.63	1.63	-	-	1.63	-
California Sagebrush Scrub**	91.74	23.22/23.34****	3.15	0.85	27.22/27.34****	64.52/64.40****
California Sagebrush Scrub**/Non-Native Herbaceous Cover	7.86	0.70	0.28	-	0.98	6.88
Coast Prickly Pear Scrub*	0.69	-	-	-	-	0.69
Non-Native Upland Communities						
Eucalyptus Woodland	2.78	2.32	0.37	-	2.67	0.11
Non-Native Grassland	5.27	2.46	-	0.07	2.53	2.74
Non-Native Herbaceous Cover	44.16	10.98	15.89	0.38	27.25	16.91
Non-Native Herbaceous Cover/California Sagebrush Scrub**	71.70	24.14	3.07	0.97	28.18	43.52
Unvegetated Areas						
Open Water	13.93	13.93	-	-	13.93	-
Disturbed	6.92	3.26/3.14****	0.05	0.43	3.74/3.62****	3.18/3.30****
Total	**265.74**	**95.84**	**22.91**	**2.70**	**121.43**	**144.31**

* Asterisk indicates that an alliance/association is considered sensitive by CDFW.

** Double asterisk indicates that an alliance/association that is a covered habitat type under the NCCP/HCP and is therefore considered a sensitive natural community.

*** Although these areas will be permanently impacted by the proposed project, they will be replaced by the creation of riparian and upland habitat areas on-site, which in some cases may have an equivalent or beneficial effect.

**** Indicates impact acreages for Option A/Option B, which were calculated for the Proposed Filter/Chlorination/De-chlorination Facility Option A or Option B. Only one option will be selected.



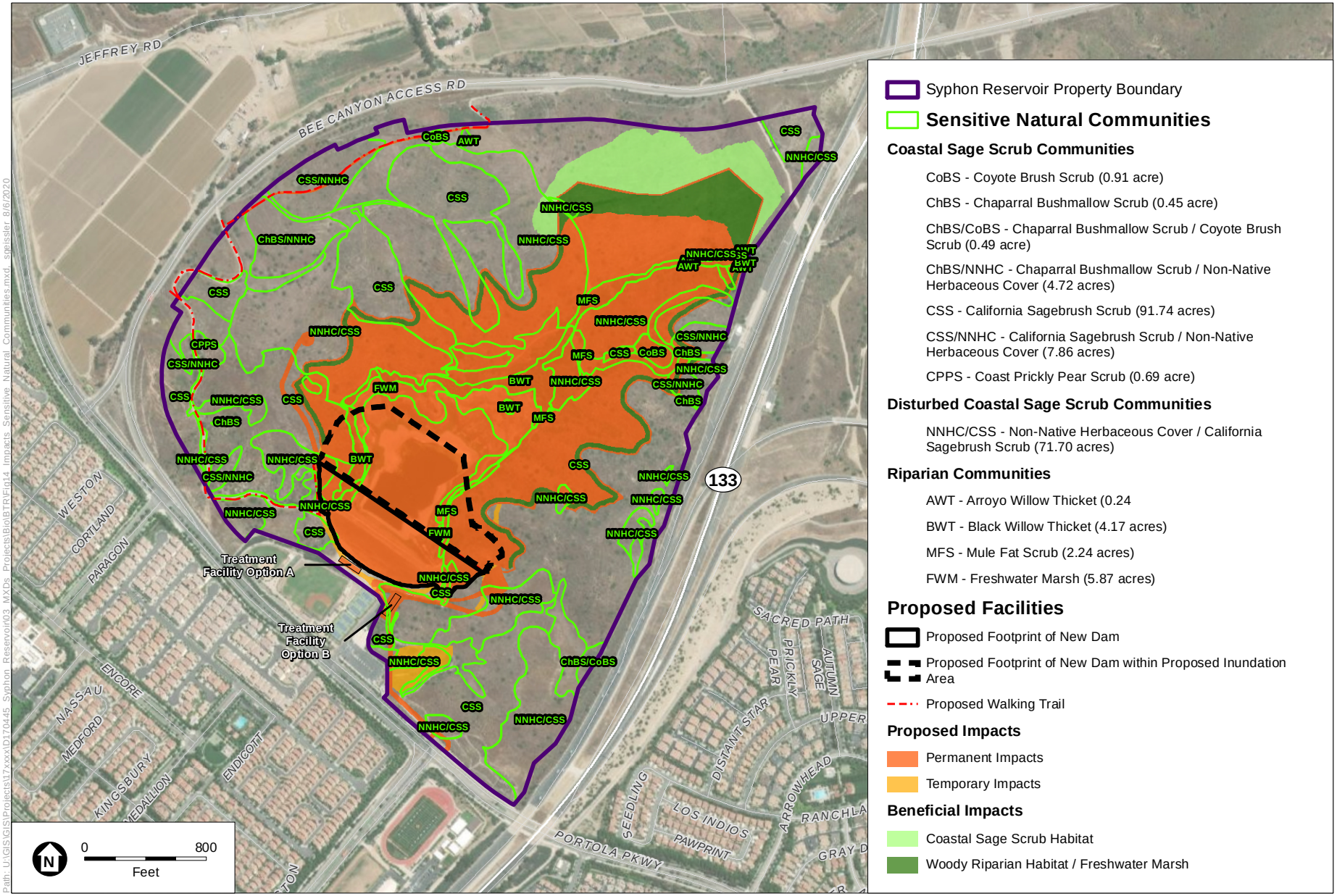
SOURCE: ESRI, 2016

Syphon Reservoir Improvement Project

Figure 13

Impacts to Natural Communities

ESA



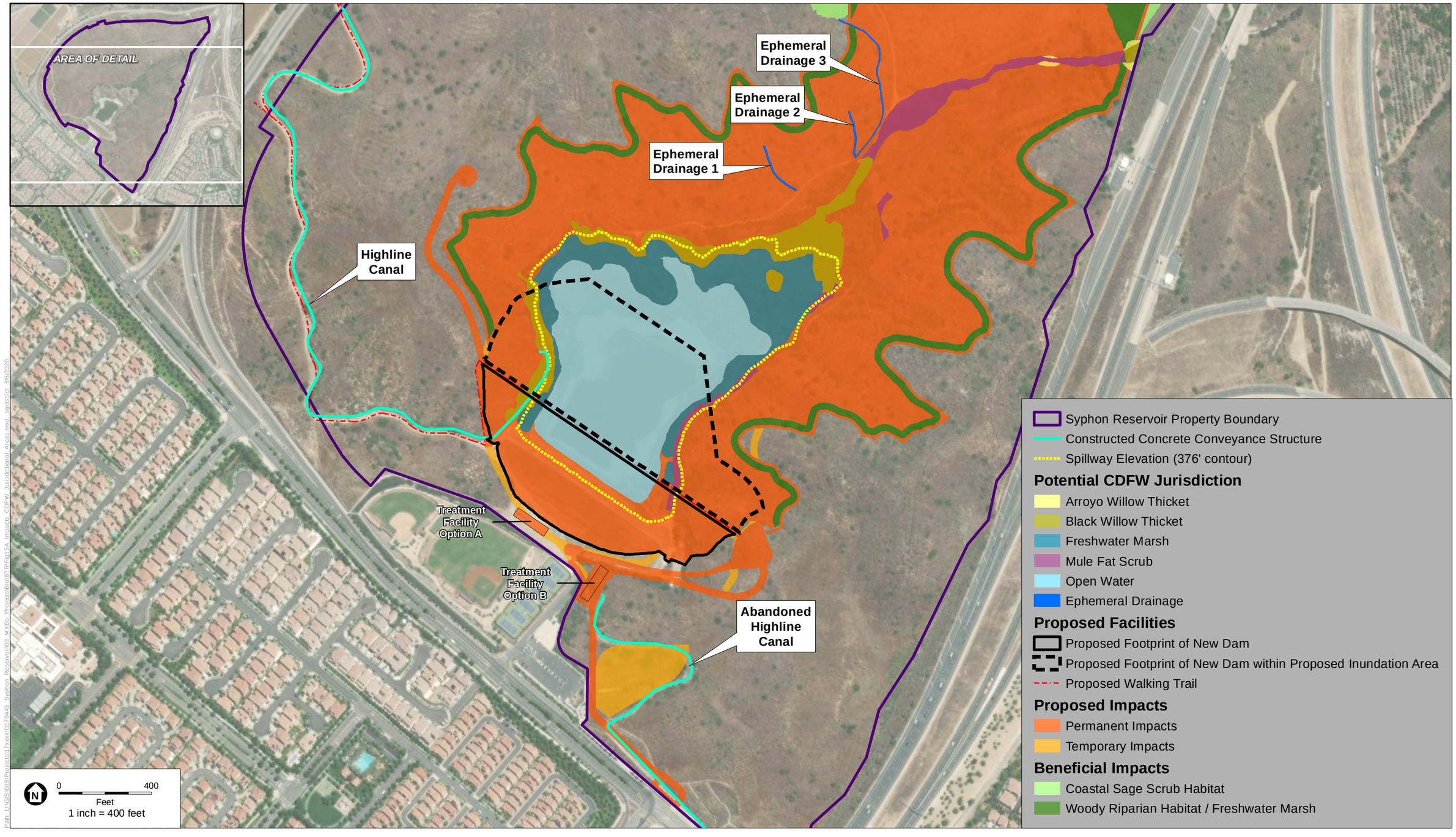
SOURCE: ESRI, 2016

Syphon Reservoir Improvement Project

Figure 14

Impacts to Sensitive Natural Communities

ESA



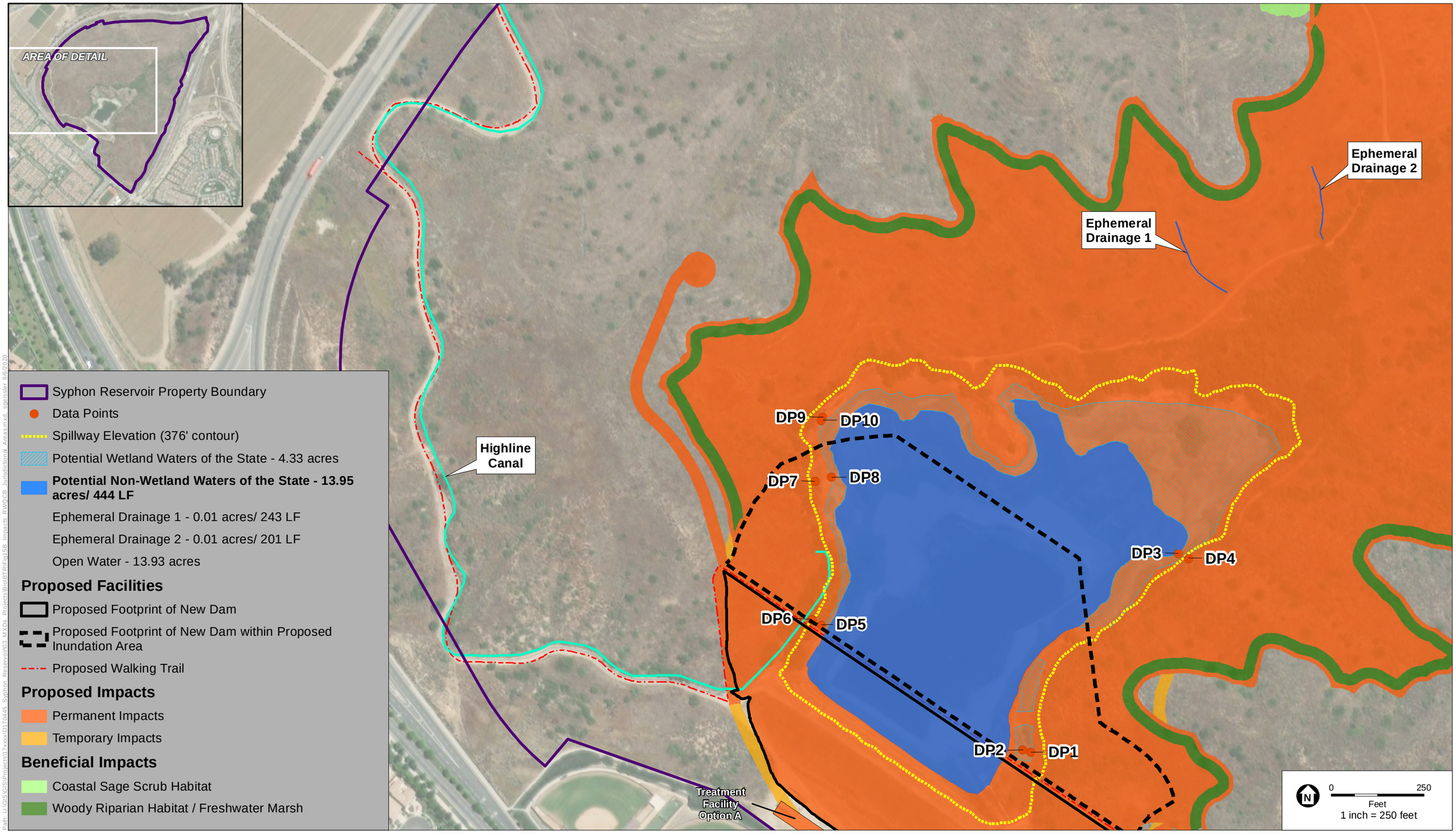
Path: U:\GIS\GIS\Projects\17xxxx\D170445_Syphon_Reservoir\03_MXDs_Projects\Bio\BTR\Fig15A_Impacts_CDFW_Jurisdictional_Areas.mxd, spessler, 8/6/2020

SOURCE: ESRI, 2016

Syphon Reservoir Improvement Project

Figure 15A
Impacts to CDFW Jurisdictional Areas

ESA



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SOURCE: ESRI, 2016

Syphon Reservoir Geotechnical Investigations Project

Figure 15B
Impacts to RWQCB Jurisdictional Areas

ESA

The proposed project would also create at least 6.58 acres of riparian woodland, and approximately 5.88 acres of additional woody riparian and/or freshwater marsh habitat. The proposed project would also potentially add more than 10 acres of coastal sage scrub habitat where it is planned to be restored on the slope that will be cut northeast of the proposed reservoir to make space for the on-site riparian/wetland habitat areas.

Impacts to sensitive natural communities that would result from the proposed project would be potentially significant. Implementation of mitigation measure MM BIO-6, prescribed in Section 6.0 below, would reduce impacts to a less than significant level.

In addition, a large portion of the study area contains riparian and freshwater marsh habitat as well as the open water associated with the existing reservoir, which are all considered to be subject to CDFW jurisdiction, which includes lakes, streams, and associated vegetation. The proposed project would temporarily impact 26.35 acres of CDFW jurisdictional lakes, streams, and associated vegetation, of which 0.05 acre would be considered a beneficial impact (i.e., the areas will be impacted to create riparian woodland or freshwater marsh habitat). **Table 4** summarizes the temporary impacts on CDFW jurisdictional riparian habitat from the proposed project (shown in **Figure 15A**). The proposed project would avoid 0.20 acre of CDFW jurisdictional lakes, streams, and associated vegetation within the study area. The proposed project would also create at least 6.58 acres of on-site riparian woodland and approximately 5.88 acres of additional on-site woody riparian and/or freshwater marsh habitat and enlarge the reservoir, which would expand the open water resources on-site. Thus, the proposed project would result in a beneficial impact, which would increase the amount of CDFW jurisdictional riparian habitat, and impacts would be less than significant. Because the proposed project will be altering a substantial area subject to CDFW jurisdiction, the proposed project must comply with MM BIO-7, prescribed in Section 6.0 below, to obtain a Streambed Alteration Agreement from CDFW.

TABLE 4
IMPACTS TO CDFW POTENTIALLY JURISDICTIONAL AREAS

Jurisdiction Types	Existing (Acres)	Permanent Impacts (Acres)	Permanent Beneficial Impacts* (Acres)	Temporary Impacts (Acres)	Total Impacts (Acres)	Avoided (Acres)
CDFW Lakes, Streams, and Associated Vegetation	26.55	26.30	0.05	-	26.35	0.20
Total	**26.55**	**26.30**	**0.05**	**0.0**	**26.35**	**0.20**

* Although these areas will be permanently impacted by the proposed project, they will have the beneficial effect of creating riparian and upland habitat areas on-site.

Maintenance of the created riparian/wetland habitat areas, which will include creation of sensitive riparian communities that include riparian habitat subject to CDFW regulatory jurisdiction, would be required for up to 5 years after construction is complete for the proposed habitat areas to meet success criteria and provide good quality wildlife habitat. Approximately 2 crews of 6 workers each would be required 40 days per year for the first two years, with level of effort tapering off to one crew 30 days per year for the subsequent two to three years. The work will promote establishment of the habitat that will replace the existing riparian/wetland habitat area currently subject to CDFW jurisdiction. Reestablishing an equivalent or greater area of such habitat would be considered to have a beneficial impact as it would result in no net loss of CDFW jurisdictional area.

With implementation of Mitigation Measure MM BIO-6, impacts to sensitive natural communities would be less than significant and impacts to riparian habitat would be less than significant.

5.3 Jurisdictional Wetlands

5.3.1 Significance Threshold

The project would not have a substantial adverse effect on federal- or state-protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means.

5.3.2 Analysis of Project Effects

In response to a request to review the resources on site as described in the delineation report, the USACE issued an Approved Jurisdictional Determination letter (Appendix B), which confirmed that waters of the U.S. do not occur within the study area since Syphon Reservoir is an intrastate isolated water with no apparent interstate or foreign commerce connection (USACE 2018). The CWA also excludes certain features from this regulation, including "wastewater recycling facility constructed on dry land" (see 33 CFR §230.3 (o)(2)(vii)). Thus, jurisdictional features identified are only subject to the jurisdiction of the State (i.e., wetlands and non-wetland waters of the State [discussed in this section below], and CDFW lakes, streams, and associated vegetation [previously discussed in Section 5.2 above]).

The proposed project would permanently impact 18.28 acres of wetlands and waters of the State (4.33 acres of wetlands, 13.95 acres of non-wetland waters of the State). **Table 5** summarizes the impacts on wetlands and waters of the State from the proposed project (shown in **Figure 15B**). The proposed project would also create 5.88 acres of freshwater marsh wetland habitat and enlarge the reservoir, which would expand the open water resources on-site. Thus, the proposed project would result in a beneficial impact, which would increase the amount of potential RWQCB jurisdictional wetlands and water of the State, and impacts would be less than significant.

TABLE 5
IMPACTS TO RWQCB POTENTIALLY JURISDICTIONAL AREAS

Jurisdiction Types	Existing (Acres)	Permanent Impacts (Acres)	Permanent Beneficial Impacts* (Acres)	Temporary Impacts (Acres)	Total Impacts (Acres)	Avoided (Acres)
Wetland Waters of the State	4.33	4.33	-	-	4.33	-
Non-Wetland Waters of the State	13.95	13.95	-	-	13.95	-
Total	**18.28**	**18.28**	**0.0**	**0.0**	**18.28**	**0.0**

* Although these areas will be permanently impacted by the proposed project, they will have the beneficial effect of creating riparian and upland habitat areas on-site.

Maintenance of the created wetland areas would be required for up to 5 years after construction is complete to ensure success of the vegetated areas. Approximately 2 crews of 6 workers each would be required 40 days per year for the first two years, with level of effort tapering off to one crew 30 days per year for the subsequent two to three years. Operations and maintenance efforts to establish and maintain the proposed riparian/wetland habitat around the fringe of the future reservoir would avoid a net loss of areas subject to RWQCB jurisdiction and would therefore have a beneficial impact.

Impacts to wetlands and waters would be less than significant.

5.4 Wildlife Movement and Nursery Sites

5.4.1 Significance Threshold

The 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.

5.4.2 Analysis of Project Effects

The existing toll roads (SR-133 and SR-241) effectively stop most terrestrial wildlife movement from the study area to the west and Portola Parkway and dense suburban development also block most wildlife from proceeding to the south. Nevertheless, the study area lies at the southeastern edge of a large contiguous block of habitat that is an important element in the context of regional wildlife movement, particularly for avian species (e.g., dispersal habitat for coastal California gnatcatcher within this region). The reservoir is also one of several local water sources that attracts a number of avian species and provides habitat for migrating birds. Thus, the study area functions as a part of a wildlife movement corridor from a regional perspective, as well as providing live-in and movement habitat for a variety of species on a local scale.

The proposed project would temporarily drain the reservoir, which is used by a number of birds and other wildlife for water supply and foraging. IRWD already periodically drains the reservoir as part of its current normal operations; however, the reservoir will be drained until project completion. It should be noted that there is another nearby water feature, Rattlesnake Reservoir, which lies 1.1 miles to the north-northwest that could be utilized as a water source and for riparian habitat by migratory species moving through the region. The proposed project would impact 121.43 acres of natural communities during construction on-site, which could disrupt local movement and displace wildlife within the proposed project's footprint, particularly within the riparian habitats on-site. The proposed project would avoid 144.31 acres of natural communities; thus, displaced wildlife utilizing upland habitats can disperse to other upland areas on-site, and the impacted areas would not inhibit local or regional movement of wildlife within these avoided areas of the study area, though wildlife that is more sensitive to human disturbances and noise may be deterred by the nearby construction activities. Once completed, the enlarged reservoir will provide greater water storage capacity and an expanded open water area for migrating birds, and the proposed project will create at least 6.58 acres of on-site riparian woodland and approximately 5.88 acres of additional on-site woody riparian and/or freshwater marsh habitat that would be maintained to consistently provide habitat year-round, which would be a benefit to migratory species. In addition, approximately 10.47 acres of coastal sage scrub habitat would be created in an area northeast of the reservoir that currently exhibits predominantly low-value ruderal grassland. Therefore, with the creation of the on-site riparian and upland habitat, impacts to local movement are not expected to be significant. Thus, impacts to regional and local wildlife movement are considered less than significant, and no mitigation is required.

In addition, a walking trail is proposed along the northwestern boundary of the study area. The proposed walking trail traverses through coastal sage scrub and disturbed coastal sage scrub communities. The property is currently closed to public use, but a proposed walking trail would increase human use of the area. However, the level of activity and disturbance associated with people occasionally using the proposed trail would not impede local wildlife movement through the area. Thus, impacts would be less than significant and no mitigation is required.

Regarding the proposed project's potential to "impede the use of native wildlife nursery sites", to the extent mass grading and construction activities occur during the breeding season and in close proximity to active nests or suitable nesting habitat, the proposed project may have potentially significant direct impacts. Nesting activity typically occurs from February 15 to August 31 (or January 15 to June 31 for raptors). Active nests and eggs are protected under Fish and Wildlife Code Section 3503. Impacts to any active songbird or raptor nests would violate State law and may be considered potentially significant, particularly with regard to special status bird species. Implementation of mitigation measure MM BIO-3, prescribed in Section 6.0 below, would avoid violation of the Fish and Game Code and reduce potential impacts to special status birds to a less than significant level.

Maintenance of the created riparian and upland habitat areas would be required for up to 5 years after construction is complete for the proposed habitat areas to meet success criteria and provide good quality wildlife habitat. Approximately 2 crews of 6 workers each would be required 40 days per year for the first two years, with level of effort tapering off to one crew 30 days per year

for the subsequent two to three years. The riparian and upland habitat areas would be irrigated as needed from a main supply line installed around the perimeter of the reservoir that connects to the reservoir water source. When maintenance of the riparian and upland habitat areas involves vegetation removal (e.g., weeding) and cannot be scheduled outside of nesting season, such work could impact nesting bird species, which could be potentially significant. Implementation of Mitigation Measure BIO-3 would reduce impacts to a less than significant level.

With implementation of Mitigation Measures MM BIO-3, impacts to wildlife movement and nursery sites would be less than significant.

5.5 Local Policies, Ordinances, and Adopted Plans

5.5.1 Significance Threshold

The project would not conflict with one or more local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance, and/or would not conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan.

5.5.2 Analysis of Project Effects

The study area is within the Central Subregion of the County of Orange NCCP/HCP, and is located with the NCCP/HCP Reserve. IRWD is participating landowner and a signatory of the Central & Coastal Subregion NCCP/HCP. The NCCP/HCP included provisions for IRWD to build a future reservoir "as a permitted use within the Reserve System" (R.J. Meade Consulting 1996a). At the time that the NCCP/HCP was prepared, IRWD had identified and was considering four alternative seasonal recycled water storage reservoirs (including the Syphon Reservoir site), all of which were located within the subregional Reserve System, though only one reservoir would ultimately be needed. Thus, the need for a future reservoir was identified as "a permitted use within the Reserve System in the event that public health, safety, and welfare require such a facility in the future. At the time such a facility is needed, IRWD will review the plans with appropriate agencies and propose a specific mitigation plan or pay fees adequate to mitigate the Incidental Take associated with the new reservoir" (R.J. Meade Consulting 1996a).

The proposed Syphon Reservoir Improvement Project is a permitted use within the Reserve System. Compliance with specific conditions required for NCCP/HCP conditionally covered species (i.e., least Bell's vireo) are discussed in Section 5.1. However, the removal of coastal sage scrub communities would be considered potentially significant. Implementation of mitigation measures MM BIO-1 and MM BIO-2, prescribed in Section 6.0 below, would reduce impacts to a less than significant level.

Maintenance of the created upland habitat areas would be required for up to 5 years after construction is complete to ensure success of the vegetated areas. Approximately 2 crews of 6 workers each would be required 40 days per year for the first two years, with level of effort tapering off to one crew 30 days per year for the subsequent two to three years. The upland habitat areas would be irrigated from a main supply line installed around the perimeter of the

reservoir that connects to the reservoir water source. When maintenance of the riparian and upland habitat areas involves vegetation removal (e.g., weeding) and cannot be scheduled outside of nesting season, such work could impact nesting special-status bird species, which could be potentially significant. Implementation of Mitigation Measure BIO-3 would reduce impacts to a less than significant level, and thus would not conflict with the provisions of the Central & Coastal Subregion NCCP/HCP.

With implementation of Mitigation Measures MM BIO-1, MM BIO-2, and MM BIO-3, the project would not conflict with the provisions of any local policies or ordinances protecting biological resources or any adopted NCCP/HCPs.

6.0 Mitigation Measures

To minimize and avoid significant impacts to sensitive biological resources as a result of proposed project implementation, the following mitigation measures are recommended.

6.1 Measures to Mitigate Potentially Significant Impacts to Special-Status Species

MM BIO-1: IRWD has been engaged in close coordination with the Wildlife Agencies (i.e., USFWS and CDFW) since 2018 to develop a multi-faceted mitigation strategy to address impacts to California gnatcatcher, as well as to address the additional mitigation the agencies mandate to compensate for displacement of habitat and land previously set aside for mitigation and subject to the restrictions and requirements imposed under the Mitigation Grant Deed, of which USFWS is a third party beneficiary. To date, IRWD has researched numerous off-site lands with high value habitat and biological resources, and initiated negotiations with landowners for possible acquisition. IRWD shall implement one, or a combination, of the following measures to mitigate permanent impacts to special-status wildlife species:

a. Use of Incidental Take Credits for participating landowners (within the Reserve, or outside of the Reserve) to offset permanent impacts to coastal sage scrub (e.g., California sagebrush scrub, California sagebrush scrub/non-native herbaceous cover, coyote brush scrub, chaparral bushmallow scrub, chaparral bushmallow scrub/non-native herbaceous cover, and non-native herbaceous cover/California sagebrush scrub) at a 1:1 impact-to-mitigation ratio.

b. On- and/or off-site creation, restoration, and/or enhancement containing natural communities suitable for special-status species or comparable, as determined acceptable by the USFWS and CDFW.

c. Off-site land acquisition, preservation, creation, restoration, and/or enhancement containing natural communities suitable for special-status species or comparable, as determined acceptable by the USFWS and CDFW.

d. Areas where temporary impacts occur would be returned to pre-project conditions (i.e., pre-project elevation contours and revegetated with native upland scrub species) within one-year after construction is completed, and will be monitored for three years, or until a qualified biologist determines that the project site has returned to pre-project conditions. A revegetation plan would be prepared to re-seed/re-plant the area

with local species, and would include performance standards, success criteria, maintenance, and future monitoring.

MM BIO-2: IRWD will implement the following:

a. In accordance with the NCCP/HCP, certain construction-related mitigation measures are required to minimize impacts to the coastal California gnatcatcher and other coastal sage scrub species. The removal of coastal sage scrub communities will be conducted in compliance with the NCCP/HCP's Construction Related Minimization Measures:

   1. To the maximum extent practicable, no grading of coastal sage scrub habitat that is occupied by nesting gnatcatchers will occur during the breeding season (February 15 through July 15).
   2. Prior to the commencement of grading operations or other activities involving significant soil disturbance, all areas of coastal sage scrub habitat to be avoided under the provisions of the NCCP/HCP shall be identified with temporary fencing or other markers clearly visible to construction personnel. Additionally, prior to the commencement of grading operations or other activities involving disturbance of coastal sage scrub, a survey will be conducted to locate gnatcatchers and cactus wrens within 100 feet of the outer extent of projected soil disturbance activities and the locations of any such species shall be clearly marked and identified on the construction/grading plans.
   3. A monitoring biologist, acceptable to USFWS/CDFW, will be on-site during any clearing of coastal sage scrub. IRWD will advise USFWS/CDFW at least seven calendar days (and preferably fourteen calendar days) prior to the clearing of any habitat occupied by Identified Species[10] to allow USFWS/CDFW to work with the monitoring biologist in connection with bird flushing/capture activities. The monitoring biologist will flush Identified Species (avian or other mobile Identified Species) from occupied habitat areas immediately prior to brush-clearing and earth-moving activities. If birds cannot be flushed, they will be captured in mist nets, if feasible, and relocated to areas of the site to be protected or to the NCCP/HCP Reserve System. It will be the responsibility of the monitoring biologist to assure that Identified bird species will not be directly impacted by brush-clearing and earth-moving equipment in a manner that also allows for construction activities on a timely basis.
   4. Following the completion of initial grading/earth moving activities, all areas of coastal sage scrub habitat to be avoided by construction equipment and personnel will be marked with temporary fencing and other appropriate markers clearly visible to construction personnel. No construction access, parking, or storage of equipment or materials will be permitted within such marked areas.
   5. In areas bordering the NCCP Reserve System or Special Linkage/Special Management areas containing significant coastal sage scrub identified in the NCCP/HCP for protection, vehicle/equipment transportation routes and staging areas will be restricted to a minimum number during construction consistent with

[10] NCCP/HCP Identified Species that occur, or have potential to occur, on-site include the following: coastal California gnatcatcher, coastal cactus wren, orange-throated whiptail, coastal western whiptail, red-diamond rattlesnake, coast horned lizard, northern harrier, sharp-shinned hawk, prairie falcon, American peregrine falcon, red-shouldered hawk, southern California rufous-crowned sparrow, San Diego desert woodrat, gray fox, and coyote.

project construction requirements. Waste dirt or rubble will not be deposited on adjacent coastal sage scrub identified in the NCCP/HCP for protection. Pre-construction meetings involving the monitoring biologist, construction supervisors, and equipment operators will be conducted and documented to ensure maximum practicable adherence to these measures.

6. Coastal sage scrub identified in the NCCP/HCP for protection and located within the likely dust drift radius of construction areas shall be periodically sprayed with water to reduce accumulated dust on the leaves as recommended by the monitoring biologist.

MM BIO-3: Impacts to nesting birds would be avoided by conducting all clearing and grubbing outside of the bird nesting season (i.e., work should occur September 1 to February 14, or July 1 to January 14 for raptors). If clearing and grubbing cannot avoid the bird nesting season, the following measures would be implemented:

a. Prior to work during the bird nesting season (February 15 to August 31, or January 15 to June 31 for raptors), a qualified biologist should conduct a pre-construction survey of all suitable habitat for the presence of nesting birds no more than 7 days prior to construction and/or maintenance activities. The results of the pre-construction survey would be valid for 7 days; if vegetation removal activities do not commence within 7 days following the survey, a new pre-construction nesting bird survey should be conducted before these activities begin again. If no active nests are found, then no further mitigation is required.

b. If any active nests are found during a pre-construction nesting bird survey, a buffer of 300 feet (500 feet for raptors), or as determined appropriate by the qualified biologist (based on species-specific tolerances and site-specific conditions) in consultation with IRWD, would be delineated, flagged, and avoided until the nesting cycle is complete (i.e., the qualified biologist determines that the young have fledged or the nest has failed). The qualified biologist may also recommend other measures to minimize disturbances to the nest, which may include, but are not limited to, erection of sound barriers (e.g., noise blankets), erection of visual barriers (e.g., hay bales), or full-time monitoring by a qualified biologist.

MM BIO-4: With the creation of on-site riparian and wetland habitat areas, as part of the proposed project, there will be no net loss of woody riparian habitat for least Bell's vireo and no net loss of any wetland habitat. Nevertheless, there will be a temporary loss of these habitats until construction is completed and riparian habitat can be reestablished that the species can use again. IRWD is engaged with the Wildlife Agencies and is collaboratively developing a comprehensive program to address temportal impacts to least Bell's vireo and other riparian-associated special-status wildlife species (e.g., yellow warbler, yellow-breasted chat). IRWD shall implement the following measure to compensate for impacts to least Bell's vireo and associated riparian special-status wildlife species (e.g., yellow warbler, yellow-breasted chat):

a. Off-site land acquisition and preservation, and/or creation, restoration, and/or enhancement, of areas containing habitat suitable for least Bell's vireo and associated riparian special-status wildlife species (e.g., yellow warbler, yellow-breasted chat) to compensate for temporal loss in an amount or at a ratio determined acceptable by the USFWS and CDFW. Any private lands acquired and/or restored for this mitigation would be permanently preserved and dedicated for habitat conservation.

MM BIO-5: IRWD shall implement the following measure to mitigate indirect impacts to special-status wildlife species:

a. Educational signage shall be posted at the entrances of the proposed walking trail to inform the public about the sensitive biological resources in the area and local wildlife in the area (e.g., rattlesnakes, coyotes). Signage would also be posted periodically along the proposed trail to remind public to keep on the trail and out of sensitive habitat areas.

b. The proposed trail shall only be open during daylight hours (e.g., dawn to dusk).

c. A Resource Management Plan (RMP) shall be prepared to outline long-term maintenance and management responsibilities for the preservation of the biological resources on-site (e.g., invasive species management, monitoring access issues, off-trail use, erosion, trash). The RMP should also provide guidance to ensure that all operations and maintenance activities performed on-site must also comply with all applicable requirements of the NCCP/HCP and the preservation of the biological resources on-site. The RMP would also outline monitoring requirements for species populations for federal and state-listed species (i.e., least Bell's vireo and California gnatcatcher).

6.2 Measures to Mitigate Potentially Significant Impacts to Riparian Habitat and Sensitive Natural Communities

MM BIO-6: IRWD shall implement one, or a combination, of the following measures to mitigate impacts to sensitive natural communities:

a. Use of Incidental Take Credits for NCCP/HCP participating landowners (within the Reserve, or outside of the Reserve) to offset permanent impacts to coastal sage scrub (e.g., California sagebrush scrub, California sagebrush scrub/non-native herbaceous cover, coyote brush scrub, chaparral bushmallow scrub, chaparral bushmallow scrub/non-native herbaceous cover, and non-native herbaceous cover/California sagebrush scrub) at a 1:1 impact-to-mitigation ratio.

b. On- and/or off-site land acquisition and preservation, and/or creation, restoration, and/or enhancement of sensitive natural communities comparable or equivalent to a 1:1 impact-to-mitigation ratio, as determined acceptable by the USFWS and CDFW.

c. Areas where temporary impacts occur to sensitive natural communities (e.g., California sagebrush scrub) would be returned to pre-project conditions (i.e., pre-project elevation contours and revegetation initiated) within one-year after the construction is completed, and will be monitored for three years, or until a qualified biologist determines that affected natural communities have been restored to equivalent or better condition as compared to pre-project conditions. A revegetation plan would be prepared to re-seed/re-plant the area with locally indigenous native species, and would include performance standards, success criteria, maintenance, and future monitoring.

MM BIO-7: IRWD shall negotiate and execute a Lake or Streambed Alteration Agreement under Section 1602 of the California Fish and Game Code with CDFW.

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Appendix A

Preliminary Jurisdictional Delineation Report

Final

Syphon Reservoir Improvement Project

Preliminary Jurisdictional Delineation Report

Prepared for
Irvine Ranch Water District

July 2018

ESA

Final

Syphon Reservoir Improvement Project

Preliminary Jurisdictional Delineation Report

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Preliminary Jurisdictional Delineation Report

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Section 1
Introduction

1.1 Introduction and Purpose

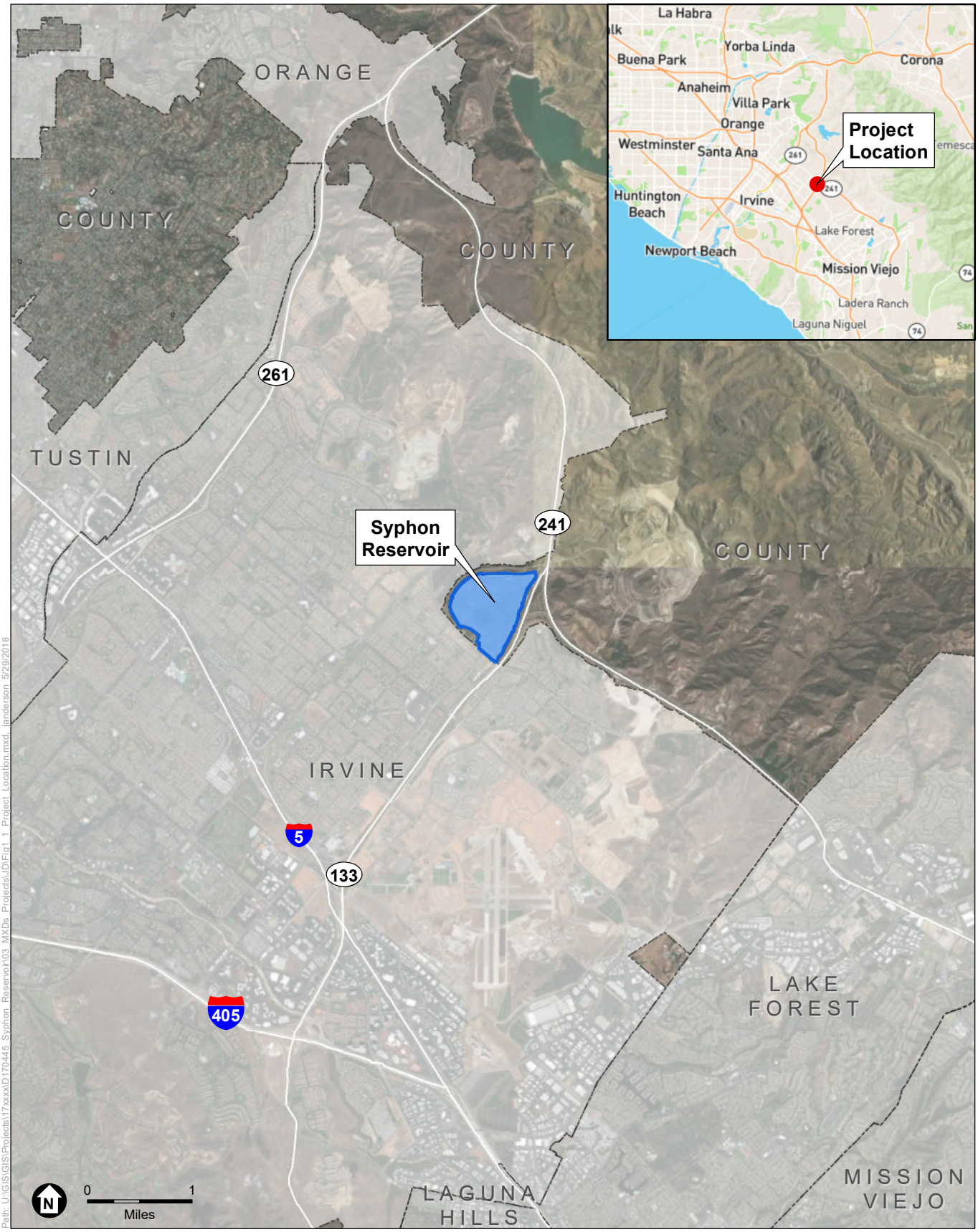
Environmental Science Associates (ESA) conducted a jurisdictional delineation for the Irvine Ranch Water District's (IRWD) Syphon Reservoir Improvement Project (project). The study area includes approximately 266 acres of the Syphon Reservoir property, including 241 acres of deed-restricted parcels within the Central and Coastal Natural Community Conservation Plan/Habitat Conservation Plan (NCCP/HCP) reserve boundary. The purpose of conducting a jurisdictional delineation in the study area was to determine the location and size of the areas defined as waters of the United States, waters of the State, and habitats subject to the California Department of the Fish and Wildlife's (CDFW) jurisdiction. The collected data will be used to determine which jurisdictional regulations apply and to calculate project impacts to jurisdictional waters and habitat during the permitting process. The results from this analysis will be used to prepare any necessary permits from the regulatory agencies.

IRWD is seeking to expand the recycled water storage capacity of Syphon Reservoir to meet the demand of its recycled water customers, enhance IRWD's water supply reliability, and reduce the need for imported water. The total storage capacity of Syphon Reservoir would be expanded from 500 acre-feet to approximately 5,000 acre-feet by raising the existing dam. In addition to an expanded dam footprint and inundation level up to the 456-foot elevation, the project would include infrastructure facilities constructed between the toe of the new dam and the IRWD property boundary, as well as roadways in order to connect the reservoir with the recycled water system.

1.2 Study Area Location

Syphon Reservoir is located in the northern portion of Irvine, California, within IRWD's service area, within Orange County, California, as shown on **Figure 1-1**. Syphon Reservoir is a 60-year-old facility historically used to store irrigation water supplies. Currently, the reservoir functions as a seasonal storage facility within the IRWD recycled water system.

The study area is within the El Toro U.S. Geological Survey 7.5-minute quadrangle map and within the land grant Lomas de Santiago (**Figure 1-2**). Coordinates for the study area are: 33°43'0.10"N, 117°43'20.83"W for the northeast corner and 33°42'41.00"N, 117°44'7.85"W for the southwest corner.

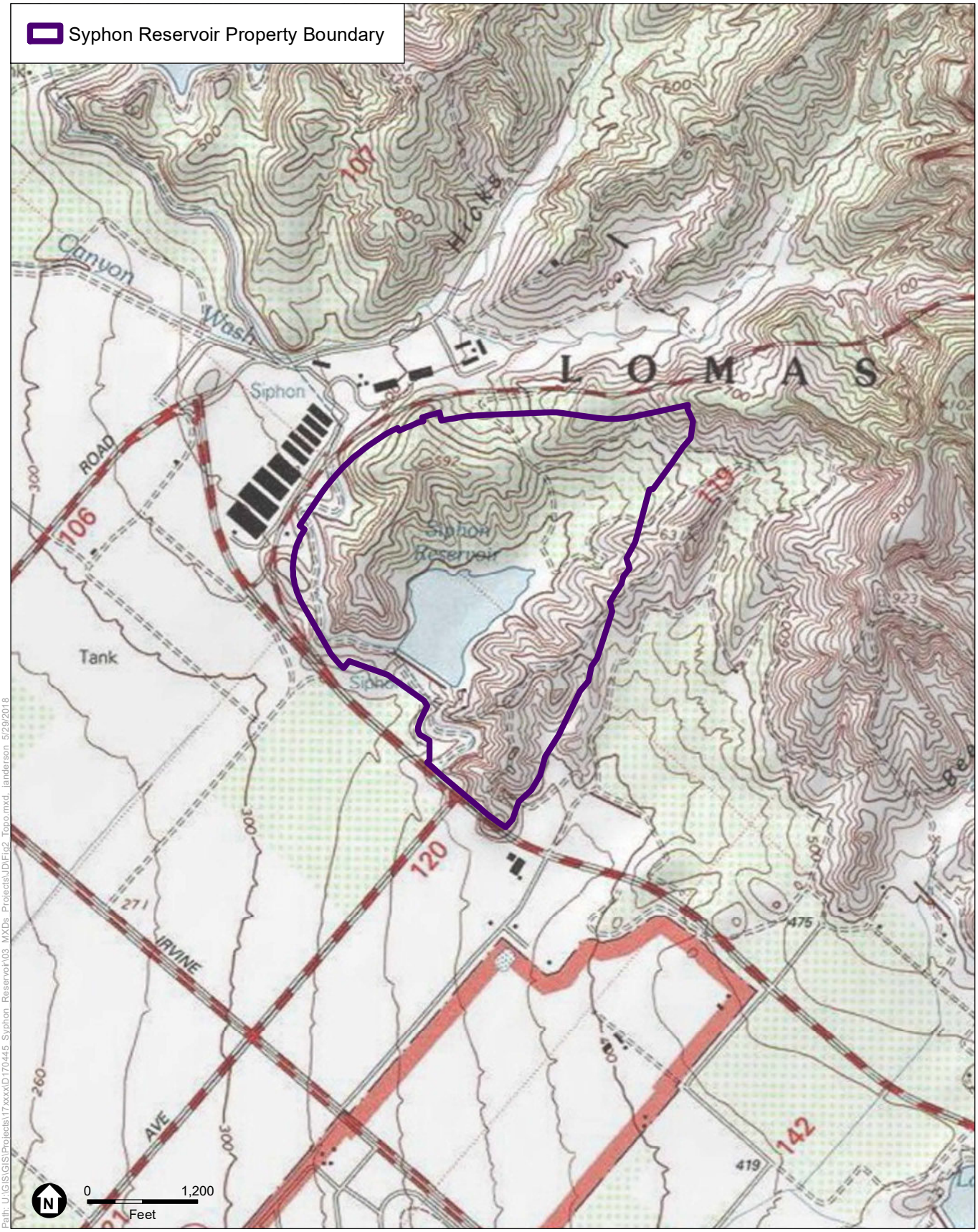


SOURCE: ESRI, 2016; OC LAFCO, 2018

IRWD Syphon Reservoir

Figure 1-1
Project Location

ESA



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SOURCE: ESRI, 2016; El Toro USGS 7.5 minute Quadrangle

IRWD Syphon Reservoir

Figure 1-2
USGS Topographic Map

ESA

Section 2
Environmental Setting

2.1 Wetland Delineation Study Area

The 266-acre study area was historically part of the Irvine Ranch and was initially subject to disturbance in the 1940s for construction of the reservoir to provide irrigation for agricultural lands. Irvine Ranch Water District purchased the reservoir and surrounding land in 2010 for the purpose of storing recycled water. In 2014, IRWD completed a project which integrated the existing capacity of the reservoir into its recycled water system as a small storage facility for recycled water, with the intent of increasing storage capacity in the future. Syphon Reservoir is currently a recycled water storage reservoir surrounded by sensitive upland, wetland, and riparian vegetation communities. The IRWD property surrounding the reservoir has been the subject of previous habitat restoration and mitigation activity as part of state and federal regulatory approvals and is within the reserve boundary of the NCCP/HCP. Consistency with the NCCP/HCP is discussed in Syphon Reservoir Environmental Regulatory Evaluation Preliminary Draft (Dudek, 2012).

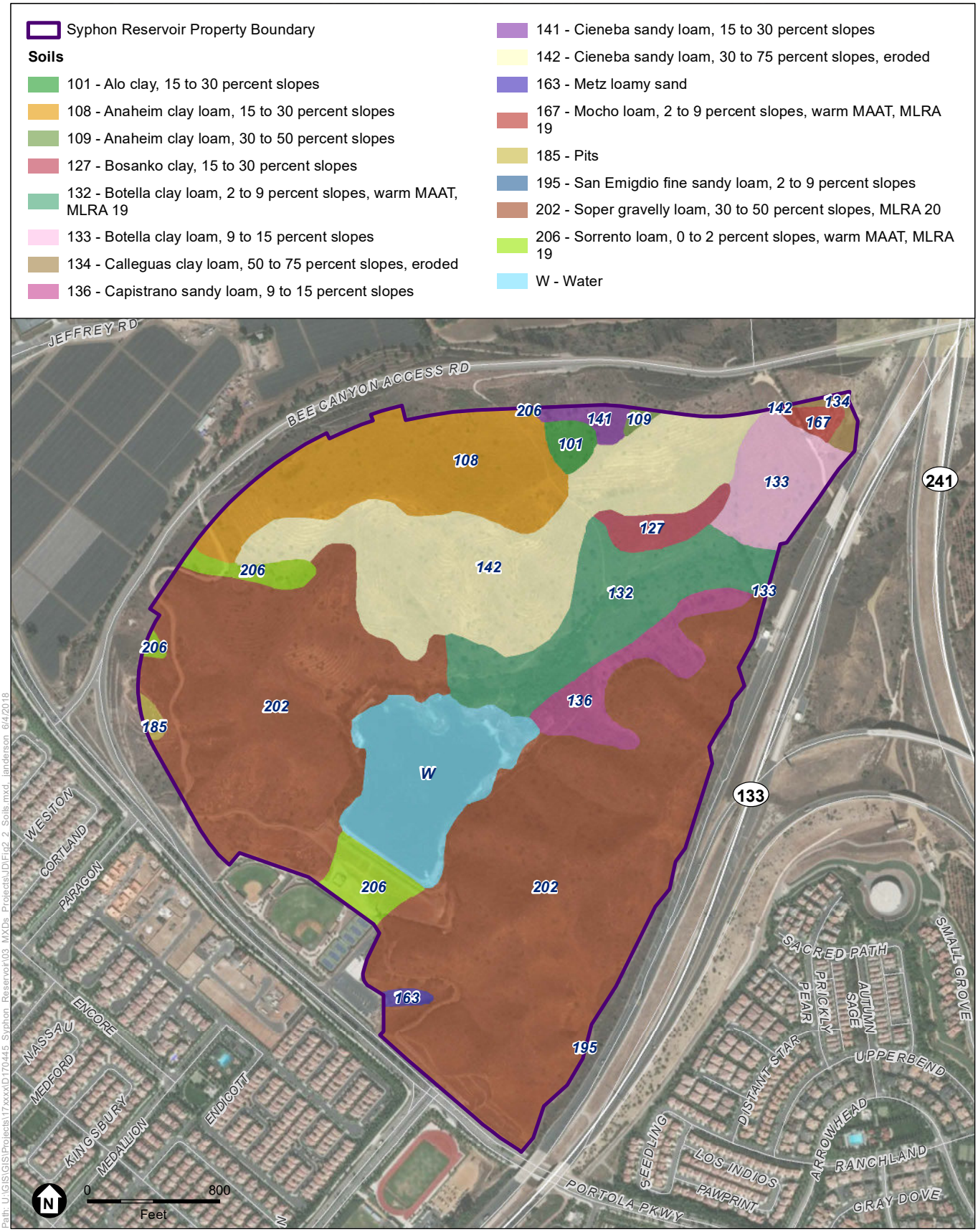
2.2 Soils

Based on review of the Natural Resources Conservation Services (NRCS) web soil survey, the study area contains 16 soil series (**Figure 2-1**) (NRCS, 2017). The following is a brief description of mapped soils within the study area underlain by potential waters of the U.S.:

Soper gravelly loam, 30 to 50 percent slopes, is a well-drained soil that is unlikely to pond or flood with an average depth of over 80 inches to the water table. The soil is mildly alkaline to slightly acidic. The profile consists of gravelly loam in the first 8 inches, gravelly clay loam between 8 and 29 inches, and bedrock from 29 to 79 inches. Soper gravelly loam is not considered hydric by the Natural Resources Conservation Service (NRCS) (NRCS, 2016).

Botella clay loam, 2 to 9 percent slopes, is a well-drained soil that is unlikely to pond or flood with an average depth of over 80 inches to the water table. The soil is slightly alkaline to moderately acidic. The profile consists of clay loam in the first 8 inches, silty clay loam between 8 and 35 inches, and clay loam from 35 to 66 inches. Botella clay loam is not considered hydric by the NRCS (NRCS, 2016).

Cieneba sandy loam, 30 to 75 percent slopes, is a somewhat excessively drained soil that is unlikely to pond or flood with an average depth of over 80 inches to the water table. The soil is neutral to strongly acidic. The profile consists of sandy loam in the first 17 inches and weathered bedrock between 17 and 59 inches. Cieneba sandy loam is not considered hydric by the NRCS (NRCS, 2016).



SOURCE: ESRI, 2016; USDA, 2018

IRWD Syphon Reservoir

Figure 2-1
Soils

ESA

Capistrano sandy loam, 9 to 15 percent slopes, is a well-drained soil that is unlikely to pond or flood with an average depth of over 80 inches to the water table. The soil is neutral to medium acidic. The profile consists of sandy loam in the first 27 inches and fine sandy loam between 27 and 65 inches. Capistrano sandy loam is not considered hydric by the NRCS (NRCS, 2016).

2.3 Hydrology

Syphon Reservoir's total basin area is approximately 205 acres within the central drainage and reservoir area. A culvert inlet in the northeast portion of the study area conveys stormwater runoff from a portion of the open space area east of the reservoir (under SR-133 and SR-241). The central drainage supports riparian habitat and conveys intermittent flow through the center of the study area to the reservoir. In addition, multiple culverts within the study area drain the upland portions of the reservoir.

With the exception of limited seasonal inflows from rain events, IRWD controls all flows in and out of the reservoir, as part of their recycled water storage and management. Following construction of the dam in the 1940s, impounded water accumulated from direct runoff from the Highline Canal. Currently, within the study area, a portion of the Highline Canal conveys periodic recycled water overflows from IRWD's Rattlesnake Reservoir into Syphon Reservoir. The Highline Canal located southwest of the Syphon Reservoir was historically used for irrigation but has been abandoned. The reservoir currently drains through a series of underground pipes that convey flows through a strainer and chlorination facility, before getting distributed to customers through IRWD's recycled water system.

2.4 Vegetation Communities

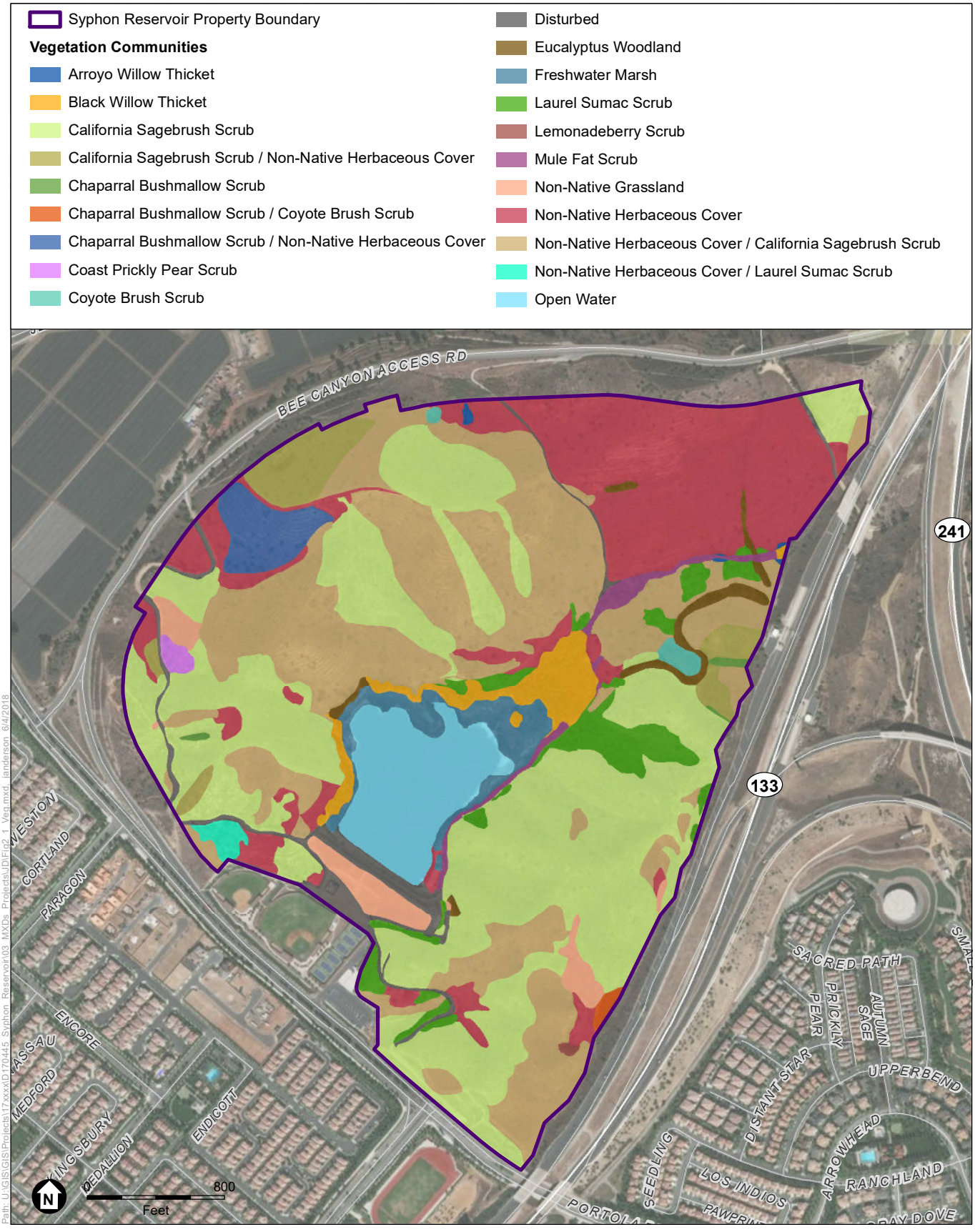
The study area is dominated by California sagebrush alliance and non-native herbaceous cover/California sagebrush alliance (i.e., communities intermixed with both native and non-native species) in the upland areas, and arroyo willow thicket within the riparian areas immediately adjacent to open water within the reservoir. Vegetation communities are mapped in **Figure 2-2**.

Acreages of each vegetation community in the study area are summarized in **Table 2-1**, and are listed according to the Orange County Habitat Classification System (Gray and Bramlet, 1992) and California vegetation alliances (Sawyer et al., 2009). Vegetation communities considered a special-status vegetation community by CDFW as listed in the California Natural Community List (CDFW, 2018) are also identified with an asterisk. Vegetation communities that are habitat type under the Central and Coastal Natural Community Conservation Plan/Habitat Conservation Plan (NCCP/HCP) and also considered a special-status vegetation community are identified with a double asterisk.

TABLE 2-1
VEGETATION COMMUNITIES

Vegetation Community	Acres	State Rank[1]
Arroyo Willow Thicket*	0.24	S4
Black Willow Thicket*	6.28	S3
Mule Fat Scrub	2.55	S4
Freshwater Marsh	6.62	S4
Coyote Brush Scrub	0.90	S5
Chaparral Bushmallow Scrub	0.45	S4
Chaparral Bushmallow Scrub/Coyote Brush Scrub	0.49	S4/S5
Chaparral Bushmallow Scrub/Non-Native Herbaceous Cover	4.72	S4/None
Laurel Sumac Scrub	9.20	S4
Lemonadeberry Scrub*	0.15	S3
California Sagebrush Scrub**	85.50	S5
California Sagebrush Scrub**/Non-Native Herbaceous Cover	7.86	S5/None
Coast Prickly Pear Scrub*	0.69	S3
Eucalyptus Woodland	2.78	None
Non-Native Grassland	5.27	None
Non-Native Herbaceous Cover	44.27	None
Non-Native Herbaceous Cover/California Sagebrush Scrub	66.61	None/S5
Non-Native Herbaceous Cover/Laurel Sumac Scrub	1.02	None/S4
Open Water	13.21	None
Disturbed	6.93	None
Grand Total	**265.74**	

* Asterisk indicates that an alliance/association is considered special-status by CDFW.
** Double asterisk indicates that an alliance/association that is a covered habitat type under the NCCP/HCP and is therefore considered a special-status vegetation community.
[1] CDFW state rank denotes the rarity of a vegetation type within the state as follows:
S1 = Critically Imperiled – At very high risk of extirpation due to very restricted range, very few populations or occurrences, very steep declines, severe threats, or other factors.
S2 = Imperiled – At high risk of extirpation due to restricted range, few populations or occurrences, steep declines, severe threats, or other factors.
S3 = Vulnerable – At moderate risk of extirpation due to a fairly restricted range, relatively few populations or occurrences, recent and widespread declines, threats, or other factors.
S4 = Apparently Secure – At a fairly low risk of extirpation due to an extensive range and/or many populations or occurrences, but with possible cause for some concern as a result of local recent declines, threats, or other factors.
S5 = Secure - At very low or no risk of extirpation due to a very extensive range, abundant populations or occurrences, with little to no concern from declines or threats.



SOURCE: ESRI, 2016

IRWD Syphon Reservoir

Figure 2-2
Vegetation Communities

ESA

Section 3
Regulatory Framework

3.1 Waters of the U.S.

The U.S. Army Corps of Engineers (USACE) and the Environmental Protection Agency (EPA) have issued a set of guidance documents detailing the process for determining Clean Water Act (CWA) jurisdiction over waters of the United States (waters of the U.S.) following the 2008 Rapanos decision. The EPA and USACE issued a summary memorandum of the guidance for implementing the Supreme Court's decision in Rapanos that addresses the jurisdiction over waters of the United States under the CWA. The complete set of guidance documents, summarized as key points below, were used to collect relevant data for evaluation by the EPA and the USACE to determine CWA jurisdiction over the project and to complete the "significant nexus test" as detailed in the guidelines.

The significant nexus test includes consideration of hydrologic and ecologic factors. For circumstances such as those described in point (B) below, the significant nexus test would take into account physical indicators of flow (evidence of an ordinary high water mark [OHWM]), if a hydrologic connection to a Traditionally Navigable Water (TNW) exists, and if the aquatic functions of the water body have a significant effect (more than speculative or insubstantial) on the chemical, physical, and biological integrity of a TNW. The USACE and EPA will apply the significant nexus standard to assess the flow characteristics and functions of the tributary drainage to determine if it significantly affects the chemical, physical, and biological integrity of the downstream TNW.

Based on the 2003 joint legal memorandum signed by General Counsels of EPA and the Department of the Army regarding the Supreme Court's decision in Solid Waste Agency of Northern Cook County vs. United States Army Corps of Engineers, 531 U.S. 159 (2001) ('SWANCC'), geographically isolated waters, including wetlands, are generally not considered to be jurisdictional under the CWA because they lack links to interstate commerce. However, for each specific request for isolated waters (i.e., approved jurisdictional determination), the USACE and EPA will need to make a case by case determination on the jurisdictional status of the resource.

Rapanos Key Points Summary

(A) The USACE and EPA will assert jurisdiction over the following waters:

- TNWs.
- Wetlands adjacent to TNW.

- Non-navigable tributaries of TNWs that are relatively permanent.
- Where the tributaries typically flow year-round or have continuous flow at least seasonally (e.g., typically three months).
- Wetlands that directly abut such tributaries.

(B) The USACE and EPA will decide jurisdiction over the following waters based on a fact-specific analysis to determine whether they have a significant nexus with a TNW:

- Non-navigable tributaries that are not relatively permanent.
- Wetlands adjacent to non-navigable tributaries that are not relatively permanent.
- Wetlands adjacent to but that do not directly abut a relatively permanent non-navigable tributary.

(C) The USACE and EPA generally will not assert jurisdiction over the following features:

- Swales or erosion features (e.g., gullies, small washes characterized by low volume, infrequent, or short duration flow).
- Ditches (including roadside ditches) excavated wholly in and draining only uplands and that do not carry a relatively permanent flow of water.

3.2 Waters of the State

Most projects involving water bodies or drainages are regulated by the Regional Water Quality Control Board (RWQCB), the principal State agency overseeing water quality of the State at the local/regional level. The study area is located within the jurisdiction of the Santa Ana RWQCB. The State Water Resources Control Board (State Water Board) directly regulates multi-regional projects and supports the Section 401 certification and wetlands program statewide. The RWQCB regulates activities pursuant to Section 401(a)(1) of the federal CWA, which specifies that certification from the State is required for any applicant requesting a federal license or permit to conduct any activity including but not limited to the construction or operation of facilities that may result in any discharge into navigable waters. The certification shall originate from the State or appropriate interstate water pollution control agency in/where the discharge originates or will originate. Any such discharge will comply with the applicable provisions of Sections 301, 302, 303, 306, and 307 of the CWA.

Absent any federal jurisdiction pursuant to Section 404 of the CWA, the RWQCB regulates discharges under the Porter-Cologne Water Quality Control Act primarily through issuance of NPDES permits for point source discharges and waste discharge requirements (WDRs) for non-point source discharges. Anyone discharging or proposing to discharge materials that could affect water quality (other than to a community sanitary sewer system regulated by an NPDES permit) must file a report of waste discharge. The Porter-Cologne Water Quality Control Act applies to the project since grading, filling, and other construction-related activities could affect the water quality of waters of the State.

3.3 Lakes, Streams, and Associated Vegetation

Pursuant to Division 2, Chapter 6, Section 1602 of the Fish and Game Code, California Department of Fish and Wildlife (CDFW) regulates all diversions, obstructions, or changes to the natural flow or bed, channel or bank of any river, stream, or lake which supports fish or wildlife. A notification of a Lake or Streambed Alteration Agreement must be submitted to CDFW for "any activity" that may substantially change the bed, channel, or bank of any river, stream, or lake." In addition, CDFW has jurisdiction over wetland and riparian habitats associated with watercourses. The CDFW reviews proposed actions, and if necessary, submits to the applicant a proposal that includes measures to protect affected fish and wildlife resources. The final proposal that is mutually agreed upon by CDFW and the applicant is the Lake or Streambed Alteration Agreement (LSAA).

Section 4
Methodology

4.1 Database and Literature Review

Prior to conducting the jurisdictional delineation, ESA conducted a review of available background information pertaining to Syphon Reservoir, geography, and topography. The following resources were also reviewed or used prior to the field surveys:

Natural Resources Conservation Service's (NRCS) *Web Soil Survey*, queried to determine the soils mapped in the study area (NRCS, 2017);

Hydric Soils List of California, *2016* (2018);

El Toro, CA USGS 7.5-minute topographic quadrangle maps;

Color aerial photography for vegetative, topographic, and hydrologic features (Google Earth, 2017);

The National Wetlands Inventory (U.S. Department of the Interior, 2018); and

Preliminary Draft Syphon Reservoir Environmental Regulatory Evaluation (Dudek, 2012).

Habitat Classification System, Natural Resources, Geographic Information System (GIS) Project (Gray and Bramlet, 1992).

Site maps were generated with available aerial photographs, and potentially jurisdictional features were identified and marked with lines and global positioning system (GPS) coordinates to assist in field verification.

4.2 Field Survey Methods

ESA biologists May Lau and Tommy Molioo conducted a site visit on April 24, 2018, to evaluate potentially jurisdictional features within the study area. The limits of potential jurisdictional features were recorded in the field within accessible areas using aerial maps and a hand-held GPS with sub-foot accuracy. Vegetation communities were described using *A Manual of California Vegetation, Second Edition* (Sawyer et al., 2009).

Delineating Waters of the U.S.

The delineation used the "Routine Determination Method" as described in the *1987 Corps of Engineers Wetland Delineation Manual* (Environmental Laboratory, 1987), hereafter called the "1987 Manual." The 1987 Manual was used in conjunction with the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0)* (U.S. Army Corps of Engineers, 2008), hereafter called the "Arid West Supplement." For areas where the 1987 Manual and the Arid West Supplement differ, the Arid West Supplement was followed. Wetlands and waters were classified using commonly accepted habitat types; however, the Cowardin classification (Cowardin et al., 1979) of each feature type is noted in the discussion in Chapter 5.

Wetlands

To determine the extent of potential jurisdictional wetlands on a project site, the Corps of Engineers *Wetlands Delineation Manual* (USACE, 1987) and *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region* (Version 2.0) (USACE, 2008b) was used as a guide for identifying wetland characteristics.

Three positive wetland parameters must normally be present for an area to be considered a wetland: 1) a dominance of wetland vegetation, 2) presence of hydric soils, and 3) presence of wetland hydrology. Presence or absence of positive indicators for wetland vegetation, soils and hydrology was assessed per the 1987 Manual and Arid West Supplement guidelines. Data points were taken within suspected wetlands and a paired point was taken (where applicable) in nearby uplands. Data points were recorded on Arid West wetland determination data forms. Data forms are provided in **Appendix A**.

At each data point, a visual assessment of the dominant plant species within a 6-foot radius was made. Dominant species were assessed using the recommended "50/20" rule per the Arid West Supplement. Plants were identified to species using the *The Jepson manual: Vascular plants of California, second edition* (Baldwin et al., 2012). The *Arid West 2016 Regional Wetland Plant List* (Lichvar et al., 2016) was used to determine the wetland indicator status of all plants. Hydric soils were identified using soil indicators presented in the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region* (Version 2.0) (USACE 2008b) and the *Field Indicators of Hydric Soils in the United States*, Version 7.0, 2010 (NRCS 2010). Soils at each data point were characterized by color, texture, organic matter accumulation, and the presence or absence of hydric soil indicators. The coloration of the soil samples, matrix, and mottles is assessed using the *Munsell Soil Color Charts* (Munsell, 2000). Presence of wetland hydrology was determined at each data point by presence of one or more of the primary and/or secondary indicators, per guidance of the Arid West Supplement.

Other Waters of the U.S.

Federal jurisdiction over a non-wetland waters of the U.S. extends to the ordinary high-water mark (OHWM), defined in 33 C.F.R. § 328.3 as the line on the shore established by fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the bank, shelving, changes in the character of the soil, destruction of terrestrial vegetation, or the

presence of litter and debris. In the Arid West region of the United States, waters are variable and include ephemeral/intermittent and perennial channel forms. The most problematic ordinary high-water (OHW) delineations are associated with the commonly occurring ephemeral/intermittent channel forms that dominate the Arid West landscape. Delineation methods were completed in accordance with *A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States* (USACE, 2008a), and the *Updated Datasheet for the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States* (USACE, 2010).

Delineating Waters of the State

Waters of the State have been delineated using the same methodology as waters of the U.S.

Delineating Lakes, Streams, and Associated Vegetation

Potential CDFW-jurisdictional waters were delineated by the top of the bank of a stream, and the outer dripline of riparian vegetation or wetlands supported by the lake or stream.

4.3 Mapping and Acreage Calculations

All features, including data points, wetland boundaries, and channels were recorded using a GPS unit (Trimble GeoXT) with real-time differential correction and an instrument-rated mapping accuracy of +/- 1 meter, or were delineated on aerial photography using Geographic Information System (GIS) software (ArcGIS 10.2) and site-specific topographic data and aerial imagery.

In the office, data from data points and wetland boundaries were downloaded from the GPS unit and mapped using GIS software on an overlay of topographic contours and geo-referenced aerial photography. GPS-determined wetland boundaries and data points were visually confirmed. Acreage of wetland and waters of the U.S. polygons, and the length of linear features were determined using ArcGIS.

Section 5
Results and Conclusions

The results of the database/literature review and jurisdictional delineation are discussed in this section. Representative photographs from the field delineation are located in **Appendix B**.

This jurisdictional delineation identified 18.28 acres of potentially jurisdictional waters of the U.S., subject to jurisdiction under Section 404 of the CWA. Potentially jurisdictional features include 4.33 acres of wetlands and 13.95 acres of other waters of the U.S. Potentially jurisdictional features within the study area include Syphon Reservoir, riverine and wetland habitats. **Table 5-1** provides the total extent of potentially jurisdictional wetlands and waters of the U.S. within the study area. Potentially jurisdictional features are depicted in detailed maps provided in **Figure 5-1** and **Figure 5-2**. Each type of wetland and other waters is described in greater detail in Section 5.1.

TABLE 5-1
POTENTIALLY JURISDICTIONAL WATERS OF THE U.S. IN THE STUDY AREA

Feature Type	Cowardin Classification	Extent	
		Linear feet	Area (acres)
Wetland Waters of the U.S.			
Wetlands	Palustrine emergent wetlands (semipermanently flooded)	N/A	4.33
	Total Wetlands		**4.33**
Other Waters of the U.S.			
Reservoir	Palustrine (diked/impounded, permanently flooded)	N/A	13.93
Drainage 1	Riverine (ephemeral)	243	0.01
Drainage 2	Riverine (ephemeral)	201	0.01
	Total Other Waters	444	13.95
	Total Waters of the U.S./State	**444**	**18.28**

NOTE: Area subtotals subject to rounding.

5.1 Potentially Jurisdictional Wetlands

The following is a discussion of those areas identified to be potentially jurisdictional wetland waters of the U.S., based upon observations or inferences of wetland hydrology, soils, and vegetation.

Wetlands

The freshwater wetlands within the study area are classified as *Palustrine Emergent Wetlands, Semipermanently Flooded* according to the Cowardin classification system (Cowardin et al., 1979). These are areas that become at least partially inundated all year, support facultative (or wetter) annual plants, and are located along the edges of the reservoir. Data points that correspond with freshwater wetland are DP2, DP3, DP5, DP8, and DP10. Corresponding upland points are DP1, DP4, DP6, DP7, and DP9.

The wetlands are largely dominated by native plant species including California bulrush (*Schoenoplectus californicus*, OBL[1]), black willow (*Salix gooddingii*, FACW[2]), and yellow sweet clover (*melilotus officinalis*, FACU[3]). This habitat also supports a range of non-native plant species including seaside heliotrope (*Heliotropium curassavicum*, FACU), spiny cocklebur (*Xanthium spinosum*, FACU), short podded mustard (*Hirschfeldia incana*, UPL[4]), and telegraph weed (*Heterotheca grandiflora*, UPL).

The wetlands occur along the margins of Syphon Reservoir (see Figures 2-2 and 5-1). Although not mapped as hydric soils according to NRCS, hydric soil indicators observed in the wetlands include the presence of muck (A9), hydrogen sulfide (A4), depleted below dark surface (A11), redox dark surface (F6), and sandy gleyed matrix (S4). The wetland areas generally had very silty loam, clay soils, while sandy soils were encountered at DP8. Indicators of wetland hydrology include a high water table (A2), saturation (A3), biotic crust (B12), and hydrogen sulfide odor (C1).

5.2 Potentially Jurisdictional Other Waters of the U.S.

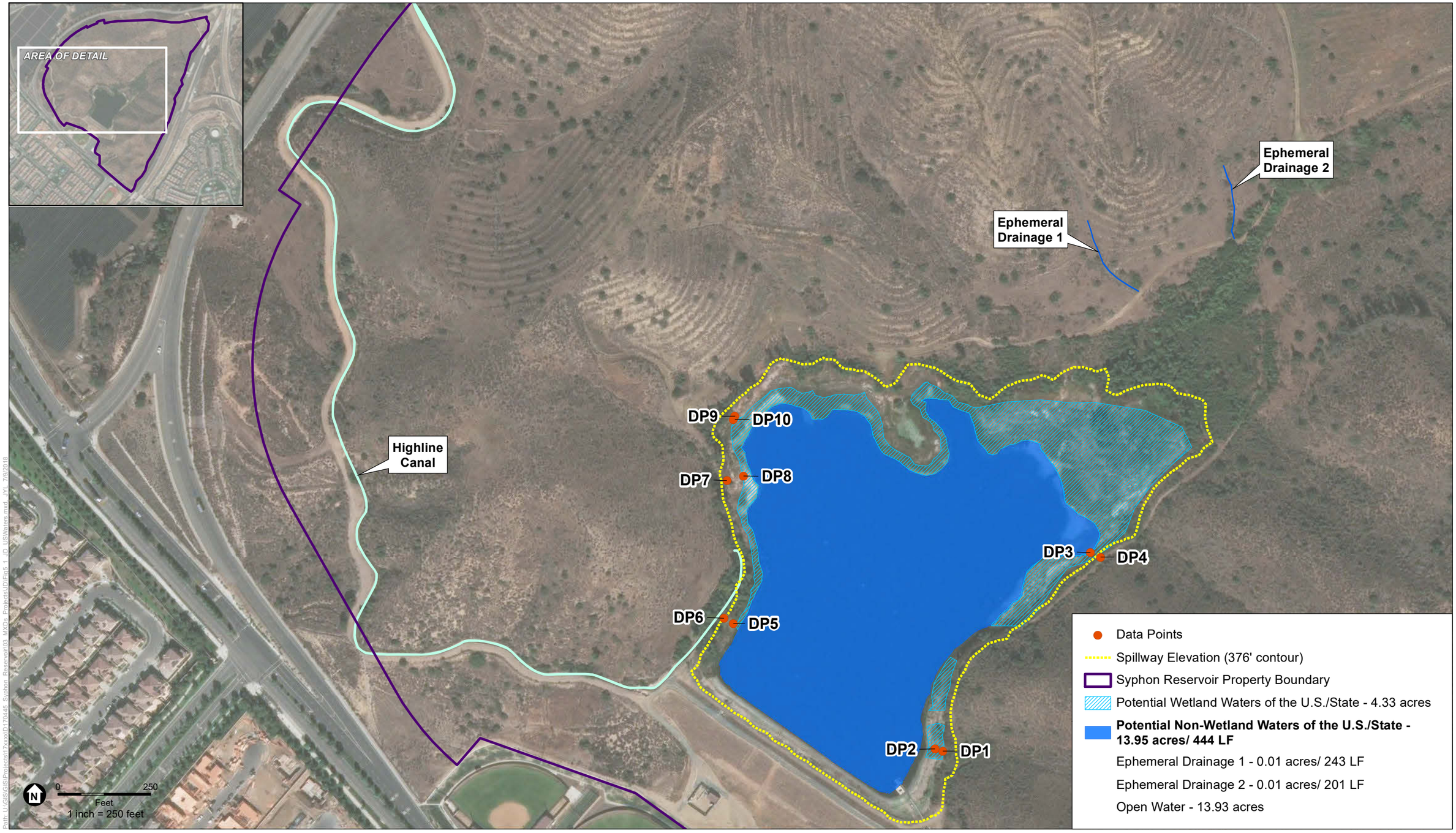
Following is a discussion of those areas identified to be potentially jurisdictional waters of the U.S., based upon observations or inferences of wetland hydrology, soils, and vegetation.

1 OBL – obligate. Plant species with this wetland indicator status occur almost always under natural conditions in wetlands.

2 FACW – facultative wetland. Plant species with this wetland indicator status usually occur in wetlands but are occasionally found in non-wetlands.

3 FACU – facultative upland. Plant species with this wetland indicator status usually occur in non-wetlands but are occasionally found in wetlands.

4 UPL – upland. Plant species with this wetland indicator status occur in wetlands in another region, but occur almost always under natural conditions in non-wetlands in the Arid West Region.

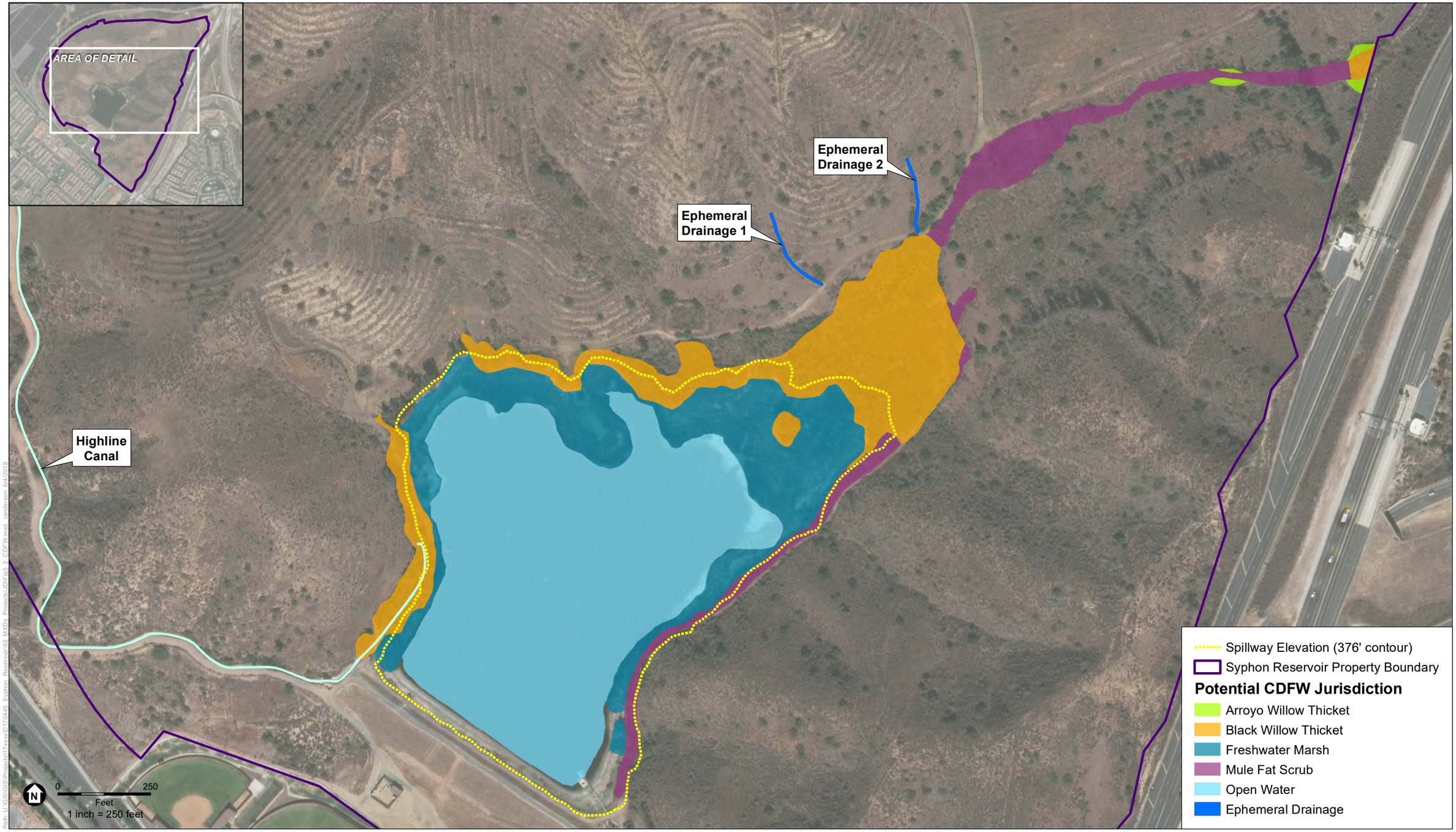


SOURCE: ESRI, 2016

IRWD Syphon Reservoir

Figure 5-1
Jurisdictional Delineation Map
Potential Waters of the U.S./State

ESA



SOURCE: ESRI, 2016

IRWD Syphon Reservoir

Figure 5-2
Jurisdictional Delineation Map – Potential CDFW Jurisdiction

ESA

Reservoir

Syphon Reservoir is considered *Lacustrine* habitat according to the Cowardin classification system (Cowardin et al., 1979). Lacustrine habitats are inland depressions or dammed riverine channels containing standing water. The OHWM of the reservoir was determined to be along the edge of the reservoir where surface water was observed at the time of the delineation, or based on physical characteristics of water fluctuation such as downed emergent vegetation. The water surface elevation of the reservoir is influenced by IRWD's management of the recycled water system. The reservoir functions as a seasonal recycled water storage facility; as such, the reservoir includes areas where open water persists throughout the year at a minimum water surface elevation but fluctuates seasonally up to a maximum water surface elevation based on demands for recycled water. The reservoir captures runoff from adjacent areas, including a primary drainage in the central portion of the study area that supports intermittent flows and riparian vegetation north of the reservoir and wetlands shown in **Figure 5-1**. However, there was no OHWM observed in this central drainage and the primary drainage was not mapped as potential other waters of the U.S.

Ephemeral Drainages

Two ephemeral drainages (Nos. 1 and 2) are considered *Riverine* habitat according to the Cowardin classification system (Cowardin et al., 1979). Riverine habitats include rivers, streams, and creeks, and can occur in association with many terrestrial habitats. Riverine habitats are also found contiguous to lacustrine and fresh emergent wetland habitats. Both ephemeral drainages were mapped north of the reservoir (Figure 5-1). These drainages convey stormwater runoff from upland areas to the central drainage via a culvert under the existing dirt road that runs along the west and north sides of the reservoir. The OHWM was an average of two feet wide, based on evidence of shelving. Ephemeral Drainage 1 supports a mix of non-native herbaceous cover and California sagebrush scrub, while Ephemeral Drainage 2 supports a mix of non-native herbaceous cover, California sagebrush scrub, and laurel sumac scrub. No surface water was observed in either drainage.

5.3 Potentially Jurisdictional Section 1602 Lakes, Streams and Associated Vegetation

Areas within CDFW jurisdiction typically refer to streambeds and associated wetland or riparian vegetation. Within the study area, the potential extent of CDFW limits was taken to the outer edge of the overhanging riparian or wetland vegetation adjacent to the reservoir, and to the top of bank for the ephemeral drainages (**Figure 5-2**). Therefore, as shown in **Table 5-2**, approximately 27.26 acres of the study area could be subject to CDFW jurisdiction.

TABLE 5-2
SUMMARY OF SECTION 1602 LAKES, STREAMS, AND ASSOCIATED VEGETATION

Feature	Stream/Riparian Limits Acres	Length (feet)	Average Stream Width	Vegetation/Habitat Type
Syphon Reservoir	13.93	N/A	N/A	Open water
Riparian	8.93	N/A	N/A	Blackwillow thicket, arroyo willow thicket, mulefat scrub
Freshwater Marsh	4.33	N/A	N/A	Freshwater marsh
Ephemeral Drainage 1	0.04	243	7	Non-native herbaceous cover/California sagebrush scrub
Ephemeral Drainage 2	0.03	201	7	Non-native herbaceous cover/California sagebrush scrub, and laurel sumac scrub
Totals:	**27.26**	**444**	**N/A**	

5.4 Jurisdictional Analysis

The following analysis discusses the delineated water features within the study area and which regulatory agencies could require approvals/permits prior to impacts. This includes wetland and riparian vegetation, Syphon Reservoir, and the two ephemeral drainages within the study area.

Wetlands

The wetlands within the study area are fringe wetlands associated with the reservoir. These wetlands are isolated from downstream waters of the U.S. and lack hydrologic connectivity to interstate commerce. As discussed in Section 3.1 above, geographically isolated waters, including wetlands, are generally not considered to be jurisdictional under the CWA because they lack links to interstate commerce. However, for each specific request for isolated waters (i.e., approved jurisdictional determination), the USACE and EPA will need to make a case by case determination on the jurisdictional status of the resource, which would dictate the appropriate permitting requirements.

Other Waters of the U.S.

As previously discussed, the reservoir currently drains through a series of underground pipes that convey flows through the strainer and chlorination facility, before being distributed to customers through IRWD's recycled water system. As such, the waters within Syphon Reservoir and the two ephemeral drainages do not exhibit hydrologic connectivity to downstream waters of the U.S. or the Pacific Ocean (TNW), and are considered isolated waters. As discussed in Section 3.1 above, geographically isolated waters, including wetlands, are generally not considered to be jurisdictional under the CWA because they lack links to interstate commerce. However, for each specific request for isolated waters (i.e., approved jurisdictional determination), the USACE and EPA will need to make a case by case determination on the jurisdictional status of the resource, which would dictate the appropriate permitting requirements.

Waters of the State

All areas mapped as potential waters of the U.S./State are regulated by the Santa Ana RWQCB pursuant to the Porter-Cologne Water Quality Control Act. Assuming the USACE and EPA will determine absence of federal jurisdiction (waters of the U.S.) onsite, a WDR and/or a WDR amendment will be required from the RWQCB for the project.

Lakes, Streams, and Associated Vegetation

Within the study area, Syphon Reservoir, wetland and riparian vegetation, and the two ephemeral drainages could be subject to CDFW jurisdiction. A Streambed Alteration Agreement (SAA) will be required from the CDFW per Section 1602 of the Fish and Game Code.

5.5 Conclusions

Based on the jurisdictional analysis presented in Section 5.4 above, it is presumed that there are no waters of the U.S. within the study area. A total of 18.28 acres of potentially jurisdictional wetlands and other waters of the State occur within the 266-acre study area, consisting of 4.33 acres of wetlands and 13.95 acres of other waters. A total of 27.26 acres of lakes, streams and associated vegetation occur within the study area that are potentially subject to Section 1602 of the Fish and Game Code.

This report documents the wetland boundary delineation and best professional judgment of ESA investigators. All conclusions presented for waters of the U.S. should be considered preliminary and subject to change pending official review and preliminary jurisdictional determination in writing by the USACE. All conclusions presented for Section 1602 lakes, streams and associated vegetation should be considered preliminary and subject to change pending official review by the CDFW.

Section 6
Supplemental Information

6.1 Directions to the Study Area

From Los Angeles, take Interstate 5 South for approximately 31 miles. Use the right 2 lanes to take exit 96B to merge onto CA-133 North toward Santa Margarita. Take exit 12 for Irvine Boulevard and turn left onto Irvine Boulevard. Turn right onto Sand Canyon Avenue and use the left 2 lanes to turn left onto Portola Parkway. Syphon Reservoir will be on your right behind the Crean Lutheran High Athletic Complex.

6.2 Project Applicant Contact Information

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Section 7
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Appendix A
Field Data Forms

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Syphon City/County: Irvine, OC Sampling Date: 4/24/18
Applicant/Owner: IRWD State: _____ Sampling Point: 1
Investigator(s): ML, TM Section, Township, Range: _____
Landform (hillslope, terrace, etc.): _____ Local relief (concave, convex, none): _____ Slope (%): _____
Subregion (LRR): C Lat: _____ Long: _____ Datum: _____
Soil Map Unit Name: _____ NWI classification: _____
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)
Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____
Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No _____	**Is the Sampled Area within a Wetland?** Yes _____ No X
Hydric Soil Present?	Yes X No _____	
Wetland Hydrology Present?	Yes _____ No X	

Remarks: ↑ Eastern edge of reservoir
South

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. Salix gooddingii	1	Y	FACW
2.			
3.			
4.			
	1	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15')			
1. Schoenoplectus californicus	70	Y	OBL
2. Baccharis salicifolia	5	N	FAC
3.			
4.			
5.			
	75	= Total Cover	
Herb Stratum (Plot size: 5')			
1. Heliotropium curassavicum	15	Y	FACU
2. Melilotus officinalis	14	Y	FACU
3. Artemesia douglasiana	1	N	FAC
4.			
5.			
6.			
7.			
8.			
	30	= Total Cover	
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	_____	= Total Cover	

% Bare Ground in Herb Stratum _____ % Cover of Biotic Crust _____

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)
Total Number of Dominant Species Across All Strata: 4 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species 70	x 1 =	70
FACW species 1	x 2 =	2
FAC species 6	x 3 =	18
FACU species 29	x 4 =	116
UPL species _____	x 5 =	_____
Column Totals: 106 (A)		206 (B)

Prevalence Index = B/A = 1.94

Hydrophytic Vegetation Indicators:
_____ Dominance Test is >50%
X Prevalence Index is ≤3.0[1]
_____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No _____

Remarks:

SOIL

Sampling Point: 1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	7.5YR 7/2	70	7.5YR 5/8	30	C	M	clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR C)**
- ___ 1 cm Muck (A9) **(LRR D)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR C)**
- ___ 2 cm Muck (A10) **(LRR B)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: roots

Depth (inches): 6

Hydric Soil Present? Yes X No ___

Remarks: living roots; oxidized root pores

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) **(Nonriverine)**
- ___ Sediment Deposits (B2) **(Nonriverine)**
- ___ Drift Deposits (B3) **(Nonriverine)**
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) **(Riverine)**
- ___ Sediment Deposits (B2) **(Riverine)**
- ___ Drift Deposits (B3) **(Riverine)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___

Water Table Present? Yes ___ No X Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): ___

Wetland Hydrology Present? Yes ___ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: downed veg. possibly from fluctuation of reservoir levels

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Syphon City/County: Irvine, OC Sampling Date: 4/24/18

Applicant/Owner: IRWD State: _____ Sampling Point: 2

Investigator(s): ML TM Section, Township, Range: _____

Landform (hillslope, terrace, etc.): _____ Local relief (concave, convex, none): _____ Slope (%): _____

Subregion (LRR): C Lat: _____ Long: _____ Datum: _____

Soil Map Unit Name: _____ NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No _____	**Is the Sampled Area within a Wetland?** Yes _____ No _____
Hydric Soil Present?	Yes X No _____	
Wetland Hydrology Present?	Yes X No _____	

Remarks: wetland adjacent to water line, eastern edge of reservoir

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 30')			
1. Salix gooddingii	5	Y	FACW
2.			
3.			
4.			
	5 = Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1. Schoenoplectus californicus	95	Y	OBL
2.			
3.			
4.			
5.			
	95 = Total Cover		
Herb Stratum (Plot size: 5')			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	_____ = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	_____ = Total Cover		

% Bare Ground in Herb Stratum _____ % Cover of Biotic Crust _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species _____	x 1 =	_____
FACW species _____	x 2 =	_____
FAC species _____	x 3 =	_____
FACU species _____	x 4 =	_____
UPL species _____	x 5 =	_____
Column Totals: _____ (A)		_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No _____

Remarks:

SOIL

Sampling Point: 2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 2/1	100					loamy, mucky	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- X 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No _____

Remarks:

organic top layer 1"

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No _____ Depth (inches): _____

Water Table Present? Yes _____ No _____ Depth (inches): 4

Saturation Present? (includes capillary fringe) Yes _____ No _____ Depth (inches): 0

Wetland Hydrology Present? Yes X No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Syphon City/County: Irvine, OC Sampling Date: 4/24/18
Applicant/Owner: IRWD State _____ Sampling Point: 3
Investigator(s): ML, TM Section, Township, Range: _____
Landform (hillslope, terrace, etc.): _____ Local relief (concave, convex, none): _____ Slope (%): _____
Subregion (LRR): _____ Lat: _____ Long: _____ Datum: _____
Soil Map Unit Name: _____ NWI classification: _____
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)
Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____
Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No _____	**Is the Sampled Area within a Wetland?** Yes X No _____
Hydric Soil Present?	Yes X No _____	
Wetland Hydrology Present?	Yes X No _____	

Remarks: Northeastern edge of reservoir

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1. Schoenoplectus californicus	85	Y	OBL
2. Xanthium spinosum	5	N	FACU
3.			
4.			
5.			
	90 = Total Cover		
Herb Stratum (Plot size: 5')			
1. melilotus officinalis	10	Y	FACU
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	10 = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum _____ % Cover of Biotic Crust _____

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)
Total Number of Dominant Species Across All Strata: 2 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species 85	x 1 =	85
FACW species _____	x 2 =	_____
FAC species _____	x 3 =	_____
FACU species 15	x 4 =	60
UPL species _____	x 5 =	_____
Column Totals: 100 (A)		145 (B)

Prevalence Index = B/A = 1.45

Hydrophytic Vegetation Indicators:
_____ Dominance Test is >50%
X Prevalence Index is ≤3.0[1]
_____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No _____

Remarks:

SOIL

Sampling Point: 3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	5YR 3/2	85	7.5YR 4/6	15	C	PL	clay loam - silty	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR C)**
- ___ 1 cm Muck (A9) **(LRR D)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR C)**
- ___ 2 cm Muck (A10) **(LRR B)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: rock

Depth (inches): 6

Hydric Soil Present? Yes X No ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) **(Nonriverine)**
- ___ Sediment Deposits (B2) **(Nonriverine)**
- ___ Drift Deposits (B3) **(Nonriverine)**
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- X Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) **(Riverine)**
- ___ Sediment Deposits (B2) **(Riverine)**
- ___ Drift Deposits (B3) **(Riverine)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___

Water Table Present? Yes ___ No X Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): ___

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Syphon City/County: Irvine, OC Sampling Date: 4/28/18
Applicant/Owner: IRWD State: _____ Sampling Point: 4
Investigator(s): ML, TM Section, Township, Range: _____
Landform (hillslope, terrace, etc.): _____ Local relief (concave, convex, none): _____ Slope (%): 5
Subregion (LRR): _____ Lat: _____ Long: _____ Datum: _____
Soil Map Unit Name: _____ NWI classification: _____
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)
Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____
Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes X No _____
Hydric Soil Present? Yes _____ No X
Wetland Hydrology Present? Yes _____ No X
Is the Sampled Area within a Wetland? Yes _____ No X

Remarks: northeastern edge of reservoir

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. Rhus lobata	10	Y	UPL
2. Malosma laurina	5	Y	UPL
3.			
4.			
	15	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15')			
1. Malosma laurina	5	Y	UPL
2.			
3.			
4.			
5.			
	_____	= Total Cover	
Herb Stratum (Plot size: 5')			
1. Melilotus officinalis	30	Y	FACU
2. Xanthium spinosum	10	N	FACU
3. Schoenoplectus californicus	50	Y	OBL
4.			
5.			
6.			
7.			
8.			
	90	= Total Cover	
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	_____	= Total Cover	

% Bare Ground in Herb Stratum _____ % Cover of Biotic Crust _____

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)
Total Number of Dominant Species Across All Strata: 5 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 20 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species 50	x 1 =	50
FACW species _____	x 2 =	_____
FAC species _____	x 3 =	_____
FACU species 40	x 4 =	160
UPL species 20	x 5 =	100
Column Totals: 110 (A)		310 (B)

Prevalence Index = B/A = 2.8

Hydrophytic Vegetation Indicators:
_____ Dominance Test is >50%
X Prevalence Index is ≤3.0[1]
_____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
_____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No _____

Remarks: upland scrub sp.

SOIL

Sampling Point: 4

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 4/2	100					Loamy sand	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: rock

Depth (inches): 4

Hydric Soil Present? Yes ____ No X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ____ No ____ Depth (inches): ____

Water Table Present? Yes ____ No ____ Depth (inches): ____

Saturation Present? (includes capillary fringe) Yes ____ No ____ Depth (inches): ____

Wetland Hydrology Present? Yes ____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Syphon City/County: Irvine, OC Sampling Date: 4/24/18

Applicant/Owner: IRWD State: _____ Sampling Point: 5

Investigator(s): ML, TM Section, Township, Range: _____

Landform (hillslope, terrace, etc.): _____ Local relief (concave, convex, none): _____ Slope (%): _____

Subregion (LRR): _____ Lat: _____ Long: _____ Datum: _____

Soil Map Unit Name: _____ NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No _____	**Is the Sampled Area within a Wetland?** Yes X No _____
Hydric Soil Present?	Yes X No _____	
Wetland Hydrology Present?	Yes X No _____	

Remarks: Southwest edge of reservoir

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. Salix gooddingii	25	Y	FACW
2.			
3.			
4.			
	25 = Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1. Schoenoplectus californicus	75	Y	OBL
2.			
3.			
4.			
5.			
	75 = Total Cover		
Herb Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	_____ = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	_____ = Total Cover		

% Bare Ground in Herb Stratum _____ % Cover of Biotic Crust _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No _____

Remarks:

SOIL

Sampling Point: 5

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-2								organic layer
2-6	10YR4/1	100					Silty loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- X 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: rock

Depth (inches): 6

Hydric Soil Present? Yes X No ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- X Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___

Water Table Present? Yes ___ No X Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes X No ___ Depth (inches): 2

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Syphon City/County: Irvine ~~EADC~~ Sampling Date: 4/24/18
Applicant/Owner: IRWD State: CA Sampling Point: 16
Investigator(s): ML, TM Section, Township, Range:
Landform (hillslope, terrace, etc.): Local relief (concave, convex, none): Slope (%):
Subregion (LRR): Lat: Long: Datum:
Soil Map Unit Name: NWI classification:
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes X No
Hydric Soil Present? Yes X No
Wetland Hydrology Present? Yes No X
Is the Sampled Area within a Wetland? Yes No X

Remarks: Southwest edge of reservoir

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. Salix goodingii	20	Y	FACW
2. Malosma laurina	25	Y	UPL
3.			
4.			
	45 = Total Cover		

Sapling/Shrub Stratum (Plot size: 15')			
1. Baccharis salicifolia	50	Y	FAC
2. Xanthium spinosum	5	N	FACU
3			
4.			
5			
	55 = Total Cover		

Herb Stratum (Plot size: 5')			
1. Schoenoplectus californicus	80	Y	OBL
2 Heliotropium curassavicum	2	N	FACU
3			
4.			
5.			
6			
7.			
8.			
	82 = Total Cover		

Woody Vine Stratum (Plot size: ____)

1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum ____ % Cover of Biotic Crust ____

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)
Total Number of Dominant Species Across All Strata: 4 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 75 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species	x 1 =	
FACW species	x 2 =	
FAC species	x 3 =	
FACU species	x 4 =	
UPL species	x 5 =	
Column Totals (A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:
X Dominance Test is >50%
__ Prevalence Index is ≤3.0[1]
__ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
__ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No

Remarks: Pit between bulrush & mulefat

SOIL

Sampling Point: 6

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 4/2	90	10YR 5/8	10	C	PL	clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- [X] Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: Rock

Depth (inches): 12

Hydric Soil Present? Yes X No ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ___ Depth (inches): ___

Water Table Present? Yes ___ No ___ Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No ___ Depth (inches): ___

Wetland Hydrology Present? Yes ___ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Syphon City/County: Irvine, OC Sampling Date: 4/24/18
Applicant/Owner: IRWD State: CA Sampling Point: 7
Investigator(s): ML, TM Section, Township, Range:
Landform (hillslope, terrace, etc.): Local relief (concave, convex, none): Slope (%):
Subregion (LRR): Lat: Long: Datum:
Soil Map Unit Name: NWI classification:
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No	Is the Sampled Area within a Wetland? Yes No X
Hydric Soil Present?	Yes No X	
Wetland Hydrology Present?	Yes No X	

Remarks: western edge of reservoir

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. Salix gooddingii	30	Y	FACW
2.			
3.			
4.			
	30 = Total Cover		
Sapling/Shrub Stratum (Plot size 15')			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
Herb Stratum (Plot size 5')			
1. Melilotus officinalis	2	N	FACU
2. Bromus madritensis	1	N	UPL
3. Schoenoplectus californicus	40	Y	OBL
4.			
5.			
6.			
7.			
8.			
	43 = Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum 27 % Cover of Biotic Crust

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)
Total Number of Dominant Species Across All Strata: 2 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: (A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:
X Dominance Test is >50%
__ Prevalence Index is ≤3.0[1]
__ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
__ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No

Remarks:

SOIL

Sampling Point: 7

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0 8	10YR 5/3	100						

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR C)**
- ___ 1 cm Muck (A9) **(LRR D)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR C)**
- ___ 2 cm Muck (A10) **(LRR B)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) **(Nonriverine)**
- ___ Sediment Deposits (B2) **(Nonriverine)**
- ___ Drift Deposits (B3) **(Nonriverine)**
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) **(Riverine)**
- ___ Sediment Deposits (B2) **(Riverine)**
- ___ Drift Deposits (B3) **(Riverine)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No X Depth (inches): _____

Water Table Present? Yes _____ No X Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No X Depth (inches): _____

Wetland Hydrology Present? Yes _____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Syphon City/County: Irvine, OC Sampling Date: 4/24/18

Applicant/Owner: IRWD State: Sampling Point: 8

Investigator(s): MM, TM Section, Township, Range:

Landform (hillslope, terrace, etc.): Local relief (concave, convex, none): Slope (%):

Subregion (LRR): Lat: Long: Datum:

Soil Map Unit Name: NWI classification:

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)

Are Vegetation , Soil X, or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes X No

Are Vegetation , Soil , or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No	**Is the Sampled Area within a Wetland?** Yes X No
Hydric Soil Present?	Yes X No	
Wetland Hydrology Present?	Yes X No	

Remarks: western edge of reservoir; disturbed soils (ie, stakes in ground)

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
Herb Stratum (Plot size: 5')			
1. Schoenoplectus californicus	70	Y	OBL
2. Heliotropium sp. Curassavicum	5	N	FACW
3. Hirschfeldia incana	2	N	UPL
4. Heterotheca grandiflora	2	N	UPL
5.			
6.			
7.			
8.			
	79 = Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum 25 % Cover of Biotic Crust

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: (A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%

__ Prevalence Index is ≤3.0[1]

__ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

__ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No

Remarks:

SOIL

Sampling Point: 8

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-10	5Y 4/1	100%					sand	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- X Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR C)**
- ___ 1 cm Muck (A9) **(LRR D)**
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- X Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR C)**
- ___ 2 cm Muck (A10) **(LRR B)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: rock

Depth (inches): 10

Hydric Soil Present? Yes X No ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required, check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) **(Nonriverine)**
- ___ Sediment Deposits (B2) **(Nonriverine)**
- ___ Drift Deposits (B3) **(Nonriverine)**
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- X Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- X Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) **(Riverine)**
- ___ Sediment Deposits (B2) **(Riverine)**
- ___ Drift Deposits (B3) **(Riverine)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___

Water Table Present? Yes X No ___ Depth (inches): 2

Saturation Present? (includes capillary fringe) Yes X No ___ Depth (inches): ___

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Syphon City/County: Irvine, OC Sampling Date: 4/24/18
Applicant/Owner: IRWD State: CA Sampling Point: 9
Investigator(s): ML, TM Section, Township, Range:
Landform (hillslope, terrace, etc.): Local relief (concave, convex, none): Slope (%):
Subregion (LRR): Lat: Long: Datum:
Soil Map Unit Name: NWI classification:
Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)
Are Vegetation ____, Soil X, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes X No
Hydric Soil Present? Yes No X
Wetland Hydrology Present? Yes X No
Is the Sampled Area within a Wetland? Yes No X

Remarks: Northwestern edge of reservoir

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. Eucalyptus globulus	25	Y	UPL
2.			
3.			
4.			
	25 = Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
	= Total Cover		
Herb Stratum (Plot size: 5')			
1. Schoenoplectus californicus	30	Y	OBL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	30 = Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum 70 % Cover of Biotic Crust

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)
Total Number of Dominant Species Across All Strata: 2 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species 30	x 1 = 30
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species 25	x 5 = 125
Column Totals: 55 (A)	155 (B)

Prevalence Index = B/A = 2.8

Hydrophytic Vegetation Indicators:
__ Dominance Test is >50%
X Prevalence Index is ≤3.0[1]
__ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
__ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No

Remarks:

SOIL

Sampling Point: 9

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	2.5YR5/2	100					sandy loam	

[1]Type. C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: FILL

Depth (inches): 6

Hydric Soil Present? Yes ___ No X

Remarks: Fill

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- X Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___

Water Table Present? Yes ___ No X Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): ___

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Syphon City/County: Irvine, OC Sampling Date: 4/24/18

Applicant/Owner: IRWD State: _____ Sampling Point: 10

Investigator(s): ML, TM Section, Township, Range: _____

Landform (hillslope, terrace, etc.): _____ Local relief (concave, convex, none): _____ Slope (%): _____

Subregion (LRR): _____ Lat: _____ Long: _____ Datum: _____

Soil Map Unit Name: _____ NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No _____	**Is the Sampled Area within a Wetland?** Yes X No _____
Hydric Soil Present?	Yes X No _____	
Wetland Hydrology Present?	Yes X No _____	

Remarks: Northwestern edge of reservoir by eucalyptus woodland

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	_____ = Total Cover		
Sapling/Shrub Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
	_____ = Total Cover		
Herb Stratum (Plot size: 5')			
1. Schoenoplectus californicus	60	Y	OBL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	60 = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	_____ = Total Cover		

% Bare Ground in Herb Stratum 40 % Cover of Biotic Crust _____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species _____	x 1 =	_____
FACW species _____	x 2 =	_____
FAC species _____	x 3 =	_____
FACU species _____	x 4 =	_____
UPL species _____	x 5 =	_____
Column Totals: _____ (A)		_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No _____

Remarks:

SOIL

Sampling Point: 10

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	5Y 4/2	98	5YR 5/8	2	C	PL	clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) **(LRR C)**
- ___ 1 cm Muck (A9) **(LRR D)**
- [X] Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) **(LRR C)**
- ___ 2 cm Muck (A10) **(LRR B)**
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: [redacted] N/A

Depth (inches): [redacted]

Hydric Soil Present? Yes [X] No ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required, check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) **(Nonriverine)**
- ___ Sediment Deposits (B2) **(Nonriverine)**
- ___ Drift Deposits (B3) **(Nonriverine)**
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- [X] Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) **(Riverine)**
- ___ Sediment Deposits (B2) **(Riverine)**
- ___ Drift Deposits (B3) **(Riverine)**
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No [X] Depth (inches): ___

Water Table Present? Yes ___ No [X] Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No [X] Depth (inches): ___

Wetland Hydrology Present? Yes [X] No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Appendix B
Representative Photographs



Photograph 1-Photo facing south across open water habitat in Syphon Reservoir.



Photograph 2-Photo facing west at Data Point 3. This sample met all 3 wetland criteria to be considered a USACE wetland.



Photograph 3-Photograph facing east at Data Point 4. DP4 is an upland sample that supports hydrophytic vegetation, but lacks both hydric soils and wetland hydrology.



Photograph 4-Photograph facing west at Data Point 6. DP6 is an upland sample that supports hydrophytic vegetation and hydric soils, but lacks wetland hydrology.



Photograph 5-Photo facing north at Data Point 8. This sample met all 3 wetland criteria to be considered a USACE wetland. Note the high water table in the soil pit.



Photograph 6- Photo facing southeast at Data Point 10. This sample met all 3 wetland criteria to be considered a USACE wetland.



Photograph 7- Photo facing north from dirt access road at Ephemeral Drainage 1.



Photograph 8- Photo facing south at the head of Ephemeral Drainage 2.



Photograph 9-Photo facing north along the central drainage's riparian corridor. Note no ordinary high water mark or bed or bank features.



Photograph 10-Photo west along the abandoned Highland Canal located in the southwest portion of the study area.

