Public Draft
Initial Study & Mitigated Negative Declaration

San Joaquin Marsh Reserve Water Conveyance and Drainage Improvement Project

March 2021

Lead Agency:

University of California

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LIST OF ACRONYMS AND ABREVIATIONS

AAQS	Ambient Air Quality Standards
AB	Assembly Bill
ALUC	Area Land Use Plan for John Wayne Airport
APE	Area of Potential Effect
AQMP	Air Quality Management Plan
BERD	California Built Environment Resource Directory
BMP	Best Management Practices
CAAQS	California Ambient Air Quality Standards
CalEEMod	California Emissions Estimator Model
Caltrans	California Department of Transportation
CAP	Climate Action Plan
CARB	California Air Resources Board
CCAA	California Clean Air Act
CCC	California Coastal Commission
CCR	California Code of Regulations
CDC	California Department of Conservation
CDP	Coastal Development Permit
CDFW	California Department of Fish and Wildlife
CEQA	California Environmental Quality Act
CHL	California Historical Landmarks
CH_4	Methane
City	City of Irvine
CNDDB	California Natural Diversity Database
CNPS	California Native Plant Society
CNEL	Community Noise Equivalent Level
CPHI	California Point of Historical Interest
CO	Carbon Monoxide
CO_2	Carbon Dioxide
CO_2e	Carbon Dioxide equivalent
Cogstone	Cogstone Resource Management

CRHR	California Register of Historic Resources
CRPR	California Rare Plant Rank
CWA	Clean Water Act
cy	Cubic yard
dB or dBA	Decibel
dbh	Diameter at breast height
DDT	Dichlorodiphenyltrichloroethane
Design Goal 1	Project's proposed Elements for addressing climate change
Design Goal 2	Project's proposed Elements for water sourcing, treatment, and measurement
DPM	Diesel Particulate Matter
DTSC	Department of Toxic Substances Control
EIR	Environmental Impact Report
EO	Executive Order
Elements	The Project's proposed water conveyance and drainage improvements
EPA	U.S. Environmental Protection Agency
ESHA	Environmentally Sensitive Habitat Area
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
FTA	Federal Transit Administration's
GHG	Greenhouse Gas
GIS	Geographical Information System
GLA	Glen Lukos Associates
HCP	Habitat Conservation Plan
HRMP	Habitat Reestablishment Plan
in/sec	inches per second
IP	Individual Permit
IPaC	Information, Planning, and Conservation
IRWD	Irvine Ranch Water District
IS	Initial Study
IS/MND	Initial Study / Mitigated Negative Declaration
ITP	Incidental Take Permit
lb	Pound
lb/day	Pounds per day
LCP	Local Coastal Program
LOP	Letter of Permission
LOS	Level of Service
LRDP	Long Range Development Plan
LSAA	Lake or Streambed Alteration Agreement
M&N	Moffatt & Nichol
MBTA	Migratory Bird Treaty Act

MLD	Most Likely Descendant
MND	Mitigated Negative Declaration
mty	Metric Tons Per Year
N/A	Not applicable
NAAQS	National Ambient Air Quality Standards
NAHC	Native American Heritage Commission
ND	Negative Declaration
NMFS	National Marine Fisheries Service
NO_2	Nitrogen Dioxide
NO_x	Nitrogen Oxides
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
NWP	Nationwide Permit
N2O	Nitrous oxide
OCFA	Orange County Fire Authority
O_3	Ozone
OHWM	Ordinary High Water Mark
Pb	Lead
PFYC	Potential Fossil Yield Classification
PM	Particulate Matter
PM_{10}	Particulates 10 microns or less in diameter
$PM_{2.5}$	Particulates 2.5 microns or less in diameter
PPV	Peak particle velocity
PRA	Preservation Area
PRC	Public Resources Code
the "Project"	San Joaquin Marsh Reserve Water Conveyance and Drainage Improvement Project or "SJMRWCDI"
RWQCB	Regional Water Quality Control Board
SB	Senate Bill
SCAB	South Coast Air Basin
SCAQMD	South Coast Air Quality Management District
SCCIC	South Central Coastal Information Center
Sea and Sage	Sea and Sage Audubon Society
SEL	Sound Energy Levels
SJMR	San Joaquin Marsh Reserve
SJMRWCDI	San Joaquin Marsh Reserve Water Conveyance and Drainage Improvement Project or "Project"
SO_X	Sulfur Oxide
SO_2	Sulfur Dioxide
SWFL	Southwestern willow flycatcher

TAC	Toxic Air Contaminants
TMDL	Total Maximum Daily Load
TPD	Tons per day
μg/m3	Micrograms per Cubic Meter
UC	University of California
UCI	University of California, Irvine
UCNRS	University of California Natural Reserve System
USACE	United States Army Corps of Engineers or "Corps"
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
WDR	Waste Discharge Requirement
WPTCMP	Western pond turtle construction management plan
WQC	Water Quality Certification
VMT	Vehicle Miles Traveled
VOC	Volatile Organic Compound

1.0 INTRODUCTION

1.1 Summary

The University of California (UC) has determined that the proposed San Joaquin Marsh Reserve Water Conveyance and Drainage Improvement Project ("SJMRWCDI" or "Project"), and the required discretionary actions of UC for the Project, require compliance with the guidelines and regulations of the California Environmental Quality Act (CEQA). The University of California, Irvine is within the UC system and is the Project sponsor. This Initial Study and Mitigated Negative Declaration (IS/MND) addresses the direct, indirect, and cumulative environmental effects associated with the proposed Project.

This IS/MND has been prepared in conformance with the California Environmental Quality Act of 1970, as amended (Public Resources Code Section 21000 *et seq.*); Section 15070 of the State Guidelines for Implementation of the California Environmental Quality Act of 1970 ("CEQA Guidelines"), as amended (CCR, Title 14, Chapter 3, Section 15000 et seq.), and applicable requirements of the Lead Agency, the University of California.

This IS/MND has determined that the proposed Project would result in potentially significant environmental impacts; however, mitigation measures are proposed that would reduce any potentially significant impact to less than significant levels. As such, an IS/MND is deemed as the appropriate document to provide the necessary environmental evaluations and clearance.

1.2 Statutory Authority and Requirements

In accordance with CEQA (Public Resources Code Sections 21000-21177) and pursuant to Section 15063 of the CEQA Guidelines set forth at Title 14 of the California Code of Regulations (CCR), the UC is the Lead Agency for the Project undergoing environmental review in this document. Acting in the capacity of CEQA Lead Agency, UC is required to undertake the preparation of an Initial Study (IS) to provide UC with information to use as the basis for determining whether an Environmental Impact Report (EIR), Negative Declaration (ND), or Mitigated Negative Declaration (MND) would be appropriate for providing the necessary environmental documentation for the proposed Project.

The purpose of an IS is to: (1) identify potential environmental impacts; (2) provide the Lead Agency with information to use as the basis for deciding whether to prepare an EIR or ND; (3) enable the project sponsor/applicant or Lead Agency to modify a project, mitigating adverse impacts before an EIR is prepared; (4) facilitate environmental assessment early in the design of a project; (5) provide documentation of the factual basis for the finding in a ND that a project would not have a significant environmental effect; (6) eliminate needless EIRs; (7) determine whether a previously prepared EIR could be used for a project; and (8) assist in the preparation of an EIR, if required, by focusing the EIR on the effects determined to be significant, identifying the effects determined not to be significant, and explaining the reasons for determining that potentially significant effects would not be significant.

Section 15063 of the CEQA Guidelines identifies global disclosure requirements for inclusion in an IS. Pursuant to those requirements, an IS must include: (1) a description of the project, including the location of the project; (2) an identification of the environmental setting; (3) an identification of environmental effects by use of a checklist, matrix or other method, provided that entries on a checklist or other form are briefly explained to indicate that there is some evidence to support the entries; (4) a discussion of ways to mitigate significant effects identified, if any; (5) an examination of whether the project is compatible with existing zoning, plans, and other applicable land use controls; and (6) the name of the person or persons who prepared or participated in the preparation of the IS.

According to Section 15065(a) of the CEQA Guidelines, an EIR must be prepared for a project if any of the following conditions occur:

- The project has the potential to: substantially degrade the quality of the environment; substantially reduce the habitat of a fish or wildlife species; cause a fish or wildlife population to drop below self-sustaining levels; threaten to eliminate a plant or animal community; substantially reduce the number or restrict the range of an endangered, rare, or threatened species; or eliminate important examples of the major periods of California history or prehistory.

- The project has the potential to achieve short-term environmental goals to the disadvantage of long-term environmental goals.

- The project has possible environmental effects that are individually limited but cumulatively considerable. "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.

- The environmental effects of a project will cause substantial adverse effects on human beings, either directly or indirectly.

According to Section 15070(a) of the CEQA Guidelines, a ND is deemed appropriate if the IS shows that there is no substantial evidence, in light of the whole record before the Lead Agency, that the project may have a significant effect on the environment.

According to Section 15070(b), a MND is deemed appropriate if it identifies potentially significant effects, but:

- Revisions in the project plans or proposals made by or agreed to by the sponsor/applicant before a proposed IS/MND is released for public review would avoid the effects or mitigate the effects to a point where clearly no significant effects would occur; and

- There is no substantial evidence, in light of the whole record before the agency, that the project as revised may have a significant effect on the environment.

1.3 Intended Uses of this Initial Study and Mitigated Negative Declaration

This IS/MND is intended to be an informational document for the UC as Lead Agency, the general-public, and for responsible agencies to review and use when approving subsequent discretionary actions for the Project. The resulting documentation is not a policy document, and its approval and/or certification neither presupposes nor mandates any actions on the part of those agencies from whom permits and other discretionary approvals would be required.

The Notice of Intent (NOI) to Adopt a MND and supporting analysis is subject to a **30-day public and agency review period (March 11, 2021 to April 9, 2021)**. During this review, comments on the document should be addressed to the University of California, Irvine (UCI). Following review of any comments received, UC will consider these comments as a part of this Project's environmental review and include them with the IS/MND documentation for consideration by the University. This document is available at the University of California, Irvine, 4199 Campus Drive, Suite 380, Irvine, CA 92697-2325. Due to the COVID-19 ("Coronavirus") pandemic, offices are closed, and visits can be scheduled by appointment only through the contact listed on page 6. The document can also be accessed online at https://cpep.uci.edu/environmental/review.php.

1.4 Supportive Documentation

1.4.1 Incorporation by Reference

Incorporation by reference is a procedure for reducing the size of environmental documents and is most appropriate for including long, descriptive, or technical materials that provide general background information but do not contribute directly to the specific analysis of the project itself. This procedure is particularly useful when an EIR or ND relies on a broadly drafted EIR for its evaluation of cumulative impacts of related projects. (*Las Virgenes Homeowners Federation v. County of Los Angeles* (1986) 177 Cal.App.3d 300.) If an EIR or ND relies on information from a supporting study that is available to the public, the EIR or ND cannot be deemed unsupported by evidence or analysis (*San Francisco Ecology Center v. City and County of San Francisco* (1975) 48 Cal.App.3d 584, 595.). This document incorporates by reference the UCI Long Range Development Plan (LRDP) and LRDP EIR (UCI 2007a and UCI 2007b).

When an EIR or ND incorporates a document by reference, the incorporation must comply with Section 15150 of the CEQA Guidelines as follows:

- The incorporated document must be available to the public or be a matter of public record (CEQA Guidelines Section 15150(a)). The LRDP and LRDP EIR are available online at https://cpep.uci.edu/physical/campus-lrdp.php and at the University of California, Irvine, 4199 Campus Drive, Suite 380, Irvine, CA 92697-2325. Please contact UCI at (949) 824-8692 to make an appointment regarding special access, availability and requirements concerning COVID-19 Coronavirus. This document must be available for inspection by the public at an office of the lead agency (CEQA Guidelines Section 15150(b)). This document is available at the University of California, Irvine, 4199 Campus Drive, Suite 380, Irvine, CA 92697-2325.

Please contact UCI at (949) 824-8692 to make an appointment regarding special access, availability and requirements concerning COVID-19 Coronavirus. The document can also be accessed online at https://cpep.uci.edu/environmental/review.php.

- This document must summarize the portion of the document being incorporated by reference or briefly describe information that cannot be summarized (CEQA Guidelines Section 15150(c)). The LRDP and LRDP EIR are included for the discussion of land use and relevant UC policies and programs.

- The material to be incorporated in this document will include general background information (CEQA Guidelines Section 15150(f)). The LRDP and LRDP EIR are available online at https://cpep.uci.edu/physical/campus-lrdp.php.

1.4.2 Technical Studies

This IS/MND also uses information provided in the following documents, which are included in the appendices:

- Biological Technical Report (Glenn Lukos Associates March 2021a);
- Cultural Resources Assessment Report (Cogstone Resource Management Inc. March 2021a);
- Jurisdictional Delineation (Glenn Lukos Associates January 2021b); and
- Paleontological Resources Assessment Report (Cogstone Resource Management Inc. March 2021b).

2.0 INITIAL STUDY / ENVIRONMENTAL CHECKLIST

2.1 Project Title

San Joaquin Marsh Reserve Water Conveyance and Drainage Improvement Project

2.2 Lead Agency

University of California

2.3 Project Contact

Lindsey Hashimoto, Senior Planner
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2.4 Project Sponsor

University of California, Irvine
UCI Nature
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2.5 Project Location

The Project site is located within the San Joaquin Marsh Reserve, City of Irvine (City), Orange County, California. The San Joaquin Marsh Reserve is owned by the University of California (UC) and managed by the UC Natural Reserve System (UCNRS) and by the University of California, Irvine (UCI). The Project is located south of Interstate 405, north of University Drive, and west of Campus Drive (Figure 1 [Note all figures are presented in Section 6.0 of this document]).

2.6 General Plan / Zoning Designations

<u>Land Use Designation</u>: Open Space – General (UCI Long Range Development Plan, 2007).

2.7 Environmental Setting and Surrounding Land Uses

The University of California San Joaquin Marsh Water Conveyance and Drainage Improvement Project ("SJMRWCDI" or "Project") is located in the City of Irvine (City), Orange County, California (Figure 1). The San Joaquin Marsh Reserve is owned by the University of California (UC) and is managed by the UC Natural Reserve System (UCNRS) and by the University of California, Irvine (UCI). The Project is located south of Interstate 405, west of University Drive, and south of Campus Drive. The UCNRS San Joaquin Marsh Reserve ("SJMR" or "Marsh Reserve") is a depressional wetland complex that covers approximately 199 acres and is a remnant of a once more extensive fresh and brackish water wetland. The Marsh Reserve area consists of seasonal shallow marsh, deeper semi-permanent marsh, shallow ponds, and adjacent upland buffers. Depending on water availability, the marsh generally supports approximately 30 acres of open water, 30 acres of shallow ponds, and 70 acres of shallow and deep semi-permanent emergent marshlands.

The Marsh Reserve consists of six distinct areas: Seasonal Marsh, Upper Marsh, Middle Marsh, Lower Marsh, Hoag Pond, and Experimental Ponds (Figure 2). Historically, the Marsh Reserve was primarily ground water fed with some input from tributaries of the San Joaquin Hills. Due to agricultural development in the early 1900's, an opening in a low ridge barrier was excavated allowing for drainage of the Tustin Plain. San Diego Creek was channelized and directed to flow out to Newport Bay along the northwestern edge of the Marsh Reserve. In the 1960's, groundwater pumping depleted shallow water aquifers, and the flow of San Diego Creek was channelized to the southeast end of the Marsh Reserve severing direct overland flow connection. The Marsh Reserve is bordered by the Irvine Ranch Water District (IRWD) and Campus Drive to the east; a decommissioned and closed county landfill to the west; UCI undeveloped land, UCI Support Facilities, and UCI Arboretum to the north; and San Diego Creek to the south (Figures 1 and 2). The Marsh Reserve retains riparian water rights to San Diego Creek and owns the segment of the Creek immediately adjacent to the Experimental Ponds, Hoag Pond, and the Lower Marsh.

UCI has managed the Marsh Reserve for the purposes of research, education, community engagement, and stewardship as a habitat for wildlife since 1970. Use of the Marsh Reserve is restricted to approved purposes for research, teaching, and public service. There are dirt roads around the Marsh Reserve that provide vehicular access for management and approved uses only. In addition to providing educational opportunities, the Marsh Reserve provides an array of ecological functions. For instance, it is located along the Pacific Flyway in a highly developed area of the southern California coast, provides breeding habitat for a variety of species, and adds connectivity and diversity to the local ecosystems.

2.8 Project Background

Although legacies of the historic marsh remain, available water resources have been declining within the Marsh Reserve due to continued groundwater pumping in neighboring areas and water diversions and conservation in the San Diego Creek watershed. The current source of fresh water for the Marsh Reserve and the adjacent IRWD Marsh comes indirectly through pumping from the San Diego Creek flood control channel. The majority of pumping is conducted by IRWD, equipped with a large pump station situated in the channel basin. After flowing through the IRWD Natural Treatment System, water is conveyed passively through a culvert under Campus Drive on the west end of the Marsh Reserve and into the Upper Marsh cell (Figure 2). Additionally, for a few days during storm events, the Marsh Reserve is able to pump from San Diego Creek's Basin 1 that is within Reserve property. The duration of pumping from this source is limited by the elevation of water flowing in San Diego Creek. Water is then distributed throughout the Marsh Reserve through a series of culverts and pipes controlled by slide gates. Many of the existing water control features date back to the 1970's, but a large wetland restoration project in 1999 established eleven Experimental Ponds and water passage and infrastructure. Some of these existing early culverts, pipes, and slide gates are no longer functioning or are unable to pass and control needed flows. For example, two outlets (the South culvert and the North culvert between San Diego Creek and the Lower Marsh) do not function, and do not provide a viable connection with San Diego Creek. This is in part because San Diego Creek was widened and deepened in the 1980's after their construction.

In the past decade, droughts have intensified, and it has become difficult to maintain water levels within the Marsh Reserve using the current antiquated infrastructure. This Project proposes improvements that would increase the ability to retain and manage water within the Marsh Reserve. This Project is anticipated to improve habitat for existing resident and migratory birds, increase the duration in which open water habitat can be maintained during the winter and spring, promote desirable emergent wetland vegetation, increase circulation, and improve overall ecosystem health.

2.9 Project Description

The proposed Project is intended to improve long-term water management to sustain hydrologic function and habitat value of the Marsh Reserve. One of the Project's design goals proposes infrastructure establishment and/or modifications that anticipate impacts of climate change (e.g., drought, flooding, and sea level rise), primarily associated with the Lower Marsh. This Design Goal is for Lower Marsh Drainage Conveyance and Hoag Pond Water Control Features ("Design Goal 1"). Design Goal 1 includes Project Elements 1 through 5 as described in detail below. A second design goal, "Design Goal 2", focuses on water sourcing, capture, and measurement (from IRWD or San Diego Creek). Design Goal 2 is for IRWD Water Conveyance and Retention in Experimental and Water Catchment Basins, which includes Project Elements 6 through 8 as described in detail below. In addition, a previously graded portion of the Marsh may be used as a research plot for the UCI School of Biological Sciences to install a mesocosm after construction of this project.

Temporary construction activities include excavation that would enhance water distribution and expansion of wetland habitat, raising berms/dirt roads to increase storage capacity and duration and efficiency of passive drainage, and the installation of new and/or replacement water control mechanisms such as culverts, headwalls, pipes, and slide gates. The proposed Project is necessary to ensure efficient use of existing water sources within the Marsh Reserve, improve soil and water chemistry through improved circulation and drainage, increase water capacity for stable wetland habitat, and to retain water in priority management cells in the face of drought. The Project does not propose the use of additional water sources; however, the proposed elements would allow for increased water capacity should additional water inputs become available in the future. The proposed Project improvements have been separated into individual conceptual design elements (Elements). The locations of these various Project Elements are described in Table 1 and are shown on Figure 2. Because these Elements are in the conceptual design stage, minor changes could occur as a result of additional analysis and/or trustee/responsible agency input received during future advanced design phases. In general, minor changes to the Project Elements would neither change their intended purpose nor would they be anticipated to result in a substantial change in associated impacts from those discussed, analyzed, and presented in this document. Any design refinements would only be made to benefit the long-term habitat value of the site and/or to avoid or minimize temporary construction impacts to sensitive habitat or native vegetation. Elements 1-5 are part of Design Goal 1 and Elements 6-8 are part of Design Goal 2.

Table 1. SJMRWCDI Project Conceptual Design Elements

Element		Location	Goal	Equipment
1	Replace existing open pipe with culvert and slide gate	Existing levee between Middle Marsh and Lower Marsh	Control water movement from the Middle Marsh to the Lower Marsh to maintain Middle Marsh refugia in dry years and expand habitat in the Lower Marsh in wet years.	Excavation equipment, concrete and delivery trucks
2	Restore or replace a non-functioning outlet to San Diego Creek	Existing non-functioning south culvert between the Lower Marsh and San Diego Creek	Restore a viable connection through the south culvert, between the Lower Marsh and San Diego Creek allowing water circulation and discharge during extreme flood events. Provide future capability for flow from San Diego Creek into the Marsh with future sea level rise.	Excavation equipment, delivery trucks, vacuum truck
3	Excavate a curvilinear swale	Along the lower 2/3rds of the Lower Marsh, beginning below a new raised berm defining an upper pooled area to the restored South Culvert draining to San Diego Creek	Create swale to concentrate and direct water, allow wetland habitat to persist during wet years, and provide directed drainage during flood years. Protect in place deeper pooled areas along the upper, west edge of the Lower Marsh by allowing a rise in elevation prior to the beginning of the swale directing water to the drainage culvert. Funding permitting, possible broadening of the swale on marsh side of South Culvert, to function as additional habitat and to accommodate future sedimentation.	Excavation equipment marsh buggy, backhoe, front-end loader, grader
4	Install culvert with slide gate	Between Hoag Pond and Experimental Pond 3	Increase the function of Hoag Pond as an optional water source for the Experimental Pond pipe network through the Pond 3 connection to the system. It is the most suitable cell due to its large area and depth, and it is adjacent to San Diego Creek.	Excavation equipment, concrete and delivery trucks
5	Raise berm	Between Hoag Pong and Experimental Pond 3	Increase the water capacity and water surface elevation of Hoag Pond and Experimental Pond 3 to support wetland habitat in these areas, in addition to passive flow to other connected Experimental Ponds when needed.	Dump trucks, front-end loader, backhoe, grader
6	Raise berm and modify or replace the existing culvert	Along Middle Marsh berm road and existing headwall at Middle Marsh slide gate leading to Seasonal Marsh.	Allow the Middle Marsh to fill to capacity without overtopping its existing headwall.	Concrete and delivery trucks, front-end loader, backhoe, grader
7a	Install water measurement sensor	Existing IRWD Inlet in the Upper Marsh adjacent to Campus Drive.	Measure water quantity coming from IRWD.	Hand tools

Element		Location	Goal	Equipment
7b	Install headwall w/ gate	From the Campus Drive culvert at the Upper Marsh gate (7c), determine the best divergence point from the existing Upper Marsh swale to establish a headwall and gate to convey water under the dirt road separating the Upper Marsh and Seasonal Marsh. The best stretch of existing swale to add a connection under the road is approximately 75 ft- 250 ft down steam of the existing swale. Net excess excavation material can be beneficially re-used to create a low-profile island in the Middle Marsh.	Improve the distribution of water from IRWD to the Experimental Ponds more directly, bypassing the Middle Marsh. A new slide gate just downstream of the existing IRWD – UCI culvert will convey water to a swale or pipe along the Seasonal Marsh to a pool area and then pumped into Pond 10. Pond 10 has a gate with a direct connection to the Experimental Pond pipe network. The Experimental Ponds are managed as semi-permanent marsh and perennial ponds, and thus need to receive water later in the year than other marsh areas. This is also important for managing mosquito populations to not have all units filled year-round. The Middle Marsh island can provide a dry habitat area for turtles and birds.	Excavation equipment, concrete and delivery trucks
7c	Convey IRWD water more directly to the Experimental Pond pipe network by installing pipe(s) or a swale.	From the Campus Drive culvert at the Upper Marsh gate (7c), determine the best path from the existing Upper Marsh swale, under the dirt road separating the Upper Marsh and Seasonal Marsh, to a lower pooled area in the southwest corner of Seasonal Marsh. From this pooled area, water would be pumped through a newly installed pipe (with one-way flap) under the road to a connection with the existing Experimental Pond pipe network. The connection to the Experimental Pond pipe network may be established by going through Pond 10 or the Middle Marsh, whichever is deemed most effective and least impactful to existing habitat.	Enable the conveyance of water from IRWD to the Experimental Ponds pipe network, allowing for semi-permanent to perennial wetland/pond conditions in this area. Currently the Middle Marsh needs to be filled prior to filling the ponds prohibiting maintaining the ponds later in the season and in drought years. Minimize long-term habitat impacts and maintenance costs.	Delivery trucks, excavation equipment, marsh buggy, backhoe, front-end loader, grader
8	Expand and modify Water Catchment Basin and Pond 1 area		Allow for greater capacity adjacent to the existing Water Catchment Basin and Pond 1.	Excavation Front-end loader, backhoe

Construction Methods

All culverts, pipes, and slide gates would be pre-fabricated to the extent practical and transported to the site with trucks. Headwall structures would be constructed in place. Construction at the site would be limited to the movement of sediment and transport of prefabricated materials. All excavation would be balanced on site and used to adjust grades under Project Elements three, five, six and seven. Excavation and fill volumes are estimated at 3,200 cubic yards (cy) for Design Goal Elements 1 and 13,800 cy for Design Goal Elements 2. Excavation would generally occur in the dry season if possible; however, a marsh master/marsh buggy may be used in wet areas. Prior to construction, water may be managed within the Marsh Reserve to facilitate easier access but draining of specific areas is not anticipated. To the extent feasible, excavation for restoration or replacement of the south culvert (Project Element 2) would be completed outside of the flooding season and during low tide periods when San Diego Creek would be anticipated to have a very low water flow. The excavation depth would vary throughout the site but the anticipated maximum depth is approximately 5 feet. Upon excavation, the materials would be placed into a front-end loader or dump truck and transported to a different onsite location where a backhoe would be used to place the soil. Once the soil is placed, a grader would be used to smooth out the berms/dirt roads. Areas with vegetation cleared during excavation and for temporary access would be replanted with native vegetation. Where feasible, construction activities would be scheduled to minimize potential disturbances to nesting birds and special status species.

Conveyance of water from the swale below the IRWD/UCI Marsh culvert through the Seasonal Marsh and to the Experimental Pond pipe network, whether by open swale or pipe, would to the greatest extent possible avoid impacts to sensitive habitat, such as willows or other trees exceeding 4 inches diameter at breast height (dbh), as well as California bulrush. Impacts to willows would be minimized by employing manual removal of lower branches and dead material. Where feasible in open marsh areas, a path would be selected that traverses areas with non-native cover or cattails. Excavation for a swale would be limited to the minimum depth and width necessary to convey water required to fill the Experimental Ponds. Marsh and pond areas are slowly filled over days and weeks. The swale is needed to extend to the pooled area in the lower section of the Seasonal Marsh to allow the formation of a pooled "head" of water that would be sufficient for pumping and water conveyance. This water source is needed for the warmer months when the Middle and Upper Marsh are not filled due to maintaining a diverse seasonal marsh habitat, limitations of water quantity, and mosquito control. In the winter and spring months, the new gate leading to the Experimental Pond pipe network can be closed so water can flow into the Upper Marsh and Middle Marsh, as well as the Experimental Pond Network. An access location for equipment needed to excavate the swale and install a new gate would be selected to minimize impacts to native vegetation. A possible location is near a sharp turn in the access road leading from UCI Marsh monitoring wells to the Campus Drive culvert from IRWD.

Construction is anticipated to take approximately 8 to 10 months total and may occur in two phases, likely one phase for Design Goal Elements 1 and one phase for Design Goal Elements 2. UCI is constitutionally autonomous and not subject to local noise regulations; however, construction would occur consistent with the City of Irvine's permitted construction hours of 7:00 a.m. to 7:00 p.m. Monday through Friday, and 9:00 a.m. to 6:00 p.m. on Saturday. Approximately 20 workers are anticipated to be onsite at any one time depending on construction stage and associated equipment use. Anticipated construction equipment for each Project Element is described in Table 1. The equipment listed below could also be used at any time during the duration of the Project.

- Grader (up to 1)
- Excavation equipment (up to 2, one conventional/land-based and one marsh buggy)
- Trucks for transportation of pre-fabricated infrastructure, excavated sediment, concrete, water and construction materials (up to 5)
- Backhoe (up to 2)
- Front-end loaders (up to 3)
- Hand tools

2.10 Other Permits and Approvals

This IS/MND is intended to be an informational document for the UC, as Lead Agency, to review and use when approving subsequent discretionary actions for this Project. Table 2 provides a potential, but not exhaustive, list of other responsible agencies, trustee agencies, and/or entities that may rely upon this IS/MND to grant subsequent discretionary approvals and/or permits, where applicable, related to Project implementation.

Table 2. Other Permits and Approvals

Agency/Entity	Permit/Approval	Description	Timing
United States Army Corps of Engineers (USACE)	404 Nationwide Permit (NWP), Letter of Permission (LOP) or Individual Permit (IP)	Work within jurisdictional waters.	Prior to impacts to Waters of the United States
Regional Water Quality Control Board (RWQCB)	401 Water Quality Certification (WQC) or Waste Discharge Requirement (WDR)	Work within jurisdictional waters.	Prior to impacts to Waters of the United States/State
California Department of Fish and Wildlife (CDFW)	1602 Lake or Streambed Alteration Agreement (LSAA) and/or Incidental Take Permit (ITP)	Work within jurisdictional waters and/or potential impacts to species.	Prior to impacts to Waters of the State
California Coastal Commission (CCC)	Coastal Development Permit (CDP) or other approval	Work activities within the Coastal Zone	Prior to construction

2.11 Consultation with California Native American Tribe(s)

The University of California, as the CEQA lead agency, initiated formal AB52 consultation requests on December 23, 2020 and concluded consultation on February 25, 2021. Only the Kizh Nation requested formal consultation. A summary of AB52 correspondences is provided below:

- Gabrieleño Band of Mission Indians – Kizh Nation representative asked for the lead agency's contact information on September 23, 2020. Cogstone provided the information on November 3, 2020 and confirmed receipt on November 4, 2020. A meeting between UCI and the Kizh Nation occurred on February 24, 2021, at which time, the Kizh Nation requested Native American Monitoring during earthwork.

- Juaneño Band of Mission Indians Acjachemen Nation representative indicated on September 29, 2020 that they are not aware of any specific cultural sites or properties in the area but that it is a sensitive area. They requested additional information regarding the 40 cultural resources within and near the Project area, and the results of the pedestrian survey. This information was provided on October 15, 2020. The representative indicated on November 5, 2020 that they would wait for Cogstone's official recommendations but were inclined to recommend cultural resources and Native American monitoring.

- Gabrielino/Tongva San Gabriel Band of Mission Indians representative stated on October 7, 2020 that the APE is culturally sensitive and is a traditional cultural property and landscape. The representative recommended archaeological and Native American monitoring for all ground disturbances in the area.

- Gabrielino Tongva Indians of California Tribal Council representative requested additional information on the resources within the APE, and results of the pedestrian survey. This information was provided on October 15, 2020.

2.12 Environmental Factors Potentially Affected

All potential environmental impacts listed below are addressed in this IS. Those that are checked below have been identified as involving at least one impact that is a "Potentially Significant Impact" as indicated by the checklist on the following pages for which mitigation measures have been identified to reduce the impact to less than significant.

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

2.13 Determination (To be completed by the Lead Agency)

On the basis of this initial evaluation:

☐ I find that the proposed Project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.

☒ I find that although the proposed Project could have a significant effect on the environment, there will not be a significant effect in this case because the mitigation measures described on an attached sheet (Appendix A) have been added to the Project. A MITIGATED NEGATIVE DECLARATION will be prepared.

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

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

☐ I find that although the proposed Project could have a significant effect on the environment, there WILL NOT be a significant effect in this case because all potentially significant effects (a) have been analyzed adequately in an earlier EIR pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR, including revisions or mitigation measures that are imposed upon the proposed Project, nothing further is required.

Signature: DocuSigned by: Richard Demerjian 5D9C3C95F0494ED...	Date: 3/10/2021
Printed Name: Richard Demerjian	Title: Assistant Vice Chancellor

3.0 ENVIRONMENTAL ANALYSIS

The environmental analysis provided below in Section 3.0 is patterned after the IS Checklist recommended by the CEQA Guidelines, as amended, and used by UCI in its environmental review process. For the environmental review undertaken as part of this IS preparation, a determination that there is a potential for significant effects indicates the need to more fully analyze the Project's impacts and to identify mitigation.

For the evaluation of potential impacts, the questions in the IS Checklist are stated and an answer is provided according to the analysis undertaken as part of this IS. The analysis considers the short-term, long-term, direct, indirect, and cumulative impacts of the Project. There are four possible responses to each question:

- ***No impact.*** The Project would not have any measurable environmental impact on the environment.

- ***Less than significant impact.*** The Project would have the potential to impact the environment, although this impact would be negligible, it would be below established thresholds that are considered to be significant and/or would be reduced to less than significant with the implementation of established plans, policies, procedures and/or regulations.

- ***Less than significant with mitigation.*** The Project would have the potential to generate impacts, which may be considered as a significant effect on the environment, although mitigation measures or changes to the Project's physical or operational characteristics would reduce these impacts to levels that are less than significant.

- ***Potentially significant impact.*** The Project could have impacts that may be considered significant and, therefore, additional analysis is required to identify mitigation measures that could reduce potentially significant impacts to less than significant levels.

The following is a discussion of potential Project impacts as identified in the Initial Study/Environmental Checklist. Explanations are provided for each item.

Aesthetics

Except as provided in Public Resources Code Section 21099, would the Project:

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

3.1 Aesthetics

a) Would the Project have a substantial adverse effect on a scenic vista?

No impact. The Project site's land-use designation is Open Space – General pursuant to the LRDP (UCI 2007a). The Project proposes new- and repair-of existing hydrology and water quality infrastructure to better manage flows within the marsh. These improvements are generally low-lying non-visible structures (e.g., pipes and culverts). In addition, no substantial land modifications or structures are proposed that would impact a scenic vista or significant ridgeline. No impacts would occur, and no mitigation is required.

b) Would the Project substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?

No impact. There are no state-designated scenic highways near the Project site per review of the California State Scenic Highway System Map (Caltrans 2020a). The nearest such resource is Highway 1, which is eligible to become officially designated but is located over 3.5 miles from the Project site. In addition, no damage to a scenic resource is proposed. No impacts would occur, and no mitigation is required.

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

No impact. The Project site is viewable from adjacent public spaces and streets. University Drive passes by the southern border of the Project site; however, the closest "Major View" is identified near the intersection of University Drive and Culver, located approximately 1.2 miles east of the Project site. Construction of low-lying hydrology/water-quality infrastructure, shallow excavations for swales and minor modifications to existing berms would not change the natural character or scenic quality of the site or its surroundings. In addition, the Project is consistent with the Open Space – General land use designation as it is intended to better manage the marsh as open space. No impacts would occur, and no mitigation is required.

d) Would the Project create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?

No impact. The Project proposes no new sources of light or glare. No new structures are proposed with lit or reflective surfaces that could impact day or nighttime views. The Project proposes improvements to continue management of the site as an open space area with no change in light, glare or visual character. No construction nightwork is proposed that would require the use of lighting work areas. No impacts are anticipated, and no mitigation is required.

Avoidance, Minimization, and/or Mitigation Measures

No significant impacts were identified, and no mitigation measures are required.

Sources:

California State Scenic Highway System Map (Caltrans 2020a); UCI LRDP, Chapter 5 Plan Elements (UCI 2007a).

Agricultural and Forest Resources

In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Department of Conservation as an optional model to use in assessing impacts on agriculture and farmland. In determining whether impacts to forest resources, including timberland, are significant environmental effects, lead agencies may refer to information compiled by the California Department of Forestry and Fire Protection regarding the state's inventory of forest land, including the Forest and Range Assessment Project and the Forest Legacy Assessment Project; and forest carbon measurement methodology provided in Forest Protocols adopted by the California Air Resources Board. – Would the Project:

	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	☐	☐	☐	☒
b) Conflict with existing agricultural zoning for agricultural use, or a Williamson Act contract?	☐	☐	☐	☒
c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?	☐	☐	☐	☒
d) Result in the loss of forest land or conversion of forest land to non-forest use?	☐	☐	☐	☒
e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?	☐	☐	☐	☒

3.2 Agricultural and Forest Resources

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

No impact. According to the California Department of Conservation (CDC) Farmland Mapping and Monitoring Program's California Important Farmland Finder, the Project site and adjacent lands are classified as Urban Built-up Land or Other Land (CDC 2016). The Project site would not be located on or encroach upon Prime Farmland, Unique Farmland, or Farmland of Statewide Importance. No existing or planned farming operations occur at the Project site. Impacts are not anticipated, and no mitigation is required.

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

No impact. No change in use is proposed for the Project site. The Project site is not located on land designated or zoned for agricultural use. The zoning for the Project site is Open Space – General pursuant to the LRDP (UCI 2007a). Pursuant to the LRDP, primary uses for Open Space - General include landscaping, pedestrian and bike trails, water quality and drainage structures, habitat restoration and management activities, renewable energy demonstration projects or other "green" initiatives, and small facilities such as food service, interpretive centers, seating and viewing areas, and other amenities compatible with open space (UCI 2007a). Associated or compatible uses include facilities that support campus open space resources such as maintenance roads, support structures, and field research facilities (UCI 2007a). Review of the Orange County General Plan Figure VI-2 shows the nearest Williamson Act Agricultural Preserve as offsite and south of the San Joaquin Hills Transportation Corridor (i.e., 73 toll road). No impacts are anticipated, and no mitigation is required.

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

No impact. As previously discussed, the zoning for the Project site is Open Space – General pursuant to the LRDP (UCI 2007a). The Project site is not located on or adjacent to land designated for forest land, timberland, or timberland zoned timberland production. No impacts are anticipated, and no mitigation is required.

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

No impact. See discussion under 3.2.c) above.

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

No impact. As previously discussed, the Project site neither contains forest land nor forest resources. As also discussed above, no existing or planned farming operations occur in or adjacent to the Project site. Therefore, impacts are not anticipated, and no mitigation is required.

Avoidance, Minimization and/or Mitigation Measures

No significant impacts were identified, and no mitigation measures are required.

Sources

Farmland Mapping and Monitoring Program (CDC 2020); Orange County General Plan, Chapter VI-10 Prime Farmland in Orange County (Figure VI-1) (County of Orange 2001); UCI LRDP, Chapter 5 Plan Elements (UCI 2007a).

Air Quality

Where available, the significance criteria established by the applicable air quality management district or air pollution control district may be relied upon to make the following determinations. – Would the Project:

	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
a) Conflict with or obstruct implementation of the applicable air quality plan?	☐	☐	☐	☒
b) Result in a cumulatively considerable net increase of any criteria pollutant for which the Project region is non-attainment under an applicable federal or state ambient air quality standard.	☐	☐	☒	☐
c) Expose sensitive receptors to substantial pollutant concentrations?	☐	☐	☐	☒
d) Result in other emissions (such as those leading to odors adversely affecting a substantial number of people)?	☐	☐	☐	☒

3.3 Air Quality

Ambient air quality standards (AAQS) define the maximum amount of a pollutant averaged over a specified time that can be present in outdoor air without any harmful effects on people or the environment. California law continues to mandate California ambient air quality standards (CAAQS), which are often more stringent than National Ambient Air Quality Standards (NAAQS). Air basins are the areas defined to identify which regions meet the CAAQS and NAAQS standards. If a pollutant level is too high for the region and the AAQS standard is not met, the air basin is considered a nonattainment area for that pollutant. The Project is located within the South Coast Air Basin (SCAB). The SCAB is a nonattainment area under the CAAQS for the following pollutants: Particulate Matter of 10 Microns or Less in Diameter (PM_{10}), Particulate Matter of 2.5 Microns or Less in Diameter ($PM_{2.5}$) and Ozone (O_3). The SCAB is a nonattainment area under the NAAQS, also for $PM_{2.5}$ and O_3.

According to the South Coast Air Quality Management District (SCAQMD), PM_{10} and $PM_{2.5}$ pollutant sources include road dust, diesel soot, combustion products, tire and brake abrasion, construction operations and fires. It is also formed in the atmosphere from Nitrogen Oxides[1] (NO_X) and Sulfur Dioxide (SO_2) reactions with ammonia. Health risks associated with PM_{10} and $PM_{2.5}$ include reduced lung

[1] Nitrogen Oxides or Oxides of Nitrogen is a general term pertaining to compounds of nitric acid (NO), nitrogen dioxide (NO_2), and other oxides of nitrogen.

function, aggravation of respiratory and cardio-respiratory diseases, increases in mortality rate, and reduced lung function growth in children.

O_3 is one of several substances called photochemical oxidants that are formed when volatile organic compounds (VOC) and NO_X react in the presence of ultraviolet sunlight. Individuals exercising outdoors, children, and people with preexisting lung disease, such as asthma and chronic pulmonary lung disease, are considered subgroups most susceptible to O_3 effects. Short-term exposures (lasting for a few hours) to O_3 at levels typically observed in southern California can result in breathing pattern changes, reduction of breathing capacity, increased susceptibility to infections, inflammation of the lung tissue, and some immunological changes. A correlation between elevated ambient O_3 levels and increases in daily hospital admission rates, as well as mortality, have also been reported (SCAQMD 2005).

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

No impact. The California Clean Air Act (CCAA), which was approved in 1988, requires that each local air district prepare and maintain an Air Quality Management Plan (AQMP) to achieve compliance with CAAQS. The SCAQMD is one of 35 air quality management districts established to protect air quality in California and is responsible for regulating stationary, indirect, and area sources of pollution within the SCAB and for implementing the AQMP for the SCAB. The SCAB is a nonattainment area under the CAAQS for PM_{10}, $PM_{2.5}$ and O_3. The SCAB is a nonattainment area under the NAAQS for $PM_{2.5}$ and O_3. The SCAB has an attainment or unclassified status for Sulfur Oxide (SO_X), Carbon Monoxide (CO) and Lead.

This IS uses SCAQMD's Air Quality Significance Thresholds, specifically the Mass Daily Thresholds for Construction and Operation taken from the South Coast AQMD CEQA Handbook (SCAQMD, 1993), to assess the proposed Project's potential impacts on air quality. The Mass Daily Thresholds for both construction and operation are the same and are listed below as follows:

- NO_X = 100 lbs/day
- VOC = 75 lbs/day
- PM_{10} = 150 lbs/day
- $PM_{2.5}$ = 55 lbs/day
- SO_X = 150 lbs/day
- CO = 550 lbs/day
- Lead = 3 lbs/day

SCAQMD also has Localized Significance Thresholds for designated Source Receptor Areas within the SCAB. The Project site is in Source Receptor Area 20 "Central Orange County Coastal". Localized thresholds are based on acreage of the project site and distance from the site boundary to receptors. This analysis considers a conservative 5 acres of site disturbance per day and 500 feet to the nearest sensitive receptor, the nearest sensitive receptor actually-being UCI residences approximately 940 feet away. Because no emissions would occur during operation of the site, only construction emission thresholds are applicable and utilized in the analysis. Using these criteria, the localized construction thresholds are as follows:

- NO_X = 278 lbs/day
- PM_{10} = 167 lbs/day
- $PM_{2.5}$ = 101 lbs/day
- CO = 9,272 lbs/day

Construction Emissions

The Project's construction activities would produce temporary emissions of nonattainment pollutants, primarily from diesel combustion equipment and dust during the approximate 8 to 10 months of proposed construction. Peak emissions are anticipated during earthwork activities associated with swale construction, excavations, and berm modifications. Based on the anticipated construction equipment and proposed earthwork, the Project's greatest anticipated daily emission impacts compared to applicable thresholds are shown below in Table 3. Construction emission calculation sheets are provided in Appendix B of this IS/MND (M&N 2020a).

Table 3. Project-Level Emissions

Pollutant	SCAQMD Mass Daily Thresholds (lbs/day)	SCAQMD Localized Thresholds (lbs/day)	Anticipated Peak Project Emissions (lbs/day)	Significant?
NO_x	100	278	54	No
VOC *	75	N/A	5*	No
PM_{10}	150	167	43	No
$PM_{2.5}$	55	101	11	No
SO_X	150	N/A	0.1	No
CO	550	9,272	43	No
Lead	3	N/A	N/A **	No

Sources: California Emissions Estimator Model (CalEEMod 2016), Air Quality and GHG Calculations Appendix B of this IS/MND (M&N 2020a).
* Both VOC and ROG are precursors to ozone so they are summed in the CalEEMod report under the header ROG.
** Lead (Pb) emissions are not anticipated and considered not applicable (N/A) given the scope of the Project and proposed equipment. Lead is typically emitted by waste incinerators, utilities, lead-acid battery manufacturers and lead smelters.

As shown in the table above, pollutant emissions from temporary construction activities are not anticipated to exceed SCAQMD's Mass Daily Thresholds or Localized Thresholds. No potential significant impacts are anticipated resulting from Project construction.

At a local level, toxic air contaminants (TACs) and $PM_{2.5}$ are considered potential community risks and hazards. The Project is anticipated to produce diesel particulate matter (DPM) from the combustion of diesel fuel. The California Air Resources Board (CARB) classifies DPM emissions as a TAC. The burning of diesel fuel can produce both $PM_{2.5}$ and PM_{10} emissions. The CARB uses PM_{10} emissions from diesel exhaust as a surrogate measurement for DPM. The maximum daily on-site DPM emissions (as PM_{10} and $PM_{2.5}$ exhaust) is not anticipated to exceed the SCAQMD significance thresholds as shown in the table above. Therefore, there are no anticipated local air quality emission hazards anticipated to be associated with the Project and no mitigation is required.

Based on the analysis above, the Project is not anticipated to conflict with or disrupt any SCAQMD's air quality regulations or AQMP. Potential impacts are assumed to be less than significant, and no mitigation is required.

Operational Emissions

The Project only proposes raising berms/dirt roads to increase water storage capacity and function of passive drainage and the installation of new and/or replacement water control mechanisms. No increase in facility use or operations are proposed that could lead to a direct or indirect increase in the emission of pollutants listed above. Additional vehicular travel is not anticipated as the site would continue to operate as a marsh and preservation area. No new roads or new pollutant emitting equipment are a part of the Project's operations. The Project does not otherwise propose changes to roadway intersections or roadways that would change the level of service (LOS), increase traffic, increase delays, or decrease capacity. Therefore, no operational impacts would occur associated with localized CO or other pollutant emissions. Operational impacts are not anticipated, and no mitigation is required.

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

Less than significant impact. Cumulative impacts are impacts that may not result from individually minor project contributions but may result from collectively significant multiple project contributions. The SCAQMD has developed a policy to address the cumulative impacts of CEQA Projects. The policy holds the cumulative threshold to be the same as the project-level threshold and indicates that project impacts are cumulatively considerable if they exceed the project-specific AQMP significance thresholds. Based on the discussion provided above in Section 3.3.a), the Project would generate non-attainment pollutants within the SCAB but would not result in a project-level exceedance of the applicable thresholds. Therefore, the Project would not result in a cumulatively considerable impact and no mitigation is required.

The proposed Project would result in temporary emissions during construction but is not anticipated to result in significant cumulative emission increases or conflict with established plans. The Project's estimated maximum daily construction emissions are substantially below the applicable significance thresholds as shown above in Table 3. Two projects, Irvine Campus Medical Complex and Center for Advanced Care (previously Center for Child Health) would be constructed at the North Campus, north of the Project site. Chances are these other projects would be constructed simultaneously, however, they are not anticipated to pose a potential for daily cumulative impacts. SCAQMD rules, mandates, compliance with adopted AQMP emissions control measures and other project-specific mitigation would be imposed on construction projects throughout SCAB, which would include related cumulative projects. As concluded above, the Project's construction-related impacts would be less than significant. Compliance with SCAQMD rules and regulations would further minimize the proposed Project's construction-related emissions. Therefore, Project-related construction emissions, in combination with those from other projects in the area, would not substantially deteriorate the local or regional air quality.

Potential temporary impacts are considered less than significant, and no mitigation is required. Post construction, the Project site would continue to function as an open space preservation area with anticipated air quality benefits. No permanent impacts are anticipated, and no mitigation is required.

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

No impact. Per the SCAQMD (2005), a sensitive receptor is a person in the population who is particularly susceptible to health effects due to exposure to an air contaminant. The following land uses (sensitive sites) where sensitive receptors are typically located include schools, playgrounds, and childcare centers; long-term health care facilities; rehabilitation centers; convalescent centers; hospitals; retirement homes; and residences. The nearest sensitive receptors to the Project site by type are as follows:

- The nearest school, playground and childcare center is the UCI Health Child Development School - Special Education School located at 19262 Jamboree Road, Irvine, CA 92612. It should be noted; however, this facility has been closed since June 2019. The playground is approximately 0.21 mile (approximately 1,150 feet) west of the nearest construction area;
- The nearest residences are UCI student housing facilities located approximately 0.18 miles (approximately 940 feet) southeast of the nearest construction area;
- The nearest park to the Project is Mesa Court Field located approximately 0.25 miles (approximately 1,335 feet) east of the of the nearest construction area;
- No other sensitive receptor types are within 0.25 mile of the Project site.

The Project proposes temporary use of standard construction equipment as described in the Project Description. Equipment usage would require the burning of diesel fuel and would emit air pollutant emissions. Impacts to sensitive receptors are typically evaluated in terms of exposure to toxic air contaminants (TACs). The CARB classifies diesel particulate matter (DPM) emissions as a TAC. Proposed construction activities would result in short-term emissions of DPM from the combustion of diesel fuel from construction equipment. The burning of diesel fuel can produce both $PM_{2.5}$ and PM_{10} emissions. The CARB uses PM_{10} emissions from diesel exhaust as a surrogate measurement for DPM.

According to the anticipated equipment use emissions calculations (Appendix B), which are based on California Emissions Estimator Model (CalEEMod 2016), estimated PM_{10} emissions would be 43 lb/day and would not exceed the 150 lb/day significance threshold. This analysis is conservative as it assumes two 97 hp backhoes, three 97 hp front-end loaders, three 158 hp excavators, one 187 hp grader, and five 402 hp off-road hauling trucks running 8 hours per day. It is more likely that run times would be shorter, resulting in less PM emissions than those presented.

In addition, health effects from carcinogenic TACs are usually described in terms of individual cancer risk, which is based on a 70-year lifetime exposure to TACs. The proposed Project construction period of 8 to 10 months would be much less than the 70 years used for risk determination. Also, equipment would be moved throughout the Project site during construction activities and not remain near a particular receptor over the 8- to 10-month period. Generally, the work would range from 0.18 mile to the nearest receptor, for work near the UCI student housing, to over 0.6 mile away depending on the specific project element being constructed at the time. Once construction is complete, the Project site would continue to operate, similar to existing conditions, as a marsh and preservation area with no expanded development that would generate operational air pollutants. Based on the analysis above, the proposed Project would not expose sensitive receptors to substantial TAC emissions during construction or operations; potential impacts are considered negligible, and no mitigation is required.

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

No impact. The Project does not propose land uses or facilities identified as likely to be associated with the generation of odors or dust by the SCAQMD (SCAQMD 2005). Such facilities, for example, include those associated with agriculture, chemical plants, asphalt and cement plants, composting operations, auto body facilities, dairies and landfills. There is no proposed change in land use or increase in use. The Project would not result in operational odor emissions impacts.

Construction equipment emissions would be dispersed over the Project site, short-term, transient and generally situated far from populated areas based on location of construction activities and distance to other development. Therefore, no impacts are anticipated, and no mitigation is required.

Avoidance, Minimization and/or Mitigation Measures

No significant impacts were identified, and no mitigation measures are required.

Sources

Guidance Document for Addressing Air Quality Issues in General Plans and Local Planning, A Reference for Local Governments Within the South Coast Air Quality Management District (SCAQMD 2005); South Coast AQMD Air Quality Significance Thresholds (SCAQMD 2019); South Coast AQMD CEQA Handbook (SCAQMD 1993); California Emissions Estimator Model (CalEEMod 2016).

Biological Resources

Would the Project:

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

3.4 Biological Resources

The analysis and findings presented in this section are summarized and based on the Biological Technical Report and Jurisdictional Delineation prepared by Glenn Lukos Associates (GLA 2021a and GLA 2021b), Appendix C of this IS. The Biological Technical Report's Exhibit 3 through Exhibit 13 are included in Section 6 of this IS for easy reader reference. Exhibits 1 and 2 are not included in this IS as they represent a repeat of information provided on Figures 1 and 2.

As part of the Biological Technical Report, existing biological resource conditions within the Marsh Reserve were investigated through review of pertinent scientific literature and field surveys. In addition, UCI staff conducted early consultation with the United States Fish and Wildlife Service (USFWS), the

United States Army Corps of Engineers (USACE or Corps), Regional Water Quality Control Board (RWQCB) and California Department of Fish and Wildlife (CDFW) for information on jurisdictional resources within the Marsh Reserve.

Methods of the Biological Technical Report study included a review of relevant literature, field surveys, and a Geographical Information System (GIS)-based analysis of vegetation communities and wetlands. The Biological Technical Report was prepared consistent with accepted scientific and technical standards and survey guideline requirements issued by the USFWS, CDFW, the California Native Plant Society (CNPS), and other applicable agencies/organizations. The field surveys included (1) general reconnaissance survey and vegetation mapping; (2) general biological surveys; (3) habitat assessments for special status plant species; (4) habitat assessments for special status wildlife species, and (5) delineation of wetlands including those with special status alliances. Observations of all plant and wildlife species were recorded during the general biological surveys and previous surveys. The complete floral compendium and faunal compendium can be found in the Biological Technical Report appendices.

The Project's purpose is to enhance the hydraulics within the Marsh Reserve, which in turn would enhance the habitat functions and values within the Marsh Reserve, benefitting the various groups of species within over the long-term. Proposed improvements are discrete and limited and in no instances would temporary construction impacts have significant long-term permanent adverse effects (GLA 2021a). Potential temporary impacts would occur during construction and consist of vegetation trimming, removal and ground disturbance within work areas (e.g., swale excavation and berm expansion areas). Elements of the Project also exhibit potential for short-term impacts associated with construction noise and dust within proximity to potential nesting birds or roosting bat sites. The potential for impacts to biological resources is discussed in detail below.

It is important to note that many of the impacts addressed below overlap. Where overlap occurs, the impact and mitigation are based on the greatest extent of impacts, which is the controlling value for establishing mitigation requirements. It is also important to note, as discussed further below, impacts to Goodding's black willow forest are likely overstated as the impact analysis was conducted in "plan view" in GIS which in many instances captures canopy overhanging work areas where it would be possible to avoid direct impacts to the trunk of the tree. In addition, during the work, it is expected that avoidance of permanent impacts to individual willows would be possible, reducing the impacts as quantified in GIS.

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

Less than significant with mitigation. The proposed Project is intended to improve the long-term water management and habitat value of the Marsh Reserve. Anticipated long-term permanent effects would be the enhancement of habitat value that support and benefit species within the Marsh Reserve. Temporary or short-term adverse impacts would occur from construction (e.g., vegetation removal, ground disturbance and equipment noise) that, without the use of mitigation, could potentially result in accidental harm or disturbance to a species. The potential for adverse impacts to plant and animal species, and required mitigation measures, are described below. Unless described separately, impacts refer to both adverse construction and long-term permanent impacts together.

Special Status Plants

The potential for impacts to special status plants was evaluated through general biological surveys, habitat assessments, and focused surveys. Species were evaluated based on the following factors: 1) species identified by the California Natural Diversity Database (CNDDB) and CNPS as occurring (either currently or historically) on or in the vicinity of the Project site, and 2) any other special status plants that are known to occur within the vicinity of the Project site, or for which potentially suitable habitat occurs within the site (GLA 2021a). In addition, species were confirmed absent during focused plant surveys or based on the long-term collection of botanical data at the Marsh Reserve, which includes some numerous highly knowledgeable botanists. Prior to field surveys, Dr. Peter Bowler (Reserve Manager) was consulted regarding locations for all special status plants previously recorded for the Marsh Reserve as were herbarium personnel. A complete list of species evaluated, including those determined present or absent, is included in Table 4-2 of the attached Biological Technical Report (Appendix C) and a summary of findings is below.

One special status plant was detected at the Marsh Reserve during focused surveys: southern tarplant (*Centromadia parryi* ssp. *Australis*). Another species, vernal barley (*Hordeum intercedens*), was recently reported and presumed present near the northeast corner of the Lower Marsh. Other species have been recorded at the Marsh Reserve but appear to have been extirpated (i.e., been previously destroyed) including many-stemmed dudleya (*Dudlaya multicaulis*), southwestern spiny rush (*Juncus acutus* ssp. *leopoldii*), and estuary seablite (*Suaeda esteroa*). One additional special status species occurs in the Marsh Reserve's buffer zone but outside the boundaries of the Marsh Reserve proper: California box-thorn (*Lycium californicum*). All these species are CNPS/California Rare Plant Rank (CRPR) species. None of these species have a federal or state designation. Based on the findings of the Biological Technical Report, the only special status plant species anticipated to be within the Marsh Reserve are Southern tarplant and vernal barley (Exhibit 6). No other special status plants are anticipated to be on-site or potentially impacted by the Project.

<u>Southern Tarplant</u>
Southern tarplant has a CNPS/CRPR rank of 1B.1: "plants, rare, threatened, or endangered in California and elsewhere; seriously endangered in California (over 80% occurrences threatened)." Southern tarplant has been observed on and adjacent to a bluff road and would not be impacted by any of the Project Elements as it is sufficiently far away from proposed construction (Exhibit 6). Therefore, there would be no temporary or permanent impact to this species, and no mitigation is required.

<u>Vernal Barley</u>
Vernal barley has a CNPS/CRPR rank of 3.2: "Plants about which more information is needed (a review list); fairly endangered in California (20-80% occurrences threatened)." Vernal barley has been observed

near the northeast corner of the Lower Marsh and a portion or potentially all the small population could be impacted by Project Element 5 (Exhibit 6). However, impacts to species with a CNPR of 3 or 4 are not considered significant and mitigation would not be required.

Special Status Animals

The potential for impacts to special status animals was evaluated through general biological surveys, habitat assessments, and focused surveys. Species were evaluated based on the following factors: 1) species identified by the CNDDB as occurring (either currently or historically) on or in the vicinity of the Project site, and 2) any other special status animals that are known to occur within the vicinity of the Project site, or for which potentially suitable habitat occurs within the site. Presence or absence (or alternative determinations such as "expected for foraging" or "not expected") was determined based on the long-term collection of data at the Marsh Reserve. For avian species, Sea and Sage Audubon Society (Sea and Sage) has conducted monthly avian occurrence data between 2011 and present. Combined with additional avian survey data, there is a robust data set regarding avian use of the Marsh Reserve. Similarly, long-term data collection for species such as the western pond turtle (*Emys marmorata*) provided robust data allowing for accurate assessments of presence or absence. For species such as bats, the Marsh Reserve provides suitable foraging habitat due to the presence of bodies of ponded water; however, roosting habitat in not available for most species. A complete list of species evaluated, including those determined present or absent, is included in Table 4-3 of the attached Biological Technical Report (Appendix C) and a summary of findings is below. Unless described separately, impacts refer to both adverse construction and long-term permanent impacts together.

The following special status animals were detected or are presumed to utilize the Marsh Reserve: western pond turtle (*Emys marmorata*), American peregrine falcon (*Falco peregrinus anatum*), bald eagle (*Haliaeetus leucocephalus*) (wintering), burrowing owl (*Athene cunicularia)* (wintering), coastal California gnatcatcher (*Polioptila californica californica*), California least tern (*Sterna antillarum browni*), least Bell's vireo (*Vireo bellii pusillus*), Ridgeway rail (*Rallus obsoletus*), willow flycatcher (*Empidonax traillii extimus*), yellow-breasted chat (*Icteria virens*), yellow warbler (*Setophaga petechia*), white-tailed kite (*Elanus leucurus*), big free-tailed bat (*Nyctinomops macrotis*), Mexican long-tongued bat (*Choeronycteris mexicana*), western mastiff bat (*Eumops perotis californicus*), western red bat (*Lasiurus blossevillii*) and western yellow bat (*Lasiurus xanthinus*). No other special status animals are anticipated to be on-site or potentially impacted by the Project.

Western Pond Turtle

The western pond turtle has no federal or state designation but is a CDFW Species of Special Concern. Turtle have been identified on the site and the survey data indicates a population of between 274 and 355 individuals, making it the largest population in Orange County and of six studied populations in southern California. Nesting occurs almost exclusively in upland areas including in coastal sage scrub and on the banks of existing access roads. Nesting occurs between April 15 and July 15, with May and June showing the highest nesting activities. Following completion of the nesting season, turtles begin movement to aestivation[2] sites, with movement recorded in the Marsh Reserve between June 24 and July 9 and with aestivation between late June extending into the winter months. Within the areas of wetland/marsh habitat, western pond turtles were observed in the Middle Marsh, Lower Marsh and Experimental Ponds (Exhibit 7). Western pond turtle nest sites were documented within areas of adjacent coastal sage scrub or on the banks of existing access roads. Therefore, construction of the Project Elements exhibit less potential for impacts to nesting based on their location; however, potential for impacts to individuals cannot be ruled out. Project construction exhibits greater potential for impacts to foraging or aestivating turtles, depending on the construction timing of the Project Elements. Therefore, it would be necessary to implement appropriate measures during construction to protect pond turtles at each stage of their lifecycle. Mitigation measure **MM BIO-1** would require the preparation and implementation of a Western Pond Turtle Construction Monitoring Plan (WPTCMP) as described below. Implementation of **MM BIO-1** would minimize the potential for temporary adverse construction impacts to less than significant. The Project would not permanently adversely impact nesting, foraging or aestivation habitat for the western pond turtle.

American Peregrine Falcon

American peregrine falcon was observed by Sea and Sage during monthly surveys in 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, and 2020. The Marsh Reserve provides foraging habitat but does not have areas suitable for nesting. None of the Project Elements exhibit potential for impacts to this species because the Project has no potential for impacts to nesting habitat areas. Peregrine falcons visiting the Marsh Reserve to forage during construction would avoid work areas, forage in other locations within the Marsh Reserve, and would not be affected. Therefore, potential temporary impacts are considered less than significant, and no mitigation is required. No long-term permanent direct or indirect adverse impacts would occur as the Marsh Reserve would continue to function as a preservation area.

Bald Eagle (Wintering)

Bald eagle is a federally Delisted species, State Endangered and CDFW California Fully-Protected Species. Bald eagle was observed by Sea and Sage in 2013. The Marsh Reserve provides foraging habitat but does not include areas suitable for nesting. None of the Project Elements exhibit potential for impacts to this species because the Project has no potential for impacts to nesting habitat areas. In the rare event that a bald eagle visits the Marsh Reserve to forage during construction, the eagle would avoid work areas, forage in other locations within the Marsh Reserve, and would not be affected. Therefore, potential temporary impacts are considered less than significant, and no mitigation is required. No long-term permanent direct or indirect adverse impacts would occur as the Marsh Reserve would continue to function as a preservation area.

Burrowing Owl (Wintering)

Burrowing owl is a Federal Species of Special Concern, has no state designation and is a CDFW Species

[2] Aestivation entails entering a state of dormancy during hot and cold periods to preserve energy.

of Special Concern. A single burrowing owl was observed by Sea and Sage on October 26 and November 2, 2011 and a single burrowing owl was observed by Sea and Sage on October 7, 2015. In addition, a single wintering owl was observed by GLA on October 14 and 15 on the berms adjacent to Pond 5. All observation dates correspond to the dates that wintering owls would occur within southern California. Given that burrowing owl has not been detected during the breeding season, it is presumed that only wintering owls use the Marsh Reserve. Exhibit 8 depicts the location of burrows used by the owls in 2020. The Project would result in temporary ground disturbances necessary to raise a portion of the berm at the location or in the vicinity of where the burrowing owl was observed. To avoid impacts from construction of the Project Elements to burrowing owl, mitigation measure **MM BIO-2** would require pre-construction surveys and avoidance if an owl is present as described below. Implementation of **MM BIO-2** would reduce potential impacts from construction to less than significant. The Project would not permanently adversely impact breeding habitat for the burrowing owl. No long-term permanent direct or indirect adverse impacts would occur as the Marsh Reserve would continue to function as a preservation area.

<u>Coastal California Gnatcatcher</u>

Coastal California gnatcatcher is Federally Threatened, has no state designation, and is a CDFW Species of Special Concern. The coastal California gnatcatcher is common within areas of coastal sage scrub north of the Marsh Reserve and within coastal sage scrub along the eastern edge of the Marsh Reserve, where they were observed during site visits (Exhibit 9). A single coastal California gnatcatcher was observed foraging in mulefat thickets along the eastern edge of the Lower Marsh but outside of any proposed work areas. None of the Project Elements exhibit potential for significant impacts on this species because none of the Project Element locations support suitable habitat for this species. Therefore, no temporary or permanent impacts to nesting or foraging areas would occur, and no mitigation is required. No long-term permanent direct or indirect adverse impacts would occur as the Marsh Reserve would continue to function as a preservation area.

<u>California Least Tern</u>

California least tern is Federally Endangered, State Endangered and a CDFW California Fully-Protected Species. California least tern was observed foraging by Sea and Sage in 2012, 2013, 2014, 2015, 2016, 2017, 2018, and 2020. Ponds with deeper ponding areas within the Marsh Reserve provide suitable foraging habitat for the California least tern; however, the Marsh Reserve does not contain suitable breeding habitat for this species and breeding has not been recorded during surveys. None of the Project Elements exhibit potential for significant impacts on this species because none of the proposed work is proposed in deep ponding areas. There would be no temporary impact to nesting or potential foraging areas. Therefore, mitigation is not required. No long-term permanent direct or indirect adverse impacts would occur as the Marsh Reserve would continue to function as a preservation area.

<u>Least Bell's Vireo</u>

Least Bell's vireo is Federally Endangered, State Endangered and has no CDFW designation. Least Bell's vireo was observed by Sea and Sage in 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, and 2020. Areas of Goodding's black willow forest and mulefat thickets provide suitable breeding habitat for this species within the Marsh Reserve. Direct impacts (trimming or removal) of up to 2.274 acres of black willow forest and up to 2.06 acres of mulefat thickets would occur from construction of the proposed Project Elements. Of these areas that would potentially be disturbed, up to 1.94 acre of black willow forest and 0.72 acre of mulefat scrub is suitable for vireo nesting and would potentially be occupied[3]. Exhibit 10 depicts areas of suitable black willow forest which essentially ring the Upper Marsh, occur at the northeast corner of the Middle Marsh and along the western boundary of the Middle Marsh. The mulefat thickets within the southern one-third of the Lower Marsh and black willow forest at the western end of the Hoag Pond also provide suitable habitat. The impact areas are described as follows:

- *Design Goal 1, Element 3* exhibits potential for direct impacts to mulefat scrub associated with excavation of the curvilinear swale within the Lower Marsh, which would directly impact 0.72 acre of mulefat scrub potentially occupied by least Bell's vireo (the 0.72 acre impact includes 0.49 acre for excavation and 0.23 acre for work area);
- *Design Goal 1, Element 4* exhibits potential for direct impacts to black willow riparian forest associated with installation of a connection between Hoag Pond and Experimental Pond 3 that could remove 0.32 acre of black willow riparian forest occupied by least Bell's vireo (0.32 acre impact includes 0.12 for berm expansion and 0.20 within work area);
- *Design Goal 2, Element7b, and 7c and portion of Element 5* exhibit potential for direct impacts to 1.62 acre of black willow forest potentially occupied by least Bell's vireo (1.62 acre impact is associated with excavation of swale within the Upper Marsh from Campus Drive to Experimental Pond 10, excavation of swale and creation of berm in Lower Marsh, and expansion of access road/berm that separates the Upper Marsh and Seasonal Marsh).

Direct physical disturbance to nests from vegetation removal or noise and dust disturbances from construction equipment could adversely impact least Bell's vireo breeding should construction take place during the vireo nesting season (March 15 – August 15). To minimize the chance for impacts to nesting vireo, the Project would be required to implement mitigation measure **MM BIO-3** for preconstruction surveys and additional avoidance measures should vireo be identified within 500 feet of a work area during nesting season. Implementation of **MM BIO-3** would reduce potential adverse impacts from construction to less than significant.

Potential long-term permanent impacts associated with loss of black willow forest and mulefat thickets would be reduced to less than significant with implementation of mitigation measure **MM BIO-4**, which would require replacement of any suitable least Bell's vireo habitat removed during construction. Additional discussion regarding disturbance of sensitive habitat is provided in Section 3.4.b) below.

[3] It should be noted that USFWS issued a Biological Opinion (USFWS 2008) for impacts to least Bell's vireo due to the loss of riparian habitat associated with a previous restoration project (GLA 2001a).

Ridgeway Rail

Ridgeway rail is a Federally Endangered, State Endangered and CDFW California Fully-Protected Species. There have been multiple observations of the Ridgeway rail within areas of emergent marsh habitat at the Marsh Reserve. Ridgeway rail was detected during monthly surveys by Sea and Sage in 2012. Other observations include nesting Ridgeway rails in Pond 8 and Pond 6. Based on past occurrences, the Middle Marsh, Experimental Ponds and Hoag Pond all exhibit potential to support this species.

The Project would have potential short-term impacts on individual rails depending on the season of work. Construction of Design Goal 1, Elements 1 and 4 and Design Goal 2, Elements 6 and 7c exhibit potential for direct physical disturbance to nests from vegetation removal or noise and dust disturbances from equipment during nesting season (February 1 through September 15). To minimize potential for impacts to nesting Ridgeway rail, the Project would be required to implement mitigation measure **MM BIO-3** for preconstruction surveys and additional avoidance measures should Ridgeway rail be identified within 500 feet of a work area during nesting season. In addition, if the Ridgeway rail is present outside the nesting season during construction, there is potential for direct harm to the species from equipment due to their preference for walking or running rather than flying. To minimize the potential for impacts to non-nesting Ridgeway rail, the Project would be required to implement mitigation measure **MM BIO-5** for preconstruction surveys and potential exclusionary fencing to separate Ridgeway rail from construction activities. Implementation of **MM BIO-3** and **MM BIO-5** would reduce potential impacts from construction to less than significant.

The proposed Project would result in expanded and enhanced habitat for this species in the Marsh Reserve. Therefore, no adverse long-term permanent impacts on nesting, foraging or aestivating habitat would occur. The Marsh Reserve would continue to function as a preservation area post construction.

Southwestern Willow Flycatcher

Willow flycatcher is a migratory species composed of four subspecies, which breed within distinct geographic ranges. Southwestern Willow Flycatcher (SWFL) is a Federally Endangered and State Endangered subspecies that breeds within the southwestern region of the United States. SWFL is a riparian obligate species and prefers to nest within dense, contiguous riparian habitat that is at least 30 feet wide with slow-moving water sources and saturated soils present. There has been one (migrant) individual observed by Sea and Sage during a monthly survey in June 2017 and five (migrant) individuals detected in June 2020. In accordance with the survey protocol, a single early season detection of this species indicates a migrant subspecies and not the listed subspecies SWFL. Potentially suitable black willow forest habitat occurs in the Upper Marsh, Middle Marsh and Hoag Pond; however, given the lack of detection for this species, construction of the Project Elements exhibit no potential for significant impacts to this species and mitigation would not be required. No long-term permanent direct or indirect adverse impacts would occur as the Marsh Reserve would continue to function as a preservation area.

Yellow-Breasted Chat

The yellow-breasted chat has no federal or state designation but is a CDFW Species of Special Concern.

Yellow-breasted chat was observed during monthly surveys by Sea and Sage in 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, and 2020 and breeds onsite in areas of black willow forest and mulefat scrub (Exhibit 10). Direct physical disturbance to nests from vegetation removal or noise and dust disturbances from equipment could adversely impact breeding should construction take place during the nesting season (March 15 through September 15). To avoid and minimize the potential for adverse impacts to nesting yellow-breasted chat, the Project would be required to implement mitigation measure **MM BIO-3** for preconstruction surveys and additional avoidance measures should a nest be identified within 300 feet of a work area during nesting season. Implementation of **MM BIO-3** would reduce potential impacts from construction to less than significant.

While the yellow-breasted warbler is a California Species of Special Concern, it remains common and widespread in California and southern California; therefore, the loss of suitable black willow forest and mulefat scrub habitat would be less than significant for this species over the long-term. No mitigation would be required. Additional discussion regarding disturbance of sensitive habitat is provided in Section 3.4.b) below. No long-term permanent direct or indirect adverse impacts would occur as the Marsh Reserve would continue to function as a preservation area.

<u>Yellow Warbler</u>

The yellow warbler has no federal or state designation but is a CDFW Species of Special Concern. Yellow warbler was observed during monthly surveys by Sea and Sage Audubon Society in 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, and 2020 and breeds onsite in areas of black willow forest (Exhibit 10). Direct physical disturbance to nests from vegetation removal or noise and dust disturbances from equipment could adversely impact breeding should construction take place during the nesting season (March 15 through September 15). To minimize potential for impacts to nesting yellow warbler, the Project would be required to implement mitigation measure **MM BIO-3** for preconstruction surveys and additional avoidance measures should a nest be identified within 300 feet of a work area during nesting season. Implementation of **MM BIO-3** would reduce potential impacts from construction to less than significant.

While the yellow warbler is a federal Bird of Conservation Concern and California Species of Special Concern, it remains common and widespread in California and southern California; therefore, the loss of suitable black willow forest habitat would be less than significant for this species over the long term. No mitigation would be required. Additional discussion regarding disturbance of sensitive habitat is provided in Section 3.4.b) below. No long-term permanent direct or indirect adverse impacts would occur as the Marsh Reserve would continue to function as a preservation area.

<u>White-Tailed Kite</u>

White-tailed kite is a Federal Species of Special Concern, has no state listing and is a CDFW California Fully-Protected Species. White-tailed kite was observed during monthly surveys by Sea and Sage in all years between 2011 and 2020 and was observed by GLA biologists during most site visits in September, October and November of 2020. White-tailed kites have been documented to breed in the riparian habitat adjacent to the UCI Arboretum and are presumed to breed in other suitable areas of the Marsh Reserve. Exhibit 10 depicts areas of suitable black willow forest, which are the same areas of black willow forest habitat discussed under the section above for least Bell's vireo.

Direct impacts to trees occupied by a white-tailed kite nest during the breeding season (January 1 through June 30) would be a potentially significant impact. To minimize the potential for temporary construction impacts to nesting white-tailed kite, the Project would be required to implement mitigation measure **MM BIO-3** for preconstruction surveys and additional avoidance measures should a nest be identified within 500 feet of a work area during nesting season. Implementation of **MM BIO-3** would reduce potential impacts from construction to less than significant.

Potential long-term permanent impacts associated with loss of black willow forest would be reduced to less than significant with implementation of mitigation measure **MM BIO-4**, which would require replacement of suitable white-tailed kite habitat removed during construction. Additional discussion regarding temporary and short-term disturbance of sensitive habitat is provided in Section 3.4.(b) below.

Big Free-Tailed Bat

Big free-tailed bat has no federal or state designation but is a CDFW Species of Special Concern. The Marsh Reserve contains open areas of water suitable for big free-tailed bat to obtain water and forage. Focused surveys were not conducted because the Project does not exhibit potential for maternal roosts and would not impact foraging activities. All bats potentially using the Marsh Reserve for foraging or water would be able to avoid active construction and forage elsewhere within the Marsh Reserve. No temporary construction impacts are anticipated, and no mitigation is required. No long-term permanent direct or indirect adverse impacts would occur as the Marsh Reserve would continue to function as a preservation area.

Mexican Long-Tongued Bat

Mexican long-tongued bat has no federal or state designation but is a CDFW Species of Special Concern and Western Bat Working Group High Priority species. The Marsh Reserve contains open areas of water suitable for Mexican long-tongued bat to obtain water and forage. Focused surveys were not conducted because the Project does not exhibit potential for maternal roosts and would not impact foraging activities. All bats potentially using the Marsh Reserve for foraging or water would be able to avoid active construction and forage elsewhere within the Marsh Reserve. No temporary construction impacts are anticipated and, no mitigation is required. No long-term permanent direct or indirect adverse impacts would occur as the Marsh Reserve would continue to function as a preservation area.

Western Mastiff Bat

Western mastiff bat has no federal or state designation but is a CDFW Species of Special Concern and Western Bat Working Group High Priority species. The Marsh Reserve contains open areas of water suitable for western mastiff bat to obtain water and forage. Focused surveys were not conducted because the Project does not exhibit potential for maternal roosts and would not impact foraging activities. All bats potentially using the Marsh Reserve for foraging or water would be able to avoid active construction and forage elsewhere within the Marsh Reserve. No temporary construction impacts are anticipated, and no mitigation is required. No long-term permanent direct or indirect adverse impacts would occur as the Marsh Reserve would continue to function as a preservation area.

Western Red Bat

Western red bat has no federal designation, is a state species of concern and is a Western Bat Working Group High Priority species. The Marsh Reserve contains open areas of water suitable for western red bat to obtain water and forage. Although not confirmed by focused surveys, the Marsh Reserve also exhibits potential areas for maternal roosts within black willow forest habitat (Exhibit 10). All bats potentially using the Marsh Reserve for foraging or water would be able to avoid active construction and forage elsewhere within the Marsh Reserve. However, impacts from direct disturbance of a roosting site through removal of trees or construction noise could potentially occur during the period of maternal roosting season (March through August). If work occurs outside of the roosting season, no impacts would occur and no mitigation would be required. If work occurs during the roosting season, mitigation measure **MM BIO-6** would require preconstruction surveys and additional avoidance measures should a roosting site be found. Implementation of **MM BIO-6** would reduce potential temporary construction impacts to less than significant. No long-term permanent direct or indirect adverse impacts would occur as the Marsh Reserve would continue to function as a preservation area.

Western Yellow Bat

Western yellow bat has no federal or state designation but is a CDFW Species of Special Concern. The Marsh Reserve contains open areas of water suitable for western yellow bat to obtain water and forage. Although not confirmed by focused surveys, the Marsh Reserve also exhibits potential areas for maternal roosts within black willow forest habitat (Exhibit 10). All bats potentially using the Marsh Reserve for foraging or water would be able to avoid active construction and forage elsewhere within the Marsh Reserve. However, impacts from direct disturbance of a roosting site through removal of trees or construction noise could potentially occur during the period of maternal roosting season (March through August). If work occurs outside of the roosting season, no impacts would occur and no mitigation would be required. If work occurs during the roosting season, mitigation measure **MM BIO-6** would require preconstruction surveys and additional avoidance measures should a roosting site be found. Implementation of **MM BIO-6** would reduce potential temporary construction impacts to less than significant. No long-term permanent direct or indirect adverse impacts would occur as the Marsh Reserve would continue to function as a preservation area.

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

Less than significant with mitigation. The Marsh Reserve has not been designated as Critical Habitat for any federally listed species by the USFWS or by the National Oceanic and Atmospheric

Administration/National Marine Fisheries Service (NMFS).

The Marsh Reserve contains 14 different vegetation alliances and land cover types that were identified during vegetation mapping (Exhibit 4). Of these 14, 5 are special status wetland vegetation alliances including California bulrush, Goodding's black willow forest, Saltmarsh bulrush, Pickleweed mats, and western sea-purslane marsh (Exhibit 5). One special status non-wetland vegetation alliance (Coast Prickly Pear Scrub) also occurs with the Marsh Reserve. The Project would not impact Coast Prickley Pear Scrub. The vegetation alliances and land cover types within the Marsh Reserve are shown on Exhibits 4 and 5 and are summarized below in Table 4. A detailed description of all vegetation alliances and land cover types is included in the attached Biological Technical Report (Appendix C).

Table 4. Summary of Vegetation/Land Cover Types

Vegetation Alliances/Land Use Type	CNDDB Rank	Acreage
Forest and Woodland Alliances		
Salix gooddingii Forest & Woodland Alliance (Goodding's Willow Riparian Forest & Woodland)	G4 S3	17.73
Shrubland and Grassland Alliances		
Artemisia californica Shrubland Alliance (California Sagebrush Scub)	G5 S5	5.53
Baccharis Salicifolia Shrubland Alliance (Mulefat Thickets)	G4 S4	21.14
Opuntia littoralis Shrubland Alliance (Coast Prickly Pear Scrub)	G4 S3	0.07
Herbaceous Alliances		
Bolboschoenus maritimus Herbaceous Alliance (Salt Marsh Bulrush Marshes)	G4 S3	12.99
Schoenoplectus Californicus Herbaceous Alliance (California Bulrush Marshes)	GNR S3	37.48
Typha spp. Herbaceous Alliance (Cattail Marshes)	G5 S5	29.55
Sesuvium verrucosum Herbaceous Alliance (Western Sea-purslane Marshes)	G3 S2.2	3.94
Crypsis schoenoides Semi-Natural Herbaceous Alliance (Swamp Pricklegrass Mats)	N/A	2.94
Salicornia *pacifica* Herbaceous Alliance (Pickleweed mats)	G4 S3	0.47
Mixed Herbaceous Wetland	N/A	39.10
Mixed Herbaceous Upland	N/A	5.84
Other Land Use Types		
Open Water	N/A	13.70
Disturbed	N/A	8.37
TOTAL		**198.94**

Global Ranking:	State Ranking:
G1 = Critically imperiled globally because of extreme rarity (5 or fewer occurrences), or because of some factor(s) making it especially vulnerable to extinction. G2 = Imperiled globally because of rarity (6-20 occurrences), or because of some other factor(s) making it very vulnerable to extinction throughout its range. G3 = Either very rare and local throughout its range (21 to 100 occurrences), or found locally (even abundantly at some of its locations) in a restricted range (e.g., a physiographic region), or because of some other factor(s) making it vulnerable to extinction throughout its range. G4 = Uncommon but not rare; some cause for long-term concern due to declines or other factors. G5 = Common, widespread and abundant. N/A = Not applicable.	S1 = Extremely rare; typically, 5 or fewer known occurrences in the state; or only a few remaining individuals; may be especially vulnerable to extirpation. S2 = Very rare; typically, between 6 and 20 known occurrences; may be susceptible to becoming extirpated. S3 = Rare to uncommon; typically, 21 to 50 known occurrences; S3 ranked species are not yet susceptible to becoming extirpated in the state but may be if additional populations are destroyed. S4 = Uncommon but not rare; some cause for long-term concern due to declines or other factors. S5 = Common, widespread, and abundant in the state N/A = Not applicable.
Source: Biological Technical Report (Appendix C) if this IS (GLA 2021a)	

The Project is designed for purposes of enhancing the hydraulics in the marsh to enhance the wetlands and riparian habitat in the Marsh Reserve. Therefore, Project impacts to sensitive wetland vegetation alliances are generally considered temporary or short-term based on the nature of the proposed Project, which is designed to restore and/or enhance the function and value of wetland vegetation alliances within the greater Marsh Reserve. In addition, siting of the proposed Project Design Goals, associated Elements, and proposed staging and access areas was performed in coordination with project biologist and the project engineer to avoid and minimize disturbances to sensitive alliances where feasible. Nevertheless, construction would result in direct, albeit temporary or short-term, disturbances to these resources as summarized in Table 5 below. Direct disturbances would be associated with the following construction activities:

- Removal of special status woody wetland vegetation
- Fill within special status herbaceous wetlands
- Excavation within special status herbaceous wetlands
- Mowing within special status herbaceous wetlands

The Project site is located partially within the Coastal Zone, which is under the jurisdiction of the California Coastal Commission (CCC). The CCC is responsible for managing Environmentally Sensitive Habitat Areas (ESHA) under the California Coastal Act. ESHA designations are usually based on the presence of plants, animals, or habitat types that have been designated as "rare" by CDFW or other authority. ESHAs may also include areas that are especially valuable because of their special nature, such as supporting a species' population with unusual genetic characteristics, or important ecosystems like wetlands as defined by the CCC under California Code of Regulations Section 13577(b)). The Coastal Act and Local Coastal Programs (LCPs) only allow resource-dependent uses within ESHAs to ensure the long-term protection of the habitat. Ultimately, it is the responsibility of the CCC, or delegated local agency under a LCP, to determine whether an area qualifies as an ESHA. ESHA determinations are based on the information provided by the project proponent, input from experts from other agencies, and actual conditions on the ground. The Project site contains special status animal species, plant species and habitat (as described in the sections above and below) that are anticipated to meet the definition of ESHA. Based on the nature of proposed Project activities, which are intended to improve the long-term habitat value of resources within the Marsh Reserve, no significant adverse impacts would occur. The Project would also comply with the California Coastal Act and obtain any required Coastal Development Permit (CDP) and/or other approvals prior to implementation. No adverse impacts are anticipated, and no mitigation is required.

Summary of Impacts

A summary of direct impacts to special-status wetland vegetation alliances is provided below. It is important to note that this impact analysis is conservative in that it considers all potential impacts that have been identified based on preliminary or conceptual design. With final design refinements, certain impacts may potentially be reduced or eliminated. In addition, no anticipated project benefit or credit has been factored into the impact analysis calculations. For example, restoration, enhancement and creation effects resulting from Project implementation are not quantified. Therefore, the analysis described below and summarized in Table 5 is likely overstated for the purposes of evaluating the Project under the CEQA. It is also important to note that the "special status" wetlands and riparian habitats in Table 5 below comprise a subset of wetlands and riparian habitats on the site and as such, are also included below under Section 3.4(c) and Table 6. Total impacts to wetland and riparian habitats for the Project are summarized in Table 7, which is inclusive of special status wetlands and riparian habitats (Exhibit 13). Unless described separately, impacts refer to both adverse construction and long-term permanent impacts together.

Table 5. Special Status Wetland Alliance Impacts

Element[1]	Vegetation Alliance	Removal Woody Vegetation (acres)[2]	Fill Herbaceous (acres)	Excavation Herbaceous (acres)	Mowing Herbaceous (acres)
1	California Bulrush Marsh	--	0.01	--	--
2	None Present	--	--	--	--
3	California Bulrush Marsh	--	--	1.16	--
	Salt Marsh Bulrush Marsh	--	--	0.03	--
4	California Bulrush Marsh	--	0.01	--	--
5	California Bulrush Marsh	--	0.36	--	--
	Goodding's Willow Forest	0.41	--	--	--
	Salt Marsh Bulrush Marsh	--	0.11	--	--
6	California Bulrush Marsh	--	0.01	--	--
7a	None Present	--	--	--	--
7b	Goodding's Willow Forest	0.01	--	--	--
7c	California Bulrush Marsh	--	0.14	0.52	--
	Goodding's Willow Forest	0.34	--	--	--
	Salt Marsh Bulrush Marsh	--	--	0.01	--
	Goodding's Willow Forest	0.03	--	--	--

Element[1]	Vegetation Alliance	Removal Woody Vegetation (acres)[2]	Fill Herbaceous (acres)	Excavation Herbaceous (acres)	Mowing Herbaceous (acres)
8	Gooding's Willow Forest	0.03	--	--	--
Staging[2]	California Bulrush Marsh	--	0.02	--	--
	Goodding's Willow Forest	0.01	--	--	--
	Salt Marsh Bulrush Marsh	--	0.05	--	--
Work Area[3]	California Bulrush Marsh	--	--	--	1.62
	Goodding's Willow Forest	1.44	--	--	--
	Pickleweed Mat	--	--	--	0.004
	Salt Marsh Bulrush Marsh	--	--	--	0.54
	Western Sea-purslane mats	--	--	--	0.01
	Totals	**2.27**	**0.71**	**1.72**	**2.174**

Notes:
[1] Impact calculations for each Element account for the temporary "Proposed Access Route" required to access that Element as shown on Exhibits 13a – 13d.
[2] Impact calculations for Removal of Woody Vegetation and for the "Proposed Staging Area" shown on Exhibits 13a – 13d are likely overstated. Impact analysis was conducted in "plan view" in GIS, which in many instances captures canopy overhanging work areas where it would be possible to avoid direct impacts to the trunk of the tree. Project staging is anticipated to avoid woody vegetation removal and not require placement of fill.
[3] Accounts for potential impacts associated with a "Temporary Work Area" buffer around the proposed Elements as shown on Exhibits 13a – 13d.
Source: Biological Technical Report (Appendix C) if this IS (GLA 2021a)

Impact Analysis

<u>Removal of Special-Status Woody Wetland Vegetation</u>
Implementation of certain Project Elements would result in the removal of up to 2.27 acres of Goodding's black willow forest during construction (Table 5). These acreages are shown in the Removal Woody Vegetation column. Such removal is necessary where woody wetland vegetation would prohibit implementation of specific elements such as construction of berms, excavation of swales, and access to and work within work areas for berm construction or swale excavation. Impacts to this alliance includes specific areas identified above in Section 3.4(a) that addresses special status animals such as least Bell's vireo and other special status avifauna and bats. Impacts to 2.24 acres of Goodding's black willow forest would be considered potentially significant before mitigation due to potential long-term permanent impacts to least Bell's vireo and other special-status species. With implementation of mitigation measure **MM BIO-4** as described below, potential impacts would be reduced to less than significant. No long-term permanent direct or indirect adverse impacts would occur as the Marsh Reserve would continue to function as a preservation area. As noted above, impacts to Goodding's black willow forest are likely overstated as the impact analysis was conducted in "plan view" in GIS, which in many instances captures canopy overhanging work areas where it would be possible to avoid direct impacts to the trunk of the tree. Implementation of the Project would be done in a manner that avoids impacts to individual willows

to the maximum extent including through minor modifications determined feasible during construction. For example, adding fill around the base of large willows would not have an adverse effect and thus allow for additional avoidance.

Fill within Special Status Herbaceous Wetlands

Implementation of certain Project Elements would result in the fill of special-status herbaceous wetlands including 0.55 acre of California bulrush marsh and 0.16 acre of saltmarsh bulrush (Table 5). Acreage totals 0.71 acre under the Fill Herbaceous column. Fill of these areas is associated with expansion or construction of berms. Impacts to these areas, regardless of their special-status would be considered potentially significant before mitigation because these areas meet state and federal wetland definitions. With implementation of mitigation measure **MM BIO-4** as described below, potential impacts would be reduced to less than significant. No long-term permanent direct or indirect adverse impacts would occur as the Marsh Reserve would continue to function as a preservation area.

Excavation within Special-Status Herbaceous Wetlands

Implementation of certain Project Elements would result in the excavation of herbaceous wetlands including 1.68 acres of California bulrush marsh and 0.04 acre of saltmarsh bulrush (Table 5; under the Excavation Herbaceous column). Impacts to these areas regardless of their special status would be considered potentially significant before mitigation because these areas meet state and federal wetland definitions. With implementation of mitigation measure **MM BIO-4** as described below, potential impacts would be reduced to less than significant. No long-term permanent direct or indirect adverse impacts would occur as the Marsh Reserve would continue to function as a preservation area.

Mowing within Special-Status Herbaceous Wetlands

Implementation of certain Project Elements would result in the mowing of herbaceous wetlands for purposes of access, including 1.62 acres of California bulrush marsh, 0.54 acre of saltmarsh bulrush, 0.004 acre of pickleweed mats, and 0.01 acre of western sea-purslane (Table 5; under the Work Area row). Mowing of these areas would not be considered significant as these areas would regrow upon completion of work. No mitigation is required. No long-term permanent direct or indirect adverse impacts would occur as the Marsh Reserve would continue to function as a preservation area.

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

Less than significant impact. The Marsh Reserve supports federally protected wetlands and potentially state protected wetlands and riparian habitat (Exhibit 11 and Exhibit 12). Areas within the Marsh Reserve would be considered waters of the U.S. as an adjacent wetland (33 CFR Part 328.3(a)(4)). All the wetland areas within the Marsh Reserve meet the definition for Waters of the U.S. Thus, any impacts to the wetlands would be subject to a Water Quality Certification pursuant to Section 401 of the Clean Water Act and areas of jurisdiction for the USACE and RWQCB would be the same. Except for San Diego Creek and associated riparian habitat, the Marsh Reserve does not strictly meet the definition for a stream (having bed, bank, or channel) or lake (large body of water within enclosed basin) in accordance with Section 1602 of the Fish and Game Code and thus would not be subject to the Notification provisions under Section 1602. Nevertheless, the Marsh Reserve exhibits significant values for fish and wildlife resources including multiple special status animals, including at least one state-listed bird: least Bell's vireo. CDFW would be expected to comment on this IS/MND and at that time would comment on whether CDFW would request Notification under Section 1602. Table 6 shows a summary of agency jurisdiction within the Marsh Reserve.

Table 6. Summary of Agency Jurisdiction

Wetland Area	Wetland Waters of the U.S. (USACE Jurisdiction)	Wetland Waters of the State (Regional Board Jurisdiction)	Potential CDFW Jurisdiction
Upper Marsh	26.75	26.75	26.75
Middle Marsh	43.76	43.76	43.76
Lower Marsh	19.53	19.53	19.53
Seasonal Marsh	33.57	33.57	33.57
Experimental Ponds	34.80	34.80	34.80
Hoag Pond	6.50	6.50	6.50
San Diego Creek	14.15	14.15	14.15
Total	**179.05**	**179.05**	**179.05**
Source: Biological Technical Report (Appendix C) if this IS (GLA 2021a)			

The Project is designed for purposes of enhancing the hydraulics in the marsh that further enhances the wetlands and riparian habitat in the Marsh Reserve. Project impacts to these wetland and riparian resources are generally considered temporary or short-term based on the nature of the proposed Project, which is designed to restore and/or enhance the function and value of habitat within the greater Marsh Reserve. In addition, siting of the proposed Project Design Goals and associated Elements, and proposed staging and access areas was performed in coordination with GLA and the project engineer to avoid and minimize disturbances to resources where feasible. Nevertheless, proposed construction would result in direct, albeit temporary or short-term disturbances, to these resources as described in detail below and as summarized for each Element in Table 7. Direct disturbances would be associated with the following construction activities:

- Removal of woody wetland vegetation
- Fill within herbaceous wetlands
- Excavation within herbaceous wetlands
- Mowing within herbaceous wetlands

It is important to note that impacts to state and federally protected wetlands that are considered special status have already been addressed above in Section 3.4(b) and are included in the overall wetland impacts. As such, it is important that such impacts are not counted twice. Therefore, Table 7 below includes all wetland impacts inclusive of special status wetlands and riparian habitats.

Summary of Impacts

A summary of direct impacts to wetlands and riparian habitat is provided in Table 7 below. This impact analysis is conservative in that it considers all potential impacts that have been identified based on preliminary or conceptual design (Exhibit 13). With final design refinements, certain impacts may potentially be reduced or eliminated. In addition, no anticipated project benefit or credit has been factored into the impact analysis calculations. For example, restoration, enhancement and creation effects resulting from Project implementation are not quantified. Therefore, the analysis described below and summarized in Table 7 is likely overstated for the purposes of evaluating the Project under CEQA. In fact, this Project is intended to maintain and enhance the wetland and riparian ecosystems of the Marsh Reserve given the challenges of a changing climate and increased urbanization in the region over the years. The temporary impacts would result in the long-term and permanent support of habitats that better align with the history of the Marsh Reserve and its unique position to support wetland and riparian communities. Unless described separately, impacts refer to both adverse construction and long-term permanent impacts together.

Certain proposed impacts must be considered in the larger context of the goals of the Marsh Reserve, such as part of proposed Element 7c to create a basking island in the Middle Marsh, which would result in placement of fill within an area of cattail marsh to enhance a regional important population of the western pond turtle. Cattail marsh is common and widespread; while the western pond turtle remains in decline regionally and enhancement of the Marsh Reserve for western pond turtle is fully consistent with the goals of the Marsh Reserve.

Table 7. Wetland Impacts

Element[1]	Vegetation Alliance	Removal Woody Vegetation (acres)[2]	Fill Herbaceous (acres)	Excavation Herbaceous (acres)	Mowing Herbaceous (acres)
1	California Bulrush Marsh	--	0.01	--	--
2	None Present	--	--	--	--
3	California Bulrush Marsh	--	--	1.16	--
	Mixed Herbaceous Wetland	--	--	0.05	--
	Mulefat Thickets	0.49	--	--	--
	Salt Marsh Bulrush Marsh	--	--	0.03	--
4	California Bulrush Marsh	--	0.01	--	--
	Mixed Herbaceous Wetland	--	0.01	--	--
5	California Bulrush Marsh	--	0.36	--	--
	Goodding's Willow Forest	0.41	--	--	--
	Mixed Herbaceous Wetland	--	0.61	--	--
	Mulefat Thicket	0.23	--	--	--
	Salt Marsh Bulrush Marsh	--	0.11	--	--
6	California Bulrush Marsh	--	0.01	--	--
	Mixed Herbaceous Wetland	--	0.01	--	--

Element[1]	Vegetation Alliance	Removal Woody Vegetation (acres)[2]	Fill Herbaceous (acres)	Excavation Herbaceous (acres)	Mowing Herbaceous (acres)
	Swamp Pricklegrass Mats	--	0.01	--	--
7b	Goodding's Willow Forest	0.01	--	--	--
	Mixed Herbaceous Wetland	--	0.01	--	--
7c	California Bulrush Marsh	--	0.14	0.52	--
	Cattail Marsh	--	1.04	0.83	--
	Goodding's Willow Forest	0.34	--	--	--
	Mulefat Thickets	0.42	--	--	--
	Mixed Herbaceous Wetland	--	0.54	1.18	--
	Salt Marsh Bulrush Marsh	--	--	0.01	--
	Swamp Prickelgrass Mats	--	--	0.01	--
8	Cattail Marsh	--	--	0.003	--
	Goodding's Willow Forest	0.03	--	--	--
Staging[2]	California Bulrush Marsh	--	0.02	--	--
	Goodding's Willow Forest	0.01	--	--	--
	Mixed Herbaceous Wetland	--	0.12	--	--
	Salt Marsh Bulrush Marsh	--	0.05	--	--
Work[3] Area	California Bulrush Marsh	--	--	--	1.62
	Cattail Marsh	--	--	--	0.84
	Goodding's Willow Forest	1.44	--	--	--
	Mixed Herbaceous Wetland	--	--	--	2.35
	Mulefat Thicket	0.92	--	--	--
	Pickleweed Mat	--	--	--	0.004
	Salt Marsh Bulrush Marsh	--	--	--	0.54
	Swamp Pricklegrass Mats	--	--	--	0.05
	Western Sea-purslane mats	--	--	--	0.01
	Totals	**4.30**	**3.06**	**3.79**	**5.414**

Notes:

[1] Impact calculations for each Element account for the temporary "Proposed Access Route" required to access that Element as shown on Exhibits 13a – 13d.

[2] Impact calculations for Removal of Woody Vegetation and for the "Proposed Staging Area" shown on Exhibits 13a – 13d are likely overstated. Impact analysis was conducted in "plan view" in GIS, which in many instances captures canopy overhanging work areas where it would be possible to avoid direct impacts to the trunk of the tree. Project staging is anticipated to avoid woody vegetation removal and not require placement of fill.

[3] Accounts for potential impacts associated with a "Temporary Work Area" buffer around the proposed Elements as shown on Exhibits 13a – 13d.

Source: Biological Technical Report (Appendix C) if this IS (GLA 2021a)

Impact Analysis

Removal of Woody Wetland Vegetation

Implementation of certain Project Elements could result in the removal of up to 2.27 acres of Goodding's black willow forest and 2.06 acres of mulefat thickets (Table 7). Such removal is necessary where woody wetland vegetation would prohibit implementation of specific elements such as construction of berms, excavation of swales, and access to and work within work areas for berm construction or swale excavation if staff and contractors are unable to identify less impactful alternatives. However, it is important to note this impact analysis is conservative. Cut and fill areas would avoid impact to sensitive habitat such as California bulrush and mature willows where feasible. Where feasible manual removal of lower branches and dead material would be employed to open up paths beneath and around larger trees and sensitive vegetation.

It is important to note that impacts to these alliances include specific areas identified above in Sections 3.4(a) and 3.4(b) that addresses special-status animals such as least Bell's vireo and other special-status avifauna and bats. Impacts to 2.27 acres of Goodding's black willow forest and 2.06 acres of mulefat thickets would be considered potentially significant before mitigation. With implementation of mitigation measure **MM BIO-4** as described below, potential impacts would be reduced to less than significant. No long-term permanent direct or indirect adverse impacts would occur as the Marsh Reserve would continue to function as a preservation area. As noted above, impacts to Goodding's black willow forest are likely overstated as the impact analysis was conducted in "plan view" in GIS, which in many instances captures canopy overhanging work areas where it would be possible to avoid direct impacts to the trunk of the tree. Implementation of the Project would be done in a manner that avoids impacts to individual willows to the maximum extent including through minor modifications determined feasible during construction. For example, adding fill around the base of large willows would not have an adverse effect and thus allow for additional avoidance.

Fill within Herbaceous Wetlands

Implementation of certain project elements would result in the fill of herbaceous wetlands including 0.55 acre of California bulrush marsh, 1.04 acres of cattail marsh, 1.30 acres of mixed herbaceous wetland, 0.16 acre of saltmarsh bulrush, and 0.01 acre of swamp pricklegrass mats (Table 7). Fill of these areas is associated with expansion or construction of berms and would be considered potentially significant before mitigation. With implementation of mitigation measure **MM BIO-4** as described below, potential impacts would be reduced to less than significant. No long-term permanent direct or indirect adverse impacts would occur as the Marsh Reserve would continue to function as a preservation area.

Excavation within Herbaceous Wetlands

Implementation of certain project elements would result in the excavation of herbaceous wetlands including 1.68 acres of California bulrush marsh, 0.83 acre of cattail marsh, 1.23 acres of mixed herbaceous wetland, 0.16 acre of saltmarsh bulrush, and 0.01 acre of swamp pricklegrass mats (Table 7). Impacts to these areas is associated with excavation and would be considered potentially significant before mitigation. With implementation of mitigation measure **MM BIO-4** as described below, potential impacts would be reduced to less than significant. No long-term permanent direct or indirect adverse impacts would occur as the Marsh Reserve would continue to function as a preservation area.

<u>Mowing within Herbaceous Wetlands</u>
Implementation of certain project elements would result in the mowing of herbaceous wetlands for purposes of access, including 1.62 acres of California bulrush marsh, 0.84 acre of cattail marsh, 2.35 acres of mixed herbaceous wetland, 0.54 acre of saltmarsh bulrush, and 0.05 acre of swamp pricklegrass mats (Table 7). Mowing of these areas would not be considered significant as these areas would regrow upon completion of work. No mitigation is required. No long-term permanent direct or indirect adverse impacts would occur as the Marsh Reserve would continue to function as a preservation area.

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

Less than significant with mitigation. The Marsh Reserve supports what is potentially the largest western pond turtle population in Orange County, which also supports active breeding. Almost all nesting sites occur in the adjacent upland areas within coastal sage scrub or along the banks of existing access roads as depicted on Exhibit 7. Temporary construction activities required for Design Feature 1 and Design Feature 2 Elements do not exhibit potential for impacts to nesting sites based on their proposed construction activities and location within the Marsh Reserve.

Temporary construction activities required for Design Goal 1, Elements 1, 5a, and 7 and Design Goal 2, Elements 2 and 3 exhibit potential for impacts to western pond turtles within areas where pond turtles could be foraging, basking, or aestivating. Direct take of western pond turtle would be considered a potentially significant impact before mitigation; however, implementation of mitigation measure **MM BIO-1** described below would avoid and reduce potential impacts of direct take to less than significant. In addition, the Project proposes construction of an island in Middle Marsh under Element 7c that would provide a dry habitat area for turtles, resulting in potential long-term permanent benefits for the population.

The Project also has the potential to temporarily impact active bird nests if vegetation is trimmed or removed during the nesting season, which varies according to species or group of species. For purposes of this Project, the bird nesting season encompasses the range of potential nesting periods (January 1 through September 15). Impacts to nesting birds are prohibited by the Migratory Bird Treaty Act (MBTA) and California Fish and Game Code. Therefore, mitigation measure **MM BIO-3** described below would be required to avoid impacts to nesting birds. Implementation of this mitigation measure would reduce potential impacts to less than significant.

No long-term permanent direct or indirect adverse impacts would occur as the Marsh Reserve would continue to function as a preservation area.

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

No impact. The Project site is located entirely within UC land and would be consistent with LRDP policies as designated Open Space – General use. No adverse impacts are anticipated. In addition, as the site is located entirely on UC land, the Project would not trim or remove trees within the City of Irvine's jurisdiction. All trees that may be trimmed or removed for Project implementation are consistent with the Open Space – General land use designation, and replacement plantings would occur consistent with mitigation required for impacts to willows, as discussed above. Therefore, no impacts would occur, and no mitigation is required.

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

No impact. The Marsh Reserve is neither within nor would it conflict with an adopted Habitat Conservation Plan, County of Orange Central/Coastal Natural Community Conservation Plan/Habitat Conservation Plan, (NCCP/HCP) or other approved local, regional, or state habitat conservation plan. The Marsh Reserve is located within the NCCP/HCP Coastal Subarea boundaries but the Marsh Reserve is not located within the NCCP/HCP Reserve. Implementation of the Project would not adversely impact the NCCP/HCP Reserve. In addition, the Project does not propose any change from existing use or new development. The Marsh Reserve would continue as a preservation area. No impacts would occur, and no mitigation is required.

Avoidance, Minimization and/or Mitigation Measures

The following project-specific mitigation/avoidance measures are required for temporary and short-term impacts. As noted above, the Project's purpose is to provide enhanced hydraulics for areas of the Marsh Reserve, which would in turn enhance the overall long-term habitat functions within the Marsh Reserve. Long-term permanent adverse impacts on biological resources would not occur and mitigation is not proposed.

MM BIO-1 Western Pond Turtle. To minimize the potential for western pond turtles to be harmed during construction, a biologist familiar with the ecology, behavior, and movement patterns of the pond turtle within the Marsh Reserve shall prepare and implement a Western Pond Turtle Construction Monitoring Plan (WPTCMP). The WPTCMP shall include the following components:

- Goals of the WPTCMP;
- Methods to be employed in pre-construction surveys including mapping requirements;
- Monitoring requirements during construction for each phase of the western pond turtle lifecycle (e.g., nesting, aestivation, foraging);
- Methods for removing western pond turtles from "harms way" if found during monitoring;

- Description of exclusion fencing or enclosures necessary to protect western pond turtle and locations where such can be determined during WPTCMP preparation; and
- Reporting requirements.

The WPTCMP must be reviewed and approved by the Marsh Reserve Manager 30 days prior to the start of construction to allow sufficient time for pre-construction surveys and associated mapping needed for western pond turtle protection. This measure may be modified as necessary to meet conditions of any required regulatory permits.

MM BIO-2 Burrowing Owl. If proposed work would occur during the wintering season (October 1 through March 15) a biologist familiar with the ecology and behavior of burrowing owl shall survey the work area(s), with suitable wintering habitat, such as berms and areas with no vegetation or areas that have low ground cover and suitable burrows and or structures. Surveys shall be conducted out to 500 feet from planned construction within three days of the start of work and within suitable habitat. If it is determined that wintering owls are using burrows within berms or other areas to be impacted by construction, the biologist shall temporarily halt work in the immediate location of the active burrow and establish a suitable buffer around the burrow (based on field conditions) until occupied burrows are vacated. Once the project biologist determines that the owl is not using burrows within the work area or within the biologist's established suitable buffer area, work on the subject berms or other area may begin. This measure may be modified as necessary to meet conditions of any required regulatory permits.

MM BIO-3 Nesting Birds. Vegetation clearing should be conducted outside of the nesting season (see below for species-specific seasons).

- Avian species that are not state or federally listed as threatened or endangered or state fully protected but which are protected by MBTA and California Fish and Game Code Sections 3503 and 3503.5 (March 15 through September 15).
- Ridgeway Rail nesting season (February 1 through September 15).
- Least Bell's Vireo nesting season (March 15 through September 15).
- White Tailed Kite nesting season (January 1 through June 30).
- Common owls and raptors (e.g., barn owls, red-tailed hawks, Cooper's hawks, etc.,) (January 1 through June 30).

If avoidance of the nesting season is not feasible, then a qualified biologist shall conduct a nesting bird survey out to 500 feet from planned construction within three days prior to any project vegetation trimming or removal, grubbing, disking, demolition activities, excavations, or grading. If active nests are identified within 300 feet for nests of MBTA protected species or species of concern (e.g. Yellow-breasted chat, Yellow Warbler) or within 500 feet for nests of ESA-listed species (e.g. Ridgeway Rail, Least Bell's Vireo, White Tailed Kite) or common owls and raptors, the biologist shall establish suitable buffers around the nests (based on species and field conditions), and the buffer areas shall be avoided until the nests are no longer occupied and the juvenile birds can survive independently from the nests. Alternatively, the biological monitor shall establish a behavioral baseline of all identified active nests and continuously monitor the nests during active construction for signs of project related behavioral changes. If behavioral changes are not observed, work may proceed. If behavioral changes are observed, work shall be halted or postponed until modifications demonstrate to the biologist's satisfaction that project-related activities are no longer causing behavioral changes. This measure may be modified as necessary to meet conditions of any required regulatory permits.

MM BIO-4 Habitat Reestablishment and Monitoring Plan. Prior to removal of wetland vegetation, fill of herbaceous wetlands or excavation of herbaceous wetlands, UCI shall prepare, or have prepared by a restoration specialist, a Habitat Reestablishment and Monitoring Plan (HRMP) that details the restoration requirements for each of these sensitive habitats that will be impacted during a project phase. The HRMP shall include the following components:

1. Map(s) identifying areas where reestablishment of Goodding's black willow forest, Mulefat thickets, California bulrush marsh, cattail marsh, mixed herbaceous wetland, saltmarsh bulrush, and swamp pricklegrass mats would occur. Note:
    a. swamp pricklegrass is non-native and would be replaced with western sea-purslane;
    b. suitable least Bell's vireo/white tailed kite habitat disturbed during construction shall be replaced at a minimum 1:1 ratio within the immediate area or other nearby suitable location;
    c. passive reestablishment may be included in the HRMP, where the HRMP can demonstrate that such passive reestablishment will result in no net loss of wetlands and riparian habitat;

2. Plant palettes and type of plant materials, including use of seed, container stock, cuttings, regrowth by trees cut but not fully removed or salvaged materials such as bulrush and cattails from excavation areas;

3. Methods for monitoring success of reestablishment areas;

4. Performance standards and adaptive management strategies; and

5. Reporting requirements.

Reestablishment shall begin following construction of the Element completed. This measure may be modified as necessary to meet conditions of any required regulatory permits.

MM BIO-5 Ridgeway rail. To minimize the potential for Ridgeway rails being harmed during construction activities, a biologist shall survey the proposed work area for rails within three days of the start of vegetation removal or ground disturbance. Once it is determined that there are no Ridgeway rails within the work area, exclusion fencing consisting of silt fence or similar material may be installed to deter rails from entering the work area. The need for exclusionary fencing and the precise locations of fencing shall be determined by the biologist based on field conditions (e.g., proximity to Ridgeway rail or dense vegetation; density of vegetation within the work area and ground visibility; intensity of proposed equipment). This measure may be modified as necessary to meet conditions of any required regulatory permits.

MM BIO-6 Western Red Bat and Western Yellow Bat. If work is to be conducted within areas of Goodding's black willow forest during the maternity roost season (March through August), a biologist shall conduct weekly bat surveys for western red bat and western yellow bat beginning 30 days prior to start of work. If a maternity roost site is detected, the active roost tree shall not be removed until roosting has been completed and the pups are no longer dependent on the roost site as determined by the biologist. This measure may be modified as necessary to meet conditions of any required regulatory permits.

Sources

Biological Technical Report for California Natural Reserve System San Joaquin Freshwater Marsh (GLA 2021a); Jurisdictional Delineation for the University of California Natural Reserve System San Joaquin Marsh Reserve (GLA 2021b).

Cultural Resources

Would the Project:

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

3.5 Cultural Resources

The analysis and findings provided in this section are based on the summary of findings found within the Cultural Resources Assessment for the San Joaquin Marsh Restoration Project prepared by Cogstone Resource Management Inc. (Cogstone) in March 2021 (Appendix D). The cultural resources survey area or Area of Potential Effects (APE) for the Project included review of approximately 200 acres located north of University Drive, south of Jamboree Road, and west of Campus Drive. The APE study area covered the broader Marsh Reserve property and adjacent properties. Project construction activities are proposed in specified areas, as shown on Figure 2, within the APE.

The assessment included a records search at the South Central Coastal Information Center (SCCIC) and search of other available databases including the National Register of Historic Places (NRHP), the California Register of Historic Resources (CRHR), California Built Environment Resource Directory (BERD), California Historical Landmarks (CHL), California Point of Historical Interest (CPHI) and Sacred Lands File search requested from the Native American Heritage Commission (NAHC). The assessment also included an intensive pedestrian survey consisting of one- to three-meter wide transects in accessible areas. Ground visibility within the APE was very poor (less than 3 percent) due to dense vegetation within the marsh and surrounding areas. Some areas were not accessible due to overgrowth of vegetation.

Results of the record search indicated that 15 cultural resources studies have been completed previously within the APE and 141 additional cultural resource investigations have been completed previously within a one-mile radius of the APE. The records search also determined three previously recorded resources are located within the APE boundaries. The resources include the Duck Ponds (identified as Locus B of the multi-component archaeological site P-30-000057 (CA-ORA-57)), a multicomponent site (P-30-000121/CA-ORA-121) and a prehistoric archaeological site (P-30-000115/CA-ORA-115). Project construction activities are proposed in the location of only one of these resources, P-30-000057 (CA-ORA-57). In addition, 40 other cultural resources are located within a one-mile radius of the APE. These include 28 prehistoric archaeological sites, five multicomponent sites (both prehistoric and historic), five historic isolates, and five historic architectural resources. Other than the berms surrounding the Duck Ponds, no cultural resources were observed during the pedestrian survey.

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

No impact.

P-30-000057(CA-ORA-57) and Duck Ponds

The current recorded boundaries of P-30-000057 have been altered greatly from when the site was first surveyed and excavated in 1935 and 1938, and from subsequent descriptions, which all describe the resource as located along the bluffs above the San Joaquin Marsh. The former San Joaquin Gun Club buildings were added to the site record for the resource in 1985. A revaluation of the resource in 1993 added the Duck Ponds that are associated with the San Joaquin Gun Club and located within San Joaquin Marsh as Locus B within P-30-000057.

The past excavations done in the 1930s within P-30-000057 discovered three Native American burials, 13 manos, nine projectile points (two obsidian), seven bone awls, five shell beads (four Olivella and one Cowry), three pestles, one plummet, three scrapers, one cogstone, 22 hammerstones, and one core. In addition, one shell bracelet was recovered near one of the burials. Much of this collection was subsequently lost and the location of these excavations was later destroyed by the construction of Jamboree Road. Based on subsequent assessments, the site has not been recommended as eligible for the NRHP or CRHR (Cogstone 2021a).

Regarding the San Joaquin Gun Club, all of the associated buildings have been previously demolished leaving only the Duck Ponds in existence. As the San Joaquin Gun Club buildings are no longer present, they cannot embody the distinctive characteristics of a type, period or method of construction, or represent the work of a master, or possess high artistic values or represent a significant and distinguishable entity whose components may lack individual distinction. Therefore, the Duck Ponds do not meet the historic criteria and are not considered eligible for the NRHP or CRHR (Cogstone 2021a).

Because the artifact collection excavated in 1938 has been lost; subsequent excavations yielded only minimal intact cultural deposits; the locations of these excavations have been destroyed by development; the Duck Ponds have been altered from their original state and configuration; the buildings from the San Joaquin Gun Club have been demolished; and no evidence of intact historic or prehistoric deposits has been found within Locus B; site P-30-000057 (CA-ORA-57) is not considered significant and no further work is recommended (Cogstone 2021a). Based on this evaluation, no adverse temporary or long-term permanent impacts are anticipated, and no mitigation is required.

P-30-000115 (CA-ORA-115) Prehistoric Archaeological Site

Previous survey of P-30-000115 conducted in May 2019 identified shell at the surface and soils that appear undisturbed indicating that subsurface archaeological deposits may be present within P-30-000115, Locus B. This evaluation was also consistent with a 1985 survey and assessment that described Locus B as in good condition with a midden and limited chert lithic material. No cultural material was found during the small portion of P-30-000115 that was surveyed for the Project's assessment. The site has been recommended for testing using shovel test pits to evaluate the potential for significant intact buried cultural material prior to any earth disturbing activities within the resource. Testing is currently recommended for P-30-000115 to determine its NRHP and CRHR eligibility.

Due to the location of the proposed Project improvements, no earth disturbing activities are planned within P-30-000115 Locus B. As P-30-000115 is over 390 feet (119 meters) from the closest planned ground disturbance, the Project would have no effect on this resource (Cogstone 2021a). No adverse temporary or long-term permanent impacts are anticipated, and no mitigation is required.

P-30-000121 (CA-ORA-121) Multicomponent Site

Previous survey of P-30-000121 conducted in May 2019 found no cultural material within the portion of Locus B of the resources surveyed. However, testing and analysis conducted in 1998 within Locus C identified significant intact buried deposits at the eastern end of the resource. Based on this information, P-30-000121 (CA-ORA-121) was recommended in 2019 as eligible for inclusion in the NRHP as it is likely to provide important information about human history or prehistory. Based on the small portion of P-30-000121 (CA-ORA-121) surveyed for this Project's assessment, no reevaluation for eligibility was conducted and the resource remains eligible for listing on the NRHP and CRHR.

Due to the location of the proposed Project improvements, no earth disturbing activities are planned within P-30-000121 (CA-ORA-121). As P-30-000121 (CA-ORA-121) is over 600 feet (182 meters) from the closest planned ground disturbance, the Project would have no effect on this resource (Cogstone 2021a). No adverse temporary or long-term permanent impacts are anticipated, and no mitigation is required.

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

Less than significant with mitigation. The APE is within the traditional territories of both the Gabrielino-Tongva and Juaneño but the Sacred Lands File search indicated that there are no known sacred sites or heritage resources located within the APE. Portions of three previously recorded cultural resources are mapped within the APE as described above. These resources include the Duck Ponds (identified as Locus B of the multi-component archaeological site P-30-000057 (CA-ORA-57)), a multicomponent site (P-30-000121/CA-ORA-121) and a prehistoric archaeological site (P-30-000115/CA-ORA-115). In addition, 40 other cultural resources are located within a one-mile radius of the APE. These include 28 prehistoric archaeological sites, five multicomponent sites (both prehistoric and historic), five historic isolates, and five historic architectural resources. Other than the berms surrounding the Duck Ponds, no cultural resources were observed during the pedestrian survey.

The southern edges of both P-30-000115, Locus B, and P-30-000121 are mapped as slightly overlapping the northwest boundary of the APE. These sites are primarily located on the bluffs overlooking the marsh land and no cultural material was found in areas currently mapped within these sites that overlap the APE. The nearest planned ground disturbance for the proposed Project is over 390 feet (119 meters) from P-30-000115, Locus B and over 600 feet (182 meters) from P-30-000121.

The portions of P-30-000057 that are above the San Joaquin Marsh are highly disturbed by development. P-30-000057, Locus B, within the San Joaquin Marsh and APE, contains no prehistoric cultural material or evidence of intact prehistoric or historic cultural deposits and is considered not significant.

Based on the analysis above, cultural sensitivity of the APE, in consideration of the Project's proposed improvements, is assessed to be low (Cogstone 2021a). Therefore, potential impacts are considered less than significant. Nonetheless, mitigation measure **MM CUL-1** is included below in the event of an unanticipated archeological discovery. Implementation of **MM CUL-1** would ensure potential impacts are less than significant.

c) Would the Project disturb any human remains, including those interred outside of formal cemeteries?

Less than significant with mitigation. No human remains are known to exist at the Project site and no substantial excavations are proposed. Sediment disturbance would be limited to excavations of up to approximately 5 feet deep. No impacts are anticipated; however, should human remains be discovered during ground disturbance, the UCI and UCI's contractor would be required to follow all standard protocols and regulations required of any project that uncovers human remains. To comply with State Health and Safety Code Section 7050.5, if human remains are encountered, the County Coroner must be notified of the find immediately. No further disturbance would occur until the County Coroner has made a determination of origin and disposition pursuant to Public Resources Code (PRC) Section 5097.98. If the remains are determined to be Native American, the Coroner would notify the Native American Heritage Commission (NAHC), which would identify and notify a Most Likely Descendant (MLD). The MLD may recommend scientific removal and nondestructive analysis of human remains and items associated with Native American burials. Although no impacts are anticipated, mitigation measure **MM CUL-2** is included below in the event of an unanticipated discovery. Implementation of **MM CUL-2** would ensure potential impacts are less than significant.

Avoidance, Minimization and/or Mitigation Measures

No significant or potentially significant impacts were identified; however, mitigation measures **MM CUL-1** and **MM CUL-2** are included to ensure impacts remain less than significant in the event of an unanticipated discovery.

MM CUL-1 In the event of an unanticipated archeological discovery, all work must be suspended within 50 feet of the find until a qualified archaeologist evaluates the discovery and recommends continuation of work.

MM CUL-2 In the unlikely event that human remains are encountered during project development, all work must cease near the find immediately. In accordance with California Health and Safety Code Section 7050.5, the County Coroner must be notified if potentially human bone is discovered. The Coroner will then determine within two working days of being notified if the remains are subject to his or her authority. If the Coroner recognizes the remains to be Native American, he or she shall contact the Native American Heritage Commission (NAHC) by phone within 24 hours, in accordance with Public Resources Code Section 5097.98. The NAHC will then designate a Most Likely Descendant (MLD) with respect to the human remains. The MLD then has the opportunity to recommend to the property owner or the person responsible for the excavation work means for treating or disposing, with appropriate dignity, the human remains and associated grave goods. Work may not resume in the vicinity of the find until all requirements of the health and safety code have been met.

Sources

Cultural Resources Assessment Report for the San Joaquin Marsh Restoration Project (Cogstone, March 2021a).

Energy

Would the Project:

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

3.6 Energy

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

No impact. The Project proposes raising berms/dirt roads to increase water storage capacity and function of passive drainage and the installation of new and/or replacement water control mechanisms. Temporary construction activities would require use of fuels to operate equipment but no unusual circumstances are anticipated that would result in the wasteful consumption of such fuels. In addition, the proposed improvements would have a negligible or no operational change in energy consumption compared to existing conditions. No wasteful, inefficient, or unnecessary consumption of energy resources is anticipated, and no mitigation is required.

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

No impact. The Project proposes no change in use or intensity of the Project site as a preservation area. No habitable buildings or structures are proposed. Any improvements would be constructed with applicable Title 24 State Building Standard Code's efficiency standards and requirements as required by law. Impacts are not anticipated, and no mitigation is required.

Avoidance, Minimization and/or Mitigation Measures

No significant impacts were identified, and no mitigation measures are required.

Sources

Based on the nature of proposed construction activities and long-term use of the site as a preservation area.

Geology and Soils

Would the Project:

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

3.7 Geology and Soils

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

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

No impact. No active or potentially active earthquake faults have been identified on the UCI campus through the State Alquist-Priolo Earthquake Fault Zoning Act program, but a locally mapped fault trace, known as the "UCI Campus Fault," traverses the campus. A Restricted Use Zone (RUZ) extending 50 feet beyond both sides of this fault has been established to prevent the construction of new building development on the fault in case of rupture, pursuant to the LRDP EIR, pages 4.5-8 through 9 (UCI 2007b). The RUZ does not extend off the UCI Main Campus and does not traverse the Project site. Additionally, the proposed Project is installing infrastructure into the Marsh to improve water flow, and as such, no structural buildings would be constructed that could result in the potential for risk due to the rupture of the fault. The next nearest Fault is the North Branch Fault located within the Newport-Inglewood-Rose Canyon Fault Zone approximately 4 miles to the west (CDC 2020). No impacts would occur and no mitigation is required.

ii) Strong seismic ground shaking?

No impact. The Project site is not located within a Fault zone as discussed above. In addition, no habitable structures are proposed. The Project site would continue to operate as a preservation area. No increase in risk associated with strong seismic ground shaking would occur and no mitigation is required.

iii) Seismic-related ground failure, including liquefaction?

No impact. Liquefaction is a ground failure hazard that typically occurs during seismic events in areas where loose sandy soils exist below shallow groundwater. The Project site is located within a Liquefaction Zone (CDC 2020). The Project site is also located in the Seismic Response Area 1 (SRA-1), which is characterized by soft soils/high ground water, per City of Irvine General Plan Figure D-3 *Seismic Response Areas* (Irvine 2015). Despite the Project's location, the Project site would continue to operate as a preservation area and no habitable buildings or structures are proposed. Therefore, no impacts are anticipated, and no mitigation is required.

iv) Landslides?

No impact. The Project site and adjacent properties are generally low-lying, flat areas. The Project site is not located in a Landslide Zone (CDC 2020). Given the absence of steep slopes within or adjacent to the Project site, landslides are unlikely; no impacts are anticipated, and no mitigation is required.

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

Less than significant impact. The Project is intended to improve long-term function of passive drainage with the installation of new and/or replacement water control mechanisms. No substantial erosion or loss of topsoil is anticipated to occur during operation of the improved site post Project construction. Some topsoil would be exposed during earthwork modifications for swales and pond/berm improvements. Temporarily disturbed areas would be managed using standard construction Best Management Practices (BMPs) and in accordance with required regulatory permit conditions that govern water quality. In addition, vegetated areas disturbed during construction would be re-vegetated after earthwork is complete for restoration and erosion control purposes. Therefore, potential impacts are considered less than significant, and no mitigation is required.

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

No impact. As described in this Section 3.7 above, the Project site is characterized as having soft soils and high groundwater, which is susceptible to liquefaction. The Project site is not in a Landslide Zone and existing topography of the site and adjacent properties is generally flat. Nonetheless, the Project site would remain a preservation area and no habitable buildings or structures are proposed. Therefore, no impacts are anticipated, and no mitigation is required.

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

No impact. Expansive soils are characteristically clay soils that are prone to large volume changes (swelling and shrinking) that are directly related to changes in water content. Expansive soils can cause damage to structures that are built on them due to shrinking and swelling events. In general, Project site soils are characterized as Alo clay, Chino silty clay loam, Omni clay, drained and Tidal flats (USDA NRCS 2020). Although clay soils are present, the Project proposes no habitable structures or substantial changes in topography that could pose a direct or indirect risk to life or property. Therefore, no impacts are anticipated, and no mitigation is required.

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

No impact. The Project does not propose use of septic tanks or habitable development that would require the use of wastewater management, treatment or disposal. Impacts are not anticipated, and no mitigation is required.

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

Less than significant with mitigation. Paleontological resources are remains of prehistoric animals and plants that are at least 11,000 years old. The Paleontological Sensitivity Zone (or risk level of uncovering a resource) at the Project site is considered "low" per the City of Irvine General Plan Figure E-2 *Paleontological Sensitivity Zones* (Irvine 2015). In addition, only shallow excavations of up to approximately 5 feet in depth would occur.

Based on the findings of the Paleontological Resources Assessment (Appendix E) prepared by Cogstone, the potential for impacting fossils is low based on site conditions and proposed depth of excavations (Cogstone 2021b). The following two paragraphs provide a summary of findings included in the Paleontological Resources Assessment.

The Project site's surface soils types are mapped as modern artificial fill, Holocene and late Pleistocene young axial channel deposits, and late to middle Pleistocene old paralic deposits overlain by alluvial-fan deposits. The record search revealed no fossil localities (known fossil locations) from similarly aged deposits within the Project site: however, localities are known from sediments the same age as sediments found within the study area near the Project site. Similarly aged deposits in southern Orange County have produced extinct Pleistocene megafauna, including sabre-toothed cat, Harlan's ground sloth, dire wolf, yesterday's camel, antique bison, and Columbian mammoth.

Sediments mapped as Holocene on the surface are assigned a low potential for fossils (Potential Fossil Yield Classification [PFYC] 2) for sediments less than 8 feet below the modern surface, due to the lack of fossils in these deposits from nearby locations. Deeper than 8 feet below the surface, the potential for fossils increases to moderate (PFYC 3). Sediments mapped as Pleistocene on the surface are assigned a low potential for fossils (PFYC 2) for sediments less than 5 feet below the modern surface due to the lack of fossils in these deposits from nearby locations. More than 5 feet below the surface, the potential for fossils increases to moderate (PFYC 3). As indicated above, excavations are planned for up to approximately 5 feet deep below surface grade, therefore, the potential for impacting paleontological resources is low. Based on the analysis summarized above, impacts to paleontological resources are not anticipated. Although no impacts are anticipated, mitigation measure **MM GEO-1** is included below in the event of an unanticipated discovery. Implementation of **MM GEO-1** would ensure potential impacts are less than significant.

Avoidance, Minimization and/or Mitigation Measures

No significant or potentially significant impacts were identified; however, mitigation measures **MM GEO-1** is included to ensure impacts remain less than significant in the event of an unanticipated discovery.

MM GEO-1 In the event of an unanticipated paleontological discovery, all work must be suspended within 50 feet of the find until a qualified paleontologist evaluates the discovery and recommends continuation of work.

Sources

California Department of Conservation EQ Zapp accessed on October 9, 2020 at https://maps.conservation.ca.gov/cgs/EQZApp/app/; Paleontological Resources Assessment Report for the San Joaquin Marsh Restoration Project (Cogstone, March 2021b); UCI LRDP EIR (UCI 2007b); United States Department of Agriculture, Natural Resources Conservation Service, Web Soil Survey accessed on October 9, 2020 at https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx.

Greenhouse Gas Emissions

Would the Project:

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

3.8 Greenhouse Gas Emissions

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

Less than significant impact. Construction activities would result in minor generation of greenhouse gas (GHG) emissions from the combustion of diesel fuel. GHG emissions would occur from direct sources such as the use of construction equipment and haul truck trips within the site. The SCAQMD has developed Interim CEQA GHG Significance Threshold for Stationary Sources, Rules and Plans (SCAQMD 2008). SCAQMD has not adopted a permanent GHG significance threshold. SCAQMD's screening level threshold of 3,000 metric tons per year of carbon dioxide (CO_2) or CO_2 equivalent (CO_2e) gases was utilized for this analysis. The Project's GHG emissions were calculated using California Emissions Estimator Model (CalEEMod)(SCAQMD 2016). Anticipated Project GHG emissions are presented in Table 8 and the calculation sheets are provided in Appendix B of this IS/MND.

Table 8. Annual GHG Emissions

Source Category	CO2 (mty)	CH4 (mty)	N2O (mty)	CO2e (mty)
Construction				
Project related emissions	453	0.14	0	457
Operation				
Operational Emissions[1]	0	0	0	0
SCAQMD screening significance threshold				3,000
Total GHG Emissions[2]	453	0.14	0	**457**
Significant?				**No**

[1] No increase in land use or operations compared to existing baseline conditions are proposed. Operational emissions are not anticipated.
[2] Total annual GHG emissions are the sum of estimated 8- to 10 months of construction emissions. Columns are not additive.
Source: California Emissions Estimator Model (CalEEMod 2016); Air Quality and GHG Calculations Appendix B of this IS/MND (M&N 2020a).

Table 8 shows that Project construction would result in an incremental increase in GHG emissions of 457 metric tons per year (mty), over 8 to 10 months of construction within one year. This is below

SCAQMD's screening significance threshold. No mitigation is required. This analysis is conservative as it assumes two 97 hp backhoes, three 97 hp front-end loaders, three 158 hp excavators, one 187 hp grader, and five 402 hp off-road hauling trucks running 8 hours per day. It is more likely that run times would be shorter, resulting in less than 457 mty of emissions.

Significant operational GHG emissions are not anticipated as the Project site would continue to operate the same as existing conditions once construction is complete. There is no substantial increase in use or change in land use proposed. No other structures are proposed that could result in operational GHG emissions. Operational GHG emission are anticipated to be negligible, and impacts are not anticipated.

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

No impact. The Governor's Executive Order S-3-05 (EO S-3-05) established GHG emission reduction targets for the state as follows: by 2010, reduce GHG emissions to 2000 levels; by 2020, reduce GHG emissions to 1990 levels; and by 2050, reduce GHG emissions to 80 percent below 1990 levels. In response to this Executive Order, California adopted Assembly Bill 32 (AB 32), which codified EO S-3-05 goals as statewide targets and instructed CARB to adopt regulations that reduce emissions from significant sources of GHGs and establish a mandatory GHG reporting and verification program. In 2008 CARB developed the AB 32 Scoping Plan, which laid out a suite of measures to reduce GHG emissions to 1990 levels by 2020. In 2014 CARB developed the 1st Update to the AB 32 Scoping Plan, which highlighted California's progress toward meeting the near-term 2020 GHG emission reduction goals, highlighted the latest climate change science and provided direction on how to achieve long-term emission reduction goals described in EO S-3-05.

In 2015, the Governor issued Executive Order B-30-15 (EO B-30-15) establishing a mid-term GHG reduction target for California of 40 percent below 1990 levels by 2030. In response to this Executive Order, California adopted Senate Bill (SB) 32, which codified EO B-30-15 goals as a statewide target and instructed CARB to adopt regulations to meet the target. The CARB is moving forward with a second update to the Scoping Plan to reflect the 2030 target set by EO B-30-15 and codified by SB 32.

AB 32 and SB 32 codified state targets and directed state regulatory agencies to develop rules and regulations to meet the targets; AB 32 and SB 32 do not stipulate project-specific requirements. Specific requirements are codified in rules and regulations developed by regulatory agencies such as CARB and SCAQMD, and local City actions such as City Climate Action Plans (CAP)s.

AB 32 Scoping Plan and Scoping Plan Update strategies include, but are not limited to the renewables portfolio standard, the low carbon fuel standard, mobiles source measures (vehicle efficiency measures, zero vehicle emission technologies), solar roof programs, carbon sequestration systems, etc. CARB and SCAQMD develop regulations based on these strategies, which are enforced at the state level on utility providers and automobile manufacturers.

As described above, minor GHG emissions would be generated during Project construction and Project site operations would continue similar to existing conditions post-construction. Construction of the proposed Project would comply with CARB and SCAQMD requirements. The proposed Project would comply with existing regulations and would, by law, comply with future regulatory requirements. The proposed Project would, therefore, not preclude the state's implementation of the AB 32 Scoping Plan or Plan Update. The Project would not conflict with any plans, policies, or regulations adopted to reduce GHG emissions. No impacts are anticipated, and no mitigation is required.

Avoidance, Minimization and/or Mitigation Measures

No significant impacts were identified, and no mitigation measures are required.

Sources

California Emissions Estimator Model (CalEEMod)(SCAQMD 2016); Interim CEQA Greenhouse Gas (GHG) Significance Threshold (SCAQMD 2008).

Hazards and Hazardous Materials

Would the Project:

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

3.9 Hazards and Hazardous Materials

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

No impact. The Project proposes the raising of berms/dirt roads to increase water storage capacity and function of passive drainage and the installation of new and/or replacement water control mechanisms. No change in operational land use from existing conditions is proposed. The Project site would remain a marsh and preservation area that does not require routine transport or disposal of hazardous materials. No impacts are anticipated, and no mitigation is required.

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

Less than significant impact. Little potential exists for encountering hazardous materials or hazardous waste within the Project site. The Project would result in temporary transport of construction equipment and petroleum-based fuels, lubricants, and other similar materials. The potential risk associated with accidental discharge during use and storage of equipment-related hazardous materials would be low since the handling of such materials would be addressed through the implementation of regulatory permit BMPs and requirements. In addition, all transport, handling, use, and disposal of substances such as petroleum products, paints, and solvents related to the operation and maintenance of the Project would comply with all federal, state, and local laws regulating management and use of hazardous materials. With the implementation of BMPs and standard regulations, potential impacts would be less than significant, and no mitigation is required.

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

No impact. The Project site is located adjacent to the UCI campus. The next nearest school to the Project site is Newport Montessori, located approximately 1 mile to the west at 20221 SW Cypress Street, Newport Beach, CA 92660 (Google Earth 2020). Neither hazardous emissions nor hazardous materials are applicable to the Project. No impacts are anticipated, and no mitigation is required.

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

Less than significant impact. A review of the Department of Toxic Substances Control's Hazardous Waste and Substances List (Cortese List) indicated that the Project site is not located on any identified hazardous material sites (DTSC 2020b). A review of the State Water Resources Control Board's GeoTracker database and the Environmental Protection Agency (EPA) EnviroStor database indicated that the Project site is located adjacent to the San Joaquin Landfill (L10008449315), which is listed as a closed landfill with its own ongoing monitoring requirements (DTSC 2020a). No Project construction activities or Elements are proposed at this offsite facility. Potential impacts are considered less than significant, and no mitigation is required.

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

No impact. The Project site is within the Airport Land Use Plan for John Wayne Airport (ALUC 2008), which is located approximately one mile to the northwest. No change in land use or construction of habitable buildings or tall structures are proposed that could otherwise potentially expose people to excessive noise or pose a safety risk. The Project does not include any elements that would create safety hazards associated with airports or air travel. No impacts are anticipated, and no mitigation is required.

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

No impact. The Project would neither physically interfere with nor impair implementation of any existing emergency response plan or emergency evacuation plan. The Project only proposes raising berms/dirt roads to increase water storage capacity and function of passive drainage and the installation of new and/or replacement water control mechanisms. The Project would not temporarily block or permanently alter roads that could provide emergency response or evacuation. All local roadways and major highways would remain fully accessible. No impacts are anticipated, and no mitigation is required.

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

No impact. The Project site is not located within a State Responsibility Area or Fire Hazard Severity Zone (CalFire 2020). No construction of habitable structures are proposed. No impacts are anticipated, and no mitigation is required.

Avoidance, Minimization and/or Mitigation Measures

No significant impacts were identified, and no mitigation measures are required.

Sources

EnviroStor database (DTSC 2020a); GeoTracker database (SWRCB 2020); Google Earth (Google Earth 2020); Department of Toxic Substances Control Cortese List (DTSC 2020b); Land Use Plan for John Wayne Airport (ALUC 2008).

Hydrology and Water Quality

Would the Project:

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

3.10 Hydrology and Water Quality

a) Would the project violate or conflict with any adopted water quality standards or waste discharge requirements or otherwise substantially degrade surface or groundwater quality?

No impact. The Clean Water Act (CWA) requires states to establish a priority ranking for waters on the 303(d) list of impaired waters and establish Total Maximum Daily Loads (TMDLs) for such waters. A TMDL is the calculation of the maximum amount of a pollutant allowed to enter a waterbody so that the waterbody will meet and continue to meet water quality standards for that particular pollutant.

As part of California's 1996 and 1998 Section 303(d) lists, the RWQCB identified San Diego Creek as water quality limited due to several toxic pollutants and designated this watershed as a high priority for TMDL development. Per Table 1-1 of the *Total Maximum Daily Loads For Toxic Pollutants San Diego Creek and Newport Bay Summary Document* (Summary Document), San Diego Creek is listed to require TMDL development for the following pollutants:

Elements/Metals

- Dissolved cadmium (Cd)
- Dissolved copper (Cu)
- Dissolved lead (Pb)
- Selenium (Se)
- Dissolved zinc (Zn)

Organic Compounds

- Chlorpyrifos – Organophosphate (OP) Pesticide
- Diazinon – Organophosphate Pesticide
- Chlordane – Organochlorinated (OC) compound
- Dieldrin – Organochlorinated compound
- Dichlorodiphenyltrichloroethane (DDT) – Organochlorinated compound
- Polychlorinated Biphenyls (PCBs) – Organochlorinated compound
- Toxaphene – Organochlorinated compound

Per the Summary Document, the source analysis for these TMDLs indicated that historical discharges of PCBs and chlorinated pesticides, all of which are no longer authorized to be used by law, are believed to be primarily responsible for the pollutant levels measured in Newport Bay, which is located downstream from the Project site. Metals loading is associated with historical and ongoing discharges of urban runoff. Selenium loadings are estimated to come primarily from erosion and runoff, and discharges of shallow groundwater. Discharges of OP pesticides are associated with past and ongoing uses of these pesticides for household and agriculture pest control. Some pollutant loads are also estimated to come from seawater and atmospheric deposition. Except for PCBs and possibly small amounts of DDT, the pollutants addressed in the OC TMDL are no longer believed to be discharged in the watershed except in association with erosion of sediments to which these pollutants may have adhered in the past.

In addition, the Santa Ana RWQCB also lists TMDLs in San Diego Creek for the following;

- Nutrients
- Siltation/Sediment

While there are a number of sources of nutrient input, tailwaters from the irrigation of agricultural crops and from several commercial nurseries in the watershed have been the predominant source of nutrients

(RWQCB). Regarding siltation/sediment, there has been no site-specific monitoring of the various sources (RWQCB), so source-specific contributors have not been specifically identified.

The Project is designed to manage water flows and water quality within the Project site and prior to any release of flows to the downstream system. No increase in urban development or agricultural/nursery use is proposed that could otherwise contribute to San Diego Creek's toxicity levels regarding Element/Metal, Organic Compounds or Nutrients. Siltation and sediments would be controlled utilizing the Project's intended design. In addition, temporary use of construction equipment within the marsh would be required to comply with all regulatory agency requirements and conditions of a Section 401 Water Quality Certification, as required. Based on the nature of proposed construction activities, the Project would not conflict with any adopted water quality standards or waste discharge requirements or otherwise substantially degrade surface or groundwater quality. No mitigation is required.

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

No impact. The Project would not increase the amount of impervious surface area that could otherwise reduce opportunities for surface water to percolate into the groundwater. The Project does not propose new pumping or extraction of groundwater or construction of wells. Therefore, impacts are not anticipated, and no mitigation is required.

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

i) result in substantial erosion or siltation on- or off-site;

No impact. The Project would purposefully alter the existing drainage pattern of the Project site to increase water storage capacity and function of passive drainage systems within the marsh. The existing hydrologic regime of the marsh would generally be maintained but specific improvements would be made to better manage flows and habitat value. Such improvements entail raising berms/dirt roads, constructing swales and berm improvements, and the installation of new and/or replacement water control mechanisms. In addition, vegetated areas disturbed during construction would be replanted or seeded post-earthwork activities to control onsite erosion. Based on the Project's intended purpose, substantial on- or off-site erosion impacts are not anticipated, and no mitigation is required.

ii) substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite;

No impact. The Project site would continue to function as a marsh and preservation area. No new impervious surfaces are proposed that could increase the rate or amount of surface runoff leaving the site. The proposed berm improvements and Project elements are anticipated to increase the amount of onsite water storage capacity, and therefore, potentially reduce rates and volumes of runoff released to the downstream system. All onsite flooding would be intentional and within existing established and improved ponds and swales. No impacts are anticipated, and no mitigation is required.

iii) create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff;

No impact. As previously discussed, the Project would not alter existing use of the site as a marsh and preservation area. No increase in impervious surface area; development of urban residential, commercial or institutional structures; or introduction of agricultural uses that could otherwise generate pollutants are proposed. The Project would connect with existing offsite drainage connection points and systems and would not create additional sources of polluted runoff.

All discharges from the Project would comply with the applicable provisions of CWA section 301 Effluent Limitations, 302 (Water Quality Related Effluent Limitations), 303 (Water Quality Standards and Implementation Plans), 306 (National Standards of Performance), and 307 (Toxic and Pretreatment Effluent Standards), and with other applicable requirements of state law. The Project would meet or exceed state stormwater requirements of the National Pollutant Discharge Elimination System (NPDES) Permit and University of California, Irvine MS4 Permit requirements (UCI 2018). No impacts are anticipated, and no mitigation is required.

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

No impact. The Project site is over 4 miles away from the Pacific Ocean and not within an enclosed body of water with a risk of exposure to tsunamis or seiches. The Project site is a marsh preservation area located within the 100-year flood plain (FEMA 2009 and 2019) and adjacent to San Diego Creek. The Project site would remain a marsh and not introduce new land uses or operational activities that could lead to a release of pollutants due to inundation. Temporary use of construction equipment would be required to construct the proposed improvements but staging, material storage and refueling would be confined to protected staging areas that comply with all regulatory agency requirements, BMPs and conditions of a Section 401 Water Quality Certification, as required. No impacts are anticipated, and no mitigation is required.

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

No impact. The Project site is located within the Lower Santa Ana River Basin and adjacent to Reach 1 (below Jeffrey Road) of San Diego Creek. This area is covered by the Water Quality Control Plan for the Santa Ana River Basin (Region 8), or, Santa Ana River Basin Plan. The Santa Ana Basin Plan identifies Beneficial Uses for listed water bodies. A beneficial use is one of the various ways that water can be used for the benefit of people and/or wildlife (RWQCB 2019a).

The "San Joaquin Freshwater Marsh" is listed in the Santa Ana River Basin Plan as a "created wetland" with beneficial uses for Water Contact Recreation (REC1); Non-contact Water Recreation (REC2); Warm Freshwater Habitat (WARM); Biological Habitats of Special Significance (BIOL); Wildlife Habitat (WILD); and Rare, Threatened or Endangered Species (RARE). Beneficial uses for San Diego Creek include Municipal and Domestic Supply (MUN); REC1 (with prohibited access); REC2; WARM; WILD; RARE; and Estuarine Habitat (EST) beginning downstream from the Project site at the MacArthur Boulevard Bridge (RWQCB 2019a). The Project site is within the Lower Santa Ana River Basin Groundwater Management Zone, which has beneficial uses for MUN, Agricultural Supply (AGR), Industrial Service Supply (IND) and Industrial Process Supply (PROC). Neither the Project site nor San Diego Creek are identified for Groundwater Recharge (GWR) beneficial uses.

The Project would not conflict with the Santa Ana River Basin Plan's goals or beneficial uses listed for the Project site or San Diego Creek. The Project would not create a change in existing use that could impact REC1, REC2, MUN, AGR, IND, PROC or GWR uses. In addition, proposed Project Elements are intended to improve the marsh's drainage system, water quality and habitat value consistent with beneficial uses for WARM, BIOL, WILD and RARE. No impacts are anticipated, and no mitigation is required.

Avoidance, Minimization and/or Mitigation Measures

No significant impacts were identified, and no mitigation measures are required.

Sources

Attachment Basin Plan Total Maximum Daily Load for Sediment in the Newport Bay/San Diego Creek Watershed (RWQCB 2014); Attachment to Resolution No. 98-9, as amended by Resolution No. 98-100, Resolution Amending the Water Quality Control Plan for the Santa Ana River Basin to Incorporate a Nutrient TMDL for the Newport Bay/San Diego Creek Watershed (RWQCB no date); Santa Ana River Basin Plan (RWQCB 2019); Federal Emergency Management Agency (FEMA) Flood Map Service Center (FEMA 2009 and 2019).

3.11 Land Use and Planning

Land Use and Planning

Would the Project:

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

a) Would the Project physically divide an established community?

No impact. The Project site is located within an existing preservation area and the proposed improvements would not alter the existing use of the property. The Project does not propose the construction of new structures or changes in access from existing conditions that would divide a community. Impacts are not anticipated, and mitigation is not required.

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

No impact. The Project site land use is designated as Open Space – General pursuant to the LRDP (UCI 2007a). The Project does not propose any changes to land use and would remain Open Space as under existing conditions. A portion of the site is also located within the Coastal Zone regulated by the California Coastal Commission (CCC). Work within the Coastal Zone may require a Coastal Development Permit (CDP) or other CCC approval, which is typical for all projects within the Coastal Zone. Because no increase in development or change in land use is proposed, no conflict with Coastal Zone plans or policies would occur. No impacts are anticipated, and no mitigation is required.

Avoidance, Minimization and/or Mitigation Measures

No impacts were identified, and no mitigation measures are required.

Sources

UCI LRDP, Chapter 5 Plan Elements (UCI 2007a).

3.12 Mineral Resources

Mineral Resources

Would the Project:

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

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

No impact. According to the County of Orange General Plan, Figure VI-3, *Orange County Mineral Resources*, the Project site is not within a Mineral Resource Area (County of Orange 2001). The United States Geological Survey (USGS) Minerals Resource Data System did not identify any critical or major mineral deposits in the Project site. The nearest listed site are salt ponds located approximately 0.9 mile to the west. In addition, no change in use is proposed with this Project. Given the nature of this Project, neither impacts to mineral resources nor the loss of availability of mineral resources are anticipated. No impacts are anticipated, and no mitigation is required.

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

No impact. As discussed above, there are no Mineral Resource Areas within the Project footprint. Therefore, the Project is not anticipated to result in the loss of availability of a locally important mineral resource recovery site. No impacts are anticipated, and no mitigation is required.

Avoidance, Minimization and/or Mitigation Measures

No impacts were identified, and no mitigation measures are required.

Sources

Mineral Resources Data System (USGS 2020); Orange County General Plan (County of Orange 2001).

Noise

Would the Project:

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

3.13 Noise

a) Would the Project result in the 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?

Less than significant with mitigation. Noise is defined as loud, unexpected, or annoying sound. In acoustics, the fundamental model consists of a noise source, a receptor, and the propagation path between the two. The loudness of the noise source, obstructions, or atmospheric factors affecting the propagation path, determine the perceived sound level and noise characteristics at the receptor. In terms of human annoyance and health impacts noise is typically measured in "A" weighted decibels (dBA).

California Government Code Section 65302(f) mandates that the legislative body of each county and city adopt a noise element as part of its comprehensive general plan. The local noise element must recognize the land use compatibility guidelines established by the State Department of Health Services. The guidelines rank noise land use compatibility in terms of "normally acceptable," "conditionally acceptable," "normally unacceptable," and "clearly unacceptable" noise levels for various land use types. Single-family homes are "normally acceptable" in exterior noise environments up to 60 Community Noise Equivalent Level (CNEL) and "conditionally acceptable" up to 70 CNEL. Multiple-family residential uses are "normally acceptable" up to 65 CNEL and "conditionally acceptable" up to 70 CNEL. Schools, libraries, and churches are "normally acceptable" up to 70 CNEL, as are office buildings and business, commercial, and professional uses. Although UCI is not subject to municipal regulations, the City of Irvine and City of Newport Beach's noise standards are relevant to UCI to establish guidelines and evaluating noise impacts at adjacent offsite locations. City regulations are relevant for addressing UCI development projects that would affect adjacent noise-sensitive land uses in the City of Irvine and City of Newport Beach. CNEL are typically applicable to long-term, operational effects of developments and for siting compatible uses, not temporary construction noise. Because the Project proposes no new habitable development or change in existing land use from an open space/preservation area, neither the City of Irvine nor City of Newport Beach Interior and Exterior Noise Standards Energy Average CNEL were used for analyzing the Project's potential noise impacts. No long-term permanent operational noise impacts would occur. In addition, City of Newport Beach noise standards were not used for temporary construction noise impact analysis because Project construction would be located sufficiently far away (i.e., over 1,400 feet or 0.27 mile) from the City of Newport Beach boundary.

Although the University of California is constitutionally autonomous and not subject to local regulations, Project construction would be consistent with the City of Irvine construction noise requirements. The City of Irvine exempts construction noise during daytime hours (7:00 a.m. and 7:00 p.m. Mondays through Fridays, and 9:00 a.m. and 6:00 p.m. on Saturdays. The 2007 LRDP EIR (UCI 2007b) specifies that construction activities would have a significant temporary (direct) noise impact if they would result in:

- Exposure of persons to, or generation of noise levels in, excess of a 12-hour average sound level of 75 dBA between 7:00 am and 7:00 pm at any noise-sensitive land use, or
- An increase of 3 dBA or more if the ambient noise levels already exceed a 12-hour average sound level of 75 dBA between 7:00 am and 7:00 pm at any noise-sensitive land use

The nearest land uses to the Project site include:

1. UCI Health Child Development School, Special Education School - located at 19262 Jamboree Road, Irvine. However, it should be noted that this facility has been closed since June 2019. The property line and edge of playground is approximately 1,157 feet northwest of the nearest fill area, and approximately 1,363 feet northwest of the nearest excavation area. The building shell is approximately 1,245 feet northwest of the nearest fill area, and approximately 1,451 feet northwest of the nearest excavation area;

2. UCI student housing facilities - located at the cross streets of Mesa Road and University Drive, Irvine. The property line is approximately 650 feet southeast of the nearest fill area and approximately 845 feet southeast of the nearest excavation area. The building shell is approximately 945 feet southeast of the nearest fill area and approximately 1,117 feet southeast of the nearest excavation area; and

3. United States Food and Drug Administration Office Building - located at 19701 Fairchild Road, Irvine. The property line is approximately 193 feet southeast of the nearest fill area and approximately 335 feet southeast of the nearest excavation area. The building shell is approximately 289 feet southeast of the nearest fill area and approximately 561 feet southeast of the nearest excavation area.

Construction noise associated with the Project would be temporary and last approximately 8 to 10 months. Most noise generated would primarily be associated with earth moving activities (i.e., excavation equipment and transport of dirt via truck within the site), which would take place periodically over the approximately 8 to 10 months. The analysis provided in this section is based on the anticipated equipment required to complete the various proposed activities as follows:

- Up to one excavator and one front loader or backhoe are anticipated to be running simultaneously during excavation activities;
- Up to one grader and one front loader or backhoe are anticipated to be running simultaneously during placement of fill. In addition, during fill and excavation activities there would be periodic truck trips to pick up or dump dirt;
- A typical excavator would generate a maximum noise level of approximately 81 dBA at a distance of 50 feet from the equipment (FHWA 2017a);
- A typical backhoe would generate a maximum noise level of approximately 78 dBA at a distance of 50 feet from the equipment (FHWA 2017a);
- A typical grader would generate a maximum noise level of approximately 79 dB at 50 feet from the source (WSDOT 2020). A typical front loader would generate a maximum noise level of approximately 79 dB at 50 feet from the source;
- A dump truck would generate a maximum noise level of approximately 76 dBA at a distance of 50 feet from the equipment (FHWA 2017a).

The combination of two or more sound pressure levels (i.e., simultaneously running equipment) at a single location requires factoring in the increased decibel addition. Decibel additions were completed in accordance with the FTA 2018 using the equation shown below (FTA 2018).

Total Sound Pressure Level = $10\text{Log}_{10}(10^{\text{individual SPL}/10}+10^{\text{Individual SPL}/10}+ 10^{\text{Individual SPL}/10})$

The resulting noise level from simultaneously running one excavator, one front loader or backhoe, and one truck during excavation activities is calculated to be about 83 dBA at 50 feet from the source (fill activities). The resulting noise level from simultaneously running one grader, one front loader or backhoe, and one truck during fill activities is about 84 dBA at 50 feet from the source (excavation activities). Generally, in-air sound levels for a point source decreases by about 6 dBA for each doubling of distance (FTA 2018). Additional noise attenuation can also be expected from screening such as changes in topography and/or vegetation that block the line of sight between a noise source and receptor; however, no screening attenuation factors were considered in this analysis for a more conservative estimate.

Based on the assumptions above, Table 9 shows the estimated maximum Project-related noise levels at the identified receptors during the most intensive construction activities (i.e., fill and excavation). The noise calculations are provided in Appendix F.

Table 9. Project Related Noise at Identified Receptors

Receptor	Maximum Exterior Noise Level During Fill	Maximum Interior Noise Level During Fill		Maximum Exterior Noise Level During Excavation	Maximum Interior Noise Level During Excavation	
		Open Windows	Closed Windows		Open Windows	Closed Windows
UCI Health Child Development School[1]	56	38	30	55	38	30
UCI Student Housing	61	40	32	59	40	32
USDA Building	71	51	43	67	46	38

Source: Noise and Vibration Calculations (Appendix F)(M&N 2020b)
[1] Note that this facility has been closed since June 2019.

Based on the locations of the nearest receptors, estimated maximum construction-related exterior noise levels at the receptor property line would reach about 56/55 dBA at the UCI Health Child Development School (closed facility), about 61/59 dBA at the UCI student housing facility, and about 71/67 dBA at the USDA Building. Compared to the LRDP EIR standards provided above, Project-related maximum exterior noise levels are not anticipated to exceed standards for any substantial amount of time but could periodically exceed noise standards at the receptor property line.

Within interior spaces, additional noise attenuation would be provided by further distance from the property line to the building and by the building shell. Noise reduction afforded by structures with open windows is typically about 17 dBA, and about 25 dBA with closed windows (FHWA 2017b; NCHRP 1971). This means that maximum construction-related interior noise levels at receptors with open windows would reach about 38/38 dBA at the UCI Health Child Development School (closed facility), about 40/40 dBA at the UCI student housing facility, and about 51/46 dBA at the USDA Building. Estimated maximum construction-related interior noise levels at receptors with closed windows would reach about 30/30 dBA at the UCI Health Child Development School (closed facility), about 32/32 dBA at the UCI student housing facility, and about 43/38 dBA at the USDA Building.

Table 10 describes typical A-weighted noise levels for common indoor and outdoor noise source activities for a comparison with the Project's anticipated construction noise.

Table 10. Typical A-Weighted Noise Levels

Common Outdoor Activities	Noise Level (dB(A))	Common Indoor Activities
	— 110 —	Rock band
Jet fly-over at 1000 feet		
	— 100 —	
Gas lawn mower at 3 feet		
	— 90 —	
Diesel truck at 50 feet at 50 mph		Food blender at 3 feet
	— 80 —	Garbage disposal at 3 feet
Noisy urban area, daytime		
Gas lawn mower, 100 feet	— 70 —	Vacuum cleaner at 10 feet

Common Outdoor Activities	Noise Level (dB(A))	Common Indoor Activities
Commercial area		Normal speech at 3 feet
Heavy traffic at 300 feet	— 60 —	
		Large business office
Quiet urban daytime	— 50 —	Dishwasher next room
Quiet urban nighttime	— 40 —	Theater, large conference room (background)
Quiet suburban nighttime		
	— 30 —	Library
Quiet rural nighttime		Bedroom at night, concert
	— 20 —	
		Broadcast/recording studio
	— 10 —	
Lowest threshold of human hearing	— 0 —	Lowest threshold of human hearing
dBA = A-weighted decibels; mph = miles per hour		
Source: California Department of Transportation, *Technical Noise Supplement*, September 2013 (Caltrans 2013).		

When compared with the noise levels in Table 10, it is apparent that maximum exterior Project construction noise levels would range from Quiet Urban Daytime levels at the UCI Health Child Development School (closed facility) property line to Noisy Urban Area Daytime levels at the USDA Building property line. Interior maximum noise levels would range from Library levels at the UCI Health Child Development School to Large Conference Room (Background) levels at the USDA Building.

The above analysis is conservative as it assumes three pieces of heavy equipment running simultaneously and at the closest proximity proposed. It is more likely that fewer pieces of equipment would be running simultaneously in the same location and that most construction would occur further away from receptors, resulting in lower generated noise levels. Table 11 below shows the approximate distances between proposed work areas and receptors required to reach exterior noise standards.

Table 11. Distance Required to Reach Exterior Noise Levels

Exterior Noise Level	Distance at which dBA is Reached (feet)
55 dBA	1,400
60 dBA	750
65 dBA	425
70 dBA	240
75 dBA	140
Source: Noise and Vibration Calculations (Appendix F)(M&N 2020b)	

Based on the distances between work areas and the nearest receptors as stated above, most work would be conducted over 750 feet away and is not anticipated to result in significant human annoyance impacts. Nonetheless, it is possible that exterior noise levels would occasionally and briefly exceed LRDP EIR noise standards described above. Temporary construction noise would not result in significant human annoyance impacts with implementation of mitigation measure **MM NOI-1** described below. As construction would be temporary, no human health impacts are anticipated. Temporary impacts would be less than significant with implementation of **MM NOI-1**.

Once the Project is complete, the Marsh Reserve would continue to operate the same as under existing conditions. There is no proposed expansion of use. Therefore, there would be no long-term permanent noise impacts associated with the Project and no mitigation is required.

b) Would the Project result in generation of excessive ground-borne vibration or ground-borne noise levels?

No impact. Construction of the Project is expected to generate temporary ground-borne vibration in the immediate vicinity of certain construction activities. Depending on distance and soil composition, ground vibration can cause human annoyance and/or potential building damage. Typical construction equipment with the potential to create ground borne vibration includes pile drivers, large bulldozers, loaded trucks, jackhammers, and small bulldozers. Of these pieces of equipment, the largest piece of equipment is anticipated to be a loaded truck.

Vibratory motion is commonly described by quantifying the peak particle velocity (PPV) of the vibrated ground in terms of inches per second (in/sec). California Department of Transportation (Caltrans) has developed guidelines for assessing potential for damage to buildings and annoyance to people from vibration caused by construction sources (Caltrans 2013). Table 12 shows the threshold criteria for potential damage to various types of buildings, and Table 13 lists the various levels of perceptibility in people caused by vibration events.

Table 12. Guideline Vibration Damage Potential Threshold Criteria

	Maximum PPV (in/sec)	
Structure and Condition	**Transient Sources**	**Continuous/Frequent Intermittent Sources**
Extremely fragile historic buildings, ruins, ancient monuments	0.12	0.08
Fragile buildings	0.2	0.1
Historic and some old buildings	0.5	0.25
Older residential structures	0.5	0.3
New residential structures	1.0	0.5
Modern industrial/commercial buildings	2.0	0.5

Note: Transient sources create a single isolated vibration event, such as blasting or drop balls. Continuous/frequent intermittent sources include impact pile drivers, pogo-stick compactors, crack-and-seat equipment, vibratory pile drivers, and vibratory compaction equipment.
Source: Caltrans 2020b

Table 13. Guideline Vibration Annoyance Potential Criteria

Human Response	Maximum PPV (in/sec)	
	Transient Sources	Continuous/Frequent Intermittent Sources
Barely perceptible	0.04	0.01
Distinctly perceptible	0.25	0.04
Strongly perceptible	0.9	0.10
Severe	2.0	0.4
Note: Transient sources create a single isolated vibration event, such as blasting or drop balls. Continuous/frequent intermittent sources include impact pile drivers, pogo-stick compactors, crack-and-seat equipment, vibratory pile drivers, and vibratory compaction equipment. Source: Caltrans 2020b		

Primary factors affecting the level of attenuation of vibration in the ground include the type and intensity of vibration at the source and the type of soil through which vibratory force propagates. The soil type in the Project area is sandy clay. Assuming the use of a loaded truck or other large piece of equipment, ground-borne vibration levels would reach the level of Barely Perceptible (0.01 PPV(in/sec)) at a distance of 130 feet between the equipment and receptor. Because all structures are well beyond 130 feet away, no vibration damage impacts or human annoyance impacts would occur and no mitigation is required. The vibration calculations are included as Appendix F of this IS/MND.

No long-term permanent operational impacts would occur as the Project proposes no change in existing operations or change in land use at the Marsh Reserve.

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

No impact. The Project site is within the area Land Use Plan for John Wayne Airport (ALUC 2008), which is located approximately one mile to the northwest. No change in land use or construction of habitable buildings or tall structures are proposed that could otherwise potentially expose people to excessive noise or pose a safety risk. No impacts are anticipated, and no mitigation is required.

Avoidance, Minimization and/or Mitigation Measures

The following mitigation measure is intended to reduce the potential for temporary human annoyance impacts resulting from temporary construction and associated elevated exterior noise levels.

MM NOI-1 Prior to initiating on-site construction for consistency with LRDP plans and policies, UCI shall approve contractor specifications that include measures to reduce construction noise. These measures shall include, but may not be limited to, the following:

1. Noise-generating construction activities occurring Monday through Friday shall be limited to the hours of 7:00 am to 7:00 pm, except during summer, winter, or spring break at which construction may occur at the times approved by UCI.

2. Noise-generating construction activities occurring on weekends in the vicinity of (can be heard from) off-campus land uses shall be limited to the hours of 9:00 am to 6:00 pm on Saturdays, with no construction occurring on Sundays or holidays.

3. Noise-generating construction activities occurring on weekends in the vicinity of (can be heard from) on-campus residential housing shall be limited to the hours of 9:00 am to 6:00 pm on Saturdays, with no construction on Sundays or holidays. However, as determined by UCI, if on-campus residential housing is unoccupied (during summer, winter, or spring break, for example), or would otherwise be unaffected by construction noise, construction may occur at any time.

4. Construction equipment shall be properly outfitted and maintained with manufacturer recommended noise-reduction devices to minimize construction-generated noise.

5. Stationary construction noise sources such as generators, pumps or compressors shall be located at least 100 feet from noise-sensitive land uses (i.e., campus housing, classrooms, libraries, and clinical facilities), as feasible.

6. Laydown and construction vehicle staging areas shall be located at least 100 feet from noise-sensitive land uses (i.e., campus housing, classrooms, libraries, and clinical facilities), as feasible.

7. All neighboring land uses that would be subject to construction noise shall be informed at least two weeks prior to the start of construction, except in an emergency situation.

Sources

Construction Noise Handbook (FHWA 2017a); (Google Earth 2021); Highway Noise: A Design Guide for Highway Engineers (National Cooperative Highway Research Program (NCHRP) Report 117 1971); Highway Traffic Noise Analysis and Abatement Policy and Guidance (FHWA 2017b); Transit Noise and Vibration Impact Assessment Manual (FTA 2018); Transportation and Construction Vibration Guidance Manual (Caltrans 2020b); Technical Noise Supplement (Caltrans 2013); UCI LRDP EIR (UCI 2007b); Washington State Department of Transportation Biological Assessment Manual (WSDOT 2020).

Population and Housing

Would the Project:

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

3.14 Population and Housing

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

No impact. The Project does not propose the construction of new housing, commercial businesses, roads or other infrastructure that would directly or indirectly induce population growth in the area. Proposed infrastructure improvements are for managing the reserve's hydrology and habitat function. The Project site would remain a preservation area as under existing conditions. No impacts are anticipated, and no mitigation is required.

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

No impact. There are no housing units or habitable structures located within the Project site. No removal of housing is proposed and no people would be displaced. No impact would occur, and no mitigation is required.

Avoidance, Minimization and/or Mitigation Measures

No impacts were identified, and no mitigation measures are required.

Sources

The findings in the section are based on the nature of proposed Project construction activities and continued use of the Marsh Reserve as a preservation area.

Public Services

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

3.15 Public Services

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

i) Fire protection

No Impact. The Orange County Fire Authority (OCFA) Fire Station 4 is located at 2 California Avenue Irvine, CA 92612, approximately 1.4 miles west of the Project site (Google Earth 2020). OCFA Fire Station 28 is located at 17862 Gillette Avenue Irvine, CA 92614, approximately 1.7 miles north of the Project site. Either station would be adequate for servicing the Project site, similar to existing conditions, without the need for alterations to existing facilities or construction of new facilities as the Project would not result in a change in use or intensity of use. The Project would not result in lane closures that could impact firefighter response times. The proposed Project is located within the existing marsh preservation area and would not create a new public safety or fire hazard. The Project is not anticipated to induce population growth that would create additional demand for public services or facilities. The Project would not result in the need for new or physically altered government facilities and would not affect response times or performance objectives. Impacts are not anticipated, and no mitigation is required.

ii) Police protection

No impact. The UCI Police Department or Irvine Police Department would provide service to the Project site in the event of a service call. The nearest UCI Police station is located at 410 East Peltason Drive Irvine, CA 92697-4900, approximately 1 mile west of the Project site (Google Earth 2020). The nearest Irvine Police Station is located at 1 Civic Center Plaza Irvine, CA 92606-5207, approximately 2.75 miles north of the Project site (Google Earth 2020). As previously discussed, the Project would not induce population growth that could lead to any incremental or cumulative increase in demand for service, impact public facilities, or impact emergency response times. The proposed Project would not impact police response times or performance objectives. No impacts are anticipated, and no mitigation is required.

iii) Schools

No impact. The Project site is located adjacent to the UCI campus. The next nearest school to the Project site is Newport Montessori, located approximately 1 mile to the west at 20221 SW Cypress Street, Newport Beach, CA 92660 (Google Earth 2020). The Project proposes raising berms/dirt roads to increase water storage capacity and function of passive drainage and the installation of new and/or replacement water control mechanisms. The Project does not include residential uses that would increase the use of existing school facilities identified above or require the construction of new school facilities. No impacts are anticipated, and no mitigation is required.

iv) Parks

No impact. The closest parks to the Project site are the UCI Arboretum and the Mesa Court Field (Google Earth 2020). The Project does not propose changes to these facilities or other existing parks. The Project also does not include residential or commercial uses that would indirectly increase the use of existing park facilities or increase the demand for construction of new park facilities. No impacts are anticipated, and no mitigation is required.

v) Other public facilities

No impact. The proposed Elements are not anticipated to increase the need for other public facilities as no change in existing use is proposed. Proposed improvements are intended to continue to maintain the Project site as a preservation area. No offsite drainage or stormwater facilities or facility upgrades would be required to accommodate the Project. No impacts are anticipated, and no mitigation is required.

Avoidance, Minimization and/or Mitigation Measures

No significant impacts were identified, and no mitigation measures are required.

Sources

Google Earth (Google, October 2020).

Recreation

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

3.16 Recreation

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

No impact. No change in land use or increase in residential development typically associated with increasing the demand for parks or other recreational facilities is proposed. The Project is also not expected to cause a significant increase in employment, only temporary construction related jobs. Impacts are not anticipated, and no mitigation is required.

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

No impact. The Project site would remain a preservation area and not open for recreational public use, same as under existing conditions. No increase in residential or commercial uses are proposed that could otherwise create a need for new or expanded recreational facilities. No impacts are anticipated, and no mitigation is required.

Avoidance, Minimization and/or Mitigation Measures

No impacts were identified, and no mitigation measures are required.

Sources

The findings in the section are based on the nature of the proposed Project.

Transportation

Would the Project:

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

3.17 Transportation

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

No impact. The Project only proposes raising berms/dirt roads to increase water storage capacity and function of passive drainage and the installation of new and/or replacement water control mechanisms. The dirt roads are private and only available for UCI maintenance, monitoring and educational purposes. No new facilities or changes to public roads, sidewalks, bicycle paths or trails are proposed. No additional housing or commercial facilities are proposed that would influence travel demand, modes and/or distribution patterns. No impacts are anticipated, and no mitigation is required.

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

No impact. The Project would not result in a change in automobile use or vehicle miles travelled (VMT) because it is not related to roadway transportation or land-use changes. The Project only proposes hydrology and water quality infrastructure improvements at the existing Marsh Reserve. No impacts are anticipated, and no mitigation is required.

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

No impact. Geometric design features such as sharp curves or dangerous intersections are not proposed. There are no proposed changes in land use or transportation facilities and no mitigation is required.

d) Would the Project result in inadequate emergency access?

No impact. Long-term permanent access to the Project site would not change from existing conditions. Temporary staging and construction would occur only within the Project site, which is not open to the public and has no existing or proposed habitable structures. All surrounding roadways would remain fully accessible. No impacts are anticipated, and no mitigation is required.

Avoidance, Minimization and/or Mitigation Measures

No significant impacts were identified, and no mitigation measures are required.

Sources

The findings in the section are based on the nature of the proposed Project.

Tribal Cultural Resources

Would the Project cause a substantial adverse change in the significance of a Tribal Cultural Resource, defined in Public Resources Code section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American Tribe, and that is:

	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
a) Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code section 5020.1(k), or	☐	☐	☐	☒
b) A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resource Code Section 5024.1 for the purposes of this paragraph, the lead agency shall consider the significance of the resource to a California Native American tribe.	☐	☒	☐	☐

3.18 Tribal Cultural Resources

The information and findings provided in this section are based, in-part, on the Cultural Resources Assessment Report for the San Joaquin Marsh Restoration Project prepared by Cogstone in March 2021 (Appendix D). As part of this assessment, a Sacred Lands File search was requested from the NAHC on September 1, 2020. In addition, letters requesting informal consultation were sent to the Native American individuals and organizations identified by the NAHC via certified mail on September 14, 2020. Follow-up emails were sent on September 23, 2020 and follow-up phone calls were made on October 7, 2020.

As of October 30, 2020, three responses had been received from the Gabrieleño Band of Mission Indians – Kizh Nation, Gabrielino Tongva Indians of California Tribal Council, and Juaneño Band of Mission Indians Acjachemen Nation. Only the Kizh Nation requested formal consultation. A summary of this correspondence is provided below:

- Gabrieleño Band of Mission Indians – Kizh Nation representative asked for the lead agency's contact information on September 23, 2020. Cogstone provided the information on November 3, 2020 and confirmed receipt on November 4, 2020. A meeting between UCI and the Kizh Nation occurred on February 24, 2021, at which time, the Kizh Nation requested Native American Monitoring during earthwork.

- Juaneño Band of Mission Indians Acjachemen Nation representative indicated on September 29, 2020 that they are not aware of any specific cultural sites or properties in the area but that it is a sensitive area. They requested additional information regarding the 40 cultural resources within and near the Project area, and the results of the pedestrian survey. This information was provided on October 15, 2020. The representative indicated on November 5, 2020 that they would wait for Cogstone's official recommendations but were inclined to recommend cultural resources and Native American monitoring.

- Gabrielino/Tongva San Gabriel Band of Mission Indians representative stated on October 7, 2020 that the APE is culturally sensitive and is a traditional cultural property and landscape. The representative recommended archaeological and Native American monitoring for all ground disturbances in the area.

- Gabrielino Tongva Indians of California Tribal Council representative requested additional information on the resources within the APE, and results of the pedestrian survey. This information was provided on October 15, 2020.

The University of California, as the CEQA lead agency, initiated formal AB52 consultation requests on December 23, 2020 and concluded consultation on February 25, 2021. On-site monitoring during Project earthwork was requested during consultation.

Would the Project cause a substantial adverse change in the significance of a Tribal Cultural Resource, defined in Public Resources Code section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American Tribe, and that is:

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

Less than significant impact. The study area or Area of Potential Effect (APE) is within the traditional territories of both the Gabrielino-Tongva and Juaneño but the Sacred Lands File search indicated that there are no known sacred sites or heritage resources located within the APE (Cogstone 2021a). Portions of three previously recorded cultural resources are mapped within the APE as described in detail in Section 3.5(a) of this IS/MND. These resources include the Duck Ponds (identified as Locus B of the multi-component archaeological site P-30-000057 (CA-ORA-57)), a multicomponent site (P-30-000121/CA-ORA-121) and a prehistoric archaeological site (P-30-000115/CA-ORA-115).

- Based on the results of the assessment (Appendix D), each resource within the APE was evaluated for NRHP and CRHR eligibility. A detailed discussion is provided in Section 3.5(a) above and a summary of the findings is provided as follows:P-30-000057 (CA-ORA-57) has not been recommended as eligible for the NRHP or CRHR (Cogstone 2021a);

- P-30-000115 is currently recommended for testing prior to ground disturbances to determine its NRHP and CRHR eligibility; and

- P-30-000121/CA-ORA-121 was not reevaluated for eligibility during this Project's assessment and the resource remains eligible for listing on the NRHP and CRHR based on past investigations and recommendations.

Because resource P-30-000115 and P-30-000121 are over 390 feet (119 meters) and over 600 feet (182 meters), respectively, from the closest planned ground disturbance, the proposed Project would have no effect on these cultural resources (Cogstone 2021a). Regarding resource P-30-000057 (CA-ORA-57), because the artifact collection excavated in 1938 has been lost; subsequent excavations yielded only minimal intact cultural deposits; and no evidence of intact historic or prehistoric deposits has been found within Locus B, resource P-30-000057 (CA-ORA-57) is not considered significant and no further work is recommended (Cogstone 2021a). Based on this evaluation, no impacts are anticipated, and no mitigation is required.

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

Less than significant with mitigation. As discussed above in Section 3.5 and Section 3.18, the Project is not anticipated to impact a cultural resource or tribal cultural resource. The location of resources P-30-000115 and P-30-000121 are not within the Project's proposed area of excavation. In addition, resource P-30-000057 (CA-ORA-57) is not considered significant (Cogstone 2021a). Based on the findings of the assessment, the probability of disturbing a resource is considered low. In addition, no changes in use or substantive changes in landscape are proposed. The Project would remain a reserve and preservation area. Therefore, potential impacts are considered less than significant, and no mitigation is required.

Although no impacts are anticipated as determined above, mitigation measure **MM TCR-1** has been included below to ensure consideration of California Native American tribe input provided during the

AB52 Consultation process. Implementation of **MM TCR-1** would reduce the potential for impacts to less than significant.

Avoidance, Minimization and/or Mitigation Measures

Although no impacts are anticipated as determined above, mitigation measure **MM TCR-1** has been included to ensure consideration of California Native American tribe input.

MM TCR-1 If subsurface deposits believed to be cultural or human in origin, or tribal cultural resources, are discovered during construction all work shall halt within a 50-foot radius of the discovery, the Construction Manager shall immediately notify UCI Physical and Environmental Planning and Facilities Management. The Construction Manager shall also immediately coordinate with the tribal monitor and an archaeologist meeting the Secretary of the Interior's Professional Qualification Standards for archaeology and subject to approval by UCI to evaluate the significance of the find and develop appropriate management recommendations. All management recommendations shall be provided to UCI in writing for UCI's review and approval. If recommended by the qualified professional and consulting tribes, and approved by UCI, this may include modification of the no-work radius.

The professional archaeologist and tribal monitor must make a determination, based on professional judgement and supported by substantial evidence, within one business day of being notified, as to whether or not the find represents a cultural resource or has the potential to be a tribal cultural resource. The subsequent actions will be determined by the type of discovery, as described below. These include: 1) a work pause that, upon further investigation, is not actually a discovery and the work pause was simply needed in order to allow for closer examination of soil (a "false alarm"); 2) a work pause and subsequent action for discoveries that are clearly not related to tribal cultural resources, such as can and bottle dumps, artifacts of European origin, and remnants of built environment features; and 3) a work pause and subsequent action for discoveries that are likely related to tribal cultural resources, such as midden soil, bedrock mortars, groundstone, or other similar expressions.

Whenever there is question as to whether or not the discovery represents a tribal resource, culturally affiliated tribes shall be consulted in making the determination. The following processes shall apply, depending on the nature of the find, subject to the review and approval of UCI:

1. Response to False Alarms: If the professional archaeologist in consultation with the tribal monitor(s) determines that the find is negative for any cultural indicators, then work may resume immediately upon notice to proceed from UCI's representative. No further notifications or tribal consultation is necessary, because the discovery is not a cultural resource of any kind. The professional archaeologist shall provide written documentation of this finding to UCI.

2. Response to Non-Tribal Discoveries: If at the time of discovery a professional archaeologist and tribal monitor determines that the find represents a non-tribal cultural resource from any time period or cultural affiliation, UCI shall be notified immediately, to consult on a finding of eligibility and implementation of appropriate treatment measures.

3. Response to Tribal Discoveries: If the find represents a tribal or potentially tribal cultural resource that does not include human remains, the [tribe(s)] and UCI shall be notified. UCI will consult with the tribe on a finding of eligibility and implement appropriate treatment measures, if the find is determined to be either a Historical Resource under CEQA, as defined in Section 15064.5(a) of the CEQA Guidelines, or a Tribal Cultural Resource, as defined in Section 21074 of the Public Resources Code. Preservation in place is the preferred treatment, if feasible. Work shall not resume within a 50-foot radius until UCI, through consultation as appropriate, determines that the site either: 1) is not a Historical Resource under CEQA, as defined in Section 15064.5(a) of the CEQA Guidelines; or 2) not a Tribal Cultural Resource, as defined in Section 21074 of the Public Resources Code; or 3) that the treatment measures have been completed to its satisfaction.

4. Response to Human Remains: If the find includes human remains, or remains that are potentially human, the construction supervisor or on-site archaeologist shall ensure reasonable protection measures are taken to protect the discovery from disturbance (AB 2641) and shall notify UCI and the Orange County Coroner (per § 7050.5 of the Health and Safety Code). The provisions of § 7050.5 of the California Health and Safety Code, § 5097.98 of the California Public Resources Code, and Assembly Bill 2641 shall be implemented. If the Coroner determines the remains are Native American and not the result of a crime scene, the Coroner will notify the Native American Heritage Commission (NAHC), which then will designate a Native American Most Likely Descendant (MLD) for the Project (§ 5097.98 of the Public Resources Code). The designated MLD will have 48 hours from the time access to the property is granted to make recommendations concerning treatment of the remains. Public Resources Code § 5097.94 provides structure for mediation through the NAHC if necessary. If no agreement is reached, UCI shall rebury the remains in a respectful manner where they will not be further disturbed (§ 5097.98 of the Public Resources Code). This will also include either recording the site with the NAHC or the appropriate Information Center; using an open space or conservation zoning designation or easement; or recording a reinternment document with the Orange County Clerk's Office (AB 2641). Work shall not resume within the no-work radius until UCI, through consultation as appropriate, determines that the treatment measures have been completed to its satisfaction.

Sources

AB52 Consultation Process (UCI 2021); Cultural Resources Assessment Report for the San Joaquin Marsh Restoration Project (Cogstone, March 2021a).

Utilities and Service Systems

Would the Project:

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

3.19 Utilities and Service Systems

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

No impact. The Project proposes raising berms/dirt roads to increase water storage capacity and function of passive drainage and the installation of new and/or replacement water control mechanisms. The Project site would continue to operate as a marsh and preservation area. No change in use, housing or commercial facilities are proposed that would directly or indirectly require construction of new or expanded utilities. No expansion of the marsh would occur with the need for additional water supply. In addition, no offsite improvements for stormwater facilities are needed; existing systems are adequate. Wastewater treatment, electrical power, natural gas and telecommunication facilities are generally not required to serve the marsh. No impacts are anticipated, and no mitigation is required.

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

No impact. There is no proposed increase or change in use of the Project site. The Project would increase the marsh's water storage capacity but additional water supply would not be required for the Project. No impact would occur, and no mitigation is required.

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

No impact. Please refer to the discussion under Section 3.9(a). There is no proposed increase in demand. No impacts are anticipated, and no mitigation is required.

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

No impact. The Project proposes construction of new and/or replacement water control mechanisms. Proposed construction would generate some demolition and construction waste that would require recycling (e.g., concrete and metal waste) at a recycling facility and other debris requiring disposal (e.g., trash and debris) at a landfill. Project construction would also generate soils during earthwork for construction of the swales and berm/dirt road improvements but these soils would be reused and balanced on-site. For all waste requiring disposal, the nearest active landfill is the Frank R. Bowerman Landfill located approximately 9 miles away at 11002 Bee Canyon Access Rd. Irvine, CA 92602. Per OC Waste & Recycling, the landfill is permitted for 11,500 tons per day (TPD) maximum with an 8,500 TPD annual average. The landfill has enough projected capacity to serve residents and businesses until approximately 2053 (OCW&R 2020). Based on the relatively small amount of construction waste anticipated to require disposal, the Project is not expected to exceed local capacity or impair waste reduction goals. In addition, no new businesses or residences are proposed that are typically associated with more substantial amounts of construction and operational waste streams. The Project's contribution to solid waste is considered de minimis and no mitigation is required.

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

No impact The University of California is not subject to Assembly Bill 939 or other local agency regulations pertaining to solid waste management. Nonetheless, the University of California has adopted the Sustainable Practices Policy that requires campuses to undertake aggressive programs to reduce solid waste generation and disposal (LRDP EIR, 4.14-20). This includes voluntary compliance with the State Agency Integrated Waste Management Plan and prioritization of waste and recycling for LEED credits, including a life cycle assessment for reuse of building materials. Furthermore, Section F of the UC Sustainable Practices Policy, Recycling and Waste Management, requires the ultimate goal of zero waste. The project would not require any unique waste collection or disposal methods or facilities and would not conflict with or obstruct any Federal, State, or local programs to reduce solid waste generation. Therefore, the proposed project would not violate solid waste regulations and no impact would occur. No mitigation is required.

Avoidance, Minimization and/or Mitigation Measures

No significant impacts were identified, and no mitigation measures are required.

Sources

Orange County Waste & Recycling, Frank R. Bowerman Landfill (OCW&R 2020) accessed on October 21, 2020 at (http://oclandfills.com/landfills/active-landfills/frank-r-bowerman-landfill).

Wildfire

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

3.20 Wildfire

If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the project:

The Project site is not located within a State Responsibility Area or Fire Hazard Severity Zone (CalFire 2020).

a) Would the project Substantially impair an adopted emergency response plan or emergency evacuation plan?

No impact. The Project does not occur in a high fire hazard area. The nearest high fire risk zone occurs approximately 1 mile east of the Project site (CalFire 2020). The Project would not temporarily or permanently block roads that could provide emergency response or evacuation from wildfires or other emergency. All local roadways and major highways would remain open. No impacts are anticipated, and no mitigation is required.

b) Due to slope, prevailing winds, and other factors, would the Project exacerbate wildfire risks, and thereby expose project occupants to, pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire?

No Impact. The Project does not propose the addition of habitable buildings or structures or construction activities that could exacerbate wildfire risks. No impacts are anticipated, and no mitigation is required.

c) Would the Project require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment?

No impact. The Project does not occur in a high fire hazard zone and the Project site would continue to function as a marsh and preservation area. The Project does not propose or require the installation or maintenance of fuel breaks, emergency water sources, or power lines. No impacts are anticipated, and no mitigation is required.

d) Would the Project expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes?

No impact. The Project site and adjacent areas are relatively flat and the Project does not propose substantial changes to existing topography. An elevation increase of approximately 3 feet is proposed for berm improvements and an elevation decrease of approximately 5 feet is proposed for the swale improvements. In addition, the Project is intended to improve management of water flows and drainage prior to any release to the downstream system. No habitable buildings or structures are proposed or located within the Project footprint. No impacts are anticipated, and no mitigation is required.

Avoidance, Minimization and/or Mitigation Measures

No significant impacts were identified, and no mitigation measures are required.

Sources

California Fire Hazard Severity Zone Viewer (CalFire, 2020) accessed on October 21, 2020 at (https://gis.data.ca.gov/datasets/789d5286736248f69c4515c04f58f414).

Mandatory Findings of Significance

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

3.21 Mandatory Findings of Significance

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

Less than significant with mitigation. As discussed in Section 3.4, the Marsh Reserve contains sensitive habitats and provides habitat for a variety of wildlife including special-status species. The purpose of the Project is to improve the hydrology and overall long-term habitat value within the Marsh Reserve. Mitigation is required to ensure temporary construction impacts are less than significant. **MM BIO-1** would require preparation and implementation of a western pond turtle construction monitoring plan in order to ensure temporary construction impacts to western pond turtle are less than significant. **MM BIO-2** would require preconstruction surveys and additional avoidance for burrowing owl (wintering) should they be found onsite. **MM BIO-3** would require preconstruction surveys and additional avoidance for MBTA and ESA protected nesting birds should construction occur during the nesting season. **MM BIO- 4** would require preparation and implementation of a habitat reestablishment and monitoring plan for reestablishment of any sensitive wetland riparian habitat disturbed during construction activities. **MM BIO-5** would provide for additional preconstruction surveys and avoidance for Ridgeway rail if detected outside of the nesting season and within a proposed work area. **MM BIO-6** would require pre-construction surveys and additional avoidance should roosting bats be detected during roosting season. Mitigation measures **MM BIO-1** through **MM BIO-6** would ensure potential impacts to biological resources are less than significant.

As discussed in Section 3.5 and Section 3.7(f), no impacts are anticipated to cultural resources or paleontological resources. However, mitigation measures **MM CUL-1**, **MM CUL-2** and **MM GEO-1** are included in the event of an unanticipated discovery. Implementation of **MM CUL-2**, **MM CUL-2** and **MM GEO-1** would ensure potential impacts to cultural resources and paleontological resource are less than significant. As discussed in Section 3.18, no significant impacts were identified, and no mitigation measures are required. Although no impacts are anticipated as determined above, mitigation measure **MM TCR-1** has been included to ensure consideration of California Native American tribe input.

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

Less than significant impact. The Project would not result in potentially significant cumulative impacts. Based on the nature of temporary construction activities and long-term continuation of the Project site as an open space preservation area, cumulative impacts are not anticipated. No significant adverse cumulative impacts have been identified and no mitigation is required.

Cumulative impacts are defined as the direct and indirect effects of a proposed project which, when considered alone, would not be deemed a substantial impact, but when considered in addition to the impacts of related projects in the area, would be considered potentially significant. "Related projects" refers to past, present, and reasonably foreseeable probable future projects, which would have similar impacts to the proposed Project. Two projects, Irvine Campus Medical Complex and Center for Advanced Care (previously Center for Child Health) would be constructed at the North Campus, north of the Project site. These Projects are development projects and are therefore not anticipated to have similar impacts to the proposed Project.

The Project would not result in any cumulative impact on biological resources. The Project is anticipated to result in a cumulative benefit to the many species that use the Marsh Reserve due to the enhanced hydrology that would occur from implementing the Design Goal Elements. No adverse cumulative impact would occur, and no mitigation is required.

Two projects, Irvine Campus Medical Complex and Center for Advanced Care (previously Center for Child Health) would be constructed at the North Campus, north of the Project site. Chances are these other projects would be constructed simultaneously; however, the Project's contribution to daily construction air quality and noise would be considered less than significant based on implementation of project-specific mitigation, relative distances between proposed activities, and location of potentially impacted receptors. Post-construction, the Project site would continue to function as an open space preservation area with no changes in noise from existing conditions. No permanent cumulative operational impacts would occur, and no mitigation is required.

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

Less than significant with mitigation. Previous sections of this IS/MND reviewed the Project's potential temporary impacts related to air quality (Section 3.3.) and noise (Section 3.13) among other environmental issue areas. As discussed, the Project would result in less than significant environmental impacts for air quality and would not require mitigation measures. Mitigation measure **MM NOI-1** would require restricted working hours, construction notification to nearby receptors, maintenance of properly functioning equipment, and staging equipment away from receptors. These measures are to reduce the potential for human annoyance at offsite receptors resulting from temporary construction noise impacts. Implementation of these measures would reduce potential impacts to less than significant.

4.0 LIST OF PREPARERS

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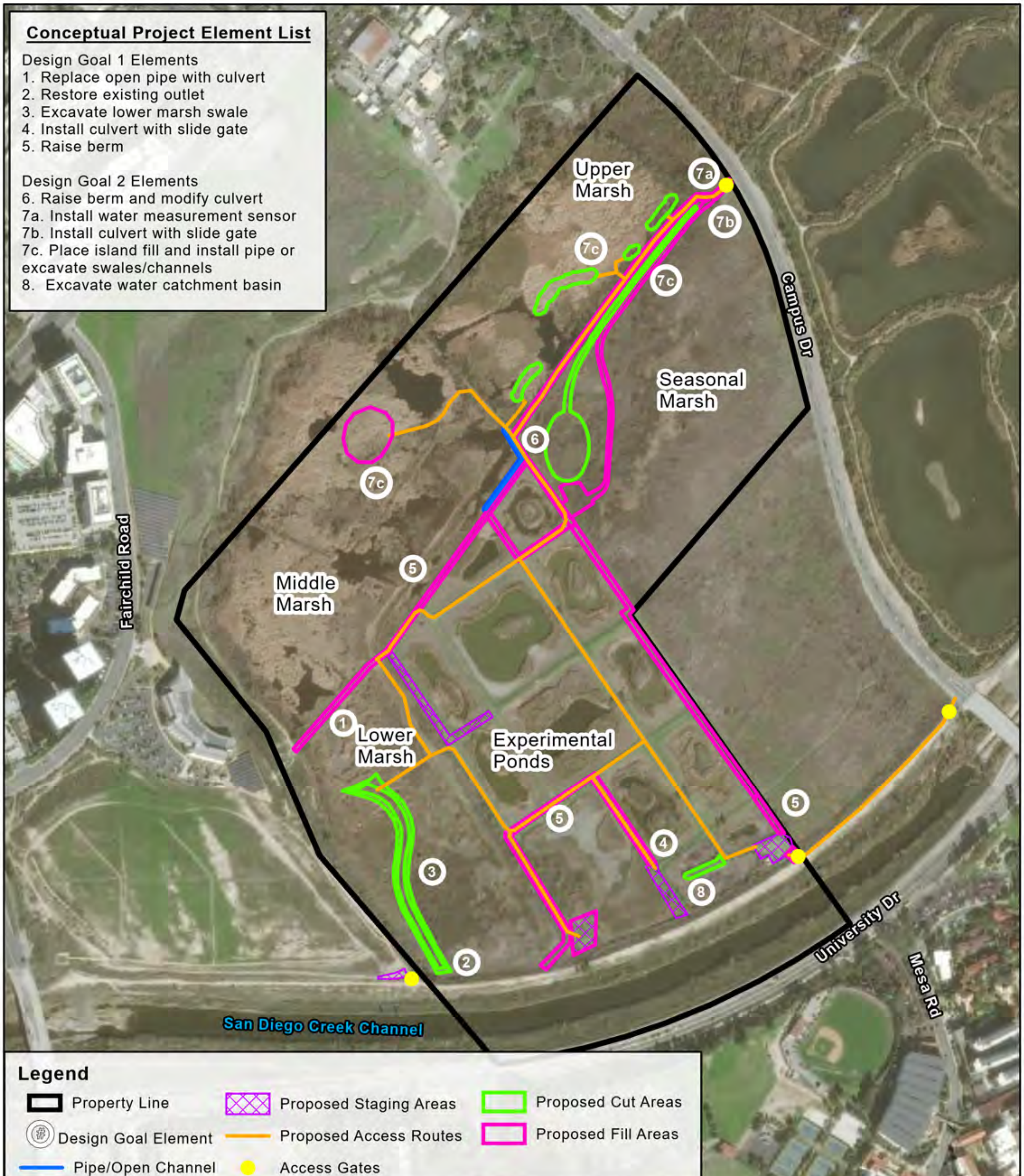
6.0 FIGURES AND EXHIBITS

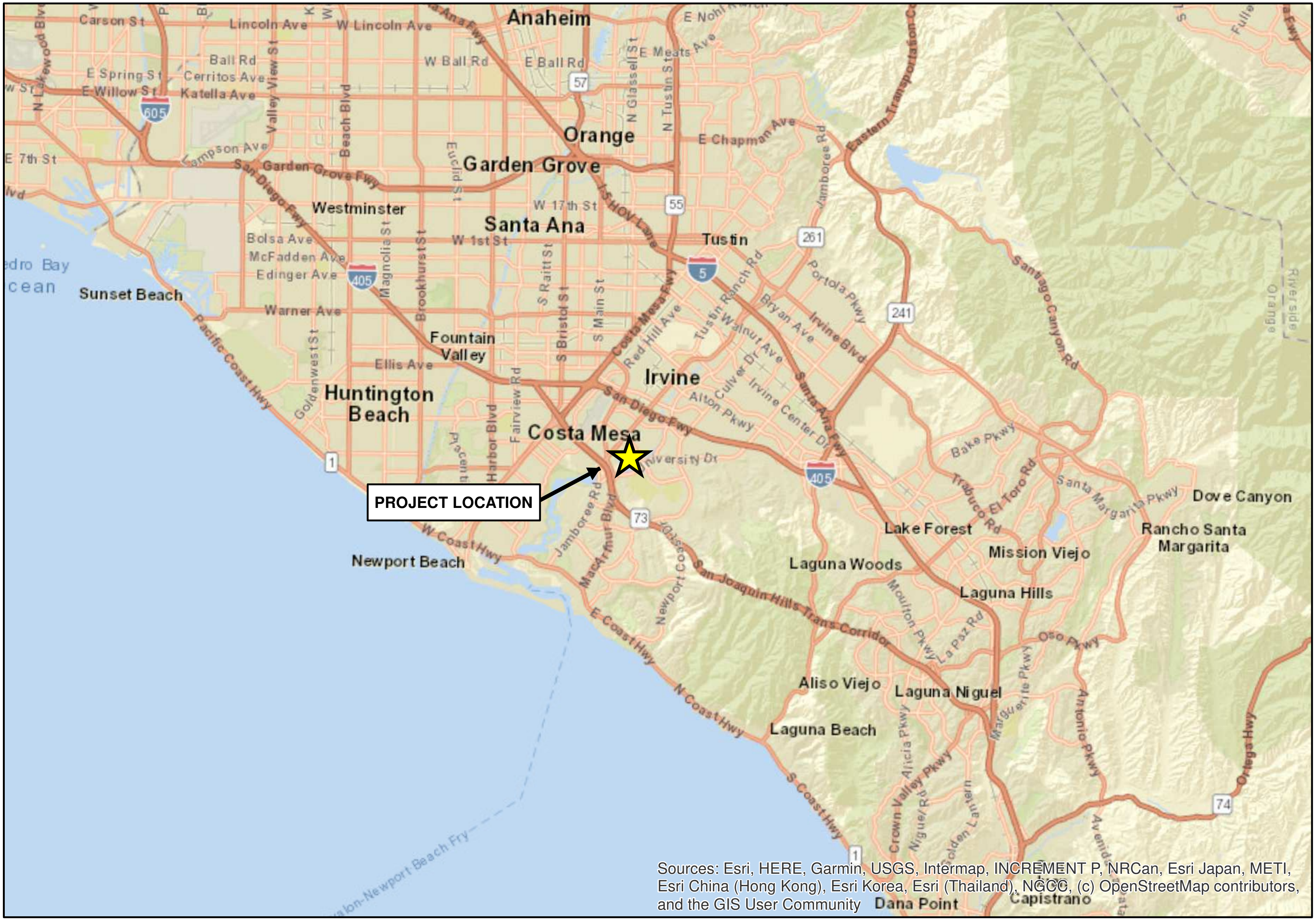
Vicinity Map

PROPOSED PROJECT: San Joaquin Marsh Reserve Water Conveyance and Drainage Improvement Project	LOCATION : University of California Irvine (UCI) San Joaquin Marsh Reserve, Irvine, CA 92697	FIGURE 1: Project Location
moffatt & nichol		N 0 0.13 0.25 0.5 Miles



PROPOSED PROJECT: San Joaquin Marsh Reserve Water Conveyance and Drainage Improvement Project	LOCATION : University of California Irvine (UCI) San Joaquin Marsh Reserve, Irvine, CA 92697	FIGURE 2: Project Elements Map
moffatt & nichol		N 0 0.05 0.1 0.2 Miles

Source: ESRI World Street Map



N

0 2 4 8
Miles

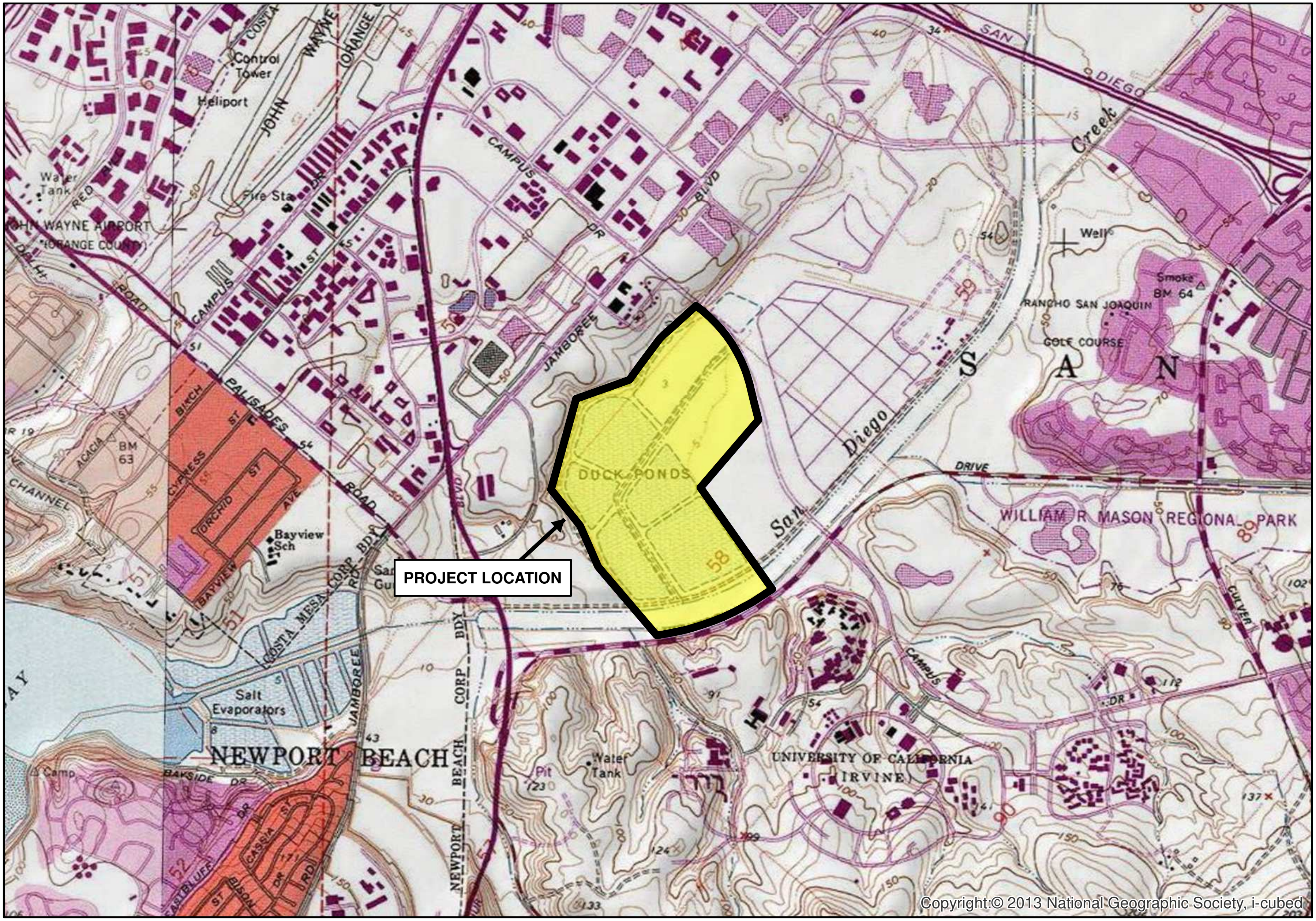
U.C. SAN JOAQUIN MARSH RESERVE

Regional Map

GLENN LUKOS ASSOCIATES

Exhibit 1

Adapted from USGS Tustin, CA quadrangle



N

0 1,000 2,000 4,000 Feet

U.C. SAN JOAQUIN MARSH RESERVE

Vicinity Map

GLENN LUKOS ASSOCIATES

Exhibit 2

Project Site

N

0 175 350 700
Feet

1 inch = 350 feet

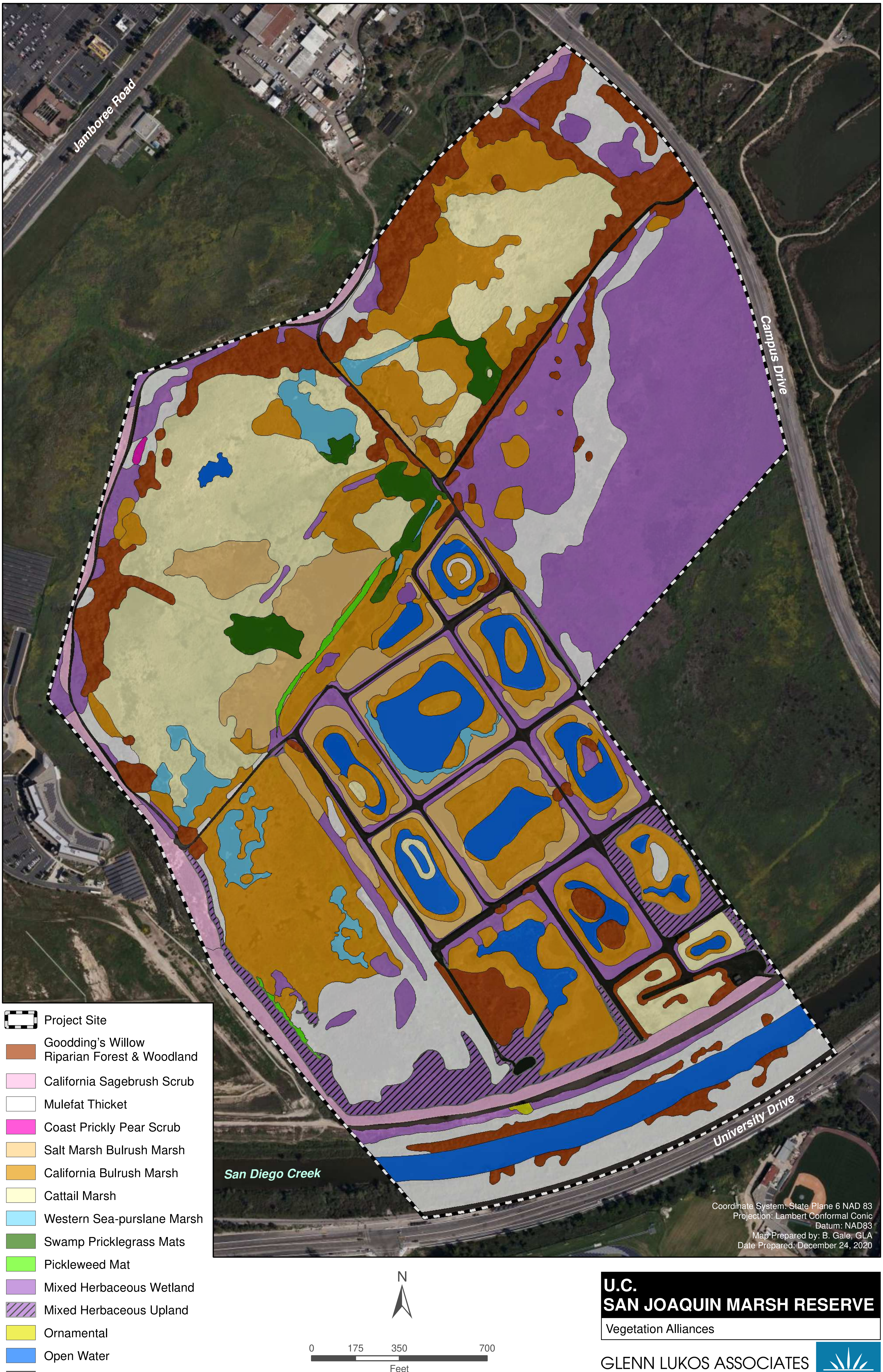
U.C.
SAN JOAQUIN MARSH RESERVE

San Joaquin Marsh Reserve Aerial Map

GLENN LUKOS ASSOCIATES

Exhibit 3

X:\1100 AFTER THE REST\1505-01SJMR\1505-1_GIS\1505-1_Aerial.mxd



Source: Glenn Lukos Associates, 2020

1 inch = 350 feet

U.C.
SAN JOAQUIN MARSH RESERVE

Vegetation Alliances

GLENN LUKOS ASSOCIATES

Exhibit 4

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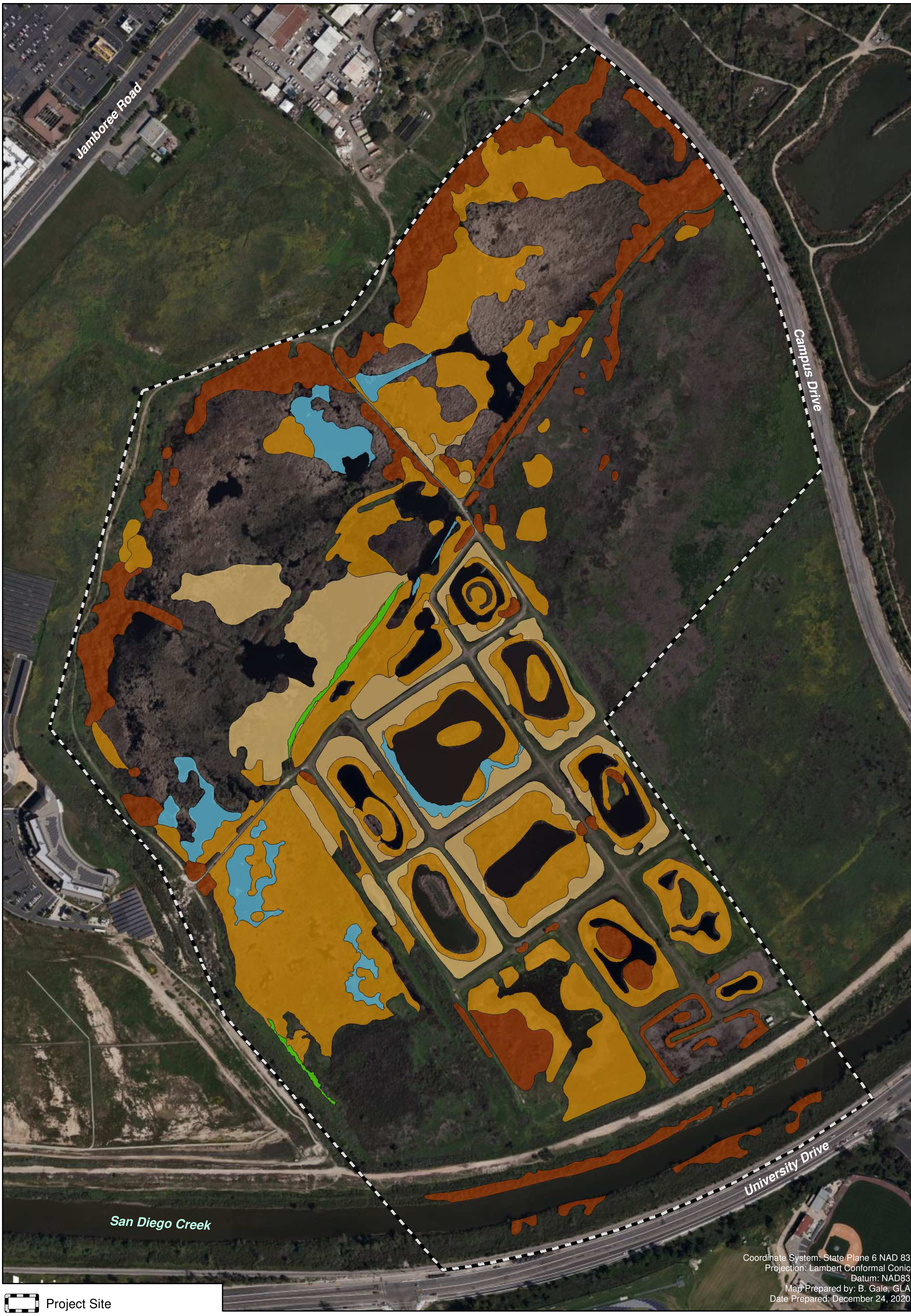

Project Site

Gooding's Willow Riparian Forest & Woodland

Salt Marsh Bulrush Marsh

California Bulrush Marsh

Western Sea-purslane Marsh

Pickleweed Mat

Source: Glenn Lukos Associates, 2020

N

0 175 350 700

Feet

1 inch = 350 feet

U.C.
SAN JOAQUIN MARSH RESERVE

Special-Status Vegetation Alliances

GLENN LUKOS ASSOCIATES

Exhibit 5

X:\1100 AFTER THE REST\1505-01SJMR\1505-1_GIS\VegetationGIS\1505-1_SpecialStatusVegetationAlliances.mxd

Project Site

Southern Tarplant

Vernal Barley

Source: Glenn Lukos Associates, 2020

N

0 175 350 700

Feet

1 inch = 350 feet

U.C.
SAN JOAQUIN MARSH RESERVE

Special-Status Plant Location Map

GLENN LUKOS ASSOCIATES

Exhibit 6

X:\1100 AFTER THE REST\1505-01SJMR\1505-1_GIS\RarePlantsGIS\1505-1_SpecialStatusPlantLocations.mxd