Appendix B

Approved Jurisdictional Determination

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS, LOS ANGELES DISTRICT
915 WILSHIRE BOULEVARD, SUITE 930
LOS ANGELES, CA 90017

December 17, 2018

SUBJECT: Approved Jurisdictional Determination

Jo Ann Corey
Irvine Ranch Water District
15600 Sand Canyon Avenue
Irvine, CA 92618

Dear Ms. Corey:

I am responding to your request (File No. SPL-2018-00528-MY) dated August 9, 2018, for an approved Department of the Army jurisdictional determination (JD) for the Syphon Reservoir Improvement Project (lat. 34.710547°N, long. -117.731105°W) located near the city of Irvine, Orange County, California.

The Corps' evaluation process for determining whether or not a Department of the Army permit is needed involves two tests. If both tests are met, a permit would likely be required. The first test determines whether or not the proposed project is located within the Corps' geographic jurisdiction (i.e., it is within a water of the United States). The second test determines whether or not the proposed project is a regulated activity under Section 10 of the Rivers and Harbors Act or Section 404 of the Clean Water Act. This evaluation pertains only to geographic jurisdiction.

Based on available information, I have determined waters of the United States do not occur on the project site. The basis for our determination can be found in the enclosed Approved Jurisdictional Determination (JD) form(s).

The aquatic resource identified as Syphon Reservoir in project documentation you provided is an intrastate isolated water with no apparent interstate or foreign commerce connection. As such, this aquatic resource is not currently regulated by the Corps of Engineers. This disclaimer of jurisdiction is only for Section 404 of the Clean Water Act. Other federal, state, and local laws may apply to your activities. In particular, you may need authorization from the California State Water Resources Control Board, the California Department of Fish and Wildlife, and/or the U.S. Fish and Wildlife Service.

This letter includes an approved jurisdictional determination for the Syphon Reservoir Improvement project site. If you wish to submit new information regarding this jurisdictional determination, please do so within 60 days. We will consider any new information so submitted and respond within 60 days by either revising the prior determination, if appropriate, or reissuing the prior determination. If you object to this or any revised or reissued jurisdictional determination, you may request an administrative appeal under Corps regulations at 33 CFR Part 331. Enclosed you will find a Notification of Appeal Process (NAP) and Request for Appeal (RFA) form. If you wish to appeal this decision, you must submit a completed RFA form within

60 days of the date on the NAP to the Corps South Pacific Division Office at the following address:

Tom Cavanaugh
Administrative Appeal Review Officer
U.S. Army Corps of Engineers
South Pacific Division, CESPD-PDS-O, 2042B
1455 Market Street
San Francisco, California 94103-1399

In order for an RFA to be accepted by the Corps, the Corps must determine that it is complete, that it meets the criteria for appeal under 33 CFR Part 331.5 (see below), and that it has been received by the Division Office by **January 29, 2018**.

This determination has been conducted to identify the extent of the Corps' Clean Water Act jurisdiction on the particular project site identified in your request, and is valid for five years from the date of this letter, unless new information warrants revision of the determination before the expiration date. This determination may not be valid for the wetland conservation provisions of the Food Security Act of 1985. If you or your tenant are USDA program participants, or anticipate participation in USDA programs, you should request a certified wetland determination from the local office of the Natural Resources Conservation Service prior to starting work.

Thank you for participating in the regulatory program. If you have any questions, please contact me at (213) 452-3411 or via e-mail at Miriam.Yemane@usace.army.mil. Please help me to evaluate and improve the regulatory experience for others by completing the customer survey form at http://corpsmapu.usace.army.mil/cm_apex/f?p=regulatory_survey.

Sincerely,

FARRAR.CORICE.JEAN.1251907028

Digitally signed by FARRAR.CORICE.JEAN.1251907028
DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USA, cn=FARRAR.CORICE.JEAN.1251907028
Date: 2018.12.17 13:51:26 -08'00'

Corice Farrar.
Chief, South Coast Branch
Regulatory Division
Los Angeles District

Enclosure(s)

NOTIFICATION OF ADMINISTRATIVE APPEAL OPTIONS AND PROCESS AND REQUEST FOR APPEAL		
Applicant: Jo Ann Corey	File Number: SPL-2018-00528-MY	Date: December 17, 2018
Attached is:		See Section below
	INITIAL PROFFERED PERMIT (Standard Permit or Letter of permission)	A
	PROFFERED PERMIT (Standard Permit or Letter of permission)	B
	PERMIT DENIAL	C
X	APPROVED JURISDICTIONAL DETERMINATION	D
	PRELIMINARY JURISDICTIONAL DETERMINATION	E

SECTION I - The following identifies your rights and options regarding an administrative appeal of the above decision. Additional information may be found at http://www.usace.army.mil/cecw/pages/reg_materials.aspx or Corps regulations at 33 CFR Part 331.

A: INITIAL PROFFERED PERMIT: You may accept or object to the permit.

- ACCEPT: If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.

- OBJECT: If you object to the permit (Standard or LOP) because of certain terms and conditions therein, you may request that the permit be modified accordingly. You must complete Section II of this form and return the form to the district engineer. Your objections must be received by the district engineer within 60 days of the date of this notice, or you will forfeit your right to appeal the permit in the future. Upon receipt of your letter, the district engineer will evaluate your objections and may: (a) modify the permit to address all of your concerns, (b) modify the permit to address some of your objections, or (c) not modify the permit having determined that the permit should be issued as previously written. After evaluating your objections, the district engineer will send you a proffered permit for your reconsideration, as indicated in Section B below.

B: PROFFERED PERMIT: You may accept or appeal the permit

- ACCEPT: If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.

- APPEAL: If you choose to decline the proffered permit (Standard or LOP) because of certain terms and conditions therein, you may appeal the declined permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

C: PERMIT DENIAL: You may appeal the denial of a permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

D: APPROVED JURISDICTIONAL DETERMINATION: You may accept or appeal the approved JD or provide new information.

- ACCEPT: You do not need to notify the Corps to accept an approved JD. Failure to notify the Corps within 60 days of the date of this notice means that you accept the approved JD in its entirety, and waive all rights to appeal the approved JD.

- APPEAL: If you disagree with the approved JD, you may appeal the approved JD under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

E: PRELIMINARY JURISDICTIONAL DETERMINATION: You do not need to respond to the Corps regarding the preliminary JD. The Preliminary JD is not appealable. If you wish, you may request an approved JD (which may be appealed), by contacting the Corps district for further instruction. Also you may provide new information for further consideration by the Corps to reevaluate the JD.

SECTION II - REQUEST FOR APPEAL or OBJECTIONS TO AN INITIAL PROFFERED PERMIT

REASONS FOR APPEAL OR OBJECTIONS: (Describe your reasons for appealing the decision or your objections to an initial proffered permit in clear concise statements. You may attach additional information to this form to clarify where your reasons or objections are addressed in the administrative record.)

ADDITIONAL INFORMATION: The appeal is limited to a review of the administrative record, the Corps memorandum for the record of the appeal conference or meeting, and any supplemental information that the review officer has determined is needed to clarify the administrative record. Neither the appellant nor the Corps may add new information or analyses to the record. However, you may provide additional information to clarify the location of information that is already in the administrative record.

POINT OF CONTACT FOR QUESTIONS OR INFORMATION:

If you have questions regarding this decision and/or the appeal process you may contact:

Miriam Yemane
U.S. Army Corps of Engineers
Los Angeles District
915 Wilshire Boulevard., Suite 930
Los Angeles, CA 90017
Phone: (213) 452-3411
Email: Miriam.Yemane@usace.army.mil

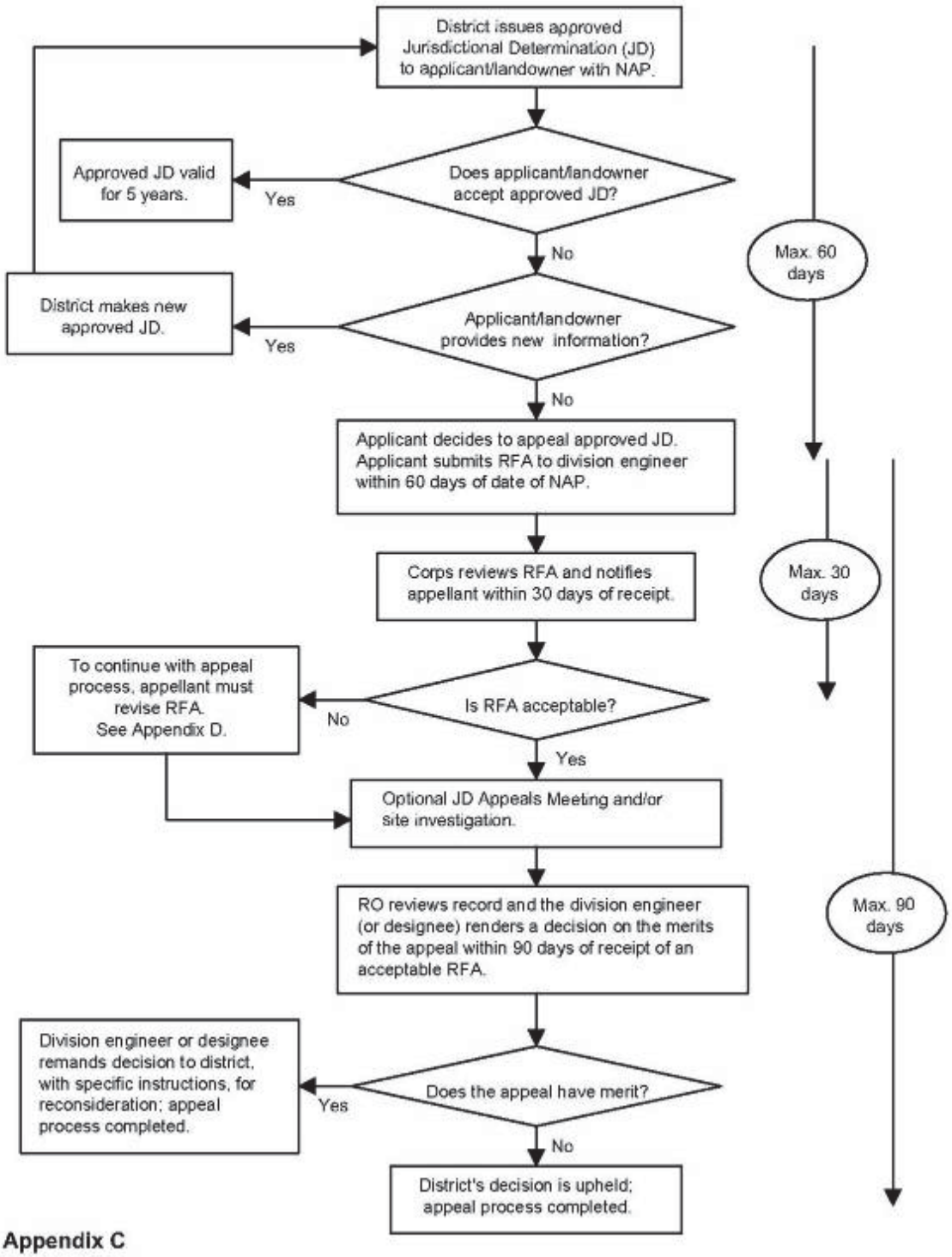
If you only have questions regarding the appeal process you may also contact: Thomas J. Cavanaugh

Administrative Appeal Review Officer,
U.S. Army Corps of Engineers
South Pacific Division
1455 Market Street, 2052B
San Francisco, California 94103-1399
Phone: (415) 503-6574
Fax: (415) 503-6646
Email: thomas.j.cavanaugh@usace.army.mil

RIGHT OF ENTRY: Your signature below grants the right of entry to Corps of Engineers personnel, and any government consultants, to conduct investigations of the project site during the course of the appeal process. You will be provided a 15 day notice of any site investigation, and will have the opportunity to participate in all site investigations.

	Date:	Telephone number:
_____ Signature of appellant or agent.		

Administrative Appeal Process for Approved Jurisdictional Determinations



Appendix C

§ 331.5 Criteria.

(a) *Criteria for appeal* —(1) *Submission of RFA.* The appellant must submit a completed RFA (as defined at §331.2) to the appropriate division office in order to appeal an approved JD, a permit denial, or a declined permit. An individual permit that has been signed by the applicant, and subsequently unilaterally modified by the district engineer pursuant to 33 CFR 325.7, may be appealed under this process, provided that the applicant has not started work in waters of the United States authorized by the permit. The RFA must be received by the division engineer within 60 days of the date of the NAP.

(2) *Reasons for appeal.* The reason(s) for requesting an appeal of an approved JD, a permit denial, or a declined permit must be specifically stated in the RFA and must be more than a simple request for appeal because the affected party did not like the approved JD, permit decision, or the permit conditions. Examples of reasons for appeals include, but are not limited to, the following: A procedural error; an incorrect application of law, regulation or officially promulgated policy; omission of material fact; incorrect application of the current regulatory criteria and associated guidance for identifying and delineating wetlands; incorrect application of the Section 404(b)(1) Guidelines (see 40 CFR Part 230); or use of incorrect data. The reasons for appealing a permit denial or a declined permit may include jurisdiction issues, whether or not a previous approved JD was appealed.

(b) *Actions not appealable.* An action or decision is not subject to an administrative appeal under this part if it falls into one or more of the following categories:

(1) An individual permit decision (including a letter of permission or a standard permit with special conditions), where the permit has been accepted and signed by the permittee. By signing the permit, the applicant waives all rights to appeal the terms and conditions of the permit, unless the authorized work has not started in waters of the United States and that issued permit is subsequently modified by the district engineer pursuant to 33 CFR 325.7;

(2) Any site-specific matter that has been the subject of a final decision of the Federal courts;

(3) A final Corps decision that has resulted from additional analysis and evaluation, as directed by a final appeal decision;

(4) A permit denial without prejudice or a declined permit, where the controlling factor cannot be changed by the Corps decision maker (e.g., the requirements of a binding statute, regulation, state Section 401 water quality certification, state coastal zone management disapproval, etc. (See 33 CFR 320.4(j));

(5) A permit denial case where the applicant has subsequently modified the proposed project, because this would constitute an amended application that would require a new public interest review, rather than an appeal of the existing record and decision;

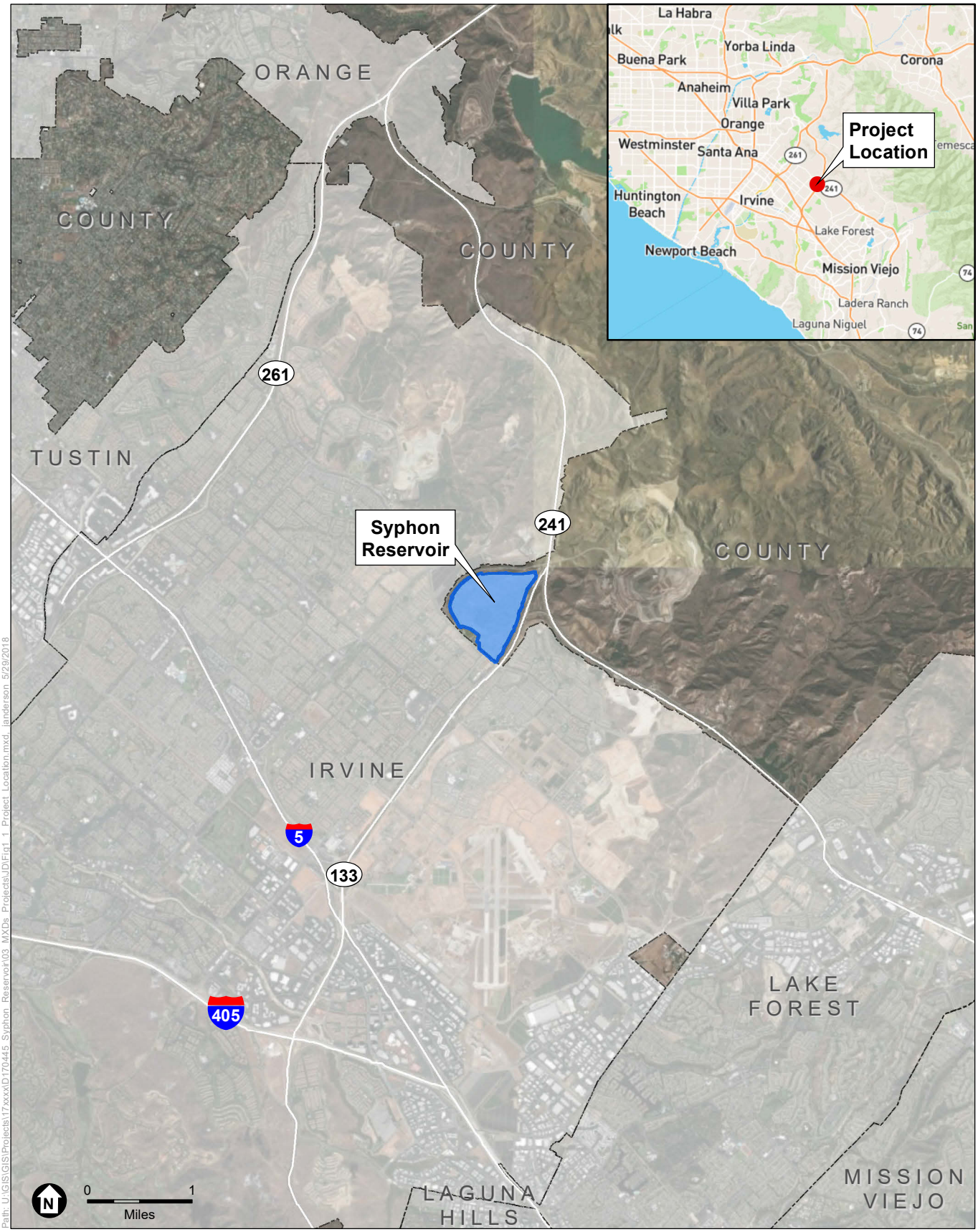
(6) Any request for the appeal of an approved JD, a denied permit, or a declined permit where the RFA has not been received by the division engineer within 60 days of the date of the NAP;

(7) A previously approved JD that has been superceded by another approved JD based on new information or data submitted by the applicant. The new approved JD is an appealable action;

(8) An approved JD associated with an individual permit where the permit has been accepted and signed by the permittee;

(9) A preliminary JD; or

(10) A JD associated with unauthorized activities except as provided in §331.11.

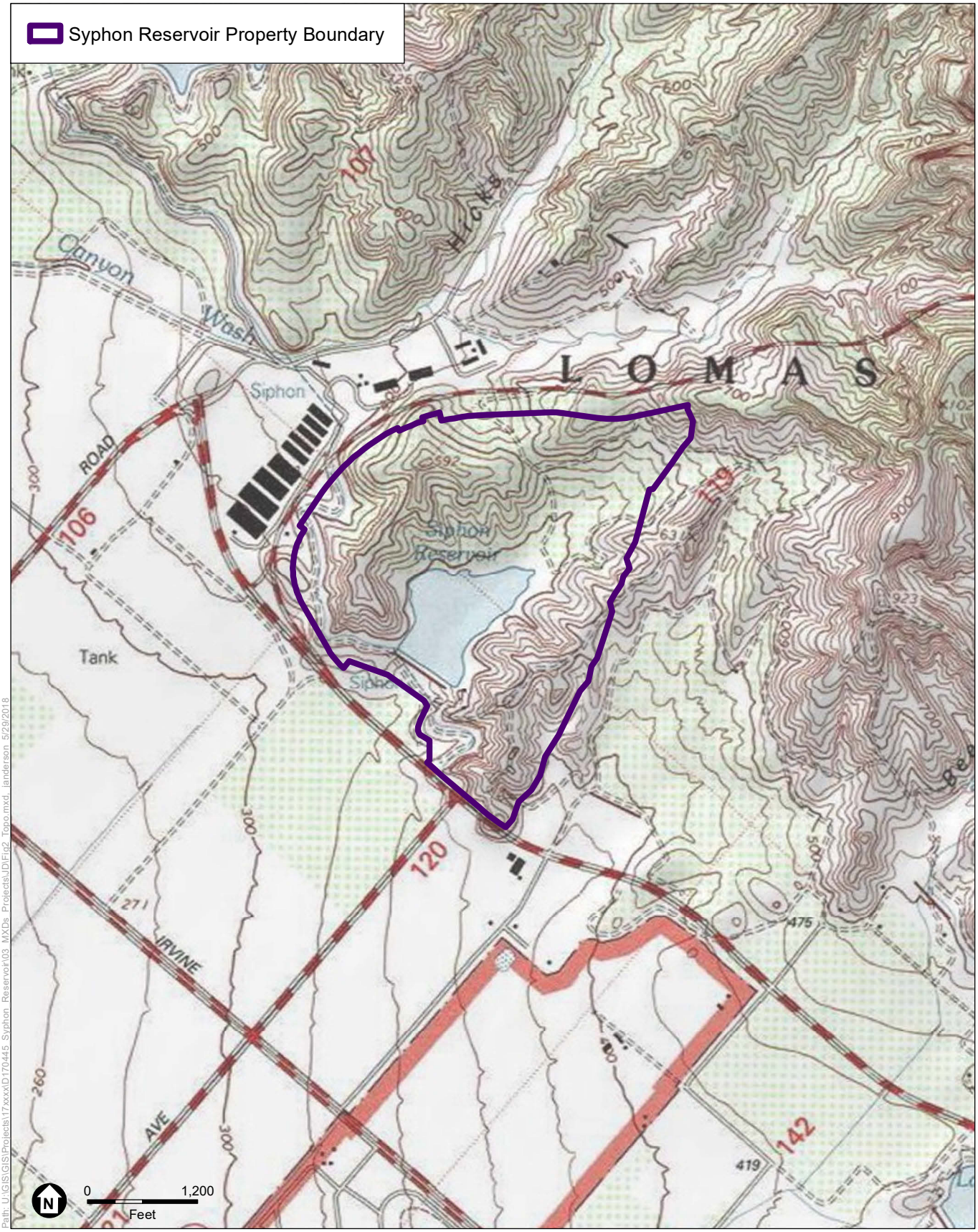


SOURCE: ESRI, 2016; OC LAFCO, 2018

IRWD Syphon Reservoir

Figure 1-1
Project Location

ESA



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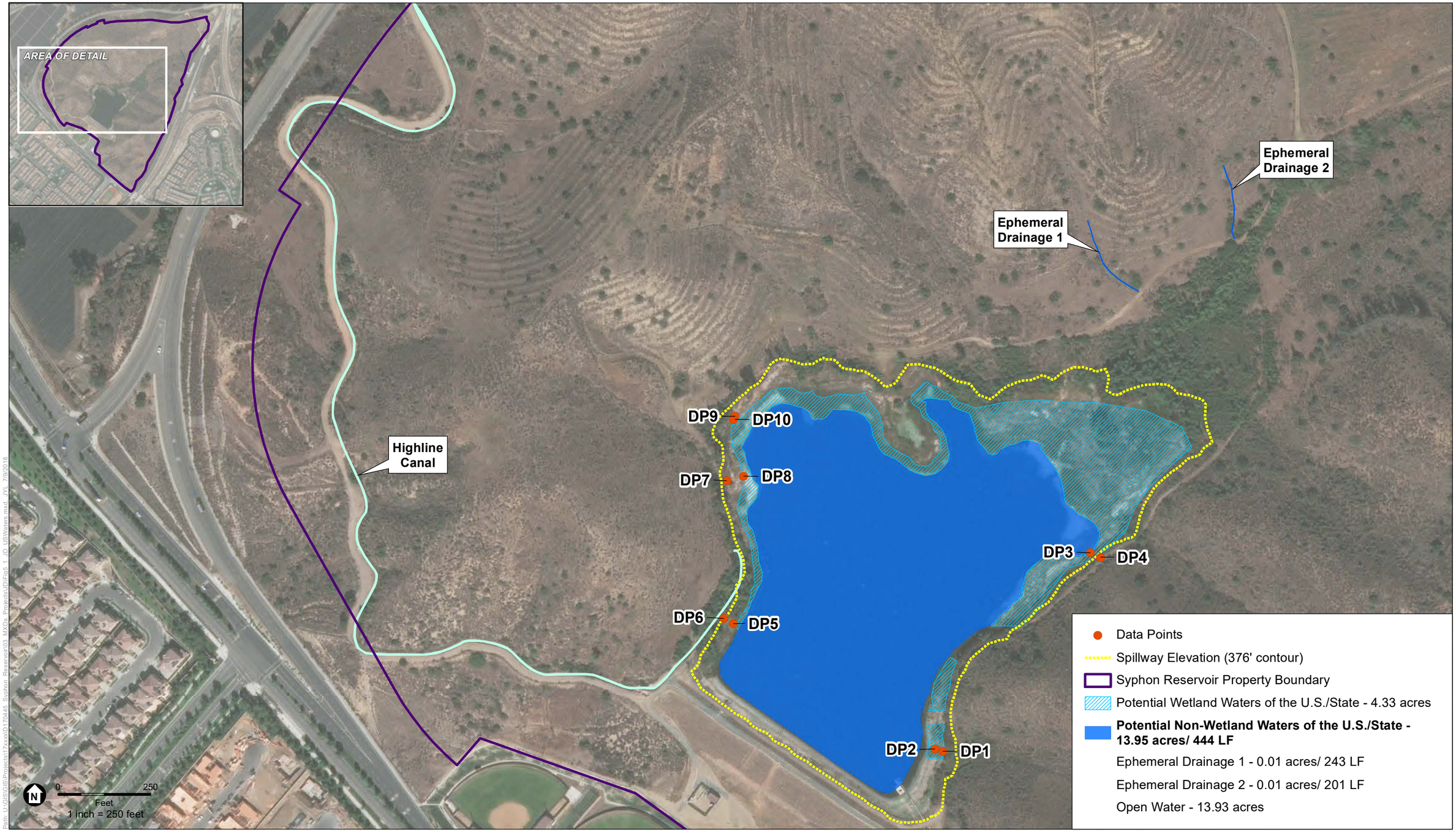
SOURCE: ESRI, 2016; El Toro USGS 7.5 minute Quadrangle

IRWD Syphon Reservoir

Figure 2

USGS Topographic Map

ESA

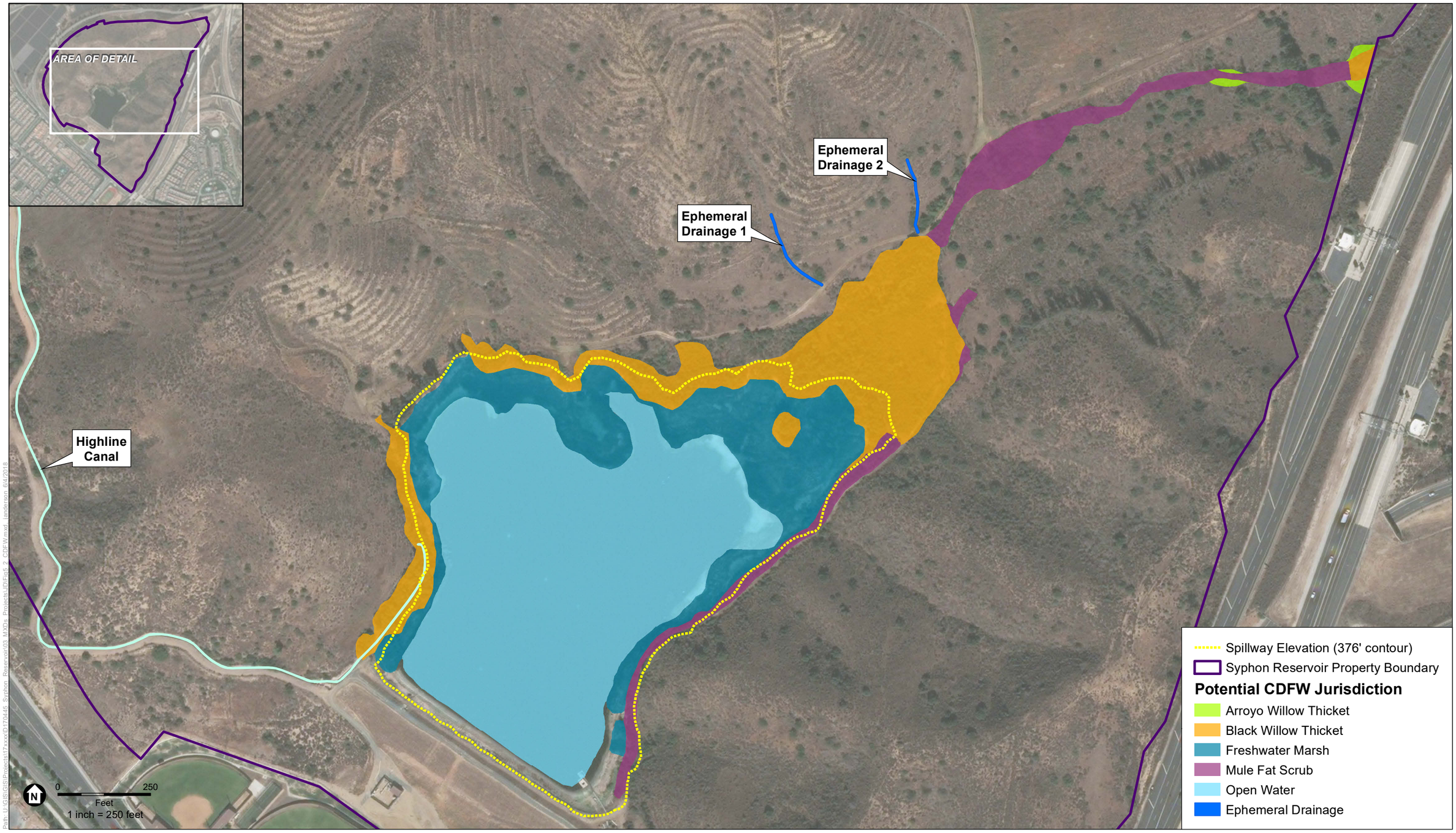


SOURCE: ESRI, 2016

IRWD Syphon Reservoir

Figure 3
Jurisdictional Delineation Map
Potential Waters of the U.S./State

ESA



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SOURCE: ESRI, 2016

IRWD Syphon Reservoir

Figure 4

Jurisdictional Delineation Map – Potential CDFW Jurisdiction

ESA

Appendix C

Plant and Wildlife Species Compendia

Appendix C: Plant and Wildlife Species Compendia

Scientific Name	Common Name	Special Status
EUDICOTS		
Adoxaceae - Muskroot Family		
Sambucus nigra ssp. *caerulea*	blue elderberry	
Amaranthaceae - Amaranth Family		
Amaranthus blitoides	procumbent pigweed	
Amaranthus californicus	California amaranth	
Anacardiaceae - Sumac or Cashew Family		
Malosma laurina	laurel sumac	
Rhus integrifolia	lemonadeberry	
* *Schinus molle*	Peruvian pepper	
* *Searsia lancea*	African sumac	
Toxicodendron diversilobum	poison oak	
Apiaceae - Carrot Family		
Daucus pusillus	wild carrot	
Sanicula sp.	sanicle	
Apocynaceae - Dogbane Family		
Funastrum cynanchoides var. *hartwegii*	climbing milkweed	
* *Nerium oleander*	oleander	
Asteraceae - Sunflower Family		
Acourtia microcephala	sacapellote	
Anaphalis margaritacea	western pearly everlasting	
Artemisia californica	California sagebrush	
Baccharis pilularis	coyote brush	
Baccharis salicifolia	mule fat	
Bahiopsis laciniata	San Diego County viguiera	CRPR 4.3
Brickellia californica	California brickellbush	
* *Carduus pycnocephalus*	Italian thistle	
* *Centaurea melitensis*	tocalote	
* *Cynara cardunculus* ssp. *flavescens*	cardoon	
Deinandra fasciculata	fascicled tarweed	
* *Dimorphotheca* sp.	African daisy	
Eclipta prostrata	false daisy	
Encelia californica	California brittlebush	

Scientific Name	Common Name	Special Status
Encelia farinosa	brittlebush	
Ericameria pinifolia	pine-bush	
* *Erigeron bonariensis*	flax-leaved horseweed	
Erigeron canadensis	horseweed	
Erigeron foliosus	leafy fleabane	
Eriophyllum confertiflorum	golden yarrow	
* *Gazania rigens*	African daisy	
Gnaphalium palustre	lowland cudweed	
Gutierrezia californica	California matchweed	
* *Helminthotheca echioides*	bristly ox-tongue	
Heterotheca grandiflora	telegraph weed	
* *Hypochaeris glabra*	smooth cat's ear	
Isocoma menziesii var. *menziesii*	Menzies' goldenbush	
Isocoma menziesii var. *vernonioides*	coastal goldenbush	
* *Lactuca serriola*	prickly lettuce	
Laennecia coulteria	Coulter's horseweed	
Lagfia gallica	narrowleaf cottonrose	
Lasthenia sp.	goldfields	
* *Oncosiphon piluliferum*	stinknet	
Osmadenia tenella	false rosinweed	
Pseudognaphalium biolettii	two-color rabbit-tobacco	
Pseudognaphalium californicum	Ladies' tobacco	
Pseudognaphalium canescens	Wright's cudweed	
* *Pulicaria paludosa*	Spanish false fleabane	
Pseudognaphalium luteoalbum	Jersey cudweed	
* *Pulicaria paludosa*	Spanish false fleabane	
* *Senecio vulgaris*	common groundsel	
* *Sonchus asper*	spiny sow thistle	
* *Sonchus oleraceus*	common sow thistle	
Stebbinsoseris heterocarpa	grassland silverpuffs	
Stephanomeria virgata	rod wirelettuce	
Uropappus lindleyi	silver puffs	
Xanthium strumarium	cocklebur	
Boraginaceae - Borage Family		
Amsinckia menziesii	common fiddleneck	

Scientific Name	Common Name	Special Status
Cryptantha sp.	cryptantha	
Heliotropium curassavicum var. *oculatum*	seaside heliotrope, alkali heliotrope	
Phacelia cicutaria	caterpillar phacelia	
Phacelia minor	wild Canterbury bells	
Plagiobothrys sp.	popcornflower	
Brassicaceae - Mustard Family		
* *Brassica nigra*	black mustard	
* *Hirschfeldia incana*	short-podded mustard	
Lepidium lasiocarpum	shaggyfruit pepperweed	
Rorippa curvisiliqua	curvepod yellowcress	
* *Sisymbrium altissimum*	tumble mustard	
* *Sisymbrium irio*	London rocket	
* *Sisymbrium orientale*	Oriental hedge mustard	
Boraginaceae - Borage Family		
Eucrypta chrysanthemifolia	common eucrypta	
Cactaceae - Cactus Family		
Cylindropuntia prolifera	coast cholla	
Opuntia ficus-indica	tuna cactus	
Opuntia littoralis	coastal prickly pear	
Opuntia occidentalis	western prickly pear	
Opuntia vaseyi	Vasey's prickly pear	
Caryophyllaceae - Pink Family		
* *Cerastium glomeratum*.	sticky mouse-ear chickweed	
* *Polycarpon tetraphyllum*	four-leaved allseed	
Silene gallica	small-flower catchfly	
Chenopodiaceae - Goosefoot Family		
* *Atriplex semibaccata*	Australian saltbush	
* *Chenopodium macrospermum*	largeseed goosefoot	
* *Chenopodium murale*	nettle leaf goosefoot	
* *Salsola tragus*	Russian thistle	
Cleomaceae - Spiderflower Family		
Peritoma arborea	bladderpod	
Convolvulaceae - Morning-glory Family		
Calystegia macrostegia	Island false bindweed	

Scientific Name	Common Name	Special Status
* *Convolvulus arvensis*	field bindweed	
Crassulaceae - Stonecrop Family		
Crassula connata	pigmy weed	
Dudleya lanceolata	lance-leaved dudleya	
Dudleya multicaulis	many-stemmed dudleya	
Cucurbitaceae - Gourd Family		
Cucurbita foetidissima	calabazilla	
Marah macrocarpa	chilicothe	
Euphorbiaceae - Spurge Family		
Croton setigerus	turkey-mullein	
Euphorbia albomarginata	rattlesnake weed	
* *Euphorbia maculata*	spotted spurge	
Euphorbia polycarpa	smallseed sandmat	
* *Euphorbia prostrata*	prostrate sandmat	
* *Euphorbia serpens*	matted sandmat	
Euphorbia serpillifolia	thyme-leafed spurge	
* *Ricinus communis*	castor bean	
Fabaceae - Legume Family		
* *Acacia redolens*	bank catclaw	
Acmispon glaber	deerweed	
Acmispon micranthus	small flowered lotus	
Acmispon strigosus	strigose lotus	
Lupinus bicolor	miniature lupine	
Lupinus succulentus	arroyo lupine	
Lupinus truncatus	blunt leaved lupine	
* *Medicago polymorpha*	California burclover	
* *Melilotus indicus*	sourclover	
* *Melilotus officinalis*	yellow sweetclover	
Trifolium sp.	clover	
Fagaceae - Oak Family		
Quercus agrifolia	coast live oak	
Gentianaceae - Gentian Family		
Zeltnera venusta	California centaury	

Scientific Name	Common Name	Special Status
Geraniaceae - Geranium Family		
* *Erodium botrys*	broad leaf filaree	
* *Erodium cicutarium*	red-stemmed filaree	
Lamiaceae - Mint Family		
* *Marrubium vulgare*	horehound	
Salvia apiana	white sage	
Salvia columbariae	chia	
Salvia mellifera	black sage	
Trichostema lanceolata	vinegarweed	
Malvaceae - Mallow Family		
Malacothamnus fasciculatus	chaparral mallow	
* *Malva parviflora*	cheeseweed	
Montiaceae – Miner's Lettuce Family		
Claytonia perfoliata	Miner's lettuce	
Myrsinaceae - Myrsine Family		
* *Lysimachia arvensis*	scarlet pimpernel	
Myrtaceae - Myrtle Family		
* *Eucalyptus camaldulensis*	red gum	
Nyctaginaceae - Four O'clock Family		
Mirabilis laevis var. *crassifolia*	wishbone bush	
Onagraceae - Evening Primrose Family		
Camissoniopsis intermedia	intermediate sun cups	
Epilobium canum	California fuchsia	
Ludwigia repens	creeping primrose-willow	
Orobanchaceae - Broomrape Family		
Castilleja exserta	purple owl's-clover	
Phrymaceae - Lopseed Family		
Diplacus aurantiacus	orange bush monkeyflower	
Plantaginaceae - Plantain Family		
Antirrhinum nuttallianum	Nuttall's snapdragon	
Plantago erecta	California plantain	
Polygonaceae - Buckwheat Family		
Chorizanthe staticoides	Turkish rugging	
Eriogonum fasciculatum	California buckwheat	

Scientific Name	Common Name	Special Status
Persicaria hydropiperoides	false waterpepper	
Persicaria lapathifolia	willow weed	
* *Persicaria maculosa*	lady's thumb	
* *Rumex crispus*	curly dock	
Pterostegia drymarioides	fairy mist	
Portulacaceae - Purslane Family		
* *Portulaca oleracea*	purslane	
Rosaceae - Rose Family		
Heteromeles arbutifolia	toyon	
Rubiaceae - Madder Family		
Galium angustifolium	narrow leaved bedstraw	
Rutaceae - Rue Family		
Heteromeles arbutifolia	wilga	
Salicaceae - Willow Family		
Salix gooddingii	Goodding's black willow	
Salix lasiolepis	arroyo willow	
Saxifragaceae - Saxifrage Family		
Jepsonia parryi	Parry's jepsonia	
Scrophulariaceae - Figwort Family		
Penstemon spectabilis	showy penstemon	
Solanaceae - Nightshade Family		
Datura wrightii	sacred thorn-apple	
* *Nicotiana glauca*	tree tobacco	
Nicotiana quadrivalvis	Indian tobacco	
Solanum americanum	American black nightshade	
Solanum douglasii	greenspot nightshade	
* *Solanum nigrum*	black nightshade	
Tamaricaceae - Tamarisk Family		
* *Tamarix ramosissima*	tamarisk	
Ulmaceae - Elm Family		
Ulmus parvifolia	Chinese elm	
Verbenaceae - Vervain Family		
Verbena bracteata	bigbract verbena	
Verbena lasiostachys	western vervain	

Scientific Name	Common Name	Special Status
Zygophyllaceae - Caltrop Family		
* *Tribulus terrestris*	puncture vine	
MONOCOTS		
Agavaceae - Century Plant Family		
* *Agave americana*	American century plant	
Chlorogalum pomeridianum var. *pomeridianum*	wavyleaf soap plant	
Hesperoyucca whipplei	chaparral yucca	
Yucca gigantea	giant yucca	
Yucca gloriosa	moundlily yucca	
Arecaceae - Palm Family		
* *Phoenix canariensis*	Canary Island palm	
* *Washingtonia robusta*	Mexican fan palm	
Cyperaceae - Sedge Family		
Cyperus eragrostis	tall cyperus	
* *Cyperus involucratus*	umbrella plant	
Schoenoplectus californicus	California bulrush	
Juncaceae - Rush Family		
Juncus bufonius	toad rush	
Liliaceae - Lily Family		
Bloomeria crocea	common goldenstar	
Calochortus catalinae	Catalina mariposa lily	CRPR 4.2
Calochortus splendens	splendid mariposa lily	
Calochortus weedii var. *intermedius*	intermediate mariposa lily	CRPR 1B.2
Poaceae - Grass Family		
* *Avena barbata*	slender oat	
* *Avena fatua*	wild oat	
* *Brachypodium distachyon*	false brome	
* *Bromus diandrus*	ripgut brome	
* *Bromus hordeaceus*	soft chess	
* *Bromus madritensis* ssp. *rubens*	foxtail brome	
Distichlis spicata	salt grass	
Elymus condensatus	giant wild rye	
* *Festuca myuros*	rattail sixweeks grass	
* *Hordeum murinum*	wall barley	

Scientific Name	Common Name	Special Status
Leptochloa fusca ssp. *uninervia*	Mexican sprangletop	
Melica imperfecta	little California melica	
Muhlenbergia microsperma	littleseed muhly	
* *Pennisetum setaceum*	fountain grass	
Poa secunda	Nevada blue grass	
* *Polypogon monspeliensis*	rabbitfoot grass	
Schismus barbatus	Mediterranean grass	
* *Setaria viridis*	green bristle grass	
Stipa coronata	crested needlegrass	
Stipa lepida	foothill needlegrass	
Stipa pulchra	purple needlegrass	
Themidaceae - Brodiaea Family		
Bloomeria crocea	common goldenstar	
Dichelostemma capitatum	blue dicks	
Typhaceae - Cattail Family		
Typha domingensis	narrowleaf cattail	

Legend

*= Non-native or invasive species

Special Status:

Federal:
FE = Endangered
FT = Threatened
State:
SE = Endangered
ST =Threatened

California Rare Plant Rank:

1A: Plants presumed extirpated in California and either rare or extinct elsewhere

1B: Plants rare, threatened, or endangered in California and elsewhere

2A: Plants presumed extirpated in California but common elsewhere

2B: Plants rare, threatened, or endangered in California but more common elsewhere

3: Review List: Plants about which more information is needed

4: Watch List: Plants of limited distribution

Threat Rank:
.1 - Seriously endangered in California
.2 – Fairly endangered in California

Scientific Name	Common Name	Special Status
INVERTEBRATES		
CRUSTACEANS		
Decapoda – Crayfish and Shrimp		
**Procambarus clarkii*	red swamp crayfish	
INSECTS		
Hymenoptera – Ants, Bees, and Wasps		
**Apis mellifera*	European honey bee	
Lepidoptera – Butteflies and Moths		
Nymphalis antiopa	mourning cloak	
Papilio rutulus	western tiger swallowtail	
Vanessa cardui	painted lady	
VERTEBRATES		
AMPHIBIANS		
Bufonidae – True Toads		
Anaxyrus boreas halophilus	California toad	
Hylidae – Treefrogs		
Pseudacris hypochondriaca hypochondriaca	Baja California treefrog	
REPTILES		
Teiidae – Whiptail Lizards		
Aspidoscelis hyperythra	orange-throated whiptail	
Phrynosomatidae – Zebratail, Earless, Horned, Spiny, Fringe-Toed Lizards		
Sceloporus occidentalis	western fence lizard	
Uta stansburiana	side-blotched lizard	
Viperidae – Vipers		
Crotalus oreganus helleri	southern Pacific rattlesnake	
BIRDS		
Anatidae – Waterfowl		
Anas platyrhynchos	mallard	
Aythya americana	redhead	
Branta canadensis	Canada goose	
Oxyura jamaicensis	ruddy duck	
Odontophoridae – Quails		
Callipepla californica	California quail	
Podicipedidae – Grebes		
Aechmophorus occidentalis	western grebe	
Phalacrocoracidae – Cormorants		
Phalacrocorax auritus	double-crested cormorant	

Scientific Name	Common Name	Special Status
Ardeidae – Herons		
Ardea alba	great egret	
Ardea herodias	great blue heron	
Butorides virescens	green heron	
Egretta thula	snowy egret	
Threskiornithidae – Ibises		
Plegadis chihi	white-faced ibis	
Cathartidae – New World Vultures		
Cathartes aura	turkey vulture	
Pandionidae – Ospreys		
Pandion haliaetus	osprey	
Accipitridae – Hawks		
Accipiter cooperii	Cooper's hawk	
Buteo jamaicensis	red-tailed hawk	
Rallidae – Rails and Gallinules		
Fulica americana	American coot	
Charadriidae – Plovers		
Charadrius vociferous	killdeer	
Recurvirostridae – Stilts and Avocets		
Himantopus mexicanus	black-necked stilt	
Scolopacidae – Sandpipers		
Calidris minutilla	least sandpiper	
Tringa melanoleuca	greater yellowlegs	
Laridae – Gulls and Terns		
Hydroprogne caspia	Caspian tern	
Sterna forsteri	Forster's tern	
Columbidae – Pigeons and Doves		
Columba livia	rock pigeon	
Zenaida macroura	mourning dove	
Cuculidae – Cuckoos and Roadrunners		
Geococcyx californianus	greater roadrunner	
Caprimulgidae – Goatsuckers		
Chordeiles acutipennis	lesser nighthawk	
Apodidae – Swifts		
Aeronautes saxatalis	white-throated swift	
Chaetura vauxi	Vaux's swift	SSC
Trochilidae – Hummingbirds		
Calypte anna	Anna's hummingbird	
Selasphorus rufus	rufous hummingbird	
Selasphorus sasin	Allen's hummingbird	

Scientific Name	Common Name	Special Status
Picidae – Woodpeckers		
Colaptes auratus	northern flicker	
Picoides nuttallii	Nuttall's woodpecker	
Tyrannidae – Tyrant Flycatchers		
Empidonax difficilis	Pacific-slope flycatcher	
Myiarchus cinerascens	ash-throated flycatcher	
Sayornis nigricans	black phoebe	
Sayornis saya	Say's phoebe	
Tyrannus vociferans	Cassin's kingbird	
Vireonidae – Vireos		
Vireo bellii pusillus	least Bell's vireo	FE, SE
Corvidae – Jays and Crows		
Corvus brachyrhynchos	American crow	
Corvus corax	common raven	
Alaudidae – Larks		
Eremophila alpestris	horned lark	
Hirundinidae – Swallows		
Hirundo rustica	barn swallow	
Petrochelidon pyrrhonota	cliff swallow	
Stelgidopteryx serripennis	northern rough-winged swallow	
Tachycineta bicolor	tree swallow	
Aegithalidae – Bushtits		
Psaltriparus minimus	bushtit	
Troglodytidae – Wrens		
Thryomanes bewickii	Bewick's wren	
Troglodytes aedon	house wren	
Polioptilidae – Gnatcatchers		
Polioptila caerulea	blue-gray gnatcatcher	
Polioptila californica	California gnatcatcher	FT, SC
Sylviidae – Wrentits		
Chamaea fasciata	wrentit	
Mimidae – Thrashers		
Mimus polyglottos	northern mockingbird	
Toxostoma redivivum	California thrasher	
Bombycillidae – Waxwings		
Bombycilla cedrorum	cedar waxing	
Parulidae – Wood Warblers		
Dendroica petechia	yellow warbler	SSC
Dendroica townsendi	Townsend's warbler	

Scientific Name	Common Name	Special Status
Geothlypis trichas	common yellowthroat	
Icteria virens	yellow-breasted chat	SSC
Oreothlypis celata	orange-crowned warbler	
Wilsonia pusilla	Wilson's warbler	
Emberizidae – Emberizine Sparrows		
Aimophila ruficeps canescens	Southern California rufous-crowned sparrow	
Melospiza melodia	song sparrow	
Melozone crissalis	California towhee	
Pipilo maculatus	spotted towhee	
Cardinalidae – Buntings, Grosbeaks, and Tanagers		
Passerina amoena	Lazuli bunting	
Passerina caerulea	blue grosbeak	
Pheucticus melanocephalus	black-headed grosbeak	
Piranga ludoviciana	western tanager	
Icteridae – Blackbirds		
Icterus bullockii	Bullock's oriole	
Icterus cucullatus	hooded oriole	
Quiscalus mexicanus	great-tailed grackle	
Sturnella neglecta	western meadowlark	
Fringillidae – Finches		
Carpodacus mexicanus	house finch	
Carduelis psaltria	lesser goldfinch	
Spinus lawrencei	Lawrence's goldfinch	
Spinus tristis	American goldfinch	
Estrildidae – Mannikins		
**Lonchura punctulata*	scaly-breasted munia	
MAMMALS		
Canidae – Canines		
Canis latrans	coyote	
Didelphidae – Opossums		
Didelphis virginiana	Virginia opossum	
Leporidae – Hares and Rabbits		
Sylvilagus audubonii	desert cottontail	
Procyonidae – Ringtails and Raccoons		
Procyon lotor	raccoon	

Scientific Name	Common Name	Special Status

Legend

*= Non-native or invasive species

Special Status:

Federal:
FE = Endangered
FT = Threatened

State:
SE = Endangered
ST =Threatened
SC = California Species of Special Concern
FP = California Fully Protected Species

Lcota

Appendix D

Special-Status Plant and Wildlife Species with Potential to Occur Within the Study Area

SPECIAL-STATUS PLANT SPECIES WITH POTENTIAL TO OCCUR WITHIN THE STUDY AREA

Species	Status[1] Federal/State, CRPR/County	Habitat Requirements	Potential to Occur
chaparral sand-verbena (*Abronia villosa* var. *aurita*)	–/1B.1/Not Covered	Found in sandy areas, chaparral, desert dunes, and coastal scrub habitats from 75 – 1600 m elevation. Blooming period is January to September.	**Unlikely.** Suitable habitat and soils are not present on-site or within the immediate vicinity.
Munz's onion (*Allium munzii*)	FE/ST,1B.1/Not Covered	Perennial herb found in chaparral, foothill woodlands, pinyon-juniper woodlands, and valley grasslands. Grassy openings in coastal sage scrub. Blooming period is March to May, and this species is found at elevation between 300 and 900m.	**Unlikely.** Although some suitable habitat is present on site, the study area is outside of the known elevation range for this species and suitable soils are not present on-site or within the immediate vicinity. No records or collections of this species has been made within Orange County.
Aphanisma (*Aphanisma blitodes*)	–/1B.2/Not Covered	Annual herb found in coastal bluff scrub, coastal dunes, and coastal scrub; sandy soils. Blooming period is March to June and found at elevations from 1 - 305 m.	**Unlikely.** Suitable habitat and soils are not present on-site or within the immediate vicinity. The project site is not a coastal setting.
Braunton's milk-vetch (*Astragalus brauntonii*)	–/1B.1/Not Covered	A perennial herb found within disturbed areas within chaparral, valley grassland, coastal sage scrub, closed-cone pine forest habitats. Blooming period is January to August. Occurs at elevations less than 650m.	**Unlikely.** Suitable habitat and soils are not present on-site or within the immediate vicinity.
Coulter's saltbush (*Atriplex coulteri*)	–/1B.2/Not Covered	Found on alkaline or clay substrate within coastal bluff scrub, coastal dune, coastal scrub and valley and foothill grassland habitats. Blooming period is March to October. Occurs at elevations from 3 - 460 m.	**Unlikely.** Suitable habitat and soils are not present on-site or within the immediate vicinity.
South Coast saltscale (*Atriplex pacifica*)	–/1B.2/Not Covered	Found within chenopod scrub, coastal bluff and coastal scrub habitats. Blooming period is March to October. Occurs at elevations up to 140 m.	**Unlikely.** Suitable habitat and soils are not present on-site or within the immediate vicinity.
Parish's brittescale (*Atriplex parishii*)	–/1B.1/Not Covered	Found in alkali meadows, vernal pools, playas and chenopod scrub. Associated with alkaline soils. Blooming period is June to October. Occurs at 25 – 1900 m elevation.	**Unlikely.** Suitable habitat and soils are not present on-site or within the immediate vicinity. This species has not been collected in Orange County since 1881.
Davidson's saltscale (*Atriplex serenana* var. *davidsonii*)	–/1B.2/Not Covered	Found on alkaline substrate within coastal bluff scrub and coastal scrub habitats. Blooming period is from April to October and occurs at elevations from 10 - 200 m.	**Unlikely.** Suitable habitat and soils are not present on-site or within the immediate vicinity. The project site is not a coastal setting.
Malibu baccharis (*Baccharis malibuensis*)	–/1B.1/Not Covered	A shrub found within grassy openings of chaparral habitats. Blooming period is in August and occurs at elevations between 50 to 300m.	**Low.** Although some suitable habitat is present on site, suitable sedimentary substrates are absent within the study area. This perennial species was not observed during special-status plant surveys conducted in 2018 and 2019.
thread-leaved brodiaea (*Brodiaea filifolia*)	–/1B.1/Not Covered	A perennial herb found within grasslands and vernal pools in valley grassland, foothill woodland, coastal sage scrub, freshwater wetlands, and wetland-riparian habitats. Blooming period is March to June. Occurs at elevations between 25 to 860m.	**Unlikely.** Suitable habitat and soils are not present on-site or within the immediate vicinity.

Species	Status[1] Federal/State, CRPR/County	Habitat Requirements	Potential to Occur
Catalina mariposa lily (*Calochortus catalinae*)	–/4.2/Covered	Occurs in heavy soils in chaparral, cismontane woodland, coastal scrub and valley and foothill grassland below 700 m. When occurring on slopes, it is usually associated with coastal scrub vegetation. Blooming period is February to June.	**Present.** This species was observed on-site during special-status plant surveys conducted in 2018 and 2019. Approximately 309 individuals were observed on-site in the western and southeastern portions of the study area. This species was also observed on-site during previous surveys by Harmsworth Associates in 1998 (Dudek 2012).
intermediate mariposa lily (*Calochortus weedii* var. *intermedius*)	–/1B.2/Conditionally Covered	Found in coastal scrub, chaparral, and valley and foothill grassland on dry, rocky open slopes and rock outcrops. Blooming period is May to July, and this species occurs at elevations of 120 - 850 m.	**Present.** This species was observed on-site during special-status plant surveys conducted in 2019. Approximately 19 individuals were observed on-site in the western portion of the study area.
southern tarplant (*Centromadia parryi* ssp. *australis*)	–/1B.1/Not Covered	Found in the margins of marshes and swamps, vernally mesic valley and foothill grasslands, and vernal pool habitats. This species is commonly found in disturbed areas, in relatively close proximity to a seasonal or perennial water source. Blooming period is May to November; and this species occurs at elevations up to 425 m.	**Unlikely.** Suitable alkali/vernal habitat and soils are not present on-site or within the immediate vicinity.
smooth tarplant (*Centromadia pungens* ssp. *laevis*)	–/1B.1/Not Covered	Annual herb found within open, poorly drained flats, depressions, waterway banks and beds, grassland, and disturbed sites in shadscale scrub, alkali sink, and valley grassland habitats. Blooming period is April to September, and this species occurs at elevations between 90 – 500 m.	**Unlikely.** Suitable alkali/vernal habitat and soils are not present on-site or within the immediate vicinity.
small-flowered mountain mahogany (*Cercocarpus minutiflorus*)	–/–/Covered	Found in chaparral, at elevations of less than 1400 m. Blooming period is March to May.	**Unlikely.** Suitable habitat is not present on-site or within the immediate vicinity. Project site is north of the recorded distribution.
Orcutt's pincushion (*Chaenactis glabriuscula* var. *orcuttiana*)	–/1B.1/Not Covered	Found in coastal bluff scrub and coastal dunes, on sandy sites at elevations of 3 -100 m. Blooming period is January to August.	**Unlikely.** Suitable habitat and soils are not present on-site or within the immediate vicinity. The project site is not a coastal setting.
salt marsh bird's-beak (*Chloropyron maritimum* ssp. *maritimum*	FE/SE,1B.2/Not Covered	Found within coastal dune, salt marsh, and swamp habitats, at elevations up to1400 m. Blooming period is May to October.	**Unlikely.** Suitable habitat and soils are not present on-site or within the immediate vicinity. The project site is not a coastal setting.
San Fernando Valley spineflower (*Chorizanthe parryi* var. *fernandina*)	FC/SE,1B.1/Not Covered	Annual herb found within sandy coastal scrub and valley and foothill grassland. Blooming period is April to July; this species occurs at 150 – 1220 m elevation.	**Unlikely.** Suitable habitat and soils are not present on-site or within the immediate vicinity. Single collection of species in Orange County is 100 years old and is likely outside of geographic range.
long-spined spineflower (*Chorizanthe polygonoides* var. *longispina*)	–/1B.2/Not Covered	Annual herb found in sandy meadows within chaparral, valley grassland, and coastal sage scrub habitats. Blooming period is April to June within elevations between 30 and 1500 m.	**Unlikely.** Suitable habitat and soils are not present on-site or within the immediate vicinity.
white-bracted spineflower (*Chorizanthe xanti* var. *leucotheca*)	–/1B.2/Not Covered	Annual herb found within sandy or gravelly soils in creosote bush scrub or pinyon-juniper woodland habitats. Blooming period is April to June, and this species occurs at elevations of 400 – 1300 m.	**Unlikely.** Suitable habitat and soils are not present on-site or within the immediate vicinity. Elevation constraints further limit suitability.

Species	Status[1] Federal/State, CRPR/County	Habitat Requirements	Potential to Occur
San Miguel savory (*Clinopodium chandleri*)	–/1B.2/Not Covered	Perennial herb found in riparian habitats or rocky slopes of chaparral, foothill woodland, coastal sage scrub, and valley grassland communities. Blooming period in March to July, and this species occurs at elevations less than 1100 m.	**Low.** Low quality habitat is present on-site or within the immediate vicinity. No recent collections made within 5 miles of project area. This species was not observed during special-status plant surveys conducted in 2018 and 2019.
summer holly (*Comarostaphylis diversifolia* ssp. *diversifolia*)	–/1B.2/Not Covered	Perennial evergreen shrub found in chaparral and cismontane woodland. Blooming period is April to June, and this species is found at elevations of 30 – 790 m.	**Unlikely.** Suitable habitat is not present on-site or within the immediate vicinity. No recent collections made within 5 miles of project area.
slender-horned spineflower (*Dodecahema leptoceras*)	FE/SE,1B.1/Not Covered	Annual herb found in sandy or gravelly soils of alluvial fans within chaparral and coastal sage scrub communities. Blooming period is May to June, and this species occurs at elevations between 200 – 700 m.	**Unlikely.** Suitable habitat and soils are not present on-site or within the immediate vicinity, and the study area is outside of known distribution and elevation range for this species.
Santa Monica Mountains dudleya (*Dudleya cymosa* ssp. *ovatifolia*)	FT/1B.1/Covered	Perennial herb found in shaded rocky outcrops and slopes within chaparral and coastal sage scrub communities. Blooming period is March to June, and this species occurs at elevations between 150 and 500m.	**Unlikely.** No suitable habitat is present on-site or within the immediate vicinity.
many-stemmed dudleya (*Dudleya multicaulis*)	–/1B.2/Not Covered	Found on clay substrate within chaparral, coastal scrub and valley and grassland habitats. Blooming period is April to July; this species occurs at elevations from 15 - 790 m.	**Present.** This species was observed on-site during special-status plant surveys conducted in 2019. Approximately 109 individuals were observed on-site in the western portion of the study area.
Laguna Beach dudleya (*Dudleya stolonifera*)	FT/ST,1B.1/Covered	Found on rocky substrate within chaparral, cismontane woodland, coastal scrub and valley and grassland habitats at elevations from 10 to 260 m. Blooming period is May to July.	**Unlikely.** Suitable habitat and soils are not present on-site or within the immediate vicinity.
sticky dudleya (*Dudleya viscida*)	–/1B.2/Not Covered	Perennial herb found on bluffs and rocky cliffs on coastal habitat within chaparral and coastal sage scrub communities. Blooming period is May to June and occurs at elevations less than 450 m.	**Unlikely.** Suitable habitat and soils are not present on-site or within the immediate vicinity. The project site is not a coastal setting.
Santa Ana River woollystar (*Eriastrum densifolium* ssp. *sanctorum*)	FE/SE,1B.1/Not Covered	Perennial herb found in chaparral or coastal scrub habitats (alluvial fans); sandy or gravelly soil. Blooming period is April to September; this species occurs at elevations from 90 – 610 m.	**Unlikely.** Suitable habitat and soils are not present on-site or within the immediate vicinity. Plants generally restricted to Santa Ana River.
cliff spurge (*Euphorbia misera*)	–/2B.2/Not Covered	Perennial shrub found in coastal bluff scrub, coastal scrub, and Mojavean desert scrub; rocky soils. Blooming period is December to October, and this species occurs at elevations of 10 – 500 m.	**Unlikely.** Suitable habitat and soils are not present on-site or within the immediate vicinity. The project site is not a coastal setting.
Los Angeles sunflower (*Helianthus nuttallii* var. *parishii*)	–/1A/Not Covered	Perennial rhizomatous herb occurs in coastal salt and freshwater marshes and swamps. Blooming period is August to October, and this species occurs at 10 – 1675 m elevation.	**Low.** Very limited habitat is present on-site or within the immediate vicinity. Species has not been observed since 1933 and is likely extinct. This species was not observed during special-status plant surveys conducted in 2018 and 2019.
Tecate cypress (*Hesperocyparis forbesii*)	–/1B.1/Covered	Small perennial evergreen tree found in chaparral and closed-cone coniferous forest; clay, gabbroic or metavolcanic, mostly in Santa Ana Mountains and south to Baja California. This species occurs from 80 – 1500 m elevation.	**Low.** Marginally suitable habitat is present on-site. This species is recorded about 6 miles north of the project site but was not observed during special-status plant surveys conducted in 2018 and 2019.

Species	Status[1] Federal/State, CRPR/County	Habitat Requirements	Potential to Occur
mesa horkelia (*Horkelia cuneata* ssp. *puberula*)	–/1B.1/Not Covered	Perennial herb found in chaparral, cismontane woodland and coastal scrub habitats; found in gravelly or sandy sites from 70 – 810 m elevation. Blooming period is February to September.	**Low.** Low quality habitat is present on-site but nearest observations greater than 5 miles from study area. This species was not observed during special-status plant surveys conducted in 2018 and 2019.
California satintail (*Imperata brevifolia*)	–/2B.1/Not Covered	Perennial grass found in chaparral, coastal scrub, Mojavean desert scrub, meadows and seeps (often alkali), or riparian scrub below 500 m elevation. Blooming period is September to May.	**Unlikely.** Suitable habitat and soils are not present on-site or within the immediate vicinity.
decumbent goldenbush (*Isocoma menziesii* var. *decumbens*)	–/1B.2/Not Covered	Perennial shrub that occurs in chaparral and coastal scrub; sandy soils (often within disturbed areas). Blooming period is April to November, and this species occurs at 10 – 135 m elevation.	**Unlikely.** Low quality habitat is present on-site but species does not grow far from the coast. The nearest observations are in Newport Beach, greater than 5 miles from project area.
Coulter's goldfields (*Lasthenia glabrata* ssp. *coulteri*)	–/1B.1/Not Covered	Found in wetland habitats. Microhabitats include playas and vernal pools at elevations up to 1220 m. Blooming period is February to June.	**Unlikely.** Suitable habitat and soils are not present on-site or within the immediate vicinity.
heart-leaved pitcher sage (*Lepechinia cardiophylla*)	–/1B.2/Covered	Shrub found in chaparral, foothill woodland, and closed-cone pine forest communities. Blooming period is April to July, and this species occurs at elevations between 600 – 1200 m.	**Unlikely.** Low quality habitat is present on-site but nearest observations greater than 5 miles from study area. The study area is outside of the known elevation range for this species.
intermediate monardella (*Monardella hypoleuca* ssp. *intermedia*)	–/1B.3/Not Covered	Perennial herb found on dry slopes of chaparral, oak woodland, and occasionally conifer forest at elevations between 200 and 1250m. Blooming period in June to September.	**Unlikely.** No suitable habitat is present on-site or within the immediate vicinity, and the study area is outside of the known elevation range for this species.
felt-leaved monardella (*Monardella hypoleuca* ssp. *lanata*)	–/1B.2/Not Covered	Perennial rhizomatous herb found on rocky or granitic slopes in chaparral and foothill woodland communities. Blooming period is June to August, and this species occurs at elevations of 300 – 1500 m.	**Unlikely.** No suitable habitat is present on-site or within the immediate vicinity, and the study area is outside of the known elevation range for this species.
Hall's monardella (*Monardella macrantha* ssp. *hallii*)	–/1B.3/Not Covered	Perennial rhizomatous herb found in chaparral, foothill woodland communities. Blooming period is June to August, and this species occurs at elevations of 300 – 1500 m.	**Unlikely.** No suitable habitat is present on-site or within the immediate vicinity, and the study area is outside of the known elevation range for this species.
mud nama (*Nama stenocarpum*)	–/2B.2/Not Covered	Found along freshwater lake margins, riverbanks, marshes and swamps. Blooming period is January to July; this species occurs at elevations from 5 - 500 m.	**Low.** Marginal habitat is present on-site or within the immediate vicinity. Collected within adjacent Lambert reservoir. This species was not observed during special-status plant surveys conducted in 2018 and 2019.
Gambel's water cress (*Nasturtium gambelii*)	FE/ST,1B.1/Not Covered	Perennial rhizomatous herb found in marshes and swamps (freshwater or brackish). Blooming period is April to October; this species is found at elevations of 5 - 330 m.	**Low.** Very limited habitat is present on-site or within the immediate vicinity. Species likely extirpated from county. This species was not observed during special-status plant surveys conducted in 2018 and 2019.
prostrate navarretia (*Navarretia prostrata*)	–/1B.1/Not Covered	Annual herb associated with coastal scrub, valley and foothill grassland, vernal pools from 15 – 1210 m elevation. Blooming period is from April to July.	**Unlikely.** Not expected due to lack of suitable vernal pool habitat on-site or within the immediate vicinity.

Species	Status[1] Federal/State, CRPR/County	Habitat Requirements	Potential to Occur
chaparral nolina (*Nolina cismontana*)	–/1B.2/Not Covered	Shrub found in dry chaparral of coastal mountains. Blooming period lasts from May to July, and this species occurs from 200 - 1200 m elevation.	**Low.** Marginal habitat is present on-site or within the immediate vicinity. Nearest observation of species 4 miles to east in Foothill Ranch area. This species was not observed during special-status plant surveys conducted in 2018 and 2019.
California beardtongue (*Penstemon californicus*)	–/1B.2/Not Covered	Perennial herb found in sandy soils within chaparral, yellow pine forest and pinyon-juniper woodland communities located in elevations between 1200 and 2300 m. Blooming period is May to June.	**Unlikely.** Suitable habitat and soils are not present on-site or within the immediate vicinity, and the study area is outside of known elevation range for this species.
Allen's pentachaeta (*Pentachaeta aurea* ssp. *allenii*)	–/1B.1/Not Covered	Annual herb found in coastal scrub openings and valley and foothill grasslands; often on clay. Blooming period is March to June; this species occurs at 75 – 520 m elevation.	**Low.** Low quality habitat is present on-site or within the immediate vicinity; suitable soils not present. This species was not observed during special-status plant surveys conducted in 2018 and 2019.
Santiago Peak phacelia (*Phacelia keckii*)	–/1B.3/Not Covered	Annual herb found in open areas of chaparral and closed-cone pine forest. Blooming period is May to September, and this species grows at elevations of 500 – 1600 m.	**Unlikely.** Suitable habitat and soils are not present on-site or within the immediate vicinity and nearest observations greater than 5 miles from study area. The study area is outside of the known elevation range for this species.
white rabbit-tobacco (*Pseudognaphalium leucocephalum*)	–/2B.2/Not Covered	Perennial herb found in sandy or gravelly benches, dry stream bottoms, and canyon bottoms within coastal sage scrub and chaparral communities. Blooming period is August to November, and this species occurs at elevations below 500 m.	**Low.** Limited, low quality habitat is present on-site or within the immediate vicinity. This species was not observed during special-status plant surveys conducted in 2018 and 2019.
Nuttall's scrub oak (*Quercus dumosa*)	–/1B.1/Covered	Perennial evergreen shrub found in close-cone coniferous forest, chaparral, and coastal sage scrub; sandy, clay loam soil. Blooming period is February to August, and this species occurs at 15 – 400 m elevation.	**Low.** Limited, low quality habitat is present on-site or within the immediate vicinity. This species was not observed during special-status plant surveys conducted in 2018 and 2019.
Coulter's matilija poppy (*Romneya coulteri*)	–/4.2/Covered	Perennial rhizomatous herb found near dry washes and canyons in chaparral and coastal sage scrub communities. This species occurs at elevations under 1200 m; blooming period is March to July.	**Low.** Marginal habitat is present on-site or within the immediate vicinity. This species was not observed during special-status plant surveys conducted in 2018 and 2019.
chaparral ragwort (*Senecio aphanactis*)	–/2B.2/Not Covered	Annual herb found in chaparral, cismontane woodland, and coastal scrub; soil is sometimes alkaline. Blooming period is January to April, and this species occurs at 15 – 800 m elevation.	**Low.** Limited, low quality habitat is present on-site or within the immediate vicinity; heavy clay soils largely absent. This species was not observed during special-status plant surveys conducted in 2018 and 2019.
Salt Spring checkerbloom (*Sidalcea neomexicana*)	–/2B.2/Not Covered	Perennial herb found in chaparral, coastal scrub, lower montane coniferous forest, Mojavean desert scrub, and playas; alkaline, mesic soils. Blooming period is March to June, and this species occurs at 15 - 1530 m elevation.	**Unlikely.** Suitable habitat and soils are not present on-site or within the immediate vicinity.
estuary seablite (*Suaeda esteroa*)	–/1B.2/Not Covered	Perennial herb found in coastal salt marshes and swamps with tidal flows. Blooming period is May to January; this species occurs at sea level (up to 5 m elevation).	**Unlikely.** Suitable habitat and soils are not present on-site or within the immediate vicinity.

Species	Status[1] Federal/State, CRPR/County	Habitat Requirements	Potential to Occur
San Bernardino aster (*Symphyotrichum defoliatum*)	–/1B.2/Not Covered	Perennial rhizomatous herb found near ditches, streams, and springs in cismontane woodland, coastal scrub, lower montane coniferous forest, meadows and seeps, marshes and swamps, and valley and foothill grassland. This species occurs from 2 – 2040 m elevation; blooming period is July to November.	**Low.** Marginally suitable habitat and moist soils are present on-site. This species was not observed during special-status plant surveys conducted in 2018 and 2019.
Parry's tetracoccus (*Tetracoccus dioicus*)	–/1B.2/Not Covered	Shrub found on dry slopes in chaparral and coastal sage scrub communities. Blooming period is April to May, and this species occurs in elevations less than 1000 m.	**Low.** Limited, low quality habitat is present on-site or within the immediate vicinity. Single county record observed in 1948 with poor locational accuracy. At the northern limit of its recorded distribution. This species was not observed during special-status plant surveys conducted in 2018 and 2019.
big-leaved crownbeard (*Verbesina dissita*)	–/1B.2/Not Covered	Found within chaparral and coastal scrub habitats. Blooming period is April to July, and this species occurs at elevations from 145 - 205 m.	**Unlikely.** Limited, low quality habitat is present on-site or within the immediate vicinity but project site is outside the recorded distribution for this species. Species records restricted to coastal bluffs near Laguna Niguel.
San Diego County viguiera (*Bahiopsis laciniata*)	–/4.3/Not Covered	Perennial shrub found on chaparral and coastal scrub. Blooming period is February to June (August), and this species occurs at elevations from 60 - 750 m.	**Present.** This species was observed on-site during special-status plant surveys conducted in 2018 and 2019. One individual was observed on-site in the easternmost portion of the study area.

[1] Description of status codes:
FE = Listed as endangered under the FESA
FT = Listed as threatened under the FESA
SE = Listed as endangered under the CESA
ST= Listed as threatened under the CESA
CRPR = California Rare Plant Rank (CNPS 2018)
CRPR 1A = Presumed extinct
CRPR 1B = Plants rare, threatened or endangered in California and elsewhere
CRPR 2B = Plants rare, threatened or endangered in California, but more common elsewhere
CRPR 3 = Plants about which more information is needed
CRPR 4 = Watch-list: Plants of limited distribution
.1 = Seriously threatened in California
.2 = Moderately threatened in California
.3 = Not very threatened in California
Covered = Covered under the Orange County NCCP/HCP
Conditionally Covered = Conditionally Covered under the Orange County NCCP/HCP
Not Covered = Not Covered under the Orange County NCCP/HCP

SPECIAL-STATUS WILDLIFE SPECIES WITH POTENTIAL TO OCCUR WITHIN THE STUDY AREA

Species	Status[1] Federal/State/County	Habitat Requirements	Potential to Occur
INSECTS			
Quino checkerspot butterfly (*Euphydryas editha quino*)	FE/–/Conditionally Covered	Sunny openings within chaparral & coastal sage shrublands in parts of Riverside & San Diego counties. Hills and mesas near the coast. Need high densities of food plants *Plantago erecta*, *Plantago insularis*, and *Orthocarpus purpurescens*.	**Unlikely.** The study area is outside of the currently known range for this species, and outside of the protocol survey area (USFWS 2014). Nearest known occurrences documented by the UFWS are 3-4 miles to the north from 1928 and 1937.
CRUSTACEANS			
San Diego fairy shrimp (*Branchinecta sandiegonensis*)	FE/–/Conditionally Covered	Known to occur in areas of swales/earth slump basins in grassland, chaparral and coastal sage scrub. Inhabit seasonally wet pools filled by winter/spring rains. Hatch in warm water later in the season.	**Unlikely.** Suitable habitat is not present on-site or within the immediate vicinity.
Riverside fairy shrimp (*Streptocephalus woottoni*)	FE/–/Conditionally Covered	Generally restricted to vernal pools and other non-vegetated ephemeral pools greater than 12 inches in depth in Riverside, Orange, and San Diego Counties. Typically observed January through March.	**Unlikely.** Suitable habitat is not present on-site or within the immediate vicinity.
FISH			
Santa Ana sucker (*Catostomus santaanae*)	FT/–/Not Covered	Habitat generalists, but prefer sand-rubble-boulder bottoms, cool, clear water, & algae.	**Unlikely.** Suitable habitat is not present on-site or within the immediate vicinity.
tidewater goby (*Eucyclogobius newberryi*)	FE/SC/Not Covered	Found in shallow brackish water habitats, lagoons and lower stream reaches. Require fairly still but not stagnant water & high oxygen levels.	**Unlikely.** Suitable habitat is not present on-site or within the immediate vicinity.
arroyo chub (*Gila orcuttii*)	–/SC/Not Covered	Los Angeles Basin south coastal streams. Slow water stream sections with mud or sand bottoms.	**Unlikely.** Suitable habitat is not present on-site or within the immediate vicinity.
steelhead - southern California DPS (*Oncorhynchus mykiss irideus* pop. 10)	FE/–/Not Covered	Found in streams and rivers with at least 7 inches minimum depth	**Unlikely.** Suitable habitat is not present on-site or within the immediate vicinity.
Santa Ana speckled dace (*Rhinichthys osculus* ssp. 3)	–/SC/Not Covered	Prefers south coast flowing waters	**Unlikely.** Suitable habitat is not present on-site or within the immediate vicinity.
AMPHIBIANS			
arroyo toad (*Anaxyrus californicus*)	FE/SC/Conditionally Covered	Prefers streams and river with fine sediments and where flow rates are great enough to keep silt and clay suspended. Shallow sandy pools bordered sand and gravel flood terraces are needed for breeding	**Unlikely.** Suitable habitat is not present on-site or within the immediate vicinity.
arboreal salamander (*Aneides lugubris*)	–/–/Covered	Occurs primarily in valley-foothill hardwood, valley-foothill hardwood-conifer, and mixed conifer habitats, but is also known from Douglas fir and redwood habitat types. May be found in chaparral in southern California. This species is only found on the surface during moist periods, when it can be common. Elevation range extends from sea level to 1520 m (5000 ft).	**Unlikely.** Suitable habitat is not present on-site or within the immediate vicinity.

Species	Status[1] Federal/State/County	Habitat Requirements	Potential to Occur
black-bellied slender salamander (*Batrachoseps nigriventris*)	–/–/Covered	Found primarily near drainages associated with open oak, mixed conifer forests, and mixed chaparral.	**Unlikely.** Suitable habitat is not present on-site or within the immediate vicinity.
western spadefoot (*Spea hammondii*)	–/SC/Covered	Prefers open areas with sandy or gravelly soils, in a variety of habitats including mixed woodlands, grasslands, chaparral, sandy washes, lowlands, river floodplains, alluvial fans, playas, alkali flats, foothills, and mountains. Rain pools or shallow temporary pools, which do not contain bullfrogs, fish, or crayfish are necessary for breeding.	**Low.** Some suitable habitat is present on-site or within the immediate vicinity. This species was not observed during surveys conducted in 2019.
Coast Range newt (*Taricha torosa*)	–/SC/Not Covered	Found in drier chaparral, oak woodland, and grasslands.	**Low.** Suitable but low quality habitat is present on-site or within the immediate vicinity.
REPTILES			
southern California legless lizard (*Anniella stebbinsi*)	–/SC/Not Covered	Occurs in moist warm loose soil with plant cover. Moisture is essential. Occurs in sparsely vegetated areas of beach dunes, chaparral, pine-oak woodlands, desert scrub, sandy washes, and stream terraces with sycamores, cottonwoods, or oaks. Leaf litter under trees and bushes in sunny areas and dunes stabilized with bush lupine and mock heather often indicate suitable habitat. Often can be found under surface objects such as rocks, boards, driftwood, and logs. Can also be found by gently raking leaf litter under bushes and trees. Sometimes found in suburban gardens in Southern California.	**Low.** Suitable but low quality habitat is present on-site or within the immediate vicinity.
California glossy snake *(Arizona elegans occidentalis*)	–/SC/Not Covered	Inhabits arid scrub, rocky washes, grasslands, and chaparral. Appears to prefer microhabitats of open areas with friable soils for burrowing.	**Unlikely.** Suitable habitat is not present on-site or within the immediate vicinity.
orange-throated whiptail (*Aspidoscelis hyperythra*)	–/–/Covered	Species requires intact habitat within chaparral, cismontane woodland and coastal scrub plant communities. Prefers washes & other sandy areas with patches of brush & rocks. Perennial plants necessary for its major food-termites.	**Present.** This species was observed within the study area during 2018 biological surveys, and was documented on-site in CNDDB in 1990.
coastal whiptail (*Aspidoscelis tigris stejnegeri*)	–/SC/Covered	Found in deserts and semi-arid areas with sparse vegetation and open areas. Also found in woodland and riparian areas. Ground may be firm soil, sandy, or rocky.	**Moderate.** Suitable habitat is present on-site or within the immediate vicinity. This species was documented in CNDDB 2 miles to the northeast in Limestone Canyon in 1999.
red-diamond rattlesnake (*Crotalus ruber*)	–/SC/Covered	Known to occur in chaparral, Mojavean desert scrub and Sonoran Desert scrub communities. Occurs in rocky areas & dense vegetation. Needs rodent burrows, cracks in rocks or surface cover objects.	**Low.** Suitable habitat is present on-site or within the immediate vicinity. This species was documented in CNDDB 2 miles to the northeast in Limestone Canyon in 1999.
San Bernardino ringneck snake (*Diadophis punctatus modestus*)	–/–/Covered	Most common in open, relatively rocky areas within valley-foothill, mixed chaparral, and annual grass habitats. Often in somewhat moist microhabitats near intermittent streams. Avoids moving through open or barren areas by restricting movements to areas of surface litter or herbaceous vegetation.	**Unlikely.** Suitable habitat is not present on-site or within the immediate vicinity. Nearest documented occurrences in CNDDB are from Los Angeles and Riverside Counties.

Species	Status[1] Federal/State/County	Habitat Requirements	Potential to Occur
western pond turtle (*Emys marmorata*)	–/SC/Not Covered	Known to occur in slow-moving permanent or intermittent streams, ponds, small lakes, reservoirs with emergent basking sites; adjacent uplands used during winter.	**Unlikely.** Suitable but low quality habitat is present on-site or within the immediate vicinity. No basking sites available within the study area, and no observation of submerged vegetation.
coastal rosy boa (*Lichanura trivirgata rosafusca*)	–/–/Covered	Rocky areas of chaparral and coastal sage scrub habitats. Attracted to water sources such as permanent and intermittent streams, but does not require permanent water.	**Unlikely.** Suitable habitat is not present on-site or within the immediate vicinity.
Coronado skink (*Plestiodon skiltonianus interparietalis*)	–/–/Covered	Grassland, chaparral, pinon-juniper and juniper sage woodland, pine-oak and pine forests in Coast Ranges of Southern California. Prefers early successional stages or open areas. Found in rocky areas close to streams and on dry hillsides.	**Unlikely.** Suitable habitat is not present on-site. Nearest known occurrences documented in CNDDB are in Camp Pendleton in San Diego County from 1999; no CNDDB occurrences of this species are documented in Orange County.
coast horned lizard (*Phrynosoma blainvillii*)	–/SC/Covered	Known to occur in sandy washes with within chaparral or coastal scrub habitat. Requires loose soil for burial and abundant supply of harvester ants.	**Low.** Suitable but low quality habitat is present on-site or within the immediate vicinity.
coast patch-nosed snake (*Salvadora hexalepis virgultea*)	–/SC/Not Covered	Known to inhabit semi-arid brushy areas and chaparral in canyons, rocky hillsides, and plains.	**Low.** Suitable but low quality habitat is present on-site or within the immediate vicinity.
two-striped garter snake (*Thamnophis hammondii*)	–/SC/Not Covered	Habitat includes marsh and swamp, riparian scrub, riparian woodland, and wetland. Highly aquatic, found in or near permanent fresh water. Often along streams with rocky beds and riparian growth.	**Unlikely.** Suitable but low quality habitat is present on-site or within the immediate vicinity.
BIRDS			
sharp-shinned hawk (*Accipiter striatus*)	–/–/Covered	Most commonly associated with woodlands and brushlands. A wide variety of habitat types are used by wintering birds.	**High.** Suitable habitat is present on-site.
tricolored blackbird (*Agelaius tricolor*)	–/SC/Not Covered	Known to occur in freshwater marsh, marsh, swamp, and wetland; highly colonial species, most numerous in Central Valley & vicinity. Requires open water, protected nesting substrate, and foraging area with insect prey within a few km of the colony.	**Low.** Limited, low quality habitat is present on-site or within the immediate vicinity.
Southern California rufous-crowned sparrow (*Aimophila ruficeps canescens*)	–/–/Covered	Known to frequent relatively steep, often rocky hillsides with grass and forb species. Resident in southern California coastal sage scrub and mixed chaparral.	**Present.** Suitable habitat is present on-site or within the immediate vicinity. This species was observed on-site in 2019 and during previous surveys (Dudek 2012).
grasshopper sparrow (*Ammodramus savannarum*)	–/SC/Not Covered	Known to occur in dense grasslands on rolling hills, lowland plains, in valleys & on hillsides on lower mountain slopes. Favors native grasslands with a mix of grasses, forbs, and scattered shrubs.	**Present.** Limited, low quality habitat is present on-site or within the immediate vicinity. One migrant species was observed on-site during previous surveys by LSA in 1999 (Dudek 2012).

Species	Status[1] Federal/State/County	Habitat Requirements	Potential to Occur
golden eagle (*Aquila chrysaetos*)	–/FP/Conditionally Covered	Known to live in open and semi-open country featuring native vegetation across most of the Northern Hemisphere. They avoid developed areas and uninterrupted stretches of forest. They are found primarily in mountains up to 12,000 feet, canyonlands, rimrock terrain, and riverside cliffs and bluffs. Golden Eagles nest on cliffs and steep escarpments in grassland, chaparral, shrubland, forest, and other vegetated areas.	**Unlikely.** Suitable habitat is not present on-site or within the immediate vicinity.
long-eared owl (*Asio otus*)	–/SC/Not Covered	Roosts in dense vegetation and forage in open grasslands or shrublands; also open coniferous or deciduous woodlands. They occur at elevations ranging from near sea level to above 6,500 feet.	**Unlikely.** Suitable habitat is not present on-site or within the immediate vicinity.
burrowing owl (*Athene cunicularia*)	–/SC/Not Covered	Known to occur within open, dry annual or perennial grasslands, deserts, and scrublands characterized by low-growing vegetation. A subterranean nester dependent upon burrowing mammals, particularly the California ground squirrel.	**Unlikely.** Suitable habitat is not present on-site or within the immediate vicinity. No suitable burrows observed within the site.
rough-legged hawk (*Buteo lagopus*)	–/–/Covered	Occurs in California only during the winter months, from October through March. Occurs in prairies, semi-deserts, grassland, pastures, and marshlands that are distant from extensive woodlands and densely developed areas.	**Unlikely.** Suitable habitat is not present on-site.
red-shouldered hawk (*Buteo lineatus*)	–/–/Covered	Prefers mature lowland forests with open water and clearings nearby. Can sometimes nest in eucalyptus groves.	**Present.** Suitable habitat is present on-site. This species was observed on-site during previous surveys (Dudek 2012).
coastal cactus wren (*Campylorhynchus brunneicapillus cousei*)	–/SC/Covered	Known to occur in coastal scrub habitats; requires stands of prickly pear or cholla cactus for nesting and roosting.	**Low (Previously Present).** This species was previously documented on-site in 1990 in CNDDB. Cactus wren were also documented on-site around 2000, prior to the 2007 Santiago Fire (Dudek 2012). There is currently very limited, isolated cactus on-site so this species has a low potential to occur due to limited suitable habitat on-site or within the immediate vicinity.
Vaux's swift (*Chaetura vauxi*)	–/SC/Not Covered	A summer resident of northern California, this species breeds in the Coast Ranges, Sierra Nevada, and possibly the Cascade Ranges. Prefers redwood and Douglas-fir habitats with nest-sites in large hollow trees and snags, especially tall, burned-out stubs. This bird is a fairly common migrant throughout most of the state in April and May, and August and September. Feeds exclusively on flying insects taken in long, continuous foraging flights; feeds high in the air over most terrains and habitats, and also commonly at lower levels in forest openings, above burns, and especially above rivers and lakes.	**Present.** This species was observed flying over the site during a May 2019 survey, and was likely a migrant.

Species	Status[1] Federal/State/County	Habitat Requirements	Potential to Occur
northern harrier (*Circus cyaneus*)	–/SC/Covered	Coastal salt & fresh-water marsh. Nest & forage in grasslands, from salt grass in desert sink to mountain cienagas. Nests on ground in shrubby vegetation, usually at marsh edge; nest built of a large mound of sticks in wet areas.	**Present.** Suitable habitat is present on-site or within the immediate vicinity. This species was observed on-site during previous surveys (Dudek 2012).
western yellow-billed cuckoo (*Coccyzus americanus occidentalis*)	FT/SE/Not Covered	Riparian forest nester, along the broad, lower flood-bottoms of larger river systems. Nests in riparian jungles of willow, often mixed with cottonwoods, with lower story of blackberry, nettles, or wild grape.	**Unlikely.** Suitable habitat is not present on-site or within the immediate vicinity.
yellow rail (*Coturnicops noveboracensis*)	–/SC/Not Covered	Known to occur within freshwater marshlands, meadows and seeps.	**Unlikely.** Limited suitable habitat is present on-site or within the immediate vicinity. Nearest occurrences in CNDDB are in Newport Back Bay in 1896 and Corona in 1914.
white-tailed kite (*Elanus leucurus*)	–/FP/Not Covered	Rolling foothills and valley margins with scattered oaks and river bottomlands or marshes next to deciduous woodland. Open grasslands, meadows, or marshes for foraging close to isolated, dense-topped trees for nesting and perching.	**Present.** Suitable habitat is present on-site or within the immediate vicinity. This species was observed on-site during previous surveys by LSA in 1999 (Dudek 2012).
southwestern willow flycatcher (*Empidonax traillii extimus*)	FE/SE/Conditionally Covered	Breeds in dense willow-dominated riparian habitat near open water.	**Low.** Suitable but limited habitat is present on-site or within the immediate vicinity. This species was not observed during focused surveys conducted in 2019.
prairie falcon (*Falco mexicanus*)	–/–/Conditionally Covered	Grasslands and other open habitats. Foraging occurs of wide areas, but cliffs are generally required for nest sites.	**Present.** Suitable foraging habitat is present on-site. No suitable nesting habitat occurs on-site, and this species is currently not known to nest within Orange County, and have not occurred within the county for over a decade (CDFW 2020, Catino-Davenport 2019). This species was observed on-site during previous surveys (Dudek 2012).
American peregrine falcon (*Falco peregrinus anatum*)	–/FP/Covered	Known to occur near wetlands, lakes, rivers, or other water; on cliffs, banks, dunes, mounds; also, human-made structures. Nest consists of a scrape or a depression or ledge in an open site.	**Present.** Suitable foraging habitat is present on-site or within the immediate vicinity. No suitable nesting habitat occurs within the study area or immediate vicinity. This species was observed on-site during previous surveys (Dudek 2012).
bald eagle (*Haliaeetus leucocephalus*)	–/SE,FP/Not Covered	Typically nest in forested areas adjacent to large bodies of water, staying away from heavily developed areas when possible. Tolerant of human activity when feeding, and may congregate around fish processing plants, dumps, and below dams where fish concentrate. For perching, bald eagles prefer tall, mature coniferous or deciduous trees that afford a wide view of the surroundings. In winter, bald eagles can also be seen in dry, open uplands if there is access to open water for fishing.	**Unlikely.** Suitable habitat is not present on-site or within the immediate vicinity.

Species	Status[1] Federal/State/County	Habitat Requirements	Potential to Occur
yellow-breasted chat (*Icteria virens*)	–/SC/Not Covered	Known to occur within riparian forest, scrub and woodland habitats.	**Present.** This species was observed within the study area during 2018 and 2019 biological surveys.
California black rail (*Laterallus jamaicensis coturniculus*)	–/ST,FP/Not Covered	Known to occur in brackish and freshwater marshes. Inhabits riparian thickets of willow & other brushy tangles near watercourses. Needs water depths of about 1 inch that do not fluctuate during the year and dense vegetation for nesting habitat.	**Unlikely.** Limited suitable habitat is present on-site or within the immediate vicinity. Nearest occurrences in CNDDB are in Newport Back Bay in 1983 and near Orange in 1986.
Belding's savannah sparrow (*Passerculus sandwichensis beldingi*)	–/SE/Not Covered	Inhabits coastal salt marshes. Nests in pickleweed on and about margins of tidal flats.	**Unlikely.** Suitable habitat is not present on-site or within the immediate vicinity.
coastal California gnatcatcher (*Polioptila californica californica*)	FT/SC/Covered	Species is an obligate, permanent resident of coastal sage scrub in southern California. Low, coastal sage scrub in arid washes, on mesas and slopes.	**Present.** This species was observed within the study area during 2018 and 2019 biological surveys.
light-footed Ridgway's rail (*Rallus obsoletus levipes*)	FE/SE,FP/Not Covered	Found in salt marshes traversed by tidal sloughs, where cordgrass and pickleweed are the dominant vegetation. Requires dense growth of either pickleweed or cordgrass for nesting or escape cover; feeds on molluscs and crustaceans.	**Unlikely.** Suitable habitat is not present on-site or within the immediate vicinity.
yellow warbler (*Setophaga petechia*)	–/SC/Not Covered	Riparian plant associations in close proximity to water. Frequently found nesting and foraging in willow shrubs and thickets, and in other riparian plants including cottonwoods, sycamores, ash, and alders.	**Present.** This species was observed within the study area during 2018 and 2019 biological surveys.
California least tern (*Sternula antillarum browni*)	FE/SE,FP/Not Covered	Known to occur in alkali playas and coastal dune and beach habitats. Colonial breeder on bare or sparsely vegetated, flat substrates: sand beaches, alkali flats, landfills, or paved areas.	**Unlikely.** Suitable habitat is not present on-site or within the immediate vicinity.
least Bell's vireo (*Vireo bellii pusillus*)	FE/SE/Conditionally Covered	Known to occur in riparian forest, scrub, and woodland habitats. Nests primarily in willow, baccharis, or mesquite habitats.	**Present.** This species was observed within the study area during 2018 and 2019 biological surveys, including focused surveys conducted in 2019.
MAMMALS			
Coyote (*Canis latrans*)	–/–/Covered	Occur in all wildland habitat types in the subregion, and are adaptable enough to use agricultural and developed lands.	**Present.** This species was observed within the study area during 2018 and 2019 biological surveys, and previous surveys (Dudek 2012).
gray fox (*Urocyon cinereoargenteus*)	–/–/Covered	Found in many habitat types, with preference for woodlands, chaparral, and coastal scrub.	**Low.** Suitable habitat is present on-site or within the immediate vicinity.
pallid bat (*Antrozous pallidus*)	–/SC/Not Covered	Known to occur in a wide variety of habitats including deserts, grasslands, shrublands, woodlands & forests. Most common in open, dry habitats with rocky areas for roosting; particularly associated with buildings and bridges.	**Low.** Suitable habitat is present on-site or within the immediate vicinity.

Species	Status[1] Federal/State/County	Habitat Requirements	Potential to Occur
northwestern San Diego pocket mouse (*Chaetodipus fallax fallax*)	–/SC/Not Covered	Moderate canopy coverage of arid shrubland or pinyon-juniper habitats on or near rocky slopes and sandy areas.	**Unlikely.** Suitable habitat is not present on-site or within the immediate vicinity.
Mexican long-tongued bat (*Choeronycteris mexicana*)	–/SC/Not Covered	Known to occur at altitudes of 300-2,400 meters in deciduous, semi-arid thorn scrub and mixed oak-conifer forests	**Unlikely.** Suitable habitat is not present on-site or within the immediate vicinity. The study area is outside of the typical range for this species.
Stephen's kangaroo rat (*Dipodomys stephensi*)	FE/SE/Not Covered	Known to occur in sparse perennial vegetation with firm soil, "neither hard nor sandy".	**Unlikely.** Suitable habitat is not present on-site or within the immediate vicinity. The study area is outside of the typical range for this species.
western mastiff bat (*Eumops perotis californicus*)	–/SC/Not Covered	Known to occur in habitat consisting of extensive open areas with abundant roost locations provided by crevices in rock outcrops and buildings.	**Low.** Limited suitable habitat is present on-site or within the immediate vicinity. Nearest CNDDB occurrence is an anecdotal observation from Limestone Canyon (date unknown) 2.8 miles to the northeast.
western red bat (*Lasiurus blossevillii*)	–/SC/Not Covered	Prefers edges or habitat mosaics that have trees for roosting and open areas for foraging. Requires nearby water source. Roosting habitat includes forests and woodlands from sea level up through mixed conifer forests. Feeds over a wide variety of habitats including grasslands, shrublands, open woodlands and forests, and croplands. Not found in desert areas.	**Low.** Limited habitat is present on-site or within the immediate vicinity. Nearest CNDDB occurrence is from Bell Canyon (near Starr Ranch) 11 miles to the southeast in 1997.
western yellow bat (*Lasiurus xanthinus*)	–/SC/Not Covered	Known only in Los Angeles and San Bernardino Cos. south to the Mexican border. This species has been recorded below 600 m (2000 ft) in valley foothill riparian, desert riparian, desert wash, and palm oasis habitats.	**Unlikely.** Suitable habitat is not present on-site or within the immediate vicinity.
San Diego desert woodrat (*Neotoma lepida intermedia*)	–/SC/Covered	Known to occur in coastal scrub, desert scrub, chaparral, cactus, and rocky habitats.	**Moderate.** Some suitable habitat is present on-site or within the immediate vicinity.
pocketed free-tailed bat (*Nyctinomops femorosaccus*)	–/SC/Not Covered	Habitats used include pinyon-juniper woodlands, desert scrub, desert succulent shrub, desert riparian, desert wash, alkali desert scrub, Joshua tree, and palm oasis. Prefers rocky desert areas with high cliffs and rock outcrops.	**Unlikely.** Suitable habitat is not present on-site or within the immediate vicinity.
big free-tailed bat (*Nyctinomops macrotis*)	–/SC/Not Covered	Prefers rugged, rocky canyons.	**Unlikely.** Suitable habitat is not present on-site or within the immediate vicinity.
southern grasshopper mouse (*Onychomys torridus ramona*)	–/SC/Not Covered	Alkali desert scrub and desert scrub habitats are preferred, with somewhat lower densities expected in other desert habitats, including succulent shrub, wash, and riparian areas. Also occurs in coastal scrub, mixed chaparral, sagebrush, low sage, and bitterbrush habitats. Uncommon in valley foothill and montane riparian, and in a variety of other habitats.	**Low.** Suitable habitat is present on-site or within the immediate vicinity.

Species	Status[1] Federal/State/County	Habitat Requirements	Potential to Occur
Pacific pocket mouse (*Perognathus longimembris pacificus*)	FE/SC/Conditionally Covered	Known to occur in coastal scrub habitats. Seems to prefer soils of fine alluvial sands of coastal plains near the ocean.	**Unlikely.** Suitable habitat is not present on-site or within the immediate vicinity.
Southern California saltmarsh shrew (*Sorex ornatus salicornicus*)	–/SC/Not Covered	Known to occur in salt marsh habitat within Southern California. Requires dense vegetation and woody debris for cover.	**Unlikely.** Suitable habitat is not present on-site or within the immediate vicinity.
American badger (*Taxidea taxus*)	–/SC/Not Covered	Most abundant in drier open stages of most shrub, forest, and herbaceous habitats, with friable soils. Needs sufficient food, friable soils and open, uncultivated ground. Preys on burrowing rodents. Digs burrows.	**Unlikely.** Suitable habitat is not present on-site or within the immediate vicinity.

[1] Description of status codes:
FE = Listed as endangered under the FESA
FT = Listed as threatened under the FESA
SE = Listed as endangered under the CESA
ST = Listed as threatened under the CESA
FP = Listed as fully protected under CDFW code
SC = Species of Special Concern
Covered = Covered under the County of Orange NCCP/HCP
Conditionally Covered = Conditionally Covered under the County of Orange NCCP/HCP
Not Covered = Not covered under the County of Orange NCCP/HCP

Appendix E

Results of 2019 Focused Western Spadefoot Toad Surveys

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March 29, 2019

Jo Ann Corey, MPA
Environmental Compliance Specialist
Water Resources and Policy Department
Irvine Ranch Water District
15600 Sand Canyon Avenue
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Subject: Results of Focused Western Spadefoot Toad Surveys for the Syphon Reservoir Improvement Project, Unincorporated Orange County, California

Dear Ms. Corey:

This letter report presents the results of focused surveys for western spadefoot toad (*Spea hammondii*) at the Syphon Reservoir Improvement Project site within unincorporated Orange County, California. ESA biologists conducted the surveys to determine the presence or absence of the species within the approximately 265-acre study area ("study area"). The species background, project location and description, methodology used during the survey, and survey results are described below.

Background

The western spadefoot toad is currently considered by the California Department of Fish and Wildlife (CDFW) as a California Species of Special Concern, and is an "Identified Species" for which conservation and management is provided for under the County of Orange Central & Coastal Subregion Natural Community Conservation Plan/Habitat Conservation Plan (NCCP/HCP). The western spadefoot toad is a small greenish, brown, cream, or gray toad that has a distinct glossy black spade (i.e., shaped like a wedge or teardrop) on each hind foot. This species' range extends from northern California south into Baja and they may occur from sea level up to 4,500' (1365m). Western spadefoot toad adults generally only enter aquatic habitats for breeding and they spend the majority of their time in upland communities near seasonally wet pools or shallow ponds, burrowed into friable soils or small mammal burrows. This species requires seasonal rain pools that can contain water for a minimum of three to four weeks. Breeding and egg laying typically occurs in late winter until the end of March and males can be heard calling during this period. Spadefoot toad eggs require 1 to 6 days to hatch and 3 to 11 weeks to complete metamorphosis.

Based on a query of the California Natural Diversity Database (CNDDB)[1], the nearest reported occurrence of the western spadefoot toad to the study area is located approximately a mile to the east from Bee Canyon.[2]

1 CDFW. 2019. California Natural Diversity Database (CNDDB) Commercial version, Information dated February 8, 2019.

2 Exact date of occurrence was not recorded, but was documented in a source from 1985.

Project Location and Description

The study area is located in central Orange County (**Figure 1**). Specifically, the study area is located on the northeast side of Portola Parkway between the Bee Canyon Landfill Access Road and State Route 133 (SR-133) (**Figure 2**). Irvine Ranch Water District (IRWD) owns the majority of the property bounded by these roadways. The Crean Lutheran High School maintains recreation facilities located between Portola Parkway and the toe of the existing dam slope. Residential neighborhoods are located on the southwest side of Portola Parkway. The ground surrounding the reservoir, which dominates the study area, is hilly with ridgelines and terraced slopes. Ground surface elevations within the study area range from approximately 319 feet above sea level at Portola Parkway immediately below the existing reservoir to approximately 675 feet above sea level in the northeast corner of the study area.

The Syphon Reservoir Improvement Project is intended to store additional recycled water to meet the seasonal demand of recycled water customers and to enhance IRWD's water supply reliability by increasing the existing recycled water seasonal storage capacity at Syphon Reservoir, which will allow the storage of additional recycled water produced at the water recycling plants during periods of low demand (winter months) for use during periods of high demand (summer months). A preliminary geotechnical investigations project would evaluate geologic and seismic conditions at the embankment dam, spillway, outlet, and borrow sites.[3]

Methodology

Prior to the site visit, ESA biologist Lily Sam reviewed topographic maps and a recently created vegetation map (**Figure 3**) of the study area, and noted the areas with relatively flat topography where potential breeding pools may have the opportunity to form. ESA also reviewed a report detailing the habitat assessment and baseline surveys conducted by United States Geological Survey (USGS) for the western spadefoot toad and the western pond turtle within the Irvine Ranch Land Reserve[4]. Upon review of the report, although USGS surveyed the Syphon Reservoir area for western pond turtle, they did not survey for the western spadefoot toad and it is assumed that the area was ruled out for the lack of suitable habitat or the presence of thick vegetation that would not provide suitable friable soils for the creation of burrows.

Since western spadefoot toad is an upland species that requires water for breeding purposes only, surveys included two diurnal surveys of water margins to search for egg clusters, and two nocturnal surveys immediately after rain events to search for individuals detectable by calls or eye-shine and visual identification. On January 18, 2019, ESA biologists Lily Sam and Robert Sweet conducted a diurnal and nocturnal survey between the hours of

3 An embankment dam is an earthen dam built by compacting successive layers of earth, using the most impervious materials to form a core and placing more permeable substances on the inner and outer sides. A spillway is a structure provided to control the release of flows from behind a dam such that the dam does not overtop. An outlet is a device used to regulate flow from a dam. A borrow site is an excavated area where material has been dug for use as fill material at another location.

4 Fisher, R. N., P. C. Trenham, S. L. Compton, A. R. Backlin, S. A. Hathaway, and T. A. Touré. 2004. *Habitat Assessment and Baseline Surveys for the Western Spadefoot (*Spea hammondii*) and the Western Pond Turtle (*Emys marmorata*) on the Irvine Ranch Land Reserve*. U. S. Geological Survey technical report. 50 pp.

12:00 pm to 8:00 pm, after substantial rainfall occurred with nearly 1" of precipitation recorded in the area over the preceding 3 days. Weather conditions were overcast, the temperatures ranged between 56.5 to 65 degrees Fahrenheit (F) and the winds ranged from 0 to 5 miles per hour (mph). A second diurnal and nocturnal survey was conducted on March 7, 2019 by ESA biologists Lily Sam and Douglas Gordon-Blackwood between the hours of 1:00 pm and 8:00 pm, after another rain event with at least 0.4" of rain on March 6. Weather conditions were overcast with very brief light drizzle, the temperatures ranged between 56 to 59° F and the winds ranged from 0 to 3 mph. For both diurnal surveys, the study area was walked to assess the locations of standing pools of water. All locations of standing water or puddles were recorded with a GPS unit and mapped. Each of the puddles were visually inspected for eggs and larvae or the presence of western spadefoot toads. Both night surveys were conducted using eye-shine detection techniques, which involve using appropriately powered lights with the aid of binoculars to sweep the study area in order to detect eye-shine from amphibious species, as well as auditory detection of potential males calling. Water was present in the reservoir at the time of the survey and the banks were surveyed for toads, it should be noted that it is not considered likely for any spadefoot toads to be found within the open water portion of the reservoir. Western spadefoot toads do not prefer deep water, rather, they prefer shallow, turbid pools containing some vegetative matter. Therefore, the reservoir itself is not considered preferred breeding habitat for this species.

Results

A total of eight potential breeding pools were detected within the study area, but no western spadefoot toads were detected by sight or calls during either survey (**Figure 4**). Although some suitable pools were present on site, nearly all of the flat areas within the study area were densely vegetated with grasses and annual herbs, which make it difficult for adult toads to move around. Furthermore, there are very limited areas of the site that are flat. The majority of the study area is sloped, excluding the access roads and the margins or marshy areas located adjacent to the open water habitat. Furthermore, the reservoir itself is a man-made feature created in the 1940s following construction of the dam that impounded water to provide irrigation for agricultural uses for the Irvine Ranch; thus, the study area has been subject to previous disturbance and likely did not historically support suitable habitat or populations of this species. As such, it is concluded that there are currently no western spadefoot toads within the Syphon Reservoir study area. Two California toads (*Anaxyrus boreas halophilus*) were visually detected during the second survey and Baja California treefrogs (*Pseudacris hypochondriaca hypochondriaca*) calls were detected during both surveys. See **Attachment A** for photos depicting the pools/puddles found.

If there are any questions regarding this report or the results, please feel free to reach out to Maile Tanaka at 949-870-1501 or mtanaka@esassoc.com.

Sincerely,

Lily Sam
Senior Associate Biologist

Maile Tanaka
Managing Associate Biologist

Attachments:
Figure 1: Regional Map
Figure 2: Vicinity Map
Figure 3: Natural Communities Map
Figure 4: Potential Breeding Pool Locations
Attachment A: Representative Site Photographs



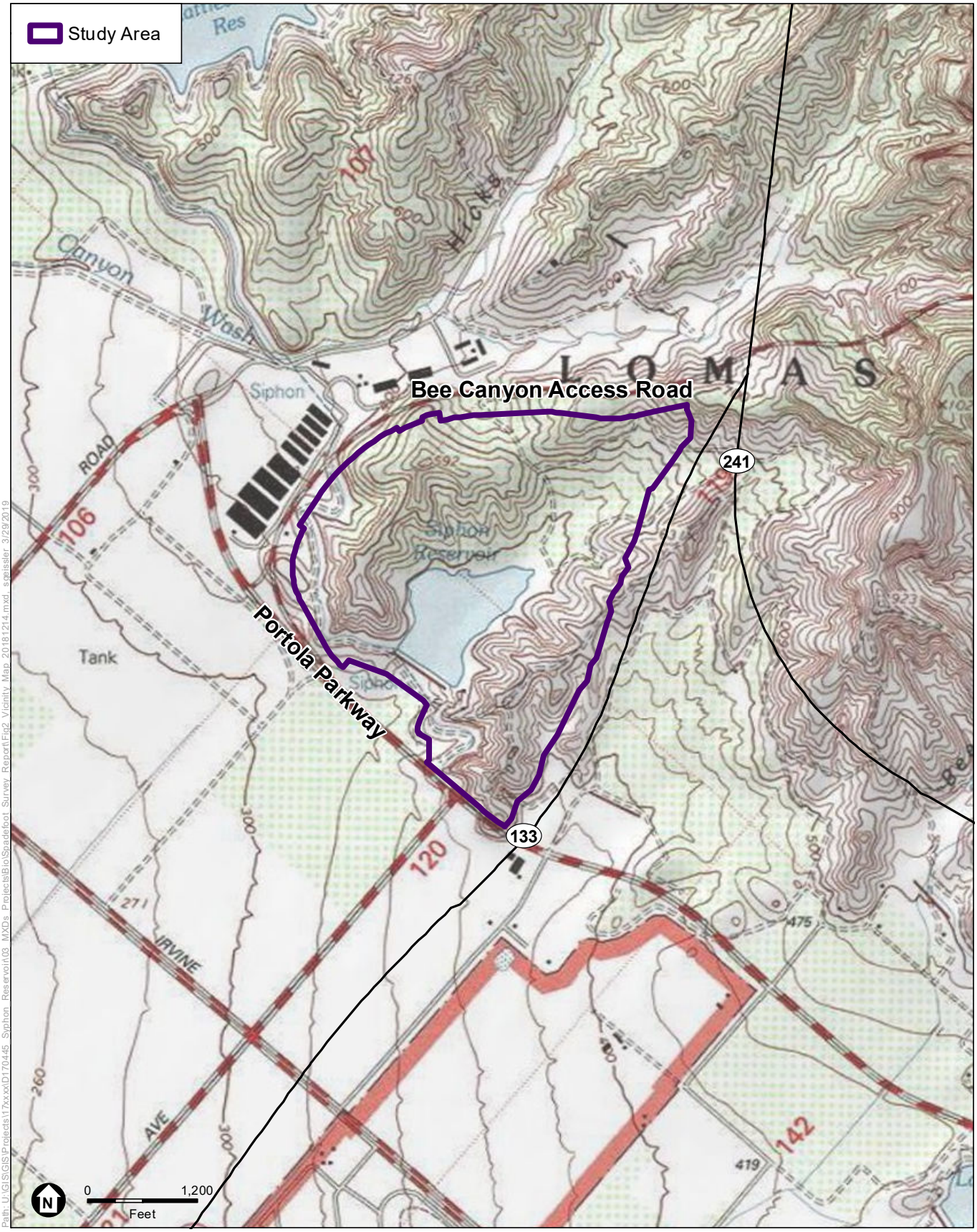
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SOURCE: ESRI, 2016; OC LAFCO, 2018

Syphon Reservoir Improvement Project

Figure 1
Regional Map

ESA



SOURCE: ESRI, 2016; El Toro USGS 7.5 minute Quadrangle

Syphon Reservoir Improvement Project

Figure 2
Vicinity Map

ESA



SOURCE: ESRI, 2016.