Project Site

Pond Turtle Female in Pond

Pond Turtle Nesting Site

Pond Turtle Estivation Site

Source: Barry Nerhus, 2016

N

0 175 350 700

Feet

1 inch = 350 feet

U.C.
SAN JOAQUIN MARSH RESERVE

Western Pond Turtle Map

GLENN LUKOS ASSOCIATES

Exhibit 7

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Project Site

Burrowing with Owl (10/14/20 - 10/15/20)

Burrowing Owl Observation (10/14/20 - 10/15/20)

N

0 175 350 700

Feet

1 inch = 350 feet

U.C. SAN JOAQUIN MARSH RESERVE

Burrowing Owl 2020 Location Map

GLENN LUKOS ASSOCIATES

Exhibit 8

X:\1100 AFTER THE REST\1505-01SJMR\1505-1_GIS\BUOW_GIS\1505-1_BUOW.mxd

Project Site

Suitable California Gnatcatcher Habitat

N

0 175 350 700

Feet

1 inch = 350 feet

U.C.
SAN JOAQUIN MARSH RESERVE

Suitable California Gnatcatcher Habitat Map

GLENN LUKOS ASSOCIATES

Exhibit 9

X:\1100 AFTER THE REST\1505-01SJMR\1505-1_GIS\HabitatGIS\1505-1_SuitableCAGNHabitat.mxd

Project Site

Goodding's Willow Riparian Forest & Woodland - Suitable Habitat for Least Bell's Vireo, Yellow Walbler, Yellow-Brested Chat, and Western Red Bat

Mulefat Thicket - Suitable Habitat for Least Bell's Vireo and Yellow-Brested Chat

Arboretum Transect

Bluff Rd/Riparian Transect

Ponds 1-3 Transect

Ponds 4-11 Transect

Visual Observations Only

N

0 200 400 800

Feet

1 inch = 400 feet

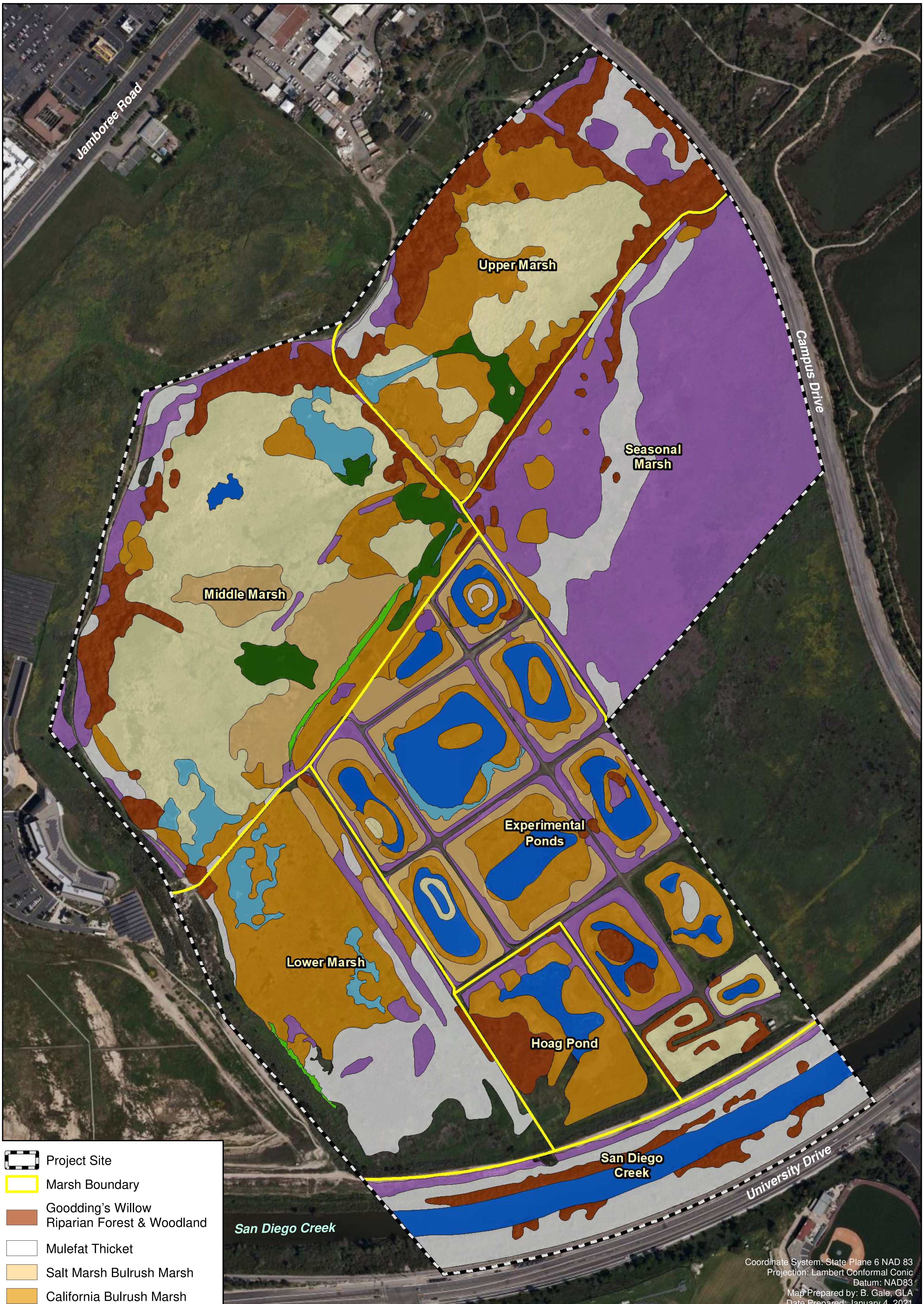
U.C.
SAN JOAQUIN MARSH RESERVE

Riparian Species Suitable Habitat and Audubon Survey Routes

GLENN LUKOS ASSOCIATES

Exhibit 10

X:\1100 AFTER THE REST\1505-01SJMR\1505-1_GIS\HabitatGIS\1505-1_RiparianSpeciesSuitableHabitat_AudubonSurveyRoutes.mxd



Source: Glenn Lukos Associates, 2020

N

0 175 350 700
Feet

1 inch = 350 feet

U.C.
SAN JOAQUIN MARSH RESERVE

Corps, CDFW, and Regional Board Wetland Alliances

GLENN LUKOS ASSOCIATES

Exhibit 11

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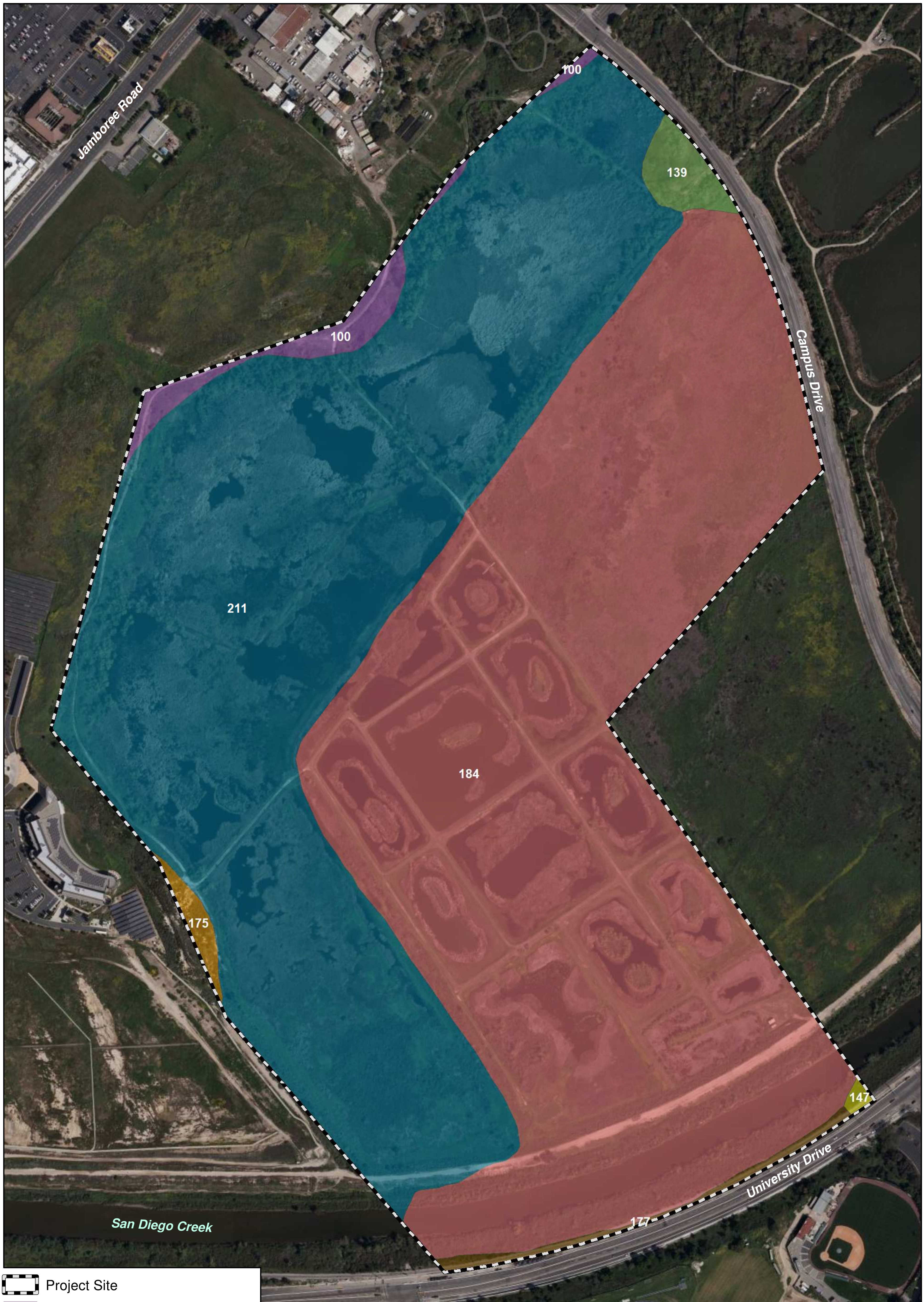

- Project Site
- 100 Alo Clay, 9 to 15 Percent Slopes
- 139 Chino Silty Clay Loam
- 147 Corralitos Loamy Sand, Moderately Fine Substratum
- 175 Myford Sandy Loam, 9 to 15 Percent Slopes
- 177 Myford Sandy Loam, 9 to 30 Percent Slopes, Eroded
- 184 Omni Clay, Drained
- 211 Tidal Flats

N

0 175 350 700
Feet

1 inch = 350 feet

**U.C.
SAN JOAQUIN MARSH RESERVE**

Soils

GLENN LUKOS ASSOCIATES

Exhibit 12

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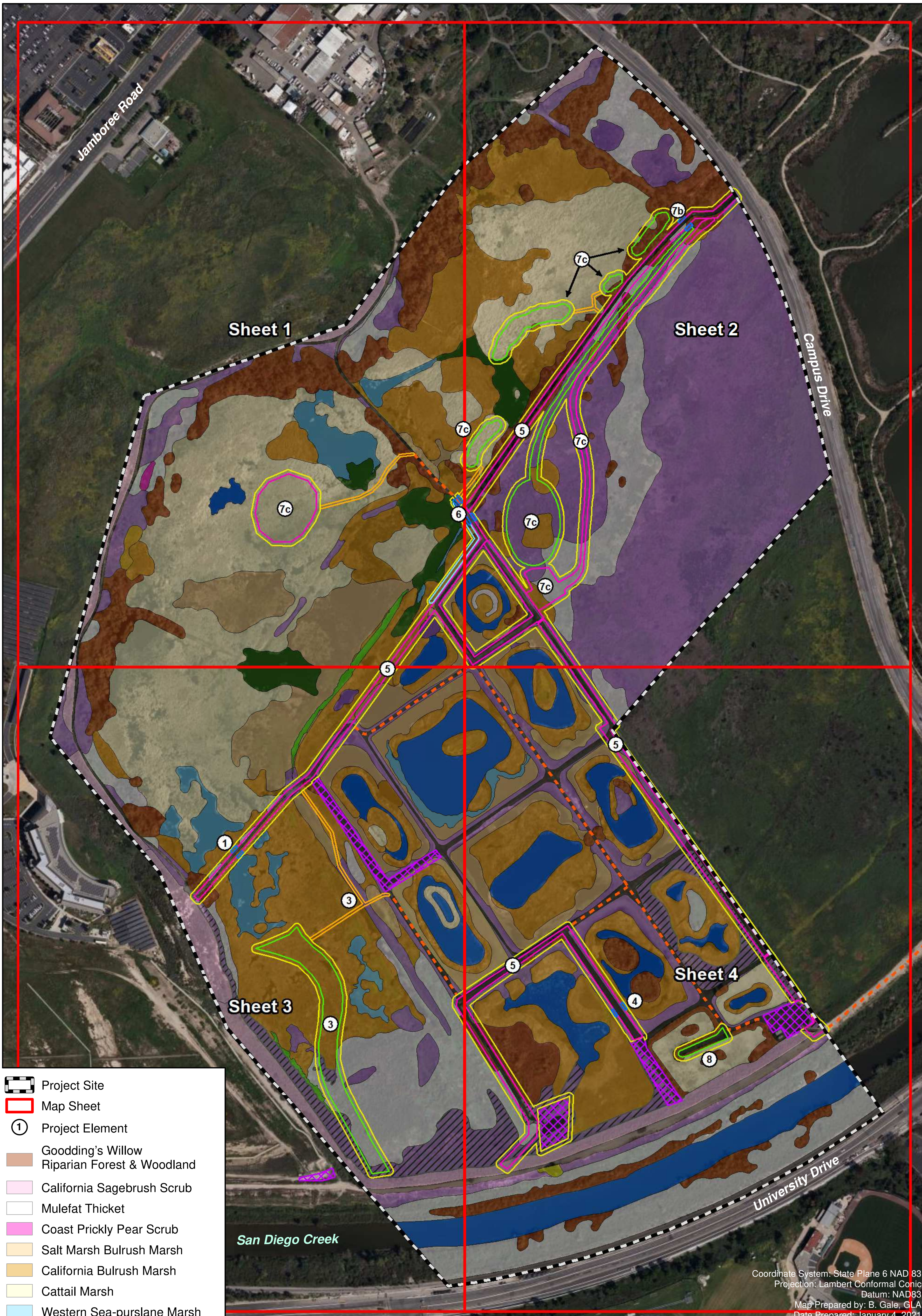

Project Site
Map Sheet
Project Element
Goodding's Willow Riparian Forest & Woodland
California Sagebrush Scrub
Mulefat Thicket
Coast Prickly Pear Scrub
Salt Marsh Bulrush Marsh
California Bulrush Marsh
Cattail Marsh
Western Sea-purslane Marsh
Swamp Pricklegrass Mats
Pickleweed Mat
Mixed Herbaceous Wetland
Mixed Herbaceous Upland
Ornamental
Open Water
Disturbed

Culvert
Pipe/Open Channel
Proposed Cut Area
Proposed Fill Area
Proposed Staging Area
Temporary Work Area
Proposed Access Route
Existing Road

Source: Glenn Lukos Associates, 2020

N

0 175 350 700
Feet

1 inch = 350 feet

U.C.
SAN JOAQUIN MARSH RESERVE

Impact Map - Key Map

GLENN LUKOS ASSOCIATES

Exhibit 13

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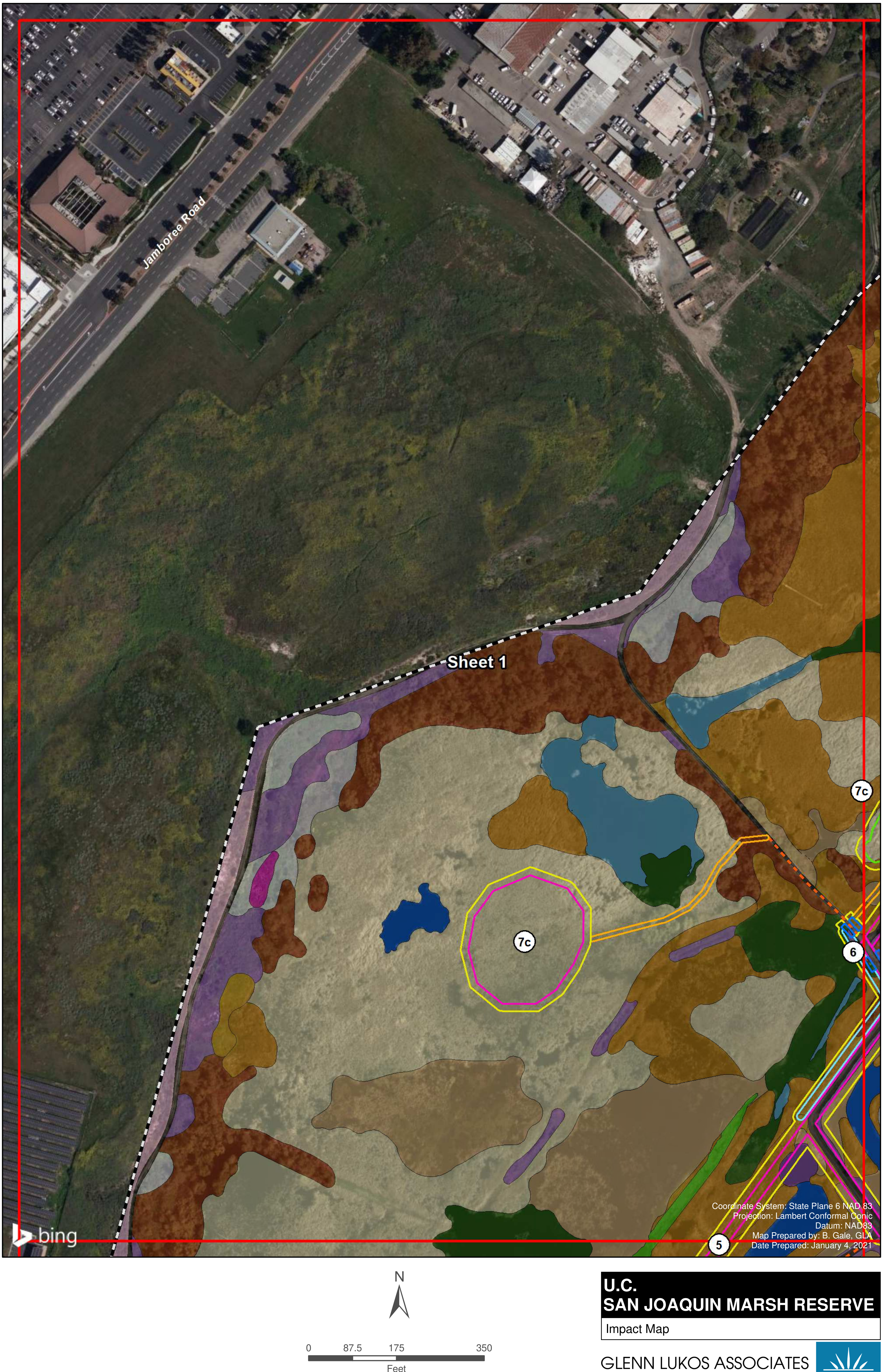

Source: Glenn Lukos Associates, 2020

1 inch = 175 feet

U.C.
SAN JOAQUIN MARSH RESERVE

Impact Map

GLENN LUKOS ASSOCIATES

Exhibit 13A

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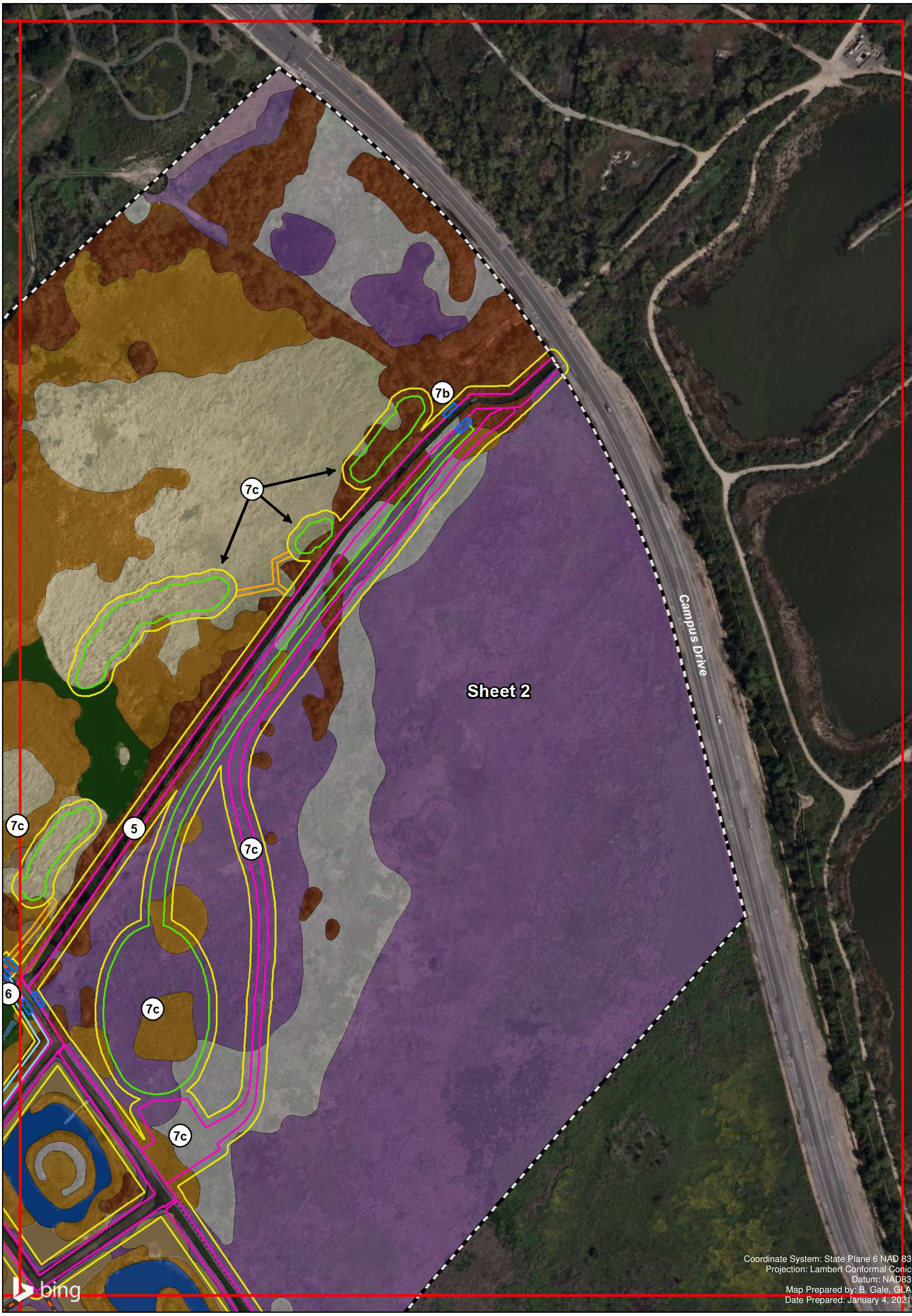


U.C. SAN JOAQUIN MARSH RESERVE

Impact Map

GLENN LUKOS ASSOCIATES

Exhibit 13B

Source: Glenn Lukos Associates, 2020

1 inch = 175 feet

X:\1100 AFTER THE REST\1505-01SJMR\1505-1_GIS\ImpactsGIS\1505-1_VegetationImpacts_MapSheets.mxd

N

0 87.5 175 350
Feet

1 inch = 175 feet

Source: Glenn Lukos Associates, 2020

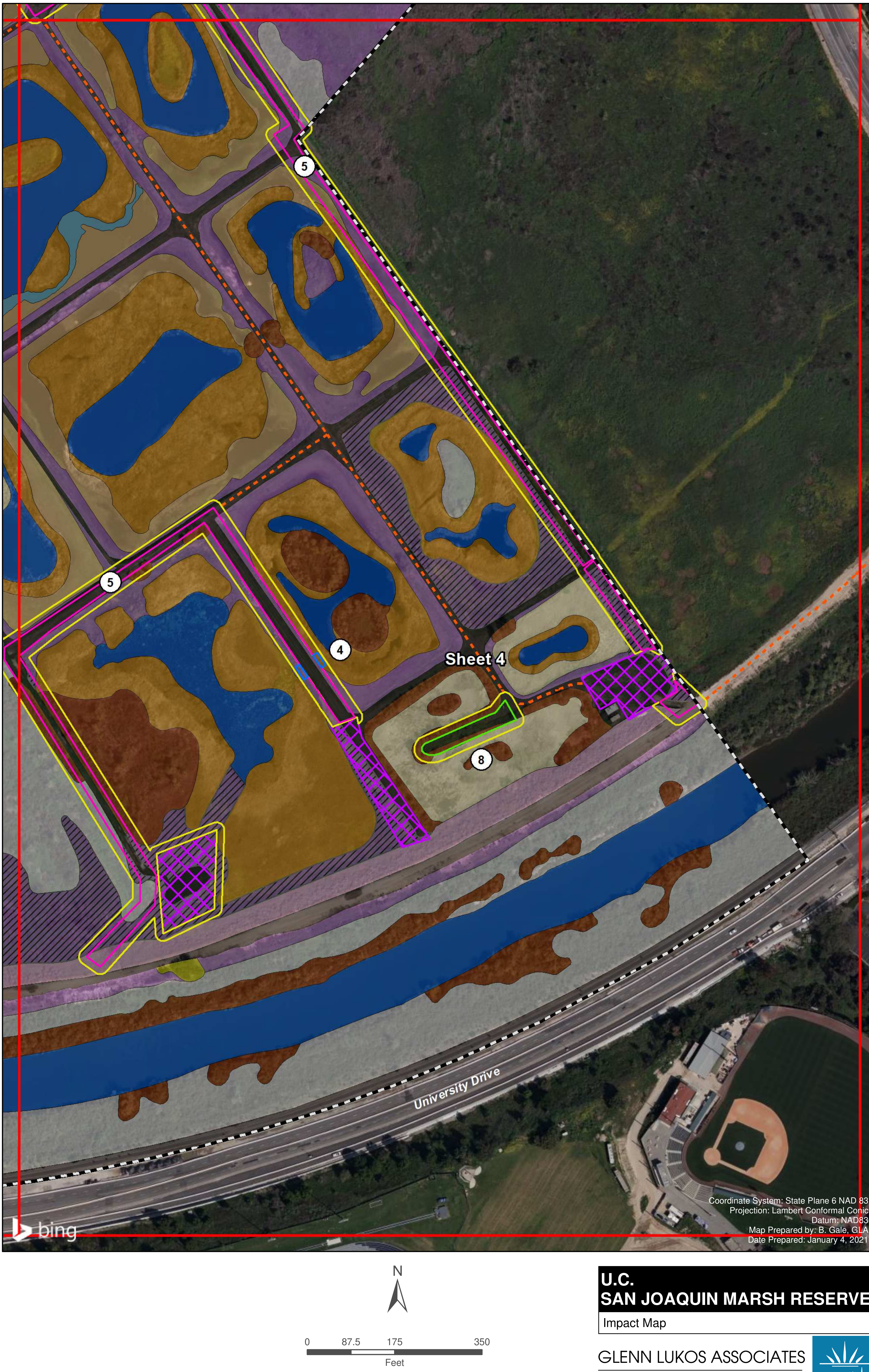
U.C.
SAN JOAQUIN MARSH RESERVE

Impact Map

GLENN LUKOS ASSOCIATES

Exhibit 13C

X:\1100 AFTER THE REST\1505-01SJMR\1505-1_GIS\ImpactsGIS\1505-1_VegetationImpacts_MapSheets.mxd



1 inch = 175 feet

U.C. SAN JOAQUIN MARSH RESERVE

Impact Map

GLENN LUKOS ASSOCIATES

Exhibit 13D

Source: Glenn Lukos Associates, 2020

X:\1100 AFTER THE REST\1505-01SJMR\1505-1_GIS\ImpactsGIS\1505-1_VegetationImpacts_MapSheets.mxd

7.0 APPENDICES

Appendix A

Mitigation Monitoring and Reporting Program

San Joaquin Marsh Reserve Water Conveyance and Drainage Improvement Project

MITIGATION MONITORING AND REPORTING PROGRAM (MMRP)

Introduction

This document is the Mitigation Monitoring and Reporting Program (MMRP) for the San Joaquin Marsh Reserve Water Conveyance and Drainage Improvement Project (SJMRWCDI or Project). This MMRP has been prepared pursuant to Section 21081.6 of the California Public Resources Code, which requires public agencies to "adopt a reporting and monitoring program for the changes made to the project or conditions of project approval, adopted in order to mitigate or avoid significant effects on the environment." A MMRP is required for the proposed Project because the Initial Study/Mitigated Negative Declaration (IS/MND) has identified mitigation measures to reduce potential impacts to less than significant.

Mitigation Monitoring and Reporting Program

As the lead agency, the University of California (UC) will be responsible for monitoring compliance with all mitigation measures. Different departments within the UC are responsible for aspects of the Project. It is expected that one or more departments will coordinate efforts to ensure compliance. The MMRP is presented in tabular form on the following pages. The components of the MMRP are described briefly below:

- **Mitigation Measure:** The mitigation measure(s) are taken from the IS/MND, in the same order that they appear in the IS/MND.

- **Method of Verification:** Identifies the potential method(s) that will be used to confirm that each mitigation measure has been implemented.

- **Timing of Verification:** Identifies at which stage of the Project the mitigation must be completed.

- **Monitoring Responsibility:** Identifies the UC as responsible for mitigation monitoring and other parties potentially needed to facilitate implementation.

- **Verification (Date and Initials):** Provides a contact who reviewed the mitigation measure and the date the measure was determined complete.

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Mitigation Monitoring and Reporting Program (MMRP)				
Mitigation/Avoidance Measure	**Method(s) of Verification**	**Timing of Verification**	**Monitoring Responsibility**	**Verification (Date/Initials) and Remarks**
Biological Resources				
BIO-1 Western Pond Turtle. To minimize the potential for western pond turtles to be harmed during construction, a biologist familiar with the ecology, behavior, and movement patterns of the pond turtle within the Marsh Reserve shall prepare and implement a Western Pond Turtle Construction Monitoring Plan (WPTCMP). The WPTCMP shall include the following components: • Goals of the WPTCMP; • Methods to be employed in pre-construction surveys including mapping requirements; • Monitoring requirements during construction for each phase of the western pond turtle lifecycle (e.g., nesting, aestivation, foraging); • Methods for removing western pond turtles from "harms way" if found during monitoring; • Description of exclusion fencing or enclosures necessary to protect western pond turtle and locations where such can be determined during WPTCMP preparation; and Reporting requirements. The WPTCMP must be reviewed and approved by the Marsh Reserve Manager 30 days prior to the start of construction to allow sufficient time for pre-construction surveys and associated mapping needed for western pond turtle protection. This measure may be modified as necessary to meet conditions of any required regulatory permits.	Biologist compliance documentation	Prior to and during construction	UCI / UCI Biologist	
BIO-2 Burrowing Owl. If proposed work would occur during the wintering season (October 1 through March 15) a biologist familiar with the ecology and behavior of burrowing owl shall survey the work area(s), with suitable wintering habitat, such as berms and areas with no vegetation or areas that have low ground cover and suitable burrows and or structures. Surveys shall be conducted out to 500 feet from planned construction within three days of the start of work and within suitable habitat. If it is determined that wintering owls are using burrows within berms or other areas to be impacted by construction, the biologist shall temporarily halt work in the immediate location of the active burrow and establish a suitable buffer around the burrow (based on field conditions) until occupied burrows are vacated. Once the project biologist determines that the owl is not using burrows within the work area or within the biologist's established suitable buffer area, work on the subject berms or other area may begin. This measure may be modified as necessary to meet conditions of any required	Biologist compliance documentation	Prior to and during construction within applicable work window	UCI / UCI Biologist	

Mitigation Monitoring and Reporting Program (MMRP)				
Mitigation/Avoidance Measure	**Method(s) of Verification**	**Timing of Verification**	**Monitoring Responsibility**	**Verification (Date/Initials) and Remarks**
regulatory permits.				
BIO-3 Nesting Birds. Vegetation clearing should be conducted outside of the nesting season (see below for species-specific seasons). • Avian species that are not state or federally listed as threatened or endangered or state fully protected but which are protected by MBTA and California Fish and Game Code Sections 3503 and 3503.5 (March 15 through September 15). • Ridgeway Rail nesting season (February 1 through September 15). • Least Bell's Vireo nesting season (March 15 through September 15). • White Tailed Kite nesting season (January 1 through June 30). • Common owls and raptors (e.g., barn owls, red-tailed hawks, Cooper's hawks, etc.,) (January 1 through June 30). If avoidance of the nesting season is not feasible, then a qualified biologist shall conduct a nesting bird survey out to 500 feet from planned construction within three days prior to any project vegetation trimming or removal, grubbing, disking, demolition activities, excavations, or grading. If active nests are identified within 300 feet for nests of MBTA protected species or species of concern (e.g. Yellow-breasted chat, Yellow Warbler) or within 500 feet for nests of ESA-listed species (e.g. Ridgeway Rail, Least Bell's Vireo, White Tailed Kite) or common owls and raptors, the biologist shall establish suitable buffers around the nests (based on species and field conditions), and the buffer areas shall be avoided until the nests are no longer occupied and the juvenile birds can survive independently from the nests. Alternatively, the biological monitor shall establish a behavioral baseline of all identified active nests and continuously monitor the nests during active construction for signs of project related behavioral changes. If behavioral changes are not observed, work may proceed. If behavioral changes are observed, work shall be halted or postponed until modifications demonstrate to the biologist's satisfaction that project-related activities are no longer causing behavioral changes. This measure may be modified as necessary to meet conditions of any required regulatory permits.	Biologist compliance documentation	Prior to and during construction within applicable work window	UCI / UCI Biologist	
BIO-4 Habitat Reestablishment and Monitoring Plan. Prior to removal of wetland vegetation, fill of herbaceous wetlands or excavation of herbaceous wetlands, UCI shall prepare, or have prepared by a restoration specialist, a Habitat Reestablishment and Monitoring Plan (HRMP) that details the restoration requirements for each of these sensitive habitats that will be impacted during a project phase. The HRMP shall include the following components:	Biologist compliance documentation	Prior to and after construction activity within	UCI / UCI Biologist	

Mitigation Monitoring and Reporting Program (MMRP)				
Mitigation/Avoidance Measure	**Method(s) of Verification**	**Timing of Verification**	**Monitoring Responsibility**	**Verification (Date/Initials) and Remarks**
1. Map(s) identifying areas where reestablishment of Goodding's black willow forest, Mulefat thickets, California bulrush marsh, cattail marsh, mixed herbaceous wetland, saltmarsh bulrush, and swamp pricklegrass mats would occur. Note: a. swamp pricklegrass is non-native and would be replaced with western sea-purslane; b. suitable least Bell's vireo/white tailed kite habitat disturbed during construction shall be replaced at a minimum 1:1 ratio within the immediate area or other nearby suitable location; c. passive reestablishment may be included in the HRMP, where the HRMP can demonstrate that such passive reestablishment will result in no net loss of wetlands and riparian habitat; 2. Plant palettes and type of plant materials, including use of seed, container stock, cuttings, regrowth by trees cut but not fully removed or salvaged materials such as bulrush and cattails from excavation areas; 3. Methods for monitoring success of reestablishment areas; 4. Performance standards and adaptive management strategies; and 5. Reporting requirements. Reestablishment shall begin following construction of the Element completed. This measure may be modified as necessary to meet conditions of any required regulatory permits.		specified habitat		
BIO-5 Ridgeway rail. To minimize the potential for Ridgeway rails being harmed during construction activities, a biologist shall survey the proposed work area for rails within three days of the start of vegetation removal or ground disturbance. Once it is determined that there are no Ridgeway rails within the work area, exclusion fencing consisting of silt fence or similar material may be installed to deter rails from entering the work area. The need for exclusionary fencing and the precise locations of fencing shall be determined by the biologist based on field conditions (e.g. proximity to Ridgeway rail or dense vegetation; density of vegetation within the work area and ground visibility; intensity of proposed equipment). This measure may be modified as necessary to meet conditions of any required regulatory permits.	Biologist compliance documentation	Prior to and during construction within applicable work window	UCI / UCI Biologist	
BIO-6 Western Red Bat and Western Yellow Bat. If work is to be conducted within areas of Goodding's black willow forest during the maternity roost season (March through August), a biologist shall conduct weekly bat surveys for western red bat and western yellow bat	Biologist compliance documentation	Prior to and during construction	UCI / UCI Biologist	

Mitigation Monitoring and Reporting Program (MMRP)				
Mitigation/Avoidance Measure	**Method(s) of Verification**	**Timing of Verification**	**Monitoring Responsibility**	**Verification (Date/Initials) and Remarks**
beginning 30 days prior to start of work. If a maternity roost site is detected, the active roost tree shall not be removed until roosting has been completed and the pups are no longer dependent on the roost site as determined by the biologist. This measure may be modified as necessary to meet conditions of any required regulatory permits.		within applicable work window		
Cultural Resources				
CUL-1 In the event of an unanticipated archeological discovery, all work must be suspended within 50 feet of the find until a qualified archaeologist evaluates the discovery and recommends continuation of work.	UCI documentation only in event of discovery	During construction	UCI / Contractor	
CUL-2 In the unlikely event that human remains are encountered during project development, all work must cease near the find immediately. In accordance with California Health and Safety Code Section 7050.5, the County Coroner must be notified if potentially human bone is discovered. The Coroner will then determine within two working days of being notified if the remains are subject to his or her authority. If the Coroner recognizes the remains to be Native American, he or she shall contact the Native American Heritage Commission (NAHC) by phone within 24 hours, in accordance with Public Resources Code Section 5097.98. The NAHC will then designate a Most Likely Descendant (MLD) with respect to the human remains. The MLD then has the opportunity to recommend to the property owner or the person responsible for the excavation work means for treating or disposing, with appropriate dignity, the human remains and associated grave goods. Work may not resume in the vicinity of the find until all requirements of the health and safety code have been met.	UCI documentation only in event of discovery	During construction	UCI / Contractor	
Geology and Soils				
GEO-1 In the event of an unanticipated paleontological discovery, all work must be suspended within 50 feet of the find until a qualified paleontologist evaluates the discovery and recommends continuation of work.	UCI documentation only in event of discovery	During construction	UCI / Contractor	
Noise				
NOI-1 Prior to initiating on-site construction for consistency with LRDP plans and policies, UCI shall approve contractor specifications that include measures to reduce construction noise. These measures shall include, but may not be limited to, the following: 1. Noise-generating construction activities occurring Monday through Friday shall be	Contractor Agreement/Specifications and Contractor	During construction	UCI / Contractor	

Mitigation Monitoring and Reporting Program (MMRP)				
Mitigation/Avoidance Measure	**Method(s) of Verification**	**Timing of Verification**	**Monitoring Responsibility**	**Verification (Date/Initials) and Remarks**
limited to the hours of 7:00 am to 7:00 pm, except during summer, winter, or spring break at which construction may occur at the times approved by UCI. 2. Noise-generating construction activities occurring on weekends in the vicinity of (can be heard from) off-campus land uses shall be limited to the hours of 9:00 am to 6:00 pm on Saturdays, with no construction occurring on Sundays or holidays. 3. Noise-generating construction activities occurring on weekends in the vicinity of (can be heard from) on-campus residential housing shall be limited to the hours of 9:00 am to 6:00 pm on Saturdays, with no construction on Sundays or holidays. However, as determined by UCI, if on-campus residential housing is unoccupied (during summer, winter, or spring break, for example), or would otherwise be unaffected by construction noise, construction may occur at any time. 4. Construction equipment shall be properly outfitted and maintained with manufacturer recommended noise-reduction devices to minimize construction-generated noise. 5. Stationary construction noise sources such as generators, pumps or compressors shall be located at least 100 feet from noise-sensitive land uses (i.e., campus housing, classrooms, libraries, and clinical facilities), as feasible. 6. Laydown and construction vehicle staging areas shall be located at least 100 feet from noise-sensitive land uses (i.e., campus housing, classrooms, libraries, and clinical facilities), as feasible. 7. All neighboring land uses that would be subject to construction noise shall be informed at least two weeks prior to the start of construction, except in an emergency situation.	work log			
Tribal Cultural Resources				
TCR-1 If subsurface deposits believed to be cultural or human in origin, or tribal cultural resources, are discovered during construction all work shall halt within a *50*-foot radius of the discovery, the Construction Manager shall immediately notify UCI Physical and Environmental Planning and Facilities Management. The Construction Manager shall also immediately coordinate with the tribal monitor and an archaeologist meeting the Secretary of the Interior's Professional Qualification Standards for archaeology and subject to approval by UCI to evaluate the significance of the find and develop appropriate management recommendations. All management recommendations shall be provided to UCI in writing for UCI's review and approval. If recommended by the qualified professional and consulting tribes, and approved by UCI, this may include modification of the no-work radius.	Monitoring Agreement and monitoring log	Prior to and during clearing, grading, or excavation in areas within native soils	UCI / Contractor	

Mitigation Monitoring and Reporting Program (MMRP)				
Mitigation/Avoidance Measure	**Method(s) of Verification**	**Timing of Verification**	**Monitoring Responsibility**	**Verification (Date/Initials) and Remarks**
The professional archaeologist and tribal monitor must make a determination, based on professional judgement and supported by substantial evidence, within one business day of being notified, as to whether or not the find represents a cultural resource or has the potential to be a tribal cultural resource. The subsequent actions will be determined by the type of discovery, as described below. These include: 1) a work pause that, upon further investigation, is not actually a discovery and the work pause was simply needed in order to allow for closer examination of soil (a "false alarm"); 2) a work pause and subsequent action for discoveries that are clearly not related to tribal cultural resources, such as can and bottle dumps, artifacts of European origin, and remnants of built environment features; and 3) a work pause and subsequent action for discoveries that are likely related to tribal cultural resources, such as midden soil, bedrock mortars, groundstone, or other similar expressions. Whenever there is question as to whether or not the discovery represents a tribal resource, culturally affiliated tribes shall be consulted in making the determination. The following processes shall apply, depending on the nature of the find, subject to the review and approval of UCI: 1. Response to False Alarms: If the professional archaeologist in consultation with the tribal monitor(s) determines that the find is negative for any cultural indicators, then work may resume immediately upon notice to proceed from UCI's representative. No further notifications or tribal consultation is necessary, because the discovery is not a cultural resource of any kind. The professional archaeologist shall provide written documentation of this finding to UCI. 2. Response to Non-Tribal Discoveries: If at the time of discovery a professional archaeologist and tribal monitor determines that the find represents a non-tribal cultural resource from any time period or cultural affiliation, UCI shall be notified immediately, to consult on a finding of eligibility and implementation of appropriate treatment measures. 3. Response to Tribal Discoveries: If the find represents a tribal or potentially tribal cultural resource that does not include human remains, the [tribe(s)] and UCI shall be notified. UCI will consult with the tribe on a finding of eligibility and implement appropriate treatment measures, if the find is determined to be either a Historical Resource under				

Mitigation Monitoring and Reporting Program (MMRP)				
Mitigation/Avoidance Measure	**Method(s) of Verification**	**Timing of Verification**	**Monitoring Responsibility**	**Verification (Date/Initials) and Remarks**
CEQA, as defined in Section 15064.5(a) of the CEQA Guidelines, or a Tribal Cultural Resource, as defined in Section 21074 of the Public Resources Code. Preservation in place is the preferred treatment, if feasible. Work shall not resume within a 50-foot radius until UCI, through consultation as appropriate, determines that the site either: 1) is not a Historical Resource under CEQA, as defined in Section 15064.5(a) of the CEQA Guidelines; or 2) not a Tribal Cultural Resource, as defined in Section 21074 of the Public Resources Code; or 3) that the treatment measures have been completed to its satisfaction. 4. Response to Human Remains: If the find includes human remains, or remains that are potentially human, the construction supervisor or on-site archaeologist shall ensure reasonable protection measures are taken to protect the discovery from disturbance (AB 2641) and shall notify UCI and the Orange County Coroner (per § 7050.5 of the Health and Safety Code). The provisions of § 7050.5 of the California Health and Safety Code, § 5097.98 of the California Public Resources Code, and Assembly Bill 2641 shall be implemented. If the Coroner determines the remains are Native American and not the result of a crime scene, the Coroner will notify the Native American Heritage Commission (NAHC), which then will designate a Native American Most Likely Descendant (MLD) for the Project (§ 5097.98 of the Public Resources Code). The designated MLD will have 48 hours from the time access to the property is granted to make recommendations concerning treatment of the remains. Public Resources Code § 5097.94 provides structure for mediation through the NAHC if necessary. If no agreement is reached, UCI shall rebury the remains in a respectful manner where they will not be further disturbed (§ 5097.98 of the Public Resources Code). This will also include either recording the site with the NAHC or the appropriate Information Center; using an open space or conservation zoning designation or easement; or recording a reinternment document with the Orange County Clerk's Office (AB 2641). Work shall not resume within the no-work radius until UCI, through consultation as appropriate, determines that the treatment measures have been completed to its satisfaction.				

Appendix B
Air Quality and GHG Emissions Calculation Sheets

SJMRCDI

Orange County, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
User Defined Educational	0.00	User Defined Unit	200.00	0.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	30
Climate Zone	8			**Operational Year**	2022

Utility Company

CO2 Intensity (lb/MWhr)	0	**CH4 Intensity (lb/MWhr)**	0	**N2O Intensity (lb/MWhr)**	0

1.3 User Entered Comments & Non-Default Data

Project Characteristics - No change in use or development intensity is proposed. Project site would continue to function as a preservation area.

Land Use - The Project site is a preservation area used for educational purposes associated with UCI. No habitable structures (e.g. institutional, commercial, residential) exisitng or proposed.

Construction Phase - Only site preparation and grading apply as well as minor demolition efforts associated with removal of exisitng damaged water conveyance structures. Assumes 2 phases at 10 acres each for grading days (30) and site preparation days (10). Based on Table 3.1 Phase Length, CalEEMod Appendix D Default Data Tables for site < or = 10 Acres.

Off-road Equipment - Changes in Off-road equipment defaults are based on the Project Description and anticipated equipment use for the most intensive period of construction. Note, Table 3.2 CalEEMod Appendix D assumes only up to 7 pieces of equipment for site preparation and grading of a site < or = 10 acres. This analysis assumes up to 14 pieces of equipment for conservative analysis.

Grading - The entire preservation area is approximately 200 acres. The restoration work requires approximately 10 acres of daily working area per each Design Feature phase. Construciton of Design Feature 1 Elements would require approximately 3,200 cy of cut/fill balanced onsite. Construciton of Design Feature 2 Elements would require approximately 13,800 cy of cut/fill balanced onsite per the Project engineer. The higher amount of 13,800 cy was used for this analysis.

Demolition - Minor amount of debris anticipated for removal of existing damaged culvert structures.

Trips and VMT - All grading earthwork is balanced onsite. Assumes one (1) mile distance along onsite access roads from one side of the property to the other for hauling trips. Building construction, paving and architectural coatings are not applicable to the Project.
Vehicle Trips - No change in operations. Project site would continue to function as a preservation area.

Vehicle Emission Factors - No change in operations. Project site would continue to function as a preservation area.

Vehicle Emission Factors - No change in operations. Project site would continue to function as a preservation area.

Vehicle Emission Factors - No change in operations. Project site would continue to function as a preservation area.

Road Dust - No change in operations. Project site would continue to function as a preservation area.

Woodstoves - No change in operations. Project site would continue to function as a preservation area.

Consumer Products - No change in operations. Project site would continue to function as a preservation area.

Area Coating - No change in operations. Project site would continue to function as a preservation area.

Landscape Equipment - No change in operations. Project site would continue to function as a preservation area.

Energy Use - No change in operations. Project site would continue to function as a preservation area.

Water And Wastewater - No change in operations. Project site would continue to function as a preservation area.

Solid Waste - No change in operations. Project site would continue to function as a preservation area.

Operational Off-Road Equipment - No change in operations. Project site would continue to function as a preservation area.

Stationary Sources - Emergency Generators and Fire Pumps - No change in operations. Project site would continue to function as a preservation area.

Stationary Sources - Emergency Generators and Fire Pumps EF - No change in operations. Project site would continue to function as a preservation area.

Stationary Sources - Process Boilers - No change in operations. Project site would continue to function as a preservation area.

Stationary Sources - Process Boilers EF - No change in operations. Project site would continue to function as a preservation area.

Stationary Sources - User Defined - No change in operations. Project site would continue to function as a preservation area.

Land Use Change - No change in operations. Project site would continue to function as a preservation area.

Sequestration - No change in operations. Project site would continue to function as a preservation area.

On-road Fugitive Dust - All earthwork is balanced onsite. Grading hauling will be along interior unpaved access roads. Assumes 40 ton truck (full) and 20 ton truck (empty) for 30 ton average. Assumes 7.1 mph vehicle speed consistent with Dust from Material Movement default assumptons.

Off-road Equipment - Building construction is not applicable to the Project

Off-road Equipment -

Off-road Equipment -

Off-road Equipment - Paving is not applicable to the Project.

Off-road Equipment - Architectural coating is not applicable to the Project.

Architectural Coating - Not applicable to the Project.

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	220.00	0.00
tblConstructionPhase	NumDays	3,100.00	0.00
tblConstructionPhase	NumDays	200.00	5.00
tblConstructionPhase	NumDays	310.00	30.00
tblConstructionPhase	NumDays	220.00	0.00
tblConstructionPhase	NumDays	120.00	10.00
tblConstructionPhase	PhaseEndDate	2/20/2037	4/30/2021
tblConstructionPhase	PhaseEndDate	6/15/2035	4/30/2021
tblConstructionPhase	PhaseEndDate	12/3/2021	3/5/2021
tblConstructionPhase	PhaseEndDate	7/28/2023	4/30/2021
tblConstructionPhase	PhaseEndDate	4/18/2036	4/30/2021
tblConstructionPhase	PhaseEndDate	5/20/2022	3/19/2021
tblConstructionPhase	PhaseStartDate	4/19/2036	5/1/2021
tblConstructionPhase	PhaseStartDate	7/29/2023	5/1/2021
tblConstructionPhase	PhaseStartDate	5/21/2022	3/20/2021
tblConstructionPhase	PhaseStartDate	6/16/2035	5/1/2021
tblConstructionPhase	PhaseStartDate	12/4/2021	3/6/2021
tblGrading	AcresOfGrading	15.00	10.00
tblGrading	AcresOfGrading	0.00	10.00
tblGrading	MaterialExported	0.00	13,800.00
tblGrading	MaterialImported	0.00	13,800.00
tblLandUse	LotAcreage	0.00	200.00
tblOffRoadEquipment	OffRoadEquipmentType		Off-Highway Trucks
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00

tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	3.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	5.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOnRoadDust	AverageVehicleWeight	2.40	30.00
tblOnRoadDust	HaulingPercentPave	100.00	0.00
tblOnRoadDust	MeanVehicleSpeed	40.00	7.10
tblTripsAndVMT	HaulingTripLength	20.00	1.00
tblVehicleTrips	CC_TL	8.40	0.00
tblVehicleTrips	CNW_TL	6.90	0.00
tblVehicleTrips	CW_TL	16.60	0.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2021	5.3584	53.6782	42.9895	0.1136	40.6296	2.0458	42.6626	10.0986	1.8821	11.9807	0.0000	11,103.5820	11,103.5820	3.3735	0.0000	11,187.9196
Maximum	**5.3584**	**53.6782**	**42.9895**	**0.1136**	**40.6296**	**2.0458**	**42.6626**	**10.0986**	**1.8821**	**11.9807**	**0.0000**	**11,103.5820**	**11,103.5820**	**3.3735**	**0.0000**	**11,187.9196**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2021	5.3584	53.6782	42.9895	0.1136	40.6296	2.0458	42.6626	10.0986	1.8821	11.9807	0.0000	11,103.5820	11,103.5820	3.3735	0.0000	11,187.9196
Maximum	**5.3584**	**53.6782**	**42.9895**	**0.1136**	**40.6296**	**2.0458**	**42.6626**	**10.0986**	**1.8821**	**11.9807**	**0.0000**	**11,103.5820**	**11,103.5820**	**3.3735**	**0.0000**	**11,187.9196**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	3/1/2021	3/5/2021	5	5	
2	Site Preparation	Site Preparation	3/6/2021	3/19/2021	5	10	
3	Grading	Grading	3/20/2021	4/30/2021	5	30	
4	Building Construction	Building Construction	5/1/2021	4/30/2021	5	0	
5	Paving	Paving	5/1/2021	4/30/2021	5	0	
6	Architectural Coating	Architectural Coating	5/1/2021	4/30/2021	5	0	

Acres of Grading (Site Preparation Phase): 10

Acres of Grading (Grading Phase): 10

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Architectural Coating	Air Compressors	0	6.00	78	0.48
Demolition	Excavators	3	8.00	158	0.38
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Grading	Excavators	3	8.00	158	0.38
Building Construction	Cranes	0	7.00	231	0.29
Building Construction	Forklifts	0	8.00	89	0.20
Building Construction	Generator Sets	0	8.00	84	0.74
Paving	Pavers	0	8.00	130	0.42
Paving	Rollers	0	8.00	80	0.38
Demolition	Rubber Tired Dozers	2	8.00	247	0.40
Grading	Rubber Tired Dozers	0	8.00	247	0.40
Building Construction	Tractors/Loaders/Backhoes	0	7.00	97	0.37
Grading	Graders	1	8.00	187	0.41
Grading	Tractors/Loaders/Backhoes	5	8.00	97	0.37
Paving	Paving Equipment	0	8.00	132	0.36
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Site Preparation	Rubber Tired Dozers	3	8.00	247	0.40
Grading	Scrapers	0	8.00	367	0.48
Building Construction	Welders	0	8.00	46	0.45
Grading	Off-Highway Trucks	5	8.00	402	0.38

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	6	15.00	0.00	2.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	7	18.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Grading	14	35.00	0.00	1,725.00	14.70	6.90	1.00	LD_Mix	HDT_Mix	HHDT
Building Construction	0	0.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Paving	0	0.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	0	0.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Demolition - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0856	0.0000	0.0856	0.0130	0.0000	0.0130			0.0000			0.0000
Off-Road	3.1651	31.4407	21.5650	0.0388		1.5513	1.5513		1.4411	1.4411		3,747.944 9	3,747.944 9	1.0549		3,774.317 4
Total	**3.1651**	**31.4407**	**21.5650**	**0.0388**	**0.0856**	**1.5513**	**1.6369**	**0.0130**	**1.4411**	**1.4541**		**3,747.944 9**	**3,747.944 9**	**1.0549**		**3,774.317 4**

3.2 Demolition - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	2.9500e-003	0.1029	0.0293	3.0000e-004	6.9600e-003	3.3000e-004	7.2900e-003	1.9100e-003	3.1000e-004	2.2200e-003		33.1940	33.1940	3.5700e-003		33.2833
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0613	0.0360	0.4204	1.5000e-003	0.1677	1.0900e-003	0.1688	0.0445	1.0000e-003	0.0455		149.3748	149.3748	3.2000e-003		149.4548
Total	**0.0643**	**0.1389**	**0.4497**	**1.8000e-003**	**0.1746**	**1.4200e-003**	**0.1760**	**0.0464**	**1.3100e-003**	**0.0477**		**182.5688**	**182.5688**	**6.7700e-003**		**182.7381**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0856	0.0000	0.0856	0.0130	0.0000	0.0130			0.0000			0.0000
Off-Road	3.1651	31.4407	21.5650	0.0388		1.5513	1.5513		1.4411	1.4411	0.0000	3,747.9449	3,747.9449	1.0549		3,774.3174
Total	**3.1651**	**31.4407**	**21.5650**	**0.0388**	**0.0856**	**1.5513**	**1.6369**	**0.0130**	**1.4411**	**1.4541**	**0.0000**	**3,747.9449**	**3,747.9449**	**1.0549**		**3,774.3174**

3.2 Demolition - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	2.9500e-003	0.1029	0.0293	3.0000e-004	6.9600e-003	3.3000e-004	7.2900e-003	1.9100e-003	3.1000e-004	2.2200e-003		33.1940	33.1940	3.5700e-003		33.2833
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0613	0.0360	0.4204	1.5000e-003	0.1677	1.0900e-003	0.1688	0.0445	1.0000e-003	0.0455		149.3748	149.3748	3.2000e-003		149.4548
Total	**0.0643**	**0.1389**	**0.4497**	**1.8000e-003**	**0.1746**	**1.4200e-003**	**0.1760**	**0.0464**	**1.3100e-003**	**0.0477**		**182.5688**	**182.5688**	**6.7700e-003**		**182.7381**

3.3 Site Preparation - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					19.1268	0.0000	19.1268	10.0452	0.0000	10.0452			0.0000			0.0000
Off-Road	3.8882	40.4971	21.1543	0.0380		2.0445	2.0445		1.8809	1.8809		3,685.6569	3,685.6569	1.1920		3,715.4573
Total	**3.8882**	**40.4971**	**21.1543**	**0.0380**	**19.1268**	**2.0445**	**21.1712**	**10.0452**	**1.8809**	**11.9261**		**3,685.6569**	**3,685.6569**	**1.1920**		**3,715.4573**

3.3 Site Preparation - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0736	0.0432	0.5045	1.8000e-003	0.2012	1.3000e-003	0.2025	0.0534	1.2000e-003	0.0546		179.2498	179.2498	3.8400e-003		179.3458
Total	**0.0736**	**0.0432**	**0.5045**	**1.8000e-003**	**0.2012**	**1.3000e-003**	**0.2025**	**0.0534**	**1.2000e-003**	**0.0546**		**179.2498**	**179.2498**	**3.8400e-003**		**179.3458**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					19.1268	0.0000	19.1268	10.0452	0.0000	10.0452			0.0000			0.0000
Off-Road	3.8882	40.4971	21.1543	0.0380		2.0445	2.0445		1.8809	1.8809	0.0000	3,685.6569	3,685.6569	1.1920		3,715.4573
Total	**3.8882**	**40.4971**	**21.1543**	**0.0380**	**19.1268**	**2.0445**	**21.1712**	**10.0452**	**1.8809**	**11.9261**	**0.0000**	**3,685.6569**	**3,685.6569**	**1.1920**		**3,715.4573**

3.3 Site Preparation - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category						lb/day								lb/day		
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0736	0.0432	0.5045	1.8000e-003	0.2012	1.3000e-003	0.2025	0.0534	1.2000e-003	0.0546		179.2498	179.2498	3.8400e-003		179.3458
Total	**0.0736**	**0.0432**	**0.5045**	**1.8000e-003**	**0.2012**	**1.3000e-003**	**0.2025**	**0.0534**	**1.2000e-003**	**0.0546**		**179.2498**	**179.2498**	**3.8400e-003**		**179.3458**

3.4 Grading - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category						lb/day								lb/day		
Fugitive Dust					0.4575	0.0000	0.4575	0.0539	0.0000	0.0539			0.0000			0.0000
Off-Road	5.1064	48.1806	40.9056	0.1037		2.0252	2.0252		1.8632	1.8632		10,039.3754	10,039.3754	3.2469		10,120.5488
Total	**5.1064**	**48.1806**	**40.9056**	**0.1037**	**0.4575**	**2.0252**	**2.4827**	**0.0539**	**1.8632**	**1.9171**		**10,039.3754**	**10,039.3754**	**3.2469**		**10,120.5488**

3.4 Grading - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.1090	5.4136	1.1030	6.4200e-003	35.6492	5.2900e-003	35.6545	3.5504	5.0600e-003	3.5555		715.6654	715.6654	0.1191		718.6430
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1430	0.0840	0.9809	3.4900e-003	4.5228	2.5300e-003	4.5253	1.1179	2.3300e-003	1.1202		348.5413	348.5413	7.4600e-003		348.7279
Total	**0.2520**	**5.4976**	**2.0839**	**9.9100e-003**	**40.1720**	**7.8200e-003**	**40.1798**	**4.6683**	**7.3900e-003**	**4.6757**		**1,064.2067**	**1,064.2067**	**0.1266**		**1,067.3708**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.4575	0.0000	0.4575	0.0539	0.0000	0.0539			0.0000			0.0000
Off-Road	5.1064	48.1806	40.9056	0.1037		2.0252	2.0252		1.8632	1.8632	0.0000	10,039.3754	10,039.3754	3.2469		10,120.5488
Total	**5.1064**	**48.1806**	**40.9056**	**0.1037**	**0.4575**	**2.0252**	**2.4827**	**0.0539**	**1.8632**	**1.9171**	**0.0000**	**10,039.3754**	**10,039.3754**	**3.2469**		**10,120.5488**

3.4 Grading - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.1090	5.4136	1.1030	6.4200e-003	35.6492	5.2900e-003	35.6545	3.5504	5.0600e-003	3.5555		715.6654	715.6654	0.1191		718.6430
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1430	0.0840	0.9809	3.4900e-003	4.5228	2.5300e-003	4.5253	1.1179	2.3300e-003	1.1202		348.5413	348.5413	7.4600e-003		348.7279
Total	**0.2520**	**5.4976**	**2.0839**	**9.9100e-003**	**40.1720**	**7.8200e-003**	**40.1798**	**4.6683**	**7.3900e-003**	**4.6757**		**1,064.2067**	**1,064.2067**	**0.1266**		**1,067.3708**

3.5 Building Construction - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

3.5 Building Construction - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

3.5 Building Construction - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

3.6 Paving - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Paving	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

3.6 Paving - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Paving	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

3.6 Paving - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

3.7 Architectural Coating - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

3.7 Architectural Coating - 2021

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

3.7 Architectural Coating - 2021

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	lb/day										lb/day					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
User Defined Educational	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
User Defined Educational	0.00	0.00	0.00	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
User Defined Educational	0.561378	0.043284	0.209473	0.111826	0.015545	0.005795	0.025829	0.017125	0.001747	0.001542	0.004926	0.000594	0.000934

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
User Defined Educational	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
User Defined Educational	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000		0.0000

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

SJMRCDI Appendix B. GHG Emissions Calculation Sheets

Project GHG Emissions	
Peak Daily Project Construction CO2e Emissions in lbs./day [1]	**11188**
Peak Daily Project Construction CH4 Emissions in lbs./day [1]	3.4
Peak Daily Project Construction N2O Emissions in lbs./day [1]	0
Peak Daily Project Construction CO2 Emissions in lbs./day [1]	11104
Number of Peak Days [2]	90
Total lbs. CO2e [3]	**1006912**
Total lbs. CH4	306
Total lbs. N2O	0
Total lbs. CO2	999360
Total mt (lbs.*0.000453592) CO2e [3]	**457**
Total mt CH4	0.14
Total mt N2O	0
Total mt CO2	453
Total mt CO2e amortized over 30 years	**15**

Source Data:

[1] Based on Project's peak daily construction emissions without mitigation, CalEEMod.

[2] Table 3.1 Phase Length, CalEEMod Appendix D Default Data Tables for site < or = 10 Acres.
Assumes 2 phases at 10 acres each for grading days (30) and site preparation days (10).
An additional 10 days added for minor demolition activities associated with removal of damaged culvert facilities.

[3] CO2 totals are not additive based on CalEEMod results.

Appendix C
Biological Technical Report and Jurisdictional Delineation

DRAFT
BIOLOGICAL TECHNICAL REPORT

FOR

CALIFORNIA NATURAL RESERVE SYSTEM
SAN JOAQUIN FRESHWATER MARSH
LOCATED IN THE CITY OF IRVINE
ORANGE, CALIFORNIA

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Report Preparer: Tony Bomkamp

March 2021

INFORMATION SUMMARY

A.	**Report Date:**	**March 2021**
B.	**Report Title:**	**Biological Technical Report** **California Natural Reserve System, San Joaquin Freshwater Marsh**
C.	**Project Site Location:**	**University of California Irvine**
D.	**Owner/Applicant:**	**University of California Natural Reserve System** **Contact: Drs Megan Lulow and Peter Bowler** **UCI Nature, Steinhaus Hall Room 322** **University of California, Irvine** **Irvine, California 92697-2525**
E.	**Principal Investigator:**	**Glenn Lukos Associates, Inc.** **1940 East Deere Avenue, Suite 250** **Santa Ana, California 92705** **Phone: (949) 340-7333** **Report Preparer: Tony Bomkamp**
F.	**Individuals Conducting Fieldwork:**	**Tony Bomkamp** **Chris Waterston** **Jillian Stephens**

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TABLES

EXHIBITS

APPENDICES

1.0 INTRODUCTION

1.1 Background and Scope of Work

This document provides the results of general biological surveys and focused biological surveys for the approximately 199-acre The University of California (UC) Natural Reserve System (NRS) San Joaquin Marsh Reserve (SJMR or Marsh Reserve). This report identifies and evaluates impacts to biological resources associated with the proposed San Joaquin Marsh Water Conveyance and Drainage Improvement Project ("SJMRCDI" or "Project"), which includes Design Goal 1 and Design Goal 2 in the context of the California Environmental Quality Act (CEQA), and State and Federal regulations such as the Endangered Species Act (ESA), Clean Water Act (CWA), and the California Fish and Game Code.

The scope of this report includes a discussion of existing conditions for the approximately 202-acre site, all methods employed regarding the general biological surveys and focused biological surveys, the documentation of botanical and wildlife resources identified (including special-status species), and an analysis of potential impacts to biological resources. Methods of the study include a review of relevant literature, field surveys, and a Geographical Information System (GIS)-based analysis of vegetation communities and wetlands. As appropriate, this report is consistent with accepted scientific and technical standards and survey guideline requirements issued by the U.S. Fish and Wildlife Service (USFWS), the California Department of Fish and Wildlife (CDFW), the California Native Plant Society (CNPS), and other applicable agencies/organizations.

The field study focused on a number of primary objectives that would comply with CEQA requirements, including (1) general reconnaissance survey and vegetation mapping; (2) general biological surveys; (3) habitat assessments for special-status plant species; (4) habitat assessments for special-status wildlife species, and (5) delineation of wetlands including those with special-status alliances. Observations of all plant and wildlife species were recorded during the general biological surveys and previous surveys discussed below and are included as Appendix A: Floral Compendium and Appendix B: Faunal Compendium.

1.2 Project Location

The SJMR site comprises approximately 199 acres in the City of Irvine, California [Exhibit 1 – Regional Map] and is located within an un-sectioned area of Township T6S, Range R9W, of the U.S. Geological Survey (USGS) 7.5" quadrangle map Tustin (dated 1965 and photo-revised in 1981) [Exhibit 2 – Vicinity Map]. The Project site is bordered by Campus Drive on the East, Jamboree Road on the west, San Diego Creek on the south and Fairchild Road on the west. Exhibit 3 is an Aerial Photograph depicting the SJMR boundaries and designations of management areas within the SJMR.

1.3 Project Description

The purpose of this Biological Technical Report is to identify the extent of special status biological resources subject to potential impacts associated with the Project that includes Design

Goal 1 and Design Goal 2 that would implement hydraulic enhancement efforts for the SJMR. The proposed Project activities are intended to improve long-term water management and enhance habitat values within the SJMR. Temporary construction activities include excavation associated with the installation of structures for conveying water, creating wetland habitat, raising berms/dirt roads to increase capacity and control of passive drainage, and the installation of new and/or replacement water-control structures such as culverts, headwalls, pipes, and slide gates. The proposed Project is anticipated to help the University of California, Irvine (UCI) staff to better manage existing water sources within the SJMR, by improving circulation and long-term soil and water chemistry through enhanced water movement, by increasing capacity for wetland habitat, and improving controls to retain water in priority management cells during drought. The Project will also enhance existing wetland habitat as well as create additional wetlands in the SJMR. The Project does not propose the use of additional water sources; however, the proposed elements would create additional water capacity should new sources of water become available in the future. The proposed Project improvements also anticipate sea-level rise and provide accommodations for this potential. In summary, the rationale for the proposed Project is to enhance the existing marsh and riparian areas in the Reserve.

2.0 METHODOLOGY

In order to adequately identify biological resources in accordance with the requirements of CEQA, Glenn Lukos Associates (GLA) assembled biological data consisting of four main components:

- Delineation of aquatic resources (including wetlands and riparian habitat) subject to the jurisdiction of the U.S. Army Corps of Engineers (Corps), Regional Water Quality Control Board (Regional Board), and CDFW;
- Performance of vegetation mapping for the Project site;
- Performance of habitat assessments, and site-specific biological surveys, to evaluate the presence/absence of special-status species in accordance with the requirements of CEQA; and
- Review and incorporation of relevant survey data from numerous previous surveys conducted for the site.
- Review relevant data bases as applicable to the site.[1]

The focus of the 2020 biological surveys was determined through initial site reconnaissance, a review of the CNDDB [CDFW 2020], CNPS 8th edition online inventory (CNPS 2020), Natural Resource Conservation Service (NRCS) soil data, other reports, avian census data and other

[1] For purposes of completeness, the following databases were also consulted; however, it is important to note that the U.C. SJMR has, as detailed throughout this report, been subject to detailed study over the last few decades, including university research projects, detailed floristic surveys, habitat restoration efforts, monthly avian surveys for the past decade, and numerous other efforts to catalog the habitats and species within the SJMR. Thus, the biological information collected over the past few decades provides a robust dataset for the area.
https://ecos.fws.gov/ipac/;
https://www.fisheries.noaa.gov/resource/map/protected-resources-app;
https://fws.maps.arcgis.com/home/webmap/viewer.html?webmap=9d8de5e265ad4fe09893cf75b8dbfb77

information prepared for the SJMR, and knowledge of the region. Site-specific general surveys within the Project site were conducted on foot in the SJMR areas, with focus on areas potentially impacted by proposed improvements, for each target plant or animal species identified below.

Vegetation was mapped directly onto a 200-scale (1" = 200') aerial photograph or delineated using sub-meter GPS technology, following the currently accepted List of Vegetation Alliances and Associations. The list is based on A Manual of California Vegetation, Second Edition or MCVII, which is the California expression of the National Vegetation Classification. All flora and fauna identified on site during vegetation mapping was included in a floral and faunal compendium prepared for the Project. Vegetation communities not listed under the above-mentioned vegetation classification systems were named based on the dominant plant species present.

2.1 Summary of Surveys[2]

GLA conducted biological analysis in order to identify and analyze actual or potential impacts to biological resources associated with proposed improvements within the SJMR. Observations of all plant and wildlife species recorded during each of the above-mentioned survey efforts and during various previous surveys of the site are included in Appendix A: Floral Compendium and Appendix B: Faunal Compendium. The 2020 studies by GLA include the following:

- Performance of vegetation mapping;
- Performance of site-specific habitat assessments and biological surveys to evaluate the potential presence/absence of special-status species (or potentially suitable habitat) to the satisfaction of CEQA and federal and state regulations, in conjunction with review and incorporation of avian survey data collected monthly by Sea and Sage Audubon between 2011 and 2020; and
- Delineation/evaluation of aquatic resources (including wetlands and riparian habitat) potentially subject to the jurisdiction of the U.S. Army Corps of Engineers (Corps), Regional Water Quality Control Board (Regional Board), and/or CDFW.

Table 2-1 provides a summary list of survey dates, survey types and personnel.

Table 2-1. Summary of Biological Surveys for the Project Site.

Survey Type	2020 Survey Dates	Biologist(s)
General Biological Survey	10/9, 10/14, 10/14, 10/15, 11/3	TB, CW, JS
Focused Plant Survey	10/14, 10/15, 10/27	TB, JS
Jurisdictional Delineation	10/14, 10/19, 10/30, 11/3, 11/5, 12/16	TB, CW, JS

TB = Tony Bomkamp, CW = Chris Waterston, JS = Jillian Stephens

Individual plants and wildlife species are evaluated in this report based on their "special-status." For the purpose of this report, plants were considered "special-status" based on one or more of the following criteria:

[2] See footnote 1 above for discussion of available dataset.

- Listing through the Federal and/or State Endangered Species Act (ESA);
- Occurrence in the CNPS Rare Plant Inventory (Rank 1A/1B, 2A/2B, 3, or 4); and/or
- Occurrence in the CNDDB inventory.

Wildlife species were considered "special-status" based on one or more of the following criteria:

- Listing through the Federal and/or State ESA; and
- Designation by the State as a Species of Special Concern (SSC) or California Fully Protected (CFP) species.

Vegetation communities and habitats were considered "special-status" based on one or more of the following criteria:

- Global (G) and/or State (S) ranking of category 3 or less based on CDFW (see Section 3.2.2 below for further explanation); and
- Riparian habitat, emergent marsh, or coastal sage scrub that supports State or federally listed threatened or endangered species.

2.2 Botanical Resources

A site-specific survey program was designed to accurately document the botanical resources within the Project site, and consisted of five components: (1) a literature search; (2) preparation of a list of target special-status plant species and sensitive vegetation communities that could occur within the SJMR environs; (3) general field reconnaissance surveys; (4) vegetation mapping according to the List of Vegetation Alliances and Associations; and (5) habitat assessments and focused surveys for special-status plants.

2.2.1 Literature Search

Prior to conducting fieldwork, pertinent literature on the flora of the region was examined. A thorough archival review was conducted using available literature and other historical records. These resources included the following:

- California Native Plant Society, Rare Plant Program.2017. Inventory of Rare and Endangered Plants of California (online edition, v8-03 0.39) (CNPS 2020);
- CNDDB for the USGS 7.5' quadrangles: Tustin, Newport Beach, Laguna Beach, El Toro, San Juan Capistrano, Orange, Black Star Canyon and Anaheim (CNDDB 2020).
- https://ecos.fws.gov/ipac/;
- https://www.fisheries.noaa.gov/resource/map/protected-resources-app;
- https://fws.maps.arcgis.com/home/webmap/viewer.html?webmap=9d8de5e265ad4fe09893cf75b8dbfb77

2.2.2 Vegetation Mapping

Vegetation communities within the Project site were mapped according to the List of Vegetation Alliances and Associations (or Natural Communities List). The list is based on A Manual of

California Vegetation, Second Edition or MCVII, which is the California expression of the National Vegetation Classification. Where necessary, deviations were made when areas did not fit into exact habitat descriptions. These vegetation communities were named based on the dominant plant species present. Plant communities were mapped in the field directly onto a 200-scale (1” = 200’) aerial photograph. A vegetation map is included as Exhibit 4 and Exhibit 5 depicts special-status vegetation alliances.

2.2.3 Special-Status Plant Species and Habitats Evaluated for the Project Site

A literature search was conducted to obtain a list of special status plants with the potential to occur within the Project site. The CNDDB was initially consulted to determine well-known occurrences of plants and habitats of special concern in the region. Other sources used to develop a list of target species for the survey program included the CNPS online inventory (2015).

Based on this information, vegetation profiles and a list of target sensitive plant species and habitats that could occur within the Project site were developed and incorporated into a mapping and survey program to achieve the following goals: (1) characterize the vegetation associations and land use; (2) prepare a detailed floristic compendium; (3) identify the potential for any special status plants that may occur within the Project site; and (4) prepare a map showing the distribution of any sensitive botanical resources associated with the Project site, if applicable.

2.2.4 Botanical Surveys

GLA biologists (Tony Bomkamp and Jillian Stephens) visited the site on October 14, 15, and 27 to conduct general and focused plant surveys, with the focused surveys aimed at southern tarplant (*Centromadia parryi* ssp. *australis*) which flowers in the fall. Surveys were conducted in accordance with accepted botanical survey guidelines (CDFG 2009, CNPS 2001, USFWS 2000). As applicable, surveys for southern tarplant were conducted at appropriate times based on precipitation and flowering periods. An aerial photograph, a soil map, and/or a topographic map were used to determine the community types and other physical features that may support sensitive and uncommon taxa or communities within the Project site. Surveys were conducted by following meandering transects within target areas of suitable habitat. All plant species encountered during the field surveys were identified and recorded following the above-referenced guidelines adopted by CNPS (2010) and CDFW by Nelson (1984). A complete list of the plant species observed is provided in Appendix A. Scientific nomenclature and common names used in this report follow Baldwin et al (2012), and Munz (1974). Locations for special-status plants are depicted on Exhibit 6.

2.3 <u>Wildlife Resources</u>

Wildlife species were evaluated and detected during field surveys by sight, call, tracks, and scat. Site reconnaissance was conducted in such a manner as to allow inspection of the entire Project site by direct observation, including the use of binoculars. As noted, substantial data on avifauna were available from Sea and Sage Audubon and provide much of the date used in this report. In addition, observational data of the coastal California gnatcatcher was provided by Dr. Peter

Bowler, which has been used in the impact discussion below. Observations of physical evidence and direct sightings of wildlife by GLA Biologists were recorded in field notes during the site visits. A complete list of wildlife species observed within the SJMR during all of the various surveys is provided in Appendix B. Scientific nomenclature and common names for vertebrate species referred to in this report follow the Complete List of Amphibian, Reptile, Bird, and Mammal Species in California (CDFG 2008), Standard Common and Scientific Names for North American Amphibians, Turtles, Reptiles, and Crocodilians 6th Edition, Collins and Taggert (2009) for amphibians and reptiles, and the American Ornithologists' Union Checklist 7th Edition (2009) for birds. The methodology (including any applicable survey protocols) utilized to conduct general surveys, habitat assessments, and/or focused surveys for special-status animals are included below.

2.3.1 General Surveys

Birds

During the general biological and reconnaissance survey within the SJMR, birds were detected incidentally by direct observation and/or by vocalizations, with identifications recorded in field notes. As already noted, extensive avian survey data collected by Sea and Sage Audubon was provided to GLA by UCI consisting of monthly surveys over the last 10 years.

Mammals

During general biological and reconnaissance survey within the SJMR, mammals were identified and detected incidentally by direct observations and/or by the presence of diagnostic sign (i.e., tracks, burrows, scat, etc.).

Reptiles and Amphibians

During general biological and reconnaissance surveys within the SJMR, reptiles and amphibians were identified incidentally during surveys. Habitats were examined for diagnostic reptile sign, which include shed skins, scat, tracks, snake prints, and lizard tail drag marks. All reptiles and amphibian species observed, as well as diagnostic sign, were recorded in field notes.

2.3.2 Special-Status Animal Species Reviewed

A literature search was conducted in order to obtain a list of special-status wildlife species with the potential to occur within the SJMR. Species were evaluated based on three factors: 1) species identified by the CNDDB as occurring (either currently or historically) on or in the vicinity of the SJMR, and 2) any other special-status animals that are known to occur within the vicinity of the SJMR, or for which potentially suitable habitat occurs on the SJMR.

2.3.3 Habitat Assessment for Special Status Animal Species

Given the extensive surveys data available for the SJMR, GLA biologists Tony Bomkamp and Christopher Waterston conducted habitat assessments focused on potential work areas for special-status animal species on October 9, 2020. An aerial photograph, soil map and/or topographic map were used to determine the community types and other physical features that may support special-status and uncommon taxa within the Project site. As noted, prior to conducting the surveys and habitat assessment efforts, GLA reviewed a variety of sources from Sea and Sage Audubon, Barry Nerhus (2016), and UCI Staff, including Dr. Bowler. Locations and/or habitat for special-status species are depicted on Exhibits 7 – 10.

2.3.4 Surveys for Special-Status Animals Species

Western Burrowing Owl

Western burrowing owl was observed by Sea and Sage Audubon in 2011 and 2015. GLA observed a single western burrowing owl on October 14 and 15, 2020 as depicted on Exhibit 8.

Coastal California Gnatcatcher

Coastal California gnatcatchers have been opportunistically observed and recorded by Sea and Sage Audubon in every year between 2011 and 2020. They have historically occupied areas along the bluffs from the yellow loop at the landfill to the San Diego Creek berm, and along the inside of the berm to the pump house. Some of these areas are not within the Sea and Sage monthly transects. There have been gnatcatchers seen and heard in this zone and in the Lower Marsh project area according to Dr. Bowler and were also observed opportunistically by GLA during vegetation mapping and wetland delineation. Also, at the Arboretum coastal California gnatcatchers have been detected in coastal sage scrub along the bluffs facing the Marsh, and while not within the current project area, is useful to be confirm presence in the SJMR environs. Suitable habitat is depicted on Exhibit 9.

Least Bell's Vireo

Least bell's vireo has been recorded within areas of the SJMR during the breeding season every year between 2012 and 2020. Areas of suitable riparian habitat are associated with the Bluff Road Riparian area. Suitable habitat is depicted on Exhibit 10.

Ridgeway Rail

Ridgeway rail was observed in the marsh in 2006 and 2007 by Harmsworth and Associates (Harmsworth, 2007, 2008) in 2012 by Sea and Sage Audubon and by Barry Nerhus during a variety of site visits as noted below.

Western Pond Turtle

Western Pond Turtle was subject to a five-year trapping to investigate the population dynamics, movements, and habitat use of western pond turtles in SJMR from 2008-2012 using radio telemetry and mark-recapture data (Nerhus 2016). Pond turtle locations from Nerhus are depicted on Exhibit 7.

Other Special-Status Avifauna

Other special-status avifauna have been recorded by various surveyors between 2006 and 2020, including American peregrine falcon, Bald eagle, California least tern, northern harrier, western burrowing owl, white-tailed kite, willow flycatcher, yellow-breasted chat, and yellow warbler.

2.4 Jurisdictional Delineation

Prior to beginning the field delineation a variety of color aerial photographs were examined in conjunction with a 2004 Delineation Report prepared by Wetland Research Associates (Wetland Research Associates, 2004) to determine the locations of potential areas of Corps/Regional Board/CDFW jurisdiction. Suspected jurisdictional areas were field checked for the presence of definable channels and/or wetland vegetation, soils and hydrology. Potential wetland habitats at the subject site were evaluated using the methodology set forth in the U.S. Army Corps of Engineers 1987 Wetland Delineation Manual[3] (Wetland Manual) and the 2008 Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Supplement (Arid West Supplement)[4]. While in the field the limits of the OHWM, wetlands, and non-wetland riparian vegetation were recorded using GPS technology and/or on aerial photographs. Other data were recorded onto the field datasheets. The results of the Jurisdictional Delineation are depicted on Exhibit 11 and a soils map is included as Exhibit 12.

Because the proposed project will only impact limited areas, areas outside of proposed impacts, access routes and staging areas were determined to be wetlands based on the presence of standing water in aerial photographs in conjunction with emergent vegetation with wetland indicator statuses of Facultative Wetland (FACW) or Obligate (OBL) as addressed in more detail in the Jurisdictional Delineation prepared for the project and attached as Appendix C.

3.0 REGULATORY SETTING

The proposed Project is subject to state and federal regulations associated with a number of regulatory programs. These programs often overlap and were developed to protect natural resources, including: state- and federally listed plants and animals; aquatic resources including rivers and creeks, ephemeral streambeds, wetlands, and areas of riparian habitat; other special-status species which are not listed as threatened or endangered by the state or federal governments; and other special-status vegetation communities.

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[3] Environmental Laboratory. 1987. Corps of Engineers Wetlands Delineation Manual, Technical Report Y-87-1, U.S. Army Engineer Waterways Experimental Station, Vicksburg, Mississippi.

[4] U.S. Army Corps of Engineers. 2008. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Supplement (Version 2.0). Ed. J.S. Wakeley, R.W. Lichvar, and C.V. Noble. ERDC/EL TR-06-16. Vicksburg, MS: U.S. Army Engineer Research and Development Center.

3.1 State and/or Federally Listed Plants or Animals

3.1.1 State of California Endangered Species Act

California's Endangered Species Act (CESA) defines an endangered species as "a native species or subspecies of a bird, mammal, fish, amphibian, reptile, or plant which is in serious danger of becoming extinct throughout all, or a significant portion, of its range due to one or more causes, including loss of habitat, change in habitat, overexploitation, predation, competition, or disease." The State defines a threatened species as "a native species or subspecies of a bird, mammal, fish, amphibian, reptile, or plant that, although not presently threatened with extinction, is likely to become an Endangered species in the foreseeable future in the absence of the special protection and management efforts required by this chapter. Any animal determined by the commission as rare on or before January 1, 1985 is a threatened species." Candidate species are defined as "a native species or subspecies of a bird, mammal, fish, amphibian, reptile, or plant that the commission has formally noticed as being under review by the department for addition to either the list of endangered species or the list of threatened species, or a species for which the commission has published a notice of proposed regulation to add the species to either list." Candidate species may be afforded temporary protection as though they were already listed as threatened or endangered at the discretion of the Fish and Game Commission. Unlike the Federal Endangered Species Act (FESA), CESA does not list invertebrate species.

Article 3, Sections 2080 through 2085, of the CESA addresses the taking of threatened, endangered, or candidate species by stating "No person shall import into this state, 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 determines to be an endangered species or a threatened species, or attempt any of those acts, except as otherwise provided." Under the CESA, "take" is defined as "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill." Exceptions authorized by the state to allow "take" require permits or memoranda of understanding and can be authorized for endangered species, threatened species, or candidate species for scientific, educational, or management purposes and for take incidental to otherwise lawful activities. Sections 1901 and 1913 of the California Fish and Game Code provide that notification is required prior to disturbance.

3.1.2 Federal Endangered Species Act

The FESA of 1973 defines an endangered species as "any species that is in danger of extinction throughout all or a significant portion of its range." A threatened species is defined as "any species that is likely to become an Endangered species within the foreseeable future throughout all or a significant portion of its range." Under provisions of Section 9(a)(1)(B) of the FESA it is unlawful to "take" any listed species. "Take" is defined in Section 3(18) of FESA: "...harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." Further, the USFWS, through regulation, has interpreted the terms "harm" and "harass" to include certain types of habitat modification that result in injury to, or death of species as forms of "take." These interpretations, however, are generally considered and applied on a case-by-case basis and often vary from species to species. In a case where a property owner seeks permission from a Federal agency for an action that could affect a federally listed plant and animal species, the property owner and agency are required to consult with USFWS. Section 9(a)(2)(b) of the FESA addresses the protections afforded to listed plants.

3.1.3 State and Federal Take Authorizations for Listed Species

Federal or state authorizations of impacts to or incidental take of a listed species by a private individual or other private entity would be granted in one of the following ways:

- Section 7 of the FESA stipulates that any federal action that may affect a species listed as threatened or endangered requires a formal consultation with USFWS to ensure that the action is not likely to jeopardize the continued existence of the listed species or result in destruction or adverse modification of designated critical habitat. 16 U.S.C. 1536(a)(2).
- In 1982, the FESA was amended to give private landowners the ability to develop Habitat Conservation Plans (HCP) pursuant to Section 10(a) of the FESA. Upon development of an HCP, the USFWS can issue incidental take permits for listed species where the HCP specifies at minimum, the following: (1) the level of impact that will result from the taking, (2) steps that will minimize and mitigate the impacts, (3) funding necessary to implement the plan, (4) alternative actions to the taking considered by the applicant and the reasons why such alternatives were not chosen, and (5) such other measures that the Secretary of the Interior may require as being necessary or appropriate for the plan.
- Sections 2090-2097 of the CESA require that the state lead agency consult with CDFW on projects with potential impacts on state-listed species. These provisions also require CDFW to coordinate consultations with USFWS for actions involving federally listed as well as state-listed species. In certain circumstances, Section 2080.1 of the California Fish and Game Code allows CDFW to adopt the federal incidental take statement or the 10(a) Permit as its own based on its findings that the federal permit adequately protects the species under state law.

3.1.4 Consultation with State and Federal Agencies

UCI staff has conducted early consultation with the USFWS, the Corps, Regional Board and CDFW. Specifically, on November 23, 2020, Reserve Managers Peter Bowler and Megan Lulow, along with members of the project consultant team, conducted a teleconference with Eric Sweeney of the Corps to discuss the extent of Corps jurisdiction and potential permitting procedures. Also, on November 23, 2020, Reserve Managers Peter Bowler and Megan Lulow along with members of the project consultant team conducted a teleconference with William Miller of USFWS to introduce the project and provide preliminary information regarding the project.

3.2 <u>California Environmental Quality Act</u>

3.2.1 CEQA Guidelines Section 15380

CEQA requires evaluation of a project's impacts on biological resources and provides guidelines and thresholds for use by lead agencies for evaluating the significance of proposed impacts. Sections 5.1.1 and 5.2.2 below set forth these thresholds and guidelines. Furthermore, pursuant to the CEQA Guidelines Section 15380, CEQA provides protection for non-listed species that could potentially meet the criteria for state listing. For plants, CDFW recognizes that plants on Lists 1A, 1B, or 2 of the CNPS *Inventory of Rare and Endangered Plants in California* may meet the criteria for listing and should be considered under CEQA. CDFW also recommends protection of plants, which are regionally important, such as locally rare species, disjunct populations of more common plants, or plants on the CNPS Lists 3 or 4.

3.2.2 Special-Status Plants, Wildlife and Vegetation Communities Evaluated Under CEQA

Federally Designated Special-Status Species

Within recent years, the USFWS instituted changes in the listing status of candidate species. Former C1 (candidate) species are now referred to simply as candidate species and represent the only candidates for listing. Former C2 species (for which the USFWS had insufficient evidence to warrant listing) and C3 species (either extinct, no longer a valid taxon or more abundant than was formerly believed) are no longer considered as candidate species. Therefore, these species are no longer maintained in list form by the USFWS, nor are they formally protected. This term is employed in this document but carries no official protections. All references to federally protected species in this report (whether listed, proposed for listing, or candidate) include the most current published status or candidate category to which each species has been assigned by USFWS.

For this report the following acronyms are used for federal special-status species:

- FE Federally listed as Endangered
- FT Federally listed as Threatened
- FPE Federally proposed for listing as Endangered
- FPT Federally proposed for listing as Threatened
- FC Federal Candidate Species (former C1 species)
- FSC Federal Species of Concern (former C2 species)
- BCC Birds of Conservation Concern

State-Designated Special-Status Species

Some mammals and birds are protected by the state as Fully Protected (SFP) Mammals or Fully Protected Birds, as described in the California Fish and Game Code, Sections 4700 and 3511, respectively. California SSC are designated as vulnerable to extinction due to declining population levels, limited ranges, and/or continuing threats. This list is primarily a working document for the CDFW's CNDDB project. Informally listed taxa are not protected but warrant consideration in the preparation of biotic assessments. For some species, the CNDDB is only concerned with specific portions of the life history, such as roosts, rookeries, or nest sites.

For this report the following acronyms are used for State special-status species:

- SE State-listed as Endangered
- ST State-listed as Threatened
- SR State-listed as Rare

- SCE State Candidate for listing as Endangered
- SCT State Candidate for listing as Threatened
- SFP State Fully Protected
- SP State Protected
- SSC State Species of Special Concern

CNDDB Global/State Rankings

The CNDDB provides global and state rankings for species and communities based on a system developed by The Nature Conservancy to measure rarity of a species. The ranking provides a shorthand formula about how rare a species/community is, and is based on the best information available from multiple sources, including state and federal listings, and other groups that recognize species as sensitive (e.g., Bureau of Land Management, Audubon Society, etc.). State and global rankings are used to prioritize conservation and protection efforts so that the rarest species/communities receive immediate attention. In both cases, the lower ranking (i.e., G1 or S1) indicates extreme rarity. Rare species are given a ranking from 1 to 3. Species with a ranking of 4 or 5 are considered to be common. If the exact global/state ranking is undetermined, a range is generally provided. For example, a global ranking of "G1G3" indicates that a species/community global rarity is between G1 and G3. If the animal being considered is a subspecies of a broader species, a "T" ranking is attached to the global ranking. The following are descriptions of global and state rankings:

Global Rankings

- G1 – Critically imperiled globally because of extreme rarity (5 or fewer occurrences), or because of some factor(s) making it especially vulnerable to extinction.
- G2 – Imperiled globally because of rarity (6-20 occurrences), or because of some other factor(s) making it very vulnerable to extinction throughout its range.
- G3 – Either very rare and local throughout its range (21 to 100 occurrences), or found locally (even abundantly at some of its locations) in a restricted range (e.g., a physiographic region), or because of some other factor(s) making it vulnerable to extinction throughout its range.
- G4 – Uncommon but not rare; some cause for long-term concern due to declines or other factors.
- G5 – Common, widespread and abundant.

State Rankings

- S1 – Extremely rare; typically, 5 or fewer known occurrences in the state; or only a few remaining individuals; may be especially vulnerable to extirpation.
- S2 – Very rare; typically, between 6 and 20 known occurrences; may be susceptible to becoming extirpated.
- S3 – Rare to uncommon; typically, 21 to 50 known occurrences; S3 ranked species are not yet susceptible to becoming extirpated in the state but may be if additional populations are destroyed.

- S4 - Uncommon but not rare; some cause for long-term concern due to declines or other factors.
- S5 - Common, widespread, and abundant in the state.

California Native Plant Society and California Rare Plant Rank

The CNPS is a private plant conservation organization dedicated to the monitoring and protection of sensitive species in California. The CNPS's Eighth Edition of the *California Native Plant Society's Inventory of Rare and Endangered Plants of California* separates plants of interest into five ranks. CNPS has compiled an inventory comprised of the information focusing on geographic distribution and qualitative characterization of Rare, Threatened, or Endangered vascular plant species of California. The list serves as the candidate list for listing as threatened and endangered by CDFW. CNPS and CDFW have jointly assigned five California Rare Plant Ranks (CRPR), which are categories of rarity that are summarized in Table 3-1.

Table 3-1. CRPR Ranks 1, 2, 3, & 4, and Threat Code Extensions

CRPR Rank	Comments
Rank 1A – Plants Presumed Extirpated in California and Either Rare or Extinct Elsewhere	Thought to be extinct in California based on a lack of observation or detection for many years.
Rank 1B – Plants Rare, Threatened, or Endangered in California and Elsewhere	Species, which are generally rare throughout their range that are also judged to be vulnerable to other threats such as declining habitat.
Rank 2A – Plants presumed Extirpated in California, But Common Elsewhere	Species that are presumed extinct in California but more common outside of California
Rank 2B – Plants Rare, Threatened or Endangered in California, But More Common Elsewhere	Species that are rare in California but more common outside of California
Rank 3 – Plants About Which More Information Is Needed (A Review List)	Species that are thought to be rare or in decline but CNPS lacks the information needed to assign to the appropriate list. In most instances, the extent of surveys for these species is not sufficient to allow CNPS to accurately assess whether these species should be assigned to a specific rank. In addition, many of the Rank 3 species have associated taxonomic problems such that the validity of their current taxonomy is unclear.
Rank 4 – Plants of Limited Distribution (A Watch List)	Species that are currently thought to be limited in distribution or range whose vulnerability or susceptibility to threat is currently low. In some cases, as noted above for Rank 3 species, CNPS lacks survey data to accurately determine status in California. Many species have been placed on Rank 4 in previous editions of the "Inventory" and have been removed as survey data has indicated that the species are more common than previously thought. CNPS recommends that species currently included on this list should be monitored to ensure that future substantial declines are minimized.
Extension	**Comments**
.1 – Seriously endangered in California	Species with over 80% of occurrences threatened and/or have a high degree and immediacy of threat.

.2 – Fairly endangered in California	Species with 20-80% of occurrences threatened.
.3 – Not very endangered in California	Species with <20% of occurrences threatened or with no current threats known.

3.3 Jurisdictional Waters

3.3.1 Army Corps of Engineers

Pursuant to Section 404 of the Clean Water Act, the Corps regulates the discharge of dredged and/or fill material into waters of the United States. The term "waters of the United States" is defined in Corps regulations at 33 CFR Part 328.3(a), pursuant to the *Navigable Waters Protection Rule*[5] (NWPR), as:

(a) Jurisdictional waters. For purposes of the Clean Water Act, 33 U.S.C. 1251 *et seq.* and its implementing regulations, subject to the exclusions in paragraph (b) of this section, the term ''waters of the United States'' means:

> *(1) The territorial seas, and waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including waters which are subject to the ebb and flow of the tide;*
> *(2) Tributaries;*
> *(3) Lakes and ponds, and impoundments of jurisdictional waters; and*
> *(4) Adjacent wetlands.*

(b) Non-jurisdictional waters. The following are not ''waters of the United States'':

> *(1) Waters or water features that are*
> *not identified in paragraph (a)(1), (2), (3), or (4) of this section;*
> *(2) Groundwater, including groundwater drained through subsurface drainage systems;*
> *(3) Ephemeral features, including ephemeral streams, swales, gullies, rills, and pools;*
> *(4) Diffuse stormwater run-off and directional sheet flow over upland;*
> *(5) Ditches that are not waters identified in paragraph (a)(1) or (2) of this section, and those portions of ditches constructed in waters identified in paragraph (a)(4) of this section that do not satisfy the conditions of paragraph (c)(1) of this section;*
> *(6) Prior converted cropland;*
> *(7) Artificially irrigated areas, including fields flooded for agricultural production, that would revert to upland should application of irrigation water to that area cease;*
> *(8) Artificial lakes and ponds, including water storage reservoirs and farm, irrigation, stock watering, and log cleaning ponds, constructed or excavated in upland or in non-jurisdictional waters, so long as those artificial lakes and ponds are not impoundments of jurisdictional waters that meet the conditions of paragraph (c)(6) of this section;*

[5] U.S. Environmental Protection Agency & Department of Defense. 2020. Federal Register / Vol. 85, No. 77 / Tuesday, April 21, 2020 / Rules and Regulations.

(9) Water-filled depressions constructed or excavated in upland or in non-jurisdictional waters incidental to mining or construction activity, and pits excavated in upland or in non-jurisdictional waters for the purpose of obtaining fill, sand, or gravel;
(10) Stormwater control features constructed or excavated in upland or in non-jurisdictional waters to convey, treat, infiltrate, or store stormwater runoff;
(11) Groundwater recharge, water reuse, and wastewater recycling structures, including detention, retention, and infiltration basins and ponds, constructed or excavated in upland or in non-jurisdictional waters; and
(12) Waste treatment systems.

In the absence of wetlands, the limits of Corps jurisdiction in non-tidal waters, such as intermittent streams, extend to the OHWM which is defined at 33 CFR 328.3(e) as:

> *...that line on the shore established by the fluctuation of water and indicated by physical characteristics such as clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas.*

3.3.1.1. Wetland Definition Pursuant to Section 404 of the Clean Water Act

The term “wetlands” (a subset of “waters of the United States”) is defined at 33 CFR 328.3(b) as "those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support...a prevalence of vegetation typically adapted for life in saturated soil conditions." In 1987 the Corps published the Wetland Manual to guide its field personnel in determining jurisdictional wetland boundaries. The methodology set forth in the Wetland Manual and the Arid West Supplement generally require that, in order to be considered a wetland, the vegetation, soils, and hydrology of an area exhibit at least minimal hydric characteristics. While the Wetland Manual and Arid West Supplement provide great detail in methodology and allow for varying special conditions, a wetland should normally meet each of the following three criteria:

- More than 50 percent of the dominant plant species at the site must be typical of wetlands (i.e., rated as facultative or wetter in the Arid West 2016 Regional Wetland Plant List[6],[7]);

- Soils must exhibit physical and/or chemical characteristics indicative of permanent or periodic saturation (e.g., a gleyed color, or mottles with a matrix of low chroma indicating a relatively consistent fluctuation between aerobic and anaerobic conditions); and

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[6] Lichvar, R.W., D.L. Banks, W.N. Kirchner, and N.C. Melvin. 2016. Arid West 2016 Regional Wetland Plant List. Phytoneuron 2016-30: 1-17. Published 28 April 2016.
[7] Note the Corps also publishes a National List of Plant Species that Occur in Wetlands (Lichvar, R.W., D.L. Banks, W.N. Kirchner, and N.C. Melvin. 2016. The National Wetland Plant List: 2016 wetland ratings. Phytoneuron 2016-30: 1-17. Published 28 April 2016.); however, the Regional Wetland Plant List should be used for wetland delineations within the Arid West Region.

- Whereas the Wetland Manual requires that hydrologic characteristics indicate that the ground is saturated to within 12 inches of the surface for at least five percent of the growing season during a normal rainfall year, the Arid West Supplement does not include a quantitative criteria with the exception for areas with “problematic hydrophytic vegetation”, which require a minimum of 14 days of ponding to be considered a wetland.

As discussed with and confirmed by the Corps on November 23, 2020, the SJMR would be considered waters of the U.S. as an adjacent wetland (33 CFR Part 328.3(a)(4)), specifically as set forth on page 22251 of the preamble to the NWPR:

> *The final rule defines ‘‘adjacent wetlands’’ as wetlands that…are physically separated from a territorial sea or traditional navigable water, a tributary, or a lake, pond, or impoundment of a jurisdictional water only by an artificial dike, barrier, or similar artificial structure so long as that structure allows for a direct hydrological surface connection to the territorial sea or traditional navigable water, tributary, or lake, pond, or impoundment of a jurisdictional water in a typical year, such as through a culvert, flood or tide gate, pump, or similar artificial feature.*[8]

3.3.1.2. San Diego Creek Special Area Management Plan

The SJMR is within the San Diego Creek Special Area Management Plan (SAMP) area and is included as an area with “High Aquatic Integrity”. Inclusion in the SAMP does not change or in any way modify the definitions for waters of the U.S. The permitting procedures under the SAMP are set forth on the Los Angeles District Corps of Engineers website.[9]

3.3.2 Regional Water Quality Control Board

Section 401 of the Clean Water Act requires any applicant for a Section 404 permit to obtain certification from the State that the discharge (and the operation of the facility being constructed) will comply with the applicable effluent limitation and water quality standards. In California 401 certification is obtained from the Regional Water Quality Control Board. The Corps, by law, cannot issue a Section 404 permit until a 401 certification is issued or waived.

Subsequent to the SWANCC decision, the Chief Counsel for the State Water Resources Control Board issued a memorandum that addressed the effects of the SWANCC decision on the Section 401 Water Quality Certification Program.[10] The memorandum stating that for waters that are no longer considered subject to federal jurisdiction pursuant to Section 404 of the Clean Water Act, but which remain “waters of the state”, the State will continue to regulate discharges under the Porter-Cologne Act. In such cases the applicant must apply for and obtain a Waste Discharge Requirement from the Regional Board.

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[8] Federal Register /Vol. 85, No. 77 /Tuesday, April 21, 2020 /Rules and Regulations
[9] https://www.spl.usace.army.mil/Missions/Regulatory/SAMP-Permitting-and-Research/SDC-SAMP/Permitting/
[10] Wilson, Craig M. January 25, 2001. Memorandum addressed to State Board Members and Regional Board Executive Officers.

3.3.3 California Department of Fish and Wildlife

Pursuant to Division 2, Chapter 6, Sections 1600-1603 of the California Fish and Game Code, the 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.

CDFW defines a "stream" (including creeks and rivers) as "a body of water that flows at least periodically or intermittently through a bed or channel having banks and supports fish or other aquatic life. This includes watercourses having surface or subsurface flow that supports or has supported riparian vegetation." CDFW's definition of "lake" includes "natural lakes or man-made reservoirs."

CDFW jurisdiction within altered or artificial waterways is based upon the value of those waterways to fish and wildlife. CDFW Legal Advisor has prepared the following opinion[11]:

- Natural waterways that have been subsequently modified and which have the potential to contain fish, aquatic insects and riparian vegetation will be treated like natural waterways...
- Artificial waterways that have acquired the physical attributes of natural stream courses and which have been viewed by the community as natural stream courses, should be treated by [CDFW] as natural waterways...
- Artificial waterways without the attributes of natural waterways should generally not be subject to Fish and Game Code provisions...

Thus, CDFW jurisdictional limits closely mirror those of the Corps. Exceptions are CDFW's addition of artificial stock ponds and irrigation ditches constructed on uplands, and the addition of riparian habitat supported by a river, stream, or lake regardless of the riparian area's federal wetland status.

4.0 RESULTS

This section provides the results of general biological surveys, vegetation mapping, habitat assessments and focused surveys for special-status plants and animals, and a jurisdictional delineation for Waters of the United States (including wetlands) subject to the jurisdiction of the Corps and Regional Board, and streams (including riparian vegetation) and lakes subject to the jurisdiction of CDFW.

4.1 <u>Existing Conditions</u>

The SJMR includes a mosaic of wetland and upland habitats [Exhibit 4: Vegetation Alliances], many of which exhibit special status, which in turn support both State and federally listed species and other special-status plants and animals. As summarized below, the vegetation is dominated by

[11] California Department of Fish and Game. Environmental Services Division (ESD). 1994. *A Field Guide to Lake and Streambed Alteration Agreements, Sections 1600-1607, California Fish and Game Code*.

herbaceous emergent marsh vegetation alliances including California bulrush, salt marsh bulrush and the more common cattail marsh. Areas of woody vegetation include black willow forest and mulefat scrub. Upland vegetation occurs along the margins of the reserve and consists of coastal sage scrub with areas of non-native mustards and poison hemlock. The hydrology of the marsh includes inputs from Irvine Ranch Water District (IRWD) and direct rainfall. Discharges from IRWD are managed by UCI Staff to provide for optimal functions in the SJMA and as described, the proposed project will provide for enhanced hydrology and higher levels of biological function for the vegetation alliances and associated special-status species addressed below. Special-status vegetation alliances are depicted on Exhibit 5: Special-Status Vegetation Alliances].

As discussed below, the SJMR supports a wide diversity of common and special-status flora and fauna which has been documented by the variety of surveys and focused investigations conducted in the SJMR.

4.2 Vegetation

During vegetation mapping of the Project site, fourteen different vegetation alliances and land cover types were identified. Table 4-1 provides a summary of vegetation alliances/land uses and the corresponding acreage. Detailed descriptions of each vegetation type follow the table. A Vegetation Map is attached as Exhibit 4.