Syphon Reservoir Improvement Project

Figure 3

Natural Communities

ESA



SOURCE: ESRI, 2016.

Syphon Reservoir Improvement Project

Figure 4

Potential Breeding Pool Locations

ESA

Attachment A
Representative Site Photographs



Photo 1: Puddle within the access road on east side of reservoir (facing northeast).



Photo 2: Overall view of sloped upland habitat with very dense vegetation (facing west).



Photo 3: View of road rut puddle in access road on the west side of the reservoir (facing south).



Photo 4: View of puddle on southern access road of reservoir (facing west).



Photo 5: View of puddles near athletic fields (facing south).



Photo 6: View of puddle in cemented area near southeast corner of the reservoir (facing south).



Photo 7: View of ponded area with weir near the center of the reservoir (facing west).



Photo 7: California toad found during second survey in southwest portion of reservoir within cattails.



Photo 7: View of California toad in drain located on the southwestern corner of the reservoir (facing west).

Appendix F

Results of 2019 Focused Least Bell's Vireo Surveys

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August 1, 2019

Stacey Love
Carlsbad Fish and Wildlife Service Office
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Carlsbad, California 92008

Esther Burkett
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Sacramento, California 95814

Subject: Results of 2019 Focused Least Bell's Vireo Surveys for the Syphon Reservoir Improvement Project, Unincorporated Orange County, California

Dear Ms. Love and Ms. Burkett:

This letter report presents the methodology and results of focused surveys conducted for least Bell's vireo (*Vireo bellii pusillus*; LBV) at the Syphon Reservoir Improvement Project site within unincorporated Orange County, California. **Environmental Science Associates (ESA)** biologists Maile Tanaka, Jaclyn Catino-Davenport, and Karl Fairchild conducted the surveys to determine the presence or absence of the species within the approximately 265-acre study area ("study area").

Project Location and Description

The study area is located in central Orange County (**Figure 1**). Specifically, the study area is located on the northeast side of Portola Parkway between the Bee Canyon Landfill Access Road and State Route 133 (SR-133) (**Figure 2**). Irvine Ranch Water District (IRWD) owns the majority of the property bounded by these roadways. The Crean Lutheran High School maintains recreation facilities located between Portola Parkway and the toe of the existing dam slope. Residential neighborhoods are located on the southwest side of Portola Parkway. The ground surrounding the reservoir, which dominates the study area, is hilly with ridgelines and terraced slopes. Ground surface elevations within the study area range from approximately 319 feet above sea level at Portola Parkway immediately below the existing reservoir to approximately 675 feet above sea level in the northeast corner of the study area.

The Syphon Reservoir Improvement Project is intended to store additional recycled water to meet the seasonal demand of recycled water customers and to enhance IRWD's water supply reliability by increasing the existing recycled water seasonal storage capacity at Syphon Reservoir, which will allow the storage of additional recycled water produced at the water recycling plants during periods of low demand (winter months) for use during

periods of high demand (summer months). A preliminary geotechnical investigations project would evaluate geologic and seismic conditions at the embankment dam, spillway, outlet, and borrow sites.[1]

Natural Communities

Natural communities found within the study area include arroyo willow thicket, black willow thicket, mule fat scrub, freshwater marsh, coyote brush scrub, chaparral bushmallow scrub, chaparral bushmallow scrub/coyote brush scrub, chaparral bushmallow scrub/non-native herbaceous cover, sumac chaparral, California sagebrush scrub, California sagebrush scrub/non-native herbaceous cover, coast prickly pear scrub, eucalyptus woodland, non-native grassland, non-native herbaceous cover, non-native herbaceous cover/California sagebrush scrub, open water, and disturbed areas. Vegetation communities and cover types within the study area are described below. California sagebrush alliance and non-native herbaceous cover/California sagebrush alliance are the dominant vegetation covers in the upland areas, and arroyo willow thicket is the dominant vegetation cover within the riparian areas of the study area. **Figure 3** depicts the natural communities found within the study area. A description of the potentially suitable habitat surveyed for LBV within the study area is presented below.

Arroyo Willow Thicket

Arroyo willow thicket (i.e., *Salix lasiolepis* Shrubland Alliance or Arroyo Willow Riparian Forest) is characterized by a canopy cover dominated by mature arroyo willow (*Salix lasiolepis*) with an understory of smaller willows, and variable herbaceous layer. This alliance is typically found within stream banks and benches, slope seeps, and stringers along drainages.[2] A total of 0.24 acre of arroyo willow thicket occurs primarily within the northern and northeastern portions of the study area.

Black Willow Thicket

Black willow thicket (i.e., *Salix gooddingii* Woodland Alliance or Black Willow Riparian Forest) is characterized by a canopy cover dominated by mature black willow (*Salix gooddingii*) with an understory of smaller willows, mule fat (*Baccharis salicifolia*), and variable herbaceous layer. This alliance is typically found on terraces along large rivers, canyons, and along rocky floodplains of small, intermittent streams, seeps, and springs.[3] Species associated with this alliance include native arroyo willow and non-native tamarisk (*Tamarix ramosissima*) and red gum (*Eucalyptus camaldulensis*). A total of 4.13 acres of black willow thicket were mapped around the northern and northeastern perimeter of the reservoir within the center of the study area.

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1 An embankment dam is an earthen dam built by compacting successive layers of earth, using the most impervious materials to form a core and placing more permeable substances on the inner and outer sides. A spillway is a structure provided to control the release of flows from behind a dam such that the dam does not overtop. An outlet is a device used to regulate flow from a dam. A borrow site is an excavated area where material has been dug for use as fill material at another location.

2 Sawyer, J. O., T. Keeler-Wolf, and J. M. Evens. 2009. *A Manual of California Vegetation, Second Edition.* California Native Plant Society, Sacramento, CA

3 Ibid.

Mule Fat Scrub

Mule fat scrub (i.e., mulefat thickets [*Baccharis salicifolia* Shrubland Alliance]) is characterized by large shrub cover dominated by mule fat and variable herbaceous layer. This alliance is typically found within canyon bottoms, floodplains, lake margins, and stream channels with soils of mixed alluvium.[4] Species associated with this alliance include native black willow, California sagebrush (*Artemisia californica*), laurel sumac (*Malosma laurina*), cocklebur (*Xanthium strumarium*), and non-native Spanish false fleabane (*Pulicaria paludosa*), and black mustard (*Brassica nigra*). A total of 2.25 acres of mule fat scrub were mapped around the northern and northeastern perimeter of the reservoir within the center of the study area.

Methodology

Surveys for LBV were conducted by ESA biologists Maile Tanaka, Jaclyn Catino-Davenport, and Karl Fairchild. Methods employed were in conformance with U.S. Fish and Wildlife Service (USFWS) *Least Bell's Vireo Survey Guidelines* issued January 19, 2001. [5] Eight surveys were conducted between April 10 and July 8, 2019 within all portions of the study area containing potentially suitable habitat and adjacent habitat potentially used for foraging. Surveys were conducted no less than ten days apart between 6:10 AM and 11:00 AM. Weather conditions were suitable for surveys, with overcast to clear skies, winds of 9 miles per hour or less, and temperatures between 51 and 74 degrees Fahrenheit.

Results

Survey results are summarized in **Table 1** below and depicted on **Figure 4**. LBV were detected during all 2019 focused surveys. No brown-headed cowbirds (*Molothrus ater*), which are brood parasites, were detected within the study area during protocol LBV surveys; however, multiple brown-headed cowbird traps, installed and maintained by Leatherman BioConsulting Inc., were observed on-site with captive decoy birds inside. A complete list of avian species detected within the study area is included in **Attachment A**.

California Natural Diversity Database (CNDDB) reporting forms for all incidental special-status species are included as **Attachment B**.

4 Ibid.

5 U.S. Department of the Interior, Fish and Wildlife Service. January 19, 2001. *Least Bell's Vireo Survey Guidelines.* Ecological Services. Carlsbad Fish and Wildlife Office.

TABLE 1
LBV SURVEY RESULTS

Date	Time	Wind (mph) (start/end)	Temperature (F) (start-end)	Weather (start/end)	Results	Surveyors
04/10/19	0710–1100	0-7/0-9	57°–71°	0% Cloud Cover/ 0% Cloud Cover	8 LBV Detected	Maile Tanaka
04/22/19	0700–1100	2/9	51°–66°	5% Cloud Cover/ 5% Cloud Cover	11 LBV Detected	Maile Tanaka
05/03/19	0610–1010	2/3	60°–68°	100% Cloud Cover/ 60% Cloud Cover	14 LBV Detected	Jaclyn Catino-Davenport
05/15/19	0645–1040	3/7	62°–64°	100% Cloud Cover/ 100% Cloud Cover	14 LBV Detected	Maile Tanaka
06/05/19	0803–1018	1/2	65°–71°	100% Cloud Cover/ 95% Cloud Cover	16 LBV Detected	Karl Fairchild
06/17/19	0728–1034	2/3	68°–66°	100% Cloud Cover; misting/ 100% Cloud Cover; misting	14 LBV Detected	Karl Fairchild
06/27/19	0727–1039	1/3	70°–74°	80% Cloud Cover/ 15% Cloud Cover	15 LBV Detected	Karl Fairchild
07/08/19	0721–1009	1/1	70°–73°	100% Cloud Cover/ 100% Cloud Cover	12 LBV Detected	Karl Fairchild

SOURCE: ESA 2019.

Incidentally-observed avian special-status species included the coastal California gnatcatcher (*Polioptila californica californica*), yellow warbler (*Setophaga petechia*), yellow-breasted chat (*Icteria virens*), and southern California rufous-crowned sparrow (*Aimophila ruficeps canescens*). Coastal California gnatcatcher is a federally threatened species, southern California rufous-crowned sparrow is a California Department of Fish and Wildlife (CDFW) watch list species, and yellow warbler and yellow-breasted chat are both CDFW species of special concern. These species were detected during multiple surveys.

Conclusion

Based on the results of the protocol-level LBV surveys, the study area contains LBV vireo habitat that was occupied by up to 16 LBV. Coastal California gnatcatcher, southern California rufous-crowned sparrow, yellow warbler, and yellow-breasted chat were also observed on-site, as well as brown-headed cowbirds only within the traps on-site.

If there are any questions regarding this report or the results, please feel free to reach out to Maile Tanaka at 949-870-1501 or mtanaka@esassoc.com.

Sincerely,

Maile Tanaka
Managing Associate Biologist

Karl Fairchild
Associate Biologist III

Attachments:
Figure 1: Regional Map
Figure 2: Vicinity Map
Figure 3: Natural Communities
Figure 4: Least Bell's Vireo Territory Map
Attachment A: Avian Compendium
Attachment B: CNDDB Forms

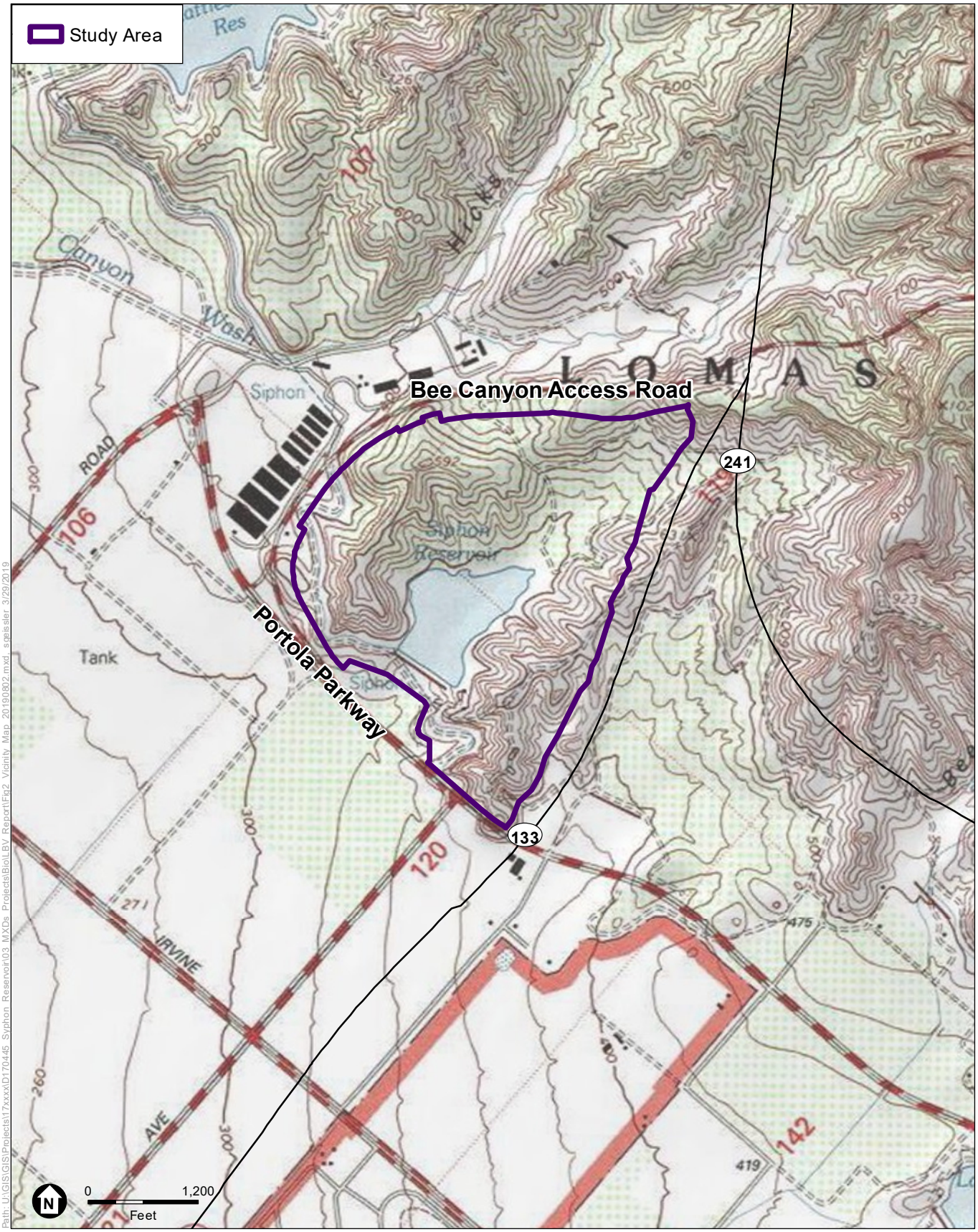


SOURCE: ESRI, 2016; OC LAFCO, 2018

Syphon Reservoir Improvement Project

Figure 1
Regional Map

ESA

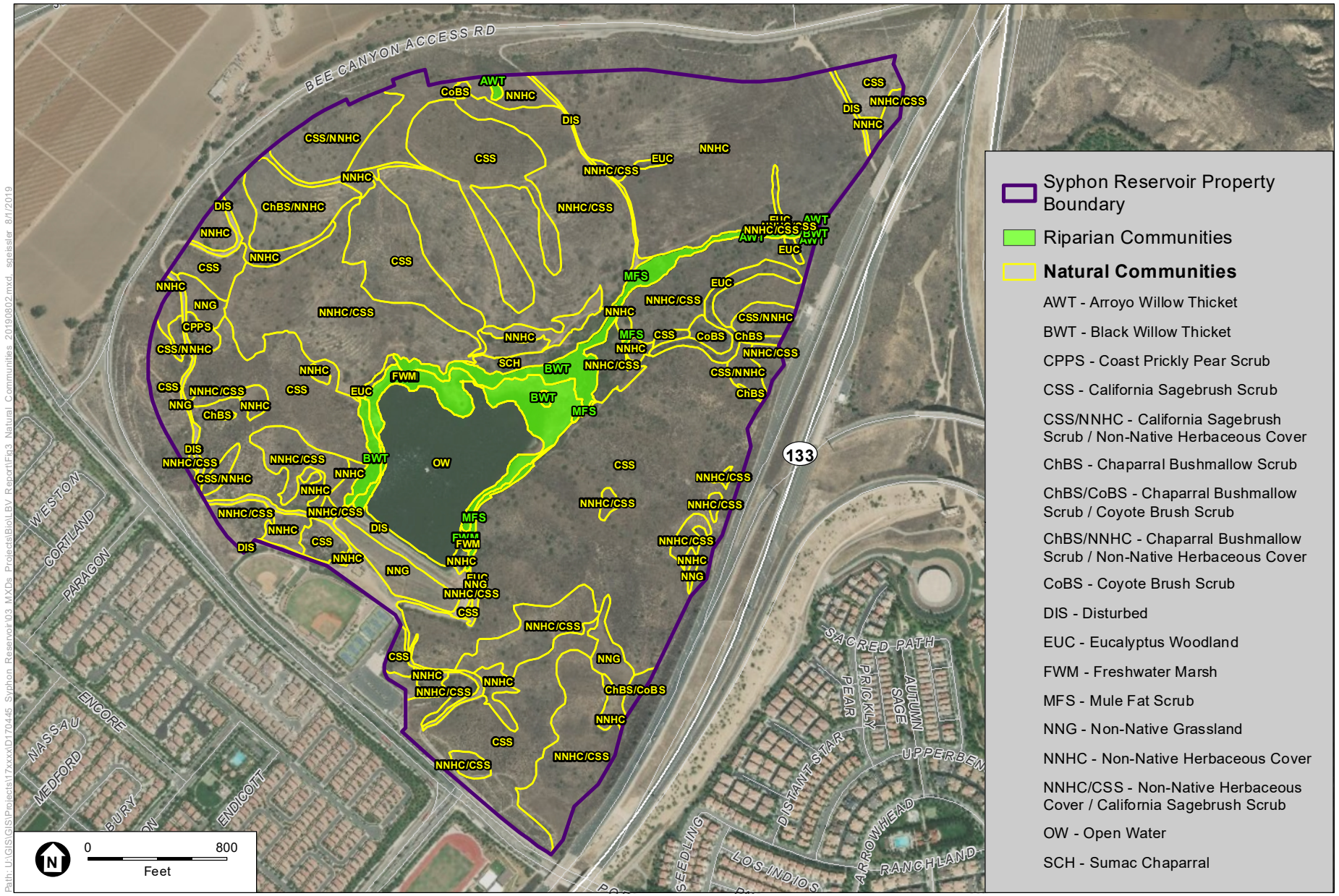


SOURCE: ESRI, 2016; El Toro USGS 7.5 minute Quadrangle

Syphon Reservoir Improvement Project

Figure 2
Vicinity Map

ESA



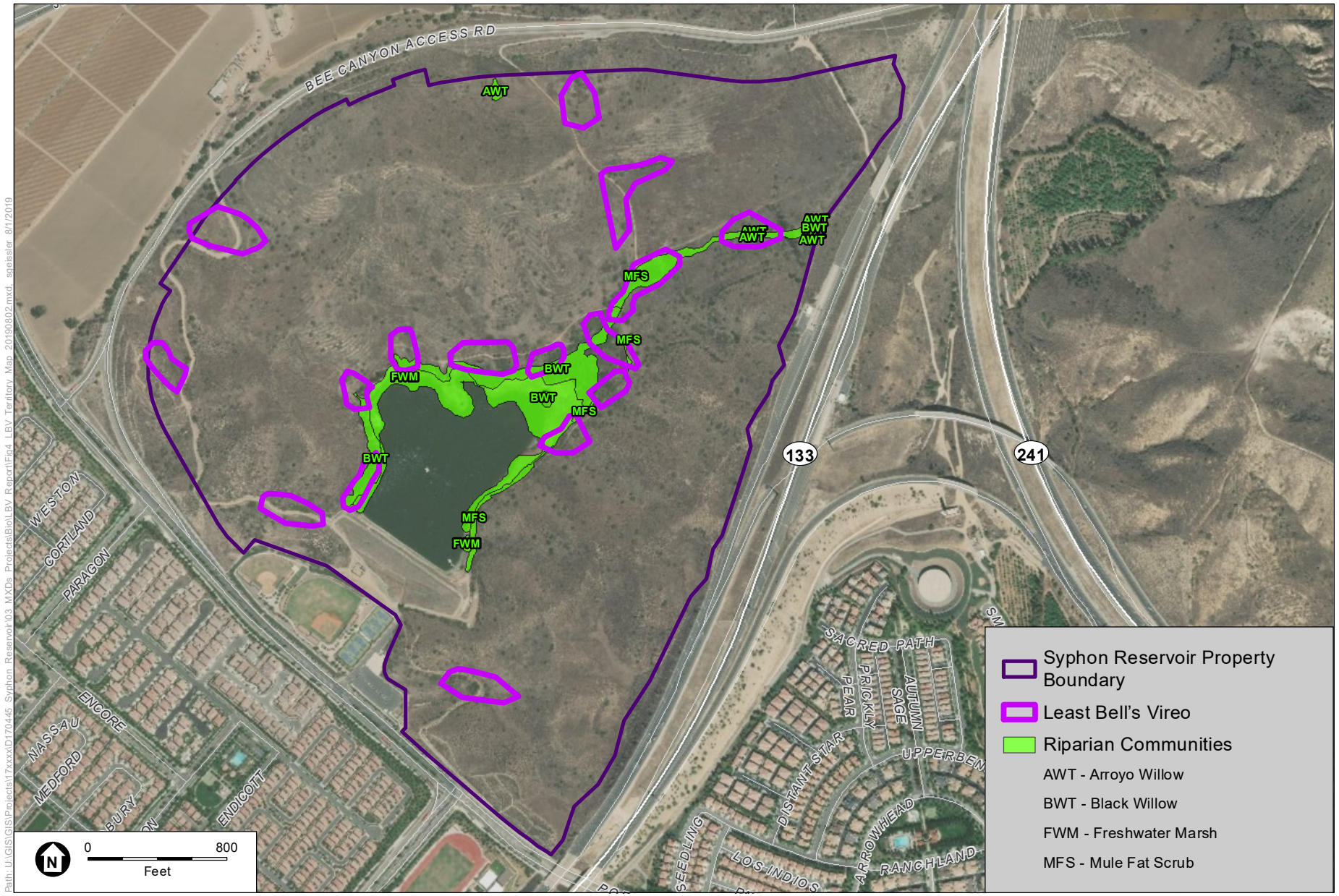
SOURCE: ESRI, 2016.

Syphon Reservoir Improvement Project

Figure 3

Natural Communities

ESA



Path: U:\GIS\GIS\Projects\17xxxx\D170445 Syphon Reservoir\03 MXDs Projects\Bio\LBV Report\Fig4 LBV Territory Map 20190802.mxd sgeissler 8/1/2019

SOURCE: ESRI, 2016.

Syphon Reservoir Improvement Project

Figure 4

Least Bell's Vireo Territory Map

ESA

ESA

ATTACHMENT A – AVIAN COMPENDIUM

Common Name	Scientific Name	4/10/19	4/22/19	5/3/19	5/15/19	6/5/19	6/17/19	6/27/19	7/8/19	Special Status[b]
Allen's Hummingbird	*Selasphorus sasin*		X	X	X	X	X	X	X	
American Coot	*Fulica americana*	X		X						
American Crow	*Corvus brachyrhynchos*	X	X	X	X	X	X	X		
American Goldfinch	*Spinus tristis*							X	X	
Anna's Hummingbird	*Calypte anna*			X			X	X	X	
Ash-throated Flycatcher	*Myiarchus cinerascens*		X				X		X	
Barn Swallow	*Hirundo rustica*			X		X	X	X	X	
Bewick's Wren	*Thryomanes bewickii*			X		X	X	X	X	
Black Phoebe	*Sayornis nigricans*	X		X		X	X	X	X	
Black-headed Grosbeak	*Pheucticus melanocephalus*		X	X		X	X			
Black-necked Stilt	*Himantopus mexicanus*						X			
Blue-gray Gnatcatcher	*Polioptila caerulea*	X	X	X	X	X	X	X	X	
Blue Grosbeak	*Passerina caerulea*			X				X	X	
Bullock's Oriole	*Icterus bullockii*		X	X				X		
Bushtit	*Psaltriparus minimus*	X	X	X	X	X	X	X	X	
Coastal California Gnatcatcher	*Polioptila californica californica*			X		X	X	X	X	FESA Threatened; CDFW: SSC
California Quail	*Callipepla californica*	X	X	X	X	X	X	X	X	
California Thrasher	*Toxostoma redivivum*	X	X	X	X	X	X	X	X	
California Towhee	*Melozone crissalis*		X	X	X	X	X	X		
Caspian Tern	*Hydroprogne caspia*			X			X			
Cassin's Kingbird	*Tyrannus vociferans*	X	X	X	X	X	X	X	X	
Cedar Waxwing	*Bombycilla cedrorum*			X						
Cliff Swallow	*Petrochelidon pyrrhonota*		X	X	X		X	X	X	
Common Raven	*Corvus corax*			X		X	X	X	X	
Common Yellowthroat	*Geothlypis trichas*	X	X	X	X	X	X	X	X	
Cooper's Hawk	*Accipiter cooperii*			X						
Double-crested Cormorant	*Phalacrocorax auritus*			X						
Forster's Tern	*Sterna forsteri*					X				
Great Blue Heron	*Ardea herodias*								X	
Great Egret	*Ardea alba*	X		X						
Greater Roadrunner	*Geococcyx californianus*	X	X	X				X		
Greater Yellowlegs	*Tringa melanoleuca*					X				
Great-tailed Grackle	*Quiscalus mexicanus*			X						
Hooded Oriole	*Icterus cucullatus*	X	X	X	X	X	X	X	X	
Horned Lark	*Eremophila alpestris*							X		
House Finch	*Haemorhous mexicanus*	X	X	X	X	X	X	X	X	
House Wren	*Troglodytes aedon*					X	X	X	X	
Killdeer	*Charadrius vociferous*	X	X	X	X	X	X	X	X	
Lawrence's Goldfinch	*Spinus lawrencei*							X		
Lazuli Bunting	*Passerina amoena*			X						
Least Bell's Vireo	*Vireo bellii pusillus*	X	X	X	X	X	X	X	X	CESA Endangered; FESA Endangered
Lesser Goldfinch	*Spinus psaltria*	X	X	X	X	X	X	X	X	
Lesser Nighthawk	*Chordeiles acutipennis*		X							
Mallard	*Anas platyrhynchos*	X		X		X	X	X	X	

ATTACHMENT A – AVIAN COMPENDIUM

Common Name	Scientific Name	4/10/19	4/22/19	5/3/19	5/15/19	6/5/19	6/17/19	6/27/19	7/8/19	Special Status[b]
Mourning Dove	*Zenaida macroura*	X	X	X			X	X	X	
Northern Flicker	*Colaptes auratus*						X			
Northern Mockingbird	*Mimus polyglottos*	X	X	X	X	X	X	X	X	
Northern Rough-winged Swallow	*Stelgidopteryx serripennis*		X			X	X			
Nuttall's Woodpecker	*Dryobates nuttallii*							X	X	
Orange-crowned Warbler	*Oreothlypis celata*			X						
Pacific-slope Flycatcher	*Empidonax difficilis*			X						
Redhead	*Aythya americana*					X	X	X		
Red-tailed Hawk	*Buteo jamaicensis*		X	X	X	X	X	X	X	
Rock Pigeon[a]	*Columba livia*								X	
Ruddy Duck	*Oxyura jamaicensis*		X	X		X	X	X		
Rufous Hummingbird	*Selasphorus rufus*	X	X							
Say's Phoebe	*Sayornis saya*						X	X		
Scaly-breasted Munia[a]	*Lonchura punctulata*			X	X	X	X	X	X	
Snowy Egret	*Egretta thula*			X		X	X	X	X	
Song Sparrow	*Melospiza melodia*	X	X	X	X	X	X	X	X	
Southern California Rufous-crowned Sparrow	*Aimophila ruficeps canescens*							X		CDFW: WL
Spotted Towhee	*Pipilo maculatus*	X	X	X	X		X	X	X	
Tree Swallow	*Tachycineta bicolor*			X						
Turkey Vulture	*Cathartes aura*			X	X	X	X	X		
Vaux's Swift	*Chaetura vauxi*			X						
Western Grebe	*Aechmophorus occidentalis*			X						
Western Meadowlark	*Sturnella neglecta*			X						
Western Tanager	*Piranga ludoviciana*			X						
White-faced Ibis	*Plegadis chihi*						X	X		
White-throated Swift	*Aeronautes saxatalis*			X		X	X	X	X	
Wilson's Warbler	*Cardellina pusilla*	X		X						
Wrentit	*Chamaea fasciata*	X	X	X	X	X	X	X	X	
Yellow Warbler	*Setophaga petechia*					X	X	X	X	CDFW: SSC
Yellow-breasted Chat	*Icteria virens*		X		X		X	X	X	CDFW: SSC

[a] Exotic species

[b] CESA = California Endangered Species Act; FESA = Federal Endangered Species Act; CDFW = California Department of Fish and Wildlife; WL = Watch List; SSC = Species of Special Concern.

Mail to:
California Natural Diversity Database
California Dept. of Fish & Wildlife
P.O. Box 944209
Sacramento, CA 94244-2090
CNDDB@wildlife.ca.gov

For Office Use Only
Source Code: _____ Quad Code: _____
Elm Code: _____ Occ No.: _____
EO Index: _____ Map Index: _____

Date of Field Work (mm/dd/yyyy): 05/03/2019

Clear Form

California Native Species Field Survey Form

Print Form

Scientific Name: *Polioptila californica californica*

Common Name: coastal California gnatcatcher

Species Found? (●) Yes ( ) No _____ If not found, why?

Total No. Individuals: 7 Subsequent Visit? (●) Yes ( ) No

Is this an existing NDDB occurrence? 283 Yes, Occ. # ☐ No ☐ Unk.

Collection? If yes: _____ Number _____ Museum / Herbarium

Reporter: Maile Tanaka, ESA
Address: 2121 Alton Parkway, Suite 100
Irvine, CA 92606
E-mail Address: mtanaka@esassoc.com
Phone: 949-753-7001

Plant Information
Phenology:
_____ % vegetative _____ % flowering _____ % fruiting

Animal Information
7 # adults _____ # juveniles _____ # larvae _____ # egg masses _____ # unknown
☐ wintering ☒ breeding ☐ nesting ☐ rookery ☐ burrow site ☐ lek ☐ other

Location Description ***(please attach map AND/OR fill out your choice of coordinates, below)***

County: Orange Landowner / Mgr: Irvine Ranch Water District
Quad Name: El Toro Elevation: _____
T___ R___ Sec___, ___¼ of ___ ¼, Meridian: H ( ) M ( ) S ( ) Source of Coordinates (GPS, topo. map & type): GPS
T___ R___ Sec___, ___¼ of ___ ¼, Meridian: H ( ) M ( ) S ( ) GPS Make & Model: _____
DATUM: **NAD27** ( ) **NAD83** ( ) **WGS84** ( ) Horizontal Accuracy: _____ meters/feet
Coordinate System: UTM Zone 10 ( ) UTM Zone 11 ( ) ***OR*** Geographic (Latitude & Longitude) (●)
Coordinates: 33.71573842, -117.72854097
33.71318457, -117.72793069
33.71411233, -117.73430724
33.71187830, -117.73267864
33.71188568, -117.73564123
33.70975627, -117.73310024
33.70863200, -117.72975805

Habitat Description (plants & animals) *plant communities, dominants, associates, substrates/soils, aspects/slope:*
Animal Behavior *(Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):*
California sagebrush scrub and disturbed California sagebrush scrub.
Singing males most of which were likely pairs and breeding.

Please fill out separate form for other rare taxa seen at this site.

Site Information Overall site/occurrence quality/viability (site + population): ( ) Excellent (●) Good ( ) Fair ( ) Poor
Immediate AND surrounding land use: Undeveloped reservoir surrounded by open space, agriculture, and development.
Visible disturbances: None
Threats: _____
Comments: Incidental observations of at least 7 singing males heard calling during surveys conducted from April-July 2019.

Determination: *(check one or more, and fill in blanks)*
☐ Keyed (cite reference): _____
☐ Compared with specimen housed at: _____
☐ Compared with photo / drawing in: _____
☒ By another person (name): Maile Tanaka, Jaclyn Catino-Davenport, Karl Fairchild
☐ Other: _____

Photographs: *(check one or more)*

	Slide	Print	Digital
Plant / animal	☐	☐	☐
Habitat	☐	☐	☒
Diagnostic feature	☐	☐	☐

May we obtain duplicates at our expense? (●) yes ( ) no

Mail to:
California Natural Diversity Database
California Dept. of Fish & Wildlife
P.O. Box 944209
Sacramento, CA 94244-2090
CNDDB@wildlife.ca.gov

For Office Use Only
Source Code: _____ Quad Code: _____
Elm Code: _____ Occ No.: _____
EO Index: _____ Map Index: _____

Date of Field Work (mm/dd/yyyy): 06/27/2019

Clear Form

California Native Species Field Survey Form

Print Form

Scientific Name: *Aimophila ruficeps canescens*

Common Name: Southern California rufous-crowned sparrow

Species Found? (●) Yes ( ) No _____ If not found, why?

Total No. Individuals: 2 Subsequent Visit? ( ) Yes (●) No

Is this an existing NDDB occurrence? _____ Yes, Occ. # [X] No [ ] Unk.

Collection? If yes: _____ Number _____ Museum / Herbarium

Reporter: Maile Tanaka, ESA
Address: 2121 Alton Parkway, Suite 100
Irvine, CA 92606
E-mail Address: mtanaka@esassoc.com
Phone: 949-753-7001

Plant Information

Phenology:

_____ % vegetative _____ % flowering _____ % fruiting

Animal Information

1 # adults | 1 # juveniles | _____ # larvae | _____ # egg masses | _____ # unknown

[ ] wintering [X] breeding [X] nesting [ ] rookery [ ] burrow site [ ] lek [ ] other

Location Description (please attach map AND/OR fill out your choice of coordinates, below)

County: Orange Landowner / Mgr: Irvine Ranch Water District

Quad Name: El Toro Elevation: 490 ft amsl

T____ R____ Sec____, ____¼ of ____ ¼, Meridian: H ( ) M ( ) S ( )

T____ R____ Sec____, ____¼ of ____ ¼, Meridian: H ( ) M ( ) S ( )

Source of Coordinates (GPS, topo. map & type): GPS

GPS Make & Model: _____

DATUM: **NAD27** ( ) **NAD83** ( ) **WGS84** ( )

Horizontal Accuracy: _____ meters/feet

Coordinate System: UTM Zone 10 ( ) UTM Zone 11 ( ) ***OR*** Geographic (Latitude & Longitude) (●)

Coordinates: 33.715496000, -117.72805096

Habitat Description (plants & animals) *plant communities, dominants, associates, substrates/soils, aspects/slope:*

Animal Behavior *(Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):*

Disturbed California sagebrush scrub and ruderal vegetation along ridge/saddle of hill north of reservoir.
Adult observed feeding fledgling.

Please fill out separate form for other rare taxa seen at this site.

Site Information

Overall site/occurrence quality/viability (site + population): (●) Excellent ( ) Good ( ) Fair ( ) Poor

Immediate AND surrounding land use: Undeveloped reservoir surrounded by open space, agriculture, and development.

Visible disturbances: None.

Threats: _____

Comments:

Determination: *(check one or more, and fill in blanks)*

- [ ] Keyed (cite reference): _____
- [ ] Compared with specimen housed at: _____
- [ ] Compared with photo / drawing in: _____
- [X] By another person (name): Karl Fairchild
- [ ] Other: _____

Photographs: *(check one or more)*

	Slide	Print	Digital
Plant / animal	[ ]	[ ]	[ ]
Habitat	[ ]	[ ]	[X]
Diagnostic feature	[ ]	[ ]	[ ]

May we obtain duplicates at our expense? (●) yes ( ) no

Mail to:
California Natural Diversity Database
California Dept. of Fish & Wildlife
P.O. Box 944209
Sacramento, CA 94244-2090
CNDDB@wildlife.ca.gov

For Office Use Only
Source Code: _____ Quad Code: _____
Elm Code: _____ Occ No.: _____
EO Index: _____ Map Index: _____

Date of Field Work (mm/dd/yyyy): 04/22/2019

Clear Form

California Native Species Field Survey Form

Print Form

Scientific Name: *Icteria virens*

Common Name: yellow-breasted chat

Species Found? (●) Yes ( ) No _____ If not found, why?

Total No. Individuals: 5 Subsequent Visit? (●) Yes ( ) No

Is this an existing NDDB occurrence? _____ Yes, Occ. # [X] No [ ] Unk.

Collection? If yes: _____ Number _____ Museum / Herbarium

Reporter: Maile Tanaka, ESA
Address: 2121 Alton Parkway, Suite 100
Irvine, CA 92606
E-mail Address: mtanaka@esassoc.com
Phone: 949-753-7001

Plant Information

Phenology:

_____ % vegetative _____ % flowering _____ % fruiting

Animal Information

5 # adults _____ # juveniles _____ # larvae _____ # egg masses _____ # unknown

[ ] wintering [X] breeding [ ] nesting [ ] rookery [ ] burrow site [ ] lek [ ] other

Location Description (please attach map AND/OR fill out your choice of coordinates, below)

County: Orange Landowner / Mgr: Irvine Ranch Water District

Quad Name: El Toro Elevation: _____

T___ R___ Sec___, ___¼ of ___ ¼, Meridian: H ( ) M ( ) S ( ) Source of Coordinates (GPS, topo. map & type): GPS

T___ R___ Sec___, ___¼ of ___ ¼, Meridian: H ( ) M ( ) S ( ) GPS Make & Model: _____

DATUM: **NAD27** ( ) **NAD83** ( ) **WGS84** ( ) Horizontal Accuracy: _____ meters/feet

Coordinate System: UTM Zone 10 ( ) UTM Zone 11 ( ) ***OR*** Geographic (Latitude & Longitude) (●)

Coordinates: 33.71433324, -117.72496433
33.71407166, -117.72729259
33.71218457, -117.73023584
33.71256261, -117.72748380
33.70994554, -117.72976378

Habitat Description (plants & animals) *plant communities, dominants, associates, substrates/soils, aspects/slope:*

Animal Behavior *(Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):*

Riparian arroyo and black willow thickets, mule fat scrub.
Singing males most of which were likely pairs and breeding.

Please fill out separate form for other rare taxa seen at this site.

Site Information

Overall site/occurrence quality/viability (site + population): ( ) Excellent (●) Good ( ) Fair ( ) Poor

Immediate AND surrounding land use: Undeveloped reservoir surrounded by open space, agriculture, and development.

Visible disturbances: None.

Threats: _____

Comments: Incidental observations of at least 5 singing males heard calling during surveys conducted from April-July 2019.

Determination: *(check one or more, and fill in blanks)*

- [ ] Keyed (cite reference): _____
- [ ] Compared with specimen housed at: _____
- [ ] Compared with photo / drawing in: _____
- [X] By another person (name): Maile Tanaka, Karl Fairchild
- [ ] Other: _____

Photographs: *(check one or more)*

	Slide	Print	Digital
Plant / animal	[ ]	[ ]	[ ]
Habitat	[ ]	[ ]	[X]
Diagnostic feature	[ ]	[ ]	[ ]

May we obtain duplicates at our expense? (●) yes ( ) no

Mail to:
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California Dept. of Fish & Wildlife
P.O. Box 944209
Sacramento, CA 94244-2090
CNDDB@wildlife.ca.gov

For Office Use Only
Source Code: _____ Quad Code: _____
Elm Code: _____ Occ No.: _____
EO Index: _____ Map Index: _____

Date of Field Work (mm/dd/yyyy): 06/05/2019

Clear Form

California Native Species Field Survey Form

Print Form

Scientific Name: *Setophaga petechia*

Common Name: yellow warbler

Species Found? (●) Yes ( ) No _____ If not found, why?

Total No. Individuals: 5 Subsequent Visit? (●) Yes ( ) No

Is this an existing NDDB occurrence? _____ Yes, Occ. # [X] No [ ] Unk.

Collection? If yes: _____ Number _____ Museum / Herbarium

Reporter: Maile Tanaka, ESA
Address: 2121 Alton Parkway, Suite 100
Irvine, CA 92606
E-mail Address: mtanaka@esassoc.com
Phone: 949-753-7001

Plant Information
Phenology:
_____ % vegetative _____ % flowering _____ % fruiting

Animal Information
5 # adults _____ # juveniles _____ # larvae _____ # egg masses _____ # unknown
[ ] wintering [X] breeding [X] nesting [ ] rookery [ ] burrow site [ ] lek [ ] other

Location Description ***(please attach map AND/OR fill out your choice of coordinates, below)***

County: Orange Landowner / Mgr: Irvine Ranch Water District
Quad Name: El Toro Elevation: _____
T___ R___ Sec___, ___¼ of ___ ¼, Meridian: H( ) M( ) S( ) Source of Coordinates (GPS, topo. map & type): GPS
T___ R___ Sec___, ___¼ of ___ ¼, Meridian: H( ) M( ) S( ) GPS Make & Model: _____
DATUM: **NAD27** ( ) **NAD83** ( ) **WGS84** ( ) Horizontal Accuracy: _____ meters/feet
Coordinate System: UTM Zone 10 ( ) UTM Zone 11 ( ) ***OR*** Geographic (Latitude & Longitude) (●)
Coordinates: 33.71351648, -117.72724222
33.71179387, -117.72798946
33.71203387, -117.73142631
33.71036455, -117.73201018
33.71012740, -117.72967475

Habitat Description (plants & animals) *plant communities, dominants, associates, substrates/soils, aspects/slope:*
Animal Behavior *(Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):*
Riparian arroyo and black willow thickets, mule fat scrub.
Singing males most of which were likely pairs and breeding; in addition, one family group of adults feeding fledgling.

Please fill out separate form for other rare taxa seen at this site.

Site Information Overall site/occurrence quality/viability (site + population): ( ) Excellent (●) Good ( ) Fair ( ) Poor
Immediate AND surrounding land use: Undeveloped reservoir surrounded by open space, agriculture, and development.
Visible disturbances: None.
Threats: _____
Comments: Incidental observations of at least 5 singing males heard calling during surveys conducted from April-July 2019.

Determination: *(check one or more, and fill in blanks)*
[ ] Keyed (cite reference): _____
[ ] Compared with specimen housed at: _____
[ ] Compared with photo / drawing in: _____
[X] By another person (name): Karl Fairchild
[ ] Other: _____

Photographs: *(check one or more)*

	Slide	Print	Digital
Plant / animal	[ ]	[ ]	[ ]
Habitat	[ ]	[ ]	[X]
Diagnostic feature	[ ]	[ ]	[ ]

May we obtain duplicates at our expense? (●) yes ( ) no

Appendix G

Results of 2019 Focused Southwestern Willow Flycatcher Surveys

2121 Alton Parkway
Suite 100
Irvine, CA 92606
949.753.7001 phone
949.753.7002 fax

esassoc.com

August 1, 2019

Stacey Love
Carlsbad Fish and Wildlife Service Office
2177 Salk Avenue, Suite 250
Carlsbad, California 92008

Esther Burkett
California Department of Fish and Wildlife
1416 Ninth Street, 12th Floor
Sacramento, California 95814

Subject: Results of 2019 Focused Southwestern Willow Flycatcher Surveys for the Syphon Reservoir Improvement Project, Unincorporated Orange County, California

Dear Ms. Love and Ms. Burkett:

This letter report presents the methodology and results of focused surveys conducted for southwestern willow flycatcher (*Empidonax traillii extimus*; SWFL) at the Syphon Reservoir Improvement Project site within unincorporated Orange County, California. **Environmental Science Associates (ESA)** biologist Karl Fairchild (TE-92799B-2) conducted the surveys to determine the presence or absence of the species within the approximately 265-acre study area ("study area").

Project Location and Description

The study area is located in central Orange County (**Figure 1**). Specifically, the study area is located on the northeast side of Portola Parkway between the Bee Canyon Landfill Access Road and State Route 133 (SR-133) (**Figure 2**). Irvine Ranch Water District (IRWD) owns the majority of the property bounded by these roadways. The Crean Lutheran High School maintains recreation facilities located between Portola Parkway and the toe of the existing dam slope. Residential neighborhoods are located on the southwest side of Portola Parkway. The ground surrounding the reservoir, which dominates the study area, is hilly with ridgelines and terraced slopes. Ground surface elevations within the study area range from approximately 319 feet above sea level at Portola Parkway immediately below the existing reservoir to approximately 675 feet above sea level in the northeast corner of the study area.

The Syphon Reservoir Improvement Project is intended to store additional recycled water to meet the seasonal demand of recycled water customers and to enhance IRWD's water supply reliability by increasing the existing recycled water seasonal storage capacity at Syphon Reservoir, which will allow the storage of additional recycled water produced at the water recycling plants during periods of low demand (winter months) for use during

periods of high demand (summer months). A preliminary geotechnical investigations project would evaluate geologic and seismic conditions at the embankment dam, spillway, outlet, and borrow sites.[1]

Natural Communities

Natural communities found within the study area include arroyo willow thicket, black willow thicket, mule fat scrub, freshwater marsh, coyote brush scrub, chaparral bushmallow scrub, chaparral bushmallow scrub/coyote brush scrub, chaparral bushmallow scrub/non-native herbaceous cover, sumac chaparral, California sagebrush scrub, California sagebrush scrub/non-native herbaceous cover, coast prickly pear scrub, eucalyptus woodland, non-native grassland, non-native herbaceous cover, non-native herbaceous cover/California sagebrush scrub, open water, and disturbed areas. Vegetation communities and cover types within the study area are described below. California sagebrush alliance and non-native herbaceous cover/California sagebrush alliance are the dominant vegetation covers in the upland areas, and arroyo willow thicket is the dominant vegetation cover within the riparian areas of the study area. **Figure 3** depicts the natural communities found within the study area. A description of the potentially suitable habitat surveyed for SWFL within the study area is presented below.

Arroyo Willow Thicket

Arroyo willow thicket (i.e., *Salix lasiolepis* Shrubland Alliance or Arroyo Willow Riparian Forest) is characterized by a canopy cover dominated by mature arroyo willow (*Salix lasiolepis*) with an understory of smaller willows, and variable herbaceous layer. This alliance is typically found within stream banks and benches, slope seeps, and stringers along drainages (Sawyer et al. 2009)[2]. A total of 0.24 acre of arroyo willow thicket occurs primarily within the northern and northeastern portions of the study area.

Black Willow Thicket

Black willow thicket (i.e., *Salix gooddingii* Woodland Alliance or Black Willow Riparian Forest) is characterized by a canopy cover dominated by mature black willow (*Salix gooddingii*) with an understory of smaller willows, mule fat (*Baccharis salicifolia*), and variable herbaceous layer. This alliance is typically found on terraces along large rivers, canyons, and along rocky floodplains of small, intermittent streams, seeps, and springs (Sawyer et al. 2009)[3]. Species associated with this alliance include native arroyo willow and non-native tamarisk (*Tamarix ramosissima*) and red gum (*Eucalyptus camaldulensis*). A total of 4.13 acres of black willow thicket were mapped around the northern and northeastern perimeter of the reservoir within the center of the study area.

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1 An embankment dam is an earthen dam built by compacting successive layers of earth, using the most impervious materials to form a core and placing more permeable substances on the inner and outer sides. A spillway is a structure provided to control the release of flows from behind a dam such that the dam does not overtop. An outlet is a device used to regulate flow from a dam. A borrow site is an excavated area where material has been dug for use as fill material at another location.

2 Sawyer, J. O., T. Keeler-Wolf, and J. M. Evens. 2009. *A Manual of California Vegetation, Second Edition.* California Native Plant Society, Sacramento, CA

3 Ibid.

Mule Fat Scrub

Mule fat scrub (i.e., mulefat thickets [*Baccharis salicifolia* Shrubland Alliance]) is characterized by large shrub cover dominated by mule fat and variable herbaceous layer. This alliance is typically found within canyon bottoms, floodplains, lake margins, and stream channels with soils of mixed alluvium (Sawyer et al. 2009) [4]. Species associated with this alliance include native black willow, California sagebrush (*Artemisia californica*), laurel sumac (*Malosma laurina*), cocklebur (*Xanthium strumarium*), and non-native Spanish false fleabane (*Pulicaria paludosa*), and black mustard (*Brassica nigra*). A total of 2.25 acres of mule fat scrub were mapped around the northern and northeastern perimeter of the reservoir within the center of the study area.

Methodology

Surveys for SWFL were conducted by ESA biologist Karl Fairchild (TE-92799B-2). Methods employed were in conformance with U.S. Fish and Wildlife Service (USFWS) *A Natural History Summary and Survey Protocol for the Southwestern Willow Flycatcher* issued in 2010. [5] Five surveys were conducted, with one survey during Period 1 (May 29), two surveys during Period 2 (June 5 and June 17), and two surveys during Period 3 (June 27 and July 8). All portions of the study area containing potentially suitable habitat and adjacent habitat potentially used for foraging were surveyed using playback of taped vocalizations. Surveys were conducted between 5:56 AM and 8:30 AM, during suitable weather conditions (overcast to clear skies, winds of 3 miles per hour or less, and temperatures between 63 and 74 degrees Fahrenheit). The permitted biologist played a 15-second recording of SWFL vocalizations (including *fitz-bew* and *britt* notes). The recording was played twice before the biologist moved approximately 100 feet and repeated the procedure. Due to the patchy nature of the habitat present at this site, the biologist frequently moved greater distances between patches of suitable habitat between playbacks.

Results

Survey results are summarized in **Table 1** below. No willow flycatchers were detected during any of the 2019 focused surveys. No brown-headed cowbirds (*Molothrus ater*), which are brood parasites, were detected within the study area during protocol SWFL surveys; however, multiple brown-headed cowbird traps, installed and maintained by Leatherman BioConsulting Inc., were observed on-site with captive decoy birds inside. A complete list of avian species detected within the study area is included in **Attachment A**.

California Natural Diversity Database (CNDDB) reporting forms for all incidental special-status species are included as **Attachment B**. The Willow Flycatcher Survey and Detection Form is included as **Appendix C**.

4 Ibid.

5 Sogge, M. K., D. Ahlers, and S. J. Sferra. 2010. *A Natural History Summary and Survey Protocol for the Southwestern Willow Flycatcher*. U.S. Geological Survey Techniques and Methods 2A-10, 38 p.

TABLE 1
SWFL SURVEY RESULTS

Date	Time	Wind (mph) (start/end)	Temperature (F) (start-end)	Weather (start/end)	Results	Surveyors
05/29/19	0655–0830	0/3	67°–68°	2% Cloud Cover/ 0% Cloud Cover	No willow flycatchers detected	Karl Fairchild
06/05/19	0625–0802	3/1	63°–65°	100% Cloud Cover/ 100% Cloud Cover	No willow flycatchers detected	Karl Fairchild
06/17/19	0600–0727	0/2	67°–68°	100% Cloud Cover; misting/ 100% Cloud Cover; misting	No willow flycatchers detected	Karl Fairchild
06/27/19	0558–0726	0/1	68°–70°	99% Cloud Cover/ 80% Cloud Cover	No willow flycatchers detected	Karl Fairchild
07/08/19	0556–0720	1/1	69°–70°	100% Cloud Cover/ 100% Cloud Cover	No willow flycatchers detected	Karl Fairchild

SOURCE: ESA 2019.

Incidentally-observed avian special-status species included the coastal California gnatcatcher (*Polioptila californica californica*), least Bell's vireo (*Vireo bellii pusillus*), yellow warbler (*Setophaga petechia*), and yellow-breasted chat (*Icteria virens*). Coastal California gnatcatcher is a federally threatened species, least Bell's vireo is a State and federally endangered species, southern California rufous-crowned sparrow is a California Department of Fish and Wildlife (CDFW) watch list species, and yellow warbler and yellow-breasted chat are both CDFW species of special concern. These species were detected during multiple surveys.

Conclusion

Based on the results of the protocol-level SWFL surveys, the study area is not occupied by SWFL. Coastal California gnatcatcher, least Bell's vireo, southern California rufous-crowned sparrow, yellow warbler, and yellow-breasted chat were also observed on-site, as well as brown-headed cowbirds only within the traps on-site.

If there are any questions regarding this report or the results, please feel free to reach out to Maile Tanaka at 949-870-1501 or mtanaka@esassoc.com.

Sincerely,

Maile Tanaka
Managing Associate Biologist

Karl Fairchild
Associate Biologist III

Attachments:
Figure 1: Regional Map
Figure 2: Vicinity Map
Figure 3: Natural Communities
Attachment A: Avian Compendium
Attachment B: CNDDB Forms
Attachment C: Willow Flycatcher Survey and Detection Form

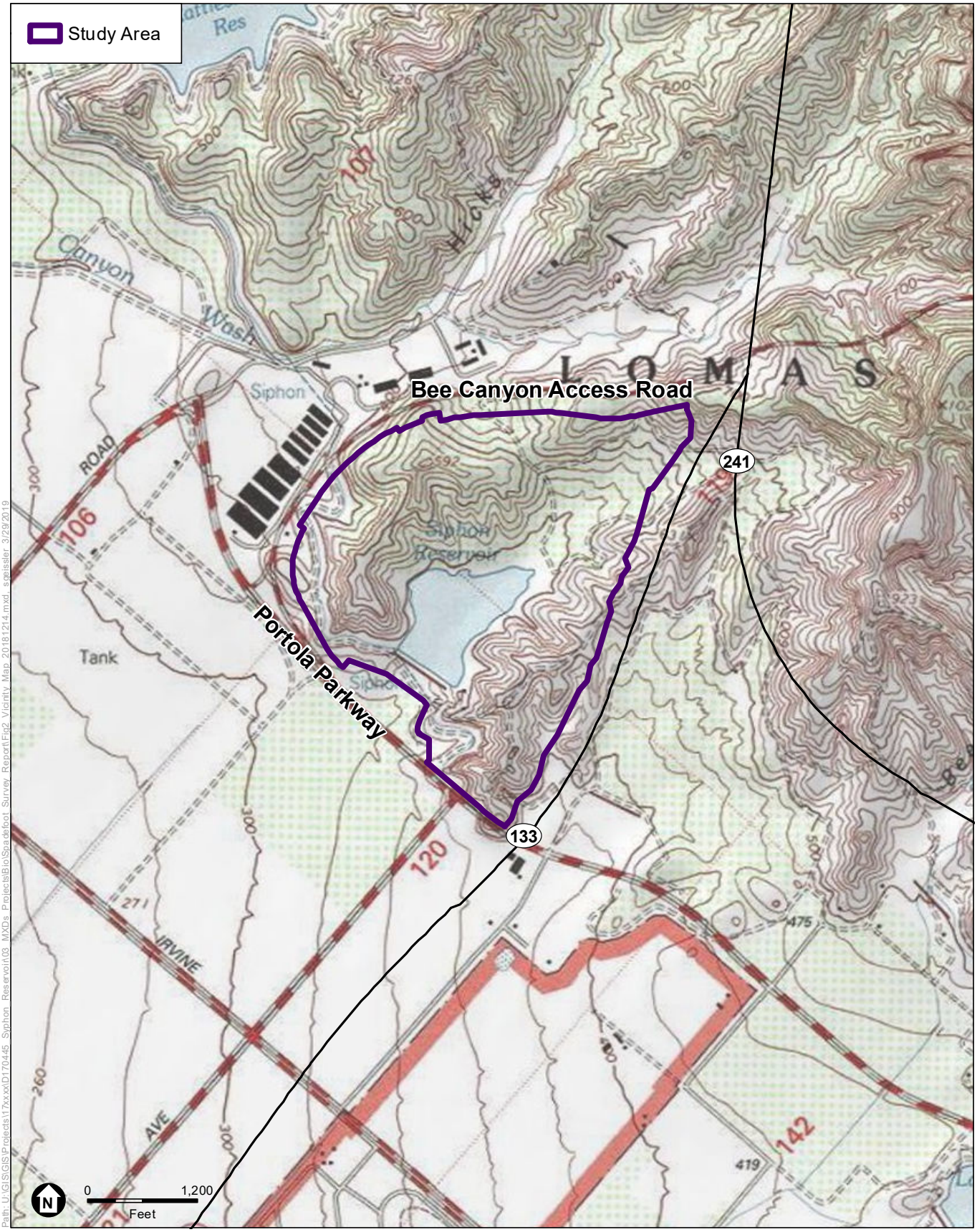


SOURCE: ESRI, 2016; OC LAFCO, 2018

Syphon Reservoir Improvement Project

Figure 1
Regional Map

ESA

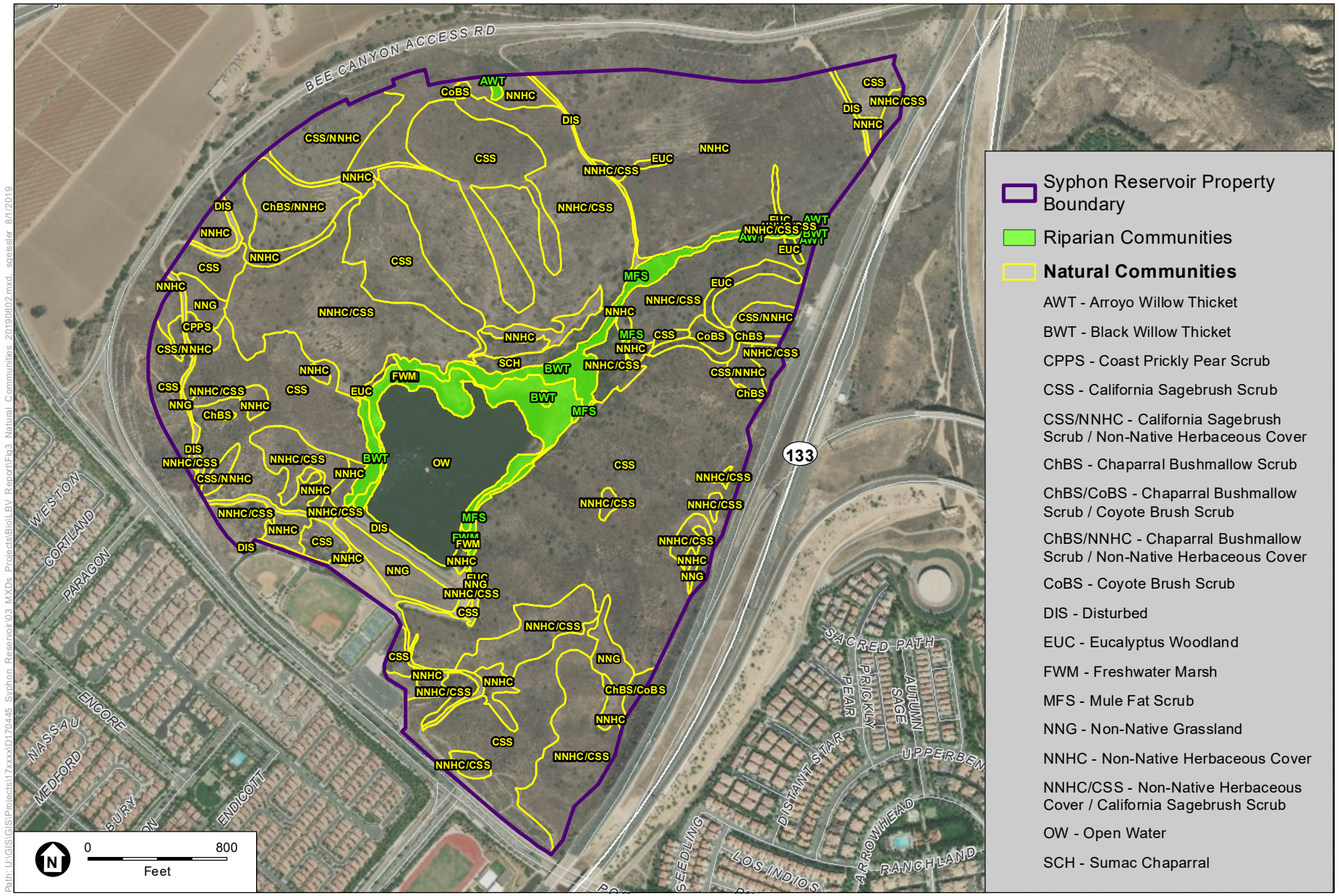


SOURCE: ESRI, 2016; El Toro USGS 7.5 minute Quadrangle

Syphon Reservoir Improvement Project

Figure 2
Vicinity Map

ESA



SOURCE: ESRI, 2016.

Syphon Reservoir Improvement Project

Figure 3

Natural Communities

ESA

ESA

ATTACHMENT A – AVIAN COMPENDIUM

Common Name	Scientific Name	5/29/19	6/5/19	6/17/19	6/27/19	7/8/19	Special Status[b]
Allen's Hummingbird	*Selasphorus sasin*	X	X	X	X	X	
American Crow	*Corvus brachyrhynchos*		X	X	X		
American Goldfinch	*Spinus tristis*				X	X	
Anna's Hummingbird	*Calypte anna*	X		X	X	X	
Ash-throated Flycatcher	*Myiarchus cinerascens*			X		X	
Barn Swallow	*Hirundo rustica*		X	X	X	X	
Bewick's Wren	*Thryomanes bewickii*	X	X	X	X	X	
Black Phoebe	*Sayomis nigricans*	X	X	X	X	X	
Black-headed Grosbeak	*Pheucticus melanocephalus*	X	X	X			
Black-necked Stilt	*Himantopus mexicanus*	X		X			
Blue-gray Gnatcatcher	*Polioptila caerulea*	X	X	X	X	X	
Blue Grosbeak	*Passerina caerulea*				X	X	
Bullock's Oriole	*Icterus bullockii*	X			X		
Bushtit	*Psaltriparus minimus*	X	X	X	X	X	
Coastal California Gnatcatcher	*Polioptila californica californica*		X	X	X	X	FESA Threatened; CDFW: SSC
California Quail	*Callipepla californica*	X	X	X	X	X	
California Thrasher	*Toxostoma redivivum*		X	X	X	X	
California Towhee	*Melozone crissalis*		X	X	X		
Caspian Tern	*Hydroprogne caspia*			X			
Cassin's Kingbird	*Tyrannus vociferans*	X	X	X	X	X	
Cliff Swallow	*Petrochelidon pyrrhonota*	X		X	X	X	
Common Raven	*Corvus corax*	X	X	X	X	X	
Common Yellowthroat	*Geothlypis trichas*	X	X	X	X	X	
Forster's Tern	*Sterna forsteri*		X				
Great Blue Heron	*Ardea herodias*	X				X	
Greater Roadrunner	*Geococcyx californianus*				X		
Greater Yellowlegs	*Tringa melanoleuca*		X				
Great-tailed Grackle	*Quiscalus mexicanus*	X					
Green Heron	*Butorides virescens*	X					
Hooded Oriole	*Icterus cucullatus*	X	X	X	X	X	
Horned Lark	*Eremophila alpestris*				X		
House Finch	*Haemorhous mexicanus*	X	X	X	X	X	
House Wren	*Troglodytes aedon*		X	X	X	X	
Killdeer	*Charadrius vociferous*	X	X	X	X	X	
Lawrence's Goldfinch	*Spinus lawrencei*				X		
Least Bell's Vireo	*Vireo bellii pusillus*	X	X	X	X	X	CESA Endangered; FESA Endangered
Lesser Goldfinch	*Spinus psaltria*	X	X	X	X	X	
Mallard	*Anas platyrhynchos*	X	X	X	X	X	
Mourning Dove	*Zenaida macroura*	X		X	X	X	
Northern Flicker	*Colaptes auratus*			X			
Northern Mockingbird	*Mimus polyglottos*	X	X	X	X	X	
Northern Rough-winged Swallow	*Stelgidopteryx serripennis*	X	X	X			
Nuttall's Woodpecker	*Dryobates nuttallii*				X	X	
Pacific-slope Flycatcher	*Empidonax difficilus*	X					
Redhead	*Aythya americana*	X	X	X	X		

ATTACHMENT A – AVIAN COMPENDIUM

Common Name	Scientific Name	5/29/19	6/5/19	6/17/19	6/27/19	7/8/19	Special Status[b]
Red-tailed Hawk	*Buteo jamaicensis*	X	X	X	X	X	
Rock Pigeon[a]	*Columba livia*					X	
Ruddy Duck	*Oxyura jamaicensis*		X	X	X		
Say's Phoebe	*Sayornis saya*			X	X		
Scaly-breasted Munia[a]	*Lonchura punctulata*	X	X	X	X	X	
Snowy Egret	*Egretta thula*	X	X	X	X	X	
Song Sparrow	*Melospiza melodia*	X	X	X	X	X	
Southern California Rufous-crowned Sparrow	*Aimophila ruficeps canescens*				X		CDFW: WL
Spotted Towhee	*Pipilo maculatus*	X		X	X	X	
Turkey Vulture	*Cathartes aura*		X	X	X		
Western Grebe	*Aechmophorus occidentalis*	X					
White-faced Ibis	*Plegadis chihi*			X	X		
White-throated Swift	*Aeronautes saxatalis*	X	X	X	X	X	
Wrentit	*Chamaea fasciata*	X	X	X	X	X	
Yellow Warbler	*Setophaga petechia*	X	X	X	X	X	CDFW: SSC
Yellow-breasted Chat	*Icteria virens*	X		X	X	X	CDFW: SSC

[a] Exotic species

[b] CESA = California Endangered Species Act; FESA = Federal Endangered Species Act; CDFW = California Department of Fish and Wildlife; WL = Watch List; SSC = Species of Special Concern.

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California Dept. of Fish & Wildlife
P.O. Box 944209
Sacramento, CA 94244-2090
CNDDB@wildlife.ca.gov

For Office Use Only
Source Code: _____ Quad Code: _____
Elm Code: _____ Occ No.: _____
EO Index: _____ Map Index: _____

Date of Field Work (mm/dd/yyyy): 05/03/2019

Clear Form

California Native Species Field Survey Form

Print Form

Scientific Name: *Polioptila californica californica*

Common Name: coastal California gnatcatcher

Species Found? (●) Yes ( ) No _____ If not found, why?

Total No. Individuals: 7 Subsequent Visit? (●) Yes ( ) No

Is this an existing NDDB occurrence? 283 Yes, Occ. # ☐ No ☐ Unk.

Collection? If yes: _____ Number _____ Museum / Herbarium

Reporter: Maile Tanaka, ESA
Address: 2121 Alton Parkway, Suite 100
Irvine, CA 92606
E-mail Address: mtanaka@esassoc.com
Phone: 949-753-7001

Plant Information
Phenology:
_____ % vegetative _____ % flowering _____ % fruiting

Animal Information
7 # adults _____ # juveniles _____ # larvae _____ # egg masses _____ # unknown
☐ wintering ☒ breeding ☐ nesting ☐ rookery ☐ burrow site ☐ lek ☐ other

Location Description ***(please attach map AND/OR fill out your choice of coordinates, below)***

County: Orange Landowner / Mgr: Irvine Ranch Water District
Quad Name: El Toro Elevation: _____
T___ R___ Sec___, ___¼ of ___ ¼, Meridian: H ( ) M ( ) S ( ) Source of Coordinates (GPS, topo. map & type): GPS
T___ R___ Sec___, ___¼ of ___ ¼, Meridian: H ( ) M ( ) S ( ) GPS Make & Model: _____
DATUM: **NAD27** ( ) **NAD83** ( ) **WGS84** ( ) Horizontal Accuracy: _____ meters/feet
Coordinate System: UTM Zone 10 ( ) UTM Zone 11 ( ) ***OR*** Geographic (Latitude & Longitude) (●)
Coordinates: 33.71573842, -117.72854097
33.71318457, -117.72793069
33.71411233, -117.73430724
33.71187830, -117.73267864
33.71188568, -117.73564123
33.70975627, -117.73310024
33.70863200, -117.72975805

Habitat Description (plants & animals) *plant communities, dominants, associates, substrates/soils, aspects/slope:*
Animal Behavior *(Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):*
California sagebrush scrub and disturbed California sagebrush scrub.
Singing males most of which were likely pairs and breeding.

Please fill out separate form for other rare taxa seen at this site.

Site Information Overall site/occurrence quality/viability (site + population): ( ) Excellent (●) Good ( ) Fair ( ) Poor
Immediate AND surrounding land use: Undeveloped reservoir surrounded by open space, agriculture, and development.
Visible disturbances: None
Threats: _____
Comments: Incidental observations of at least 7 singing males heard calling during surveys conducted from April-July 2019.

Determination: *(check one or more, and fill in blanks)*
☐ Keyed (cite reference): _____
☐ Compared with specimen housed at: _____
☐ Compared with photo / drawing in: _____
☒ By another person (name): Maile Tanaka, Jaclyn Catino-Davenport, Karl Fairchild
☐ Other: _____

Photographs: *(check one or more)*

	Slide	Print	Digital
Plant / animal	☐	☐	☐
Habitat	☐	☐	☒
Diagnostic feature	☐	☐	☐

May we obtain duplicates at our expense? (●) yes ( ) no

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California Natural Diversity Database
California Dept. of Fish & Wildlife
P.O. Box 944209
Sacramento, CA 94244-2090
CNDDB@wildlife.ca.gov

For Office Use Only
Source Code: _____ Quad Code: _____
Elm Code: _____ Occ No.: _____
EO Index: _____ Map Index: _____

Date of Field Work (mm/dd/yyyy): 06/27/2019

Clear Form

California Native Species Field Survey Form

Print Form

Scientific Name: *Aimophila ruficeps canescens*

Common Name: Southern California rufous-crowned sparrow

Species Found? (●) Yes ( ) No _____ If not found, why?

Total No. Individuals: 2 Subsequent Visit? ( ) Yes (●) No

Is this an existing NDDB occurrence? _____ Yes, Occ. # [X] No [ ] Unk.

Collection? If yes: _____ Number _____ Museum / Herbarium

Reporter: Maile Tanaka, ESA
Address: 2121 Alton Parkway, Suite 100
Irvine, CA 92606
E-mail Address: mtanaka@esassoc.com
Phone: 949-753-7001

Plant Information

Phenology:

_____ % vegetative _____ % flowering _____ % fruiting

Animal Information

1 # adults | 1 # juveniles | _____ # larvae | _____ # egg masses | _____ # unknown

[ ] wintering [X] breeding [X] nesting [ ] rookery [ ] burrow site [ ] lek [ ] other

Location Description (please attach map AND/OR fill out your choice of coordinates, below)

County: Orange Landowner / Mgr: Irvine Ranch Water District

Quad Name: El Toro Elevation: 490 ft amsl

T____ R____ Sec____, ____¼ of ____ ¼, Meridian: H ( ) M ( ) S ( )

T____ R____ Sec____, ____¼ of ____ ¼, Meridian: H ( ) M ( ) S ( )

Source of Coordinates (GPS, topo. map & type): GPS

GPS Make & Model: _____

DATUM: **NAD27** ( ) **NAD83** ( ) **WGS84** ( )

Horizontal Accuracy: _____ meters/feet

Coordinate System: UTM Zone 10 ( ) UTM Zone 11 ( ) ***OR*** Geographic (Latitude & Longitude) (●)

Coordinates: 33.715496000, -117.72805096

Habitat Description (plants & animals) *plant communities, dominants, associates, substrates/soils, aspects/slope:*

Animal Behavior *(Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):*

Disturbed California sagebrush scrub and ruderal vegetation along ridge/saddle of hill north of reservoir.
Adult observed feeding fledgling.

Please fill out separate form for other rare taxa seen at this site.

Site Information

Overall site/occurrence quality/viability (site + population): (●) Excellent ( ) Good ( ) Fair ( ) Poor

Immediate AND surrounding land use: Undeveloped reservoir surrounded by open space, agriculture, and development.

Visible disturbances: None.

Threats: _____

Comments:

Determination: *(check one or more, and fill in blanks)*

- [ ] Keyed (cite reference): _____
- [ ] Compared with specimen housed at: _____
- [ ] Compared with photo / drawing in: _____
- [X] By another person (name): Karl Fairchild
- [ ] Other: _____

Photographs: *(check one or more)*

	Slide	Print	Digital
Plant / animal	[ ]	[ ]	[ ]
Habitat	[ ]	[ ]	[X]
Diagnostic feature	[ ]	[ ]	[ ]

May we obtain duplicates at our expense? (●) yes ( ) no

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P.O. Box 944209
Sacramento, CA 94244-2090
CNDDB@wildlife.ca.gov

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Source Code: _____ Quad Code: _____
Elm Code: _____ Occ No.: _____
EO Index: _____ Map Index: _____

Date of Field Work (mm/dd/yyyy): 04/22/2019

Clear Form

California Native Species Field Survey Form

Print Form

Scientific Name: *Icteria virens*

Common Name: yellow-breasted chat

Species Found? (●) Yes ( ) No _____ If not found, why?

Total No. Individuals: 5 Subsequent Visit? (●) Yes ( ) No

Is this an existing NDDB occurrence? _____ Yes, Occ. # [X] No [ ] Unk.

Collection? If yes: _____ Number _____ Museum / Herbarium

Reporter: Maile Tanaka, ESA
Address: 2121 Alton Parkway, Suite 100
Irvine, CA 92606
E-mail Address: mtanaka@esassoc.com
Phone: 949-753-7001

Plant Information

Phenology:

_____ % vegetative _____ % flowering _____ % fruiting

Animal Information

5 # adults _____ # juveniles _____ # larvae _____ # egg masses _____ # unknown

[ ] wintering [X] breeding [ ] nesting [ ] rookery [ ] burrow site [ ] lek [ ] other

Location Description (please attach map AND/OR fill out your choice of coordinates, below)

County: Orange Landowner / Mgr: Irvine Ranch Water District

Quad Name: El Toro Elevation: _____

T___ R___ Sec___, ___¼ of ___ ¼, Meridian: H ( ) M ( ) S ( ) Source of Coordinates (GPS, topo. map & type): GPS

T___ R___ Sec___, ___¼ of ___ ¼, Meridian: H ( ) M ( ) S ( ) GPS Make & Model: _____

DATUM: **NAD27** ( ) **NAD83** ( ) **WGS84** ( ) Horizontal Accuracy: _____ meters/feet

Coordinate System: UTM Zone 10 ( ) UTM Zone 11 ( ) ***OR*** Geographic (Latitude & Longitude) (●)

Coordinates: 33.71433324, -117.72496433
33.71407166, -117.72729259
33.71218457, -117.73023584
33.71256261, -117.72748380
33.70994554, -117.72976378

Habitat Description (plants & animals) *plant communities, dominants, associates, substrates/soils, aspects/slope:*

Animal Behavior *(Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):*

Riparian arroyo and black willow thickets, mule fat scrub.
Singing males most of which were likely pairs and breeding.

Please fill out separate form for other rare taxa seen at this site.

Site Information

Overall site/occurrence quality/viability (site + population): ( ) Excellent (●) Good ( ) Fair ( ) Poor

Immediate AND surrounding land use: Undeveloped reservoir surrounded by open space, agriculture, and development.

Visible disturbances: None.

Threats: _____

Comments: Incidental observations of at least 5 singing males heard calling during surveys conducted from April-July 2019.

Determination: *(check one or more, and fill in blanks)*

- [ ] Keyed (cite reference): _____
- [ ] Compared with specimen housed at: _____
- [ ] Compared with photo / drawing in: _____
- [X] By another person (name): Maile Tanaka, Karl Fairchild
- [ ] Other: _____

Photographs: *(check one or more)*

	Slide	Print	Digital
Plant / animal	[ ]	[ ]	[ ]
Habitat	[ ]	[ ]	[X]
Diagnostic feature	[ ]	[ ]	[ ]

May we obtain duplicates at our expense? (●) yes ( ) no

Mail to:
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California Dept. of Fish & Wildlife
P.O. Box 944209
Sacramento, CA 94244-2090
CNDDB@wildlife.ca.gov

For Office Use Only
Source Code: _____ Quad Code: _____
Elm Code: _____ Occ No.: _____
EO Index: _____ Map Index: _____

Date of Field Work (mm/dd/yyyy): 06/05/2019

Clear Form

California Native Species Field Survey Form

Print Form

Scientific Name: *Setophaga petechia*

Common Name: yellow warbler

Species Found? (●) Yes ( ) No _____ If not found, why?

Total No. Individuals: 5 Subsequent Visit? (●) Yes ( ) No

Is this an existing NDDB occurrence? _____ Yes, Occ. # [X] No [ ] Unk.

Collection? If yes: _____ Number _____ Museum / Herbarium

Reporter: Maile Tanaka, ESA
Address: 2121 Alton Parkway, Suite 100
Irvine, CA 92606
E-mail Address: mtanaka@esassoc.com
Phone: 949-753-7001

Plant Information
Phenology:
_____ % vegetative _____ % flowering _____ % fruiting

Animal Information
5 # adults _____ # juveniles _____ # larvae _____ # egg masses _____ # unknown
[ ] wintering [X] breeding [X] nesting [ ] rookery [ ] burrow site [ ] lek [ ] other

Location Description ***(please attach map AND/OR fill out your choice of coordinates, below)***

County: Orange Landowner / Mgr: Irvine Ranch Water District
Quad Name: El Toro Elevation: _____
T___ R___ Sec___, ___¼ of ___ ¼, Meridian: H( ) M( ) S( ) Source of Coordinates (GPS, topo. map & type): GPS
T___ R___ Sec___, ___¼ of ___ ¼, Meridian: H( ) M( ) S( ) GPS Make & Model: _____
DATUM: **NAD27** ( ) **NAD83** ( ) **WGS84** ( ) Horizontal Accuracy: _____ meters/feet
Coordinate System: UTM Zone 10 ( ) UTM Zone 11 ( ) ***OR*** Geographic (Latitude & Longitude) (●)
Coordinates: 33.71351648, -117.72724222
33.71179387, -117.72798946
33.71203387, -117.73142631
33.71036455, -117.73201018
33.71012740, -117.72967475

Habitat Description (plants & animals) *plant communities, dominants, associates, substrates/soils, aspects/slope:*
Animal Behavior *(Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):*
Riparian arroyo and black willow thickets, mule fat scrub.
Singing males most of which were likely pairs and breeding; in addition, one family group of adults feeding fledgling.

Please fill out separate form for other rare taxa seen at this site.

Site Information Overall site/occurrence quality/viability (site + population): ( ) Excellent (●) Good ( ) Fair ( ) Poor
Immediate AND surrounding land use: Undeveloped reservoir surrounded by open space, agriculture, and development.
Visible disturbances: None.
Threats: _____
Comments: Incidental observations of at least 5 singing males heard calling during surveys conducted from April-July 2019.

Determination: *(check one or more, and fill in blanks)*
[ ] Keyed (cite reference): _____
[ ] Compared with specimen housed at: _____
[ ] Compared with photo / drawing in: _____
[X] By another person (name): Karl Fairchild
[ ] Other: _____

Photographs: *(check one or more)*

	Slide	Print	Digital
Plant / animal	[ ]	[ ]	[ ]
Habitat	[ ]	[ ]	[X]
Diagnostic feature	[ ]	[ ]	[ ]

May we obtain duplicates at our expense? (●) yes ( ) no

Appendix 1. Willow Flycatcher Survey and Detection Form

Always check the U.S. Fish and Wildlife Service Arizona Ecological Services Field Office web site (http://www.fws.gov/southwest/es/arizona/) for the most up-to-date version.

Willow Flycatcher (WIFL) Survey and Detection Form (revised April 2010)

Site Name Syphon Reservoir State CA County Orange
USGS Quad Name El Toro Elevation 113 (meters)
Creek, River, Wetland, or Lake Name Syphon Reservoir
Is copy of USGS map marked with survey area and WIFL sightings attached (as required)? ***Yes*** X ***No*** ____

Survey Coordinates: Start: E 432341 N 3730110 UTM Datum NAD 1983 (See instructions)
Stop: E 432147 N 3730231 UTM Zone 11S
If survey coordinates changed between visits, enter coordinates for each survey in comments section on back of this page.

***** Fill in additional site information on back of this page *****

Survey # / Observer(s) (Full Name)	Date (m/d/y) Survey time	Number of Adult WIFLs	Estimated Number of Pairs	Estimated Number of Territories	Nest(s) Found? Y or N / If Yes, number of nests	Comments (e.g., bird behavior; evidence of pairs or breeding; potential threats [livestock, cowbirds, *Diorhabda* spp.]). If *Diorhabda* found, contact USFWS and State WIFL coordinator	GPS Coordinates for WIFL Detections (this is an optional column for documenting individuals, pairs, or groups of birds found on each survey). Include additional sheets if necessary.			
							# Birds	Sex	UTM E	UTM N
Survey # 1 Observer(s) K. Fairchild	Date 05/21/2019 Start 0655 Stop 0830 Total hrs 1.6	0	0	0	N	Habitat marginal, no willow flycatchers detected				
Survey # 2 Observer(s) K. Fairchild	Date 06/05/2019 Start 0625 Stop 0802 Total hrs 1.6	0	0	0	N	Habitat marginal, no willow flycatchers detected				
Survey # 3 Observer(s) K. Fairchild	Date 06/17/2019 Start 0600 Stop 0727 Total hrs 1.4	0	0	0	N	Habitat marginal, no willow flycatchers detected				
Survey # 4 Observer(s) K. Fairchild	Date 06/27/2019 Start 0558 Stop 0726 Total hrs 1.5	0	0	0	N	Habitat marginal, no willow flycatchers detected				
Survey # 5 Observer(s) K. Fairchild	Date 07/08/2019 Start 0556 Stop 0720 Total hrs 1.4	0	0	0	N	Habitat marginal, no willow flycatchers detected				

Overall Site Summary Totals do not equal the sum of each column. Include only resident adults. Do not include migrants, nestlings, and fledglings. Be careful not to double count individuals. Total Survey Hrs 7.5	Total Adult Residents	Total Pairs	Total Territories	Total Nests	Were any Willow Flycatchers color-banded? Yes___ No X If yes, report color combination(s) in the comments section on back of form and report to USFWS.
	0	0	0	0	

Reporting Individual Karl Fairchild Date Report Completed July 31, 2019
US Fish and Wildlife Service Permit # TE-92799B-2 State Wildlife Agency Permit # SC-11720

Submit form to USFWS and State Wildlife Agency by September 1st. Retain a copy for your records.

Fill in the following information completely. <u>Submit</u> form by September 1st. Retain a copy for your records.

Reporting Individual Karl Fairchild Phone # 541-609-1038
Affiliation Environmental Science Assoicates E-mail kfairchild@esassoc.com
Site Name Syphon Reservoir Date Report Completed July 31, 2019

Did you verify that this site name is consistent with that used in previous years? Yes ____ No _____ Not Applicable X
If site name is different, what name(s) was used in the past?_____
If site was surveyed last year, did you survey the same general area this year? Yes ____ No ____ If no, summarize below.
Did you survey the same general area during each visit to this site this year? Yes X No ____ If no, summarize below.

Management Authority for Survey Area : Federal____ Municipal/County X State ____ Tribal ____ Private ____
Name of Management Entity or Owner (e.g., Tonto National Forest) Irvine Ranch Water District

Length of area surveyed: _____ (meters)

Vegetation Characteristics: Mark the category that best describes the predominant tree/shrub foliar layer at this site (check one):

_____ Native broadleaf plants (entirely or almost entirely, > 90% native, includes high-elevation willow)

_____ Mixed native and exotic plants (mostly native, 50 - 90% native)

X_____ Mixed native and exotic plants (mostly exotic, 50 - 90% exotic)

_____ Exotic/introduced plants (entirely or almost entirely, > 90% exotic)

Identify the 2-3 predominant tree/shrub species in order of dominance. Use scientific name.
Salix goodingii, Baccharis salicifolia, Salix lasiolepis

Average height of canopy (Do not include a range): 5 (meters)

Attach copy of USGS quad/topographical map (REQUIRED) of survey area, outlining survey site and location of WIFL detections.
Attach sketch or aerial photo showing site location, patch shape, survey route, location of any WIFLs or WIFL nests detected.
Attach photos of the interior of the patch, exterior of the patch, and overall site; describe any unique habitat features.

Comments (attach additional sheets if necessary)

Habitat is very patchy with disjunct thickets of black willow and arroyo willow. The single large thicket of black willow is partially intermixed with mulefat and eucalyptus.

Latitude/Longitude:
Start: 33.709N 117.730W
End: 33.709N 117.732W

Territory Summary Table. Provide the following information for each verified territory at your site.

Territory Number	All Dates Detected	UTM N	UTM E	Pair Confirmed? Y or N	Nest Found? Y or N	Description of How You Confirmed Territory and Breeding Status (e.g., vocalization type, pair interactions, nesting attempts, behavior)

Attach additional sheets if necessary

Appendix D

Noise and Vibration Technical Report

ESA

SYPHON RESERVOIR IMPROVEMENT PROJECT

Noise and Vibration Technical Report

Prepared for
Irvine Ranch Water District
15600 Sand Canyon Ave.
Irvine, CA 92618

March 2021

ESA

SYPHON RESERVOIR IMPROVEMENT PROJECT

Noise and Vibration Technical Report

Prepared for
Irvine Ranch Water District
15600 Sand Canyon Ave.
Irvine, CA 92618

March 2021

2121 Alton Parkway
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D201700445.00

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ACRONYMS AND ABBREVIATIONS

Acronym	Description
amsl	above mean sea level
ANSI	American National Standard Institute
Caltrans	California Department of Transportation
CEQA	California Environmental Quality Act
City	City of Irvine
CNEL	Community Noise Equivalent Level
COG	Council of Governments
dB	decibel
dBA	A-weighted dB scale
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
I	Interstate
IRWD	Irvine Ranch Water District
L_{eq}	Equivalent Sound Level
L_{max}	Maximum Noise Level
L_{min}	Minimum Noise Level
NB	northbound
PPV	peak particle velocity
Project	Syphon Reservoir Improvement Project
ROW	Right-of-way
SR	State Route
TeNS	Technical Noise Supplement
USEPA	U.S. Environmental Protection Agency
WRP	Water Recycling Plant

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EXECUTIVE SUMMARY

The purpose of this Noise and Vibration Technical Report is to assess and discuss the impacts of potential noise and vibration impacts that may occur with the implementation of the proposed Syphon Reservoir Improvement Project (proposed project) located in unincorporated County of Orange and within the City of Irvine's (City) sphere of influence. The Syphon Reservoir is an existing recycled water storage reservoir in Irvine Ranch Water District's (IRWD's) service area. The proposed project would increase the capacity of the existing Syphon Reservoir and replace the existing engineered dam with a new and larger engineered dam. The proposed project would allow the storage of additional recycled water produced at the Michelson Water Recycling Plant (WRP) during periods of low demand (winter months) for use during periods of high demand (summer months).

The analysis describes the existing noise environment in the vicinity of the project limits, estimates future noise and vibration levels at surrounding land uses resulting from construction and operation of the project, and identifies the potential for significant noise impacts based on applicable noise and vibration threshold of significance. Noise worksheets and technical data used in this analysis are provided in Appendices A and B of this report. The findings of the analyses are as follows:

- Construction activities would be required to comply with the City's allowable construction hours of between the hours of 7:00 A.M. to 7:00 P.M. Mondays through Fridays, and 9:00 A.M. to 6:00 P.M. on Saturdays. Therefore, construction noise impacts generated by the proposed project would be less than significant and would not require mitigation measures.
- Off-site haul truck trips and vendor deliveries would occur only during daytime hours within the allowable hours specified in the City's Municipal Code. Therefore, noise impacts from off-site construction traffic would be less than significant, and no mitigation measures are required.
- Project operational traffic would not increase from existing conditions; therefore, noise levels at off-site noise-sensitive uses in the project area would not increase with the operation of the project. Operational traffic-related noise impacts would be less than significant.
- Temporary construction-related vibration would not exceed the established threshold for building damage and human annoyance to the adjacent residential uses adjacent to the project area. Vibration generated by on-site construction activities would have a less than significant impact.
- The project area is not located within the vicinity of a private airstrip. The project is also not located within an airport land use plan or within 2 miles of a public airport or public use airport. Therefore, the project would have no impact related to public or private airport/airstrip noise levels.

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SECTION 1
Introduction

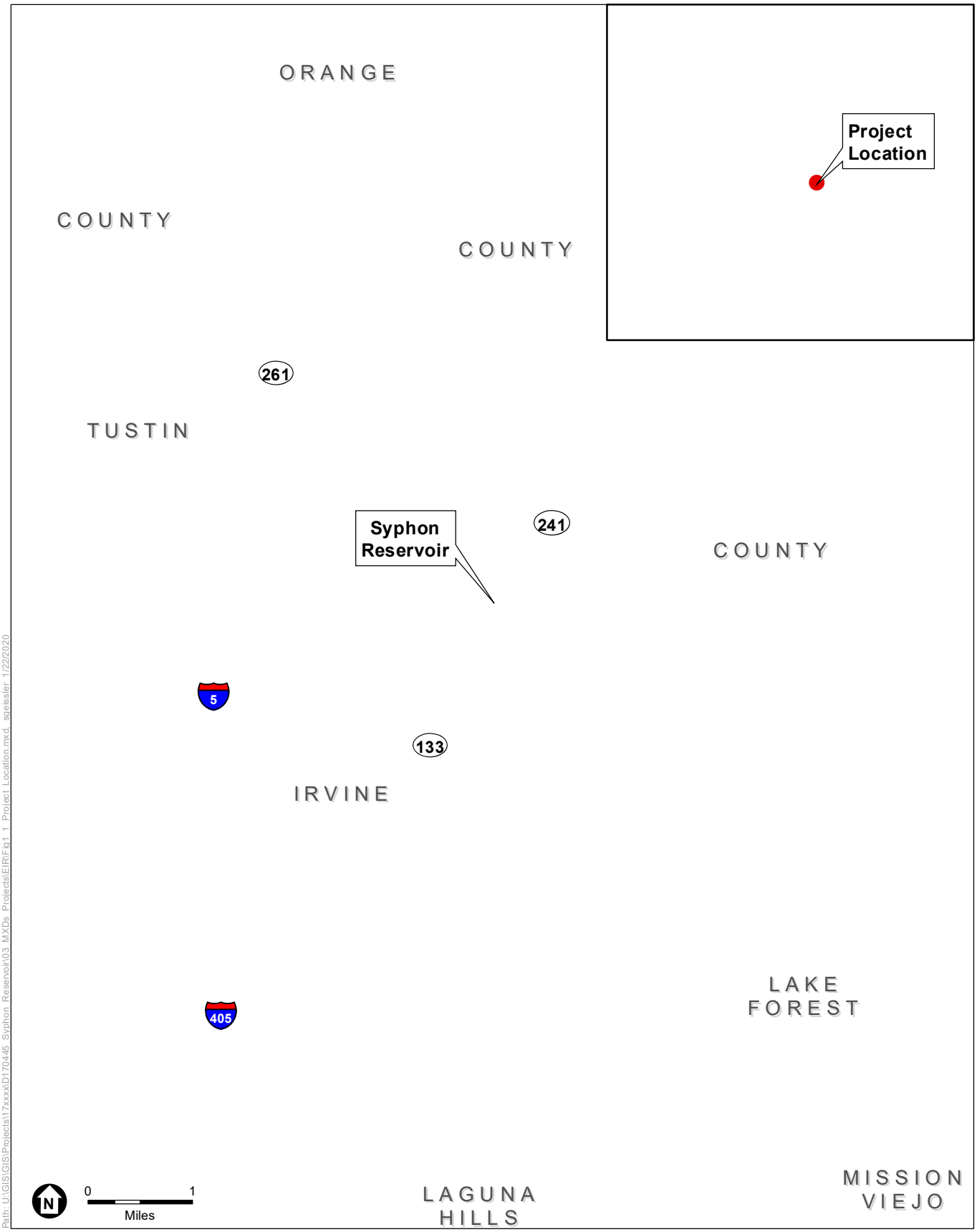
IRWD is proposing to implement the proposed project. The Syphon Reservoir is an existing recycled water storage reservoir in IRWD's service area. The proposed project would increase the capacity of the existing Syphon Reservoir and replace the existing engineered dam with a new and larger engineered dam. The proposed project would allow the storage of additional recycled water produced at the Michelson WRP during periods of low demand (winter months) for use during periods of high demand (summer months).

An acoustical study has been conducted with respect to potential noise and vibration impacts from construction activities, surface transportation, and other aspects of Project operations that are noise and vibration intensive and that have the potential to impact existing off-site noise sensitive land uses and existing on- and off-site vibration-sensitive land uses. The objectives of this noise study are to:

1. Evaluate construction-related noise and vibration impacts and the traffic and operational noise and vibration impacts to noise sensitive receptors;
2. Provide noise mitigation measures, as required, to meet applicable noise regulations and standards including interior sound level standards as specified by the City or the County.

1.1 Project Location

The proposed project would be implemented within IRWD's service area at the location of the existing Syphon Reservoir, northeast of Portola Parkway between Bee Canyon Access Road and State Route 133 (SR-133) in the County of Orange (see **Figure 1**). The Crean Lutheran High School Athletic Complex is located between Portola Parkway and the toe of the existing dam. Residential neighborhoods are located on the southwest side of Portola Parkway. A single-family residence is also located north of the project site, on the north side of Bee Canyon Access Road. The ground surrounding the reservoir is hilly with ridgelines and terraced slopes.



SOURCE: ESRI, 2016; OC LAFCO, 2018

Syphon Reservior Improvement Project

Figure 1
Project Location

ESA

1.2 Existing Site Conditions

The existing engineered dam is comprised of compacted on-site geologic materials, approximately 59 feet high, with a crest length of 843 feet and width of 10 to 12 feet. The surface area of the existing reservoir is approximately 28 acres when filled to capacity, and the current capacity of the reservoir below the existing spillway crest is approximately 535 acre-feet (AF). The 2011 topography survey of the dam indicates its crest is at an elevation of 387.7 feet above mean sea level (amsl).

The existing dam spillway was constructed as a 12-foot wide, broad-crested weir, located at the left abutment of the dam with a crest at 380 feet amsl. The reservoir does not receive water from rivers or streams. The reservoir includes a small watershed that is approximately 205 acres and not capable of generating significant amounts of runoff that need to be managed through the use of the spillway.

1.3 Project Description

The proposed project primarily involves the expansion of three on-site facilities: Syphon Reservoir Dam, Syphon Reservoir, and the Syphon Treatment Facilities. Other operational design features would include an internal seepage control system within the new engineered dam; a circulation/aeration system for the reservoir; new onsite access and maintenance roads; a wetland mitigation area; and potential recreational facilities.

The delivery of recycled water to and from Syphon Reservoir would be accomplished with existing offsite facilities. Modifications to offsite facilities would be limited to the addition of pumps within the existing structures as further described below. Existing offsite conveyance facilities would be used to deliver tertiary-treated recycled water from the Michelson WRP to the Eastwood Recycled Water Pump Station, and then to Syphon Reservoir via an existing 36-inch recycled water pipeline. The pump station structure is currently under construction. When completed, the Eastwood Recycled Water Pump Station can accommodate the Syphon Reservoir Improvement Project with additional pump equipment. Installation of the additional pump equipment would be coordinated as a separate "equipping project" in parallel to the construction of the proposed Syphon Reservoir improvements. The existing Highline Canal would be abandoned in place and no longer used to deliver water to Syphon Reservoir from IRWD's Rattlesnake Reservoir. Under normal operating conditions, all flow out of Syphon Reservoir would be conveyed back to Eastwood Recycled Water Pump Station through the same 36-inch recycled water pipeline, for connection to IRWD's recycled water distribution system.

1.3.1 Dam Replacement

The proposed project would replace the existing engineered dam with a new engineered dam, which would be an earthfill embankment with upstream and downstream slopes. Onsite materials would be obtained from excavation of the existing earthen embankment dam and spillway, excavation below the new dam footprint and borrow excavations within the existing and proposed reservoir area. The proposed project would require an estimated 2.3 million cubic yards of fill, of which approximately 2.2 million cubic yards would be available onsite. Approximately 0.1

million (100,000) cubic yards of material would be imported from offsite sources, including rock, gravel and other materials required to construct portions of the dam. Similar to the existing dam, it is a requirement of the California Department of Water Resources (DWR), Division of Safety of Dams requirements (DSOD) that a spillway be included with the new dam to protect the reservoir from overtopping. The new spillway would be constructed and lined with reinforced concrete to prevent erosion of the abutment and embankment materials.

1.3.2 Reservoir Enlargement

The replacement dam would increase the reservoir's capacity from approximately 500 AF to approximately 5,000 AF. The existing reservoir ground surface would be excavated non-uniformly to obtain approximately 2.2 million cubic yards of material to construct the new engineered dam.

A new approximately 42-inch inlet/outlet conduit would be constructed to connect two proposed inlet/outlet ports along the north-facing reservoir slope to the existing onsite 36-inch inlet/outlet pipeline that ends near the toe of the existing dam. Similar to the existing reservoir, the proposed project would require a water circulation/aeration system to maintain water quality within the reservoir. The water circulation/aeration system will be detailed during final design, but would likely consist of a compressed air distribution system or surface mixer/aeration system.

1.3.3 Treatment Facilities

The existing strainer and disinfection facilities would be demolished, reconstructed and expanded at the toe of the new dam to provide filtration, chlorination and de-chlorination facilities (treatment facilities). The treatment facilities could be constructed at one of two locations, both of which are located close to the toe of the existing dam. The layout would consist of an enclosed masonry building. The footprint of the proposed treatment facilities would be determined during the detailed design, but is anticipated to be approximately 40 feet by 160 feet. A masonry block wall building would house the storage tanks, metering pumps, and control system.

1.3.4 Access and Maintenance Roads

The primary access point for construction traffic and future IRWD operation and maintenance is anticipated to be from the intersection at Portola Parkway and Sand Canyon Avenue. As part of the proposed project, the existing intersection and associated traffic lights would be modified to allow construction and future IRWD access through the intersection into the District's property. Construction vehicles and IRWD vehicles would also leave the site through the same intersection. Cross walks and associated pedestrian signals would also be modified to allow safe pedestrian crossing in both directions.

An unpaved road currently exists on the District's property in the vicinity of the intersection at Portola Parkway and Sand Canyon Avenue, which was used to access and maintain the existing Highline Canal. As part of the proposed project, this dirt road would be utilized and improved to allow two lanes (one in each direction) for ingress and egress for the construction and IRWD operation traffic. As part of the access road improvements, it is anticipated that excavation into

the existing slope and construction of a retaining wall may be necessary to allow trucks to make the left turn onto the existing highline canal road after passing through the intersection. Potential secondary construction access may be considered through existing IRWD maintenance roads off of Bee Canyon Access Road. If used, these roads would be considered as one-way access points and limited to specific construction activities as further determined during the detailed design phase.

1.3.5 On-Site Wetland and Riparian Mitigation Areas

At least 12.3 acres of riparian/wetland habitat consisting of native woody riparian vegetation and freshwater marsh habitat is proposed to be established onsite to replace habitat displaced by construction. Both freshwater marsh and woody riparian vegetation are proposed to be placed within a large patch at the northeast end of the proposed reservoir. Also, much of the woody riparian replacement habitat would be situated within a strip that would extend around the proposed reservoir at the same elevation as the planned water surface elevation when the reservoir is full. A shallow trough would be constructed around the reservoir perimeter (excluding the dam face), which would support native trees and shrubs (e.g., willows, mulefat, etc.) forming a belt of riparian vegetation around the upper edge of the artificial lake. In addition to reserving a strip around the edge of the expanded reservoir for woody riparian habitat, an approximately 6- to 8-acre wetland area would also be established within a flat area extending northeast of the expanded reservoir.

1.3.6 Recreational Facilities

During project design, IRWD would consider passive recreational facilities compatible with the project site. Recreational facilities could include a walking trail along existing access roads at the project site. This proposed walking trail could be located in the south and west portions of the project site, beginning at the new permanent access road at Portola Parkway and Sand Canyon Avenue and traveling along that route, across the dam crest, and following the alignment of the existing Highline Canal, which would be abandoned with implementation of the proposed project. Offsite recreational facilities are not part of this project and would be analyzed under separate environmental review if/when future offsite recreational facilities are established. Final design would determine the appropriateness and location of the proposed walking trail on existing access roads and any other optional recreational facilities.

1.3.7 Additional Geotechnical Investigations

IRWD previously completed a comprehensive geotechnical investigation of the site from which the resulting data would be used during final design to develop the detailed construction documents. During the design phase, additional geotechnical investigations may need to be performed. If additional investigations are deemed necessary, the investigations may include the performance of exploratory test pits, soil borings, packer testing, and/or non-intrusive geologic investigations and observations. The additional geotechnical investigations, if needed, would remain within the proposed limits of disturbance defined by the project and would be mitigated as part of the overall project.

1.3.8 Technical Advisory Group

During the design phase, IRWD intends to establish an independent Technical Advisory Group (TAG) comprised of nationally recognized industry experts in the disciplines of dam geology/site characterization, seismic analysis, hydrology/hydraulics, dam construction, and potential failure mode analysis and RIDM. The purpose of the TAG is to provide an independent assessment of the design development including, but not limited to, review of design criteria, design details, technical approach, and other aspects of the design engineer's work to confirm the project design is in full compliance with governing standards and requirements.

1.4 Project Construction

Construction of the proposed project is estimated to require a total of 41 months. The preconstruction activities would begin in the fall of 2022 and would involve approximately 5 months of access road improvements. Preconstruction would be followed by approximately 36 months for construction of the new dam, reservoir, and associated facilities, depending on weather conditions and other variables. Construction is currently anticipated to begin in 2023. Most construction activities would be limited to 7:00 a.m. to 7:00 p.m. Monday through Friday and 9:00 am to 6:00 p.m. on Saturday. If construction work is conducted outside of these hours, IRWD would secure a variance/waiver from the appropriate entity. Construction of the proposed project would include activities implemented in phases as outlined below, which may involve overlap. Construction of the proposed project would include activities implemented in phases as outlined below in **Table 1**, which may involve overlap.

TABLE 1
CONSTRUCTION SCHEDULE

Phases	Start Date	End Date
Preconstruction Activities		
Drain Reservoir[a]	9/12/2022	2/24/2023
Vegetation Clearing	9/12/2022	11/4/2022
Access Routes/Intersection Improvements	9/12/2022	1/27/2023
Excavation of Sediment/Existing Dam		
Mobilization, site prep/Staging Areas	1/30/2023	3/24/2023
Upstream Excavation and Foundation Treatment	3/27/2023	8/11/2023
Dam Excavation and Foundation Treatment	8/14/2023	11/3/2023
Construction of Dam/Spillway/Reservoir		
Install Inlet/Outlet	9/25/2023	11/10/2023
Install Embankment to Bottom of Blanket Drain	11/13/2023	1/5/2024
Install Blanket Drain	1/8/2024	3/29/2024
Install Chimney/Remaining Embankment	4/1/2024	2/28/2025
Spillway Construction	12/9/2024	4/25/2025
Construction of Filtration/Chlor/Dechlor Facility	3/3/2025	1/30/2026

Phases	Start Date	End Date
Wetlands/Riparian Installation	3/3/2025	5/23/2025
Installation of Recreation Facilities	4/2/2025	7/18/2025
Demobilization	2/2/2026	3/13/2026

NOTES:

[a] This phase was not modeled as it is remote activity that requires no on-site work.

SOURCE: IRWD 2020

1.5 Noise and Vibration Fundamentals

1.5.1 Noise

Sound can be described as the mechanical energy of a vibrating object transmitted by pressure waves through a liquid or gaseous medium (e.g., air). Noise is generally defined as unwanted sound (i.e., loud, unexpected, or annoying sound). Acoustics is defined as the physics of sound. In acoustics, the fundamental scientific model consists of a sound (or noise) source, a receiver, and the propagation path between the two. The loudness of the noise source and obstructions or atmospheric factors affecting the propagation path to the receiver determines the sound level and characteristics of the noise perceived by the receiver. Acoustics primarily addresses the propagation and control of sound.

Sound, traveling in the form of waves from a source, exerts 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 feeling and pain, respectively. 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, with audible frequencies of the sound spectrum ranging from 20 to 20,000 Hz. The typical human ear is not equally sensitive to this frequency range. As a consequence, 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 these extremely low and extremely high frequencies. This method of frequency filtering or weighting is referred to as A-weighting, expressed in units of A-weighted decibels (dBA), which is typically applied to community noise measurements. Some representative common outdoor and indoor noise sources and their corresponding A-weighted noise levels are shown in **Figure 2**.

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. However, noise levels rarely persist at that level over a long period of time. Rather, community noise varies continuously over a period of time with respect to the sound sources contributing to the community noise environment. Community noise is primarily the product of many distant noise sources, which constitute a relatively stable background noise exposure, with many of 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 changes in traffic volume. What makes community noise 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.

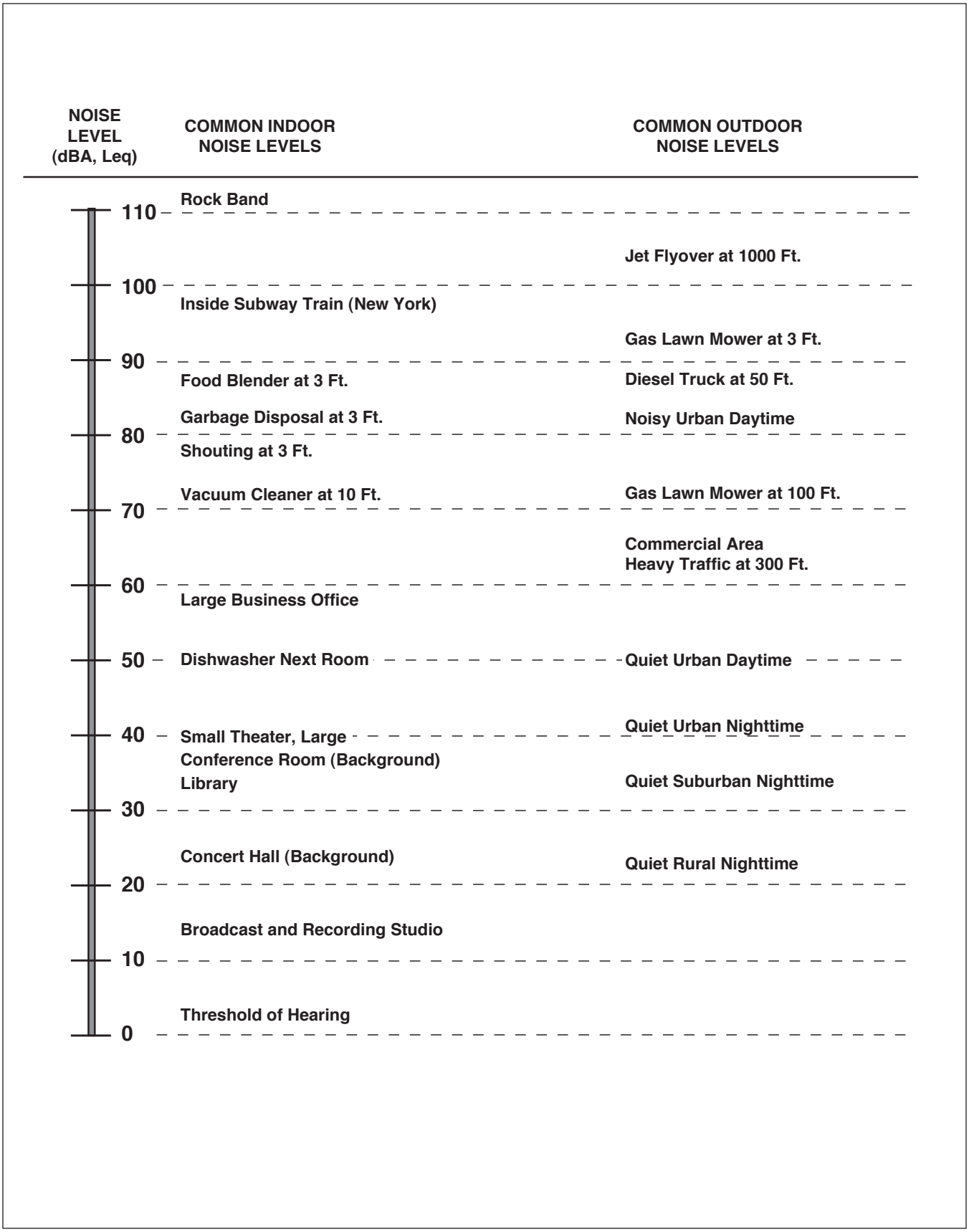
These successive additions of sound to the community noise environment change the community noise level from instant to instant, requiring the noise exposure to be measured over periods of time to legitimately characterize a community noise environment and evaluate cumulative noise impacts. The following noise descriptors are used to characterize environmental noise levels over time, which are applicable to the proposed project.

L_{eq}: The equivalent sound level over a specified period of time, typically, 1 hour ($L_{eq}(1)$). The Leq 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.

CNEL: The Community Noise Equivalent Level (CNEL) is the average A-weighted noise level during a 24-hour day that includes an addition of 5 dB to measured noise levels between the hours of 7:00 a.m. to 10:00 p.m. and an addition of 10 dB to noise levels between the hours of 10:00 p.m. to 7:00 a.m. to account for noise sensitivity in the evening and nighttime, respectively.



D170230.00

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

Syphon Reservoir Improvement Project

Figure 2
Decibel Scale and Common Noise Sources

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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, psychological, and physiological effects, the principal human responses to typical environmental noise exposure are related to subjective effects and interference with activities. Interference effects 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.

With regard to the subjective effects, the responses of individuals to similar noise events are diverse and 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. With regard to increases in A-weighted noise level, the following relationships generally occur[1]:

- Except in carefully controlled laboratory experiments, a change of 1 dBA in ambient noise levels cannot be perceived.
- Outside of the laboratory, a 3 dBA change in ambient noise levels is considered to be a barely perceivable difference.
- A change in ambient noise levels of 5 dBA is considered to be a readily perceivable difference.
- A change in ambient noise levels of 10 dBA is subjectively heard as doubling of the perceived loudness.

[1] California Department of Transportation (Caltrans), Technical Noise Supplement (TeNS), Section 2.2.1, September, 2013.

These relationships occur in part because of the logarithmic nature of sound and the decibel scale. The human ear perceives sound in a non-linear fashion; therefore, the dBA scale was developed. Because the dBA scale is based on logarithms, two noise sources do not combine in a simple additive fashion, but rather logarithmically. Under the dBA scale, a doubling of sound energy corresponds to a 3 dBA increase. In other words, when two sources are each producing sound of the same loudness, the resulting sound level at a given distance would be approximately 3 dBA higher than one of the sources under the same conditions. For example, if two identical noise sources produce noise levels of 50 dBA, the combined sound level would be 53 dBA, not 100 dBA. Under the dBA scale, three sources of equal loudness together produce a sound level of approximately 5 dBA louder than one source, and ten sources of equal loudness together produce a sound level of approximately 10 dBA louder than the single source.[2]

Noise Attenuation

When noise propagates over a distance, the noise level reduces with distance depending on the type of noise source and the propagation path. Noise from a localized source (i.e., point source) propagates uniformly outward in a spherical pattern, referred to as "spherical spreading." Stationary point sources of noise, including stationary mobile sources such as idling vehicles, attenuate (i.e., reduce) at a rate of between 6 dBA for acoustically "hard" sites and 7.5 dBA for "soft" sites for each doubling of distance from the reference measurement, as their energy is continuously spread out over a spherical surface (e.g., for hard surfaces, 80 dBA at 50 feet attenuates to 74 at 100 feet, 68 dBA at 200 feet, etc.). 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 reduction in noise levels with distance (i.e., distance loss) 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, which in addition to geometric spreading, provides an excess ground attenuation value of 1.5 dBA (per doubling distance).[3] Most sites are a combination of both hard and soft surfaces; therefore, using the hard site criteria of 6 dBA is the more conservative approach.

Roadways and highways consist of several localized noise sources on a defined path, and hence are treated as "line" sources, which approximate the effect of several point sources. Noise from a line source propagates over a cylindrical surface, often referred to as "cylindrical spreading." Line sources (e.g., traffic noise from vehicles) 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.[4] Therefore, noise due to a line source attenuates less with distance than that of a point source with increased distance.

Additionally, receptors located downwind from a noise source can be exposed to increased noise levels relative to calm conditions, whereas locations upwind can have lowered noise levels. Atmospheric temperature inversion (i.e., increasing temperature with elevation) can increase

2 Caltrans, Technical Noise Supplement (TeNS), Section 2.2.1.1, September, 2013.
3 Caltrans, Technical Noise Supplement (TeNS), Section 2.1.4.2, September, 2013.
4 Caltrans, Technical Noise Supplement (TeNS), Section 2.1.4.1, September, 2013.

sound levels at long distances (e.g., more than 500 feet). Other factors such as air temperature, humidity, and turbulence can also have significant effects on noise levels. [5]

1.5.2 Vibration

Vibration can be interpreted as energy transmitted in waves through the ground or man-made structures, which generally dissipate with distance from the vibration source. Because energy is lost during the transfer of energy from one particle to another, vibration becomes less perceptible with increasing distance from the source.

As described in the Federal Transit Administration's (FTA) *Transit Noise and Vibration Impact Assessment*, 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.[6] In contrast to airborne noise, groundborne vibration is not a common environmental problem, as 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, heavy trucks traveling on rough roads, and construction activities, such as blasting, pile-driving, and operation of heavy earth-moving 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 in inches per second (in/sec), and is most frequently used to describe vibration impacts to buildings.

Groundborne noise is a result of groundborne vibration and specifically refers to the rumbling noise emanating from the motion of building room surfaces due to the vibration of floors and walls; it is perceptible only inside buildings.[7] The relationship between groundborne vibration and groundborne noise depends on the frequency content of the vibration and the acoustical absorption characteristics of the receiving room. For typical buildings, groundborne vibration that causes low frequency noise (i.e., the vibration spectrum peak is less than 30 Hz) results in a groundborne noise level that is approximately 50 decibels lower than the velocity level. For groundborne vibration that causes mid-frequency noise (i.e., the vibration spectrum peak is 30 to 60 Hz), the groundborne noise level will be approximately 35 to 37 decibels lower than the velocity level.[8] Therefore, for typical buildings, the groundborne noise decibel level is lower than the groundborne vibration velocity level.

1.6 Regulatory Framework

Many government agencies have established noise standards and guidelines to protect citizens from potential hearing damage and various other adverse physiological and social effects associated with noise and groundborne vibration. Federal and local policies and/or standards such as those of FTA, U.S. Environmental Protection Agency (USEPA), and regulations in the City

5 Caltrans, Technical Noise Supplement (TeNS), Section 2.1.4.3 September, 2013.

6 FTA, Transit Noise and Vibration Impact Assessment, Section 7.1.3, 2018.

7 FTA, Transit Noise and Vibration Impact Assessment Manual, Section 5.4, 2018.

8 FTA, Transit Noise and Vibration Impact Assessment Manual, Table 6-3 and Table 6-14, pages 126 and 146, 2018.

General Plan Noise Element, and the Irvine Municipal Code would be applicable to the project, as summarized below.

1.6.1 City of Irvine General Plan Noise Element (2015)

As shown in **Table 2**, the City has established noise guidelines in the Noise Element of the City's General Plan that are used for planning purposes. These guidelines are based, in part, on the community noise compatibility guidelines established by the California State Governor's Office of Planning and Research and are intended for use in assessing the compatibility of various land use types with a range of noise levels. Page F-11 of the Noise Element provides the guidelines of land use compatibility for community noise sources. 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.

Additionally, the Proposed Project is subject to the following policies provided in the Noise Element of the General Plan:

Mobile Noise:

- *Policy (c):* Ensure that all proposed development projects are compatible with the existing and projected noise level by using the Land Use Noise Compatibility Matrix (see Table 2).
- *Policy (d):* Require noise studies to be prepared in accordance with the City's environmental review procedure for all projects that are not "clearly compatible" with the future noise level at the site.
- *Policy (f):* Require noise studies to identify all the mitigation measures necessary to reduce noise levels to meet the City's Municipal Code CNEL standard (see **Table 3**) and Single Event Noise Standard.

TABLE 2
CITY OF IRVINE LAND USE NOISE COMPATIBILITY

		Energy Average (CNEL, dB)						
Land Use Categories	**Uses**	**≤**	**55**	**60**	**65**	**70**	**75**	**80>**
RESIDENTIAL	Single-Family	A	A	B	B	C	D	D
RESIDENTIAL	Mobile Home	A	A	B	C	C	D	D
COMMERCIAL Regional	Hotel, Motel, Transient Lodging	A	A	B	B	C	C	D
COMMERCIAL Regional, Community	Commercial retail, Bank, Restaurant, Movie theater	A	A	A	A	B	B	C
COMMERCIAL Recreation INSTITUTIONAL General	Amphitheater, Concert Hall, Auditorium, Meeting hall	B	B	C	C	D	D	D
COMMERCIAL Recreation	Children's amusement park, Miniature golf, Go-cart track, Health club, Equestrian center	A	A	A	B	B	D	D
COMMERCIAL Community INDUSTRIAL General	Automobile service station, Auto dealer, Manufacturing, Warehousing, Wholesale, Utilities	A	A	A	A	B	B	B
INSTITUTIONAL General	Hospital, Church, Library, School classrooms	A	A	B	C	C	D	D
OPEN SPACE	Parks	A	A	A	B	C	D	D
OPEN SPACE	Golf course, Nature centers, Cemeteries, Wildlife reserves, Wildlife habitat	A	A	A	A	B	C	C
AGRICULTURAL	Agriculture	A	A	A	A	A	A	A

NOTES:

ZONE A Clearly Compatible	Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction without any special noise insulation requirements
ZONE B Normally Compatible	New construction or development should be undertaken only after detailed analysis of the noise reduction requirements are made and needed noise insulation features in the design are determined. Conventional construction, with closed windows and fresh air supply systems or air conditioning, will normally suffice.
ZONE C Normally Incompatible	New construction or development should normally be discouraged. If new construction or development does proceed, a detailed analysis or noise reduction requirements must be made and needed noise insulation features must be included in the design.
ZONE D Clearly Incompatible	New construction or development should generally not be undertaken.

SOURCE: City of Irvine General Plan, Noise Element, 2015.

TABLE 3
CITY OF IRVINE NOISE STANDARDS

Zone	Location	Time Period	Noise Levels for a Period Not Exceeding (minutes/hour)				
			30	15	5	1	0 (anytime)
Noise zone 1: All hospitals, libraries, churches, schools and residential properties.	Exterior	7:00 a.m.—10:00 p.m.	55	60	65 [1]	70	75
		10:00 p.m.—7:00 a.m.	50	55	60	65 [1]	70
	Interior	7:00 a.m.—10:00 p.m.	--	--	55	60	65
		10:00 p.m.—7:00 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

NOTES:

1 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.
2 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.
3 Each of the noise standards specified above shall be reduced by five dB(A) for impact, or predominant tone noise or for noises consisting of speech or music.
4 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.

SOURCE: City of Irvine, 2020.

Stationary Noise

- *Policy (a):* Require any new construction to meet the City Noise Ordinance standards as a condition of building permit approval.
- *Policy (b):* Require developers to depict, on any appropriate development application review (zone change, subdivisions, conditional use permit, site plan, and building plans), any potential noise sources known at the time of submittal and mitigation measures that ensure these noise sources meet the City Noise Ordinance standards. Such sources include, but are not limited to, the following:
  - Truck pickup and loading areas.
  - Mechanical and electrical equipment such as air conditioning, swimming pool pumps and filters, and spa pumps.
  - Exterior nuisances such as speaker boxes and outdoor public address systems.
- *Policy (c):* Condition subdivision approval of the projects adjacent to any developed/occupied uses by requiring the developer to submit a construction-related noise mitigation plan to the Director of Community Development for review and approval prior to issuance of grading permits. The plan must depict the location of construction equipment and how the noise from

this equipment will be mitigated during construction of the project, through the use of such methods as following:

- Temporary noise attenuation fences.
- Preferential location of equipment.
- Use of current technology and noise suppression equipment.

Noise Abatement

- *Policy (a):* Coordinate efforts to reduce noise impacts with appropriate public and government agencies.

1.6.2 City of Irvine Municipal Code

Table 3 summarizes Section 6-8-204, General Provisions, of the City's Municipal Code, which provides interior and exterior noise standards that apply to all properties within a designated zone located in the City.

The City Municipal Code Section 6.8.205.A limits construction activities between the hours of 7:00 A.M. to 7:00 P.M. Mondays through Fridays, and 9:00 A.M. to 6:00 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 project in the City shall not be operated or driven on City streets outside of these hours or on Sundays and federal holidays unless a temporary waiver is granted by the City. 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 City rights-of-way that might be required.

1.6.3 County of Orange Municipal Code

Section 4-6-4 and 4-6-5 of the Orange County Municipal Code 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 4**.

TABLE 4
COUNTY OF ORANGE NOISE STANDARDS

Noise Zone[1]	Location	Noise Level	Time Period
1	Exterior	55 dB(A)	7:00 A.M. – 10:00 P.M.
		50 db(A)	10:00 P.M. – 7:00 A.M.
	Interior	55 dB(A)	7:00 A.M. – 10:00 P.M.
		45 dB(A)	10:00 P.M. – 7:00 A.M.

NOTES:

[1] The entire territory of Orange County, including incorporated and unincorporated territory, is hereby designated as "Noise Zone 1."

SOURCE: County of Orange, 2020.

The Orange County Municipal Code Section 4-6-7(e) exempts noise associated with construction, repair, remodeling, or grading of any real property, provided said activities take place between the hours of 7:00 A.M. to 8:00 P.M. on weekdays, including Saturday.

1.6.4 Groundborne Vibration

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 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 City does not address vibration either in the municipal code or in the Noise Element of the General Plan. The County does not address vibration the municipal code. However, the FTA's *Transit Noise and Vibration Impact Assessment* (FTA, 2018) has identified the human annoyance response to vibration levels as 80 VdB and building damage with a threshold of 0.2 in/sec PPV for non-engineered timber buildings.[9]

1.7 Environmental Setting

1.7.1 Noise-Sensitive Receptor Locations

Some land uses are considered more sensitive to noise than others due to the amount of noise exposure and the types of activities typically involved at the receptor location. Residences, schools, motels and hotels, libraries, religious institutions, hospitals, nursing homes, and parks are generally more sensitive to noise than commercial and industrial land uses. The distance of the noise sensitive receptor locations was calculated from the property line of the receptors to the closest proposed project site boundary. Existing noise sensitive uses within 500 feet of the proposed project site are shown in **Figure 3** and include the following:

[9] FTA, Transit Noise and Vibration Impact Assessment, Section 12.2.2, May. 2018.

- The Crean Lutheran High School Athletic Complex, located between Portola Parkway and the toe of the existing dam, approximately 55 feet from the project site.
- Residential neighborhoods located on the southwest side of Portola Parkway, are as close as 180 feet from the proposed access road construction. Construction of the new proposed dam, reservoir and treatment facilities would occur farther away from these sensitive receptors, approximately 700 feet.
- Crean Lutheran High School, located on the south side of Portola Parkway, east of Sand Canyon Road. This property line of the school is located approximately 140 feet from the proposed access road construction.

All other noise-sensitive uses are located at greater distances and/or shielded from activity at the proposed project by buildings closer to the project area and would experience lower noise levels associated with the proposed project. Therefore, additional sensitive receptors beyond those identified above are not evaluated in this report.

1.7.2 Ambient Noise Levels

The existing noise environment within the project area is comprised primarily of vehicle traffic including trucks, buses, etc. on Portola Parkway, Sand Canyon Avenue, Irvine Boulevard, and State Route 133 (SR-133). Secondary noise sources include nearby residential activities and activities associated with nearby schools. While the proposed project site is located with the jurisdiction of the Orange County, the residents and school that would be impacted by the noise from the project are located within the jurisdiction of the City of Irvine. Therefore, the analysis uses the City of Irvine's noise thresholds. The Noise Element of the City of Irvine's General Plan provides estimated vehicular traffic noise levels for areas throughout the City for the year 2020. The General Plan does not have estimated traffic noise levels for the local roadways directly adjacent to the proposed project site. The closest roadway segment with estimated 2020 traffic noise levels is Irvine Boulevard between Yale Avenue and Jeffrey Road. Similar to the proposed project vicinity, this area consists primarily of residential land uses, where the noise environmental is comprised primarily from vehicular traffic. The estimated 2020 traffic noise levels for this area is 71.7 dBA CNEL, 100 feet from the centerline of the roadway.

1.7.3 Vibration-Sensitive Receptor Locations

Activities associated with implementation of the proposed project have the potential to generate low levels of groundborne vibration due to the operation of equipment (i.e., rubber-tired dozer, drill rigs, and haul trucks). Groundborne vibrations propagate though the ground and rapidly diminish in intensity with increasing distance from the source. No high-impact activities, such as pile driving or blasting, would be used during construction of the proposed project. The nearest off-site buildings to the project site that could be exposed to vibration levels generated from project activities include residential uses located on the southwest side of Portola Parkway, located approximately 300 feet from the proposed project boundary.



D1704445.00 - IRWD Syphon Reservoir Recycled Water Storage\05 Graphics-GIS-Modeling\Illustrator

SOURCE: Google, 2020; ESA, 2020

Syphon Reservoir Improvement Project

Figure 3
Noise Sensitive Receiver Locations

ESA

SECTION 2
Thresholds of Significance

The significance thresholds below are derived from the Environmental Checklist questions in Appendix G of the State CEQA Guidelines. Accordingly, a significant impact associated with noise would occur based on the following thresholds described below:

NOI-1: Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?

NOI-2: Generation of excessive groundborne vibration or groundborne noise levels?

NOI-3: For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?

The following significance criteria are used to evaluate potential noise and vibration impacts of the project based on the regulatory framework described above. The Project would result in potentially significant impacts under the following circumstances:

- Project construction activities occur between the hours of 7:00 p.m. and 7:00 a.m. for the City and between the hours of 8:00 p.m. and 7:00 a.m. for the County.
- The Project-related operations would cause ambient noise levels to exceed the City's noise standards as stated in Section 6-8-204 of the City's Municipal Code and Section 4-6-4 and 4-6-5 of the Orange County Municipal Code (see Table 3 and 4 above in Section 1.7).
- Potential Building Damage – Project construction activities cause groundborne vibration levels to exceed 0.2 in/sec PPV at the nearest residential buildings.
- Potential Human Annoyance – Project construction activities cause groundborne vibration levels to exceed 80 VdB at nearby residential uses.

The proposed project site is located with the jurisdiction of the Orange County. However, the receptors that will be impacted by the construction and operation of the proposed project are located within the City of Irvine. Therefore, this analysis uses the City of Irvine's thresholds to determine significance.

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SECTION 3
Impact Analysis

3.1 Methodology

3.1.1 On-Site Construction Noise

On-site construction noise impacts were evaluated by determining the noise levels generated by the different types of construction activity anticipated, calculating the construction-related noise level at nearby sensitive receptor locations, and comparing these construction-related noise levels to existing ambient noise levels (i.e., noise levels without construction noise) at those receptors. More, specifically, the following steps were undertaken to assess construction-period noise impacts:

1. Typical noise levels for each type of construction equipment were obtained from the FHWA's Construction Noise Handbook (FHWA 2006);
2. Distances between construction site locations (noise sources) and surrounding sensitive receptors were measured using Project architectural drawings and site plans and Google Earth;
3. The construction noise level was then calculated, in terms of hourly L_{eq}, for sensitive receptor locations based on the standard point source noise-distance attenuation factor of 6.0 dBA for each doubling of distance.

3.1.2 Off-Site Roadway Noise (Construction)

Roadway noise impacts have been evaluated using the Caltrans Technical Noise Supplement (TeNS) method based on the traffic data provided in the Project's Construction Transportation Impact Analysis (Fehr & Peers 2020). The Caltrans TeNS method allows for the definition of roadway configurations, barrier information (if any), and receiver locations.

3.1.3 Groundborne Vibration (Construction and Operations)

Groundborne vibration impacts were evaluated by identifying potential vibration sources, measuring the distance between vibration sources and surrounding structure locations, and making a significance determination based on the significance thresholds described below.

3.2 Noise Impacts

Threshold NOI-1: Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.

Impact NOI-1: **The proposed project could generate a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies. (Less than Significant).**

3.2.1 Construction Noise

On-Site Construction Noise

Construction of the proposed project is estimated to require approximately 41 months (weather permitting) and would require the use of heavy equipment during the various construction phases at the proposed project site. During each stage of development, there would be a different mix of equipment. As such, construction activity noise levels at and near the proposed project area would fluctuate depending on the particular type, number, and duration of use of the various pieces of construction equipment. Additionally, as previously shown in Table 1, construction is currently anticipated to begin in the fall of 2022 with the potential of overlap for a number of phases of construction.

Additional geotechnical work may or may not occur, and the intensity of any geotechnical work is unknown at this time. There are three potential geotechnical tests that could occur: borings, test pits, or trenches. The geotechnical work would be associated with the damn upgrades and would most likely occur in the reservoir area, at a distance of 330 feet (100 meters) or more from the nearest sensitive uses. Because the intensity of any work that will occur is unknown, the analysis determines the maximum intensity of geotechnical work that can occur concurrently and independent from the reservoir work. The *Irvine Ranch Water District Syphon Reservoir Geotechnical Investigations Project Initial Study/Mitigated Negative Declaration* was used to determine the equipment and workers that would be used to conduct the additional geotechnical investigations.

Individual pieces of construction equipment anticipated during Project construction could produce maximum noise levels of 75 dBA to 85 dBA L_{max} at a reference distance of 50 feet from the noise source, as shown in **Table 5**. These maximum noise levels would occur when equipment is operating at full power. The estimated usage factor for the equipment is also shown in Table 5, which are based on FHWA's Construction Handbook (FHWA 2006). Typical or average construction noise levels account for the estimated usage factors as shown.

Construction activity would result in the loudest noise levels at ground-level sensitive land uses nearest to the proposed project area that have a direct line-of-sight to construction activities. This

is because the first tier of buildings immediately surrounding the proposed project site would act as a noise barrier to other sensitive receptors located beyond these buildings. Therefore, construction-related noise levels are only presented for receptors closest to the proposed project site, as shown in Figure 3. Specifically, the nearest off-site noise sensitive receptors include the following:

- R1: The Crean Lutheran High School Athletic Complex, located between Portola Parkway and the toe of the existing dam, approximately 55 feet from the proposed project site.
- R2 and R3: Residential neighborhoods located on the southwest side of Portola Parkway, are as close as 180 feet from the proposed access road construction. Construction of the new proposed dam, reservoir and treatment facilities would occur farther away from these sensitive receptors, approximately 700 feet.
- R4: Crean Lutheran High School, located on the south side of Portola Parkway, east of Sand Canyon Road. This property line of the school is located approximately 140 feet from the proposed access road construction.

TABLE 5
CONSTRUCTION EQUIPMENT NOISE LEVELS

Construction Equipment	Estimated Usage Factor, %	Noise Level at 50 Feet (dBA, Lmax)
Backhoe	40%	78
Bore/Drill Rig	40%	78
Cement/Mortar Mixers	40%	79
Compactor	20%	83
Cranes	16%	81
Dozer	40%	82
Excavator	40%	81
Grader	40%	85
Pavers	50%	77
Pick-up Truck	40%	75
Pumps	50%	81
Roller	20%	80
Rubber Tired Dozer	40%	82
Rubber Tired Loader	40%	79
Rollers	20%	80
Scraper	40%	84
Support Truck	40%	76
Tractor/Loader/Backhoe	25%	80
Water Truck	10%	80

SOURCE: FHWA 2006

Noise from construction activities would be generated by the operation of vehicles and equipment involved during various stages of construction: site excavation, grading, facilities construction and paving. The noise levels generated by construction equipment would vary depending on factors such as the type and number of equipment, the specific model (horsepower rating), the construction activities being performed, and the maintenance condition of the equipment. Construction noise associated with the proposed project was analyzed using a mix of typical construction equipment, estimated durations, and construction phasing, based on construction equipment data provided by IRWD and assumptions derived from similar projects. **Table 6** shows the estimated construction noise levels that would occur at the nearest off-site sensitive uses during a peak day of construction activity at the proposed project site. Details are provided in Appendix A.

TABLE 6
ESTIMATE OF CONSTRUCTION NOISE LEVELS (L_{EQ}) AT EXISTING OFF-SITE SENSITIVE RECEIVER LOCATIONS

	Receiver (Distance in feet from construction activity)			
Construction Phase [a, b]	**R1 (55) dBA, Leq**	**R2 (330) dBA, Leq**	**R3 (180) dBA, Leq**	**R4 (140) dBA, Leq**
Vegetation Clearing Access Routes/Intersection Improvements	87	73	78	80
Access Routes/Intersection Improvements	86	71	76	78
Excavation of Sediment/Existing Dam: *Mobilization, site prep/Staging Areas*	84	69	74	76
Excavation of Sediment/Existing Dam: *Upstream Excavation and Foundation Treatment*	87	72	77	79
Excavation of Sediment/Existing Dam: *Dam Excavation and Foundation Treatment*	88	73	78	81
Excavation of Sediment/Existing Dam: *Dam Excavation and Foundation Treatment* Construction of Dam/Spillway/Reservoir: *Install Inlet/Outlet*	89	74	79	81
Construction of Dam/Spillway/Reservoir: *Install Embankment to Bottom of Blanket Drain*	89	74	79	81
Construction of Dam/Spillway/Reservoir: *Install Blanket Drain*	79	64	69	71
Construction of Dam/Spillway/Reservoir: *Install Chimney/Remaining Embankment*	89	74	79	81
Construction of Dam/Spillway/Reservoir: *Install Chimney/Remaining Embankment* *Spillway Construction*	89	75	80	82
Construction of Dam/Spillway/Reservoir: *Spillway Construction* Construction of Filtration/Chlor/Dechlor Facility Wetlands/Riparian Installation	84	69	74	76
Construction of Dam/Spillway/Reservoir: *Spillway Construction* Construction of Filtration/Chlor/Dechlor Facility Wetlands/Riparian Installation Installation of Recreation Facilities	88	73	78	80

Construction Phase [a, b]	Receiver (Distance in feet from construction activity) R1 (55) dBA, Leq	R2 (330) dBA, Leq	R3 (180) dBA, Leq	R4 (140) dBA, Leq
Construction of Filtration/Chlor/Dechlor Facility Wetlands/Riparian Installation Installation of Recreation Facilities	87	72	77	79
Construction of Filtration/Chlor/Dechlor Facility Installation of Recreation Facilities	86	71	76	79
Construction of Filtration/Chlor/Dechlor Facility	79	64	69	71
Demobilization	77	64	68	70
Geotechnical Exploration [c] (minimum of 330 feet [100 meters] from nearest receptor)				
Borings (at 330 feet)	60	60	60	60
Test Pits (at 330 feet)	60	60	60	60
Trenches (at 330 feet)	61	61	61	61

NOTES:

[a] Construction schedule provided by the project applicant.

[b] Detailed construction noise calculations are provided in Appendix A.

[c] Based on Irvine Ranch Water District Syphon Reservoir Geotechnical Investigations Project Initial Study/Mitigated Negative Declaration, February 2019.

SOURCE: ESA 2021.

As shown in Table 6, construction noise levels are estimated to reach a maximum of 89 dBA L_{eq} at the nearest sensitive receptor (R1). Existing residences and school facilities in the vicinity of the proposed project area would be exposed to temporary and sporadic increased noise from nearby construction activities. Weather permitting, the overall construction would last for approximately 36 to 41 months. However, since equipment operates intermittently and moves around the site, noise from operation of construction equipment would be sporadic and temporary during the construction period. Construction noise would be noticeable during the operation of heavy grading equipment working at the site (sporadically over the duration of construction), especially during the vegetation clearing, excavation, and construction period.

The City has not established numerical thresholds for construction noise; however, per the City Municipal Code, Section 6-8-205, construction shall only occur between the hours of 7:00 A.M. to 7:00 P.M. Mondays through Fridays, and 9:00 A.M. to 6:00 P.M. on Saturdays. The proposed project construction activities would comply with the hours allowed by the City and the duration of construction would be short term. If the proposed project's construction work is needed to be conducted outside of the allowable hours, IRWD will work with the appropriate entity to secure a variance/waiver. Thus, a significant noise impact would not occur during project construction and construction noise impacts would be less than significant.

Off-Site Construction Noise

Delivery and haul truck trips would occur throughout the construction period. Trucks traveling to and from the project area would be required to travel along the haul route approved by the City for the proposed project. The following two haul routes are being proposed for the project:

- Haul Route 1: SR-133, north on Irvine Boulevard, and east on Sand Canyon Avenue for trucks traveling inbound and westbound on Sand Canyon Avenue and south on Irvine Boulevard to SR-133 for trucks traveling outbound.
- Haul Route 2: I-5, east on Sand Canyon Avenue for trucks traveling inbound and westbound on Sand Canyon Avenue to I-5 for trucks traveling outbound.

Table 7 shows the estimated construction traffic noise levels that would occur at the nearest off-site sensitive uses along the proposed haul routes. Details are provided in Appendix B. Sensitive noise receptors along the haul route are located approximately 40 to 80 feet from the edge of the roadways. Construction traffic noise levels generated by truck trips would range from approximately 57.5 dBA, L_{eq} to 72.7 dBA, L_{eq}. Detailed traffic noise calculations are provided in Appendix B. Construction truck trips would be required to comply with the City's allowable hours as described above and would be temporary in nature. Therefore, construction activities would comply with the City's noise standard, and impacts would be less than significant.

3.2.2 Operational Noise

Operation of the proposed project would not increase the average daily traffic (ADT) volumes along the major thoroughfares within the project vicinity. Additionally, the proposed inlet and outlet pipelines that would supply and drain the reservoir would be located underground and would not result in any operational noise. The primary pumps used for water distribution are already existing and located off-site. Operation of the proposed project would introduce small pumps located within the proposed treatment facilities. A proposed masonry block wall building would house the storage tanks, metering pumps, and control system. The small pumps located on-site would not generate noise above ambient conditions at sensitive receptor property lines. Therefore, impacts from the operations of the proposed project would be less than significant.

Mitigation: None required.

Significance after Mitigation: Less Than Significant Impact.

TABLE 7
ESTIMATE OF CONSTRUCTION TRAFFIC NOISE LEVELS (L_{EQ}) AT EXISTING OFF-SITE SENSITIVE RECEIVER LOCATIONS

	Roadway Segment (Distance in feet from construction activity)			
Construction Phase	**Portola Pkwy, between SR-133 and Paragon (60) dBA, Leq**	**Sand Canyon Ave, between Portola Pkwy and Irvine Blvd (40) dBA, Leq**	**Irvine Blvd, between San Canyon Ave and Native Spring (55) dBA, Leq**	**SR-133, between Irvine Blvd and SR-241 (80) dBA, Leq**
Vegetation Clearing Access Routes/Intersection Improvements	70.7	71.6	72.0	71.2
Access Routes/Intersection Improvements	62.5	63.4	63.9	63.1
Excavation of Sediment/Existing Dam: *Mobilization, site prep/Staging Areas*	58.4	59.1	59.8	59.1
Excavation of Sediment/Existing Dam: *Upstream Excavation and Foundation Treatment*	61.9	62.6	63.3	62.6
Excavation of Sediment/Existing Dam: *Dam Excavation and Foundation Treatment*	61.9	62.6	63.3	62.6
Excavation of Sediment/Existing Dam: *Dam Excavation and Foundation Treatment* Construction of Dam/Spillway/Reservoir: *Install Inlet/Outlet*	70.9	71.8	72.3	71.5
Construction of Dam/Spillway/Reservoir: *Install Embankment to Bottom of Blanket Drain*	70.4	71.2	71.7	70.9
Construction of Dam/Spillway/Reservoir: *Install Blanket Drain*	70.4	71.2	71.7	70.9
Construction of Dam/Spillway/Reservoir: *Install Chimney/Remaining Embankment*	70.4	71.2	71.7	70.9
Construction of Dam/Spillway/Reservoir: *Install Chimney/Remaining Embankment* *Spillway Construction*	71.4	72.2	72.7	71.9
Construction of Dam/Spillway/Reservoir: *Spillway Construction* Construction of Filtration/Chlor/Dechlor Facility Wetlands/Riparian Installation	70.1	70.9	71.4	70.7

Construction Phase	Roadway Segment (Distance in feet from construction activity)			
	Portola Pkwy, between SR-133 and Paragon (60) dBA, Leq	**Sand Canyon Ave, between Portola Pkwy and Irvine Blvd (40) dBA, Leq**	**Irvine Blvd, between San Canyon Ave and Native Spring (55) dBA, Leq**	**SR-133, between Irvine Blvd and SR-241 (80) dBA, Leq**
Construction of Dam/Spillway/Reservoir: *Spillway Construction* Construction of Filtration/Chlor/Dechlor Facility Wetlands/Riparian Installation Installation of Recreation Facilities	70.5	71.4	71.9	71.1
Construction of Filtration/Chlor/Dechlor Facility Wetlands/Riparian Installation Installation of Recreation Facilities	69.3	70.1	70.6	69.8
Construction of Filtration/Chlor/Dechlor Facility Installation of Recreation Facilities	68.6	69.4	69.9	69.1
Construction of Filtration/Chlor/Dechlor Facility	67.9	68.8	69.2	68.4
Demobilization	57.5	58.2	58.9	58.3

NOTES:

A) Construction schedule and truck traffic information provided by the project applicant.

B) Detailed traffic noise calculations are provided in Appendix B.

SOURCE: ESA 2020.

3.3 Vibration Impacts

Threshold NOI-2: Generation of excessive groundborne vibration or groundborne noise levels.

Impact NOI-2: The proposed project would not generate excessive groundborne vibration or groundborne noise levels. (Less than Significant).

3.3.1 Construction Vibration

Construction activities for the proposed project have the potential to generate low levels of groundborne vibration as the operation of heavy equipment (i.e., backhoe, dozer, grader, loader, and haul trucks, etc.) generates vibrations that propagate though the ground and diminish in intensity with distance from the source. No high-impact activities, such as pile driving or blasting, would be used during the proposed project's construction. In order to evaluate potential structural damage, the nearest off-site sensitive buildings to the project area were identified. The residential buildings located on the south side of Portola Parkway are approximately from 300 feet from the proposed project boundary line. Groundborne vibrations from construction activities very rarely reach the levels that can damage structures, but they may be perceived in buildings very close to a construction site.

The PPV vibration velocities for several types of construction equipment that can generate perceptible vibration levels are identified in **Table 8**. Based on the information presented in Table 8, vibration velocities could range from 0.0014 to 0.0083 in/sec PPV at 300 feet from the source of activity.

TABLE 8
VIBRATION SOURCE LEVELS FOR CONSTRUCTION EQUIPMENT

	Approximate PPV (in/sec)						
Equipment	**25 Feet**	**50 Feet**	**60 Feet**	**75 Feet**	**100 Feet**	**200 Feet**	**300 Feet**
Vibratory Roller	0.2100	0.0853	0.0673	0.0503	0.0346	0.0141	0.0083
Large Bulldozer	0.0890	0.0361	0.0285	0.0213	0.0147	0.0060	0.0035
Loaded Trucks	0.0760	0.0309	0.0244	0.0182	0.0125	0.0060	0.0035
Jackhammer	0.0350	0.0142	0.0112	0.0084	0.0058	0.0051	0.0030
Small Bulldozer	0.0030	0.0012	0.0010	0.0007	0.0005	0.0023	0.0014

SOURCE: FTA 2018; ESA 2020.

Proposed construction activities would occur throughout the project area and would not be concentrated at the point closest to the nearest structure. Based on the vibration levels presented in Table 8, at a distance of 300 feet from the proposed project area, the maximum vibration level would be up to approximately 0.0083 in/sec PPV for a vibratory roller, which would not exceed the significance threshold of 0.2 in/sec PPV. The geotechnical work would be associated with the damn upgrades and would most likely occur in the reservoir area, at a distance of 330 feet (100

meters) or more from the nearest sensitive uses, which would generate vibration levels below 0.2 in/sec PPV at sensitive receptor locations. Therefore, the use of all construction equipment would not result in a groundborne vibration velocity level above 0.2 inches per second at the nearest off-site structure. Therefore, impacts would be less than significant.

With respect to human annoyance, the nearest residential buildings located within 300 feet from the proposed project site would be exposed to vibration levels below the 80 VdB threshold for human annoyance. Therefore, impacts would be less than significant.

3.3.2 Operational Vibration

Sources of groundborne vibration would be unchanged from the existing conditions. Additionally, operational vibration impacts of the improvements at the new proposed reservoir would be consistent with the existing vibration velocity levels and with the existing ambient vibration velocity levels. As such, operational vibration impacts of the proposed Syphon Reservoir improvements would be less than significant.

Mitigation: None required.

Significance after Mitigation: Less Than Significant Impact.

3.4 Airport and Airstrip Noise Impacts

Threshold NOI-3: For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels.

Impact NOI-3: The proposed project would not expose people residing or working in the project area to excessive noise levels 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. (No Impact).

The proposed project area is not located within the vicinity of a private airstrip. Further, the nearest airport to the project area is the John Wayne Airport, located approximately 7.7 miles to the southwest of the project area. The proposed project is not located within an airport land use plan or within 2 miles of a public airport or public use airport. Therefore, the proposed project would have no impact related to public or private airport/airstrip noise levels.

Mitigation: None required.

Significance after Mitigation: No Impact.

3.5 Cumulative Impacts

CEQA Guidelines require a discussion of cumulative impacts of a project "when the project's incremental effect is cumulatively considerable" (2011 CEQA Guidelines, Section 15130). As defined by Section 15065 (a)(3) "cumulatively considerable" means that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects (2011 CEQA Guidelines, Section 15065 (a)(3)). These cumulative impacts are defined as "two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts" (CEQA Guidelines Section 15355).

Two cumulative projects within 1,000 feet of the proposed project site have been identified, which include the Gateway Community Park / City of Irvine Master Parks Plan and the Truck Route Roadway Rehabilitation (CIP 311902) Project. Should all three projects undergo construction at the same time, the projects would be required to comply with the construction hours allowed by the City or comply with City restrictions imposed if a variance to the allowable construction hours for either project is issued. As described in Section 3.3, the proposed project construction and operation would comply with the City's noise standard, and impacts would be less than significant. Therefore, the proposed project, when combined with the identified cumulative projects, would not cause a cumulatively considerable noise impact. With regard to groundborne vibration, the construction vibration levels generated by the proposed project would be substantially below the FTA thresholds. Vibration level diminish rapidly from the source and the range of vibration concern is usually limited to 50 feet from the vibration source; thus, the proposed project, when combined with the identified cumulative projects, would not cause a cumulatively considerable vibration impact. As a result, cumulative impacts would be less than significant.

Mitigation: None required.

Significance after Mitigation: Less Than Significant Impact.

3.6 References

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County of Orange Municipal Code. Division 6 – Noise Control. Available at: https://library.municode.com/ca/orange_county/codes/code_of_ordinances?nodeId=TIT4HESAANRE_DIV6NOCO_ART1GEPR_S4-6-6INNOST. Accessed on June 2, 2020.

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Irvine Ranch Water District (IRWD). Construction Schedule Assumptions. May 2018.

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Appendix A
Construction Equipment Noise

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Project: IRWD Syphon

Construction Noise Impact on Sensitive Receptors

Parameters

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

				R1					R2				
Construction Phase **Equipment Type**	**No. of Equip.**	**Reference Noise Level at 50ft, Lmax**	**Acoustical Usage Factor**	**Distance (ft)**	**Lmax**	**Leq**	**L10**	**Estimated Noise Shielding, dBA**	**Distance (ft)**	**Lmax**	**Leq**	**L10**	**Estimated Noise Shielding, dBA**
Vegetation Removal					**69**	***70***				**87**	***87***		
Rubber Tired Dozer	3	82	40%	470	67	63	66	0	55	86	82	85	0
Water Truck	1	80	10%	470	61	51	54	0	55	79	69	72	0
Rubber Tired Loader	4	79	40%	570	64	60	63	0	155	75	71	74	0
Pick-up Truck	3	75	40%	670	57	53	56	0	255	66	62	65	0
Access Route/Intersection Improvements													
Grader	2	85	40%	470	69	65	68	0	55	87	83	86	0
Excavator	3	81	40%	470	66	62	65	0	55	85	81	84	0
Crawler Tractor	1	80	25%	470	61	55	58	0	55	79	73	76	0
Tractor/Loader/Backhoe	2	80	25%	570	62	56	59	0	155	73	67	70	0
Water Truck	1	80	10%	570	59	49	52	0	155	70	60	63	0
Roller	2	80	20%	670	60	53	56	0	255	69	62	65	0
Rubber Tired Loader	1	79	40%	670	56	52	55	0	255	65	61	64	0
Access Route/Intersection Improvements					**69**	***68***				**87**	***86***		
Grader	2	85	40%	470	69	65	68	0	55	87	83	86	0
Excavator	3	81	40%	470	66	62	65	0	55	85	81	84	0
Crawler Tractor	1	80	25%	470	61	55	58	0	55	79	73	76	0
Tractor/Loader/Backhoe	2	80	25%	570	62	56	59	0	155	73	67	70	0
Water Truck	1	80	10%	570	59	49	52	0	155	70	60	63	0
Roller	2	80	20%	670	60	53	56	0	255	69	62	65	0
Rubber Tired Loader	1	79	40%	670	56	52	55	0	255	65	61	64	0
Mobilization, site prep/Staging Areas					**66**	***66***				**84**	***84***		
Grader	1	85	40%	470	66	62	65	0	55	84	80	83	0
Flatbed Truck	1	84	40%	470	65	61	64	0	55	83	79	82	0
Excavator	1	81	40%	470	62	58	61	0	55	80	76	79	0
Tool Carrier	1	80	25%	570	59	53	56	0	155	70	64	67	0
Water Truck	2	80	10%	570	62	52	55	0	155	73	63	66	0
Rubber Tired Loader	1	79	40%	570	58	54	57	0	155	69	65	68	0
Off-highway Truck	2	76	40%	670	56	52	55	0	255	65	61	64	0
Pick-up Truck	3	75	40%	670	57	53	56	0	255	66	62	65	0

Project: IRWD Syphon

Construction Noise Impact on Sensitive Receptors

Parameters

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

				R1					R2				
Upstream Excavation and Foundation Treatment					**69**	***69***				**87**	***87***		
Grader	2	85	40%	470	69	65	68	0	55	87	83	86	0
Track Dozer	2	82	40%	470	66	62	65	0	55	84	80	83	0
Rubber Tired Dozer	2	82	40%	470	66	62	65	0	55	84	80	83	0
Excavator	2	81	40%	570	63	59	62	0	155	74	70	73	0
Pumps	3	81	50%	570	65	62	65	0	155	76	73	76	0
Water Truck	2	80	10%	570	62	52	55	0	155	73	63	66	0
Off-highway Truck	6	76	40%	670	61	57	60	0	255	70	66	69	0
Pick-up Truck	3	75	40%	670	57	53	56	0	255	66	62	65	0
Damn Excavation and Foundation Treatment					**71**	***71***				**89**	***88***		
Grader	1	85	40%	470	66	62	65	0	55	84	80	83	0
Scraper	4	84	40%	470	71	67	70	0	55	89	85	88	0
Rubber Tired Dozer	3	82	40%	470	67	63	66	0	55	86	82	85	0
Track Dozer	1	82	40%	470	63	59	62	0	55	81	77	80	0
Excavator	1	81	40%	570	60	56	59	0	155	71	67	70	0
Pumps	3	81	50%	570	65	62	65	0	155	76	73	76	0
Roller	1	80	20%	570	59	52	55	0	155	70	63	66	0
Water Truck	1	80	10%	670	57	47	50	0	255	66	56	59	0
Off-highway Truck	3	76	40%	670	58	54	57	0	255	67	63	66	0
Pick-up Truck	2	75	40%	670	55	51	54	0	255	64	60	63	0
Damn Excavation and Foundation Treatment					**71**	***71***				**89**	***89***		
Grader	1	85	40%	470	66	62	65	0	55	84	80	83	0
Scraper	4	84	40%	470	71	67	70	0	55	89	85	88	0
Rubber Tired Dozer	3	82	40%	470	67	63	66	0	55	86	82	85	0
Track Dozer	1	82	40%	470	63	59	62	0	55	81	77	80	0
Excavator	1	81	40%	570	60	56	59	0	155	71	67	70	0
Pumps	3	81	50%	570	65	62	65	0	155	76	73	76	0
Roller	1	80	20%	570	59	52	55	0	155	70	63	66	0
Water Truck	1	80	10%	670	57	47	50	0	255	66	56	59	0
Off-highway Truck	3	76	40%	670	58	54	57	0	255	67	63	66	0
Pick-up Truck	2	75	40%	670	55	51	54	0	255	64	60	63	0
Install Inlet/Outlet													
Flatbed Truck	1	84	40%	470	65	61	64	0	55	83	79	82	0
Excavator	1	81	40%	470	62	58	61	0	55	80	76	79	0
Tool Carrier	1	80	25%	570	59	53	56	0	155	70	64	67	0
Rubber Tired Loader	1	79	40%	570	58	54	57	0	155	69	65	68	0
Pick-up Truck	1	75	40%	670	52	48	51	0	255	61	57	60	0

Project: IRWD Syphon

Construction Noise Impact on Sensitive Receptors

Parameters

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

				R1					R2				
Install Embankment to Bottom of Blanket Drain					**72**	***71***				**91**	***89***		
Grader	1	85	40%	470	66	62	65	0	55	84	80	83	0
Scraper	6	84	40%	470	72	68	71	0	55	91	87	90	0
Rubber Tired Dozer	3	82	40%	470	67	63	66	0	55	86	82	85	0
Track Dozer	1	82	40%	570	61	57	60	0	155	72	68	71	0
Water Truck	2	80	10%	570	62	52	55	0	155	73	63	66	0
Roller	2	80	20%	570	62	55	58	0	155	73	66	69	0
Rubber Tired Loader	1	79	40%	670	56	52	55	0	255	65	61	64	0
Pick-up Truck	3	75	40%	670	57	53	56	0	255	66	62	65	0
Install Blanket Drain					**63**	***62***				**81**	***79***		
Track Dozer	1	82	40%	470	63	59	62	0	55	81	77	80	0
Roller	1	80	20%	470	61	54	57	0	55	79	72	75	0
Water Truck	2	80	10%	570	62	52	55	0	155	73	63	66	0
Rubber Tired Loader	1	79	40%	570	58	54	57	0	155	69	65	68	0
Pick-up Truck	1	75	40%	670	52	48	51	0	255	61	57	60	0
Install Chimney/Remaining Embankment					**72**	***71***				**91**	***89***		
Grader	1	85	40%	470	66	62	65	0	55	84	80	83	0
Scraper	6	84	40%	470	72	68	71	0	55	91	87	90	0
Rubber Tired Dozer	3	82	40%	470	67	63	66	0	55	86	82	85	0
Track Dozer	1	82	40%	570	61	57	60	0	155	72	68	71	0
Water Truck	2	80	10%	570	62	52	55	0	155	73	63	66	0
Roller	2	80	20%	570	62	55	58	0	155	73	66	69	0
Rubber Tired Loader	1	79	40%	670	56	52	55	0	255	65	61	64	0
Pick-up Truck	3	75	40%	670	57	53	56	0	255	66	62	65	0
Install Chimney/Remaining Embankment					**72**	***72***				**91**	***89***		
Grader	1	85	40%	470	66	62	65	0	55	84	80	83	0
Scraper	6	84	40%	470	72	68	71	0	55	91	87	90	0
Rubber Tired Dozer	3	82	40%	470	67	63	66	0	55	86	82	85	0
Track Dozer	1	82	40%	570	61	57	60	0	155	72	68	71	0
Water Truck	2	80	10%	570	62	52	55	0	155	73	63	66	0
Roller	2	80	20%	570	62	55	58	0	155	73	66	69	0
Rubber Tired Loader	1	79	40%	670	56	52	55	0	255	65	61	64	0
Pick-up Truck	3	75	40%	670	57	53	56	0	255	66	62	65	0
Spillway Construction													
Roller	1	80	20%	470	61	54	57	0	55	79	72	75	0
Tractor/Loader/Backhoe	4	80	25%	470	67	61	64	0	55	85	79	82	0
Water Truck	1	80	10%	570	59	49	52	0	155	70	60	63	0
Cement/Mortar Mixers	4	79	40%	570	64	60	63	0	155	75	71	74	0
Pavers	1	77	50%	670	54	51	54	0	255	63	60	63	0

Project: IRWD Syphon

Construction Noise Impact on Sensitive Receptors

Parameters

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

				R1					R2				
Spillway Construction					**67**	***67***				**85**	***84***		
Roller	1	80	20%	470	61	54	57	0	55	79	72	75	0
Tractor/Loader/Backhoe	4	80	25%	470	67	61	64	0	55	85	79	82	0
Water Truck	1	80	10%	570	59	49	52	0	155	70	60	63	0
Cement/Mortar Mixers	4	79	40%	570	64	60	63	0	155	75	71	74	0
Pavers	1	77	50%	670	54	51	54	0	255	63	60	63	0
Construction of Filtration/Chlor/Dechlor Facility													
Compactor	1	83	20%	470	64	57	60	0	55	82	75	78	0
Tractor/Loader/Backhoe	2	80	25%	470	64	58	61	0	55	82	76	79	0
Water Truck	1	80	10%	570	59	49	52	0	155	70	60	63	0
Dumper/Tenders	1	76	40%	670	53	49	52	0	255	62	58	61	0
Wetlands/Riparian Installation													
Skid Steer Loader	1	80	25%	470	61	55	58	0	55	79	73	76	0
Water Truck	1	80	10%	470	61	51	54	0	55	79	69	72	0
Pick-up Truck	3	75	40%	570	59	55	58	0	155	70	66	69	0
ATV	2	75	40%	670	55	51	54	0	255	64	60	63	0
Spillway Construction					**69**	***70***				**87**	***88***		
Roller	1	80	20%	470	61	54	57	0	55	79	72	75	0
Tractor/Loader/Backhoe	4	80	25%	470	67	61	64	0	55	85	79	82	0
Water Truck	1	80	10%	570	59	49	52	0	155	70	60	63	0
Cement/Mortar Mixers	4	79	40%	570	64	60	63	0	155	75	71	74	0
Pavers	1	77	50%	670	54	51	54	0	255	63	60	63	0
Construction of Filtration/Chlor/Dechlor Facility													
Compactor	1	83	20%	470	64	57	60	0	55	82	75	78	0
Tractor/Loader/Backhoe	2	80	25%	470	64	58	61	0	55	82	76	79	0
Water Truck	1	80	10%	570	59	49	52	0	155	70	60	63	0
Dumper/Tenders	1	76	40%	670	53	49	52	0	255	62	58	61	0
Wetlands/Riparian Installation													
Skid Steer Loader	1	80	25%	470	61	55	58	0	55	79	73	76	0
Water Truck	1	80	10%	470	61	51	54	0	55	79	69	72	0
Pick-up Truck	3	75	40%	570	59	55	58	0	155	70	66	69	0
ATV	2	75	40%	670	55	51	54	0	255	64	60	63	0
Installation of Recreation Facilities													
Grader	2	85	40%	470	69	65	68	0	55	87	83	86	0
Excavator	3	81	40%	470	66	62	65	0	55	85	81	84	0
Crawler Tractor	1	80	25%	470	61	55	58	0	55	79	73	76	0
Tractor/Loader/Backhoe	2	80	25%	570	62	56	59	0	155	73	67	70	0
Water Truck	1	80	10%	570	59	49	52	0	155	70	60	63	0
Roller	2	80	20%	670	60	53	56	0	255	69	62	65	0
Rubber Tired Loader	1	79	40%	670	56	52	55	0	255	65	61	64	0

Project: IRWD Syphon

Construction Noise Impact on Sensitive Receptors

Parameters

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

				R1					R2				
Construction of Filtration/Chlor/Dechlor Facility					**69**	***69***				**87**	***87***		
Compactor	1	83	20%	470	64	57	60	0	55	82	75	78	0
Tractor/Loader/Backhoe	2	80	25%	470	64	58	61	0	55	82	76	79	0
Water Truck	1	80	10%	570	59	49	52	0	155	70	60	63	0
Dumper/Tenders	1	76	40%	670	53	49	52	0	255	62	58	61	0
Wetlands/Riparian Installation													
Skid Steer Loader	1	80	25%	470	61	55	58	0	55	79	73	76	0
Water Truck	1	80	10%	470	61	51	54	0	55	79	69	72	0
Pick-up Truck	3	75	40%	570	59	55	58	0	155	70	66	69	0
ATV	2	75	40%	670	55	51	54	0	255	64	60	63	0
Installation of Recreation Facilities													
Grader	2	85	40%	470	69	65	68	0	55	87	83	86	0
Excavator	3	81	40%	470	66	62	65	0	55	85	81	84	0
Crawler Tractor	1	80	25%	470	61	55	58	0	55	79	73	76	0
Tractor/Loader/Backhoe	2	80	25%	570	62	56	59	0	155	73	67	70	0
Water Truck	1	80	10%	570	59	49	52	0	155	70	60	63	0
Roller	2	80	20%	670	60	53	56	0	255	69	62	65	0
Rubber Tired Loader	1	79	40%	670	56	52	55	0	255	65	61	64	0

Project: IRWD Syphon

Construction Noise Impact on Sensitive Receptors

Parameters

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

				R1					R2				
Construction of Filtration/Chlor/Dechlor Facility					**69**	***68***				**87**	***86***		
Compactor	1	83	20%	470	64	57	60	0	55	82	75	78	0
Tractor/Loader/Backhoe	2	80	25%	470	64	58	61	0	55	82	76	79	0
Water Truck	1	80	10%	570	59	49	52	0	155	70	60	63	0
Dumper/Tenders	1	76	40%	670	53	49	52	0	255	62	58	61	0
Installation of Recreation Facilities													
Grader	2	85	40%	470	69	65	68	0	55	87	83	86	0
Excavator	3	81	40%	470	66	62	65	0	55	85	81	84	0
Crawler Tractor	1	80	25%	470	61	55	58	0	55	79	73	76	0
Tractor/Loader/Backhoe	2	80	25%	570	62	56	59	0	155	73	67	70	0
Water Truck	1	80	10%	570	59	49	52	0	155	70	60	63	0
Roller	2	80	20%	670	60	53	56	0	255	69	62	65	0
Rubber Tired Loader	1	79	40%	670	56	52	55	0	255	65	61	64	0
Construction of Filtration/Chlor/Dechlor Facility					**64**	***61***				**82**	***79***		
Compactor	1	83	20%	470	64	57	60	0	55	82	75	78	0
Tractor/Loader/Backhoe	2	80	25%	470	64	58	61	0	55	82	76	79	0
Water Truck	1	80	10%	570	59	49	52	0	155	70	60	63	0
Dumper/Tenders	1	76	40%	670	53	49	52	0	255	62	58	61	0
Demobilization					**62**	***61***				**80**	***77***		
Flatbed Truck	1	84	40%	470	65	61	64	0	55	83	79	82	0
Excavator	1	81	40%	470	62	58	61	0	55	80	76	79	0
Tool Carrier	1	80	25%	570	59	53	56	0	155	70	64	67	0
Water Truck	1	80	10%	570	59	49	52	0	155	70	60	63	0
Rubber Tired Loader	1	79	40%	670	56	52	55	0	255	65	61	64	0
Pick-up Truck	3	75	40%	670	57	53	56	0	255	66	62	65	0

Source for Ref. Noise Levels: LA CEQA Guides, 2006 & FHWA RCNM, 2005

Project: IRWD Syphon

Construction Noise Impact on Sensitive Receptors

Parameters

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

				R3					R4				
Construction Phase **Equipment Type**	**No. of Equip.**	**Reference Noise Level at 50ft, Lmax**	**Acoustical Usage Factor**	**Distance (ft)**	**Lmax**	**Leq**	**L10**	**Estimated Noise Shielding, dBA**	**Distance (ft)**	**Lmax**	**Leq**	**L10**	**Estimated Noise Shielding, dBA**
Vegetation Removal					**72**	***73***				**77**	***78***		
Rubber Tired Dozer	3	82	40%	330	70	66	69	0	180	76	72	75	0
Water Truck	1	80	10%	330	64	54	57	0	180	69	59	62	0
Rubber Tired Loader	4	79	40%	430	66	62	65	0	280	70	66	69	0
Pick-up Truck	3	75	40%	530	59	55	58	0	380	62	58	61	0
Access Route/Intersection Improvements													
Grader	2	85	40%	330	72	68	71	0	180	77	73	76	0
Excavator	3	81	40%	330	69	65	68	0	180	75	71	74	0
Crawler Tractor	1	80	25%	330	64	58	61	0	180	69	63	66	0
Tractor/Loader/Backhoe	2	80	25%	430	64	58	61	0	280	68	62	65	0
Water Truck	1	80	10%	430	61	51	54	0	280	65	55	58	0
Roller	2	80	20%	530	63	56	59	0	380	65	58	61	0
Rubber Tired Loader	1	79	40%	530	58	55	58	0	380	61	57	60	0
Access Route/Intersection Improvements					**72**	***71***				**77**	***76***		
Grader	2	85	40%	330	72	68	71	0	180	77	73	76	0
Excavator	3	81	40%	330	69	65	68	0	180	75	71	74	0
Crawler Tractor	1	80	25%	330	64	58	61	0	180	69	63	66	0
Tractor/Loader/Backhoe	2	80	25%	430	64	58	61	0	280	68	62	65	0
Water Truck	1	80	10%	430	61	51	54	0	280	65	55	58	0
Roller	2	80	20%	530	63	56	59	0	380	65	58	61	0
Rubber Tired Loader	1	79	40%	530	58	55	58	0	380	61	57	60	0
Mobilization, site prep/Staging Areas					**69**	***69***				**74**	***74***		
Grader	1	85	40%	330	69	65	68	0	180	74	70	73	0
Flatbed Truck	1	84	40%	330	68	64	67	0	180	73	69	72	0
Excavator	1	81	40%	330	65	61	64	0	180	70	66	69	0
Tool Carrier	1	80	25%	430	61	55	58	0	280	65	59	62	0
Water Truck	2	80	10%	430	64	54	57	0	280	68	58	61	0
Rubber Tired Loader	1	79	40%	430	60	56	59	0	280	64	60	63	0
Off-highway Truck	2	76	40%	530	59	55	58	0	380	61	57	60	0
Pick-up Truck	3	75	40%	530	59	55	58	0	380	62	58	61	0

Project: IRWD Syphon

Construction Noise Impact on Sensitive Receptors

Parameters

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

				R3					R4				
Upstream Excavation and Foundation Treatment					**72**	***72***				**77**	***77***		
Grader	2	85	40%	330	72	68	71	0	180	77	73	76	0
Track Dozer	2	82	40%	330	69	65	68	0	180	74	70	73	0
Rubber Tired Dozer	2	82	40%	330	69	65	68	0	180	74	70	73	0
Excavator	2	81	40%	430	65	61	64	0	280	69	65	68	0
Pumps	3	81	50%	430	67	64	67	0	280	71	68	71	0
Water Truck	2	80	10%	430	64	54	57	0	280	68	58	61	0
Off-highway Truck	6	76	40%	530	63	59	62	0	380	66	62	65	0
Pick-up Truck	3	75	40%	530	59	55	58	0	380	62	58	61	0
Damn Excavation and Foundation Treatment					**74**	***73***				**79**	***78***		
Grader	1	85	40%	330	69	65	68	0	180	74	70	73	0
Scraper	4	84	40%	330	74	70	73	0	180	79	75	78	0
Rubber Tired Dozer	3	82	40%	330	70	66	69	0	180	76	72	75	0
Track Dozer	1	82	40%	330	66	62	65	0	180	71	67	70	0
Excavator	1	81	40%	430	62	58	61	0	280	66	62	65	0
Pumps	3	81	50%	430	67	64	67	0	280	71	68	71	0
Roller	1	80	20%	430	61	54	57	0	280	65	58	61	0
Water Truck	1	80	10%	530	59	49	52	0	380	62	52	55	0
Off-highway Truck	3	76	40%	530	60	56	59	0	380	63	59	62	0
Pick-up Truck	2	75	40%	530	58	54	57	0	380	60	56	59	0
Damn Excavation and Foundation Treatment					**74**	***74***				**79**	***79***		
Grader	1	85	40%	330	69	65	68	0	180	74	70	73	0
Scraper	4	84	40%	330	74	70	73	0	180	79	75	78	0
Rubber Tired Dozer	3	82	40%	330	70	66	69	0	180	76	72	75	0
Track Dozer	1	82	40%	330	66	62	65	0	180	71	67	70	0
Excavator	1	81	40%	430	62	58	61	0	280	66	62	65	0
Pumps	3	81	50%	430	67	64	67	0	280	71	68	71	0
Roller	1	80	20%	430	61	54	57	0	280	65	58	61	0
Water Truck	1	80	10%	530	59	49	52	0	380	62	52	55	0
Off-highway Truck	3	76	40%	530	60	56	59	0	380	63	59	62	0
Pick-up Truck	2	75	40%	530	58	54	57	0	380	60	56	59	0
Install Inlet/Outlet													
Flatbed Truck	1	84	40%	330	68	64	67	0	180	73	69	72	0
Excavator	1	81	40%	330	65	61	64	0	180	70	66	69	0
Tool Carrier	1	80	25%	430	61	55	58	0	280	65	59	62	0
Rubber Tired Loader	1	79	40%	430	60	56	59	0	280	64	60	63	0
Pick-up Truck	1	75	40%	530	54	51	54	0	380	57	53	56	0

Project: IRWD Syphon

Construction Noise Impact on Sensitive Receptors

Parameters

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

				R3					R4				
Install Embankment to Bottom of Blanket Drain					**75**	***74***				**81**	***79***		
Grader	1	85	40%	330	69	65	68	0	180	74	70	73	0
Scraper	6	84	40%	330	75	71	74	0	180	81	77	80	0
Rubber Tired Dozer	3	82	40%	330	70	66	69	0	180	76	72	75	0
Track Dozer	1	82	40%	430	63	59	62	0	280	67	63	66	0
Water Truck	2	80	10%	430	64	54	57	0	280	68	58	61	0
Roller	2	80	20%	430	64	57	60	0	280	68	61	64	0
Rubber Tired Loader	1	79	40%	530	58	55	58	0	380	61	57	60	0
Pick-up Truck	3	75	40%	530	59	55	58	0	380	62	58	61	0
Install Blanket Drain					**66**	***64***				**71**	***69***		
Track Dozer	1	82	40%	330	66	62	65	0	180	71	67	70	0
Roller	1	80	20%	330	64	57	60	0	180	69	62	65	0
Water Truck	2	80	10%	430	64	54	57	0	280	68	58	61	0
Rubber Tired Loader	1	79	40%	430	60	56	59	0	280	64	60	63	0
Pick-up Truck	1	75	40%	530	54	51	54	0	380	57	53	56	0
Install Chimney/Remaining Embankment					**75**	***74***				**81**	***79***		
Grader	1	85	40%	330	69	65	68	0	180	74	70	73	0
Scraper	6	84	40%	330	75	71	74	0	180	81	77	80	0
Rubber Tired Dozer	3	82	40%	330	70	66	69	0	180	76	72	75	0
Track Dozer	1	82	40%	430	63	59	62	0	280	67	63	66	0
Water Truck	2	80	10%	430	64	54	57	0	280	68	58	61	0
Roller	2	80	20%	430	64	57	60	0	280	68	61	64	0
Rubber Tired Loader	1	79	40%	530	58	55	58	0	380	61	57	60	0
Pick-up Truck	3	75	40%	530	59	55	58	0	380	62	58	61	0
Install Chimney/Remaining Embankment					**75**	***75***				**81**	***80***		
Grader	1	85	40%	330	69	65	68	0	180	74	70	73	0
Scraper	6	84	40%	330	75	71	74	0	180	81	77	80	0
Rubber Tired Dozer	3	82	40%	330	70	66	69	0	180	76	72	75	0
Track Dozer	1	82	40%	430	63	59	62	0	280	67	63	66	0
Water Truck	2	80	10%	430	64	54	57	0	280	68	58	61	0
Roller	2	80	20%	430	64	57	60	0	280	68	61	64	0
Rubber Tired Loader	1	79	40%	530	58	55	58	0	380	61	57	60	0
Pick-up Truck	3	75	40%	530	59	55	58	0	380	62	58	61	0
Spillway Construction													
Roller	1	80	20%	330	64	57	60	0	180	69	62	65	0
Tractor/Loader/Backhoe	4	80	25%	330	70	64	67	0	180	75	69	72	0
Water Truck	1	80	10%	430	61	51	54	0	280	65	55	58	0
Cement/Mortar Mixers	4	79	40%	430	66	62	65	0	280	70	66	69	0
Pavers	1	77	50%	530	56	53	56	0	380	59	56	59	0

Project: IRWD Syphon

Construction Noise Impact on Sensitive Receptors

Parameters

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

				R3					R4				
Spillway Construction					**70**	***69***				**75**	***74***		
Roller	1	80	20%	330	64	57	60	0	180	69	62	65	0
Tractor/Loader/Backhoe	4	80	25%	330	70	64	67	0	180	75	69	72	0
Water Truck	1	80	10%	430	61	51	54	0	280	65	55	58	0
Cement/Mortar Mixers	4	79	40%	430	66	62	65	0	280	70	66	69	0
Pavers	1	77	50%	530	56	53	56	0	380	59	56	59	0
Construction of Filtration/Chlor/Dechlor Facility													
Compactor	1	83	20%	330	67	60	63	0	180	72	65	68	0
Tractor/Loader/Backhoe	2	80	25%	330	67	61	64	0	180	72	66	69	0
Water Truck	1	80	10%	430	61	51	54	0	280	65	55	58	0
Dumper/Tenders	1	76	40%	530	55	52	55	0	380	58	54	57	0
Wetlands/Riparian Installation													
Skid Steer Loader	1	80	25%	330	64	58	61	0	180	69	63	66	0
Water Truck	1	80	10%	330	64	54	57	0	180	69	59	62	0
Pick-up Truck	3	75	40%	430	61	57	60	0	280	65	61	64	0
ATV	2	75	40%	530	58	54	57	0	380	60	56	59	0
Spillway Construction					**72**	***73***				**77**	***78***		
Roller	1	80	20%	330	64	57	60	0	180	69	62	65	0
Tractor/Loader/Backhoe	4	80	25%	330	70	64	67	0	180	75	69	72	0
Water Truck	1	80	10%	430	61	51	54	0	280	65	55	58	0
Cement/Mortar Mixers	4	79	40%	430	66	62	65	0	280	70	66	69	0
Pavers	1	77	50%	530	56	53	56	0	380	59	56	59	0
Construction of Filtration/Chlor/Dechlor Facility													
Compactor	1	83	20%	330	67	60	63	0	180	72	65	68	0
Tractor/Loader/Backhoe	2	80	25%	330	67	61	64	0	180	72	66	69	0
Water Truck	1	80	10%	430	61	51	54	0	280	65	55	58	0
Dumper/Tenders	1	76	40%	530	55	52	55	0	380	58	54	57	0
Wetlands/Riparian Installation													
Skid Steer Loader	1	80	25%	330	64	58	61	0	180	69	63	66	0
Water Truck	1	80	10%	330	64	54	57	0	180	69	59	62	0
Pick-up Truck	3	75	40%	430	61	57	60	0	280	65	61	64	0
ATV	2	75	40%	530	58	54	57	0	380	60	56	59	0
Installation of Recreation Facilities													
Grader	2	85	40%	330	72	68	71	0	180	77	73	76	0
Excavator	3	81	40%	330	69	65	68	0	180	75	71	74	0
Crawler Tractor	1	80	25%	330	64	58	61	0	180	69	63	66	0
Tractor/Loader/Backhoe	2	80	25%	430	64	58	61	0	280	68	62	65	0
Water Truck	1	80	10%	430	61	51	54	0	280	65	55	58	0
Roller	2	80	20%	530	63	56	59	0	380	65	58	61	0
Rubber Tired Loader	1	79	40%	530	58	55	58	0	380	61	57	60	0

Project: IRWD Syphon

Construction Noise Impact on Sensitive Receptors

Parameters

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

				R3					R4				
Construction of Filtration/Chlor/Dechlor Facility					**72**	***72***				**77**	***77***		
Compactor	1	83	20%	330	67	60	63	0	180	72	65	68	0
Tractor/Loader/Backhoe	2	80	25%	330	67	61	64	0	180	72	66	69	0
Water Truck	1	80	10%	430	61	51	54	0	280	65	55	58	0
Dumper/Tenders	1	76	40%	530	55	52	55	0	380	58	54	57	0
Wetlands/Riparian Installation													
Skid Steer Loader	1	80	25%	330	64	58	61	0	180	69	63	66	0
Water Truck	1	80	10%	330	64	54	57	0	180	69	59	62	0
Pick-up Truck	3	75	40%	430	61	57	60	0	280	65	61	64	0
ATV	2	75	40%	530	58	54	57	0	380	60	56	59	0
Installation of Recreation Facilities													
Grader	2	85	40%	330	72	68	71	0	180	77	73	76	0
Excavator	3	81	40%	330	69	65	68	0	180	75	71	74	0
Crawler Tractor	1	80	25%	330	64	58	61	0	180	69	63	66	0
Tractor/Loader/Backhoe	2	80	25%	430	64	58	61	0	280	68	62	65	0
Water Truck	1	80	10%	430	61	51	54	0	280	65	55	58	0
Roller	2	80	20%	530	63	56	59	0	380	65	58	61	0
Rubber Tired Loader	1	79	40%	530	58	55	58	0	380	61	57	60	0

Project: IRWD Syphon

Construction Noise Impact on Sensitive Receptors

Parameters

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

				R3					R4				
Construction of Filtration/Chlor/Dechlor Facility					**72**	***71***				**77**	***76***		
Compactor	1	83	20%	330	67	60	63	0	180	72	65	68	0
Tractor/Loader/Backhoe	2	80	25%	330	67	61	64	0	180	72	66	69	0
Water Truck	1	80	10%	430	61	51	54	0	280	65	55	58	0
Dumper/Tenders	1	76	40%	530	55	52	55	0	380	58	54	57	0
Installation of Recreation Facilities													
Grader	2	85	40%	330	72	68	71	0	180	77	73	76	0
Excavator	3	81	40%	330	69	65	68	0	180	75	71	74	0
Crawler Tractor	1	80	25%	330	64	58	61	0	180	69	63	66	0
Tractor/Loader/Backhoe	2	80	25%	430	64	58	61	0	280	68	62	65	0
Water Truck	1	80	10%	430	61	51	54	0	280	65	55	58	0
Roller	2	80	20%	530	63	56	59	0	380	65	58	61	0
Rubber Tired Loader	1	79	40%	530	58	55	58	0	380	61	57	60	0
Construction of Filtration/Chlor/Dechlor Facility					**67**	***64***				**72**	***69***		
Compactor	1	83	20%	330	67	60	63	0	180	72	65	68	0
Tractor/Loader/Backhoe	2	80	25%	330	67	61	64	0	180	72	66	69	0
Water Truck	1	80	10%	430	61	51	54	0	280	65	55	58	0
Dumper/Tenders	1	76	40%	530	55	52	55	0	380	58	54	57	0
Demobilization					**65**	***64***				**70**	***68***		
Flatbed Truck	1	84	40%	330	68	64	67	0	180	73	69	72	0
Excavator	1	81	40%	330	65	61	64	0	180	70	66	69	0
Tool Carrier	1	80	25%	430	61	55	58	0	280	65	59	62	0
Water Truck	1	80	10%	430	61	51	54	0	280	65	55	58	0
Rubber Tired Loader	1	79	40%	530	58	55	58	0	380	61	57	60	0
Pick-up Truck	3	75	40%	530	59	55	58	0	380	62	58	61	0

Source for Ref. Noise Levels: LA CEQA Guides, 2006 & FHWA RCNM, 2005

Project: IRWD Syphon

Construction Noise Impact on Sensitive Receptors

Parameters

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

				R5				
Construction Phase **Equipment Type**	**No. of Equip.**	**Reference Noise Level at 50ft, Lmax**	**Acoustical Usage Factor**	**Distance (ft)**	**Lmax**	**Leq**	**L10**	**Estimated Noise Shielding, dBA**
Vegetation Removal					**79**	***80***		
Rubber Tired Dozer	3	82	40%	140	78	74	77	0
Water Truck	1	80	10%	140	71	61	64	0
Rubber Tired Loader	4	79	40%	240	71	67	70	0
Pick-up Truck	3	75	40%	340	63	59	62	0
Access Route/Intersection Improvements								
Grader	2	85	40%	140	79	75	78	0
Excavator	3	81	40%	140	77	73	76	0
Crawler Tractor	1	80	25%	140	71	65	68	0
Tractor/Loader/Backhoe	2	80	25%	240	69	63	66	0
Water Truck	1	80	10%	240	66	56	59	0
Roller	2	80	20%	340	66	59	62	0
Rubber Tired Loader	1	79	40%	340	62	58	61	0
Access Route/Intersection Improvements					**79**	***78***		
Grader	2	85	40%	140	79	75	78	0
Excavator	3	81	40%	140	77	73	76	0
Crawler Tractor	1	80	25%	140	71	65	68	0
Tractor/Loader/Backhoe	2	80	25%	240	69	63	66	0
Water Truck	1	80	10%	240	66	56	59	0
Roller	2	80	20%	340	66	59	62	0
Rubber Tired Loader	1	79	40%	340	62	58	61	0
Mobilization, site prep/Staging Areas					**76**	***76***		
Grader	1	85	40%	140	76	72	75	0
Flatbed Truck	1	84	40%	140	75	71	74	0
Excavator	1	81	40%	140	72	68	71	0
Tool Carrier	1	80	25%	240	66	60	63	0
Water Truck	2	80	10%	240	69	59	62	0
Rubber Tired Loader	1	79	40%	240	65	61	64	0
Off-highway Truck	2	76	40%	340	62	58	61	0
Pick-up Truck	3	75	40%	340	63	59	62	0

Project: IRWD Syphon

Construction Noise Impact on Sensitive Receptors

Parameters

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

				R5				
Upstream Excavation and Foundation Treatment					**79**	***79***		
Grader	2	85	40%	140	79	75	78	0
Track Dozer	2	82	40%	140	76	72	75	0
Rubber Tired Dozer	2	82	40%	140	76	72	75	0
Excavator	2	81	40%	240	70	66	69	0
Pumps	3	81	50%	240	72	69	72	0
Water Truck	2	80	10%	240	69	59	62	0
Off-highway Truck	6	76	40%	340	67	63	66	0
Pick-up Truck	3	75	40%	340	63	59	62	0
Damn Excavation and Foundation Treatment					**81**	***81***		
Grader	1	85	40%	140	76	72	75	0
Scraper	4	84	40%	140	81	77	80	0
Rubber Tired Dozer	3	82	40%	140	78	74	77	0
Track Dozer	1	82	40%	140	73	69	72	0
Excavator	1	81	40%	240	67	63	66	0
Pumps	3	81	50%	240	72	69	72	0
Roller	1	80	20%	240	66	59	62	0
Water Truck	1	80	10%	340	63	53	56	0
Off-highway Truck	3	76	40%	340	64	60	63	0
Pick-up Truck	2	75	40%	340	61	57	60	0
Damn Excavation and Foundation Treatment					**81**	***81***		
Grader	1	85	40%	140	76	72	75	0
Scraper	4	84	40%	140	81	77	80	0
Rubber Tired Dozer	3	82	40%	140	78	74	77	0
Track Dozer	1	82	40%	140	73	69	72	0
Excavator	1	81	40%	240	67	63	66	0
Pumps	3	81	50%	240	72	69	72	0
Roller	1	80	20%	240	66	59	62	0
Water Truck	1	80	10%	340	63	53	56	0
Off-highway Truck	3	76	40%	340	64	60	63	0
Pick-up Truck	2	75	40%	340	61	57	60	0
Install Inlet/Outlet								
Flatbed Truck	1	84	40%	140	75	71	74	0
Excavator	1	81	40%	140	72	68	71	0
Tool Carrier	1	80	25%	240	66	60	63	0
Rubber Tired Loader	1	79	40%	240	65	61	64	0
Pick-up Truck	1	75	40%	340	58	54	57	0

Project: IRWD Syphon

Construction Noise Impact on Sensitive Receptors

Parameters

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

				R5				
Install Embankment to Bottom of Blanket Drain					**83**	***81***		
Grader	1	85	40%	140	76	72	75	0
Scraper	6	84	40%	140	83	79	82	0
Rubber Tired Dozer	3	82	40%	140	78	74	77	0
Track Dozer	1	82	40%	240	68	64	67	0
Water Truck	2	80	10%	240	69	59	62	0
Roller	2	80	20%	240	69	62	65	0
Rubber Tired Loader	1	79	40%	340	62	58	61	0
Pick-up Truck	3	75	40%	340	63	59	62	0
Install Blanket Drain					**73**	***71***		
Track Dozer	1	82	40%	140	73	69	72	0
Roller	1	80	20%	140	71	64	67	0
Water Truck	2	80	10%	240	69	59	62	0
Rubber Tired Loader	1	79	40%	240	65	61	64	0
Pick-up Truck	1	75	40%	340	58	54	57	0
Install Chimney/Remaining Embankment					**83**	***81***		
Grader	1	85	40%	140	76	72	75	0
Scraper	6	84	40%	140	83	79	82	0
Rubber Tired Dozer	3	82	40%	140	78	74	77	0
Track Dozer	1	82	40%	240	68	64	67	0
Water Truck	2	80	10%	240	69	59	62	0
Roller	2	80	20%	240	69	62	65	0
Rubber Tired Loader	1	79	40%	340	62	58	61	0
Pick-up Truck	3	75	40%	340	63	59	62	0
Install Chimney/Remaining Embankment					**83**	***82***		
Grader	1	85	40%	140	76	72	75	0
Scraper	6	84	40%	140	83	79	82	0
Rubber Tired Dozer	3	82	40%	140	78	74	77	0
Track Dozer	1	82	40%	240	68	64	67	0
Water Truck	2	80	10%	240	69	59	62	0
Roller	2	80	20%	240	69	62	65	0
Rubber Tired Loader	1	79	40%	340	62	58	61	0
Pick-up Truck	3	75	40%	340	63	59	62	0
Spillway Construction								
Roller	1	80	20%	140	71	64	67	0
Tractor/Loader/Backhoe	4	80	25%	140	77	71	74	0
Water Truck	1	80	10%	240	66	56	59	0
Cement/Mortar Mixers	4	79	40%	240	71	67	70	0
Pavers	1	77	50%	340	60	57	60	0

Project: IRWD Syphon

Construction Noise Impact on Sensitive Receptors

Parameters

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

				R5				
Spillway Construction					**77**	***76***		
Roller	1	80	20%	140	71	64	67	0
Tractor/Loader/Backhoe	4	80	25%	140	77	71	74	0
Water Truck	1	80	10%	240	66	56	59	0
Cement/Mortar Mixers	4	79	40%	240	71	67	70	0
Pavers	1	77	50%	340	60	57	60	0
Construction of Filtration/Chlor/Dechlor Facility								
Compactor	1	83	20%	140	74	67	70	0
Tractor/Loader/Backhoe	2	80	25%	140	74	68	71	0
Water Truck	1	80	10%	240	66	56	59	0
Dumper/Tenders	1	76	40%	340	59	55	58	0
Wetlands/Riparian Installation								
Skid Steer Loader	1	80	25%	140	71	65	68	0
Water Truck	1	80	10%	140	71	61	64	0
Pick-up Truck	3	75	40%	240	66	62	65	0
ATV	2	75	40%	340	61	57	60	0
Spillway Construction					**79**	***80***		
Roller	1	80	20%	140	71	64	67	0
Tractor/Loader/Backhoe	4	80	25%	140	77	71	74	0
Water Truck	1	80	10%	240	66	56	59	0
Cement/Mortar Mixers	4	79	40%	240	71	67	70	0
Pavers	1	77	50%	340	60	57	60	0
Construction of Filtration/Chlor/Dechlor Facility								
Compactor	1	83	20%	140	74	67	70	0
Tractor/Loader/Backhoe	2	80	25%	140	74	68	71	0
Water Truck	1	80	10%	240	66	56	59	0
Dumper/Tenders	1	76	40%	340	59	55	58	0
Wetlands/Riparian Installation								
Skid Steer Loader	1	80	25%	140	71	65	68	0
Water Truck	1	80	10%	140	71	61	64	0
Pick-up Truck	3	75	40%	240	66	62	65	0
ATV	2	75	40%	340	61	57	60	0
Installation of Recreation Facilities								
Grader	2	85	40%	140	79	75	78	0
Excavator	3	81	40%	140	77	73	76	0
Crawler Tractor	1	80	25%	140	71	65	68	0
Tractor/Loader/Backhoe	2	80	25%	240	69	63	66	0
Water Truck	1	80	10%	240	66	56	59	0
Roller	2	80	20%	340	66	59	62	0
Rubber Tired Loader	1	79	40%	340	62	58	61	0

Project: IRWD Syphon

Construction Noise Impact on Sensitive Receptors

Parameters

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

				R5				
Construction of Filtration/Chlor/Dechlor Facility					**79**	***79***		
Compactor	1	83	20%	140	74	67	70	0
Tractor/Loader/Backhoe	2	80	25%	140	74	68	71	0
Water Truck	1	80	10%	240	66	56	59	0
Dumper/Tenders	1	76	40%	340	59	55	58	0
Wetlands/Riparian Installation								
Skid Steer Loader	1	80	25%	140	71	65	68	0
Water Truck	1	80	10%	140	71	61	64	0
Pick-up Truck	3	75	40%	240	66	62	65	0
ATV	2	75	40%	340	61	57	60	0
Installation of Recreation Facilities								
Grader	2	85	40%	140	79	75	78	0
Excavator	3	81	40%	140	77	73	76	0
Crawler Tractor	1	80	25%	140	71	65	68	0
Tractor/Loader/Backhoe	2	80	25%	240	69	63	66	0
Water Truck	1	80	10%	240	66	56	59	0
Roller	2	80	20%	340	66	59	62	0
Rubber Tired Loader	1	79	40%	340	62	58	61	0

Project: IRWD Syphon

Construction Noise Impact on Sensitive Receptors

Parameters

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

				R5				
Construction of Filtration/Chlor/Dechlor Facility					**79**	***79***		
Compactor	1	83	20%	140	74	67	70	0
Tractor/Loader/Backhoe	2	80	25%	140	74	68	71	0
Water Truck	1	80	10%	240	66	56	59	0
Dumper/Tenders	1	76	40%	340	59	55	58	0
Installation of Recreation Facilities								
Grader	2	85	40%	140	79	75	78	0
Excavator	3	81	40%	140	77	73	76	0
Crawler Tractor	1	80	25%	140	71	65	68	0
Tractor/Loader/Backhoe	2	80	25%	240	69	63	66	0
Water Truck	1	80	10%	240	66	56	59	0
Roller	2	80	20%	340	66	59	62	0
Rubber Tired Loader	1	79	40%	340	62	58	61	0
Construction of Filtration/Chlor/Dechlor Facility					**74**	***71***		
Compactor	1	83	20%	140	74	67	70	0
Tractor/Loader/Backhoe	2	80	25%	140	74	68	71	0
Water Truck	1	80	10%	240	66	56	59	0
Dumper/Tenders	1	76	40%	340	59	55	58	0
Demobilization					**72**	***70***		
Flatbed Truck	1	84	40%	140	75	71	74	0
Excavator	1	81	40%	140	72	68	71	0
Tool Carrier	1	80	25%	240	66	60	63	0
Water Truck	1	80	10%	240	66	56	59	0
Rubber Tired Loader	1	79	40%	340	62	58	61	0
Pick-up Truck	3	75	40%	340	63	59	62	0

Source for Ref. Noise Levels: LA CEQA Guides, 2006 & FHWA RCNM, 2005

Appendix B
Construction Traffic Noise

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TRAFFIC NOISE ANALYSIS TOOL

Project Name: IRWD Syphon
Analysis Scenario: Vegetation Removal and Access Route
Source of Traffic Volumes: Applicant

Roadway Segment	Ground Type	Distance from Roadway to Receiver (feet)	Speed (mph)			Peak Hour Volume			Peak Hour Noise Level (Leq(h) dBA)	Noise Level dBA CNEL
			Auto	MT	HT	Auto	MT	HT		
Potola Pkwy, between SR-133 and Paragon	Hard	60	55	55	55	40	0	154	70.7	71.0
Sand Canyon Ave, between Portola Pkwy and Irvine Blvd.	Hard	40	50	50	50	40	0	154	71.6	71.9
Irvine Blvd, between San Canyon Ave and Native Spring	Hard	55	60	60	60	40	0	154	72.0	72.3
SR-133, between Irvine Blvd and SR-241	Hard	80	65	65	65	40	0	154	71.2	71.5

Model Notes:
The calculation is based on the methodology described in FHWA Traffic Noise Model Technical Manual (1998).
The peak hour noise level at 50 feet was validated with the results from FHWA Traffic Noise Model Version 2.5.
Accuracy of the calculation is within ±0.1 dB when comparing to TNM results.
Noise propagation greater than 50 feet is based on the following assumptions:
For hard ground, the propagation rate is 3 dB per doubling the distance.
For soft ground, the propagation rate is 4.5 dB per doubling the distance.
Vehicles are assumed to be on a long straight roadway with cruise speed.
Roadway grade is less than 1.5%.
CNEL levels were obtained based on Figure 2-19, on page 2-58 Caltran's TeNS 2013.

TRAFFIC NOISE ANALYSIS TOOL

Project Name: IRWD Syphon
Analysis Scenario: Access Route
Source of Traffic Volumes: Applicant

Roadway Segment	Ground Type	Distance from Roadway to Receiver (feet)	Speed (mph)			Peak Hour Volume			Peak Hour Noise Level (Leq(h) dBA)	Noise Level dBA CNEL
			Auto	MT	HT	Auto	MT	HT		
Potola Pkwy, between SR-133 and Paragon	Hard	60	55	55	55	20	0	22	62.5	62.8
Sand Canyon Ave, between Portola Pkwy and Irvine Blvd.	Hard	40	50	50	50	20	0	22	63.4	63.7
Irvine Blvd, between San Canyon Ave and Native Spring	Hard	55	60	60	60	20	0	22	63.9	64.2
SR-133, between Irvine Blvd and SR-241	Hard	80	65	65	65	20	0	22	63.1	63.4

Model Notes:
The calculation is based on the methodology described in FHWA Traffic Noise Model Technical Manual (1998).
The peak hour noise level at 50 feet was validated with the results from FHWA Traffic Noise Model Version 2.5.
Accuracy of the calculation is within ±0.1 dB when comparing to TNM results.
Noise propagation greater than 50 feet is based on the following assumptions:
For hard ground, the propagation rate is 3 dB per doubling the distance.
For soft ground, the propagation rate is 4.5 dB per doubling the distance.
Vehicles are assumed to be on a long straight roadway with cruise speed.
Roadway grade is less than 1.5%.
CNEL levels were obtained based on Figure 2-19, on page 2-58 Caltran's TeNS 2013.

TRAFFIC NOISE ANALYSIS TOOL

Project Name: IRWD Syphon
Analysis Scenario: Mobilization, site prep/Staging Areas
Source of Traffic Volumes: Applicant

Roadway Segment	Ground Type	Distance from Roadway to Receiver (feet)	Speed (mph)			Peak Hour Volume			Peak Hour Noise Level (Leq(h) dBA)	Noise Level dBA CNEL
			Auto	MT	HT	Auto	MT	HT		
Potola Pkwy, between SR-133 and Paragon	Hard	60	55	55	55	30	0	6	58.4	58.7
Sand Canyon Ave, between Portola Pkwy and Irvine Blvd.	Hard	40	50	50	50	30	0	6	59.1	59.4
Irvine Blvd, between San Canyon Ave and Native Spring	Hard	55	60	60	60	30	0	6	59.8	60.1
SR-133, between Irvine Blvd and SR-241	Hard	80	65	65	65	30	0	6	59.1	59.4

Model Notes:
The calculation is based on the methodology described in FHWA Traffic Noise Model Technical Manual (1998).
The peak hour noise level at 50 feet was validated with the results from FHWA Traffic Noise Model Version 2.5.
Accuracy of the calculation is within ±0.1 dB when comparing to TNM results.
Noise propagation greater than 50 feet is based on the following assumptions:
For hard ground, the propagation rate is 3 dB per doubling the distance.
For soft ground, the propagation rate is 4.5 dB per doubling the distance.
Vehicles are assumed to be on a long straight roadway with cruise speed.
Roadway grade is less than 1.5%.
CNEL levels were obtained based on Figure 2-19, on page 2-58 Caltran's TeNS 2013.

TRAFFIC NOISE ANALYSIS TOOL

Project Name: IRWD Syphon
Analysis Scenario: Upstream Excavation and Foundation Treatment
Source of Traffic Volumes: Applicant

Roadway Segment	Ground Type	Distance from Roadway to Receiver (feet)	Speed (mph)			Peak Hour Volume			Peak Hour Noise Level (Leq(h) dBA)	Noise Level dBA CNEL
			Auto	MT	HT	Auto	MT	HT		
Potola Pkwy, between SR-133 and Paragon	Hard	60	55	55	55	62	0	14	61.9	62.2
Sand Canyon Ave, between Portola Pkwy and Irvine Blvd.	Hard	40	50	50	50	62	0	14	62.6	62.9
Irvine Blvd, between San Canyon Ave and Native Spring	Hard	55	60	60	60	62	0	14	63.3	63.6
SR-133, between Irvine Blvd and SR-241	Hard	80	65	65	65	62	0	14	62.6	62.9

Model Notes:
The calculation is based on the methodology described in FHWA Traffic Noise Model Technical Manual (1998).
The peak hour noise level at 50 feet was validated with the results from FHWA Traffic Noise Model Version 2.5.
Accuracy of the calculation is within ±0.1 dB when comparing to TNM results.
Noise propagation greater than 50 feet is based on the following assumptions:
For hard ground, the propagation rate is 3 dB per doubling the distance.
For soft ground, the propagation rate is 4.5 dB per doubling the distance.
Vehicles are assumed to be on a long straight roadway with cruise speed.
Roadway grade is less than 1.5%.
CNEL levels were obtained based on Figure 2-19, on page 2-58 Caltran's TeNS 2013.

TRAFFIC NOISE ANALYSIS TOOL

Project Name: IRWD Syphon
Analysis Scenario: Dam Excavation and Foundation Treatment
Source of Traffic Volumes: Applicant

Roadway Segment	Ground Type	Distance from Roadway to Receiver (feet)	Speed (mph)			Peak Hour Volume			Peak Hour Noise Level (Leq(h) dBA)	Noise Level dBA CNEL
			Auto	MT	HT	Auto	MT	HT		
Potola Pkwy, between SR-133 and Paragon	Hard	60	55	55	55	62	0	14	61.9	62.2
Sand Canyon Ave, between Portola Pkwy and Irvine Blvd.	Hard	40	50	50	50	62	0	14	62.6	62.9
Irvine Blvd, between San Canyon Ave and Native Spring	Hard	55	60	60	60	62	0	14	63.3	63.6
SR-133, between Irvine Blvd and SR-241	Hard	80	65	65	65	62	0	14	62.6	62.9

Model Notes:
The calculation is based on the methodology described in FHWA Traffic Noise Model Technical Manual (1998).
The peak hour noise level at 50 feet was validated with the results from FHWA Traffic Noise Model Version 2.5.
Accuracy of the calculation is within ±0.1 dB when comparing to TNM results.
Noise propagation greater than 50 feet is based on the following assumptions:
For hard ground, the propagation rate is 3 dB per doubling the distance.
For soft ground, the propagation rate is 4.5 dB per doubling the distance.
Vehicles are assumed to be on a long straight roadway with cruise speed.
Roadway grade is less than 1.5%.
CNEL levels were obtained based on Figure 2-19, on page 2-58 Caltran's TeNS 2013.

TRAFFIC NOISE ANALYSIS TOOL

Project Name: IRWD Syphon
Analysis Scenario: Dam Excavation and Foundation Treatment and Install Inlet/Outlet
Source of Traffic Volumes: Applicant

Roadway Segment	Ground Type	Distance from Roadway to Receiver (feet)	Speed (mph)			Peak Hour Volume			Peak Hour Noise Level (Leq(h) dBA)	Noise Level dBA CNEL
			Auto	MT	HT	Auto	MT	HT		
Potola Pkwy, between SR-133 and Paragon	Hard	60	55	55	55	140	0	152	70.9	71.2
Sand Canyon Ave, between Portola Pkwy and Irvine Blvd.	Hard	40	50	50	50	140	0	152	71.8	72.1
Irvine Blvd, between San Canyon Ave and Native Spring	Hard	55	60	60	60	140	0	152	72.3	72.6
SR-133, between Irvine Blvd and SR-241	Hard	80	65	65	65	140	0	152	71.5	71.8

Model Notes:
The calculation is based on the methodology described in FHWA Traffic Noise Model Technical Manual (1998).
The peak hour noise level at 50 feet was validated with the results from FHWA Traffic Noise Model Version 2.5.
Accuracy of the calculation is within ±0.1 dB when comparing to TNM results.
Noise propagation greater than 50 feet is based on the following assumptions:
For hard ground, the propagation rate is 3 dB per doubling the distance.
For soft ground, the propagation rate is 4.5 dB per doubling the distance.
Vehicles are assumed to be on a long straight roadway with cruise speed.
Roadway grade is less than 1.5%.
CNEL levels were obtained based on Figure 2-19, on page 2-58 Caltran's TeNS 2013.

TRAFFIC NOISE ANALYSIS TOOL

Project Name: IRWD Syphon
Analysis Scenario: Install Embankment to Bottom of Blanket Drain
Source of Traffic Volumes: Applicant

Roadway Segment	Ground Type	Distance from Roadway to Receiver (feet)	Speed (mph)			Peak Hour Volume			Peak Hour Noise Level (Leq(h) dBA)	Noise Level dBA CNEL
			Auto	MT	HT	Auto	MT	HT		
Potola Pkwy, between SR-133 and Paragon	Hard	60	55	55	55	78	0	138	70.4	70.7
Sand Canyon Ave, between Portola Pkwy and Irvine Blvd.	Hard	40	50	50	50	78	0	138	71.2	71.5
Irvine Blvd, between San Canyon Ave and Native Spring	Hard	55	60	60	60	78	0	138	71.7	72.0
SR-133, between Irvine Blvd and SR-241	Hard	80	65	65	65	78	0	138	70.9	71.2

Model Notes:
The calculation is based on the methodology described in FHWA Traffic Noise Model Technical Manual (1998).
The peak hour noise level at 50 feet was validated with the results from FHWA Traffic Noise Model Version 2.5.
Accuracy of the calculation is within ±0.1 dB when comparing to TNM results.
Noise propagation greater than 50 feet is based on the following assumptions:
For hard ground, the propagation rate is 3 dB per doubling the distance.
For soft ground, the propagation rate is 4.5 dB per doubling the distance.
Vehicles are assumed to be on a long straight roadway with cruise speed.
Roadway grade is less than 1.5%.
CNEL levels were obtained based on Figure 2-19, on page 2-58 Caltran's TeNS 2013.

TRAFFIC NOISE ANALYSIS TOOL

Project Name: IRWD Syphon
Analysis Scenario: Install Blanket Drain
Source of Traffic Volumes: Applicant

Roadway Segment	Ground Type	Distance from Roadway to Receiver (feet)	Speed (mph)			Peak Hour Volume			Peak Hour Noise Level (Leq(h) dBA)	Noise Level dBA CNEL
			Auto	MT	HT	Auto	MT	HT		
Potola Pkwy, between SR-133 and Paragon	Hard	60	55	55	55	78	0	138	70.4	70.7
Sand Canyon Ave, between Portola Pkwy and Irvine Blvd.	Hard	40	50	50	50	78	0	138	71.2	71.5
Irvine Blvd, between San Canyon Ave and Native Spring	Hard	55	60	60	60	78	0	138	71.7	72.0
SR-133, between Irvine Blvd and SR-241	Hard	80	65	65	65	78	0	138	70.9	71.2

Model Notes:
The calculation is based on the methodology described in FHWA Traffic Noise Model Technical Manual (1998).
The peak hour noise level at 50 feet was validated with the results from FHWA Traffic Noise Model Version 2.5.
Accuracy of the calculation is within ±0.1 dB when comparing to TNM results.
Noise propagation greater than 50 feet is based on the following assumptions:
For hard ground, the propagation rate is 3 dB per doubling the distance.
For soft ground, the propagation rate is 4.5 dB per doubling the distance.
Vehicles are assumed to be on a long straight roadway with cruise speed.
Roadway grade is less than 1.5%.
CNEL levels were obtained based on Figure 2-19, on page 2-58 Caltran's TeNS 2013.

TRAFFIC NOISE ANALYSIS TOOL

Project Name: IRWD Syphon
Analysis Scenario: Install Chimney/Remaining Embankment
Source of Traffic Volumes: Applicant

Roadway Segment	Ground Type	Distance from Roadway to Receiver (feet)	Speed (mph)			Peak Hour Volume			Peak Hour Noise Level (Leq(h) dBA)	Noise Level dBA CNEL
			Auto	MT	HT	Auto	MT	HT		
Potola Pkwy, between SR-133 and Paragon	Hard	60	55	55	55	78	0	138	70.4	70.7
Sand Canyon Ave, between Portola Pkwy and Irvine Blvd.	Hard	40	50	50	50	78	0	138	71.2	71.5
Irvine Blvd, between San Canyon Ave and Native Spring	Hard	55	60	60	60	78	0	138	71.7	72.0
SR-133, between Irvine Blvd and SR-241	Hard	80	65	65	65	78	0	138	70.9	71.2

Model Notes:
The calculation is based on the methodology described in FHWA Traffic Noise Model Technical Manual (1998).
The peak hour noise level at 50 feet was validated with the results from FHWA Traffic Noise Model Version 2.5.
Accuracy of the calculation is within ±0.1 dB when comparing to TNM results.
Noise propagation greater than 50 feet is based on the following assumptions:
For hard ground, the propagation rate is 3 dB per doubling the distance.
For soft ground, the propagation rate is 4.5 dB per doubling the distance.
Vehicles are assumed to be on a long straight roadway with cruise speed.
Roadway grade is less than 1.5%.
CNEL levels were obtained based on Figure 2-19, on page 2-58 Caltran's TeNS 2013.

TRAFFIC NOISE ANALYSIS TOOL

Project Name: IRWD Syphon
Analysis Scenario: Install Chimney/Remaining Embankment &Spillway Construction
Source of Traffic Volumes: Applicant

Roadway Segment	Ground Type	Distance from Roadway to Receiver (feet)	Speed (mph)			Peak Hour Volume			Peak Hour Noise Level (Leq(h) dBA)	Noise Level dBA CNEL
			Auto	MT	HT	Auto	MT	HT		
Potola Pkwy, between SR-133 and Paragon	Hard	60	55	55	55	156	0	168	71.4	71.7
Sand Canyon Ave, between Portola Pkwy and Irvine Blvd.	Hard	40	50	50	50	156	0	168	72.2	72.5
Irvine Blvd, between San Canyon Ave and Native Spring	Hard	55	60	60	60	156	0	168	72.7	73.0
SR-133, between Irvine Blvd and SR-241	Hard	80	65	65	65	156	0	168	71.9	72.2

Model Notes:
The calculation is based on the methodology described in FHWA Traffic Noise Model Technical Manual (1998).
The peak hour noise level at 50 feet was validated with the results from FHWA Traffic Noise Model Version 2.5.
Accuracy of the calculation is within ±0.1 dB when comparing to TNM results.
Noise propagation greater than 50 feet is based on the following assumptions:
For hard ground, the propagation rate is 3 dB per doubling the distance.
For soft ground, the propagation rate is 4.5 dB per doubling the distance.
Vehicles are assumed to be on a long straight roadway with cruise speed.
Roadway grade is less than 1.5%.
CNEL levels were obtained based on Figure 2-19, on page 2-58 Caltran's TeNS 2013.

TRAFFIC NOISE ANALYSIS TOOL

Project Name: IRWD Syphon
Analysis Scenario: Spillway Construction & Construction of Filtration & Wetlands Installation
Source of Traffic Volumes: Applicant

Roadway Segment	Ground Type	Distance from Roadway to Receiver (feet)	Speed (mph)			Peak Hour Volume			Peak Hour Noise Level (Leq(h) dBA)	Noise Level dBA CNEL
			Auto	MT	HT	Auto	MT	HT		
Potola Pkwy, between SR-133 and Paragon	Hard	60	55	55	55	150	0	122	70.1	70.4
Sand Canyon Ave, between Portola Pkwy and Irvine Blvd.	Hard	40	50	50	50	150	0	122	70.9	71.2
Irvine Blvd, between San Canyon Ave and Native Spring	Hard	55	60	60	60	150	0	122	71.4	71.7
SR-133, between Irvine Blvd and SR-241	Hard	80	65	65	65	150	0	122	70.7	71.0

Model Notes:
The calculation is based on the methodology described in FHWA Traffic Noise Model Technical Manual (1998).
The peak hour noise level at 50 feet was validated with the results from FHWA Traffic Noise Model Version 2.5.
Accuracy of the calculation is within ±0.1 dB when comparing to TNM results.
Noise propagation greater than 50 feet is based on the following assumptions:
For hard ground, the propagation rate is 3 dB per doubling the distance.
For soft ground, the propagation rate is 4.5 dB per doubling the distance.
Vehicles are assumed to be on a long straight roadway with cruise speed.
Roadway grade is less than 1.5%.
CNEL levels were obtained based on Figure 2-19, on page 2-58 Caltran's TeNS 2013.

TRAFFIC NOISE ANALYSIS TOOL

Project Name: IRWD Syphon
Analysis Scenario: Spillway Construction & Construction of Filtration & Wetlands & Recreation Installation
Source of Traffic Volumes: Applicant

Roadway Segment	Ground Type	Distance from Roadway to Receiver (feet)	Speed (mph)			Peak Hour Volume			Peak Hour Noise Level (Leq(h) dBA)	Noise Level dBA CNEL
			Auto	MT	HT	Auto	MT	HT		
Potola Pkwy, between SR-133 and Paragon	Hard	60	55	55	55	170	0	134	70.5	70.8
Sand Canyon Ave, between Portola Pkwy and Irvine Blvd.	Hard	40	50	50	50	170	0	134	71.4	71.7
Irvine Blvd, between San Canyon Ave and Native Spring	Hard	55	60	60	60	170	0	134	71.9	72.2
SR-133, between Irvine Blvd and SR-241	Hard	80	65	65	65	170	0	134	71.1	71.4

Model Notes:
The calculation is based on the methodology described in FHWA Traffic Noise Model Technical Manual (1998).
The peak hour noise level at 50 feet was validated with the results from FHWA Traffic Noise Model Version 2.5.
Accuracy of the calculation is within ±0.1 dB when comparing to TNM results.
Noise propagation greater than 50 feet is based on the following assumptions:
For hard ground, the propagation rate is 3 dB per doubling the distance.
For soft ground, the propagation rate is 4.5 dB per doubling the distance.
Vehicles are assumed to be on a long straight roadway with cruise speed.
Roadway grade is less than 1.5%.
CNEL levels were obtained based on Figure 2-19, on page 2-58 Caltran's TeNS 2013.

TRAFFIC NOISE ANALYSIS TOOL

Project Name: IRWD Syphon
Analysis Scenario: Construction of Filtration & Wetlands & Recreation Installation
Source of Traffic Volumes: Applicant

Roadway Segment	Ground Type	Distance from Roadway to Receiver (feet)	Speed (mph)			Peak Hour Volume			Peak Hour Noise Level (Leq(h) dBA)	Noise Level dBA CNEL
			Auto	MT	HT	Auto	MT	HT		
Potola Pkwy, between SR-133 and Paragon	Hard	60	55	55	55	92	0	104	69.3	69.6
Sand Canyon Ave, between Portola Pkwy and Irvine Blvd.	Hard	40	50	50	50	92	0	104	70.1	70.4
Irvine Blvd, between San Canyon Ave and Native Spring	Hard	55	60	60	60	92	0	104	70.6	70.9
SR-133, between Irvine Blvd and SR-241	Hard	80	65	65	65	92	0	104	69.8	70.1

Model Notes:
The calculation is based on the methodology described in FHWA Traffic Noise Model Technical Manual (1998).
The peak hour noise level at 50 feet was validated with the results from FHWA Traffic Noise Model Version 2.5.
Accuracy of the calculation is within ±0.1 dB when comparing to TNM results.
Noise propagation greater than 50 feet is based on the following assumptions:
For hard ground, the propagation rate is 3 dB per doubling the distance.
For soft ground, the propagation rate is 4.5 dB per doubling the distance.
Vehicles are assumed to be on a long straight roadway with cruise speed.
Roadway grade is less than 1.5%.
CNEL levels were obtained based on Figure 2-19, on page 2-58 Caltran's TeNS 2013.

TRAFFIC NOISE ANALYSIS TOOL

Project Name: IRWD Syphon
Analysis Scenario: Construction of Filtration & Recreation Installation
Source of Traffic Volumes: Applicant

Roadway Segment	Ground Type	Distance from Roadway to Receiver (feet)	Speed (mph)			Peak Hour Volume			Peak Hour Noise Level (Leq(h) dBA)	Noise Level dBA CNEL
			Auto	MT	HT	Auto	MT	HT		
Potola Pkwy, between SR-133 and Paragon	Hard	60	55	55	55	52	0	92	68.6	68.9
Sand Canyon Ave, between Portola Pkwy and Irvine Blvd.	Hard	40	50	50	50	52	0	92	69.4	69.7
Irvine Blvd, between San Canyon Ave and Native Spring	Hard	55	60	60	60	52	0	92	69.9	70.2
SR-133, between Irvine Blvd and SR-241	Hard	80	65	65	65	52	0	92	69.1	69.4

Model Notes:
The calculation is based on the methodology described in FHWA Traffic Noise Model Technical Manual (1998).
The peak hour noise level at 50 feet was validated with the results from FHWA Traffic Noise Model Version 2.5.
Accuracy of the calculation is within ±0.1 dB when comparing to TNM results.
Noise propagation greater than 50 feet is based on the following assumptions:
For hard ground, the propagation rate is 3 dB per doubling the distance.
For soft ground, the propagation rate is 4.5 dB per doubling the distance.
Vehicles are assumed to be on a long straight roadway with cruise speed.
Roadway grade is less than 1.5%.
CNEL levels were obtained based on Figure 2-19, on page 2-58 Caltran's TeNS 2013.

TRAFFIC NOISE ANALYSIS TOOL

Project Name: IRWD Syphon
Analysis Scenario: Construction of Filtration/Chlor/Dechlor Facility
Source of Traffic Volumes: Applicant

Roadway Segment	Ground Type	Distance from Roadway to Receiver (feet)	Speed (mph)			Peak Hour Volume			Peak Hour Noise Level (Leq(h) dBA)	Noise Level dBA CNEL
			Auto	MT	HT	Auto	MT	HT		
Potola Pkwy, between SR-133 and Paragon	Hard	60	55	55	55	32	0	80	67.9	68.2
Sand Canyon Ave, between Portola Pkwy and Irvine Blvd.	Hard	40	50	50	50	32	0	80	68.8	69.1
Irvine Blvd, between San Canyon Ave and Native Spring	Hard	55	60	60	60	32	0	80	69.2	69.5
SR-133, between Irvine Blvd and SR-241	Hard	80	65	65	65	32	0	80	68.4	68.7

Model Notes:
The calculation is based on the methodology described in FHWA Traffic Noise Model Technical Manual (1998).
The peak hour noise level at 50 feet was validated with the results from FHWA Traffic Noise Model Version 2.5.
Accuracy of the calculation is within ±0.1 dB when comparing to TNM results.
Noise propagation greater than 50 feet is based on the following assumptions:
For hard ground, the propagation rate is 3 dB per doubling the distance.
For soft ground, the propagation rate is 4.5 dB per doubling the distance.
Vehicles are assumed to be on a long straight roadway with cruise speed.
Roadway grade is less than 1.5%.
CNEL levels were obtained based on Figure 2-19, on page 2-58 Caltran's TeNS 2013.

TRAFFIC NOISE ANALYSIS TOOL

Project Name: IRWD Syphon
Analysis Scenario: Spillway Construction & Construction of Filtration & Wetlands & Recreation Installation
Source of Traffic Volumes: Applicant

Roadway Segment	Ground Type	Distance from Roadway to Receiver (feet)	Speed (mph)			Peak Hour Volume			Peak Hour Noise Level (Leq(h) dBA)	Noise Level dBA CNEL
			Auto	MT	HT	Auto	MT	HT		
Potola Pkwy, between SR-133 and Paragon	Hard	60	55	55	55	32	0	4	57.5	57.8
Sand Canyon Ave, between Portola Pkwy and Irvine Blvd.	Hard	40	50	50	50	32	0	4	58.2	58.5
Irvine Blvd, between San Canyon Ave and Native Spring	Hard	55	60	60	60	32	0	4	58.9	59.2
SR-133, between Irvine Blvd and SR-241	Hard	80	65	65	65	32	0	4	58.3	58.6

Model Notes:
The calculation is based on the methodology described in FHWA Traffic Noise Model Technical Manual (1998).
The peak hour noise level at 50 feet was validated with the results from FHWA Traffic Noise Model Version 2.5.
Accuracy of the calculation is within ±0.1 dB when comparing to TNM results.
Noise propagation greater than 50 feet is based on the following assumptions:
For hard ground, the propagation rate is 3 dB per doubling the distance.
For soft ground, the propagation rate is 4.5 dB per doubling the distance.
Vehicles are assumed to be on a long straight roadway with cruise speed.
Roadway grade is less than 1.5%.
CNEL levels were obtained based on Figure 2-19, on page 2-58 Caltran's TeNS 2013.

Appendix E
Traffic Study

ESA

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Prepared for
Environmental Science Associates

Draft Irvine Ranch Water District Syphon Improvement Project

Transportation Impact Analysis

September 2020

Draft Irvine Ranch Water District
Syphon Reservoir Improvement Project
Transportation Impact Analysis

Prepared for:

Irvine Ranch Water District

September 2020

OC18-0553

FEHR PEERS

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1. Executive Summary

Fehr & Peers has completed a Transportation Impact Analysis (TIA) for construction of the Irvine Ranch Water District (IRWD) Syphon Reservoir Improvement Project (Project) located near the intersection of Sand Canyon Avenue and Portola Parkway in Irvine, California. The Project proposes to increase the capacity of the existing Syphon Reservoir and replace the existing engineered dam with a new and larger engineered dam. As part of the Project, a private 2-lane roadway connection from the northern side of the Sand Canyon Avenue and Portola Parkway intersection to the Project site is proposed for construction vehicle access. This proposal will require reconstruction of the Sand Canyon Avenue and Portola Parkway intersection to accommodate the new northern leg and the associated traffic signals, lane striping, and signage changes. Pedestrian and bicycle infrastructure at the intersection will be reconstructed to maintain access like the existing condition while following the City of Irvine requirements.