Table 4-1. Summary of Vegetation/Land Cover Types for the Project Site

VEGETATION ALLIANCES/LAND USE TYPE	RANK	ACREAGE
FOREST AND WOODLAND ALLIANCES		
Salix gooddingii Forest & Woodland Alliance (Goodding's Willow Riparian Forest & Woodland)	G4 S3	17.73
SHRUBLAND AND GRASSLAND ALLIANCES		
Artemisia californica Shrubland Alliance (California Sagebrush Scub)	G5 S5	5.53
Baccharis Salicifolia Shrubland Alliance (Mulefat Thickets)	G4 S4	21.14
Opuntia littoralis Shrubland Alliance (Coast Prickly Pear Scrub)	G4 S3	0.07
HERBACEOUS ALLIANCES		
Bolboschoenus maritimus Herbaceous Alliance (Salt Marsh Bulrush Marshes)	G4 S3	12.99
Schoenoplectus Californicus Herbaceous Alliance (California Bulrush Marshes)	GNR S3	37.48
Typha spp. Herbaceous Alliance (Cattail Marshes)	G5 S5	29.55

VEGETATION ALLIANCES/LAND USE TYPE	RANK	ACREAGE
Sesuvium verrucosum Herbaceous Alliance (Western Sea-purslane Marshes)	G3 S2.2	3.94
Crypsis schoenoides Semi-Natural Herbaceous Alliance (Swamp Pricklegrass Mats)	N/A	2.94
Salicornia *pacifica* Herbaceous Alliance (Pickleweed mats)	G4 S3	0.47
Mixed Herbaceous Wetland	N/A	39.10
Mixed Herbaceous Upland	N/A	5.84
OTHER LAND USE TYPES		
Open Water	N/A	13.70
Disturbed	N/A	8.37
TOTAL		**198.94**

4.2.1 Vegetation Alliances

***Salix gooddingii* Forest & Woodland Alliance – Goodding's Willow Riparian Forest & Woodland**[12]

The Project site contains 17.73 acres of riparian vegetation that exhibits greater than 50 percent cover of Goodding's black willow (*Salix gooddingii*) in the tree canopy. While small patches or individuals of Goodding's black willow occur sporadically throughout the entire site, the dense riparian woodland areas occur along the boundaries of the Upper and Middle Marshes. Other commonly occurring woody species within this alliance include mulefat and arroyo willow (*Salix lasiolepis*) in the shrub strata, with an herbaceous understory of alkali mallow (*Malva leprosa*), alkali heath (*Frankenia salina*), saltgrass (*Distichlis spicata*), alkali weed (*Cressa truxillensis*), chairmaker's bulrush (*Schoenoplectus americanus*), salt marsh heliotrope (*Heliotropium curassavicum*), poison hemlock (*Conium maculatum*), Spanish sunflower (*Pulicaria paludosa*), and bristly ox-tongue (*Helminthotheca echioides*). It should be noted that hybridization among willows is common, and many of the Goodding's black willow individuals onsite appear to be hybridized with red willow (*Salix laevigata*) and/or various willow species.

Goodding's willow riparian forest and woodland is considered a special-status alliance as it is ranked S3 in California, indicating it is rare to uncommon with 21-100 viable occurrences statewide and/or between 2,590-12,950 hectares.

***Artemisia californica* Shrubland Alliance – California Sagebrush Scrub**

The Project site contains a strip of California sagebrush scrub along the southern and southwestern Project boundary accounting for approximately 5.53 acres. This area is dominated

[12] Many individuals of the Goodding's black willow appear to by hybrids with other undetermined *Salix* sp., potentially *S. laevigata* (FACW) or *S. lasiandra* (FACW), meaning that the wetland indicator status used for making a determination for a predominance of wetland species is appropriately FACW. Also, each has the same State Rarity Ranking of S3 and would be treated identically relative to determination of special-status.

by coastal sage scrub species including California sagebrush (*Artemisia californica*) and California buckwheat (*Eriogonum fasciculatum*). Other commonly occurring species in this upland habitat include goldenbush (*Isocoma menziesii*), coast prickly pear (*Opuntia littoralis*), big saltbush (*Atriplex lentiformis*), coyote bush (*Baccharis pilularis*), lemonade berry (*Rhus integrifolia*), laurel sumac (*Malosma laurina*), and chalk dudleya (*Dudleya pulverulenta*). In addition, patches of non-native species occur sporadically within and along the edges of this vegetation type including black mustard (*Brassica nigra*), poison hemlock, Russian thistle (*Salsola tragus*), tamarisk (*Tamarix ramosissima*), and tree tobacco (*Nicotiana glauca*).

Baccharis salicifolia Shrubland Alliance – Mulefat Thickets
The Project site contains a total of 21.19 acres of mulefat thickets within the Upper Marsh, Middle Marsh, Lower Marsh, and Seasonal Marsh. These areas are densely vegetated with mulefat; however, other commonly occurring species are arroyo willow and tamarisk, as well as several toyon (*Heteromeles arbutifolia*) individuals along the northern boundary of the Middle Marsh.

Opuntia littoralis Shrubland Alliance – Coast Prickly Pear Scrub
An approximately 0.07-acre patch of coast prickly pear scrub occurs near the northwestern boundary of the Middle Marsh. Although this area is small, it was distinguishable from the primarily riparian surroundings and was identified as a separate vegetation category due to this community's state rarity rank of S3.

Coast prickly pear scrub is considered a special status-alliance as it is ranked S3 in California, indicating it is rare to uncommon with 21-100 viable occurrences statewide and/or between 2,590-12,950 hectares.

Bolboschoenus maritimus Herbaceous Alliance – Salt Marsh Bulrush Marshes
The Project site contains a total of 12.99 acres of salt marsh bulrush marshes, primarily within the Middle Marsh and Experimental Ponds. This vegetation type is dominated by dense stands of salt marsh bulrush (*Bolboschoenus maritimus*); however, other species that occur sporadically throughout this alliance, specifically along the borders, include five-hook bassia, alkali weed, western sea-purslane (*Sesuvium verrucosum*), swamp pricklegrass (*Crypsis schoenoides*), alkali heath, saltgrass, poison hemlock, Spanish sunflower, bristly ox-tongue, and creeping saltbush (*Atriplex prostrata*).

Salt marsh bulrush marshes are considered a special-status alliance as they are ranked S3 in California, indicating they are rare to uncommon with 21-100 viable occurrences statewide and/or between 2,590-12,950 hectares.

Schoenoplectus californicus Herbaceous Alliance – California Bulrush Marshes
The Project site contains a total of 37.48 acres of California bulrush marshes. This vegetation type occurs as patches within the Middle and Seasonal Marshes, and as large stands within the Upper and Lower Marshes and Experimental Ponds. These areas are dominated by dense stands of California bulrush creating a monoculture for much of this habitat throughout the Project site. Other species within this vegetation type, specifically along the intergrade between alliance boundaries, include cattail (*Typha* spp.), chairmaker bulrush, and salt marsh bulrush. Limited

areas within the Experimental ponds supported the diminutive bulrush three square (*Schoenoplectus pungens* ssp. *pungens*).

California bulrush marshes are considered a special status alliance as they are ranked S3 in California, indicating they are rare to uncommon with 21-100 viable occurrences statewide and/or more than 2,590-12,950 hectares.

***Typha* spp. Herbaceous Alliance – Cattail Marshes**

The Project site contains a total of 29.55 acres of cattail marshes, primarily within the Upper and Middle Marshes. This vegetation type is dominated by dense monocultural stands of cattails, including three species and a hybrid (*Typha angustifolia, latifolia and domingensis,* and *T. x glauca*). Other species within this vegetation type, specifically along the intergrade between alliance boundaries, include California bulrush, chairmaker bulrush and salt marshbulrush. Areas along the western boundary of the lower marsh also support yerbsa mansa (*Anemopsis californica*).

***Sesuvium verrucosum* Herbaceous Alliance – Western Sea-purslane Marshes**

Because the field work was conducted during the dry season, many of the areas that exhibit "open water" during earlier parts of the year were dry and exhibited two different wetland vegetation alliances, one of which is western sea-purslane marshes. These areas, totaling approximately 3.94 acres, occur within the Middle and Lower Marshes and are dominated by a monoculture of western sea-purslane as the previously ponded areas dry down.

Western sea-purslane marshes are considered a special-status alliance as they are ranked S2.2 in California, indicating they are very rare and threatened with 6-20 viable occurrences statewide and/or more than 518-2,590 hectares. Globally, western sea-purslane marshes are ranked G3, indicating they are rare to uncommon with 21-100 viable occurrences statewide and/or more than 2,590-12,950 hectares.

***Crypsis schoenoides* Semi-Natural Herbaceous Alliance – Swamp Pricklegrass Mats**

As noted above, because the field work was conducted during the dry season, many of the areas that exhibit "open water" during earlier parts of the year were dry and exhibited two different wetland vegetation alliances, one of which is swamp pricklegrass mats. These areas, totaling approximately 2.94 acres, occur within the Upper and Middle Marshes and are dominated with a monoculture of swamp pricklegrass as the previously ponded areas dry down.

***Salicornia pacifica* Herbaceous Alliance – Pickleweed mats**

The Project site contains approximately 0.47 acre of pickleweed mats. This vegetation type occurs as one patch each within the Middle and Lower Marshes. These areas are dominated with greater than ten percent absolute cover of pickleweed (*Salicornia pacifica*). The other common saltmarsh species commonly occurring within this vegetation type is alkali heath (*Frankenia salina*).

Pickleweed mats are considered a special status alliance as they are ranked S3 in California, indicating they are rare to uncommon with 21-100 viable occurrences statewide and/or between 2,590-12,950 hectares.

Open Water
Approximately 13.70 acres of the Project site is covered by open water, many of which continued to exhibit ponded water to some extent. Nevertheless, because the field work was conducted during the dry season, many of the areas that exhibit "open water" during earlier parts of the year were dry and dominated by western sea-purslane and swamp pricklegrass, while other areas remained unvegetated. Areas that exhibited vegetation were mapped according to the alliance observed and areas with no or only sparse vegetation or standing water were retained in the open water land cover type. The open water areas depicted on Exhibit 4, occur primarily within the Experimental Ponds, exhibited either standing water or bare ground with little to no vegetation at the time of field surveys in October 2020.

Mixed Herbaceous
Much of the Project site, accounting for approximately 44.94 acres, is dominated by a mosaic of various herbaceous species. These areas are associated with disturbance as they commonly occur alongside the unpaved access roads and on the associated berms which separate various areas within the SJMR. Limited portions of this land-cover type are dominated by native species including saltgrass, alkali heath, and prostrate pigweed (*Amaranthus blitoides*); however, the majority of these "mixed herbaceous" areas are dominated by non-native and non-native invasive species, as is the case within the Seasonal and Lower Marshes, and include such as poison hemlock, bristly ox-tongue, castor bean (*Ricinus communis*), Australian saltbush (*Atriplex semibaccata*), smotherweed (*Bassia hyssopifolia*), white sweet clover (*Melilotus albus*), black mustard, red brome (*Bromus madritensis Rubens*), soft chess (*Bromus hordeaceus*), cheeseweed (*Malva parviflora*), Spanish sunflower, tamarisk, and tree tobacco. Portions of the lower marsh exhibited high densities of the non-native biennial wormwood (*Artemisia biennis*).

None of the areas designated as "mixed herbaceous" is consistent with the membership rules for alliances described in the Manual of California Vegetation. One exception is the inclusion of dense monocultures of poison hemlock that dominates the easternmost portion of the Lower Marsh, between the mulefat thickets and the coastal sage scrub.

This alliance has been separated into areas that are dominated by a predominance of vegetation with wetland indicator status of FAC or wetter that also exhibit hydric soils and wetland hydrology and meet the definition for wetlands (39.10 acres), versus area that do not exhibit all three criteria and are thus uplands (5.84 acres).

Disturbed
Disturbed land accounts for approximately 8.37 acres within the Project site and consists of maintained, unpaved access roads with minimal vegetation or areas used for parking and staging that are regularly mowed. Plant species that do occur within the disturbed areas, sporadically within and alongside the unpaved access roads, are primarily weedy species such as bristly ox-tongue, Australian saltbush, prostrate pigweed, cheeseweed, and Spanish sunflower.

4.3 <u>Special-Status Vegetation Alliances (Habitats)</u>

The CNDDB identifies the following 13 special-status vegetation communities occurring in the Tustin, California quadrange map and surrounding quadrangle maps: California Walnut

Woodland, Riversidean Alluvial Fan Sage Scrub, Southern California Arroyo Chub/Santa Ana Sucker Stream, Southern California Live Oak Riparian Forest, Southern Coastal Salt Marsh, Southern Cottonwood Willow Riparian Forest, Southern Dune Scrub, Southern Foredunes, Southern Interior Cypress Forest, Southern Riparian Scrub, Southern Sycamore Alder Riparian Woodland, Southern Willow Scrub, and Valley Needlegrass Grassland. None of these is associated with the SJMR. However, as noted and described above, the site contains six special-status vegetation alliances including

Salix gooddingii Forest & Woodland Alliance (Goodding's Willow Riparian Forest & Woodland), *Opuntia littoralis* Shrubland Alliance – Coast Prickly Pear Scrub; *Bolboschoenus maritimus* Herbaceous Alliance – Salt Marsh Bulrush Marshes; *Schoenoplectus californicus* Herbaceous Alliance – California Bulrush Marshes; *Sesuvium verrucosum* Herbaceous Alliance – Western Sea-purslane Marshes; *Salicornia pacifica* Herbaceous Alliance – Pickleweed mats.

4.4 Special-Status Plants

One special-status plant was detected at the Project site during focused surveys: southern tarplant. Another species, vernal barley (*Hordeum intercedens*), was recently reported and presumed present near the northeast corner of the Lower Marsh. Other species have been recorded from the site but appear to have been extirpated including many-stemmed dudleya (*Dudlaya multicaulis*), southwestern spiny rush (*Juncus acutus* ssp. *leopoldii*), and estuary seablite (*Suaeda esteroa*). One additional special-status species occurs in the Reserve's buffer zone but outside the boundaries of the SJMR proper: California box-thorn (*Lycium californicum*). Species with Table 4-2 provides a list of special-status plants evaluated for the Project site through general biological surveys, habitat assessments, and focused surveys. Species were evaluated based on the following factors: 1) species identified by the CNDDB and CNPS as occurring (either currently or historically) on or in the vicinity of the Project site, and 2) any other special-status plants that are known to occur within the vicinity of the Project site, or for which potentially suitable habitat occurs within the site.

Other species with potential to occur as noted in Table 4-2 were confirmed absent during focused plant surveys or based on the long-term collection of botanical data at the SJMR, which includes some numerous highly knowledgeable botanists. Consistent with this it is important to note that this area is regularly visited by expert botanists in Southern California due to its association with the University of California, Irvine, including the herbarium. Prior to field surveys Dr. Peter Bowler, Reserve Manager was consulted regarding locations for all special-status plants previously recorded for the SJMR as were herbarium personnel.

Table 4-2. Special-Status Plants Evaluated for the Project Site

Status

Federal
FE – Federally Endangered
FT – Federally Threatened
FC – Federal Candidate

State
SE – State Endangered
ST – State Threatened

CNPS/CRPR
Rank 1A – Plants presumed extirpated in California and either rare or extinct elsewhere.
Rank 1B – Plants rare, threatened, or endangered in California and elsewhere.
Rank 2A – Plants presumed extirpated in California, but common elsewhere.
Rank 2B – Plants rare, threatened, or endangered in California, but more common elsewhere.
Rank 3 – Plants about which more information is needed (a review list).
Rank 4 – Plants of limited distribution (a watch list).

CNPS/CRPR Threat Code extension
.1 – Seriously endangered in California (over 80% occurrences threatened)
.2 – Fairly endangered in California (20-80% occurrences threatened)
.3 – Not very endangered in California (<20% of occurrences threatened, or no current threats known)

Occurrence

- Does not occur – The site does not contain habitat for the species and/or the site does not occur within the geographic range of the species.
- Absent – The site contains suitable habitat for the species, but the species has been confirmed absent through focused surveys.
- Not expected to occur – The species is not expected to occur onsite due to low habitat quality, however absence cannot be ruled out.
- Potential to occur – The species has a potential to occur onsite based on suitable habitat, however its presence/absence could not be confirmed.
- Present – The species was detected onsite incidentally or through focused surveys.

Species	Status	Habitat	Occurrence On-Site
Allen's Pentachaeta *Pentachaeta aurea* ssp. *allenii*	Federal: None State: None CRPR: 1B.1	Valley and foothill grasslands, coastal scrub.	Does not occur. No suitable habitat.
Aphanisma *Aphanisma blitoides*	Federal: None State: None CRPR: 1B.2	Coastal bluff scrub, coastal dunes, coastal dune scrub.	Potential to occur; however, species was not observed during focused plant surveys and not previously reported from the site.
Braunton's milk-vetch *Astragalus brauntonii*	Federal: FE State: None CNPS: Rank 1B.1	Chaparral, coastal sage scrub, valley and foothill grassland. Usually carbonate soils. Recent burn or disturbed areas.	Does not occur. No suitable habitat.
Brewer's calandrinia *Calandrinia breweri*	Federal: None State: None CNPS: Rank 4.2	Sandy or loamy soils in disturbed sites and burns. Chaparral, coastal scrub.	Does not occur. No suitable habitat.

Species	Status	Habitat	Occurrence On-Site
California beardtongue *Penstemon californicus*	Federal: None State: None CNPS: Rank 1B.2	Sandy soils in chaparral, lower montane coniferous forest, and pinyon and juniper woodland.	Does not occur. No suitable habitat.
California box-thorn *Lycium californicum*	Federal: None State: None CNPS: Rank 4.2	Coastal bluff scrub, coastal scrub.	Does not occur. Occurs along Bluff Trail, outside Reserve boundary but with buffer.
California Orcutt grass *Orcuttia californica*	Federal: FE State: SE CNPS: Rank 1B.1	Vernal pools	Does not occur. No suitable habitat.
Catalina mariposa lily *Calochortus catalinae*	Federal: None State: None CNPS: Rank 4.2	Chaparral, cismontane woodland, coastal scrub, valley and foothill grassland.	Does not occur. No suitable habitat.
Chaparral nolina *Nolina cismontana*	Federal: None State: None CNPS: Rank 1B.2	Chaparral, coastal sage scrub. Occurring on sandstone or gabbro substrates.	Does not occur. No suitable habitat.
Chaparral ragwort *Senecio aphanactis*	Federal: None State: None CNPS: Rank 2B.2	Chaparral, cismontane woodland, coastal scrub. Sometimes associated with alkaline soils.	Potential to occur in California sagebrush vegetation community; however, species was not observed during focused plant surveys.
Chaparral sand-verbena *Abronia villosa* var. *aurita*	Federal: None State: None CNPS: Rank 1B.1	Sandy soils in chaparral, coastal sage scrub.	Does not occur. No suitable habitat.
Cliff malacothrix *Malacothrix saxatilis* var. *saxatilis*	Federal: None State: None CNPS: Rank 4.2	Coastal bluff scrub, coastal scrub.	Does not occur. Species was not observed during surveys and has not been reported from the site.
Cliff spurge *Euphorbia misera*	Federal: None State: None CRPR: 2B.2	Coastal bluff scrub and coastal sage scrub. Occurring on rocky soils.	Does not occur. No suitable habitat.
Coast woolly-heads *Nemacaulis denudata* var. *denudata*	Federal: None State: None CNPS: Rank 1B.2	Coastal dunes	Does not occur. No suitable habitat.
Coulter’s goldfields *Lasthenia glabrata* ssp. *coulteri*	Federal: None State: None CRPR: 1B.1	Playas, vernal pools, marshes and swamps (coastal salt).	Potential to occur; however, species was not observed during focused plant surveys.
Coulter's matilija poppy *Romneya coulteri*	Federal: None State: None CNPS: Rank 4.2	Often in burns in chaparral and coastal scrub.	Potential to occur; however, species was not observed during focused plant surveys.

Species	Status	Habitat	Occurrence On-Site
Coulter's saltbush *Atriplex coulteri*	Federal: None State: None CRPR: 1B.2	Coastal bluff scrub, coastal dunes, coastal sage scrub, valley and foothill grassland. Occurring on alkaline or clay soils.	Potential to occur; however, species was not observed during focused plant surveys.
Davidson's saltscale *Atriplex serenana* var. *davidsonii*	Federal: None State: None CRPR: 1B.2	Alkaline soils in coastal sage scrub, coastal bluff scrub.	Does not occur. No suitable habitat.
Decumbent goldenbush *Isocoma menziesii* var. *decumbens*	Federal: None State: None CRPR: 1B.2	Utilizes coastal sage scrub habitat intermixed with grassland and is more partial to clay soils than other closely related varieties.	Potential to occur in California sagebrush vegetation community; however, species was not observed during focused plant surveys.
Estuary seablite *Suaeda esteroa*	Federal: None State: None CRPR: 1B.2	Coastal salt marsh and swamps. Occurs in sandy soils.	Does not occur; Previously reported; however, species was not observed during focused plant surveys and the site does not contain suitable habitat.
Fish's milkwort *Polygala cornuta* var. *fishae*	Federal: None State: None CNPS: Rank 4.3	Chaparral, cismontane woodland, riparian woodland.	Does not occur. No suitable habitat.
Gambel's water cress *Nasturtium gambelii*	Federal: FE State: ST CNPS: Rank 1B.1	Marshes and swamps (freshwater or brackish).	Does not occur. Potentially suitable habitat; however, species was not observed during focused plant surveys and has not been recorded during numerous previous botanical surveys.
Heart-leaved pitcher sage *Lepechinia cardiophylla*	Federal: None State: None CNPS: Rank 1B.2	Closed-cone coniferous forest, chaparral, and cismontane woodland.	Does not occur. No suitable habitat.
Horn's milk-vetch *Astragalus hornii* var. *hornii*	Federal: None State: None CNPS: Rank 1B.1	Lake margins with alkaline soils, meadows and seeps, and playas.	Does not occur. No suitable habitat..
Intermediate mariposa lily *Calochortus weedii* var. *intermedius*	Federal: None State: None CRPR: 1B.2	Rocky soils in chaparral, coastal sage scrub, valley and foothill grassland.	Does not occur. No suitable habitat.
Intermediate monardella *Monardella hypoleuca ssp.intermedia*	Federal: None State: None CNPS: Rank 1B.3	Usually in the understory of chaparral, cismontane woodland, and lower montane coniferous forest (sometimes)	Does not occur. No suitable habitat.

Species	Status	Habitat	Occurrence On-Site
Lewis' evening-primrose *Camissoniopsis lewisii*	Federal: None State: None CNPS: Rank 3	Sandy or clay soils in coastal bluff scrub, cismontane woodland, coastal dunes, coastal scrub, and valley and foothill grassland.	Potential to occur in California sagebrush vegetation community; however, species was not observed during focused plant surveys.
Long-spined spineflower *Chorizanthe polygonoides* var. *longispina*	Federal: None State: None CNPS: Rank 1B.2	Clay soils in chaparral, coastal sage scrub, meadows and seeps, and valley and foothill grasslands	Does not occur. No suitable habitat.
Los Angeles sunflower *Helianthus nuttallii* ssp. *parishii*	Federal: None State: None CNPS: Rank 1A	Marshes and swamps (coastal salt and freshwater).	Does not occur. Species presumed extinct.
Malibu baccharis *Baccharis malibuensis*	Federal: None State: None CNPS: Rank 1B.1	Chaparral, cismontane woodland, coastal sage scrub.	Does not occur. No suitable habitat.
Many-stemmed dudleya *Dudleya multicaulis*	Federal: None State: None CRPR: 1B.2	Chaparral, coastal sage scrub, valley and foothill grassland. Often occurring in clay soils.	Does not occur. Planted onsite in upland California sagebrush vegetation outside of project limits; however, species has not been observed in recent years and was not detected during plant surveys.
Mesa horkelia *Horkelia cuneata* var. *puberula*	Federal: None State: None CRPR: 1B.1	Chaparral, cismontane woodland, and coastal scrub. Occurring on sandy or gravelly soils.	Does not occur. No suitable habitat.
Mud nama *Nama stenocarpum*	Federal: None State: None CRPR: 2B.2	Marshes and swamps	Does not occur. No suitable habitat.
Nuttall's scrub oak *Quercus dumosa*	Federal: None State: None CRPR: 1B.1	Closed-cone coniferous forest, chaparral, and coastal sage scrub. Occurring on sandy, clay loam soils.	Does not occur. No suitable habitat.
Ocellated humboldt lily *Lilium humboldtii* ssp. *ocellatum*	Federal: None State: None CNPS: Rank 4.2	Chaparral, cismontane woodland, coastal sage scrub, lower montane coniferous forest, riparian woodland. Occurring in openings.	Does not occur. No suitable habitat.
Orcutt's pincushion *Chaenactis glabriuscula* var. *orcuttiana*	Federal: None State: None CRPR: 1B.1	Coastal bluff scrub (sandy soils) and coastal dunes.	Potential to occur; however, species was not observed during focused plant surveys.
Palmer's grapplinghook *Harpagonella palmeri*	Federal: None State: None CNPS: Rank 4.2	Chaparral, coastal sage scrub, valley and foothill grassland. Occurring in clay soils.	Does not occur. No suitable habitat.

Species	Status	Habitat	Occurrence On-Site
Paniculate tarplant *Deinandra paniculata*	Federal: None State: None CNPS: Rank 4.2	Usually in vernally mesic, sometimes sandy soils in coastal scrub, valley and foothill grassland, and vernal pools.	Does not occur. No suitable habitat.
Parish's brittlescale *Atriplex parishii*	Federal: None State: None CRPR: 1B.1	Alkali meadows, vernal pools, chenopod scrub, playas.	Does not occur. No suitable habitat.
Plummer's mariposa lily *Calochortus plummerae*	Federal: None State: None CNPS: Rank 4.2	Granitic, rock soils within chaparral, cismontane woodland, coastal sage scrub, lower montane coniferous forest, valley and foothill grassland.	Does not occur. No suitable habitat.
Prostrate vernal pool navarretia *Navarretia prostrata*	Federal: None State: None CNPS: Rank 1B.1	Coastal sage scrub, valley and foothill grassland (alkaline), vernal pools. Occurring in mesic soils.	Does not occur. No suitable habitat.
Red sand-verbena *Abronia maritima*	Federal: None State: None CNPS: Rank 4.2	Coastal dunes.	Does not occur. No suitable habitat.
Robinson's pepper grass *Lepidium virginicum* var. *robinsonii*	Federal: None State: None CNPS: Rank 4.3	Chaparral, coastal sage scrub	Does not occur. No suitable habitat.
Salt marsh bird's-beak *Chloropyron maritimum* ssp. *maritimum*	Federal: FE State: SE CNPS: Rank 1B.2	Coastal dune, coastal salt marshes and swamps.	Does not occur. No suitable habitat.
Salt Spring checkerbloom *Sidalcea neomexicana*	Federal: None State: None CNPS: Rank 2B.2	Mesic, alkaline soils in chaparral, coastal sage scrub, lower montane coniferous forest, Mojavean desert scrub, and playas.	Does not occur. No suitable habitat.
San Bernardino aster *Symphyotrichum defoliatum*	Federal: None State: None CNPS: Rank 1B.2	Cismontane woodland, coastal scrub, lower montane coniferous forest, meadows and seeps, marshes and swamps, valley and foothill grassland (vernally mesic).	Potential to occur; however, species was not observed during focused plant surveys.
San Diego button-celery *Eryngium aristulatum* var. *parishii*	Federal: FE State: SE CNPS: Rank 1B.1	Mesic soils in vernal pools, valley and foothill grasslands, coastal sage scrub.	Does not occur. No suitable habitat.
San Fernando Valley spineflower *Chorizanthe parryi* var. *fernandina*	Federal: Candidate State: SE CNPS: Rank 1B.1	Coastal sage scrub, occurring on sandy soils.	Does not occur. No suitable habitat.
Santa Ana River woolly star *Eriastrum densifolium* ssp. *sanctorum*	Federal: FE State: SE CNPS: Rank 1B.1	Alluvial fan sage scrub, chaparral. Occurring on sandy or rocky soils.	Does not occur. No suitable habitat.

Species	Status	Habitat	Occurrence On-Site
Seaside cistanthe *Cistanthe maritima*	Federal: None State: None CNPS: Rank 4.2	Sandy soils in coastal bluff scrub, coastal scrub, and valley and foothill grassland.	Does not occur. No suitable habitat.
Slender-horned spineflower *Dodecahema leptoceras*	Federal: FE State: SE CNPS: Rank 1B.1	Sandy soils in alluvial scrub, chaparral, cismontane woodland.	Does not occur. No suitable habitat.
Small-flowered morning-glory *Convolvulus simulans*	Federal: None State: None CNPS: Rank 4.2	Chaparral (openings), coastal sage scrub, valley and foothill grassland. Occurring on clay soils and serpentinite seeps.	Does not occur. No suitable habitat.
South coast branching phacelia *Phacelia ramosissima* var. *austrolitoralis*	Federal: None State: None CNPS: Rank 3.2	Sandy, sometimes rocky soils in chaparral, coastal dunes, coastal scrub, and marshes and swamps (coastal salt)	Does not occur. No suitable habitat.
South coast saltscale *Atriplex pacifica*	Federal: None State: None CRPR: 1B.2	Coastal bluff scrub, coastal dunes, coastal sage scrub, playas.	Does not occur. No suitable habitat.
Southern California black walnut *Juglans californica*	Federal: None State: None CNPS: Rank 4.2	Chaparral, cismontane woodland, coastal sage scrub, alluvial surfaces.	Does not occur. No suitable habitat.
Southern tarplant *Centromadia parryi* ssp. *australis*	Federal: None State: None CNPS: Rank 1B.1	Disturbed habitats, margins of marshes and swamps, vernally mesic valley and foothill grassland, vernal pools.	Present. Detected onsite.
Southwestern spiny rush *Juncus acutus* ssp. *leopoldii*	Federal: None State: None CNPS: Rank 4.2	Coastal dunes (mesic), meadows and seeps (alkaline seeps), and marshes and swamps (coastal salt).	Does not occur. Previously transplanted but now conformed extirpated.
Summer holly *Comarostaphylis diversifolia* ssp. *diversifolia*	Federal: None State: None CNPS: Rank 1B.2	Chaparral.	Does not occur. No suitable habitat.
Tecate cypress *Hesperocyparis forbesii*	Federal: None State: None CNPS: Rank 1B.1	Closed-cone coniferous forest, chaparral.	Does not occur. No suitable habitat.
Thread-leaved brodiaea *Brodiaea filifolia*	Federal: FT State: SE CNPS: Rank 1B.1	Clay soils in chaparral (openings), cismontane woodland, coastal sage scrub, playas, valley and foothill grassland, vernal pools.	Does not occur. No suitable habitat.
Vernal barley *Hordeum intercedens*	Federal: None State: None CNPS: Rank 3.2	Coastal dunes, coastal sage scrub, valley and foothill grassland (saline flats and depressions), vernal pools.	Present. Occurs near northeast corner of Lower Marsh as reported by B. Nerhus.
Western dichondra *Dichondra occidentalis*	Federal: None State: None CRPR: 4.2	Coastal sage scrub, chaparral, oak woodland. Often in dry sandy banks in scrub or under trees.	Does not occur. No suitable habitat.

Species	Status	Habitat	Occurrence On-Site
White rabbit-tobacco *Pseudognaphalium leucocephalum*	Federal: None State: None CNPS: Rank 2B.2	Sandy or gravelly soils in chaparral, cismontane woodland, coastal scrub, and riparian woodland.	Does not occur. No suitable habitat.
Woolly chaparral-pea *Pickeringia montana var tomentosa*	Federal: None State: None CNPS: Rank 4.3	Gabbroic, granitic, and clay soils in chaparral.	Does not occur. No suitable habitat.

4.4.1 Special-Status Plants Detected On-Site

Southern Tarplant – This species is a member of the sunflower family (Asteraceae) and is designated as a CNPS List 1B.1 species but is not a state or federally listed species. This annual herb is known to occur in marshes and swamps, valley and foothill grasslands, and vernal pools below 427 meters (1,400 feet) AMSL. Southern tarplant is known to occur from Santa Barbara, Ventura, Los Angeles, Orange, and San Diego counties, and is known to bloom from May through November. An estimated 1,500 southern tarplant individuals were observed along the northwestern Project boundary as depicted on Exhibit 6. The population occurs within and alongside a maintained, unpaved access road in multiple discrete patches. The southern tarplant individuals were detected primarily in fruit; however, some flowering individuals were observed as well as dried vegetative parts of individuals remaining of past season.

Vernal Barley - This species is a member of the grass family (Poaceae) and is designated as a CNPS List 3.2 species but is not a state or federally listed species. This annual herb is known to occur in coastal dunes, coastal scrub, and saline flats/depressions within valley and foothill grasslands and vernal pools from 5 to 1,000 meters (16 to 3,280 feet) AMSL. Vernal barley is known to occur from Fresno County south to Baja, California, and is known to bloom from March through June. This species was recently reported to occur near the northeast corner of the Lower Marsh by B. Nerhus. It was not observed during the focused plant surveys conducted by GLA, as the surveys were completed outside the flowering season of this annual species, Nevertheless, it is presumed extant onsite as depicted on Exhibit 6.

4.5 Special-Status Animals

The following special-status animals were detected at the Project site: Western pond turtle (*Emys marmorata*), American peregrine falcon (*Falco peregrinus anatum*), bald eagle (*Haliaeetus leucocephalus*), (wintering), burrowing owl (*Athene cunicularia)* (wintering), coastal California gnatcatcher (*Polioptila californica californica*), California least tern, least Bell's vireo (*Vireo bellii pusillus*), Ridgeway rail,(*Rallus obsoletus*) willow flycatcher (*Empidonax traillii extimus*), yellow-breasted chat (*Icteria virens*), yellow warbler (*Setophaga petechia*), white-tailed kite (*Elanus leucurus*). Table 4-3 provides a list of special-status animals evaluated for the Project site through general surveys, habitat assessments, and focused surveys. Species were evaluated based on the following: 1) species identified by the CNDDB as occurring (currently or historically) on or in the vicinity of the Project site, and 2) other special-status animals known to occur in the vicinity of the Project site, for which potentially suitable habitat occurs on the site.

Species evaluated, with potential to occur, based on factors such as historic range and/or suitability of onsite habitat is noted in Table 4-3. Presence or absence (or alternative determinations such as "expected for foraging" or "not expected") was determined based on the long-term collection of data at the SJMR. For avian species, Sea and Sage Audubon has conducted monthly avian occurrence data between 2011 and present. Combined with additional avian survey data (e.g., Harmsworth 2007, 2008), there is a robust data set regarding avian use of the SJMR. Similarly, long-term data collection for species such as the western pond turtle (*Emys marmorata*) (Nerhus, 2016) has provide robust data allowing for accurate assessments of presence or absence. For species such as bats, the SJMR provides suitable foraging habitat due to the presence of bodies of ponded water; however, roosting habitat in not available for most species as addressed in the table below.

Table 4-3. Special Status Animals Evaluated for the Project Site

Status

Federal	**State/CDFW**
FE – Federally Endangered	SE – State Endangered
FT – Federally Threatened	ST – State Threatened
FPT – Federally Proposed Threatened	SC– State Candidate
FC – Federal Candidate	CFP – California Fully-Protected Species
BGEPA– Bald and Golden Eagle Protection Act	SSC – Species of Special Concern
BCC – Birds of Conservation Concern	

Western Bat Working Group (WBWG)
H – High Priority
LM – Low-Medium Priority
M – Medium Priority
MH – Medium-High Priority

Occurrence

- Absent – The species is absent from the site, either because the site lacks suitable habitat for the species, the site is located outside of the known range of the species, or focused surveys and/or long-term census data has confirmed the absence of the species.
- Not expected to occur – The species is not expected to occur onsite due to low habitat quality and absence during census surveys, however absence cannot be ruled out.
- Potential to occur – The species has a potential to occur onsite based on suitable habitat, however its presence/absence could not be confirmed.
- Present – The species was detected onsite incidentally or through focused surveys.

Species	Status	Habitat Requirements	Occurrence On-Site
INVERTEBRATES			
Crotch bumble bee *Bombus crotchii*	Federal: None State: CE CDFW: None	Relatively warm and dry sites, including the inner Coast Range of California and margins of the Mojave Desert.	Absent, no suitable habitat.

Species	Status	Habitat Requirements	Occurrence On-Site
Quino checkerspot butterfly *Euphydryas editha quino*	Federal: FE State: None CDFW: None	Larval and adult phases each have distinct habitat requirements tied to host plant species and topography. Larval host plants include *Plantago erecta* and *Castilleja exserta*. Adults occur on sparsely vegetated rounded hilltops and ridgelines,and are known to disperse through disturbed habitats to reach suitable nectar plants.	Absent, no suitable habitat.
Riverside fairy shrimp *Streptocephalus woottoni*	Federal: FE State: None CDFW: None	Restricted to deep seasonal vernal pools, vernal pool-like ephemeral ponds, and stock ponds.	Absent, no suitable habitat.
San Diego fairy shrimp *Branchinecta sandiegonensi*	Federal: FE State: None CDFW: None	Seasonal vernal pools	Absent, no suitable habitat.
FISH			
Arroyo chub *Gila orcutti*	Federal: None State: None CDFW: SSC	Slow-moving or backwater sections of warm to cool streams with substrates of sand or mud.	Absent, no suitable habitat.
Santa Ana speckled dace *Rhinichthys osculus* ssp. *3*	Federal: None State: None CDFW: SSC	Occurs in the headwaters of the Santa Ana and San Gabriel Rivers. May be extirpated from the Los Angeles River system. Requires permanent flowing streams with summer water temperatures of 17-20 C. Usually inhabits shallow cobble and gravel riffles.	Absent, no suitable habitat.
Santa Ana sucker *Catostomus santaanae*	Federal: FT State: None CDFW: None	Small, shallow streams, less than 7 meters in width, with currents ranging from swift in the canyons to sluggish in the bottom lands. Preferred substrates are generally coarse and consist of gravel, rubble, and boulders with growths of filamentous algae, but occasionally they are found on sand/mud substrates.	Absent, no suitable habitat.
Southern steelhead – southern California DPS *Oncorhynchus mykiss irideus*	Federal: FE State: None CDFW: None	Clear, swift moving streams with gravel for spawning. Federal listing refers to populations from Santa Maria river south to southern extent of range (San Mateo Creek in San Diego county.)	Absent, no suitable habitat.
Tidewater goby *Eucyclobobius newberryi*	Federal: FE State: None CDFW: SSC	Occurs in shallow lagoons and lower stream reaches along the California coast from Agua Hedionda Lagoon, San Diego Co. to the mouth of the Smith River.	Absent, no suitable habitat.

Species	Status	Habitat Requirements	Occurrence On-Site
AMPHIBIANS			
Arroyo toad *Anaxyrus californicus*	Federal: FE State: None CDFW: SSC	Breed, forage, and/or aestivate in aquatic habitats, riparian, coastal sage scrub, oak, and chaparral habitats. Breeding pools must be open and shallow with minimal current, and with a sand or pea gravel substrate overlain with sand or flocculent silt. Adjacent banks with sandy or gravely terraces and very little herbaceous cover for adult and juvenile foraging areas, within a moderate riparian canopy of cottonwood, willow, or oak.	Absent, no suitable habitat.
Coast Range newt *Taricha torosa*	Federal: None State: None CDFW: SSC	Found in wet forests, oak forests, chaparral, and rolling grasslands. In southern California, drier chaparral, oak woodland, and grasslands are used.	Absent, no suitable habitat.
Western spadefoot *Spea hammondii*	Federal: FSC State: None CDFW: SSC	Seasonal pools in coastal sage scrub, chaparral, and grassland habitats.	Absent, no suitable habitat.
REPTILES			
California glossy snake *Arizona elegans occidentalis*	Federal: None State: None CDFW: SSC	Inhabits arid scrub, rocky washes, grasslands, chaparral.	Absent, no suitable habitat.
Coast horned lizard *Phrynosoma blainvillii*	Federal: FSC State: None CDFW: SSC	Occurs in a variety of vegetation types including coastal sage scrub, chaparral, annual grassland, oak woodland, and riparian woodlands.	Absent, no suitable habitat.
Coast patch-nosed snake *Salvadora hexalepis virgultea*	Federal: None State: None CDFW: SSC	Occurs in coastal chaparral, desert scrub, washes, sandy flats, and rocky areas.	Absent, no suitable habitat.
Coastal whiptail *Aspidoscelis tigris stejnegeri (multiscutatus)*	Federal: None State: None CDFW: SSC	Open, often rocky areas with little vegetation, or sunny microhabitats within shrub or grassland associations.	Absent, no suitable habitat.
Red-diamond rattlesnake *Crotalus ruber*	Federal: None State: None CDFW: SSC	Habitats with heavy brush and rock outcrops, including coastal sage scrub and chaparral.	Absent, no suitable habitat.

Species	Status	Habitat Requirements	Occurrence On-Site
California legless lizard *Anniella sp. 1*	Federal: None State: None CDFW: SSC	Common in the Coast Ranges from the vicinity of Antioch, Contra Costa Co. south to the Mexican border. Range includes the floor of the San Joaquin Valley from San Joaquin Co. south, the west slope of the southern Sierra, the Tehachapi Mountains west of the desert, and the mountains of southern California. Common in several habitats but especially in coastal dune, valley-foothill, chaparral, and coastal scrub types.	Absent, no suitable habitat.
Two-striped garter snake *Thamnophis hammondii*	Federal: None State: None CDFW: SSC	Aquatic snake typically associated with wetland habitats such as streams, creeks, and pools.	Potential to occur, not observed during surveys.
Western pond turtle *Emys marmorata*	Federal: None State: None CDFW: SSC	Slow-moving permanent or intermittent streams, small ponds and lakes, reservoirs, abandoned gravel pits, permanent and ephemeral shallow wetlands, stock ponds, and treatment lagoons. Abundant basking sites and cover necessary, including logs, rocks, submerged vegetation, and undercut banks.	Present. Occurs throughout areas of the SJMR based on five years of trapping surveys and ongoing monitoring by B. Nerhus.
BIRDS			
American peregrine falcon (nesting) *Falco peregrinus anatum*	Federal: Delisted, BCC State: Delisted CDFW: CFP	Breeding habitat consists of high cliffs, tall buildings, and bridges along the coast and inland. Foraging habitat primarily includes open areas near wetlands, marshes, and adjacent urban landscapes.	Present. Observed by Sea and Sage Audubon Society in 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, and 2020.
Bald eagle (nesting & wintering) *Haliaeetus leucocephalus*	Federal: Delisted State: SE CDFW: CFP	Primarily in or near seacoasts, rivers, swamps, and large lakes. Perching sites consist of large trees or snags with heavy limbs or broken tops.	Present as single occurrence. Observed by Sea and Sage Audubon Society in 2013
Bank swallow (nesting) *Riparia riparia*	Federal: None State: ST CDFW: None	Low areas along rivers, streams, ocean coasts or reservoirs. Often use human-made sites.	Potential to occur. Suitable habitat onsite, has been observed in ponds at IRWD but not at SJMR.
Belding's savannah sparrow *Passerculus sandwichensis beldingi*	Federal: None State: SE CDFW: None	Coastal Marshes	Absent. Not observed during numerous surveys and does not occur.

Species	Status	Habitat Requirements	Occurrence On-Site
Burrowing owl *Athene cunicularia*	Federal: FSC State: None CDFW: SSC	Shortgrass prairies, grasslands, lowland scrub, agricultural lands (particularly rangelands), coastal dunes, desert floors, and some artificial, open areas as a year-long resident. Occupies abandoned ground squirrel burrows as well as artificial structures such as culverts and underpasses.	Present. Observed by Sea and Sage Audubon Society in 2011 and 2015. Observed during site surveys on 10/14/20 and 10/15/20 at burrow on berm of Pond 5.
California black rail *Laterallus jamaicensis coturniculus*	Federal: BCC State: ST CDFW: CFP	Nests in high portions of salt marshes, shallow freshwater marshes, wet meadows, and flooded grassy vegetation.	Not expected to occur. Not observed by Sea and Sage Audubon between 2011 and 2020
California least tern (nesting colony) *Sterna antillarum browni*	Federal: FE State: SE CDFW: CFP	Flat, vegetated substrates near the coast. Occurs near estuaries, bays, or harbors where fish is abundant.	Present (foraging only). Observed by Sea and Sage Audubon Society in 2012, 2013, 2014, 2015, 2016, 2017, 2018, and 2020.
Coastal cactus wren *Campylorhychus brunneicapillus sandiegensis*	Federal: None State: None CDFW: SSC	Occurs almost exclusively in cactus (cholla and prickly pear) dominated coastal sage scrub.	Not expected to occur. Not observed by Sea and Sage Audubon between 2011 and 2020
Coastal California gnatcatcher *Polioptila californica californica*	Federal: FT State: None CDFW: SSC	Low elevation coastal sage scrub and coastal bluff scrub.	Present. Observed by Sea and Sage Audubon Society in 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, and 2020.
Grasshopper sparrow (nesting) *Ammodramus savannarum*	Federal: None State: None CDFW: SSC	Open grassland and prairies with patches of bare ground.	Not expected to occur. Not observed by Sea and Sage Audubon between 2011 and 2020
Least Bell's vireo *Vireo bellii pusillus*	Federal: FE State: SE CDFW: None	Dense riparian habitats with a stratified canopy, including southern willow scrub, mule fat scrub, and riparian forest.	Present. Observed by Sea and Sage Audubon Society in 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, and 2020.
Ridgeway rail *Rallus obsoletus*	Federal: FE State: SE CDFW: CFP	Marsh vegetation of coastal wetlands.	Present. Observed by Sea and Sage Audubon Society in 2012 and B. Nerhus in multiple years.
Long-eared owl (nesting) *Asio otus*	Federal: None State: None CDFW: SSC	Riparian habitats are required by the long-eared owl, but it also uses live-oak thickets and other dense stands of trees.	Not expected to occur. Not observed by Sea and Sage Audubon between 2011 and 2020
Southwestern willow flycatcher (nesting) *Empidonax traillii extimus*	Federal: FE State: SE CDFW: None	Riparian woodlands along streams and rivers with mature dense thickets of trees and shrubs.	Present. One (migrant) individual observed by Sea and Sage during a monthly survey in June 2017 and five (migrant) individuals detected by Sea and Sage in June 2020.

Species	Status	Habitat Requirements	Occurrence On-Site
Swainson's hawk (nesting) *Buteo swainsoni*	Federal: BCC State: ST CDFW: None	Summer in wide open spaces of the American West. Nest in grasslands but can use sage flats and agricultural lands. Nests are placed in lone trees.	Absent. Not observed by Sea and Sage Audubon between 2011 and 2020
Tricolored blackbird (nesting colony) *Agelaius tricolor*	Federal: BCC State: CE, SSC CDFW: None	Breeding colonies require nearby water, a suitable nesting substrate, and open-range foraging habitat of natural grassland, woodland, or agricultural cropland.	Absent. Suitable Habitat. Not observed by Sea and Sage Audubon between 2011 and 2020
Western snowy plover (nesting) *Charadrius alexandrinus nivosus*	Federal: FT, BCC State: None CDFW: SSC	Sandy or gravelly beaches along the coast, estuarine salt ponds, alkali lakes, and at the Salton Sea.	Absent. Not observed by Sea and Sage Audubon between 2011 and 2020
Western yellow-billed cuckoo (nesting) *Coccyzus americanus occidentalis*	Federal: FT, BCC State: SE CDFW: None	Dense, wide riparian woodlands with well-developed understories.	Absent. Not observed by Sea and Sage Audubon between 2011 and 2020
White-tailed kite (nesting) *Elanus leucurus*	Federal: FSC State: None CDFW: CFP	Low elevation open grasslands, savannah-like habitats, agricultural areas, wetlands, and oak woodlands. Dense canopies used for nesting and cover.	Present. Observed by Sea and Sage Audubon Society in 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, and 2020.
Yellow rail *Coturnicops noveboracensis*	Federal: BCC State: None CDFW: SSC	Shallow marshes, and wet meadows; in winter, drier freshwater and brackish marshes, as well as dense, deep grass, and rice fields.	Absent. Not observed by Sea and Sage Audubon between 2011 and 2020
Yellow warbler (nesting) *Setophaga petechia*	Federal: BCC State: None CDFW: SSC	Breed in lowland and foothill riparian woodlands dominated by cottonwoods, alders, or willows and other small trees and shrubs typical of low, open-canopy riparian woodland. During migration, forages in woodland, forest, and shrub habitats.	Present. Observed by Sea and Sage Audubon Society in 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, and 2020.
Yellow-breasted chat *Icteria virens*	Federal: None State: None CDFW: SSC	Dense, relatively wide riparian woodlands and thickets of willows, vine tangles, and dense brush with well-developed understories.	Present. Observed by Sea and Sage Audubon Society in 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, and 2020.
MAMMALS			
American badger *Taxidea taxus*	Federal: None State: None CDFW: SSC	Most abundant in drier open stages of most scrub, forest, and herbaceous habitats, with friable soils.	Absent. No suitable habitat. Does not occur.
Big free-tailed bat *Nyctinomops macrotis*	Federal: None State: None CDFW: SSC	Occurs in low-lying arid areas in Southern California. Roosts in high cliffs or rocky outcrops.	Expected. Potential foraging habitat. No roosting habitat.
Mexican long-tongued bat *Choeronycteris mexicana*	Federal: None State: None CDFW: SSC WBWG: H	Variety of habitats ranging from desert, montane, riparian, to pinyon-juniper habitats. Found roosting in desert canyons, deep caves, mines, or rock crevices. Can use abandoned buildings.	Expected. Potential foraging habitat. No roosting habitat.

Species	Status	Habitat Requirements	Occurrence On-Site
Northwestern San Diego pocket mouse *Chaetodipus fallax fallax*	Federal: None State: None CDFW: SSC	Coastal sage scrub, sage scrub/grassland ecotones, and chaparral.	Absent. No suitable habitat. Does not occur.
Pacific pocket mouse *Perognathus longimembris pacificus*	Federal: FE State: None CDFW: SSC	Fine, alluvial soils along the coastal plain. Scarcely in rocky soils of scrub habitats.	Absent. No suitable habitat. Does not occur.
Pallid bat *Antrozous pallidus*	Federal: None State: None CDFW: SSC WBWG: H	Deserts, grasslands, shrublands, woodlands, and forests. Most common in open, dry habitats with rocky areas for roosting.	Absent. No suitable habitat. Does not occur.
San Diego desert woodrat *Neotoma lepida intermedia*	Federal: None State: None CDFW: SSC	Occurs in a variety of shrub and desert habitats, primarily associated with rock outcrops, boulders, cacti, or areas of dense undergrowth.	Absent. No suitable habitat. Does not occur.
Southern California saltmarsh shrew *Sorex ornatus salicoricus*	Federal: None State: None CDFW: SSC	Coastal marshes. Requires dense vegetation and woody debris for cover.	Absent. No suitable habitat. Does not occur.
Southern grasshopper mouse *Onychomys torridus ramona*	Federal: None State: None CDFW: SSC	Desert areas, especially scrub habitats with friable soils for digging. Prefers low to moderate shrub cover.	Absent. No suitable habitat. Does not occur.
Western mastiff bat *Eumops perotis californicus*	Federal: None State: None CDFW: SSC WBWG: H	Occurs in many open, semi-arid to arid habitats, including conifer and deciduous woodlands, coastal scrub, grasslands, and chaparral. Roosts in crevices in cliff faces, high buildings, trees, and tunnels.	Expected. Potential foraging habitat. No roosting habitat.
Western red bat *Lasiurus blossevillii*	Federal: None State: SSC WBWG: H	Prefers riparian areas dominated by walnuts, oaks, willows, cottonwoods, and sycamores where they roost in broad-leafed trees.	Expected. Potential foraging habitat and roosting habitat.
Western yellow bat *Lasiurus xanthinus*	Federal: None State: None CDFW: SSC	Found in valley foothill riparian, desert riparian, desert wash, and palm oasis habitats. Roosts in trees, particularly palms. Forages over water and among trees.	Expected. Potential foraging habitat and roosting habitat.

4.5.1 Special-Status Wildlife Species Observed or Expected within the Project Site

Western Pond Turtle – The western pond turtle has been identified on the site and was the subject to detailed surveys by Barry Nerhus Jr. (2016) who conducted radio telemetry and mark-recapture data between 2008-2012. Based on the Nerhus survey data, the population size was determined to be between 274 and 355 individuals, making it the largest of six populations studied in southern California. Nesting was most prevalent in upland areas including mostly in coastal sage scrub and in three instances on access road banks. Within the areas of wetland/marsh habitat, western pond turtles were observed in the Middle Marsh, Lower Marsh and Experimental Ponds. Exhibit 7 summarizes the data by Nerhus, who, as noted, reports that the SJMR population is the largest Orange County population and the largest of six studied populations in southern California making it a significant regional population.

American Peregrine Falcon – Observed by Sea and Sage Audubon Society in 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, and 2020. The SJMR provides foraging habitat but does not include areas suitable for nesting.

Bald Eagle (Wintering) – Observed by Sea and Sage Audubon Society in 2013. The SJMR provides foraging habitat but does not include areas suitable for nesting.

Burrowing Owl (Wintering) – Burrowing owl was observed by Sea and Sage. A single wintering owl was observed by Tony Bomkamp on October 14 and 15, 2020 on the berms adjacent to Ponds 2, 3, 4 and 5. Exhibit 8 depicts the location of burrows used by the owl on October 14 and 15, 2020.

Coastal California Gnatcatcher – The coastal California gnatcatcher is common within areas of coastal sage scrub north of the SJMR Reserve and within coastal sage scrub along the eastern edge of the reserve, where they were observed during site surveys [Exhibit 9]. A single coastal California gnatcatcher was observed foraging in mulefat scrub along the eastern edge of the Lower Marsh.

California least tern – Observed foraging by Sea and Sage Audubon Society in 2012, 2013, 2014, 2015, 2016, 2017, 2018, and 2020. Ponds within the SJMR provide suitable foraging habitat for the California least tern; however, the SJMR does not contain suitable breeding habitat for this species and breeding has not been recorded during surveys.

Least Bell's vireo – Observed by Sea and Sage Audubon Society in 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, and 2020. Areas of black willow forest and mulefat thickets provide suitable breeding habitat for this species. Exhibit 10 depicts areas of suitable black willow forest which essentially ring the Upper Marsh, occur at the northeast corner of the Middle Marsh and along the western boundary of the Middle Marsh. Exhibit 10 also depicts the Sea and Sage Audubon survey routes. The mulefat thickets within the southern one-third of the Lower Marsh and black willow forest at the western end of the Hoag Pond also provide suitable habitat for least Bell's vireo as do the mulefat thickets in the Seasonal Pond.

Ridgeway rail – There have been multiple observations of the Ridgeway rail within areas of emergent marsh at the SJMR. Ridgeway rail was detected during monthly surveys by Sea and Sage Audubon in 2012. Other observations were reported by Barry Nerhus (2020) that include sightings of Ridgeway rails in Pond 8 that consisted of a single advertising male and a nesting pair in the middle marsh. Nerhus (2020) reported observations of Ridgeways rails "throughout the marsh over the years", including "a 9 egg nest in 2009 in Pond 6". Thus, the Middle Marsh, Experimental Ponds and Hoag Pond all exhibit potential to support this species.

Southwestern Willow Flycatcher – Willow flycatcher is a migratory species composed of four subspecies which breed within distinct geographic ranges. Southwestern Willow Flycatcher (SWFL) is a federally and State-listed endangered subspecies that breeds within the southwestern region of the United States. SWFL is a riparian obligate species and prefers to nest within dense, contiguous riparian habitat that is at least 30 feet wide with slow-moving water sources and saturated soils present (Sogge et al. 2010). One (migrant) individual observed by Sea and Sage during a monthly survey in June 2017 and five (migrant) individuals detected by Sea and Sage in June 2020. In accordance with the survey protocol, a single early season detection of this species indicates a migrant subspecies and not the listed subspecies SWFL. Exhibit 10 depicts areas of suitable black willow forest which essentially ring the Upper Marsh, occur at the northeast corner of the Middle Marsh and along the western boundary of the Middle Marsh. The black willow forest at the western end of the Hoag Pond also provide potentially suitable habitat.

Yellow-Breasted Chat – Yellow-breasted chat was observed during monthly surveys by Sea and Sage Audubon Society in 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, and 2020 and breeds onsite in areas of black willow forest and mulefat scrub. Exhibit 10 depicts areas of suitable black willow forest which essentially ring the Upper Marsh, occur at the northeast corner of the Middle Marsh and along the western boundary of the Middle Marsh. The mulefat thickets within the southern one-third of the Lower Marsh and black willow forest at the western end of the Hoag Pond also provide suitable habitat for Yellow-breasted chat as do the mulefat thickets in the Seasonal Pond.

Yellow Warbler – Yellow warbler was observed during monthly surveys by Sea and Sage Audubon Society in 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, and 2020 and breeds onsite in areas of black willow forest. Exhibit 10 depicts areas of suitable black willow forest which essentially ring the Upper Marsh, occur at the northeast corner of the Middle Marsh and along the western boundary of the Middle Marsh. The black willow forest at the western end of the Hoag Pond also provide suitable habitat for Yellow warbler.

White-Tailed Kite – White-tailed kite was observed during monthly surveys by Sea and Sage in 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, and 2020. White-tailed kites we observed by GLA biologists during most site visits in September, October and November of 2020. White-tailed kites have been documented to breed in the riparian habitat adjacent to the UCI Arboretum by Lee (2012) and are presumed to breed in other suitable areas of the SJMR. Exhibit 10 depicts areas of suitable black willow forest which essentially ring the Upper Marsh, occur at the northeast corner of the Middle Marsh and along the western boundary of the Middle Marsh. The mulefat thickets within the southern one-third of the Lower Marsh and black willow forest at the western end of the Hoag Pond also provide suitable habitat as would individual and small clumps of black willow.

Big free-tailed bat – The SJMR contains areas suitable for foraging bats, particularly areas of open water that provide foraging opportunities and opportunities for obtaining water. Focused surveys were not conducted because the project does not exhibit potential for maternal roosts and would not impact foraging activities.

Mexican Long-Tongued Bat – The SJMR contains areas suitable for foraging bats, particularly areas of open water that provide foraging opportunities and opportunities for obtaining water. Focused surveys were not conducted because the project does not exhibit potential for maternal roosts and would not impact foraging activities.

Western Mastiff Bat – The SJMR contains areas suitable for foraging bats, particularly areas of open water that provide foraging opportunities and opportunities for obtaining water. Focused surveys were not conducted because the project does not exhibit potential for maternal roosts and would not impact foraging activities.

Western Red Bat – The SJMR contains areas suitable for foraging bats, particularly areas of open water that provide foraging opportunities and opportunities for obtaining water. The SJMR also exhibits potential areas for maternal roosts within the black willow forest.

Western Yellow Bat – The SJMR contains areas suitable for foraging bats, particularly areas of open water that provide foraging opportunities and opportunities for obtaining water. The SJMR also exhibits potential areas for maternal roosts within the black willow forest.

4.5.2 Critical Habitat

The SJMR has not been designated as Critical Habitat for any federally listed species by the USFWS or by the National Oceanic and Atmospheric Administration/National Marine Fisheries Service (NMFS).

4.6 Raptor and Owl Use

The SJMR provides suitable foraging and breeding habitat for a number of raptor species, including special-status raptors. Monthly surveys by Sea and Sage Audubon has recorded the following raptor species between 2011 and 2020 using the SJMR: turkey vulture, osprey, white-tailed kite, northern harrier, sharp-shinned hawk, Cooper's hawk, red-shouldered hawk, red-tailed hawk, bald eagle, American kestrel, merlin, and peregrine falcon. The following owls have been recorded on the site by Sea and Sage between 2011 and 2020: burrowing owl (wintering), barn owl, and great-horned owl and as noted, burrowing owl was observed during surveys on October 14 and 15, 2020 by GLA.

4.7 Nesting Birds

The Project site contains trees, shrubs, and ground cover that provide suitable habitat for nesting migratory birds. Impacts to nesting birds are prohibited under the Migratory Bird Treaty Act (MBTA) and California Fish and Game Code.[13]

4.8 Wildlife Linkages/ Corridors and Nursery Sites

Habitat linkages are areas which provide a communication between two or more other habitat areas which are often larger or superior in quality to the linkage. Such linkage sites can be quite small or constricted but can be vital to the long-term health of connected habitats. Linkage values are often addressed in terms of "gene flow" between populations, with movement taking potentially many generations.

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[13] The MBTA makes it unlawful to take, possess, buy, sell, purchase, or barter any migratory bird listed in 50 C.F.R. Part 10, including feathers or other parts, nests, eggs, or products, except as allowed by implementing regulations (50 C.F.R.21). In addition, sections 3505, 3503.5, and 3800 of the California Department of Fish and Game Code prohibit the take, possession, or destruction of birds, their nests or eggs.

Corridors are similar to linkages but provide specific opportunities for individual animals to disperse or migrate between areas, generally extensive but otherwise partially or wholly separated regions. Adequate cover and tolerably low levels of disturbance are common requirements for corridors. Habitat in corridors may be quite different than that in the connected areas, but if used by the wildlife species of interest, the corridor will still function as desired.

Wildlife nurseries are sites where wildlife concentrate for hatching and/or raising young, such as rookeries, spawning areas, and bat colonies. Nurseries can be important to both special-status species as well as commonly occurring species. As noted above, the site contains one of the largest populations for western pond turtle in Orange County and southern California.

4.9. Jurisdictional Delineation

4.9.1 Corps Jurisdiction

As noted in Section 3.3.1 above, the SJMR would be considered waters of the U.S. as an adjacent wetland (33 CFR Part 328.3(a)(4)), specifically as set forth on page 22251 of the preamble to the NWPR:

> *The final rule defines ''adjacent wetlands'' as wetlands that…are physically separated from a territorial sea or traditional navigable water, a tributary, or a lake, pond, or impoundment of a jurisdictional water only by an artificial dike, barrier, or similar artificial structure so long as that structure allows for a direct hydrological surface connection to the territorial sea or traditional navigable water, tributary, or lake, pond, or impoundment of a jurisdictional water in a typical year, such as through a culvert, flood or tide gate, pump, or similar artificial feature.*[14]

Corps jurisdiction associated with the SJMR totals approximately 179.05 acres of waters of the United States which consists entirely of wetlands adjacent to San Juan Creek, an intermittent steam that is tributary to Upper Newport Bay, which is subject to the ebb and flow of the tide and connected to the Pacific Ocean. The boundaries of the waters of the United States are depicted on the enclosed maps.

The SJMR Reserve is divided into areas designated as the Upper Marsh, Middle Marsh, Lower Marsh, Seasonal Marsh, Experimental Ponds and Hoag Pond. Exhibit 3 depicts the SJMR with each of the subareas identified. Exhibit 11 depicts the areas of Corps, potential CDFW jurisdiction and Regional Board jurisdiction. Exhibit 12, depicts the soil types associated with the SJMR.

Hydrology within the SJMR originates as direct rainfall limited runoff from the surrounding watershed as well as discharges of water beneath Campus Drive that is provided by the Irvine Ranch Water District (IRWD). The water that enters the marsh from IRWD moves southward through the Upper Marsh and is carried by culvert to the Middle Marsh and ultimately to the Lower Marsh. Water is also pumped to the Experimental Ponds and the Hoag Pond.

[14] Federal Register /Vol. 85, No. 77 /Tuesday, April 21, 2020 /Rules and Regulations

Upper Marsh

The Upper Marsh covers 27.63 acres and includes a mosaic of wetland areas covering 26.75 acres consisting of California bulrush marsh, cattail marsh, and Goodding's black willow forest. The California bulrush marsh is dominated by California bulrush (*Schoenoplectus californicus*, OBL), which occurs as a monoculture in substantial portions of this alliance. Other species within thus alliance include cattails (*Typha angustifolia, latifolia and domingensis*, with a hybrid *T. x glauca* OBL)[15] and salt marsh bulrush (*Bolboschoenus maritimus*, OBL). Areas of cattail marsh occurs as monocultural stands of cattails, which as noted, varies by species within the marsh including three species and a hybrid, with, a small component of California bulrush. The Goodding's black willow forest is dominated by Goodding's black willow (*Salix goodinggii*, FACW) with a shrubby understory of mulefat (*Baccharis salicifolia,* FAC), arroyo willow (*Salix lasiolepis,* FACW), and herbaceous understory of alkali mallow (*Malva leprosa*, FACU), alkali heath (*Frankenia salina*, FACW), saltgrass (*Distichlis spicata*, FAC), Olney's bulrush (*Schoenoplectus americanus*, OBL), and non-native species including poison hemlock (*Conium maculatum*, FACW), Spanish sunflower (*Pulicaria paludosa*, FAC), and bristly ox-tongue (*Helminthotheca echioides*, FAC). Because the field work was conducted during the dry season, many of the areas that exhibit "open water" during earlier parts of the year were dry and exhibited two different wetland vegetation alliances including western sea purslane (*Sesuvium verrucosum,* FACW) and swamp pricklegrass (*Crypsis schoenoides,* FACW), which occupy the areas as near monocultures or in some cases in mixed stands, as the ponding areas dry down.

Middle Marsh

Like the Upper Marsh, the 46.02-acre Middle Marsh includes a mosaic wetland of areas consisting of California bulrush marsh, cattail marsh, and limited areas of Goodding's black willow (hybrid) forest and accounts for 43.76 acres. The California bulrush marsh is dominated by California bulrush (*Schoenoplectus californicus*, OBL), which occurs as a monoculture for substantial portions of this alliance. Other species within thus alliance include cattail (*Typha* sp., OBL) and salt marsh bulrush (*Bolboschoenus maritimus*, OBL). Areas of southern cattail marsh occurs as monocultural stands of southern cattail (*Typha domingensis*, OBL) with a small component of California bulrush. The Goodding's black willow (hybrid) forest is dominated by Goodding's black willow (*Salix gooddingii*, FACW) (hybrid) with a shrubby understory of mulefat (*Baccharis salicifolia,* FAC and herbaceous understory of alkali mallow (*Malva leprosa*, FACU), alkali heath (*Frankenia salina*, FACW), and saltgrass (*Distichlis spicata*, FAC). The Middle Marsh also includes areas of the western sea purslane and areas of swamp pricklegrass.

Lower Marsh

Like the Upper Marsh and Middle Marsh, the 25.81-acre Lower Marsh includes a mosaic of areas consisting of California bulrush marsh and cattail marsh accounting for 19.53 acres. The eastern approximately one-third of the Lower Marsh supports areas of dense Mulefat Thickets dominated by mulefat (*Baccharis salicifolia*, FAC). The California bulrush marsh is dominated by California bulrush (*Schoenoplectus californicus*, OBL), which includes a larger component of

[15] The variety of cattails within the various portions of the marsh was provided by Dr. Peter Bowler in an email to Tony Bomkamp, dated October 20, 2020.

the cattails. Other species within thus alliance include Olney's bulrush (*Scirpus americanus,* OBL) and salt marsh bulrush (*Bolboschoenus maritimus*, OBL). Areas of cattail marsh occurs as monocultural stands of cattail (*Typha* sp., OBL) with a larger component of California bulrush than in the Upper and Middle Marsh areas. The western portion of the Upper Marsh also includes areas of the western sea purslane and the northern edge supports areas of salt marsh bulrush (*Bolboschoenus maritimus,* OBL).

Seasonal Marsh

The Seasonal Marsh accounts for 34.01 acres with 33.57 acres of wetlands and is located at the northeast corner of the reserve. The Seasonal Marsh is the driest area within the reserve as it does not receive discharges originating from the IRWD water. This area relies on direct rainfall and exhibits a mosaic of wetland and upland vegetation alliances including areas with monocultural thickets of smooth cocklebur (*Xanthium strumarium*, FAC), stands of California bulrush marsh, Goodding's black willow forest, mulefat scrub, and weedy herbaceous alliances including mustard fields dominated by black mustard (*Brassica nigra*, UPL), bristly ox-tongue thickets dominated by bristly ox-tongue (*Helminthotheca echioides*, FAC), poison hemlock stands dominated by poison hemlock (*Conium maculatum*, FACU), and areas where the various species noted above are mixed together such that the vegetation includes areas of mixed species that includes Upland and wetland indicators. The western edge of the Seasonal Marsh will be subject to potential impacts for an alternative that would include installation of a swale and berm that will carry water from the culvert beneath Campus Drive to the toward a pipe in Pond 10 or the Middle Marsh leading to the culvert at the end of the Experimental Pond pipe network. As such, wetland delineation efforts were focused on the areas of potential impact.

Experimental Ponds

The Experimental Ponds cover 40.78 acres and were created in 1999, and as noted, receive water through direct rainfall as well as water that is pumped to the ponds which are subject to hydrological manipulation by means of "gates" which can be opened or closed at the discretion of the Reserve Manager.

There are 11 Experimental Ponds contain 34.80 acres of wetlands and areas of open water that occupy the east-central portion of the SJMR Reserve. The ponds generally exhibit similar characteristics (with exceptions). Most of the ponds include areas of open water that extend for various periods based on the annual hydrologic input. Areas surrounding the open water exhibit aeras dominated by California bulrush or cattails as described above. The outer portions of the Experimental Ponds are typically dominated by monocultural stands of salt marsh bulrush, which is an OBL species and thus is included in the wetland areas. The salt marsh bulrush areas often intergrade with a mosaic of species, which vary from pond to pond and even within ponds. This mosaic of species typically extends part way up the berms that encircle the Experimental ponds which transition to the roads. Species that are included in the transition zone include salt marsh bulrush, alkali heath (*Frankenia salina*, FACW), bristly ox-tongue (*Helminthotheca echioides,* FAC), slim aster (*Symphyotrichum subulatum* OBL), smooth cocklebur (*Xanthium strumarium*, FAC), prostrate spearscale (*Atriplex prostrata*, FACW), salt-loving goosefoot (*Chenopodium macrospermum*, FACW), rabbitsfoot grass (*Polypogon monspeliensis*, FACW), five-hook bassia

(*Bassia hyssopifolia*, FACU), and seaside heliotrope (*Heliotropium curassavicum*, FACU). The driest portions of the transition areas support a predominance of upland non-native grasses including soft chess (*Bromus hordeaceus*, FACU), red brome (*Bromus madritensis rubens*, UPL) and black mustard (*Brassica nigra*, UPL).

Hoag Pond

The Hoag Pond covers approximately 8.88 acres and includes a mosaic of areas consisting of California bulrush marsh, cattail marsh, and limited areas of Goodding's black willow (hybrid) forest and accounts for approximately 6.50 acres wetlands. The California bulrush marsh is dominated by California bulrush (*Schoenoplectus californicus*, OBL), which occurs as a monoculture for substantial portions of this alliance. Other species within this alliance include cattail (*Typha* sp., OBL) and salt marsh bulrush (*Bolboschoenus maritimus*, OBL). A substantial portion of the Hoag Pond consists of open water during the wet season and is largely unvegetated when dry with scattered seaside heliotrope (*Heliotropium curassavicum*, FACU).

San Diego Creek

The boundary of the SJMR extends to the southeast, encompassing a segment of San Diego Creek and adjacent areas that cover 15.81 acres of which 14.15 acres consist of a mix of mulefat scrub, Goodding's black willow forest, mulefat thickets and open water/stream channel.

4.9.2. Regional Water Quality Control Board Jurisdiction

All of the wetland areas within the SJMR meet the definition for Waters of the U.S. Thus, any impacts to the wetlands would be subject to Water Quality Certification pursuant to Section 401 of the Clean Water Act and areas of jurisdiction for the Corps and Regional Board would be the same.

4.9.3. CDFW Jurisdiction

With the exception of San Diego Creek and associated riparian habitat, the SJMR does not strictly meet the definition for a stream (having bed, bank, or channel) or lake (large body of water within enclosed basin) in accordance with Section 1602 of the Fish and Game Code and thus would not be subject to the Notification provisions under Section 1602. Nevertheless, the SJMR exhibits significant values for fish and wildlife resources including a number of special-status animals, including at least one state-listed bird: least Bell's vireo (*Vireo belli pusillus*). CDFW will be expected to comment on the project's Draft Environmental Document and at that time would comment on whether CDFW would request Notification under Section 1602. To ensure that any impacts are fully addressed pursuant to the California Environmental Quality Act, wetland and riparian areas are provisionally included in the analysis to ensure that any potential impacts to areas where CDFW may require notification are addressed.

Table 4-4: Summary of Agency Jurisdiction

Wetland Area	Wetland Waters of the U.S. (Corps Jurisdiction)	Wetland Waters of the State (Regional Board Jurisdiction)	Potential CDFW Jurisdiction
Upper Marsh	26.75	26.75	26.75
Middle Marsh	43.76	43.76	43.76
Lower Marsh	19.53	19.53	19.53
Seasonal Marsh	33.57	33.57	33.57
Experimental Ponds	34.80	34.80	34.80
Hoag Pond	6.50	6.50	6.50
San Diego Creek	14.15	14.15	14.15
Total	**179.05**	**179.05**	**179.05**

5.0 IMPACT ANALYSIS

The following discussion examines the potential impacts to plant and wildlife resources that would occur as a result of the proposed hydraulic enhancements within the SJMR. Impacts (or effects) can occur in two forms, direct and indirect. Direct impacts are those that involve the loss, modification or disturbance of plant communities, which in turn, directly affect the flora and fauna that use those habitats. Direct impacts also include the destruction of individual plants or animals, which may also directly affect regional population numbers of a species or result in the physical isolation of populations thereby reducing genetic diversity and population stability. Finally, direct impacts can also occur through construction-related disturbances such as noise generated by construction in proximity to (for example) nests for special-status avifauna, maternity roosts for special-status bats, or special-status pond turtle nest or aestivation sites.

Indirect impacts pertain to those impacts that result in a change to the physical environment, but which is not immediately related to a project. Indirect (or secondary) impacts are those that are reasonably foreseeable and caused by a project but occur at a different time or place. Indirect impacts can occur at the urban/wildland interface of projects, to biological resources located downstream from projects, and other off-site areas where the effects of the project may be experienced by plants and wildlife. Examples of indirect impacts include the effects of increases in ambient levels of noise or light; predation by domestic pets; competition with exotic plants and animals; introduction of toxics, including pesticides; and other human disturbances such as hiking, off-road vehicle use, unauthorized dumping, etc. Indirect impacts are often attributed to the subsequent day-to-day activities associated with project build-out, such as increased noise, the use of artificial light sources, and invasive ornamental plantings that may encroach into native areas. Indirect effects may be both short-term and long-term in their duration. These impacts are commonly referred to as "edge effects" and may result in a slow replacement of native plants by non-native invasive species, as well as changes in the behavioral patterns of wildlife and reduced wildlife diversity and abundance in habitats adjacent to project sites.

Cumulative impacts refer to two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts. A cumulative impact can occur from multiple individual effects from the same project, or from several projects. The cumulative impact from several projects is the change in the environment resulting from the incremental impact of the project when added to other closely related past, present, and reasonably foreseeable probable future projects. Cumulative impacts can result from individually minor but collectively significant projects taking place over a period of time.

5.1 California Environmental Quality Act (CEQA)

5.1.1 Thresholds of Significance

Environmental impacts to biological resources are assessed using impact significance threshold criteria, which reflect the policy statement contained in CEQA, Section 21001(c) of the California Public Resources Code. Accordingly, the State Legislature has established it to be the policy of the State of California:

> *"Prevent the elimination of fish or wildlife species due to man's activities, ensure that fish and wildlife populations do not drop below self-perpetuating levels, and preserve for future generations representations of all plant and animal communities..."*

Determining whether a project may have a significant effect, or impact, plays a critical role in the CEQA process. According to CEQA, Section 15064.7 (Thresholds of Significance), each public agency is encouraged to develop and adopt (by ordinance, resolution, rule, or regulation) thresholds of significance that the agency uses in the determination of the significance of environmental effects. A threshold of significance is an identifiable quantitative, qualitative or performance level of a particular environmental effect, non-compliance with which means the effect will normally be determined to be significant by the agency and compliance with which means the effect normally will be determined to be less than significant. In the development of thresholds of significance for impacts to biological resources CEQA provides guidance primarily in Section 15065, Mandatory Findings of Significance, and the CEQA Guidelines, Appendix G, Environmental Checklist Form. Section 15065(a) states that a project may have a significant effect where:

> *"The project has the potential to substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or wildlife community, reduce the number or restrict the range of an endangered, rare, or threatened species, ..."*

Therefore, for the purpose of this analysis, impacts to biological resources are considered potentially significant (before considering offsetting mitigation measures) if one or more of the following criteria discussed below would result from implementation of the proposed project. In considering the subject criteria it is important to consider the findings relative to significance in the context of the overall goals of the project, which is occurring within a U.C. Reserve that is proposing the project specifically to further the policy goals of the State of California relative to the first italicized excerpt in the section above by ensuring that… wildlife populations do not drop below self-perpetuating levels, and preserve for future generations representations of all plant and animal communities...". Thus, the goals of the project are accurately summarized in a modified version of the second italicized excerpt above:

> *"The project has the potential to substantially ~~degrade~~* ***enhance*** *the quality of the environment, substantially ~~reduce~~* ***increase*** *the habitat of a fish or wildlife species, cause a fish or wildlife population to ~~drop below~~* ***remain*** *at self-sustaining levels, ~~threaten to eliminate~~* ***preserve*** *a plant or wildlife community, ~~reduce~~* ***increase*** *the number or ~~restrict~~* ***expand*** *the range of an endangered, rare, or threatened species, ..."*

As discussed below, the project has the potential for short-term temporary impacts on special-status species and/or vegetation communities and wetlands; however, as addressed in detail below, the project would not substantially degrade, substantially reduce, or threaten to eliminate plants or animals and that in some instances, certain short-term effects such as can occur during construction are fully mitigated.

5.1.2 Criteria for Determining Significance Pursuant to CEQA

Appendix G of the 2019 State CEQA guidelines indicate that a project may be deemed to have a significant effect on the environment if the project is likely to:

> *a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service.*
>
> *b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or U.S. Fish and Wildlife Service.*
>
> *c) Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means.*
>
> *d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites.*
>
> *e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance.*
>
> *f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan.*

5.2 Project Description and Project Impacts

As noted, the purpose of Design Goal 1 and Design Goal 2, and associated elements, is to enhance the hydraulics within the SJMR which in turn would enhance the habitat functions and values within the SJMR, benefitting the various groups of species that use the SJMR. Impacts are discrete and limited and in no instances would the impacts have long-term effects. Certain impacts that require conversion of berm areas to concrete culverts and loss of lower-value wetlands along road edges due to raising of roads/berms and placement of fill to increase capacity for impounding water within certain marsh and pond areas, will result in benefits for both the short-term and long-term. Temporary impacts will occur during construction and consist of temporary crushing or removal, by cutting herbaceous vegetation at the ground surface within work areas associated with the Project Elements necessary for the various types of construction (e.g., swale excavation, berm expansion, etc.,). Impact areas associated with each of the Design Goal 1 and Design Goal 2 Elements are depicted on Exhibit 13a-d. Elements of the project also exhibit potential for short-term impacts associated with construction noise and dust within proximity to potential nesting or roosting sites. In order to evaluate potential impacts, the project elements associated with Design Goal 1 and Design Goal 2 are addressed below within each specific discussion for each of the Appendix G of the 2019 State CEQA guidelines, paragraphs a - f.

It is also important to note that many of the impacts addressed below overlap. For instance, impacts to Goodding's black willow forest is addressed under special-status species, because impact to this habitat exhibit potential for a finding of "significant impacts" associated with potential impacts to special-status species such as least Bell's vireo and is also addressed under special status habitats because it is considered sensitive by the CNDDB with a Rarity Ranking of S3. Finally, areas of Goodding's black willow forest meet the definition for State and federally regulated wetlands and are evaluated for example under Section 404 of the Clean Water Act. Where overlap occurs, the impact and mitigation are based on the greatest extent of impacts, which is the controlling value for establishing mitigation requirements. It is important to note, as will be discussed further below, impacts to Goodding's black willow forest are likely overstated as the impact analysis was conducted in "plan view" in GIS which in many instances captures canopy overhanging work areas where it will be possible to avoid direct impacts to the trunk of the tree. In addition, during the work, it is expected that avoidance of permanent impacts to individual willows will be possible, reducing the impacts as quantified in GIS,

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

Special-Status Plants

The SJMR Reserve includes two special-status plants, southern tarplant (CNPR 1B.1) and vernal barley (CNPR 3.2). Southern tarplant occurs on and adjacent to the Bluff Road and would not be impacted by any of the project elements. Thus, there would be no significant impact to this species. Vernal barley occurs near the northeast corner of the Lower Marsh and a portion or potentially all of the small population could be impacted by Project Element 5. However, impacts to species with a CNPR Rank of 3 or 4 are not considered significant and mitigation would not be required. Other species previously identified within the SJMR including many-stemmed dudleya and southwestern spiny rush have been extirpated based on site surveys and confirmed by Reserve Manager Dr. Peter Bowler. Estuary seablite, which was reported in the Experimental Pond area and outside of the potential impact area, was not detected and is presumed extirpated as well. Based on this analysis, the proposed project elements associated with Design Goal 1 and Design Goal 2 exhibit no potential for significant impacts on special-status plants because they would not substantially reduce or threaten to eliminate special-status plants. Therefore, impacts are not anticipated, and mitigation would not be required for special-status plants.

Special-Status Animals

Project elements have the potential for impacts to special-status animals as set forth below.

Western Pond Turtle – The western pond turtle has been identified on the site and the survey data indicates a population of between 274 and 355 individuals, making it the largest population in Orange County and of six studied populations in southern California. Nesting was most prevalent in upland areas including in coastal sage scrub and on the banks of existing access roads and occurs between April 15 and July 15, with May and June with the highest nesting activities. Following completion of the nesting season, turtles begin movement to aestivation sites with movement recorded in SJMR between June 24 and July 9 (Nerhus, 2015) with aestivation between late June extending into the winter months. Within the areas of wetland/marsh habitat, western pond turtles were observed in the Middle Marsh, Lower Marsh and Experimental Ponds. Each of the Project Elements discussed below exhibit potential for impacts to the western pond turtle as discussed below and depending on the timing of the proposed work exhibits potential for impacts at various points in the lifecycle. It is noteworthy, that western pond turtle nest sites were documented within areas of adjacent coastal sage scrub or on the banks of existing access roads. Thus, the Project Elements exhibit less potential for impacts to nesting; however, impacts cannot be completely ruled out. Project activities exhibit greater potential for impacts to foraging or aestivating turtles, depending on the timing of the proposed Project Elements. Thus, it will be necessary to ensure that appropriate measures are implemented to protect pond turtles at each stage of the lifecycle.

Design Goal 1, Element 1 exhibits potential for direct impacts to limited areas of the Middle and Lower Marsh associated with installation of a culvert and slide gate connecting the Middle and Lower Marsh areas. Potential impacts to western pond turtle could include disruption of foraging and or disturbance of aestivation but does not exhibit potential to substantially reduce or threaten to eliminate pond turtles within the reserve and with the proposed enhancements would ensure that the population remains at self-sustaining levels. With mitigation that addresses impacts at each stage of the lifecycle, as set forth in Section 6.1.1 below, any potential impacts to individual pond turtles during construction would be reduced to less than significant.

Design Goal 1, Element 3 exhibits potential for direct impacts to areas of the Lower Marsh associated with excavation of the curvilinear swale. Potential impacts to western pond turtle could include disruption of nesting, foraging and or disturbance of aestivation but does not exhibit potential to substantially reduce or threaten to eliminate pond turtles within the reserve and with the proposed enhancements would ensure that the population remains at self-sustaining levels. With mitigation that addresses impacts at each stage of the lifecycle, as set forth in Section 6.1.1 below, any potential impacts to individual pond turtles during construction would be reduced to less than significant.

Design Goal 1, Element 4 exhibits potential for direct impacts to areas of the Hoag Pond and Experimental Pond 3. Potential impacts to western pond turtle could include disruption of foraging and or disturbance of aestivation but does not exhibit potential to substantially reduce or threaten to eliminate pond turtles within the reserve and with the proposed enhancements would ensure that the population remains at self-sustaining levels. With mitigation that addresses impacts at each stage of the lifecycle, as set forth in Section 6.1.1 below, any potential impacts to individual pond turtles during construction would be reduced to less than significant.

American Peregrine Falcon – Observed by Sea and Sage during monthly surveys in 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, and 2020. The SJMR provides foraging habitat but does not include areas suitable for nesting. None of the Design Goal 1 or Design Goal 2 Elements exhibit potential for impacts to this species because the project has no potential for impacts to nesting habitat areas. Peregrine falcons visiting the SJMR to forage during the proposed work would avoid work areas and would not be affected by the project. Therefore, the proposed project elements do not exhibit potential for significant impacts on this species and mitigation would not be required.

Bald Eagle (Wintering) – Observed by Sea and Sage Audubon Society in 2013. The SJMR provides foraging habitat but does not include areas suitable for nesting. None of the Design Goal 1 or Design Goal 2 Elements exhibit potential for impacts to this species because the project has no potential for impacts to nesting habitat areas. In the rare event that a bald eagle visits the SJMR to forage during the proposed work such a visitor would avoid work areas and would not be affected by the project. Therefore, the proposed project elements do not exhibit potential for significant impacts on this species and mitigation would not be required.

Burrowing Owl (Wintering) – A single burrowing owl, was observed by Sea and Sage on October 26 and November 2, 2011 and a single burrowing owl was observed on October 7, 2015 by Sea and Sage. In addition, a single wintering owl was observed by Tony Bomkamp on October 14 and 15 on the berms adjacent to Pond 5. All of these dates correspond to the dates that wintering owls would occur within southern California. Given that burrowing owl has not been detected during the breeding season it is presumed that only wintering owls use the SJMR. Exhibit 8 depicts the location of burrows used by the owl in 2020. Design Goal 1 Elements 4 and 5, would result in temporary ground disturbances necessary to raise a portion of the berm at the location or in the vicinity of where the burrowing owl was observed. With mitigation, as set forth in Section 6.1.2 any potential for significant impacts on wintering burrowing owl would be reduced to less than significant. Design Goal 2 Element 8 would result in temporary ground disturbance necessary to conduct excavation in the vicinity of where the burrowing owl was observed. With mitigation, as set forth in Section 6.1.2 any potential for significant impacts on wintering burrowing owl would be reduced to less than significant.

Coastal California Gnatcatcher – The coastal California gnatcatcher is common within areas of coastal sage scrub north of the SJMR Reserve and within coastal sage scrub along the eastern edge of the Reserve, where they observed during site visits [Exhibit 9]. A single coastal California gnatcatcher was observed foraging in mulefat thickets along the eastern edge of the Lower Marsh but outside of any proposed work areas. None of the Design Goal 1 or Design Goal 2 Elements exhibit potential for significant impacts on this species because none of the Element support suitable habitat for this species. Therefore, mitigation is not required.

California Least Tern – Observed foraging by Sea and Sage Audubon Society in 2012, 2013, 2014, 2015, 2016, 2017, 2018, and 2020. Ponds, with deeper ponding areas within the SJMR provide suitable foraging habitat for the California least tern; however, the SJMR does not contain suitable breeding habitat for this species and breeding has not been recorded during surveys. None of the Design Goal 1 or Design Goal 2 Elements exhibit potential for significant impacts on this species because none of the proposed work is proposed in deep ponding areas there would be no impact potential foraging areas. Therefore, mitigation is not required.

Least Bell's Vireo – Observed by Sea and Sage Audubon Society in 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, and 2020. Areas of black willow forest and mulefat thickets [Exhibit 10] provide suitable breeding habitat for this species and potential impacts are addressed below. It should be noted that USFWS issued a Biological Opinion (USFWS 2008) for impacts to least Bell's vireo due to the loss of riparian habitat associated with a previous restoration project.

Design Goal 1, Element 3 exhibits potential for direct impacts to mulefat scrub associated with excavation of the curvilinear swale within the Lower Marsh, which would directly impact 0.72 acre of mulefat scrub potentially occupied by least Bell's vireo (the 0.72 acre impact includes 0.49 acre for excavation and 0.23 acre for work area). The loss of 0.72 acres of mulefat scrub occupied by least Bell's vireo would be considered potentially significant before mitigation and with mitigation, as set forth in Section 6.1.3 and Section 6.1.6, would be reduced to less-than significant.

Design Goal 1, Element 4 exhibits potential for direct impacts to black willow riparian forest associated with installation of a connection between Hoag Pond and Experimental Pond 3 that could remove black willow riparian forest occupied by least Bell's vireo. The loss of 0.32 acre of black willow forest (including 0.12 for berm expansion and 0.20 within work area) occupied by least Bell's vireo would be considered potentially significant before mitigation and with mitigation, as set forth in Section 6.1.3 and Section 6.1.6 would be reduced to less-than significant.

Design Goal 2, Element7b, and 7c and portion of Element 5 exhibit potential for direct impacts to black willow forest associated with excavation of swale within the Upper Marsh from Campus Drive to Experimental Pond 10, excavation of swale and creation of berm in Lower Marsh, and expansion of access road/berm that separates the Upper Marsh and Seasonal Marsh, which would directly impact 1.62 acres of black willow forest potentially occupied by least

Bell's vireo. The loss of 1.62 acres of black willow forest occupied by least Bell's vireo would be considered potentially significant before mitigation, as set forth in Section 6.1.3 and Section 6.1.6 and with mitigation would be reduced to less-than significant.

Design Goal 1, Element 3, Element 4 and Element 5, and Design Goal 2, Element 7a-c each exhibit potential for noise impacts to this species should impacts occur during the nesting season March 15 – August 15. Such work could adversely impact breeding if conducted near a nesting site. With mitigation, as set forth in Section 6.1.7 potential impacts from noise would be reduced to less than significant. If work occurs outside of the nesting season, there would be no significant impacts to this species from noise impacts associated with Design Goal 1, Elements 3, 4 and 5 and Design Goal 2, Elements 7a, 7b, and 7c and mitigation would not be required.

Ridgeway Rail – There have been multiple observations of the Ridgeway rail within areas of emergent marsh at the SJMR. Ridgeway rail was detected during monthly surveys by Sea and Sage Audubon in 2012. Other observations were reported by Barry Nerhus (2020) that include sightings of Ridgeway rails in Pond 8 that consisted of a single advertising male and a nesting pair in the middle marsh. Nerhus reported observations of Ridgeways rails "throughout the marsh over the years", including "a 9-egg nest in 2009 in Pond 6". Thus, the Middle Marsh, Experimental Ponds and Hoag Pond all exhibit potential to support this species and the proposed project will result in expanded and enhanced habitat for this species in the SJMR.

Design Goal 1, Elements 1 and 4 and Design Goal 2, Elements 6and 7c exhibits potential for adverse impacts on this species if work occurs during the breeding season and the species is present and would be potentially significant before mitigation. Similarly, if the species is present outside the breeding season during construction, there is potential for harm to the species, which would be considered a significant impact before mitigation. With mitigation, as set forth in Section 6.1.4 any potential construction-related impacts to this species would be reduced to less-than-significant.

Southwestern Willow Flycatcher – Willow flycatcher is a migratory species composed of four subspecies which breed within distinct geographic ranges. Southwestern Willow Flycatcher (SWFL) is a federally and State-listed endangered subspecies that breeds within the southwestern region of the United States. SWFL is a riparian obligate species and prefers to nest within dense, contiguous riparian habitat that is at least 30 feet wide with slow-moving water sources and saturated soils present (Sogge et al. 2010). One (migrant) individual observed by Sea and Sage during monthly survey in June 2017 and five (migrant) individuals detected by Sea and Sage in June 2020. In accordance with the survey protocol, a single early season detection of this species indicates a migrant subspecies and not the listed subspecies SWFL. Exhibit 10 depicts areas of suitable black willow forest which essentially ring the Upper Marsh, occur at the northeast corner of the Middle Marsh and along the western boundary of the Middle Marsh. The black willow forest at the western end of the Hoag Pond also provide potentially suitable habitat. Given the lack of detection for this species, the project elements exhibit no potential for significant impacts to this species and mitigation would not be required.

Yellow-Breasted Chat – Yellow-breasted chat was observed during monthly surveys by Sea and Sage Audubon Society in 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, and 2020 and breeds onsite in areas of black willow forest and mulefat scrub. Exhibit 10 depicts areas of suitable black willow forest which essentially ring the Upper Marsh, occur at the northeast corner of the Middle Marsh and along the western boundary of the Middle Marsh. The mulefat thickets within the southern one-third of the Lower Marsh and black willow forest at the western end of the Hoag Pond also provide suitable habitat for yellow-breasted chat as do the mulefat thickets in the Seasonal Pond.

Design Goal 1, Element 3 exhibits potential for direct impacts to mulefat scrub associated with excavation of the curvilinear swale within the Lower Marsh, which would directly impact 0.72 acre of mulefat scrub potentially occupied by yellow-breasted chat (the 0.72 acre impact includes 0.49 acre for excavation and 0.23 acre for work area). While the yellow-breasted chat is a California Species of Special Concern, it remains common widespread in California and southern California. The loss of 0.72 acres of mulefat scrub occupied by yellow-breasted chat would not be considered significant.

Design Goal 1, Element 4 exhibits potential for direct impacts to black willow riparian forest associated with installation of a connection between Hoag Pond and Experimental Pond 3 that could remove black willow riparian forest occupied by yellow-breasted chat. While the yellow-breasted chat is a California Species of Special Concern, it remains common widespread in California and southern California, The loss of 0.32 acre of black willow forest (including 0.12 for berm expansion and 0.20 within work area) occupied by yellow-breasted chat would not be considered significant.

Design Goal 2, Element 7a, 7b, and 7c and portion of Element 5 exhibit potential for direct impacts to black willow forest associated with excavation of swale within the Upper Marsh from Campus Drive to Experimental Pond 10, excavation of swale and creation of berm in Lower Marsh, and expansion of access road/berm that separates the Upper Marsh and Seasonal Marsh, which would directly impact 1.62 acres of black willow forest potentially occupied by yellow-breasted chat. While the yellow-breasted chat is a California Species of Special Concern, it remains common widespread in California and southern California. The loss of 1.62 acres of black willow forest occupied by yellow-breasted chat would not be considered significant.

Design Goal 1, Element 3, Element 4 and Element 5, and Design Goal 2, Element 7a-c each exhibit potential for impacts to this species should vegetation with occupied nests be removed during the nesting season. Such work could adversely impact breeding if conducted in a manner that removes a nesting site. With mitigation, as set forth in Section 6.1.7 potential impacts to nesting sites would be reduced to less than significant. If work occurs outside of the nesting season, there would be no mitigation necessary.

<u>Yellow Warbler</u> – Yellow warbler was observed during monthly surveys by Sea and Sage Audubon Society in 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, and 2020 and breeds onsite in areas of black willow forest. Exhibit 10 depicts areas of suitable black willow forest which essentially ring the Upper Marsh, occur at the northeast corner of the Middle Marsh and along the western boundary of the Middle Marsh. The black willow forest at the western end of the Hoag Pond also provide suitable habitat for Yellow warbler.

Design Goal 1, Element 4 exhibits potential for direct impacts to black willow riparian forest associated with installation of a connection between Hoag Pond and Experimental Pond 3 that could remove black willow riparian forest occupied by yellow warbler. While the yellow warbler is a California Species of Special Concern, it remains common widespread in California and southern California. The loss of 0.32 acre of black willow forest (including 0.12 for berm expansion and 0.20 within work area) occupied by yellow warbler would not be considered significant.

Design Goal 2, Element7a, 7b, and 7c and portion of Element 5 exhibit potential for direct impacts to black willow forest associated with excavation of swale within the Upper Marsh from Campus Drive to Experimental Pond 10, excavation of swale and creation of berm in Lower Marsh, and expansion of access road/berm that separates the Upper Marsh and Seasonal Marsh, which would directly impact 1.62 acres of black willow forest potentially occupied by yellow warbler. While the yellow warbler is a California Species of Special Concern, it remains common widespread in California and southern California. The loss of 1.62 acres of black willow forest occupied by yellow warbler would not be considered significant.

Design Goal 1, Element 4 and Element 5, and Design Goal 2, Element 7a-c each exhibit potential for impacts to this species should vegetation with occupied nests be removed during the nesting season. Such work could adversely impact breeding if conducted in a manner that removes a nesting site. With mitigation, as set forth in Section 6.1.7 potential impacts to a nesting site would be reduced to less than significant. If work occurs outside of the nesting season, there would be no mitigation required.

White-Tailed Kite – White-tailed kite was observed during monthly surveys by Sea and Sage in all years between 2011 and 2020. White-tailed kites were observed by GLA biologists during most site visits in September, October and November of 2020. White-tailed kites have been documented to breed in the riparian habitat adjacent UCI Arboretum by Lee (2012) and are presumed to breed in other suitable areas of the SJMR. Exhibit 10 depicts areas of suitable black willow forest which essentially ring the Upper Marsh, occur at the northeast corner of the Middle Marsh and along the western boundary of the Middle Marsh. Direct impacts to trees occupied by a white-tailed kite nest during the breeding would be a significant impact.

Design Goal 1, Element 4 exhibits potential for direct impacts to black willow riparian forest associated with installation of a connection between Hoag Pond and Experimental Pond 3 that could remove black willow riparian forest occupied by nesting white-tailed kite. Removal of trees occupied by a white-tailed kite nest would be considered significant before mitigation and with mitigation, as set forth in Section 6.1.6 would be reduced to less-than significant.

Design Goal 2, Element7a, 7b, and 7c and portion of Element 5 exhibit potential for direct impacts to black willow riparian forest associated with installation of a connection between Hoag Pond and Experimental Pond 3 that could remove black willow riparian forest occupied by nesting white-tailed kite. Removal of trees occupied by a white-tailed kite nest would be considered significant before mitigation and with mitigation, as set forth in Section 6.1.6 would be reduced to less-than significant.

Design Goal 1, Element 4 and Element 5, and Design Goal 2, Element 7a-c each exhibit potential for noise impacts to this species should impacts occur during the nesting season. Such work could adversely impact breeding if conducted near a nesting site. With mitigation, as set forth in Section 6.1.7 potential impacts from noise would be reduced to less than significant. If work occurs outside of the nesting season, there would be no significant impacts to this species from Design Goal 1, Elements 3 4 and 5 and Design Goal 2, Elements 7a, 7b, and 7c and mitigation would not be required.

Western Red Bat and Western Yellow Bat – The SJMR contains areas suitable for foraging bats, particularly areas of open water that provide foraging opportunities and opportunities for obtaining water. Although not confirmed by focused surveys, the SJMR exhibits potential areas for maternal roosts within the black willow forest. Direct disturbance through removal of trees during the period of maternal roosting would be a significant impact. Element 4 and Element 7a-c exhibit potential for noise impacts to this species should impacts occur during the period of material roosting. If work occurs outside of the roosting season, there would be no significant impacts to this species.

Design Goal 1, Element 4 exhibits potential for direct impacts to black willow riparian forest associated with installation of a connection between Hoag Pond and Experimental Pond 3 that could remove black willow riparian forest occupied by western red bat maternity roosts. Removal of willow trees occupied by a western red bat and/or western yellow bat maternity roost would be considered significant before mitigation and with mitigation, as set forth in Section 6.1.5 would be reduced to less-than significant.

Design Goal 2, Element7a, 7b, and 7c and portion of Element 5 exhibit potential for direct impacts to black willow forest associated with excavation of swale within the Upper Marsh from Campus Drive to Experimental Pond 10, excavation of swale and creation of berm in Lower Marsh, and expansion of access road/berm that separates the Upper Marsh and Seasonal Marsh, which would directly impact 1.62 acres of black willow forest occupied by western red bat maternity roosts. Removal of black willow trees occupied by western red bat and/or western yellow bat maternity roost would be considered significant before mitigation, as set forth in Section 6.1.5 would be reduced to less-than significant.

Design Goal 1, Element 4 and Element 5, and Design Goal 2, Element 7a-c each exhibit potential for noise impacts to these species should impacts occur during the period of maternity roosting season. Such work could adversely impact breeding if conducted near a roosting site. With mitigation, as set forth in Section 6.1.5 potential impacts from noise would be reduced to less than significant. If work occurs outside of the maternity roosting season, there would be no significant impacts to this species from Design Goal 1, Elements 3 4 and 5 and Design Goal 2, Elements 7a, 7b, and 7c and mitigation would not be required.

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

The SJMR supports special-status wetland vegetation alliances including California bulrush (S3), Goodding's black willow forest (S3), Saltmarsh bulrush (S3), Pickleweed mats (S3), and western sea-purslane marsh (S2). As noted above, the project is designed for purposes of enhancing the hydraulics in the marsh to enhance the wetlands and riparian habitat in the SJMR that are depicted on Exhibits 13a – 13d]. Therefore, project impacts to these wetland vegetation alliances are generally considered temporary or short-term based on the nature of proposed activities, which are designed to restore and/or enhance the function and value of wetland vegetation alliances within the greater SJMR. In addition, siting of the proposed project activities including the Design Goals and associated Elements and proposed staging and access areas was performed in coordination with GLA and the project engineer to avoid and minimize disturbances to sensitive alliances where feasible. Nevertheless, proposed activities will result in direct, albeit temporary or short-term disturbances to these resources as described in detail below and Design Goals as set forth in Table 5.2-1 below. Direct disturbances will be associated with the following activities:

- Removal of Special-Status Woody Wetland Vegetation
- Fill within Special-Status Herbaceous Wetlands
- Excavation within Special-Status Herbaceous Wetlands
- Mowing within Special-Status Herbaceous Wetlands

Removal of Special-Status Woody Wetland Vegetation
As summarized in Table 5.2.1, implementation of certain project elements will result in the removal of up to 2.27 acres of Goodding's black willow forest during construction. These acreages are also shown in Table 5.2.1 under the Removal Woody Vegetation column. Such removal is necessary where woody wetland vegetation would prohibit implementation of specific elements such as construction of berms, excavation of swales, and access to and work within work areas for berm construction or swale excavation. It is important to note that impacts to this alliance includes specific areas identified above in Section 5.2(a) that addresses special-status animals such as least Bell's vireo and other special-status avifauna and bats. Impacts to 2.27 acres of Goodding's black willow forest would be considered potentially significant before mitigation due to potential impacts to least Bell's vireo and other special-status species, with mitigation as set forth in Section 6.1.6 below, the impacts would be reduced to less than significant. As noted above, impacts to Goodding's black willow forest are likely overstated as the impact analysis was conducted in "plan view" in GIS which in many instances captures canopy overhanging work areas where it will be possible to avoid direct impacts to the trunk of the tree. Implementation of the project will be done in a manner that avoids impacts to individual willows to the maximum extent including through minor modifications determined feasible during construction. For example, adding fill around the base of large willows would not have an adverse effect and thus allow for additional avoidance.

Fill within Special Status Herbaceous Wetlands

As summarized in Table 4-2, implementation of certain project elements will result in the fill of special-status herbaceous wetlands including 0.55 acre of California bulrush marsh and 0.16 acre of saltmarsh bulrush. These acreages are also shown in Table 5.2.1 totaling 0.71 acre under the Fill Herbaceous column. Fill of these areas is associated with expansion or construction of berms. Impacts to these areas, regardless of their special status would be considered potentially significant before mitigation because of these areas meeting the state and federal wetland definitions. With mitigation as set forth in Section 6.1.6 below, the impacts would be reduced to less than significant.

Excavation within Special-Status Herbaceous Wetlands

As summarized in Table 4-2, implementation of certain project elements will result in the excavation of herbaceous wetlands including 1.68 acres of California bulrush marsh and 0.04 acre of saltmarsh bulrush. These acreages are also shown in Table 5.2.1 under the Excavation Herbaceous column. Impacts to these areas regardless of their special status would be considered potentially significant before mitigation because of these areas meeting the state and federal wetland definitions. With mitigation as set forth in Section 6.1.6 below, the impacts would be reduced to less than significant.

Mowing within Special-Status Herbaceous Wetlands

As summarized in Table 4-2, implementation of certain project elements will result in the mowing of herbaceous wetlands for purposes of access, including 1.62 acres of California bulrush marsh, 0.54 acre of saltmarsh bulrush, 0.004 acre of pickleweed mats, and 0.01 acre of western sea-purslane. These acreages are also shown in Table 5.2.1 under the Work Area row. Mowing of these areas would not be considered significant as these areas would regrow upon completion of work. No mitigation is recommended.

Summary of Impacts

A summary of direct impacts to special-status wetland vegetation alliances is provided below. It is important to note that this impact analysis is conservative in that it considers all potential impacts that have been identified based on preliminary or conceptual design. With final design refinements, certain impacts may potentially be reduced or eliminated. In addition, no anticipated project benefit or credit has been factored into the impact analysis calculations. For example, restoration, enhancement and creation effects resulting from project implementation are not quantified. Therefore, the analysis described above and summarized in Table 5.2.1 is likely overstated for the purposes of evaluating the project under the California Environmental Quality Act (CEQA). It is also important to note that the “Special Status” wetlands and riparian habitats in Table 5.2.1 below comprise a subset of wetlands and riparian habitats on the site and as such, are also included below under Section 5.2(c) and Table 5.2.2. Total impacts to wetland and riparian habitats for the project are summarized in Table 5.2.2 which is inclusive of Special Status wetlands and riparian habitats.

Table 5.2.1: Special Status Wetland Alliance Impacts					
Element[1]	Vegetation Alliance	Removal Woody Vegetation (acres)	Fill Herbaceous (acres)	Excavation Herbaceous (acres)	Mowing Herbaceous (acres)
1	California Bulrush Marsh	--	0.01	--	--
2	None Present	--	--	--	--
3	California Bulrush Marsh	--	--	1.16	--
	Salt Marsh Bulrush Marsh	--	--	0.03	--
4	California Bulrush Marsh	--	0.01	--	--
5	California Bulrush Marsh	--	0.36	--	--
	Goodding's Willow Forest	0.41	--	--	--
	Salt Marsh Bulrush Marsh	--	0.11	--	--
6	California Bulrush Marsh	--	0.01	--	--
7a	None Present	--	--	--	--
7b	Goodding's Willow Forest	0.01	--	--	--
7c	California Bulrush Marsh	--	0.14	0.52	--
	Goodding's Willow Forest	0.34	--	--	--
	Salt Marsh Bulrush Marsh	--	--	0.01	--
	Goodding's Willow Forest	0.03	--	--	--
8	Goodding's Willow Forest	0.03	--	--	--
Staging[2]	California Bulrush Marsh	--	0.02	--	--
	Goodding's Willow Forest	0.01	--	--	--
	Salt Marsh Bulrush Marsh	--	0.05	--	--
Work Area[3]	California Bulrush Marsh	--	--	--	1.62
	Goodding's Willow Forest	1.44	--	--	--
	Pickleweed Mat	--	--	--	0.004
	Salt Marsh Bulrush Marsh	--	--	--	0.54
	Western Sea-purslane mats	--	--	--	0.01
	Totals	**2.27**	**0.71**	**1.72**	**2.174**

Notes:
[1] Impact calculations for each Element account for the temporary "Proposed Access Route" required to access that Element as shown on Exhibits 13a – 13d.
[2] Impact calculations for the "Proposed Staging Area" shown on Exhibits 13a – 13d are likely overstated as project staging is anticipated to avoid woody vegetation removal and not require placement of fill.
[3] Accounts for potential impacts associated with a "Temporary Work Area" buffer around the proposed Elements as shown on Exhibits 13a – 13d.

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

The SMJR supports federally protected wetlands and potentially state protected wetlands and riparian habitat. As noted above, the project is designed for purposes of enhancing the hydraulics in the marsh to enhance the wetlands and riparian habitat in the SJMR that are depicted on Exhibits 13a – 13d]. Therefore, project impacts to these wetland and riparian resources are generally considered temporary or short-term based on the nature of proposed activities, which are designed to restore and/or enhance the function and value of habitat within the greater SJMR. In addition, siting of the proposed project activities including the Design Goals and associated Elements and proposed staging and access areas was performed in coordination with GLA and the project engineer to avoid and minimize disturbances to resources where feasible. Nevertheless, proposed activities will result in direct, albeit temporary or short-term disturbances to these resources as described in detail below and as summarized for each Element in Table 5.2 below. Direct disturbances will be associated with the following activities:

- Removal of Woody Wetland Vegetation
- Fill within Herbaceous Wetlands
- Excavation within Herbaceous Wetlands
- Mowing within Herbaceous Wetlands

It is important to note that impacts to State and federally protected wetlands that are considered special status (e.g., have CNDDB Rarity Ranking of S1, S2 or S3) have already been addressed above and are include in the overall wetland impacts. As such, it is important that such impacts are not counted twice. Thus, Table 5.2.2 below includes all wetland impacts inclusive of Special Status wetlands and riparian habitats.

Removal of Woody Wetland Vegetation

As summarized in Table 5.2.2, implementation of certain project elements will result in the removal of 2.27 acres of Goodding's black willow forest and 2.06 acres of mulefat thickets. Such removal is necessary where woody wetland vegetation would prohibit implementation of specific elements such as construction of berms, excavation of swales, and access to and work within work areas for berm construction or swale excavation. It is important to note that impacts to these alliances include specific areas identified above in Section 5.2(a) that addresses special-status animals such as least Bell's vireo and other special-status avifauna and bats. Impacts to 2.27 acres of Goodding's black willow forest and 2.06 acres of mulefat thickets would be considered potentially significant before mitigation. With mitigation as set forth in Section 6.1.6 below, the impacts would be reduced to less than significant. As noted above, impacts to Goodding's black willow forest are likely overstated as the impact analysis was conducted in "plan view" in GIS which in many instances captures canopy overhanging work areas where it will be possible to avoid direct impacts to the trunk of the tree. Implementation of the project will be done in a manner that avoids impacts to individual willows to the maximum extent including through minor modifications determined feasible during construction. For example, adding fill around the base of large willows would not have an adverse effect and thus allow for additional avoidance.

Fill within Herbaceous Wetlands

As summarized in Table 5.2.2, implementation of certain project elements will result in the fill of herbaceous wetlands including 0.55 acre of California bulrush marsh, 1.04 acres of cattail marsh, 1.30 acres of mixed herbaceous wetland, 0.16 acre of saltmarsh bulrush, and 0.01 acre of swamp pricklegrass mats. Fill of these areas is associated with expansion or construction of berms and would be considered significant before mitigation. With mitigation as set forth in Section 6.1.6 below, the impacts would be reduced to less than significant.

Excavation within Herbaceous Wetlands

As summarized in Table 4-2, implementation of certain project elements will result in the excavation of herbaceous wetlands including 1.68 acres of California bulrush marsh, 0.83 acre of cattail marsh, 1.23 acres of mixed herbaceous wetland, 0.16 acre of saltmarsh bulrush, and 0.01 acre of swamp pricklegrass mats. Impacts to these areas is associated with excavation and would be considered potentially significant before mitigation. With mitigation as set forth in Section 6.1.6 below, the impacts would be reduced to less than significant.

Mowing within Herbaceous Wetlands

As summarized in Table 4-2, implementation of certain project elements will result in the mowing of herbaceous wetlands for purposes of access, including 1.62 acres of California bulrush marsh, 0.84 acre of cattail marsh, 2.35 acres of mixed herbaceous wetland, 0.54 acre of saltmarsh bulrush, and 0.05 acre of swamp pricklegrass mats. Mowing of these areas would not be considered potentially significant as these areas would regrow upon completion of work. No mitigation is recommended.

Summary of Impacts

A summary of direct impacts to wetlands and riparian habitat is provided in Table 5.2.2 below. It is important to note that this impact analysis is conservative in that it considers all potential impacts that have been identified based on preliminary or conceptual design. With final design refinements, certain impacts may potentially be reduced or eliminated. In addition, no anticipated project benefit or credit has been factored into the impact analysis calculations. For example, restoration, enhancement and creation effects resulting from project implementation are not quantified. Therefore, the analysis described above and summarized in Table 5.2.2 is likely overstated for the purposes of evaluating the project under the California Environmental Quality Act (CEQA). Certain proposed impacts must be considered in the larger context of the goals of the SJMR, such as the proposal as part of Element 7c to create a basking island in the Middle Marsh, which would result in placement of fill within an area of cattail marsh to enhance a regional important population of the western pond turtle. Cattail marsh is common and widespread; while the western pond turtle remains in decline regionally and enhancement of the SJMR for western pond turtle is fully consistent with the goals of the SJMR.

Table 5.2.2: Wetland Impacts					
Element[1]	Vegetation Alliance	Removal Woody Vegetation (acres)	Fill Herbaceous (acres)	Excavation Herbaceous (acres)	Mowing Herbaceous (acres)
1	California Bulrush Marsh	--	0.01	--	--
2	None Present	--	--	--	--
3	California Bulrush Marsh	--	--	1.16	--
	Mixed Herbaceous Wetland	--	--	0.05	--
	Mulefat Thickets	0.49	--	--	--
	Salt Marsh Bulrush Marsh	--	--	0.03	--
4	California Bulrush Marsh	--	0.01	--	--
	Mixed Herbaceous Wetland	--	0.01	--	--
5	California Bulrush Marsh	--	0.36	--	--
	Goodding's Willow Forest	0.41	--	--	--
	Mixed Herbaceous Wetland	--	0.61	--	--
	Mulefat Thicket	0.23	--	--	--
	Salt Marsh Bulrush Marsh	--	0.11	--	--
6	California Bulrush Marsh	--	0.01	--	--
	Mixed Herbaceous Wetland	--	0.01	--	--
	Swamp Pricklegrass Mats	--	0.01	--	--
7b	Goodding's Willow Forest	0.01	--	--	--
	Mixed Herbaceous Wetland	--	0.01	--	--
7c	California Bulrush Marsh	--	0.14	0.52	--
	Cattail Marsh	--	1.04	0.83	--
	Goodding's Willow Forest	0.34	--	--	--
	Mulefat Thickets	0.42	--	--	--
	Mixed Herbaceous Wetland	--	0.54	1.18	--
	Salt Marsh Bulrush Marsh	--	--	0.01	--
	Swamp Prickelgrass Mats	--	--	0.01	--
8	Cattail Marsh	--	--	0.003	--
	Goodding's Willow Forest	0.03	--	--	--
Staging[2]	California Bulrush Marsh	--	0.02	--	--
	Goodding's Willow Forest	0.01	--	--	--
	Mixed Herbaceous Wetland	--	0.12	--	--
	Salt Marsh Bulrush Marsh	--	0.05	--	--
Work[3] Area	California Bulrush Marsh	--	--	--	1.62
	Cattail Marsh	--	--	--	0.84
	Goodding's Willow Forest	1.44	--	--	--
	Mixed Herbaceous Wetland	--	--	--	2.35
	Mulefat Thicket	0.92	--	--	--
	Pickleweed Mat	--	--	--	0.004
	Salt Marsh Bulrush Marsh	--	--	--	0.54
	Swamp Pricklegrass Mats	--	--	--	0.05
	Western Sea-purslane mats	--	--	--	0.01

Totals	**4.30**	**3.06**	**3.79**	**5.414**
Notes: [1] Impact calculations for each Element account for the temporary "Proposed Access Route" required to access that Element as shown on Exhibits 13a – 13d. [2] Impact calculations for the "Proposed Staging Area" shown on Exhibits 13a – 13d are likely overstated as project staging is anticipated to avoid woody vegetation removal and not require placement of fill. [3] Accounts for potential impacts associated with a "Temporary Work Area" buffer around the proposed Elements as shown on Exhibits 13a – 13d.				

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

As discussed above, the SJMR supports what is potentially the largest western pond turtle population in Orange County, which also supports active breeding. Essentially all of the nesting sites occur in the adjacent upland areas within coastal sage scrub or along the banks of existing access roads as depicted on Exhibit 7. Design Feature 1 and Design Feature 2 Elements do not exhibit potential for impacts to nesting sites based on their proposed activities and location within the SJMR.

Design Goal 1, Elements 1, 5a, and 7 and Design Goal 2, Elements 2 and 3 exhibit potential for impacts to western pond turtles within areas where pond turtles could be foraging, basking, or aestivating. Direct take of western pond turtle would be considered a significant impact before mitigation; however, with mitigation as described in Section 6.1.1 below, the potential for take would be eliminated and any potential impacts would be reduced to less-than significant.

The project has the potential to impact active bird nests if vegetation is removed during the nesting season which varies according to species or group of species and for purposes of this project is encompasses the range of potential nesting periods (January 1 to September 15). Impacts to nesting birds are prohibited by the MBTA and California Fish and Game Code. A project-specific mitigation measure is identified in Section 6.0 of this report to avoid impacts to nesting birds. Implementation of this mitigation measure would ensure potential impacts are less than significant.

(e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?

The proposed project would not conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance. Specifically, the project does not meet the criteria established by the City of Irvine's Tree Ordinance[16] because in

[16] https://legacy.cityofirvine.org/civica/filebank/blobdload.asp?BlobID=10755. Sec. 5-7-410. - Tree removal municipal code

accordance with the Tree Ordinance, "Trees located on non-residential properties and which are not part of required parking lot landscaping, are not on public right of way, are not considered significant by the Municipal Code on tree removal, and are not part of an established eucalyptus windrow. Therefore, a tree permit from the City is not required.

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

The SJMR is not within nor would it conflict with an adopted Habitat Conservation Plan, County of Orange Central/Coastal Natural Community Conservation Plan/Habitat Conservation Plan, (NCCP/HCP) or other approved local, regional, or state habitat conservation plan. The SJMR is located within the NCCP/HCP Coastal Subarea boundaries but the SJMR is not located with the NCCP/HCP Reserve. Implementation of the proposed project would not adversely impact the NCCP/HCP Reserve.

5.3 <u>Indirect Impacts to Biological Resources</u>

In the context of biological resources, indirect effects are those effects associated with developing areas adjacent to native open space. Potential indirect effects associated with development include water quality impacts associated with drainage into adjacent open space/downstream aquatic resources; lighting effects; noise effects; invasive plant species from landscaping; and effects from human access into adjacent open space, such as recreational activities (including off-road vehicles and hiking), pets, dumping, etc. Temporary, indirect effects may also occur as a result of construction-related activities.

The Project does have the potential for temporary or permanent indirect effects due to construction activities including potential noise disturbance addressed in 5.2(a) above.

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https://library.municode.com/ca/irvine/codes/code_of_ordinances?nodeId=TIT5PL_DIV7SULA_CH4URFO_ARTERE_S5-7-410TRRE .

5.4 Cumulative Impacts to Biological Resources

Cumulative impacts are defined as the direct and indirect effects of a proposed project which, when considered alone, would not be deemed a substantial impact, but when considered in addition to the impacts of related projects in the area, would be considered potentially significant. "Related projects" refers to past, present, and reasonably foreseeable probable future projects, which would have similar impacts to the proposed project.

The project would not result in any cumulative impact on biological resources and in fact would result in a cumulative benefit to the many species that utilize the SJMR due to the enhanced hydrology that will occur as the goal of the project.

6.0 MITIGATION/AVOIDANCE MEASURES

The following discussion provides project-specific mitigation/avoidance measures for actual or potential impacts to special-status resources. As noted above under the discussion of potential impacts, the goal of the project is to provide enhanced hydraulics for areas of the SJMR, which will in turn enhance the overall habitat functions within the SJMR. As such, the project will result in a gain in functions within the SJMR; however, the project exhibits potential for short-term impacts to State and/or federally listed species as well as other special-status species due to habitat loss, direct take, or construction-related disturbance including noise. Such impacts can be reduced to less than significant through a variety of approaches, which are included below in the proposed mitigation and monitoring program.

Also, construction activities exhibit potential for incidental impacts to State and/or federally listed species and other special-status species, either through loss of habitat, direct take, or through the impact of noise on essential activities.

6.1 Mitigation for Potential Impacts to Special-Status Animals

As noted, the SJMR supports a variety of State and federally listed animals as well as other special-status species. As set forth in the impacts section above, specifically, Section 5.2(a) above, which found potentially significant impacts to State and/or federally listed species and other special-status species. Potentially significant impact were determined to be associated with two categories of impact: Removal of woody riparian habitat used by least Bell's vireo, white tailed kite, and western red bat, all of which use Goodding's black willow riparian forest and mulefat scrub (with the exception of western red bat). The second category of potential impact is associated with work conducted during the breeding, nesting or roosting season that would have the potential for physical harm (direct take) or through noise or other construction-related activities that could disrupt essential breeding behaviors.

Thus, mitigation requirements are separated into replacement of woody riparian habitat and measures to reduce noise and other construction-related impacts to ensure that breeding activities are not adversely impacted should it be necessary to conduct work during the breeding season.

6.1.1 Western Pond Turtle

The project would not permanently impact nesting, foraging or aestivation habitat for the western pond turtle. The project could have impacts on individual pond turtle depending on the season of the work.

Western Pond Turtle Mitigation Measure 1: In order to ensure that western pond turtles are not harmed during the work, a biologist familiar with the ecology, behavior, and movement patterns of the pond turtle within the SJMR will prepare a Western Pond Turtle Construction Monitoring Plan (WPTCMP). The WPTCMP will include the following components:

- Goals of the WPTCMP;
- Methods to be employed in pre-construction surveys including mapping requirements;
- Monitoring requirements during construction for each phase of the western pond turtle lifecycle (e.g., nesting phase, aestivation, etc.,);
- Methods for removing western pond turtles from “harms way” if found during monitoring;
- Description of exclusion fencing or enclosures necessary to protect western pond turtle and locations where such can be determined during WPTCMP preparation; and
- Reporting requirements.

The WPTCMP must be reviewed and approved by the SJMR Reserve Manager 30 days prior to the start of construction to allow sufficient time for pre-construction surveys and associated mapping needed to ensure western pond turtle protection. This measure may be modified as necessary to meet conditions of any required regulatory permits.

6.1.2 Burrowing Owl Mitigation Measure 1

The project would not permanently impact breeding habitat for the burrowing owl. The project could have impacts on wintering burrowing owl depending on the season of the work.

Burrowing Owl Mitigation Measure 1: If proposed work will occur during the wintering season (October 1 – March 15) a biologist familiar with the ecology and behavior of burrowing owl will survey the work area(s), with suitable wintering habitat, such as berms and areas with no vegetation or areas that have low ground cover and suitable burrows and or structures. Surveys will be conducted out to 500 feet from planned construction within three days of the start of work and within suitable habitat. If it is determined that wintering owls are using burrows within berms or other areas to be impacted by construction, the biologist shall temporarily halt work in the immediate location of the active burrow and establish a suitable buffer around the burrow (based on field conditions) until occupied burrows are vacated. Once the project biologist determines that the owl is not using burrows within the work area or within the biologist’s established suitable buffer area, work on the subject berms or other area may begin. This measure may be modified as necessary to meet conditions of any required regulatory permits.

6.1.3 Least Bell's vireo

Significant impacts to least Bell's vireo would potentially occur due to loss of occupied or potentially occupied habitat. Significant impacts could also occur should work occur during the nesting season and a least Bell's vireo nest be within 500 feet of the work area.

Impacts to habitat potentially used by least Bell's vireo include up to 0.72 acre of mulefat scrub associated with Element 3, and loss of up to 2.27 acres of Goodding's black willow forest associated with Elements 5, 7b, 7c, 8, Staging Areas and Work Areas.

Least Bell's Vireo Mitigation Measure 1: In order to ensure no-net-loss of suitable habitat, up to 0.72 acre of mulefat scrub and up to 2.27 acres of black willow forest would be reestablished within or adjacent to areas where the mulefat scrub and Goodding's black willow forest are removed. As noted, given that the impact totals are overstated and that project refinements will likely result in less impact than currently identified, the reestablishment of mulefat thickets and Goodding's black willow forest would occur within or adjacent to areas where the vegetation was removed at a ratio of 1:1 as set forth in Mitigation Measure 6.1.6 below. This measure may be modified as necessary to meet conditions of any required regulatory permits.

Design Goal 1, Element 3, 5, and Design Goal 2, Elements 6, 7a, 7b, 7c, and associated Work Areas each exhibit potential for noise impacts to this species should impacts occur during the nesting season. Such work could adversely impact breeding if conducted near a nesting site. With mitigation, potential impacts from noise would be reduced to less than significant. For specific mitigation measures for all avian species including least Bell's vireo, see Mitigation Measure 6.1.7 below. If work occurs outside of the nesting season, there would be no significant impacts to this species associated with the above-referenced Elements.

6.1.4 Ridgeway Rail

There have been multiple observations of the Ridgeway rail within areas of emergent marsh at the SJMR. The project would not permanently impact nesting or foraging habitat for the Ridgeway rail. The project could have impacts on individual rails depending on the season of the work. To ensure that Ridgeway rails are not harmed during construction activities, a biologist shall survey the proposed work area for rails within three days of the start of vegetation removal or ground disturbance. Once it is determined that there are no Ridgeway rails within the work area, exclusion fencing consisting of silt fence or similar material may be installed to deter rails from entering the work area. The need for exclusionary fencing and the precise locations of fencing shall be determined by the biologist based on field conditions (e.g. proximity to Ridgeway rail or dense vegetation; density of vegetation within the work area and ground visibility; intensity of proposed equipment). This measure may be modified as necessary to meet conditions of any required regulatory permits.

Design Goal 1, Elements 1, 5a, and 7 and Design Goal 2, Elements 2 and 3 exhibit potential for impacts to the Ridgeway rail should work be conducted during the breeding season and Ridgeway rail is nesting within proximity to the work area. Should Ridgeway rail be detected nesting at the time of the proposed work, potential impacts could be reduced to less than significant with mitigation. For specific mitigation measures for all avian species, including Ridgeway rail, see Mitigation Measure 6.1.7 below.

6.1.5 Western Red Bat and Western Yellow Bat

Design Goal 1, Elements 4 and 5 Design Goal 2, Elements 7a, 7b, and 7c exhibit potential for direct impacts to black willow riparian forest that could support western red bat and western yellow bat maternity roosts. Removal of willow trees occupied by a western red bat or western yellow bat maternity roost would be considered significant before mitigation and with mitigation, as set forth below

Direct Impacts to Nesting Trees – If work is to be conducted within areas of Goodding's black willow forest during the maternity roost season (March – August), a biologist will conduct weekly surveys beginning 30 days prior to start of work. If a maternity roost site is detected the active roost tree shall not be removed until roosting has been completed and the pups are no longer dependent on the roost site as determined by the biologist.

6.1.6 Mitigation for Permanent Impacts to Wetland Vegetation Alliances

The impact section above, follows the Appendix G Guidelines Paragraphs a – f. Because there is overlap between some of the special-status alliances and more common wetland alliances, where there is overlap, the mitigation measures are combined. As addressed in the Impact Section 5.2 above, impacts associated with the following proposed activities were determined to be potentially significant before mitigation:

- Removal of Woody Vegetation
- Fill of Herbaceous Wetlands
- Excavation within Herbaceous Wetlands

Prior to removal of wetland vegetation, fill of herbaceous wetlands or excavation of herbaceous wetlands, UCI shall prepare, or have prepared by a restoration specialist, a Habitat Reestablishment and Monitoring Plan (HRMP) that details the restoration requirements for each of these sensitive habitats that will be impacted during a project phase. The HRMP shall include the following components:

1. Map(s) identifying areas where reestablishment of Goodding's black willow forest, Mulefat thickets, California bulrush marsh, cattail marsh, mixed herbaceous wetland, saltmarsh bulrush, and swamp pricklegrass mats would occur. Note:
    a. swamp pricklegrass is non-native and would be replaced with western sea-purslane;
    b. suitable least Bell's vireo/white tailed kite habitat disturbed during construction will be replaced at a minimum 1:1 ratio within the immediate area or other nearby suitable location;
    c. passive reestablishment may be included in the HRMP, where the HRMP can demonstrate that such passive reestablishment will result in no net loss of wetlands and riparian habitat;

2. Plant palettes and type of plant materials, including use of seed, container stock, cuttings, regrowth by trees cut but not fully removed or salvaged materials such as bulrush and cattails from excavation areas;
3. Methods for monitoring success of reestablishment areas;
4. Performance standards and adaptive management strategies; and
5. Reporting requirements.

Reestablishment shall begin following construction of the Element completed. This measure may be modified as necessary to meet conditions of any required regulatory permits.

6.1.7 Mitigation for Potential Impacts to Nesting Birds

Vegetation clearing should be conducted outside of the nesting season (see below for species-specific seasons).

- Avian species that are not State or federally listed as threatened or endangered or State fully protected but which are protected by MBTA and California Fish and Game Code Sections 3503 and 3503.5 (March 15 through September 15)
- Ridgeway Rail nesting season (February 1 through September 15)
- Least Bell's Vireo nesting season (March 15 through September 15)
- White Tailed Kite nesting season (January 1 through June 30)
- Common owls and raptors (e.g., barn owls, red-tailed hawks, Cooper's hawks, etc.,) (January 1 through June 30).

If avoidance of the nesting season is not feasible, then a qualified biologist shall conduct a nesting bird survey out to 500 feet from planned construction within three days prior to any project vegetation trimming or removal, grubbing, disking, demolition activities, excavations, or grading. If active nests are identified within 300 feet for nests of MBTA protected species or within 500 feet for nests of ESA-listed species (e.g. Ridgeway Rail, Least Bell's Vireo, White Tailed Kite) or common owls and raptors, the biologist shall establish suitable buffers around the nests (based on species and field conditions), and the buffer areas shall be avoided until the nests are no longer occupied and the juvenile birds can survive independently from the nests. Alternatively, the biological monitor shall establish a behavioral baseline of all identified active nests and continuously monitor the nests during active construction for signs of project related behavioral changes. If behavioral changes are not observed, work may proceed. If behavioral changes are observed, work shall be halted or postponed until modifications demonstrate to the biologist's satisfaction that project-related activities are no longer causing behavioral changes. This measure may be modified as necessary to meet conditions of any required regulatory permits.

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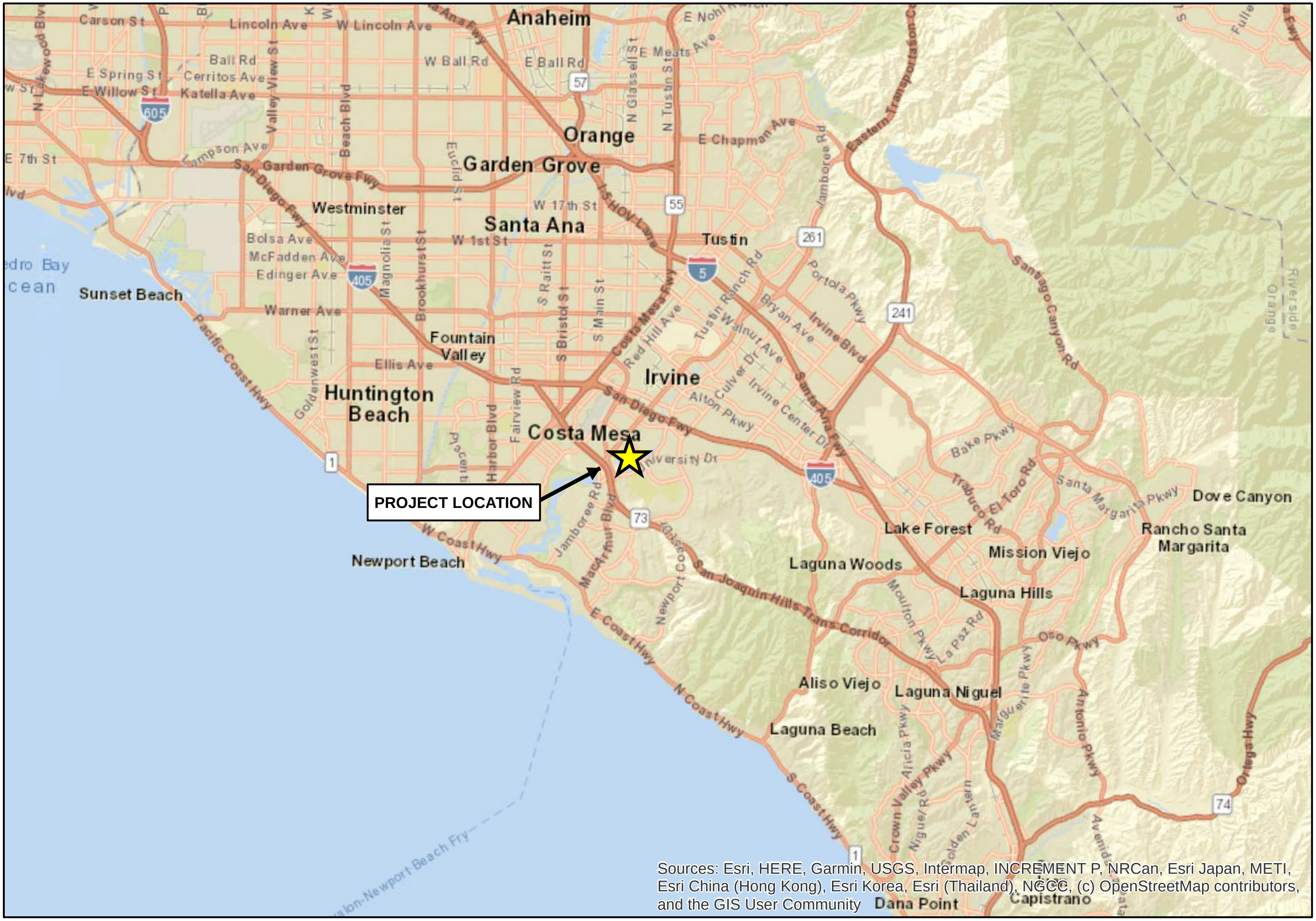
8.0 CERTIFICATION

I hereby certify that the statements furnished above and in the attached exhibits present data and information required for this biological evaluation, and that the facts, statements, and information presented are true and correct to the best of my knowledge and belief.

Signed: Tony Bomkamp Date: March 2, 2021

p:1505-1_SJMR_Bio Resources_March 2021

Source: ESRI World Street Map



N

0
2
4
8
Miles

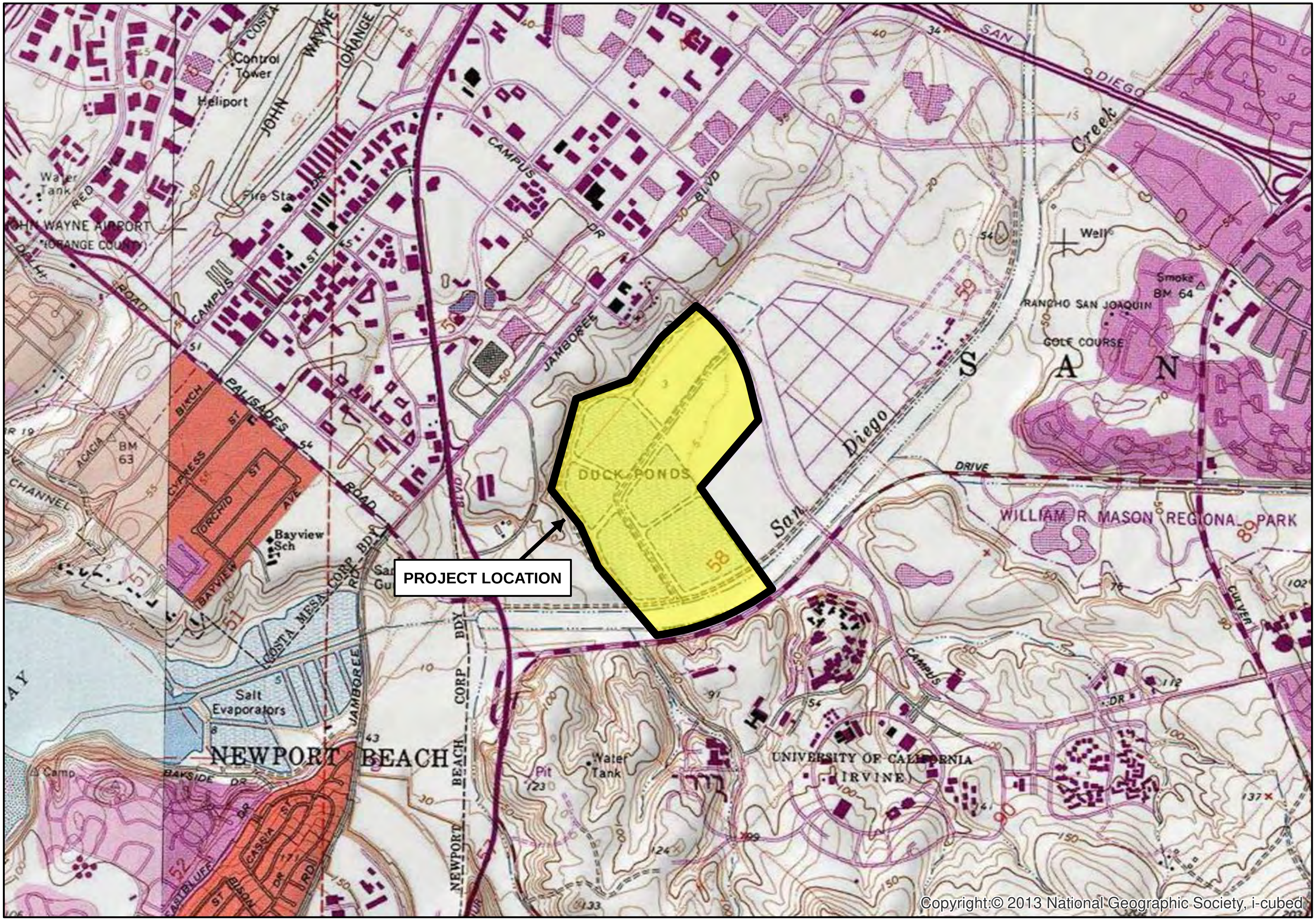
U.C. SAN JOAQUIN MARSH RESERVE

Regional Map

GLENN LUKOS ASSOCIATES

Exhibit 1

Adapted from USGS Tustin, CA quadrangle



N

0 1,000 2,000 4,000 Feet

U.C. SAN JOAQUIN MARSH RESERVE

Vicinity Map

GLENN LUKOS ASSOCIATES

Exhibit 2

Project Site

N

0 175 350 700
Feet

1 inch = 350 feet

U.C.
SAN JOAQUIN MARSH RESERVE

San Joaquin Marsh Reserve Aerial Map

GLENN LUKOS ASSOCIATES

Exhibit 3

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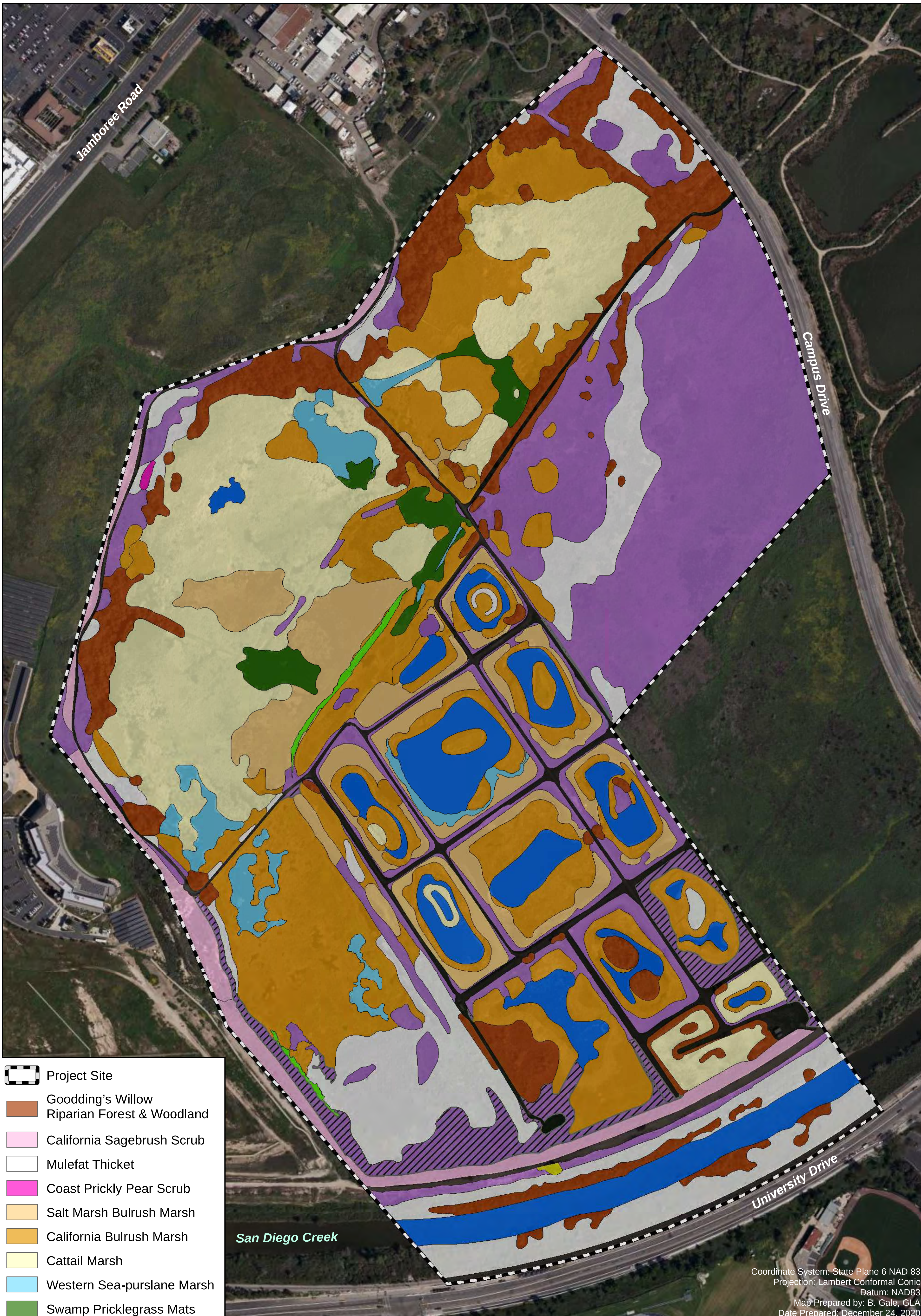

Source: Glenn Lukos Associates, 2020

N

0 175 350 700

Feet

1 inch = 350 feet

U.C.
SAN JOAQUIN MARSH RESERVE

Vegetation Alliances

GLENN LUKOS ASSOCIATES

Exhibit 4

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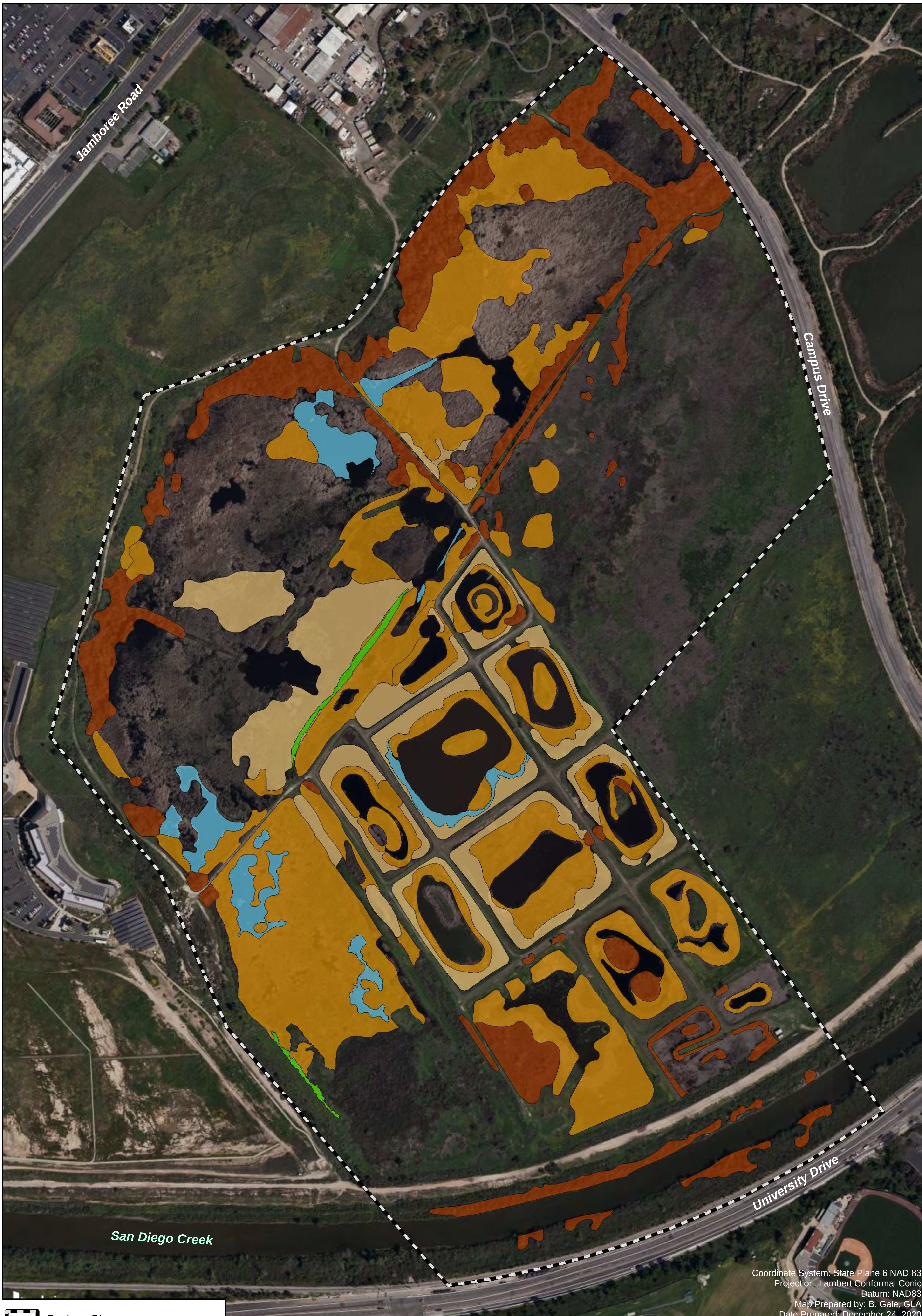


Project Site

Gooding's Willow Riparian Forest & Woodland

Salt Marsh Bulrush Marsh

California Bulrush Marsh

Western Sea-purslane Marsh

Pickleweed Mat

Source: Glenn Lukos Associates, 2020

N

0 175 350 700
Feet

1 inch = 350 feet

U.C. SAN JOAQUIN MARSH RESERVE

Special-Status Vegetation Alliances

GLENN LUKOS ASSOCIATES

Exhibit 5

X:\1100 AFTER THE REST\1505-01SJMR\1505-1_GIS\VegetationGIS\1505-1_SpecialStatusVegetationAlliances.mxd

Project Site

Southern Tarplant

Vernal Barley

Source: Glenn Lukos Associates, 2020

N

0 175 350 700

Feet

1 inch = 350 feet

U.C. SAN JOAQUIN MARSH RESERVE

Special-Status Plant Location Map

GLENN LUKOS ASSOCIATES

Exhibit 6

X:\1100 AFTER THE REST\1505-01SJMR\1505-1_GIS\RarePlantsGIS\1505-1_SpecialStatusPlantLocations.mxd

Project Site

Pond Turtle Female in Pond

Pond Turtle Nesting Site

Pond Turtle Estivation Site

Source: Barry Nerhus, 2016

N

0 175 350 700

Feet

1 inch = 350 feet

U.C.
SAN JOAQUIN MARSH RESERVE

Western Pond Turtle Map

GLENN LUKOS ASSOCIATES

Exhibit 7

X:\1100 AFTER THE REST\1505-01SJMR\1505-1_GIS\TurtlesGIS\1505-1_WesternPondTurtles.mxd

Project Site

Burrow with Owl (10/14/20 - 10/15/20)

Burrowing Owl Observation (10/14/20 - 10/15/20)

N

0 175 350 700
Feet

1 inch = 350 feet

U.C. SAN JOAQUIN MARSH RESERVE

Burrowing Owl 2020 Location Map

GLENN LUKOS ASSOCIATES

Exhibit 8

X:\1100 AFTER THE REST\1505-01SJMR\1505-1_GIS\BUOW_GIS\1505-1_BUOW.mxd

Project Site

Suitable California Gnatcatcher Habitat

N

0 175 350 700

Feet

1 inch = 350 feet

U.C. SAN JOAQUIN MARSH RESERVE

Suitable California Gnatcatcher Habitat Map

GLENN LUKOS ASSOCIATES

Exhibit 9

X:\1100 AFTER THE REST\1505-01SJMR\1505-1_GIS\HabitatGIS\1505-1_SuitableCAGNHabitat.mxd

Project Site

Goodding's Willow Riparian Forest & Woodland - Suitable Habitat for Least Bell's Vireo, Yellow Walbler, Yellow-Brested Chat, and Western Red Bat

Mulefat Thicket - Suitable Habitat for Least Bell's Vireo and Yellow-Brested Chat

Arboretum Transect

Bluff Rd/Riparian Transect

Ponds 1-3 Transect

Ponds 4-11 Transect

Visual Observations Only

N

0 200 400 800

Feet

1 inch = 400 feet

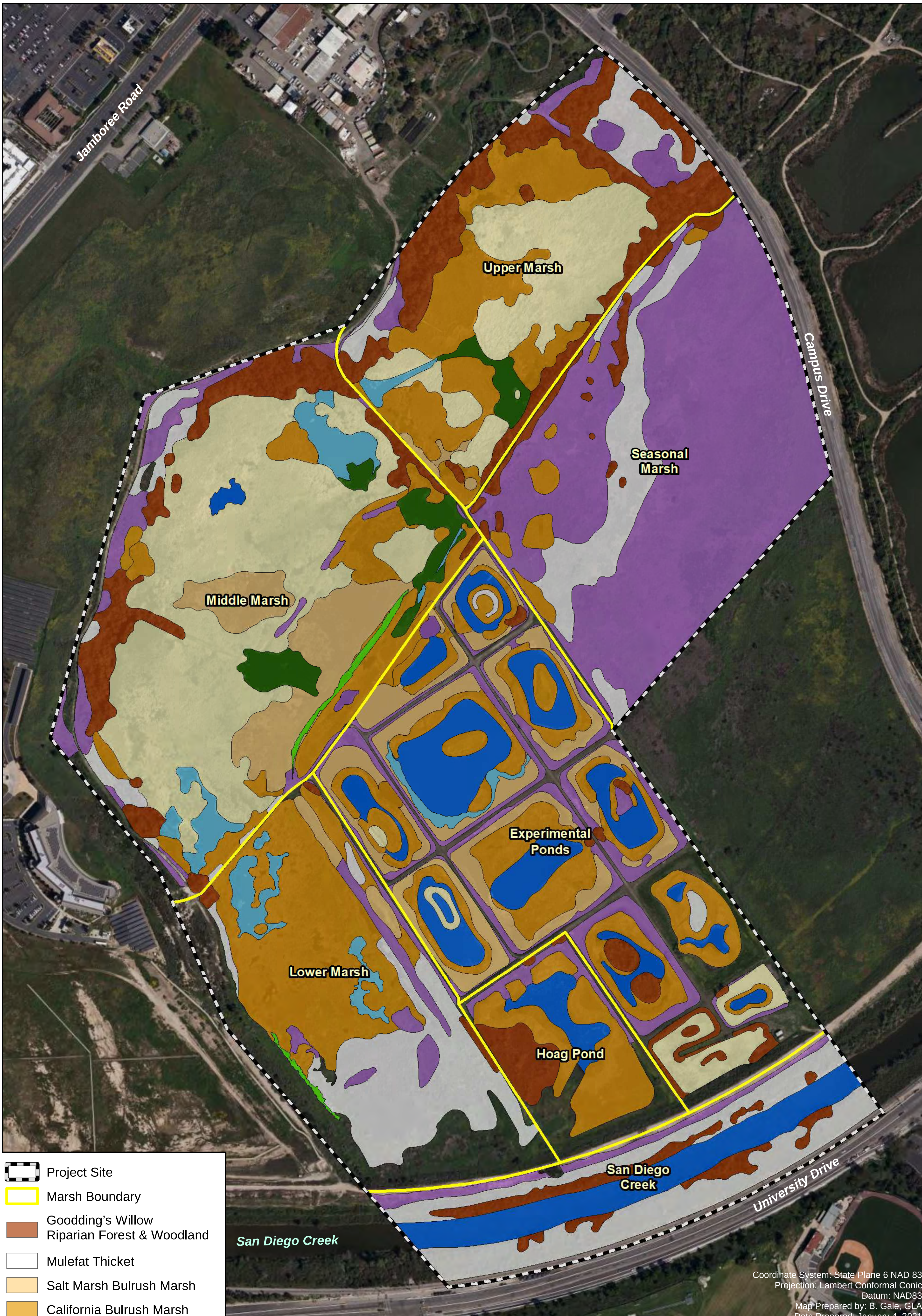
U.C.
SAN JOAQUIN MARSH RESERVE

Riparian Species Suitable Habitat and Audubon Survey Routes

GLENN LUKOS ASSOCIATES

Exhibit 10

X:\1100 AFTER THE REST\1505-01SJMR\1505-1_GIS\HabitatGIS\1505-1_RiparianSpeciesSuitableHabitat_AudubonSurveyRoutes.mxd



- Project Site
- Marsh Boundary
- Goodding's Willow Riparian Forest & Woodland
- Mulefat Thicket
- Salt Marsh Bulrush Marsh
- California Bulrush Marsh
- Cattail Marsh
- Western Sea-purslane Marsh
- Swamp Pricklegrass Mats
- Pickleweed Mat
- Mixed Herbaceous Wetland
- Open Water

Source: Glenn Lukos Associates, 2020

N

0 175 350 700
Feet

1 inch = 350 feet

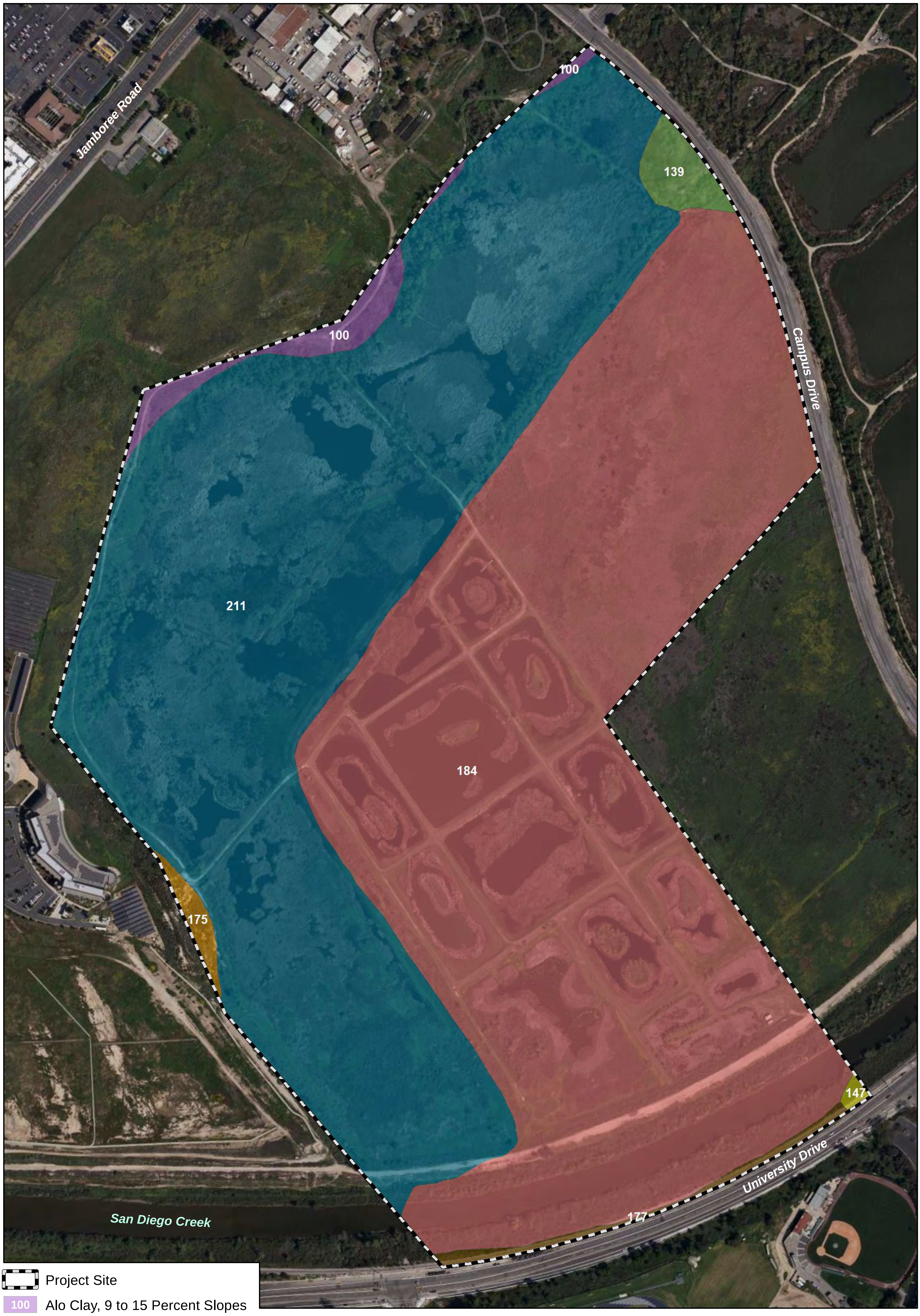
U.C.
SAN JOAQUIN MARSH RESERVE

Corps, CDFW, and Regional Board Wetland Alliances

GLENN LUKOS ASSOCIATES

Exhibit 11

X:\1100 AFTER THE REST\1505-01SJMR\1505-1_GIS\DelineationGIS\1505-1_Corps_CDFW_RWQCB_WetlandAlliances.mxd



Project Site
100 Alo Clay, 9 to 15 Percent Slopes
139 Chino Silty Clay Loam
147 Corralitos Loamy Sand, Moderately Fine Substratum
175 Myford Sandy Loam, 9 to 15 Percent Slopes
177 Myford Sandy Loam, 9 to 30 Percent Slopes, Eroded
184 Omni Clay, Drained
211 Tidal Flats

N

0 175 350 700
Feet

1 inch = 350 feet

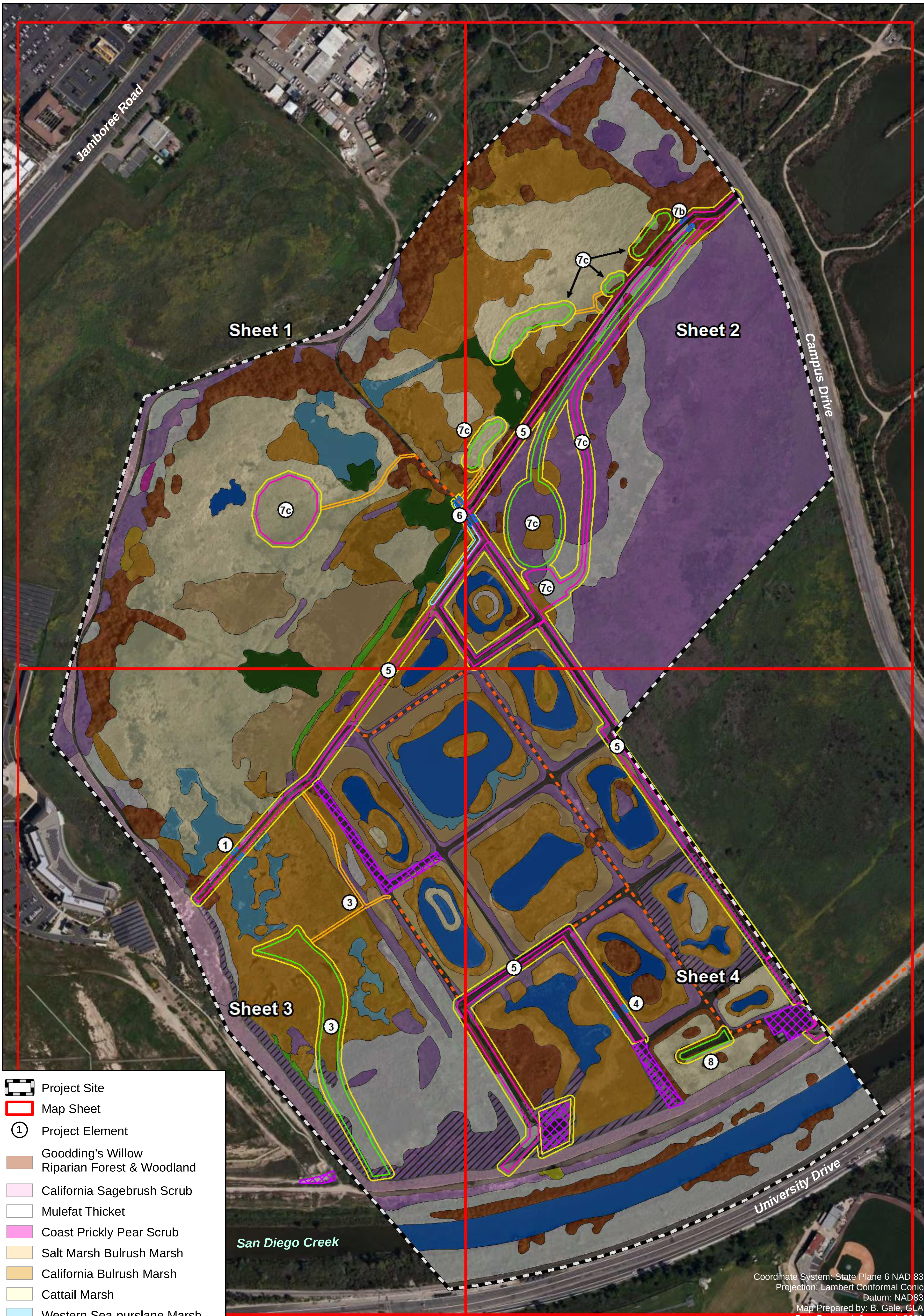
U.C.
SAN JOAQUIN MARSH RESERVE

Soils

GLENN LUKOS ASSOCIATES

Exhibit 12

X:\1100 AFTER THE REST\1505-01SJMR\1505-1_GIS\SoilsGIS\1505-1_Soils.mxd



Project Site
Map Sheet
1 Project Element
Goodding's Willow Riparian Forest & Woodland
California Sagebrush Scrub
Mulefat Thicket
Coast Prickly Pear Scrub
Salt Marsh Bulrush Marsh
California Bulrush Marsh
Cattail Marsh
Western Sea-purslane Marsh
Swamp Pricklegrass Mats
Pickleweed Mat
Mixed Herbaceous Wetland
Mixed Herbaceous Upland
Ornamental
Open Water
Disturbed

Culvert
Pipe/Open Channel
Proposed Cut Area
Proposed Fill Area
Proposed Staging Area
Temporary Work Area
Proposed Access Route
Existing Road

Source: Glenn Lukos Associates, 2020

N

0 175 350 700
Feet

1 inch = 350 feet

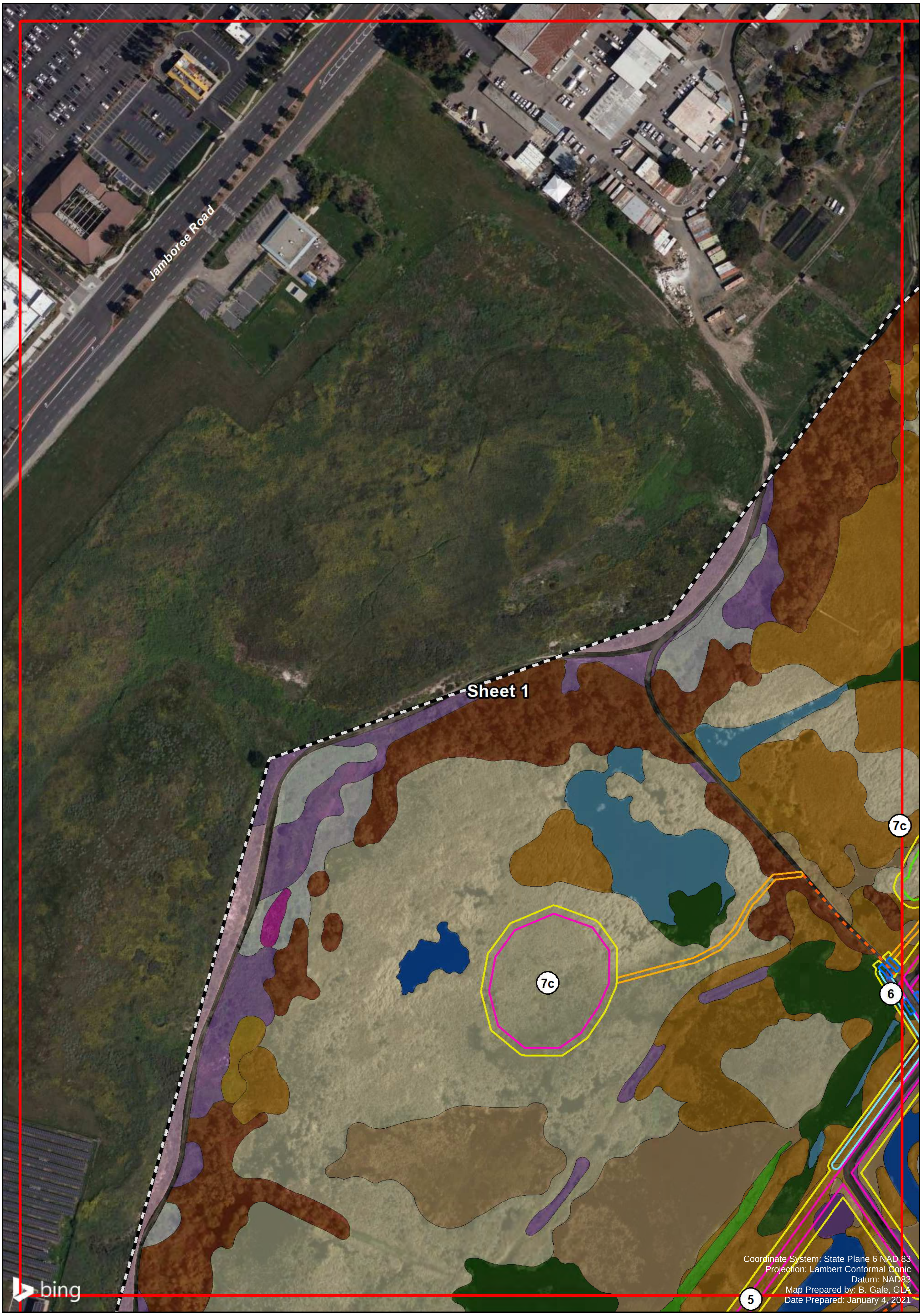
U.C.
SAN JOAQUIN MARSH RESERVE

Impact Map - Key Map

GLENN LUKOS ASSOCIATES

Exhibit 13

X:\1100 AFTER THE REST\1505-01SJMR\1505-1_GIS\ImpactsGIS\1505-1_VegetationImpacts_KeyMap.mxd



N

0 87.5 175 350
Feet

U.C.
SAN JOAQUIN MARSH RESERVE

Impact Map

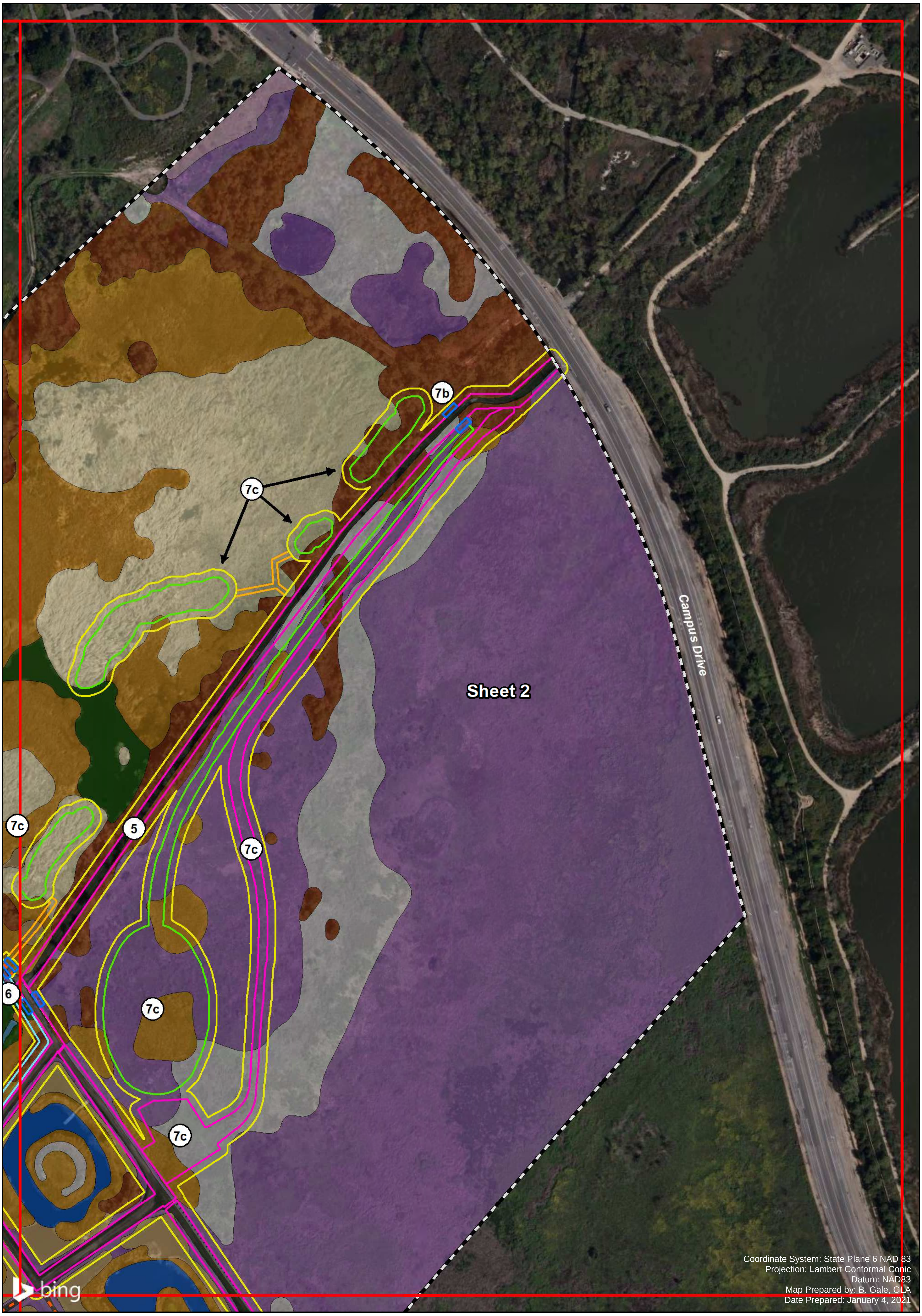
GLENN LUKOS ASSOCIATES

Exhibit 13A

Source: Glenn Lukos Associates, 2020

1 inch = 175 feet

X:\1100 AFTER THE REST\1505-01SJMR\1505-1_GIS\ImpactsGIS\1505-1_VegetationImpacts_MapSheets.mxd



U.C.
SAN JOAQUIN MARSH RESERVE

Impact Map

GLENN LUKOS ASSOCIATES

Exhibit 13B

Source: Glenn Lukos Associates, 2020

1 inch = 175 feet

X:\1100 AFTER THE REST\1505-01SJMR\1505-1_GIS\ImpactsGIS\1505-1_VegetationImpacts_MapSheets.mxd

N

0 87.5 175 350
Feet

1 inch = 175 feet

U.C.
SAN JOAQUIN MARSH RESERVE

Impact Map

GLENN LUKOS ASSOCIATES

Exhibit 13C

Source: Glenn Lukos Associates, 2020

X:\1100 AFTER THE REST\1505-01SJMR\1505-1_GIS\ImpactsGIS\1505-1_VegetationImpacts_MapSheets.mxd

N

0 87.5 175 350
Feet

1 inch = 175 feet

Source: Glenn Lukos Associates, 2020

U.C.
SAN JOAQUIN MARSH RESERVE

Impact Map

GLENN LUKOS ASSOCIATES

Exhibit 13D

X:\1100 AFTER THE REST\1505-01SJMR\1505-1_GIS\ImpactsGIS\1505-1_VegetationImpacts_MapSheets.mxd

APPENDIX A
FLORAL COMPENDIUM

The floral compendium lists species identified on the project site. Taxonomy follows the Jepson Manual (Baldwin et al 2012) and, for sensitive species, the California Native Plant Society's Rare Plant Inventory (Tibor 2001). Common plant names are taken from Hickman (1993), Munz (1974), and Roberts et al (2004). An asterisk (*) denotes a non-native species. A cross (†) denotes special-status species

SCIENTIFIC NAME	COMMON NAME
TRACHEOPHYTA	**FERNS**
Pteridaceae	**Brake Fern Family**
Pentagramma triangularis	Gold back fern
GYMNOSPERMOPHTYA	**GYMNOSPERMS**
Pinaceae	**Pine Family**
**Pinus halepensis*	Aleppo pine
MAGNOLIIDAE	**MAGNOLIIDS**
Saururaceae	**Lizard Tail Family**
Anemopsis californica	Yerba mansa
ANGIOSPERMOPHYTA	**FLOWERING PLANTS**
MONOCOTYLEDONS	**MONOCOTS**
Agavaceae	**Agave Family**
Chlorogalum pomeridianum	Amole
Araceae	**Arum Family**
Lemna minuta	Least duckweed
Arecaceae	**Palm Family**

**Phoenix canariensis*	Canary island date palm
**Phoenix dactylifera*	Date palm
**Washingtonia robusta*	Mexican fan palm
Asparagaceae	**Asparagas Family**
**Asparagus officinalis*	Garden asparagus
Cyperaceae	**Sedge Family**
Bolboschoenus glaucus	Tubered bulrush
Bolboschoenus maritimus	Alkali bulrush
Bolboschoenus maritimus ssp. *paludosus*	Saltmarsh bulrush
Bolboschoenus robustus	Sturdy bullrush
Cyperus eragrostis	Tall cyperus
Cyperus esculentus	Nut grass
Cyperus odoratus	Fragrant flatsedge
Eleocharis macrostachya	Spike rush
Schoenoplectus americanus	Chairmaker's bulrush
Schoenoplectus californicus	California bulrush
Schoenoplectus pungens var. *longispicatus*	Common threesquare
Iridaceae	**Iris Family**
Sisyrinchium bellum	Blue eyed grass
Juncaceae	**Rush Family**
Juncus acutus	Spiny rush
Juncus balticus	Wire rush
Juncus bufonius	Common toad rush
Poaceae	**Grass Family**
**Arundo donax*	Giant reed
**Avena barbata*	Slim oat
**Avena fatua*	Wildoats
**Avena sativa*	Wild oat
**Bromus diandrus*	Ripgut brome
**Bromus hordeaceus*	Soft chess
**Bromus inermis*	Smooth brome
**Bromus madritensis* ssp. *rubens*	red brome
**Cortaderia selloana*	Pampas grass
**Crypsis schoenoides*	Swamp grass
**Crypsis vaginiflora*	African prickle grass
**Cynodon dactylon*	Bermuda grass
**Digitaria sanguinalis*	Crabgrass
Distichlis spicata	Salt grass

**Echinochloa colona*	Jungle rice
**Echinochloa crus-galli*	Barnyard grass
Elymus condensatus	Giant wild rye
Elymus triticoides	Beardless wild rye
**Festuca myuros*	Rattail fescue
**Festuca perennis*	Italian rye grass
Hordeum brachyantherum ssp. *brachyantherum*	Meadow barley
†Hordeum intercedens	Vernal barley
**Hordeum murinum*	Foxtail barley
**Hordeum murinum* ssp. *glaucum*	Foxtail
**Hordeum vulgare*	Common barley
**Lamarckia aurea*	Goldentop
Leptochloa fusca	Sprangletop
Leptochloa fusca ssp. *uninervia*	Mexican sprangletop
**Paspalum dilatatum*	Dallis grass
Paspalum distichum	Knot grass
**Paspalum vaginatum*	Seashore paspalum
**Pennisetum clandestinum*	Kikuyu grass
**Pennisetum setaceum*	Fountaingrass
**Phalaris canariensis*	Canarygrass
**Phalaris minor*	Mediterranean canarygrass
**Polypogon monspeliensis*	Annual beard grass
**Schismus barbatus*	common mediterranean grass
**Setaria verticillata*	Hooked bristlegrass
**Sorghum halepense*	Johnsongrass
Stipa pulchra	Purple needle grass
Potamogetonaceae	**Pondweed Family**
Stuckenia pectinata	Sago pondweed
Themidaceae	**Brodiaea Family**
Bloomeria crocea	Golden stars
Dichelostemma capitatum	Blue dicks
Typhaceae	**Cattail Family**
**Typha angustifolia*	Narrow leaf cattail
Typha domingensis	Southern cattail
Typha latifolia	Broadleaf cattail
DICOTYLEDONS	**DICOTS**
Adoxaceae	**Moschatel Family**
Sambucus nigra ssp. *caerulea*	Blue elderberry

Aizoaceae	**Fig-marigold Family**
**Malephora crocea*	Coppery mesembryanthemum
**Mesembryanthemum crystallinum*	Crystalline ice plant
**Mesembryanthemum nodiflorum*	Small flowered iceplant
Sesuvium verrucosum	Western sea purslane
Amaranthaceae	**Amaranth Family**
**Amaranthus albus*	Tumbleweed
Amaranthus blitoides	Prostrate pigweed
**Amaranthus retroflexus*	Rough pigweed
Anacardiaceae	**Cashew Family**
Malosma laurina	Laurel sumac
Rhus integrifolia	Lemonade berry
**Schinus terebinthifolius*	Brazilian pepper tree
Toxicodendron diversilobum	Poison oak
Apiaceae	**Parsley Family**
Apiastrum angustifolium	Wild celery
**Apium graveolens*	Celery
**Conium maculatum*	Poison hemlock
Daucus pusillus	Wild carrot
**Foeniculum vulgare*	Fennel
Apocynaceae	**Dogbane Family**
Asclepias fascicularis	narrow leaf milkweed
Asteraceae	**Sunflower Family**
**Acroptilon repens*	Russian knapweed
Ambrosia acanthicarpa	Annual burrweed
Ambrosia psilostachya	Ragweed
**Anthemis cotula*	Dog fennel
Artemisia californica	Coastal sage brush
Artemisia douglasiana	California mugwort
Artemisia dracunculus	Tarragon
Baccharis glutinosa	Salt Marsh baccharis
Baccharis pilularis ssp. *consanguinea*	Coyote brush
Baccharis salicifolia	Mule fat
Baccharis salicina	Willow baccharis
**Bellis perennis*	English lawn daisy
**Centaurea melitensis*	Tocalote
†*Centromadia parryi* ssp. *australis*	Southern tarplant

**Cirsium vulgare*	Bullthistle
Corethrogyne filaginifolia	Common sandaster
**Cotula australis*	Brass buttons
**Cotula coronopifolia*	Brass buttons
**Cynara cardunculus*	Cardoon
Deinandra fasciculata	Clustered tarweed
**Dimorphotheca fruticosa*	Trailing african daisy
Eclipta prostrata	False daisy
Encelia californica	Bush sunflower
Ericameria palmeri	Palmer goldenweed
**Erigeron bonariensis*	Flax-leaved horseweed
Erigeron canadensis	Canada horseweed
Euthamia occidentalis	Western goldenrod
**Glebionis coronaria*	Crown daisy
Gnaphalium palustre	Lowland cudweed
Grindelia camporum	Gumweed
Helianthus annuus	Common sunflower
**Helminthotheca echioides*	Bristly ox-tongue
Heterotheca grandiflora	Telegraph weed
Heterotheca sessiliflora	Golden aster
**Hypochaeris glabra*	Smooth cats ear
Isocoma menziesii var. *vernonioides*	Green leaved dune goldenbush
**Lactuca serriola*	Prickly lettuce
Laennecia coulteri	Coulter's horseweed
Logfia filaginoides	California cottonrose
Matricaria discoidea	Pineapple weed
Pluchea odorata	Salt marsh fleabane
Pseudognaphalium californicum	Ladies' tobacco
Pseudognaphalium canescens	Wright's cudweed
**Pseudognaphalium luteoalbum*	Jersey cudweed
Pseudognaphalium microcephalum	Wright's cudweed
Pseudognaphalium stramineum	Cottonbatting plant
Psilocarphus brevissimus var. *brevissimus*	Woolly heads
**Pulicaria paludosa*	Spanish false fleabane
**Senecio vulgaris*	Common groundsel
**Silybum marianum*	Milk thistle
**Soliva sessilis*	South american soliva
**Sonchus asper* ssp. *asper*	Sow thistle
**Sonchus oleraceus*	Sow thistle
**Sonchus tenerrimus*	Slender sow thistle
Stebbinsoseris heterocarpa	Grassland stebbinsoseris
Stephanomeria virgata	Twiggy wreath plant
Symphyotrichum subulatum	Eastern annual saltmarsh aster

Symphyotrichum subulatum var. *parviflorum*	Eastern annual saltmarsh aster
Xanthium strumarium	Cocklebur
Boraginaceae	**Borage Family**
Amsinckia intermedia	Common fiddleneck
Amsinckia menziesii	Fiddleneck
Heliotropium curassavicum	heliotrope
Pectocarya linearis	Sagebrush combseed
Phacelia ramosissima	Branching phacelia
Plagiobothrys acanthocarpus	Adobe allocarya
Brassicaceae	**Mustard Family**
**Brassica nigra*	Black mustard
**Brassica rapa*	Common mustard
Cardamine oligosperma	Idaho bittercress
**Hirschfeldia incana*	Summer mustard
**Lepidium didymum*	Lesser swine cress
**Lepidium draba*	Whitetop
Lepidium lasiocarpum	Shaggyfruit pepperweed
**Lepidium latifolium*	Perennial pepperweed
Lepidium nitidum	Shining pepper grass
Lepidium oblongum	Veiny pepper grass
Lepidium virginicum	Wild pepper grass
**Lobularia maritima*	Sweet alyssum
**Raphanus sativus*	Wild radish
**Sisymbrium irio*	London rocket
Cactaceae	**Cactus Family**
Cylindropuntia prolifera	Coastal cholla
Opuntia littoralis	Prickly pear
Opuntia oricola	Chaparral pricklypear
Opuntia Xoccidentalis	Western prickly pear
Caryophyllaceae	**Pink Family**
Spergularia marina	Salt sand spurry
**Spergularia rubra*	Purple sand spurry
**Spergularia villosa*	Villous sand spurry
Chenopodiaceae	**Goosefoot Family**
Atriplex canescens	Hoary saltbush
Atriplex lentiformis	Big saltbush
**Atriplex prostrata*	Fat-hen
**Atriplex rosea*	Redscale

**Atriplex semibaccata*	Australian saltbush
**Atriplex suberecta*	Peregrine saltbush
**Bassia hyssopifolia*	Five horn bassia
**Beta vulgaris*	Beet
**Chenopodium album*	Lambs quarters
Chenopodium berlandieri var. *zschackei*	Pit seed goosefoot
**Chenopodium glaucum*	Oak leaved goosefoot
**Chenopodium macrospermum*	Largeseed goosefoot
**Chenopodium murale*	Nettle leaf goosefoot
**Chenopodium strictum*	Lateflowering goosefoot
**Dysphania ambrosioides*	Mexican tea
Salicornia pacifica	Pickleweed
**Salsola tragus*	Russian thistle
Cleomaceae	**Bladderpod Family**
Peritoma arborea	Bladderpod
Convolvulaceae	**Bindweed Family**
Calystegia sepium ssp. *limnophila*	Marsh morning glory
**Convolvulus arvensis*	Field bindweed
Cressa truxillensis	Alkali weed
Cuscuta californica	California dodder
Cuscuta campestris	Field dodder
Cuscuta salina	Saltmarsh dodder
Cuscuta subinclusa	Canyon dodder
Crassulaceae	**Stonecrop Family**
Crassula connata	Sand pygmy weed
Dudleya lanceolata	Southern california dudleya
Dudleya pulverulenta	Chalk dudleya
Cucurbitaceae	**Cucumber Family**
Cucurbita foetidissima	Missouri gourd
Euphorbiaceae	**Spurge Family**
Croton setiger	Turkey-mullein, doveweed
Euphorbia albomarginata	Rattlesnake sandmat
**Euphorbia maculata*	Spotted spurge
**Euphorbia prostrata*	Prostrate sandmat
Euphorbia serpens	Matted sandmat
Euphorbia serpillifolia ssp. *hirtula*	hairy thyme leafed spurge
**Ricinus communis*	Castor bean

Fabaceae	**Pea Family**
**Acacia cyclops*	Coastal wattle
**Acacia longifolia*	Golden wattle
**Acacia retinodes*	Ever blooming acacia
Acmispon glaber	Deerweed
**Medicago polymorpha*	California burclover
**Melilotus albus*	White sweetclover
**Melilotus indicus*	Annual yellow sweetclover
**Melilotus officinalis*	Yellow sweetclover
Prosopis glandulosa var. *torreyana*	Honey mesquite
Fagaceae	**Oak Family**
Quercus agrifolia	Coast live oak
Frankeniaceae	**Sea Heath Family**
Frankenia salina	Alkali heath
Geraniaceae	**Geranium Family**
**Erodium botrys*	Big heron bill
**Erodium cicutarium*	Coastal heron's bill
**Erodium moschatum*	Whitestem filaree
Lamiaceae	**Mint Family**
**Lamium amplexicaule*	Henbit
**Marrubium vulgare*	White horehound
Salvia mellifera	Black sage
Linaceae	**Flax Family**
**Linum usitatissimum*	Common flax
Lythraceae	**Loosestrife Family**
**Lythrum hyssopifolia*	Hyssop loosestrife
Malvaceae	**Mallow Family**
**Abutilon theophrasti*	Velvet leaf
**Malva parviflora*	Cheeseweed
**Malva pseudolavatera*	Cretan mallow
**Malva sylvestris*	High mallow
Malvella leprosa	Alkali mallow
Moraceae	**Mulberry Family**
**Ficus carica*	Common fig

Myrsinaceae	**Myrsine Family**
**Lysimachia arvensis*	Scarlet pimpernel
Myrtaceae	**Myrtle Family**
**Callistemon citrinus*	Crimson bottlebrush
**Eucalyptus camaldulensis*	Red gum
**Eucalyptus citriodora*	Lemon scented gum
**Melaleuca citrina*	Crimson bottlebrush
**Melaleuca viminalis*	Weeping bottlebrush
Nyctaginaceae	**Four o'clock Family**
Mirabilis laevis	Desert wishbone bush
Oleaceae	**Olive Family**
**Fraxinus uhdei*	Shamel ash
Onagraceae	**Evening Primrose Family**
**Ludwigia peploides*	Marsh purslane
**Oenothera speciosa*	Mexican evening primrose
Oxalidaceae	**Wood Sorrel Family**
**Oxalis pes-caprae*	Bermuda buttercup
Phrymaceae	**Lopseed Family**
Diplacus aurantiacus	Sticky monkeyflower
Plantaginaceae	**Plantain Family**
Plantago elongata	Coastal plantain
Plantago erecta	California plantain
**Plantago major*	Common plantain
**Veronica anagallis-aquatica*	Water speedwell
Veronica peregrina	Neckweed
Platanaceae	**Plane Tree Family**
Platanus racemosa	California sycamore
Plumbaginaceae	**Leadwort Family**
**Limonium ramosissimum*	Algerian sealavender
Polygonaceae	**Buckwheat Family**
Eriogonum cinereum	Coastal buckwheat
Eriogonum elongatum	Longstem buckwheat
Eriogonum fasciculatum	California buckwheat

Eriogonum fasciculatum var. *foliolosum*	California buckwheat
Persicaria amphibia	Water smartweed
Persicaria lapathifolia	Common knotweed
**Persicaria maculosa*	Spotted ladysthumb
**Polygonum aviculare*	Prostrate knotweed
**Rumex conglomeratus*	Green dock
**Rumex crispus*	Curly dock
**Rumex pulcher*	Fiddleleaf dock
Portulacaceae	**Purslane Family**
**Portulaca oleracea*	Common purslane
Ranunculaceae	**Buttercup Family**
Myosurus minimus	Little mouse tail
Rhamnaceae	**Buckthorn Family**
Ceanothus megacarpus var. *megacarpus*	Big pod ceanothus
Rosaceae	**Rose Family**
Heteromeles arbutifolia	Toyon
Rosa californica	California wild rose
Rubiaceae	**Bedstraw Family**
Galium aparine	Cleavers
Ruppiaceae	**Ditch Grass Family**
Ruppia maritima	Ditch grass
Salicaceae	**Willow Family**
Populus fremontii ssp. *fremontii*	Cottonwood
Salix exigua	Narrowleaf willow
Salix exigua var. *hindsiana*	Sandbar willow
Salix gooddingii	Gooding's willow, black willow
Salix laevigata	Polished willow
Salix lasiolepis	Arroyo willow
Sapindaceae	**Soapberry Family**
**Koelreuteria bipinnata*	Goldenrain tree
Scrophulariaceae	**Figwort Family**
Myoporum laetum	Ngaio tree
Solanaceae	**Nightshade Family**

**Datura stramonium*	Jimson weed
Datura wrightii	Jimsonweed
†Lycium californicum	California boxthorn
**Lycopersicon esculentum*	Tomato
**Nicotiana glauca*	Tree tobacco
Nicotiana quadrivalvis	Indian tobacco
Solanum americanum	White nightshade
Solanum douglasii	Douglas' nightshade
Tamaricaceae	**Tamarisk Family**
**Tamarix chinensis*	Chinese tamarisk
Urticaceae	**Nettle Family**
Urtica dioica	Stinging nettle
Urtica dioica ssp. *holosericea*	Stinging nettle
**Urtica urens*	Annual stinging nettle

APPENDIX B
FAUNAL COMPENDIUM

The faunal compendium lists species identified on the Study Area. Scientific nomenclature and common names for vertebrate species referred to in this report follow Collins (2009) for amphibians and reptiles, Bradley, et al. (2014) for mammals, and AOU Checklist (1998) for birds. An (*) denotes non-native species. A (†) denotes special-status species.

SCIENTIFIC NAME	COMMON NAME
REPTILES	
Phrynosomatidae	**Phrynosomatid Lizards**
Sceloporus occidentalis	Great Basin fence lizard
BIRDS	
Anatidae	**Swans, Geese, and Ducks**
Anser caerulescens	Snow Goose
Branta canadensis	Canada Goose
Alopochen aegyptiaca	Egyptian Goose
Aix sponsa	Wood Duck
Spatula discors	Blue-winged Teal
Spatula cyanoptera	Cinnamon Teal
Spatula clypeata	Northern Shoveler
Mareca strepera	Gadwall
Mareca americana	American Wigeon
Anas platyrhynchos	Mallard
Anas acuta	Northern Pintail
Anas crecca	Green-winged Teal
Aythya americana	Redhead
Aythya collaris	Ring-necked Duck
Aythya affinis	Lesser Scaup
Bucephala albeola	Bufflehead
Lophodytes cucullatus	Hooded Merganser
Oxyura jamaicensis	Ruddy Duck

Odontophoridae	**Upland Game Birds**
Callipepla californica	California Quail
Podicipedidae	**Loons and Grebes**
Podilymbus podiceps	Pied-billed Grebe
Podiceps nigricollis	Eared Grebe
Aechmophorus occidentalis	Western Grebe
Pelecanidae	**Pelicans**
Pelecanus erythrorhynchos	American White Pelican
Pelecanus occidentalis	Brown Pelican
Phalacrocoracidae	**Cormorants**
Phalacrocorax auritus	Double-crested Cormorant
Ardeidae	**Herons**
Botaurus lentiginosus	American Bittern
Ardea herodias	Great Blue Heron
Ardea alba	Great Egret
Egretta thula	Snowy Egret
Butorides virescens	Green Heron
Nycticorax nycticorax	Black-crowned Night-Heron
Threskiornithidae	**Ibis Family**
Plegadis chihi	White-faced Ibis
Cathartidae	**Vultures**
Cathartes aura	Turkey Vulture
Accipitridae	**Hawks**
†Elanus leucurus	White-tailed Kite
†Circus hudsonius	Northern Harrier
Accipiter striatus	Sharp-shinned Hawk
Accipiter cooperii	Cooper's Hawk
Buteo lineatus	Red-shouldered Hawk
Buteo lineatus elegans	Red-shouldered Hawk (elegans)
Buteo jamaicensis	Red-tailed Hawk
†Haliaeetus leucocephalus	Bald Eagle
Pandionidae	**Ospreys**
Pandion haliaetus	Osprey

Rallidae	**Gruiformes**
†Rallus obsoletus	Ridgway's Rail
Rallus crepitans	clapper rail
Rallus limicola	Virginia Rail
Porzana carolina	Sora
Gallinula galeata	Common Gallinule
Fulica americana	American Coot
Scolopacidae	**Shorebirds**
Charadrius vociferus	Killdeer
Numenius americanus	Long-billed Curlew
Calidris minutilla	Least Sandpiper
Calidris melanotos	Pectoral Sandpiper
Calidris mauri	Western Sandpiper
Calidris alpina	Dunlin
Limnodromus scolopaceus	Long-billed Dowitcher
Limnodromus griseus/scolopaceus	Short-billed/Long-billed Dowitcher
Gallinago delicata	Wilson's Snipe
Phalaropus tricolor	Wilson's Phalarope
Phalaropus lobatus	Red-necked Phalarope
Actitis macularius	Spotted Sandpiper
Tringa solitaria	Solitary Sandpiper
Tringa melanoleuca	Greater Yellowlegs
Tringa flavipes	Lesser Yellowlegs
Tringa semipalmata	Willet
Limosa fedoa	Marbled Godwit
Numenius phaeopus	Whimbrel
Charadriidae	**Plovers**
Pluvialis squatarola	Black-bellied Plover
Charadrius semipalmatus	Semipalmated Plover
Recurvirostridae	**Avocets and Stilts**
Himantopus mexicanus	Black-necked Stilt
Recurvirostra americana	American Avocet
Laridae	**Gulls, Terns, and Skimmers**
Chroicocephalus philadelphia	Bonaparte's Gull
Larus delawarensis	Ring-billed Gull
Larus occidentalis	Western Gull
Larus californicus	California Gull

†Sternula antillarum	Least Tern
Hydroprogne caspia	Caspian Tern
Sterna forsteri	Forster's Tern
Thalasseus elegans	Elegant Tern
Rynchops niger	Black Skimmer
Columbidae	**Pigeons and Doves**
**Columba livia*	Rock Pigeon (Feral Pigeon)
**Streptopelia decaocto*	Eurasian Collared-Dove
Zenaida macroura	Mourning Dove
Cuculidae	**Cuckoos and Allies**
Geococcyx californianus	Greater Roadrunner
Strigidae	**Owls**
Bubo virginianus	Great Horned Owl
†Athene cunicularia	Burrowing Owl
Tytonidae	**Barn Owl Family**
Tyto alba	Barn Owl
Apodidae	**Swifts**
Chaetura vauxi	Vaux's Swift
Aeronautes saxatalis	White-throated Swift
Trochilidae	**Hummingbirds**
Calypte anna	Anna's Hummingbird
Archilochus alexandri	Black-chinned Hummingbird
Calypte costae	Costa's Hummingbird
Selasphorus rufus	Rufous Hummingbird
Selasphorus sasin	Allen's Hummingbird
Alcedinidae	**Kingfishers**
Megaceryle alcyon	Belted Kingfisher
Picidae	**Woodpeckers**
Melanerpes formicivorus	Acorn Woodpecker
Dryobates pubescens	Downy Woodpecker
Dryobates nuttallii	Nuttall's Woodpecker
Colaptes auratus	Northern Flicker

Falconidae	**Falcons**
Falco sparverius	American Kestrel
Falco columbarius	Merlin
†*Falco peregrinus*	Peregrine Falcon
Tyrant Flycatchers	**Tyrannidae**
Contopus sordidulus	Western Wood-Pewee
Empidonax traillii	Willow Flycatcher
Empidonax difficilis	Pacific-slope Flycatcher
Sayornis nigricans	Black Phoebe
Sayornis saya	Say's Phoebe
Pyrocephalus rubinus	Vermilion Flycatcher
Myiarchus cinerascens	Ash-throated Flycatcher
Tyrannus vociferans	Cassin's Kingbird
Tyrannus verticalis	Western Kingbird
Laniidae	**Shrikes**
Lanius ludovicianus	Loggerhead Shrike
Vireonidae	**Vireos**
Vireo bellii	Bell's Vireo
†*Vireo bellii pusillus*	Bell's Vireo (Least)
Vireo huttoni	Hutton's Vireo
Vireo gilvus	Warbling Vireo
Corvidae	**Jays, Crows, and Allies**
Aphelocoma californica	California Scrub-Jay
Corvus brachyrhynchos	American Crow
Corvus corax	Common Raven
Alaudidae	**Larks**
Eremophila alpestris	Horned Lark
Hirundinidae	**Swallows**
Stelgidopteryx serripennis	Northern Rough-winged Swallow
Tachycineta bicolor	Tree Swallow
Tachycineta thalassina	Violet-green Swallow
Hirundo rustica	Barn Swallow
Petrochelidon pyrrhonota	Cliff Swallow

Aegithalidae	**Long-tailed tits**
Psaltriparus minimus	Bushtit
Troglodytidae	**Wrens**
Troglodytes aedon	House Wren
Cistothorus palustris	Marsh Wren
Thryomanes bewickii	Bewick's Wren
Paradoxornithidae	**Parrotbills**
Chamaea fasciata	Wrentit
Polioptilidae	**Gnatcatchers**
Polioptila caerulea	Blue-gray Gnatcatcher
†Polioptila californica	California Gnatcatcher
Regulidae	**Kinglets**
Regulus calendula	Ruby-crowned Kinglet
Zosteropidae	**White-Eyes**
Zosterops simplex	Swinhoe's White-eye
Turidiae	**Thrushes**
Sialia mexicana	Western Bluebird
Sialia currucoides	Mountain Bluebird
Catharus ustulatus	Swainson's Thrush
Catharus guttatus	Hermit Thrush
Turdus migratorius	American Robin
Mimidae	**Mimids**
Toxostoma redivivum	California Thrasher
Mimus polyglottos	Northern Mockingbird
Sturnidae	**Starlings**
Sturnus vulgaris	European Starling
Motacillidae	**Wagtails, Longclaws, and Pipits**
Anthus rubescens	American Pipit
Bombycillidae	**Waxwings**
Bombycilla cedrorum	Cedar Waxwing

Ptiliogonatidae	**Silky-Flycatchers**
Phainopepla nitens	Phainopepla
Parulidae	**Wood-Warblers**
Leiothlypis celata	Orange-crowned Warbler
Leiothlypis ruficapilla	Nashville Warbler
Geothlypis tolmiei	MacGillivray's Warbler
Geothlypis trichas	Common Yellowthroat
Mniotilta varia	Black-and-white Warbler
†Setophaga petechia	Yellow Warbler
Setophaga coronata	Yellow-rumped Warbler
Setophaga coronata coronata	Yellow-rumped Warbler (Myrtle)
Setophaga coronata auduboni	Yellow-rumped Warbler (Audubon's)
Setophaga nigrescens	Black-throated Gray Warbler
Setophaga townsendi	Townsend's Warbler
Cardellina pusilla	Wilson's Warbler
Cardellina pusilla chryseola	Wilson's Warbler (chryseola)
†Icteria virens	Yellow-breasted Chat
Emberizidae	**Sparrows and Allies**
Spizella passerina	Chipping Sparrow
Chondestes grammacus	Lark Sparrow
Junco hyemalis	Dark-eyed Junco
Zonotrichia leucophrys	White-crowned Sparrow
Zonotrichia atricapilla	Golden-crowned Sparrow
Passerculus sandwichensis	Savannah Sparrow
Melospiza melodia	Song Sparrow
Melospiza lincolnii	Lincoln's Sparrow
Melozone crissalis	California Towhee
Pipilo maculatus	Spotted Towhee
Passerella iliaca	Fox sparrow
Cardinalidae	**Tanagers, Cardinals, and Allies**
Piranga ludoviciana	Western Tanager
Pheucticus melanocephalus	Black-headed Grosbeak
Passerina caerulea	Blue Grosbeak
Icteridae	**Icterids**
Icterus cucullatus	Hooded Oriole
Icterus bullockii	Bullock's Oriole

Icterus galbula	Baltimore Oriole
Agelaius phoeniceus	Red-winged Blackbird
Molothrus ater	Brown-headed Cowbird
Quiscalus mexicanus	Great-tailed Grackle
Xanthocephalus xanthocephalus	Yellow-headed Blackbird
Sturnella neglecta	Western Meadowlark
Fringillidae	**Finches**
Haemorhous mexicanus	House Finch
Spinus psaltria	Lesser Goldfinch
Spinus lawrencei	Lawrence's Goldfinch
Spinus tristis	American Goldfinch
Estrildidae	**Estrildid Finches**
Lonchura punctulata	Scaly-breasted Munia
Passeridae	**Old World Sparrows**
Passer domesticus	House Sparrow
Ploceidae	**Weavers**
Euplectes franciscanus	Orange Bishop
Viduidae	**Whydahs**
Vidua macroura	Pin-tailed Whydah

MAMMALS

Sciuridae	**Squirrels**
Otospermophilus beecheyi	California ground squirrel

GLENN LUKOS ASSOCIATES

Regulatory Services

January 4, 2021

Drs. Megan Lulow and Peter Bowler
UCI Nature, Steinhaus Hall Room 322
University of California,
Irvine, California 92697-2525

SUBJECT: Jurisdictional Delineation for the University of California Natural Reserve System San Joaquin Marsh Reserve, City of Irvine, Orange County, California

Dear Drs. Lulow and Bowler:

This letter report summarizes our preliminary findings of U.S. Army Corps of Engineers (Corps), State of California Regional Water Quality Control Board (Regional Board), and California Department of Fish and Wildlife (CDFW) jurisdictions for the above-referenced property.[1]

The University of California Natural Reserve System San Joaquin Marsh Reserve (UCNRS SJMR or SJMR) in Orange County [Exhibit 1], comprises approximately 202 acres and contains no blue-line drainages (as depicted on the U.S. Geological Survey (USGS) topographic map Tustin, California [dated 1965 and photorevised in 1981]) [Exhibit 2]. On October 9. 14, 20, and 30, November 3, and December 16, 2020 regulatory specialists of Glenn Lukos Associates, Inc. (GLA) examined the project site to determine the presence and limits of (1) Corps jurisdiction pursuant to Section 404 of the Clean Water Act, (2) Regional Board jurisdiction pursuant to Section 401 of the Clean Water Act and Section 13260 of the California Water Code (CWC), and (3) CDFW jurisdiction pursuant to Division 2, Chapter 6, Section 1600 of the Fish and Game Code. Enclosed are 175-scale maps [Exhibits 3a – 3d] that depict the areas of Corps, Regional Board and potential CDFW jurisdiction. Photographs to document the topography, vegetative communities, and general widths of each of the waters are provided as Exhibit 4. Wetland data sheets are attached as Appendix A and point where data was collected on Exhibits 3a – 3d. Soils are depicted on Exhibit 5.

[1] This report presents our best effort at estimating the subject jurisdictional boundaries using the most up-to-date regulations and written policy and guidance from the regulatory agencies. Only the regulatory agencies can make a final determination of jurisdictional boundaries.

The purpose of this jurisdictional delineation is to identify the extent of wetlands subject to potential impacts associated with Design Goal 1 and Design Goal 2 that would implement hydraulic enhancement efforts for the SJMR The proposed Project activities are intended to improve long-term water management to enhance habitat values within the SJMR. Temporary construction activities include excavation associated with the installation of structures for conveying water, creating wetland habitat, raising berms/dirt roads to increase capacity and control of passive drainage, and the installation of new and/or replacement water-control structures such as culverts, headwalls, pipes, and slide gates. The proposed Project is anticipated to help the University of California, Irvine (UCI) staff to better manage existing water sources within the SJMR, by improving circulation and long-term soil and water chemistry through enhanced water movement, by increasing capacity for wetland habitat, and improving controls to retain water in priority management cells during drought, and drain water during high flow periods. The Project will also enhance existing wetland habitat as well as create additional wetlands in the SJMR. The Project does not propose the use of additional water sources; however, the proposed elements would create additional water capacity should new sources of water become available in the future. The proposed Project improvements also anticipate sea-level rise and provide accommodations for this potential. In summary, the rationale for the proposed Project is to enhance the existing marsh and riparian areas and to enable management to better adapt to the impacts of climate change in the Reserve.

Corps jurisdiction at the site totals approximately 179.05 acres, all of which consist of federal wetlands.

Regional Board jurisdiction at the site totals approximately 179.05 acres, all of which consist of State wetlands. Of the total 179.05 acres, all comprise Corps jurisdictional wetlands and would be subject to Regional Board jurisdiction pursuant to Section 401 of the Clean Water Act.

Potential CDFW jurisdiction at the site comprises approximately 179.05 acres, of which approximately 179.05 acres consist of woody riparian and or emergent marsh habitat.

I. METHODOLOGY

Prior to beginning the field delineation, color aerial photographs, a topographic base map of the property, the previously cited USGS topographic map, a soils map, previous jurisdictional delineation reports prepared by Wetland Research Associates[2] and Michael Baker International[3] were examined to determine the locations of potential areas of Corps, Regional Board, and CDFW jurisdiction. Suspected jurisdictional areas were field checked for evidence of stream activity and/or wetland vegetation, soils and hydrology. Where applicable, reference was made to the U.S. Army Corps of Engineers 1987 Wetland Delineation Manual[4] (Wetland Manual) and the 2008 Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Supplement Version 2.0 (AWS V. 2.0).[5] Reference was also made to the 2019 State Wetland Definition and Procedures for Discharges of Dredged or Fill Material to Waters of the State (State Board Wetland Definition and Procedures) to identify suspected State wetland habitats.[6] While in the field the potential limits of jurisdictional habitats were recorded with a sub-meter Trimble GPS device in conjunction with a color aerial photograph using visible landmarks. Other data were recorded onto wetland data sheets and data collection points are depicted on Exhibit 3a – 3d. The data point locations were recorded using sub-meter GPS and the GPS data is available upon request. The majority of data point locations were selected due to proximity of impacts, especially along the edges of roads/berms.

For purposes of this delineation, the SJMR was separated into six areas: Upper Marsh, Middle Marsh, Lower Marsh, Seasonal Marsh, Experimental Ponds, and Hoag Pond. Because the project proposes impacts to limited areas, the focus of data collection was on the areas subject to proposed impacts. Thus, data points are concentrated around areas of proposed work. Many areas, such as the Upper and Middle Marsh exhibit a predominance of emergent species that have wetland indicator status as Obligate (OBL) or Facultative Wetland (FACW) species and these areas exhibit seasonal standing water based on site observations as well as in aerial photographs.

Because vegetation within the marsh is prominent and easily identifiable both by individual species and by wetland vegetation alliance, the initial phase of the delineation of wetland areas was mapping of the vegetation according to alliance using the Manual of California Vegetation,

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[2] Wetland Research Associates. February 2004. Delineation of Potential Jurisdictional Waters of the United States: University of California Natural Reserved System San Joaquin Freshwater Marsh, Irvine, California. Prepared for the University of California, Office of Campus and Environmental Planning.
[3] Michael Baker International. August 2019. Health Campus Hospital & Ambulatory Care Project, University of California, Irvine, Orange County, California: Jurisdictional Delineation Report. Prepared for University of California, Irvine Environmental Planning & Sustainability.
[4] Environmental Laboratory. 1987. Corps of Engineers Wetlands Delineation Manual, Technical Report Y-87-1, U.S. Army Engineer Waterways Experimental Station, Vicksburg, Mississippi.
[5] U.S. Army Corps of Engineers. 2008. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0), ed. J. S. Wakeley, R. W. Lichvar, and C. V. Noble. ERDC/EL TR-08-28. Vicksburg, MS: U.S. Army Engineer Research and Development Center.
[6] State Water Resources Control Board. 2019. State Wetland Definition and Procedures for Discharges of Dredged or Fill Material to Waters of the State.

Second Edition (MCV2).[7] Once the vegetation mapping was completed and all areas (alliances) with a predominance of plants with an indicator status of FAC or wetter were identified, these areas were generally assumed to be wetlands due to the presence of wetland vegetation.

The second phase was the evaluation of the soils within the areas of proposed work, including those that are subject to permanent impacts and areas where temporary work from equipment would have potential impacts such as temporary soil disturbance and/or temporary removal of vegetation. During this phase of the field investigation, it was noted that the soils in many areas with a predominance of OBL and FACW species and hydrology indicators such as Indicator B7: Inundation visible on aerial imagery or Indicator B12: Biotic crust, failed to exhibit clear indicators for the presence of hydric soils such as the redoximorphic features typical of Indicator F6: Redox Dark Surface or Indicator F8: Redox Depressions. Given the lack of hydric soil indicators, the method for "Problematic hydric soils" beginning on page 96 of the AWS V. 2.0 was adopted.

The final phase was to confirm that areas subject to potential disturbance by project activities that exhibited positive indicators for wetland vegetation and hydric soils (assumed based on protocol for problematic hydric soils) also exhibited wetland hydrology and thus met each of the three criteria for wetlands set forth in the AWS V. 2.0. It is also important to note, that the outer edges of the Experimental Ponds, as well as the transition areas from the road/berm features exhibit a wide variety of vegetation, much consisting of non-native weeds) that includes plants with wetland indicator statuses ranging from UPL to OBL, with most species in the FAC and FACU categories. These areas were collectively mapped as "Mixed Herbaceous" where they do not conform to the membership rules for vegetation alliances in the MCV2. These areas are mapped as "Mixed Herbaceous Wetland" and Mixed Herbaceous Upland" on Exhibits 3a – 3d with each potential impact site subject to evaluation for each of the three wetland criteria set forth above.

With regard to hydric soils, the National Cooperative Soil Survey (NCSS) has mapped the following soil types [Exhibit 5] as occurring in the general vicinity of the project site:

Omni Clay - Drained

Omni soils are in nearly level concave basin areas at elevations of 5 to 150 feet. The sediments are of mixed origin. In a typical profile, the surface layer ranges from very dark gray to gray in 10YR hue. Texture is silt loam or clay, 12 to 20 inches thick. Because altered drainage has lowered the water table to a depth of 60 inches or more, excess salts have been leached and the soil is generally slightly saline-alkaline.

[7] Sawyer, J.O, T. Keeler-Wolf, and J.M. Evens. 2009. A Manual of California Vegetation. Second Edition. California Native Plant Society Press. Sacramento, California. 1,300 pp.

Tidal Flats
Tidal Flats are nearly level areas adjacent to bays and lagoons along the coast. Periodically they are covered by tidal overflow. Some of the higher areas are only covered during very high tides. Tidal flats are stratified clayey to sandy deposits. They are poorly drained and high in salts. Tidal flats are identified as hydric in the SCS's publication, *Hydric Soils of the United States*[8] in SCS's *Field Office Official List of Hydric Soil Map Units for Orange & Part of Riverside Co., California.*[9] It is important to note that under the Arid West Supplement, the presence of mapped hydric soils is no longer dispositive for the presence of hydric soils. Rather, the presence of hydric soils must now be confirmed in the field independent of previous mapping.