As part of the TIA, consistent with California Environmental Quality Act (CEQA) requirements, a Vehicle Miles Traveled (VMT) analysis was conducted for the Project. Intersection Level of Service (LOS) was also conducted to determine intersection operations with and without the Project. The study intersections selected represent the intersections where construction traffic is proposed to travel through. Four routes are proposed for the Project.

Findings

On a peak construction activity day, approximately 232 daily trips are estimated, of which 36 trips (27 inbound/9 outbound) would occur during the AM peak hour and 18 trips (0 inbound/18 outbound) would occur during the PM peak hour. For the purpose of the intersection LOS analysis, the trip generation estimates were converted to Passenger Car Equivalent (PCE) trips. PCE reflects the additional effect larger vehicles have on intersection operations based on their larger size. A PCE factor of 1.0 was assumed for worker vehicles and a PCE factor of 3.0 was assumed for all construction trucks, based on the Highway Capacity Manual 6th Edition (HCM) (Transportation Research Board, 2017). As shown in Table 3, on a peak construction activity day, approximately 512 daily PCE trips are estimated, of which 72 PCE trips (45 inbound/27 outbound) would occur during the AM peak hour and 18 PCE trips (0 inbound/18 outbound) would occur during the PM peak hour.

The City of Irvine's *CEQA VMT Impact Analysis Guidelines* identify projects generating fewer than 250 weekday daily trips as requiring no further VMT impact analysis. All phases of construction have a daily trip generation less than 250 trips. Therefore, it can be determined that all the construction phases do not meet the daily trip screening threshold and require no further VMT impact analysis using the *CEQA VMT Impact Analysis Guidelines*.

The LOS analyses resulted in no intersection deficiencies under any of the "plus Project" scenarios. Therefore, no intersection improvements would be required.

2. Introduction

This report presents the analysis and findings of a Transportation Impact Analysis (TIA) prepared for construction of the Irvine Ranch Water District (IRWD) Syphon Reservoir Improvement Project (Project) located near the intersection of Sand Canyon Avenue and Portola Parkway in Irvine, California. This chapter discusses the TIA purpose, analysis locations and methods, scenarios, and report organization.

Study Purpose

The purpose of this study is to evaluate the temporary transportation impacts associated with the Syphon Reservoir Improvement Project. The Project proposes to increase the capacity of the existing Syphon Reservoir and replace the existing engineered dam with a new and larger engineered dam. The Project would allow the storage of additional recycled water produced at the Michelson Water Recycling Plant during periods of low demand (winter months) for use during periods of high demand (summer months). The Project would expand the reservoir's storage capacity from the current 500 Acre-Feet (AF) to approximately 5,000 AF and would help IRWD become more self-sufficient by reducing its dependence on costly and less-reliable imported water from both Northern California and the Colorado River. The Project would help IRWD to store more drought-proof recycled water during summer months and support the increased use of recycled water for public landscaping, agricultural, business, and industrial uses. Every gallon of recycled water IRWD uses for non-drinking water purposes saves a gallon of drinking water, helping the region's existing and planned future development to better withstand future water shortages. By reducing IRWD's dependence on costly imported water, the Project would allow IRWD to replace an expensive source of water for one that is less expensive and a drought-resilient supply, which increases IRWD's water supply reliability. The proposed Project is assumed to be operational by end of 2026.

The Project would be implemented within the IRWD service area at the location of the existing Syphon Reservoir, northeast of Portola Parkway between Bee Canyon Access Road and SR-133 in the County of Orange. The Crean Lutheran High School Athletic Complex is located between Portola Parkway and the toe of the existing dam. Residential neighborhoods are located on the southwest side of Portola Parkway. Figure 1 identifies the location of the Project within Irvine.

As part of the Project, a private 2-lane roadway connection from the northern side of the Sand Canyon Avenue and Portola Parkway intersection to the Project site is proposed for construction vehicle access during Project construction and maintenance/operations access during Project operation. This proposal will require reconstruction of the Sand Canyon Avenue and Portola Parkway intersection to accommodate the new northern leg and the associated traffic signals, lane striping, and signage changes. Pedestrian and bicycle infrastructure at the intersection would be reconstructed to maintain access like the existing condition while following the City of Irvine requirements. This improvement assumes the northbound

approach at Sand Canyon Avenue and Portola Parkway would be modified from two left-turn lanes and two right-turn lanes to one left-turn lane, one shared through/left-turn lane, and two right-turn lanes. The southbound approach would be constructed with one shared left/through/right-turn lane. Split phasing (a traffic signal phasing that gives a green signal for all vehicle movements of one direction followed by a green signal for all movements of the opposite direction) would be incorporated for the northbound and new southbound approaches during construction and typical operations. During construction of the Project, this private roadway would be used by construction trips for ingress and egress of the construction site. Upon completion of the Project, this private roadway would be used by IRWD staff conducting maintenance and inspections as part of typical operations, similar to existing conditions. Trips by IRWD staff to the reservoir are not anticipated to increase as compared to the existing condition and are not considered to have a significant effect on the future intersection operations.

Study Area Boundary

The scope of the traffic analysis, methodology assumptions, and selection of study intersections was developed in consultation with City of Irvine staff and documented in the Scope of Work for Irvine Ranch Water District (IRWD) Syphon Reservoir Construction Transportation Impact Analysis dated June 29, 2020. The approved scope of work is included in Appendix A.

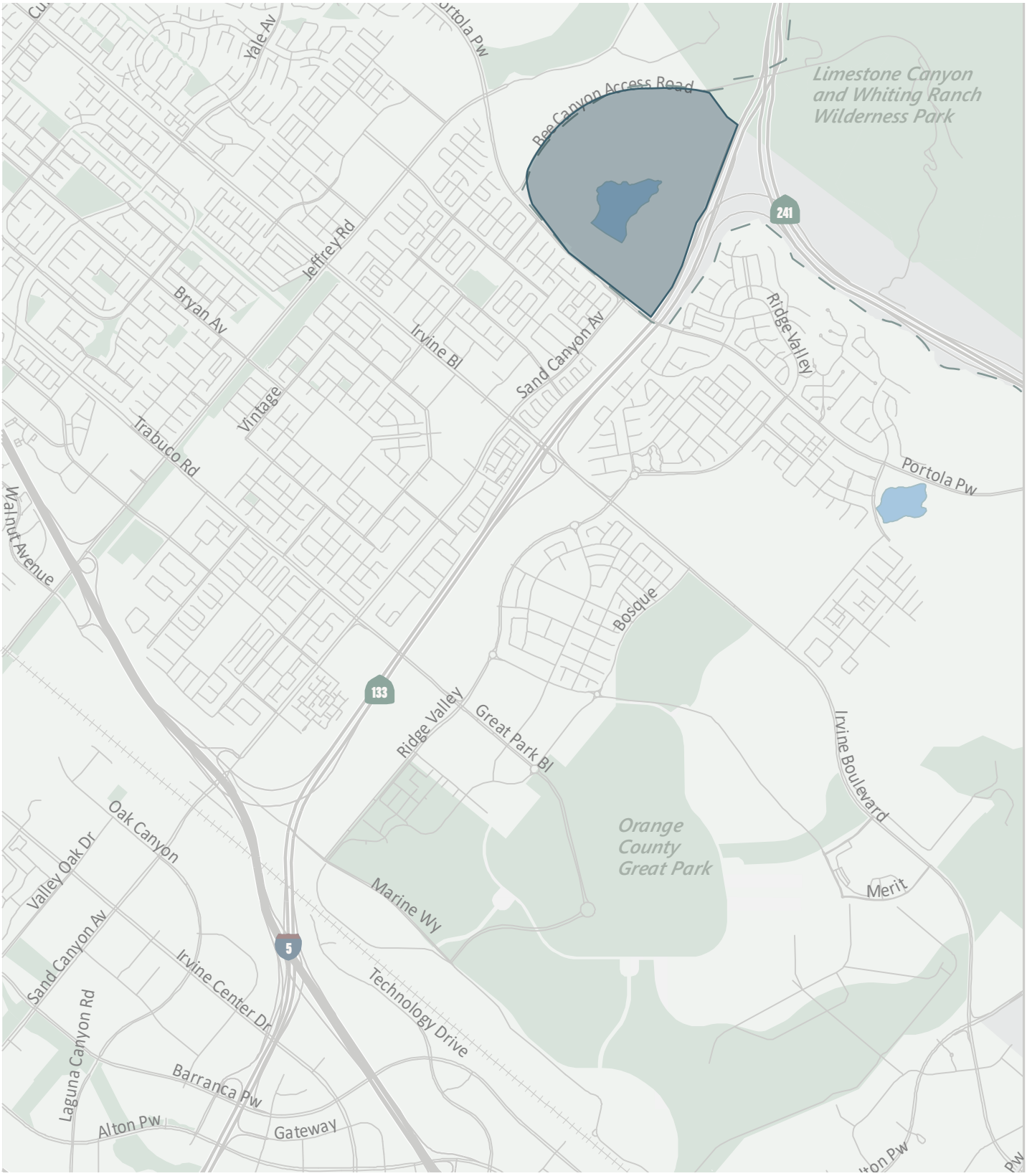
The study intersections selected represent the intersections where construction traffic is proposed to travel through. Four routes are proposed for the Project.

- Route 1A – I-5 (from the north), south on Sand Canyon Avenue for trucks traveling inbound and southbound on Sand Canyon Avenue to I-5 (to the north) for trucks traveling outbound.
- Route 1B – I-5 (from the south), south on Sand Canyon Avenue for trucks traveling inbound and southbound on Sand Canyon Avenue to I-5 (to the south) for trucks traveling outbound.
- Route 2A – SR-133 (from the north), west on Irvine Boulevard, and north on Sand Canyon Avenue for trucks traveling inbound and southbound on Sand Canyon Avenue and east on Irvine Boulevard to SR-133 (to the north) for trucks traveling outbound.
- Route 2B – SR-133 (from the south), west on Irvine Boulevard, and north on Sand Canyon Avenue for trucks traveling inbound and southbound on Sand Canyon Avenue and east on Irvine Boulevard to SR-133 (to the south) for trucks traveling outbound.

As presented in Figure 2, the following intersections have been selected for study:

1. Sand Canyon Avenue & Portola Parkway
2. Sand Canyon Avenue & Irvine Boulevard
3. Sand Canyon Avenue & Trabuco Road
4. Sand Canyon Avenue & I-5 Northbound Ramps
5. Sand Canyon Avenue & Marine Way
6. Sand Canyon Avenue & I-5 Southbound Ramps
7. SR-133 Southbound Ramps & Irvine Boulevard
8. SR-133 Northbound Off-Ramp & Irvine Boulevard

Freeway links were not included in this study as less than 50 peak hour trips would be added to the freeway system.



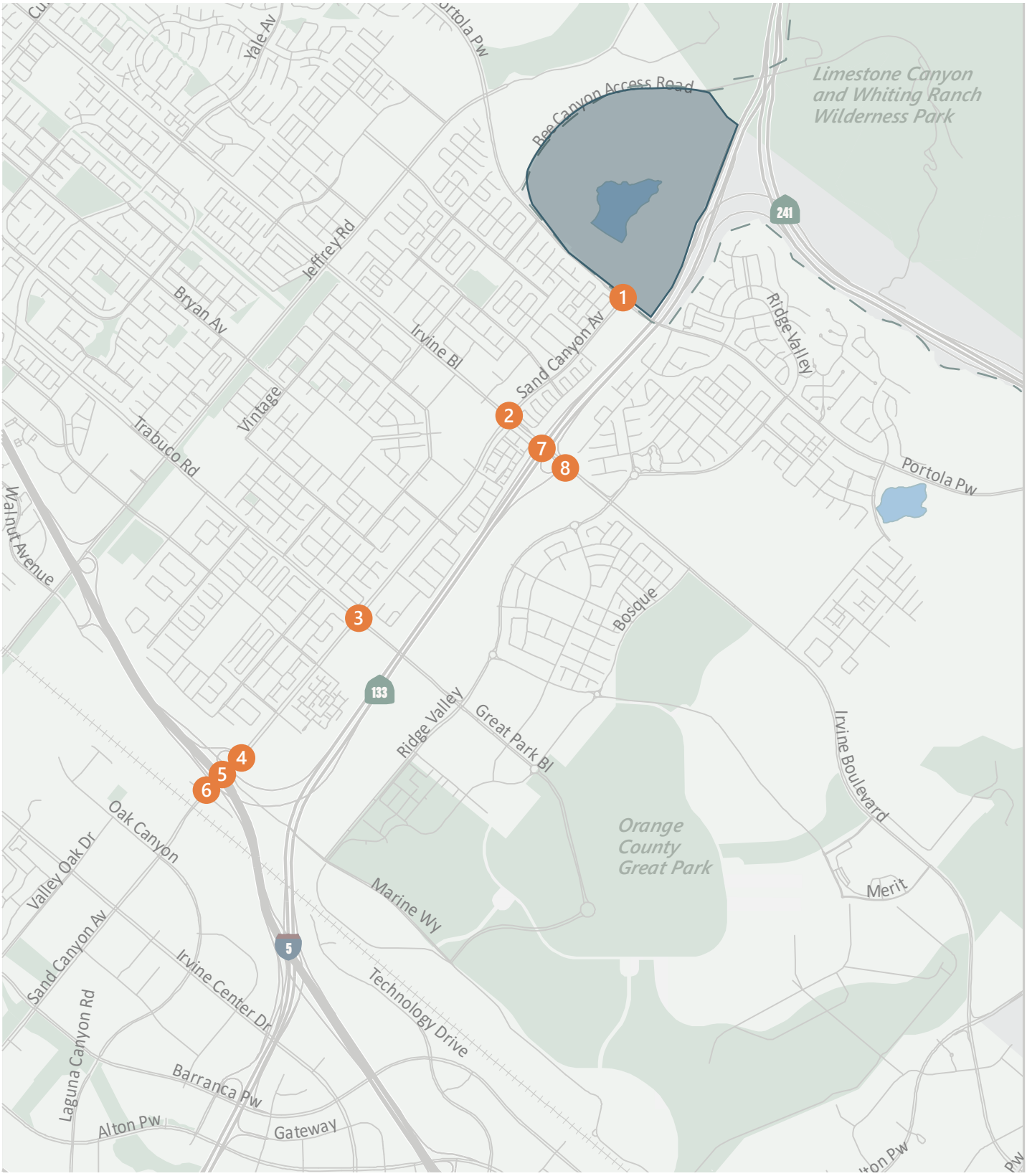
Note: For the purpose of this study Sand Canyon Avenue is regarded as a north-south roadway

Legend

Project Site Syphon Reservoir

Figure 1

Project Location



Note: For the purpose of this study Sand Canyon Avenue is regarded as a north-south roadway

N

Legend

- Study Intersections
- Project Site Syphon Reservoir

Figure 2

Study Intersections

Analysis Methods

The *City of Irvine Traffic Study Guidelines* (City of Irvine, April 2020) were used to identify the analysis methodologies for the Vehicle Miles Traveled (VMT) and intersection Level of Service (LOS) analyses. Many jurisdictions in Southern California have regarded construction-related traffic as causing adverse but not significant impacts because, while sometimes inconvenient, construction-related traffic effects are temporary.

Vehicle Miles Traveled Analysis

On September 27, 2013, Governor Jerry Brown signed Senate Bill (SB) 743 into law and started a process that has fundamentally changed transportation impact analyses conducted as part of California Environmental Quality Act (CEQA) compliance. The Governor's Office of Planning and Research (OPR) was charged with developing new guidelines for evaluating transportation impacts under CEQA using methods that no longer focus on measuring automobile delay and LOS.

OPR issued proposed updates to the CEQA guidelines in support of these goals in November 2017 and a supporting technical advisory in December 2018. The updates establish VMT as the metric for evaluating a project's environmental impacts on the transportation system. Lead agencies, including the City of Irvine, had until July 1, 2020 to implement these new requirements. On June 23, 2020, the City of Irvine adopted the *CEQA VMT Impact Analysis Guidelines* (City of Irvine, April 2020). These guidelines are included as an exhibit in the *City of Irvine Traffic Study Guidelines*.

Neither OPR nor the City of Irvine have provided guidance regarding VMT thresholds for construction related traffic. Nonetheless and per the approved scope of work, a VMT impact analysis was conducted for the Project that follows the adopted *CEQA VMT Impact Analysis Guidelines*.

Intersection Level of Service Analysis

For the signalized intersections within the study area, the transportation analysis was conducted in accordance with *City of Irvine Traffic Study Guidelines* requirements using the Intersection Capacity Utilization (ICU) methodology.

The ICU methodology is considered a standard approach for evaluating signalized intersection operations in Irvine. The ICU method of intersection capacity analysis determines the intersection volume-to-capacity (V/C) ratio and corresponding LOS for the turning movements and intersection characteristics at signalized intersections. "Capacity" represents the maximum volume of vehicles in the critical lanes that have a reasonable expectation of passing through an intersection in one hour under prevailing roadway and traffic

conditions. The ICU method calculates the V/C ratio for each critical movement by dividing volume by capacity. The V/C ratios for each critical movement are summed with an added lost time due to vehicle start-ups and stops to determine the total intersection V/C ratio. Traffic conditions for signalized intersections were evaluated using the Vistro Version 7.0 software.

After the quantitative V/C and delay estimates were completed, the methodologies assign a qualitative letter grade that represents the operations of the intersection. These grades range from level of service (LOS) A (minimal delay) to LOS F (excessive congestion). LOS E represents at-capacity operations. Descriptions of the LOS letter grades for intersections are provided in Table 1.

Analysis Scenarios

The proposed Project is assumed to be operational by end of 2026. The study was directed at analyzing the potential Project generated traffic effect on the local street system under both existing and future year traffic conditions. The following traffic scenarios were developed and analyzed as part of this study:

- Existing Conditions – Due to emergence of COVID-19 in southern California and the decision of local schools to end on-campus classes for the 2019-2020 academic year, existing intersection counts could not be collected in the study area. However, the City of Irvine provided intersection counts from 2018 that were used to estimate 2020 intersection volumes. Per the approved scope of work with the City of Irvine, a growth factor of 2% per year was applied to previously collected counts to develop 2020 intersection volumes for the AM and PM peak hours.
- Existing plus Project Conditions – the proposed construction trip generation (in passenger car equivalence) and route assignment estimates was added to the Existing Conditions. Buildout of a private roadway connection from the northern side of the Sand Canyon Avenue and Portola Parkway intersection to the Project site was included.
- Short-Term Interim Year Approved Conditions – the future (Short-Term Interim Year Approved) conditions were developed using study area intersection volume growth rates on a per year basis. The per year growth rates were developed based on outputs from the latest versions of the Existing and Short-Term Interim Year Approved Irvine Traffic Analysis Model (ITAM) provided by the City of Irvine. The growth rate was applied to the Existing Conditions intersection volumes to reflect Existing Conditions growth to the Short-Term Interim Year Approved condition of ITAM.
- Short-Term Interim Year Approved plus Project Conditions – the proposed construction trip generation (in passenger car equivalence) and route assignment estimates was added to the Short-Term Interim Year Approved Conditions. Buildout of a private roadway connection from the northern side of the Sand Canyon Avenue and Portola Parkway intersection to the Project site was included.

TABLE 1
INTERSECTION LEVEL OF SERVICE CRITERIA

Level of Service	Description	ICU Volume to Capacity (V/C) Ratio
A	Signalized: Operations with very low delay occurring with favorable progression and/or short cycle length. Unsignalized: Little or no delay.	0.000 - 0.600
B	Signalized: Operations with low delay occurring with good progression and/or short cycle lengths. Unsignalized: Short traffic delays.	0.601 - 0.700
C	Signalized: Operations with average delays resulting from fair progression and/or longer cycle lengths. Individual cycle failures begin to appear. Unsignalized: Average traffic delays.	0.701 - 0.800
D	Signalized: Operations with longer delays due to a combination of unfavorable progression, long cycle lengths, or high V/C ratios. Many vehicles stop and individual cycle failures are noticeable. Unsignalized: Long traffic delays.	0.801 - 0.900
E	Signalized: Operations with high delay values indicating poor progression, long cycle lengths, and high V/C ratios. Individual cycle failures are frequent occurrences. Unsignalized: Very long traffic delays.	0.901 - 1.000
F	Signalized: Operation with delays unacceptable to most drivers occurring due to over saturation, poor progression, or very long cycle lengths. Unsignalized: Extreme traffic delays with intersection capacity exceeded	> 1.000

Sources: *Transportation Research Circular No. 212, Interim Materials on Highway Capacity,* Transportation Research Board, 1980.

- Short-Term Interim Year Pending Conditions – the future (Short-Term Interim Year Pending) conditions were developed using study area intersection volume growth rates on a per year basis. The per year growth rates were developed based on outputs from the latest versions of the Existing and Short-Term Interim Year Pending ITAM provided by the City of Irvine. The growth rate was applied to the Existing Conditions intersection volumes to reflect Existing Conditions growth to the Short-Term Interim Year Pending condition of ITAM.
- Short-Term Interim Year Pending plus Project Conditions – the proposed construction trip generation (in passenger car equivalence) and route assignment estimates was added to the Short-Term Interim Year Pending Conditions. Buildout of a private roadway connection from the northern side of the Sand Canyon Avenue and Portola Parkway intersection to the Project site was included.

Report Organization

This report is divided into eight chapters as described below:

- Chapter 1 – Executive summary summarizes the findings of the analysis.
- Chapter 2 – Introduction discusses the purpose and organization of the report.
- Chapter 3 – Existing Conditions describes the transportation system in the Project vicinity, including the surrounding roadway network, morning and evening peak period intersection turning movement volumes, existing bicycle, pedestrian, and transit facilities, and intersection operations.
- Chapter 4 – Performance criteria identify the thresholds for impacts and when traffic improvements would be required.
- Chapter 5 – Project characteristics identify the trip generation, distribution, and assignment of the Project traffic.
- Chapter 6 – Existing Plus Project Traffic Conditions addresses the Existing Conditions with the Project and discusses Project effect on intersections.
- Chapter 7 – Short-Term Interim Year Conditions addresses the Short-Term Interim Year without the Project.
- Chapter 8 – Short-Term Interim Year Plus Project Conditions addresses the Short-Term Interim Year Plus Project Conditions, with the Project, and discusses Project effect on intersections.
- Chapter 9 – Special Issues address site access analysis and VMT analysis.
- Chapter 10 – Required improvements address the improvements required of the Project.
- Chapter 11 – Conclusion summarizes the findings of the analysis.

3. Existing Conditions

This chapter describes transportation facilities in the study area including the surrounding roadway network, transit, pedestrian, and bicycle facilities. Existing intersection operations are also described.

Roadway System

The following discusses the roadways that would provide access to the site and are most likely to experience direct traffic effects, if any, from the Project (see Figure 1).

State Route 133 (SR-133) is a north-south freeway that runs between Laguna Beach, California, and Irvine. In the study area, SR-133 provides four general purpose travel lanes in both the northbound and southbound directions.

Interstate 5 (I-5) is a north-south freeway that runs between the Mexico border and the Oregon state line. In the study area, I-5 provides five general purpose travel lanes and one high occupancy vehicle lane in both the northbound and southbound directions.

Marine Way is an east-west roadway through Irvine. In the study area, the roadway generally provides one travel lane in each direction with turn pockets at intersections and driveways. The posted speed limit is 45 mph. No on-street parking is permitted on either side of the road.

Trabuco Road/Great Park Boulevard is an east-west roadway through Irvine. In the study area, the roadway generally provides three travel lanes in each direction with a raised median and turn pockets at intersections. The posted speed limit is 50 mph. No on-street parking is permitted on either side of the road.

Irvine Boulevard is an east-west roadway through Irvine that provides access to SR-133. In the study area, the roadway generally provides three travel lanes in each direction with a raised median and turn pockets at intersections. The posted speed limit is 55 mph. No on-street parking is permitted on either side of the road.

Portola Parkway is an east-west roadway through Irvine. In the study area, the roadway generally provides two travel lanes in each direction with a raised median and turn pockets at intersections. The posted speed limit is 55 mph. No on-street parking is permitted on either side of the road.

Sand Canyon Avenue is a north-south roadway through Irvine that provides access to I-5. In the study area, the roadway generally provides four travel lanes in each direction between Trabuco Road/Great Park

Boulevard and I-5, three travel lanes in each direction between Irvine Boulevard and Trabuco Road/Great Park Boulevard, and two travel lanes in each direction between Portola Parkway and Irvine Boulevard. A raised median and turn pockets are generally provided at intersections. The posted speed limit is 50 mph. No on-street parking is permitted on either side of the road.

Existing Pedestrian and Bicycle Facilities

Pedestrian facilities in the study area include sidewalks, crosswalks, and pedestrian signals. All the roadways in the study areas provide sidewalks or paths on both sides of the street. Sidewalks are not provided along SR-133 or I-5. At the signalized intersections in the study areas, crosswalks and pedestrian push-button actuated signals are provided. Figure 3 presents the following bicycle facilities in the study area, per the *California State Bicycle and Pedestrian Plan* (Caltrans, 2017) 3:

- **Bike paths (Class I)** – Bike paths provide a separate right-of-way and are designated for the exclusive use of people riding bicycles and walking with minimal crossflow traffic. Such paths can be well situated along creeks, canals, and rail lines. Class I Bikeways can also offer opportunities not provided by the road system by serving as both recreational areas and/or desirable commuter routes. Bike paths are provided along the following roadway segments.
    - Sand Canyon Avenue from Portola Parkway to I-5
    - Towngate from Hallmark to Crosspointe
    - Portola Parkway from Paragon to SR-133
    - Cypress Village Trail along I-5
- **Bike lanes (Class II)** – Bike lanes provide designated street space for bicyclists, typically adjacent to the outer vehicle travel lanes. Bike lanes include special lane markings, pavement legends, and signage. Bike lanes may be enhanced with painted buffers between vehicle lanes and/or parking, and green paint at conflict zones (such as driveways or intersections). The following roadway segments have Class II bike lanes.
    - Sand Canyon Avenue from Portola Parkway to I-5
    - Spring Meadows from Medallion to Coralwood
    - Towngate from Hallmark to Crosspointe
    - Roosevelt from Tulip to Sand Canyon Avenue
    - Marine Way from Sand Canyon to SR-133
    - Portola Parkway from Paragon to SR-133
    - Irvine Boulevard from Groveland to SR-133
    - Trabuco Road/Great Park Boulevard from Keystone to SR-133
    - Nightmist from Tulip to Sand Canyon Avenue

- **Bike routes (Class III)** – Bike routes provide enhanced mixed-traffic conditions for bicyclists through signage, striping, and/or traffic calming treatments, and to provide continuity to a bikeway network. Bike routes are typically designated along gaps between bike trails or bike lanes, or along low-volume, low-speed streets. There are no Class III facilities in the study areas.

- **Separated Bikeway (Class IV)** – Separated bikeways, also referred to as cycle tracks or protected bikeways, are bikeways for the exclusive use of bicycles which are physically separated from vehicle traffic. Separated Bikeways were recently adopted by Caltrans in 2015. Types of separation may include, but are not limited to, grade separation, flexible posts, physical barriers, or on-street parking. There are no Class IV facilities in the study areas.

Existing Transit Service

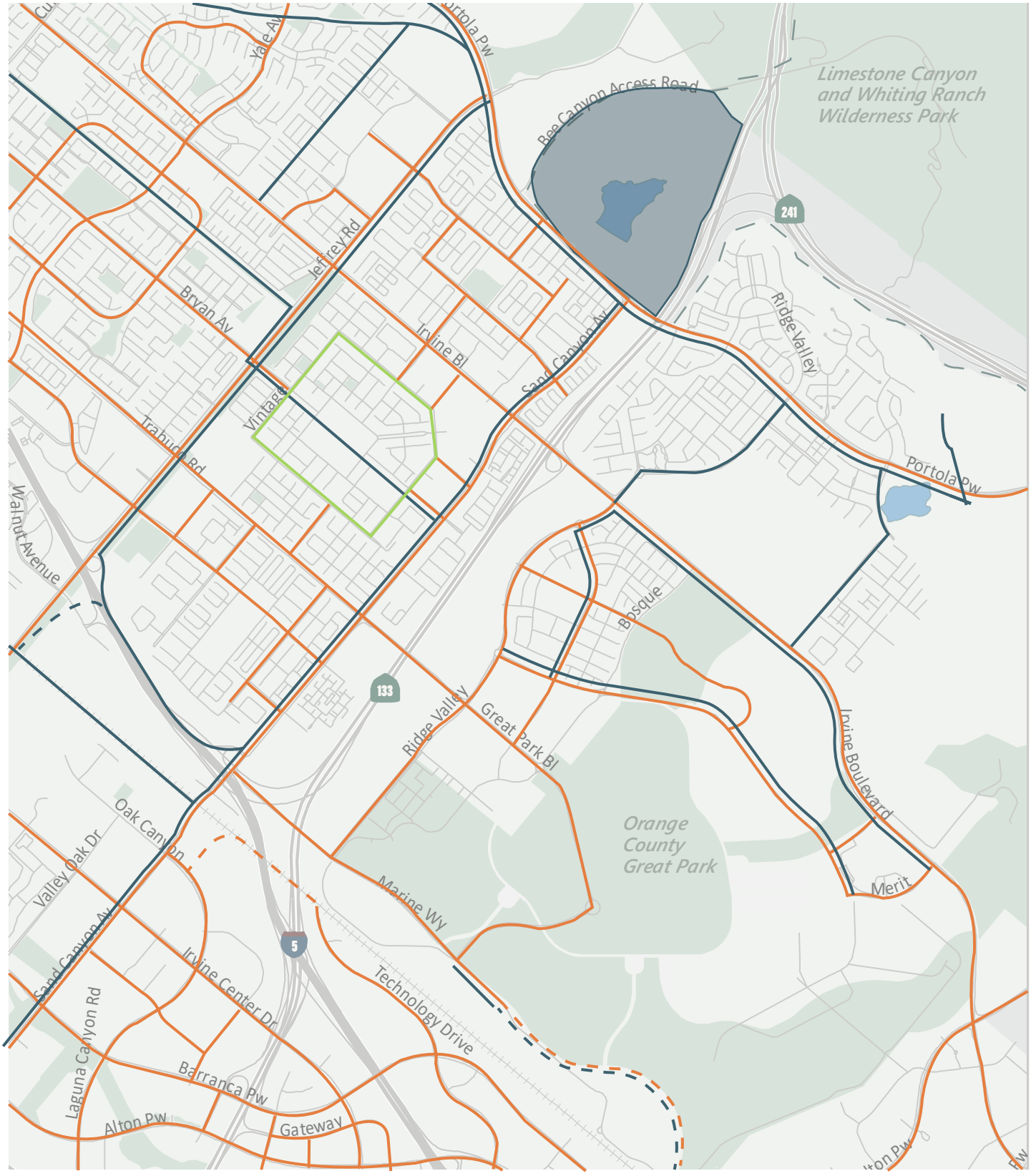
Transit service in the study areas is provided by Orange County Transit Authority (OCTA). OCTA operates Routes 83 and 206 along I-5 in the study area. These routes provide regional service but have no stops in the study area.

Existing Traffic Counts

Due to the COVID-19 pandemic in 2020, travel activity and traffic volumes in the existing year of analysis were substantially decreased throughout the study area and Southern California. It was not possible to collect counts that represented existing traffic conditions. A baseline condition that reflected travel activity and traffic volume prior to the COVID-19 pandemic was developed for the intersection analysis. Historical AM and PM peak hour turning movement counts collected at the study intersection in 2018 provided by the City of Irvine. Each of these counts were grown by 2% per year from their respective count year to the established baseline year of 2020. Peak hour intersection volumes are summarized on Figure 4 along with existing lane configurations and traffic controls. The traffic counts from 2018 are provided in Appendix B.

Existing Operations Analysis

Existing intersection operations were evaluated using the methods described in Chapter 1 for the weekday AM and PM peak hours at the study intersections. The analysis was based on the volumes, lane configurations, and traffic control presented on Figure 4. Detailed intersection LOS calculation worksheets are presented in Appendix C. As shown in Table 2, all signalized study intersections currently operate at LOS C or better in both the AM and PM peak hours.



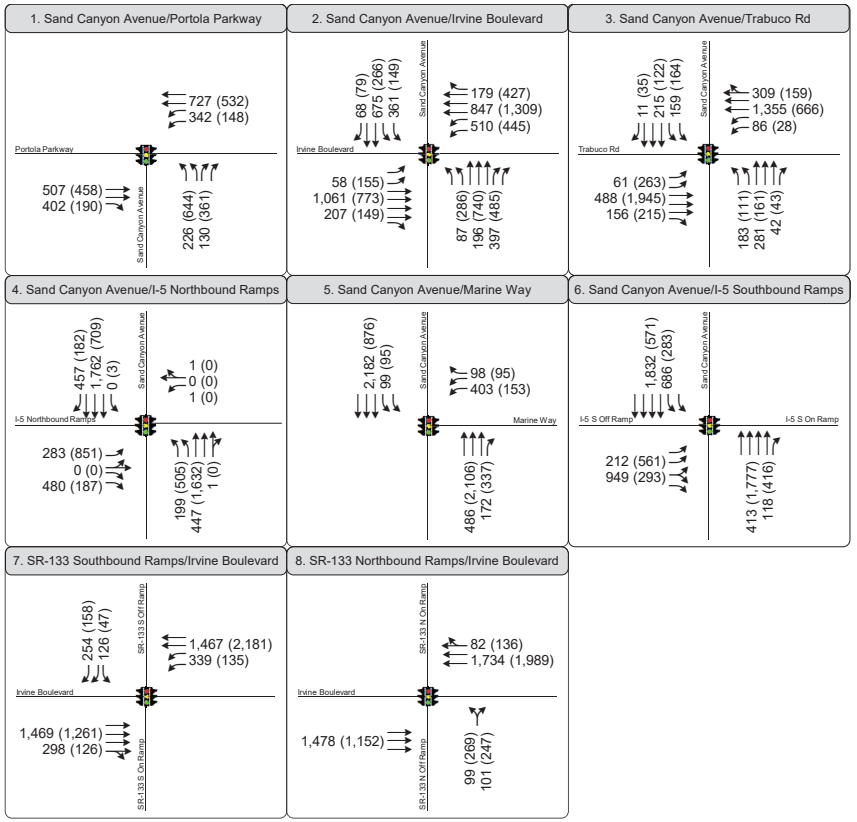
Legend

- Project Site Syphon Reservoir
- On-Street Bikeway
- Planned On-Street Bikeway
- On-Street Bikeway on One Side of the Road
- Off-Street Bikeway
- Planned Off-Street Bikeway

Figure 3

Bicycle Facilities





Legend

Study Intersections

Project Site Syphon Reservoir

XX(XX) AM(PM)

Figure 4

Existing Peak Hour

Traffic Volumes, Lane Configurations, and Traffic Control

TABLE 2
EXISTING
INTERSECTION LEVEL OF SERVICE

ID	N/S Street Name	E/W Street Name	Control Type	Time Period	Existing Conditions	
					V/C	LOS
1	Sand Canyon Avenue	Portola Parkway	Signalized	AM	0.366	A
				PM	0.418	A
2	Sand Canyon Avenue	Irvine Boulevard	Signalized	AM	0.580	A
				PM	0.541	A
3	Sand Canyon Avenue	Trabuco Road	Signalized	AM	0.496	A
				PM	0.519	A
4	Sand Canyon Avenue	I-5 Northbound Ramps	Signalized	AM	0.538	A
				PM	0.622	B
5	Sand Canyon Avenue	Marine Way	Signalized	AM	0.596	A
				PM	0.547	A
6	Sand Canyon Avenue	I-5 Southbound Ramps	Signalized	AM	0.600	A
				PM	0.520	A
7	SR-133 Southbound Ramps	Irvine Boulevard	Signalized	AM	0.556	A
				PM	0.738	C
8	SR-133 Northbound Off-Ramp	Irvine Boulevard	Signalized	AM	0.465	A
				PM	0.625	B

4. Performance Criteria

The determination of significance for Project impacts is based on applicable policies, regulations, goals, and guidelines defined by the City of Irvine. The proposed impact criteria for this study are presented below.

Vehicle Miles Traveled Impact Thresholds

On June 23, 2020, the City of Irvine adopted the *CEQA VMT Impact Analysis Guidelines*. These guidelines identify the screening criteria, analysis requirements, thresholds, and mitigation options for VMT analysis associated with the operation of new projects in the City of Irvine. The City of Irvine has not provided guidance regarding VMT thresholds for construction related traffic. The screening opportunities and VMT thresholds identified below are documented in the *CEQA VMT Impact Analysis Guidelines* and were utilized as part of the analysis and performance criteria for the Project.

Construction-related traffic is typically considered to cause adverse but not lasting intersection deficiencies because, while sometimes inconvenient, construction-related traffic effects are temporary. However, in an effort to document potential impacts related to the Project, the City of Irvine VMT impact thresholds were applied to the Project.

Screening

If the analysis of environmental impacts related to transportation (i.e., VMT impact analysis) is required for a discretionary project, but if it can be demonstrated that the project meets any one of the following four screening criteria, then no further VMT impact analysis is required:

1. The project results in a net increase of 250 or fewer weekday daily trips.
2. The project is located in a Transit Priority Area[1]
3. The project is 100-percent restricted affordable housing units
4. The project is locally serving such as 100,000 square feet or less of retail use, a daycare use or a locally serving public school

[1] A Transit Priority Area (TPA) is defined as within half-mile distance of existing rail transit station or located within half-mile of two or more existing bus routes with a frequency of service interval of 15 minutes or less during morning and evening peak hours.

Thresholds of Significance

The City's identified significance criteria is for the operation of new projects to generate 15 percent less VMT per capita (or per employee) compared to existing conditions, which is consistent with the OPR Technical Advisory recommendations. City staff will periodically update the VMT thresholds based on the latest calibrated and validated City VMT traffic model. Any technical updates to the VMT significance thresholds are subject to the approval of the Transportation Commission at the recommendation of the Director of Public Works and Transportation.

The table below identifies the existing residential VMT per capita and the non-residential VMT per employee, as well as the proposed residential VMT per capita and non-residential VMT per employee significance thresholds, as documented in the *CEQA VMT Impact Analysis Guidelines*. The residential significance threshold is based on the countywide residential VMT divided by the countywide population, while the non-residential significance threshold is based on the countywide commute and other (i.e., customer and client) VMT divided by the number of countywide employees.

Land Use Type	Existing	Significance Threshold* (15 percent reduction)
Residential (VMT per population)	17.5	14.9
Non-Residential (VMT per employee)	48.8	41.5

* Any technical updates to the VMT significance thresholds are subject to the approval of the Transportation Commission at the recommendation of the Director of Public Works and Transportation.
Source: *CEQA VMT Impact Analysis Guidelines* (City of Irvine, April 2020)

If the project VMT rate exceeds the respective threshold, then the project creates a significant impact. When a project results in a significant VMT impact, it must identify the mitigation measures to reduce the impact to a level that meets the City's adopted VMT threshold. All feasible mitigation measures must be incorporated into the project to substantially reduce the impact even if the project cannot meet the adopted VMT threshold.

Signalized Intersections Deficiencies

Construction-related traffic is typically considered to cause adverse but not lasting intersection deficiencies because, while sometimes inconvenient, construction-related traffic effects are temporary. However, in an effort to document potential intersection deficiencies related to the Project, City of Irvine intersection criteria was applied to all signalized intersections. A signalized intersection is considered to be deficient if one of the following criteria is met.

- A location is at acceptable LOS in the baseline condition and the project causes the location to become deficient; or
- A location at unacceptable LOS in the baseline condition and the project causes the location to further deteriorate by two percent or more (i.e. 0.02 v/c ratio change).

According to the *City of Irvine Traffic Study Guidelines*, LOS E shall be considered acceptable for links and intersections in accordance with the City's General Plan Objective B-1. LOS D shall be considered acceptable for all other areas of the City. Based on these criteria, all study intersections will be identified as operating acceptably if they are at or better than LOS D.

For intersection analysis, if an intersection is determined to be deficient based on the criteria above, then the project will be required to improve the intersection, at a minimum, back to the baseline condition.

5. Project Characteristics

Trip Generation

Construction of the Project is estimated to be approximately 41 months, depending on weather conditions and other variables. Construction is currently anticipated to begin in the Fall of 2022. Most construction activities would be limited to 7:00 AM to 7:00 PM Monday through Friday. Construction of the Project would include activities implemented in phases as outlined below.

- Access Routes/Intersection Improvements
- Excavation of Sediment/Existing Dam
- Construction of Dam/Spillway/Reservoir
- Construction of Filtration/Chlor/Dechlor Facilities
- Wetlands/Riparian Installation
- Installation of Recreation Facilities
- Demobilization

Construction Vehicle Type

Haul Trucks

Hauling hours are anticipated to be 7:00 AM to 3:00 PM on weekdays. During the peak trip period, approximately 52 material delivery trucks would enter and exit the site per workday for approximately twelve months. During other times of construction, material deliveries would be expected in the range of 5 to 10 material delivery trucks per day. These trucks are assumed to arrive and depart evenly between 7:00 AM and 3:00 PM during an 8-hour shift.

Equipment and Delivery Trucks

In addition to haul trucks, the site is also expected to generate equipment and delivery trucks during each phase of construction. These materials would be delivered to the site and stored on-site. These deliveries are expected to occur in a variety of vehicles including small delivery trucks to cement mixer trucks and 18-wheel trucks. Additionally, construction equipment would also have to be delivered to the site. This equipment could include bulldozers, excavators, and other large items of machinery. Most of the heavy equipment is expected to be transported to the site on large trucks such as 18-wheelers or other similar vehicles. These trucks are assumed to arrive and depart evenly between 7:00 AM and 3:00 PM during an 8-hour shift.

Employee Vehicles

The number of construction workers would vary throughout the construction period. Parking for all construction workers would be provided on-site. Construction workers are assumed to arrive in single occupant vehicles.

Construction Period Trip Generation

Based on the aforementioned information, a construction period trip generation analysis was conducted to estimate daily, morning, and evening peak hour trips of the phase with the highest trip generation potential. As seen in Table 3, the construction of Dam/Spillway/Reservoir phase represents the day with the highest trip generation potential with approximately 116 vehicles.

Construction workers often travel to and from a worksite outside of the typical peak commute hours. Construction hours are anticipated to occur from 7:00 AM to 7:00 PM, with most worker trips and truck trips anticipated to occur outside of the AM and PM peak hours. For the purpose of the analysis, it was assumed that up to 40% of the construction workers would arrive at the construction site during the peak morning commute hour and up to 40% would depart the construction site during the peak evening commute hour. Equipment trucks were assumed to arrive and depart evenly between 7:00 AM and 3:00 PM during an 8-hour shift.

Table 3 presents a summary of the construction trip generation on a peak day. As shown, on a peak construction activity day, approximately 232 daily trips are estimated, of which 36 trips (27 inbound/9 outbound) would occur during the AM peak hour and 18 trips (0 inbound/18 outbound) would occur during the PM peak hour. For the purpose of the intersection LOS analysis, the trip generation estimates were converted to Passenger Car Equivalent (PCE) trips. PCE reflects the additional effect larger vehicles have on intersection operations based on their larger size. A PCE factor of 1.0 was assumed for worker vehicles and a PCE factor of 3.0 was assumed for all construction trucks, based on the *Highway Capacity Manual 6th Edition (HCM)* (Transportation Research Board, 2017). As shown in Table 3, on a peak construction activity day, approximately 512 daily PCE trips are estimated, of which 72 PCE trips (45 inbound/27 outbound) would occur during the AM peak hour and 18 PCE trips (0 inbound/18 outbound) would occur during the PM peak hour.

This trip generation is anticipated to occur for approximately two to three months. Trip generation outside of this phase would be reduced with approximately 30 daily to 154 daily trips being generated.

Trip Distribution and Assignment

Four routes are proposed for the Project.

- Route 1A – I-5 (from the north), north on Sand Canyon Avenue for trucks traveling inbound and southbound on Sand Canyon Avenue to I-5 (to the north) for trucks traveling outbound.
- Route 1B – I-5 (from the south), north on Sand Canyon Avenue for trucks traveling inbound and southbound on Sand Canyon Avenue to I-5 (to the south) for trucks traveling outbound.
- Route 2A – SR-133 (from the north), west on Irvine Boulevard, and north on Sand Canyon Avenue for trucks traveling inbound and southbound on Sand Canyon Avenue and east on Irvine Boulevard to SR-133 (to the north) for trucks traveling outbound.
- Route 2B – SR-133 (from the south), west on Irvine Boulevard, and north on Sand Canyon Avenue for trucks traveling inbound and southbound on Sand Canyon Avenue and east on Irvine Boulevard to SR-133 (to the south) for trucks traveling outbound.

Figure 5 shows the distribution and assignment of the four routes studied. Figure 6a – Figure 6d shows the study intersection turning movement volumes of the Project trips for each route.

Timeline

The proposed Project is assumed to be operational by end of 2026.

TABLE 3
CONSTRUCTION TRIP GENERATION

Phase	Duration (Months)	Peak Day Activity Under Each Phase			Total Vehicles	Total Daily Vehicle Trips
		Haul Trucks	Equipment and Delivery Trucks	Employee Vehicles		
Access Routes/Intersection Improvements	5	8	3	10	21	42
Excavation of Sediment/ Existing Dam	6.6	0	6	31	37	74
Construction of Dam/Spillway/Reservoir	13.8	52	18	46	116	232
Construction of Filtration/Chlor/Dechlor Facility	12	0	29	48	77	154
Wetlands/Riparian Installation	12	0	5	20	25	50
Installation of Recreation Facilities	3	0	5	10	15	30
Demobilization	1	0	7	15	22	44

Construction of Dam/Spillway/Reservoir Trip Generation							
Trip Type	Daily Trips [a]	Morning Peak Hour Trips			Evening Peak Hour Trips		
		In	Out	Total	In	Out	Total
Haul Truck Trips [b]	104	7	7	14	0	0	0
Delivery and Equipment Truck Trips [b]	36	2	2	4	0	0	0
Construction Worker Trips [c]	92	18	0	18	0	18	18
Phase Total	**232**	**27**	**9**	**36**	**0**	**18**	**18**

Construction of Dam/Spillway/Reservoir Trip Generation							
Trip Type and Passenger Car Equivalency	Daily Trips [a]	Morning Peak Hour Trips			Evening Peak Hour Trips		
		In	Out	Total	In	Out	Total
Haul Truck Trips PCE: 3.0	312	21	21	42	0	0	0
Delivery and Equipment Truck Trips PCE: 3.0	108	6	6	12	0	0	0
Construction Worker Trips PCE: 1.0	92	18	0	18	0	18	18
PCE Phase Total	**512**	**45**	**27**	**72**	**0**	**18**	**18**

Notes:

[a] - Daily trips were calculated by counting two trips, one inbound and one outbound trip for each vehicle

[b] - Daily haul and delivery/equipment truck trips were assumed to occur evenly throughout an 8-hour construction day. Therefore, the daily truck trips were divided by 8 hours to calculate morning and evening peak hour truck trips.

[c] - Up to 40% of the construction workers were assumed to arrive during the morning peak hour of adjacent street traffic. A total of up to 40% worker were assumed to depart during the evening peak hour.



Note: For the purpose of this study Sand Canyon Avenue is regarded as a north-south roadway

Legend

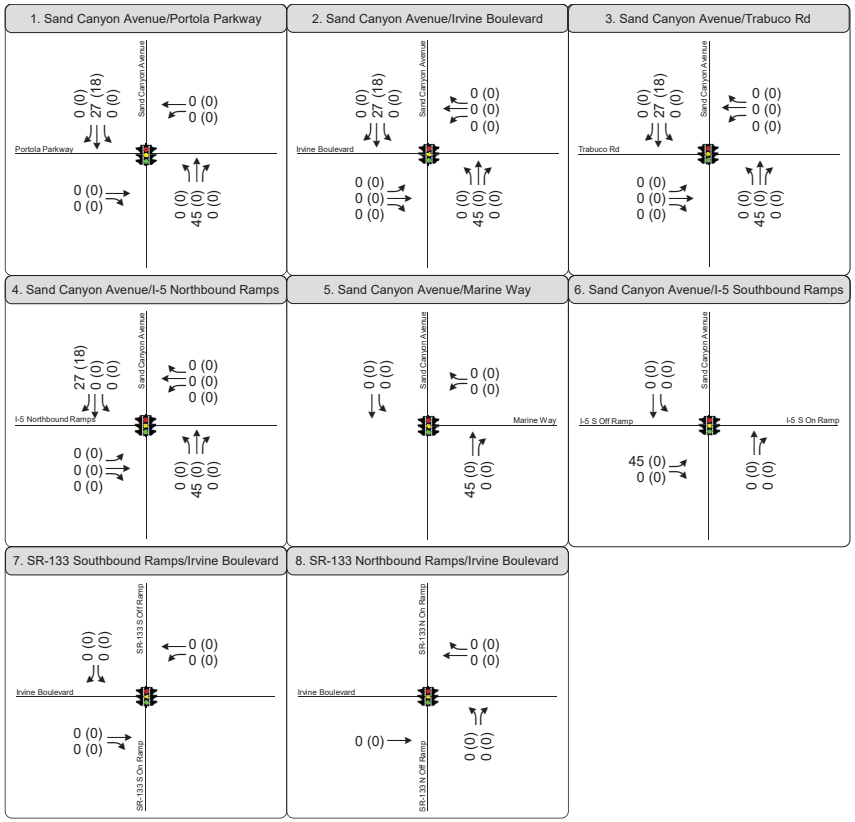
Project Site Syphon Reservoir

Route 1A
Route 1B
Route 2A
Route 2B

Figure 5

Distribution and Assignment





Note: For the purpose of this study Sand Canyon Avenue is regarded as a north-south roadway

Legend

Study Intersections

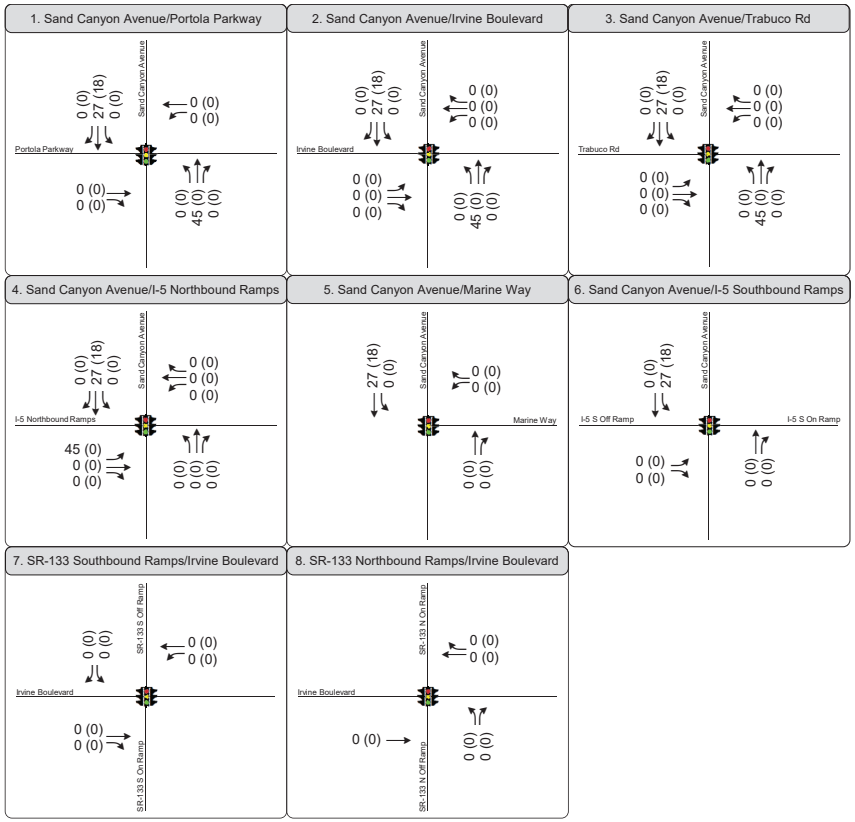
Project Site Syphon Reservoir

XX(XX) AM(PM)

Figure 6a

Project Only (Route 1A) Peak Hour Traffic Volumes and Traffic Control





Note: For the purpose of this study Sand Canyon Avenue is regarded as a north-south roadway

Legend

Study Intersections

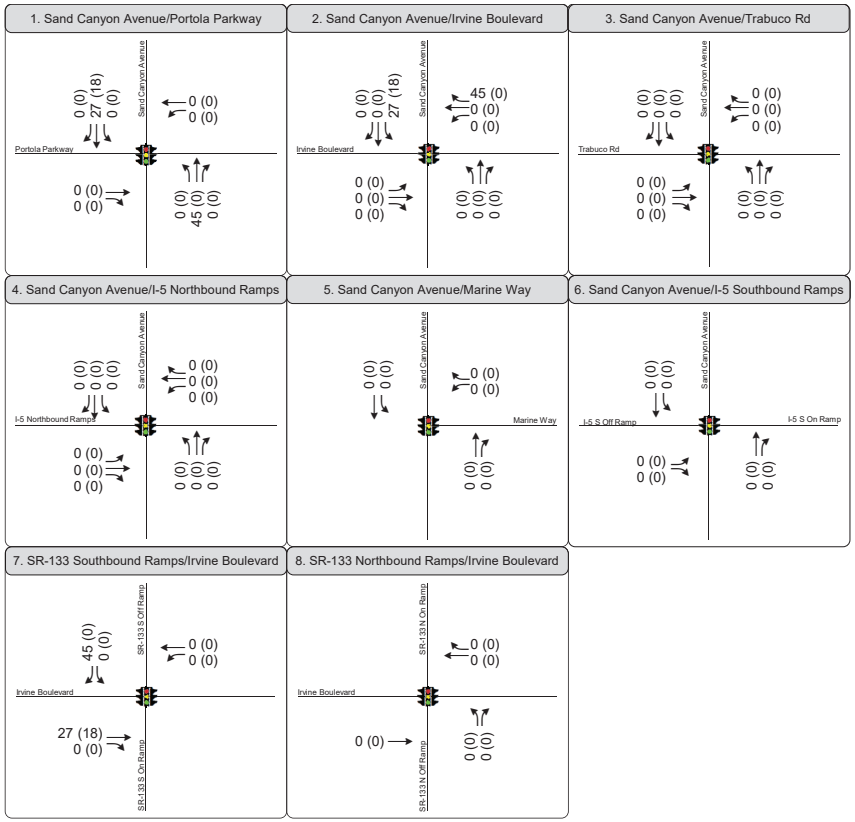
Project Site Syphon Reservoir

XX(XX) AM(PM)

Figure 6b

Project Only (Route 1B) Peak Hour Traffic Volumes and Traffic Control





Note: For the purpose of this study Sand Canyon Avenue is regarded as a north-south roadway

Legend

Study Intersections

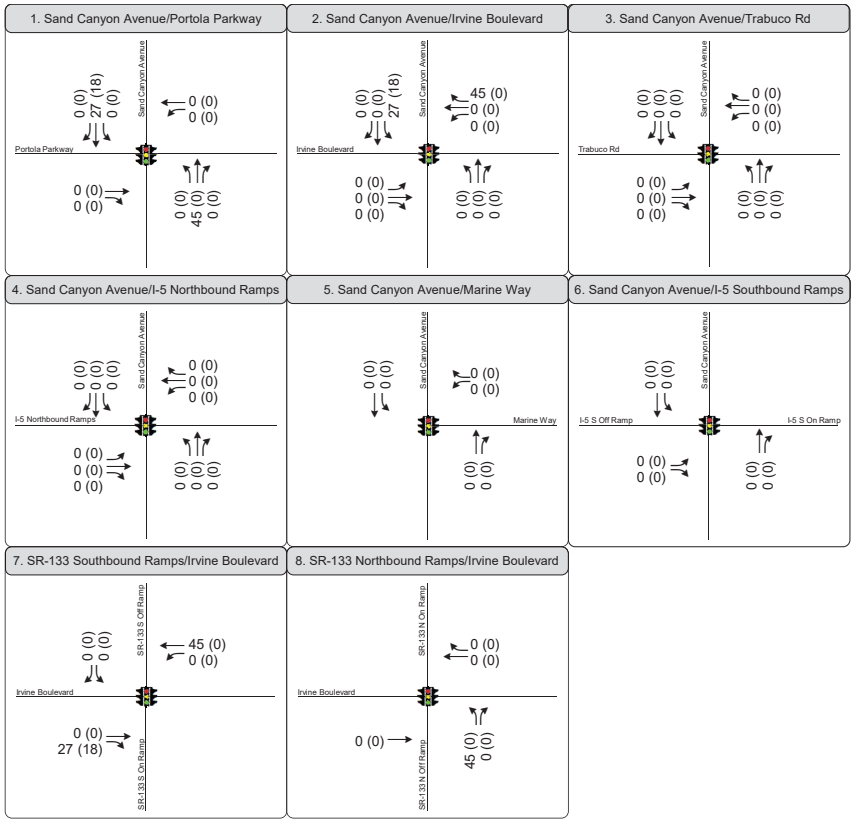
Project Site Syphon Reservoir

XX(XX) AM(PM)

Figure 6c

Project Only (Route 2A) Peak Hour Traffic Volumes and Traffic Control





Note: For the purpose of this study Sand Canyon Avenue is regarded as a north-south roadway

Legend

Study Intersections

Project Site Syphon Reservoir

XX(XX) AM(PM)

Figure 6d

Project Only (Route 2B) Peak Hour Traffic Volumes and Traffic Control

6. Existing Plus Project Conditions

This chapter evaluates potential off-site intersection deficiencies under Existing Plus Project conditions.

Traffic Volumes

The Project traffic volumes on Figure 6a through Figure 6d were added to the existing traffic volumes from Figure 4 to estimate the Existing Plus Project traffic volumes for each route, as shown on Figure 7a through Figure 7d.

Intersection Improvements

All Existing Plus Project scenarios intersection lane configurations are assumed to include buildout of a private roadway connection from the northern side of the Sand Canyon Avenue and Portola Parkway intersection to the Project site. This improvement assumes the northbound approach at Sand Canyon Avenue and Portola Parkway is modified from two left-turn lanes and two right-turn lanes to one left-turn lane, one shared through/left-turn lane, and two right-turn lanes. The southbound approach will be constructed with one shared left/through/right-turn lane. Split phasing (a traffic signal operation that gives a green phase for all vehicle movements of one direction followed by a green phase for all movements of the opposite direction) would be incorporated for the northbound and new southbound approaches during construction and typical operations.

Intersection Operations

Existing Plus Project intersection operations were evaluated using the methods described in Chapter 1. All the Existing Plus Project analysis results for each route are presented in Table 4, based on the traffic volumes presented on Figure 7a through Figure 7d. As shown, all routes would have each signalized study intersections operate at LOS C or better in both the AM and PM peak hours.

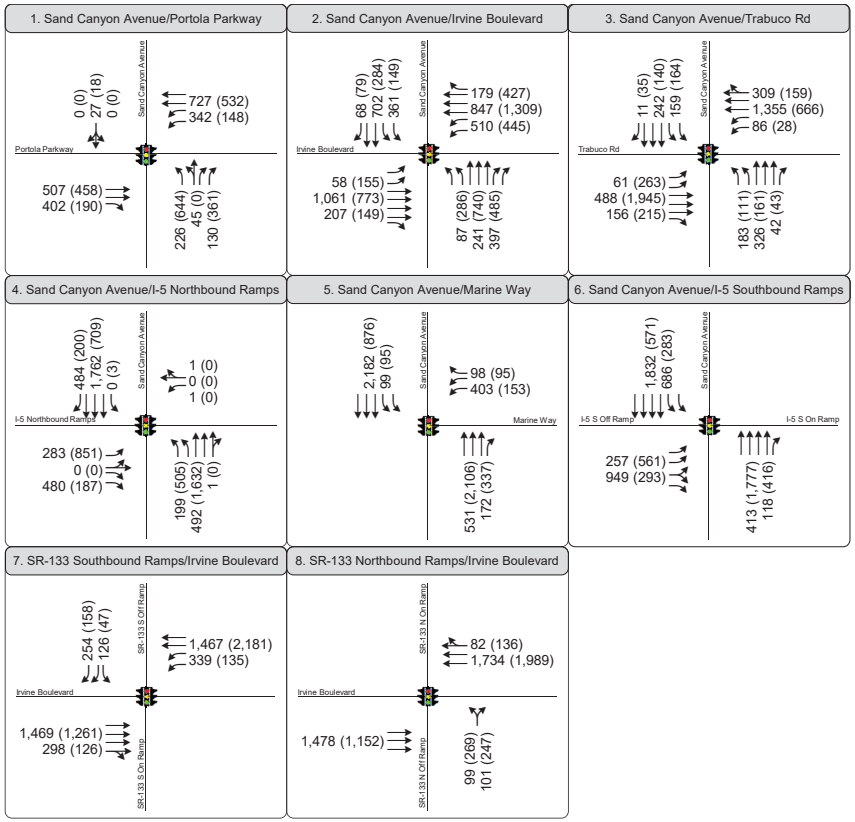
Intersection Deficiencies

As presented in Table 4, after applying the intersection deficiency criteria, it was determined none of the route options would have a deficient intersection under the Existing Plus Project condition.

Recommended Improvements

There are no intersection deficiencies under Existing Plus Project condition. No intersection improvements are required.





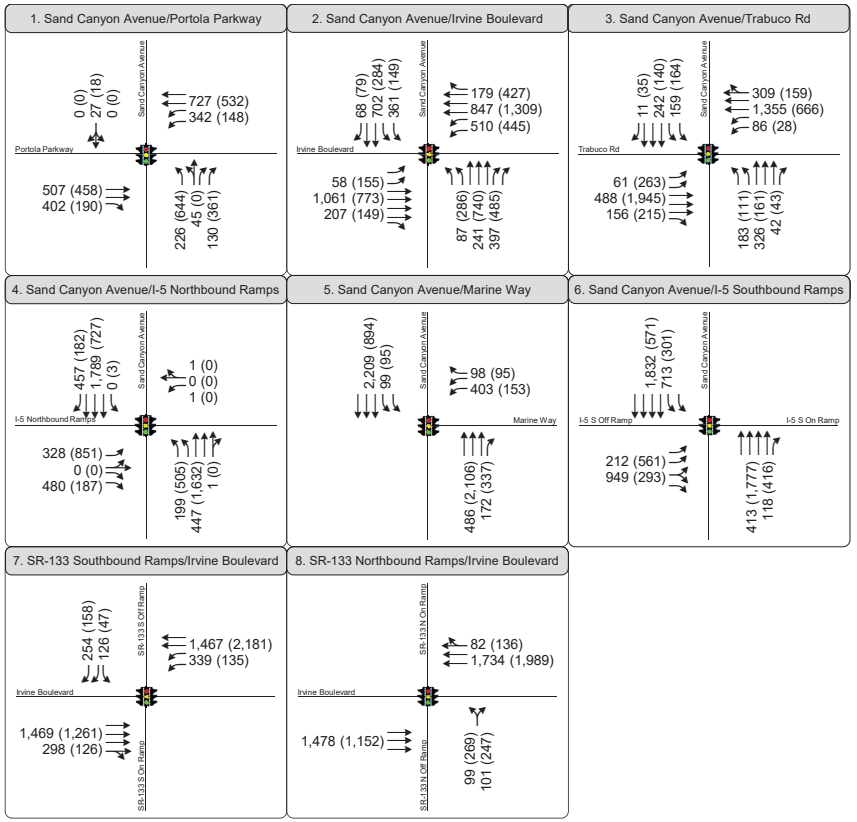
Note: For the purpose of this study Sand Canyon Avenue is regarded as a north-south roadway

Legend

Study Intersections
Project Site Syphon Reservoir
XX(XX) AM(PM)

Figure 7a
Existing Plus Project (Route 1A) Peak Hour
Traffic Volumes, Lane Configurations, and Traffic Control





Note: For the purpose of this study Sand Canyon Avenue is regarded as a north-south roadway

Legend

Study Intersections

Project Site Syphon Reservoir

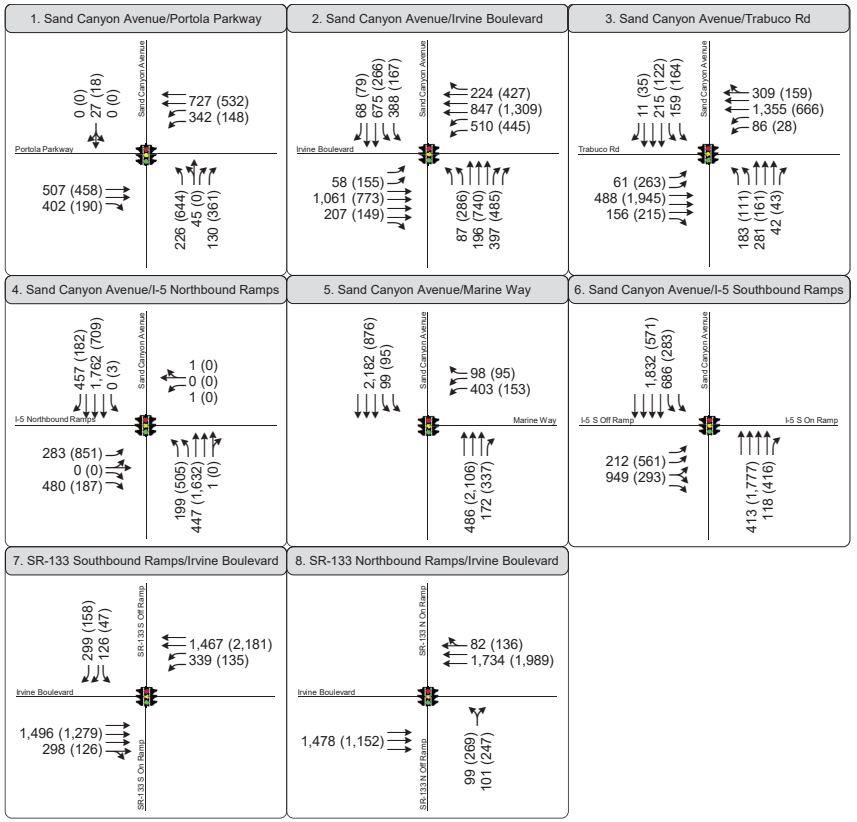
XX(XX) AM(PM)

Figure 7b

Existing Plus Project (Route 1B) Peak Hour

Traffic Volumes, Lane Configurations, and Traffic Control





Note: For the purpose of this study Sand Canyon Avenue is regarded as a north-south roadway

Legend

Study Intersections

Project Site Syphon Reservoir

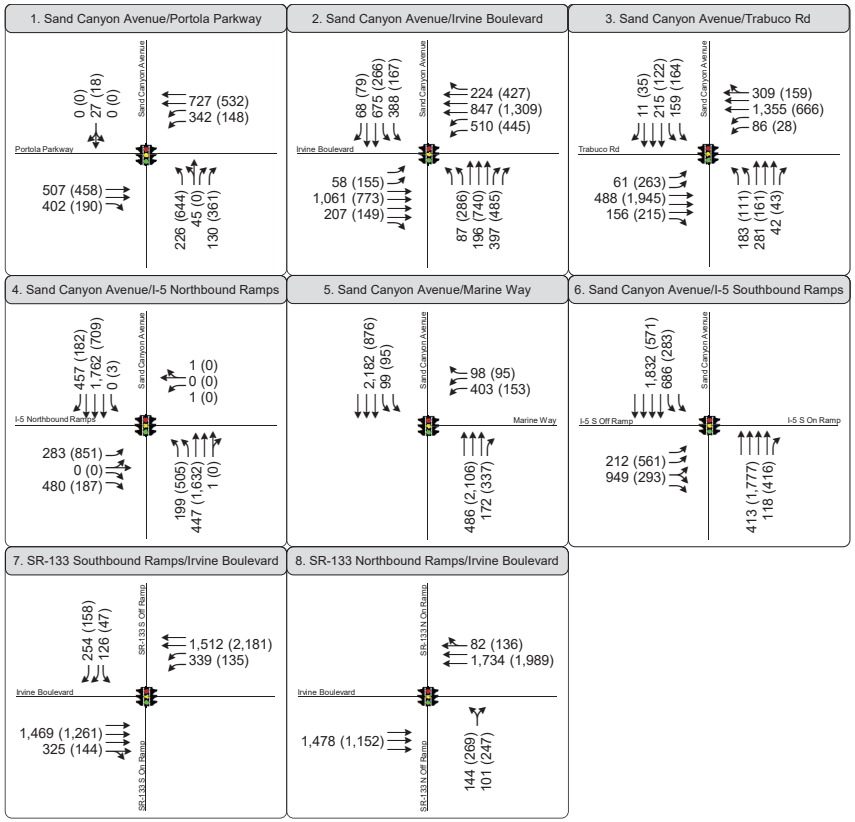
XX(XX) AM(PM)

Figure 7c

Existing Plus Project (Route 2A) Peak Hour

Traffic Volumes, Lane Configurations, and Traffic Control





Note: For the purpose of this study Sand Canyon Avenue is regarded as a north-south roadway

Legend

Study Intersections

Project Site Syphon Reservoir

XX(XX) AM(PM)

Figure 7d

Existing Plus Project (Route 2B) Peak Hour

Traffic Volumes, Lane Configurations, and Traffic Control

TABLE 4
EXISTING PLUS PROJECT (ALL ROUTE OPTIONS)
INTERSECTION LEVEL OF SERVICE

ID	N/S Street Name	E/W Street Name	Control Type	Time Period	Existing Conditions		Existing Plus Project (Route 1A)				Existing Plus Project (Route 1B)				Existing Plus Project (Route 2A)				Existing Plus Project (Route 2B)			
					V/C	LOS	V/C	LOS	Change in V/C	Deficient	V/C	LOS	Change in V/C	Deficient	V/C	LOS	Change in V/C	Deficient	V/C	LOS	Change in V/C	Deficient
1	Sand Canyon Avenue	Portola Parkway	Signalized	AM	0.366	A	0.396	A	0.030	No	0.396	A	0.030	No	0.396	A	0.030	No	0.396	A	0.030	No
				PM	0.418	A	0.429	A	0.011	No	0.429	A	0.011	No	0.429	A	0.011	No	0.429	A	0.011	No
2	Sand Canyon Avenue	Irvine Boulevard	Signalized	AM	0.580	A	0.588	A	0.008	No	0.588	A	0.008	No	0.580	A	0.000	No	0.580	A	0.000	No
				PM	0.541	A	0.541	A	0.000	No	0.541	A	0.000	No	0.546	A	0.005	No	0.546	A	0.005	No
3	Sand Canyon Avenue	Trabuco Road	Signalized	AM	0.496	A	0.505	A	0.009	No	0.505	A	0.009	No	0.496	A	0.000	No	0.496	A	0.000	No
				PM	0.519	A	0.519	A	0.000	No	0.519	A	0.000	No	0.519	A	0.000	No	0.519	A	0.000	No
4	Sand Canyon Avenue	I-5 Northbound Ramps	Signalized	AM	0.538	A	0.538	A	0.000	No	0.556	A	0.018	No	0.538	A	0.000	No	0.538	A	0.000	No
				PM	0.622	B	0.622	B	0.000	No	0.622	B	0.000	No	0.622	B	0.000	No	0.622	B	0.000	No
5	Sand Canyon Avenue	Marine Way	Signalized	AM	0.596	A	0.596	A	0.000	No	0.602	B	0.006	No	0.596	A	0.000	No	0.596	A	0.000	No
				PM	0.547	A	0.547	A	0.000	No	0.547	A	0.000	No	0.547	A	0.000	No	0.547	A	0.000	No
6	Sand Canyon Avenue	I-5 Southbound Ramps	Signalized	AM	0.600	A	0.600	A	0.000	No	0.608	B	0.008	No	0.600	A	0.000	No	0.600	A	0.000	No
				PM	0.520	A	0.520	A	0.000	No	0.525	A	0.005	No	0.520	A	0.000	No	0.520	A	0.000	No
7	SR-133 Southbound Ramps	Irvine Boulevard	Signalized	AM	0.556	A	0.556	A	0.000	No	0.556	A	0.000	No	0.569	A	0.013	No	0.569	A	0.013	No
				PM	0.738	C	0.738	C	0.000	No	0.738	C	0.000	No	0.738	C	0.000	No	0.738	C	0.000	No
8	SR-133 Northbound Off-Ramp	Irvine Boulevard	Signalized	AM	0.465	A	0.465	A	0.000	No	0.465	A	0.000	No	0.465	A	0.000	No	0.491	A	0.026	No
				PM	0.625	B	0.625	B	0.000	No	0.625	B	0.000	No	0.625	B	0.000	No	0.625	B	0.000	No

7. Short-Term Interim Year Conditions

This chapter evaluates the Short-Term Interim Year Conditions.

Future Traffic Forecasts

Per the approved scope of work, the Project is required to study the Short-Term Interim Year Approved and Short-Term Interim Year Pending scenarios from ITAM. ITAM forecasts for the base year and both short-term interim year scenarios were provided by the City of Irvine. These scenarios were used to determine growth rates on a per year basis that were applied to the 2020 existing intersection volumes to develop Short-Term Interim Year Approved and Pending intersection volumes. Study intersection volumes Short-Term Interim Year Approved are provided in Figure 8 and study intersection volumes Short-Term Interim Year Pending are provided in Figure 9.

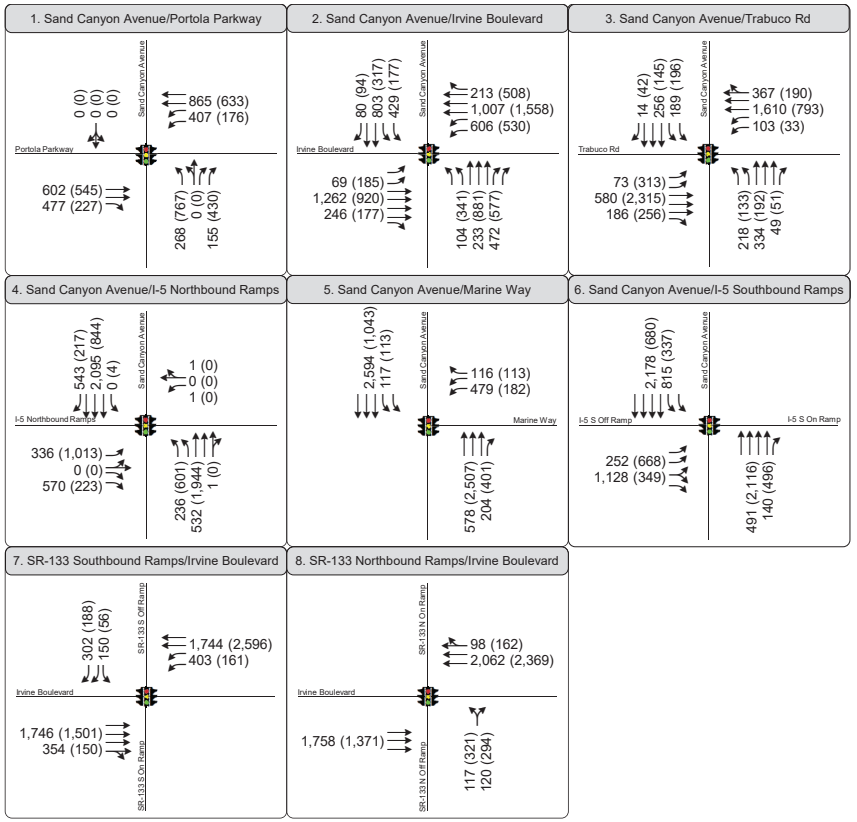
Intersection Improvements

Both Short-Term Interim Year scenarios intersection lane configurations are assumed to include the same lane geometry as the Existing Conditions.

Intersection Operations

Short-Term Interim Year intersection operations were evaluated using the methods described in Chapter 1. The Short-Term Interim Year Approved analysis results are presented in Table 5. As shown, all signalized intersections operate at LOS D or better in both the AM and PM peak hours. The Short-Term Interim Year Pending analysis results are presented in Table 6. As shown, all signalized intersections operate at LOS D or better in both the AM and PM peak hours.





Note: For the purpose of this study Sand Canyon Avenue is regarded as a north-south roadway

Legend

Study Intersections

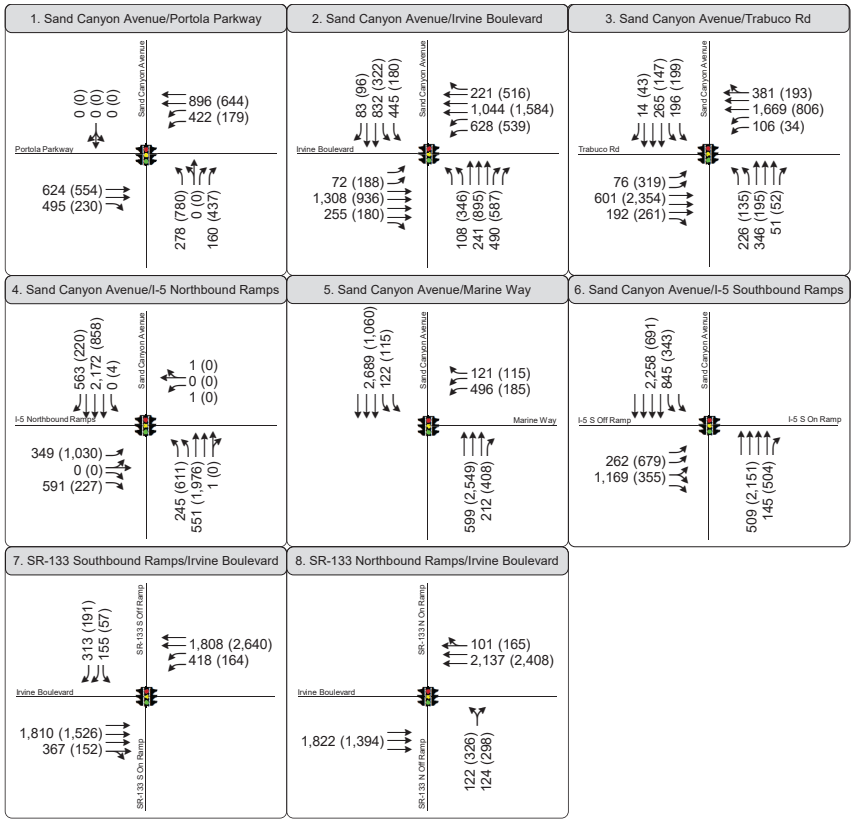
Project Site Syphon Reservoir

XX(XX) AM(PM)

Figure 8

Short-Term Interim Year Approved Peak Hour
Traffic Volumes, Lane Configurations, and Traffic Control





Note: For the purpose of this study Sand Canyon Avenue is regarded as a north-south roadway

Legend

Study Intersections

Project Site Syphon Reservoir

XX(XX) AM(PM)

Figure 9

Short-Term Interim Year Pending Peak Hour
Traffic Volumes, Lane Configurations, and Traffic Control

TABLE 5
SHORT-TERM YEAR APPROVED
INTERSECTION LEVEL OF SERVICE

ID	N/S Street Name	E/W Street Name	Control Type	Time Period	Short-Term Approved Conditions	
					V/C	LOS
1	Sand Canyon Avenue	Portola Parkway	Signalized	AM	0.426	A
				PM	0.488	A
2	Sand Canyon Avenue	Irvine Boulevard	Signalized	AM	0.681	B
				PM	0.635	B
3	Sand Canyon Avenue	Trabuco Road	Signalized	AM	0.580	A
				PM	0.609	B
4	Sand Canyon Avenue	I-5 Northbound Ramps	Signalized	AM	0.630	B
				PM	0.731	C
5	Sand Canyon Avenue	Marine Way	Signalized	AM	0.700	B
				PM	0.641	B
6	Sand Canyon Avenue	I-5 Southbound Ramps	Signalized	AM	0.704	C
				PM	0.610	B
7	SR-133 Southbound Ramps	Irvine Boulevard	Signalized	AM	0.652	B
				PM	0.869	D
8	SR-133 Northbound Off-Ramp	Irvine Boulevard	Signalized	AM	0.544	A
				PM	0.735	C

TABLE 6
SHORT-TERM YEAR PENDING
INTERSECTION LEVEL OF SERVICE

ID	N/S Street Name	E/W Street Name	Control Type	Time Period	Short-Term Pending Conditions	
					V/C	LOS
1	Sand Canyon Avenue	Portola Parkway	Signalized	AM	0.439	A
				PM	0.495	A
2	Sand Canyon Avenue	Irvine Boulevard	Signalized	AM	0.704	C
				PM	0.644	B
3	Sand Canyon Avenue	Trabuco Road	Signalized	AM	0.600	A
				PM	0.618	B
4	Sand Canyon Avenue	I-5 Northbound Ramps	Signalized	AM	0.651	B
				PM	0.743	C
5	Sand Canyon Avenue	Marine Way	Signalized	AM	0.723	C
				PM	0.651	B
6	Sand Canyon Avenue	I-5 Southbound Ramps	Signalized	AM	0.728	C
				PM	0.619	B
7	SR-133 Southbound Ramps	Irvine Boulevard	Signalized	AM	0.674	B
				PM	0.883	D
8	SR-133 Northbound Off-Ramp	Irvine Boulevard	Signalized	AM	0.562	A
				PM	0.746	C

8. Short-Term Interim Year Plus Project Conditions

This chapter evaluates the potential off-site intersection deficiencies under Short-Term Interim Year Plus Project conditions.

Future Traffic Forecasts

The Project traffic volumes from Figure 6a through Figure 6d were added to the Short-Term Interim Year Approved traffic volumes from Figure 8 to estimate the Short-Term Interim Year Approved plus Project traffic volumes, as shown on Figure 10a through Figure 10d.

The Project traffic volumes from Figure 6a through Figure 6d were added to the Short-Term Interim Year Pending traffic volumes from Figure 9 to estimate the Short-Term Interim Year Pending plus Project traffic volumes, as shown on Figure 11a through Figure 11d.

Intersection Improvements

All Short-Term Interim Year Approved plus Project and Short-Term Interim Year Pending plus Project scenarios intersection lane configurations are assumed to include buildout of a private roadway connection from the northern side of the Sand Canyon Avenue and Portola Parkway intersection to the Project site. This improvement assumes the northbound approach at Sand Canyon Avenue and Portola Parkway is modified from two left-turn lanes and two right-turn lanes to one left-turn lane, one shared through/left-turn lane, and two right-turn lanes. The southbound approach will be constructed with one shared left/through/right-turn lane. Split phasing (a traffic signal operation that gives a green phase for all vehicle movements of one direction followed by a green phase for all movements of the opposite direction) would be incorporated for the northbound and new southbound approaches during construction and typical operations.

Intersection Operations

Short-Term Interim Year Approved plus Project and Short-Term Interim Year Pending plus Project intersection operations were evaluated using the methods described in Chapter 1. All the Short-Term Interim Year Approved plus Project analysis results for each route are presented in Table 7, based on the traffic volumes presented on Figure 10a through Figure 10d. As shown, all routes would have each signalized study intersections operate at LOS D or better in both the AM and PM peak hours. All the Short-Term

Interim Year Pending plus Project analysis results for each route are presented in Table 8, based on the traffic volumes presented on Figure 11a through Figure 11d. As shown, all routes would have each signalized study intersections operate at LOS D or better in both the AM and PM peak hours.

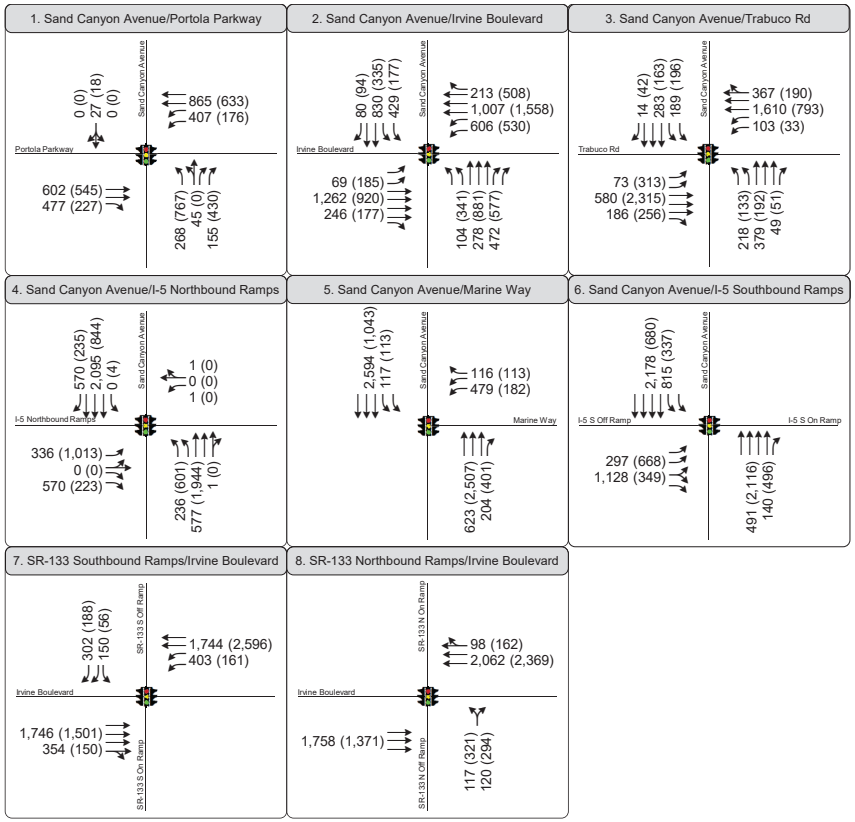
Intersection Deficiencies

As presented in Table 7, after applying the intersection deficiency criteria, it was determined none of the route options would have a deficient intersection under the Short-Term Interim Year Approved plus Project condition. As presented in Table 8, after applying the intersection deficiency criteria, it was determined none of the route options would have a deficient intersection under the Short-Term Interim Year Pending plus Project condition.

Recommended Improvements

There are no intersection deficiencies under either the Short-Term Interim Year Approved plus Project condition or the Short-Term Interim Year Pending plus Project conditions. No intersection improvements are required.





Note: For the purpose of this study Sand Canyon Avenue is regarded as a north-south roadway

Legend

Study Intersections

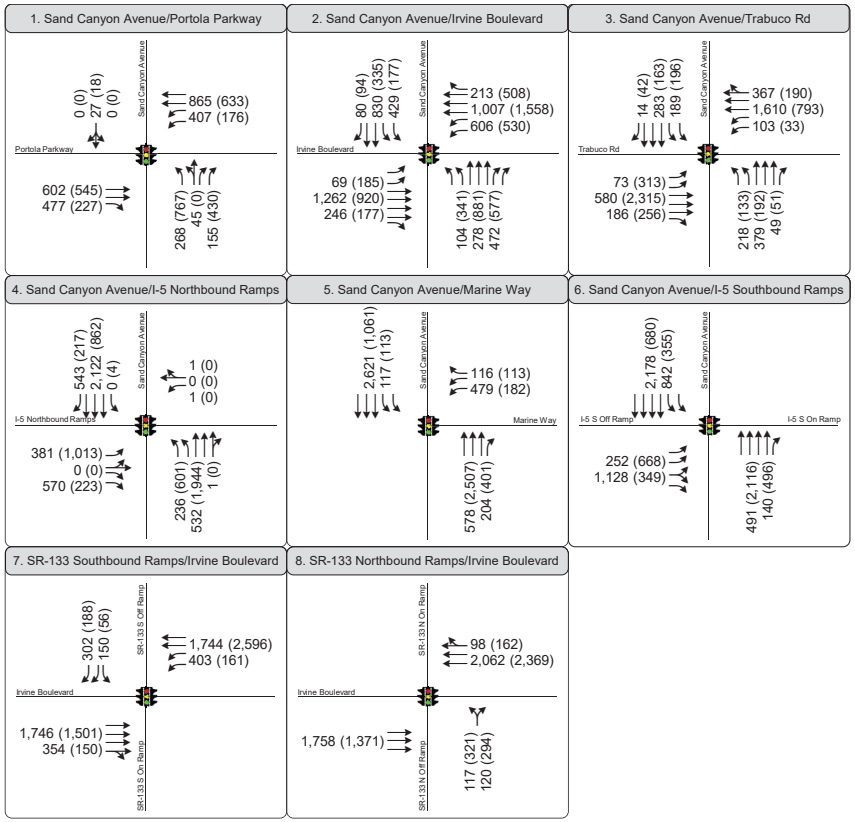
Project Site Syphon Reservoir

XX(XX) AM(PM)

Figure 10a

Short-Term Interim Year Approved Plus Project (Route 1A) Peak Hour Traffic Volumes, Lane Configurations, and Traffic Control





Note: For the purpose of this study Sand Canyon Avenue is regarded as a north-south roadway

Legend

Study Intersections

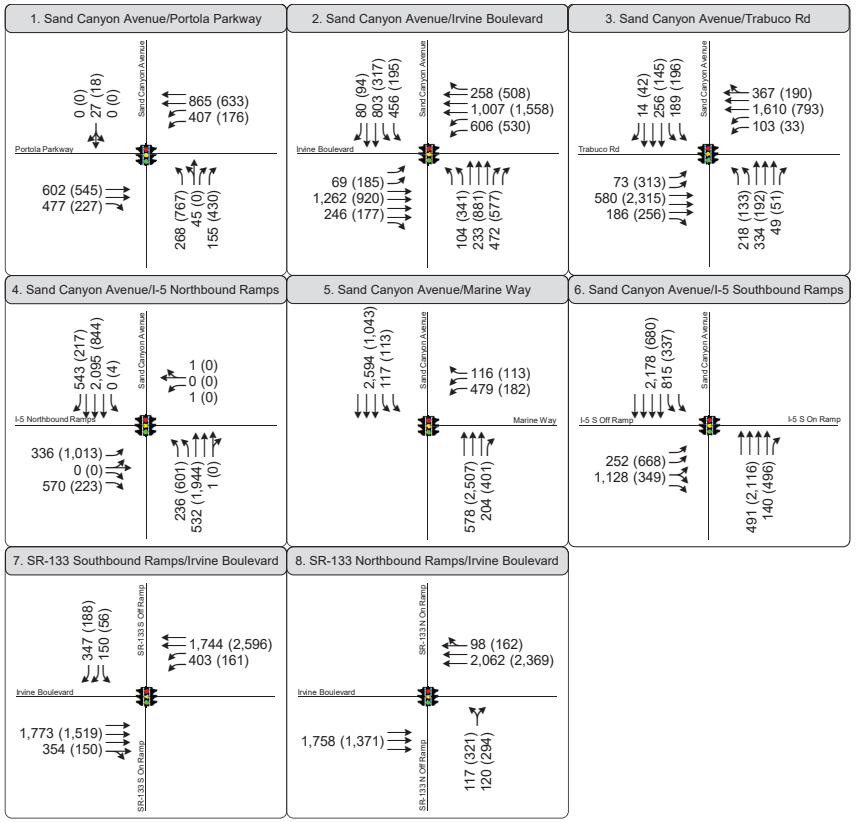
Project Site Syphon Reservoir

XX(XX) AM(PM)

Figure 10b

Short-Term Interim Year Approved Plus Project (Route 1B) Peak Hour Traffic Volumes, Lane Configurations, and Traffic Control





Note: For the purpose of this study Sand Canyon Avenue is regarded as a north-south roadway

Legend

Study Intersections

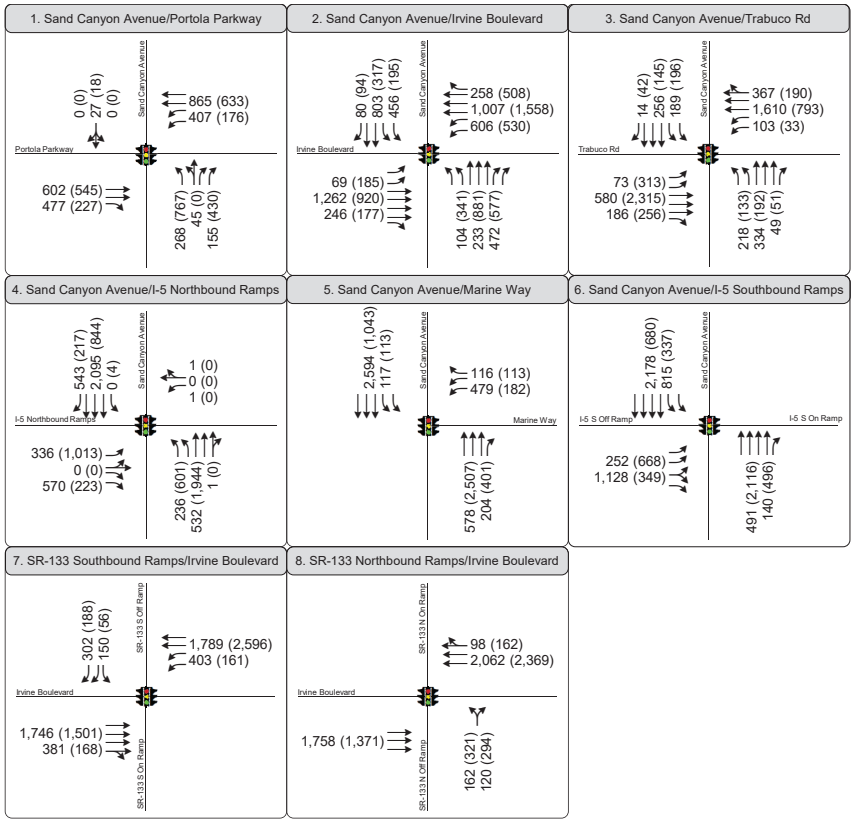
Project Site Syphon Reservoir

XX(XX) AM(PM)

Figure 10c

Short-Term Interim Year Approved Plus Project (Route 2A) Peak Hour Traffic Volumes, Lane Configurations, and Traffic Control





Note: For the purpose of this study Sand Canyon Avenue is regarded as a north-south roadway

Legend

Study Intersections

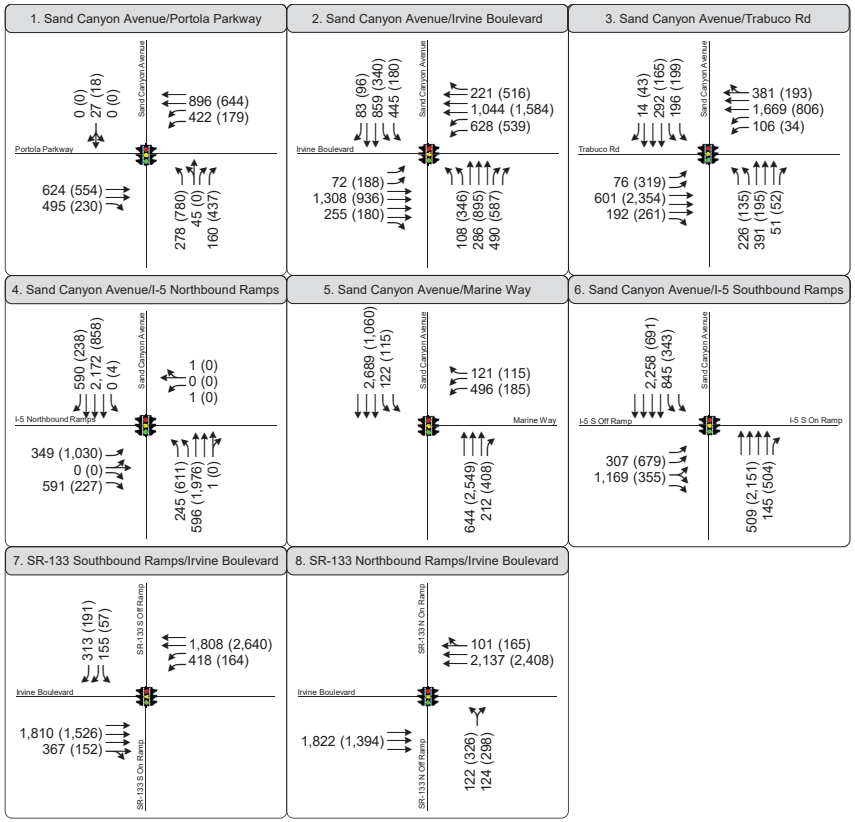
Project Site Syphon Reservoir

XX(XX) AM(PM)

Figure 10d

Short-Term Interim Year Approved Plus Project (Route 2B) Peak Hour Traffic Volumes, Lane Configurations, and Traffic Control





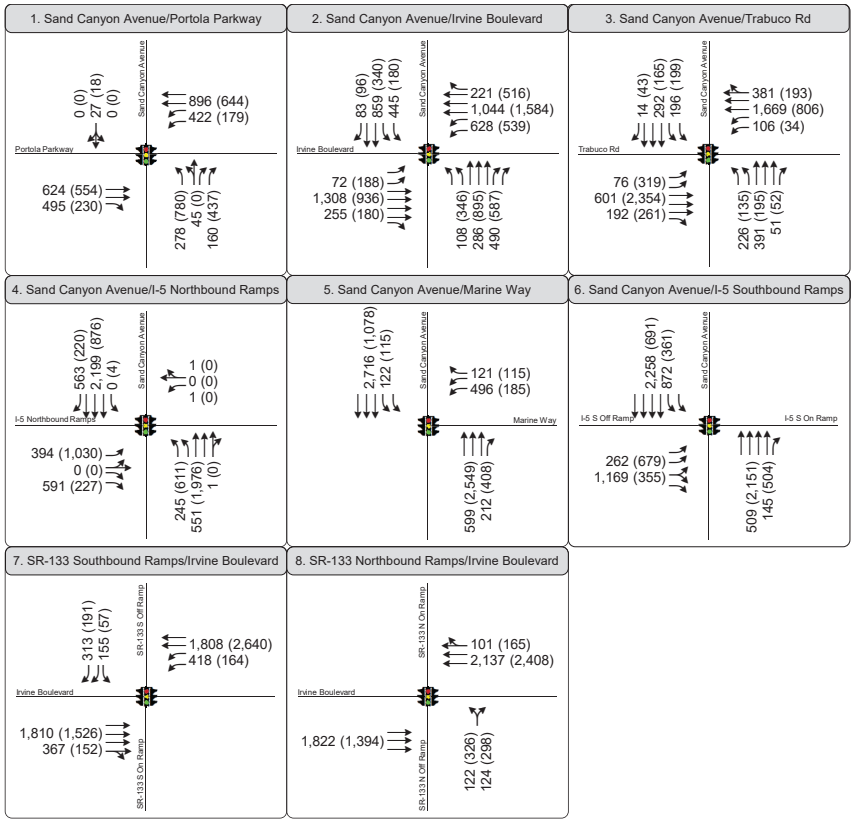
Note: For the purpose of this study Sand Canyon Avenue is regarded as a north-south roadway

Legend

Study Intersections
Project Site Syphon Reservoir
XX(XX) AM(PM)

Figure 11a
Short-Term Interim Year Pending Plus Project (Route 1A) Peak Hour Traffic Volumes, Lane Configurations, and Traffic Control





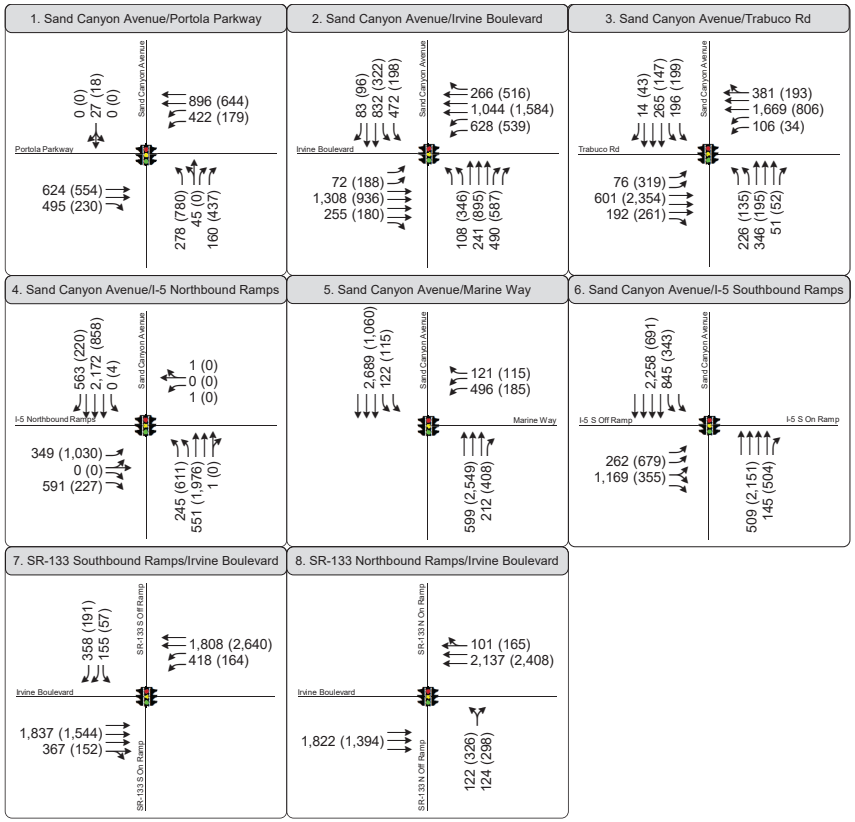
Note: For the purpose of this study Sand Canyon Avenue is regarded as a north-south roadway

Legend

Study Intersections
Project Site Syphon Reservoir
XX(XX) AM(PM)

Figure 11b
Short-Term Interim Year Pending Plus Project (Route 1B) Peak Hour Traffic Volumes, Lane Configurations, and Traffic Control





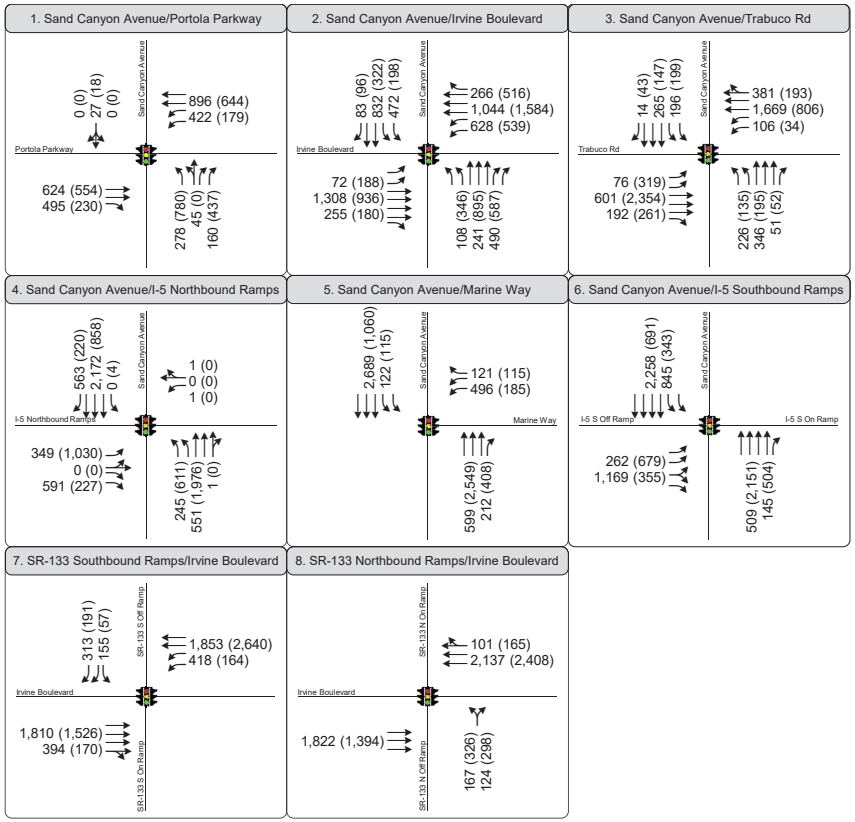
Note: For the purpose of this study Sand Canyon Avenue is regarded as a north-south roadway

Legend

Study Intersections
Project Site Syphon Reservoir
XX(XX) AM(PM)

Figure 11c
Short-Term Interim Year Pending Plus Project (Route 2A) Peak Hour Traffic Volumes, Lane Configurations, and Traffic Control





Note: For the purpose of this study Sand Canyon Avenue is regarded as a north-south roadway

Legend

Study Intersections
Project Site Syphon Reservoir
XX(XX) AM(PM)

Figure 11d
Short-Term Interim Year Pending Plus Project (Route 2B) Peak Hour Traffic Volumes, Lane Configurations, and Traffic Control

TABLE 7
SHORT-TERM YEAR APPROVED PLUS PROJECT (ALL ROUTE OPTIONS)
INTERSECTION LEVEL OF SERVICE

ID	N/S Street Name	E/W Street Name	Control Type	Time Period	Short-Term Approved Conditions		Short-Term Approved Plus Project (Route 1A)		Change in		Short-Term Approved Plus Project (Route 1B)		Change in		Short-Term Approved Plus Project (Route 2A)		Change in		Short-Term Approved Plus Project (Route 2B)		Change in	
					V/C	LOS	V/C	LOS	V/C	Deficient	V/C	LOS	V/C	Deficient	V/C	LOS	V/C	Deficient	V/C	LOS	V/C	Deficient
1	Sand Canyon Avenue	Portola Parkway	Signalized	AM	0.426	A	0.456	A	0.030	No	0.456	A	0.030	No	0.456	A	0.030	No	0.456	A	0.030	No
				PM	0.488	A	0.499	A	0.011	No	0.499	A	0.011	No	0.499	A	0.011	No	0.499	A	0.011	No
2	Sand Canyon Avenue	Irvine Boulevard	Signalized	AM	0.681	B	0.689	B	0.008	No	0.689	B	0.008	No	0.681	B	0.000	No	0.681	B	0.000	No
				PM	0.635	B	0.635	B	0.000	No	0.635	B	0.000	No	0.640	B	0.005	No	0.640	B	0.005	No
3	Sand Canyon Avenue	Trabuco Road	Signalized	AM	0.580	A	0.589	A	0.009	No	0.589	A	0.009	No	0.580	A	0.000	No	0.580	A	0.000	No
				PM	0.609	B	0.609	B	0.000	No	0.609	B	0.000	No	0.609	B	0.000	No	0.609	B	0.000	No
4	Sand Canyon Avenue	I-5 Northbound Ramps	Signalized	AM	0.630	B	0.630	B	0.000	No	0.648	B	0.018	No	0.630	B	0.000	No	0.630	B	0.000	No
				PM	0.731	C	0.731	C	0.000	No	0.731	C	0.000	No	0.731	C	0.000	No	0.731	C	0.000	No
5	Sand Canyon Avenue	Marine Way	Signalized	AM	0.700	B	0.700	B	0.000	No	0.705	C	0.005	No	0.700	B	0.000	No	0.700	B	0.000	No
				PM	0.641	B	0.641	B	0.000	No	0.641	B	0.000	No	0.641	B	0.000	No	0.641	B	0.000	No
6	Sand Canyon Avenue	I-5 Southbound Ramps	Signalized	AM	0.704	C	0.704	C	0.000	No	0.712	C	0.008	No	0.704	C	0.000	No	0.704	C	0.000	No
				PM	0.610	B	0.610	B	0.000	No	0.615	B	0.005	No	0.610	B	0.000	No	0.610	B	0.000	No
7	SR-133 Southbound Ramps	Irvine Boulevard	Signalized	AM	0.652	B	0.652	B	0.000	No	0.652	B	0.000	No	0.665	B	0.013	No	0.665	B	0.013	No
				PM	0.869	D	0.869	D	0.000	No	0.869	D	0.000	No	0.869	D	0.000	No	0.869	D	0.000	No
8	SR-133 Northbound Off-Ramp	Irvine Boulevard	Signalized	AM	0.544	A	0.544	A	0.000	No	0.544	A	0.000	No	0.544	A	0.000	No	0.569	A	0.025	No
				PM	0.735	C	0.735	C	0.000	No	0.735	C	0.000	No	0.735	C	0.000	No	0.735	C	0.000	No

TABLE 8
SHORT-TERM YEAR PENDING PLUS PROJECT (ALL ROUTE OPTIONS)
INTERSECTION LEVEL OF SERVICE

ID	N/S Street Name	E/W Street Name	Control Type	Time Period	Short-Term Pending Conditions		Short-Term Pending Plus Project (Route 1A)				Short-Term Pending Plus Project (Route 1B)				Short-Term Pending Plus Project (Route 2A)				Short-Term Pending Plus Project (Route 2B)			
					V/C	LOS	V/C	LOS	Change in V/C	Deficient	V/C	LOS	Change in V/C	Deficient	V/C	LOS	Change in V/C	Deficient	V/C	LOS	Change in V/C	Deficient
1	Sand Canyon Avenue	Portola Parkway	Signalized	AM	0.439	A	0.470	A	0.031	No	0.470	A	0.031	No	0.470	A	0.031	No	0.470	A	0.031	No
				PM	0.495	A	0.506	A	0.011	No	0.506	A	0.011	No	0.506	A	0.011	No	0.506	A	0.011	No
2	Sand Canyon Avenue	Irvine Boulevard	Signalized	AM	0.704	C	0.711	C	0.007	No	0.711	C	0.007	No	0.704	C	0.000	No	0.704	C	0.000	No
				PM	0.644	B	0.644	B	0.000	No	0.644	B	0.000	No	0.650	B	0.006	No	0.650	B	0.006	No
3	Sand Canyon Avenue	Trabuco Road	Signalized	AM	0.600	A	0.609	B	0.009	No	0.609	B	0.009	No	0.600	A	0.000	No	0.600	A	0.000	No
				PM	0.618	B	0.618	B	0.000	No	0.618	B	0.000	No	0.618	B	0.000	No	0.618	B	0.000	No
4	Sand Canyon Avenue	I-5 Northbound Ramps	Signalized	AM	0.651	B	0.651	B	0.000	No	0.670	B	0.019	No	0.651	B	0.000	No	0.651	B	0.000	No
				PM	0.743	C	0.743	C	0.000	No	0.743	C	0.000	No	0.743	C	0.000	No	0.743	C	0.000	No
5	Sand Canyon Avenue	Marine Way	Signalized	AM	0.723	C	0.723	C	0.000	No	0.728	C	0.005	No	0.723	C	0.000	No	0.723	C	0.000	No
				PM	0.651	B	0.651	B	0.000	No	0.651	B	0.000	No	0.651	B	0.000	No	0.651	B	0.000	No
6	Sand Canyon Avenue	I-5 Southbound Ramps	Signalized	AM	0.728	C	0.728	C	0.000	No	0.736	C	0.008	No	0.728	C	0.000	No	0.728	C	0.000	No
				PM	0.619	B	0.619	B	0.000	No	0.625	B	0.006	No	0.619	B	0.000	No	0.619	B	0.000	No
7	SR-133 Southbound Ramps	Irvine Boulevard	Signalized	AM	0.674	B	0.674	B	0.000	No	0.674	B	0.000	No	0.687	B	0.013	No	0.687	B	0.013	No
				PM	0.883	D	0.883	D	0.000	No	0.883	D	0.000	No	0.883	D	0.000	No	0.883	D	0.000	No
8	SR-133 Northbound Off-Ramp	Irvine Boulevard	Signalized	AM	0.562	A	0.562	A	0.000	No	0.562	A	0.000	No	0.562	A	0.000	No	0.587	A	0.025	No
				PM	0.746	C	0.746	C	0.000	No	0.746	C	0.000	No	0.746	C	0.000	No	0.746	C	0.000	No

9. Special Issues

This chapter addresses the site access analysis and VMT analysis for the Project.