II. JURISDICTION

A. <u>Army Corps of Engineers</u>

Pursuant to Section 404 of the Clean Water Act, the Corps regulates the discharge of dredged and/or fill material into waters of the United States. The term "waters of the United States" is defined in Corps regulations at 33 CFR Part 328.3(a), pursuant to the *Navigable Waters Protection Rule*[10] (NWPR), as:

(a) Jurisdictional waters. For purposes of the Clean Water Act, 33 U.S.C. 1251 *et seq.* and its implementing regulations, subject to the exclusions in paragraph (b) of this section, the term ‘‘waters of the United States’’ means:

> *(1) The territorial seas, and waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including waters which are subject to the ebb and flow of the tide;*
> *(2) Tributaries;*
> *(3) Lakes and ponds, and impoundments of jurisdictional waters; and*
> *(4) Adjacent wetlands.*

(b) Non-jurisdictional waters. The following are not ‘‘waters of the United States’’:

> *(1) Waters or water features that are*
> *not identified in paragraph (a)(1), (2), (3), or (4) of this section;*

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[8] United States Department of Agriculture, Soil Conservation Service. 1991. <u>Hydric Soils of the United States</u>, 3rd Edition, Miscellaneous Publication Number 1491. (In cooperation with the National Technical Committee for Hydric Soils.)
[9] United States Department of Agriculture, Soil Conservation Service. 1992. Hydric Soil Lists, Field Office Technical Guide, Davis California.
[10] U.S. Environmental Protection Agency & Department of Defense. 2020. Federal Register / Vol. 85, No. 77 / Tuesday, April 21, 2020 / Rules and Regulations.

> *(2) Groundwater, including groundwater drained through subsurface drainage systems;*
> *(3) Ephemeral features, including ephemeral streams, swales, gullies, rills, and pools;*
> *(4) Diffuse stormwater run-off and directional sheet flow over upland;*
> *(5) Ditches that are not waters identified in paragraph (a)(1) or (2) of this section, and those portions of ditches constructed in waters identified in paragraph (a)(4) of this section that do not satisfy the conditions of paragraph (c)(1) of this section;*
> *(6) Prior converted cropland;*
> *(7) Artificially irrigated areas, including fields flooded for agricultural production, that would revert to upland should application of irrigation water to that area cease;*
> *(8) Artificial lakes and ponds, including water storage reservoirs and farm, irrigation, stock watering, and log cleaning ponds, constructed or excavated in upland or in non-jurisdictional waters, so long as those artificial lakes and ponds are not impoundments of jurisdictional waters that meet the conditions of paragraph (c)(6) of this section;*
> *(9) Water-filled depressions constructed or excavated in upland or in non-jurisdictional waters incidental to mining or construction activity, and pits excavated in upland or in non-jurisdictional waters for the purpose of obtaining fill, sand, or gravel;*
> *(10) Stormwater control features constructed or excavated in upland or in non-jurisdictional waters to convey, treat, infiltrate, or store stormwater runoff;*
> *(11) Groundwater recharge, water reuse, and wastewater recycling structures, including detention, retention, and infiltration basins and ponds, constructed or excavated in upland or in non-jurisdictional waters; and*
> *(12) Waste treatment systems.*

In the absence of wetlands, the limits of Corps jurisdiction in non-tidal waters, such as intermittent streams, extend to the OHWM which is defined at 33 CFR 328.3(e) as:

> *...that line on the shore established by the fluctuation of water and indicated by physical characteristics such as clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas.*

1. Wetland Definition Pursuant to Section 404 of the Clean Water Act

The term “wetlands” (a subset of “waters of the United States”) is defined at 33 CFR 328.3(b) as "those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support...a prevalence of vegetation typically adapted for life in saturated soil conditions." In 1987 the Corps published the Wetland Manual to guide its field personnel in determining jurisdictional wetland boundaries. The methodology set forth in the Wetland

Manual and the Arid West Supplement generally require that, in order to be considered a wetland, the vegetation, soils, and hydrology of an area exhibit at least minimal hydric characteristics. While the Wetland Manual and Arid West Supplement provide great detail in methodology and allow for varying special conditions, a wetland should normally meet each of the following three criteria:

- More than 50 percent of the dominant plant species at the site must be typical of wetlands (i.e., rated as facultative or wetter in the Arid West 2016 Regional Wetland Plant List[11],[12]);

- Soils must exhibit physical and/or chemical characteristics indicative of permanent or periodic saturation (e.g., a gleyed color, or mottles with a matrix of low chroma indicating a relatively consistent fluctuation between aerobic and anaerobic conditions); and

- Whereas the Wetland Manual requires that hydrologic characteristics indicate that the ground is saturated to within 12 inches of the surface for at least five percent of the growing season during a normal rainfall year, the Arid West Supplement does not include a quantitative criteria with the exception for areas with "problematic hydrophytic vegetation", which require a minimum of 14 days of ponding to be considered a wetland.

The SJMR would be considered waters of the U.S. as an adjacent wetland (33 CFR Part 328.3(a)(4)), specifically as set forth on page 22251 of the preamble to the NWPR:

> *The final rule defines ''adjacent wetlands'' as wetlands that…are physically separated from a territorial sea or traditional navigable water, a tributary, or a lake, pond, or impoundment of a jurisdictional water only by an artificial dike, barrier, or similar artificial structure so long as that structure allows for a direct hydrological surface connection to the territorial sea or traditional navigable water, tributary, or lake, pond, or impoundment of a jurisdictional water in a typical year, such as through a culvert, flood or tide gate, pump, or similar artificial feature.*[13]

[11] Lichvar, R.W., D.L. Banks, W.N. Kirchner, and N.C. Melvin. 2016. Arid West 2016 Regional Wetland Plant List. Phytoneuron 2016-30: 1-17. Published 28 April 2016.
[12] Note the Corps also publishes a National List of Plant Species that Occur in Wetlands (Lichvar, R.W., D.L. Banks, W.N. Kirchner, and N.C. Melvin. 2016. The National Wetland Plant List: 2016 wetland ratings. Phytoneuron 2016-30: 1-17. Published 28 April 2016.); however, the Regional Wetland Plant List should be used for wetland delineations within the Arid West Region.
[13] Federal Register /Vol. 85, No. 77 /Tuesday, April 21, 2020 /Rules and Regulations

B. Regional Water Quality Control Board

The State of California Water Resource Control Board and each of its nine Regional Boards regulate the discharge of waste (dredged or fill material) into waters of the United States[14] and waters of the State. Waters of the United States are defined above in Section II.A and waters of the State are defined as "any surface water or groundwater, including saline waters, within the boundaries of the state" (California Water Code 13050[e]). The SJMR lies within the Santa Ana Region of the Water Resource Control Board system.

Section 401 of the CWA requires certification for any federal permit or license authorizing impacts to waters of the U.S. (i.e., waters that are within federal jurisdiction), such as Section 404 of the CWA and Section 10 of the Safe Rivers and Harbors Act, to ensure that the impacts do not violate state water quality standards. When a project could impact waters outside of federal jurisdiction, the Regional Board has the authority under the Porter-Cologne Water Quality Control Act to issue Waste Discharge Requirements (WDRs) to ensure that impacts do not violate state water quality standards. Clean Water Act Section 401 Water Quality Certifications, WDRs, and waivers of WDRs are also referred to as orders or permits.

1. State Wetland Definition

The State Board Wetland Definition and Procedures define an area as wetland as follows: *An area is wetland if, under normal circumstances, (1) the area has continuous or recurrent saturation of the upper substrate caused by groundwater, or shallow surface water, or both; (2) the duration of such saturation is sufficient to cause anaerobic conditions in the upper substrate; and (3) the area's vegetation is dominated by hydrophytes or the area lacks vegetation.*

[14] Therefore, wetlands that meet the current definition, or any historic definition, of waters of the U.S. are waters of the state. In 2000, the State Water Resources Control Board determined that all waters of the U.S. are also waters of the state by regulation, prior to any regulatory or judicial limitations on the federal definition of waters of the U.S. (California Code or Regulations title 23, section 3831(w)). This regulation has remained in effect despite subsequent changes to the federal definition. Therefore, waters of the state includes features that have been determined by the U.S. Environmental Protection Agency (U.S. EPA) or the U.S. Army Corps of Engineers (Corps) to be "waters of the U.S." in an approved jurisdictional determination; "waters of the U.S." identified in an aquatic resource report verified by the Corps upon which a permitting decision was based; and features that are consistent with any current or historic final judicial interpretation of "waters of the U.S." or any current or historic federal regulation defining "waters of the U.S." under the federal Clean Water Act.

The following wetlands are waters of the State:

1. *Natural wetlands;*
2. *Wetlands created by modification of a surface water of the state; and*
3. *Artificial wetlands*[15] *that meet any of the following criteria:*
    a. Approved by an agency as compensatory mitigation for impacts to other waters of the state, except where the approving agency explicitly identifies the mitigation as being of limited duration;
    b. Specifically identified in a water quality control plan as a wetland or other water of the state;
    c. Resulted from historic human activity, is not subject to ongoing operation and maintenance, and has become a relatively permanent part of the natural landscape; or
    d. Greater than or equal to one acre in size, unless the artificial wetland was constructed, and is currently used and maintained, primarily for one or more of the following purposes (i.e., the following artificial wetlands are not waters of the state unless they also satisfy the criteria set forth in 2, 3a, or 3b):
        i. Industrial or municipal wastewater treatment or disposal,
        ii. Settling of sediment,
        iii. Detention, retention, infiltration, or treatment of stormwater runoff and other pollutants or runoff subject to regulation under a municipal, construction, or industrial stormwater permitting program,
        iv. Treatment of surface waters,
        v. Agricultural crop irrigation or stock watering,
        vi. Fire suppression,
        vii. Industrial processing or cooling,
        viii. Active surface mining – even if the site is managed for interim wetlands functions and values,
        ix. Log storage,
        x. Treatment, storage, or distribution of recycled water, or
        xi. Maximizing groundwater recharge (this does not include wetlands that have incidental groundwater recharge benefits); or
        xii. Fields flooded for rice growing.[16]

[15] Artificial wetlands are wetlands that result from human activity.
[16] Fields used for the cultivation of rice (including wild rice) that have not been abandoned due to five consecutive years of non-use for the cultivation of rice (including wild rice) that are determined to be a water of the state in accordance with these Procedures shall not have beneficial use designations applied to them through the Water Quality Control Plan for the Sacramento and San Joaquin River Basins, except as otherwise required by federal law for fields that are considered to be waters of the United States. Further, agricultural inputs legally applied to fields used for the cultivation of rice (including wild rice) shall not constitute a discharge of waste to a water of the state.

All artificial wetlands that are less than an acre in size and do not satisfy the criteria set forth in 2, 3.a, 3.b, or 3.c are not waters of the state. If an aquatic feature meets the wetland definition, the burden is on the applicant to demonstrate that the wetland is not a water of the state.

C. California Department of Fish and Wildlife

Pursuant to Division 2, Chapter 6, Sections 1600-1603 of the California Fish and Game Code, the 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.

CDFW defines a stream (including creeks and rivers) as "a body of water that flows at least periodically or intermittently through a bed or channel having banks and supports fish or other aquatic life. This includes watercourses having surface or subsurface flow that supports or has supported riparian vegetation." CDFW's definition of "lake" includes "natural lakes or man-made reservoirs." CDFW also defines a stream as “a body of water that flows, or has flowed, over a given course during the historic hydrologic regime, and where the width of its course can reasonably be identified by physical or biological indicators.”

It is important to note that the Fish and Game Code defines fish and wildlife to include: all wild animals, birds, plants, fish, amphibians, invertebrates, reptiles, and related ecological communities including the habitat upon which they depend for continued viability (FGC Division 5, Chapter 1, section 45 and Division 2, Chapter 1 section 711.2(a) respectively). Furthermore, Division 2, Chapter 5, Article 6, Section 1600 et seq. of the California Fish and Game Code does not limit jurisdiction to areas defined by specific flow events, seasonal changes in water flow, or presence/absence of vegetation types or communities.

III. RESULTS

A. Corps Jurisdiction

Corps jurisdiction associated with the SJMR totals approximately 179.05 acres of waters of the United States which consists entirely of wetlands and associated areas of open water[17] adjacent to San Diego Creek, an intermittent steam that is tributary to Upper Newport Bay, which is

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Agricultural inputs that migrate to a surface water or groundwater may be considered a discharge of waste and are subject to waste discharge requirements or waivers of such requirements pursuant to the Water Board’s authority to issue or waive waste discharge requirements or take other actions as applicable.

[17] Many of the areas that exhibit long-term inundation support herbaceous wetland plants during periods of dry-down including western sea purslane (*Sesuvium verrucosum*, FACW), smooth cocklebur (*Xanthium strumarium*, FAC), and swamp pricklegrass (*Crypsis schoenoides*, FACW) and meet the Corps’ three-criteria test for wetlands.

subject to the ebb and flow of the tide and connected to the Pacific Ocean. The boundaries of the waters of the United States are depicted on the enclosed maps.

The SJM Reserve is divided into areas designated as the Upper Marsh, Middle Marsh, Lower Marsh, Seasonal Marsh, Experimental Ponds and Hoag Pond. Exhibit 3 depicts the SJMR with each of the subareas identified.

Hydrology within the SJMR originates as direct rainfall limited runoff from the surrounding watershed as well as discharges of water beneath Campus Drive that is provided by the Irvine Ranch Water District (IRWD) [Exhibit 4, Photograph 1]. The water that enters the marsh from IRWD moves southward through the Upper Marsh and is carried by culvert to the Middle Marsh and ultimately to the Lower Marsh. Water is also pumped to the Experimental Ponds and the Hoag Pond.

1. Upper Marsh

The Upper Marsh [Exhibits 3a and 3b] covers 27.63 acres and includes a mosaic of wetland areas covering 26.75 acres consisting of California bulrush marsh, cattail marsh, and Goodding's black willow forest. The California bulrush marsh is dominated by California bulrush (*Schoenoplectus californicus*, OBL), which occurs as a monoculture in substantial portions of this alliance. Other species within thus alliance include cattails (*Typha angustifolia, latifolia and T. domingensis*, with a hybrid *T. x glauca* OBL)[18] and alkali bulrush (*Bolboschoenus maritimus*, OBL). Areas of cattail marsh occur as monocultural stands of cattails, that as noted, vary by species within the marsh including three species and a hybrid, or which a minor component of which is California bulrush. The Goodding's black willow forest is dominated by Goodding's black willow (*Salix goodinggii*, FACW)[19] with a shrubby understory of mulefat (*Baccharis salicifolia*, FAC), arroyo willow (*Salix lasiolepis*, FACW), narrow leaved willow (*Salix exigua*, FACW) and herbaceous understory of alkali mallow (*Malva leprosa*, FACU), alkali heath (*Frankenia salina*, FACW), saltgrass (*Distichlis spicata*, FAC), Olney's bulrush (*Schoenoplectus americanus*, OBL), and non-native species including poison hemlock (*Conium maculatum*, FACW), Spanish sunflower (*Pulicaria paludosa*, FAC), and bristly ox-tongue (*Helminthotheca echioides*, FAC) [Exhibit 4, Photograph 2]. Because the field work was conducted during the dry season, many of the areas that exhibit "open water" during earlier parts of the year were dry and exhibited two different wetland vegetation alliances including western sea purslane (*Sesuvium verrucosum*, FACW) and swamp pricklegrass (*Crypsis schoenoides*, FACW), which

[18] The variety of cattails within the various portions of the marsh was provided by Dr. Peter Bowler in an email to Tony Bomkamp, dated October 20, 2020.

[19] Many individuals of the Goodding's black willow appear to by hybrids with other undetermined *Salix* sp., potentially *S. laevigata* (FACW) or *S. lasiandra* (FACW), meaning that the wetland indicator status used for making a determination for a predominance of wetland species is appropriately FACW. Also, each has the same State Rarity Ranking of S3 and would be treated identically relative to determination of special-status.

occupy the areas as near monocultures or in some cases in mixed stands, as the ponding areas dry down [Exhibit 3, Photograph 3].

2. Middle Marsh

Like the Upper Marsh, the 46.02-acre Middle Marsh includes a mosaic of wetland areas consisting of California bulrush marsh, cattail marsh, and limited areas of Goodding's black willow (hybrid) forest and accounts for 43.76 acres. The California bulrush marsh is dominated by California bulrush (*Schoenoplectus californicus*, OBL), which occurs as a monoculture for substantial portions of this alliance. Other species within thus alliance include cattail (*Typha* sp., OBL) and alkali bulrush (*Bolboschoenus maritimus*, OBL). Areas of southern cattail marsh occurs as monocultural stands of southern cattail (*Typha domingensis*, OBL) with a small component of California bulrush. The Goodding's black willow (hybrid) forest is dominated by Goodding's black willow (*Salix gooddingii*, FACW) (hybrid) with a shrubby understory of mulefat (*Baccharis salicifolia*, FAC and herbaceous understory of alkali mallow (*Malva leprosa*, FACU), alkali heath (*Frankenia salina*, FACW), and saltgrass (*Distichlis spicata*, FAC). The Middle Marsh also includes areas of the western sea purslane and areas of swamp pricklegrass [Exhibit 4, Photograph 4].

3. Lower Marsh

Like the Upper Marsh and Middle Marsh, the 25.81-acre Lower Marsh [Exhibit 3a and 3c] includes a mosaic of wetland areas totaling 19.53 acres consisting of California bulrush marsh and cattail marsh, mixed herbaceous wetland, western sea-purslane marsh and limited areas of pickleweedmaots. The eastern approximately one-third of the Lower Marsh supports areas of dense Mulefat Thickets dominated by mulefat (*Baccharis salicifolia*, FAC) [Exhibit 4, Photograph 5]. The California bulrush marsh is dominated by California bulrush (*Schoenoplectus californicus*, OBL), which includes a larger component of the cattails. Other species within thus alliance include chairmaker's bulrush (*Schoenoplectus americanus*, OBL) and alkali bulrush (*Bolboschoenus maritimus*, OBL). Areas of cattail marsh occur as monocultural stands of cattail (*Typha* sp., OBL) with a larger component of California bulrush than in the Upper and Middle Marsh areas. The western portion of the Upper Marsh also includes areas of the western sea purslane and the northern edge supports areas of alkali bulrush (*Bolboschoenus maritimus*, OBL).

4. Seasonal Marsh

The Seasonal Marsh accounts for 34.01 acres and is located at the northeast corner of the reserve [Exhibit 3b]. The Seasonal Marsh is the driest area within Reserve and is not completely inundated annually. This area exhibits a mosaic of wetland (33.57 acres) and upland vegetation alliances including areas with monocultural thickets of smooth cocklebur (*Xanthium strumarium*, FAC) [Exhibit 4, Photograph 6], stands of California bulrush marsh, Goodding's black willow forest, mulefat scrub, and weedy herbaceous alliances including mustard fields dominated by black mustard (*Brassica nigra*, UPL), bristly ox-tongue thickets dominated by bristly ox-tongue (*Helminthotheca echioides*, FAC), poison hemlock stands dominated by poison hemlock (*Conium maculatum*, FACU), and areas where the various species noted above are mixed together such that the vegetation includes areas of mixed species that includes upland and wetland indicators. The western edge of the Seasonal Marsh will be subject to potential impacts for an alternative that would include installation of a swale and berm that will carry water from the culvert beneath Campus Drive to the toward a pipe in Pond 10 or the Middle Marsh leading to the culvert at the end of the Experimental Pond pipe network. As such, wetland delineation efforts were focused on the areas of potential impact.

5. Experimental Ponds

The Experimental Ponds cover 40.78 acres and were created in 1999. This eleven-pond series receives water through direct rainfall as well as water that is pumped into the ponds from San Diego Creek or from IRWD-originating water in the Middle Marsh. Water levels in the ponds are controlled by hydrological manipulation by means of Fontaine slide "gates" which can be opened or closed at the discretion of the Reserve Manager.

The 11 Experimental Ponds contain 34.80 acres of wetlands and areas of open water that occupy the east-central portion of the SJMR Reserve [Exhibits 3 a – d]. The ponds generally exhibit similar characteristics (with exceptions). Most of the ponds include areas of deep, open water (up to 40-percent of the surface area during wet periods) that extend for various periods based on the annual hydrologic input Exhibit 4, Photograph 7]. Areas along the periphery of the open water exhibit dominated by California bulrush or cattails as described above. The adjacent habitat abutting surrounding pond berms are shallow shelves are typically dominated by monocultural stands of alkali bulrush, which is an OBL species and thus is included in the wetland areas [Exhibit 4, Photograph 8]. The alkali bulrush areas often intergrade with a mosaic of species including chairmaker's bulrush, which vary from pond to pond and even within ponds. This mosaic of species typically extends part way up the berms that encircle the Experimental ponds which transition to the roads. Species that are included in the transition zone include alkali bulrush, alkali heath (*Frankenia salina*, FACW), bristly ox-tongue (*Helminthotheca echioides*, FAC), slim aster (*Symphyotrichum subulatum* OBL), smooth cocklebur (*Xanthium strumarium*, FAC), prostrate spearscale (*Atriplex prostrata*, FACW), salt-loving goosefoot (*Chenopodium macrospermum*, FACW), rabbitsfoot grass (*Polypogon monspeliensis*, FACW), five-hook bassia (*Bassia hyssopifolia*, FACU), and seaside heliotrope (*Heliotropium curassavicum*, FACU). The driest portions of the transition areas support a predominance of upland non-native grasses including soft chess (*Bromus hordeaceus*, FACU), red brome (*Bromus madritensis rubens*, UPL) and black mustard (*Brassica nigra*, UPL).

6. Hoag Pond

The Hoag Pond [Exhibit 3d] covers approximately 8.88 acres includes a mosaic of areas consisting of California bulrush marsh, cattail marsh, and limited areas of Goodding's black willow (hybrid) forest and accounts for approximately 6.50 acres wetlands. The California bulrush marsh is dominated by California bulrush (*Schoenoplectus californicus*, OBL), which occurs as a monoculture for substantial portions of this alliance. Other species within thus alliance include cattail (*Typha* sp., OBL) and alkali bulrush (*Bolboschoenus maritimus*, OBL). A substantial portion of the Hoag Pond consists of open water during the wet season and is largely unvegetated when dry with scattered seaside heliotrope (*Heliotropium curassavicum*, FACU).

7. San Diego Creek

The boundary of the SJMR extends to the southeast, encompassing a segment of San Diego Creek [Exhibits 3c and 3d] and adjacent areas that cover 15.81 acres of which 14.15 acres consist of a mix of mulefat scrub, Goodding's black willow forest, mulefat thickets and open water/stream channel.

B. <u>Regional Water Quality Control Board Jurisdiction</u>

The wetland areas within the SJMR meet the definition for Waters of the U.S. Thus, any impacts to the wetlands would be subject to Water Quality Certification pursuant to Section 401 of the Clean Water Act and areas of jurisdiction for the Corps and Regional Board would be the same.

C. <u>CDFW Jurisdiction</u>

The SJMR does not meet the definition for a stream or lake in accordance with Section 1602 of the Fish and Game Code and thus would not be subject to the Notification provisions under Section 1602. Nevertheless, the SJMR exhibits significant values for fish and wildlife resources including a number of special-status animals, including at least one state-listed bird: least Bell's vireo (*Vireo belli pusillus*). CDFW will be expected to comment on the project Draft Environmental Impact Report (DIER) and at that time would comment on whether CDFW would request Notification under Section 1602. To ensure that any impacts are fully addressed pursuant to the California Environmental Quality Act, wetland and riparian areas are provisionally included in the analysis to ensure that any potential impacts to areas where CDFW may require notification are addressed.

Table 1: Summary of Agency Jurisdiction			
Wetland Area	**Wetland Waters of the U.S. (Corps Jurisdiction)**	**Wetland Waters of the State (Regional Board Jurisdiction)**	**Potential CDFW Jurisdiction**
Upper Marsh	26.75	26.75	26.75
Middle Marsh	43.76	43.76	43.76
Lower Marsh	19.53	19.53	19.53
Seasonal Marsh	33.57	33.57	33.57
Experimental Ponds	34.80	34.80	34.80
Hoag Pond	6.50	6.50	6.50
San Diego Creek	14.15	14.15	14.15
Total	**179.05**	**179.05**	**179.05**

IV. PROJECT DESCRIPTION

The project description is set forth in Table 2 below which describes each Element, the Element location, the goal associated with each Element and finally the equipment to used for completion of each Element. The Elements are depicted on the project impact maps [Exhibits 6a – 6d]

Table 2: UCI San Joaquin Marsh Improvements Project Conceptual Design Elements. Elements 1-5 are part of Design Goal 1 and Elements 6-8 are part of Design Goal 2.				
Element		**Location**	**Goal**	**Equipment**
1	Replace existing open pipe with culvert and slide gate	Existing levee between Middle Marsh and Lower Marsh	Control water movement from the Middle Marsh to the Lower Marsh to maintain Middle Marsh refugia in dry years and expand habitat in the Lower Marsh in wet years.	Excavation equipment, concrete and delivery trucks
2	Restore or replace a non-functioning outlet to San Diego Creek	Existing non-functioning south culvert between the Lower Marsh and San Diego Creek	Restore a viable connection through the south culvert, between the Lower Marsh and San Diego Creek allowing water circulation and discharge during extreme flood events. Provide future capability for flow from San Diego Creek into the Marsh with future sea level rise.	Excavation equipment, delivery trucks, vacuum truck

3	Excavate a curvilinear swale	Along the lower 2/3rds of the Lower Marsh, beginning below a new raised berm defining an upper pooled area to the restored South Culvert draining to San Diego Creek	Create swale to concentrate and direct water, allow wetland habitat to persist during wet years, and provide directed drainage during flood years. Protect in place deeper pooled areas along the upper, west edge of the Lower Marsh by allowing a rise in elevation prior to the beginning of the swale directing water to the drainage culvert. Funding permitting, possible broadening of the swale on marsh side of South Culvert, to function as additional habitat and to accommodate future sedimentation.	Excavation equipment marsh buggy, backhoe, front-end loader, grader
4	Install culvert w/ slide gate	Between Hoag Pond and Experimental Pond 3	Increase the function of Hoag Pond as an optional water source for the Experimental Pond pipe network through the Pond 3 connection to the system. It is the most suitable cell due to its large area and depth, and it is adjacent to San Diego Creek.	Excavation equipment, concrete and delivery trucks
5	Raise berm	Between Hoag Pong and Experimental Pond 3	Increase the water capacity and water surface elevation of Hoag Pond and Experimental Pond 3 to support wetland habitat in these areas, in addition to passive flow to other connected Experimental Ponds when needed.	Dump trucks, front-end loader, backhoe, grader
6	Raise berm and modify or replace the existing culvert	Along Middle Marsh berm road and existing headwall at Middle Marsh slide gate leading to Seasonal Marsh.	Allow the Middle Marsh to fill to capacity without overtopping its existing headwall.	Concrete and delivery trucks, front-end loader, backhoe, grader

7a	Install water measurement sensor	Existing IRWD Inlet in the Upper Marsh adjacent to Campus Drive.	Measure water quantity coming from IRWD.	Hand tools
7c	Convey IRWD water more directly to the Experimental Pond pipe network by installing pipe(s) or a swale.	From the Campus Drive culvert at the Upper Marsh gate (7c), determine the best path from the existing Upper Marsh swale, under the dirt road separating the Upper Marsh and Seasonal Marsh, to a lower pooled area in the southwest corner of Seasonal Marsh. From this pooled area, water would be pumped through a newly installed pipe (with one-way flap) under the road to a connection with the existing Experimental Pond pipe network. The connection to the Experimental Pond pipe network may be established by going through Pond 10 or the Middle Marsh, whichever is deemed most effective and least impactful to existing habitat. Included in this element is constrction of a basking island for the western pond turtle in the Middle Marsh	Enable the conveyance of water from IRWD to the Experimental Ponds pipe network, allowing for semi-permanent to perennial wetland/pond conditions in this area without needing to first fill the Middle Marsh. Minimize long term habitat impacts and maintenance costs. Finally, provide a basking island for the western pond turtle in the Middle Marsh that could serve as a basking site and as a potential breeding location.	Delivery trucks, excavation equipment, marsh buggy, backhoe, front-end loader, grader
7b	Install headwall w/ gate	From the Campus Drive culvert at the Upper Marsh gate (7c), determine the best divergence point from the existing Upper Marsh swale to establish a headwall and gate to convey water under the dirt road separating the	Improve the distribution of water from IRWD to the Experimental Ponds more directly, bypassing the Middle Marsh. A slide gate will connect a pooled swale or pipe from Upper Marsh or Seasonal Marsh to a pipe in Pond 10 or the Middle Marsh leading to the	Excavation equipment, concrete and delivery trucks

		Upper Marsh and Seasonal Marsh. The best stretch of existing swale to add a connection under the road is approximately 75 ft- 250 ft down steam of the existing swale.	culvert at the end of the Experimental Pond pipe network. The Experimental Ponds are managed as semi-permanent marsh and perennial ponds, and thus need to receive water later in the year than other marsh areas. This is also important for managing mosquito populations to not have all units filled year-round.	
8	Expand and modify Water Catchment Basin and Pond 1 area		Allow for greater capacity adjacent to the existing Water Catchment Basin and Pond 1.	Excavation Front-end loader, backhoe

V. IMPACTS

The SMJR supports federally protected wetlands and potentially state protected wetlands and riparian habitat. As noted above, the project is designed for purposes of enhancing the hydraulics in the marsh to enhance the wetlands and riparian habitat in the SJMR that are depicted on Exhibits 6a – 6d]. Therefore, project impacts to these wetland and riparian resources are generally considered temporary or short-term based on the nature of proposed activities, which are designed to restore and/or enhance the function and value of habitat within the greater SJMR. In addition, siting of the proposed project activities including the Design Goals and associated Elements and proposed staging and access areas was performed in coordination with GLA and the project engineer to avoid and minimize disturbances to resources where feasible. Nevertheless, proposed activities will result in direct, albeit temporary or short-term disturbances to these resources as described in detail below and as summarized for each Element in Table 5.2 below. Direct disturbances will be associated with the following activities:

- Removal of Woody Wetland Vegetation
- Fill within Herbaceous Wetlands
- Excavation within Herbaceous Wetlands
- Mowing within Herbaceous Wetlands

Removal of Woody Wetland Vegetation

As summarized in Table 3, implementation of certain project elements will result in the removal of 2.27 acres of Goodding's black willow forest and 2.06 acres of mulefat thickets. Such removal is necessary where woody wetland vegetation would prohibit implementation of specific elements such as construction of berms, excavation of swales, and access to and work within work areas for berm construction or swale excavation.

Fill within Herbaceous Wetlands

As summarized in Table 3, implementation of certain project elements will result in the fill of herbaceous wetlands including 0.55 acre of California bulrush marsh, 1.04 acres of cattail marsh, 1.30 acres of mixed herbaceous wetland, 0.16 acre of saltmarsh bulrush, and 0.01 acre of swamp pricklegrass mats. Fill of these areas is primarily associated with expansion or construction of berms.

Excavation within Herbaceous Wetlands

As summarized in Table 3, implementation of certain project elements will result in the excavation of herbaceous wetlands including 1.68 acres of California bulrush marsh, 0.83 acre of cattail marsh, 1.23 acres of mixed herbaceous wetland, 0.16 acre of saltmarsh bulrush, and 0.01 acre of swamp pricklegrass mats. Impacts to these areas is associated with excavation of swales to move water in the SJMR as part of the overall enhancement efforts.

Mowing within Herbaceous Wetlands

As summarized in Table 3, implementation of certain project elements will result in the mowing of herbaceous wetlands for purposes of access, including 1.62 acres of California bulrush marsh, 0.84 acre of cattail marsh, 2.35 acres of mixed herbaceous wetland, 0.54 acre of saltmarsh bulrush, and 0.05 acre of swamp pricklegrass mats. Mowing of these areas would not result in a discharge of fill material; nevertheless, there areas are identified as part of the overstated impacts in case it is necessary to do temporary grading in any of these areas during or as needed to access construction.

Summary of Impacts

A summary of direct impacts to wetlands and riparian habitat is provided in Table 3 below. It is important to note that this impact analysis is conservative in that it considers all potential impacts that have been identified based on preliminary or conceptual design. With final design refinements, certain impacts may potentially be reduced or eliminated. Certain proposed impacts must be considered in the larger context of the goals of the SJMR, such as the proposal as part of Element 7c to create a basking island in the Middle Marsh, which would result in placement of fill within an area of cattail marsh to enhance a regional important population of the western pond turtle. Cattail marsh is common and widespread; while the western pond turtle remains in decline regionally and enhancement of the SJMR for western pond turtle is fully consistent with the goals of the SJMR.

Table 3: Wetland Impacts

Element[1]	Vegetation Alliance	Removal Woody Vegetation (acres)	Fill Herbaceous (acres)	Excavation Herbaceous (acres)	Mowing Herbaceous (acres)
1	California Bulrush Marsh	--	0.01	--	--
2	None Present	--	--	--	--
3	California Bulrush Marsh	--	--	1.16	--
	Mixed Herbaceous Wetland	--	--	0.05	--
	Mulefat Thickets	0.49	--	--	--
	Salt Marsh Bulrush Marsh	--	--	0.03	--
4	California Bulrush Marsh	--	0.01	--	--
	Mixed Herbaceous Wetland	--	0.01	--	--
5	California Bulrush Marsh	--	0.36	--	--
	Goodding's Willow Forest	0.41	--	--	--
	Mixed Herbaceous Wetland	--	0.61	--	--
	Mulefat Thicket	0.23	--	--	--
	Salt Marsh Bulrush Marsh	--	0.11	--	--
6	California Bulrush Marsh	--	0.01	--	--
	Mixed Herbaceous Wetland	--	0.01	--	--
	Swamp Pricklegrass Mats	--	0.01	--	--
7b	Goodding's Willow Forest	0.01	--	--	--
	Mixed Herbaceous Wetland	--	0.01	--	--
7c	California Bulrush Marsh	--	0.14	0.52	--
	Cattail Marsh	--	1.04	0.83	--
	Goodding's Willow Forest	0.34	--	--	--
	Mulefat Thickets	0.42	--	--	--
	Mixed Herbaceous Wetland	--	0.54	1.18	--
	Salt Marsh Bulrush Marsh	--	--	0.01	--
	Swamp Prickelgrass Mats	--	--	0.01	--
8	Cattail Marsh	--	--	0.003	--
	Goodding's Willow Forest	0.03	--	--	--
Staging[2]	California Bulrush Marsh	--	0.02	--	--
	Goodding's Willow Forest	0.01	--	--	--
	Mixed Herbaceous Wetland	--	0.12	--	--
	Salt Marsh Bulrush Marsh	--	0.05	--	--
Work[3] Area	California Bulrush Marsh	--	--	--	1.62
	Cattail Marsh	--	--	--	0.84

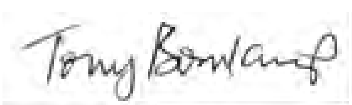
	Goodding's Willow Forest	1.44	--	--	--
	Mixed Herbaceous Wetland	--	--	--	2.35
	Mulefat Thicket	0.92	--	--	--
	Pickleweed Mat	--	--	--	0.004
	Salt Marsh Bulrush Marsh	--	--	--	0.54
	Swamp Pricklegrass Mats	--	--	--	0.05
	Western Sea-purslane mats	--	--	--	0.01
	Totals	**4.30**	**3.06**	**3.79**	**5.414**

Notes:
[1] Impact calculations for each Element account for the temporary "Proposed Access Route" required to access that Element as shown on Exhibits 6a – 6d.
[2] Impact calculations for the "Proposed Staging Area" shown on Exhibits 6a – 6d are likely overstated as project staging is anticipated to avoid woody vegetation removal and not require placement of fill.
[3] Accounts for potential impacts associated with a "Temporary Work Area" buffer around the proposed Elements as shown on Exhibits 6a – 6d.

If you have any questions about this letter report, please contact Tony Bomkamp at (949) 340-7333.

Sincerely,

GLENN LUKOS ASSOCIATES, INC.



Tony Bomkamp
Technical Director

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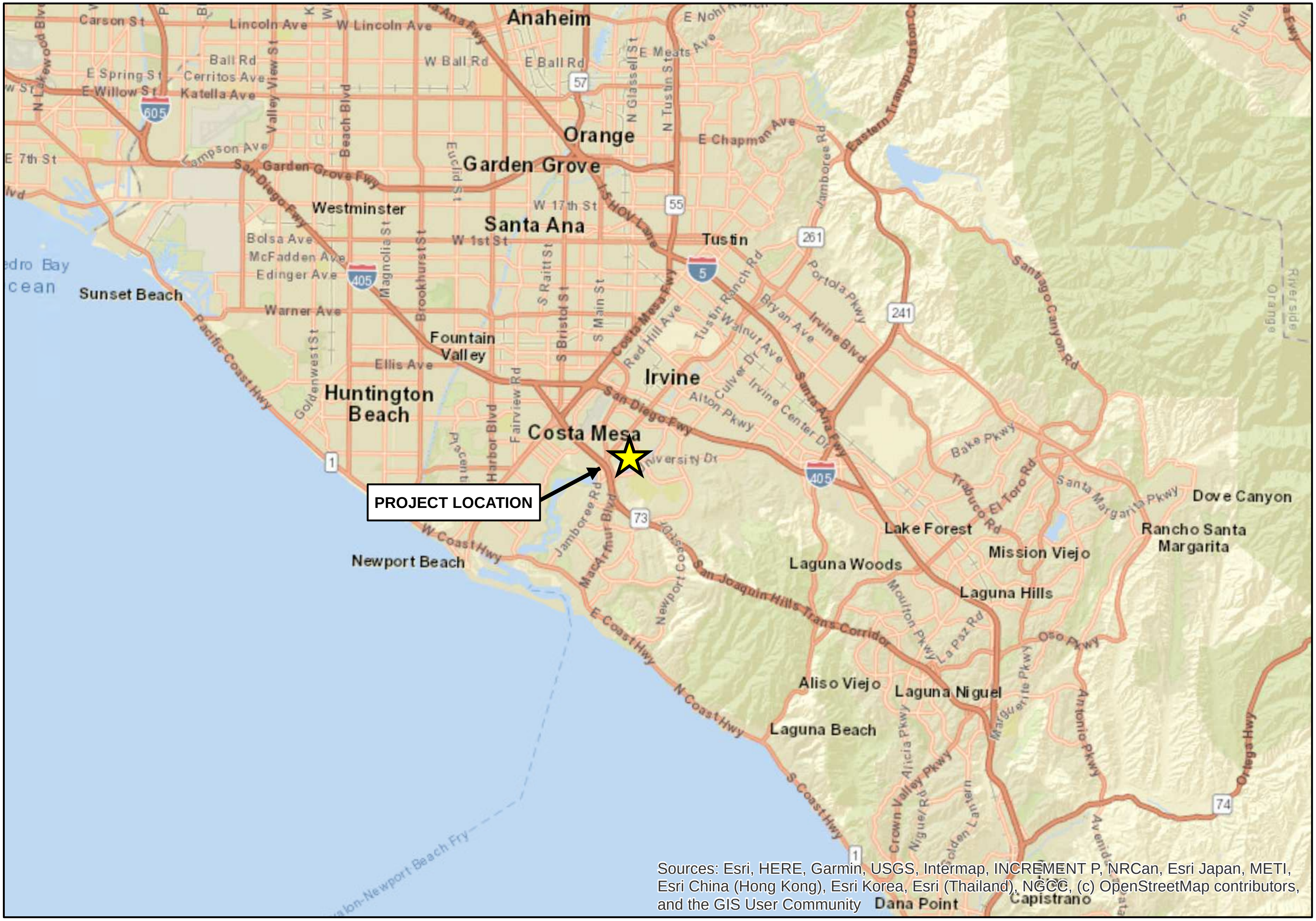


N

0 2 4 8 Miles

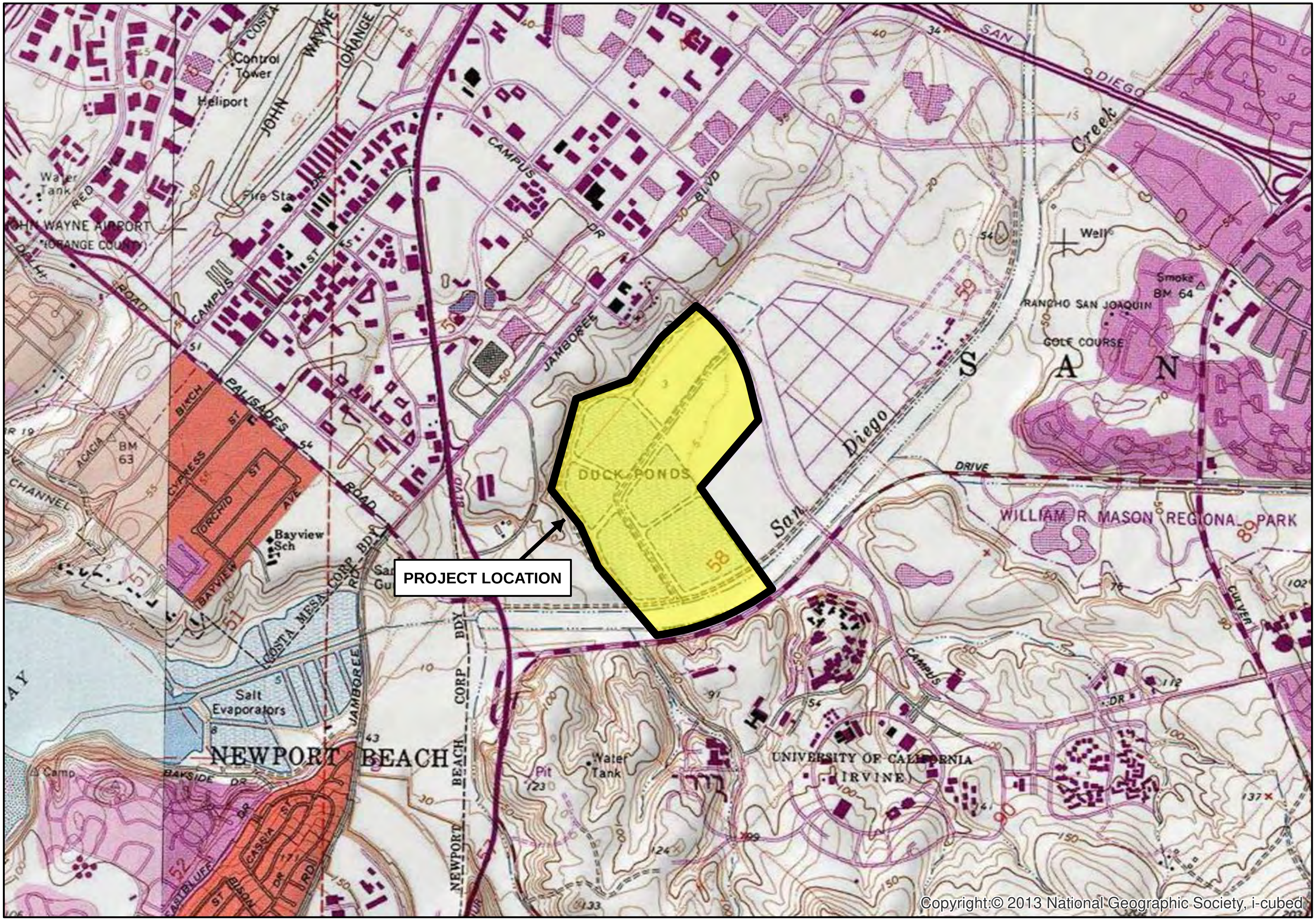
U.C. SAN JOAQUIN MARSH RESERVE

Regional Map

GLENN LUKOS ASSOCIATES

Exhibit 1

Adapted from USGS Tustin, CA quadrangle



N

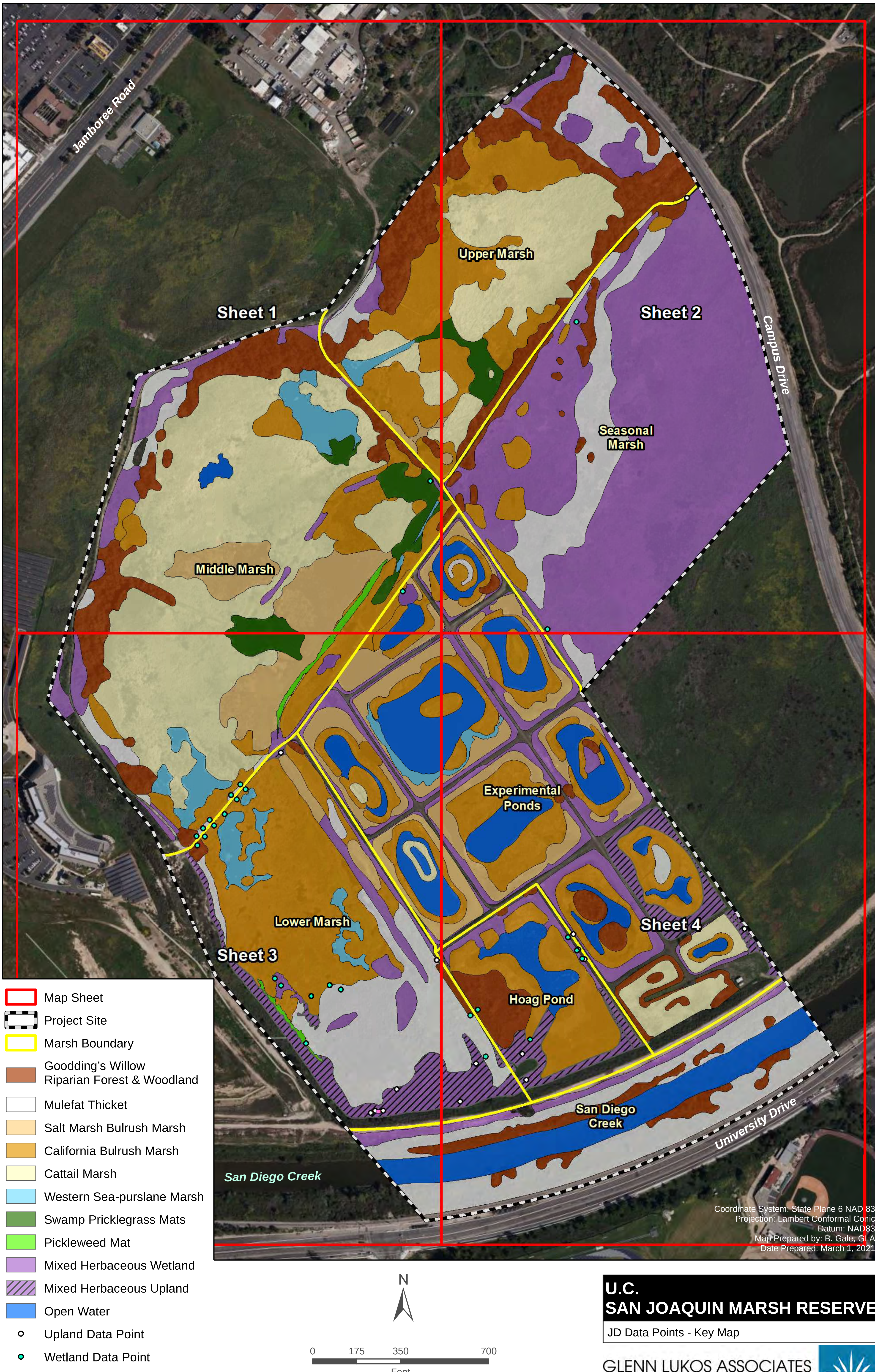
0
1,000
2,000
4,000
Feet

U.C. SAN JOAQUIN MARSH RESERVE

Vicinity Map

GLENN LUKOS ASSOCIATES

Exhibit 2



Source: Glenn Lukos Associates, 2020

1 inch = 350 feet

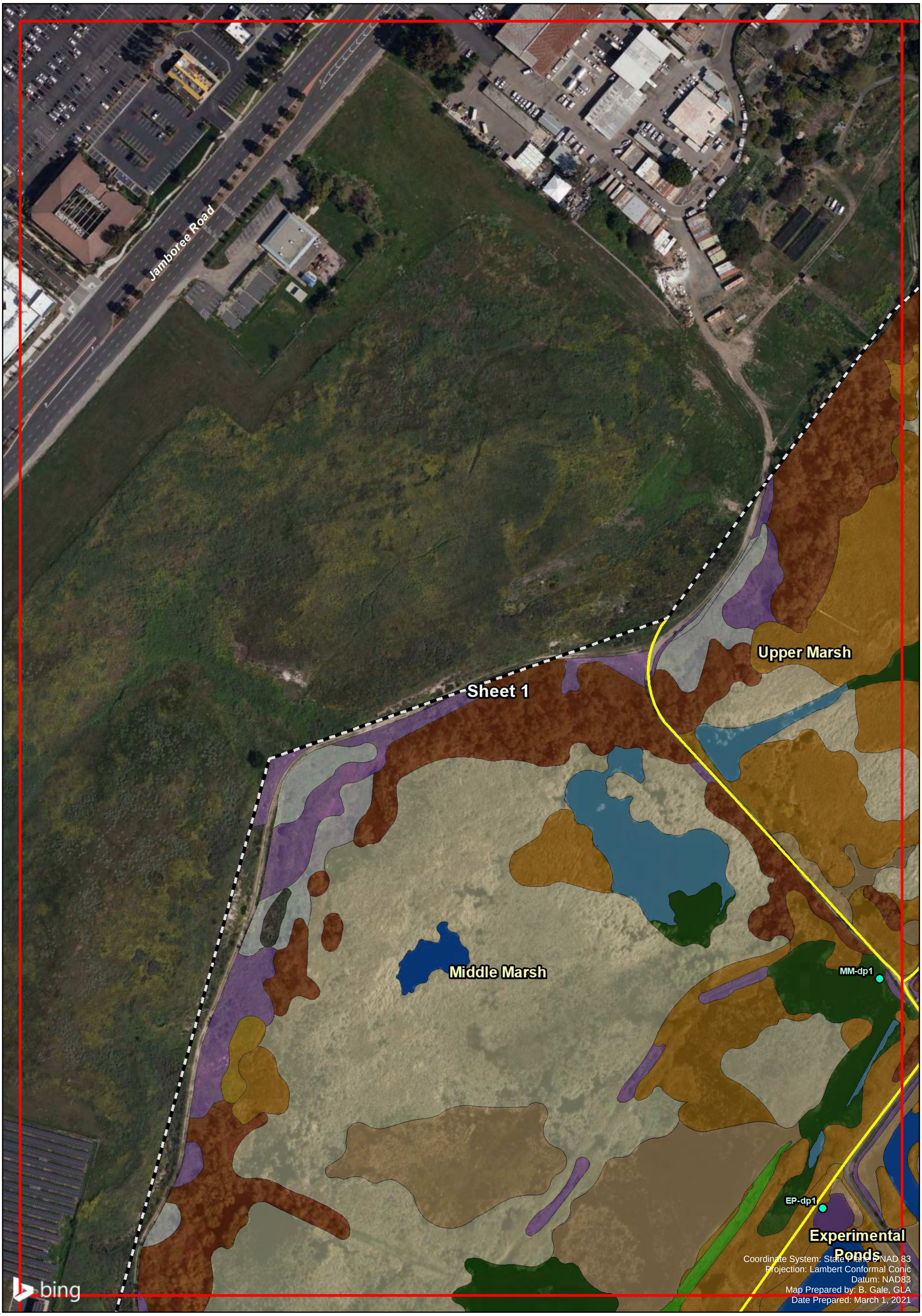
U.C.
SAN JOAQUIN MARSH RESERVE

JD Data Points - Key Map

GLENN LUKOS ASSOCIATES

Exhibit 3

X:\1100 AFTER THE REST\1505-01SJMR\1505-1_GIS\DelineationGIS\1505-1_JDDataPoints_KeyMap.mxd



N

0 87.5 175 350
Feet

1 inch = 175 feet

Source: Glenn Lukos Associates, 2020

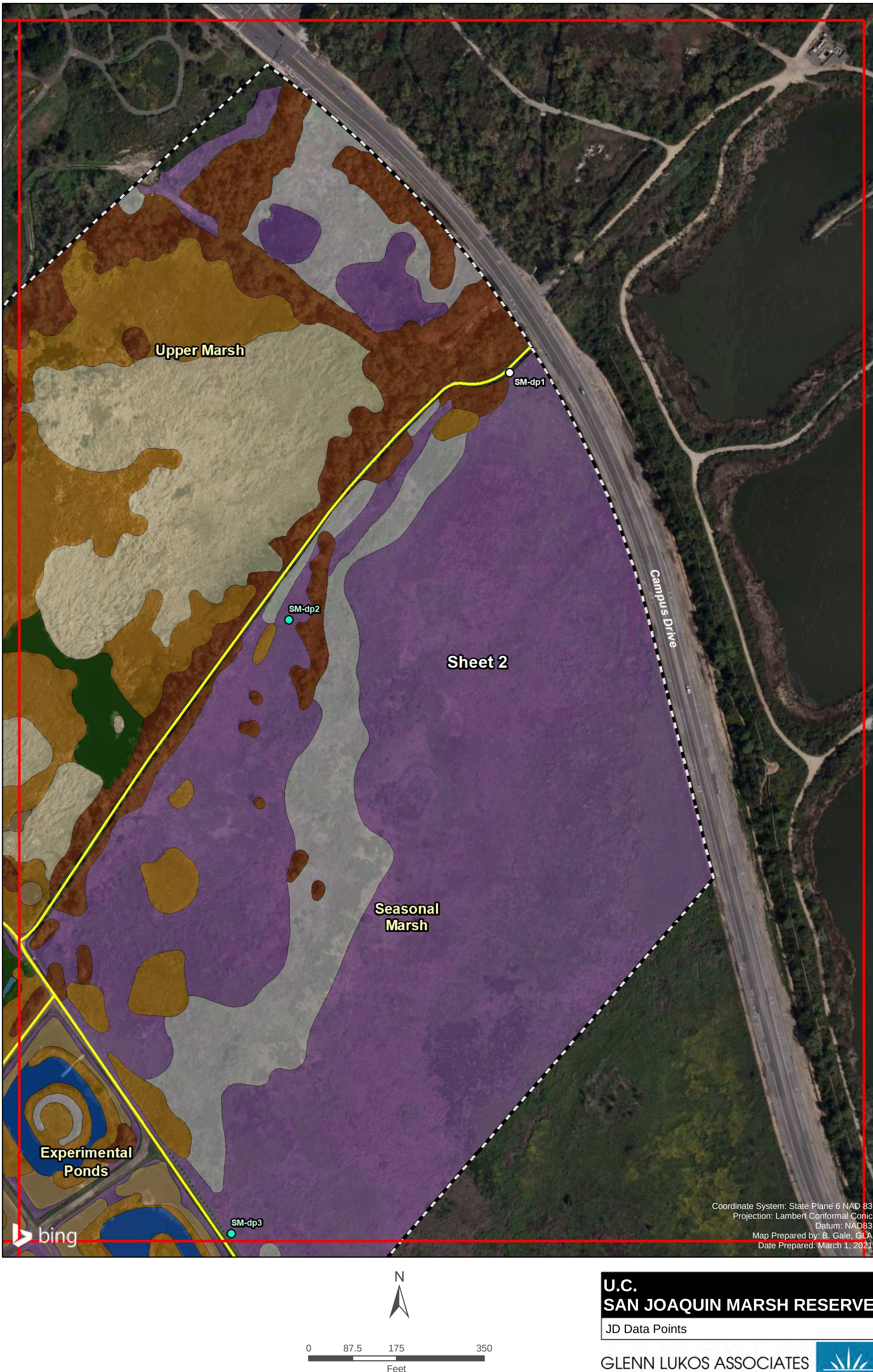
U.C.
SAN JOAQUIN MARSH RESERVE

JD Data Points

GLENN LUKOS ASSOCIATES

Exhibit 3A

X:\1100 AFTER THE REST\1505-01SJMR\1505-1_GIS\DelineationGIS\1505-1_JDDataPoints_MapSheets.mxd



1 inch = 175 feet

Source: Glenn Lukos Associates, 2020

U.C. SAN JOAQUIN MARSH RESERVE

JD Data Points

GLENN LUKOS ASSOCIATES

Exhibit 3B

X:\1100 AFTER THE REST\1505-01SJMR\1505-1_GIS\DelineationGIS\1505-1_JDDataPoints_MapSheets.mxd

1 inch = 175 feet

U.C. SAN JOAQUIN MARSH RESERVE

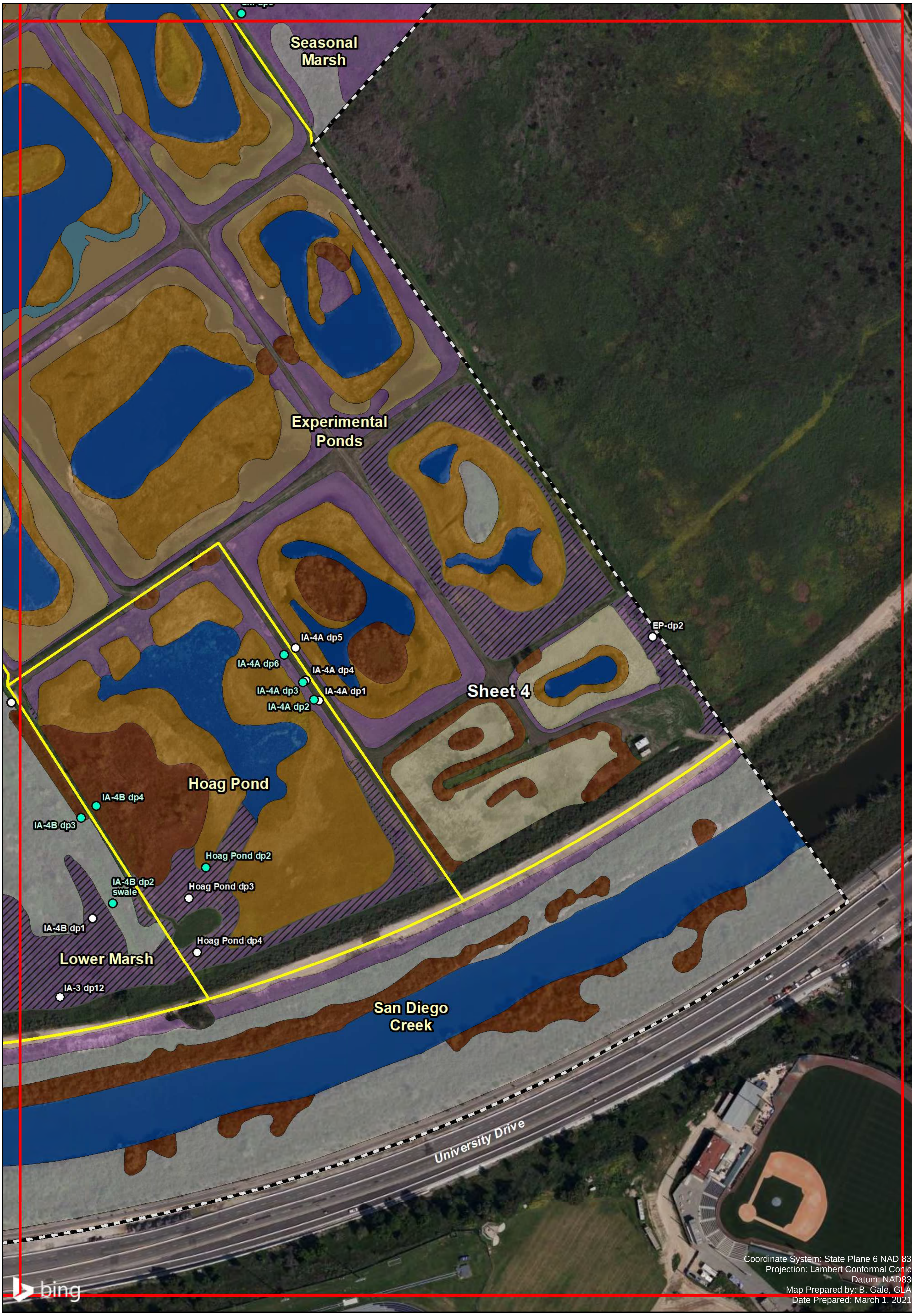
JD Data Points

GLENN LUKOS ASSOCIATES

Exhibit 3C

Source: Glenn Lukos Associates, 2020

X:\1100 AFTER THE REST\1505-01SJMR\1505-1_GIS\DelineationGIS\1505-1_JDDataPoints_MapSheets.mxd



N

0 87.5 175 350
Feet

1 inch = 175 feet

Source: Glenn Lukos Associates, 2020

U.C.
SAN JOAQUIN MARSH RESERVE

JD Data Points

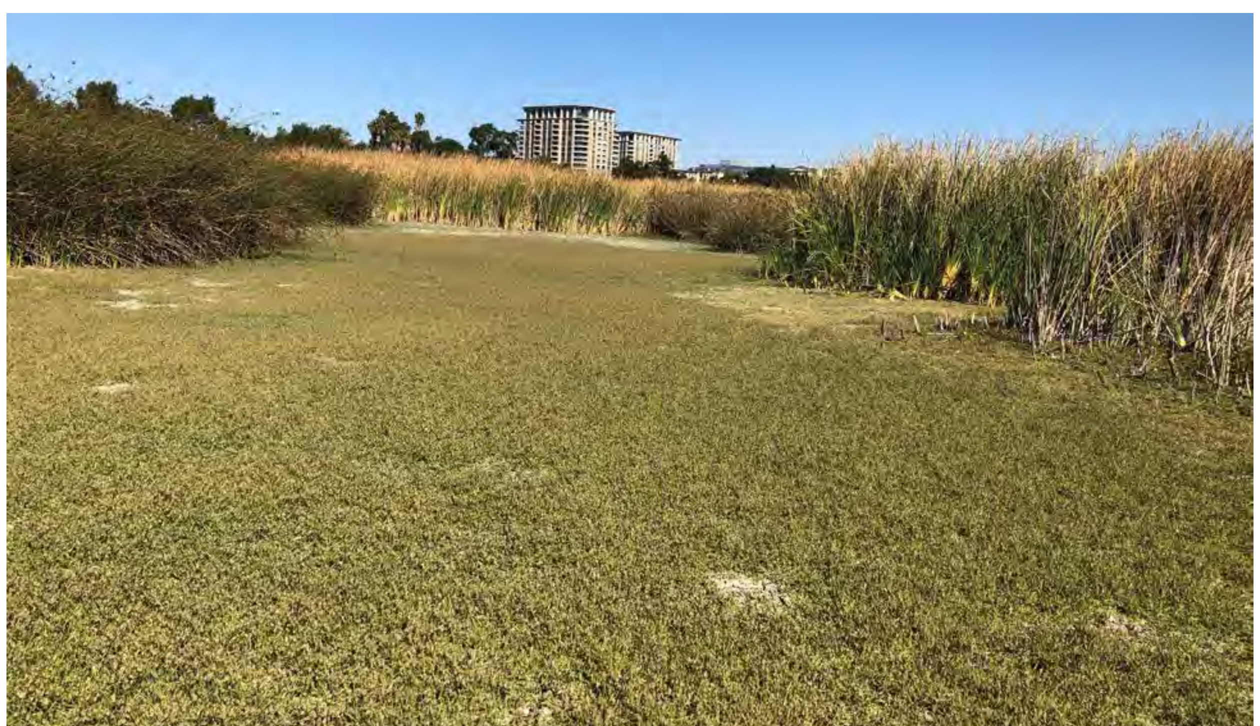
GLENN LUKOS ASSOCIATES

Exhibit 3D

X:\1100 AFTER THE REST\1505-01SJMR\1505-1_GIS\DelineationGIS\1505-1_JDDataPoints_MapSheets.mxd

Photograph 1: Culvert at Campus Drive where water is discharge to SJMR from Irvine Ranch Water District.

Photograph 2: Black Willow Forest at western edge of Upper marsh.



Photograph 3: Mix of Pricklegrass and Western Sea-Purslane in Upper Marsh in mosaic of California bulrush on left and cattails on right..

Photograph 4: Mix of Pricklegrass and Western Sea-Purslane in Middle Marsh in mosaic of California bulrush.

GLENN LUKOS ASSOCIATES

Exhibit 4 – Page 1

PROJECT NAME

Site Photographs

Photograph 5: Mix of Mulefat Scrub and Poison Hemlock at the southern limits of Lower Marsh near culvert to San Diego Creek. This area lacks hydric soils and wetland hydrology.

Photograph 6: Dense thicket of Smooth Cocklebur in Seasonal Wetland at location of Swale and Berm complex.

Photograph 7: Experimental Pond with long duration ponding.

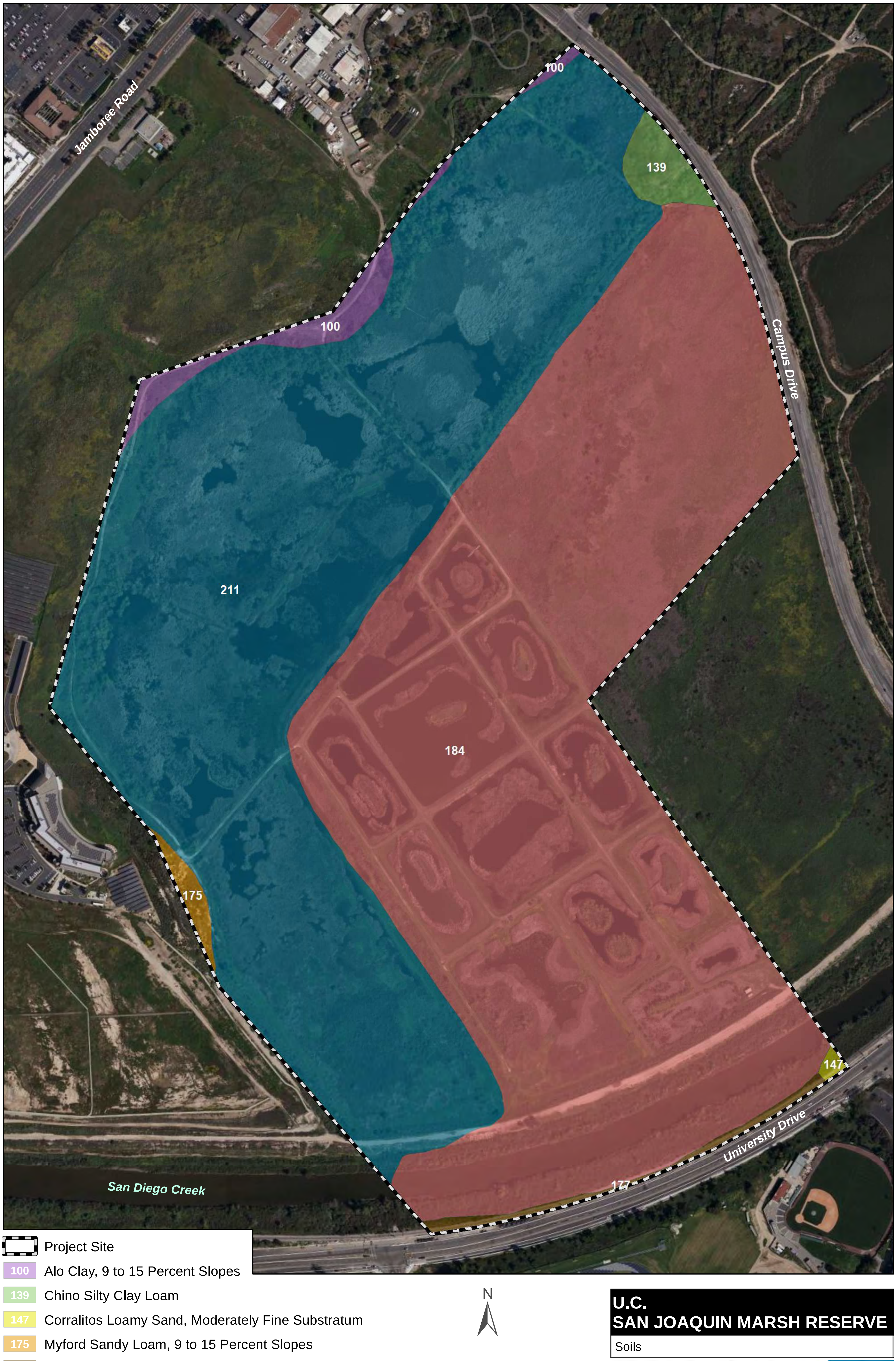
Photograph 8: Edge of Experimental Pond showing transition between Alkali Bulrush on left to taller California bulrush on right.

GLENN LUKOS ASSOCIATES

Exhibit 4 – Page 2

PROJECT NAME

Site Photographs



Project Site
100 Alo Clay, 9 to 15 Percent Slopes
139 Chino Silty Clay Loam
147 Corralitos Loamy Sand, Moderately Fine Substratum
175 Myford Sandy Loam, 9 to 15 Percent Slopes
177 Myford Sandy Loam, 9 to 30 Percent Slopes, Eroded
184 Omni Clay, Drained
211 Tidal Flats

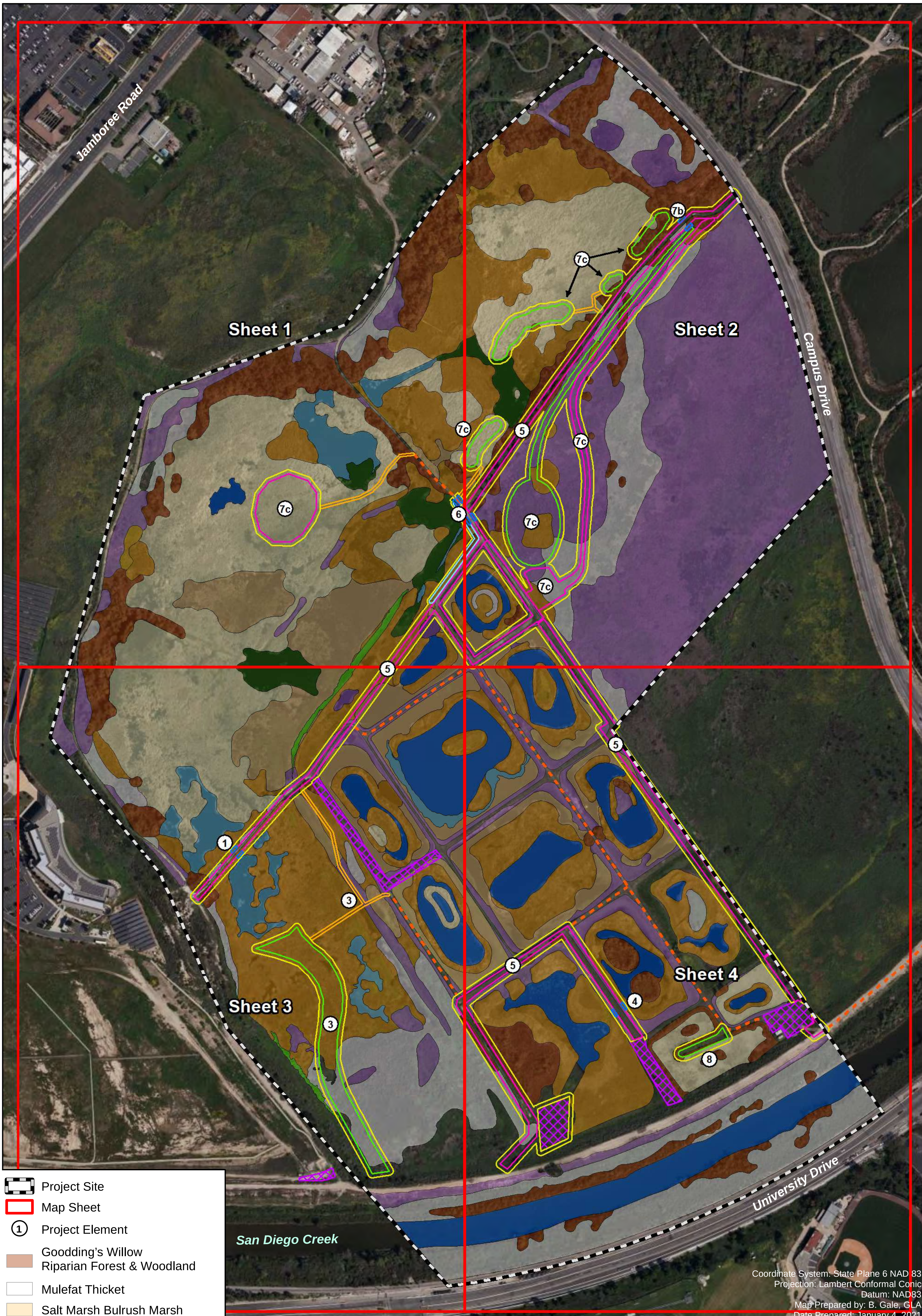
U.C.
SAN JOAQUIN MARSH RESERVE

Soils

GLENN LUKOS ASSOCIATES

Exhibit 5

X:\1100 AFTER THE REST\1505-01SJMR\1505-1_GIS\SoilsGIS\1505-1_Soils.mxd



Project Site
Map Sheet
1 Project Element
Goodding's Willow Riparian Forest & Woodland
Mulefat Thicket
Salt Marsh Bulrush Marsh
California Bulrush Marsh
Cattail Marsh
Western Sea-purslane Marsh
Swamp Pricklegrass Mats
Pickleweed Mat
Mixed Herbaceous Wetland
Open Water

Source: Glenn Lukos Associates, 2020

Culvert
Pipe/Open Channel
Proposed Cut Area
Proposed Fill Area
Proposed Staging Area
Temporary Work Area
Proposed Access Route
Existing Road

N

0 175 350 700
Feet

1 inch = 350 feet

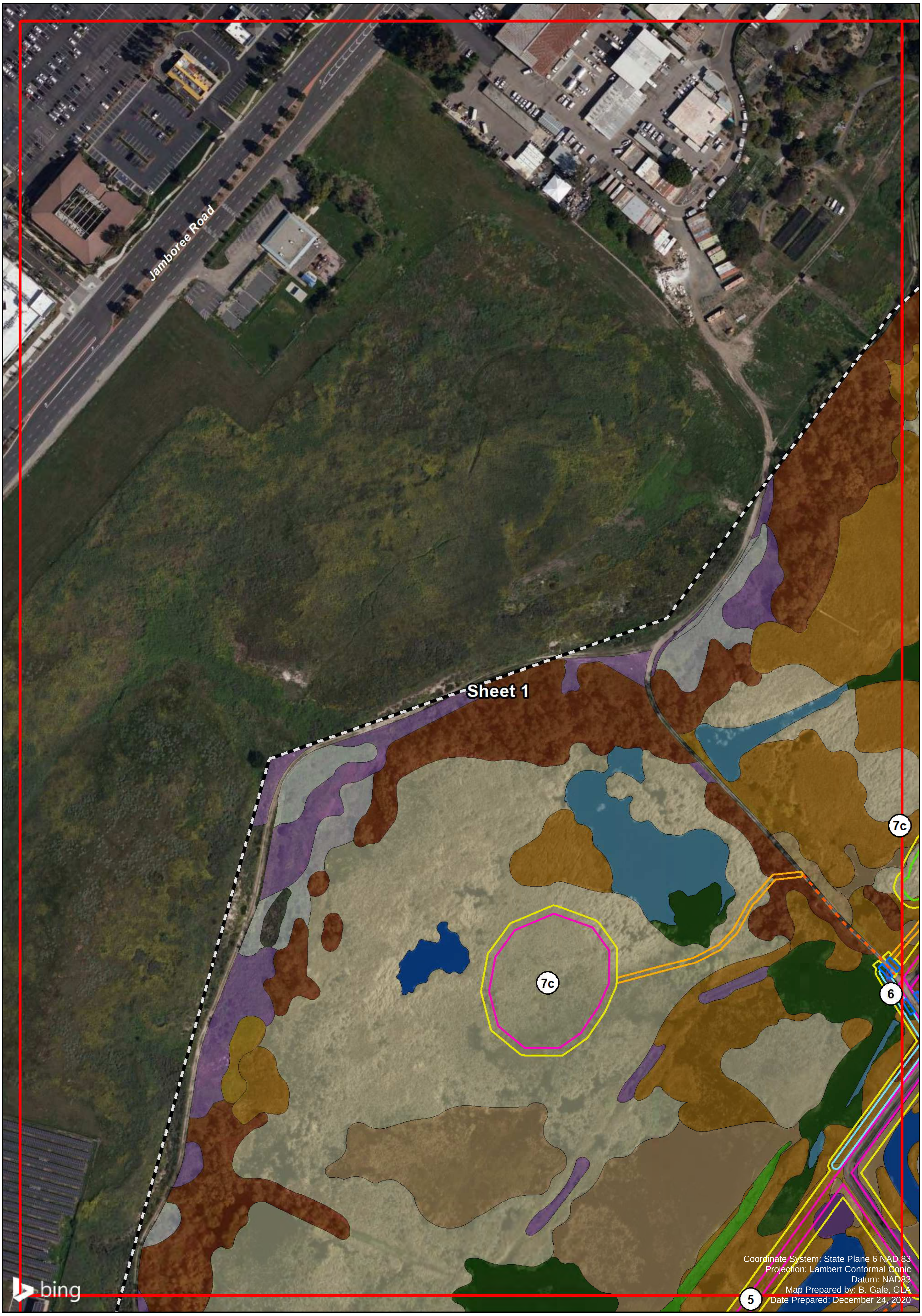
U.C.
SAN JOAQUIN MARSH RESERVE

Wetland Impacts - Key Map

GLENN LUKOS ASSOCIATES

Exhibit 6

X:\1100 AFTER THE REST\1505-01SJMR\1505-1_GIS\ImpactsGIS\1505-1_WetlandImpacts_KeyMap.mxd



N

0 87.5 175 350
Feet

1 inch = 175 feet

U.C.
SAN JOAQUIN MARSH RESERVE

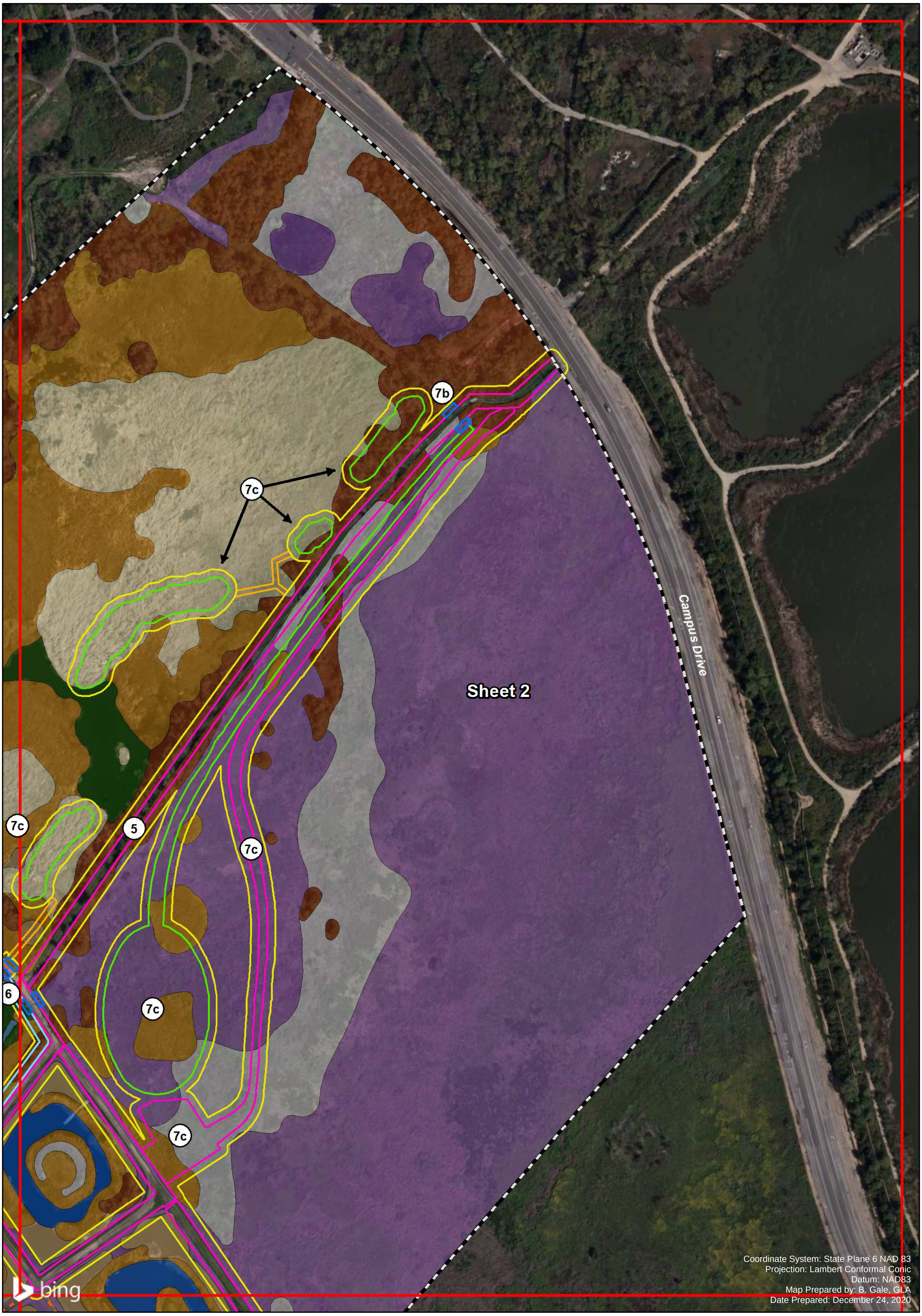
Wetland Impacts

GLENN LUKOS ASSOCIATES

Exhibit 6A

Source: Glenn Lukos Associates, 2020

X:\1100 AFTER THE REST\1505-01SJMR\1505-1_GIS\ImpactsGIS\1505-1_WetlandImpacts_MapSheets.mxd



N

0 87.5 175 350
Feet

1 inch = 175 feet

U.C.
SAN JOAQUIN MARSH RESERVE

Wetland Impacts

GLENN LUKOS ASSOCIATES

Exhibit 6B

Source: Glenn Lukos Associates, 2020

X:\1100 AFTER THE REST\1505-01SJMR\1505-1_GIS\ImpactsGIS\1505-1_WetlandImpacts_MapSheets.mxd

N

0 87.5 175 350

Feet

1 inch = 175 feet

Source: Glenn Lukos Associates, 2020

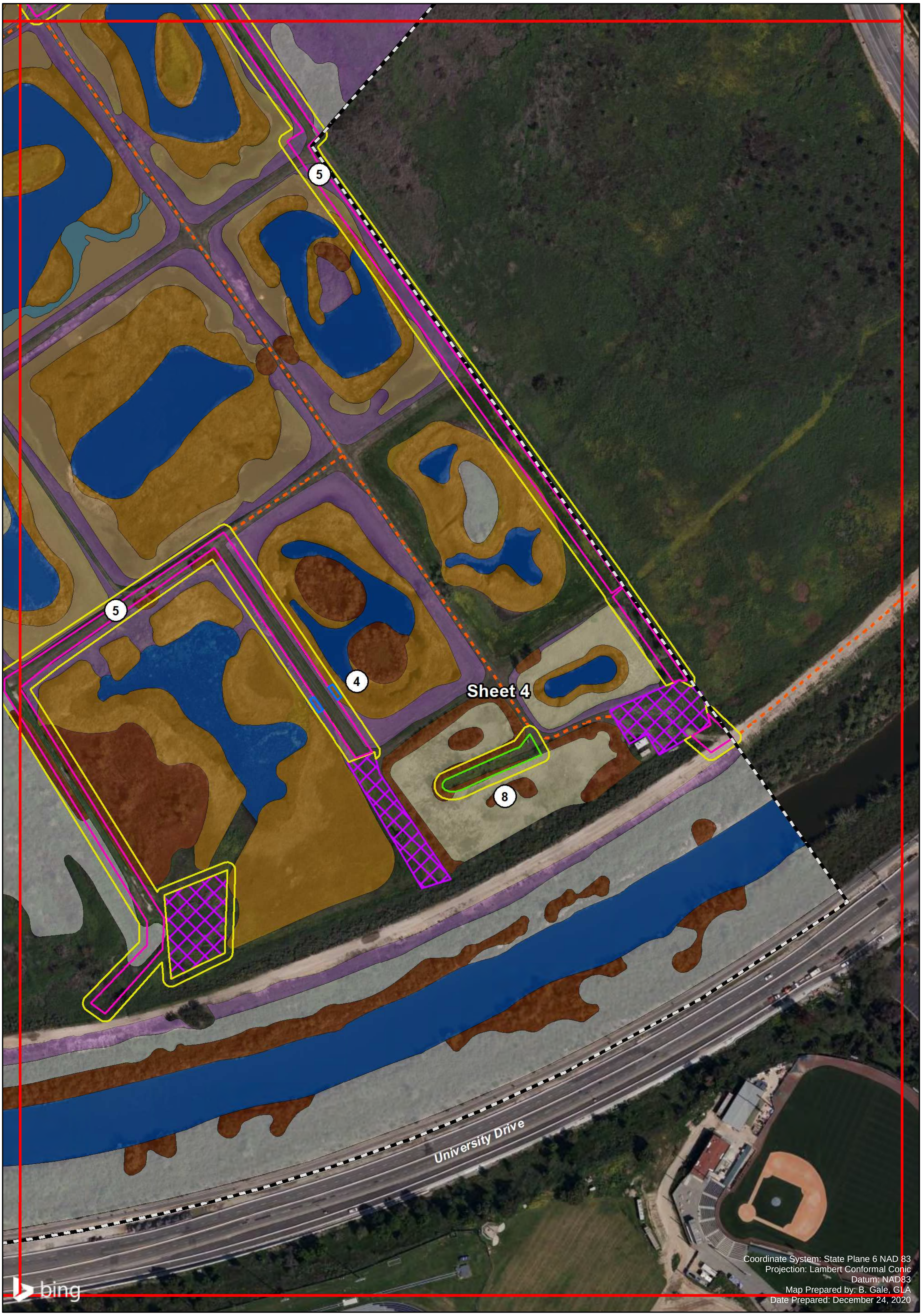
U.C.
SAN JOAQUIN MARSH RESERVE

Wetland Impacts

GLENN LUKOS ASSOCIATES

Exhibit 6C

X:\1100 AFTER THE REST\1505-01SJMR\1505-1_GIS\ImpactsGIS\1505-1_WetlandImpacts_MapSheets.mxd



N

0 87.5 175 350
Feet

1 inch = 175 feet

Source: Glenn Lukos Associates, 2020

U.C.
SAN JOAQUIN MARSH RESERVE

Wetland Impacts

GLENN LUKOS ASSOCIATES

Exhibit 6D

X:\1100 AFTER THE REST\1505-01SJMR\1505-1_GIS\ImpactsGIS\1505-1_WetlandImpacts_MapSheets.mxd

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: San Joaquin Freshwater Marsh Reserve City/County: Irvine Sampling Date: 12-16-20

Applicant/Owner: University of California, Irvine State: CA Sampling Point: EP-dp1

Investigator(s): Tony Bomkamp Section, Township, Range: Unsectioned, T6S, R9W

Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): < 2%

Subregion (LRR): LRR-C Lat: 33.657865 Long: -117.853313 Datum: NAD 83

Soil Map Unit Name: Tidal Flats NWI classification: Palustrine

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ 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 ✔ No ____	Is the Sampled Area within a Wetland?	Yes ✔ No ____
Hydric Soil Present?	Yes ✔ No ____		
Wetland Hydrology Present?	Yes ✔ No ____		

Remarks:

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	40		
Herb Stratum (Plot size: ____)			
1. Sesuvium verrucosum	30	Y	FACW
2. Crypsis schoenoides	70	Y	FACW
3.			
4.			
5.			
6.			
7.			
8.			
= Total Cover	100		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
= Total Cover			

% Bare Ground in Herb Stratum 0.0 % Cover of Biotic Crust 90

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	100	x 2 = 200
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	100 (A)	280 (B)

Prevalence Index = B/A = 2.0

Hydrophytic Vegetation Indicators:

✔ 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 ✔ No ____

Remarks:

SOIL

Sampling Point: EP-dp1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 2/2	100	Not Present	0	NA	NA	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)
- ___ 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: None

Depth (inches): NA

Hydric Soil Present? Yes ✔ No ______

Remarks:

Problematic soils: Moderately to Very Strongly Alkaline Soils preventing redox formation.

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 ______

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: San Joaquin Freshwater Marsh Reserve City/County: Irvine Sampling Date: 12-16-20

Applicant/Owner: University of California, Irvine State: CA Sampling Point: EP dp2

Investigator(s): Tony Bomkamp Section, Township, Range: Unsectioned, T6S, R9W

Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): < 2%

Subregion (LRR): LRR-C Lat: 33.654228 Long: -117.848781 Datum: NAD 83

Soil Map Unit Name: Omni Clay, Drained NWI classification: Palustrine

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ 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.

	Yes	No
Hydrophytic Vegetation Present?	✔	
Hydric Soil Present?		✔
Wetland Hydrology Present?		✔

Is the Sampled Area within a Wetland? Yes ____ No ✔

Remarks:

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: ____)			
1. Conium maculatum	100	Y	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
= Total Cover	100		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
= Total Cover			

% Bare Ground in Herb Stratum 0 % Cover of Biotic Crust 0

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	100	x 2 = 200
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	100 (A)	200 (B)

Prevalence Index = B/A = 2.0

Hydrophytic Vegetation Indicators:

✔ 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 ✔ No ____

Remarks:

SOIL

Sampling Point: EP dp2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 3/2	100	Not Present	0	NA	NA	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)
- ___ 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: None

Depth (inches): NA

Hydric Soil Present? Yes ___ 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 ✔

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: San Joaquin Freshwater Marsh Reserve City/County: Irvine Sampling Date: 12-16-20

Applicant/Owner: University of California, Irvine State: CA Sampling Point: Hoag dp1

Investigator(s): Tony Bomkamp Section, Township, Range: Unsectioned, T6S, R9W

Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): < 2%

Subregion (LRR): LRR-C Lat: 33.653831 Long: -117.852798 Datum: NAD 83

Soil Map Unit Name: Omni Clay, Drained NWI classification: Palustrine

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ 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 ✔ No ___	Is the Sampled Area within a Wetland?	Yes ___ No ✔
Hydric Soil Present?	Yes ___ No ✔		
Wetland Hydrology Present?	Yes ___ No ✔		

Remarks:

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: ___)			
1. Conium maculatum	100	Y	FAC
2.			
3.			
4.			
5.			
6.			
7.			
8.			
= Total Cover	100		
Woody Vine Stratum (Plot size: ___)			
1.			
2.			
= Total Cover			

% Bare Ground in Herb Stratum 0.0 % Cover of Biotic Crust 0.0

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	100	x 3 = 300
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	100 (A)	300 (B)

Prevalence Index = B/A = 3.0

Hydrophytic Vegetation Indicators:

- ✔ 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 ✔ No ___

Remarks:

SOIL

Sampling Point: Hoag dp1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 3/2	100	Not Present	0	NA	NA	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)
- ___ 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: None

Depth (inches): NA

Hydric Soil Present? Yes ___ 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 ✔

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: San Joaquin Freshwater Marsh Reserve City/County: Irvine Sampling Date: 12-16-20

Applicant/Owner: University of California, Irvine State: CA Sampling Point: Hoag dp2

Investigator(s): Tony Bomkamp Section, Township, Range: Unsectioned, T6S, R9W

Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): < 2%

Subregion (LRR): LRR-C Lat: 33.652981 Long: -117.851558 Datum: NAD 83

Soil Map Unit Name: Omni Clay, Drained NWI classification: Palustrine

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ 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 ✔	No ____
Hydric Soil Present?	Yes ✔	No ____
Wetland Hydrology Present?	Yes ✔	No ____

Is the Sampled Area within a Wetland? Yes ✔ No ____

Remarks:

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: ____)			
1. Schoenoplectus californicus	100	Y	OBL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
= Total Cover	100		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
= Total Cover			

% Bare Ground in Herb Stratum 0.0 % Cover of Biotic Crust 50

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	100	x 1 =	100
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	100 (A)		100 (B)

Prevalence Index = B/A = 1.0

Hydrophytic Vegetation Indicators:

- ✔ 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 ✔ No ____

Remarks:

SOIL

Sampling Point: Hoag dp2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 2/2	100	Not Present	0	NA	NA	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)
- ___ 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: None

Depth (inches): NA

Hydric Soil Present? Yes ✔ No ______

Remarks:

Problematic soils: Moderately to Very Strongly Alkaline Soils preventing redox formation.

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 ✔

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: San Joaquin Freshwater Marsh Reserve City/County: Irvine Sampling Date: 12-16-20

Applicant/Owner: University of California, Irvine State: CA Sampling Point: Hoag dp3

Investigator(s): Tony Bomkamp Section, Township, Range: Unsectioned, T6S, R9W

Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): < 2%

Subregion (LRR): LRR-C Lat: 33.652819 Long: -117.851662 Datum: NAD 83

Soil Map Unit Name: Omni Clay, Drained NWI classification: Palustrine

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ 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 ___	No ✔
Hydric Soil Present?	Yes ___	No ✔
Wetland Hydrology Present?	Yes ___	No ✔

Is the Sampled Area within a Wetland? Yes ___ No ✔

Remarks:

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: ___)			
1. Brassica nigra	60	Y	UPL
2. Malvella leprosa	20	Y	FACU
3. Polygonum aviculare	20	Y	FAC
4.			
5.			
6.			
7.			
8.			
= Total Cover	100		
Woody Vine Stratum (Plot size: ___)			
1.			
2.			
= Total Cover			

% Bare Ground in Herb Stratum 0.0 % Cover of Biotic Crust 0.0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 33 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species	20	x 3 =	60
FACU species	20	x 4 =	80
UPL species	60	x 5 =	300
Column Totals:	100 (A)		440 (B)

Prevalence Index = B/A = 4.4

Hydrophytic Vegetation Indicators:

___ 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 ___ No ✔

Remarks:

SOIL

Sampling Point: Hoag dp3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 3/2	100	Not Present	0	NA	NA	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)
- ___ 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: None

Depth (inches): NA

Hydric Soil Present? Yes ______ 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 ✔

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: San Joaquin Freshwater Marsh Reserve City/County: Irvine Sampling Date: 12-16-20

Applicant/Owner: University of California, Irvine State: CA Sampling Point: Hoag dp4

Investigator(s): Tony Bomkamp Section, Township, Range: Unsectioned, T6S, R9W

Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): < 2%

Subregion (LRR): LRR-C Lat: 33.652535 Long: -117.851605 Datum: NAD 83

Soil Map Unit Name: Omni Clay, Drained NWI classification: Palustrine

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ 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 ____	No ✔
Hydric Soil Present?	Yes ____	No ✔
Wetland Hydrology Present?	Yes ____	No ✔

Is the Sampled Area within a Wetland? Yes ____ No ✔

Remarks:

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: ____)			
1. Brassica nigra	60	Y	UPL
2. Malvella leprosa	20	Y	FACU
3. Conium maculatum	20	Y	FACW
4.			
5.			
6.			
7.			
8.			
= Total Cover	100		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
= Total Cover			

% Bare Ground in Herb Stratum 0.0 % Cover of Biotic Crust 0.0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 33 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species	20	x 2 =	40
FAC species		x 3 =	
FACU species	20	x 4 =	80
UPL species	60	x 5 =	300
Column Totals:	100 (A)		420 (B)

Prevalence Index = B/A = 4.2

Hydrophytic Vegetation Indicators:

___ 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 ____ No ✔

Remarks:

SOIL

Sampling Point: Hoag dp4

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 3/2	100	Not Present	0	NA	NA	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)
- ___ 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: None

Depth (inches): NA

Hydric Soil Present? Yes ______ 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 ✔

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: San Joaquin Freshwater Marsh Reserve City/County: Irvine Sampling Date: 10-30-20

Applicant/Owner: University of California, Irvine State: CA Sampling Point: IA-1 DP1

Investigator(s): Tony Bomkamp Section, Township, Range: Unsectioned, T6S, R9W

Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): < 2%

Subregion (LRR): LRR-C Lat: 33.655330 Long: -117.855789 Datum: NAD 83

Soil Map Unit Name: Tidal Flats NWI classification: Palustrine

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ 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 ✔	No ___
Hydric Soil Present?	Yes ✔	No ___
Wetland Hydrology Present?	Yes ✔	No ___

Is the Sampled Area within a Wetland? **Yes ✔ No ___**

Remarks:

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: ___)			
1. Schoenoplectus californicus	90	Y	OBL
2. Frankenia salina	10	N	FACW
3.			
4.			
5.			
6.			
7.			
8.			
= Total Cover	100		
Woody Vine Stratum (Plot size: ___)			
1.			
2.			
= Total Cover			

% Bare Ground in Herb Stratum 0.0 % Cover of Biotic Crust 90

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	90	x 1 = 90
FACW species	10	x 2 = 20
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	100 (A)	110 (B)

Prevalence Index = B/A = 1.1

Hydrophytic Vegetation Indicators:

✔ 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 ✔ No ___**

Remarks:

SOIL

Sampling Point: IA-1 DP1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 3/1	100	Not Present	0	NA	NA	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)
- ___ 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: None

Depth (inches): NA

Hydric Soil Present? Yes ✔ No ___

Remarks:

Problematic soils: Moderately to Very Strongly Alkaline Soils preventing redox formation.

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 ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: San Joaquin Freshwater Marsh Reserve City/County: Irvine Sampling Date: 10-30-20

Applicant/Owner: University of California, Irvine State: CA Sampling Point: IA-1 DP2

Investigator(s): Tony Bomkamp Section, Township, Range: Unsectioned, T6S, R9W

Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): < 2%

Subregion (LRR): LRR-C Lat: 33.655150 Long: -117.855958 Datum: NAD 83

Soil Map Unit Name: Tidal Flats NWI classification: Palustrine

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ 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 ✔	No ____
Hydric Soil Present?	Yes ✔	No ____
Wetland Hydrology Present?	Yes ✔	No ____

Is the Sampled Area within a Wetland? Yes ✔ No ____

Remarks:

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. Baccharis salicifolia	50	Y	FAC
2.			
3.			
4.			
5.			
= Total Cover			
Herb Stratum (Plot size: ____)			
1. Schoenoplectus californicus	50	Y	OBL
2. Frankenia salina	10	N	FACW
3.			
4.			
5.			
6.			
7.			
8.			
= Total Cover	100		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
= Total Cover			

% Bare Ground in Herb Stratum 0.0 % Cover of Biotic Crust 90

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	50	x 1 = 50
FACW species	10	x 2 = 20
FAC species	50	x 3 = 150
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	110 (A)	220 (B)

Prevalence Index = B/A = 2.0

Hydrophytic Vegetation Indicators:

- ✔ 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 ✔ No ____

Remarks:

SOIL

Sampling Point: IA-1 DP2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 3/1	100	Not Present	0	NA	NA	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)
- ___ 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: None

Depth (inches): NA

Hydric Soil Present? Yes ✔ No ___

Remarks:

Problematic soils: Moderately to Very Strongly Alkaline Soils preventing redox formation.

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 ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: San Joaquin Freshwater Marsh Reserve City/County: Irvine Sampling Date: 10-30-20

Applicant/Owner: University of California, Irvine State: CA Sampling Point: IA-1 DP3

Investigator(s): Tony Bomkamp Section, Township, Range: Unsectioned, T6S, R9W

Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): < 2%

Subregion (LRR): LRR-C Lat: 33.655150 Long: -117.855958 Datum: NAD 83

Soil Map Unit Name: Tidal Flats NWI classification: Palustrine

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ 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 ✔ No ____	Is the Sampled Area within a Wetland? Yes ✔ No ____
Hydric Soil Present?	Yes ✔ No ____	
Wetland Hydrology Present?	Yes ✔ No ____	

Remarks:

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: ____)			
1. Salix gooddinggii	60	Y	FACW
2.			
3.			
4.			
	60 = Total Cover		
Sapling/Shrub Stratum (Plot size: ____)			
1. Baccharis salicifolia	20	Y	FAC
2.			
3.			
4.			
5.			
	20 = Total Cover		
Herb Stratum (Plot size: ____)			
1. Schoenoplectus californicus	30	Y	OBL
2. Conium maculatum	20	Y	FACW
3.			
4.			
5.			
6.			
7.			
8.			
	50 = Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ = Total Cover		

% Bare Ground in Herb Stratum 0.0 % Cover of Biotic Crust 90

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	30	x 1 = 30
FACW species	80	x 2 = 160
FAC species	20	x 3 = 60
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	130 (A)	250 (B)

Prevalence Index = B/A = 1.92

Hydrophytic Vegetation Indicators:

✔ 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 ✔ No ____

Remarks:

SOIL

Sampling Point: IA-1 DP3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 3/1	100	Not Present	0	NA	NA	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)
- ___ 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: None

Depth (inches): NA

Hydric Soil Present? Yes ✔ No ______

Remarks:

Problematic soils: Moderately to Very Strongly Alkaline Soils preventing redox formation.

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 ______

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: San Joaquin Freshwater Marsh Reserve City/County: Irvine Sampling Date: 10-30-20

Applicant/Owner: University of California, Irvine State: CA Sampling Point: IA-1 DP4

Investigator(s): Tony Bomkamp Section, Township, Range: Unsectioned, T6S, R9W

Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): < 2%

Subregion (LRR): LRR-C Lat: 33.655051 Long: -117.855948 Datum: NAD 83

Soil Map Unit Name: Tidal Flats NWI classification: Palustrine

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ 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 ✔ No ____	Is the Sampled Area within a Wetland?	Yes ✔ No ____
Hydric Soil Present?	Yes ✔ No ____		
Wetland Hydrology Present?	Yes ✔ No ____		

Remarks:

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. Baccharis salicifolia	60	Y	FAC
2.			
3.			
4.			
5.			
= Total Cover			
Herb Stratum (Plot size: ____)			
1. Conium maculatum	40	Y	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
= Total Cover	100		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
= Total Cover			

% Bare Ground in Herb Stratum 0.0 % Cover of Biotic Crust 90

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	40	x 2 = 80
FAC species	60	x 3 = 180
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	100 (A)	260 (B)

Prevalence Index = B/A = 2.6

Hydrophytic Vegetation Indicators:

- ✔ 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 ✔ No ____

Remarks:

SOIL

Sampling Point: IA-1 DP4

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 3/1	100	Not Present	0	NA	NA	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)
- ___ 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: None

Depth (inches): NA

Hydric Soil Present? Yes ✔ No ______

Remarks:

Problematic soils: Moderately to Very Strongly Alkaline Soils preventing redox formation.

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 ______

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: San Joaquin Freshwater Marsh Reserve City/County: Irvine Sampling Date: 10-30-20

Applicant/Owner: University of California, Irvine State: CA Sampling Point: IA-1 DP5

Investigator(s): Tony Bomkamp Section, Township, Range: Unsectioned, T6S, R9W

Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): < 2%

Subregion (LRR): LRR-C Lat: 33.655147 Long: -117.855849 Datum: NAD 83

Soil Map Unit Name: Tidal Flats NWI classification: Palustrine

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ 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 ✔ No ___	Is the Sampled Area within a Wetland?	Yes ✔ No ___
Hydric Soil Present?	Yes ✔ No ___		
Wetland Hydrology Present?	Yes ✔ No ___		

Remarks:

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: ___)			
1. Schoenoplectus californicus	90	Y	OBL
2. Heliotropium curassavicum	10	N	FACU
3.			
4.			
5.			
6.			
7.			
8.			
= Total Cover	100		
Woody Vine Stratum (Plot size: ___)			
1.			
2.			
= Total Cover			

% Bare Ground in Herb Stratum 0.0 % Cover of Biotic Crust 90

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	90	x 1 = 90
FACW species		x 2 =
FAC species		x 3 =
FACU species	10	x 4 = 40
UPL species		x 5 =
Column Totals:	100 (A)	130 (B)

Prevalence Index = B/A = 1.3

Hydrophytic Vegetation Indicators:

- ✔ 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 ✔ No ___

Remarks:

SOIL

Sampling Point: IA-1 DP5

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 3/1	100	Not Present	0	NA	NA	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)
- ___ 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: None

Depth (inches): NA

Hydric Soil Present? Yes ✔ No ______

Remarks:

Problematic soils: Moderately to Very Strongly Alkaline Soils preventing redox formation.

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 ______

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: San Joaquin Freshwater Marsh Reserve City/County: Irvine Sampling Date: 10-30-20

Applicant/Owner: University of California, Irvine State: CA Sampling Point: IA-1 DP6

Investigator(s): Tony Bomkamp Section, Township, Range: Unsectioned, T6S, R9W

Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): < 2%

Subregion (LRR): LRR-C Lat: 33.655267 Long: -117.855734 Datum: NAD 83

Soil Map Unit Name: Tidal Flats NWI classification: Palustrine

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ 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 ✔ No ____	**Is the Sampled Area within a Wetland?** Yes ✔ No ____
Hydric Soil Present?	Yes ✔ No ____	
Wetland Hydrology Present?	Yes ✔ No ____	

Remarks:

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: ____)			
1. Schoenoplectus californicus	100	Y	OBL
2. Frankenia salina	5	N	FACW
3.			
4.			
5.			
6.			
7.			
8.			
= Total Cover	100		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
= Total Cover			

% Bare Ground in Herb Stratum 0.0 % Cover of Biotic Crust 90

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	100	x 1 = 100
FACW species	5	x 2 = 10
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	105 (A)	110 (B)

Prevalence Index = B/A = 1.05

Hydrophytic Vegetation Indicators:

- ✔ 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 ✔ No ____

Remarks:

SOIL

Sampling Point: IA-1 DP6

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 3/1	100	Not Present	0	NA	NA	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)
- ___ 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: None

Depth (inches): NA

Hydric Soil Present? Yes ✔ No ______

Remarks:

Problematic soils: Moderately to Very Strongly Alkaline Soils preventing redox formation.