Site Access Analysis

As part of the Project, a private 2-lane roadway connection from the northern side of the Sand Canyon Avenue and Portola Parkway intersection to the Project site is proposed for construction vehicle access during Project construction and maintenance/operations access during Project operation. This proposal will require reconstruction of the Sand Canyon Avenue and Portola Parkway intersection to accommodate the new northern leg and the associated traffic signals, lane striping, and signage changes. Pedestrian and bicycle infrastructure at the intersection would be reconstructed to maintain access like the existing condition while following the City of Irvine requirements. This improvement assumes the northbound approach at Sand Canyon Avenue and Portola Parkway would be modified from two left-turn lanes and two right-turn lanes to one left-turn lane, one shared through/left-turn lane, and two right-turn lanes. The southbound approach would be constructed with one shared left/through/right-turn lane. Split phasing (a traffic signal operation that gives a green phase for all vehicle movements of one direction followed by a green phase for all movements of the opposite direction) would be incorporated for the northbound and new southbound approaches during construction and typical operations. During construction of the Project, this private roadway would be used by construction trips for ingress and egress of the construction site. Upon completion of the Project, this private roadway would be used by IRWD staff conducting maintenance and inspections as part of typical operations, similar to existing conditions. Trips by IRWD staff to the reservoir are not anticipated to increase as compared to the existing condition and are not considered to have a significant effect on the future intersection operations.

An analysis of the *City of Irvine Transportation Design Procedures* (City of Irvine, February 2007) [TDPs] was conducted to address primary access to the Project. The following TDPs were reviewed at request of the City of Irvine per the approved scope of work.

TDP – 1 Turn Lane Pocket Lengths

TDP – 1 identifies recommended lengths of left-turn pockets using a Nomograph for Left-Turn Storage, which uses inputs sch as the number of left-turning vehicles, cycle length, and truck percentage. Eastbound left-turn pockets are not proposed at the intersection of Sand Canyon Avenue and Portola Parkway as the Project is planning to only modify the northbound and southbound approaches. Therefore TDP – 1 is not applicable to this Project.

TDP – 14 Driveway Lengths

TDP – 14 identifies recommended lengths for driveways to projects based on the number of peak hour trips entering a project site. The Project will construct a 2-lane private roadway from the northern side of the Sand Canyon Avenue and Portola Parkway intersection to the Project site. While plans for this roadway have yet to be submitted, it is estimated that this private roadway will exceed 1,500 feet (ft) from the Sand Canyon Avenue and Portola Parkway intersection to the Project site. Signage indicating the use as a private road will be installed at the intersection and along the roadway. As a private road, access control will be maintained with a gate at least 500 ft away from the intersection. During the construction period this gate will remain open during hours of construction and closed when no construction is occurring. Following construction, the gate will remain closed and only IRWD staff conducting maintenance and inspections as part of typical operations will have access to open the gate. The gate location will provide an area for vehicles to turn around if they do not have access beyond the gate. As peak hour traffic into the Project site is estimated to be 27 vehicles, TDP – 14 recommends a driveway of at least 50 ft. The private road length (greater than 1,500 ft) and distance to the gate (at least 500 ft) exceed the recommendation of 50 feet based on TDP – 14.

TDP – 15 Gate Stacking

TDP – 15 identifies recommendations for vehicle stacking and gate-stacking at project sites. TDP-15 provides recommendations based on different types of land uses for vehicle stacking analysis. As a construction project, none of the examples provided in TDP-15 reflect the Projects' construction management operations or typical conditions of the reservoir following construction. The Project will construct a 2-lane private road with at least 500 ft of distance between the Sand Canyon Avenue and Portola Parkway intersection and a proposed gate. Signage indicating the use as a private road will be installed at the intersection and along the roadway. The proposed gate location will provide an area for vehicles to turn around if they do not have access beyond the gate.

During construction, the gate will remain open during hours of construction and closed when no construction is occurring. With an open gate, the private roadway and internal staging on-site can accommodate vehicle queuing that may be associated with a peak construction activity day.

Following construction, the gate will remain closed and only IRWD staff conducting maintenance and inspections as part of typical operations will have access to open the gate. The trips by IRWD staff will be nominal and are not considered to have a significant effect on the future intersection operations. The proposed gate location and gate operations during typical operations can meet the nominal inbound volume during future operations.

CEQA VMT Impact Analysis

The City of Irvine's *CEQA VMT Impact Analysis Guidelines* identify projects generating fewer than 250 weekday daily trips as requiring no further VMT impact analysis. As identified in Table 3, all phases of construction generate fewer than 250 daily weekday trips. Therefore, it can be determined that all the construction phases do not meet the daily trip screening threshold and require no further VMT impact analysis using the *CEQA VMT Impact Analysis Guidelines*. In addition, many jurisdictions in Southern California have regarded construction-related traffic as causing adverse but not significant impacts because, while sometimes inconvenient, construction-related traffic effects are temporary.

Pedestrian Network Impact Analysis

Disruptions to Existing Facilities

Significance Criteria

The following significance criteria were applied:

> A significant impact occurs if a project disrupts existing pedestrian facilities.

Project Impact

Pedestrian infrastructure at the intersection of Sand Canyon Avenue and Portola Parkway will be reconstructed to maintain existing access while following the City of Irvine requirements. Therefore, it is concluded that the Project impact related to this item is less than significant.

Project Interferes with Planned Pedestrian Facilities

Significance Criteria

The following significance criteria were applied to determine if the Project conflicts with planned facilities:

> A significant impact occurs if a project interferes with planned pedestrian facilities.

Project Impact

Pedestrian infrastructure at the intersection of Sand Canyon Avenue and Portola Parkway will be reconstructed to maintain existing access while following the City of Irvine requirements. The Project will not affect any planned pedestrian facilities in the study area. Therefore, it is concluded that the Project impact related to this item is less than significant.

Project Conflicts with Adopted Pedestrian System Plans, Guidelines, Policies, or Standards

Significance Criteria

A significant impact occurs if a project conflicts or creates inconsistencies with adopted pedestrian system plans, guidelines, policies, or standards.

Project Impact

The Project is consistent with the policies identified in the City of Irvine General Plan Objective B-3: Pedestrian Circulation. The Project will reconstruct pedestrian infrastructure at the intersection of Sand Canyon Avenue and Portola Parkway to maintain existing access while following the City of Irvine requirements. Therefore, it is concluded that the Project impact related to this item is less than significant.

Bicycle Network Impact Analysis

Disruptions to Existing Facilities

Significance Criteria

The following significance criteria were applied:

A significant impact occurs if a project disrupts existing bicycle facilities.

Project Impact

Bicycle infrastructure at the intersection of Sand Canyon Avenue and Portola Parkway will be reconstructed to maintain existing access while following the City of Irvine requirements. Therefore, it is concluded that the Project impact related to this item is less than significant.

Project Interferes with Planned Bicycle Facilities

Significance Criteria

The following significance criteria were applied to determine if the Project conflicts with planned facilities:

A significant impact occurs if a project interferes with planned bicycle facilities.

Project Impact

Bicycle infrastructure at the intersection of Sand Canyon Avenue and Portola Parkway will be reconstructed to maintain existing access while following the City of Irvine requirements. The Project will not affect any planned bicycle facilities in the study area. Therefore, it is concluded that the Project impact related to this item is less than significant.

Project Conflicts with Adopted Bicycle System Plans, Guidelines, Policies, or Standards

Significance Criteria

A significant impact occurs if a project conflicts or creates inconsistencies with adopted bicycle system plans, guidelines, policies, or standards.

Project Impact

The Project is consistent with the policies identified in the City of Irvine General Plan Objective B-4: Bicycle Circulation. The Project will reconstruct bicycle infrastructure at the intersection of Sand Canyon Avenue and Portola Parkway to maintain existing access while following the City of Irvine requirements. Therefore, it is concluded that the Project impact related to this item is less than significant.

Transit System

Disruptions to Existing Transit Service

Significance Criteria

The following significance criteria were applied to determine if the Project is responsible for a disruption of existing transit services or facilities:

> A significant impact occurs if a project disrupts existing transit services or facilities.

Project Impact

As noted in the review of existing transit routes, no transit routes currently run through the study area. Therefore, it is concluded that the Project impact related to this item is less than significant.

Interference with Planned Transit Services

Significance Criteria

The following significance criteria were applied:

> A significant impact occurs if a project interferes with planned transit services or facilities.

Project Impact

As noted in the review of existing transit routes, no transit routes currently run through the study area. Furthermore, the Project does not propose any changes to existing bus pullout along any of the study roadways. Therefore, it is concluded that the Project impact related to this item is less than significant.

Project Conflicts or Creates Inconsistencies with Adopted Transit System Plans, Guidelines, Policies, or Standards

Significance Criteria

The following significance criteria regarding consistency with adopted transit plans, guidelines, policies, or standards were applied:

> A significant impact occurs if a project conflicts or creates inconsistencies with adopted transit system plans, guidelines, policies, or standards.

Project Impact

Based on the review of the Project, it can be concluded that the Project does not conflict with these policies or other policies related to transit. The impact is therefore less than significant, and no mitigation is required.

Demand for Public Transit Services Above Capacity

Significance Criteria

The following significance criteria were applied:

> A significant impact occurs if the project creates demand for public transit service above the capacity which is provided or planned.

Project Impact

The Project is consistent with the policies identified in the City of Irvine General Plan Objective B-6: Public Transit Circulation. Therefore, it is concluded that the Project impact related to this item is less than significant.

CMP Traffic Impact Analysis

The *2015 Orange County Congestion Management Program* (Orange County Transportation Authority, November 2015) [CMP] guidelines require that projects with the potential to create an impact of more than 3% of LOS E capacity on the CMP highway system links should require a traffic impact analysis. All projects generating 2,400 or more daily trips should require evaluation. If a project will have direct access to a CMP link, the threshold is reduced to 1,600 or more daily trips. A traffic impact analysis is not required if one has already been performed for the Project as part of an earlier development approval which takes the impact on the CMP highway system into account.

The nearest OCTA CMP intersection is Irvine Boulevard and SR-133 Northbound ramps. As documented in Table 3, the Project generates less than 1,600 daily trips on a peak construction activity day. Therefore, a CMP traffic impact analysis is not required.

10. Improvements

Based on the results of the analysis and in accordance with the adopted *Traffic Impact Analysis Guidelines*, no significant impacts or intersection deficiencies were identified as part of this Project and therefore no improvements are required.

While no significant impacts were identified as part of this study, the following measures are recommended to alleviate the potential effect of construction traffic:

- Off-site truck staging, if required, shall be provided in a legal area furnished by the contractor. Trucks shall not be permitted to travel along local residential streets.
- To the extent feasible, deliveries and pick-ups of construction materials should be scheduled during non-peak travel periods and coordinated to reduce the potential of trucks waiting to load or unload for protracted periods of time.
- Access shall remain unobstructed for land uses in proximity to the Project site during Project construction.
- Full-time lane or sidewalk closures are not anticipated for the Project. Temporary lane or sidewalk closures, when needed, shall be scheduled to avoid peak commute hours and peak school drop-off and pick-up hours to the extent possible. In the event of a lane or sidewalk closure, a worksite traffic control plan, approved by the City of Irvine, shall be implemented to route traffic or pedestrians around any such lane or sidewalk closures.

11. Conclusion

The purpose of this study is to evaluate the temporary transportation impacts associated with the Syphon Reservoir Improvement Project in Irvine, California. The following summarizes the results of this analysis:

- The Project proposes to increase the capacity of the existing Syphon Reservoir and replace the existing engineered dam with a new and larger engineered dam. The Project would be implemented within the IRWD service area at the location of the existing Syphon Reservoir, northeast of Portola Parkway between Bee Canyon Access Road and SR-133.
- The scope of the traffic analysis, methodology assumptions, and selection of study intersections was developed in consultation with City of Irvine staff and documented in the Scope of Work for Irvine Ranch Water District (IRWD) Syphon Reservoir Construction Transportation Impact Analysis dated June 29, 2020.
- The study intersections selected represent the intersections where construction traffic is proposed to travel through. Four routes are proposed for the Project.
- On a peak construction activity day, approximately 232 daily trips are estimated, of which 36 trips (27 inbound/9 outbound) would occur during the AM peak hour and 18 trips (0 inbound/18 outbound) would occur during the PM peak hour. For the purpose of the intersection LOS analysis, the trip generation estimates were converted to PCE which resulted in approximately 512 daily PCE trips are estimated, of which 72 PCE trips (45 inbound/27 outbound) would occur during the AM peak hour and 18 PCE trips (0 inbound/18 outbound) would occur during the PM peak hour on the same peak construction activity day.
- The LOS analyses for all Existing Plus Project routes, Short-Term Interim Year Approved plus Project, and Short-Term Interim Year Pending plus Project that the Project would have no deficiencies at any study intersection. Therefore, no intersection improvements to address intersection deficiencies would be required.
- Based on the daily trip generation on a peak construction activity day, the Project does not meet the daily trip screening threshold and does not require further VMT impact analysis.
- The Project does not have a significant impact on the pedestrian, bicycle, or transit network.

Appendix A:
Scope of Work for Irvine Ranch Water District (IRWD) Syphon Reservoir Construction Transportation Impact Analysis

FEHR PEERS

MEMORANDUM

Date: June 29, 2020

To: Justin Equina, City of Irvine

CC: Jennifer Jacobus, PhD, ESA
Jo Ann Corey, Irvine Ranch Water District

From: Spencer Reed, PE and Ethan Yue Sun, PhD

Subject: Scope of Work for Irvine Ranch Water District (IRWD) Syphon Reservoir Construction Transportation Impact Analysis

OC18-0553

Fehr & Peers has been retained by ESA to assist with the transportation impact analysis for construction of the Irvine Ranch Water District (IRWD) Syphon Reservoir Project (Project) located near the intersection of Sand Canyon Avenue and Portola Parkway. Based on the City of Irvine's Traffic Study Guidelines (City of Irvine, August 2004, Updated 2020), this project is required to evaluate the impacts associated with construction of the Project. As the Project is anticipated to generate less than 50 peak hour trips (see trip generation section below), a Limited Scope Traffic Impact Analysis (TIA) will be prepared to evaluative short-term interim-year conditions and satisfy the City's analysis requirements.

The purpose of this memorandum is to document the methodologies and assumptions which will be used in the transportation impact analysis so there is an opportunity to approve the approach prior to preparing the traffic study. This Limited Scope TIA will include the following sections.

I. Executive Summary

This section will provide a summary of the project description and the analysis results. Any mitigations recommended as part of the project will also be included, if necessary.

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II. Introduction

This section will describe the project, outline the Limited Scope TIA, and include the following sections:

Project Site

The Project proposes to increase the capacity of the existing Syphon Reservoir and replace the existing engineered dam with a new and larger engineered dam. The Project would allow the storage of additional recycled water produced at the Michelson WRP during periods of low demand (winter months) for use during periods of high demand (summer months). The Project would expand the reservoir's storage capacity from the current 500 Acre-Feet (AF) to approximately 5,000 AF and would help IRWD become more self-sufficient by reducing its dependence on costly and less-reliable imported water from both Northern California and the Colorado River. The Project would help IRWD to store more drought-proof recycled water during summer months and support the increased use of recycled water for public landscaping, agricultural, business and industrial uses. Every gallon of recycled water IRWD uses for non-drinking water purposes saves a gallon of drinking water, helping the region's existing and planned future development to better withstand future water shortages. By reducing IRWD's dependence on costly imported water, the Project would allow IRWD to replace an expensive source of water for one that is less expensive and a drought-resilient supply, which increases IRWD's water supply reliability.

The Project would be implemented within the IRWD service area at the location of the existing Syphon Reservoir, northeast of Portola Parkway between Bee Canyon Access Road and SR-133 in the County of Orange. The Crean Lutheran High School Athletic Complex is located between Portola Parkway and the toe of the existing dam. Residential neighborhoods are located on the southwest side of Portola Parkway.

As part of the Project, a private 2-lane roadway connection from the northern side of the Sand Canyon Avenue and Portola Parkway intersection to the Project site is proposed for construction vehicle access. This proposal will require reconstruction of the Sand Canyon Avenue and Portola Parkway intersection to accommodate the new northern leg and the associated traffic signals, lane striping, and signage changes. During the Project, this private roadway will be used by construction trips for ingress and egress of the construction site. Upon completion of the Project, this private roadway will be used by IRWD staff conducting maintenance and inspections as part of typical

operations. The trips by IRWD staff will be nominal and are not considered to have a significant effect on the future intersection operations.

Study Area Boundary

The study intersections selected represent the intersections where construction traffic is proposed to travel through. Two route options are proposed for the Project. Route Option 1 will be SR-133, north on Irvine Boulevard, and east on Sand Canyon Avenue for trucks traveling inbound and westbound on Sand Canyon Avenue and south on Irvine Boulevard to SR-133 for trucks traveling outbound. Route Option 2 will be I-5, east on Sand Canyon Avenue for trucks traveling inbound and westbound on Sand Canyon Avenue to I-5 for trucks traveling outbound. As presented in Figure 1, the following intersections have been selected for study:

1. Sand Canyon Avenue & Portola Parkway
2. Sand Canyon Avenue & Irvine Boulevard
3. Sand Canyon Avenue & Trabuco Rd
4. Sand Canyon Avenue & I-5 Northbound Ramps
5. Sand Canyon Avenue & Marine Way
6. Sand Canyon Avenue & I-5 Southbound Ramps
7. SR-133 Southbound Ramps & Irvine Boulevard
8. SR-133 Northbound Off-Ramp & Irvine Boulevard

Data Collection

Due to emergence of COVID-19 in southern California and the decision of local schools to end on-campus classes for the 2019-2020 academic year, it is not recommended to collect existing intersection counts in the study area. However, the City of Irvine has agreed to provide the most recent intersection counts available that can be used to estimate 2020 intersection volumes. As prescribed by the City of Irvine, a growth factor of 2% per year will be applied to previously counts collected to develop 2020 intersection volumes for the AM and PM peak hours.

III. Existing Conditions

Existing Lane Uses

Existing land uses on site will be identified. The existing site is the IRWD syphon reservoir.

Existing Roadways and Intersections

Fehr & Peers will collect the following information in a field visit to the study area:

- Lane & intersection configurations
- Traffic signal locations
- Signal phasing
- Land uses in the study area
- Existing pedestrian and bicycle facilities
- Transit service

IV. Performance Criteria

The performance criteria to determine potential impacts and mitigations will be consistent with the City's criteria, as outlined in the Traffic Study Guidelines. The City's Transportation Design Procedures (TDP) adopted February 2007 will be used as the performance criteria to evaluate the design features of the project access.

V. Proposed Project Impacts

Trip Generation

Construction of the Project is estimated to be approximately 41 months, depending on weather conditions and other variables. Construction is currently anticipated to begin in the Fall of 2022. Most construction activities would be limited to 7:00 AM to 4:00 PM Monday through Friday. Construction of the Project would include activities implemented in phases as outlined below.

- Access Routes/Intersection Improvements
- Excavation of Sediment/Existing Dam
- Construction of Dam/Spillway/Reservoir
- Construction of Filtration/Chlor/Dechlor Facilities
- Wetlands/Riparian Installation
- Installation of Recreation Facilities
- Demobilization

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Construction Vehicle Type

Haul Trucks

Hauling hours are anticipated to be 7:00 AM to 3:00 PM on weekdays. During the peak trip period, approximately 52 material delivery trucks would enter and exit the site per workday for approximately twelve months. During other times of construction, material deliveries would be expected in the range of 5 to 10 material delivery trucks per day. These trucks are assumed to arrive and depart evenly between 7:00 AM and 3:00 PM during an 8-hour shift.

Equipment and Delivery Trucks

In addition to haul trucks, the site is also expected to generate equipment and delivery trucks during each phase of construction. These materials would be delivered to the site and stored on-site. These deliveries are expected to occur in a variety of vehicles including small delivery trucks to cement mixer trucks and 18-wheel trucks. Additionally, construction equipment would also have to be delivered to the site. This equipment could include bulldozers, excavators, and other large items of machinery. Most of the heavy equipment is expected to be transported to the site on large trucks such as 18-wheelers or other similar vehicles. These trucks are assumed to arrive and depart evenly between 7:00 AM and 3:00 PM during an 8-hour shift.

Employee Vehicles

The number of construction workers would vary throughout the construction period. Parking for all construction workers will be provided on-site. Construction workers are assumed to arrive in single occupant vehicles.

Construction Period Trip Generation

Based on the aforementioned information, a construction period trip generation analysis was conducted to estimate daily, morning, and evening peak hour trips of the phase with the highest trip generation potential. As seen in Table 1, the construction of Dam/Spillway/Reservoir phase represents the day with the highest trip generation potential with approximately 116 vehicles.

Construction workers often travel to and from a worksite outside of the typical peak commute hours. Construction hours are anticipated to occur from 7:00 AM to 4:00 PM, with most worker trips and truck trips anticipated to occur outside of the AM and PM peak hours. For the purpose of the analysis, it was assumed that up to 40% of the construction workers would arrive at the construction

site during the peak morning commute hour and up to 40% would depart the construction site during the peak evening commute hour. Equipment trucks were assumed to arrive and depart evenly between 7:00 AM and 3:00 PM during an 8-hour shift.

Table 1 presents a summary of the construction trip generation on a peak day. As shown, on a peak construction activity day, approximately 232 daily trips are estimated, of which 36 trips (27 inbound/9 outbound) would occur during the AM peak hour and 18 trips (0 inbound/18 outbound) would occur during the PM peak hour. This trip generation is anticipated to occur for approximately two to three months. Trip generation outside of this phase would be reduced with approximately 30 daily to 154 daily trips being generated.

Adjustments to Trip Generation

No adjustments to the trip generation shall be made without prior written approval from the City.

Trip Distribution and Assignment

Two route options are proposed for the Project. Route Option 1 will be SR-133, north on Irvine Boulevard, and east on Sand Canyon Avenue for trucks traveling inbound and westbound on Sand Canyon Avenue and south on Irvine Boulevard to SR-133 for trucks traveling outbound. Route Option 2 will be I-5, east on Sand Canyon Avenue for trucks traveling inbound and westbound on Sand Canyon Avenue to I-5 for trucks traveling outbound.

Phasing

The proposed project will be constructed in a single phase and is assumed to be operational by early 2026.

Vehicle Miles Traveled Methodology and Approach

On September 27, 2013, Governor Jerry Brown signed Senate Bill (SB) 743 into law and started a process that will fundamentally change transportation impact analysis conducted as part of California Environmental Quality Act (CEQA) compliance. The Governor's Office of Planning and Research (OPR) was charged with developing new guidelines for evaluating transportation impacts under CEQA using methods that no longer focus on measuring automobile delay and level of service (LOS).

OPR issued proposed updates to the CEQA guidelines in support of these goals in November 2017 and a supporting technical advisory in December 2018. The updates establish vehicle miles traveled (VMT) as the metric for evaluating a project's environmental impacts on the transportation system. Lead agencies, including the City of Irvine, have until July 1, 2020 to implement these new requirements. On June 23, 2020, the City of Irvine adopted the CEQA VMT Impact Analysis Guidelines. This project will include a VMT impact analysis section that follows the adopted CEQA VMT Impact Analysis Guidelines.

The City of Irvine's guidelines identify projects generating fewer than 250 daily trips as being screened out of VMT analysis. As identified in Table 1, all phases of construction have a daily trip generation less than 250 trips. Therefore, it can be assumed that all of the construction phases could be screened out of conducting a VMT analysis using the City of Irvine draft guidelines.

Many jurisdictions in Southern California have regarded construction-related traffic as causing adverse but not significant impacts because, while sometimes inconvenient, construction-related traffic effects are temporary. Therefore, due to all phases meeting the daily trip screening threshold of the City of Irvine and the temporary nature of the one phase that exceeds the threshold, this Project can be considered to be exempt from VMT and the traffic study will include a CEQA VMT Impact Analysis section and provide justification on how the project is exempt from VMT analysis.

Intersection Level of Service Analysis Methodology and Approach

The Intersection Capacity Utilization (ICU) methodology will be used to evaluate the intersection level of service (LOS) under the analysis scenarios identified below. The LOS will be reported at the study intersection for the AM and PM peak hours.

In addition, the Project's effect to non-automotive transportation will be evaluated based on the Project's consistency with existing or planned facilities in the study area

The following six scenarios will be analyzed:

- Existing Conditions – estimated intersection counts will be analyzed.
- Existing plus Project Conditions – the proposed construction trip generation (in passenger car equivilance) and route assignment estimates will be added to the Existing Conditions. Buildout of a private roadway connection from the northern side of the Sand Canyon Avenue and Portola Parkway intersection to the Project site will be included.

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- Short-Term Interim Year Approved Basline Conditions – the future (Short-Term Interim Year) conditions will be developed based on the latest verision of the Irvine Traffic Analysis Model (ITAM). Short-Term Interim Year Baseline Approved peak hour traffic volumes will be extracted for the study itnersections.

- Short-Term Interim Year Approved Baseline plus Project Conditions – the proposed construction trip generation (in passenger car equivilance) and route assignment estimates will be added to the Short-Term Interim Year Approved Basline Conditions . Buildout of a private roadway connection from the northern side of the Sand Canyon Avenue and Portola Parkway intersection to the Project site will be included.

- Short-Term Interim Year Pending Basline Conditions – the future (Short-Term Interim Year) conditions will be developed based on the latest verision of ITAM. Short-Term Interim Year Baseline Pending peak hour traffic volumes will be extracted for the study itnersections.

- Short-Term Interim Year Pending Baseline plus Project Conditions – the proposed construction trip generation (in passenger car equivilance) and route assignment estimates will be added to the Short-Term Interim Year Pending Basline Conditions . Buildout of a private roadway connection from the northern side of the Sand Canyon Avenue and Portola Parkway intersection to the Project site will be included.

The following parameters will be used in our operations analysis:

- Manual assignment of project trips added to the estimated intersection count volumes.
- Vistro v7.0 software and ICU methodology to analyze signalized study intersections.
- Volume to capacity (V/C) ratios and the associated LOS will be reported for the signalized Irvine study intersections under the ICU methodology.
- A VMT analysis will be prepared in accordance with adopted Traffic Impact Analysis Guidelines in effect at the time of project approval.
- Per the City of Irvine Traffic Impact Analysis Guidelines, lane capacities of 1,700 per hour per lane for through and turn lanes will be used for all volume/capacity calculations.
- Per the City of Irvine Traffic Impact Analysis Guidelines, lost time of 0.05 added to ICU calculation. Lost time represents the time in which no vehicles can pass through the intersection despite having a green signal (i.e. the delay from the driver in moving the vehicle as the signal changes from red to green)
- Inclusion of proposed private roadway under Plus Project condition

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VI. Special Analyses/Issues

Access Analysis

An analysis of the City's Transportation Design Procedures (TDPs) will be conducted for the primary access intersection (Sand Canyon Avenue/Portola) of the IRWD Syphon Reservoir. The TIA will identify the proposed lane geometry at this intersection to reflect this new access. The project is also responsible for restriping and other physical improvements necessary to implement the new access.

The specific TDPs to be evaluated include:

- TDP-1 (Turn lane pocket length) on eastbound Portola Parkway, if an eastbound left-turn lane is proposed
- TDP -14 (Driveway Lengths)
- TDP-15 (Gate Stacking), if applicable.

VII. Required Mitigation Measures

Based on the results and in accordance with the adopted Traffic Impact Analysis Guidelines, physical, operational, and alternative improvements required to mitigate unacceptable impacts due to the proposed project will be identified and analyzed.

VIII. Conclusions

A summary of the six analyzed scenarios, along with estimated effects of the mitigations, will be included in the TIA.

IX. Revisions to the Analysis

After a review and consolidated comments by city staff, Fehr & Peers will prepare one round of revisions to the TIA.

X. Signature

The TIA will be prepared under the supervision of, and signed, stamped, and dated by a registered traffic engineer or a registered professional civil engineer.

Sun-Sun T. Murillo 7/2/20

Approved by Development Review Date

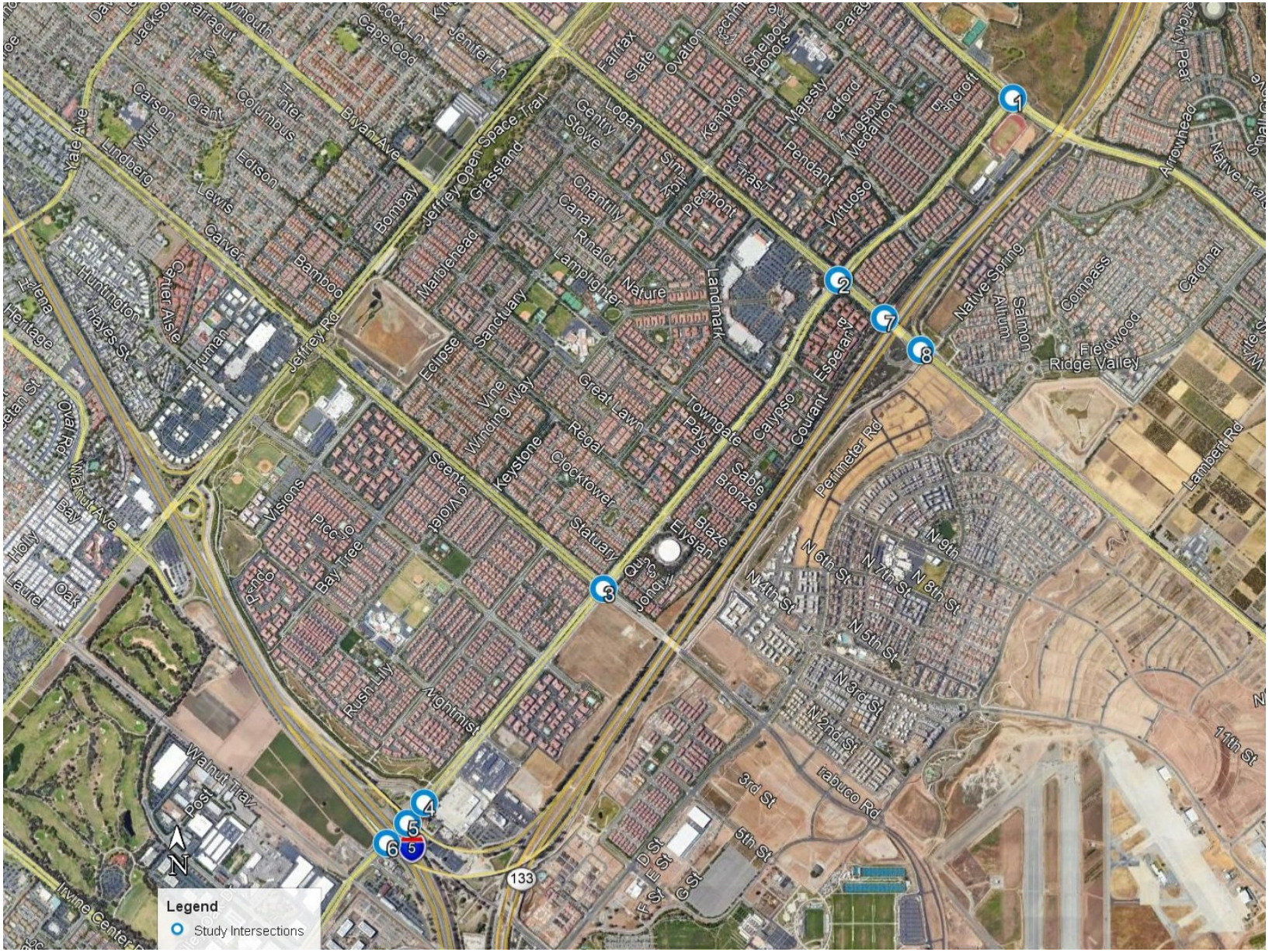


Figure 1

Study Interesections

Sun-Sun T. Murillo 7/2/20

TABLE 1
CONSTRUCTION PERIOD TRIP GENERATION

Phase	Duration (Months)	Peak Day Activity Under Each Phase			Total Vehicles	Total Daily Vehicle Trips
		Haul Trucks	Equipment and Delivery Trucks	Employee Vehicles		
Access Routes/Intersecction Improvements	5	8	3	10	21	42
Excavation of Sediment/ Existing Dam	6.6	0	6	31	37	74
Construction of Dam/Spillway/Reservoir	13.8	52	18	46	116	232
Construction of Filtration/Chlor/Dechlor Facility	12	0	29	48	77	154
Wetlands/Riparian Installation	12	0	5	20	25	50
Installation of Recreation Facilities	3	0	5	10	15	30
Demobilization	1	0	7	15	22	44

Construction of Dam/Spillway/Reservoir Trip Generation							
Trip Type	Daily Trips [a]	Morning Peak Hour Trips			Evening Peak Hour Trips		
		In	Out	Total	In	Out	Total
Haul Truck Trips [b]	104	7	7	14	0	0	0
Delivery and Equipment Truck Trips [b]	36	2	2	4	0	0	0
Construction Worker Trips [c]	92	18	0	18	0	18	18
Phase Total	**232**	**27**	**9**	**36**	**0**	**18**	**18**

Notes:

[a] - Daily trips were calculated by counting two trips, one inbound and one outbound trip for each vehicle

[b] - Daily haul and delivery/equipment truck trips were assumed to occur evenly throughout an 8-hour construction day. Therefore, the daily truck trips were divided by 8 hours to calculate morning and evening peak hour truck trips.

[c] - Up to 40% of the construction workers were assumed to arrive during the morning peak hour of adjacent street traffic. A total of up to 40% worker were assumed to depart during the evening peak hour.

Sun-Sun T. Murillo
7/2/20

Appendix B:
Traffic Counts

Location: Irvine
N/S: Sand Canyon Avenue
E/W: Portola Parkway

ITAM: 300
Date: 3/27/2018
Day: Tuesday

TOTAL VEHICLES

	Sand Canyon Avenue Southbound			Portola Parkway Westbound			Sand Canyon Avenue Northbound			Portola Parkway Eastbound			
	SL	ST	SR	WL	WT	WR	NL	NT	NR	EL	ET	ER	TOTAL
6:30 AM	0	0	0	47	26	0	10	0	28	0	92	67	270
6:45 AM	0	0	0	38	38	0	31	0	28	0	92	71	298
7:00 AM	0	0	0	58	68	0	32	0	16	0	98	82	354
7:15 AM	0	0	0	54	115	0	36	0	18	0	106	89	418
7:30 AM	0	0	0	114	223	0	69	0	29	0	82	105	622
7:45 AM	0	0	0	81	181	0	74	0	32	0	149	108	625
8:00 AM	0	0	0	72	138	0	37	0	35	0	155	87	524
8:15 AM	0	0	0	62	157	0	37	0	29	0	101	86	472
8:30 AM	0	0	0	95	140	0	43	0	32	0	117	78	505
8:45 AM	0	0	0	75	106	0	45	0	34	0	88	48	396
TOTAL VOLUMES:	0	0	0	696	1192	0	414	0	281	0	1080	821	4484

AM Peak Hr Begins at: 730 AM

	SL	ST	SR	WL	WT	WR	NL	NT	NR	EL	ET	ER	TOTAL
PEAK VOLUMES:	0	0	0	329	699	0	217	0	125	0	487	386	2243

PEAK HR FACTOR:	0.000	0.763	0.807	0.849	0.897

TOTAL VEHICLES

	Sand Canyon Avenue Southbound			Portola Parkway Westbound			Sand Canyon Avenue Northbound			Portola Parkway Eastbound			
	SL	ST	SR	WL	WT	WR	NL	NT	NR	EL	ET	ER	TOTAL
4:00 PM	0	0	0	35	124	0	99	0	67	0	72	30	427
4:15 PM	0	0	0	40	117	0	152	0	65	0	73	46	493
4:30 PM	0	0	0	36	115	0	134	0	74	0	86	45	490
4:45 PM	0	0	0	37	127	0	160	0	79	0	76	37	516
5:00 PM	0	0	0	35	109	0	170	0	71	0	89	48	522
5:15 PM	0	0	0	31	131	0	171	0	99	0	102	47	581
5:30 PM	0	0	0	32	133	0	165	0	90	0	139	55	614
5:45 PM	0	0	0	44	138	0	113	0	87	0	110	33	525
6:00 PM	0	0	0	29	109	0	130	0	103	0	108	33	512
6:15 PM	0	0	0	37	110	0	100	0	76	0	120	26	469
6:30 PM	0	0	0	33	70	0	81	0	90	0	68	21	363
6:45 PM	0	0	0	37	73	0	57	0	85	0	105	23	380
TOTAL VOLUMES:	0	0	0	426	1356	0	1532	0	986	0	1148	444	5892

PM Peak Hr Begins at: 500 PM

	SL	ST	SR	WL	WT	WR	NL	NT	NR	EL	ET	ER	TOTAL
PEAK VOLUMES:	0	0	0	142	511	0	619	0	347	0	440	183	2242

PEAK HR FACTOR:	0.000	0.897	0.894	0.803	0.913

Counts Unlimited
P.O. Box 1178
Corona, CA 92878
(951) 268-6268

Location: Irvine
N/S: Sand Canyon Avenue
E/W: Irvine Boulevard

ITAM: 301
Date: 3/27/2018
Day: Tuesday

TOTAL VEHICLES

	Sand Canyon Avenue Southbound			Irvine Boulevard Westbound			Sand Canyon Avenue Northbound			Irvine Boulevard Eastbound			
	SL	ST	SR	WL	WT	WR	NL	NT	NR	EL	ET	ER	TOTAL
7:00 AM	106	137	24	102	168	31	29	43	102	10	275	46	1073
7:15 AM	107	152	12	119	238	48	18	46	111	11	280	56	1198
7:30 AM	70	191	17	143	259	58	22	41	80	17	235	50	1183
7:45 AM	64	169	12	126	149	35	15	58	89	18	230	47	1012
8:00 AM	39	95	15	112	153	33	15	53	96	15	188	31	845
8:15 AM	60	133	19	119	103	61	19	46	89	25	131	40	845
8:30 AM	57	93	13	79	120	34	16	62	69	10	140	25	718
8:45 AM	50	79	9	84	101	21	17	47	66	12	136	43	665
TOTAL VOLUMES:	553	1049	121	884	1291	321	151	396	702	118	1615	338	7539

AM Peak Hr Begins at: 700 AM

	SL	ST	SR	WL	WT	WR	NL	NT	NR	EL	ET	ER	TOTAL
PEAK VOLUMES:	347	649	65	490	814	172	84	188	382	56	1020	199	4466

PEAK HR FACTOR:	0.954	0.802	0.934	0.919	0.932

TOTAL VEHICLES

	Sand Canyon Avenue Southbound			Irvine Boulevard Westbound			Sand Canyon Avenue Northbound			Irvine Boulevard Eastbound			
	SL	ST	SR	WL	WT	WR	NL	NT	NR	EL	ET	ER	TOTAL
4:00 PM	45	64	17	107	291	105	69	173	112	40	166	29	1218
4:15 PM	31	62	21	85	368	119	52	191	126	21	177	30	1283
4:30 PM	37	59	20	116	306	93	76	184	107	44	204	38	1284
4:45 PM	30	71	18	120	293	93	78	163	121	44	196	46	1273
5:00 PM	26	56	17	108	257	90	47	163	116	43	163	44	1130
5:15 PM	26	65	8	97	279	62	42	141	113	33	196	33	1095
5:30 PM	25	67	18	71	212	66	47	121	116	40	174	35	992
5:45 PM	22	62	19	98	168	43	45	105	88	30	150	35	865
6:00 PM	18	86	11	81	121	32	50	158	112	32	145	28	874
6:15 PM	19	60	15	87	127	41	36	102	72	42	132	28	761
6:30 PM	21	55	18	53	80	31	41	83	79	40	133	30	664
6:45 PM	11	47	13	75	77	25	34	76	69	32	124	30	613
TOTAL VOLUMES:	311	754	195	1098	2579	800	617	1660	1231	441	1960	406	12052

PM Peak Hr Begins at: 400 PM

	SL	ST	SR	WL	WT	WR	NL	NT	NR	EL	ET	ER	TOTAL
PEAK VOLUMES:	143	256	76	428	1258	410	275	711	466	149	743	143	5058

PEAK HR FACTOR:	0.942	0.916	0.984	0.905	0.985

Counts Unlimited
P.O. Box 1178
Corona, CA 92878
(951) 268-6268

Location: Irvine
N/S: Sand Canyon Avenue
E/W: Trabuco Road

ITAM: 302
Date: 3/27/2018
Day: Tuesday

TOTAL VEHICLES

	Sand Canyon Avenue Southbound			Trabuco Road Westbound			Sand Canyon Avenue Northbound			Trabuco Road Eastbound			
	SL	ST	SR	WL	WT	WR	NL	NT	NR	EL	ET	ER	TOTAL
5:30 AM	6	3	1	5	73	2	5	5	2	0	65	19	186
5:45 AM	5	3	4	10	106	8	13	4	0	1	92	28	274
6:00 AM	8	1	2	11	120	5	6	1	1	4	120	46	325
6:15 AM	11	18	3	9	143	7	15	2	1	1	150	73	433
6:30 AM	7	13	3	11	212	3	31	7	4	2	141	89	523
6:45 AM	10	16	1	17	251	6	27	9	5	4	160	93	599
7:00 AM	8	13	1	12	258	9	35	12	3	8	133	65	557
7:15 AM	11	14	1	13	335	24	44	12	8	10	141	39	652
7:30 AM	29	19	3	11	365	25	49	26	10	9	111	43	700
7:45 AM	19	26	4	18	400	68	46	44	11	11	110	35	792
8:00 AM	35	54	4	19	288	73	41	65	10	15	117	50	771
8:15 AM	38	53	2	38	317	55	48	55	13	11	116	56	802
8:30 AM	31	45	2	13	337	91	40	98	9	24	118	21	829
8:45 AM	49	55	3	13	360	78	47	52	8	9	118	23	815
TOTAL VOLUMES:	256	327	29	185	3386	444	429	383	83	108	1535	633	7798

AM Peak Hr Begins at: 800 AM

	SL	ST	SR	WL	WT	WR	NL	NT	NR	EL	ET	ER	TOTAL
PEAK VOLUMES:	153	207	11	83	1302	297	176	270	40	59	469	150	3217

PEAK HR FACTOR:	0.867	0.932	0.827	0.926	0.970

TOTAL VEHICLES

	Sand Canyon Avenue Southbound			Trabuco Road Westbound			Sand Canyon Avenue Northbound			Trabuco Road Eastbound			
	SL	ST	SR	WL	WT	WR	NL	NT	NR	EL	ET	ER	TOTAL
4:00 PM	32	35	8	11	132	29	20	42	15	32	312	37	705
4:15 PM	20	21	8	9	150	19	26	33	15	35	402	37	775
4:30 PM	29	23	7	11	130	20	27	27	12	38	369	49	742
4:45 PM	29	25	11	13	127	58	16	35	7	46	421	44	832
5:00 PM	50	34	6	3	167	33	19	45	13	43	430	40	883
5:15 PM	38	30	10	11	146	25	35	34	11	73	456	54	923
5:30 PM	32	29	11	5	168	46	25	43	9	84	528	63	1043
5:45 PM	38	24	7	8	159	49	28	33	8	53	455	50	912
6:00 PM	33	29	9	15	167	51	22	26	13	33	385	55	838
6:15 PM	27	24	5	9	129	27	29	23	13	39	410	67	802
6:30 PM	34	32	7	12	171	41	21	22	14	27	385	43	809
6:45 PM	29	21	1	6	166	21	22	22	10	18	310	56	682
TOTAL VOLUMES:	391	327	90	113	1812	419	290	385	140	521	4863	595	9946

PM Peak Hr Begins at: 500 PM

	SL	ST	SR	WL	WT	WR	NL	NT	NR	EL	ET	ER	TOTAL
PEAK VOLUMES:	158	117	34	27	640	153	107	155	41	253	1869	207	3761

PEAK HR FACTOR:	0.858	0.936	0.947	0.863	0.901

Counts Unlimited
P.O. Box 1178
Corona, CA 92878
(951) 268-6268

Location: Irvine
N/S: Sand Canyon Avenue
E/W: I-5 NB Ramps

ITAM: 303
Date: 5/22/2018
Day: Tuesday

TOTAL VEHICLES

	Sand Canyon Avenue Southbound			I-5 NB Ramps Westbound			Sand Canyon Avenue Northbound			I-5 NB Ramps Eastbound			
	SL	ST	SR	WL	WT	WR	NL	NT	NR	EL	ET	ER	TOTAL
7:00 AM	2	233	132	0	0	0	39	132	0	56	0	61	655
7:15 AM	1	356	152	1	1	0	41	121	1	67	0	72	813
7:30 AM	2	387	122	1	2	0	49	97	0	79	0	82	821
7:45 AM	0	447	95	0	0	0	42	111	0	73	0	131	899
8:00 AM	0	411	114	1	0	0	45	114	0	79	0	122	886
8:15 AM	0	436	105	0	0	0	42	99	1	53	0	95	831
8:30 AM	0	400	125	0	0	1	62	106	0	67	0	113	874
8:45 AM	0	428	128	0	0	0	51	120	0	49	0	102	878
TOTAL VOLUMES:	5	3098	973	3	3	1	371	900	2	523	0	778	6657

AM Peak Hr Begins at: 745 AM

	SL	ST	SR	WL	WT	WR	NL	NT	NR	EL	ET	ER	TOTAL
PEAK VOLUMES:	0	1694	439	1	0	1	191	430	1	272	0	461	3490

PEAK HR FACTOR:	0.984	0.500	0.926	0.898	0.971

TOTAL VEHICLES

	Sand Canyon Avenue Southbound			I-5 NB Ramps Westbound			Sand Canyon Avenue Northbound			I-5 NB Ramps Eastbound			
	SL	ST	SR	WL	WT	WR	NL	NT	NR	EL	ET	ER	TOTAL
4:00 PM	0	199	68	5	2	0	110	273	0	133	0	39	829
4:15 PM	0	182	53	1	1	0	107	309	0	143	0	54	850
4:30 PM	0	179	43	4	1	0	108	313	0	163	0	43	854
4:45 PM	1	181	34	0	1	0	106	275	0	202	0	61	861
5:00 PM	0	158	34	0	0	0	135	303	1	205	0	43	879
5:15 PM	0	169	49	0	0	0	149	440	0	184	0	48	1039
5:30 PM	0	166	40	0	0	0	99	348	0	219	0	48	920
5:45 PM	3	185	34	0	0	0	114	404	0	207	0	46	993
6:00 PM	0	161	52	0	0	0	123	377	0	208	0	38	959
6:15 PM	0	163	56	1	0	0	139	379	1	170	0	48	957
6:30 PM	1	147	69	2	1	0	103	326	0	199	0	41	889
6:45 PM	0	139	69	0	0	0	122	296	8	150	0	52	836
TOTAL VOLUMES:	5	2029	601	13	6	0	1415	4043	10	2183	0	561	10866

PM Peak Hr Begins at: 515 PM

	SL	ST	SR	WL	WT	WR	NL	NT	NR	EL	ET	ER	TOTAL
PEAK VOLUMES:	3	681	175	0	0	0	485	1569	0	818	0	180	3911

PEAK HR FACTOR:	0.967	0.000	0.872	0.934	0.941

Counts Unlimited
P.O. Box 1178
Corona, CA 92878
(951) 268-6268

Location: Irvine
N/S: Sand Canyon Avenue
E/W: Marine Way

ITAM: 304
Date: 5/24/2018
Day: Thursday

	Sand Canyon Avenue Southbound			Marine Way Westbound			Sand Canyon Avenue Northbound			Marine Way Eastbound			
	SL	ST	SR	WL	WT	WR	NL	NT	NR	EL	ET	ER	TOTAL
7:00 AM	17	298	0	44	0	16	0	153	78	0	0	0	606
7:15 AM	14	345	0	45	0	23	0	143	58	0	0	0	628
7:30 AM	19	465	0	75	0	29	0	135	39	0	0	0	762
7:45 AM	24	542	0	79	0	25	0	117	38	0	0	0	825
8:00 AM	17	489	0	93	0	26	0	118	50	0	0	0	793
8:15 AM	29	584	0	108	0	30	0	86	40	0	0	0	877
8:30 AM	26	486	0	92	0	20	0	134	34	0	0	0	792
8:45 AM	23	538	0	94	0	18	0	129	41	0	0	0	843
TOTAL VOLUMES:	169	3747	0	630	0	187	0	1015	378	0	0	0	6126

AM Peak Hr Begins at: 800 AM

	SL	ST	SR	WL	WT	WR	NL	NT	NR	EL	ET	ER	TOTAL
PEAK VOLUMES:	95	2097	0	387	0	94	0	467	165	0	0	0	3305
PEAK HR FACTOR:	0.894			0.871			0.929			0.000			0.942

	Sand Canyon Avenue Southbound			Marine Way Westbound			Sand Canyon Avenue Northbound			Marine Way Eastbound			
	SL	ST	SR	WL	WT	WR	NL	NT	NR	EL	ET	ER	TOTAL
4:00 PM	30	171	0	51	0	23	0	313	43	0	0	0	631
4:15 PM	16	222	0	41	0	28	0	431	48	0	0	0	786
4:30 PM	25	189	0	51	0	18	0	382	52	0	0	0	717
4:45 PM	42	205	0	33	0	24	0	431	67	0	0	0	802
5:00 PM	20	207	0	36	0	29	0	471	83	0	0	0	846
5:15 PM	23	207	0	38	0	21	0	599	68	0	0	0	956
5:30 PM	27	170	0	36	0	18	0	503	71	0	0	0	825
5:45 PM	21	258	0	37	0	23	0	451	102	0	0	0	892
6:00 PM	23	166	0	38	0	23	0	492	98	0	0	0	840
6:15 PM	24	244	0	36	0	24	0	437	92	0	0	0	857
6:30 PM	18	171	0	29	0	22	0	398	80	0	0	0	718
6:45 PM	23	218	0	49	0	40	0	409	61	0	0	0	800
TOTAL VOLUMES:	292	2428	0	475	0	293	0	5317	865	0	0	0	9670

PM Peak Hr Begins at: 500 PM

	SL	ST	SR	WL	WT	WR	NL	NT	NR	EL	ET	ER	TOTAL
PEAK VOLUMES:	91	842	0	147	0	91	0	2024	324	0	0	0	3519
PEAK HR FACTOR:	0.836			0.915			0.880			0.000			0.920

Counts Unlimited
P.O. Box 1178
Corona, CA 92878
(951) 268-6268

Location: Irvine
N/S: Sand Canyon Avenue
E/W: I-5 SB Ramps

ITAM: 305
Date: 5/22/2018
Day: Tuesday

TOTAL VEHICLES

	Sand Canyon Avenue Southbound			I-5 SB Ramps Westbound			Sand Canyon Avenue Northbound			I-5 SB Ramps Eastbound			
	SL	ST	SR	WL	WT	WR	NL	NT	NR	EL	ET	ER	TOTAL
7:00 AM	105	251	0	0	0	0	0	98	18	94	0	161	727
7:15 AM	129	337	0	0	0	0	0	96	21	82	1	203	869
7:30 AM	143	438	0	0	0	0	0	91	33	63	0	188	956
7:45 AM	161	486	0	0	0	0	0	102	34	48	0	194	1025
8:00 AM	154	455	0	0	0	0	0	83	29	51	2	255	1029
8:15 AM	175	407	0	0	0	0	0	108	22	52	1	234	999
8:30 AM	169	413	0	0	0	0	0	104	28	53	0	229	996
8:45 AM	163	439	0	0	0	0	0	118	23	44	0	221	1008
TOTAL VOLUMES:	1199	3226	0	0	0	0	0	800	208	487	4	1685	7609

AM Peak Hr Begins at: 745 AM

	SL	ST	SR	WL	WT	WR	NL	NT	NR	EL	ET	ER	TOTAL
PEAK VOLUMES:	659	1761	0	0	0	0	0	397	113	204	3	912	4049

PEAK HR FACTOR:	0.935	0.000	0.938	0.908	0.984

TOTAL VEHICLES

	Sand Canyon Avenue Southbound			I-5 SB Ramps Westbound			Sand Canyon Avenue Northbound			I-5 SB Ramps Eastbound			
	SL	ST	SR	WL	WT	WR	NL	NT	NR	EL	ET	ER	TOTAL
4:00 PM	87	193	0	0	0	0	0	341	81	69	0	38	809
4:15 PM	73	181	0	0	0	0	0	358	94	82	2	55	845
4:30 PM	78	162	0	0	0	0	0	367	83	93	2	74	859
4:45 PM	64	155	0	0	0	0	0	351	78	84	1	75	808
5:00 PM	71	141	0	0	0	0	0	409	119	125	0	71	936
5:15 PM	66	123	0	0	0	0	0	474	113	133	2	77	988
5:30 PM	73	131	0	0	0	0	0	429	92	118	0	75	918
5:45 PM	62	154	0	0	0	0	0	396	76	163	0	59	910
6:00 PM	81	146	0	0	0	0	0	377	63	150	0	64	881
6:15 PM	82	166	0	0	0	0	0	395	54	123	0	55	875
6:30 PM	75	124	0	0	0	0	0	339	57	149	0	59	803
6:45 PM	78	117	0	0	0	0	0	315	44	195	0	61	810
TOTAL VOLUMES:	890	1793	0	0	0	0	0	4551	954	1484	7	763	10442

PM Peak Hr Begins at: 500 PM

	SL	ST	SR	WL	WT	WR	NL	NT	NR	EL	ET	ER	TOTAL
PEAK VOLUMES:	272	549	0	0	0	0	0	1708	400	539	2	282	3752

PEAK HR FACTOR:	0.950	0.000	0.898	0.927	0.949

Counts Unlimited
P.O. Box 1178
Corona, CA 92878
(951) 268-6268

Location: Irvine
N/S: SR-133 SB Ramps
E/W: Irvine Boulevard

ITAM: 316
Date: 3/29/2017
Day: Thursday

	SR-133 SB Ramps Southbound			Irvine Boulevard Westbound			SR-133 SB Ramps Northbound			Irvine Boulevard Eastbound			
	SL	ST	SR	WL	WT	WR	NL	NT	NR	EL	ET	ER	TOTAL
7:00 AM	63	0	42	54	220	0	0	0	0	0	278	35	692
7:15 AM	38	0	54	70	241	0	0	0	0	0	267	36	706
7:30 AM	27	0	76	77	316	0	0	0	0	0	415	50	961
7:45 AM	37	1	71	76	354	0	0	0	0	0	396	79	1014
8:00 AM	38	0	48	91	439	0	0	0	0	0	262	70	948
8:15 AM	19	0	49	82	301	0	0	0	0	0	339	87	877
8:30 AM	27	1	32	76	258	0	0	0	0	0	284	70	748
8:45 AM	32	1	45	68	236	0	0	0	0	0	341	76	799
TOTAL VOLUMES:	281	3	417	594	2365	0	0	0	0	0	2582	503	6745

AM Peak Hr Begins at: 730 AM

	SL	ST	SR	WL	WT	WR	NL	NT	NR	EL	ET	ER	TOTAL
PEAK VOLUMES:	121	1	244	326	1410	0	0	0	0	0	1412	286	3800

PEAK HR FACTOR:	0.839	0.819	0.000	0.894	0.937

	SR-133 SB Ramps Southbound			Irvine Boulevard Westbound			SR-133 SB Ramps Northbound			Irvine Boulevard Eastbound			
	SL	ST	SR	WL	WT	WR	NL	NT	NR	EL	ET	ER	TOTAL
4:00 PM	15	0	41	37	419	0	0	0	0	0	300	31	843
4:15 PM	9	0	30	27	448	0	0	0	0	0	267	29	810
4:30 PM	13	0	23	29	446	0	0	0	0	0	286	24	821
4:45 PM	11	1	20	29	524	0	0	0	0	0	311	27	923
5:00 PM	7	0	34	23	481	0	0	0	0	0	294	23	862
5:15 PM	8	0	45	35	585	0	0	0	0	0	305	36	1014
5:30 PM	12	0	36	41	525	0	0	0	0	0	293	26	933
5:45 PM	18	1	37	31	505	0	0	0	0	0	320	36	948
6:00 PM	9	1	35	24	460	0	0	0	0	0	304	25	858
6:15 PM	5	1	15	12	406	0	0	0	0	0	295	15	749
6:30 PM	7	0	27	25	303	0	0	0	0	0	276	22	660
6:45 PM	8	1	22	18	286	0	0	0	0	0	263	19	617
TOTAL VOLUMES:	122	5	365	331	5388	0	0	0	0	0	3514	313	10038

PM Peak Hr Begins at: 500 PM

	SL	ST	SR	WL	WT	WR	NL	NT	NR	EL	ET	ER	TOTAL
PEAK VOLUMES:	45	1	152	130	2096	0	0	0	0	0	1212	121	3757

PEAK HR FACTOR:	0.884	0.898	0.000	0.936	0.926

Counts Unlimited
P.O. Box 1178
Corona, CA 92878
(951) 268-6268

Location: Irvine
N/S: SR-133 NB Ramps
E/W: Irvine Boulevard

ITAM: 317
Date: 3/29/2018
Day: Thursday

	SR-133 NB Ramps Southbound			Irvine Boulevard Westbound			SR-133 NB Ramps Northbound			Irvine Boulevard Eastbound			
	SL	ST	SR	WL	WT	WR	NL	NT	NR	EL	ET	ER	TOTAL
7:00 AM	0	0	0	0	264	17	13	0	21	0	311	37	663
7:15 AM	0	0	0	0	269	25	30	0	31	0	274	29	658
7:30 AM	0	0	0	0	394	23	27	0	22	0	403	33	902
7:45 AM	0	0	0	0	440	16	28	0	32	0	425	29	970
8:00 AM	0	0	0	0	487	21	22	0	23	0	278	36	867
8:15 AM	0	0	0	0	346	19	18	0	20	0	315	25	743
8:30 AM	0	0	0	0	305	21	24	0	20	0	272	30	672
8:45 AM	0	0	0	0	257	27	19	0	17	0	327	28	675
TOTAL VOLUMES:	0	0	0	0	2762	169	181	0	186	0	2605	247	6150

AM Peak Hr Begins at: 730 AM

	SL	ST	SR	WL	WT	WR	NL	NT	NR	EL	ET	ER	TOTAL
PEAK VOLUMES:	0	0	0	0	1667	79	95	0	97	0	1421	123	3482

PEAK HR FACTOR:	0.000	0.859	0.800	0.850	0.897

	SR-133 NB Ramps Southbound			Irvine Boulevard Westbound			SR-133 NB Ramps Northbound			Irvine Boulevard Eastbound			
	SL	ST	SR	WL	WT	WR	NL	NT	NR	EL	ET	ER	TOTAL
4:00 PM	0	0	0	0	406	37	46	0	42	0	234	63	828
4:15 PM	0	0	0	0	410	31	58	0	39	0	210	57	805
4:30 PM	0	0	0	0	492	34	44	0	51	0	240	55	916
4:45 PM	0	0	0	0	470	48	59	0	38	0	251	48	914
5:00 PM	0	0	0	0	461	37	55	0	58	0	249	49	909
5:15 PM	0	0	0	0	543	40	83	0	55	0	260	51	1032
5:30 PM	0	0	0	0	493	33	63	0	61	0	258	49	957
5:45 PM	0	0	0	0	429	31	64	0	54	0	313	48	939
6:00 PM	0	0	0	0	447	27	49	0	67	0	276	51	917
6:15 PM	0	0	0	0	376	28	52	0	55	0	290	38	839
6:30 PM	0	0	0	0	316	20	52	0	43	0	241	28	700
6:45 PM	0	0	0	0	301	18	28	0	53	0	229	35	664
TOTAL VOLUMES:	0	0	0	0	5144	384	653	0	616	0	3051	572	10420

PM Peak Hr Begins at: 515 PM

	SL	ST	SR	WL	WT	WR	NL	NT	NR	EL	ET	ER	TOTAL
PEAK VOLUMES:	0	0	0	0	1912	131	259	0	237	0	1107	199	3845

PEAK HR FACTOR:	0.000	0.876	0.899	0.904	0.931

Counts Unlimited
P.O. Box 1178
Corona, CA 92878
(951) 268-6268

Appendix C:
LOS Calculation Worksheets

Existing (2020) Conditions

Irvine Ranch Water District

Vistro File: N:\...\IRWD 2020 EX_Version 2.vistro
Report File: N:\...\2020 EX Base AM.pdf

Scenario 1 Base AM
8/19/2020

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Sand Canyon Ave and Portola Pkwy	Signalized	ICU 1	WB Thru	0.366	-	A
2	Sand Canyon Ave and Irvine Blvd	Signalized	ICU 1	SB Thru	0.580	-	A
3	Sand Canyon Ave and Trabuco Rd	Signalized	ICU 1	WB Thru	0.496	-	A
4	Sand Canyon Ave and I-5 NB Ramps	Signalized	ICU 1	SB Thru	0.538	-	A
5	Sand Canyon Ave and Marine Way	Signalized	ICU 1	SB Thru	0.596	-	A
6	Sand Canyon Ave and I-5 SB Ramps	Signalized	ICU 1	SB Thru	0.600	-	B
7	SR-133 SB Ramps and Irvine Blvd	Signalized	ICU 1	WB Thru	0.556	-	A
8	SR-133 NB Ramps and Irvine Blvd	Signalized	ICU 1	WB Right	0.465	-	A

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report
Intersection 1: Sand Canyon Ave and Portola Pkwy

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.366

Intersection Setup

Name						
Approach	Northbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	1	0	1	2	0
Pocket Length [ft]	280.00	500.00	100.00	300.00	380.00	100.00
Speed [mph]	50.00		50.00		55.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		Yes	

Volumes

Name						
Base Volume Input [veh/h]	226	130	507	402	342	727
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	226	130	507	402	342	727
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	57	33	127	101	86	182
Total Analysis Volume [veh/h]	226	130	507	402	342	727
Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Split	Overlap	Permissive	Unsignalized	Protected	Permissive
Signal Group	6	0	8	0	7	4
Auxiliary Signal Groups						
Lead / Lag	Lag	-	-	-	Lead	-

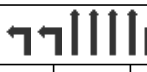
Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.07	0.00	0.15	0.00	0.10	0.21
Intersection LOS	A					
Intersection V/C	0.366					

Intersection Level Of Service Report
Intersection 2: Sand Canyon Ave and Irvine Blvd

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.580

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	2	0	2	2	0	1	2	0	1	2	0	1
Pocket Length [ft]	200.00	100.00	350.00	170.00	100.00	310.00	150.00	100.00	310.00	280.00	100.00	350.00
Speed [mph]	50.00			50.00			55.00			55.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	87	196	397	361	675	68	58	1061	207	510	847	179
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	87	196	397	361	675	68	58	1061	207	510	847	179
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	22	49	99	90	169	17	15	265	52	128	212	45
Total Analysis Volume [veh/h]	87	196	397	361	675	68	58	1061	207	510	847	179
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protect	Permis	Overla	Protect	Permis	Permis	Protect	Permis	Permis	Protect	Permis	Permis
Signal Group	1	6	0	5	2	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

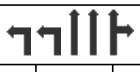
Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.03	0.04	0.00	0.11	0.20	0.04	0.02	0.16	0.12	0.15	0.17	0.11
Intersection LOS	A											
Intersection V/C	0.580											

Intersection Level Of Service Report
Intersection 3: Sand Canyon Ave and Trabuco Rd

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.496

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	2	0	0	2	0	1	2	0	1	2	0	0
Pocket Length [ft]	250.00	100.00	100.00	200.00	100.00	280.00	150.00	100.00	430.00	320.00	100.00	100.00
Speed [mph]	50.00			50.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	183	281	42	159	215	11	61	488	156	86	1355	309
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	183	281	42	159	215	11	61	488	156	86	1355	309
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	46	70	11	40	54	3	15	122	39	22	339	77
Total Analysis Volume [veh/h]	183	281	42	159	215	11	61	488	156	86	1355	309
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protect	Permis	Unsign	Protect	Permis	Permis	Protect	Permis	Unsign	Protect	Permis	Permis
Signal Group	1	6	0	5	2	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

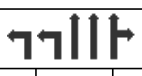
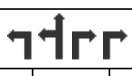
Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.05	0.06	0.00	0.05	0.04	0.01	0.02	0.10	0.00	0.03	0.33	0.33
Intersection LOS	A											
Intersection V/C	0.496											

Intersection Level Of Service Report
Intersection 4: Sand Canyon Ave and I-5 NB Ramps

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.538

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	1	0	1	0	0	1	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	190.00	100.00	220.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	50.00			50.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	199	447	1	0	1762	457	283	0	480	1	0	1
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	199	447	1	0	1762	457	283	0	480	1	0	1
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	50	112	0	0	441	114	71	0	120	0	0	0
Total Analysis Volume [veh/h]	199	447	1	0	1762	457	283	0	480	1	0	1
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permis	Permis	Permis	Permis	Permis	Permis	Split	Split	Overla	Split	Split	Split
Signal Group	0	6	0	0	2	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.06	0.09	0.09	0.00	0.35	0.27	0.08	0.00	0.00	0.00	0.00	0.00
Intersection LOS	A											
Intersection V/C	0.538											

Intersection Level Of Service Report
Intersection 5: Sand Canyon Ave and Marine Way

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.596

Intersection Setup

Name						
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	1	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	380.00	100.00
Speed [mph]	50.00		50.00		50.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		Yes		Yes	

Volumes

Name						
Base Volume Input [veh/h]	486	172	99	2182	403	98
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	486	172	99	2182	403	98
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	122	43	25	546	101	25
Total Analysis Volume [veh/h]	486	172	99	2182	403	98
Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permissive	Permissive	Permissive	Permissive	Permissive	Permissive
Signal Group	6	0	0	2	4	0
Auxiliary Signal Groups						
Lead / Lag	-	-	-	-	Lag	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.10	0.10	0.03	0.43	0.12	0.06
Intersection LOS	A					
Intersection V/C	0.596					

Intersection Level Of Service Report
Intersection 6: Sand Canyon Ave and I-5 SB Ramps

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.600

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	1	2	0	0	1	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	200.00	100.00	100.00	240.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	50.00			50.00			50.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	0	413	118	686	1832	0	212	0	949	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	413	118	686	1832	0	212	0	949	0	0	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	103	30	172	458	0	53	0	237	0	0	0
Total Analysis Volume [veh/h]	0	413	118	686	1832	0	212	0	949	0	0	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permis	Permis	Permis	Protect	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis
Signal Group	0	6	0	5	2	0	0	8	0	0	0	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lead	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.06	0.07	0.20	0.27	0.00	0.04	0.00	0.17	0.00	0.00	0.00
Intersection LOS	B											
Intersection V/C	0.600											

Intersection Level Of Service Report
Intersection 7: SR-133 SB Ramps and Irvine Blvd

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.556

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	1	0	0	0	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	530.00	100.00	100.00	100.00	140.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			No			No		

Volumes

Name												
Base Volume Input [veh/h]	0	0	0	126	0	254	0	1469	298	339	1467	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	0	0	126	0	254	0	1469	298	339	1467	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	0	0	32	0	64	0	367	75	85	367	0
Total Analysis Volume [veh/h]	0	0	0	126	0	254	0	1469	298	339	1467	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis
Signal Group	0	0	0	4	0	0	0	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lag	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.07	0.00	0.07	0.00	0.26	0.26	0.10	0.43	0.00
Intersection LOS	A											
Intersection V/C	0.556											

Intersection Level Of Service Report
Intersection 8: SR-133 NB Ramps and Irvine Blvd

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.465

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

Volumes

Name												
Base Volume Input [veh/h]	99	0	101	0	0	0	0	1478	0	0	1734	82
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	99	0	101	0	0	0	0	1478	0	0	1734	82
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	25	0	25	0	0	0	0	370	0	0	434	21
Total Analysis Volume [veh/h]	99	0	101	0	0	0	0	1478	0	0	1734	82
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis
Signal Group	8	2	0	0	0	0	0	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	-	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.06	0.00	0.06	0.00	0.00	0.00	0.00	0.29	0.00	0.00	0.36	0.36
Intersection LOS	A											
Intersection V/C	0.465											

Irvine Ranch Water District

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Report File: N:\...\2020 EX Base PM.pdf

Scenario 2 Base PM
8/19/2020

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Sand Canyon Ave and Portola Pkwy	Signalized	ICU 1	NB Left	0.418	-	A
2	Sand Canyon Ave and Irvine Blvd	Signalized	ICU 1	WB Thru	0.541	-	A
3	Sand Canyon Ave and Trabuco Rd	Signalized	ICU 1	EB Thru	0.519	-	A
4	Sand Canyon Ave and I-5 NB Ramps	Signalized	ICU 1	NB Thru	0.622	-	B
5	Sand Canyon Ave and Marine Way	Signalized	ICU 1	NB Thru	0.547	-	A
6	Sand Canyon Ave and I-5 SB Ramps	Signalized	ICU 1	NB Thru	0.520	-	A
7	SR-133 SB Ramps and Irvine Blvd	Signalized	ICU 1	WB Thru	0.738	-	C
8	SR-133 NB Ramps and Irvine Blvd	Signalized	ICU 1	WB Thru	0.625	-	B

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report
Intersection 1: Sand Canyon Ave and Portola Pkwy

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.418

Intersection Setup

Name						
Approach	Northbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	1	0	1	2	0
Pocket Length [ft]	280.00	500.00	100.00	300.00	380.00	100.00
Speed [mph]	50.00		50.00		55.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		Yes	

Volumes

Name						
Base Volume Input [veh/h]	644	361	458	190	148	532
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	644	361	458	190	148	532
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	161	90	115	48	37	133
Total Analysis Volume [veh/h]	644	361	458	190	148	532
Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Split	Overlap	Permissive	Unsignalized	Protected	Permissive
Signal Group	6	0	8	0	7	4
Auxiliary Signal Groups						
Lead / Lag	Lag	-	-	-	Lead	-

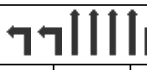
Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.19	0.00	0.13	0.00	0.04	0.16
Intersection LOS	A					
Intersection V/C	0.418					

Intersection Level Of Service Report
Intersection 2: Sand Canyon Ave and Irvine Blvd

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.541

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	2	0	2	2	0	1	2	0	1	2	0	1
Pocket Length [ft]	200.00	100.00	350.00	170.00	100.00	310.00	150.00	100.00	310.00	280.00	100.00	350.00
Speed [mph]	50.00			50.00			55.00			55.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	286	740	485	149	266	79	155	773	149	445	1309	427
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	286	740	485	149	266	79	155	773	149	445	1309	427
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	72	185	121	37	67	20	39	193	37	111	327	107
Total Analysis Volume [veh/h]	286	740	485	149	266	79	155	773	149	445	1309	427
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protect	Permis	Overla	Protect	Permis	Permis	Protect	Permis	Permis	Protect	Permis	Permis
Signal Group	1	6	0	5	2	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

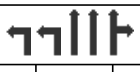
Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.08	0.15	0.00	0.04	0.08	0.05	0.05	0.11	0.09	0.13	0.26	0.25
Intersection LOS	A											
Intersection V/C	0.541											

Intersection Level Of Service Report
Intersection 3: Sand Canyon Ave and Trabuco Rd

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.519

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	2	0	0	2	0	1	2	0	1	2	0	0
Pocket Length [ft]	250.00	100.00	100.00	200.00	100.00	280.00	150.00	100.00	430.00	320.00	100.00	100.00
Speed [mph]	50.00			50.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	111	161	43	164	122	35	263	1945	215	28	666	159
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	111	161	43	164	122	35	263	1945	215	28	666	159
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	28	40	11	41	31	9	66	486	54	7	167	40
Total Analysis Volume [veh/h]	111	161	43	164	122	35	263	1945	215	28	666	159
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protect	Permis	Unsign	Protect	Permis	Permis	Protect	Permis	Unsign	Protect	Permis	Permis
Signal Group	1	6	0	5	2	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

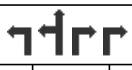
Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.03	0.03	0.00	0.05	0.02	0.02	0.08	0.38	0.00	0.01	0.16	0.16
Intersection LOS	A											
Intersection V/C	0.519											

Intersection Level Of Service Report
Intersection 4: Sand Canyon Ave and I-5 NB Ramps

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.622

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	1	0	1	0	0	1	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	190.00	100.00	220.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	50.00			50.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	505	1632	0	3	709	182	851	0	187	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	505	1632	0	3	709	182	851	0	187	0	0	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	126	408	0	1	177	46	213	0	47	0	0	0
Total Analysis Volume [veh/h]	505	1632	0	3	709	182	851	0	187	0	0	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permis	Permis	Permis	Permis	Permis	Permis	Split	Split	Overla	Split	Split	Split
Signal Group	0	6	0	0	2	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.15	0.32	0.00	0.00	0.14	0.11	0.25	0.00	0.00	0.00	0.00	0.00
Intersection LOS	B											
Intersection V/C	0.622											

Intersection Level Of Service Report
Intersection 5: Sand Canyon Ave and Marine Way

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.547

Intersection Setup

Name						
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	1	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	380.00	100.00
Speed [mph]	50.00		50.00		50.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		Yes		Yes	

Volumes

Name						
Base Volume Input [veh/h]	2106	337	95	876	153	95
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	2106	337	95	876	153	95
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	527	84	24	219	38	24
Total Analysis Volume [veh/h]	2106	337	95	876	153	95
Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permissive	Permissive	Permissive	Permissive	Permissive	Permissive
Signal Group	6	0	0	2	4	0
Auxiliary Signal Groups						
Lead / Lag	-	-	-	-	Lag	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.41	0.20	0.03	0.17	0.05	0.06
Intersection LOS	A					
Intersection V/C	0.547					

Intersection Level Of Service Report
Intersection 6: Sand Canyon Ave and I-5 SB Ramps

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.520

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	1	2	0	0	1	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	200.00	100.00	100.00	240.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	50.00			50.00			50.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	0	1777	416	283	571	0	561	0	293	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	1777	416	283	571	0	561	0	293	0	0	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	444	104	71	143	0	140	0	73	0	0	0
Total Analysis Volume [veh/h]	0	1777	416	283	571	0	561	0	293	0	0	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permis	Permis	Permis	Protect	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis
Signal Group	0	6	0	5	2	0	0	8	0	0	0	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lead	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.26	0.24	0.08	0.08	0.00	0.11	0.00	0.13	0.00	0.00	0.00
Intersection LOS	A											
Intersection V/C	0.520											

Intersection Level Of Service Report
Intersection 7: SR-133 SB Ramps and Irvine Blvd

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.738

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	1	0	0	0	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	530.00	100.00	100.00	100.00	140.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			No			No		

Volumes

Name												
Base Volume Input [veh/h]	0	0	0	47	0	158	0	1261	126	135	2181	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	0	0	47	0	158	0	1261	126	135	2181	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	0	0	12	0	40	0	315	32	34	545	0
Total Analysis Volume [veh/h]	0	0	0	47	0	158	0	1261	126	135	2181	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis
Signal Group	0	0	0	4	0	0	0	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lag	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.03	0.00	0.05	0.00	0.20	0.20	0.04	0.64	0.00
Intersection LOS	C											
Intersection V/C	0.738											

Intersection Level Of Service Report
Intersection 8: SR-133 NB Ramps and Irvine Blvd

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.625

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

Volumes

Name												
Base Volume Input [veh/h]	269	0	247	0	0	0	0	1152	0	0	1989	136
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	269	0	247	0	0	0	0	1152	0	0	1989	136
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	67	0	62	0	0	0	0	288	0	0	497	34
Total Analysis Volume [veh/h]	269	0	247	0	0	0	0	1152	0	0	1989	136
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis
Signal Group	8	2	0	0	0	0	0	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	-	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.16	0.00	0.15	0.00	0.00	0.00	0.00	0.23	0.00	0.00	0.42	0.42
Intersection LOS	B											
Intersection V/C	0.625											

Irvine Ranch Water District

Vistro File: N:\...\IRWD 2020 EX_Version 2.vistro
Report File: N:\...\2020 EX PP AM_Route 1A through I-5 N.pdf

Scenario 3 Base Route 1A AM
8/19/2020

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Sand Canyon Ave and Portola Pkwy	Signalized	ICU 1	WB Thru	0.396	-	A
2	Sand Canyon Ave and Irvine Blvd	Signalized	ICU 1	SB Thru	0.588	-	A
3	Sand Canyon Ave and Trabuco Rd	Signalized	ICU 1	WB Thru	0.505	-	A
4	Sand Canyon Ave and I-5 NB Ramps	Signalized	ICU 1	SB Thru	0.538	-	A
5	Sand Canyon Ave and Marine Way	Signalized	ICU 1	SB Thru	0.596	-	A
6	Sand Canyon Ave and I-5 SB Ramps	Signalized	ICU 1	SB Thru	0.600	-	B
7	SR-133 SB Ramps and Irvine Blvd	Signalized	ICU 1	WB Thru	0.556	-	A
8	SR-133 NB Ramps and Irvine Blvd	Signalized	ICU 1	WB Right	0.465	-	A

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report
Intersection 1: Sand Canyon Ave and Portola Pkwy

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.396

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	1	0	0	0	0	0	1	2	0	0
Pocket Length [ft]	280.00	100.00	500.00	100.00	100.00	100.00	100.00	100.00	300.00	380.00	100.00	100.00
Speed [mph]	50.00			30.00			50.00			55.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			Yes			No			Yes		

Volumes

Name												
Base Volume Input [veh/h]	226	0	130	0	0	0	0	507	402	342	727	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	45	0	0	27	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	226	45	130	0	27	0	0	507	402	342	727	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	57	11	33	0	7	0	0	127	101	86	182	0
Total Analysis Volume [veh/h]	226	45	130	0	27	0	0	507	402	342	727	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Split	Split	Overla	Split	Split	Split	Permis	Permis	Unsign	Protect	Permis	Permis
Signal Group	6	6	0	0	2	0	0	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	-	-	-	-	-	-	Lead	-	-

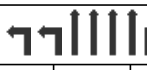
Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.07	0.08	0.00	0.00	0.02	0.00	0.00	0.15	0.00	0.10	0.21	0.00
Intersection LOS	A											
Intersection V/C	0.396											

Intersection Level Of Service Report
Intersection 2: Sand Canyon Ave and Irvine Blvd

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.588

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	2	0	2	2	0	1	2	0	1	2	0	1
Pocket Length [ft]	200.00	100.00	350.00	170.00	100.00	310.00	150.00	100.00	310.00	280.00	100.00	350.00
Speed [mph]	50.00			50.00			55.00			55.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	87	196	397	361	675	68	58	1061	207	510	847	179
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	45	0	0	27	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	87	241	397	361	702	68	58	1061	207	510	847	179
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	22	60	99	90	176	17	15	265	52	128	212	45
Total Analysis Volume [veh/h]	87	241	397	361	702	68	58	1061	207	510	847	179
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protect	Permis	Overla	Protect	Permis	Permis	Protect	Permis	Permis	Protect	Permis	Permis
Signal Group	1	6	0	5	2	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

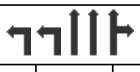
Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.03	0.05	0.00	0.11	0.21	0.04	0.02	0.16	0.12	0.15	0.17	0.11
Intersection LOS	A											
Intersection V/C	0.588											

Intersection Level Of Service Report
Intersection 3: Sand Canyon Ave and Trabuco Rd

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.505

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	2	0	0	2	0	1	2	0	1	2	0	0
Pocket Length [ft]	250.00	100.00	100.00	200.00	100.00	280.00	150.00	100.00	430.00	320.00	100.00	100.00
Speed [mph]	50.00			50.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	183	281	42	159	215	11	61	488	156	86	1355	309
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	45	0	0	27	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	183	326	42	159	242	11	61	488	156	86	1355	309
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	46	82	11	40	61	3	15	122	39	22	339	77
Total Analysis Volume [veh/h]	183	326	42	159	242	11	61	488	156	86	1355	309
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protect	Permis	Unsign	Protect	Permis	Permis	Protect	Permis	Unsign	Protect	Permis	Permis
Signal Group	1	6	0	5	2	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

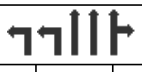
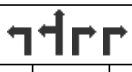
Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.05	0.06	0.00	0.05	0.05	0.01	0.02	0.10	0.00	0.03	0.33	0.33
Intersection LOS	A											
Intersection V/C	0.505											

Intersection Level Of Service Report
Intersection 4: Sand Canyon Ave and I-5 NB Ramps

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.538

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	1	0	1	0	0	1	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	190.00	100.00	220.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	50.00			50.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	199	447	1	0	1762	457	283	0	480	1	0	1
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	45	0	0	0	27	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	199	492	1	0	1762	484	283	0	480	1	0	1
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	50	123	0	0	441	121	71	0	120	0	0	0
Total Analysis Volume [veh/h]	199	492	1	0	1762	484	283	0	480	1	0	1
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permis	Permis	Permis	Permis	Permis	Permis	Split	Split	Overla	Split	Split	Split
Signal Group	0	6	0	0	2	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.06	0.10	0.10	0.00	0.35	0.28	0.08	0.00	0.00	0.00	0.00	0.00
Intersection LOS	A											
Intersection V/C	0.538											

Intersection Level Of Service Report
Intersection 5: Sand Canyon Ave and Marine Way

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.596

Intersection Setup

Name						
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	1	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	380.00	100.00
Speed [mph]	50.00		50.00		50.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		Yes		Yes	

Volumes

Name						
Base Volume Input [veh/h]	486	172	99	2182	403	98
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	45	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	531	172	99	2182	403	98
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	133	43	25	546	101	25
Total Analysis Volume [veh/h]	531	172	99	2182	403	98
Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permissive	Permissive	Permissive	Permissive	Permissive	Permissive
Signal Group	6	0	0	2	4	0
Auxiliary Signal Groups						
Lead / Lag	-	-	-	-	Lag	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.10	0.10	0.03	0.43	0.12	0.06
Intersection LOS	A					
Intersection V/C	0.596					

Intersection Level Of Service Report
Intersection 6: Sand Canyon Ave and I-5 SB Ramps

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.600

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	1	2	0	0	1	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	200.00	100.00	100.00	240.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	50.00			50.00			50.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	0	413	118	686	1832	0	212	0	949	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	45	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	413	118	686	1832	0	257	0	949	0	0	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	103	30	172	458	0	64	0	237	0	0	0
Total Analysis Volume [veh/h]	0	413	118	686	1832	0	257	0	949	0	0	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permis	Permis	Permis	Protect	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis
Signal Group	0	6	0	5	2	0	0	8	0	0	0	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lead	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.06	0.07	0.20	0.27	0.00	0.05	0.00	0.18	0.00	0.00	0.00
Intersection LOS	B											
Intersection V/C	0.600											

Intersection Level Of Service Report
Intersection 7: SR-133 SB Ramps and Irvine Blvd

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.556

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	1	0	0	0	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	530.00	100.00	100.00	100.00	140.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			No			No		

Volumes

Name												
Base Volume Input [veh/h]	0	0	0	126	0	254	0	1469	298	339	1467	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	0	0	126	0	254	0	1469	298	339	1467	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	0	0	32	0	64	0	367	75	85	367	0
Total Analysis Volume [veh/h]	0	0	0	126	0	254	0	1469	298	339	1467	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis
Signal Group	0	0	0	4	0	0	0	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lag	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.07	0.00	0.07	0.00	0.26	0.26	0.10	0.43	0.00
Intersection LOS	A											
Intersection V/C	0.556											

Intersection Level Of Service Report
Intersection 8: SR-133 NB Ramps and Irvine Blvd

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.465

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

Volumes

Name												
Base Volume Input [veh/h]	99	0	101	0	0	0	0	1478	0	0	1734	82
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	99	0	101	0	0	0	0	1478	0	0	1734	82
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	25	0	25	0	0	0	0	370	0	0	434	21
Total Analysis Volume [veh/h]	99	0	101	0	0	0	0	1478	0	0	1734	82
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis
Signal Group	8	2	0	0	0	0	0	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	-	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.06	0.00	0.06	0.00	0.00	0.00	0.00	0.29	0.00	0.00	0.36	0.36
Intersection LOS	A											
Intersection V/C	0.465											

Irvine Ranch Water District

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Report File: N:\...\2020 EX PP PM_Route 1A through I-5 N.pdf

Scenario 4 Base Route 1A PM
8/19/2020

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Sand Canyon Ave and Portola Pkwy	Signalized	ICU 1	NB Left	0.429	-	A
2	Sand Canyon Ave and Irvine Blvd	Signalized	ICU 1	WB Thru	0.541	-	A
3	Sand Canyon Ave and Trabuco Rd	Signalized	ICU 1	EB Thru	0.519	-	A
4	Sand Canyon Ave and I-5 NB Ramps	Signalized	ICU 1	NB Thru	0.622	-	B
5	Sand Canyon Ave and Marine Way	Signalized	ICU 1	NB Thru	0.547	-	A
6	Sand Canyon Ave and I-5 SB Ramps	Signalized	ICU 1	NB Thru	0.520	-	A
7	SR-133 SB Ramps and Irvine Blvd	Signalized	ICU 1	WB Thru	0.738	-	C
8	SR-133 NB Ramps and Irvine Blvd	Signalized	ICU 1	WB Thru	0.625	-	B

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report
Intersection 1: Sand Canyon Ave and Portola Pkwy

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.429

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	1	0	0	0	0	0	1	2	0	0
Pocket Length [ft]	280.00	100.00	500.00	100.00	100.00	100.00	100.00	100.00	300.00	380.00	100.00	100.00
Speed [mph]	50.00			30.00			50.00			55.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			Yes			No			Yes		

Volumes

Name												
Base Volume Input [veh/h]	644	0	361	0	0	0	0	458	190	148	532	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	18	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	644	0	361	0	18	0	0	458	190	148	532	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	161	0	90	0	5	0	0	115	48	37	133	0
Total Analysis Volume [veh/h]	644	0	361	0	18	0	0	458	190	148	532	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Split	Split	Overla	Split	Split	Split	Permis	Permis	Unsign	Protect	Permis	Permis
Signal Group	6	6	0	0	2	0	0	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	-	-	-	-	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.19	0.00	0.00	0.00	0.01	0.00	0.00	0.13	0.00	0.04	0.16	0.00
Intersection LOS	A											
Intersection V/C	0.429											

Intersection Level Of Service Report
Intersection 2: Sand Canyon Ave and Irvine Blvd

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.541

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	2	0	2	2	0	1	2	0	1	2	0	1
Pocket Length [ft]	200.00	100.00	350.00	170.00	100.00	310.00	150.00	100.00	310.00	280.00	100.00	350.00
Speed [mph]	50.00			50.00			55.00			55.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	286	740	485	149	266	79	155	773	149	445	1309	427
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	18	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	286	740	485	149	284	79	155	773	149	445	1309	427
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	72	185	121	37	71	20	39	193	37	111	327	107
Total Analysis Volume [veh/h]	286	740	485	149	284	79	155	773	149	445	1309	427
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protect	Permis	Overla	Protect	Permis	Permis	Protect	Permis	Permis	Protect	Permis	Permis
Signal Group	1	6	0	5	2	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

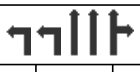
Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.08	0.15	0.00	0.04	0.08	0.05	0.05	0.11	0.09	0.13	0.26	0.25
Intersection LOS	A											
Intersection V/C	0.541											

Intersection Level Of Service Report
Intersection 3: Sand Canyon Ave and Trabuco Rd

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.519

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	2	0	0	2	0	1	2	0	1	2	0	0
Pocket Length [ft]	250.00	100.00	100.00	200.00	100.00	280.00	150.00	100.00	430.00	320.00	100.00	100.00
Speed [mph]	50.00			50.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	111	161	43	164	122	35	263	1945	215	28	666	159
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	18	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	111	161	43	164	140	35	263	1945	215	28	666	159
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	28	40	11	41	35	9	66	486	54	7	167	40
Total Analysis Volume [veh/h]	111	161	43	164	140	35	263	1945	215	28	666	159
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protect	Permis	Unsign	Protect	Permis	Permis	Protect	Permis	Unsign	Protect	Permis	Permis
Signal Group	1	6	0	5	2	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

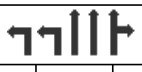
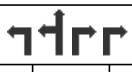
Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.03	0.03	0.00	0.05	0.03	0.02	0.08	0.38	0.00	0.01	0.16	0.16
Intersection LOS	A											
Intersection V/C	0.519											

Intersection Level Of Service Report
Intersection 4: Sand Canyon Ave and I-5 NB Ramps

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.622

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	1	0	1	0	0	1	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	190.00	100.00	220.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	50.00			50.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	505	1632	0	3	709	182	851	0	187	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	18	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	505	1632	0	3	709	200	851	0	187	0	0	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	126	408	0	1	177	50	213	0	47	0	0	0
Total Analysis Volume [veh/h]	505	1632	0	3	709	200	851	0	187	0	0	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permis	Permis	Permis	Permis	Permis	Permis	Split	Split	Overla	Split	Split	Split
Signal Group	0	6	0	0	2	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.15	0.32	0.00	0.00	0.14	0.12	0.25	0.00	0.00	0.00	0.00	0.00
Intersection LOS	B											
Intersection V/C	0.622											

Intersection Level Of Service Report
Intersection 5: Sand Canyon Ave and Marine Way

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.547

Intersection Setup

Name						
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	1	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	380.00	100.00
Speed [mph]	50.00		50.00		50.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		Yes		Yes	

Volumes

Name						
Base Volume Input [veh/h]	2106	337	95	876	153	95
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	2106	337	95	876	153	95
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	527	84	24	219	38	24
Total Analysis Volume [veh/h]	2106	337	95	876	153	95
Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permissive	Permissive	Permissive	Permissive	Permissive	Permissive
Signal Group	6	0	0	2	4	0
Auxiliary Signal Groups						
Lead / Lag	-	-	-	-	Lag	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.41	0.20	0.03	0.17	0.05	0.06
Intersection LOS	A					
Intersection V/C	0.547					

Intersection Level Of Service Report
Intersection 6: Sand Canyon Ave and I-5 SB Ramps

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.520

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	1	2	0	0	1	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	200.00	100.00	100.00	240.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	50.00			50.00			50.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	0	1777	416	283	571	0	561	0	293	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	1777	416	283	571	0	561	0	293	0	0	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	444	104	71	143	0	140	0	73	0	0	0
Total Analysis Volume [veh/h]	0	1777	416	283	571	0	561	0	293	0	0	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permis	Permis	Permis	Protect	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis
Signal Group	0	6	0	5	2	0	0	8	0	0	0	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lead	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.26	0.24	0.08	0.08	0.00	0.11	0.00	0.13	0.00	0.00	0.00
Intersection LOS	A											
Intersection V/C	0.520											

Intersection Level Of Service Report
Intersection 7: SR-133 SB Ramps and Irvine Blvd

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.738

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	1	0	0	0	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	530.00	100.00	100.00	100.00	140.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			No			No		

Volumes

Name												
Base Volume Input [veh/h]	0	0	0	47	0	158	0	1261	126	135	2181	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	0	0	47	0	158	0	1261	126	135	2181	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	0	0	12	0	40	0	315	32	34	545	0
Total Analysis Volume [veh/h]	0	0	0	47	0	158	0	1261	126	135	2181	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis
Signal Group	0	0	0	4	0	0	0	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lag	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.03	0.00	0.05	0.00	0.20	0.20	0.04	0.64	0.00
Intersection LOS	C											
Intersection V/C	0.738											

Intersection Level Of Service Report
Intersection 8: SR-133 NB Ramps and Irvine Blvd

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.625

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

Volumes

Name												
Base Volume Input [veh/h]	269	0	247	0	0	0	0	1152	0	0	1989	136
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	269	0	247	0	0	0	0	1152	0	0	1989	136
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	67	0	62	0	0	0	0	288	0	0	497	34
Total Analysis Volume [veh/h]	269	0	247	0	0	0	0	1152	0	0	1989	136
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis
Signal Group	8	2	0	0	0	0	0	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	-	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.16	0.00	0.15	0.00	0.00	0.00	0.00	0.23	0.00	0.00	0.42	0.42
Intersection LOS	B											
Intersection V/C	0.625											

Irvine Ranch Water District

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Report File: N:\...\2020 EX PP AM_Route 1B through I-5 S.pdf

Scenario 5 Base Route 1B AM
8/19/2020

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Sand Canyon Ave and Portola Pkwy	Signalized	ICU 1	WB Thru	0.396	-	A
2	Sand Canyon Ave and Irvine Blvd	Signalized	ICU 1	SB Thru	0.588	-	A
3	Sand Canyon Ave and Trabuco Rd	Signalized	ICU 1	WB Thru	0.505	-	A
4	Sand Canyon Ave and I-5 NB Ramps	Signalized	ICU 1	SB Thru	0.556	-	A
5	Sand Canyon Ave and Marine Way	Signalized	ICU 1	SB Thru	0.602	-	B
6	Sand Canyon Ave and I-5 SB Ramps	Signalized	ICU 1	SB Thru	0.608	-	B
7	SR-133 SB Ramps and Irvine Blvd	Signalized	ICU 1	WB Thru	0.556	-	A
8	SR-133 NB Ramps and Irvine Blvd	Signalized	ICU 1	WB Right	0.465	-	A

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report
Intersection 1: Sand Canyon Ave and Portola Pkwy

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.396

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	1	0	0	0	0	0	1	2	0	0
Pocket Length [ft]	280.00	100.00	500.00	100.00	100.00	100.00	100.00	100.00	300.00	380.00	100.00	100.00
Speed [mph]	50.00			30.00			50.00			55.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			Yes			No			Yes		

Volumes

Name												
Base Volume Input [veh/h]	226	0	130	0	0	0	0	507	402	342	727	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	45	0	0	27	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	226	45	130	0	27	0	0	507	402	342	727	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	57	11	33	0	7	0	0	127	101	86	182	0
Total Analysis Volume [veh/h]	226	45	130	0	27	0	0	507	402	342	727	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Split	Split	Overla	Split	Split	Split	Permis	Permis	Unsign	Protect	Permis	Permis
Signal Group	6	6	0	0	2	0	0	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	-	-	-	-	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.07	0.08	0.00	0.00	0.02	0.00	0.00	0.15	0.00	0.10	0.21	0.00
Intersection LOS	A											
Intersection V/C	0.396											

Intersection Level Of Service Report
Intersection 2: Sand Canyon Ave and Irvine Blvd

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.588

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	2	0	2	2	0	1	2	0	1	2	0	1
Pocket Length [ft]	200.00	100.00	350.00	170.00	100.00	310.00	150.00	100.00	310.00	280.00	100.00	350.00
Speed [mph]	50.00			50.00			55.00			55.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	87	196	397	361	675	68	58	1061	207	510	847	179
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	45	0	0	27	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	87	241	397	361	702	68	58	1061	207	510	847	179
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	22	60	99	90	176	17	15	265	52	128	212	45
Total Analysis Volume [veh/h]	87	241	397	361	702	68	58	1061	207	510	847	179
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protect	Permis	Overla	Protect	Permis	Permis	Protect	Permis	Permis	Protect	Permis	Permis
Signal Group	1	6	0	5	2	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

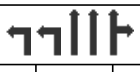
Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.03	0.05	0.00	0.11	0.21	0.04	0.02	0.16	0.12	0.15	0.17	0.11
Intersection LOS	A											
Intersection V/C	0.588											

Intersection Level Of Service Report
Intersection 3: Sand Canyon Ave and Trabuco Rd

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.505

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	2	0	0	2	0	1	2	0	1	2	0	0
Pocket Length [ft]	250.00	100.00	100.00	200.00	100.00	280.00	150.00	100.00	430.00	320.00	100.00	100.00
Speed [mph]	50.00			50.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	183	281	42	159	215	11	61	488	156	86	1355	309
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	45	0	0	27	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	183	326	42	159	242	11	61	488	156	86	1355	309
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	46	82	11	40	61	3	15	122	39	22	339	77
Total Analysis Volume [veh/h]	183	326	42	159	242	11	61	488	156	86	1355	309
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protect	Permis	Unsign	Protect	Permis	Permis	Protect	Permis	Unsign	Protect	Permis	Permis
Signal Group	1	6	0	5	2	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

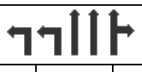
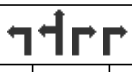
Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.05	0.06	0.00	0.05	0.05	0.01	0.02	0.10	0.00	0.03	0.33	0.33
Intersection LOS	A											
Intersection V/C	0.505											

Intersection Level Of Service Report
Intersection 4: Sand Canyon Ave and I-5 NB Ramps

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.556

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	1	0	1	0	0	1	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	190.00	100.00	220.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	50.00			50.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	199	447	1	0	1762	457	283	0	480	1	0	1
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	27	0	45	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	199	447	1	0	1789	457	328	0	480	1	0	1
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	50	112	0	0	447	114	82	0	120	0	0	0
Total Analysis Volume [veh/h]	199	447	1	0	1789	457	328	0	480	1	0	1
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permis	Permis	Permis	Permis	Permis	Permis	Split	Split	Overla	Split	Split	Split
Signal Group	0	6	0	0	2	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.06	0.09	0.09	0.00	0.35	0.27	0.10	0.00	0.00	0.00	0.00	0.00
Intersection LOS	A											
Intersection V/C	0.556											

Intersection Level Of Service Report
Intersection 5: Sand Canyon Ave and Marine Way

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.602

Intersection Setup

Name						
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	1	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	380.00	100.00
Speed [mph]	50.00		50.00		50.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		Yes		Yes	

Volumes

Name						
Base Volume Input [veh/h]	486	172	99	2182	403	98
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	27	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	486	172	99	2209	403	98
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	122	43	25	552	101	25
Total Analysis Volume [veh/h]	486	172	99	2209	403	98
Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permissive	Permissive	Permissive	Permissive	Permissive	Permissive
Signal Group	6	0	0	2	4	0
Auxiliary Signal Groups						
Lead / Lag	-	-	-	-	Lag	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.10	0.10	0.03	0.43	0.12	0.06
Intersection LOS	B					
Intersection V/C	0.602					

Intersection Level Of Service Report
Intersection 6: Sand Canyon Ave and I-5 SB Ramps

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.608

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	1	2	0	0	1	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	200.00	100.00	100.00	240.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	50.00			50.00			50.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	0	413	118	686	1832	0	212	0	949	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	27	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	413	118	713	1832	0	212	0	949	0	0	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	103	30	178	458	0	53	0	237	0	0	0
Total Analysis Volume [veh/h]	0	413	118	713	1832	0	212	0	949	0	0	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permis	Permis	Permis	Protect	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis
Signal Group	0	6	0	5	2	0	0	8	0	0	0	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lead	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.06	0.07	0.21	0.27	0.00	0.04	0.00	0.17	0.00	0.00	0.00
Intersection LOS	B											
Intersection V/C	0.608											

Intersection Level Of Service Report
Intersection 7: SR-133 SB Ramps and Irvine Blvd

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.556

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	1	0	0	0	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	530.00	100.00	100.00	100.00	140.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			No			No		

Volumes

Name												
Base Volume Input [veh/h]	0	0	0	126	0	254	0	1469	298	339	1467	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	0	0	126	0	254	0	1469	298	339	1467	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	0	0	32	0	64	0	367	75	85	367	0
Total Analysis Volume [veh/h]	0	0	0	126	0	254	0	1469	298	339	1467	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis
Signal Group	0	0	0	4	0	0	0	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lag	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.07	0.00	0.07	0.00	0.26	0.26	0.10	0.43	0.00
Intersection LOS	A											
Intersection V/C	0.556											

Intersection Level Of Service Report
Intersection 8: SR-133 NB Ramps and Irvine Blvd

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.465

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

Volumes

Name												
Base Volume Input [veh/h]	99	0	101	0	0	0	0	1478	0	0	1734	82
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	99	0	101	0	0	0	0	1478	0	0	1734	82
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	25	0	25	0	0	0	0	370	0	0	434	21
Total Analysis Volume [veh/h]	99	0	101	0	0	0	0	1478	0	0	1734	82
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis
Signal Group	8	2	0	0	0	0	0	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	-	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.06	0.00	0.06	0.00	0.00	0.00	0.00	0.29	0.00	0.00	0.36	0.36
Intersection LOS	A											
Intersection V/C	0.465											

Irvine Ranch Water District

Vistro File: N:\...\IRWD 2020 EX_Version 2.vistro
Report File: N:\...\2020 EX PP PM_Route 1B through I-5 S.pdf

Scenario 6 Base Route 1B PM
8/19/2020

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Sand Canyon Ave and Portola Pkwy	Signalized	ICU 1	NB Left	0.429	-	A
2	Sand Canyon Ave and Irvine Blvd	Signalized	ICU 1	WB Thru	0.541	-	A
3	Sand Canyon Ave and Trabuco Rd	Signalized	ICU 1	EB Thru	0.519	-	A
4	Sand Canyon Ave and I-5 NB Ramps	Signalized	ICU 1	NB Thru	0.622	-	B
5	Sand Canyon Ave and Marine Way	Signalized	ICU 1	NB Thru	0.547	-	A
6	Sand Canyon Ave and I-5 SB Ramps	Signalized	ICU 1	NB Thru	0.525	-	A
7	SR-133 SB Ramps and Irvine Blvd	Signalized	ICU 1	WB Thru	0.738	-	C
8	SR-133 NB Ramps and Irvine Blvd	Signalized	ICU 1	WB Thru	0.625	-	B

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report
Intersection 1: Sand Canyon Ave and Portola Pkwy

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.429

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	1	0	0	0	0	0	1	2	0	0
Pocket Length [ft]	280.00	100.00	500.00	100.00	100.00	100.00	100.00	100.00	300.00	380.00	100.00	100.00
Speed [mph]	50.00			30.00			50.00			55.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			Yes			No			Yes		

Volumes

Name												
Base Volume Input [veh/h]	644	0	361	0	0	0	0	458	190	148	532	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	18	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	644	0	361	0	18	0	0	458	190	148	532	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	161	0	90	0	5	0	0	115	48	37	133	0
Total Analysis Volume [veh/h]	644	0	361	0	18	0	0	458	190	148	532	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Split	Split	Overla	Split	Split	Split	Permis	Permis	Unsign	Protect	Permis	Permis
Signal Group	6	6	0	0	2	0	0	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	-	-	-	-	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.19	0.00	0.00	0.00	0.01	0.00	0.00	0.13	0.00	0.04	0.16	0.00
Intersection LOS	A											
Intersection V/C	0.429											

Intersection Level Of Service Report
Intersection 2: Sand Canyon Ave and Irvine Blvd

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.541

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	2	0	2	2	0	1	2	0	1	2	0	1
Pocket Length [ft]	200.00	100.00	350.00	170.00	100.00	310.00	150.00	100.00	310.00	280.00	100.00	350.00
Speed [mph]	50.00			50.00			55.00			55.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	286	740	485	149	266	79	155	773	149	445	1309	427
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	18	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	286	740	485	149	284	79	155	773	149	445	1309	427
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	72	185	121	37	71	20	39	193	37	111	327	107
Total Analysis Volume [veh/h]	286	740	485	149	284	79	155	773	149	445	1309	427
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protect	Permis	Overla	Protect	Permis	Permis	Protect	Permis	Permis	Protect	Permis	Permis
Signal Group	1	6	0	5	2	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

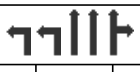
Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.08	0.15	0.00	0.04	0.08	0.05	0.05	0.11	0.09	0.13	0.26	0.25
Intersection LOS	A											
Intersection V/C	0.541											

Intersection Level Of Service Report
Intersection 3: Sand Canyon Ave and Trabuco Rd

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.519

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	2	0	0	2	0	1	2	0	1	2	0	0
Pocket Length [ft]	250.00	100.00	100.00	200.00	100.00	280.00	150.00	100.00	430.00	320.00	100.00	100.00
Speed [mph]	50.00			50.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	111	161	43	164	122	35	263	1945	215	28	666	159
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	18	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	111	161	43	164	140	35	263	1945	215	28	666	159
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	28	40	11	41	35	9	66	486	54	7	167	40
Total Analysis Volume [veh/h]	111	161	43	164	140	35	263	1945	215	28	666	159
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protect	Permis	Unsign	Protect	Permis	Permis	Protect	Permis	Unsign	Protect	Permis	Permis
Signal Group	1	6	0	5	2	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

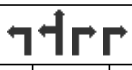
Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.03	0.03	0.00	0.05	0.03	0.02	0.08	0.38	0.00	0.01	0.16	0.16
Intersection LOS	A											
Intersection V/C	0.519											

Intersection Level Of Service Report
Intersection 4: Sand Canyon Ave and I-5 NB Ramps

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.622

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	1	0	1	0	0	1	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	190.00	100.00	220.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	50.00			50.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	505	1632	0	3	709	182	851	0	187	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	18	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	505	1632	0	3	727	182	851	0	187	0	0	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	126	408	0	1	182	46	213	0	47	0	0	0
Total Analysis Volume [veh/h]	505	1632	0	3	727	182	851	0	187	0	0	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permis	Permis	Permis	Permis	Permis	Permis	Split	Split	Overla	Split	Split	Split
Signal Group	0	6	0	0	2	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.15	0.32	0.00	0.00	0.14	0.11	0.25	0.00	0.00	0.00	0.00	0.00
Intersection LOS	B											
Intersection V/C	0.622											

Intersection Level Of Service Report
Intersection 5: Sand Canyon Ave and Marine Way

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.547

Intersection Setup

Name						
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	1	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	380.00	100.00
Speed [mph]	50.00		50.00		50.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		Yes		Yes	

Volumes

Name						
Base Volume Input [veh/h]	2106	337	95	876	153	95
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	18	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	2106	337	95	894	153	95
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	527	84	24	224	38	24
Total Analysis Volume [veh/h]	2106	337	95	894	153	95
Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permissive	Permissive	Permissive	Permissive	Permissive	Permissive
Signal Group	6	0	0	2	4	0
Auxiliary Signal Groups						
Lead / Lag	-	-	-	-	Lag	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.41	0.20	0.03	0.18	0.05	0.06
Intersection LOS	A					
Intersection V/C	0.547					

Intersection Level Of Service Report
Intersection 6: Sand Canyon Ave and I-5 SB Ramps

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.525

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	1	2	0	0	1	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	200.00	100.00	100.00	240.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	50.00			50.00			50.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	0	1777	416	283	571	0	561	0	293	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	18	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	1777	416	301	571	0	561	0	293	0	0	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	444	104	75	143	0	140	0	73	0	0	0
Total Analysis Volume [veh/h]	0	1777	416	301	571	0	561	0	293	0	0	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permis	Permis	Permis	Protect	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis
Signal Group	0	6	0	5	2	0	0	8	0	0	0	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lead	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.26	0.24	0.09	0.08	0.00	0.11	0.00	0.13	0.00	0.00	0.00
Intersection LOS	A											
Intersection V/C	0.525											

Intersection Level Of Service Report
Intersection 7: SR-133 SB Ramps and Irvine Blvd

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.738

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	1	0	0	0	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	530.00	100.00	100.00	100.00	140.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			No			No		

Volumes

Name												
Base Volume Input [veh/h]	0	0	0	47	0	158	0	1261	126	135	2181	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	0	0	47	0	158	0	1261	126	135	2181	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	0	0	12	0	40	0	315	32	34	545	0
Total Analysis Volume [veh/h]	0	0	0	47	0	158	0	1261	126	135	2181	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis
Signal Group	0	0	0	4	0	0	0	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lag	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.03	0.00	0.05	0.00	0.20	0.20	0.04	0.64	0.00
Intersection LOS	C											
Intersection V/C	0.738											

Intersection Level Of Service Report
Intersection 8: SR-133 NB Ramps and Irvine Blvd

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.625

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

Volumes

Name												
Base Volume Input [veh/h]	269	0	247	0	0	0	0	1152	0	0	1989	136
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	269	0	247	0	0	0	0	1152	0	0	1989	136
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	67	0	62	0	0	0	0	288	0	0	497	34
Total Analysis Volume [veh/h]	269	0	247	0	0	0	0	1152	0	0	1989	136
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis
Signal Group	8	2	0	0	0	0	0	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	-	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.16	0.00	0.15	0.00	0.00	0.00	0.00	0.23	0.00	0.00	0.42	0.42
Intersection LOS	B											
Intersection V/C	0.625											

Irvine Ranch Water District

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Report File: N:\...\2020 EX PP AM_Route 2A through SR-133 N.pdf

Scenario 7 Base Route 2A AM
8/19/2020

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Sand Canyon Ave and Portola Pkwy	Signalized	ICU 1	WB Thru	0.396	-	A
2	Sand Canyon Ave and Irvine Blvd	Signalized	ICU 1	SB Thru	0.580	-	A
3	Sand Canyon Ave and Trabuco Rd	Signalized	ICU 1	WB Thru	0.496	-	A
4	Sand Canyon Ave and I-5 NB Ramps	Signalized	ICU 1	SB Thru	0.538	-	A
5	Sand Canyon Ave and Marine Way	Signalized	ICU 1	SB Thru	0.596	-	A
6	Sand Canyon Ave and I-5 SB Ramps	Signalized	ICU 1	SB Thru	0.600	-	B
7	SR-133 SB Ramps and Irvine Blvd	Signalized	ICU 1	WB Thru	0.569	-	A
8	SR-133 NB Ramps and Irvine Blvd	Signalized	ICU 1	WB Right	0.465	-	A

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report
Intersection 1: Sand Canyon Ave and Portola Pkwy

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.396

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	1	0	0	0	0	0	1	2	0	0
Pocket Length [ft]	280.00	100.00	500.00	100.00	100.00	100.00	100.00	100.00	300.00	380.00	100.00	100.00
Speed [mph]	50.00			30.00			50.00			55.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			Yes			No			Yes		

Volumes

Name												
Base Volume Input [veh/h]	226	0	130	0	0	0	0	507	402	342	727	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	45	0	0	27	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	226	45	130	0	27	0	0	507	402	342	727	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	57	11	33	0	7	0	0	127	101	86	182	0
Total Analysis Volume [veh/h]	226	45	130	0	27	0	0	507	402	342	727	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Split	Split	Overla	Split	Split	Split	Permis	Permis	Unsign	Protect	Permis	Permis
Signal Group	6	6	0	0	2	0	0	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	-	-	-	-	-	-	Lead	-	-

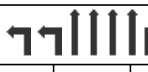
Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.07	0.08	0.00	0.00	0.02	0.00	0.00	0.15	0.00	0.10	0.21	0.00
Intersection LOS	A											
Intersection V/C	0.396											

Intersection Level Of Service Report
Intersection 2: Sand Canyon Ave and Irvine Blvd

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.580

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	2	0	2	2	0	1	2	0	1	2	0	1
Pocket Length [ft]	200.00	100.00	350.00	170.00	100.00	310.00	150.00	100.00	310.00	280.00	100.00	350.00
Speed [mph]	50.00			50.00			55.00			55.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	87	196	397	361	675	68	58	1061	207	510	847	179
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	27	0	0	0	0	0	0	0	45
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	87	196	397	388	675	68	58	1061	207	510	847	224
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	22	49	99	97	169	17	15	265	52	128	212	56
Total Analysis Volume [veh/h]	87	196	397	388	675	68	58	1061	207	510	847	224
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protect	Permis	Overla	Protect	Permis	Permis	Protect	Permis	Permis	Protect	Permis	Permis
Signal Group	1	6	0	5	2	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

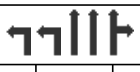
Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.03	0.04	0.00	0.11	0.20	0.04	0.02	0.16	0.12	0.15	0.17	0.13
Intersection LOS	A											
Intersection V/C	0.580											

Intersection Level Of Service Report
Intersection 3: Sand Canyon Ave and Trabuco Rd

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.496

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	2	0	0	2	0	1	2	0	1	2	0	0
Pocket Length [ft]	250.00	100.00	100.00	200.00	100.00	280.00	150.00	100.00	430.00	320.00	100.00	100.00
Speed [mph]	50.00			50.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	183	281	42	159	215	11	61	488	156	86	1355	309
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	183	281	42	159	215	11	61	488	156	86	1355	309
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	46	70	11	40	54	3	15	122	39	22	339	77
Total Analysis Volume [veh/h]	183	281	42	159	215	11	61	488	156	86	1355	309
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protect	Permis	Unsign	Protect	Permis	Permis	Protect	Permis	Unsign	Protect	Permis	Permis
Signal Group	1	6	0	5	2	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

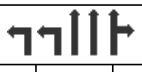
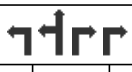
Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.05	0.06	0.00	0.05	0.04	0.01	0.02	0.10	0.00	0.03	0.33	0.33
Intersection LOS	A											
Intersection V/C	0.496											

Intersection Level Of Service Report
Intersection 4: Sand Canyon Ave and I-5 NB Ramps

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.538

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	1	0	1	0	0	1	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	190.00	100.00	220.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	50.00			50.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	199	447	1	0	1762	457	283	0	480	1	0	1
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	199	447	1	0	1762	457	283	0	480	1	0	1
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	50	112	0	0	441	114	71	0	120	0	0	0
Total Analysis Volume [veh/h]	199	447	1	0	1762	457	283	0	480	1	0	1
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permis	Permis	Permis	Permis	Permis	Permis	Split	Split	Overla	Split	Split	Split
Signal Group	0	6	0	0	2	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.06	0.09	0.09	0.00	0.35	0.27	0.08	0.00	0.00	0.00	0.00	0.00
Intersection LOS	A											
Intersection V/C	0.538											

Intersection Level Of Service Report
Intersection 5: Sand Canyon Ave and Marine Way

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.596

Intersection Setup

Name						
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	1	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	380.00	100.00
Speed [mph]	50.00		50.00		50.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		Yes		Yes	

Volumes

Name						
Base Volume Input [veh/h]	486	172	99	2182	403	98
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	486	172	99	2182	403	98
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	122	43	25	546	101	25
Total Analysis Volume [veh/h]	486	172	99	2182	403	98
Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permissive	Permissive	Permissive	Permissive	Permissive	Permissive
Signal Group	6	0	0	2	4	0
Auxiliary Signal Groups						
Lead / Lag	-	-	-	-	Lag	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.10	0.10	0.03	0.43	0.12	0.06
Intersection LOS	A					
Intersection V/C	0.596					

Intersection Level Of Service Report
Intersection 6: Sand Canyon Ave and I-5 SB Ramps

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.600

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	1	2	0	0	1	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	200.00	100.00	100.00	240.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	50.00			50.00			50.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	0	413	118	686	1832	0	212	0	949	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	413	118	686	1832	0	212	0	949	0	0	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	103	30	172	458	0	53	0	237	0	0	0
Total Analysis Volume [veh/h]	0	413	118	686	1832	0	212	0	949	0	0	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permis	Permis	Permis	Protect	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis
Signal Group	0	6	0	5	2	0	0	8	0	0	0	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lead	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.06	0.07	0.20	0.27	0.00	0.04	0.00	0.17	0.00	0.00	0.00
Intersection LOS	B											
Intersection V/C	0.600											

Intersection Level Of Service Report
Intersection 7: SR-133 SB Ramps and Irvine Blvd

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.569

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	1	0	0	0	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	530.00	100.00	100.00	100.00	140.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			No			No		

Volumes

Name												
Base Volume Input [veh/h]	0	0	0	126	0	254	0	1469	298	339	1467	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	45	0	27	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	0	0	126	0	299	0	1496	298	339	1467	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	0	0	32	0	75	0	374	75	85	367	0
Total Analysis Volume [veh/h]	0	0	0	126	0	299	0	1496	298	339	1467	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis
Signal Group	0	0	0	4	0	0	0	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lag	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.07	0.00	0.09	0.00	0.26	0.26	0.10	0.43	0.00
Intersection LOS	A											
Intersection V/C	0.569											

Intersection Level Of Service Report
Intersection 8: SR-133 NB Ramps and Irvine Blvd

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.465

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

Volumes

Name												
Base Volume Input [veh/h]	99	0	101	0	0	0	0	1478	0	0	1734	82
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	99	0	101	0	0	0	0	1478	0	0	1734	82
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	25	0	25	0	0	0	0	370	0	0	434	21
Total Analysis Volume [veh/h]	99	0	101	0	0	0	0	1478	0	0	1734	82
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis
Signal Group	8	2	0	0	0	0	0	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	-	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.06	0.00	0.06	0.00	0.00	0.00	0.00	0.29	0.00	0.00	0.36	0.36
Intersection LOS	A											
Intersection V/C	0.465											

Irvine Ranch Water District

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Report File: N:\...\2020 EX PP PM_Route 2A through SR-133 N.pdf

Scenario 8 Base Route 2A PM
8/19/2020

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Sand Canyon Ave and Portola Pkwy	Signalized	ICU 1	NB Left	0.429	-	A
2	Sand Canyon Ave and Irvine Blvd	Signalized	ICU 1	WB Thru	0.546	-	A
3	Sand Canyon Ave and Trabuco Rd	Signalized	ICU 1	EB Thru	0.519	-	A
4	Sand Canyon Ave and I-5 NB Ramps	Signalized	ICU 1	NB Thru	0.622	-	B
5	Sand Canyon Ave and Marine Way	Signalized	ICU 1	NB Thru	0.547	-	A
6	Sand Canyon Ave and I-5 SB Ramps	Signalized	ICU 1	NB Thru	0.520	-	A
7	SR-133 SB Ramps and Irvine Blvd	Signalized	ICU 1	WB Thru	0.738	-	C
8	SR-133 NB Ramps and Irvine Blvd	Signalized	ICU 1	WB Thru	0.625	-	B

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report
Intersection 1: Sand Canyon Ave and Portola Pkwy

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.429

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	1	0	0	0	0	0	1	2	0	0
Pocket Length [ft]	280.00	100.00	500.00	100.00	100.00	100.00	100.00	100.00	300.00	380.00	100.00	100.00
Speed [mph]	50.00			30.00			50.00			55.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			Yes			No			Yes		

Volumes

Name												
Base Volume Input [veh/h]	644	0	361	0	0	0	0	458	190	148	532	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	18	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	644	0	361	0	18	0	0	458	190	148	532	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	161	0	90	0	5	0	0	115	48	37	133	0
Total Analysis Volume [veh/h]	644	0	361	0	18	0	0	458	190	148	532	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Split	Split	Overla	Split	Split	Split	Permis	Permis	Unsign	Protect	Permis	Permis
Signal Group	6	6	0	0	2	0	0	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	-	-	-	-	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.19	0.00	0.00	0.00	0.01	0.00	0.00	0.13	0.00	0.04	0.16	0.00
Intersection LOS	A											
Intersection V/C	0.429											

Intersection Level Of Service Report
Intersection 2: Sand Canyon Ave and Irvine Blvd

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.546

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	2	0	2	2	0	1	2	0	1	2	0	1
Pocket Length [ft]	200.00	100.00	350.00	170.00	100.00	310.00	150.00	100.00	310.00	280.00	100.00	350.00
Speed [mph]	50.00			50.00			55.00			55.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	286	740	485	149	266	79	155	773	149	445	1309	427
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	18	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	286	740	485	167	266	79	155	773	149	445	1309	427
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	72	185	121	42	67	20	39	193	37	111	327	107
Total Analysis Volume [veh/h]	286	740	485	167	266	79	155	773	149	445	1309	427
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protect	Permis	Overla	Protect	Permis	Permis	Protect	Permis	Permis	Protect	Permis	Permis
Signal Group	1	6	0	5	2	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

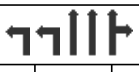
Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.08	0.15	0.00	0.05	0.08	0.05	0.05	0.11	0.09	0.13	0.26	0.25
Intersection LOS	A											
Intersection V/C	0.546											

Intersection Level Of Service Report
Intersection 3: Sand Canyon Ave and Trabuco Rd

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.519

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	2	0	0	2	0	1	2	0	1	2	0	0
Pocket Length [ft]	250.00	100.00	100.00	200.00	100.00	280.00	150.00	100.00	430.00	320.00	100.00	100.00
Speed [mph]	50.00			50.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	111	161	43	164	122	35	263	1945	215	28	666	159
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	111	161	43	164	122	35	263	1945	215	28	666	159
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	28	40	11	41	31	9	66	486	54	7	167	40
Total Analysis Volume [veh/h]	111	161	43	164	122	35	263	1945	215	28	666	159
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protect	Permis	Unsign	Protect	Permis	Permis	Protect	Permis	Unsign	Protect	Permis	Permis
Signal Group	1	6	0	5	2	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

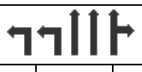
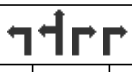
Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.03	0.03	0.00	0.05	0.02	0.02	0.08	0.38	0.00	0.01	0.16	0.16
Intersection LOS	A											
Intersection V/C	0.519											

Intersection Level Of Service Report
Intersection 4: Sand Canyon Ave and I-5 NB Ramps

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.622

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	1	0	1	0	0	1	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	190.00	100.00	220.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	50.00			50.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	505	1632	0	3	709	182	851	0	187	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	505	1632	0	3	709	182	851	0	187	0	0	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	126	408	0	1	177	46	213	0	47	0	0	0
Total Analysis Volume [veh/h]	505	1632	0	3	709	182	851	0	187	0	0	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permis	Permis	Permis	Permis	Permis	Permis	Split	Split	Overla	Split	Split	Split
Signal Group	0	6	0	0	2	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.15	0.32	0.00	0.00	0.14	0.11	0.25	0.00	0.00	0.00	0.00	0.00
Intersection LOS	B											
Intersection V/C	0.622											

Intersection Level Of Service Report
Intersection 5: Sand Canyon Ave and Marine Way

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.547

Intersection Setup

Name						
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	1	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	380.00	100.00
Speed [mph]	50.00		50.00		50.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		Yes		Yes	

Volumes

Name						
Base Volume Input [veh/h]	2106	337	95	876	153	95
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	2106	337	95	876	153	95
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	527	84	24	219	38	24
Total Analysis Volume [veh/h]	2106	337	95	876	153	95
Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permissive	Permissive	Permissive	Permissive	Permissive	Permissive
Signal Group	6	0	0	2	4	0
Auxiliary Signal Groups						
Lead / Lag	-	-	-	-	Lag	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.41	0.20	0.03	0.17	0.05	0.06
Intersection LOS	A					
Intersection V/C	0.547					

Intersection Level Of Service Report
Intersection 6: Sand Canyon Ave and I-5 SB Ramps

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.520

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	1	2	0	0	1	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	200.00	100.00	100.00	240.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	50.00			50.00			50.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	0	1777	416	283	571	0	561	0	293	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	1777	416	283	571	0	561	0	293	0	0	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	444	104	71	143	0	140	0	73	0	0	0
Total Analysis Volume [veh/h]	0	1777	416	283	571	0	561	0	293	0	0	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permis	Permis	Permis	Protect	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis
Signal Group	0	6	0	5	2	0	0	8	0	0	0	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lead	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.26	0.24	0.08	0.08	0.00	0.11	0.00	0.13	0.00	0.00	0.00
Intersection LOS	A											
Intersection V/C	0.520											

Intersection Level Of Service Report
Intersection 7: SR-133 SB Ramps and Irvine Blvd

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.738

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	1	0	0	0	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	530.00	100.00	100.00	100.00	140.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			No			No		

Volumes

Name												
Base Volume Input [veh/h]	0	0	0	47	0	158	0	1261	126	135	2181	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	18	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	0	0	47	0	158	0	1279	126	135	2181	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	0	0	12	0	40	0	320	32	34	545	0
Total Analysis Volume [veh/h]	0	0	0	47	0	158	0	1279	126	135	2181	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis
Signal Group	0	0	0	4	0	0	0	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lag	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.03	0.00	0.05	0.00	0.21	0.21	0.04	0.64	0.00
Intersection LOS	C											
Intersection V/C	0.738											

Intersection Level Of Service Report
Intersection 8: SR-133 NB Ramps and Irvine Blvd

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.625

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

Volumes

Name												
Base Volume Input [veh/h]	269	0	247	0	0	0	0	1152	0	0	1989	136
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	269	0	247	0	0	0	0	1152	0	0	1989	136
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	67	0	62	0	0	0	0	288	0	0	497	34
Total Analysis Volume [veh/h]	269	0	247	0	0	0	0	1152	0	0	1989	136
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis
Signal Group	8	2	0	0	0	0	0	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	-	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.16	0.00	0.15	0.00	0.00	0.00	0.00	0.23	0.00	0.00	0.42	0.42
Intersection LOS	B											
Intersection V/C	0.625											

Irvine Ranch Water District

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Scenario 9 Base Route 2B AM
8/19/2020

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Sand Canyon Ave and Portola Pkwy	Signalized	ICU 1	WB Thru	0.396	-	A
2	Sand Canyon Ave and Irvine Blvd	Signalized	ICU 1	SB Thru	0.580	-	A
3	Sand Canyon Ave and Trabuco Rd	Signalized	ICU 1	WB Thru	0.496	-	A
4	Sand Canyon Ave and I-5 NB Ramps	Signalized	ICU 1	SB Thru	0.538	-	A
5	Sand Canyon Ave and Marine Way	Signalized	ICU 1	SB Thru	0.596	-	A
6	Sand Canyon Ave and I-5 SB Ramps	Signalized	ICU 1	SB Thru	0.600	-	B
7	SR-133 SB Ramps and Irvine Blvd	Signalized	ICU 1	WB Thru	0.569	-	A
8	SR-133 NB Ramps and Irvine Blvd	Signalized	ICU 1	WB Right	0.491	-	A

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report
Intersection 1: Sand Canyon Ave and Portola Pkwy

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.396

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	1	0	0	0	0	0	1	2	0	0
Pocket Length [ft]	280.00	100.00	500.00	100.00	100.00	100.00	100.00	100.00	300.00	380.00	100.00	100.00
Speed [mph]	50.00			30.00			50.00			55.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			Yes			No			Yes		

Volumes

Name												
Base Volume Input [veh/h]	226	0	130	0	0	0	0	507	402	342	727	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	45	0	0	27	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	226	45	130	0	27	0	0	507	402	342	727	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	57	11	33	0	7	0	0	127	101	86	182	0
Total Analysis Volume [veh/h]	226	45	130	0	27	0	0	507	402	342	727	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Split	Split	Overla	Split	Split	Split	Permis	Permis	Unsign	Protect	Permis	Permis
Signal Group	6	6	0	0	2	0	0	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	-	-	-	-	-	-	Lead	-	-

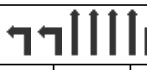
Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.07	0.08	0.00	0.00	0.02	0.00	0.00	0.15	0.00	0.10	0.21	0.00
Intersection LOS	A											
Intersection V/C	0.396											

Intersection Level Of Service Report
Intersection 2: Sand Canyon Ave and Irvine Blvd

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.580

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	2	0	2	2	0	1	2	0	1	2	0	1
Pocket Length [ft]	200.00	100.00	350.00	170.00	100.00	310.00	150.00	100.00	310.00	280.00	100.00	350.00
Speed [mph]	50.00			50.00			55.00			55.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	87	196	397	361	675	68	58	1061	207	510	847	179
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	27	0	0	0	0	0	0	0	45
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	87	196	397	388	675	68	58	1061	207	510	847	224
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	22	49	99	97	169	17	15	265	52	128	212	56
Total Analysis Volume [veh/h]	87	196	397	388	675	68	58	1061	207	510	847	224
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protect	Permis	Overla	Protect	Permis	Permis	Protect	Permis	Permis	Protect	Permis	Permis
Signal Group	1	6	0	5	2	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

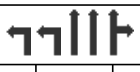
Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.03	0.04	0.00	0.11	0.20	0.04	0.02	0.16	0.12	0.15	0.17	0.13
Intersection LOS	A											
Intersection V/C	0.580											

Intersection Level Of Service Report
Intersection 3: Sand Canyon Ave and Trabuco Rd

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.496

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	2	0	0	2	0	1	2	0	1	2	0	0
Pocket Length [ft]	250.00	100.00	100.00	200.00	100.00	280.00	150.00	100.00	430.00	320.00	100.00	100.00
Speed [mph]	50.00			50.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	183	281	42	159	215	11	61	488	156	86	1355	309
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	183	281	42	159	215	11	61	488	156	86	1355	309
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	46	70	11	40	54	3	15	122	39	22	339	77
Total Analysis Volume [veh/h]	183	281	42	159	215	11	61	488	156	86	1355	309
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protect	Permis	Unsign	Protect	Permis	Permis	Protect	Permis	Unsign	Protect	Permis	Permis
Signal Group	1	6	0	5	2	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

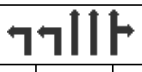
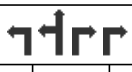
Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.05	0.06	0.00	0.05	0.04	0.01	0.02	0.10	0.00	0.03	0.33	0.33
Intersection LOS	A											
Intersection V/C	0.496											

Intersection Level Of Service Report
Intersection 4: Sand Canyon Ave and I-5 NB Ramps

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.538

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	1	0	1	0	0	1	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	190.00	100.00	220.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	50.00			50.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	199	447	1	0	1762	457	283	0	480	1	0	1
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	199	447	1	0	1762	457	283	0	480	1	0	1
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	50	112	0	0	441	114	71	0	120	0	0	0
Total Analysis Volume [veh/h]	199	447	1	0	1762	457	283	0	480	1	0	1
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permis	Permis	Permis	Permis	Permis	Permis	Split	Split	Overla	Split	Split	Split
Signal Group	0	6	0	0	2	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.06	0.09	0.09	0.00	0.35	0.27	0.08	0.00	0.00	0.00	0.00	0.00
Intersection LOS	A											
Intersection V/C	0.538											

Intersection Level Of Service Report
Intersection 5: Sand Canyon Ave and Marine Way

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.596

Intersection Setup

Name						
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	1	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	380.00	100.00
Speed [mph]	50.00		50.00		50.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		Yes		Yes	

Volumes

Name						
Base Volume Input [veh/h]	486	172	99	2182	403	98
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	486	172	99	2182	403	98
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	122	43	25	546	101	25
Total Analysis Volume [veh/h]	486	172	99	2182	403	98
Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permissive	Permissive	Permissive	Permissive	Permissive	Permissive
Signal Group	6	0	0	2	4	0
Auxiliary Signal Groups						
Lead / Lag	-	-	-	-	Lag	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.10	0.10	0.03	0.43	0.12	0.06
Intersection LOS	A					
Intersection V/C	0.596					

Intersection Level Of Service Report
Intersection 6: Sand Canyon Ave and I-5 SB Ramps

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.600

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	1	2	0	0	1	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	200.00	100.00	100.00	240.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	50.00			50.00			50.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	0	413	118	686	1832	0	212	0	949	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	413	118	686	1832	0	212	0	949	0	0	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	103	30	172	458	0	53	0	237	0	0	0
Total Analysis Volume [veh/h]	0	413	118	686	1832	0	212	0	949	0	0	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permis	Permis	Permis	Protect	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis
Signal Group	0	6	0	5	2	0	0	8	0	0	0	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lead	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.06	0.07	0.20	0.27	0.00	0.04	0.00	0.17	0.00	0.00	0.00
Intersection LOS	B											
Intersection V/C	0.600											

Intersection Level Of Service Report
Intersection 7: SR-133 SB Ramps and Irvine Blvd

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.569

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	1	0	0	0	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	530.00	100.00	100.00	100.00	140.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			No			No		

Volumes

Name												
Base Volume Input [veh/h]	0	0	0	126	0	254	0	1469	298	339	1467	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	27	0	45	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	0	0	126	0	254	0	1469	325	339	1512	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	0	0	32	0	64	0	367	81	85	378	0
Total Analysis Volume [veh/h]	0	0	0	126	0	254	0	1469	325	339	1512	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis
Signal Group	0	0	0	4	0	0	0	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lag	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.07	0.00	0.07	0.00	0.26	0.26	0.10	0.44	0.00
Intersection LOS	A											
Intersection V/C	0.569											

Intersection Level Of Service Report
Intersection 8: SR-133 NB Ramps and Irvine Blvd

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.491

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

Volumes

Name												
Base Volume Input [veh/h]	99	0	101	0	0	0	0	1478	0	0	1734	82
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	45	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	144	0	101	0	0	0	0	1478	0	0	1734	82
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	36	0	25	0	0	0	0	370	0	0	434	21
Total Analysis Volume [veh/h]	144	0	101	0	0	0	0	1478	0	0	1734	82
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis
Signal Group	8	2	0	0	0	0	0	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	-	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.08	0.00	0.06	0.00	0.00	0.00	0.00	0.29	0.00	0.00	0.36	0.36
Intersection LOS	A											
Intersection V/C	0.491											

Irvine Ranch Water District

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Report File: N:\...\2020 EX PP PM_Route 2B through SR-133 S.pdf

Scenario 10 Base Route 2B PM
8/19/2020

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Sand Canyon Ave and Portola Pkwy	Signalized	ICU 1	NB Left	0.429	-	A
2	Sand Canyon Ave and Irvine Blvd	Signalized	ICU 1	WB Thru	0.546	-	A
3	Sand Canyon Ave and Trabuco Rd	Signalized	ICU 1	EB Thru	0.519	-	A
4	Sand Canyon Ave and I-5 NB Ramps	Signalized	ICU 1	NB Thru	0.622	-	B
5	Sand Canyon Ave and Marine Way	Signalized	ICU 1	NB Thru	0.547	-	A
6	Sand Canyon Ave and I-5 SB Ramps	Signalized	ICU 1	NB Thru	0.520	-	A
7	SR-133 SB Ramps and Irvine Blvd	Signalized	ICU 1	WB Thru	0.738	-	C
8	SR-133 NB Ramps and Irvine Blvd	Signalized	ICU 1	WB Thru	0.625	-	B

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report
Intersection 1: Sand Canyon Ave and Portola Pkwy

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.429

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	1	0	0	0	0	0	1	2	0	0
Pocket Length [ft]	280.00	100.00	500.00	100.00	100.00	100.00	100.00	100.00	300.00	380.00	100.00	100.00
Speed [mph]	50.00			30.00			50.00			55.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			Yes			No			Yes		

Volumes

Name												
Base Volume Input [veh/h]	644	0	361	0	0	0	0	458	190	148	532	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	18	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	644	0	361	0	18	0	0	458	190	148	532	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	161	0	90	0	5	0	0	115	48	37	133	0
Total Analysis Volume [veh/h]	644	0	361	0	18	0	0	458	190	148	532	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Split	Split	Overla	Split	Split	Split	Permis	Permis	Unsign	Protect	Permis	Permis
Signal Group	6	6	0	0	2	0	0	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	-	-	-	-	-	-	Lead	-	-

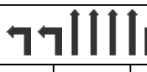
Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.19	0.00	0.00	0.00	0.01	0.00	0.00	0.13	0.00	0.04	0.16	0.00
Intersection LOS	A											
Intersection V/C	0.429											

Intersection Level Of Service Report
Intersection 2: Sand Canyon Ave and Irvine Blvd

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.546

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	2	0	2	2	0	1	2	0	1	2	0	1
Pocket Length [ft]	200.00	100.00	350.00	170.00	100.00	310.00	150.00	100.00	310.00	280.00	100.00	350.00
Speed [mph]	50.00			50.00			55.00			55.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	286	740	485	149	266	79	155	773	149	445	1309	427
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	18	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	286	740	485	167	266	79	155	773	149	445	1309	427
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	72	185	121	42	67	20	39	193	37	111	327	107
Total Analysis Volume [veh/h]	286	740	485	167	266	79	155	773	149	445	1309	427
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protect	Permis	Overla	Protect	Permis	Permis	Protect	Permis	Permis	Protect	Permis	Permis
Signal Group	1	6	0	5	2	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

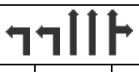
Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.08	0.15	0.00	0.05	0.08	0.05	0.05	0.11	0.09	0.13	0.26	0.25
Intersection LOS	A											
Intersection V/C	0.546											

Intersection Level Of Service Report
Intersection 3: Sand Canyon Ave and Trabuco Rd

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.519

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	2	0	0	2	0	1	2	0	1	2	0	0
Pocket Length [ft]	250.00	100.00	100.00	200.00	100.00	280.00	150.00	100.00	430.00	320.00	100.00	100.00
Speed [mph]	50.00			50.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	111	161	43	164	122	35	263	1945	215	28	666	159
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	111	161	43	164	122	35	263	1945	215	28	666	159
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	28	40	11	41	31	9	66	486	54	7	167	40
Total Analysis Volume [veh/h]	111	161	43	164	122	35	263	1945	215	28	666	159
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protect	Permis	Unsign	Protect	Permis	Permis	Protect	Permis	Unsign	Protect	Permis	Permis
Signal Group	1	6	0	5	2	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

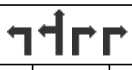
Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.03	0.03	0.00	0.05	0.02	0.02	0.08	0.38	0.00	0.01	0.16	0.16
Intersection LOS	A											
Intersection V/C	0.519											

Intersection Level Of Service Report
Intersection 4: Sand Canyon Ave and I-5 NB Ramps

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.622

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	1	0	1	0	0	1	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	190.00	100.00	220.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	50.00			50.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	505	1632	0	3	709	182	851	0	187	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	505	1632	0	3	709	182	851	0	187	0	0	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	126	408	0	1	177	46	213	0	47	0	0	0
Total Analysis Volume [veh/h]	505	1632	0	3	709	182	851	0	187	0	0	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permis	Permis	Permis	Permis	Permis	Permis	Split	Split	Overla	Split	Split	Split
Signal Group	0	6	0	0	2	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.15	0.32	0.00	0.00	0.14	0.11	0.25	0.00	0.00	0.00	0.00	0.00
Intersection LOS	B											
Intersection V/C	0.622											

Intersection Level Of Service Report
Intersection 5: Sand Canyon Ave and Marine Way

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.547

Intersection Setup

Name						
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	1	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	380.00	100.00
Speed [mph]	50.00		50.00		50.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		Yes		Yes	

Volumes

Name						
Base Volume Input [veh/h]	2106	337	95	876	153	95
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	2106	337	95	876	153	95
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	527	84	24	219	38	24
Total Analysis Volume [veh/h]	2106	337	95	876	153	95
Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permissive	Permissive	Permissive	Permissive	Permissive	Permissive
Signal Group	6	0	0	2	4	0
Auxiliary Signal Groups						
Lead / Lag	-	-	-	-	Lag	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.41	0.20	0.03	0.17	0.05	0.06
Intersection LOS	A					
Intersection V/C	0.547					

Intersection Level Of Service Report
Intersection 6: Sand Canyon Ave and I-5 SB Ramps

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.520

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	1	2	0	0	1	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	200.00	100.00	100.00	240.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	50.00			50.00			50.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	0	1777	416	283	571	0	561	0	293	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	1777	416	283	571	0	561	0	293	0	0	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	444	104	71	143	0	140	0	73	0	0	0
Total Analysis Volume [veh/h]	0	1777	416	283	571	0	561	0	293	0	0	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permis	Permis	Permis	Protect	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis
Signal Group	0	6	0	5	2	0	0	8	0	0	0	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lead	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.26	0.24	0.08	0.08	0.00	0.11	0.00	0.13	0.00	0.00	0.00
Intersection LOS	A											
Intersection V/C	0.520											

Intersection Level Of Service Report
Intersection 7: SR-133 SB Ramps and Irvine Blvd

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.738

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	1	0	0	0	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	530.00	100.00	100.00	100.00	140.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			No			No		

Volumes

Name												
Base Volume Input [veh/h]	0	0	0	47	0	158	0	1261	126	135	2181	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	18	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	0	0	47	0	158	0	1261	144	135	2181	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	0	0	12	0	40	0	315	36	34	545	0
Total Analysis Volume [veh/h]	0	0	0	47	0	158	0	1261	144	135	2181	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis
Signal Group	0	0	0	4	0	0	0	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lag	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.03	0.00	0.05	0.00	0.21	0.21	0.04	0.64	0.00
Intersection LOS	C											
Intersection V/C	0.738											

Intersection Level Of Service Report
Intersection 8: SR-133 NB Ramps and Irvine Blvd

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.625

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

Volumes

Name												
Base Volume Input [veh/h]	269	0	247	0	0	0	0	1152	0	0	1989	136
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	269	0	247	0	0	0	0	1152	0	0	1989	136
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	67	0	62	0	0	0	0	288	0	0	497	34
Total Analysis Volume [veh/h]	269	0	247	0	0	0	0	1152	0	0	1989	136
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis
Signal Group	8	2	0	0	0	0	0	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	-	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.16	0.00	0.15	0.00	0.00	0.00	0.00	0.23	0.00	0.00	0.42	0.42
Intersection LOS	B											
Intersection V/C	0.625											

Interim Year (2023) Approved Project Conditions

Irvine Ranch Water District

Vistro File: N:\...\IRWD 2023 APP.vistro
Report File: N:\...\2023 APP NB AM.pdf

Scenario 1 2023 APP NB AM
8/19/2020

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Sand Canyon Ave and Portola Pkwy	Signalized	ICU 1	WB Thru	0.426	-	A
2	Sand Canyon Ave and Irvine Blvd	Signalized	ICU 1	SB Thru	0.681	-	B
3	Sand Canyon Ave and Trabuco Rd	Signalized	ICU 1	WB Thru	0.580	-	A
4	Sand Canyon Ave and I-5 NB Ramps	Signalized	ICU 1	SB Thru	0.630	-	B
5	Sand Canyon Ave and Marine Way	Signalized	ICU 1	SB Thru	0.700	-	B
6	Sand Canyon Ave and I-5 SB Ramps	Signalized	ICU 1	SB Thru	0.704	-	C
7	SR-133 SB Ramps and Irvine Blvd	Signalized	ICU 1	WB Thru	0.652	-	B
8	SR-133 NB Ramps and Irvine Blvd	Signalized	ICU 1	WB Thru	0.544	-	A

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report
Intersection 1: Sand Canyon Ave and Portola Pkwy

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.426

Intersection Setup

Name						
Approach	Northbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	1	0	1	2	0
Pocket Length [ft]	280.00	500.00	100.00	300.00	380.00	100.00
Speed [mph]	50.00		50.00		55.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		Yes	

Volumes

Name						
Base Volume Input [veh/h]	268	155	602	477	407	865
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	268	155	602	477	407	865
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	67	39	151	119	102	216
Total Analysis Volume [veh/h]	268	155	602	477	407	865
Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Split	Overlap	Permissive	Unsignalized	Protected	Permissive
Signal Group	6	0	8	0	7	4
Auxiliary Signal Groups						
Lead / Lag	Lag	-	-	-	Lead	-

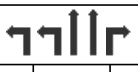
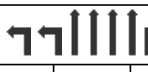
Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.08	0.00	0.18	0.00	0.12	0.25
Intersection LOS	A					
Intersection V/C	0.426					

Intersection Level Of Service Report
Intersection 2: Sand Canyon Ave and Irvine Blvd

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.681

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	2	0	2	2	0	1	2	0	1	2	0	1
Pocket Length [ft]	200.00	100.00	350.00	170.00	100.00	310.00	150.00	100.00	310.00	280.00	100.00	350.00
Speed [mph]	50.00			50.00			55.00			55.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	104	233	472	429	803	80	69	1262	246	606	1007	213
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	104	233	472	429	803	80	69	1262	246	606	1007	213
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	26	58	118	107	201	20	17	316	62	152	252	53
Total Analysis Volume [veh/h]	104	233	472	429	803	80	69	1262	246	606	1007	213
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protect	Permis	Overla	Protect	Permis	Permis	Protect	Permis	Permis	Protect	Permis	Permis
Signal Group	1	6	0	5	2	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

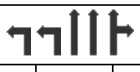
Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.03	0.05	0.00	0.13	0.24	0.05	0.02	0.19	0.14	0.18	0.20	0.13
Intersection LOS	B											
Intersection V/C	0.681											

Intersection Level Of Service Report
Intersection 3: Sand Canyon Ave and Trabuco Rd

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.580

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	2	0	0	2	0	1	2	0	1	2	0	0
Pocket Length [ft]	250.00	100.00	100.00	200.00	100.00	280.00	150.00	100.00	430.00	320.00	100.00	100.00
Speed [mph]	50.00			50.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	218	334	49	189	256	14	73	580	186	103	1610	367
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	218	334	49	189	256	14	73	580	186	103	1610	367
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	55	84	12	47	64	4	18	145	47	26	403	92
Total Analysis Volume [veh/h]	218	334	49	189	256	14	73	580	186	103	1610	367
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protect	Permis	Unsign	Protect	Permis	Permis	Protect	Permis	Unsign	Protect	Permis	Permis
Signal Group	1	6	0	5	2	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

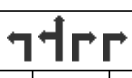
Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.06	0.07	0.00	0.06	0.05	0.01	0.02	0.11	0.00	0.03	0.39	0.39
Intersection LOS	A											
Intersection V/C	0.580											

Intersection Level Of Service Report
Intersection 4: Sand Canyon Ave and I-5 NB Ramps

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.630

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	1	0	1	0	0	1	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	190.00	100.00	220.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	50.00			50.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	236	532	1	0	2095	543	336	0	570	1	0	1
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	236	532	1	0	2095	543	336	0	570	1	0	1
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	59	133	0	0	524	136	84	0	143	0	0	0
Total Analysis Volume [veh/h]	236	532	1	0	2095	543	336	0	570	1	0	1
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permis	Permis	Permis	Permis	Permis	Permis	Split	Split	Overla	Split	Split	Split
Signal Group	0	6	0	0	2	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.07	0.10	0.10	0.00	0.41	0.32	0.10	0.00	0.00	0.00	0.00	0.00
Intersection LOS	B											
Intersection V/C	0.630											

Intersection Level Of Service Report
Intersection 5: Sand Canyon Ave and Marine Way

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.700

Intersection Setup

Name						
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	1	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	380.00	100.00
Speed [mph]	50.00		50.00		50.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		Yes		Yes	

Volumes

Name						
Base Volume Input [veh/h]	578	204	117	2594	479	116
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	578	204	117	2594	479	116
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	145	51	29	649	120	29
Total Analysis Volume [veh/h]	578	204	117	2594	479	116
Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permissive	Permissive	Permissive	Permissive	Permissive	Permissive
Signal Group	6	0	0	2	4	0
Auxiliary Signal Groups						
Lead / Lag	-	-	-	-	Lag	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.11	0.12	0.03	0.51	0.14	0.07
Intersection LOS	B					
Intersection V/C	0.700					

Intersection Level Of Service Report
Intersection 6: Sand Canyon Ave and I-5 SB Ramps

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.704

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	1	2	0	0	1	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	200.00	100.00	100.00	240.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	50.00			50.00			50.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	0	491	140	815	2178	0	252	0	1128	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	491	140	815	2178	0	252	0	1128	0	0	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	123	35	204	545	0	63	0	282	0	0	0
Total Analysis Volume [veh/h]	0	491	140	815	2178	0	252	0	1128	0	0	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permis	Permis	Permis	Protect	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis
Signal Group	0	6	0	5	2	0	0	8	0	0	0	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lead	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.07	0.08	0.24	0.32	0.00	0.05	0.00	0.20	0.00	0.00	0.00
Intersection LOS	C											
Intersection V/C	0.704											

Intersection Level Of Service Report
Intersection 7: SR-133 SB Ramps and Irvine Blvd

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.652

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	1	0	0	0	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	530.00	100.00	100.00	100.00	140.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			No			No		

Volumes

Name												
Base Volume Input [veh/h]	0	0	0	150	0	302	0	1746	354	403	1744	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	0	0	150	0	302	0	1746	354	403	1744	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	0	0	38	0	76	0	437	89	101	436	0
Total Analysis Volume [veh/h]	0	0	0	150	0	302	0	1746	354	403	1744	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis
Signal Group	0	0	0	4	0	0	0	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lag	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.09	0.00	0.09	0.00	0.31	0.31	0.12	0.51	0.00
Intersection LOS	B											
Intersection V/C	0.652											

Intersection Level Of Service Report
Intersection 8: SR-133 NB Ramps and Irvine Blvd

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.544

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

Volumes

Name												
Base Volume Input [veh/h]	117	0	120	0	0	0	0	1758	0	0	2062	98
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	117	0	120	0	0	0	0	1758	0	0	2062	98
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	29	0	30	0	0	0	0	440	0	0	516	25
Total Analysis Volume [veh/h]	117	0	120	0	0	0	0	1758	0	0	2062	98
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis
Signal Group	8	2	0	0	0	0	0	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	-	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.07	0.00	0.07	0.00	0.00	0.00	0.00	0.34	0.00	0.00	0.42	0.42
Intersection LOS	A											
Intersection V/C	0.544											

Irvine Ranch Water District

Vistro File: N:\...\IRWD 2023 APP.vistro
Report File: N:\...\2023 APP NB PM.pdf

Scenario 2 2023 APP NB PM
8/19/2020

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Sand Canyon Ave and Portola Pkwy	Signalized	ICU 1	NB Left	0.488	-	A
2	Sand Canyon Ave and Irvine Blvd	Signalized	ICU 1	WB Thru	0.635	-	B
3	Sand Canyon Ave and Trabuco Rd	Signalized	ICU 1	EB Thru	0.609	-	B
4	Sand Canyon Ave and I-5 NB Ramps	Signalized	ICU 1	NB Thru	0.731	-	C
5	Sand Canyon Ave and Marine Way	Signalized	ICU 1	NB Thru	0.641	-	B
6	Sand Canyon Ave and I-5 SB Ramps	Signalized	ICU 1	NB Thru	0.610	-	B
7	SR-133 SB Ramps and Irvine Blvd	Signalized	ICU 1	WB Thru	0.869	-	D
8	SR-133 NB Ramps and Irvine Blvd	Signalized	ICU 1	WB Right	0.735	-	C

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report
Intersection 1: Sand Canyon Ave and Portola Pkwy

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.488

Intersection Setup

Name						
Approach	Northbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	1	0	1	2	0
Pocket Length [ft]	280.00	500.00	100.00	300.00	380.00	100.00
Speed [mph]	50.00		50.00		55.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		Yes	

Volumes

Name						
Base Volume Input [veh/h]	767	430	545	227	176	633
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	767	430	545	227	176	633
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	192	108	136	57	44	158
Total Analysis Volume [veh/h]	767	430	545	227	176	633
Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Split	Overlap	Permissive	Unsignalized	Protected	Permissive
Signal Group	6	0	8	0	7	4
Auxiliary Signal Groups						
Lead / Lag	Lag	-	-	-	Lead	-

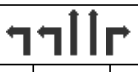
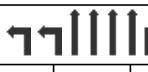
Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.23	0.00	0.16	0.00	0.05	0.19
Intersection LOS	A					
Intersection V/C	0.488					

Intersection Level Of Service Report
Intersection 2: Sand Canyon Ave and Irvine Blvd

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.635

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	2	0	2	2	0	1	2	0	1	2	0	1
Pocket Length [ft]	200.00	100.00	350.00	170.00	100.00	310.00	150.00	100.00	310.00	280.00	100.00	350.00
Speed [mph]	50.00			50.00			55.00			55.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	341	881	577	177	317	94	185	920	177	530	1558	508
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	341	881	577	177	317	94	185	920	177	530	1558	508
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	85	220	144	44	79	24	46	230	44	133	390	127
Total Analysis Volume [veh/h]	341	881	577	177	317	94	185	920	177	530	1558	508
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protect	Permis	Overla	Protect	Permis	Permis	Protect	Permis	Permis	Protect	Permis	Permis
Signal Group	1	6	0	5	2	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

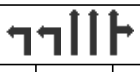
Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.10	0.17	0.00	0.05	0.09	0.06	0.05	0.14	0.10	0.16	0.31	0.30
Intersection LOS	B											
Intersection V/C	0.635											

Intersection Level Of Service Report
Intersection 3: Sand Canyon Ave and Trabuco Rd

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.609

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	2	0	0	2	0	1	2	0	1	2	0	0
Pocket Length [ft]	250.00	100.00	100.00	200.00	100.00	280.00	150.00	100.00	430.00	320.00	100.00	100.00
Speed [mph]	50.00			50.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	133	192	51	196	145	42	313	2315	256	33	793	190
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	133	192	51	196	145	42	313	2315	256	33	793	190
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	33	48	13	49	36	11	78	579	64	8	198	48
Total Analysis Volume [veh/h]	133	192	51	196	145	42	313	2315	256	33	793	190
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protect	Permis	Unsign	Protect	Permis	Permis	Protect	Permis	Unsign	Protect	Permis	Permis
Signal Group	1	6	0	5	2	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

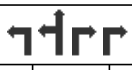
Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.04	0.04	0.00	0.06	0.03	0.02	0.09	0.45	0.00	0.01	0.19	0.19
Intersection LOS	B											
Intersection V/C	0.609											

Intersection Level Of Service Report
Intersection 4: Sand Canyon Ave and I-5 NB Ramps

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.731

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	1	0	1	0	0	1	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	190.00	100.00	220.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	50.00			50.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	601	1944	0	4	844	217	1013	0	223	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	601	1944	0	4	844	217	1013	0	223	0	0	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	150	486	0	1	211	54	253	0	56	0	0	0
Total Analysis Volume [veh/h]	601	1944	0	4	844	217	1013	0	223	0	0	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permis	Permis	Permis	Permis	Permis	Permis	Split	Split	Overla	Split	Split	Split
Signal Group	0	6	0	0	2	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.18	0.38	0.00	0.00	0.17	0.13	0.30	0.00	0.00	0.00	0.00	0.00
Intersection LOS	C											
Intersection V/C	0.731											

Intersection Level Of Service Report
Intersection 5: Sand Canyon Ave and Marine Way

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.641

Intersection Setup

Name						
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	1	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	380.00	100.00
Speed [mph]	50.00		50.00		50.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		Yes		Yes	

Volumes

Name						
Base Volume Input [veh/h]	2507	401	113	1043	182	113
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	2507	401	113	1043	182	113
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	627	100	28	261	46	28
Total Analysis Volume [veh/h]	2507	401	113	1043	182	113
Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permissive	Permissive	Permissive	Permissive	Permissive	Permissive
Signal Group	6	0	0	2	4	0
Auxiliary Signal Groups						
Lead / Lag	-	-	-	-	Lag	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.49	0.24	0.03	0.20	0.05	0.07
Intersection LOS	B					
Intersection V/C	0.641					

Intersection Level Of Service Report
Intersection 6: Sand Canyon Ave and I-5 SB Ramps

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.610

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	1	2	0	0	1	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	200.00	100.00	100.00	240.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	50.00			50.00			50.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	0	2116	496	337	680	0	668	0	349	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	2116	496	337	680	0	668	0	349	0	0	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	529	124	84	170	0	167	0	87	0	0	0
Total Analysis Volume [veh/h]	0	2116	496	337	680	0	668	0	349	0	0	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permis	Permis	Permis	Protect	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis
Signal Group	0	6	0	5	2	0	0	8	0	0	0	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lead	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.31	0.29	0.10	0.10	0.00	0.13	0.00	0.15	0.00	0.00	0.00
Intersection LOS	B											
Intersection V/C	0.610											

Intersection Level Of Service Report
Intersection 7: SR-133 SB Ramps and Irvine Blvd

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.869

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	1	0	0	0	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	530.00	100.00	100.00	100.00	140.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			No			No		

Volumes

Name												
Base Volume Input [veh/h]	0	0	0	56	0	188	0	1501	150	161	2596	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	0	0	56	0	188	0	1501	150	161	2596	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	0	0	14	0	47	0	375	38	40	649	0
Total Analysis Volume [veh/h]	0	0	0	56	0	188	0	1501	150	161	2596	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis
Signal Group	0	0	0	4	0	0	0	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lag	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.03	0.00	0.06	0.00	0.24	0.24	0.05	0.76	0.00
Intersection LOS	D											
Intersection V/C	0.869											

Intersection Level Of Service Report
Intersection 8: SR-133 NB Ramps and Irvine Blvd

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.735

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

Volumes

Name												
Base Volume Input [veh/h]	321	0	294	0	0	0	0	1371	0	0	2369	162
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	321	0	294	0	0	0	0	1371	0	0	2369	162
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	80	0	74	0	0	0	0	343	0	0	592	41
Total Analysis Volume [veh/h]	321	0	294	0	0	0	0	1371	0	0	2369	162
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis
Signal Group	8	2	0	0	0	0	0	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	-	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.19	0.00	0.17	0.00	0.00	0.00	0.00	0.27	0.00	0.00	0.50	0.50
Intersection LOS	C											
Intersection V/C	0.735											

Irvine Ranch Water District

Vistro File: N:\...\IRWD 2023 APP.vistro
Scenario 3 2023 APP PP Route 1A AM
Report File: N:\...\2023 APP PP Route 1A AM.pdf
8/19/2020

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Sand Canyon Ave and Portola Pkwy	Signalized	ICU 1	WB Thru	0.456	-	A
2	Sand Canyon Ave and Irvine Blvd	Signalized	ICU 1	SB Thru	0.689	-	B
3	Sand Canyon Ave and Trabuco Rd	Signalized	ICU 1	WB Thru	0.589	-	A
4	Sand Canyon Ave and I-5 NB Ramps	Signalized	ICU 1	SB Thru	0.630	-	B
5	Sand Canyon Ave and Marine Way	Signalized	ICU 1	SB Thru	0.700	-	B
6	Sand Canyon Ave and I-5 SB Ramps	Signalized	ICU 1	SB Thru	0.704	-	C
7	SR-133 SB Ramps and Irvine Blvd	Signalized	ICU 1	WB Thru	0.652	-	B
8	SR-133 NB Ramps and Irvine Blvd	Signalized	ICU 1	WB Thru	0.544	-	A

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report
Intersection 1: Sand Canyon Ave and Portola Pkwy

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.456

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	1	0	0	0	0	0	1	2	0	0
Pocket Length [ft]	280.00	100.00	500.00	100.00	100.00	100.00	100.00	100.00	300.00	380.00	100.00	100.00
Speed [mph]	50.00			30.00			50.00			55.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			Yes			No			Yes		

Volumes

Name												
Base Volume Input [veh/h]	268	0	155	0	0	0	0	602	477	407	865	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	45	0	0	27	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	268	45	155	0	27	0	0	602	477	407	865	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	67	11	39	0	7	0	0	151	119	102	216	0
Total Analysis Volume [veh/h]	268	45	155	0	27	0	0	602	477	407	865	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Split	Split	Overla	Split	Split	Split	Permis	Permis	Unsign	Protect	Permis	Permis
Signal Group	6	6	0	0	2	0	0	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	-	-	-	-	-	-	Lead	-	-

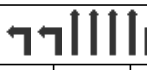
Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.08	0.09	0.00	0.00	0.02	0.00	0.00	0.18	0.00	0.12	0.25	0.00
Intersection LOS	A											
Intersection V/C	0.456											

Intersection Level Of Service Report
Intersection 2: Sand Canyon Ave and Irvine Blvd

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.689

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	2	0	2	2	0	1	2	0	1	2	0	1
Pocket Length [ft]	200.00	100.00	350.00	170.00	100.00	310.00	150.00	100.00	310.00	280.00	100.00	350.00
Speed [mph]	50.00			50.00			55.00			55.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	104	233	472	429	803	80	69	1262	246	606	1007	213
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	45	0	0	27	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	104	278	472	429	830	80	69	1262	246	606	1007	213
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	26	70	118	107	208	20	17	316	62	152	252	53
Total Analysis Volume [veh/h]	104	278	472	429	830	80	69	1262	246	606	1007	213
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protect	Permis	Overla	Protect	Permis	Permis	Protect	Permis	Permis	Protect	Permis	Permis
Signal Group	1	6	0	5	2	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

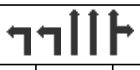
Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.03	0.05	0.00	0.13	0.24	0.05	0.02	0.19	0.14	0.18	0.20	0.13
Intersection LOS	B											
Intersection V/C	0.689											

Intersection Level Of Service Report
Intersection 3: Sand Canyon Ave and Trabuco Rd

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.589

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	2	0	0	2	0	1	2	0	1	2	0	0
Pocket Length [ft]	250.00	100.00	100.00	200.00	100.00	280.00	150.00	100.00	430.00	320.00	100.00	100.00
Speed [mph]	50.00			50.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	218	334	49	189	256	14	73	580	186	103	1610	367
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	45	0	0	27	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	218	379	49	189	283	14	73	580	186	103	1610	367
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	55	95	12	47	71	4	18	145	47	26	403	92
Total Analysis Volume [veh/h]	218	379	49	189	283	14	73	580	186	103	1610	367
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protect	Permis	Unsign	Protect	Permis	Permis	Protect	Permis	Unsign	Protect	Permis	Permis
Signal Group	1	6	0	5	2	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

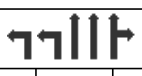
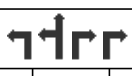
Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.06	0.07	0.00	0.06	0.06	0.01	0.02	0.11	0.00	0.03	0.39	0.39
Intersection LOS	A											
Intersection V/C	0.589											

Intersection Level Of Service Report
Intersection 4: Sand Canyon Ave and I-5 NB Ramps

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.630

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	1	0	1	0	0	1	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	190.00	100.00	220.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	50.00			50.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	236	532	1	0	2095	543	336	0	570	1	0	1
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	45	0	0	0	27	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	236	577	1	0	2095	570	336	0	570	1	0	1
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	59	144	0	0	524	143	84	0	143	0	0	0
Total Analysis Volume [veh/h]	236	577	1	0	2095	570	336	0	570	1	0	1
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permis	Permis	Permis	Permis	Permis	Permis	Split	Split	Overla	Split	Split	Split
Signal Group	0	6	0	0	2	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.07	0.11	0.11	0.00	0.41	0.34	0.10	0.00	0.00	0.00	0.00	0.00
Intersection LOS	B											
Intersection V/C	0.630											

Intersection Level Of Service Report
Intersection 5: Sand Canyon Ave and Marine Way

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.700

Intersection Setup

Name						
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	1	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	380.00	100.00
Speed [mph]	50.00		50.00		50.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		Yes		Yes	

Volumes

Name						
Base Volume Input [veh/h]	578	204	117	2594	479	116
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	45	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	623	204	117	2594	479	116
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	156	51	29	649	120	29
Total Analysis Volume [veh/h]	623	204	117	2594	479	116
Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permissive	Permissive	Permissive	Permissive	Permissive	Permissive
Signal Group	6	0	0	2	4	0
Auxiliary Signal Groups						
Lead / Lag	-	-	-	-	Lag	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.12	0.12	0.03	0.51	0.14	0.07
Intersection LOS	B					
Intersection V/C	0.700					

Intersection Level Of Service Report
Intersection 6: Sand Canyon Ave and I-5 SB Ramps

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.704

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	1	2	0	0	1	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	200.00	100.00	100.00	240.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	50.00			50.00			50.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	0	491	140	815	2178	0	252	0	1128	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	45	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	491	140	815	2178	0	297	0	1128	0	0	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	123	35	204	545	0	74	0	282	0	0	0
Total Analysis Volume [veh/h]	0	491	140	815	2178	0	297	0	1128	0	0	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permis	Permis	Permis	Protect	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis
Signal Group	0	6	0	5	2	0	0	8	0	0	0	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lead	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.07	0.08	0.24	0.32	0.00	0.06	0.00	0.21	0.00	0.00	0.00
Intersection LOS	C											
Intersection V/C	0.704											

Intersection Level Of Service Report
Intersection 7: SR-133 SB Ramps and Irvine Blvd

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.652

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	1	0	0	0	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	530.00	100.00	100.00	100.00	140.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			No			No		

Volumes

Name												
Base Volume Input [veh/h]	0	0	0	150	0	302	0	1746	354	403	1744	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	0	0	150	0	302	0	1746	354	403	1744	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	0	0	38	0	76	0	437	89	101	436	0
Total Analysis Volume [veh/h]	0	0	0	150	0	302	0	1746	354	403	1744	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis
Signal Group	0	0	0	4	0	0	0	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lag	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.09	0.00	0.09	0.00	0.31	0.31	0.12	0.51	0.00
Intersection LOS	B											
Intersection V/C	0.652											

Intersection Level Of Service Report
Intersection 8: SR-133 NB Ramps and Irvine Blvd

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.544

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

Volumes

Name												
Base Volume Input [veh/h]	117	0	120	0	0	0	0	1758	0	0	2062	98
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	117	0	120	0	0	0	0	1758	0	0	2062	98
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	29	0	30	0	0	0	0	440	0	0	516	25
Total Analysis Volume [veh/h]	117	0	120	0	0	0	0	1758	0	0	2062	98
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis
Signal Group	8	2	0	0	0	0	0	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	-	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.07	0.00	0.07	0.00	0.00	0.00	0.00	0.34	0.00	0.00	0.42	0.42
Intersection LOS	A											
Intersection V/C	0.544											

Irvine Ranch Water District

Vistro File: N:\...\IRWD 2023 APP.vistro
Scenario 4 2023 APP PP Route 1A PM
Report File: N:\...\2023 APP PP Route 1A PM.pdf
8/19/2020

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Sand Canyon Ave and Portola Pkwy	Signalized	ICU 1	NB Left	0.499	-	A
2	Sand Canyon Ave and Irvine Blvd	Signalized	ICU 1	WB Thru	0.635	-	B
3	Sand Canyon Ave and Trabuco Rd	Signalized	ICU 1	EB Thru	0.609	-	B
4	Sand Canyon Ave and I-5 NB Ramps	Signalized	ICU 1	NB Thru	0.731	-	C
5	Sand Canyon Ave and Marine Way	Signalized	ICU 1	NB Thru	0.641	-	B
6	Sand Canyon Ave and I-5 SB Ramps	Signalized	ICU 1	NB Thru	0.610	-	B
7	SR-133 SB Ramps and Irvine Blvd	Signalized	ICU 1	WB Thru	0.869	-	D
8	SR-133 NB Ramps and Irvine Blvd	Signalized	ICU 1	WB Right	0.735	-	C

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report
Intersection 1: Sand Canyon Ave and Portola Pkwy

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.499

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	1	0	0	0	0	0	1	2	0	0
Pocket Length [ft]	280.00	100.00	500.00	100.00	100.00	100.00	100.00	100.00	300.00	380.00	100.00	100.00
Speed [mph]	50.00			30.00			50.00			55.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			Yes			No			Yes		

Volumes

Name												
Base Volume Input [veh/h]	767	0	430	0	0	0	0	545	227	176	633	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	18	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	767	0	430	0	18	0	0	545	227	176	633	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	192	0	108	0	5	0	0	136	57	44	158	0
Total Analysis Volume [veh/h]	767	0	430	0	18	0	0	545	227	176	633	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Split	Split	Overla	Split	Split	Split	Permis	Permis	Unsign	Protect	Permis	Permis
Signal Group	6	6	0	0	2	0	0	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	-	-	-	-	-	-	Lead	-	-

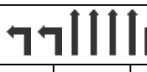
Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.23	0.00	0.00	0.00	0.01	0.00	0.00	0.16	0.00	0.05	0.19	0.00
Intersection LOS	A											
Intersection V/C	0.499											

Intersection Level Of Service Report
Intersection 2: Sand Canyon Ave and Irvine Blvd

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.635

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	2	0	2	2	0	1	2	0	1	2	0	1
Pocket Length [ft]	200.00	100.00	350.00	170.00	100.00	310.00	150.00	100.00	310.00	280.00	100.00	350.00
Speed [mph]	50.00			50.00			55.00			55.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	341	881	577	177	317	94	185	920	177	530	1558	508
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	18	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	341	881	577	177	335	94	185	920	177	530	1558	508
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	85	220	144	44	84	24	46	230	44	133	390	127
Total Analysis Volume [veh/h]	341	881	577	177	335	94	185	920	177	530	1558	508
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protect	Permis	Overla	Protect	Permis	Permis	Protect	Permis	Permis	Protect	Permis	Permis
Signal Group	1	6	0	5	2	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

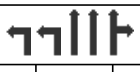
Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.10	0.17	0.00	0.05	0.10	0.06	0.05	0.14	0.10	0.16	0.31	0.30
Intersection LOS	B											
Intersection V/C	0.635											

Intersection Level Of Service Report
Intersection 3: Sand Canyon Ave and Trabuco Rd

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.609

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	2	0	0	2	0	1	2	0	1	2	0	0
Pocket Length [ft]	250.00	100.00	100.00	200.00	100.00	280.00	150.00	100.00	430.00	320.00	100.00	100.00
Speed [mph]	50.00			50.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	133	192	51	196	145	42	313	2315	256	33	793	190
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	18	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	133	192	51	196	163	42	313	2315	256	33	793	190
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	33	48	13	49	41	11	78	579	64	8	198	48
Total Analysis Volume [veh/h]	133	192	51	196	163	42	313	2315	256	33	793	190
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protect	Permis	Unsign	Protect	Permis	Permis	Protect	Permis	Unsign	Protect	Permis	Permis
Signal Group	1	6	0	5	2	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

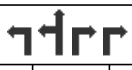
Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.04	0.04	0.00	0.06	0.03	0.02	0.09	0.45	0.00	0.01	0.19	0.19
Intersection LOS	B											
Intersection V/C	0.609											

Intersection Level Of Service Report
Intersection 4: Sand Canyon Ave and I-5 NB Ramps

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.731

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	1	0	1	0	0	1	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	190.00	100.00	220.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	50.00			50.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	601	1944	0	4	844	217	1013	0	223	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	18	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	601	1944	0	4	844	235	1013	0	223	0	0	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	150	486	0	1	211	59	253	0	56	0	0	0
Total Analysis Volume [veh/h]	601	1944	0	4	844	235	1013	0	223	0	0	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permis	Permis	Permis	Permis	Permis	Permis	Split	Split	Overla	Split	Split	Split
Signal Group	0	6	0	0	2	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.18	0.38	0.00	0.00	0.17	0.14	0.30	0.00	0.00	0.00	0.00	0.00
Intersection LOS	C											
Intersection V/C	0.731											

Intersection Level Of Service Report
Intersection 5: Sand Canyon Ave and Marine Way

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.641

Intersection Setup

Name						
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	1	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	380.00	100.00
Speed [mph]	50.00		50.00		50.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		Yes		Yes	

Volumes

Name						
Base Volume Input [veh/h]	2507	401	113	1043	182	113
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	2507	401	113	1043	182	113
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	627	100	28	261	46	28
Total Analysis Volume [veh/h]	2507	401	113	1043	182	113
Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permissive	Permissive	Permissive	Permissive	Permissive	Permissive
Signal Group	6	0	0	2	4	0
Auxiliary Signal Groups						
Lead / Lag	-	-	-	-	Lag	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.49	0.24	0.03	0.20	0.05	0.07
Intersection LOS	B					
Intersection V/C	0.641					

Intersection Level Of Service Report
Intersection 6: Sand Canyon Ave and I-5 SB Ramps

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.610

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	1	2	0	0	1	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	200.00	100.00	100.00	240.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	50.00			50.00			50.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	0	2116	496	337	680	0	668	0	349	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	2116	496	337	680	0	668	0	349	0	0	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	529	124	84	170	0	167	0	87	0	0	0
Total Analysis Volume [veh/h]	0	2116	496	337	680	0	668	0	349	0	0	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permis	Permis	Permis	Protect	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis
Signal Group	0	6	0	5	2	0	0	8	0	0	0	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lead	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.31	0.29	0.10	0.10	0.00	0.13	0.00	0.15	0.00	0.00	0.00
Intersection LOS	B											
Intersection V/C	0.610											

Intersection Level Of Service Report
Intersection 7: SR-133 SB Ramps and Irvine Blvd

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.869

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	1	0	0	0	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	530.00	100.00	100.00	100.00	140.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			No			No		

Volumes

Name												
Base Volume Input [veh/h]	0	0	0	56	0	188	0	1501	150	161	2596	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	0	0	56	0	188	0	1501	150	161	2596	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	0	0	14	0	47	0	375	38	40	649	0
Total Analysis Volume [veh/h]	0	0	0	56	0	188	0	1501	150	161	2596	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis
Signal Group	0	0	0	4	0	0	0	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lag	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.03	0.00	0.06	0.00	0.24	0.24	0.05	0.76	0.00
Intersection LOS	D											
Intersection V/C	0.869											

Intersection Level Of Service Report
Intersection 8: SR-133 NB Ramps and Irvine Blvd

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.735

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

Volumes

Name												
Base Volume Input [veh/h]	321	0	294	0	0	0	0	1371	0	0	2369	162
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	321	0	294	0	0	0	0	1371	0	0	2369	162
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	80	0	74	0	0	0	0	343	0	0	592	41
Total Analysis Volume [veh/h]	321	0	294	0	0	0	0	1371	0	0	2369	162
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis
Signal Group	8	2	0	0	0	0	0	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	-	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.19	0.00	0.17	0.00	0.00	0.00	0.00	0.27	0.00	0.00	0.50	0.50
Intersection LOS	C											
Intersection V/C	0.735											

Irvine Ranch Water District

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Scenario 5 2023 APP PP Route 1B AM
Report File: N:\...\2023 APP PP Route 1B AM.pdf
8/19/2020

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Sand Canyon Ave and Portola Pkwy	Signalized	ICU 1	WB Thru	0.456	-	A
2	Sand Canyon Ave and Irvine Blvd	Signalized	ICU 1	SB Thru	0.689	-	B
3	Sand Canyon Ave and Trabuco Rd	Signalized	ICU 1	WB Thru	0.589	-	A
4	Sand Canyon Ave and I-5 NB Ramps	Signalized	ICU 1	SB Thru	0.648	-	B
5	Sand Canyon Ave and Marine Way	Signalized	ICU 1	SB Thru	0.705	-	C
6	Sand Canyon Ave and I-5 SB Ramps	Signalized	ICU 1	SB Thru	0.712	-	C
7	SR-133 SB Ramps and Irvine Blvd	Signalized	ICU 1	WB Thru	0.652	-	B
8	SR-133 NB Ramps and Irvine Blvd	Signalized	ICU 1	WB Thru	0.544	-	A

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report
Intersection 1: Sand Canyon Ave and Portola Pkwy

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.456

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	1	0	0	0	0	0	1	2	0	0
Pocket Length [ft]	280.00	100.00	500.00	100.00	100.00	100.00	100.00	100.00	300.00	380.00	100.00	100.00
Speed [mph]	50.00			30.00			50.00			55.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			Yes			No			Yes		

Volumes

Name												
Base Volume Input [veh/h]	268	0	155	0	0	0	0	602	477	407	865	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	45	0	0	27	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	268	45	155	0	27	0	0	602	477	407	865	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	67	11	39	0	7	0	0	151	119	102	216	0
Total Analysis Volume [veh/h]	268	45	155	0	27	0	0	602	477	407	865	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Split	Split	Overla	Split	Split	Split	Permis	Permis	Unsign	Protect	Permis	Permis
Signal Group	6	6	0	0	2	0	0	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	-	-	-	-	-	-	Lead	-	-

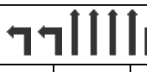
Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.08	0.09	0.00	0.00	0.02	0.00	0.00	0.18	0.00	0.12	0.25	0.00
Intersection LOS	A											
Intersection V/C	0.456											

Intersection Level Of Service Report
Intersection 2: Sand Canyon Ave and Irvine Blvd

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.689

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	2	0	2	2	0	1	2	0	1	2	0	1
Pocket Length [ft]	200.00	100.00	350.00	170.00	100.00	310.00	150.00	100.00	310.00	280.00	100.00	350.00
Speed [mph]	50.00			50.00			55.00			55.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	104	233	472	429	803	80	69	1262	246	606	1007	213
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	45	0	0	27	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	104	278	472	429	830	80	69	1262	246	606	1007	213
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	26	70	118	107	208	20	17	316	62	152	252	53
Total Analysis Volume [veh/h]	104	278	472	429	830	80	69	1262	246	606	1007	213
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protect	Permis	Overla	Protect	Permis	Permis	Protect	Permis	Permis	Protect	Permis	Permis
Signal Group	1	6	0	5	2	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

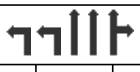
Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.03	0.05	0.00	0.13	0.24	0.05	0.02	0.19	0.14	0.18	0.20	0.13
Intersection LOS	B											
Intersection V/C	0.689											

Intersection Level Of Service Report
Intersection 3: Sand Canyon Ave and Trabuco Rd

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.589

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	2	0	0	2	0	1	2	0	1	2	0	0
Pocket Length [ft]	250.00	100.00	100.00	200.00	100.00	280.00	150.00	100.00	430.00	320.00	100.00	100.00
Speed [mph]	50.00			50.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	218	334	49	189	256	14	73	580	186	103	1610	367
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	45	0	0	27	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	218	379	49	189	283	14	73	580	186	103	1610	367
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	55	95	12	47	71	4	18	145	47	26	403	92
Total Analysis Volume [veh/h]	218	379	49	189	283	14	73	580	186	103	1610	367
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protect	Permis	Unsign	Protect	Permis	Permis	Protect	Permis	Unsign	Protect	Permis	Permis
Signal Group	1	6	0	5	2	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

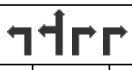
Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.06	0.07	0.00	0.06	0.06	0.01	0.02	0.11	0.00	0.03	0.39	0.39
Intersection LOS	A											
Intersection V/C	0.589											

Intersection Level Of Service Report
Intersection 4: Sand Canyon Ave and I-5 NB Ramps

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.648

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	1	0	1	0	0	1	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	190.00	100.00	220.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	50.00			50.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	236	532	1	0	2095	543	336	0	570	1	0	1
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	27	0	45	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	236	532	1	0	2122	543	381	0	570	1	0	1
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	59	133	0	0	531	136	95	0	143	0	0	0
Total Analysis Volume [veh/h]	236	532	1	0	2122	543	381	0	570	1	0	1
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permis	Permis	Permis	Permis	Permis	Permis	Split	Split	Overla	Split	Split	Split
Signal Group	0	6	0	0	2	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.07	0.10	0.10	0.00	0.42	0.32	0.11	0.00	0.00	0.00	0.00	0.00
Intersection LOS	B											
Intersection V/C	0.648											

Intersection Level Of Service Report
Intersection 5: Sand Canyon Ave and Marine Way

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.705

Intersection Setup

Name						
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	1	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	380.00	100.00
Speed [mph]	50.00		50.00		50.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		Yes		Yes	

Volumes

Name						
Base Volume Input [veh/h]	578	204	117	2594	479	116
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	27	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	578	204	117	2621	479	116
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	145	51	29	655	120	29
Total Analysis Volume [veh/h]	578	204	117	2621	479	116
Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permissive	Permissive	Permissive	Permissive	Permissive	Permissive
Signal Group	6	0	0	2	4	0
Auxiliary Signal Groups						
Lead / Lag	-	-	-	-	Lag	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.11	0.12	0.03	0.51	0.14	0.07
Intersection LOS	C					
Intersection V/C	0.705					

Intersection Level Of Service Report
Intersection 6: Sand Canyon Ave and I-5 SB Ramps

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.712

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	1	2	0	0	1	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	200.00	100.00	100.00	240.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	50.00			50.00			50.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	0	491	140	815	2178	0	252	0	1128	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	27	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	491	140	842	2178	0	252	0	1128	0	0	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	123	35	211	545	0	63	0	282	0	0	0
Total Analysis Volume [veh/h]	0	491	140	842	2178	0	252	0	1128	0	0	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permis	Permis	Permis	Protect	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis
Signal Group	0	6	0	5	2	0	0	8	0	0	0	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lead	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.07	0.08	0.25	0.32	0.00	0.05	0.00	0.20	0.00	0.00	0.00
Intersection LOS	C											
Intersection V/C	0.712											

Intersection Level Of Service Report
Intersection 7: SR-133 SB Ramps and Irvine Blvd

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.652

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	1	0	0	0	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	530.00	100.00	100.00	100.00	140.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			No			No		

Volumes

Name												
Base Volume Input [veh/h]	0	0	0	150	0	302	0	1746	354	403	1744	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	0	0	150	0	302	0	1746	354	403	1744	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	0	0	38	0	76	0	437	89	101	436	0
Total Analysis Volume [veh/h]	0	0	0	150	0	302	0	1746	354	403	1744	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis
Signal Group	0	0	0	4	0	0	0	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lag	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.09	0.00	0.09	0.00	0.31	0.31	0.12	0.51	0.00
Intersection LOS	B											
Intersection V/C	0.652											

Intersection Level Of Service Report
Intersection 8: SR-133 NB Ramps and Irvine Blvd

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.544

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

Volumes

Name												
Base Volume Input [veh/h]	117	0	120	0	0	0	0	1758	0	0	2062	98
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	117	0	120	0	0	0	0	1758	0	0	2062	98
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	29	0	30	0	0	0	0	440	0	0	516	25
Total Analysis Volume [veh/h]	117	0	120	0	0	0	0	1758	0	0	2062	98
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis
Signal Group	8	2	0	0	0	0	0	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	-	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.07	0.00	0.07	0.00	0.00	0.00	0.00	0.34	0.00	0.00	0.42	0.42
Intersection LOS	A											
Intersection V/C	0.544											

Irvine Ranch Water District

Vistro File: N:\...\IRWD 2023 APP.vistro
Scenario 6 2023 APP PP Route 1B PM
Report File: N:\...\2023 APP PP Route 1B PM.pdf
8/19/2020

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Sand Canyon Ave and Portola Pkwy	Signalized	ICU 1	NB Left	0.499	-	A
2	Sand Canyon Ave and Irvine Blvd	Signalized	ICU 1	WB Thru	0.635	-	B
3	Sand Canyon Ave and Trabuco Rd	Signalized	ICU 1	EB Thru	0.609	-	B
4	Sand Canyon Ave and I-5 NB Ramps	Signalized	ICU 1	NB Thru	0.731	-	C
5	Sand Canyon Ave and Marine Way	Signalized	ICU 1	NB Thru	0.641	-	B
6	Sand Canyon Ave and I-5 SB Ramps	Signalized	ICU 1	NB Thru	0.615	-	B
7	SR-133 SB Ramps and Irvine Blvd	Signalized	ICU 1	WB Thru	0.869	-	D
8	SR-133 NB Ramps and Irvine Blvd	Signalized	ICU 1	WB Right	0.735	-	C

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report

Intersection 1: Sand Canyon Ave and Portola Pkwy

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.499

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	1	0	0	0	0	0	1	2	0	0
Pocket Length [ft]	280.00	100.00	500.00	100.00	100.00	100.00	100.00	100.00	300.00	380.00	100.00	100.00
Speed [mph]	50.00			30.00			50.00			55.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			Yes			No			Yes		

Volumes

Name												
Base Volume Input [veh/h]	767	0	430	0	0	0	0	545	227	176	633	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	18	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	767	0	430	0	18	0	0	545	227	176	633	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	192	0	108	0	5	0	0	136	57	44	158	0
Total Analysis Volume [veh/h]	767	0	430	0	18	0	0	545	227	176	633	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Split	Split	Overla	Split	Split	Split	Permis	Permis	Unsign	Protect	Permis	Permis
Signal Group	6	6	0	0	2	0	0	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	-	-	-	-	-	-	Lead	-	-

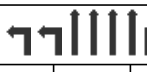
Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.23	0.00	0.00	0.00	0.01	0.00	0.00	0.16	0.00	0.05	0.19	0.00
Intersection LOS	A											
Intersection V/C	0.499											

Intersection Level Of Service Report
Intersection 2: Sand Canyon Ave and Irvine Blvd

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.635

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	2	0	2	2	0	1	2	0	1	2	0	1
Pocket Length [ft]	200.00	100.00	350.00	170.00	100.00	310.00	150.00	100.00	310.00	280.00	100.00	350.00
Speed [mph]	50.00			50.00			55.00			55.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	341	881	577	177	317	94	185	920	177	530	1558	508
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	18	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	341	881	577	177	335	94	185	920	177	530	1558	508
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	85	220	144	44	84	24	46	230	44	133	390	127
Total Analysis Volume [veh/h]	341	881	577	177	335	94	185	920	177	530	1558	508
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protect	Permis	Overla	Protect	Permis	Permis	Protect	Permis	Permis	Protect	Permis	Permis
Signal Group	1	6	0	5	2	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

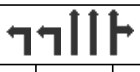
Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.10	0.17	0.00	0.05	0.10	0.06	0.05	0.14	0.10	0.16	0.31	0.30
Intersection LOS	B											
Intersection V/C	0.635											

Intersection Level Of Service Report
Intersection 3: Sand Canyon Ave and Trabuco Rd

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.609

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	2	0	0	2	0	1	2	0	1	2	0	0
Pocket Length [ft]	250.00	100.00	100.00	200.00	100.00	280.00	150.00	100.00	430.00	320.00	100.00	100.00
Speed [mph]	50.00			50.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	133	192	51	196	145	42	313	2315	256	33	793	190
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	18	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	133	192	51	196	163	42	313	2315	256	33	793	190
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	33	48	13	49	41	11	78	579	64	8	198	48
Total Analysis Volume [veh/h]	133	192	51	196	163	42	313	2315	256	33	793	190
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protect	Permis	Unsign	Protect	Permis	Permis	Protect	Permis	Unsign	Protect	Permis	Permis
Signal Group	1	6	0	5	2	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

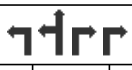
Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.04	0.04	0.00	0.06	0.03	0.02	0.09	0.45	0.00	0.01	0.19	0.19
Intersection LOS	B											
Intersection V/C	0.609											

Intersection Level Of Service Report
Intersection 4: Sand Canyon Ave and I-5 NB Ramps

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.731

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	1	0	1	0	0	1	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	190.00	100.00	220.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	50.00			50.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	601	1944	0	4	844	217	1013	0	223	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	18	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	601	1944	0	4	862	217	1013	0	223	0	0	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	150	486	0	1	216	54	253	0	56	0	0	0
Total Analysis Volume [veh/h]	601	1944	0	4	862	217	1013	0	223	0	0	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permis	Permis	Permis	Permis	Permis	Permis	Split	Split	Overla	Split	Split	Split
Signal Group	0	6	0	0	2	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.18	0.38	0.00	0.00	0.17	0.13	0.30	0.00	0.00	0.00	0.00	0.00
Intersection LOS	C											
Intersection V/C	0.731											

Intersection Level Of Service Report
Intersection 5: Sand Canyon Ave and Marine Way

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.641

Intersection Setup

Name						
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	1	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	380.00	100.00
Speed [mph]	50.00		50.00		50.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		Yes		Yes	

Volumes

Name						
Base Volume Input [veh/h]	2507	401	113	1043	182	113
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	18	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	2507	401	113	1061	182	113
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	627	100	28	265	46	28
Total Analysis Volume [veh/h]	2507	401	113	1061	182	113
Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permissive	Permissive	Permissive	Permissive	Permissive	Permissive
Signal Group	6	0	0	2	4	0
Auxiliary Signal Groups						
Lead / Lag	-	-	-	-	Lag	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.49	0.24	0.03	0.21	0.05	0.07
Intersection LOS	B					
Intersection V/C	0.641					

Intersection Level Of Service Report
Intersection 6: Sand Canyon Ave and I-5 SB Ramps

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.615

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	1	2	0	0	1	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	200.00	100.00	100.00	240.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	50.00			50.00			50.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	0	2116	496	337	680	0	668	0	349	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	18	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	2116	496	355	680	0	668	0	349	0	0	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	529	124	89	170	0	167	0	87	0	0	0
Total Analysis Volume [veh/h]	0	2116	496	355	680	0	668	0	349	0	0	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permis	Permis	Permis	Protect	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis
Signal Group	0	6	0	5	2	0	0	8	0	0	0	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lead	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.31	0.29	0.10	0.10	0.00	0.13	0.00	0.15	0.00	0.00	0.00
Intersection LOS	B											
Intersection V/C	0.615											

Intersection Level Of Service Report
Intersection 7: SR-133 SB Ramps and Irvine Blvd

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.869

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	1	0	0	0	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	530.00	100.00	100.00	100.00	140.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			No			No		

Volumes

Name												
Base Volume Input [veh/h]	0	0	0	56	0	188	0	1501	150	161	2596	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	0	0	56	0	188	0	1501	150	161	2596	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	0	0	14	0	47	0	375	38	40	649	0
Total Analysis Volume [veh/h]	0	0	0	56	0	188	0	1501	150	161	2596	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis
Signal Group	0	0	0	4	0	0	0	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lag	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.03	0.00	0.06	0.00	0.24	0.24	0.05	0.76	0.00
Intersection LOS	D											
Intersection V/C	0.869											

Intersection Level Of Service Report
Intersection 8: SR-133 NB Ramps and Irvine Blvd

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.735

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

Volumes

Name												
Base Volume Input [veh/h]	321	0	294	0	0	0	0	1371	0	0	2369	162
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	321	0	294	0	0	0	0	1371	0	0	2369	162
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	80	0	74	0	0	0	0	343	0	0	592	41
Total Analysis Volume [veh/h]	321	0	294	0	0	0	0	1371	0	0	2369	162
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis
Signal Group	8	2	0	0	0	0	0	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	-	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.19	0.00	0.17	0.00	0.00	0.00	0.00	0.27	0.00	0.00	0.50	0.50
Intersection LOS	C											
Intersection V/C	0.735											

Irvine Ranch Water District

Vistro File: N:\...\IRWD 2023 APP.vistro
Scenario 7 2023 APP PP Route 2A AM
Report File: N:\...\2023 APP PP Route 2A AM.pdf
8/19/2020

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Sand Canyon Ave and Portola Pkwy	Signalized	ICU 1	WB Thru	0.456	-	A
2	Sand Canyon Ave and Irvine Blvd	Signalized	ICU 1	SB Thru	0.681	-	B
3	Sand Canyon Ave and Trabuco Rd	Signalized	ICU 1	WB Thru	0.580	-	A
4	Sand Canyon Ave and I-5 NB Ramps	Signalized	ICU 1	SB Thru	0.630	-	B
5	Sand Canyon Ave and Marine Way	Signalized	ICU 1	SB Thru	0.700	-	B
6	Sand Canyon Ave and I-5 SB Ramps	Signalized	ICU 1	SB Thru	0.704	-	C
7	SR-133 SB Ramps and Irvine Blvd	Signalized	ICU 1	WB Thru	0.665	-	B
8	SR-133 NB Ramps and Irvine Blvd	Signalized	ICU 1	WB Thru	0.544	-	A

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report

Intersection 1: Sand Canyon Ave and Portola Pkwy

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.456

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	1	0	0	0	0	0	1	2	0	0
Pocket Length [ft]	280.00	100.00	500.00	100.00	100.00	100.00	100.00	100.00	300.00	380.00	100.00	100.00
Speed [mph]	50.00			30.00			50.00			55.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			Yes			No			Yes		

Volumes

Name												
Base Volume Input [veh/h]	268	0	155	0	0	0	0	602	477	407	865	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	45	0	0	27	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	268	45	155	0	27	0	0	602	477	407	865	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	67	11	39	0	7	0	0	151	119	102	216	0
Total Analysis Volume [veh/h]	268	45	155	0	27	0	0	602	477	407	865	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Split	Split	Overla	Split	Split	Split	Permis	Permis	Unsign	Protect	Permis	Permis
Signal Group	6	6	0	0	2	0	0	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	-	-	-	-	-	-	Lead	-	-

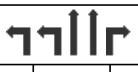
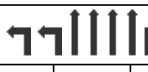
Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.08	0.09	0.00	0.00	0.02	0.00	0.00	0.18	0.00	0.12	0.25	0.00
Intersection LOS	A											
Intersection V/C	0.456											

Intersection Level Of Service Report
Intersection 2: Sand Canyon Ave and Irvine Blvd

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.681

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	2	0	2	2	0	1	2	0	1	2	0	1
Pocket Length [ft]	200.00	100.00	350.00	170.00	100.00	310.00	150.00	100.00	310.00	280.00	100.00	350.00
Speed [mph]	50.00			50.00			55.00			55.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	104	233	472	429	803	80	69	1262	246	606	1007	213
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	27	0	0	0	0	0	0	0	45
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	104	233	472	456	803	80	69	1262	246	606	1007	258
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	26	58	118	114	201	20	17	316	62	152	252	65
Total Analysis Volume [veh/h]	104	233	472	456	803	80	69	1262	246	606	1007	258
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protect	Permis	Overla	Protect	Permis	Permis	Protect	Permis	Permis	Protect	Permis	Permis
Signal Group	1	6	0	5	2	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

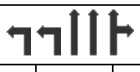
Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.03	0.05	0.00	0.13	0.24	0.05	0.02	0.19	0.14	0.18	0.20	0.15
Intersection LOS	B											
Intersection V/C	0.681											

Intersection Level Of Service Report
Intersection 3: Sand Canyon Ave and Trabuco Rd

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.580

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	2	0	0	2	0	1	2	0	1	2	0	0
Pocket Length [ft]	250.00	100.00	100.00	200.00	100.00	280.00	150.00	100.00	430.00	320.00	100.00	100.00
Speed [mph]	50.00			50.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	218	334	49	189	256	14	73	580	186	103	1610	367
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	218	334	49	189	256	14	73	580	186	103	1610	367
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	55	84	12	47	64	4	18	145	47	26	403	92
Total Analysis Volume [veh/h]	218	334	49	189	256	14	73	580	186	103	1610	367
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protect	Permis	Unsign	Protect	Permis	Permis	Protect	Permis	Unsign	Protect	Permis	Permis
Signal Group	1	6	0	5	2	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

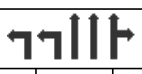
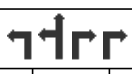
Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.06	0.07	0.00	0.06	0.05	0.01	0.02	0.11	0.00	0.03	0.39	0.39
Intersection LOS	A											
Intersection V/C	0.580											

Intersection Level Of Service Report
Intersection 4: Sand Canyon Ave and I-5 NB Ramps

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.630

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	1	0	1	0	0	1	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	190.00	100.00	220.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	50.00			50.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	236	532	1	0	2095	543	336	0	570	1	0	1
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	236	532	1	0	2095	543	336	0	570	1	0	1
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	59	133	0	0	524	136	84	0	143	0	0	0
Total Analysis Volume [veh/h]	236	532	1	0	2095	543	336	0	570	1	0	1
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permis	Permis	Permis	Permis	Permis	Permis	Split	Split	Overla	Split	Split	Split
Signal Group	0	6	0	0	2	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.07	0.10	0.10	0.00	0.41	0.32	0.10	0.00	0.00	0.00	0.00	0.00
Intersection LOS	B											
Intersection V/C	0.630											

Intersection Level Of Service Report
Intersection 5: Sand Canyon Ave and Marine Way

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.700

Intersection Setup

Name						
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	1	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	380.00	100.00
Speed [mph]	50.00		50.00		50.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		Yes		Yes	

Volumes

Name						
Base Volume Input [veh/h]	578	204	117	2594	479	116
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	578	204	117	2594	479	116
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	145	51	29	649	120	29
Total Analysis Volume [veh/h]	578	204	117	2594	479	116
Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permissive	Permissive	Permissive	Permissive	Permissive	Permissive
Signal Group	6	0	0	2	4	0
Auxiliary Signal Groups						
Lead / Lag	-	-	-	-	Lag	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.11	0.12	0.03	0.51	0.14	0.07
Intersection LOS	B					
Intersection V/C	0.700					

Intersection Level Of Service Report
Intersection 6: Sand Canyon Ave and I-5 SB Ramps

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.704

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	1	2	0	0	1	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	200.00	100.00	100.00	240.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	50.00			50.00			50.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	0	491	140	815	2178	0	252	0	1128	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	491	140	815	2178	0	252	0	1128	0	0	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	123	35	204	545	0	63	0	282	0	0	0
Total Analysis Volume [veh/h]	0	491	140	815	2178	0	252	0	1128	0	0	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permis	Permis	Permis	Protect	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis
Signal Group	0	6	0	5	2	0	0	8	0	0	0	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lead	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.07	0.08	0.24	0.32	0.00	0.05	0.00	0.20	0.00	0.00	0.00
Intersection LOS	C											
Intersection V/C	0.704											

Intersection Level Of Service Report
Intersection 7: SR-133 SB Ramps and Irvine Blvd

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.665

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	1	0	0	0	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	530.00	100.00	100.00	100.00	140.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			No			No		

Volumes

Name												
Base Volume Input [veh/h]	0	0	0	150	0	302	0	1746	354	403	1744	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	45	0	27	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	0	0	150	0	347	0	1773	354	403	1744	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	0	0	38	0	87	0	443	89	101	436	0
Total Analysis Volume [veh/h]	0	0	0	150	0	347	0	1773	354	403	1744	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis
Signal Group	0	0	0	4	0	0	0	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lag	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.09	0.00	0.10	0.00	0.31	0.31	0.12	0.51	0.00
Intersection LOS	B											
Intersection V/C	0.665											

Intersection Level Of Service Report
Intersection 8: SR-133 NB Ramps and Irvine Blvd

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.544

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

Volumes

Name												
Base Volume Input [veh/h]	117	0	120	0	0	0	0	1758	0	0	2062	98
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	117	0	120	0	0	0	0	1758	0	0	2062	98
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	29	0	30	0	0	0	0	440	0	0	516	25
Total Analysis Volume [veh/h]	117	0	120	0	0	0	0	1758	0	0	2062	98
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis
Signal Group	8	2	0	0	0	0	0	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	-	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.07	0.00	0.07	0.00	0.00	0.00	0.00	0.34	0.00	0.00	0.42	0.42
Intersection LOS	A											
Intersection V/C	0.544											

Irvine Ranch Water District

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Scenario 8 2023 APP PP Route 2A PM
Report File: N:\...\2023 APP PP Route 2A PM.pdf
8/19/2020

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Sand Canyon Ave and Portola Pkwy	Signalized	ICU 1	NB Left	0.499	-	A
2	Sand Canyon Ave and Irvine Blvd	Signalized	ICU 1	WB Thru	0.640	-	B
3	Sand Canyon Ave and Trabuco Rd	Signalized	ICU 1	EB Thru	0.609	-	B
4	Sand Canyon Ave and I-5 NB Ramps	Signalized	ICU 1	NB Thru	0.731	-	C
5	Sand Canyon Ave and Marine Way	Signalized	ICU 1	NB Thru	0.641	-	B
6	Sand Canyon Ave and I-5 SB Ramps	Signalized	ICU 1	NB Thru	0.610	-	B
7	SR-133 SB Ramps and Irvine Blvd	Signalized	ICU 1	WB Thru	0.869	-	D
8	SR-133 NB Ramps and Irvine Blvd	Signalized	ICU 1	WB Right	0.735	-	C

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report

Intersection 1: Sand Canyon Ave and Portola Pkwy

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.499

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	1	0	0	0	0	0	1	2	0	0
Pocket Length [ft]	280.00	100.00	500.00	100.00	100.00	100.00	100.00	100.00	300.00	380.00	100.00	100.00
Speed [mph]	50.00			30.00			50.00			55.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			Yes			No			Yes		

Volumes

Name												
Base Volume Input [veh/h]	767	0	430	0	0	0	0	545	227	176	633	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	18	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	767	0	430	0	18	0	0	545	227	176	633	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	192	0	108	0	5	0	0	136	57	44	158	0
Total Analysis Volume [veh/h]	767	0	430	0	18	0	0	545	227	176	633	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Split	Split	Overla	Split	Split	Split	Permis	Permis	Unsign	Protect	Permis	Permis
Signal Group	6	6	0	0	2	0	0	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	-	-	-	-	-	-	Lead	-	-

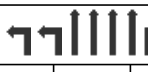
Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.23	0.00	0.00	0.00	0.01	0.00	0.00	0.16	0.00	0.05	0.19	0.00
Intersection LOS	A											
Intersection V/C	0.499											

Intersection Level Of Service Report
Intersection 2: Sand Canyon Ave and Irvine Blvd

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.640

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	2	0	2	2	0	1	2	0	1	2	0	1
Pocket Length [ft]	200.00	100.00	350.00	170.00	100.00	310.00	150.00	100.00	310.00	280.00	100.00	350.00
Speed [mph]	50.00			50.00			55.00			55.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	341	881	577	177	317	94	185	920	177	530	1558	508
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	18	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	341	881	577	195	317	94	185	920	177	530	1558	508
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	85	220	144	49	79	24	46	230	44	133	390	127
Total Analysis Volume [veh/h]	341	881	577	195	317	94	185	920	177	530	1558	508
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protect	Permis	Overla	Protect	Permis	Permis	Protect	Permis	Permis	Protect	Permis	Permis
Signal Group	1	6	0	5	2	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

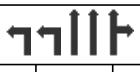
Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.10	0.17	0.00	0.06	0.09	0.06	0.05	0.14	0.10	0.16	0.31	0.30
Intersection LOS	B											
Intersection V/C	0.640											

Intersection Level Of Service Report
Intersection 3: Sand Canyon Ave and Trabuco Rd

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.609

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	2	0	0	2	0	1	2	0	1	2	0	0
Pocket Length [ft]	250.00	100.00	100.00	200.00	100.00	280.00	150.00	100.00	430.00	320.00	100.00	100.00
Speed [mph]	50.00			50.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	133	192	51	196	145	42	313	2315	256	33	793	190
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	133	192	51	196	145	42	313	2315	256	33	793	190
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	33	48	13	49	36	11	78	579	64	8	198	48
Total Analysis Volume [veh/h]	133	192	51	196	145	42	313	2315	256	33	793	190
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protect	Permis	Unsign	Protect	Permis	Permis	Protect	Permis	Unsign	Protect	Permis	Permis
Signal Group	1	6	0	5	2	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

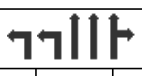
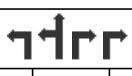
Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.04	0.04	0.00	0.06	0.03	0.02	0.09	0.45	0.00	0.01	0.19	0.19
Intersection LOS	B											
Intersection V/C	0.609											

Intersection Level Of Service Report
Intersection 4: Sand Canyon Ave and I-5 NB Ramps

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.731

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	1	0	1	0	0	1	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	190.00	100.00	220.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	50.00			50.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	601	1944	0	4	844	217	1013	0	223	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	601	1944	0	4	844	217	1013	0	223	0	0	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	150	486	0	1	211	54	253	0	56	0	0	0
Total Analysis Volume [veh/h]	601	1944	0	4	844	217	1013	0	223	0	0	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permis	Permis	Permis	Permis	Permis	Permis	Split	Split	Overla	Split	Split	Split
Signal Group	0	6	0	0	2	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.18	0.38	0.00	0.00	0.17	0.13	0.30	0.00	0.00	0.00	0.00	0.00
Intersection LOS	C											
Intersection V/C	0.731											

Intersection Level Of Service Report
Intersection 5: Sand Canyon Ave and Marine Way

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.641

Intersection Setup

Name						
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	1	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	380.00	100.00
Speed [mph]	50.00		50.00		50.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		Yes		Yes	

Volumes

Name						
Base Volume Input [veh/h]	2507	401	113	1043	182	113
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	2507	401	113	1043	182	113
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	627	100	28	261	46	28
Total Analysis Volume [veh/h]	2507	401	113	1043	182	113
Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permissive	Permissive	Permissive	Permissive	Permissive	Permissive
Signal Group	6	0	0	2	4	0
Auxiliary Signal Groups						
Lead / Lag	-	-	-	-	Lag	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.49	0.24	0.03	0.20	0.05	0.07
Intersection LOS	B					
Intersection V/C	0.641					

Intersection Level Of Service Report
Intersection 6: Sand Canyon Ave and I-5 SB Ramps

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.610

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	1	2	0	0	1	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	200.00	100.00	100.00	240.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	50.00			50.00			50.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	0	2116	496	337	680	0	668	0	349	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	2116	496	337	680	0	668	0	349	0	0	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	529	124	84	170	0	167	0	87	0	0	0
Total Analysis Volume [veh/h]	0	2116	496	337	680	0	668	0	349	0	0	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permis	Permis	Permis	Protect	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis
Signal Group	0	6	0	5	2	0	0	8	0	0	0	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lead	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.31	0.29	0.10	0.10	0.00	0.13	0.00	0.15	0.00	0.00	0.00
Intersection LOS	B											
Intersection V/C	0.610											

Intersection Level Of Service Report
Intersection 7: SR-133 SB Ramps and Irvine Blvd

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.869

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	1	0	0	0	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	530.00	100.00	100.00	100.00	140.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			No			No		

Volumes

Name												
Base Volume Input [veh/h]	0	0	0	56	0	188	0	1501	150	161	2596	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	18	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	0	0	56	0	188	0	1519	150	161	2596	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	0	0	14	0	47	0	380	38	40	649	0
Total Analysis Volume [veh/h]	0	0	0	56	0	188	0	1519	150	161	2596	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis
Signal Group	0	0	0	4	0	0	0	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lag	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.03	0.00	0.06	0.00	0.25	0.25	0.05	0.76	0.00
Intersection LOS	D											
Intersection V/C	0.869											

Intersection Level Of Service Report
Intersection 8: SR-133 NB Ramps and Irvine Blvd

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.735

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

Volumes

Name												
Base Volume Input [veh/h]	321	0	294	0	0	0	0	1371	0	0	2369	162
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	321	0	294	0	0	0	0	1371	0	0	2369	162
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	80	0	74	0	0	0	0	343	0	0	592	41
Total Analysis Volume [veh/h]	321	0	294	0	0	0	0	1371	0	0	2369	162
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis
Signal Group	8	2	0	0	0	0	0	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	-	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.19	0.00	0.17	0.00	0.00	0.00	0.00	0.27	0.00	0.00	0.50	0.50
Intersection LOS	C											
Intersection V/C	0.735											

Irvine Ranch Water District

Vistro File: N:\...\IRWD 2023 APP.vistro
Scenario 9 2023 APP PP Route 2B AM
Report File: N:\...\2023 APP PP Route 2B AM.pdf
8/19/2020

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Sand Canyon Ave and Portola Pkwy	Signalized	ICU 1	WB Thru	0.456	-	A
2	Sand Canyon Ave and Irvine Blvd	Signalized	ICU 1	SB Thru	0.681	-	B
3	Sand Canyon Ave and Trabuco Rd	Signalized	ICU 1	WB Thru	0.580	-	A
4	Sand Canyon Ave and I-5 NB Ramps	Signalized	ICU 1	SB Thru	0.630	-	B
5	Sand Canyon Ave and Marine Way	Signalized	ICU 1	SB Thru	0.700	-	B
6	Sand Canyon Ave and I-5 SB Ramps	Signalized	ICU 1	SB Thru	0.704	-	C
7	SR-133 SB Ramps and Irvine Blvd	Signalized	ICU 1	WB Thru	0.665	-	B
8	SR-133 NB Ramps and Irvine Blvd	Signalized	ICU 1	WB Thru	0.569	-	A

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report
Intersection 1: Sand Canyon Ave and Portola Pkwy

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.456

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	1	0	0	0	0	0	1	2	0	0
Pocket Length [ft]	280.00	100.00	500.00	100.00	100.00	100.00	100.00	100.00	300.00	380.00	100.00	100.00
Speed [mph]	50.00			30.00			50.00			55.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			Yes			No			Yes		

Volumes

Name												
Base Volume Input [veh/h]	268	0	155	0	0	0	0	602	477	407	865	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	45	0	0	27	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	268	45	155	0	27	0	0	602	477	407	865	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	67	11	39	0	7	0	0	151	119	102	216	0
Total Analysis Volume [veh/h]	268	45	155	0	27	0	0	602	477	407	865	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Split	Split	Overla	Split	Split	Split	Permis	Permis	Unsign	Protect	Permis	Permis
Signal Group	6	6	0	0	2	0	0	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	-	-	-	-	-	-	Lead	-	-

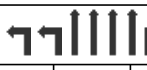
Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.08	0.09	0.00	0.00	0.02	0.00	0.00	0.18	0.00	0.12	0.25	0.00
Intersection LOS	A											
Intersection V/C	0.456											

Intersection Level Of Service Report
Intersection 2: Sand Canyon Ave and Irvine Blvd

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.681

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	2	0	2	2	0	1	2	0	1	2	0	1
Pocket Length [ft]	200.00	100.00	350.00	170.00	100.00	310.00	150.00	100.00	310.00	280.00	100.00	350.00
Speed [mph]	50.00			50.00			55.00			55.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	104	233	472	429	803	80	69	1262	246	606	1007	213
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	27	0	0	0	0	0	0	0	45
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	104	233	472	456	803	80	69	1262	246	606	1007	258
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	26	58	118	114	201	20	17	316	62	152	252	65
Total Analysis Volume [veh/h]	104	233	472	456	803	80	69	1262	246	606	1007	258
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protect	Permis	Overla	Protect	Permis	Permis	Protect	Permis	Permis	Protect	Permis	Permis
Signal Group	1	6	0	5	2	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

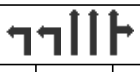
Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.03	0.05	0.00	0.13	0.24	0.05	0.02	0.19	0.14	0.18	0.20	0.15
Intersection LOS	B											
Intersection V/C	0.681											

Intersection Level Of Service Report
Intersection 3: Sand Canyon Ave and Trabuco Rd

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.580

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	2	0	0	2	0	1	2	0	1	2	0	0
Pocket Length [ft]	250.00	100.00	100.00	200.00	100.00	280.00	150.00	100.00	430.00	320.00	100.00	100.00
Speed [mph]	50.00			50.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	218	334	49	189	256	14	73	580	186	103	1610	367
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	218	334	49	189	256	14	73	580	186	103	1610	367
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	55	84	12	47	64	4	18	145	47	26	403	92
Total Analysis Volume [veh/h]	218	334	49	189	256	14	73	580	186	103	1610	367
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protect	Permis	Unsign	Protect	Permis	Permis	Protect	Permis	Unsign	Protect	Permis	Permis
Signal Group	1	6	0	5	2	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

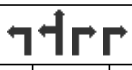
Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.06	0.07	0.00	0.06	0.05	0.01	0.02	0.11	0.00	0.03	0.39	0.39
Intersection LOS	A											
Intersection V/C	0.580											

Intersection Level Of Service Report
Intersection 4: Sand Canyon Ave and I-5 NB Ramps

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.630

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	1	0	1	0	0	1	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	190.00	100.00	220.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	50.00			50.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	236	532	1	0	2095	543	336	0	570	1	0	1
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	236	532	1	0	2095	543	336	0	570	1	0	1
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	59	133	0	0	524	136	84	0	143	0	0	0
Total Analysis Volume [veh/h]	236	532	1	0	2095	543	336	0	570	1	0	1
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permis	Permis	Permis	Permis	Permis	Permis	Split	Split	Overla	Split	Split	Split
Signal Group	0	6	0	0	2	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.07	0.10	0.10	0.00	0.41	0.32	0.10	0.00	0.00	0.00	0.00	0.00
Intersection LOS	B											
Intersection V/C	0.630											

Intersection Level Of Service Report
Intersection 5: Sand Canyon Ave and Marine Way

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.700

Intersection Setup

Name						
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	1	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	380.00	100.00
Speed [mph]	50.00		50.00		50.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		Yes		Yes	

Volumes

Name						
Base Volume Input [veh/h]	578	204	117	2594	479	116
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	578	204	117	2594	479	116
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	145	51	29	649	120	29
Total Analysis Volume [veh/h]	578	204	117	2594	479	116
Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permissive	Permissive	Permissive	Permissive	Permissive	Permissive
Signal Group	6	0	0	2	4	0
Auxiliary Signal Groups						
Lead / Lag	-	-	-	-	Lag	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.11	0.12	0.03	0.51	0.14	0.07
Intersection LOS	B					
Intersection V/C	0.700					

Intersection Level Of Service Report
Intersection 6: Sand Canyon Ave and I-5 SB Ramps

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.704

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	1	2	0	0	1	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	200.00	100.00	100.00	240.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	50.00			50.00			50.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	0	491	140	815	2178	0	252	0	1128	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	491	140	815	2178	0	252	0	1128	0	0	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	123	35	204	545	0	63	0	282	0	0	0
Total Analysis Volume [veh/h]	0	491	140	815	2178	0	252	0	1128	0	0	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permis	Permis	Permis	Protect	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis
Signal Group	0	6	0	5	2	0	0	8	0	0	0	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lead	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.07	0.08	0.24	0.32	0.00	0.05	0.00	0.20	0.00	0.00	0.00
Intersection LOS	C											
Intersection V/C	0.704											

Intersection Level Of Service Report
Intersection 7: SR-133 SB Ramps and Irvine Blvd

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.665

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	1	0	0	0	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	530.00	100.00	100.00	100.00	140.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			No			No		

Volumes

Name												
Base Volume Input [veh/h]	0	0	0	150	0	302	0	1746	354	403	1744	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	27	0	45	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	0	0	150	0	302	0	1746	381	403	1789	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	0	0	38	0	76	0	437	95	101	447	0
Total Analysis Volume [veh/h]	0	0	0	150	0	302	0	1746	381	403	1789	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis
Signal Group	0	0	0	4	0	0	0	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lag	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.09	0.00	0.09	0.00	0.31	0.31	0.12	0.53	0.00
Intersection LOS	B											
Intersection V/C	0.665											

Intersection Level Of Service Report
Intersection 8: SR-133 NB Ramps and Irvine Blvd

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.569

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

Volumes

Name												
Base Volume Input [veh/h]	117	0	120	0	0	0	0	1758	0	0	2062	98
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	45	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	162	0	120	0	0	0	0	1758	0	0	2062	98
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	41	0	30	0	0	0	0	440	0	0	516	25
Total Analysis Volume [veh/h]	162	0	120	0	0	0	0	1758	0	0	2062	98
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis
Signal Group	8	2	0	0	0	0	0	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	-	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.10	0.00	0.07	0.00	0.00	0.00	0.00	0.34	0.00	0.00	0.42	0.42
Intersection LOS	A											
Intersection V/C	0.569											

Irvine Ranch Water District

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Scenario 10 2023 APP PP Route 2B PM
Report File: N:\...\2023 APP PP Route 2B PM.pdf
8/19/2020

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Sand Canyon Ave and Portola Pkwy	Signalized	ICU 1	NB Left	0.499	-	A
2	Sand Canyon Ave and Irvine Blvd	Signalized	ICU 1	WB Thru	0.640	-	B
3	Sand Canyon Ave and Trabuco Rd	Signalized	ICU 1	EB Thru	0.609	-	B
4	Sand Canyon Ave and I-5 NB Ramps	Signalized	ICU 1	NB Thru	0.731	-	C
5	Sand Canyon Ave and Marine Way	Signalized	ICU 1	NB Thru	0.641	-	B
6	Sand Canyon Ave and I-5 SB Ramps	Signalized	ICU 1	NB Thru	0.610	-	B
7	SR-133 SB Ramps and Irvine Blvd	Signalized	ICU 1	WB Thru	0.869	-	D
8	SR-133 NB Ramps and Irvine Blvd	Signalized	ICU 1	WB Right	0.735	-	C

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report

Intersection 1: Sand Canyon Ave and Portola Pkwy

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.499

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	1	0	0	0	0	0	1	2	0	0
Pocket Length [ft]	280.00	100.00	500.00	100.00	100.00	100.00	100.00	100.00	300.00	380.00	100.00	100.00
Speed [mph]	50.00			30.00			50.00			55.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			Yes			No			Yes		

Volumes

Name												
Base Volume Input [veh/h]	767	0	430	0	0	0	0	545	227	176	633	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	18	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	767	0	430	0	18	0	0	545	227	176	633	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	192	0	108	0	5	0	0	136	57	44	158	0
Total Analysis Volume [veh/h]	767	0	430	0	18	0	0	545	227	176	633	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Split	Split	Overla	Split	Split	Split	Permis	Permis	Unsign	Protect	Permis	Permis
Signal Group	6	6	0	0	2	0	0	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	-	-	-	-	-	-	Lead	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.23	0.00	0.00	0.00	0.01	0.00	0.00	0.16	0.00	0.05	0.19	0.00
Intersection LOS	A											
Intersection V/C	0.499											

Intersection Level Of Service Report
Intersection 2: Sand Canyon Ave and Irvine Blvd

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.640

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	2	0	2	2	0	1	2	0	1	2	0	1
Pocket Length [ft]	200.00	100.00	350.00	170.00	100.00	310.00	150.00	100.00	310.00	280.00	100.00	350.00
Speed [mph]	50.00			50.00			55.00			55.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	341	881	577	177	317	94	185	920	177	530	1558	508
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	18	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	341	881	577	195	317	94	185	920	177	530	1558	508
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	85	220	144	49	79	24	46	230	44	133	390	127
Total Analysis Volume [veh/h]	341	881	577	195	317	94	185	920	177	530	1558	508
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protect	Permis	Overla	Protect	Permis	Permis	Protect	Permis	Permis	Protect	Permis	Permis
Signal Group	1	6	0	5	2	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

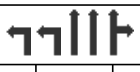
Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.10	0.17	0.00	0.06	0.09	0.06	0.05	0.14	0.10	0.16	0.31	0.30
Intersection LOS	B											
Intersection V/C	0.640											

Intersection Level Of Service Report
Intersection 3: Sand Canyon Ave and Trabuco Rd

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.609

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	2	0	0	2	0	1	2	0	1	2	0	0
Pocket Length [ft]	250.00	100.00	100.00	200.00	100.00	280.00	150.00	100.00	430.00	320.00	100.00	100.00
Speed [mph]	50.00			50.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	133	192	51	196	145	42	313	2315	256	33	793	190
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	133	192	51	196	145	42	313	2315	256	33	793	190
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	33	48	13	49	36	11	78	579	64	8	198	48
Total Analysis Volume [veh/h]	133	192	51	196	145	42	313	2315	256	33	793	190
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protect	Permis	Unsign	Protect	Permis	Permis	Protect	Permis	Unsign	Protect	Permis	Permis
Signal Group	1	6	0	5	2	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

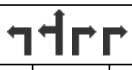
Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.04	0.04	0.00	0.06	0.03	0.02	0.09	0.45	0.00	0.01	0.19	0.19
Intersection LOS	B											
Intersection V/C	0.609											

Intersection Level Of Service Report
Intersection 4: Sand Canyon Ave and I-5 NB Ramps

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.731

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	1	0	1	0	0	1	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	190.00	100.00	220.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	50.00			50.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	601	1944	0	4	844	217	1013	0	223	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	601	1944	0	4	844	217	1013	0	223	0	0	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	150	486	0	1	211	54	253	0	56	0	0	0
Total Analysis Volume [veh/h]	601	1944	0	4	844	217	1013	0	223	0	0	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permis	Permis	Permis	Permis	Permis	Permis	Split	Split	Overla	Split	Split	Split
Signal Group	0	6	0	0	2	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.18	0.38	0.00	0.00	0.17	0.13	0.30	0.00	0.00	0.00	0.00	0.00
Intersection LOS	C											
Intersection V/C	0.731											