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 ______

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: San Joaquin Freshwater Marsh Reserve City/County: Irvine Sampling Date: 10-30-20

Applicant/Owner: University of California, Irvine State: CA Sampling Point: IA-1 DP7

Investigator(s): Tony Bomkamp Section, Township, Range: Unsectioned, T6S, R9W

Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): < 2%

Subregion (LRR): LRR-C Lat: 33.655394 Long: -117.855595 Datum: NAD 83

Soil Map Unit Name: Tidal Flats NWI classification: Palustrine

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ 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 ✔	No ___
Hydric Soil Present?	Yes ✔	No ___
Wetland Hydrology Present?	Yes ✔	No ___

Is the Sampled Area within a Wetland? Yes ✔ No ___

Remarks:

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: ___)			
1.			
2.			
3.			
4.			
= Total Cover			
Sapling/Shrub Stratum (Plot size: ___)			
1.			
2.			
3.			
4.			
5.			
= Total Cover			
Herb Stratum (Plot size: ___)			
1. Typha angustifolia	100	Y	OBL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
= Total Cover	100		
Woody Vine Stratum (Plot size: ___)			
1.			
2.			
= Total Cover			

% Bare Ground in Herb Stratum 0.0 % Cover of Biotic Crust 90

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	100	x 1 = 100
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	100 (A)	100 (B)

Prevalence Index = B/A = 1.0

Hydrophytic Vegetation Indicators:

- ✔ 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 ✔ No ___

Remarks:

SOIL

Sampling Point: IA-1 DP7

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 3/1	100	Not Present	0	NA	NA	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)
- ___ 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: None

Depth (inches): NA

Hydric Soil Present? Yes ✔ No ___

Remarks:

Problematic soils: Moderately to Very Strongly Alkaline Soils preventing redox formation.

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 ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: San Joaquin Freshwater Marsh Reserve City/County: Irvine Sampling Date: 10-30-20

Applicant/Owner: University of California, Irvine State: CA Sampling Point: IA-1 DP8

Investigator(s): Tony Bomkamp Section, Township, Range: Unsectioned, T6S, R9W

Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): < 2%

Subregion (LRR): LRR-C Lat: 33.655608 Long: -117.855513 Datum: NAD 83

Soil Map Unit Name: Tidal Flats NWI classification: Palustrine

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ 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 ✔ No ____	**Is the Sampled Area within a Wetland?**	**Yes ✔ No ____**
Hydric Soil Present?	Yes ✔ No ____		
Wetland Hydrology Present?	Yes ✔ No ____		

Remarks:

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. Baccharis salicifolia	30	Y	FAC
2.			
3.			
4.			
5.			
= Total Cover	30		
Herb Stratum (Plot size: ____)			
1. Schoenoplectus	70	Y	OBL
2. Distichlis spicata	10	N	FAC
3.			
4.			
5.			
6.			
7.			
8.			
= Total Cover	80		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
= Total Cover			

% Bare Ground in Herb Stratum 0.0 % Cover of Biotic Crust 90

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	70	x 1 = 70
FACW species		x 2 =
FAC species	40	x 3 = 120
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	110 (A)	190 (B)

Prevalence Index = B/A = 1.72

Hydrophytic Vegetation Indicators:

✔ 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 ✔ No ____

Remarks:

SOIL

Sampling Point: IA-1 DP8

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 3/1	100	Not Present	0	NA	NA	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)
- ___ 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: None

Depth (inches): NA

Hydric Soil Present? Yes ✔ No ______

Remarks:

Problematic soils: Moderately to Very Strongly Alkaline Soils preventing redox formation.

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 ______

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: San Joaquin Freshwater Marsh Reserve City/County: Irvine Sampling Date: 10-30-20

Applicant/Owner: University of California, Irvine State: CA Sampling Point: IA-1 DP9

Investigator(s): Tony Bomkamp Section, Township, Range: Unsectioned, T6S, R9W

Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): < 2%

Subregion (LRR): LRR-C Lat: 33.655559 Long: -117.855440 Datum: NAD 83

Soil Map Unit Name: Tidal Flats NWI classification: Palustrine

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ 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 ✔ No ____	**Is the Sampled Area within a Wetland?** Yes ✔ No ____
Hydric Soil Present?	Yes ✔ No ____	
Wetland Hydrology Present?	Yes ✔ No ____	

Remarks:

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: ____)			
1. Schoenoplectus californicus	20	Y	OBL
2. Typha angustifolia	80	Y	OBL
3.			
4.			
5.			
6.			
7.			
8.			
= Total Cover	100		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
= Total Cover			

% Bare Ground in Herb Stratum 0.0 % Cover of Biotic Crust 90

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	100	x 1 =	100
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	100 (A)		100 (B)

Prevalence Index = B/A = 1.0

Hydrophytic Vegetation Indicators:

✔ 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 ✔ No ____

Remarks:

SOIL

Sampling Point: IA-1 DP9

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 3/1	100	Not Present	0	NA	NA	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)
- ___ 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: None

Depth (inches): NA

Hydric Soil Present? Yes ✔ No ______

Remarks:

Problematic soils: Moderately to Very Strongly Alkaline Soils preventing redox formation.

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 ______

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: San Joaquin Freshwater Marsh Reserve City/County: Irvine Sampling Date: 10-30-20

Applicant/Owner: University of California, Irvine State: CA Sampling Point: IA-1 DP10

Investigator(s): Tony Bomkamp Section, Township, Range: Unsectioned, T6S, R9W

Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): < 2%

Subregion (LRR): LRR-C Lat: 33.655672 Long: -117.855326 Datum: NAD 83

Soil Map Unit Name: Tidal Flats NWI classification: Palustrine

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ 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 ✔	No ____	Is the Sampled Area within a Wetland? Yes ✔ No ____
Hydric Soil Present?	Yes ✔	No ____	
Wetland Hydrology Present?	Yes ✔	No ____	

Remarks:

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	30		
Herb Stratum (Plot size: ____)			
1. Schoenoplectus californicus	30	Y	OBL
2. Typha angustifolia	70	Y	OBL
3. Schoenoplectus americanus	10	N	OBL
4.			
5.			
6.			
7.			
8.			
= Total Cover	110		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
= Total Cover			

% Bare Ground in Herb Stratum 0.0 % Cover of Biotic Crust 90

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	110	x 1 = 110
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	110 (A)	110 (B)

Prevalence Index = B/A = 1.0

Hydrophytic Vegetation Indicators:

✔ 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 ✔ No ____

Remarks:

SOIL

Sampling Point: IA-1 DP10

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 3/1	100	Not Present	0	NA	NA	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)
- ___ 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: None

Depth (inches): NA

Hydric Soil Present? Yes ✔ No ______

Remarks:

Problematic soils: Moderately to Very Strongly Alkaline Soils preventing redox formation.

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 ______

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: San Joaquin Freshwater Marsh Reserve City/County: Irvine Sampling Date: 10-30-20

Applicant/Owner: University of California, Irvine State: CA Sampling Point: IA-1 DP11

Investigator(s): Tony Bomkamp Section, Township, Range: Unsectioned, T6S, R9W

Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): < 2%

Subregion (LRR): LRR-C Lat: 33.655727 Long: -117.855393 Datum: NAD 83

Soil Map Unit Name: Tidal Flats NWI classification: Palustrine

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ 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 ✔ No ___	**Is the Sampled Area within a Wetland?** Yes ✔ No ___
Hydric Soil Present?	Yes ✔ No ___	
Wetland Hydrology Present?	Yes ✔ No ___	

Remarks:

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	30		
Herb Stratum (Plot size: ___)			
1. Schoenoplectus californicus	100	Y	OBL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
= Total Cover	100		
Woody Vine Stratum (Plot size: ___)			
1.			
2.			
= Total Cover			

% Bare Ground in Herb Stratum 0.0 % Cover of Biotic Crust 90

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	100	x 1 =	100
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	100 (A)		100 (B)

Prevalence Index = B/A = 1.0

Hydrophytic Vegetation Indicators:

✔ 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 ✔ No ___

Remarks:

SOIL

Sampling Point: IA-1 DP11

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 3/1	100	Not Present	0	NA	NA	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)
- ___ 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: None

Depth (inches): NA

Hydric Soil Present? Yes ✔ No ___

Remarks:

Problematic soils: Moderately to Very Strongly Alkaline Soils preventing redox formation.

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 ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: San Joaquin Freshwater Marsh Reserve City/County: Irvine Sampling Date: 10-30-20

Applicant/Owner: University of California, Irvine State: CA Sampling Point: IA-3 DP1

Investigator(s): Tony Bomkamp Section, Township, Range: Unsectioned, T6S, R9W

Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): < 2%

Subregion (LRR): LRR-C Lat: 33.653498 Long: -117.854041 Datum: NAD 83

Soil Map Unit Name: Tidal Flats NWI classification: Palustrine

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ 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 ✔ No ___	Is the Sampled Area within a Wetland? Yes ✔ No ___
Hydric Soil Present?	Yes ✔ No ___	
Wetland Hydrology Present?	Yes ✔ No ___	

Remarks:

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. Baccharis salicifolia	60	Y	FAC
2.			
3.			
4.			
5.			
= Total Cover	60		
Herb Stratum (Plot size: ___)			
1. Pulicaria paludosa	80	Y	FAC
2.			
3.			
4.			
5.			
6.			
7.			
8.			
= Total Cover	80		
Woody Vine Stratum (Plot size: ___)			
1.			
2.			
= Total Cover			

% Bare Ground in Herb Stratum 0.0 % Cover of Biotic Crust 90

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	140	x 3 = 420
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	140 (A)	420 (B)

Prevalence Index = B/A = 3.0

Hydrophytic Vegetation Indicators:

- ✔ 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 ✔ No ___

Remarks:

SOIL

Sampling Point: IA-3 DP1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features				Texture	Remarks
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]		
0-12	10YR 3/1	100	Not Present	0	NA	NA	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)
- ___ 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: None

Depth (inches): NA

Hydric Soil Present? Yes ✔ No ___

Remarks:

Problematic soils: Moderately to Very Strongly Alkaline Soils preventing redox formation.

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 ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: San Joaquin Freshwater Marsh Reserve City/County: Irvine Sampling Date: 10-30-20

Applicant/Owner: University of California, Irvine State: CA Sampling Point: IA-3 DP2

Investigator(s): Tony Bomkamp Section, Township, Range: Unsectioned, T6S, R9W

Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): < 2%

Subregion (LRR): LRR-C Lat: 33.653544 Long: -117.854185 Datum: NAD 83

Soil Map Unit Name: Tidal Flats NWI classification: Palustrine

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ 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 ✔ No ____	**Is the Sampled Area within a Wetland?** **Yes** ✔ **No** ____
Hydric Soil Present?	Yes ✔ No ____	
Wetland Hydrology Present?	Yes ✔ No ____	

Remarks:

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: ____)			
1. Pulicaria paludosa	30	Y	FAC
2. Schoenoplectus californicus	100	Y	OBL
3.			
4.			
5.			
6.			
7.			
8.			
= Total Cover	130		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
= Total Cover			

% Bare Ground in Herb Stratum 0.0 % Cover of Biotic Crust 90

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	100	x 1 = 100
FACW species		x 2 =
FAC species	30	x 3 = 90
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	130 (A)	190 (B)

Prevalence Index = B/A = 1.46

Hydrophytic Vegetation Indicators:

- ✔ 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** ✔ **No** ____

Remarks:

SOIL

Sampling Point: IA-3 DP2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 3/1	100	Not Present	0	NA	NA	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)
- ___ 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: None

Depth (inches): NA

Hydric Soil Present? Yes ✔ No ______

Remarks:

Problematic soils: Moderately to Very Strongly Alkaline Soils preventing redox formation.

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 ______

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: San Joaquin Freshwater Marsh Reserve City/County: Irvine Sampling Date: 10-30-20

Applicant/Owner: University of California, Irvine State: CA Sampling Point: IA-3 DP3

Investigator(s): Tony Bomkamp Section, Township, Range: Unsectioned, T6S, R9W

Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): < 2%

Subregion (LRR): LRR-C Lat: 33.653420 Long: -117.854427 Datum: NAD 83

Soil Map Unit Name: Tidal Flats NWI classification: Palustrine

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ 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 ✔ No ___	Is the Sampled Area within a Wetland? Yes ✔ No ___
Hydric Soil Present?	Yes ✔ No ___	
Wetland Hydrology Present?	Yes ✔ No ___	

Remarks:

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: ___)			
1. Pulicaria paludosa	45	Y	FAC
2. Schoenoplectus californicus	100	Y	OBL
3.			
4.			
5.			
6.			
7.			
8.			
= Total Cover	145		
Woody Vine Stratum (Plot size: ___)			
1.			
2.			
= Total Cover			

% Bare Ground in Herb Stratum 0.0 % Cover of Biotic Crust 90

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	100	x 1 = 100
FACW species		x 2 =
FAC species	45	x 3 = 135
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	145 (A)	235 (B)

Prevalence Index = B/A = 1.62

Hydrophytic Vegetation Indicators:

✔ 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 ✔ No ___

Remarks:

SOIL

Sampling Point: IA-3 DP3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 3/1	100	Not Present	0	NA	NA	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)
- ___ 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: None

Depth (inches): NA

Hydric Soil Present? Yes ✔ No ______

Remarks:

Problematic soils: Moderately to Very Strongly Alkaline Soils preventing redox formation.

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 ______

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: San Joaquin Freshwater Marsh Reserve City/County: Irvine Sampling Date: 10-30-20

Applicant/Owner: University of California, Irvine State: CA Sampling Point: IA-3 DP4

Investigator(s): Tony Bomkamp Section, Township, Range: Unsectioned, T6S, R9W

Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): < 2%

Subregion (LRR): LRR-C Lat: 33.653603 Long: -117.854909 Datum: NAD 83

Soil Map Unit Name: Tidal Flats NWI classification: Palustrine

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ 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 ✔ No ____	Is the Sampled Area within a Wetland? Yes ✔ No ____
Hydric Soil Present?	Yes ✔ No ____	
Wetland Hydrology Present?	Yes ✔ No ____	

Remarks:

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: ____)			
1. Pulicaria paludosa	60	Y	FAC
2. Brassica nigra	20	Y	UPL
3. Artemisia biennis	20	N	FACW
4.			
5.			
6.			
7.			
8.			
= Total Cover	100		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
= Total Cover			

% Bare Ground in Herb Stratum 0.0 % Cover of Biotic Crust 90

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 67 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species	20	x 2 = 40
FAC species	60	x 3 = 180
FACU species		x 4 =
UPL species	20	x 5 = 100
Column Totals:	100 (A)	320 (B)

Prevalence Index = B/A = 3.2

Hydrophytic Vegetation Indicators:

✔ 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 ✔ No ____

Remarks:

SOIL

Sampling Point: IA-3 DP4

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 3/1	100	Not Present	0	NA	NA	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)
- ___ 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: None

Depth (inches): NA

Hydric Soil Present? Yes ✔ No ______

Remarks:

Problematic soils: Moderately to Very Strongly Alkaline Soils preventing redox formation.

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 ______

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: San Joaquin Freshwater Marsh Reserve City/County: Irvine Sampling Date: 10-30-20

Applicant/Owner: University of California, Irvine State: CA Sampling Point: IA-3 DP5

Investigator(s): Tony Bomkamp Section, Township, Range: Unsectioned, T6S, R9W

Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): < 2%

Subregion (LRR): LRR-C Lat: 33.653528 Long: -117.854825 Datum: NAD 83

Soil Map Unit Name: Tidal Flats NWI classification: Palustrine

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ 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 ✔	No ___
Hydric Soil Present?	Yes ✔	No ___
Wetland Hydrology Present?	Yes ✔	No ___

Is the Sampled Area within a Wetland? **Yes** ✔ **No** ___

Remarks:

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: ___)			
1. Pulicaria paludosa	80	Y	FAC
2. Brassica nigra	10	Y	UPL
3. Artemisia biennis	10	N	FACW
4.			
5.			
6.			
7.			
8.			
= Total Cover	100		
Woody Vine Stratum (Plot size: ___)			
1.			
2.			
= Total Cover			

% Bare Ground in Herb Stratum 0.0 % Cover of Biotic Crust 90

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	10	x 2 = 20
FAC species	80	x 3 = 240
FACU species		x 4 =
UPL species	10	x 5 = 50
Column Totals:	100 (A)	310 (B)

Prevalence Index = B/A = 3.1

Hydrophytic Vegetation Indicators:

✔ 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** ___ **No** ✔

Remarks:

SOIL

Sampling Point: IA-3 DP5

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 3/1	100	Not Present	0	NA	NA	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)
___ 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: None

Depth (inches): NA

Hydric Soil Present? **Yes** ✔ **No** ___

Remarks:

Problematic soils: Moderately to Very Strongly Alkaline Soils preventing redox formation.

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** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: San Joaquin Freshwater Marsh Reserve City/County: Irvine Sampling Date: 10-30-20

Applicant/Owner: University of California, Irvine State: CA Sampling Point: IA-3 DP6

Investigator(s): Tony Bomkamp Section, Township, Range: Unsectioned, T6S, R9W

Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): < 2%

Subregion (LRR): LRR-C Lat: 33.652900 Long: -117.854486 Datum: NAD 83

Soil Map Unit Name: Tidal Flats NWI classification: Palustrine

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ 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 ✔	No ____	**Is the Sampled Area within a Wetland?** Yes ✔ No ____
Hydric Soil Present?	Yes ✔	No ____	
Wetland Hydrology Present?	Yes ✔	No ____	

Remarks:

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: ____)			
1. Salicornia pacifica	80	Y	OBL
2. Frankenia salina	20	Y	FACW
3.			
4.			
5.			
6.			
7.			
8.			
= Total Cover	100		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
= Total Cover			

% Bare Ground in Herb Stratum 0.0 % Cover of Biotic Crust 90

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	80	x 1 = 80
FACW species	20	x 2 = 40
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	100 (A)	120 (B)

Prevalence Index = B/A = 1.2

Hydrophytic Vegetation Indicators:

✔ 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 ____ No ✔

Remarks:

SOIL

Sampling Point: IA-3 DP6

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 3/1	100	Not Present	0	NA	NA	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)
- ___ 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: None

Depth (inches): NA

Hydric Soil Present? Yes ✔ **No** ___

Remarks:

Problematic soils: Moderately to Very Strongly Alkaline Soils preventing redox formation.

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** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: San Joaquin Freshwater Marsh Reserve City/County: Irvine Sampling Date: 10-30-20

Applicant/Owner: University of California, Irvine State: CA Sampling Point: IA-3 DP7

Investigator(s): Tony Bomkamp Section, Township, Range: Unsectioned, T6S, R9W

Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): < 2%

Subregion (LRR): LRR-C Lat: 33.652152 Long: -117.853627 Datum: NAD 83

Soil Map Unit Name: Tidal Flats NWI classification: Palustrine

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ 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 ✔	No ____	Is the Sampled Area within a Wetland? Yes ____ No ✔
Hydric Soil Present?	Yes ____	No ✔	
Wetland Hydrology Present?	Yes ____	No ✔	

Remarks:

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
= Total Cover			
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
= Total Cover			
Herb Stratum (Plot size: ____)			
1. Conium maculatum	100	Y	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
= Total Cover	100		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
= Total Cover			

% Bare Ground in Herb Stratum 0.0 % Cover of Biotic Crust 0.0

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	100	x 2 = 100
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	200 (A)	200 (B)

Prevalence Index = B/A = 2.0

Hydrophytic Vegetation Indicators:

✔ 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 ✔ No ____

Remarks:

SOIL

Sampling Point: IA-3 DP7

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 3/2	100	Not Present	0	NA	NA	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)
___ 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: None

Depth (inches): NA

Hydric Soil Present? Yes ______ 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 ✔

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: San Joaquin Freshwater Marsh Reserve City/County: Irvine Sampling Date: 10-30-20

Applicant/Owner: University of California, Irvine State: CA Sampling Point: IA-3 DP8

Investigator(s): Tony Bomkamp Section, Township, Range: Unsectioned, T6S, R9W

Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): < 2%

Subregion (LRR): LRR-C Lat: 33.655608 Long: -117.855513 Datum: NAD 83

Soil Map Unit Name: Tidal Flats NWI classification: Palustrine

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ 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.

	Yes	No
Hydrophytic Vegetation Present?	✔	
Hydric Soil Present?		✔
Wetland Hydrology Present?		✔

Is the Sampled Area within a Wetland? **Yes** ____ **No** ✔

Remarks:

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
= Total Cover			
Sapling/Shrub Stratum (Plot size: ____)			
1. Baccharis salicifolia	40	Y	FAC
2. Toxicodendron diversilobum	30	Y	FACU
3.			
4.			
5.			
= Total Cover	70		
Herb Stratum (Plot size: ____)			
1. Conium maculatum	80	Y	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
= Total Cover	80		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
= Total Cover			

% Bare Ground in Herb Stratum 0.0 % Cover of Biotic Crust 0.0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 67 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species	80	x 2 =	160
FAC species	40	x 3 =	120
FACU species	30	x 4 =	120
UPL species		x 5 =	
Column Totals:	150 (A)		400 (B)

Prevalence Index = B/A = 2.67

Hydrophytic Vegetation Indicators:

✔ 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** ✔ **No** ____

Remarks:

SOIL

Sampling Point: IA-3 DP8

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 3/2	100	Not Present	0	NA	NA	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)
- ___ 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: None

Depth (inches): NA

Hydric Soil Present? Yes ______ 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 ✔

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: San Joaquin Freshwater Marsh Reserve City/County: Irvine Sampling Date: 10-30-20

Applicant/Owner: University of California, Irvine State: CA Sampling Point: IA-3 DP9

Investigator(s): Tony Bomkamp Section, Township, Range: Unsectioned, T6S, R9W

Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): None Slope (%): < 2%

Subregion (LRR): LRR-C Lat: 33.655559 Long: -117.855440 Datum: NAD 83

Soil Map Unit Name: Tidal Flats NWI classification: Palustrine

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ 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 ✔	No ____	Is the Sampled Area within a Wetland? Yes ____ No ✔
Hydric Soil Present?	Yes ____	No ✔	
Wetland Hydrology Present?	Yes ____	No ✔	

Remarks:

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
= Total Cover			
Sapling/Shrub Stratum (Plot size: ____)			
1. Baccharis salicifolia	10	Y	FAC
2.			
3.			
4.			
5.			
= Total Cover	10		
Herb Stratum (Plot size: ____)			
1. Conium maculatum	100	Y	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
= Total Cover	100		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
= Total Cover			

% Bare Ground in Herb Stratum 0.0 % Cover of Biotic Crust 0.0

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	100	x 2 = 200
FAC species	10	x 3 = 30
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	110 (A)	230 (B)

Prevalence Index = B/A = 2.1

Hydrophytic Vegetation Indicators:

✔ 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 ✔ No ____

Remarks:

SOIL

Sampling Point: IA-3 DP9

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 3/2	100	Not Present	0	NA	NA	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)
- ___ 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: None

Depth (inches): NA

Hydric Soil Present? Yes ______ 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 ✔

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: San Joaquin Freshwater Marsh Reserve City/County: Irvine Sampling Date: 10-30-20

Applicant/Owner: University of California, Irvine State: CA Sampling Point: IA-3 DP10

Investigator(s): Tony Bomkamp Section, Township, Range: Unsectioned, T6S, R9W

Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): None Slope (%): < 2%

Subregion (LRR): LRR-C Lat: 33.652413 Long: -117.853292 Datum: NAD 83

Soil Map Unit Name: Tidal Flats NWI classification: Palustrine

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ 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 ✔	No ___	Is the Sampled Area within a Wetland? Yes ___ No ✔
Hydric Soil Present?	Yes ___	No ✔	
Wetland Hydrology Present?	Yes ___	No ✔	

Remarks:

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	10		
Herb Stratum (Plot size: ___)			
1. Conium maculatum	100	Y	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
= Total Cover	100		
Woody Vine Stratum (Plot size: ___)			
1.			
2.			
= Total Cover			

% Bare Ground in Herb Stratum 0.0 % Cover of Biotic Crust 0.0

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	100	x 2 = 200
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	100 (A)	200 (B)

Prevalence Index = B/A = 2.0

Hydrophytic Vegetation Indicators:

✔ 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 ✔ No ___

Remarks:

SOIL

Sampling Point: IA-3 DP10

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 3/2	100	Not Present	0	NA	NA	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)
___ 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: None

Depth (inches): NA

Hydric Soil Present? **Yes** ______ **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** ✔

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: San Joaquin Freshwater Marsh Reserve City/County: Irvine Sampling Date: 10-30-20

Applicant/Owner: University of California, Irvine State: CA Sampling Point: IA-3 DP12

Investigator(s): Tony Bomkamp Section, Township, Range: Unsectioned, T6S, R9W

Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): < 2%

Subregion (LRR): LRR-C Lat: 33.652289 Long: -117.852462 Datum: NAD 83

Soil Map Unit Name: Tidal Flats NWI classification: Palustrine

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ 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.

	Yes	No
Hydrophytic Vegetation Present?	✔	
Hydric Soil Present?		✔
Wetland Hydrology Present?		✔
Is the Sampled Area within a Wetland?		✔

Remarks:

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: ___)			
1.			
2.			
3.			
4.			
= Total Cover			
Sapling/Shrub Stratum (Plot size: ___)			
1.			
2.			
3.			
4.			
5.			
= Total Cover	10		
Herb Stratum (Plot size: ___)			
1. Conium maculatum	100	Y	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
= Total Cover	100		
Woody Vine Stratum (Plot size: ___)			
1.			
2.			
= Total Cover			

% Bare Ground in Herb Stratum 0.0 % Cover of Biotic Crust 0.0

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	100	x 2 = 200
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	100 (A)	200 (B)

Prevalence Index = B/A = 2.0

Hydrophytic Vegetation Indicators:

✔ 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 ✔ No ___

Remarks:

SOIL

Sampling Point: IA-3 DP12

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 3/2	100	Not Present	0	NA	NA	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)
- ___ 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: None

Depth (inches): NA

Hydric Soil Present? Yes ______ 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 ✔

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: San Joaquin Freshwater Marsh Reserve City/County: Irvine Sampling Date: 10-30-20

Applicant/Owner: University of California, Irvine State: CA Sampling Point: IA-4A DP1

Investigator(s): Tony Bomkamp Section, Township, Range: Unsectioned, T6S, R9W

Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): < 2%

Subregion (LRR): LRR-C Lat: 33.653869 Long: -117.850865 Datum: NAD 83

Soil Map Unit Name: Tidal Flats NWI classification: Palustrine

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ 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 ____	No ✔	Is the Sampled Area within a Wetland? Yes ____ No ✔
Hydric Soil Present?	Yes ____	No ✔	
Wetland Hydrology Present?	Yes ____	No ✔	

Remarks:

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: ____)			
1. Melilotus albus	60	Y	FACU
2. Brassica nigra	20	Y	UPL
3. Helminthotheca echioides	20	Y	FAC
4.			
5.			
6.			
7.			
8.			
= Total Cover	100		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
= Total Cover			

% Bare Ground in Herb Stratum 0.0 % Cover of Biotic Crust 0.0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 33 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species	20	x 3 =	60
FACU species	60	x 4 =	240
UPL species	20	x 5 =	100
Column Totals:	100 (A)		400 (B)

Prevalence Index = B/A = 4.0

Hydrophytic Vegetation Indicators:

___ 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 ____ No ✔

Remarks:

SOIL

Sampling Point: IA-4A DP1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 3/2	100	Not Present	0	NA	NA	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)
___ 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: None

Depth (inches): NA

Hydric Soil Present? Yes ______ 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 ✔

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: San Joaquin Freshwater Marsh Reserve City/County: Irvine Sampling Date: 10-30-20

Applicant/Owner: University of California, Irvine State: CA Sampling Point: IA-4A DP2

Investigator(s): Tony Bomkamp Section, Township, Range: Unsectioned, T6S, R9W

Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): < 2%

Subregion (LRR): LRR-C Lat: 33.653873 Long: -117.850897 Datum: NAD 83

Soil Map Unit Name: Tidal Flats NWI classification: Palustrine

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ 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 ✔ No ____	**Is the Sampled Area within a Wetland?**	**Yes ✔ No ____**
Hydric Soil Present?	Yes ✔ No ____		
Wetland Hydrology Present?	Yes ✔ No ____		

Remarks:

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
= Total Cover			
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
= Total Cover			
Herb Stratum (Plot size: ____)			
1. Xanthium strumarium	60	Y	FAC
2. Scoenoplectus californicus	20	Y	OBL
3.			
4.			
5.			
6.			
7.			
8.			
= Total Cover	80		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
= Total Cover			

% Bare Ground in Herb Stratum 20 % Cover of Biotic Crust 40

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	20	x 1 = 20
FACW species		x 2 =
FAC species	60	x 3 = 180
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	80 (A)	200 (B)

Prevalence Index = B/A = 1.6

Hydrophytic Vegetation Indicators:

- ✔ 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 ✔ No ____

Remarks:

SOIL

Sampling Point: IA-4A DP2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 3/1	100	Not Present	0	NA	NA	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)
- ___ 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: None

Depth (inches): NA

Hydric Soil Present? **Yes** ✔ **No** ______

Remarks:

Long or very long duration for inundation

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** ______

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: San Joaquin Freshwater Marsh Reserve City/County: Irvine Sampling Date: 10-30-20

Applicant/Owner: University of California, Irvine State: CA Sampling Point: IA-4A DP3

Investigator(s): Tony Bomkamp Section, Township, Range: Unsectioned, T6S, R9W

Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): < 2%

Subregion (LRR): LRR-C Lat: 33.653964 Long: -117.850969 Datum: NAD 83

Soil Map Unit Name: Tidal Flats NWI classification: Palustrine

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ 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 ✔ No ___	Is the Sampled Area within a Wetland? Yes ✔ No ___
Hydric Soil Present?	Yes ✔ No ___	
Wetland Hydrology Present?	Yes ✔ No ___	

Remarks:

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: ___)			
1. Xanthium strumarium	20	Y	FAC
2. Schoenoplectus pungens	50	Y	OBL
3. Schoenoplectus californicus	20	Y	OBL
4. Helminthotheca echioides	10	N	FAC
5.			
6.			
7.			
8.			
	100 = Total Cover		
Woody Vine Stratum (Plot size: ___)			
1.			
2.			
	___ = Total Cover		

% Bare Ground in Herb Stratum 0.0 % Cover of Biotic Crust 20

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	70	x 1 = 70
FACW species		x 2 =
FAC species	30	x 3 = 90
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	100 (A)	160 (B)

Prevalence Index = B/A = 1.6

Hydrophytic Vegetation Indicators:

- ✔ 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 ✔ No ___

Remarks:

SOIL

Sampling Point: IA-4A DP3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 3/1	100	Not Present	0	NA	NA	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)
- ___ 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: None

Depth (inches): NA

Hydric Soil Present? Yes ✔ No ___

Remarks:

Problematic soils: Moderately to Very Strongly Alkaline Soils preventing redox formation. Long or very long duration for inundation

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 ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: San Joaquin Freshwater Marsh Reserve City/County: Irvine Sampling Date: 10-30-20

Applicant/Owner: University of California, Irvine State: CA Sampling Point: IA-4A DP4

Investigator(s): Tony Bomkamp Section, Township, Range: Unsectioned, T6S, R9W

Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): < 2%

Subregion (LRR): LRR-C Lat: 33.653972 Long: -117.850950 Datum: NAD 83

Soil Map Unit Name: Tidal Flats NWI classification: Palustrine

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ 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 ____	No ✔
Hydric Soil Present?	Yes ____	No ✔
Wetland Hydrology Present?	Yes ____	No ✔

Is the Sampled Area within a Wetland? Yes ____ No ✔

Remarks:

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: ____)			
1. Melilotus albus	50	Y	FACU
2. Helminthotheca echioides	30	Y	FAC
3. Amaranthus blitoides	20	Y	FACU
4.			
5.			
6.			
7.			
8.			
= Total Cover	100		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
= Total Cover			

% Bare Ground in Herb Stratum 0.0 % Cover of Biotic Crust 0.0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 33 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species	30	x 3 =	90
FACU species	70	x 4 =	280
UPL species		x 5 =	
Column Totals:	100 (A)		390 (B)

Prevalence Index = B/A = 3.9

Hydrophytic Vegetation Indicators:

- ___ 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 ____ No ✔

Remarks:

SOIL

Sampling Point: IA-4A DP4

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 3/2	100	Not Present	0	NA	NA	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)
- ___ 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: None

Depth (inches): NA

Hydric Soil Present? **Yes** ______ **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** ✔

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: San Joaquin Freshwater Marsh Reserve City/County: Irvine Sampling Date: 10-30-20

Applicant/Owner: University of California, Irvine State: CA Sampling Point: IA-4A DP5

Investigator(s): Tony Bomkamp Section, Township, Range: Unsectioned, T6S, R9W

Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Slope Slope (%): < 2%

Subregion (LRR): LRR-C Lat: 33.654144 Long: -117.851006 Datum: NAD 83

Soil Map Unit Name: Tidal Flats NWI classification: Palustrine

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ 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.

	Yes	No
Hydrophytic Vegetation Present?		✔
Hydric Soil Present?		✔
Wetland Hydrology Present?		✔

Is the Sampled Area within a Wetland? Yes ____ No ✔

Remarks:

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: ____)			
1. Melilotus albus	20	Y	FACU
2. Helminthotheca echioides	15	N	FAC
3. Amaranthus blitoides	25	Y	FACU
4. Brassica nigra	30	Y	UPL
5.			
6.			
7.			
8.			
= Total Cover	90		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
= Total Cover			

% Bare Ground in Herb Stratum 10.0 % Cover of Biotic Crust 0.0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species	15	x 3 = 45
FACU species	45	x 4 = 180
UPL species	30	x 5 = 150
Column Totals:	90 (A)	390 (B)

Prevalence Index = B/A = 4.17

Hydrophytic Vegetation Indicators:

___ 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 ____ No ✔

Remarks:

SOIL

Sampling Point: IA-4A DP5

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 3/2	100	Not Present	0	NA	NA	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)
- ___ 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: None

Depth (inches): NA

Hydric Soil Present? **Yes** ______ **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** ✔

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: San Joaquin Freshwater Marsh Reserve City/County: Irvine Sampling Date: 10-30-20

Applicant/Owner: University of California, Irvine State: CA Sampling Point: IA-4A DP6

Investigator(s): Tony Bomkamp Section, Township, Range: Unsectioned, T6S, R9W

Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): < 2%

Subregion (LRR): LRR-C Lat: 33.654106 Long: -117.851087 Datum: NAD 83

Soil Map Unit Name: Tidal Flats NWI classification: Palustrine

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ 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 ✔ No ____	**Is the Sampled Area within a Wetland?**	**Yes ✔ No ____**
Hydric Soil Present?	Yes ✔ No ____		
Wetland Hydrology Present?	Yes ✔ No ____		

Remarks:

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
= Total Cover			
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
= Total Cover			
Herb Stratum (Plot size: ____)			
1. Helminthotheca echioides	20	Y	FAC
2. Scoenoplectus californicus	70	Y	OBL
3.			
4.			
5.			
6.			
7.			
8.			
= Total Cover	90		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
= Total Cover			

% Bare Ground in Herb Stratum 10 % Cover of Biotic Crust 50

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	70	x 1 = 70
FACW species		x 2 =
FAC species	20	x 3 = 60
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	90 (A)	130 (B)

Prevalence Index = B/A = 1.44

Hydrophytic Vegetation Indicators:

- ✔ 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 ✔ No ____

Remarks:

SOIL

Sampling Point: IA-4A DP6

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 3/1	100	Not Present	0	NA	NA	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)
- ___ 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: None

Depth (inches): NA

Hydric Soil Present? Yes ✔ No ___

Remarks:

Alkaline soils masking redox, long or very long duration for inundation

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 ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: San Joaquin Freshwater Marsh Reserve City/County: Irvine Sampling Date: 10-30-20

Applicant/Owner: University of California, Irvine State: CA Sampling Point: IA-4b DP1

Investigator(s): Tony Bomkamp Section, Township, Range: Unsectioned, T6S, R9W

Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): < 2%

Subregion (LRR): LRR-C Lat: 33.652705 Long: -117.852264 Datum: NAD 83

Soil Map Unit Name: Tidal Flats NWI classification: Palustrine

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ 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 ✔	No ____	Is the Sampled Area within a Wetland? Yes ____ No ✔
Hydric Soil Present?	Yes ____	No ✔	
Wetland Hydrology Present?	Yes ____	No ✔	

Remarks:

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: ____)			
1. Conium maculatum	40	Y	FACW
2. Frankenia salina	60	Y	FACW
3.			
4.			
5.			
6.			
7.			
8.			
= Total Cover	100		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
= Total Cover			

% Bare Ground in Herb Stratum 0.0 % Cover of Biotic Crust 0.0

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	100	x 2 = 200
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	100 (A)	200 (B)

Prevalence Index = B/A = 2.0

Hydrophytic Vegetation Indicators:

✔ 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 ✔ No ____

Remarks:

SOIL

Sampling Point: IA-4b DP1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 3/2	100	Not Present	0	NA	NA	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)
- ___ 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: None

Depth (inches): NA

Hydric Soil Present? **Yes** ______ **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** ✔

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: San Joaquin Freshwater Marsh Reserve City/County: Irvine Sampling Date: 10-30-20

Applicant/Owner: University of California, Irvine State: CA Sampling Point: IA-4b DP2

Investigator(s): Tony Bomkamp Section, Township, Range: Unsectioned, T6S, R9W

Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): < 2%

Subregion (LRR): LRR-C Lat: 33.652787 Long: -117.852139 Datum: NAD 83

Soil Map Unit Name: Tidal Flats NWI classification: Palustrine

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ 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 ✔ No ___	Is the Sampled Area within a Wetland? Yes ✔ No ___
Hydric Soil Present?	Yes ✔ No ___	
Wetland Hydrology Present?	Yes ✔ No ___	

Remarks:

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: ___)			
1.			
2.			
3.			
4.			
= Total Cover			
Sapling/Shrub Stratum (Plot size: ___)			
1.			
2.			
3.			
4.			
5.			
= Total Cover			
Herb Stratum (Plot size: ___)			
1. Conium maculatum	85	Y	FACW
2. Heliotropium curassavicum	15	Y	FACU
3.			
4.			
5.			
6.			
7.			
8.			
= Total Cover	100		
Woody Vine Stratum (Plot size: ___)			
1.			
2.			
= Total Cover			

% Bare Ground in Herb Stratum 0.0 % Cover of Biotic Crust 0.0

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	85	x 2 = 170
FAC species		x 3 =
FACU species	16	x 4 = 60
UPL species		x 5 =
Column Totals:	100 (A)	230 (B)

Prevalence Index = B/A = 2.3

Hydrophytic Vegetation Indicators:

✔ 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 ✔ No ___

Remarks:

SOIL

Sampling Point: IA-4b DP2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 3/1	100	Not Present	0	NA	NA	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)
- ___ 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: None

Depth (inches): NA

Hydric Soil Present? Yes ✔ No ___

Remarks:

Alkaline Soils in Swale - Soils Presumed

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 ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Swale with signs of surface flow

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: San Joaquin Freshwater Marsh Reserve City/County: Irvine Sampling Date: 10-30-20

Applicant/Owner: University of California, Irvine State: CA Sampling Point: IA-4B DP3

Investigator(s): Tony Bomkamp Section, Township, Range: Unsectioned, T6S, R9W

Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): < 2%

Subregion (LRR): LRR-C Lat: 33.653234 Long: -117.852347 Datum: NAD 83

Soil Map Unit Name: Tidal Flats NWI classification: Palustrine

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ 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 ✔ No ____	**Is the Sampled Area within a Wetland?** Yes ✔ No ____
Hydric Soil Present?	Yes ✔ No ____	
Wetland Hydrology Present?	Yes ✔ No ____	

Remarks:

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: ____)			
1. Salix gooddingii	30	Y	FACW
2.			
3.			
4.			
	30	= Total Cover	
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
		= Total Cover	
Herb Stratum (Plot size: ____)			
1. Conium maculatum	80	Y	FACW
2. Heliotropium curassavicum	20	Y	FACU
3.			
4.			
5.			
6.			
7.			
8.			
	100	= Total Cover	
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum 0.0 % Cover of Biotic Crust 30

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 67 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species	110	x 2 = 220
FAC species		x 3 =
FACU species	20	x 4 = 80
UPL species		x 5 =
Column Totals:	130 (A)	300 (B)

Prevalence Index = B/A = 2.3

Hydrophytic Vegetation Indicators:

✔ 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 ✔ No ____

Remarks:

SOIL

Sampling Point: IA-4B DP3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 3/1	100	Not Present	0	NA	NA	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)
- ___ 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: None

Depth (inches): NA

Hydric Soil Present? Yes ___ No ✔

Remarks:

Alkali soils in depression - hydric soils presumed

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 ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: San Joaquin Freshwater Marsh Reserve City/County: Irvine Sampling Date: 10-30-20

Applicant/Owner: University of California, Irvine State: CA Sampling Point: IA-4B DP4

Investigator(s): Tony Bomkamp Section, Township, Range: Unsectioned, T6S, R9W

Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): < 2%

Subregion (LRR): LRR-C Lat: 33.653297 Long: -117.852253 Datum: NAD 83

Soil Map Unit Name: Tidal Flats NWI classification: Palustrine

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ 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 ✔ No ____ Hydric Soil Present? Yes ✔ No ____ Wetland Hydrology Present? Yes ✔ No ____	**Is the Sampled Area within a Wetland?** Yes ✔ No ____

Remarks:

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. Baccharis salicifolia	40	Y	FAC
2.			
3.			
4.			
5.			
= Total Cover	40		
Herb Stratum (Plot size: ____)			
1. Conium maculatum	60	Y	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
= Total Cover	60		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
= Total Cover			

% Bare Ground in Herb Stratum 0.0 % Cover of Biotic Crust 25

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	60	x 2 =	120
FAC species	40	x 3 =	120
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	100 (A)		240 (B)

Prevalence Index = B/A = 2.4

Hydrophytic Vegetation Indicators:

- ✔ 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 ✔ No ____

Remarks:

SOIL

Sampling Point: IA-4B DP4

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 3/1	100	Not Present	0	NA	NA	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)
- ___ 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: None

Depth (inches): NA

Hydric Soil Present? **Yes** ✔ **No** ______

Remarks:

Alkali soils - problem soils, hydric soils assumed

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** ______

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: San Joaquin Freshwater Marsh Reserve City/County: Irvine Sampling Date: 12-16-20

Applicant/Owner: University of California, Irvine State: CA Sampling Point: LM dp1

Investigator(s): Tony Bomkamp Section, Township, Range: Unsectioned, T6S, R9W

Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): < 2%

Subregion (LRR): LRR-C Lat: 33.656080 Long: -117.854875 Datum: NAD 83

Soil Map Unit Name: Omni Clay, Drained NWI classification: Palustrine

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ 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 ✔	No
Hydric Soil Present?	Yes	No ✔
Wetland Hydrology Present?	Yes	No ✔

Is the Sampled Area within a Wetland? Yes ____ No ✔

Remarks:

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: ____)			
1. Frankenia salina	60	Y	FACW
2. Distichlis spicata	20	Y	FAC
3. Amaranthus blitoides	10	N	FACU
4. Helminthotheca echioides	5	N	FAC
5. Hirschfeldia incana	5	N	UPL
6.			
7.			
8.			
	100 = Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	= Total Cover		

% Bare Ground in Herb Stratum 0.0 % Cover of Biotic Crust 0.0

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	60	x 2 =	120
FAC species	25	x 3 =	75
FACU species	10	x 4 =	40
UPL species	5	x 5 =	25
Column Totals:	100 (A)		260 (B)

Prevalence Index = B/A = 2.6

Hydrophytic Vegetation Indicators:

- ✔ 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 ✔ No ____

Remarks:

SOIL

Sampling Point: LM dp1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 3/2	100	Not Present	0	NA	NA	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)
___ 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: None

Depth (inches): NA

Hydric Soil Present? Yes ______ 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 ✔

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: San Joaquin Freshwater Marsh Reserve City/County: Irvine Sampling Date: 12-16-20

Applicant/Owner: University of California, Irvine State: CA Sampling Point: MM-dp1

Investigator(s): Tony Bomkamp Section, Township, Range: Unsectioned, T6S, R9W

Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): < 2%

Subregion (LRR): LRR-C Lat: 33.659076 Long: -11785.29.78 Datum: NAD 83

Soil Map Unit Name: Omni Clay, Drained NWI classification: Palustrine

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ 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 ✔ No ____	**Is the Sampled Area within a Wetland?**	**Yes** ✔ **No** ____
Hydric Soil Present?	Yes ✔ No ____		
Wetland Hydrology Present?	Yes ✔ No ____		

Remarks:

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
= Total Cover			
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
= Total Cover	40		
Herb Stratum (Plot size: ____)			
1. Xanthium strumarium	80	Y	FAC
2. Crypsis schoenoides	20	Y	FACW
3.			
4.			
5.			
6.			
7.			
8.			
= Total Cover	100		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
= Total Cover			

% Bare Ground in Herb Stratum 0.0 % Cover of Biotic Crust 60

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	20	x 2 = 40
FAC species	80	x 3 = 240
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	100 (A)	280 (B)

Prevalence Index = B/A = 2.8

Hydrophytic Vegetation Indicators:

✔ 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** ✔ **No** ____

Remarks:

SOIL

Sampling Point: MM-dp1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 2/2	100	Not Present	0	NA	NA	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)
- ___ 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: None

Depth (inches): NA

Hydric Soil Present? Yes ✔ No ___

Remarks:

Problematic soils: Moderately to Very Strongly Alkaline Soils preventing redox formation.

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 ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: San Joaquin Freshwater Marsh Reserve City/County: Irvine Sampling Date: 12-16-20

Applicant/Owner: University of California, Irvine State: CA Sampling Point: SM-dp1

Investigator(s): Tony Bomkamp Section, Township, Range: Unsectioned, T6S, R9W

Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): < 2%

Subregion (LRR): LRR-C Lat: 33.662187 Long: -117.849661 Datum: NAD 83

Soil Map Unit Name: Chino Silty Clay Loam NWI classification: Palustrine

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ 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.

	Yes	No
Hydrophytic Vegetation Present?		✔
Hydric Soil Present?		✔
Wetland Hydrology Present?		✔

Is the Sampled Area within a Wetland? Yes ____ No ✔

Remarks:

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: ____)			
1. Conium maculatum	60	Y	FACW
2. Brassica nigra	40	Y	UPL
3.			
4.			
5.			
6.			
7.			
8.			
= Total Cover	100		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
= Total Cover			

% Bare Ground in Herb Stratum 0.0 % Cover of Biotic Crust 0.0

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		x 1 =
FACW species	60	x 2 = 120
FAC species		x 3 =
FACU species		x 4 =
UPL species	40	x 5 = 200
Column Totals:	100 (A)	320 (B)

Prevalence Index = B/A = 3.2

Hydrophytic Vegetation Indicators:

- ___ 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 ____ No ✔

Remarks:

SOIL

Sampling Point: SM-dp1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 3/2	100	Not Present	0	NA	NA	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)
- ___ 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: None

Depth (inches): NA

Hydric Soil Present? Yes ______ 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 ✔

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: San Joaquin Freshwater Marsh Reserve City/County: Irvine Sampling Date: 12-16-20

Applicant/Owner: University of California, Irvine State: CA Sampling Point: SM-dp2

Investigator(s): Tony Bomkamp Section, Township, Range: Unsectioned, T6S, R9W

Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): < 2%

Subregion (LRR): LRR-C Lat: 33.660846 Long: -117.851103 Datum: NAD 83

Soil Map Unit Name: Omni Clay, Drained NWI classification: Palustrine

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ 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 ✔ No ____	Is the Sampled Area within a Wetland? Yes ✔ No ____
Hydric Soil Present?	Yes ✔ No ____	
Wetland Hydrology Present?	Yes ✔ No ____	

Remarks:

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
	____ = Total Cover		
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
	____ = Total Cover		
Herb Stratum (Plot size: ____)			
1. Xanthium strumarium	80	Y	FAC
2. Sesuvium verrucosum	20	Y	FACW
3.			
4.			
5.			
6.			
7.			
8.			
	100 = Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ = Total Cover		

% Bare Ground in Herb Stratum 0.0 % Cover of Biotic Crust 60

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	20	x 2 = 40
FAC species	80	x 3 = 240
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	100 (A)	280 (B)

Prevalence Index = B/A = 2.8

Hydrophytic Vegetation Indicators:

✔ 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** ✔ **No** ____

Remarks:

SOIL

Sampling Point: SM-dp2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 2/2	100	Not Present	0	NA	NA	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)
___ 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: None

Depth (inches): NA

Hydric Soil Present? Yes ✔ No ______

Remarks:

Problematic soils: Moderately to Very Strongly Alkaline Soils preventing redox formation.

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 ______

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: San Joaquin Freshwater Marsh Reserve City/County: Irvine Sampling Date: 12-16-20

Applicant/Owner: University of California, Irvine State: CA Sampling Point: SM dp3

Investigator(s): Tony Bomkamp Section, Township, Range: Unsectioned, T6S, R9W

Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): Concave Slope (%): < 2%

Subregion (LRR): LRR-C Lat: 33.657473 Long: -117.851417 Datum: NAD 83

Soil Map Unit Name: Omni Clay, Drained NWI classification: Palustrine

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ 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 ✔ No ____	Is the Sampled Area within a Wetland?	Yes ✔ No ____
Hydric Soil Present?	Yes ✔ No ____		
Wetland Hydrology Present?	Yes ✔ No ____		

Remarks:

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	40		
Herb Stratum (Plot size: ____)			
1. Helminthotheca echioides	80	Y	FAC
2. Malvella leprosa	10	Y	FACU
3.			
4.			
5.			
6.			
7.			
8.			
= Total Cover	90		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
= Total Cover			

% Bare Ground in Herb Stratum 10 % Cover of Biotic Crust 60

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	80	x 3 = 240
FACU species	10	x 4 = 40
UPL species		x 5 =
Column Totals:	90 (A)	280 (B)

Prevalence Index = B/A = 3.1

Hydrophytic Vegetation Indicators:

✔ 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 ✔ No ____

Remarks:

SOIL

Sampling Point: SM dp3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 2/2	100	Not Present	0	NA	NA	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)
___ 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: None
Depth (inches): NA

Hydric Soil Present? Yes ✔ No ______

Remarks:

Problematic soils: Moderately to Very Strongly Alkaline Soils preventing redox formation.

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 ______

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Appendix D
Cultural Resources Assessment Report

cogstone

PALEONTOLOGY - ARCHAEOLOGY - HISTORY

CULTURAL RESOURCES ASSESSMENT REPORT FOR THE UNIVERSITY OF CALIFORNIA NATURAL RESERVE SYSTEM SAN JOAQUIN MARSH RESERVE WATER CONVEYANCE AND DRAINAGE IMPROVEMENT PROJECT, CITY OF IRVINE, ORANGE COUNTY, CALIFORNIA

(EXCLUDES CONFIDENTIAL APPENDICES)

Prepared for:
Moffatt and Nichol
4225 East Conant Street
Long Beach, CA 90808

Authors:
Sandy Duarte, B.A. and John Gust, Ph.D., RPA

Principal Investigator:
John Gust, Ph.D., RPA

Revised March 2021

Cogstone Project Number: 5084
Type of Study: Cultural resources assessment
Sites: P-30-000057, P-30-000115, P-30-000121
USGS 7.5' Quadrangle: Tustin (1981)
Area: Approximately 199 acres
Key Words: Cultural Resource Assessment, Gabrielino-Tongva territory, Juaneño territory, San Joaquin Marsh, San Diego Creek, Duck ponds

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Federal Certifications WOSB, EDWOSB, SDB
State Certifications DBE, WBE, SBE, UDBE

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SUMMARY OF FINDINGS

This study was conducted to determine the potential impacts to cultural resources during the University of California (UC) Natural Reserve System (NRS) San Joaquin Marsh Reserve Water Conveyance and Drainage Improvement Project (SJMRCDI; Project), City of Irvine (City), Orange County, California. This report complies with the requirements of the California Environmental Quality Act (CEQA) with the UC acting as the lead agency. Due to the proximity of the Project to the San Diego Creek, the Project also requires a Clean Water Act Section 404 permit from the United States Army Corps of Engineers (USACE) and must comply with Section 106 of the National Historic Preservation Act (NHPA). USACE is the lead agency under the National Environmental Policy Act (NEPA).

The Area of Potential Effects (APE) for the Project is approximately 199 acres located north of University Drive, south of Jamboree Road, and west of Campus Drive. Specifically, the APE is mapped within Sections 7, 8, 17, and 18, of Township 6 South, Range 9 West, in the United States Geological Survey (USGS) Tustin 7.5 minute topographic quadrangle map, San Bernardino Baseline and Meridian. The UC NRS San Joaquin Marsh Reserve (Marsh Reserve) retains riparian water rights to San Diego Creek and owns the segment of the Creek immediately adjacent to the Experimental Ponds, Hoag Pond, and the Lower Marsh. The University of California, Irvine has managed the Marsh Reserve for the purposes of research, education, community engagement, and stewardship as a habitat for wildlife since 1970 (Moffatt and Nichol 2020).

The Project activities are intended to improve the long-term water management and habitat value of the Marsh Reserve. The Project is anticipated to help UCI better manage existing water sources within the Marsh Reserve to improve circulation and long term soil and water chemistry through providing drainage, by increasing capacity for wetland habitat, and improving controls to retain water in priority management cells during drought. Temporary construction activities include excavation associated with conveying water and creating wetland habitat, raising berms/dirt roads to increase capacity and function of passive drainage, and the installation of new and/or replacement water control mechanisms such as culverts, headwalls, pipes, and slide gates. The excavation depth will vary throughout the site, but the anticipated maximum depth is five feet below modern ground surface.

Cogstone requested a search for archaeological and historical records of the California Historical Resource Inventory System (CHRIS) from the South Central Coastal Information Center (SCCIC) located on the campus of California State University, Fullerton. The results of the record search indicated that 15 cultural resources studies have been completed previously within the APE and 141 additional cultural resource investigations have been completed previously within a one-mile radius of the APE.

The records search also determined three previously recorded resources are located within the APE boundaries. The resources include the Duck Ponds, identified as Locus B of the multi-component archaeological site P-30-000057 (CA-ORA-57), multicomponent site (P-30-000121/CA-ORA-121) and prehistoric archaeological site (P-30-000115/CA-ORA-115). In addition, 40 other cultural resources are located within a one-mile radius of the APE. These include 28 prehistoric archaeological sites, five multicomponent sites (both prehistoric and historic), five historic isolates, and five historic architectural resources.

Cogstone archaeologist Sandy Duarte surveyed the APE on October 8, 2020. Ground visibility within the APE was very poor (less than 3 percent) due to dense vegetation within the Marsh Reserve and surrounding areas. Some areas were not accessible due to overgrowth of vegetation. The intensive pedestrian survey consisted of one- to three-meter wide transects in accessible areas. Other than the berms surrounding the duck ponds, no cultural resources were observed during the pedestrian survey.

No new cultural resources were identified within the APE during the intensive pedestrian survey. Locus B of P-30-000057 (CA-ORA-00057) consists of duck ponds associated with the now destroyed San Joaquin Gun Club. Both P-30-000121(CA-ORA-121) and P-30-000115 (CA-ORA-115) are situated primarily on the bluffs just northwest of the APE.

As only a small portion of P-30-000121 was visited during this present work, the National Register of Historic Places (NRHP)/California Register of Historical Resources (CRHR) eligibility status cannot be reevaluated based on this visit to the resource. However, during testing and analysis conducted by LSA Associates in 1998, significant intact buried deposits were identified within Locus C at the eastern end of the resource. Based on this information, Gust (2019:7) recommended P-30-000121as eligible for inclusion in the NRHP under Criterion D and the CRHR under Criterion 4 as it is likely to provide important information about human history or prehistory. We recommend that Gust's (2019) evaluation that the resource is eligible for listing in the NRHP under Criterion 4 and the CRHR under Criterion D be retained.

As only a small portion of P-30-000115 was visited during this present work, the National Register of Historic Places (NRHP)/California Register of Historical Resources (CRHR) eligibility status cannot be reevaluated based on this visit to the resource. Previous to this current work, P-30-000115 was last revisited in May 2019 by Edgar Alvarez of Cogstone Resource Management. During that evaluation Alvarez noted "shell at the surface, and soils that appear undisturbed indicate that subsurface archaeological deposits may be present… within P-30-000115, Locus B." This is consistent with J. Brock's (1985c) assessment that describes Locus B as "in good condition with a midden and limited chert lithic material."

Gust (2019:7) recommended "testing be conducted in this area using shovel test pits that are broadly spaced across Locus B …to evaluate the potential for significant intact buried cultural material" prior to any earth disturbing activities within the resource.

The current recorded boundaries of P-30-000057 have been altered greatly from when the site was first surveyed and excavated by John Winterbourne (1935, 1938) and from subsequent descriptions (Briggs 1949, Barros and Koerper 1990, De Barros 1991, Eberhardt 1949, Macko 1985) which all describe the resource as located along the bluffs above the Marsh Reserve. The former San Joaquin Gun Club buildings were added to the site record for the resource in 1985 (Macko 1985). Jeannette McKenna's 1993 revaluation of the resource added the duck ponds that are associated with the San Joaquin Gun Club and located within Marsh Reserve as Locus B.

As part of the WPA, John Winterbournes surveyed the resource in 1935, returning to excavate in 1938. He described the site as being located on two knolls of Upper Newport Bay. The southernmost knoll was occupied by then still operational San Joaquin Gun Club. In 1938, Winterbourne excavated 12 trenches and four plots. He discovered three Native American burials, 13 manos, nine projectile points (two obsidian), seven bone awls, five shell beads (four Olivella and one Cowry), three pestles, one plummet, three scrapers, one cogstone, 22 hammerstones, and one core. In addition, one shell bracelet was recovered in close proximity to one of the burials. Much of this collection has unfortunately been lost (De Barros 1991). The location of Winterbourne's 1938 excavations was later destroyed by the construction of Jamboree Road.

On March 18, 1991, P. De Barros with Chambers Group, Inc. surveyed and tested the site. De Barros indicated that the site had been heavily damaged by development and surface collecting (De Barros 1991).

The San Joaquin Gun Club was first recorded during M. Macko's work in Locus A of the resource. A scatter of historic artifacts mostly dating to the 1950s was found but the gun club buildings had already been demolished. McKenna similarly found no features from the gun club building during her 1993 revisit to the resource. The duck ponds associated with the gun club were added as Locus B (1993).

In ca. 1960, Locus B was divided into a grid-like pattern and multiple ponds were constructed as a wildlife habitat for the benefit of duck hunters (Frame Finder 1960). Between 1999 and 2002 the layout of the southern duck ponds was changed to their current configuration (NETRonline 2002, Nobel 1999) and thus no longer have integrity of design. As the building from the San Joaquin Gun Club has been demolished the duck ponds also lack integrity of association.

The San Joaquin Gun Club was used as a recreation area by residents of Irvine and the surrounding area but was one of a number of gun clubs in the area and not unique in this regard. The club was not associated with events that have made a significant contribution to the broad patterns of our history. The resource is recommended as not eligible for inclusion in the NRHP or CRHR under Criteria A/1. Similarly, no association between the resource and persons significant in our past has been found. The resource is recommended as not eligible for inclusion in the NRHP or CRHR under Criteria B/2.

NRHP/CRHR Criteria C/3 apply to buildings, objects, and structures. In the case of the San Joaquin Gun Club all of the associated buildings have been previously demolished leaving only the duck ponds extant. As the San Joaquin Gun Club building are no longer present, they cannot embody the distinctive characteristics of a type, period or method of construction, or represent the work of a master, or possess high artistic values or represent a significant and distinguishable entity whose components may lack individual distinction. The resource is recommended as not eligible for inclusion in the NRHP or CRHR under Criteria C/3.

Items of completely earthen construction, including the duck ponds, do not qualify as buildings or structures for the purposes of the NRHP or CRHR and cannot be considered for eligibility under Criteria A/1, B/2, or C/3.

The area of Winterbourne's excavations has been destroyed by the construction of Jamboree Road. The location of the artifact collection from this work is unknown and available for further study. Results from De Barros and Koerper's excavations within Locus A indicate that that area of the site was already heavily disturbed. They recommended that the site be determined as not eligible for listing on the NRHP based on its limited research potential as it is highly disturbed, has a low yield of stone tools and vertebrate fauna, relative lack of obsidian for a residential base, and Winterbourne's 1938 collection has been lost. As this area is now the site of the Fletcher Jones Motor Car dealership any remnant potential for intact buried remains within Locus A has been lost.

No prehistoric artifacts have been identified within Locus B of the resource nor has any other indication that intact prehistoric or historic deposit may be present. As testing in Locus A in 1990 yielded minimal intact cultural depth, the intact area has since been destroyed by development, the location of Winterbourne's 1938 excavation have been destroyed and the artifact collection lost, and as no evidence of prehistoric material of any kind or intact historic cultural deposits that been identified, we concur with De Barros and Koerper's (1990) assessment that P-30-000057 is unlikely to yield information important in history or prehistory and recommend that the site as not eligible for the NRHP or CRHR under Criteria D/4. A site record update is included in Appendix D.

The APE is within the traditional territories of both the Gabrielino-Tongva and Juaneño but the Sacred Lands File search indicated that there are no known sacred sites or heritage resources located within the APE.

The nearest planned ground disturbance for the proposed Project is over 940 feet (286 meters) from P-30-000115, Locus B and over 600 feet (182 meters) from P-30-000121. P-30-000057 is not significant. For these reasons cultural sensitivity of the APE due to the planned Project assessed to be low. As no significant resources are likely to be affected, the Project should proceed as planned

In the event of an unanticipated discovery, all work must be suspended within 50 feet of the find until a qualified archaeologist evaluates it. In the unlikely event that human remains are encountered during project development, all work must cease near the find immediately.

In accordance with California Health and Safety Code Section 7050.5, the County Coroner must be notified if potentially human bone is discovered. The Coroner will then determine within two working days of being notified if the remains are subject to his or her authority. If the Coroner recognizes the remains to be Native American, he or she shall contact the Native American Heritage Commission (NAHC) by phone within 24 hours, in accordance with Public Resources Code Section 5097.98. The NAHC will then designate a Most Likely Descendant (MLD) with respect to the human remains. The MLD then has the opportunity to recommend to the property owner or the person responsible for the excavation work means for treating or disposing, with appropriate dignity, the human remains and associated grave goods. Work may not resume in the vicinity of the find until all requirements of the health and safety code have been met.

INTRODUCTION

PURPOSE OF STUDY

This study was conducted to determine the potential impacts to cultural resources during the University of California (UC) Natural Reserve System (NRS) San Joaquin Marsh Reserve Water Conveyance and Drainage Improvement Project (SJMRCDI; Project; Figure 1), City of Irvine (City), Orange County, California. This report complies with the requirements of the California Environmental Quality Act (CEQA) with UC acting as the lead agency. Due to the proximity of the Project to the San Diego Creek, the Project also requires a Clean Water Act Section 404 permit from the United States Army Corps of Engineers (USACE) and must comply with Section 106 of the National Historic Preservation Act (NHPA). USACE is the lead agency under the National Environmental Policy Act (NEPA).

AREA OF POTENTIAL EFFECTS AND VERTICAL IMPACTS

The Area of Potential Effects (APE) for the Project is approximately 199 acres located north of University Drive, south of Jamboree Road, and west of Campus Drive. Specifically, the APE is mapped within Sections 7, 8, 17, and 18, of Township 6 South, Range 9 West, in the United States Geological Survey (USGS) Tustin 7.5 minute topographic quadrangle map, San Bernardino Baseline and Meridian (Figures 2 and 3). The Marsh Reserve retains riparian water rights to San Diego Creek and owns the segment of the Creek immediately adjacent to the Experimental Ponds, Hoag Pond, and the Lower Marsh (Moffatt and Nichol 2020). The excavation depth will vary throughout the site, but the anticipated maximum depth is five feet below modern ground surface.

Figure 1. Project vicinity map

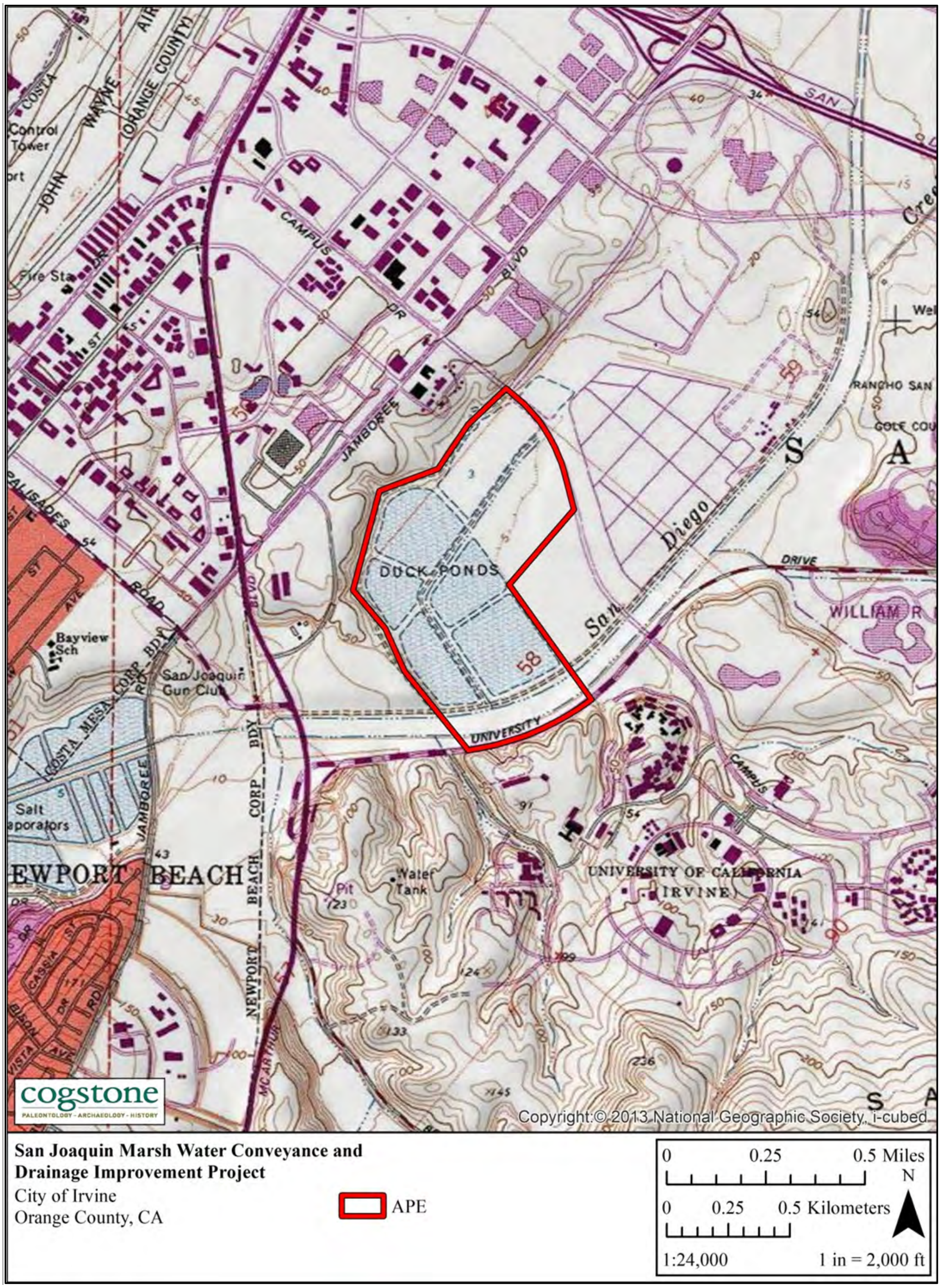

Figure 2. Project location map

Figure 3. APE map

PROJECT DESCRIPTION

The proposed Project activities are intended to improve the long-term water management and habitat value of the Marsh Reserve. One of the Project's design goals proposes infrastructure establishment and/or modifications that anticipate impacts of climate change (e.g., drought, flooding, and sea level rise), primarily associated with the Lower Marsh. This Design Goal is for Lower Marsh Drainage Conveyance and Hoag Pond Water Control Features ("Design Goal 1"). Design Goal 1 includes Project Elements 1 through 5 as described in detail below. A second design goal, "Design Goal 2", focuses on water sourcing, treatment and measurement (from IRWD or San Diego Creek). Design Goal 2 is for IRWD Water Conveyance and Retention in Experimental and Water Catchment Basins, which includes Project Elements 6 through 8 as described in detail below.

Temporary construction activities include excavation that will enhance water distribution and expansion of wetland habitat, raising berms/dirt roads to increase storage capacity and duration and efficiency of passive drainage, and the installation of new and/or replacement water control mechanisms such as culverts, headwalls, pipes, and slide gates. The proposed Project is necessary to ensure better management of existing water sources within the Marsh Reserve, thus improving circulation and long-term soil and water chemistry by providing improved drainage, increasing water capacity for wetland habitat, and enhancing controls to retain water in priority management cells during drought. The Project does not propose the use of additional water sources; however, the proposed elements would allow for additional water capacity should additional water inputs become available in the future. The proposed Project improvements have been separated into individual conceptual design elements (Elements). The locations of these various Project Elements are described in Table 1 and are shown on Figure 4. Because these Elements are in the conceptual design stage, minor changes could occur as a result of additional analysis and/or trustee/responsible agency input received during future advanced design phases. In general, minor changes to the Project Elements would neither change their intended purpose nor would they be anticipated to result in a substantial change in associated impacts from those discussed, analyzed and presented in this document.

Table 1. SJMRCDI Project Conceptual Design Elements Conceptual Design Elements. Elements 1-5 are part of Design Goal 1 and Elements 6-8 are part of Design Goal 2 (Moffat and Nichols 2020).

Element		Location	Goal	Equipment
1	Replace existing open pipe with culvert and slide gate	Existing levee between Middle Marsh and Lower Marsh	Control water movement from the Middle Marsh to the Lower Marsh to maintain Middle Marsh refugia in dry years and expand habitat in the Lower Marsh in wet years.	Excavation equipment, concrete and delivery trucks

Element		Location	Goal	Equipment
2	Restore or replace a non-functioning outlet to San Diego Creek	Existing non-functioning south culvert between the Lower Marsh and San Diego Creek	Restore a viable connection through the south culvert, between the Lower Marsh and San Diego Creek allowing water circulation and discharge during extreme flood events. Provide future capability for flow from San Diego Creek into the Marsh with future sea level rise.	Excavation equipment, delivery trucks, vacuum truck
3	Excavate a curvilinear swale	Along the lower 2/3rds of the Lower Marsh, beginning below a new raised berm defining an upper pooled area to the restored South Culvert draining to San Diego Creek	Create swale to concentrate and direct water, allow wetland habitat to persist during wet years, and provide directed drainage during flood years. Protect in place deeper pooled areas along the upper, west edge of the Lower Marsh by allowing a rise in elevation prior to the beginning of the swale directing water to the drainage culvert. Funding permitting, possible broadening of the swale on marsh side of South Culvert, to function as additional habitat and to accommodate future sedimentation.	Excavation equipment marsh buggy, backhoe, front-end loader, grader
4	Install culvert with slide gate	Between Hoag Pond and Experimental Pond 3	Increase the function of Hoag Pond as an optional water source for the Experimental Pond pipe network through the Pond 3 connection to the system. It is the most suitable cell due to its large area and depth, and it is adjacent to San Diego Creek.	Excavation equipment, concrete and delivery trucks
5	Raise berm	Between Hoag Pong and Experimental Pond 3	Increase the water capacity and water surface elevation of Hoag Pond and Experimental Pond 3 to support wetland habitat in these areas, in addition to passive flow to other connected Experimental Ponds when needed.	Dump trucks, front-end loader, backhoe, grader
6	Raise berm and modify or replace the existing culvert	Along Middle Marsh berm road and existing headwall at Middle Marsh slide gate leading to Seasonal Marsh.	Allow the Middle Marsh to fill to capacity without overtopping its existing headwall.	Concrete and delivery trucks, front-end loader, backhoe, grader
7a	Install water measurement sensor	Existing IRWD Inlet in the Upper Marsh adjacent to Campus Drive.	Measure water quantity coming from IRWD.	Hand tools

Element		Location	Goal	Equipment
7c	Convey IRWD water more directly to the Experimental Pond pipe network by installing pipe(s) or a swale.	From the Campus Drive culvert at the Upper Marsh gate (7c), determine the best path from the existing Upper Marsh swale, under the dirt road separating the Upper Marsh and Seasonal Marsh, to a lower pooled area in the southwest corner of Seasonal Marsh. From this pooled area, water would be pumped through a newly installed pipe (with one-way flap) under the road to a connection with the existing Experimental Pond pipe network. The connection to the Experimental Pond pipe network may be established by going through Pond 10 or the Middle Marsh, whichever is deemed most effective and least impactful to existing habitat.	Enable the conveyance of water from IRWD to the Experimental Ponds pipe network, allowing for semi-permanent to perennial wetland/pond conditions in this area without needing to first fill the Middle Marsh. Minimize long term habitat impacts and maintenance costs.	Delivery trucks, excavation equipment, marsh buggy, backhoe, front-end loader, grader
7b	Install headwall w/ gate	From the Campus Drive culvert at the Upper Marsh gate (7c), determine the best divergence point from the existing Upper Marsh swale to establish a headwall and gate to convey water under the dirt road separating the Upper Marsh and Seasonal Marsh. The best stretch of existing swale to add a connection under the road is approximately 75 ft- 250 ft down steam of the existing swale. Net excess excavation material can be beneficially re-used to create a low-profile island in the Middle Marsh.	Improve the distribution of water from IRWD to the Experimental Ponds more directly, bypassing the Middle Marsh. A slide gate will connect a pooled swale or pipe from Upper Marsh or Seasonal Marsh to a pipe in Pond 10 or the Middle Marsh leading to the culvert at the end of the Experimental Pond pipe network. The Experimental Ponds are managed as semi-permanent marsh and perennial ponds, and thus need to receive water later in the year than other marsh areas. This is also important for managing mosquito populations to not have all units filled year-round. The Middle Marsh island can provide a dry habitat area for turtles and birds.	Excavation equipment, concrete and delivery trucks
8	Expand and modify Water Catchment Basin and Pond 1 area		Allow for greater capacity adjacent to the existing Water Catchment Basin and Pond 1.	Excavation Front-end loader, backhoe

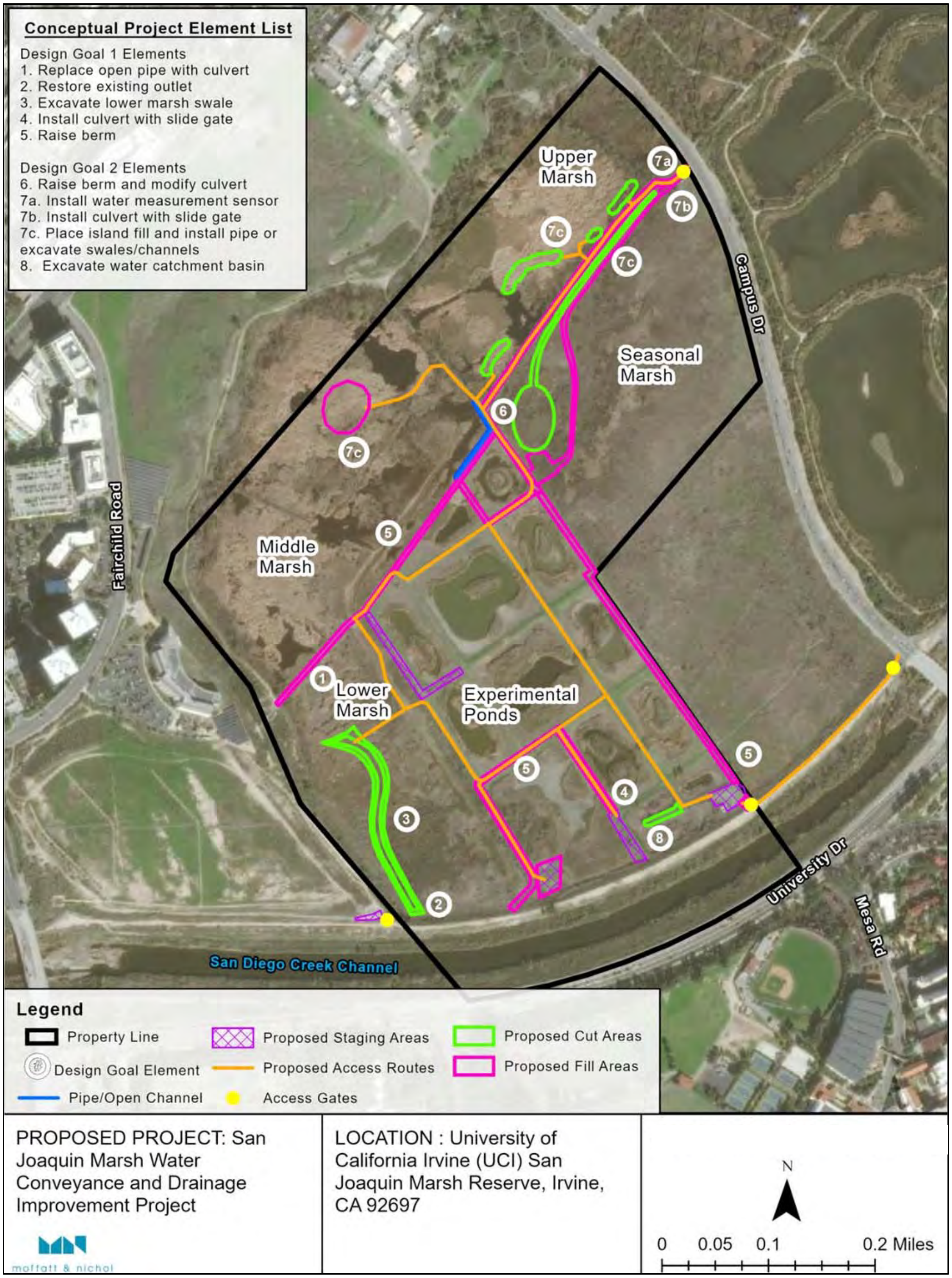

Figure 4. Project elements map (Moffatt and Nichol 2020)

PROJECT PERSONNEL

Cogstone Resource Management, Inc. (Cogstone) conducted the cultural and paleontological resources study. Resumes of key personnel are provided in Appendix A.

- John Gust, Registered Professional Archaeologist (RPA), served as the Principal Investigator for Archaeology, supervising all work, and co-authored this report. Dr. Gust has a Ph.D. in Anthropology from the University of California (UC), Riverside and an M.A. in Geography from the University of Colorado, Colorado Springs and has more than eight years of experience in archaeology.

- Sandy Duarte conducted the intensive pedestrian survey and co-authored this report. Ms. Duarte holds a B.A. in Anthropology from the UC Santa Barbara, and has more than 15 years of experience in southern California archaeology.

- Logan Freeberg conducted the archaeological record search and prepared the maps for the report. Mr. Freeberg has a certificate in Geographic Information Systems (GIS) from California State University, Fullerton and a B.A. in Anthropology from UC Santa Barbara and has more than 15 years of experience in southern California archaeology.

- Shannon Lopez completed the additional sources consulted and drafted portions of this report. Ms. Lopez holds an M.A. from CSU Fullerton and has more than two years of experience as an architectural historian.

- Desireé Martinez, RPA provided QA/QC for this Project. Ms. Martinez has an M.A. in Anthropology (Archaeology) from Harvard University, Cambridge and has over 24 years of experience in southern California archaeology.

REGULATORY ENVIRONMENT

FEDERAL LAWS AND REGULATIONS

The Project requires a Clean Water Act Section 404 permit from the USACE due to the proximity of the federally managed San Diego Creek. As such this Project must also comply with Section 106 of the NHPA.

NATIONAL ENVIRONMENTAL POLICY ACT

The National Environmental Policy Act (NEPA) directs federal agencies to use all practicable means to “Preserve important historic, cultural, and natural aspects of our national heritage…”.

If the presence of a significant environmental resource is identified during the scoping process, federal agencies *and* their agents must take the resource into consideration when evaluating project effects.

NATIONAL HISTORIC PRESERVATION ACT

The National Historic Preservation Act (NHPA) is the primary federal law governing the preservation of cultural and historic resources in the United States. The law establishes a national preservation program and a system of procedural protections which encourage the identification and protection of cultural and historic resources of national, state, tribal and local significance. A primary component of the act requires that federal agencies take into consideration actions that could adversely affect historic properties listed or eligible for listing on the National Register of Historic Places, known as the Section 106 Review Process.

NATIONAL REGISTER OF HISTORIC PLACES

The National Register of Historic Places is the nation's official list of buildings, structures, objects, sites, and districts worthy of preservation because of their significance in American history, architecture, archeology, engineering, and culture. The National Register recognizes resources of local, state and national significance which have been documented and evaluated according to uniform standards and criteria.

Authorized under the National Historic Preservation Act of 1966, the National Register is part of a national program to coordinate and support public and private efforts to identify, evaluate, and protect historic and archeological resources. The National Register is administered by the National Park Service, which is part of the U. S. Department of the Interior.
To be eligible for listing in the National Register, a resource must meet at least one of the following criteria:

A. Is associated with events that have made a significant contribution to the broad patterns of our history
B. Is associated with the lives of persons significant in our past
C. Embodies the distinctive characteristics of a type, period or method of construction, or represents the work of a master, or possesses high artistic values, or represents a significant and distinguishable entity whose components may lack individual distinction
D. Has yielded, or may be likely to yield, information important in history or prehistory

ANTIQUITIES ACT

The Antiquities Act states, in part: That any person who shall appropriate, excavate, injure or destroy any historic or prehistoric ruin or monument, or any object of antiquity, situated on lands owned or controlled by the Government of the United States, without the permission of the Secretary of the Department of the Government having jurisdiction over the lands on which said antiquities are situated, shall upon conviction, be fined in a sum of not more than five hundred dollars or be imprisoned for a period of not more than ninety days, or shall suffer both fine and imprisonment, in the discretion of the court.

STATE LAWS AND REGULATIONS

CALIFORNIA ENVIRONMENTAL QUALITY ACT

CEQA states that: It is the policy of the state that public agencies should not approve projects as proposed if there are feasible alternatives or feasible mitigation measures available which would substantially lessen the significant environmental effects of such projects, and that the procedures required are intended to assist public agencies in systematically identifying both the significant effects of proposed project and the feasible alternatives or feasible mitigation measures which will avoid or substantially lessen such significant effects.

CEQA declares that it is state policy to: “take all action necessary to provide the people of this state with...historic environmental qualities.” It further states that public or private projects financed or approved by the state are subject to environmental review by the state. All such projects, unless entitled to an exemption, may proceed only after this requirement has been satisfied. CEQA requires detailed studies that analyze the environmental effects of a proposed project. In the event that a project is determined to have a potential significant environmental effect, the act requires that alternative plans and mitigation measures be considered.

TRIBAL CULTURAL RESOURCES

As of 2015, CEQA established 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). In order to be considered a “tribal cultural resource,” a resource must be either:

(1) listed, or determined to be eligible for listing, on the national, state, or local register of historic resources, or

(2) a resource that the lead agency chooses, in its discretion, to treat as a tribal cultural resource.

To help determine whether a project may have such an effect, the lead agency must consult with any California Native American tribe that requests consultation and is traditionally and culturally affiliated with the geographic area of a proposed project. If a lead agency determines that a project may cause a substantial adverse change to tribal cultural resources, the lead agency must consider measures to mitigate that impact. Public Resources Code §20184.3 (b)(2) provides examples of mitigation measures that lead agencies may consider to avoid or minimize impacts to tribal cultural resources.

PUBLIC RESOURCES CODE

Section 5097.5: No person shall knowingly and willfully excavate upon, or remove, destroy, injure or deface any historic or prehistoric ruins, burial grounds, archaeological or vertebrate paleontological site, including fossilized footprints, inscriptions made by human agency, or any other archaeological, paleontological or historical feature, situated on public lands (lands under state, county, city, district or public authority jurisdiction, or the jurisdiction of a public corporation), except with the express permission of the public agency having jurisdiction over such lands. Violation of this section is a misdemeanor. As used in this section, "public lands" means lands owned by, or under the jurisdiction of, the state, or any city, county, district, authority, or public corporation, or any agency thereof.

CALIFORNIA REGISTER OF HISTORICAL RESOURCES

The California Register of Historical Resources (CRHR) is a listing of all properties considered to be significant historical resources in the state. The California Register includes all properties listed or determined eligible for listing on the National Register, including properties evaluated under Section 106, and State Historical Landmarks No. 770 and above. The California Register statute specifically provides that historical resources listed, determined eligible for listing on the California Register by the State Historical Resources Commission, or resources that meet the California Register criteria are resources which must be given consideration under CEQA (see above). Other resources, such as resources listed on local registers of historic resources or in local surveys, may be listed if they are determined by the State Historic Resources Commission to be significant in accordance with criteria and procedures to be adopted by the Commission and are nominated; their listing in the California Register is not automatic.

Resources eligible for listing include buildings, sites, structures, objects, or historic districts that retain historical integrity and are historically significant at the local, state or national level under one or more of the following four criteria:

1) It is associated with events that have made a significant contribution to the broad patterns of local or regional history, or the cultural heritage of California or the United States;
2) It is associated with the lives of persons important to local, California, or national history;
3) It embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of a master or possesses high artistic values; or
4) It has yielded, or has the potential to yield, information important to the prehistory or history of the local area, California, or the nation.

In addition to having significance, resources must have integrity for the period of significance. The period of significance is the date or span of time within which significant events transpired, or significant individuals made their important contributions. Integrity is the authenticity of a historical resource's physical identity as evidenced by the survival of characteristics or historic fabric that existed during the resource's period of significance.

Alterations to a resource or changes in its use over time may have historical, cultural, or architectural significance. Simply, resources must retain enough of their historic character or appearance to be recognizable as historical resources and to convey the reasons for their significance. A resource that has lost its historic character or appearance may still have sufficient integrity for the California Register, if, under Criterion 4, it maintains the potential to yield significant scientific or historical information or specific data.

NATIVE AMERICAN HUMAN REMAINS

Sites that may contain human remains important to Native Americans must be identified and treated in a sensitive manner, consistent with state law (i.e., Health and Safety Code §7050.5 and Public Resources Code §5097.98).

In the event that human remains are encountered during project development and in accordance with the Health and Safety Code Section 7050.5, the County Coroner must be notified if potentially human bone is discovered. The Coroner will then determine within two working days of being notified if the remains are subject to his or her authority. If the Coroner recognizes the remains to be Native American, he or she shall contact the Native American Heritage Commission (NAHC) by phone within 24 hours, in accordance with Public Resources Code Section 5097.98. The NAHC will then designate a Most Likely Descendant (MLD) with respect to the human remains. The MLD then has the opportunity to recommend to the property owner or the person responsible for the excavation work means for treating or disposing, with appropriate dignity, the human remains and associated grave goods.

CALIFORNIA ADMINISTRATIVE CODE, TITLE 14, SECTION 4307

This section states that "No person shall remove, injure, deface or destroy any object of paleontological, archeological or historical interest or value."

BACKGROUND

ENVIRONMENTAL SETTING

The Project Area is in the northern extent of the California Geomorphic Province known as the Peninsular Ranges. The Peninsular Ranges geomorphic province extends from Mount San Jacinto in the north, through the tip of Baja, Mexico in the south. Subparallel to these ranges on the east is the San Andreas Fault Zone. The northwestwards motion of the Pacific Plate has created these ranges and their corresponding valleys (Wagner 2002).

Marsh Reserve is a depressional wetland complex that covers approximately 199 acres and is a remnant of a once more extensive fresh and brackish water wetland. The Marsh Reserve area consists of seasonal shallow marsh, deeper, semi-permanent marsh, shallow ponds, and adjacent upland buffers. Depending on water availability, the marsh generally supports approximately 30 acres of open water, 30 acres of shallow ponds, and 70 acres of shallow and deep semi-permanent emergent marshlands (Moffatt and Nichol 2020).

The Marsh Reserve consists of six distinct areas: Seasonal Marsh, Upper Marsh, Middle Marsh, Lower Marsh, Hoag Pond, and Experimental Ponds (Figure 4). Historically, the Marsh Reserve was ground water fed with no Creek input. When the Tustin Plain was drained due to agricultural practices in the early 1900's, San Diego Creek expanded and could flow past a former natural barrier to Newport Bay along the western edge of the Marsh Reserve. In the 1960's, groundwater pumping depleted shallow water aquifers, and the flow of San Diego Creek was channelized to the east end of the Marsh Reserve severing direct overland flow connection. The Marsh Reserve is bordered by the Irvine Ranch Water District (IRWD) and Campus Drive to the east, a decommissioned and closed county landfill to the west, undeveloped land, UCI Arboretum, and UCI support service facilitates to the north, and San Diego Creek to the south (Figures 1 and 3). The Marsh Reserve retains riparian water rights to San Diego Creek and owns the segment of the Creek immediately adjacent to the Experimental Ponds, Hoag Pond, and the Lower Marsh (Moffatt and Nichol 2020).

PREHISTORIC SETTING

Approaches to prehistoric frameworks have changed over the past half century from being based on material attributes to radiocarbon chronologies to association with cultural traditions. A large part of what was previously referred to as the Millingstone Period is now called the Topanga pattern of the Encinitas Tradition. The latest cultural revisions for the APE define traits for time phases of the Topanga pattern of the Encinitas Tradition applicable to coastal Los Angeles and Orange counties (Sutton and Gardner 2010; Table 2). This pattern is replaced in the APE by the Angeles pattern of the Del Rey Tradition later in time (Sutton 2010).

Topanga Pattern groups were relatively small and highly mobile. Sites tend to be along the coast in wetlands, bays, coastal plains, near-coastal valleys, marine terraces and mountains. The Topanga toolkit is dominated by manos and metates with projectile points scarce (Sutton and Gardner 2010: 9).

In Topanga Phase I other typical characteristics were a few mortars and pestles, abundant core tools (scraper planes, choppers, and hammerstones), relatively few large, leaf-shaped projectile points, cogged stones, and early discoidals (Table 2). Secondary inhumation under cairns was the common mortuary practice. In Orange County as many as 600 flexed burials were present at one site and dated 6,435 calibrated radiocarbon years before present (Sutton and Gardner 2010: 9, 13).

In Topanga Phase II, flexed burials and secondary burial under cairns continued. Adoption of the mortar and pestle is a marker of this phase. Other typical artifacts include manos, metates, scrapers, core tools, discoidals, charmstones, cogged stones, and an increase in the number of projectile points. In Orange County stabilization of sea level during this time period resulted in increased use of estuary, near shore and local terrestrial food sources (Sutton and Gardner 2010: 14-16).

Table 2. Culture Change Chronology

Pattern	Phase	Dates (BP)	Material Traits	Other Traits
Encinitas	Topanga I	8,500 to 5,000	Abundant manos and metates, many core tools and scrapers, few but large points, charmstones, cogged stones, early discoidals, bone gorge fishhooks, faunal remains rare; *Olivella* spire/end lopped beads appear	Estuary/lagoon shellfish and sharks/rays common, hunting important, secondary burials under metate cairns (some with long bones only), some extended inhumations, no cremations
	Topanga II	5,000 to 3,500	Abundant but decreasing manos and metates, adoption of mortars and pestles, smaller points, cogged stones, late discoidals, fewer scraper planes and core tools, some stone balls and charmstones; inhumations common; Olivella Grooved Rectangular beads introduced	Estuary/lagoon shellfish and sharks/rays common,, addition of acorns, reburial of long bones only, addition of flexed inhumations (some beneath metate cairns), cremations rare
Angeles	Angeles I	3,500 to 2,600	Appearance of Elko dart points and an increase in the overall number of projectile points from Encinitas components; beginning of large-scale trade in small steatite artifacts (effigies, pipes, and beads) and *Olivella* shell beads; appearance of single-piece shell fishhooks and bone harpoon points; Coso obsidian becomes important; appearance of donut stones; appearance of *Mytilus* beads	Apparent population increase; fewer and larger sites along the coast; collector strategy; less overall dependence on shellfish but fishing and terrestrial hunting more important; appearance of flexed and extended inhumations without cairns, cremations uncommon
	Angeles II	2,600 to 1,600	Continuation of basic Angeles I material culture with the addition of mortuary features containing broken tools and fragmented cremated human bone; fishhooks become more common	Shellfish change to mudflat species, more emphasis on fish, birds and mammals, continuation of basic Angeles I settlement and subsistence systems; appearance of a new funerary complex
	Angeles III	1,600 to 1,250	Appearance of bow and arrow technology (e.g., Marymount or Rose Spring points); changes in *Olivella* beads; asphaltum becomes important; reduction in obsidian use; Obsidian Butte obsidian largely replaces Coso	Larger seasonal villages; flexed primary inhumations but no extended inhumations and an increase in cremations; appearance of obsidian grave goods
	Angeles IV	1,250 to 800	Cottonwood points appear; some imported pottery appears; birdstone effigies at the beginning of the phase and "spike" effigies dropped by the end of the phase; possible appearance of ceramic pipes, *Mytilus* shell disks	Change in settlement pattern to fewer but larger permanent villages; flexed primary inhumations continue, cremations uncommon

Pattern	Phase	Dates (BP)	Material Traits	Other Traits
	Angeles V	800 to 450	Trade of steatite artifacts from the southern Channel Islands becomes more intensive and extensive, with the addition or increase in more and larger artifacts, such as vessels and comals; larger and more elaborate effigies; portable mortars and pestles	Strengthening of ties, especially trade, with southern Channel Islands; expansion into the northern Santa Ana Mountains and San Joaquin Hills
	Angeles VI	450 to 150	Addition of Euroamerican material culture (e.g., glass beads and metal tools), locally made pottery, metal needle-drilled *Olivella* beads	Change of settlement pattern, movement close to missions and ranches; use of domesticated species obtained from Euroamericans; flexed primary inhumations continue; apparent adoption of Chingichngish religion

The Angeles pattern generally is restricted to the mainland and appears to have been less technologically conservative and more ecologically diverse, with a largely terrestrial focus and greater emphases on hunting and nearshore fishing. In Angeles Phase I Elko points for atlatls or darts appear, small steatite objects such as pipes and effigies are found, shell beads and ornaments increase, fishing technologies increase including bone harpoons/fishhooks and shell fishhooks, donut stones appear, and hafted micro blades for cutting/graving wood or stone appear. In addition, several Encinitas traits, such as discoidals, cogged stones, plummet-like charm stones and cairn burials virtually disappear from the record. Mortuary practices changed to consist of primarily flexed primary inhumations, with extended inhumations becoming less common. Settlement patterns made a shift from general use sites being common to habitation areas separate from functional work areas. Subsistence shifted from mostly collecting to increased hunting and fishing.

The Angeles Phase II is identified primarily by the appearance of a new funerary complex, with other characteristics similar to Angeles I. The complex features killed (broken) artifacts plus highly fragmented cremated human bones and a variety of faunal remains. In addition to the cremains, the other material also often burned. None of the burning was performed in the burial feature.

The Angeles III Phase is the beginning of what has been known as the Late Period and is marked by several changes from Angeles I and II. These include the appearance of small projectile points, steatite shaft straighteners and increased use of asphaltum all reflecting adoption of bow and arrow technology, obsidian sources changed from mostly Coso to Obsidian Butte and shell beads from Gulf of California species began to appear. Subsistence practices continued as before and the geographic extent of the Angeles Pattern increased (Sutton 2010).

Angeles Phase IV is marked by new material items including Cottonwood points for arrows, *Olivella* cupped beads and *Mytilus* shell disks, birdstones (zoomorphic effigies with magico-religious properties) and trade items from the Southwest including pottery. It appears that populations increased and that there was a change in the settlement pattern to fewer but larger permanent villages. Presence and utility of steatite vessels may have impeded the diffusion of pottery into the Los Angeles Basin. The settlement pattern altered to one of fewer and larger permanent villages. Smaller special-purpose sites continued to be used.

Angeles V components contain more and larger steatite artifacts, including larger vessels, more elaborate effigies and comals. Settlement locations shifted from woodland to open grasslands. The exploitation of marine resources seems to have declined and use of small seeds increased. Inhumations contained grave goods while cremations did not.

The Angeles VI phase reflects the post-contact (i.e., post-A.D. 1542) period. One of the first changes after contact was undoubtedly population loss due to disease, coupled with resulting social and political disruption. Angeles VI material culture is essentially Angeles V augmented by a number of Euroamerican tools and materials, including glass beads and metal tools such as knives and needles (used in bead manufacture). The frequency of Euroamerican material culture increased through time until it constituted the vast majority of materials used. Locally produced brownware pottery appears along with metal needle-drilled *Olivella* disk beads.

The subsistence system was based primarily on terrestrial hunting and gathering, although nearshore fish and shellfish played important roles. Sea mammals, especially whales (likely from beached carcasses), were prized. In addition, a number of European plant and animal domesticates were obtained and exploited (Sutton 2010).

ETHNOGRAPHY

The APE is located in area that is within the traditional tribal territory of the Gabrielino-Tongva; however, the Juaneño Acjachemen also identify the APE as part of their traditional use area (Figure 5). The following provides a brief overview of the ethnography of both tribes.

GABRIELINO-TONGVA

Much of the southern California archaeological literature argues that the Gabrielino-Tongva (Tongva) moved into southern California from the Great Basin around 4,000 Before Present (B. P.), “wedging” themselves between the Hokan-speaking Chumash, located to the north, and the Yuman-speaking Kumeyaay, located to the south (see Sutton 2009 for the latest discussion).

This Shoshonean Wedge, or Shoshonean "intrusion" theory, is counter to the Gabrielino-Tongva community's knowledge about their history and origins. The Gabrielino-Tongva speak a language that is part of the Takic language family. Their territory encompassed a vast area stretching from Topanga Canyon in the northwest, to the base of Mount Wilson in the north, to San Bernardino in the east, Aliso Creek in the southeast and the Southern Channel Islands, in all an area of more than 2,500 square miles (Figure 5; Bean and Shipek 1978; McCawley 1996). At European contact, the tribe consisted of more than 5,000 people living in various settlements throughout the area. Some of the villages could be quite large, housing up to 150 people.

The Gabrielino-Tongva are considered to have been one of the wealthiest tribes and to have greatly influenced tribes they traded with (Kroeber 1925). Houses were domed, circular structures thatched with tule or similar materials (Bean and Shipek 1978:542). The best known artifacts were made of steatite and were highly prized. Many common everyday items were decorated with inlaid shell or carvings reflecting an elaborately developed artisanship (Bean and Shipek 1978:542).

The main food zones utilized were marine, woodland, and grassland (Bean and Shipek 1978). Plant foods were, by far, the greatest part of the traditional diet at contact. Acorns were the most important single food source. Villages were located near water sources necessary for the leaching of acorns, which was a daily occurrence. Grass seeds were the next most abundant plant food used along with chia. Seeds were parched, ground, and cooked as mush in various combinations according to taste and availability. Greens and fruits were eaten raw or cooked or sometimes dried for storage. Bulbs, roots, and tubers were dug in the spring and summer and usually eaten fresh. Mushrooms and tree fungus were prized as delicacies. Various teas were made from flowers, fruits, stems, and roots for medicinal cures as well as beverages (Bean and Shipek 1978:538-540).

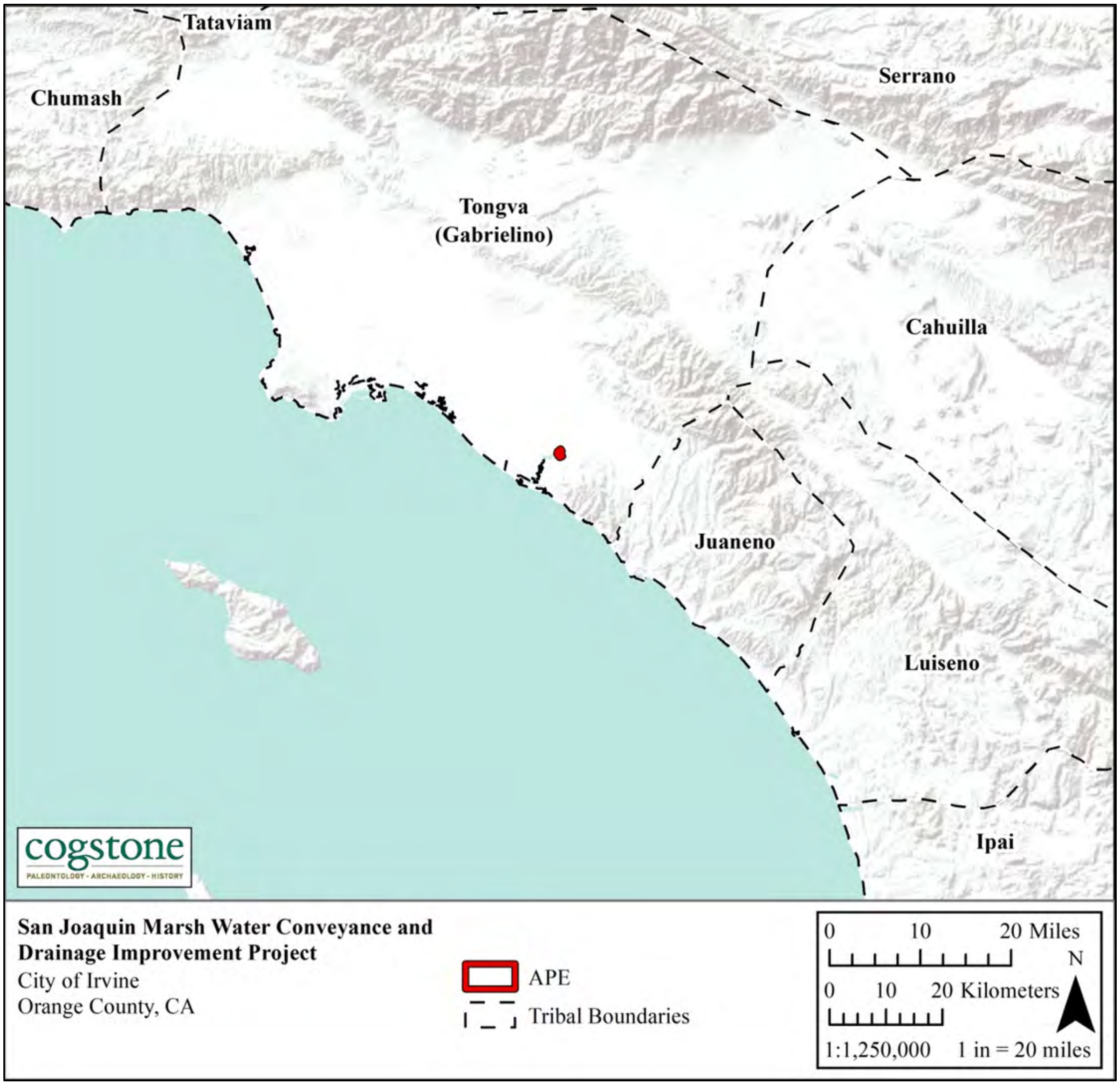

Figure 5. Native American traditional tribal territories

The APE was not home to any known major ethnohistoric villages (McCawley 1996). However, smaller villages and seasonal camps may have been present as burials have been identified and recovered at sites located to the to the west of the Project area

JUANEÑO ACJACHEMEN

About 1,300 years ago, the Acjachemen (Juaneño) were hunters and gatherers of the San Luis Rey Cultural Pattern who moved into southern Orange County. The Acjachemen speak a language that is part of the Takic language family. Their traditional tribal territory was situated partly in northern San Diego County and partly in southern Orange County. The boundaries were Las Pulgas Creek (south), Aliso Creek (north), the Pacific Ocean (west) and, the Santa Ana

Mountains (east). Villages were mostly along San Juan Creek, Trabuco Creek, and, San Mateo Creek (O'Neil and Evans 1980).

The Acjachemen had a patrilineal society and lived in groups with other relatives. These groups had established claims to places including the sites of their villages and resource areas. They usually arranged their marriages from outside villages, which established a social network of related peoples in the region. There was a well-developed political system including a hereditary chief. Religion was an important aspect of their society. Religious ceremonies included rites of passage at puberty and mourning rituals (Kroeber 1976).

HISTORIC SETTING

Juan Cabrillo was the first European to sail along the coast of California in 1542 and was followed in 1602 by Sebastian Vizcaino (Bean and Rawls 1993). During the Spanish colonial period between 1769 and 1822, the Spanish established missions, presidios and pueblos (McCawley 1996).

In 1821, Mexico won its independence from Spain and worked to lessen the wealth and power held by the missions. The Secularization Act was passed in 1833, giving the vast mission lands to the Mexican governor and downgrading the missions' status to that of parish churches. The governor then redistributed the former mission lands in the form of grants, to private owners. Ranchos in California numbered over 500 by 1846, all but approximately 30 of which resulted from land grants (Bean and Rawls 1993).

The APE is within the former Rancho San Joaquin (Figure 6), a land grant issued to Don Jose Sepulveda in 1837. The land grant issued by the Mexican government incorporated approximately 50,000 acres of the former San Juan Capistrano mission lands. In 1864 Jose Sepulveda sold the rancho to James Irvine and the Flint, Bixby & Company (City of Irvine 2004).

In 1876, James Irvine bought out his partners in Flint, Bixby and Company, and became the sole owner of what became known as the Irvine Ranch and continued as a ranching operation for many years. James Irvine and James McFadden played pivotal roles in the history of the City of Irvine. James Irvine was the largest landholder in the region and was interested in identifying the most lucrative agricultural uses for the enormous tract of land. When he died in 1886, James Irvine II took control of the ranch and increased its agricultural production. In 1894 James Irvine II incorporated the land holdings as the Irvine Company.