Intersection Level Of Service Report
Intersection 5: Sand Canyon Ave and Marine Way

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.641

Intersection Setup

Name						
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	1	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	380.00	100.00
Speed [mph]	50.00		50.00		50.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		Yes		Yes	

Volumes

Name						
Base Volume Input [veh/h]	2507	401	113	1043	182	113
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	2507	401	113	1043	182	113
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	627	100	28	261	46	28
Total Analysis Volume [veh/h]	2507	401	113	1043	182	113
Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permissive	Permissive	Permissive	Permissive	Permissive	Permissive
Signal Group	6	0	0	2	4	0
Auxiliary Signal Groups						
Lead / Lag	-	-	-	-	Lag	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.49	0.24	0.03	0.20	0.05	0.07
Intersection LOS	B					
Intersection V/C	0.641					

Intersection Level Of Service Report
Intersection 6: Sand Canyon Ave and I-5 SB Ramps

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.610

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	1	2	0	0	1	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	200.00	100.00	100.00	240.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	50.00			50.00			50.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	0	2116	496	337	680	0	668	0	349	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	2116	496	337	680	0	668	0	349	0	0	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	529	124	84	170	0	167	0	87	0	0	0
Total Analysis Volume [veh/h]	0	2116	496	337	680	0	668	0	349	0	0	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permis	Permis	Permis	Protect	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis
Signal Group	0	6	0	5	2	0	0	8	0	0	0	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lead	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.31	0.29	0.10	0.10	0.00	0.13	0.00	0.15	0.00	0.00	0.00
Intersection LOS	B											
Intersection V/C	0.610											

Intersection Level Of Service Report
Intersection 7: SR-133 SB Ramps and Irvine Blvd

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.869

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	1	0	0	0	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	530.00	100.00	100.00	100.00	140.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			No			No		

Volumes

Name												
Base Volume Input [veh/h]	0	0	0	56	0	188	0	1501	150	161	2596	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	18	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	0	0	56	0	188	0	1501	168	161	2596	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	0	0	14	0	47	0	375	42	40	649	0
Total Analysis Volume [veh/h]	0	0	0	56	0	188	0	1501	168	161	2596	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis
Signal Group	0	0	0	4	0	0	0	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lag	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.03	0.00	0.06	0.00	0.25	0.25	0.05	0.76	0.00
Intersection LOS	D											
Intersection V/C	0.869											

Intersection Level Of Service Report
Intersection 8: SR-133 NB Ramps and Irvine Blvd

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.735

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

Volumes

Name												
Base Volume Input [veh/h]	321	0	294	0	0	0	0	1371	0	0	2369	162
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	321	0	294	0	0	0	0	1371	0	0	2369	162
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	80	0	74	0	0	0	0	343	0	0	592	41
Total Analysis Volume [veh/h]	321	0	294	0	0	0	0	1371	0	0	2369	162
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis
Signal Group	8	2	0	0	0	0	0	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	-	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.19	0.00	0.17	0.00	0.00	0.00	0.00	0.27	0.00	0.00	0.50	0.50
Intersection LOS	C											
Intersection V/C	0.735											

Interim Year (2023) Pending Project Conditions

Irvine Ranch Water District

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Report File: N:\...\2023 PEN NB AM.pdf

Scenario 1 2023 PEN NB AM
8/19/2020

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Sand Canyon Ave and Portola Pkwy	Signalized	ICU 1	WB Thru	0.439	-	A
2	Sand Canyon Ave and Irvine Blvd	Signalized	ICU 1	SB Thru	0.704	-	C
3	Sand Canyon Ave and Trabuco Rd	Signalized	ICU 1	WB Thru	0.600	-	A
4	Sand Canyon Ave and I-5 NB Ramps	Signalized	ICU 1	SB Thru	0.651	-	B
5	Sand Canyon Ave and Marine Way	Signalized	ICU 1	SB Thru	0.723	-	C
6	Sand Canyon Ave and I-5 SB Ramps	Signalized	ICU 1	SB Thru	0.728	-	C
7	SR-133 SB Ramps and Irvine Blvd	Signalized	ICU 1	WB Thru	0.674	-	B
8	SR-133 NB Ramps and Irvine Blvd	Signalized	ICU 1	WB Right	0.562	-	A

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report
Intersection 1: Sand Canyon Ave and Portola Pkwy

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.439

Intersection Setup

Name						
Approach	Northbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	1	0	1	2	0
Pocket Length [ft]	280.00	500.00	100.00	300.00	380.00	100.00
Speed [mph]	50.00		50.00		55.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		Yes	

Volumes

Name						
Base Volume Input [veh/h]	278	160	624	495	422	896
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	278	160	624	495	422	896
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	70	40	156	124	106	224
Total Analysis Volume [veh/h]	278	160	624	495	422	896
Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Split	Overlap	Permissive	Unsignalized	Protected	Permissive
Signal Group	6	0	8	0	7	4
Auxiliary Signal Groups						
Lead / Lag	Lag	-	-	-	Lead	-

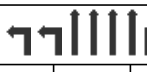
Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.08	0.00	0.18	0.00	0.12	0.26
Intersection LOS	A					
Intersection V/C	0.439					

Intersection Level Of Service Report
Intersection 2: Sand Canyon Ave and Irvine Blvd

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.704

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	2	0	2	2	0	1	2	0	1	2	0	1
Pocket Length [ft]	200.00	100.00	350.00	170.00	100.00	310.00	150.00	100.00	310.00	280.00	100.00	350.00
Speed [mph]	50.00			50.00			55.00			55.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	108	241	490	445	832	83	72	1308	255	628	1044	221
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	108	241	490	445	832	83	72	1308	255	628	1044	221
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	27	60	123	111	208	21	18	327	64	157	261	55
Total Analysis Volume [veh/h]	108	241	490	445	832	83	72	1308	255	628	1044	221
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protect	Permis	Overla	Protect	Permis	Permis	Protect	Permis	Permis	Protect	Permis	Permis
Signal Group	1	6	0	5	2	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

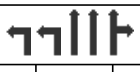
Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.03	0.05	0.00	0.13	0.24	0.05	0.02	0.19	0.15	0.18	0.20	0.13
Intersection LOS	C											
Intersection V/C	0.704											

Intersection Level Of Service Report
Intersection 3: Sand Canyon Ave and Trabuco Rd

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.600

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	2	0	0	2	0	1	2	0	1	2	0	0
Pocket Length [ft]	250.00	100.00	100.00	200.00	100.00	280.00	150.00	100.00	430.00	320.00	100.00	100.00
Speed [mph]	50.00			50.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	226	346	51	196	265	14	76	601	192	106	1669	381
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	226	346	51	196	265	14	76	601	192	106	1669	381
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	57	87	13	49	66	4	19	150	48	27	417	95
Total Analysis Volume [veh/h]	226	346	51	196	265	14	76	601	192	106	1669	381
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protect	Permis	Unsign	Protect	Permis	Permis	Protect	Permis	Unsign	Protect	Permis	Permis
Signal Group	1	6	0	5	2	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

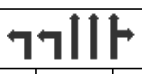
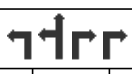
Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.07	0.07	0.00	0.06	0.05	0.01	0.02	0.12	0.00	0.03	0.40	0.40
Intersection LOS	A											
Intersection V/C	0.600											

Intersection Level Of Service Report
Intersection 4: Sand Canyon Ave and I-5 NB Ramps

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.651

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	1	0	1	0	0	1	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	190.00	100.00	220.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	50.00			50.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	245	551	1	0	2172	563	349	0	591	1	0	1
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	245	551	1	0	2172	563	349	0	591	1	0	1
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	61	138	0	0	543	141	87	0	148	0	0	0
Total Analysis Volume [veh/h]	245	551	1	0	2172	563	349	0	591	1	0	1
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permis	Permis	Permis	Permis	Permis	Permis	Split	Split	Overla	Split	Split	Split
Signal Group	0	6	0	0	2	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.07	0.11	0.11	0.00	0.43	0.33	0.10	0.00	0.00	0.00	0.00	0.00
Intersection LOS	B											
Intersection V/C	0.651											

Intersection Level Of Service Report
Intersection 5: Sand Canyon Ave and Marine Way

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.723

Intersection Setup

Name						
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	1	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	380.00	100.00
Speed [mph]	50.00		50.00		50.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		Yes		Yes	

Volumes

Name						
Base Volume Input [veh/h]	599	212	122	2689	496	121
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	599	212	122	2689	496	121
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	150	53	31	672	124	30
Total Analysis Volume [veh/h]	599	212	122	2689	496	121
Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permissive	Permissive	Permissive	Permissive	Permissive	Permissive
Signal Group	6	0	0	2	4	0
Auxiliary Signal Groups						
Lead / Lag	-	-	-	-	Lag	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.12	0.12	0.04	0.53	0.15	0.07
Intersection LOS	C					
Intersection V/C	0.723					

Intersection Level Of Service Report
Intersection 6: Sand Canyon Ave and I-5 SB Ramps

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.728

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	1	2	0	0	1	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	200.00	100.00	100.00	240.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	50.00			50.00			50.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	0	509	145	845	2258	0	262	0	1169	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	509	145	845	2258	0	262	0	1169	0	0	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	127	36	211	565	0	66	0	292	0	0	0
Total Analysis Volume [veh/h]	0	509	145	845	2258	0	262	0	1169	0	0	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permis	Permis	Permis	Protect	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis
Signal Group	0	6	0	5	2	0	0	8	0	0	0	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lead	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.07	0.09	0.25	0.33	0.00	0.05	0.00	0.21	0.00	0.00	0.00
Intersection LOS	C											
Intersection V/C	0.728											

Intersection Level Of Service Report
Intersection 7: SR-133 SB Ramps and Irvine Blvd

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.674

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	1	0	0	0	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	530.00	100.00	100.00	100.00	140.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			No			No		

Volumes

Name												
Base Volume Input [veh/h]	0	0	0	155	0	313	0	1810	367	418	1808	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	0	0	155	0	313	0	1810	367	418	1808	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	0	0	39	0	78	0	453	92	105	452	0
Total Analysis Volume [veh/h]	0	0	0	155	0	313	0	1810	367	418	1808	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis
Signal Group	0	0	0	4	0	0	0	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lag	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.09	0.00	0.09	0.00	0.32	0.32	0.12	0.53	0.00
Intersection LOS	B											
Intersection V/C	0.674											

Intersection Level Of Service Report
Intersection 8: SR-133 NB Ramps and Irvine Blvd

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.562

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

Volumes

Name												
Base Volume Input [veh/h]	122	0	124	0	0	0	0	1822	0	0	2137	101
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	122	0	124	0	0	0	0	1822	0	0	2137	101
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	31	0	31	0	0	0	0	456	0	0	534	25
Total Analysis Volume [veh/h]	122	0	124	0	0	0	0	1822	0	0	2137	101
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis
Signal Group	8	2	0	0	0	0	0	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	-	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.07	0.00	0.07	0.00	0.00	0.00	0.00	0.36	0.00	0.00	0.44	0.44
Intersection LOS	A											
Intersection V/C	0.562											

Irvine Ranch Water District

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Report File: N:\...\2023 PEN NB PM.pdf

Scenario 2 2023 PEN NB PM
8/19/2020

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Sand Canyon Ave and Portola Pkwy	Signalized	ICU 1	NB Left	0.495	-	A
2	Sand Canyon Ave and Irvine Blvd	Signalized	ICU 1	WB Thru	0.644	-	B
3	Sand Canyon Ave and Trabuco Rd	Signalized	ICU 1	EB Thru	0.618	-	B
4	Sand Canyon Ave and I-5 NB Ramps	Signalized	ICU 1	NB Thru	0.743	-	C
5	Sand Canyon Ave and Marine Way	Signalized	ICU 1	NB Thru	0.651	-	B
6	Sand Canyon Ave and I-5 SB Ramps	Signalized	ICU 1	NB Thru	0.619	-	B
7	SR-133 SB Ramps and Irvine Blvd	Signalized	ICU 1	WB Thru	0.883	-	D
8	SR-133 NB Ramps and Irvine Blvd	Signalized	ICU 1	WB Thru	0.746	-	C

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report
Intersection 1: Sand Canyon Ave and Portola Pkwy

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.495

Intersection Setup

Name						
Approach	Northbound		Eastbound		Westbound	
Lane Configuration						
Turning Movement	Left	Right	Thru	Right	Left	Thru
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	1	0	1	2	0
Pocket Length [ft]	280.00	500.00	100.00	300.00	380.00	100.00
Speed [mph]	50.00		50.00		55.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	No		No		Yes	

Volumes

Name						
Base Volume Input [veh/h]	780	437	554	230	179	644
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	780	437	554	230	179	644
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	195	109	139	58	45	161
Total Analysis Volume [veh/h]	780	437	554	230	179	644
Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Split	Overlap	Permissive	Unsignalized	Protected	Permissive
Signal Group	6	0	8	0	7	4
Auxiliary Signal Groups						
Lead / Lag	Lag	-	-	-	Lead	-

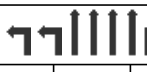
Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.23	0.00	0.16	0.00	0.05	0.19
Intersection LOS	A					
Intersection V/C	0.495					

Intersection Level Of Service Report
Intersection 2: Sand Canyon Ave and Irvine Blvd

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.644

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	2	0	2	2	0	1	2	0	1	2	0	1
Pocket Length [ft]	200.00	100.00	350.00	170.00	100.00	310.00	150.00	100.00	310.00	280.00	100.00	350.00
Speed [mph]	50.00			50.00			55.00			55.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	346	895	587	180	322	96	188	936	180	539	1584	516
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	346	895	587	180	322	96	188	936	180	539	1584	516
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	87	224	147	45	81	24	47	234	45	135	396	129
Total Analysis Volume [veh/h]	346	895	587	180	322	96	188	936	180	539	1584	516
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protect	Permis	Overla	Protect	Permis	Permis	Protect	Permis	Permis	Protect	Permis	Permis
Signal Group	1	6	0	5	2	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

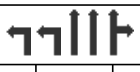
Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.10	0.18	0.00	0.05	0.09	0.06	0.06	0.14	0.11	0.16	0.31	0.30
Intersection LOS	B											
Intersection V/C	0.644											

Intersection Level Of Service Report
Intersection 3: Sand Canyon Ave and Trabuco Rd

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.618

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	2	0	0	2	0	1	2	0	1	2	0	0
Pocket Length [ft]	250.00	100.00	100.00	200.00	100.00	280.00	150.00	100.00	430.00	320.00	100.00	100.00
Speed [mph]	50.00			50.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	135	195	52	199	147	43	319	2354	261	34	806	193
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	135	195	52	199	147	43	319	2354	261	34	806	193
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	34	49	13	50	37	11	80	589	65	9	202	48
Total Analysis Volume [veh/h]	135	195	52	199	147	43	319	2354	261	34	806	193
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protect	Permis	Unsign	Protect	Permis	Permis	Protect	Permis	Unsign	Protect	Permis	Permis
Signal Group	1	6	0	5	2	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

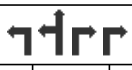
Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.04	0.04	0.00	0.06	0.03	0.03	0.09	0.46	0.00	0.01	0.20	0.20
Intersection LOS	B											
Intersection V/C	0.618											

Intersection Level Of Service Report
Intersection 4: Sand Canyon Ave and I-5 NB Ramps

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.743

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	1	0	1	0	0	1	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	190.00	100.00	220.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	50.00			50.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	611	1976	0	4	858	220	1030	0	227	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	611	1976	0	4	858	220	1030	0	227	0	0	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	153	494	0	1	215	55	258	0	57	0	0	0
Total Analysis Volume [veh/h]	611	1976	0	4	858	220	1030	0	227	0	0	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permis	Permis	Permis	Permis	Permis	Permis	Split	Split	Overla	Split	Split	Split
Signal Group	0	6	0	0	2	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.18	0.39	0.00	0.00	0.17	0.13	0.30	0.00	0.00	0.00	0.00	0.00
Intersection LOS	C											
Intersection V/C	0.743											

Intersection Level Of Service Report
Intersection 5: Sand Canyon Ave and Marine Way

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.651

Intersection Setup

Name						
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	1	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	380.00	100.00
Speed [mph]	50.00		50.00		50.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		Yes		Yes	

Volumes

Name						
Base Volume Input [veh/h]	2549	408	115	1060	185	115
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	2549	408	115	1060	185	115
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	637	102	29	265	46	29
Total Analysis Volume [veh/h]	2549	408	115	1060	185	115
Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permissive	Permissive	Permissive	Permissive	Permissive	Permissive
Signal Group	6	0	0	2	4	0
Auxiliary Signal Groups						
Lead / Lag	-	-	-	-	Lag	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.50	0.24	0.03	0.21	0.05	0.07
Intersection LOS	B					
Intersection V/C	0.651					

Intersection Level Of Service Report
Intersection 6: Sand Canyon Ave and I-5 SB Ramps

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.619

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	1	2	0	0	1	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	200.00	100.00	100.00	240.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	50.00			50.00			50.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	0	2151	504	343	691	0	679	0	355	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	2151	504	343	691	0	679	0	355	0	0	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	538	126	86	173	0	170	0	89	0	0	0
Total Analysis Volume [veh/h]	0	2151	504	343	691	0	679	0	355	0	0	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permis	Permis	Permis	Protect	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis
Signal Group	0	6	0	5	2	0	0	8	0	0	0	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lead	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.32	0.30	0.10	0.10	0.00	0.13	0.00	0.15	0.00	0.00	0.00
Intersection LOS	B											
Intersection V/C	0.619											

Intersection Level Of Service Report
Intersection 7: SR-133 SB Ramps and Irvine Blvd

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.883

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	1	0	0	0	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	530.00	100.00	100.00	100.00	140.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			No			No		

Volumes

Name												
Base Volume Input [veh/h]	0	0	0	57	0	191	0	1526	152	164	2640	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	0	0	57	0	191	0	1526	152	164	2640	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	0	0	14	0	48	0	382	38	41	660	0
Total Analysis Volume [veh/h]	0	0	0	57	0	191	0	1526	152	164	2640	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis
Signal Group	0	0	0	4	0	0	0	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lag	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.03	0.00	0.06	0.00	0.25	0.25	0.05	0.78	0.00
Intersection LOS	D											
Intersection V/C	0.883											

Intersection Level Of Service Report
Intersection 8: SR-133 NB Ramps and Irvine Blvd

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.746

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

Volumes

Name												
Base Volume Input [veh/h]	326	0	298	0	0	0	0	1394	0	0	2408	165
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	326	0	298	0	0	0	0	1394	0	0	2408	165
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	82	0	75	0	0	0	0	349	0	0	602	41
Total Analysis Volume [veh/h]	326	0	298	0	0	0	0	1394	0	0	2408	165
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis
Signal Group	8	2	0	0	0	0	0	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	-	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.19	0.00	0.18	0.00	0.00	0.00	0.00	0.27	0.00	0.00	0.50	0.50
Intersection LOS	C											
Intersection V/C	0.746											

Irvine Ranch Water District

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Scenario 3 2023 PEN PP Route 1A AM
Report File: N:\...\2023 PEN PP Route 1A AM.pdf
8/19/2020

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Sand Canyon Ave and Portola Pkwy	Signalized	ICU 1	WB Thru	0.470	-	A
2	Sand Canyon Ave and Irvine Blvd	Signalized	ICU 1	SB Thru	0.711	-	C
3	Sand Canyon Ave and Trabuco Rd	Signalized	ICU 1	WB Thru	0.609	-	B
4	Sand Canyon Ave and I-5 NB Ramps	Signalized	ICU 1	SB Thru	0.651	-	B
5	Sand Canyon Ave and Marine Way	Signalized	ICU 1	SB Thru	0.723	-	C
6	Sand Canyon Ave and I-5 SB Ramps	Signalized	ICU 1	SB Thru	0.728	-	C
7	SR-133 SB Ramps and Irvine Blvd	Signalized	ICU 1	WB Thru	0.674	-	B
8	SR-133 NB Ramps and Irvine Blvd	Signalized	ICU 1	WB Right	0.562	-	A

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report
Intersection 1: Sand Canyon Ave and Portola Pkwy

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.470

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	1	0	0	0	0	0	1	2	0	0
Pocket Length [ft]	280.00	100.00	500.00	100.00	100.00	100.00	100.00	100.00	300.00	380.00	100.00	100.00
Speed [mph]	50.00			30.00			50.00			55.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			Yes			No			Yes		

Volumes

Name												
Base Volume Input [veh/h]	278	0	160	0	0	0	0	624	495	422	896	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	45	0	0	27	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	278	45	160	0	27	0	0	624	495	422	896	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	70	11	40	0	7	0	0	156	124	106	224	0
Total Analysis Volume [veh/h]	278	45	160	0	27	0	0	624	495	422	896	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Split	Split	Overla	Split	Split	Split	Permis	Permis	Unsign	Protect	Permis	Permis
Signal Group	6	6	0	0	2	0	0	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	-	-	-	-	-	-	Lead	-	-

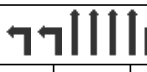
Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.08	0.10	0.00	0.00	0.02	0.00	0.00	0.18	0.00	0.12	0.26	0.00
Intersection LOS	A											
Intersection V/C	0.470											

Intersection Level Of Service Report
Intersection 2: Sand Canyon Ave and Irvine Blvd

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.711

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	2	0	2	2	0	1	2	0	1	2	0	1
Pocket Length [ft]	200.00	100.00	350.00	170.00	100.00	310.00	150.00	100.00	310.00	280.00	100.00	350.00
Speed [mph]	50.00			50.00			55.00			55.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	108	241	490	445	832	83	72	1308	255	628	1044	221
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	45	0	0	27	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	108	286	490	445	859	83	72	1308	255	628	1044	221
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	27	72	123	111	215	21	18	327	64	157	261	55
Total Analysis Volume [veh/h]	108	286	490	445	859	83	72	1308	255	628	1044	221
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protect	Permis	Overla	Protect	Permis	Permis	Protect	Permis	Permis	Protect	Permis	Permis
Signal Group	1	6	0	5	2	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

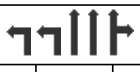
Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.03	0.06	0.00	0.13	0.25	0.05	0.02	0.19	0.15	0.18	0.20	0.13
Intersection LOS	C											
Intersection V/C	0.711											

Intersection Level Of Service Report
Intersection 3: Sand Canyon Ave and Trabuco Rd

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.609

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	2	0	0	2	0	1	2	0	1	2	0	0
Pocket Length [ft]	250.00	100.00	100.00	200.00	100.00	280.00	150.00	100.00	430.00	320.00	100.00	100.00
Speed [mph]	50.00			50.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	226	346	51	196	265	14	76	601	192	106	1669	381
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	45	0	0	27	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	226	391	51	196	292	14	76	601	192	106	1669	381
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	57	98	13	49	73	4	19	150	48	27	417	95
Total Analysis Volume [veh/h]	226	391	51	196	292	14	76	601	192	106	1669	381
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protect	Permis	Unsign	Protect	Permis	Permis	Protect	Permis	Unsign	Protect	Permis	Permis
Signal Group	1	6	0	5	2	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

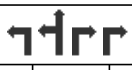
Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.07	0.08	0.00	0.06	0.06	0.01	0.02	0.12	0.00	0.03	0.40	0.40
Intersection LOS	B											
Intersection V/C	0.609											

Intersection Level Of Service Report
Intersection 4: Sand Canyon Ave and I-5 NB Ramps

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.651

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	1	0	1	0	0	1	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	190.00	100.00	220.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	50.00			50.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	245	551	1	0	2172	563	349	0	591	1	0	1
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	45	0	0	0	27	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	245	596	1	0	2172	590	349	0	591	1	0	1
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	61	149	0	0	543	148	87	0	148	0	0	0
Total Analysis Volume [veh/h]	245	596	1	0	2172	590	349	0	591	1	0	1
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permis	Permis	Permis	Permis	Permis	Permis	Split	Split	Overla	Split	Split	Split
Signal Group	0	6	0	0	2	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.07	0.12	0.12	0.00	0.43	0.35	0.10	0.00	0.00	0.00	0.00	0.00
Intersection LOS	B											
Intersection V/C	0.651											

Intersection Level Of Service Report
Intersection 5: Sand Canyon Ave and Marine Way

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.723

Intersection Setup

Name						
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	1	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	380.00	100.00
Speed [mph]	50.00		50.00		50.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		Yes		Yes	

Volumes

Name						
Base Volume Input [veh/h]	599	212	122	2689	496	121
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	45	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	644	212	122	2689	496	121
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	161	53	31	672	124	30
Total Analysis Volume [veh/h]	644	212	122	2689	496	121
Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permissive	Permissive	Permissive	Permissive	Permissive	Permissive
Signal Group	6	0	0	2	4	0
Auxiliary Signal Groups						
Lead / Lag	-	-	-	-	Lag	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.13	0.12	0.04	0.53	0.15	0.07
Intersection LOS	C					
Intersection V/C	0.723					

Intersection Level Of Service Report
Intersection 6: Sand Canyon Ave and I-5 SB Ramps

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.728

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	1	2	0	0	1	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	200.00	100.00	100.00	240.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	50.00			50.00			50.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	0	509	145	845	2258	0	262	0	1169	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	45	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	509	145	845	2258	0	307	0	1169	0	0	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	127	36	211	565	0	77	0	292	0	0	0
Total Analysis Volume [veh/h]	0	509	145	845	2258	0	307	0	1169	0	0	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permis	Permis	Permis	Protect	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis
Signal Group	0	6	0	5	2	0	0	8	0	0	0	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lead	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.07	0.09	0.25	0.33	0.00	0.06	0.00	0.22	0.00	0.00	0.00
Intersection LOS	C											
Intersection V/C	0.728											

Intersection Level Of Service Report
Intersection 7: SR-133 SB Ramps and Irvine Blvd

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.674

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	1	0	0	0	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	530.00	100.00	100.00	100.00	140.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			No			No		

Volumes

Name												
Base Volume Input [veh/h]	0	0	0	155	0	313	0	1810	367	418	1808	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	0	0	155	0	313	0	1810	367	418	1808	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	0	0	39	0	78	0	453	92	105	452	0
Total Analysis Volume [veh/h]	0	0	0	155	0	313	0	1810	367	418	1808	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis
Signal Group	0	0	0	4	0	0	0	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lag	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.09	0.00	0.09	0.00	0.32	0.32	0.12	0.53	0.00
Intersection LOS	B											
Intersection V/C	0.674											

Intersection Level Of Service Report
Intersection 8: SR-133 NB Ramps and Irvine Blvd

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.562

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

Volumes

Name												
Base Volume Input [veh/h]	122	0	124	0	0	0	0	1822	0	0	2137	101
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	122	0	124	0	0	0	0	1822	0	0	2137	101
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	31	0	31	0	0	0	0	456	0	0	534	25
Total Analysis Volume [veh/h]	122	0	124	0	0	0	0	1822	0	0	2137	101
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis
Signal Group	8	2	0	0	0	0	0	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	-	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.07	0.00	0.07	0.00	0.00	0.00	0.00	0.36	0.00	0.00	0.44	0.44
Intersection LOS	A											
Intersection V/C	0.562											

Irvine Ranch Water District

Vistro File: N:\...\IRWD 2023 APP.vistro
Scenario 4 2023 PEN PP Route 1A PM
Report File: N:\...\2023 PEN PP Route 1A PM.pdf
8/19/2020

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Sand Canyon Ave and Portola Pkwy	Signalized	ICU 1	NB Left	0.506	-	A
2	Sand Canyon Ave and Irvine Blvd	Signalized	ICU 1	WB Thru	0.644	-	B
3	Sand Canyon Ave and Trabuco Rd	Signalized	ICU 1	EB Thru	0.618	-	B
4	Sand Canyon Ave and I-5 NB Ramps	Signalized	ICU 1	NB Thru	0.743	-	C
5	Sand Canyon Ave and Marine Way	Signalized	ICU 1	NB Thru	0.651	-	B
6	Sand Canyon Ave and I-5 SB Ramps	Signalized	ICU 1	NB Thru	0.619	-	B
7	SR-133 SB Ramps and Irvine Blvd	Signalized	ICU 1	WB Thru	0.883	-	D
8	SR-133 NB Ramps and Irvine Blvd	Signalized	ICU 1	WB Thru	0.746	-	C

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report
Intersection 1: Sand Canyon Ave and Portola Pkwy

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.506

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	1	0	0	0	0	0	1	2	0	0
Pocket Length [ft]	280.00	100.00	500.00	100.00	100.00	100.00	100.00	100.00	300.00	380.00	100.00	100.00
Speed [mph]	50.00			30.00			50.00			55.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			Yes			No			Yes		

Volumes

Name												
Base Volume Input [veh/h]	780	0	437	0	0	0	0	554	230	179	644	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	18	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	780	0	437	0	18	0	0	554	230	179	644	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	195	0	109	0	5	0	0	139	58	45	161	0
Total Analysis Volume [veh/h]	780	0	437	0	18	0	0	554	230	179	644	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Split	Split	Overla	Split	Split	Split	Permis	Permis	Unsign	Protect	Permis	Permis
Signal Group	6	6	0	0	2	0	0	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	-	-	-	-	-	-	Lead	-	-

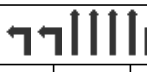
Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.23	0.00	0.00	0.00	0.01	0.00	0.00	0.16	0.00	0.05	0.19	0.00
Intersection LOS	A											
Intersection V/C	0.506											

Intersection Level Of Service Report
Intersection 2: Sand Canyon Ave and Irvine Blvd

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.644

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	2	0	2	2	0	1	2	0	1	2	0	1
Pocket Length [ft]	200.00	100.00	350.00	170.00	100.00	310.00	150.00	100.00	310.00	280.00	100.00	350.00
Speed [mph]	50.00			50.00			55.00			55.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	346	895	587	180	322	96	188	936	180	539	1584	516
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	18	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	346	895	587	180	340	96	188	936	180	539	1584	516
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	87	224	147	45	85	24	47	234	45	135	396	129
Total Analysis Volume [veh/h]	346	895	587	180	340	96	188	936	180	539	1584	516
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protect	Permis	Overla	Protect	Permis	Permis	Protect	Permis	Permis	Protect	Permis	Permis
Signal Group	1	6	0	5	2	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

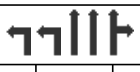
Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.10	0.18	0.00	0.05	0.10	0.06	0.06	0.14	0.11	0.16	0.31	0.30
Intersection LOS	B											
Intersection V/C	0.644											

Intersection Level Of Service Report
Intersection 3: Sand Canyon Ave and Trabuco Rd

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.618

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	2	0	0	2	0	1	2	0	1	2	0	0
Pocket Length [ft]	250.00	100.00	100.00	200.00	100.00	280.00	150.00	100.00	430.00	320.00	100.00	100.00
Speed [mph]	50.00			50.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	135	195	52	199	147	43	319	2354	261	34	806	193
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	18	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	135	195	52	199	165	43	319	2354	261	34	806	193
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	34	49	13	50	41	11	80	589	65	9	202	48
Total Analysis Volume [veh/h]	135	195	52	199	165	43	319	2354	261	34	806	193
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protect	Permis	Unsign	Protect	Permis	Permis	Protect	Permis	Unsign	Protect	Permis	Permis
Signal Group	1	6	0	5	2	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

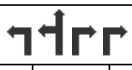
Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.04	0.04	0.00	0.06	0.03	0.03	0.09	0.46	0.00	0.01	0.20	0.20
Intersection LOS	B											
Intersection V/C	0.618											

Intersection Level Of Service Report
Intersection 4: Sand Canyon Ave and I-5 NB Ramps

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.743

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	1	0	1	0	0	1	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	190.00	100.00	220.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	50.00			50.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	611	1976	0	4	858	220	1030	0	227	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	18	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	611	1976	0	4	858	238	1030	0	227	0	0	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	153	494	0	1	215	60	258	0	57	0	0	0
Total Analysis Volume [veh/h]	611	1976	0	4	858	238	1030	0	227	0	0	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permis	Permis	Permis	Permis	Permis	Permis	Split	Split	Overla	Split	Split	Split
Signal Group	0	6	0	0	2	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.18	0.39	0.00	0.00	0.17	0.14	0.30	0.00	0.00	0.00	0.00	0.00
Intersection LOS	C											
Intersection V/C	0.743											

Intersection Level Of Service Report
Intersection 5: Sand Canyon Ave and Marine Way

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.651

Intersection Setup

Name						
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	1	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	380.00	100.00
Speed [mph]	50.00		50.00		50.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		Yes		Yes	

Volumes

Name						
Base Volume Input [veh/h]	2549	408	115	1060	185	115
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	2549	408	115	1060	185	115
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	637	102	29	265	46	29
Total Analysis Volume [veh/h]	2549	408	115	1060	185	115
Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permissive	Permissive	Permissive	Permissive	Permissive	Permissive
Signal Group	6	0	0	2	4	0
Auxiliary Signal Groups						
Lead / Lag	-	-	-	-	Lag	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.50	0.24	0.03	0.21	0.05	0.07
Intersection LOS	B					
Intersection V/C	0.651					

Intersection Level Of Service Report
Intersection 6: Sand Canyon Ave and I-5 SB Ramps

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.619

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	1	2	0	0	1	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	200.00	100.00	100.00	240.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	50.00			50.00			50.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	0	2151	504	343	691	0	679	0	355	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	2151	504	343	691	0	679	0	355	0	0	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	538	126	86	173	0	170	0	89	0	0	0
Total Analysis Volume [veh/h]	0	2151	504	343	691	0	679	0	355	0	0	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permis	Permis	Permis	Protect	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis
Signal Group	0	6	0	5	2	0	0	8	0	0	0	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lead	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.32	0.30	0.10	0.10	0.00	0.13	0.00	0.15	0.00	0.00	0.00
Intersection LOS	B											
Intersection V/C	0.619											

Intersection Level Of Service Report
Intersection 7: SR-133 SB Ramps and Irvine Blvd

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.883

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	1	0	0	0	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	530.00	100.00	100.00	100.00	140.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			No			No		

Volumes

Name												
Base Volume Input [veh/h]	0	0	0	57	0	191	0	1526	152	164	2640	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	0	0	57	0	191	0	1526	152	164	2640	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	0	0	14	0	48	0	382	38	41	660	0
Total Analysis Volume [veh/h]	0	0	0	57	0	191	0	1526	152	164	2640	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis
Signal Group	0	0	0	4	0	0	0	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lag	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.03	0.00	0.06	0.00	0.25	0.25	0.05	0.78	0.00
Intersection LOS	D											
Intersection V/C	0.883											

Intersection Level Of Service Report
Intersection 8: SR-133 NB Ramps and Irvine Blvd

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.746

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

Volumes

Name												
Base Volume Input [veh/h]	326	0	298	0	0	0	0	1394	0	0	2408	165
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	326	0	298	0	0	0	0	1394	0	0	2408	165
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	82	0	75	0	0	0	0	349	0	0	602	41
Total Analysis Volume [veh/h]	326	0	298	0	0	0	0	1394	0	0	2408	165
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis
Signal Group	8	2	0	0	0	0	0	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	-	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.19	0.00	0.18	0.00	0.00	0.00	0.00	0.27	0.00	0.00	0.50	0.50
Intersection LOS	C											
Intersection V/C	0.746											

Irvine Ranch Water District

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Scenario 5 2023 PEN PP Route 1B AM
Report File: N:\...\2023 PEN PP Route 1B AM.pdf
8/19/2020

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Sand Canyon Ave and Portola Pkwy	Signalized	ICU 1	WB Thru	0.470	-	A
2	Sand Canyon Ave and Irvine Blvd	Signalized	ICU 1	SB Thru	0.711	-	C
3	Sand Canyon Ave and Trabuco Rd	Signalized	ICU 1	WB Thru	0.609	-	B
4	Sand Canyon Ave and I-5 NB Ramps	Signalized	ICU 1	SB Thru	0.670	-	B
5	Sand Canyon Ave and Marine Way	Signalized	ICU 1	SB Thru	0.728	-	C
6	Sand Canyon Ave and I-5 SB Ramps	Signalized	ICU 1	SB Thru	0.736	-	C
7	SR-133 SB Ramps and Irvine Blvd	Signalized	ICU 1	WB Thru	0.674	-	B
8	SR-133 NB Ramps and Irvine Blvd	Signalized	ICU 1	WB Right	0.562	-	A

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report
Intersection 1: Sand Canyon Ave and Portola Pkwy

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.470

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	1	0	0	0	0	0	1	2	0	0
Pocket Length [ft]	280.00	100.00	500.00	100.00	100.00	100.00	100.00	100.00	300.00	380.00	100.00	100.00
Speed [mph]	50.00			30.00			50.00			55.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			Yes			No			Yes		

Volumes

Name												
Base Volume Input [veh/h]	278	0	160	0	0	0	0	624	495	422	896	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	45	0	0	27	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	278	45	160	0	27	0	0	624	495	422	896	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	70	11	40	0	7	0	0	156	124	106	224	0
Total Analysis Volume [veh/h]	278	45	160	0	27	0	0	624	495	422	896	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Split	Split	Overla	Split	Split	Split	Permis	Permis	Unsign	Protect	Permis	Permis
Signal Group	6	6	0	0	2	0	0	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	-	-	-	-	-	-	Lead	-	-

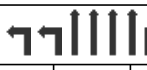
Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.08	0.10	0.00	0.00	0.02	0.00	0.00	0.18	0.00	0.12	0.26	0.00
Intersection LOS	A											
Intersection V/C	0.470											

Intersection Level Of Service Report
Intersection 2: Sand Canyon Ave and Irvine Blvd

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.711

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	2	0	2	2	0	1	2	0	1	2	0	1
Pocket Length [ft]	200.00	100.00	350.00	170.00	100.00	310.00	150.00	100.00	310.00	280.00	100.00	350.00
Speed [mph]	50.00			50.00			55.00			55.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	108	241	490	445	832	83	72	1308	255	628	1044	221
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	45	0	0	27	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	108	286	490	445	859	83	72	1308	255	628	1044	221
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	27	72	123	111	215	21	18	327	64	157	261	55
Total Analysis Volume [veh/h]	108	286	490	445	859	83	72	1308	255	628	1044	221
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protect	Permis	Overla	Protect	Permis	Permis	Protect	Permis	Permis	Protect	Permis	Permis
Signal Group	1	6	0	5	2	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

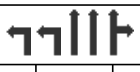
Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.03	0.06	0.00	0.13	0.25	0.05	0.02	0.19	0.15	0.18	0.20	0.13
Intersection LOS	C											
Intersection V/C	0.711											

Intersection Level Of Service Report
Intersection 3: Sand Canyon Ave and Trabuco Rd

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.609

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	2	0	0	2	0	1	2	0	1	2	0	0
Pocket Length [ft]	250.00	100.00	100.00	200.00	100.00	280.00	150.00	100.00	430.00	320.00	100.00	100.00
Speed [mph]	50.00			50.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	226	346	51	196	265	14	76	601	192	106	1669	381
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	45	0	0	27	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	226	391	51	196	292	14	76	601	192	106	1669	381
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	57	98	13	49	73	4	19	150	48	27	417	95
Total Analysis Volume [veh/h]	226	391	51	196	292	14	76	601	192	106	1669	381
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protect	Permis	Unsign	Protect	Permis	Permis	Protect	Permis	Unsign	Protect	Permis	Permis
Signal Group	1	6	0	5	2	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

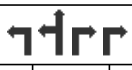
Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.07	0.08	0.00	0.06	0.06	0.01	0.02	0.12	0.00	0.03	0.40	0.40
Intersection LOS	B											
Intersection V/C	0.609											

Intersection Level Of Service Report
Intersection 4: Sand Canyon Ave and I-5 NB Ramps

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.670

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	1	0	1	0	0	1	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	190.00	100.00	220.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	50.00			50.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	245	551	1	0	2172	563	349	0	591	1	0	1
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	27	0	45	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	245	551	1	0	2199	563	394	0	591	1	0	1
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	61	138	0	0	550	141	99	0	148	0	0	0
Total Analysis Volume [veh/h]	245	551	1	0	2199	563	394	0	591	1	0	1
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permis	Permis	Permis	Permis	Permis	Permis	Split	Split	Overla	Split	Split	Split
Signal Group	0	6	0	0	2	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.07	0.11	0.11	0.00	0.43	0.33	0.12	0.00	0.00	0.00	0.00	0.00
Intersection LOS	B											
Intersection V/C	0.670											

Intersection Level Of Service Report
Intersection 5: Sand Canyon Ave and Marine Way

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.728

Intersection Setup

Name						
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	1	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	380.00	100.00
Speed [mph]	50.00		50.00		50.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		Yes		Yes	

Volumes

Name						
Base Volume Input [veh/h]	599	212	122	2689	496	121
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	27	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	599	212	122	2716	496	121
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	150	53	31	679	124	30
Total Analysis Volume [veh/h]	599	212	122	2716	496	121
Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permissive	Permissive	Permissive	Permissive	Permissive	Permissive
Signal Group	6	0	0	2	4	0
Auxiliary Signal Groups						
Lead / Lag	-	-	-	-	Lag	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.12	0.12	0.04	0.53	0.15	0.07
Intersection LOS	C					
Intersection V/C	0.728					

Intersection Level Of Service Report
Intersection 6: Sand Canyon Ave and I-5 SB Ramps

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.736

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	1	2	0	0	1	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	200.00	100.00	100.00	240.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	50.00			50.00			50.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	0	509	145	845	2258	0	262	0	1169	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	27	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	509	145	872	2258	0	262	0	1169	0	0	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	127	36	218	565	0	66	0	292	0	0	0
Total Analysis Volume [veh/h]	0	509	145	872	2258	0	262	0	1169	0	0	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permis	Permis	Permis	Protect	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis
Signal Group	0	6	0	5	2	0	0	8	0	0	0	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lead	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.07	0.09	0.26	0.33	0.00	0.05	0.00	0.21	0.00	0.00	0.00
Intersection LOS	C											
Intersection V/C	0.736											

Intersection Level Of Service Report
Intersection 7: SR-133 SB Ramps and Irvine Blvd

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.674

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	1	0	0	0	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	530.00	100.00	100.00	100.00	140.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			No			No		

Volumes

Name												
Base Volume Input [veh/h]	0	0	0	155	0	313	0	1810	367	418	1808	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	0	0	155	0	313	0	1810	367	418	1808	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	0	0	39	0	78	0	453	92	105	452	0
Total Analysis Volume [veh/h]	0	0	0	155	0	313	0	1810	367	418	1808	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis
Signal Group	0	0	0	4	0	0	0	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lag	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.09	0.00	0.09	0.00	0.32	0.32	0.12	0.53	0.00
Intersection LOS	B											
Intersection V/C	0.674											

Intersection Level Of Service Report
Intersection 8: SR-133 NB Ramps and Irvine Blvd

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.562

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

Volumes

Name												
Base Volume Input [veh/h]	122	0	124	0	0	0	0	1822	0	0	2137	101
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	122	0	124	0	0	0	0	1822	0	0	2137	101
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	31	0	31	0	0	0	0	456	0	0	534	25
Total Analysis Volume [veh/h]	122	0	124	0	0	0	0	1822	0	0	2137	101
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis
Signal Group	8	2	0	0	0	0	0	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	-	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.07	0.00	0.07	0.00	0.00	0.00	0.00	0.36	0.00	0.00	0.44	0.44
Intersection LOS	A											
Intersection V/C	0.562											

Irvine Ranch Water District

Vistro File: N:\...\IRWD 2023 APP.vistro
Scenario 6 2023 PEN PP Route 1B PM
Report File: N:\...\2023 PEN PP Route 1B PM.pdf
8/19/2020

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Sand Canyon Ave and Portola Pkwy	Signalized	ICU 1	NB Left	0.506	-	A
2	Sand Canyon Ave and Irvine Blvd	Signalized	ICU 1	WB Thru	0.644	-	B
3	Sand Canyon Ave and Trabuco Rd	Signalized	ICU 1	EB Thru	0.618	-	B
4	Sand Canyon Ave and I-5 NB Ramps	Signalized	ICU 1	NB Thru	0.743	-	C
5	Sand Canyon Ave and Marine Way	Signalized	ICU 1	NB Thru	0.651	-	B
6	Sand Canyon Ave and I-5 SB Ramps	Signalized	ICU 1	NB Thru	0.625	-	B
7	SR-133 SB Ramps and Irvine Blvd	Signalized	ICU 1	WB Thru	0.883	-	D
8	SR-133 NB Ramps and Irvine Blvd	Signalized	ICU 1	WB Thru	0.746	-	C

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report
Intersection 1: Sand Canyon Ave and Portola Pkwy

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.506

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	1	0	0	0	0	0	1	2	0	0
Pocket Length [ft]	280.00	100.00	500.00	100.00	100.00	100.00	100.00	100.00	300.00	380.00	100.00	100.00
Speed [mph]	50.00			30.00			50.00			55.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			Yes			No			Yes		

Volumes

Name												
Base Volume Input [veh/h]	780	0	437	0	0	0	0	554	230	179	644	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	18	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	780	0	437	0	18	0	0	554	230	179	644	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	195	0	109	0	5	0	0	139	58	45	161	0
Total Analysis Volume [veh/h]	780	0	437	0	18	0	0	554	230	179	644	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Split	Split	Overla	Split	Split	Split	Permis	Permis	Unsign	Protect	Permis	Permis
Signal Group	6	6	0	0	2	0	0	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	-	-	-	-	-	-	Lead	-	-

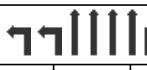
Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.23	0.00	0.00	0.00	0.01	0.00	0.00	0.16	0.00	0.05	0.19	0.00
Intersection LOS	A											
Intersection V/C	0.506											

Intersection Level Of Service Report
Intersection 2: Sand Canyon Ave and Irvine Blvd

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.644

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	2	0	2	2	0	1	2	0	1	2	0	1
Pocket Length [ft]	200.00	100.00	350.00	170.00	100.00	310.00	150.00	100.00	310.00	280.00	100.00	350.00
Speed [mph]	50.00			50.00			55.00			55.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	346	895	587	180	322	96	188	936	180	539	1584	516
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	18	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	346	895	587	180	340	96	188	936	180	539	1584	516
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	87	224	147	45	85	24	47	234	45	135	396	129
Total Analysis Volume [veh/h]	346	895	587	180	340	96	188	936	180	539	1584	516
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protect	Permis	Overla	Protect	Permis	Permis	Protect	Permis	Permis	Protect	Permis	Permis
Signal Group	1	6	0	5	2	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

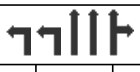
Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.10	0.18	0.00	0.05	0.10	0.06	0.06	0.14	0.11	0.16	0.31	0.30
Intersection LOS	B											
Intersection V/C	0.644											

Intersection Level Of Service Report
Intersection 3: Sand Canyon Ave and Trabuco Rd

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.618

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	2	0	0	2	0	1	2	0	1	2	0	0
Pocket Length [ft]	250.00	100.00	100.00	200.00	100.00	280.00	150.00	100.00	430.00	320.00	100.00	100.00
Speed [mph]	50.00			50.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	135	195	52	199	147	43	319	2354	261	34	806	193
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	18	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	135	195	52	199	165	43	319	2354	261	34	806	193
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	34	49	13	50	41	11	80	589	65	9	202	48
Total Analysis Volume [veh/h]	135	195	52	199	165	43	319	2354	261	34	806	193
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protect	Permis	Unsign	Protect	Permis	Permis	Protect	Permis	Unsign	Protect	Permis	Permis
Signal Group	1	6	0	5	2	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

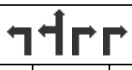
Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.04	0.04	0.00	0.06	0.03	0.03	0.09	0.46	0.00	0.01	0.20	0.20
Intersection LOS	B											
Intersection V/C	0.618											

Intersection Level Of Service Report
Intersection 4: Sand Canyon Ave and I-5 NB Ramps

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.743

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	1	0	1	0	0	1	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	190.00	100.00	220.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	50.00			50.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	611	1976	0	4	858	220	1030	0	227	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	18	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	611	1976	0	4	876	220	1030	0	227	0	0	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	153	494	0	1	219	55	258	0	57	0	0	0
Total Analysis Volume [veh/h]	611	1976	0	4	876	220	1030	0	227	0	0	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permis	Permis	Permis	Permis	Permis	Permis	Split	Split	Overla	Split	Split	Split
Signal Group	0	6	0	0	2	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.18	0.39	0.00	0.00	0.17	0.13	0.30	0.00	0.00	0.00	0.00	0.00
Intersection LOS	C											
Intersection V/C	0.743											

Intersection Level Of Service Report
Intersection 5: Sand Canyon Ave and Marine Way

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.651

Intersection Setup

Name						
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	1	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	380.00	100.00
Speed [mph]	50.00		50.00		50.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		Yes		Yes	

Volumes

Name						
Base Volume Input [veh/h]	2549	408	115	1060	185	115
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	18	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	2549	408	115	1078	185	115
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	637	102	29	270	46	29
Total Analysis Volume [veh/h]	2549	408	115	1078	185	115
Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permissive	Permissive	Permissive	Permissive	Permissive	Permissive
Signal Group	6	0	0	2	4	0
Auxiliary Signal Groups						
Lead / Lag	-	-	-	-	Lag	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.50	0.24	0.03	0.21	0.05	0.07
Intersection LOS	B					
Intersection V/C	0.651					

Intersection Level Of Service Report
Intersection 6: Sand Canyon Ave and I-5 SB Ramps

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.625

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	1	2	0	0	1	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	200.00	100.00	100.00	240.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	50.00			50.00			50.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	0	2151	504	343	691	0	679	0	355	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	18	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	2151	504	361	691	0	679	0	355	0	0	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	538	126	90	173	0	170	0	89	0	0	0
Total Analysis Volume [veh/h]	0	2151	504	361	691	0	679	0	355	0	0	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permis	Permis	Permis	Protect	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis
Signal Group	0	6	0	5	2	0	0	8	0	0	0	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lead	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.32	0.30	0.11	0.10	0.00	0.13	0.00	0.15	0.00	0.00	0.00
Intersection LOS	B											
Intersection V/C	0.625											

Intersection Level Of Service Report
Intersection 7: SR-133 SB Ramps and Irvine Blvd

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.883

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	1	0	0	0	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	530.00	100.00	100.00	100.00	140.00	100.00	100.00
Speed [mph]		30.00			30.00			30.00			30.00	
Grade [%]		0.00			0.00			0.00			0.00	
Crosswalk		Yes			Yes			No			No	

Volumes

Name												
Base Volume Input [veh/h]	0	0	0	57	0	191	0	1526	152	164	2640	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	0	0	57	0	191	0	1526	152	164	2640	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	0	0	14	0	48	0	382	38	41	660	0
Total Analysis Volume [veh/h]	0	0	0	57	0	191	0	1526	152	164	2640	0
Pedestrian Volume [ped/h]		0			0			0			0	
Bicycle Volume [bicycles/h]		0			0			0			0	

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis
Signal Group	0	0	0	4	0	0	0	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lag	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.03	0.00	0.06	0.00	0.25	0.25	0.05	0.78	0.00
Intersection LOS	D											
Intersection V/C	0.883											

Intersection Level Of Service Report
Intersection 8: SR-133 NB Ramps and Irvine Blvd

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.746

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

Volumes

Name												
Base Volume Input [veh/h]	326	0	298	0	0	0	0	1394	0	0	2408	165
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	326	0	298	0	0	0	0	1394	0	0	2408	165
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	82	0	75	0	0	0	0	349	0	0	602	41
Total Analysis Volume [veh/h]	326	0	298	0	0	0	0	1394	0	0	2408	165
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis
Signal Group	8	2	0	0	0	0	0	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	-	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.19	0.00	0.18	0.00	0.00	0.00	0.00	0.27	0.00	0.00	0.50	0.50
Intersection LOS	C											
Intersection V/C	0.746											

Irvine Ranch Water District

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Report File: N:\...\2023 PEN PP Route 2A AM.pdf

Scenario 7 2023 PEN Route 2A AM
8/19/2020

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Sand Canyon Ave and Portola Pkwy	Signalized	ICU 1	WB Thru	0.470	-	A
2	Sand Canyon Ave and Irvine Blvd	Signalized	ICU 1	SB Thru	0.704	-	C
3	Sand Canyon Ave and Trabuco Rd	Signalized	ICU 1	WB Thru	0.600	-	A
4	Sand Canyon Ave and I-5 NB Ramps	Signalized	ICU 1	SB Thru	0.651	-	B
5	Sand Canyon Ave and Marine Way	Signalized	ICU 1	SB Thru	0.723	-	C
6	Sand Canyon Ave and I-5 SB Ramps	Signalized	ICU 1	SB Thru	0.728	-	C
7	SR-133 SB Ramps and Irvine Blvd	Signalized	ICU 1	WB Thru	0.687	-	B
8	SR-133 NB Ramps and Irvine Blvd	Signalized	ICU 1	WB Right	0.562	-	A

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report
Intersection 1: Sand Canyon Ave and Portola Pkwy

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.470

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	1	0	0	0	0	0	1	2	0	0
Pocket Length [ft]	280.00	100.00	500.00	100.00	100.00	100.00	100.00	100.00	300.00	380.00	100.00	100.00
Speed [mph]	50.00			30.00			50.00			55.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			Yes			No			Yes		

Volumes

Name												
Base Volume Input [veh/h]	278	0	160	0	0	0	0	624	495	422	896	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	45	0	0	27	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	278	45	160	0	27	0	0	624	495	422	896	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	70	11	40	0	7	0	0	156	124	106	224	0
Total Analysis Volume [veh/h]	278	45	160	0	27	0	0	624	495	422	896	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Split	Split	Overla	Split	Split	Split	Permis	Permis	Unsign	Protect	Permis	Permis
Signal Group	6	6	0	0	2	0	0	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	-	-	-	-	-	-	Lead	-	-

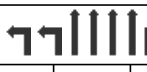
Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.08	0.10	0.00	0.00	0.02	0.00	0.00	0.18	0.00	0.12	0.26	0.00
Intersection LOS	A											
Intersection V/C	0.470											

Intersection Level Of Service Report
Intersection 2: Sand Canyon Ave and Irvine Blvd

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.704

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	2	0	2	2	0	1	2	0	1	2	0	1
Pocket Length [ft]	200.00	100.00	350.00	170.00	100.00	310.00	150.00	100.00	310.00	280.00	100.00	350.00
Speed [mph]	50.00			50.00			55.00			55.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	108	241	490	445	832	83	72	1308	255	628	1044	221
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	27	0	0	0	0	0	0	0	45
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	108	241	490	472	832	83	72	1308	255	628	1044	266
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	27	60	123	118	208	21	18	327	64	157	261	67
Total Analysis Volume [veh/h]	108	241	490	472	832	83	72	1308	255	628	1044	266
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protect	Permis	Overla	Protect	Permis	Permis	Protect	Permis	Permis	Protect	Permis	Permis
Signal Group	1	6	0	5	2	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

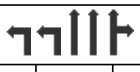
Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.03	0.05	0.00	0.14	0.24	0.05	0.02	0.19	0.15	0.18	0.20	0.16
Intersection LOS	C											
Intersection V/C	0.704											

Intersection Level Of Service Report
Intersection 3: Sand Canyon Ave and Trabuco Rd

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.600

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	2	0	0	2	0	1	2	0	1	2	0	0
Pocket Length [ft]	250.00	100.00	100.00	200.00	100.00	280.00	150.00	100.00	430.00	320.00	100.00	100.00
Speed [mph]	50.00			50.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	226	346	51	196	265	14	76	601	192	106	1669	381
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	226	346	51	196	265	14	76	601	192	106	1669	381
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	57	87	13	49	66	4	19	150	48	27	417	95
Total Analysis Volume [veh/h]	226	346	51	196	265	14	76	601	192	106	1669	381
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protect	Permis	Unsign	Protect	Permis	Permis	Protect	Permis	Unsign	Protect	Permis	Permis
Signal Group	1	6	0	5	2	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

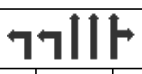
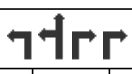
Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.07	0.07	0.00	0.06	0.05	0.01	0.02	0.12	0.00	0.03	0.40	0.40
Intersection LOS	A											
Intersection V/C	0.600											

Intersection Level Of Service Report
Intersection 4: Sand Canyon Ave and I-5 NB Ramps

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.651

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	1	0	1	0	0	1	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	190.00	100.00	220.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	50.00			50.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	245	551	1	0	2172	563	349	0	591	1	0	1
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	245	551	1	0	2172	563	349	0	591	1	0	1
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	61	138	0	0	543	141	87	0	148	0	0	0
Total Analysis Volume [veh/h]	245	551	1	0	2172	563	349	0	591	1	0	1
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permis	Permis	Permis	Permis	Permis	Permis	Split	Split	Overla	Split	Split	Split
Signal Group	0	6	0	0	2	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.07	0.11	0.11	0.00	0.43	0.33	0.10	0.00	0.00	0.00	0.00	0.00
Intersection LOS	B											
Intersection V/C	0.651											

Intersection Level Of Service Report
Intersection 5: Sand Canyon Ave and Marine Way

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.723

Intersection Setup

Name						
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	1	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	380.00	100.00
Speed [mph]	50.00		50.00		50.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		Yes		Yes	

Volumes

Name						
Base Volume Input [veh/h]	599	212	122	2689	496	121
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	599	212	122	2689	496	121
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	150	53	31	672	124	30
Total Analysis Volume [veh/h]	599	212	122	2689	496	121
Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permissive	Permissive	Permissive	Permissive	Permissive	Permissive
Signal Group	6	0	0	2	4	0
Auxiliary Signal Groups						
Lead / Lag	-	-	-	-	Lag	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.12	0.12	0.04	0.53	0.15	0.07
Intersection LOS	C					
Intersection V/C	0.723					

Intersection Level Of Service Report
Intersection 6: Sand Canyon Ave and I-5 SB Ramps

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.728

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	1	2	0	0	1	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	200.00	100.00	100.00	240.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	50.00			50.00			50.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	0	509	145	845	2258	0	262	0	1169	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	509	145	845	2258	0	262	0	1169	0	0	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	127	36	211	565	0	66	0	292	0	0	0
Total Analysis Volume [veh/h]	0	509	145	845	2258	0	262	0	1169	0	0	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permis	Permis	Permis	Protect	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis
Signal Group	0	6	0	5	2	0	0	8	0	0	0	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lead	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.07	0.09	0.25	0.33	0.00	0.05	0.00	0.21	0.00	0.00	0.00
Intersection LOS	C											
Intersection V/C	0.728											

Intersection Level Of Service Report
Intersection 7: SR-133 SB Ramps and Irvine Blvd

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.687

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	1	0	0	0	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	530.00	100.00	100.00	100.00	140.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			No			No		

Volumes

Name												
Base Volume Input [veh/h]	0	0	0	155	0	313	0	1810	367	418	1808	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	45	0	27	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	0	0	155	0	358	0	1837	367	418	1808	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	0	0	39	0	90	0	459	92	105	452	0
Total Analysis Volume [veh/h]	0	0	0	155	0	358	0	1837	367	418	1808	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis
Signal Group	0	0	0	4	0	0	0	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lag	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.09	0.00	0.11	0.00	0.32	0.32	0.12	0.53	0.00
Intersection LOS	B											
Intersection V/C	0.687											

Intersection Level Of Service Report
Intersection 8: SR-133 NB Ramps and Irvine Blvd

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.562

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

Volumes

Name												
Base Volume Input [veh/h]	122	0	124	0	0	0	0	1822	0	0	2137	101
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	122	0	124	0	0	0	0	1822	0	0	2137	101
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	31	0	31	0	0	0	0	456	0	0	534	25
Total Analysis Volume [veh/h]	122	0	124	0	0	0	0	1822	0	0	2137	101
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis
Signal Group	8	2	0	0	0	0	0	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	-	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.07	0.00	0.07	0.00	0.00	0.00	0.00	0.36	0.00	0.00	0.44	0.44
Intersection LOS	A											
Intersection V/C	0.562											

Irvine Ranch Water District

Vistro File: N:\...\IRWD 2023 APP.vistro
Scenario 8 2023 PEN PP Route 2A PM
Report File: N:\...\2023 PEN PP Route 2A PM.pdf
8/19/2020

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Sand Canyon Ave and Portola Pkwy	Signalized	ICU 1	NB Left	0.506	-	A
2	Sand Canyon Ave and Irvine Blvd	Signalized	ICU 1	WB Thru	0.650	-	B
3	Sand Canyon Ave and Trabuco Rd	Signalized	ICU 1	EB Thru	0.618	-	B
4	Sand Canyon Ave and I-5 NB Ramps	Signalized	ICU 1	NB Thru	0.743	-	C
5	Sand Canyon Ave and Marine Way	Signalized	ICU 1	NB Thru	0.651	-	B
6	Sand Canyon Ave and I-5 SB Ramps	Signalized	ICU 1	NB Thru	0.619	-	B
7	SR-133 SB Ramps and Irvine Blvd	Signalized	ICU 1	WB Thru	0.883	-	D
8	SR-133 NB Ramps and Irvine Blvd	Signalized	ICU 1	WB Thru	0.746	-	C

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report
Intersection 1: Sand Canyon Ave and Portola Pkwy

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.506

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	1	0	0	0	0	0	1	2	0	0
Pocket Length [ft]	280.00	100.00	500.00	100.00	100.00	100.00	100.00	100.00	300.00	380.00	100.00	100.00
Speed [mph]	50.00			30.00			50.00			55.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			Yes			No			Yes		

Volumes

Name												
Base Volume Input [veh/h]	780	0	437	0	0	0	0	554	230	179	644	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	18	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	780	0	437	0	18	0	0	554	230	179	644	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	195	0	109	0	5	0	0	139	58	45	161	0
Total Analysis Volume [veh/h]	780	0	437	0	18	0	0	554	230	179	644	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Split	Split	Overla	Split	Split	Split	Permis	Permis	Unsign	Protect	Permis	Permis
Signal Group	6	6	0	0	2	0	0	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	-	-	-	-	-	-	Lead	-	-

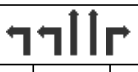
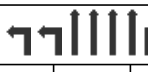
Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.23	0.00	0.00	0.00	0.01	0.00	0.00	0.16	0.00	0.05	0.19	0.00
Intersection LOS	A											
Intersection V/C	0.506											

Intersection Level Of Service Report
Intersection 2: Sand Canyon Ave and Irvine Blvd

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.650

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	2	0	2	2	0	1	2	0	1	2	0	1
Pocket Length [ft]	200.00	100.00	350.00	170.00	100.00	310.00	150.00	100.00	310.00	280.00	100.00	350.00
Speed [mph]	50.00			50.00			55.00			55.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	346	895	587	180	322	96	188	936	180	539	1584	516
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	18	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	346	895	587	198	322	96	188	936	180	539	1584	516
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	87	224	147	50	81	24	47	234	45	135	396	129
Total Analysis Volume [veh/h]	346	895	587	198	322	96	188	936	180	539	1584	516
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protect	Permis	Overla	Protect	Permis	Permis	Protect	Permis	Permis	Protect	Permis	Permis
Signal Group	1	6	0	5	2	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

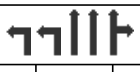
Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.10	0.18	0.00	0.06	0.09	0.06	0.06	0.14	0.11	0.16	0.31	0.30
Intersection LOS	B											
Intersection V/C	0.650											

Intersection Level Of Service Report
Intersection 3: Sand Canyon Ave and Trabuco Rd

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.618

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	2	0	0	2	0	1	2	0	1	2	0	0
Pocket Length [ft]	250.00	100.00	100.00	200.00	100.00	280.00	150.00	100.00	430.00	320.00	100.00	100.00
Speed [mph]	50.00			50.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	135	195	52	199	147	43	319	2354	261	34	806	193
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	135	195	52	199	147	43	319	2354	261	34	806	193
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	34	49	13	50	37	11	80	589	65	9	202	48
Total Analysis Volume [veh/h]	135	195	52	199	147	43	319	2354	261	34	806	193
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protect	Permis	Unsign	Protect	Permis	Permis	Protect	Permis	Unsign	Protect	Permis	Permis
Signal Group	1	6	0	5	2	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

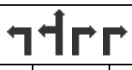
Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.04	0.04	0.00	0.06	0.03	0.03	0.09	0.46	0.00	0.01	0.20	0.20
Intersection LOS	B											
Intersection V/C	0.618											

Intersection Level Of Service Report
Intersection 4: Sand Canyon Ave and I-5 NB Ramps

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.743

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	1	0	1	0	0	1	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	190.00	100.00	220.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	50.00			50.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	611	1976	0	4	858	220	1030	0	227	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	611	1976	0	4	858	220	1030	0	227	0	0	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	153	494	0	1	215	55	258	0	57	0	0	0
Total Analysis Volume [veh/h]	611	1976	0	4	858	220	1030	0	227	0	0	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permis	Permis	Permis	Permis	Permis	Permis	Split	Split	Overla	Split	Split	Split
Signal Group	0	6	0	0	2	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.18	0.39	0.00	0.00	0.17	0.13	0.30	0.00	0.00	0.00	0.00	0.00
Intersection LOS	C											
Intersection V/C	0.743											

Intersection Level Of Service Report
Intersection 5: Sand Canyon Ave and Marine Way

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.651

Intersection Setup

Name						
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	1	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	380.00	100.00
Speed [mph]	50.00		50.00		50.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		Yes		Yes	

Volumes

Name						
Base Volume Input [veh/h]	2549	408	115	1060	185	115
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	2549	408	115	1060	185	115
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	637	102	29	265	46	29
Total Analysis Volume [veh/h]	2549	408	115	1060	185	115
Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permissive	Permissive	Permissive	Permissive	Permissive	Permissive
Signal Group	6	0	0	2	4	0
Auxiliary Signal Groups						
Lead / Lag	-	-	-	-	Lag	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.50	0.24	0.03	0.21	0.05	0.07
Intersection LOS	B					
Intersection V/C	0.651					

Intersection Level Of Service Report
Intersection 6: Sand Canyon Ave and I-5 SB Ramps

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.619

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	1	2	0	0	1	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	200.00	100.00	100.00	240.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	50.00			50.00			50.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	0	2151	504	343	691	0	679	0	355	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	2151	504	343	691	0	679	0	355	0	0	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	538	126	86	173	0	170	0	89	0	0	0
Total Analysis Volume [veh/h]	0	2151	504	343	691	0	679	0	355	0	0	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permis	Permis	Permis	Protect	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis
Signal Group	0	6	0	5	2	0	0	8	0	0	0	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lead	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.32	0.30	0.10	0.10	0.00	0.13	0.00	0.15	0.00	0.00	0.00
Intersection LOS	B											
Intersection V/C	0.619											

Intersection Level Of Service Report
Intersection 7: SR-133 SB Ramps and Irvine Blvd

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.883

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	1	0	0	0	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	530.00	100.00	100.00	100.00	140.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			No			No		

Volumes

Name												
Base Volume Input [veh/h]	0	0	0	57	0	191	0	1526	152	164	2640	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	18	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	0	0	57	0	191	0	1544	152	164	2640	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	0	0	14	0	48	0	386	38	41	660	0
Total Analysis Volume [veh/h]	0	0	0	57	0	191	0	1544	152	164	2640	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis
Signal Group	0	0	0	4	0	0	0	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lag	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.03	0.00	0.06	0.00	0.25	0.25	0.05	0.78	0.00
Intersection LOS	D											
Intersection V/C	0.883											

Intersection Level Of Service Report
Intersection 8: SR-133 NB Ramps and Irvine Blvd

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.746

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

Volumes

Name												
Base Volume Input [veh/h]	326	0	298	0	0	0	0	1394	0	0	2408	165
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	326	0	298	0	0	0	0	1394	0	0	2408	165
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	82	0	75	0	0	0	0	349	0	0	602	41
Total Analysis Volume [veh/h]	326	0	298	0	0	0	0	1394	0	0	2408	165
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis
Signal Group	8	2	0	0	0	0	0	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	-	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.19	0.00	0.18	0.00	0.00	0.00	0.00	0.27	0.00	0.00	0.50	0.50
Intersection LOS	C											
Intersection V/C	0.746											

Irvine Ranch Water District

Vistro File: N:\...\IRWD 2023 APP.vistro
Scenario 9 2023 PEN PP Route 2B AM
Report File: N:\...\2023 PEN PP Route 2B AM.pdf
8/19/2020

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Sand Canyon Ave and Portola Pkwy	Signalized	ICU 1	WB Thru	0.470	-	A
2	Sand Canyon Ave and Irvine Blvd	Signalized	ICU 1	SB Thru	0.704	-	C
3	Sand Canyon Ave and Trabuco Rd	Signalized	ICU 1	WB Thru	0.600	-	A
4	Sand Canyon Ave and I-5 NB Ramps	Signalized	ICU 1	SB Thru	0.651	-	B
5	Sand Canyon Ave and Marine Way	Signalized	ICU 1	SB Thru	0.723	-	C
6	Sand Canyon Ave and I-5 SB Ramps	Signalized	ICU 1	SB Thru	0.728	-	C
7	SR-133 SB Ramps and Irvine Blvd	Signalized	ICU 1	WB Thru	0.687	-	B
8	SR-133 NB Ramps and Irvine Blvd	Signalized	ICU 1	WB Right	0.587	-	A

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report
Intersection 1: Sand Canyon Ave and Portola Pkwy

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.470

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	1	0	0	0	0	0	1	2	0	0
Pocket Length [ft]	280.00	100.00	500.00	100.00	100.00	100.00	100.00	100.00	300.00	380.00	100.00	100.00
Speed [mph]	50.00			30.00			50.00			55.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			Yes			No			Yes		

Volumes

Name												
Base Volume Input [veh/h]	278	0	160	0	0	0	0	624	495	422	896	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	45	0	0	27	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	278	45	160	0	27	0	0	624	495	422	896	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	70	11	40	0	7	0	0	156	124	106	224	0
Total Analysis Volume [veh/h]	278	45	160	0	27	0	0	624	495	422	896	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Split	Split	Overla	Split	Split	Split	Permis	Permis	Unsign	Protect	Permis	Permis
Signal Group	6	6	0	0	2	0	0	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	-	-	-	-	-	-	Lead	-	-

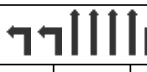
Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.08	0.10	0.00	0.00	0.02	0.00	0.00	0.18	0.00	0.12	0.26	0.00
Intersection LOS	A											
Intersection V/C	0.470											

Intersection Level Of Service Report
Intersection 2: Sand Canyon Ave and Irvine Blvd

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.704

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	2	0	2	2	0	1	2	0	1	2	0	1
Pocket Length [ft]	200.00	100.00	350.00	170.00	100.00	310.00	150.00	100.00	310.00	280.00	100.00	350.00
Speed [mph]	50.00			50.00			55.00			55.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	108	241	490	445	832	83	72	1308	255	628	1044	221
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	27	0	0	0	0	0	0	0	45
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	108	241	490	472	832	83	72	1308	255	628	1044	266
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	27	60	123	118	208	21	18	327	64	157	261	67
Total Analysis Volume [veh/h]	108	241	490	472	832	83	72	1308	255	628	1044	266
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protect	Permis	Overla	Protect	Permis	Permis	Protect	Permis	Permis	Protect	Permis	Permis
Signal Group	1	6	0	5	2	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

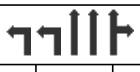
Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.03	0.05	0.00	0.14	0.24	0.05	0.02	0.19	0.15	0.18	0.20	0.16
Intersection LOS	C											
Intersection V/C	0.704											

Intersection Level Of Service Report
Intersection 3: Sand Canyon Ave and Trabuco Rd

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.600

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	2	0	0	2	0	1	2	0	1	2	0	0
Pocket Length [ft]	250.00	100.00	100.00	200.00	100.00	280.00	150.00	100.00	430.00	320.00	100.00	100.00
Speed [mph]	50.00			50.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	226	346	51	196	265	14	76	601	192	106	1669	381
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	226	346	51	196	265	14	76	601	192	106	1669	381
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	57	87	13	49	66	4	19	150	48	27	417	95
Total Analysis Volume [veh/h]	226	346	51	196	265	14	76	601	192	106	1669	381
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protect	Permis	Unsign	Protect	Permis	Permis	Protect	Permis	Unsign	Protect	Permis	Permis
Signal Group	1	6	0	5	2	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

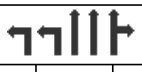
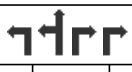
Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.07	0.07	0.00	0.06	0.05	0.01	0.02	0.12	0.00	0.03	0.40	0.40
Intersection LOS	A											
Intersection V/C	0.600											

Intersection Level Of Service Report
Intersection 4: Sand Canyon Ave and I-5 NB Ramps

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.651

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	1	0	1	0	0	1	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	190.00	100.00	220.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	50.00			50.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	245	551	1	0	2172	563	349	0	591	1	0	1
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	245	551	1	0	2172	563	349	0	591	1	0	1
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	61	138	0	0	543	141	87	0	148	0	0	0
Total Analysis Volume [veh/h]	245	551	1	0	2172	563	349	0	591	1	0	1
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permis	Permis	Permis	Permis	Permis	Permis	Split	Split	Overla	Split	Split	Split
Signal Group	0	6	0	0	2	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.07	0.11	0.11	0.00	0.43	0.33	0.10	0.00	0.00	0.00	0.00	0.00
Intersection LOS	B											
Intersection V/C	0.651											

Intersection Level Of Service Report
Intersection 5: Sand Canyon Ave and Marine Way

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.723

Intersection Setup

Name						
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	1	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	380.00	100.00
Speed [mph]	50.00		50.00		50.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		Yes		Yes	

Volumes

Name						
Base Volume Input [veh/h]	599	212	122	2689	496	121
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	599	212	122	2689	496	121
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	150	53	31	672	124	30
Total Analysis Volume [veh/h]	599	212	122	2689	496	121
Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permissive	Permissive	Permissive	Permissive	Permissive	Permissive
Signal Group	6	0	0	2	4	0
Auxiliary Signal Groups						
Lead / Lag	-	-	-	-	Lag	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.12	0.12	0.04	0.53	0.15	0.07
Intersection LOS	C					
Intersection V/C	0.723					

Intersection Level Of Service Report
Intersection 6: Sand Canyon Ave and I-5 SB Ramps

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.728

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	1	2	0	0	1	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	200.00	100.00	100.00	240.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	50.00			50.00			50.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	0	509	145	845	2258	0	262	0	1169	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	509	145	845	2258	0	262	0	1169	0	0	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	127	36	211	565	0	66	0	292	0	0	0
Total Analysis Volume [veh/h]	0	509	145	845	2258	0	262	0	1169	0	0	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permis	Permis	Permis	Protect	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis
Signal Group	0	6	0	5	2	0	0	8	0	0	0	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lead	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.07	0.09	0.25	0.33	0.00	0.05	0.00	0.21	0.00	0.00	0.00
Intersection LOS	C											
Intersection V/C	0.728											

Intersection Level Of Service Report
Intersection 7: SR-133 SB Ramps and Irvine Blvd

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.687

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	1	0	0	0	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	530.00	100.00	100.00	100.00	140.00	100.00	100.00
Speed [mph]		30.00			30.00			30.00			30.00	
Grade [%]		0.00			0.00			0.00			0.00	
Crosswalk		Yes			Yes			No			No	

Volumes

Name												
Base Volume Input [veh/h]	0	0	0	155	0	313	0	1810	367	418	1808	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	27	0	45	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	0	0	155	0	313	0	1810	394	418	1853	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	0	0	39	0	78	0	453	99	105	463	0
Total Analysis Volume [veh/h]	0	0	0	155	0	313	0	1810	394	418	1853	0
Pedestrian Volume [ped/h]		0			0			0			0	
Bicycle Volume [bicycles/h]		0			0			0			0	

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis
Signal Group	0	0	0	4	0	0	0	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lag	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.09	0.00	0.09	0.00	0.32	0.32	0.12	0.55	0.00
Intersection LOS	B											
Intersection V/C	0.687											

Intersection Level Of Service Report
Intersection 8: SR-133 NB Ramps and Irvine Blvd

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.587

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

Volumes

Name												
Base Volume Input [veh/h]	122	0	124	0	0	0	0	1822	0	0	2137	101
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	45	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	167	0	124	0	0	0	0	1822	0	0	2137	101
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	42	0	31	0	0	0	0	456	0	0	534	25
Total Analysis Volume [veh/h]	167	0	124	0	0	0	0	1822	0	0	2137	101
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis
Signal Group	8	2	0	0	0	0	0	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	-	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.10	0.00	0.07	0.00	0.00	0.00	0.00	0.36	0.00	0.00	0.44	0.44
Intersection LOS	A											
Intersection V/C	0.587											

Irvine Ranch Water District

Vistro File: N:\...\IRWD 2023 APP.vistro
Scenario 10 2023 PEN PP Route 2B PM
Report File: N:\...\2023 PEN PP Route 2B PM.pdf
8/19/2020

Intersection Analysis Summary

ID	Intersection Name	Control Type	Method	Worst Mvmt	V/C	Delay (s/veh)	LOS
1	Sand Canyon Ave and Portola Pkwy	Signalized	ICU 1	NB Left	0.506	-	A
2	Sand Canyon Ave and Irvine Blvd	Signalized	ICU 1	WB Thru	0.650	-	B
3	Sand Canyon Ave and Trabuco Rd	Signalized	ICU 1	EB Thru	0.618	-	B
4	Sand Canyon Ave and I-5 NB Ramps	Signalized	ICU 1	NB Thru	0.743	-	C
5	Sand Canyon Ave and Marine Way	Signalized	ICU 1	NB Thru	0.651	-	B
6	Sand Canyon Ave and I-5 SB Ramps	Signalized	ICU 1	NB Thru	0.619	-	B
7	SR-133 SB Ramps and Irvine Blvd	Signalized	ICU 1	WB Thru	0.883	-	D
8	SR-133 NB Ramps and Irvine Blvd	Signalized	ICU 1	WB Thru	0.746	-	C

V/C, Delay, LOS: For two-way stop, these values are taken from the movement with the worst (highest) delay value. For all other control types, they are taken for the whole intersection.

Intersection Level Of Service Report

Intersection 1: Sand Canyon Ave and Portola Pkwy

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	A
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.506

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	1	0	1	0	0	0	0	0	1	2	0	0
Pocket Length [ft]	280.00	100.00	500.00	100.00	100.00	100.00	100.00	100.00	300.00	380.00	100.00	100.00
Speed [mph]	50.00			30.00			50.00			55.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			Yes			No			Yes		

Volumes

Name												
Base Volume Input [veh/h]	780	0	437	0	0	0	0	554	230	179	644	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	18	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	780	0	437	0	18	0	0	554	230	179	644	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	195	0	109	0	5	0	0	139	58	45	161	0
Total Analysis Volume [veh/h]	780	0	437	0	18	0	0	554	230	179	644	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Split	Split	Overla	Split	Split	Split	Permis	Permis	Unsign	Protect	Permis	Permis
Signal Group	6	6	0	0	2	0	0	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	-	-	-	-	-	-	Lead	-	-

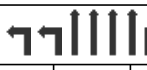
Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.23	0.00	0.00	0.00	0.01	0.00	0.00	0.16	0.00	0.05	0.19	0.00
Intersection LOS	A											
Intersection V/C	0.506											

Intersection Level Of Service Report
Intersection 2: Sand Canyon Ave and Irvine Blvd

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.650

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	2	0	2	2	0	1	2	0	1	2	0	1
Pocket Length [ft]	200.00	100.00	350.00	170.00	100.00	310.00	150.00	100.00	310.00	280.00	100.00	350.00
Speed [mph]	50.00			50.00			55.00			55.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	346	895	587	180	322	96	188	936	180	539	1584	516
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	18	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	346	895	587	198	322	96	188	936	180	539	1584	516
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	87	224	147	50	81	24	47	234	45	135	396	129
Total Analysis Volume [veh/h]	346	895	587	198	322	96	188	936	180	539	1584	516
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protect	Permis	Overla	Protect	Permis	Permis	Protect	Permis	Permis	Protect	Permis	Permis
Signal Group	1	6	0	5	2	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

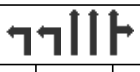
Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.10	0.18	0.00	0.06	0.09	0.06	0.06	0.14	0.11	0.16	0.31	0.30
Intersection LOS	B											
Intersection V/C	0.650											

Intersection Level Of Service Report
Intersection 3: Sand Canyon Ave and Trabuco Rd

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.618

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	2	0	0	2	0	1	2	0	1	2	0	0
Pocket Length [ft]	250.00	100.00	100.00	200.00	100.00	280.00	150.00	100.00	430.00	320.00	100.00	100.00
Speed [mph]	50.00			50.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	135	195	52	199	147	43	319	2354	261	34	806	193
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	135	195	52	199	147	43	319	2354	261	34	806	193
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	34	49	13	50	37	11	80	589	65	9	202	48
Total Analysis Volume [veh/h]	135	195	52	199	147	43	319	2354	261	34	806	193
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Protect	Permis	Unsign	Protect	Permis	Permis	Protect	Permis	Unsign	Protect	Permis	Permis
Signal Group	1	6	0	5	2	0	3	8	0	7	4	0
Auxiliary Signal Groups												
Lead / Lag	Lead	-	-	Lead	-	-	Lead	-	-	Lead	-	-

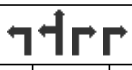
Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.04	0.04	0.00	0.06	0.03	0.03	0.09	0.46	0.00	0.01	0.20	0.20
Intersection LOS	B											
Intersection V/C	0.618											

Intersection Level Of Service Report
Intersection 4: Sand Canyon Ave and I-5 NB Ramps

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.743

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	1	0	1	0	0	1	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	190.00	100.00	220.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	50.00			50.00			50.00			50.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	611	1976	0	4	858	220	1030	0	227	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	611	1976	0	4	858	220	1030	0	227	0	0	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	153	494	0	1	215	55	258	0	57	0	0	0
Total Analysis Volume [veh/h]	611	1976	0	4	858	220	1030	0	227	0	0	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permis	Permis	Permis	Permis	Permis	Permis	Split	Split	Overla	Split	Split	Split
Signal Group	0	6	0	0	2	0	0	8	0	0	4	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	-	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.18	0.39	0.00	0.00	0.17	0.13	0.30	0.00	0.00	0.00	0.00	0.00
Intersection LOS	C											
Intersection V/C	0.743											

Intersection Level Of Service Report
Intersection 5: Sand Canyon Ave and Marine Way

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.651

Intersection Setup

Name						
Approach	Northbound		Southbound		Westbound	
Lane Configuration						
Turning Movement	Thru	Right	Left	Thru	Left	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	1	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	380.00	100.00
Speed [mph]	50.00		50.00		50.00	
Grade [%]	0.00		0.00		0.00	
Crosswalk	Yes		Yes		Yes	

Volumes

Name						
Base Volume Input [veh/h]	2549	408	115	1060	185	115
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0
Total Hourly Volume [veh/h]	2549	408	115	1060	185	115
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	637	102	29	265	46	29
Total Analysis Volume [veh/h]	2549	408	115	1060	185	115
Pedestrian Volume [ped/h]	0		0		0	
Bicycle Volume [bicycles/h]	0		0		0	

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permissive	Permissive	Permissive	Permissive	Permissive	Permissive
Signal Group	6	0	0	2	4	0
Auxiliary Signal Groups						
Lead / Lag	-	-	-	-	Lag	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.50	0.24	0.03	0.21	0.05	0.07
Intersection LOS	B					
Intersection V/C	0.651					

Intersection Level Of Service Report
Intersection 6: Sand Canyon Ave and I-5 SB Ramps

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	B
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.619

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	1	2	0	0	1	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	200.00	100.00	100.00	240.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	50.00			50.00			50.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			Yes			Yes		

Volumes

Name												
Base Volume Input [veh/h]	0	2151	504	343	691	0	679	0	355	0	0	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	2151	504	343	691	0	679	0	355	0	0	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	538	126	86	173	0	170	0	89	0	0	0
Total Analysis Volume [veh/h]	0	2151	504	343	691	0	679	0	355	0	0	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permis	Permis	Permis	Protect	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis
Signal Group	0	6	0	5	2	0	0	8	0	0	0	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lead	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.32	0.30	0.10	0.10	0.00	0.13	0.00	0.15	0.00	0.00	0.00
Intersection LOS	B											
Intersection V/C	0.619											

Intersection Level Of Service Report
Intersection 7: SR-133 SB Ramps and Irvine Blvd

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	D
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.883

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	1	0	0	0	1	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	530.00	100.00	100.00	100.00	140.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	Yes			Yes			No			No		

Volumes

Name												
Base Volume Input [veh/h]	0	0	0	57	0	191	0	1526	152	164	2640	0
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	18	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	0	0	0	57	0	191	0	1526	170	164	2640	0
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	0	0	0	14	0	48	0	382	43	41	660	0
Total Analysis Volume [veh/h]	0	0	0	57	0	191	0	1526	170	164	2640	0
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis
Signal Group	0	0	0	4	0	0	0	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	-	-	-	Lag	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.00	0.00	0.00	0.03	0.00	0.06	0.00	0.25	0.25	0.05	0.78	0.00
Intersection LOS	D											
Intersection V/C	0.883											

Intersection Level Of Service Report
Intersection 8: SR-133 NB Ramps and Irvine Blvd

Control Type:	Signalized	Delay (sec / veh):	-
Analysis Method:	ICU 1	Level Of Service:	C
Analysis Period:	15 minutes	Volume to Capacity (v/c):	0.746

Intersection Setup

Name												
Approach	Northbound			Southbound			Eastbound			Westbound		
Lane Configuration												
Turning Movement	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Width [ft]	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
No. of Lanes in Pocket	0	0	0	0	0	0	0	0	0	0	0	0
Pocket Length [ft]	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Speed [mph]	30.00			30.00			30.00			30.00		
Grade [%]	0.00			0.00			0.00			0.00		
Crosswalk	No			No			No			No		

Volumes

Name												
Base Volume Input [veh/h]	326	0	298	0	0	0	0	1394	0	0	2408	165
Base Volume Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Heavy Vehicles Percentage [%]	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Growth Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
In-Process Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Site-Generated Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Diverted Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Pass-by Trips [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Existing Site Adjustment Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Other Volume [veh/h]	0	0	0	0	0	0	0	0	0	0	0	0
Total Hourly Volume [veh/h]	326	0	298	0	0	0	0	1394	0	0	2408	165
Peak Hour Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Other Adjustment Factor	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Total 15-Minute Volume [veh/h]	82	0	75	0	0	0	0	349	0	0	602	41
Total Analysis Volume [veh/h]	326	0	298	0	0	0	0	1394	0	0	2408	165
Pedestrian Volume [ped/h]	0			0			0			0		
Bicycle Volume [bicycles/h]	0			0			0			0		

Intersection Settings

Cycle Length [s]	100
Lost time [s]	5.00

Phasing & Timing

Control Type	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis	Permis
Signal Group	8	2	0	0	0	0	0	2	0	0	6	0
Auxiliary Signal Groups												
Lead / Lag	Lag	-	-	-	-	-	-	-	-	-	-	-

Movement, Approach, & Intersection Results

V/C, Movement V/C Ratio	0.19	0.00	0.18	0.00	0.00	0.00	0.00	0.27	0.00	0.00	0.50	0.50
Intersection LOS	C											
Intersection V/C	0.746											

Appendix F

Tribal Cultural Resources Consultation (AB 52 Letters)

ESA

Irvine Ranch
WATER DISTRICT

May 24, 2019

Andrew Salas, Chairman
Gabrieleño Band of Mission Indians – Kizh Nation
P.O. Box 393
Covina, CA 91723

Subject: Assembly Bill 52 Consultation for Irvine Ranch Water District Syphon Reservoir Improvement Project, Orange County, California

Dear Mr. Salas:

Pursuant to the provisions of Assembly Bill (AB) 52 and Section 21080.3.1(d) of the Public Resources Code, this notification serves to extend an invitation to enter consultation for the Syphon Reservoir Improvement Project (project). Irvine Ranch Water District (IRWD) is the lead agency for the proposed project under the California Environmental Quality Act (CEQA, Public Resources Code 21000 et. seq.), and for Native American consultation per AB 52. IRWD seeks your input on tribal cultural resources that could be impacted by the project.

PROJECT DESCRIPTION

Syphon Reservoir is an existing recycled water storage reservoir located in Orange County, California (see Map 1, Project Location). IRWD acquired Syphon Reservoir in 2010 from the Irvine Company. In 2012, IRWD implemented the Syphon Reservoir Interim Facilities project, which made minor improvements to integrate the reservoir into IRWD's recycled water system. IRWD proposes to implement the Syphon Reservoir Improvement Project, which would increase the reservoir storage capacity by replacing the existing 59-foot high dam with a new embankment dam that would be up to approximately 136 feet high. By replacing the dam, the storage capacity at Syphon Reservoir would increase from 535 acre feet (AF) to approximately 5,000 AF. Existing onsite strainer and disinfection facilities would be replaced with larger facilities, and well as other supporting facilities to distribute water within IRWD's service area. The project location is shown on the attached project site map. Refer to Map 1, Project Location.

Please note that IRWD contacted you in November 2018 regarding the Syphon Reservoir Geotechnical Investigations Project, which led to the preparation of an Initial Study/Mitigated Negative Declaration. While the current project would be located at the same site as the geotechnical investigation, a separate CEQA document will be prepared, and IRWD is conducting separate AB 52 outreach.

PREVIOUS CULTURAL RESOURCES STUDY

As part of a geotechnical investigation, a Phase I Cultural Resources Technical Report for the full project area was prepared in January 2019, in accordance with both CEQA and Section 106 requirements. The report included a project description; regulatory and cultural/historical background contexts; methods and results of archival research and field studies; and recommendations for mitigation or any additional studies that might be required. Because both prehistoric and historic-period archaeological resources are

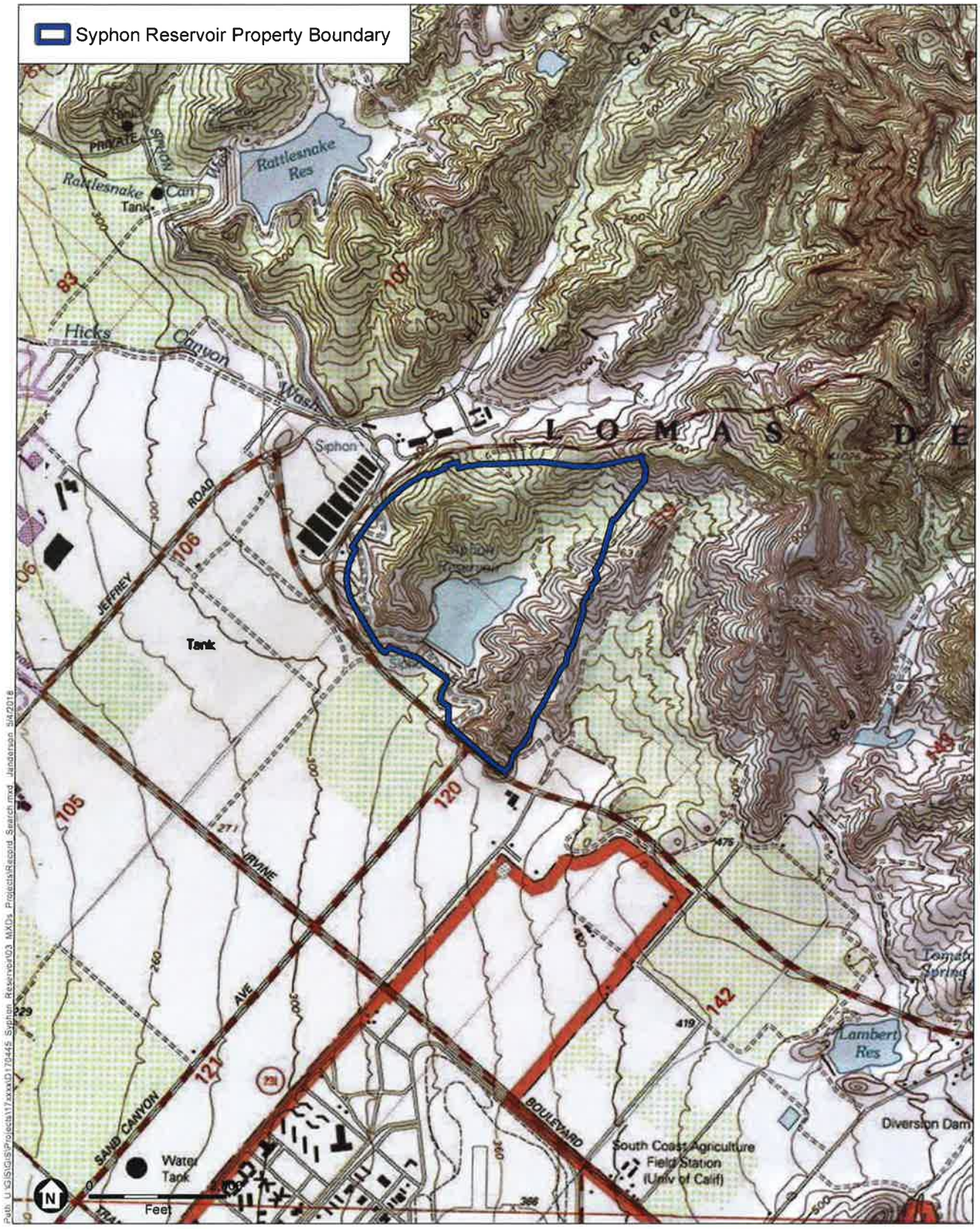
known to occur within the project site, archaeological and Native American monitoring are included as recommended mitigation. The report will be used as the basis for the cultural resources section of the CEQA environmental document, following Appendix G of the CEQA Guidelines.

Your participation in this local planning process is important. If you have any knowledge of tribal cultural resources, Native American Sacred Lands, or other cultural resources on or near the study area, or would like to consult on the project, please contact me **within 30 days** of receipt of this letter at (949) 453-5300 or via email at corey@irwd.com, with the subject line referencing the "Syphon Reservoir Improvement Project".

Sincerely,

Jo Ann Corey
Environmental Compliance Specialist
Water Resources & Environmental Compliance

Attachment: Map 1, Project Location



TOPOQUAD: El Toro

IRWD Syphon Reservoir

Map 1 - Project Location
Record Search

ESA

Irvine Ranch
WATER DISTRICT

May 24, 2019

Joyce Stanfield Perry, Tribal Manager
Juaneño Band of Mission Indians – Acjachemen Nation
4955 Paseo Segovia
Irvine, CA 92603

Subject: Assembly Bill 52 Consultation for Irvine Ranch Water District Syphon Reservoir Improvement Project, Orange County, California

Dear Ms. Perry:

Pursuant to the provisions of Assembly Bill (AB) 52 and Section 21080.3.1(d) of the Public Resources Code, this notification serves to extend an invitation to enter consultation for the Syphon Reservoir Improvement Project (project). Irvine Ranch Water District (IRWD) is the lead agency for the proposed project under the California Environmental Quality Act (CEQA, Public Resources Code 21000 et. seq.), and for Native American consultation per AB 52. IRWD seeks your input on tribal cultural resources that could be impacted by the project.

PROJECT DESCRIPTION

Syphon Reservoir is an existing recycled water storage reservoir located in Orange County, California (see Map 1, Project Location). IRWD acquired Syphon Reservoir in 2010 from the Irvine Company. In 2012, IRWD implemented the Syphon Reservoir Interim Facilities project, which made minor improvements to integrate the reservoir into IRWD's recycled water system. IRWD proposes to implement the Syphon Reservoir Improvement Project, which would increase the reservoir storage capacity by replacing the existing 59-foot high dam with a new embankment dam that would be up to approximately 136 feet high. By replacing the dam, the storage capacity at Syphon Reservoir would increase from 535 acre feet (AF) to approximately 5,000 AF. Existing onsite strainer and disinfection facilities would be replaced with larger facilities, and well as other supporting facilities to distribute water within IRWD's service area. The project location is shown on the attached project site map. Refer to Map 1, Project Location.

Please note that IRWD contacted you in November 2018 regarding the Syphon Reservoir Geotechnical Investigations Project, which led to the preparation of an Initial Study/Mitigated Negative Declaration. While the current project would be located at the same site as the geotechnical investigation, a separate CEQA document will be prepared, and IRWD is conducting separate AB 52 outreach.

PREVIOUS CULTURAL RESOURCES STUDY

As part of a geotechnical investigation, a Phase I Cultural Resources Technical Report for the full project area was prepared in January 2019, in accordance with both CEQA and Section 106 requirements. At your request, during AB 52 consultation for the Syphon Reservoir Geotechnical Investigations Project Initial Study/Mitigated Declaration, this report was provided to you on January 3, 2019. The report included a project description; regulatory and cultural/historical background contexts; methods and results

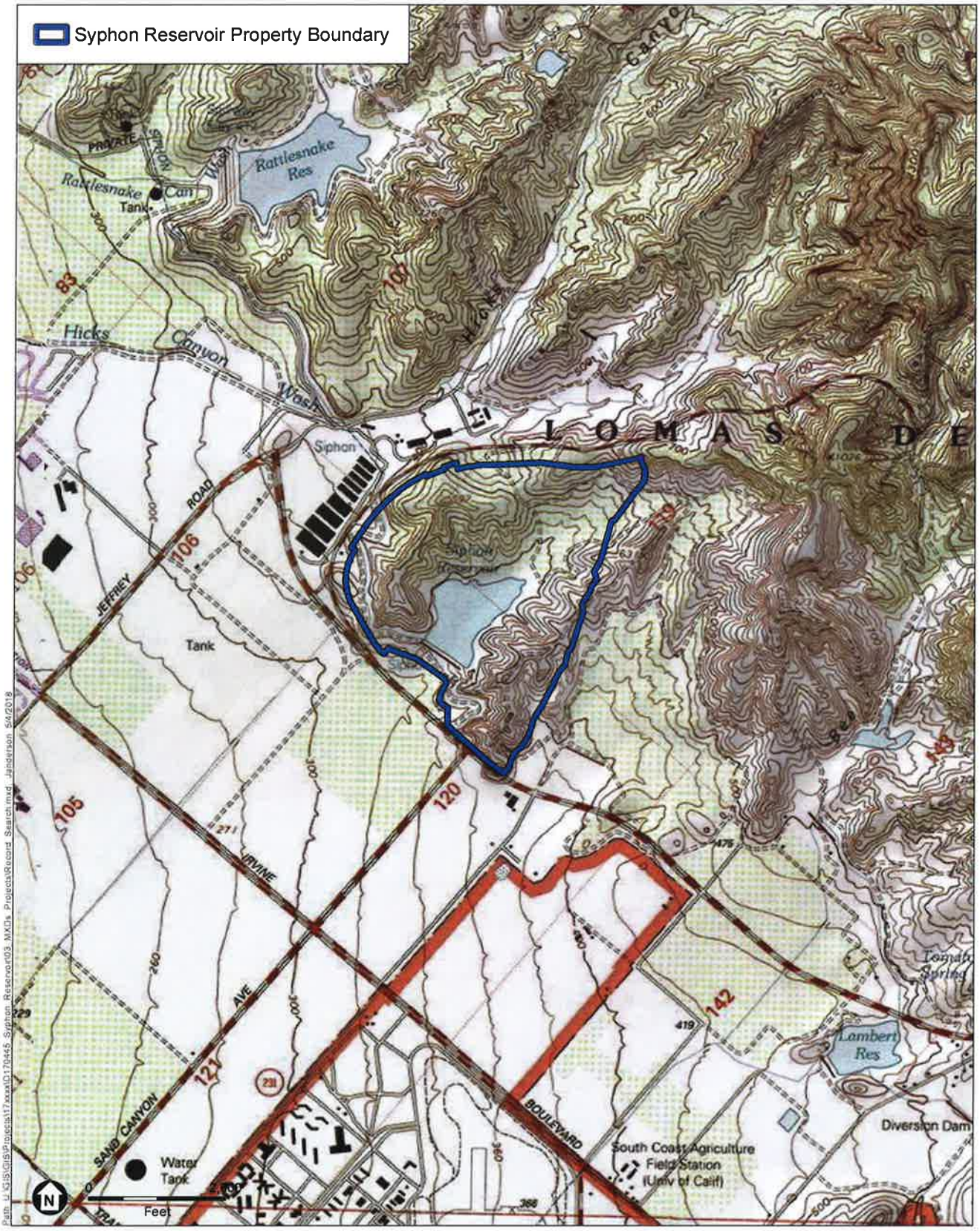
of archival research and field studies; and recommendations for mitigation or any additional studies that might be required. Because both prehistoric and historic-period archaeological resources are known to occur within the project site, archaeological and Native American monitoring are included as recommended mitigation. The report will be used as the basis for the cultural resources section of the CEQA environmental document, following Appendix G of the CEQA Guidelines.

Your participation in this local planning process is important. If you have any knowledge of tribal cultural resources, Native American Sacred Lands, or other cultural resources on or near the study area, or would like to consult on the project, please contact me **within 30 days** of receipt of this letter at (949) 453-5300 or via email at corey@irwd.com, with the subject line referencing the "Syphon Reservoir Improvement Project".

Sincerely,

Jo Ann Corey
Environmental Compliance Specialist
Water Resources & Environmental Compliance

Attachment: Map 1, Project Location



TOPOQUAD: El Toro

IRWD Syphon Reservoir

Map 1 - Project Location
Record Search

ESA

Irvine Ranch
WATER DISTRICT

May 24, 2019

Michael Mirelez, Cultural Resource Coordinator
Torres Martinez Desert Cahuilla Indians
P.O. Box 1160
Thermal, CA 92274

Subject: Assembly Bill 52 Consultation for Irvine Ranch Water District Syphon Reservoir Improvement Project, Orange County, California

Dear Mr. Mirelez:

Pursuant to the provisions of Assembly Bill (AB) 52 and Section 21080.3.1(d) of the Public Resources Code, this notification serves to extend an invitation to enter consultation for the Syphon Reservoir Improvement Project (project). Irvine Ranch Water District (IRWD) is the lead agency for the proposed project under the California Environmental Quality Act (CEQA, Public Resources Code 21000 et. seq.), and for Native American consultation per AB 52. IRWD seeks your input on tribal cultural resources that could be impacted by the project.

PROJECT DESCRIPTION

Syphon Reservoir is an existing recycled water storage reservoir located in Orange County, California (see Map 1, Project Location). IRWD acquired Syphon Reservoir in 2010 from the Irvine Company. In 2012, IRWD implemented the Syphon Reservoir Interim Facilities project, which made minor improvements to integrate the reservoir into IRWD's recycled water system. IRWD proposes to implement the Syphon Reservoir Improvement Project, which would increase the reservoir storage capacity by replacing the existing 59-foot high dam with a new embankment dam that would be up to approximately 136 feet high. By replacing the dam, the storage capacity at Syphon Reservoir would increase from 535 acre feet (AF) to approximately 5,000 AF. Existing onsite strainer and disinfection facilities would be replaced with larger facilities, and well as other supporting facilities to distribute water within IRWD's service area. The project location is shown on the attached project site map. Refer to Map 1, Project Location.

Please note that IRWD contacted you in November 2018 regarding the Syphon Reservoir Geotechnical Investigations Project, which led to the preparation of an Initial Study/Mitigated Negative Declaration. While the current project would be located at the same site as the geotechnical investigation, a separate CEQA document will be prepared, and IRWD is conducting separate AB 52 outreach.

PREVIOUS CULTURAL RESOURCES STUDY

As part of a geotechnical investigation, a Phase I Cultural Resources Technical Report for the full project area was prepared in January 2019, in accordance with both CEQA and Section 106 requirements. The report included a project description; regulatory and cultural/historical background contexts; methods and results of archival research and field studies; and recommendations for mitigation or any additional studies that might be required. Because both prehistoric and historic-period archaeological resources are

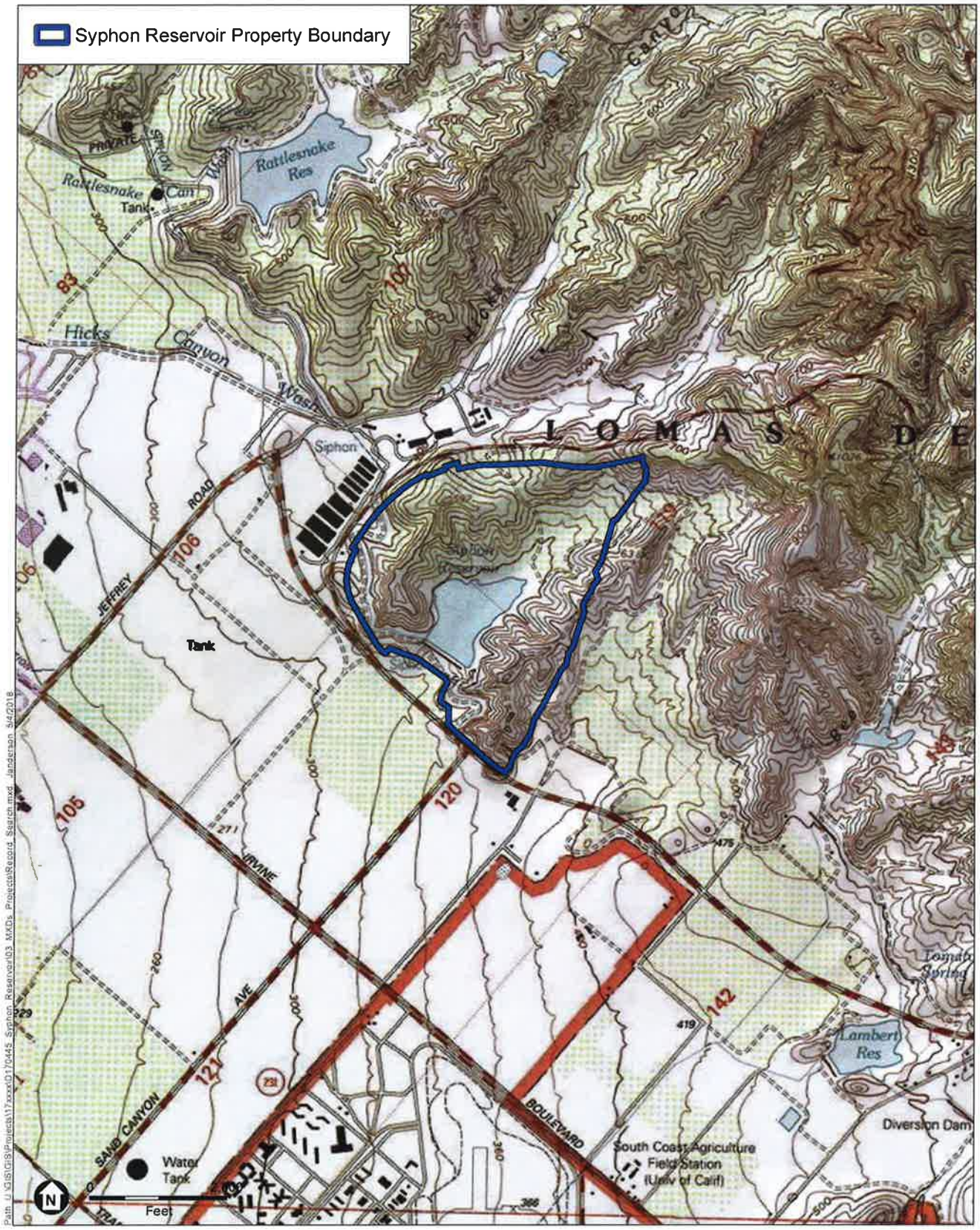
known to occur within the project site, archaeological and Native American monitoring are included as recommended mitigation. The report will be used as the basis for the cultural resources section of the CEQA environmental document, following Appendix G of the CEQA Guidelines.

Your participation in this local planning process is important. If you have any knowledge of tribal cultural resources, Native American Sacred Lands, or other cultural resources on or near the study area, or would like to consult on the project, please contact me **within 30 days** of receipt of this letter at (949) 453-5300 or via email at corey@irwd.com, with the subject line referencing the "Syphon Reservoir Improvement Project".

Sincerely,

Jo Ann Corey
Environmental Compliance Specialist
Water Resources & Environmental Compliance

Attachment: Map 1, Project Location



TOPOQUAD: El Toro

IRWD Syphon Reservoir

Map 1 - Project Location
Record Search

ESA

TORRES MARTINEZ DESERT CAHUILLA INDIANS
P.O. Box 1160
Thermal, CA 92274
(760) 397-0300 – FAX (760) 397-8146

MAU - WAL - MAH
SU-KUTT MENYIL

June 6, 2019

Attn: Jo Ann Corey

Re: Irvine Ranch Water District Syphon Reservoir Improvement Project, Orange County Ca.

The Torres – Martinez Desert Cahuilla appreciates your response to our AB52 notification request. And in light of said information concerning your agencies location, the Tribe wishes to defer all future project notifications to Tribes that are closer to your area.

Respectfully,

Michael Mirelez
Cultural Resource Coordinator
Torres-Martinez Desert Cahuilla Indians
Office: 760-397-0300 Ext: 1213
Cell: 760-399-0022
Email: mmirelez@tmdci.org

GABRIELENO BAND OF MISSION INDIANS - KIZH NATION
Historically known as The San Gabriel Band of Mission Indians
recognized by the State of California as the aboriginal tribe of the Los Angeles basin

Project County Name: Irvine Ranch Water District Syphon Reservoir Improvement Project Orange County

Dear Jo Ann Corey,

Thank you for your letter dated May 24,2019 regarding AB52 consultation. The above proposed project location is within our Ancestral Tribal Territory; therefore, our Tribal Government requests to schedule a consultation with you as the lead agency, to discuss the project and the surrounding location in further detail .

Please contact us at your earliest convenience. ***Please Note :AB 52, "consultation" shall have the same meaning as provided in SB 18 (Govt. Code Section 65352.4).***

Thank you for your time,

Andrew Salas, Chairman
Gabrieleno Band of Mission Indians – Kizh Nation
1(844)390-0787

Andrew Salas, Chairman | Nadine Salas, Vice-Chairman | Dr. Christina Swindall Martinez, secretary
Albert Perez, treasurer I | Martha Gonzalez Lemos, treasurer II | Richard Gradias, Chairman of the council of Elders