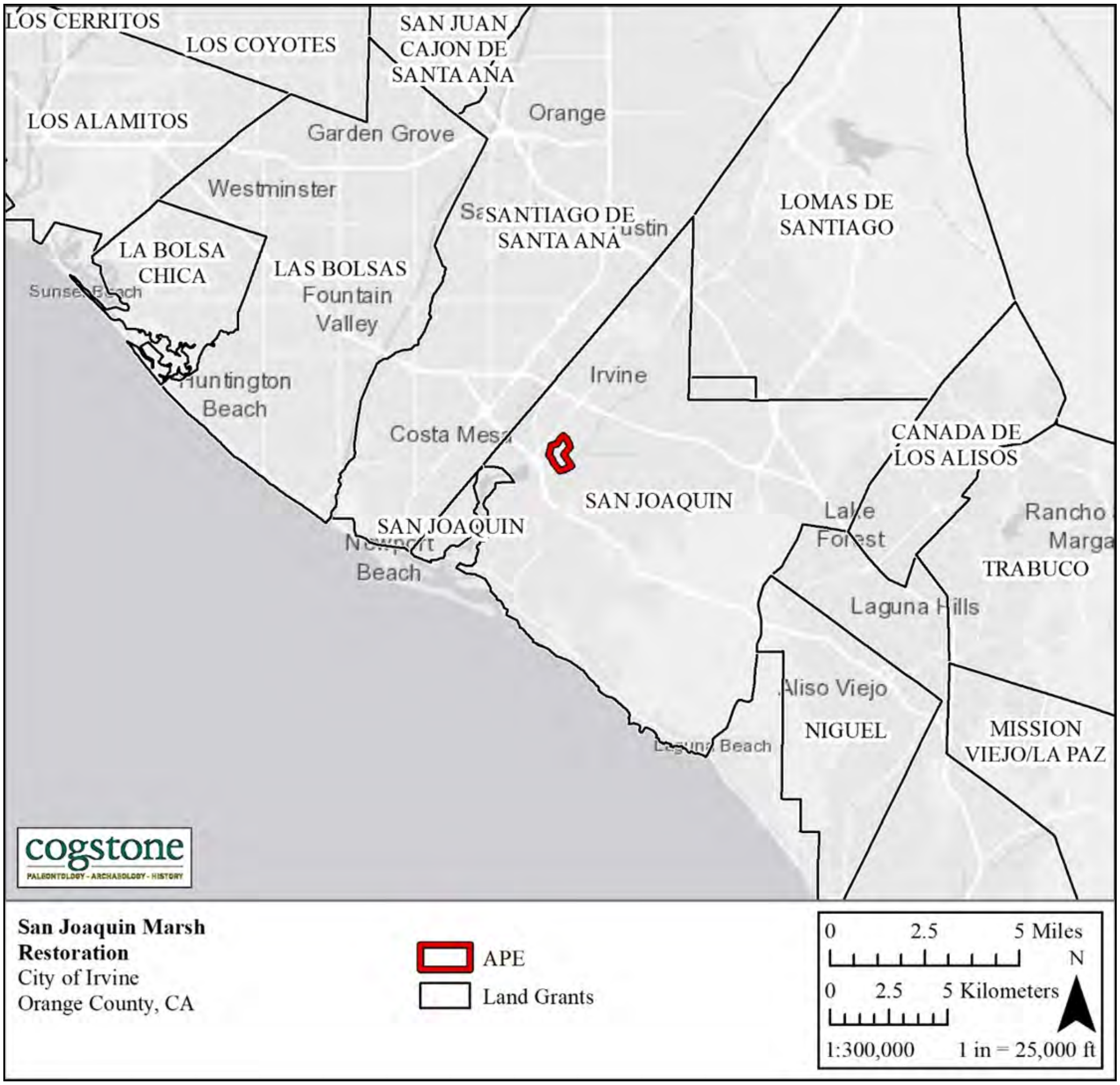

Figure 6. Land Grants map

APE History

The UC NRS San Joaquin Marsh Reserve Wildlife Habitat

A large section of what is now known as the Marsh Reserve was converted from marshland into farmland in the 1930s. From ca. 1930-1988 the San Joaquin Marsh was leased by the San Joaquin Gun Club as a duck-hunting site (Roskey 1970). It is surmised by visual inspection of historic aerial photographs that the land was used as farmland and by the San Joaquin Gun Club concurrently in the 1930s (FrameFinder 1930s). The San Joaquin Gun Club was founded in part by Count Von Schmidt in 1890 (Lovret 2009); the original location of the gun club is not known, however, it was moved in ca. 1930 (Tustin 1932). The gun club buildings were located outside of the APE and have since been demolished. In ca. 1960, the farmland was divided into a grid-like pattern and multiple ponds were constructed as a wildlife habitat for the benefit of duck hunters. According to historic aerial photographs and blueprints for planned marsh enhancements dated 1999, the duck ponds are present by 1960 (FrameFinder 1960) but were later changed to their current configuration sometime between 1999 and 2002 (NETROnline 2002, Nobel 1999).

In 1969, the marsh was sold to UC NRS, which intended to use the land to establish a wildlife preserve. However, immediately thereafter the university entered into negotiations with the gun club to lease part of the land during the hunting season (Roskey 1970). The money generated by the lease agreement was used by the University to help maintain the land. Now called the San Joaquin Duck Club, the San Joaquin Gun Club operated under permits from the Department of Fish and Game and the City of Irvine until 1988, when the City chose not to renew the permit in light of the rapidly developing residential community in the area (Mehta 2000).

SOURCES CONSULTED

CULTURAL RECORDS SEARCH

The purpose of the records search is to identify all previously recorded cultural resources (prehistoric and historic archaeological sites, historic buildings, structures, objects, or districts) within the APE. All cultural resources as well as cultural resource surveys performed within the city boundaries were reviewed.

Dr. John Gust, Cogstone Principal Investigator for Archaeology, requested a search for archaeological and historical records of the California Historical Resource Inventory System (CHRIS) from the South Central Coastal Information Center (SCCIC) located on the campus of California State University, Fullerton. The APE is approximately 199 acres located within the Tustin, CA USGS 7.5' topographic quadrangle map as is the entirety of the one-mile search radius around the APE. The results of the record search indicated that 15 studies have been completed previously within the APE and 141 additional cultural resource investigations have been completed previously within a one-mile radius of the APE (Appendix C).

The records search also determined three previously recorded resources are located within the APE boundaries. In addition, 40 other cultural resources are located within a one-mile radius of the APE. These include 28 prehistoric archaeological sites, five multicomponent sites (both prehistoric and historic), five historic isolates, and five historic architectural resources (Table 3).

Table 3. Cultural Resource Sites

Primary no. (P-30-)	Trinomial no. (CA-ORA-)	Resource Type	Year Recorded	Distance From APE (in miles)
000054	000054	Prehistoric archaeological site	1929	0.5-1.0
000055	000055	Prehistoric archaeological site	1949	0.5-1.0
000056	000056	Prehistoric archaeological site	1949, 1991	0.5-1.0
000057	000057	Multicomponent archaeological site	1949, 1949, 1984, 1985, 1991, 1993	Within-0.25
000092	000092	Prehistoric archaeological site	1966	0.5-1.0
000111	000111/H	Prehistoric archaeological site	1934, 1938, 1950, 1951, 1977	0.5-1.0
000115	000115	Prehistoric archaeological site	1963, 1966, 1976, 1985	Within-0.25
000116	000116	Prehistoric archaeological site	1963, 1976, 1985, 2000	0-0.25
000117	000117	Prehistoric archaeological site	1963, 1988	0-0.25
000118	000118	Prehistoric archaeological site	1963, 1976	0-0.25
000119	000119	Prehistoric archaeological site	1963, 1966, 1984	0.25-0.5
000120	000120	Prehistoric archaeological site	1963, 1974	0-0.5
000121	000121/H	Multicomponent archaeological site	1963, 1966, 1970, 1985, 1991, 1993, 1996, 1998	Within-1.0
000179	000179	Prehistoric archaeological site	1966	0.5-1.0
000180	000180	Prehistoric archaeological site	1966	0.5-1.0
000192	000192	Prehistoric archaeological site	1966, 1972, 1991	0.5-1.0
000195	000195	Prehistoric archaeological site	1967	0.5-1.0
000196	000196/H	Multicomponent archaeological site	1967, 1993, 1996	0.5-1.0
000197	000197	Multicomponent archaeological site	1967, 1977	0.5-1.0
P-30-000206	000206	Prehistoric archaeological site	1966, 1981, 1994	0.5-1.0
P-30-000218	000218	Prehistoric archaeological site	1966, 1976, 1976, 1985, 2008	0.5-1.0
000351	000351	Prehistoric archaeological site	1972, 1991	0.5-1.0
000552	000552	Prehistoric archaeological site	1976	0-0.25
000575	000575	Prehistoric archaeological site	1975, 1981	0.25-0.5
001041	001041	Prehistoric archaeological site	1983, 1999, 2008	0.5-1.0
001120	001120	Prehistoric archaeological site	1988, 2008	0.5-1.0
001223	001223	Prehistoric archaeological site	1990	0.5-1.0
001358	001358	Prehistoric archaeological site	1993, 2008	0.5-1.0
001487	001487H	Prehistoric archaeological site	1997	0.5-1.0
001488	001488	Multicomponent archaeological site	1997	0.5-1.0
001681	001681H	Historic built environment	1981	0.25-0.5
100161		Historic isolate	1997	0.5-1.0
100162		Prehistoric archaeological site	1997	0.5-1.0
100163		Historic isolate	1997	0.5-1.0
100164		Historic isolate	1997	0.5-1.0
100165		Historic isolate with undated bone fragment	1997	0.25-0.5
100166		Historic isolate	1997	0.25-0.5
100167		Prehistoric archaeological site	1997	0.25-1.0
100469		Prehistoric archaeological site	1990	0.5-1.0
161710		Historic district	1977	0.5-1.0
162289		Historic building, historic district element	1976, 1983, 1984	0.5-1.0
162290		Historic building, historic district element	1978, 1983	0.5-1.0

Primary no. (P-30-)	Trinomial no. (CA-ORA-)	Resource Type	Year Recorded	Distance From APE (in miles)
177617		Historic building	2015	0.5-1.0

P-30-000057/CA-ORA-000057

P-30-000057/CA-ORA-57 is a multicomponent archaeological site consisting of two loci, A and B. The locus boundaries have shifted as the site was revisited on multiple occasions and due to development of the surrounding area. Until 1993, the resource was described as being situated on two knolls above the Marsh Reserve (De Barros 1991, McKenna 1993). Locus A is currently recorded as being located near the southeast corner of Southeast Bristol Street and Jamboree Road. Locus B is located 0.5 miles east of Locus A, within with Marsh Reserve , includes a short segment of San Diego Creek, and is contained almost completely with the APE (Figure 7).

The site was first investigated by John Winterbourne in 1935 for the Works Progress Administration (WPA). The site was said to involve two knolls overlooking Upper Newport Bay. The southernmost knoll was occupied by the San Joaquin Gun Club. In 1938, Winterbourne excavated 12 trenches and four plots. He discovered three Native American burials, 13 manos, nine projectile points (two obsidian), seven bone awls, five shell beads (four Olivella and one Cowry), three pestles, one plummet, three scrapers, one cogstone, 22 hammerstones, and one core. In addition, one shell bracelet was recovered in close proximity to one of the burials.

The first site record for the resource was completed on April 28, 1949 by Briggs (first name not known). They describe the site as a "shell mound" where Palisades Road intersects the north bluff line of upper Newport Bay. Excavations were not conducted and the trinomial CA-ORA-57 (P-30-000057) was assigned to this site.

On November 27, 1949, H. & J. Eberhardt revisited the site and completed a second site form. Eberhardt describes the shell midden located immediately south of the intersection of "Palisades Drive" and Santa Ana Avenue. He also describes part of the site as being destroyed.

On April 8, 1985, M. Macko surveyed, surface collected and recorded the site as originally described, covering two knolls separated by a deep erosion channel/arroyo. The northern knoll was destroyed by construction of the Bristol St. extension (now MacArthur Blvd. South) (De Barros and Koerper 1990).

On March 18, 1991, P. De Barros with Chambers Group, Inc. surveyed and tested the site. De Barros indicated that the site had been heavily damaged by development and surface collecting (De Barros 1991).

On July 14, 1993, Jeanette A. McKenna with Chambers Group, Inc. surveyed and updated the historic component for the remains of the 1890-1945 San Joaquin Gun Club (within Locus A), once consisting of up to eight structures, and associated duck ponds (Locus B, McKenna 1993). All buildings in Locus A have been demolished.

The resource was also designated as CA-ORA-77 but was found to be indistinct from CA-ORA-57. The entirety of the resource was subsumed by CA-ORA-57 in 2013 and the CA-ORA-77 designation was retired.

P-30-000115/CA-ORA-000115

Prehistoric archaeological site P-30-000115/CA-ORA-000115 consists of two loci, A and B. The edge of Locus B is in the APE. When first recorded by the University of California in April 1963, Locus A was recorded as a midden with sparse shell, and Locus B was described simply as a shell midden (King 1963a, b). PCAS revaluated Locus B in 1966 finding groundstone and bowl fragments, and primarily water-derived faunal material (Van Hook 1966b). When re-surveyed in August 1976, Howard Jones (1976a, b) found four mano fragments, a metate fragment, three scrapers, utilized flakes, and fire-cracked rocks in Locus A, and the area was described as favorable for excavation. That same month, Jones (1976a, b) found shell midden material in Locus B and described it as favorable for excavation as well. Construction of campus buildings later destroyed much of Locus A. J. Brock of the Archaeology Advisory Group revaluated both loci in 1985 (1985b, c), noting that some material may remain in peripheral areas of Locus A. Brock described Locus B as in good condition with a midden and limited chert lithic material, noting also that vegetation limited visibility.

P-30-000121/CA-ORA-000121/H

The southern edge of multicomponent site P-30-000121/CA-ORA-000121/H was previously recorded in the APE. P-30-000121 (CA-ORA-121, also sometimes recorded as CA-ORA-287) was first recorded by the Pacific Coast Archaeological Society, Inc. (PCAS) in 1963 (Long and Schwartz 1963) as a possible village site based on the presence of a shell midden. When revaluated in 1966 by PCAS (Van Hook 1966a), cultural material found on site included chipped stone debris and a possible scraper, mano and metate fragments, bowl fragments, and shell. During revaluations in 1970 (Hafner and McKinney 1970) and in 1985 by J. Brock (1985a), the site was subdivided into at least two loci, and described as "picked over" respectively. In 1991, Juanita R. Shimm of RMW Paleo Associates noted a high level of disturbance at the site (Shimm 1991) and, in 1993, Petra Resources monitored grading at the site with negative results (Petra Resources 1993).

The most thorough revaluation of the site was completed by Ivan Studwick of LSA Associates, Inc. in 1996 (Strudwick 1996). Strudwick recorded the site has having three loci, with Locus A located near the southeast corner of Jamboree Road and Michelson Drive, Locus B located near and extending east of the corner of Carlson Avenue and Michelson Drive and into the APE, and Locus C located south of Campus Drive in and east of the northeast part of the APE. LSA returned in 1998 and tested Locus C and found intact midden deposits containing shell and lithic material (Strudwick 1998).

OTHER SOURCES CONSULTED

In addition to the records at SCCIC, Cogstone Resource Management consulted a variety of sources in September 2020 to obtain information regarding the cultural context of the APE (Table 5). Sources included the National Register of Historic Places (NRHP), the California Register of Historic Resources (CRHR), California Built Environment Resource Directory (BERD), California Historical Landmarks (CHL), and California Point of Historical Interest (CPHI) (Table 4).

Table 4. Additional Sources Consulted

Source	Results
National Register of Historic Places (NRHP)	Negative
Historic USGS Topographic Maps	The earliest topographic map for the APE is the 1896 Santa Ana 15' topographic map, which shows no development in this area. There are no visible alterations within the APE until 1932 (Tustin; 1:31,680), the first map that shows San Diego Creek at the southern border of the APE. By 1948 (Tustin, 1:24,000), a dike was constructed within the APE running southwest/northeast. By 1972 (Tustin, 1:24,000), the APE is labeled "Duck Ponds," and the area is subdivided by water features (ponds).
Historic US Department of Agriculture Aerial Photographs	The earliest known USDA historic aerial photograph for the APE, dated 1927, shows no structural development within the APE. What appears to be a section of the San Diego Creek can be seen running west/northeast near the southern boundary of the APE. There is no significant change within the APE until ca. 1946 when multiple dirt access roads appear, which divide the APE into 5 large sections. The 45 degree bend of the San Diego Creek located at the southern area of the APE has been realigned into a straight channel. Sometime between 1952 and 1963, additional dirt access roads appear at the southern half of the area that forms the duck ponds as seen today. By 1972, water and vegetation is present within the APE. The San Diego Creek channel has been widened and lined with concrete. No significant changes are visible within the APE from 1972 to present.

Source	Results
California Register of Historic Resources (CRHR)	Negative
Built Environment Resource Directory (BERD)	Negative
California Historical Landmarks (CHL)	Negative
Local Historic Inventories	Negative
California Point of Historical Interest (CPHI)	Negative
Bureau of Land Management (BLM) General Land Office Records	Positive; (See Table 5)

Table 5. Bureau of Land Management (BLM) General Land Office Records

Name	Accession No.	Township, Range, Section	Issue Date
Juan Pablo Peralta, Antonio Yorba, Bernardo Yorba, Heirs of Bernardo Yorba		6S, R:9W, Sec: 7	1883; Grant-Spanish/Mexican
Jose Sepulveda	CACAAA 084682	T6S, R:9W, Sec:7 T6S, R:9W, Sec:8 T6S, R:9W, Sec:17 T6S, R:9W, Sec:18	1867; Grant-Spanish/Mexican

NATIVE AMERICAN CONSULTATION

A Sacred Lands File search requested from the Native American Heritage Commission (NAHC) on September 1, 2020 indicated that there are no known sacred sites or heritage resources located within the same USGS Quadrangle, Township, Range and Section as the APE (Appendix B). The NAHC also provided a list of Native American individuals/organizations that may have knowledge of cultural resources and/or sacred lands within or near the APE. Cogstone supported Section 106 Consultations on behalf of USACE.

Letters requesting consultation were sent to the Native American individuals and organizations identified by the NAHC via certified mail on September 14, 2020. Follow-up emails were sent on September 23, 2020 and follow-up phone calls were made on October 7, 2020. As of October 30, 2020, three responses have been received from the Gabrieleño Band of Mission Indians – Kizh Nation, Gabrielino Tongva Indians of California Tribal Council, and Juaneño Band of Mission Indians Acjachemen Nation (below). No group has requested consultations for the Project.

- On September 23, 2020, Ms. Brandy Salas, Admin Specialist of the Gabrieleño Band of Mission Indians – Kizh Nation asked to provide the lead agency's contact information. Cogstone followed up with Ms. Salas request and sent her the information on November 3, 2020. Ms. Salas responded on November 4, 2020 thanking Cogstone for the information.

- On September 29, 2020, Ms. Joyce Perry, Tribal Manager of the Juaneño Band of Mission Indians Acjachemen Nation indicated that even though she is not aware of any specific cultural sites of properties in the area, it is a sensitive location. She requested Cogstone provide her with additional information regarding the 40 cultural resources within and near the project area, and the results of the pedestrian survey when they become available. On October 15, 2020, Cogstone provided Ms. Joyce Perry the information she requested. On November 5, 2020, Ms. Perry inquiring about Cogstone's recommendations for the Project. She indicated that she would wait for Cogstone's official recommendations but was inclined to recommend cultural resources and Native American monitoring.

- On October 7, 2020 per phone call, Mr. Anthony Morales, Chairperson of the Gabrielino/Tongva San Gabriel Band of Mission Indians stated the APE is culturally sensitive and is a traditional cultural property and landscape. Mr. Morales recommends archaeological and Native American monitoring for all ground disturbances in the area.

- On October 7, 2020 per phone call Mr. Robert Dorame, Chairperson of the Gabrielino Tongva Indians of California Tribal Council requested additional information on the resources within the APE, and results of the pedestrian survey. On October 15, 2020, Cogstone provided Mr. Robert Dorame the information he requested.

All Section 106 requests for information as well as a contact log are provided as Appendix B to this assessment.

SURVEY

METHODS

The survey stage is important in a Project's environmental assessment phase to verify the exact location of each identified cultural resource, the condition or integrity of the resource, and the proximity of the resource to areas of cultural resources sensitivity. All undeveloped ground surface areas within the ground disturbance portion of the APE were examined for artifacts (e.g., flaked stone tools, tool-making debris, stone milling tools or fire-affected rock), soil discoloration that might indicate the presence of a cultural midden, soil depressions and features indicative of the former presence of structures or buildings (e.g., postholes, foundations), or historic-era debris (e.g., metal, glass, ceramics). Existing ground disturbances (e.g., cutbanks, ditches, animal burrows, etc.) were visually inspected. Photographs of the APE, including ground surface visibility and items of interest, were taken with a digital camera.

RESULTS

Cogstone archaeologist Sandy Duarte surveyed the APE on October 8, 2020 (Confidential Appendix D, Figures 9, 10). Ground visibility within the APE was very poor (less than 3 percent) due to dense vegetation within the marsh and surrounding areas (Figure 7). Some areas were not accessible due to marsh and overgrowth of vegetation. The intensive pedestrian survey consisted of one- to three-meter wide transects in accessible areas. The marsh and surrounding areas are covered with sycamore trees, Arundo, Mule fat, wild tobacco, wild rye, prickly pear, and an abundance of other native and non-native flora (Figure 8).

Figure 7. Overview from southernmost point of APE, facing northwest

Figure 8. Overview of northwest boundary of APE, facing southwest

NATIONAL REGISTER/CALIFORNIA REGISTER ELIGIBILITY

To be eligible for the NRHP and/or the CRHR, a resource must:

A/1. be associated with events that have made a significant contribution to the broad patterns of history;
B/2. be associated with the lives of significant persons of the past;
C/3. embody distinctive characteristics of type, period, or method of construction or represent the work of a master, or possess high artistic value, or represent a significant and distinguishable entity those components may lack individual distinction; or
D/4. yielded or may likely yield information important in history or prehistory.

Criterion D/4 is typically applied to archaeological sites and the evaluation here follows the federal guidance in Bulletin 15: How to Apply the National register Criteria for Evaluation (NPS 2002). The bulletin states:

"Criterion D has two requirements, which must *both* be met for a property to qualify:

- The property must have, or have had, information to contribute to our understanding of human history or prehistory, and
- The information must be considered important.

Under the first of these requirements, a property is eligible if it has been used as a source of data and contains more, as yet unretrieved data. A property is also eligible if it has not yet yielded information but, through testing or research, is determined a likely source of data.

Under the second requirement, the information must be carefully evaluated within an appropriate context to determine its importance. Information is considered "important" when it is shown to have a significant bearing on a research design that addresses such areas as: 1) current data gaps or alternative theories that challenge existing ones or 2) priority areas identified under a State or Federal agency management plan."

P-30-000057(CA-ORA-57)

The current recorded boundaries of P-30-000057 have been altered greatly from when the site was first surveyed and excavated by John Winterbourne (1935, 1938) and from subsequent descriptions (Briggs 1949, Barros and Koerper 1990, De Barros 1991, Eberhardt 1949, Macko 1985) which all describe the resource as located along the bluffs above the Marsh Reserve . The former San Joaquin Gun Club buildings were added to the site record for the resource in 1985 (Macko 1985). Jeannette McKenna's 1993 revaluation of the resource added the duck ponds that are associated with the San Joaquin Gun Club and located within Marsh Reserve as Locus B.

As part of the WPA, John Winterbournes surveyed the resource in 1935, returning to excavate in 1938. He described the site as being located on two knolls of Upper Newport Bay. The southernmost knoll was occupied by then still operational San Joaquin Gun Club. In 1938, Winterbourne excavated 12 trenches and four plots. He discovered three Native American burials, 13 manos, nine projectile points (two obsidian), seven bone awls, five shell beads (four Olivella and one Cowry), three pestles, one plummet, three scrapers, one cogstone, 22 hammerstones, and one core. In addition, one shell bracelet was recovered in close proximity to one of the burials. Much of this collection has unfortunately been lost (De Barros 1991). The location of Winterbourne's 1938 excavations was later destroyed by the construction of Jamboree Road.

The first site record for the resource was completed on April 28, 1949 by Briggs who described the resource site as a "shell mound" where Palisades Road intersects the north bluff line of upper Newport Bay. Later that year Eberhardt describe a the shell midden located immediately south of the intersection of "Palisades Drive" and Santa Ana Avenue and that the site was already partially destroyed.

During M. Macko's 1985 revisit the resource was re-surveyed and surface collected and described as covering two knolls separated by a deep erosion channel/arroyo. The northern knoll was subsequently destroyed by construction of the Bristol St. extension (now MacArthur Blvd. South) (Barros and Koerper 1990).

On March 18, 1991, P. De Barros with Chambers Group, Inc. surveyed and tested the site. De Barros indicated that the site had been heavily damaged by development and surface collecting (De Barros 1991).

The San Joaquin Gun Club was first recorded during M. Macko's work in Locus A of the resource. A scatter of historic artifacts mostly dating to the 1950s was found but the gun club buildings had already been demolished. McKenna similarly found no features from the gun club building during her 1993 revisit to the resource. The duck ponds associated with the gun club were added as Locus B (1993).

THEME: HUNTING AND RECREATION (1960-1988)

The San Joaquin Gun Club operated in and near the Marsh Reserve from ca. 1930 until the 1988 when the City of Irvine declined to renew the permit for what was then called the San Joaquin Duck Club due to increasing development in the area.

In ca. 1960, Locus B was divided into a grid-like pattern and multiple ponds were constructed as a wildlife habitat for the benefit of duck hunters (Frame Finder 1960). Between 1999 and 2002 the layout of the southern duck ponds was changed to their current configuration (NETRonline 2002, Nobel 1999) and thus no longer have integrity of design. As the building from the San Joaquin Gun Club have been demolished, the duck ponds also lack integrity of association.

The San Joaquin Gun Club was used as a recreation area by residents of Irvine and the surrounding community but was one of a number of gun clubs in the area and not unique in this regard. The club was not associated with events that have made a significant contribution to the broad patterns of our history. The resource is recommended as not eligible for inclusion in the NRHP or CRHR under Criteria A/1. Similarly, no association between the resource and persons significant in our past has been found. The resource is recommended as not eligible for inclusion in the NRHP or CRHR under Criteria B/2.

NRHP/CRHR Criteria C/3 apply to buildings, objects, and structures. In the case of the San Joaquin Gun Club all of the associated buildings have been previously demolished leaving only the duck ponds extant. As the San Joaquin Gun Club building are no longer present, they cannot embody the distinctive characteristics of a type, period or method of construction, or represent the work of a master, or possess high artistic values or represent a significant and distinguishable entity whose components may lack individual distinction. The resource is recommended as not eligible for inclusion in the NRHP or CRHR under Criteria C/3.

Items of completely earthen construction, including the duck ponds, do not qualify as buildings or structures for the purposes of the NRHP or CRHR and cannot be considered for eligibility under Criteria A/1, B/2, or C/3.

The area of Winterbourne's excavation has been destroyed by the construction of Jamboree Road. The location of the collection from this work is unknown and available for further study. Results from De Barros and Koerper's excavations with Locus A indicate that that area of the site was already heavily disturbed. They recommended that the site be determined as not eligible for listing on the NRHP based on its limited research potential as it is highly disturbed, has a low yield of stone tools and vertebrate fauna, relative lack of obsidian for a residential base, and Winterbourne's 1938 collection has been lost. As this area is now the site of the Fletcher Jones Motor Car dealership any remnant potential for intact buried remains within Locus A has been lost. No prehistoric artifacts have been identified within Locus B of the resource nor has any other indication that intact prehistoric or historic deposit may be present. As testing in Locus A in 1990 yielded minimal intact cultural depth, the intact area has since been destroyed by development, the location of Winterbourne's 1938 excavation has been destroyed and the artifact collection lost, and as no evidence of prehistoric material of any kind or intact historic cultural deposits that been identified, we concur with De Barros and Koerper's (1990) assessment that P-30-000057 is unlikely to yield information important in history or prehistory and recommend that the site as not eligible for the NRHP or CRHR under Criteria D/4. A California Department of parks and Recreation (DPR)site record update is included in Appendix D.

P-30-000115 (CA-ORA-115)

Previous to this current work, P-30-000115 was last revisited in May 2019 by Edgar Alvarez of Cogstone Resource Management. During that evaluation Alvarez noted "shell at the surface, and soils that appear undisturbed indicate that subsurface archaeological deposits may be present… within P-30-000115, Locus B." This is consistent with J. Brock's (1985c) assessment that describes Locus B as "in good condition with a midden and limited chert lithic material."

Gust (2019:7) recommended "testing be conducted in this area using shovel test pits that are broadly spaced across Locus B …to evaluate the potential for significant intact buried cultural material" prior to any earth disturbing activities within the resource.

No cultural material was found during the small portion of the resource that was visited during this present work. Almost all of this resource is located on top of the bluff with only a small portion extending into the Marsh Reserve. It is possible that the resource did originally extend over the bluff, but it seems more likely that the boundary is a result of digitization of old field records. A DPR site record update with new boundary is in Appendix D.

As only a small part of the resource as previously mapped was visited, the eligibility of P-30-000115 cannot be fully evaluated. We recommend that Gust's (2019:7) recommendations for testing within the resource be retained.

P-30-000121 (CA-ORA-121)

Previous to this current work, P-30-000121 was last revisited in May 2019 by Edgar Alvarez of Cogstone Resource Management. During that evaluation Alvarez found no cultural material within the portion of Locus B of the resources surveyed.

However, during testing and analysis conducted by LSA Associates in 1998, significant intact buried deposits were identified within Locus C at the eastern end of the resource. Based on this information, Gust (2019:7) recommended P-30-000121 (CA-ORA-121) as eligible for inclusion in the NRHP under Criterion D and the CRHR under Criterion 4 as it is likely to provide important information about human history or prehistory.

As only a small portion of the resource was visited during this present work, the eligibility status of P-30-000121 cannot be reevaluated. We recommend that Gust's (2019:7) evaluation that the resource is eligible for listing in the NRHP under Criterion D and the CRHR under Criterion 4 be retained. A DPR site record update with new boundary is in Appendix D.

CULTURAL RESOURCE SENSITIVITY

The APE is within the traditional territories of both the Gabrielino-Tongva and Juaneño but the Sacred Lands File search indicated that there are no known sacred sites or heritage resources located within the APE. Portions of three previously recorded cultural resources are mapped within the APE.

The southern edges of both P-30-000115, Locus B, and P-30-000121 are mapped as slightly overlapping the northwest boundary of the APE. These sites are primarily located on the bluffs overlooking the marsh land and no cultural material was found in areas currently mapped within these sites that overlap the APE. The nearest planned ground disturbance for the proposed Project is over 390 feet (119 meters) from P-30-000115, Locus B and over 500 feet (152 meters) from P-30-000121.

The portions of P-30-000057 that are above the Marsh Reserve are highly disturbed by development. Locus B, within the Marsh Reserve and APE, contains no prehistoric cultural material or evidence of intact prehistoric or historic cultural deposits and is considered not significant.

For these reasons cultural sensitivity of the APE due to the planned Project assessed to be low.

RECOMMENDATIONS

Portions of three cultural resources are located within the APE for the proposed Project. Two of these resources, P-30-000115 and P-30-000121, are primarily located on the bluffs above the Marsh Reserve. Currently, testing is recommended for P-30-000115 to determine its NRHP/CRHR eligibility and P-30-000121 is recommended as eligible for listing on the NRHP and CRHR under Criteria D/4. As P-30-000115 and P-30-000121 are over 390 feet (119 meters) and over 500 feet (152 meters) respectively from the closest planned ground distance the planned Project will have no effect on these cultural resources.

The artifact collection from Winterbourne’s 1938 excavations at P-30-000057 has been lost, subsequent excavations yielded only minimal intact cultural deposits, and the locations of these excavations have been destroyed by development. The ponds located within Locus B have been altered from their original state and configuration, the buildings from the San Joaquin Gun Club have been demolished, and no evidence of intact historic or prehistoric deposits has been found within Locus B. For these reasons P-30-000057 (CA-ORA-57) is not significant and no cultural resources further work is recommended.

As no significant resources are likely to be affected, the Project should proceed as planned.

In the event of an unanticipated discovery, all work must be suspended within 50 feet of the find until a qualified archaeologist evaluates it. In the unlikely event that human remains are encountered during project development, all work must cease near the find immediately.

In accordance with California Health and Safety Code Section 7050.5, the County Coroner must be notified if potentially human bone is discovered. The Coroner will then determine within two working days of being notified if the remains are subject to his or her authority. If the Coroner recognizes the remains to be Native American, he or she shall contact the Native American Heritage Commission (NAHC) by phone within 24 hours, in accordance with Public Resources Code Section 5097.98. The NAHC will then designate a Most Likely Descendant (MLD) with respect to the human remains. The MLD then has the opportunity to recommend to the property owner or the person responsible for the excavation work means for treating or disposing, with appropriate dignity, the human remains and associated grave goods. Work may not resume in the vicinity of the find until all requirements of the health and safety code have been met.

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APPENDIX A. QUALIFICATIONS

JOHN GUST
Task Manager and Principal Investigator for Archaeology

EDUCATION

2016 Ph.D., Anthropology, University of California, Riverside (UCR)
2011 M.A., Anthropology, UCR
2007 M.A., Applied Geography, University of Colorado, Colorado Springs (UCCS)
2002 B.A., Anthropology, minor in Geography/Environmental Studies, UCCS

SUMMARY OF QUALIFICATIONS

Dr. Gust is a Registered Professional Archaeologist (RPA) with over 9 years of experience in field archaeology. He meets the qualifications required by the Secretary of the Interior's *Standards and Guidelines for Archaeology and Historic Preservation* and his field expertise includes pedestrian surveys, excavation monitoring, resource recording, and historic artifact analysis. Gust has managed cultural assessments for over 20 cellular tower projects and multiple assessments for construction of commercial and residential structures. He has also managed cultural resources monitoring projects for both public and private sector clients. Dr. Gust is a member of the Society for California Archaeology, Society for American Archaeology, and the American Anthropological Association.

SELECTED EXPERIENCE

Long Beach Municipal Urban Stormwater Treatment (MUST) Project, Los Angeles County, CA. In 2017, Cogstone prepared a cultural and paleontological resources assessment for the proposed construction of a stormwater facility. The project intended to improve the water quality of existing urban runoff to the Los Angeles River, and ultimately to the Long Beach Harbor. Services included pedestrian surveys, records searches, background research, built environment assessment, Native American consultation, and reporting. In 2020, Cogstone produced a Paleontological Resources Management Plan to propose effective mitigation of potential impacts to paleontological resources resulting from proposed construction of MUST and its associated Wetlands project. Sub to Michael Baker. Principal Investigator for Archaeology. 2020

Santiago Canyon Estates Fuel Mod Project, unincorporated Orange County, CA. Cogstone conducted a cultural resources assessment to determine the potential for surface cultural resources for compliance with Orange County Fire Authority's Precise Fuel Modification Plan for zones of the Santiago Canyon Estates Community. Services included a cultural resources records search, Sacred Lands File search from the Native American Heritage Commission, and conducted a reconnaissance survey. Sub to Fire Safe Council East Orange County Canyons. Principal Investigator for Archaeology. 2020

OC-44 Pipeline Rehabilitation Project, City of Newport Beach, Orange County, CA. Cogstone conducted cultural resources monitoring during ground-disturbing activities following a Cultural Resource Assessment of the APE in 2014 by Cogstone pursuant to the involvement of land managed by United States Army Corps of Engineers (Section 404 of the Clean Water Act), California Department of Fish and Wildlife, and California Coastal Commission (CCC). Although no cultural resources were identified within the APE, cultural resources and Native American monitoring were required as was stipulated in the Conditions of Approval by the CCC, as detailed in the Archaeological Construction Monitoring Treatment Plan for the project. Sub to Michael Baker. Supervisor. 2019-2020

Euclid Fueling Station Project, City of Santa Ana, Orange County, CA. Cogstone conducted a cultural resources assessment to determine the potential impacts to cultural and paleontological resources during the construction of a convenience store, associated parking, gas station, and underground fuel storage tank. The assessment was conducted to meet the requirements of CEQA with the City of Santa Ana acting as lead agency. Cogstone conducted record searches, a Sacred Lands File Search, an intensive pedestrian survey, gave mitigation recommendations, and produced a report. Sub to Sagecrest Planning + Environmental. Principal Investigator for Archaeology. 2019

SANDY DUARTE
Co-Author and Archaeologist

EDUCATION

2002 B.A., Cultural Anthropology, University of California, Santa Barbara

TRAINING AND CERTIFICATIONS

HAZWOPER Certified - Certified American Red Cross CPR; Certified American Red Cross Standard First Aid
Applied Archaeology of Southern California, USDA Forest Service, San Bernardino National Forest
Railroad Security Certified

SUMMARY OF QUALIFICATIONS

Ms. Duarte is a paleontologist and archaeologist with over 15 years of experience in paleontological and archaeological monitoring, surveying, and excavation in southern California. Duarte has experience with Native American consultation as required by Section 106 of the National Historic Preservation Act (NHPA) and under Senate Bill 18 for the protection and management of cultural resources. Duarte previously worked for the U.S. Forest Service in the Biology, Timber, and Geology Department as an archaeologist, including serving as a trained wild-land firefighter to preserve archaeological sites forest fires. Additional skills include paleontological identification, fossil preparation, artifact identification and preparation, and final report preparation.

SELECTED PROJECTS

Bell Gardens Water Reservoir Project, City of Bell Gardens, Los Angeles County, CA. Cogstone conducted a cultural and paleontological resources assessment to determine the potential impacts to cultural and paleontological resources during improvements which included a new two-million-gallon reservoir, booster pump station, well to be drilled, and other components. Services included record searches, Sacred Lands File search from the Native American Heritage Commission, and an intensive-pedestrian survey of the 1.7-acre project area. Sub to Infrastructure Engineers. Archaeologist/Co-Author. 2019-2020

OC-44 Pipeline Rehabilitation Project, City of Newport Beach, Orange County, CA. Cogstone conducted cultural resources monitoring during ground-disturbing activities following a Cultural Resource Assessment of the APE in 2014 by Cogstone pursuant to the involvement of land managed by United States Army Corps of Engineers (Section 404 of the Clean Water Act), California Department of Fish and Wildlife, and California Coastal Commission (CCC). Although no cultural resources were identified within the APE, cultural resources and Native American monitoring were required as was stipulated in the Conditions of Approval by the CCC, as detailed in the Archaeological Construction Monitoring Treatment Plan for the project. Sub to Michael Baker. Archaeologist. 2019-2020

Santiago Canyon Estates Fuel Mod Project, unincorporated Orange County, CA. Cogstone conducted a cultural resources assessment to determine the potential for surface cultural resources for compliance with Orange County Fire Authority's Precise Fuel Modification Plan for zones of the Santiago Canyon Estates Community. Services included a cultural resources records search, Sacred Lands File search from the Native American Heritage Commission, and conducted a reconnaissance survey. Sub to Fire Safe Council East Orange County Canyons. Archaeologist/Co-Author. 2020

Rockcroft Parcels, City of Malibu, Los Angeles County, CA. This study was conducted to determine the potential impacts to cultural resources during the proposed construction of a single residence. Cogstone assessed two parcels; conducted a record search, Sacred Lands File search, pedestrian survey; and produced a cultural resources assessment. The assessment complied with the requirements of CEQA and included all information required by the City of Malibu Archaeology Guidelines. Sub to Advance Construction. Archaeologist and Report Author. 2020

LOGAN FREEBERG
GIS Supervisor

EDUCATION

2018 Geographic Information Systems (GIS) Certificate, California State University, Fullerton
2003 B.A., Anthropology, University of California, Santa Barbara

SUMMARY OF QUALIFICATIONS

Mr. Freeberg has over 15 years of experience in cultural resource management and has extensive experience in field surveying, data recovery, monitoring, and excavation of archaeological and paleontological resources associated with land development projects in the private and public sectors. He has conducted all phases of archaeological work, including fieldwork, laboratory analysis, research, and reporting. Mr. Freeberg also has a strong grounding in conventional field and laboratory methods and is skilled in the use of ArcGIS.

SELECTED PROJECTS

Bell Gardens Water Reservoir Project, City of Bell Gardens, Los Angeles County, CA. Cogstone conducted a cultural and paleontological resources assessment to determine the potential impacts to cultural and paleontological resources during improvements which included a new two-million-gallon reservoir, booster pump station, well to be drilled, and other components. Services included record searches, Sacred Lands File search from the Native American Heritage Commission, and an intensive-pedestrian survey of the 1.7-acre project area. Sub to Infrastructure Engineers. GIS Supervisor. 2019-2020

Santiago Canyon Estates Fuel Mod Project, unincorporated Orange County, CA. Cogstone conducted a cultural resources assessment to determine the potential for surface cultural resources for compliance with Orange County Fire Authority's Precise Fuel Modification Plan for zones of the Santiago Canyon Estates Community. Services included a cultural resources records search, Sacred Lands File search from the Native American Heritage Commission, and conducted a reconnaissance survey. Sub to Fire Safe Council East Orange County Canyons. GIS Supervisor. 2020

State Route 108/Highway 49 and Mackey Ranch Road Intersection Improvements Project, Caltrans District 10, Tuolumne County, CA. The Chicken Ranch Rancheria of Me-Wuk Indians of California (Tribe), in partnership with the California Department of Transportation (Caltrans), proposed to replace an intersection and convert to a roundabout designed to accommodate forecasted future traffic volumes and provide an alternative access route to the Chicken Ranch Rancheria. Cogstone completed an intensive-level pedestrian survey, CHRIS records search, sacred lands file search from the NAHC, Native American consultation, consulted with local history societies and preservation groups, and produced a Historical Resources Compliance Report (HRCR) and Archaeological Survey Report (ASR). Sub to Foothill Associates. GIS Supervisor. 2019-2020

Dogwood Road Project, City of El Centro, Imperial County, CA. Cogstone conducted a cultural resources assessment to determine the potential effects to cultural resources resulting from the construction of United States Department of Agriculture (USDA) Part 70-B RD Funding assisted housing on a 2.2-acre parcel. Cogstone conducted a record search, pedestrian survey, and determined that no further cultural resources work was necessary. The assessment provided environmental documentation as required by Section 106 of the National Historic Preservation Act (NHPA) and the California Environmental Quality Act (CEQA). The City of El Centro acted as the lead agency. Sub to Partner Science & Engineering, Inc. GIS Supervisor. 2019-2020

Laguna Creek Trail and Bruceville Road Project, Caltrans District 3, City of Elk Grove, Sacramento County, CA. The City of Elk Grove, in cooperation with Caltrans, proposed multiple trail extensions and gap closures in effort to provide connecting links that would ultimately provide trail users with access to a vast system of trails, with connections to parks, schools, community centers, commercial retail and office areas, and transit facilities. Cogstone conducted pedestrian surveys, records search, and prepared an Archaeological Survey Report (ASR) and a Historic Property Survey Report (HPSR). Sub to Helix Environmental. GIS Supervisor. 2019-2020

cogstone
PALEONTOLOGY - ARCHAEOLOGY - HISTORY

SHANNON LOPEZ
Architectural Historian

EDUCATION

2018 M.A., History (with an emphasis in architecture), California State University, Fullerton
2012 B.A., History, Minor in Asian-Pacific Studies, California State University, Dominguez Hills

SUMMARY QUALIFICATIONS

Ms. Lopez is a qualified historian and she meets the *Secretary of the Interior's Standards and Guidelines for Architectural History.* Ms. Lopez is experienced in architectural history research and surveys along with photo documentation and recording of built environment resources for local and federal projects. She has extensive knowledge with Native American consultation, consultation with city and county historical societies, and analysis of primary and secondary sources. Additionally, she is an approved Reader at the Huntington Library by the Los Angeles Office of Historic Resources.

SELECTED EXPERIENCE

Irvine General Plan Update, Phase II, City of Irvine, Orange County, CA. Cogstone conducted a study to review and summarize available information regarding known paleontological, archaeological, and historical resources within the boundaries of the City of Irvine to support the Phase II update of the City's General Plan. A general analysis of impacts of future projects within the City of Irvine that may adversely affect paleontological, archaeological, or historic resources was provided along with mitigation recommendations. Sub to Placeworks. Architectural Historian. 2018-2019

2525 N. Main, City of Santa Ana, Orange County, CA. The project proposed demolition of existing building and the construction of a five-story multi-family residential apartment complex. Cogstone conducted a cultural and historic resources records search, a field visit to known historic homes and Santiago Park, evaluation of the historic resources, and produced a built environment report. Conducted research, evaluation and co-author. Architectural Historian. 2018

Purple Line Extension (Westside Subway) Crack Propagation Reassessment, City of Beverly Hills, Los Angeles County, CA. On behalf of METRO, Cogstone was approved to reassess the exterior façade of the old Porsche building located on Wilshire Boulevard. The purpose of this reassessment was to document and compare the cracks of the current building during construction of the underground subway with those recorded in a pre-construction survey. Architectural Monitor and Author. 2018

Desert Sage Wellness Center, City of Hemet, Riverside County, CA. Cogstone completed a National Register of Historic Places eligibility re-evaluation for a proposed historical ranching line camp on behalf of the California Area Office Indian Health Service. This study was performed pursuant to Section 110 of the National Historic Preservation Act. Services included an archaeological and architectural pedestrian survey, records search, update to DPR forms, public outreach, additional research, and reported updates to SHPO. Architectural Historian. 2018

3800 W. 6th Street Mixed-Used Development, Koreatown, Los Angeles County, CA. The project proposed to construct a 21-story mixed-use development with two levels of underground parking. Cogstone conducted a paleontological and cultural resources assessment. Tasks included records search, built environment survey, resource recording and technical report. Conducted built environment survey, recoded building, and conducted view shed impact analysis. Architectural Historian. 2018

Accelerated Charter Elementary School, Los Angeles Unified School District, City of Los Angeles, Los Angeles County, CA. The project involved the construction of a new facility on a 2.3-acre site in South Central Los Angeles. Cogstone conducted paleontological and cultural resources monitoring. Five new archaeological sites were defined and updated one building record. Updated building DPR. Sub to Gafon. Assistant Architectural Historian. 2017

DESIREÉ RENEÉ MARTINEZ

QA/QC

EDUCATION

1999 M.A., Anthropology (Archaeology), Harvard University, Cambridge
1995 B.A., Anthropology, University of Pennsylvania, Philadelphia

SUMMARY QUALIFICATIONS

Ms. Martinez is a Registered Professional Archaeologist (RPA) with over 20 years of experience in archaeological fieldwork, research, and curation. She has expertise in the planning, implementation, and completion of all phases of archaeological work and has participated in archaeological investigations as a principal investigator, crew member, and tribal monitor. She meets national standards in archaeology set by the Secretary of Interior's *Standards and Guidelines for Archaeology and Historic Preservation.* Her experience also includes compliance with CEQA, NEPA, NHPA Sec. 106, NAGPRA, SB 18, AB 52, and California General Order 131-D exemption. Ms. Martinez has extensive experience consulting with Native American leaders and community members in a variety of contexts.

SELECTED PROJECTS

Deep Soil Mixing Pilot Project, Community of Pacific Palisades, Los Angeles County, CA. As part of an on-call contract with the Los Angeles Bureau of Engineering (LABOE), Cogstone provided cultural and paleontological resources monitoring as well as managed Native American monitoring during ground-disturbing activities. The City of Los Angeles was the lead agency under the California Environmental Quality Act (CEQA). Monitoring for the Project was conducted in compliance with the Contingency Plan conditions for the Coastal Development Permit (CDP) from the California Coastal Commission (CCC). No cultural or paleontological resources were identified. No further work was necessary. Sub to ICF. Task Manager. 2020

OC-44 Pipeline Rehabilitation Project, City of Newport Beach, Orange County, CA. Cogstone conducted cultural resources monitoring during ground-disturbing activities following a Cultural Resource Assessment of the APE in 2014 by Cogstone pursuant to the involvement of land managed by the United States Army Corps of Engineers (Section 404 of the Clean Water Act), California Department of Fish and Wildlife, and California Coastal Commission (CCC). Although no cultural resources were identified within the APE, cultural resources and Native American monitoring were required as was stipulated in the Conditions of Approval by the CCC. Sub to Michael Baker. Task Manager. 2019-2020

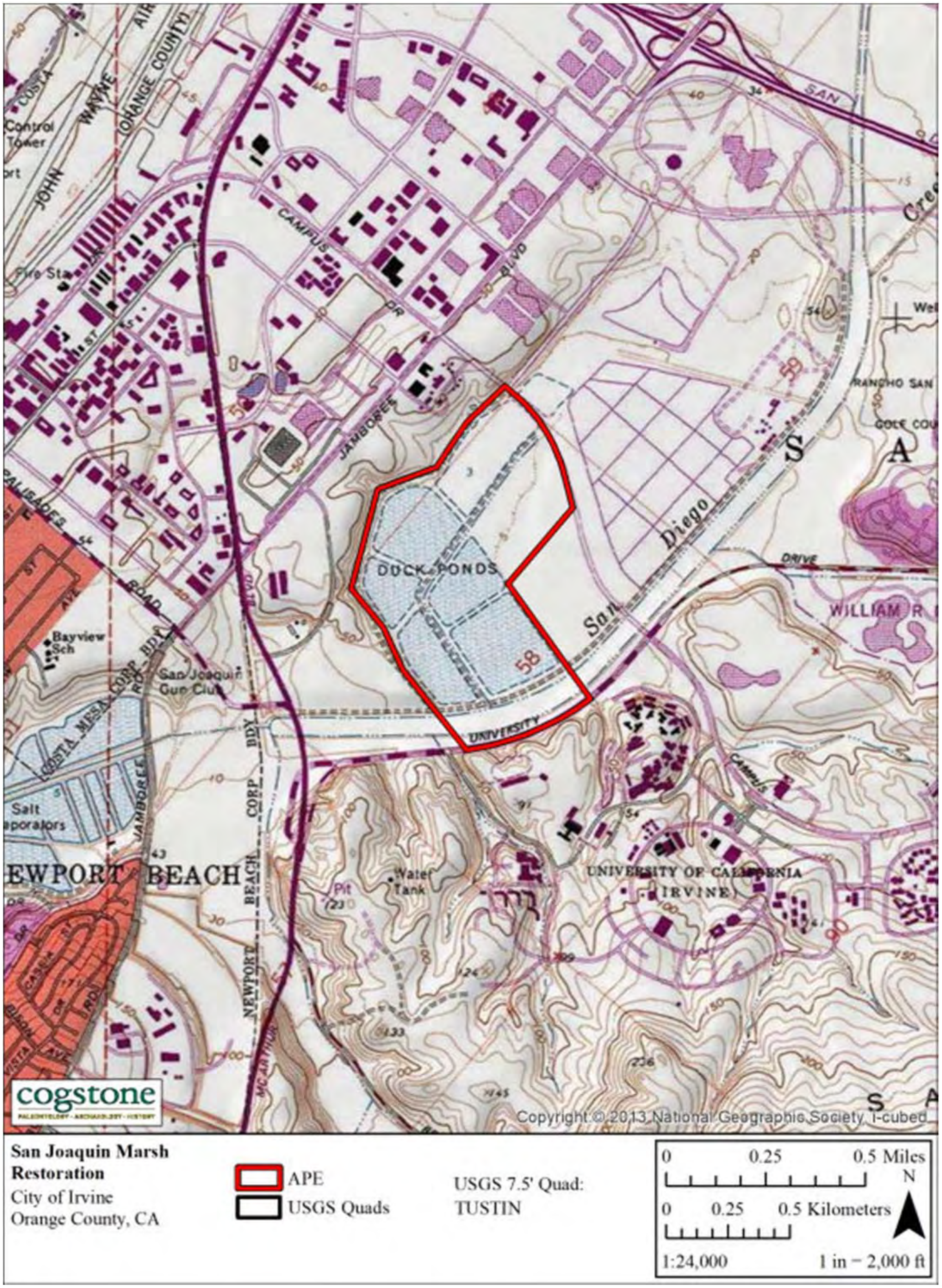
Venta Spur Trail Bicycle and Pedestrian Bridge over SR-133 Project, Caltrans District 12, City of Irvine, Orange County, CA. Cogstone conducted extensive review of existing literature and historical maps, review of a record search conducted at the SCCIC, Native American consultations, an intensive pedestrian survey, and a geoarchaeological analysis to identify and evaluate archaeological, paleontological, and historical resources that may be affected by the project. Technical reports included an Archaeological Survey Report (ASR), a Historical Resources Compliance Report (HRCR), and a combined Paleontological Identification and Evaluation Report (PIR/PER). Sub to Michael Baker. Task Manager. 2018-2019

15 Crystal Cove – Beachcomber Café Expansion Project, Crystal Cove State Park, City of Newport Beach, Orange County, CA. Cogstone provided archaeological monitoring during the excavation of a five feet deep footing to support the deck extension. Cogstone prepared a Cultural Resources Monitoring Compliance Report which documented compliance with archaeological monitoring requirements of Crystal Cove California State Park, California Environmental Quality Act (CEQA), and Public Resources Code 5024.5. Sub to Bergman KPRS. Task Manager and Principal Investigator for Archaeology. 2018

River Street Marketplace, City of San Juan Capistrano, Orange County, CA. Cogstone conducted record searches, literature studies, and intensive archaeological and paleontological surveys to determine the potential effects to cultural and paleontological resources resulting from the construction of 64,900 square feet of proposed commercial and office space, along with associated improvements. The proposed project consisted of five buildings and was located on a 5.6-acre property occupied by the Ito Nursery which has been in operation since 1970. Sub to PlaceWorks. Task Manager. 2018

APPENDIX B. NATIVE AMERICAN CONSULTATION

COGSTONE SECTION 106 SLF SEARCH REQUEST	
DATE	August 28, 2020
COGSTONE PROJECT NUMBER:	5084
COGSTONE PROJECT NAME:	San Joaquin Marsh Restoration Project
PROJECT DESCRIPTION:	The Project consists of improvements that will result in improved water flow and water control, outlet restoration, increased berm elevation, expanded natural treatment ponds, and the construction of a soil swale to create a seasonal wetland habitat. The Project Area is approximately 202.4 acres. This project will require a 404 permit from the USACE.
USGS 7.5' QUAD:	Tustin
COUNTY:	Orange
TOWNSHIP/RANGE/SECTION:	T: 6S; R: 9W; Sections 7, 8, 17 and 18
ACRES:	~202.4
TYPE OF SEARCH:	Sacred Lands File Search and Tribal Contact List
1:24000 map attached	√
Thank you.	
Please Mail to:	Logan Freeberg 1518 W. Taft Ave. Orange, CA 92865 (714) 974-8303 fax lfreeberg@cogstone.com


DUCK PONDS
UNIVERSITY
San Diego
JAMBOREE
CAMPUS DR
BLVD
San Joaquin Gun Club
Bayview Sch
Salt Evaporators
EWPORT BEACH
NEWPORT BEACH CORP BDY
COSTA MESA CORP BDY
MACARTHUR
UNIVERSITY OF CALIFORNIA (IRVINE)
Water Tank
Pit
WILLIAM R
RANCHO SAN
GOLF COU
DRIVE
Control Tower
JOHN WAYNE
(ORANGE COUNTY)
Fire Sta
PALISADES ROAD
Copyright:© 2013 National Geographic Society, i-cubed
cogstone
San Joaquin Marsh Restoration
City of Irvine
Orange County, CA
APE
USGS Quads
USGS 7.5' Quad:
TUSTIN
0 0.25 0.5 Miles
0 0.25 0.5 Kilometers
N
1:24,000
1 in = 2,000 ft

STATE OF CALIFORNIA Gavin Newsom, Governor

NATIVE AMERICAN HERITAGE COMMISSION

NAHC HEADQUARTERS
1550 Harbor Boulevard
Suite 100
West Sacramento,
California 95691
(916) 373-3710
nahc@nahc.ca.gov
NAHC.ca.gov

August 31, 2020

Logan Freeberg
Cogstone Resource Management, Inc.

Via Email to: lfreeberg@cogstone.com

Re: San Joaquin Marsh Restoration Project, Orange County

Dear Mr. Freeberg:

A record search of the Native American Heritage Commission (NAHC) Sacred Lands File (SLF) was completed for the information you have submitted for the above referenced project. The results were negative. However, the absence of specific site information in the SLF does not indicate the absence of cultural resources in any project area. Other sources of cultural resources should also be contacted for information regarding known and recorded sites.

Attached is a list of Native American tribes who may also have knowledge of cultural resources in the project area. This list should provide a starting place in locating areas of potential adverse impact within the proposed project area. I suggest you contact all of those indicated; if they cannot supply information, they might recommend others with specific knowledge. By contacting all those listed, your organization will be better able to respond to claims of failure to consult with the appropriate tribe. If a response has not been received within two weeks of notification, the Commission requests that you follow-up with a telephone call or email to ensure that the project information has been received.

If you receive notification of change of addresses and phone numbers from tribes, please notify me. With your assistance, we can assure that our lists contain current information.

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

Sincerely,

Andrew Green

Andrew Green
Cultural Resources Analyst

Attachment

Page 1 of 1

Native American Heritage Commission
Native American Contact List
Orange County
8/31/2020

Gabrieleno Band of Mission Indians - Kizh Nation
Andrew Salas, Chairperson
P.O. Box 393 — Gabrieleno
Covina, CA, 91723
Phone: (626) 926 - 4131
admin@gabrielenoindians.org

Gabrieleno/Tongva San Gabriel Band of Mission Indians
Anthony Morales, Chairperson
P.O. Box 693 — Gabrieleno
San Gabriel, CA, 91778
Phone: (626) 483 - 3564
Fax: (626) 286-1262
GTTribalcouncil@aol.com

Gabrielino /Tongva Nation
Sandonne Goad, Chairperson
106 1/2 Judge John Aiso St., #231 — Gabrielino
Los Angeles, CA, 90012
Phone: (951) 807 - 0479
sgoad@gabrielino-tongva.com

Gabrielino Tongva Indians of California Tribal Council
Robert Dorame, Chairperson
P.O. Box 490 — Gabrielino
Bellflower, CA, 90707
Phone: (562) 761 - 6417
Fax: (562) 761-6417
gtongva@gmail.com

Gabrielino-Tongva Tribe
Charles Alvarez,
23454 Vanowen Street — Gabrielino
West Hills, CA, 91307
Phone: (310) 403 - 6048
roadkingcharles@aol.com

Juaneno Band of Mission Indians Acjachemen Nation - Belardes
Joyce Perry, Tribal Manager
4955 Paseo Segovia — Juaneno
Irvine, CA, 92603
Phone: (949) 293 - 8522
kaamalam@gmail.com

Juaneno Band of Mission Indians Acjachemen Nation - Belardes
Matias Belardes, Chairperson
32161 Avenida Los Amigos — Juaneno
San Juan Capisttrano, CA, 92675
Phone: (949) 293 - 8522
kaamalam@gmail.com

Pala Band of Mission Indians
Shasta Gaughen, Tribal Historic Preservation Officer
PMB 50, 35008 Pala Temecula Rd. — Cupeno, Luiseno
Pala, CA, 92059
Phone: (760) 891 - 3515
Fax: (760) 742-3189
sgaughen@palatribe.com

Santa Rosa Band of Cahuilla Indians
Lovina Redner, Tribal Chair
P.O. Box 391820 — Cahuilla
Anza, CA, 92539
Phone: (951) 659 - 2700
Fax: (951) 659-2228
lsaul@santarosacahuilla-nsn.gov

Soboba Band of Luiseno Indians
Joseph Ontiveros, Cultural Resource Department
P.O. BOX 487 — Cahuilla, Luiseno
San Jacinto, CA, 92581
Phone: (951) 663 - 5279
Fax: (951) 654-4198
jontiveros@soboba-nsn.gov

Soboba Band of Luiseno Indians
Scott Cozart, Chairperson
P. O. Box 487 — Cahuilla, Luiseno
San Jacinto, CA, 92583
Phone: (951) 654 - 2765
Fax: (951) 654-4198
jontiveros@soboba-nsn.gov

This list is current only as of the date of this document. Distribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resource Section 5097.98 of the Public Resources Code.

This list is only applicable for contacting local Native Americans with regard to cultural resources assessment for the proposed San Joaquin Marsh Restoration Project, Orange County.

PROJ-2020-004692 — 08/31/2020 01:30 PM — 1 of 1

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September 9, 2020 Cogstone 5084

Charles Alvarez,
Gabrielino-Tongva Tribe
23454 Vanowen Street
West Hills, CA, 91307

Re: Request for Section 106 Consultation for the San Joaquin Marsh Restoration Project, City of Irvine, Orange County, California.

Mr. Alvarez:

The University of California, Irvine (UCI) proposes to develop the San Joaquin Marsh Restoration Project (Project). The Project consists of improvements that will result in improved water flow and water control, outlet restoration, increased berm elevation, expanded natural treatment ponds, and the construction of a soil swale to create a seasonal wetland habitat. The Project is located west of MacArthur Boulevard, east of Campus Drive, north of University Drive, and south of Jamboree Road (see Figures 1 and 2) on the UCI campus. The Project requires a Clean Water Act Section 404 permit from the United States Army Corps of Engineers (USACE) and thus compliance with Section 106 of the National Historic Preservation Act is required. Cogstone Resource Management, Inc. (Cogstone) has been retained by UCI to conduct a cultural resource assessment of the Area of Potential Effects (APE). The APE contains one known archaeological site with portions of two additional sites located adjacent to and within the APE. For this reason, the APE is considered highly sensitive for archaeological resources. USACE will be the Lead Federal Agency. Cogstone will be managing the Section 106 Consultations on behalf of USACE.

We invite you to help identify historic properties, cultural resources and/or areas of religious and cultural significance that might be affected by the project. If the project might have an effect to these resources and places, we would like to discuss possible ways to avoid, minimize or mitigate the potential effects.

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Federal Certifications WOSB, EDWOSB, SDB
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Please let us know of your concerns regarding the Project within **30 days, if possible**. All information provided regarding cultural, sacred sites or other areas of concern will be kept confidential. Please contact Cogstone by phone (714-974-8300), email (cogstoneconsult@cogstone.com), or fax (714-974-8303).

Thank you for your assistance.

Logan Freeberg, GIS Supervisor

Attachments: Project vicinity map
Prcject location map

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September 9, 2020 Cogstone 5084

Matias Belardes,
Chairperson
Juaneno Band of Mission Indians Acjachemen Nation - Belardes
32161 Avenida Los Amigos
San Juan Capistrano, CA, 92675

Re: Request for Section 106 Consultation for the San Joaquin Marsh Restoration Prcject, City of Irvine, Orange County, California.

Chairperson Belardes:

The University of California, Irvine (UCI) proposes to develop the San Joaquin Marsh Restoration Project (Prcject). The Project consists of improvements that will result in improved water flow and water control, outlet restoration, increased berm elevation, expanded natural treatment ponds, and the construction of a soil swale to create a seasonal wetland habitat. The Prcject is located west of MacArthur Boulevard, east of Campus Drive, north of University Drive, and south of Jamboree Road (see Figures 1 and 2) on the UCI campus. The Project requires a Clean Water Act Section 404 permit from the United States Army Corps of Engineers (USACE) and thus compliance with Section 106 of the National Historic Preservation Act is required. Cogstone Resource Management, Inc. (Cogstone) has been retained by UCI to conduct a cultural resource assessment of the Area of Potential Effects (APE). The APE contains one known archaeological site with portions of two additional sites located adjacent to and within the APE. For this reason, the APE is considered highly sensitive for archaeological resources. USACE will be the Lead Federal Agency. Cogstone will be managing the Section 106 Consultations on behalf of USACE.

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Prcject location map

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September 9, 2020 Cogstone 5084

Scott Cozart,
Chairperson
Soboba Band of Luiseno Indians
P. O. Box 487
San Jacinto, CA, 92583

Re: Request for Section 106 Consultation for the San Joaquin Marsh Restoration Project, City of Irvine, Orange County, California.

Chairperson Cozart:

The University of California, Irvine (UCI) proposes to develop the San Joaquin Marsh Restoration Project (Project). The Project consists of improvements that will result in improved water flow and water control, outlet restoration, increased berm elevation, expanded natural treatment ponds, and the construction of a soil swale to create a seasonal wetland habitat. The Project is located west of MacArthur Boulevard, east of Campus Drive, north of University Drive, and south of Jamboree Road (see Figures 1 and 2) on the UCI campus. The Project requires a Clean Water Act Section 404 permit from the United States Army Corps of Engineers (USACE) and thus compliance with Section 106 of the National Historic Preservation Act is required. Cogstone Resource Management, Inc. (Cogstone) has been retained by UCI to conduct a cultural resource assessment of the Area of Potential Effects (APE). The APE contains one known archaeological site with portions of two additional sites located adjacent to and within the APE. For this reason, the APE is considered highly sensitive for archaeological resources. USACE will be the Lead Federal Agency. Cogstone will be managing the Section 106 Consultations on behalf of USACE.

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Logan Freeberg, GIS Supervisor

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Prcject location map

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September 9, 2020 Cogstone 5084

Robert Dorame,
Chairperson
Gabrielino Tongva Indians of California Tribal Council
P.O. Box 490
Bellflower, CA, 90707

Re: Request for Section 106 Consultation for the San Joaquin Marsh Restoration Project, City of Irvine, Orange County, California.

Chairperson Dorame:

The University of California, Irvine (UCI) proposes to develop the San Joaquin Marsh Restoration Project (Project). The Project consists of improvements that will result in improved water flow and water control, outlet restoration, increased berm elevation, expanded natural treatment ponds, and the construction of a soil swale to create a seasonal wetland habitat. The Project is located west of MacArthur Boulevard, east of Campus Drive, north of University Drive, and south of Jamboree Road (see Figures 1 and 2) on the UCI campus. The Project requires a Clean Water Act Section 404 permit from the United States Army Corps of Engineers (USACE) and thus compliance with Section 106 of the National Historic Preservation Act is required. Cogstone Resource Management, Inc. (Cogstone) has been retained by UCI to conduct a cultural resource assessment of the Area of Potential Effects (APE). The APE contains one known archaeological site with portions of two additional sites located adjacent to and within the APE. For this reason, the APE is considered highly sensitive for archaeological resources. USACE will be the Lead Federal Agency. Cogstone will be managing the Section 106 Consultations on behalf of USACE.

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Logan Freeberg, GIS Supervisor

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Project location map

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September 9, 2020 Cogstone 5084

Shasta Gaughen,
Tribal Historic Preservation Officer
Pala Band of Mission Indians
35008 Pala Temecula Rd., PMB 50
Pala, CA, 92059

Re: Request for Section 106 Consultation for the San Joaquin Marsh Restoration Project, City of Irvine, Orange County, California.

Officer Gaughen:

The University of California, Irvine (UCI) proposes to develop the San Joaquin Marsh Restoration Project (Project). The Project consists of improvements that will result in improved water flow and water control, outlet restoration, increased berm elevation, expanded natural treatment ponds, and the construction of a soil swale to create a seasonal wetland habitat. The Project is located west of MacArthur Boulevard, east of Campus Drive, north of University Drive, and south of Jamboree Road (see Figures 1 and 2) on the UCI campus. The Project requires a Clean Water Act Section 404 permit from the United States Army Corps of Engineers (USACE) and thus compliance with Section 106 of the National Historic Preservation Act is required. Cogstone Resource Management, Inc. (Cogstone) has been retained by UCI to conduct a cultural resource assessment of the Area of Potential Effects (APE). The APE contains one known archaeological site with portions of two additional sites located adjacent to and within the APE. For this reason, the APE is considered highly sensitive for archaeological resources. USACE will be the Lead Federal Agency. Cogstone will be managing the Section 106 Consultations on behalf of USACE.

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Logan Freeberg, GIS Supervisor

Attachments: Project vicinity map
Prcject location map

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September 9, 2020 Cogstone 5084

Sandonne Goad,
Chairperson
Gabrielino /Tongva Nation
106 1/2 Judge John Aiso St., #231
Los Angeles, CA, 90012

Re: Request for Section 106 Consultation for the San Joaquin Marsh Restoration Prcject, City of Irvine, Orange County, California.

Chairperson Goad:

The University of California, Irvine (UCI) proposes to develop the San Joaquin Marsh Restoration Project (Prcject). The Project consists of improvements that will result in improved water flow and water control, outlet restoration, increased berm elevation, expanded natural treatment ponds, and the construction of a soil swale to create a seasonal wetland habitat. The Prcject is located west of MacArthur Boulevard, east of Campus Drive, north of University Drive, and south of Jamboree Road (see Figures 1 and 2) on the UCI campus. The Project requires a Clean Water Act Section 404 permit from the United States Army Corps of Engineers (USACE) and thus compliance with Section 106 of the National Historic Preservation Act is required. Cogstone Resource Management, Inc. (Cogstone) has been retained by UCI to conduct a cultural resource assessment of the Area of Potential Effects (APE). The APE contains one known archaeological site with portions of two additional sites located adjacent to and within the APE. For this reason, the APE is considered highly sensitive for archaeological resources. USACE will be the Lead Federal Agency. Cogstone will be managing the Section 106 Consultations on behalf of USACE.

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Logan Freeberg, GIS Supervisor

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Project location map

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September 9, 2020 Cogstone 5084

Anthony Morales,
Chairperson
Gabrieleno/Tongva San Gabriel Band of Mission Indians
P.O. Box 693
San Gabriel, CA, 91778

Re: Request for Section 106 Consultation for the San Joaquin Marsh Restoration Project, City of Irvine, Orange County, California.

Chairperson Morales:

The University of California, Irvine (UCI) proposes to develop the San Joaquin Marsh Restoration Project (Project). The Project consists of improvements that will result in improved water flow and water control, outlet restoration, increased berm elevation, expanded natural treatment ponds, and the construction of a soil swale to create a seasonal wetland habitat. The Project is located west of MacArthur Boulevard, east of Campus Drive, north of University Drive, and south of Jamboree Road (see Figures 1 and 2) on the UCI campus. The Project requires a Clean Water Act Section 404 permit from the United States Army Corps of Engineers (USACE) and thus compliance with Section 106 of the National Historic Preservation Act is required. Cogstone Resource Management, Inc. (Cogstone) has been retained by UCI to conduct a cultural resource assessment of the Area of Potential Effects (APE). The APE contains one known archaeological site with portions of two additional sites located adjacent to and within the APE. For this reason, the APE is considered highly sensitive for archaeological resources. USACE will be the Lead Federal Agency. Cogstone will be managing the Section 106 Consultations on behalf of USACE.

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Thank you for your assistance.

Logan Freeberg, GIS Supervisor

Attachments: Project vicinity map
Prcject location map

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Figure 1. Project vicinity

Figure 2. Project location

Native American Group	Date(s) and Method of First Contact Attempt	Date(s) and Method of Second Attempt	Date(s) and Method of Third Attempt	Date(s) of Replies Rec'd	Comments
Gabrieleño Band of Mission Indians - Kizh Nation Andrew Salas, Chairperson	Certified mail letter sent 9/9/2020	Email; 9/23/2020	Call; 10/07/2020	Email; 9/23/2020	Ms. Brandy Salas, Admin Specialist asked Cogstone to provide the lead agency's contact information. Cogstone followed up with Ms. Salas and sent her the information requested on November 3, 2020. Ms. Salas responded on November 4, 2020 thanking Cogstone for the information.
Gabrieleño/Tongva San Gabriel Band of Mission Indians Anthony Morales, Chairperson	Certified mail letter sent 9/9/2020	Email; 9/23/2020	Call; 10/07/2020	10/7/2020	Per phone call, Mr. Morales stated the APE is culturally sensitive to his native group and is a traditional cultural property and landscape. Mr. Morales recommends Archaeological and Native American monitoring for all ground disturbances in the area. He has not provided additional comments as of December 18, 2020.
Gabrielino /Tongva Nation Sandonne Goad, Chairperson	Certified mail letter sent 9/9/2020	Email; 9/23/2020	Call; 10/07/2020		**No response as of December 18, 2020**
Gabrielino Tongva Indians of California Tribal Council Robert Dorame, Chairperson	Certified mail letter sent 9/9/2020	Email; 9/23/2020	Call; 10/07/2020	10/7/2020	Per phone call, Mr. Dorame would like more information on the resources within APE, and results of the pedestrian survey. Cogstone followed up with Mr. Dorame's request and sent him survey results and resource information on 10/15/2020. He has not provided additional comments as of December 18, 2020.
Gabrielino-Tongva Tribe Charles Alvarez, Chairperson	Certified mail letter sent 9/9/2020	Email; 9/23/2020	Call; 10/07/2020		**No response as of December 18, 2020**

Native American Group	Date(s) and Method of First Contact Attempt	Date(s) and Method of Second Attempt	Date(s) and Method of Third Attempt	Date(s) of Replies Rec'd	Comments
Juaneño Band of Mission Indians Acjachemen Nation - Belardes Joyce Perry, Tribal Manager	Certified mail letter sent 9/9/2020	Email; 9/23/2020	Call; 10/07/2020	9/29/2020	Ms. Perry is the cultural resource director for the Juaneño Band of Mission Indians, Acjachemen Nation- Belardes. While Ms. Perry is not aware of any specific cultural sites of properties in the area, but states it is a sensitive location. Ms. Perry asked to please provide additional information regarding the 40 cultural resources within and near the project area. Also include the results of the pedestrian survey when they become available. . Cogstone followed up with Ms. Perry's request and sent her survey results and resource information on October 15, 2020. Ms. Perry responded on November 5, 2020 inquiring about Cogstone’s recommendation saying that she was inclined to recommend cultural resources and Native American
Pala Band of Mission Indians Shasta Gaughen, Tribal Historic Preservation Officer	Certified mail letter sent 9/9/2020	Email; 9/23/2020	Call; 10/07/2020		**No response as of December 18, 2020**
Santa Rosa Band of Cahuilla Indians Lovina Redner, Tribal Chair	Certified mail letter sent 9/9/2020	Email; 9/23/2020	Call; 10/07/2020		**No response as of December 18, 2020**
Soboba Band of Luiseno Indians Joseph Ontiveros, Cultural Resource Department	Certified mail letter sent 9/9/2020	Email; 9/23/2020	Call; 10/07/2020		**No response as of December 18, 2020**
Soboba Band of Luiseno Indians Scott Cozart, Chairperson	Certified mail letter sent 9/9/2020	Email; 9/23/2020	Call; 10/07/2020		**No response as of December 18, 2020**

From: Gabrieleno Administration <admin@gabrielenoindians.org>
To: Cogstone Resource Management <cogstoneconsult@cogstone.com>
Sent: 9/23/2020 2:24 PM
Subject: San Joaquin Marsh Restoration Project

To whom this may concern,

Can you please provide the lead agency's contact information?

Thank you,

Sincerely,

Brandy Salas
Admin Specialist
Gabrieleno Band of Mission Indians - Kizh Nation
PO Box 393
Covina, CA 91723
Office: 844-390-0787
website: www.gabrielenoindians.org

The region where Gabrieleño culture thrived for more than eight centuries encompassed most of Los Angeles County, more than half of Orange County and portions of Riverside and San Bernardino counties. It was the labor of the Gabrieleño who built the missions, ranchos and the pueblos of Los Angeles. They were trained in the trades, and they did the construction and maintenance, as well as the farming and managing of herds of livestock. "The Gabrieleño are the ones who did all this work, and they really are the foundation of the early economy of the Los Angeles area ". "That's a contribution that Los Angeles has not recognized--the fact that in its early decades, without the Gabrieleño, the community simply would not have survived."

Re: San Joaquin Marsh Restoration Project

From: Cogstone Resource Management <cogstoneconsult@cogstone.com>
To: Gabrieleno Administration <admin@gabrielenoindians.org>
Date: 11/3/2020 1:52 PM

Good afternoon Brandy Salas,

Apologies for the delayed response as we were compiling additional information about the San Joaquin Marsh project area. The contact Agency is UCI Lindsey Hashimoto, Senior Planner. Contact information: 380 University Tower, Irvine, Ca 92697, (949) 824-8692.

Thank you ,

Sandy Duarte

From: Gabrieleno Administration <admin@gabrielenoindians.org>
To: Cogstone Resource Management <cogstoneconsult@cogstone.com>
Sent: 11/4/2020 10:53 AM
Subject: Re: San Joaquin Marsh Restoration Project

Thank you for the information it is greatly appreciated.

Sincerely,

Brandy Salas

Admin Specialist
Gabrieleno Band of Mission Indians - Kizh Nation
PO Box 393
Covina, CA 91723
Office: 844-390-0787
website: www.gabrielenoindians.org

The region where Gabrieleño culture thrived for more than eight centuries encompassed most of Los Angeles County, more than half of Orange County and portions of Riverside and San Bernardino counties. It was the labor of the Gabrieleño who built the missions, ranchos and the pueblos of Los Angeles. They were trained in the trades, and they did the construction and maintenance, as well as the farming and managing of herds of livestock. "The Gabrieleño are the ones who did all this work, and they really are the foundation of the early economy of the Los Angeles area " . "That's a contribution that Los Angeles has not recognized--the fact that in its early decades, without the Gabrieleño, the community simply would not have survived."

9/29/2020

Re: San Joaquin Marsh Section 106 Consultation

From: Joyce Perry <kaamalam@gmail.com>
To: Cogstone Resource Management <cogstoneconsult@cogstone.com>
Date: 9/29/2020 1:11 PM

Good Afternoon Mr. Freeberg,

I am the cultural resource director for the Juaneno Band of Mission Indians, Acjachemen Nation- Belardes. Please accept this response on behalf of Chairman Belardes and myself. While I am not aware of any specific cultural sites of properties in the area, it is a sensitive location. Could you please provide for my records and additional information regarding the 40 cultural resources within and near the project area. Could you please also provide the results of the pedestrian survey when they become available? Thank you

Húu'uni 'óomaqati yáamaqati.
Teach peace
Joyce Stanfield Perry
Payomkawichum Kaamalam - President
Juaneño Band of Mission Indians, Acjachemen Nation
Tribal Manager, Cultural Resource Director

On Wed, Sep 23, 2020 at 9:39 AM Cogstone Resource Management <cogstoneconsult@cogstone.com> wrote:

San Joaquin Marsh Restoration Project infornation

From: Cogstone Resource Management <cogstoneconsult@cogstone.com>
To: kaamalam@gmail.com
Date: 10/15/2020 1:06 PM

Good afternoon Joyce,

Apologies for the delayed response as we were compiling additional information about the San Joaquin Marsh project area. In 1938, John Winterbourne excavated northeast of what is now Locus A of CA-ORA-57 (also sometimes called CA-ORA-77 but this number has been retired). He found ground stone, chipped stone, shell midden material and three fragmentary burials. The Project area is in what are now the ducks ponds and is known as Locus B of ORA-57, approximately 0.5 miles east.. Locus B was recorded because of the historic San Joaquin Gun Club, not because of prehistoric remains. Most of this area is inundated and includes only the lowlands except maybe a bit of the side of the bluffs in the northwest of the Project area.

A small amount of faunal bone and shell may have been found in Locus B but no artifacts and no sign of burials. Little to no prehistoric material is anticipated to be found when the area is surveyed.

The area from the 1938 Winterbourne excavations is now under (or otherwise disrupted by) where Jamboree Road and SR-73 cross.

I also conducted the survey last week Thursday October 8th, and no cultural resources were observed. The bluffs are a bit out of PA. Let me know if you need anymore information.

Thank you,

Sandy Duarte

From: Joyce Perry <kaamalam@gmail.com>
To: Cogstone Resource Management <cogstoneconsult@cogstone.com>
Sent: 11/5/2020 12:08 PM
Subject: Re: San Joaquin Marsh Restoration Project infornation

Good Afternoon Sandy,

Thank you for your response, and I apologize for the delay. What was Cogstone's recommendation for monitoring? I think we are inclined to recommend archaeo and native monitoring. I'll wait to hear from you before providing our official recommendations.

Húu'uni 'óomaqati yáamaqati.
Teach peace
Joyce Stanfield Perry
Payomkawichum Kaamalam - President
Juaneño Band of Mission Indians, Acjachemen Nation
Tribal Manager, Cultural Resource Director

John Gust

To: Cogstone Resource Management
Subject: RE: San Joaquin Marsh Restoration Project infornation

From: Cogstone Resource Management [mailto:cogstoneconsult@cogstone.com]
Sent: Friday, February 26, 2021 3:14 PM
To: John Gust
Subject: Fwd: San Joaquin Marsh Restoration Project infornation

From: Cogstone Resource Management <cogstoneconsult@cogstone.com>
To: Joyce Perry <kaamalam@gmail.com>
Sent: 2/26/2021 3:13 PM
Subject: Re: San Joaquin Marsh Restoration Project infornation

Good afternoon Joyce,

Apologies for the much delayed written response as I indicated when we spoke in December, the San Joaquin Marsh Reserve was included CA-ORA-57 only because the ponds from the San Joaquin Gun Club are there. No prehistoric cultural material was found in the marsh previously or during the survey for this Project. The includes material that would have been associated with CA-ORA-115 and CA-ORA-121 located on the bluffs above the marsh that washed down. These factors coupled with these two resources being 390 feet and 152 feet away from the closest planned Project activity lead us to assess cultural sensitivity of the APE due to the planned Project assessed to be low. We are not recommending cultural resources or Native American monitoring.

Thank you,
John Gust

John Gust, PhD, RPA

Principal Investigator\Project Manager

Cogstone Resource Management

San Joaquin Marsh Restoration Project

From: Cogstone Resource Management <cogstoneconsult@cogstone.com>
To: gtongva@gmail.com
Date: 10/15/2020 1:20 PM

Good afternoon Mr. Dorame,

Apologies for the delayed response as we were compiling additional information about the San Joaquin Marsh project area. In 1938, John Winterbourne excavated northeast of what is now Locus A of CA-ORA-57 (also sometimes called CA-ORA-77 but this number has been retired). He found ground stone, chipped stone, shell midden material and three fragmentary burials. The Project area is in what are now the ducks ponds and is known as Locus B of ORA-57, approximately 0.5 miles east.. Locus B was recorded because of the historic San Joaquin Gun Club, not because of prehistoric remains. Most of this area is inundated and includes only the lowlands except maybe a bit of the side of the bluffs in the northwest of the Project area. S

A small amount of faunal bone and shell may have been found in Locus B but no artifacts and no sign of burials.

The area from the 1938 Winterbourne excavations is now under (or otherwise disrupted by) where Jamboree Road and SR-73 cross. I conducted the survey on October 8, and no cultural resources were observed.

Please let me know if you have any more questions.

Thank you

Sandy Duarte

APPENDIX C. PREVIOUS CULTURAL RESOURCES STUDIES

Report Number (OR-)	Author(s)	Report Title	Year	Distance from APE (miles)	USGS 7.5' Maps
00003	King, Thomas F.	An Archaeological Reconnaissance of the Irvine Town Center Project, Orange County, California	1973	0-0.25	Tustin
00246	Cottrell, Marie G.	Report of Archaeological Resources Assessment Conducted for the Irvine Industrial Complex-West	1978	0-0.25	Tustin
00252	Desautels, Roger J.	Cultural Resources Report-Preliminary Assessment on the Proposed San Diego Creek Watershed Erosion and Sedimentary Control System in Hicks Canyon, Hicks Canyon Wash, Rattlesnake Creek Wash, San Diego Creek, and the San Joaquin Marsh Located in Orange County	1978	Within-1.0	El Toro, Tustin
00284	Cottrell, Marie G.	Test Level Investigation Conducted for Site CA-ORA-287 (ORA-121)	1978	0.25-0.5	Tustin
00285	Cottrell, Marie G.	Archaeological Investigations Conducted at CA-ORA-196, Irvine, California	1979	0.5-1.0	Tustin
00305	Schroth, Adella	The History of Archaeological Research on Irvine Ranch Property: The Evolution of a Company Tradition	1979	0-1.0.25	Black Star Canyon, El Toro, Laguna Beach, Orange, San Juan Capistrano, Tustin
00339	Craib, John L.	The Archaeology of a Late Horizon Midden (CA-ORA-197) on Newport Bay, Phase II	1977	0.5-1.0	Tustin
00351	Rice, Glen E.	A Test Investigation of CA-ORA-119, Locus C, and a Report on a Rock Feature in Locus A	1976	0-0.25	Tustin
00353	Ellis, Robert R.	Archaeological Test Excavations at Site ORA-121, Orange County, California	1973	0-0.25	Tustin
00362	Desautels, Roger J.	Archaeological Report: CA-ORA 195, Orange County, California	1967	0.5-1.0	Tustin
00363	Cottrell, Marie G.	Test Level Investigations Conducted at Archaeological Sites CA-ORA-196 and CA-ORA-197	1976	0.5-1.0	Tustin
00364	Rice, Glen E.	Report on Archaeological Investigations at CA-ORA-192	1977	0.5-1.0	Tustin
00399	Unknown	Archaeological Salvage Program at Locus B and the Peripheral Sector of Locus A, ORA-287 (ORA-121), Irvine, California	1979	0.25-0.5	Tustin
00408	Strozier, Hardy	Rancho San Joaquin Historical/Archaeological Survey-Phase I	1975	0.5-1.0	Tustin
00409	Rice, Glen E.	Test Investigations at ORA-119, Locus B	1976	0-0.25	Tustin
00410	Rice, Glen E., and Marie Cotrell	Report of Excavations at CA-ORA-111, Locus II	1975	0.5-1.0	Tustin
00411	Bingham, Jeffery C.	Test Excavations for CA-ORA-111 in Orange County, California	1975	0.5-1.0	Tustin

Report Number (OR-)	Author(s)	Report Title	Year	Distance from APE (miles)	USGS 7.5' Maps
00427	Mabry, Theo N.	Test-level Investigations, North Bluffs of Upper Newport Bay, Newport Beach, Ca.	1979	0-0.25	Tustin
00440	Mabry, Theo N.	Records Search and Reconnaissance Harvard Avenue Extension City of Irvine, California	1979	0.5-1.0	Tustin
00483	Gill, Pamela	A Report of the Excavation at CA-ORA-120, a Project Presented to the Faculty of California State University, Fullerton, in Partial Fulfillment of the Requirements for the Degree in Master of Arts in Anthropology	1974	0.5-1.0	Tustin
00531	Hurd, Gary S.	Test Excavation for CA-ORA-116	1980	0-0.25	Tustin
00532	Hurd, Gary S.	Cultural Resources of the Irvine Campus	1980	Within-1.0	Tustin
00574	Stickel, Gary E., and Jerry B. Howard	Final Report of a Cultural Resource Survey of the University of California, Irvine	1976	Within-1.0	Tustin
00575	Cooley, Theodore G.	Preliminary Report-Bonita Mesa	1974	0.5-1.0	Tustin
00589	Kaldenberg, Russell L.	Archaeological Investigations at the World Medical Foundation Site Orange County, California	1976	0.25-0.5	Tustin
00615	Douglas, Ronald D.	Archaeological Resource Survey Northern Inland Coastal Hills Planning Area Orange County, California	1981	0-0.25	Tustin
00673	Padon, Beth	Archaeological Assessment, Proposed Upper Newport Bay Bicycle/Equestrian Trail, Newport Beach, California	1983	0.5-1.0	Newport Beach, Tustin
00713	Anonymous	Orange County California Anthropological Project San Joaquin Gun Club Site ORA-192, ORA-57	1938	0.5-1.0	Newport Beach
00717	Rice, Glen E.	Defining the Southern Perimeter of ORA-575	1976	0.25-0.5	Newport Beach
00718	Van Horn, David M., J.D. Cooper, E. Crespin, and J.R. Murray	A Cultural/scientific Resources Investigation of the Planned San Joaquin Hills Transportation Corridor (Phase II)	1983	0.5-1.0	Laguna Beach, San Juan Capistrano, Tustin
00720	Cottrell, Marie G.	San Joaquin Transportation Corridor: an Annotated List of Archaeological Reports Referenced by Number.	1983	0.25-0.5	Dana Point, Laguna Beach, San Juan Capistrano, Tustin
00726	Padon, Beth	Archaeological Field Review Village 19A Project, City of Irvine, Ca.	1984	0-0.25	Tustin
00764	Padon, Beth A.	Archaeological Records Search for the Commercial Core Area of University Town Center	1983	0.25-0.5	Tustin
00774	Brock, James P.	Archaeological, Paleontological and Historical Resources Assessment Report for the U.C. Irvine North Campus Property	1985	Within-0.5	Tustin

Report Number (OR-)	Author(s)	Report Title	Year	Distance from APE (miles)	USGS 7.5' Maps
00776	Breece, William H.	Limited Test-level Investigation at CA-ORA-192 and CA-ORA-348, Bayview Planned Community, County of Orange, California	1985	0.25-0.5	Tustin
00783	Padon, Beth	An Archaeological Assessment of the North Ford/University Avenue Project, City of Newport Beach	1985	0.25-0.5	Tustin
00815	Breece, William H., and Laurel A. Harrison	Archaeological Salvage Program at CA-ORA-348 and CA-ORA-192, Bayview Planned Community, County of Orange, California	1985	0.25-0.5	Tustin
00847	Padon, Beth	Archaeological Resource Inventory City of Irvine and its Sphere of Influence	1985	Within-1.0	Black Star Canyon, El Toro, Laguna Beach, Orange, San Juan Capistrano, Tustin
00856	Padon, Beth	Archaeological and Paleontological Field Review: Irvine Business Complex, City of Irvine		0-0.25	Tustin
00933	Bissell, Ronald M.	Cultural and Paleontological Resources Reconnaissance of the Long Range Development Plan Study Area, University of California, Irvine, Orange County, California	1988	Within-1.0	Tustin
00939	Bissell, Ronald M.	Archaeological Resources Reconnaissance of the Long Range Development Plan Study Area, University of California, Irvine, Orange County, California	1988	Within	Tustin
00969	Jertberg, Patricia R.	Cultural Resource Assessment Jamboree Road Widening	1989	0.5-1.0	Tustin
00981	Breece, William H.	Results of the Survey and Test Phase Investigations at CA-ORA-218 and CA-ORA-1041 University of California, Irvine, Orange County	1989	0.5-1.0	Tustin
00986	Breece, William H., Beth Padon, and Jane Rosenthal	Results of the Test-level Investigation at CA-ORA-1120 Bonita Canyon, Orange County, California	1989	0.5-1.0	Tustin
01012	Padon, Beth	Back Bay Archaeology Site Inventory/Status Evaluation	1982	0.5-1.0	Newport Beach, Tustin
01016	Leonard, Nelson N. III	Environmental Impact Evaluation: Route Alternates Between the Michelson Treatment Plant and Plants on the Santa Ana River, Orange County, California	1975	Within-1.0	Newport Beach
01027	Van Horn, David M.	Archaeological Survey Report: 20162 Birch Street, Santa Ana Heights, County of Orange	1990	0.5-1.0	Tustin

Report Number (OR-)	Author(s)	Report Title	Year	Distance from APE (miles)	USGS 7.5' Maps
01046	Jertberg, Patricia R.	Archaeological Monitoring Results - Amherst Court Project Letter: Dear Ms. Griffiths	1990	0.5-1.0	Tustin
01058	Jertberg, Patricia R.	Archaeological and Paleontological Monitoring for Bison and Berkeley Avenues Extensions	1990	0.5-1.0	Tustin
01068	Shinn, Juanita R.	Cultural Resources Reconnaissance of the 25 Acre Irvine Planning Area 23 Project Orange County, California	1991	0-0.25	Tustin
01087	Dillon, Brian D.	Archaeological Record Search for the Green Acres Phase II Project, Orange County Water District, Cities of Huntington Beach and Newport Beach, Orange County, California	1990	0.25-0.5	Newport Beach, Seal Beach, Tustin
01097	Brown, Joan C.	Cultural Resources Reconnaissance of a 138 Acre Section of Upper Newport Bay Regional Park Located in Newport Beach, Orange County, California	1991	0.5-1.0	Newport Beach
01120	Marmor, Jason D.	Historic Architectural Survey Report for a Segment of Macarthur Boulevard Pacific Coast Highway to University Drive Newport Beach/Irvine, Orange County, California	1991	0.25-0.5	Laguna Beach, Tustin
01123	Clevenger, Joyce M.	Archaeological Salvage Program at Locus B and the Peripheral Sector of Locus A, ORA-287 Irvine, California.	1979	0.25-0.5	Tustin
01124	Clevenger, Joyce M.	Archaeological Investigations at CA-ORA-287 a Multicomponent Site on Newport Bay.	1986	0.25-0.5	Tustin
01125	Koerper, Henry C., and Christopher E. Drover	Chronology Building for Coastal Orange County: The Case From CA-ORA-119-a.	1983	0.25-0.5	Tustin
01131	Follett, W. I.	Fish Remains From Archaeological Sites at Irvine Orange County California	1966	0-0.25	Tustin
01133	De Barros, Philip, and Henry C. Koerper	Final Test Investigation Report and Request for Determination of Eligibility for 23 Sites Along the San Joaquin Hills Transportation Corridor	1990	0.25-0.5	Laguna Beach, San Juan Capistrano, Tustin
01170	Rosenthal, Jane	Addendum to Cultural Resources Assessment Jamboree Road Widening Irvine, California	1991	0.5-1.0	Tustin
01189	Brown, Joan C.	Cultural Resources Reconnaissance of 11 Parcels of Land Located in Newport Beach, Orange County, California.	1992	0.25-0.5	Laguna Beach, Newport Beach, Tustin
01220	Koerper, Henry C.	A Speculation on the Existence of Talon-shaped Exotics in Southern California	1988	0.5-1.0	Tustin
01276	De Barros, Phillip	Boundary Delineation of CA-ORA-196/H Irvine Ranch Water District Demonstration Gardens Project	1993	0.5-1.0	Tustin
01339	Demcak, Carol R., and Marie G. Cottrell	Report of Archaeological Investigations Performed in Association With the Upper Newport Bay Bike and Equestrian Trail	1985	0-0.25	Tustin

Report Number (OR-)	Author(s)	Report Title	Year	Distance from APE (miles)	USGS 7.5' Maps
01350	McKenna, Jeanette A., and Philip De Barros	Archaeological Survey Report Historic Sites Addendum San Joaquin Hills Transportation Corridor 12-ORA-73 12-102540	1993	0.25-0.5	Dana Point, Laguna Beach, San Juan Capistrano, Tustin
01351	McKenna, Jeanette A., and Philip De Barros	Historic Study Report San Joaquin Hills Transportation Corridor 12-ORA-73 12-102540	1993	0.25-0.5	Dana Point, Laguna Beach, San Juan Capistrano, Tustin
01380	Mason, Roger D.	Treatment Program for ORA-1358 in the MacArthur Segment, San Joaquin Hills Transportation Corridor Irvine, California Pursuant to 36 CFR 800.11	1994	0-0.25	Tustin
01413	Whitney-Desautels, Nancy A., and David A. Kice	Cultural Resources Assessment of the Irvine Ranch Water District Alternate Aqueous Waste Disposal Facility Sites, Orange County, California	1993	0.5-1.0	El Toro, Tustin
01476	Padon, Beth	Archaeological Monitoring of Preliminary Grading and Trenching for UCI/TIC University Research Park, Planning Area 25, Parcel 1 and 2 of Tentative Parcel Map No. 94-160	1996	0-0.25	Tustin
01481	Strudwick, Ivan H.	Results of Archaeological Testing in the Northeast Portion of CA-ORA-196/H for the Michelson Drive Bridge Widening, San Diego Creek, Irvine, California	1996	0.5-1.0	Tustin
01515	Allen, Kathleen C.	Archaeological Assessment of L.A. Cellular Site #686.10, Bonita Creek Park, Orange County, California	1996	0.5-1.0	Tustin
01555	Allen, Kathleen C. and Stephen D. Dibble	Archaeological Salvage Investigations at CA-ORA-575, City of Irvine	1995	0.25-0.5	Tustin
01570	Padon, Beth and Fran Govean	An Archaeological and Paleontological Resource Review of the Proposed Planning Area 25 Project, City of Irvine, Orange County	1995	0-0.25	Tustin
01591	Breece, Bill and Beth Padon	Archaeological and Paleontological Assessment of the Habitat Enhancement Project	1986	Within-1.0	Tustin
01614	Padon, Beth	Archaeological Monitoring of Preliminary Grading and Trenching for UCI/TIC University Research Park, Planning Area 25, Parcels 3 and 4, and Portions of Parcels 6, 7, and 8 of Tentative Parcel Map No. 94-160	1997	0.25-0.5	Tustin

Report Number (OR-)	Author(s)	Report Title	Year	Distance from APE (miles)	USGS 7.5' Maps
01651	Mason, Roger D., Wayne H. Bonner, Stephen J. Bouscaren, Larry Carbone, Robert O. Gibson, Lisa Klug, Mark L. Peterson, and Virginia Popper	San Joaquin Transportation Corridor Results of Data Recovery at CA-ORA-206	1997	0.5-1.0	Tustin
01690	Padon, Beth	Archaeological Monitoring Report, University Research Park, Phase III, Irvine, California	1998	0-0.25	Tustin
01693	Jertberg, Patricia R.	Archaeological Monitoring of Preliminary Grading and Trenching for Offsite Street, University Research Park, Phase III, Tentative Parcel Map No. 94-160	1998	0.25-0.5	Tustin
01708	Hurd, Gary S., and Michael E. Macko	Test Program Results, Significance Evaluations, and Recommendations for Mitigation of Impacts at CA-ORA-115a, -115b, -116, & -121b, University of California, Irvine, North Campus	1989	0-0.25	Tustin
01716	Mason, Roger D.	Treatment Plan Prehistoric Archaeological Sites Discovered During Constructions of the San Joaquin Hills Transportation Corridor (12-ORA-73, 12-102540), Orange County, California	1994	0.5-1.0	Laguna Beach, Tustin
01717	Mason, Roger D., and Brant A. Brechbiel	San Joaquin Hills Transportation Corridor Results of Construction Monitoring for Archaeological Resources Mitigation Monitoring Measures 11-1	1997	0.25-0.5	Dana Point, Laguna Beach, San Juan Capistrano, Tustin
01730	Chapman, Phillips, Brandt, Reddick, and Associates	Draft Environmental Impact Report Rancho San Joaquin Planned Community Irvine, California	1975	0.25-0.5	Newport Beach
01731	Unknown	Index to the Artifacts Collected During the Second Part of the WPA Project	1961	0.25-0.5	Laguna Beach, Newport Beach, Tustin
01733	Brown, Joan C.	Archaeological Monitoring During Excavation for the Green Acres Phase II Project Pipeline Extension Into Newport Beach (Contract Ga-97-1)	1998	0.25-0.5	Newport Beach, Tustin
01785	Brechbiel, Brant A.	Cultural Resources Records Search and Literature Review Report for a Pacific Bell Mobile Services Telecommunications Facility: Cm 005-15 in the City of Irvine, California	1998	0.5-1.0	Tustin

Report Number (OR-)	Author(s)	Report Title	Year	Distance from APE (miles)	USGS 7.5' Maps
01814	Padon, Beth	Archaeological Monitoring Report for One Park Place, Orange County	1994	0.25-0.5	Tustin
01828	Chace, Paul G.	A Cultural/scientific Resources Survey for the Irvine Planning Area 26, Bonita Canyon- Coyote Canyon, Zone Change 18903-zc, in the City of Irvine, Orange County, California	1995	0.5-1.0	Laguna Beach, Tustin
01880	Bonner, Wayne H.	Cultural Resources Monitoring L.A. Cellular Site 657.1 Irvine, Ca	1998	0.5-1.0	Tustin
01883	Getchell, Barbie Stevenson, and John E. Atwood	Cultural Resources Survey of a 46 Acre Portion of the San Joaquin Freshwater Marsh Reserve, Irvine, Orange County, California	1998	Within	Tustin
01909	Padon, Beth	Paleontological Monitoring for EH & S Building on University of California, Irvine Campus	1998	0.5-1.0	Tustin
01916	Strudwick, Ivan H.	Results of Archaeological Testing at Site CA-ORA-121, Locus C, Near Upper Newport Bay Orange County, California	1998	0.25-0.5	Tustin
01920	Grenda, Donn R., Christopher J. Doolittle, and Jeffrey H. Altschul	House Pits and Middens	1998	0-0.25	Tustin
01943	Duke, Curt, and Deborah K.B. McLean	Results of Archaeological Monitoring for the San Joaquin Marsh Enhancement Plan Project, City of Irvine, Orange County, California	1998	0.25-0.5	Tustin
01945	Padon, Beth	Archaeological Testing Report for CA-ORA-1041, University Research Park, Phase 10, Irvine, California	1999	0.25-0.5	Tustin
01952	Anonymous	Historic Property Survey Report, Route 73 and I-405 Improvements From Birch Street to I-405, From Bear Street to Euclid Street	1996	0.5-1.0	Newport Beach, Tustin
01972	Duke, Curt	Cultural Resource Assessment for Pacific Bell Mobile Services Facility Cm 536-01, in the County of Orange, California	1999	0.5-1.0	Tustin
01985	Duke, Curt	Cultural Resource Assessment for Pacific Bell Mobile Services Facility CM 482-05, County of Orange, California	1999	0.5-1.0	Tustin
02058	Padon, Beth	Paleontological and Archaeological Monitoring for University Research Park, Phase 10, Parcel a and Bison Avenue Landscape Area	2000	0.5-1.0	Tustin
02063	Padon, Beth	Paleontological and Archaeological Monitoring for California Avenue Sewer Line, Bison Avenue Water Line, and I-25/university Slope Repair Projects, University Research Park, Phase III and IV	1999	0.25-0.5	Tustin
02171	Getchell, Barbie	Archaeological Monitoring of the San Joaquin Reserve Enhancement Project in Irvine, Orange County	1999	Within	Tustin

Report Number (OR-)	Author(s)	Report Title	Year	Distance from APE (miles)	USGS 7.5' Maps
02225	Strozier, Hardy	The Irvine Company Planning Process and California Archaeology-A Review and Critique	1978	Within-1.0	Black Star Canyon, El Toro, Laguna Beach, Newport Beach, Orange, San Juan Capistrano, Tustin
02238	Lapin, Philippe	Cultural Resource Assessment for Pacific Bell Mobile Services Facility Cm 299-01, County of Orange, Ca	2000	0.25-0.5	Tustin
02252	Robbins, Susan	Michelson Water Reclamation Plant Riparian Way and Duck Club Road Improvements	2000	0.25-0.5	Tustin
02256	Demcak, Carol R.	Cultural Resources Assessments for Orange County Sanitation Districts	1999	0.5-1.0	Anaheim, La Habra, Los Alamitos, Newport Beach, Orange, Seal Beach, Tustin, Yorba Linda
02301	Avina, Mike	Monitoring Report for Xo California Builds-1920 Maple Ave., El Segundo, California, and 4000 MacArthur Blvd., Newport Beach, California	2001	0-0.25	Tustin, Venice
02348	McKenna, Jeanette A.	Review of Cultural Resource Assessment/Evaluation for Cingular Wireless Site Cm-299-04, Orange County, California	2001	0.5-1.0	Tustin
02350	Crabtree, Robert H.	Conclusion of Archaeological Investigations on a Portion of 105 Acres Located East of Jamboree Road, South of San Diego Freeway	1974	0.5-1.0	Tustin
02352	Unknown	Records Search and Reconnaissance Harvard Avenue Extension City of Irvine, California	1979	0.5-1.0	Tustin
02448	Strudwick, Ivan H.	Results of Archaeological Testing at Site CA-ORA-121, Locus C, Near Upper Newport Bay Orange County, California	1999	0-0.25	Tustin
02471	Duke, Curt	Cultural Resource Assessment Cingular Wireless Facility No. Cm 299-05 Orange County, California	2001	0.25-0.5	Tustin
02475	Duke, Curt	Cultural Resource Assessment Cingular Wireless Facility No. Sc 025-01 Orange County, California	2001	0-0.25	Tustin
02478	Duke, Curt	Cultural Resource Assessment Cingular Wireless Facility No. Sc 062-01 Orange County, California	2001	0.25-0.5	Tustin

Report Number (OR-)	Author(s)	Report Title	Year	Distance from APE (miles)	USGS 7.5’ Maps
02480	Crownover, Scott, Beth Padon, and Jane Rosenthal	Archaeological Investigations at CA-ORA-121 Orange County, California	1990	0-0.25	Tustin
02492	Bolin, David P.	Proposed AT&T Wireless Telecommunications Equipment Installation 2525 Dupont Drive, Irvine, California 92612	2001	0.5-1.0	Tustin
02494	Thane, Michael D.	Proposed Sheraton Rooftop Site 4701 Von Karman Avenue Newport Beach, Orange County, California	2001	0.5-1.0	Tustin
02496	Unknown	Archaeological Salvage Program at Locus B and the Peripheral Sector of Locus A, ORA-121 (287) Irvine, California	1979	0-0.25	Tustin
02534	Archaeological Research, Inc	Annual Report to The Irvine Company from Archaeological Research, Inc.	1976	Within-1.0	Black Star Canyon, El Toro, Laguna Beach, Orange, San Juan Capistrano, Tustin
02597	Duke, Curt	Cultural Resource Assessment Cingular Wireless Facility No. Sc 113-02 Orange County, California	2002	0.5-1.0	Tustin
02599	Cottrell, Marie G.	Report of Grading Activities, CA-ORA-111	1976	0.5-1.0	Tustin
02600	Cottrell, Marie G.	Archaeological Research, Inc. Quarterly Report	1975	0-0.25	El Toro, Laguna Beach, Newport Beach, Tustin
02601	Cottrell, Marie G.	Archaeological Testing Proposal of Site ORA-575, City of Irvine	1975	0-0.25	Tustin
02629	Pletka, Nicole	Results of Archaeological Monitoring the Bluffs Retain Center Newport Beach, Orange County, California	2003	0.5-1.0	Tustin
02636	Brown, Joan C.	A Cultural Resources Literature Study and Field Reconnaissance for the Natural Treatment System Master Plan Facilities, Orange County, California	2003	0-0.25	El Toro, Orange, Tustin
02672	Duke, Curt	Revised Cultural Resource Assessment Cingular Wireless Facility No. Cm 005-15 Orange County, California	2002	0.5-1.0	Tustin
02673	Brechbiel, Brant A.	Cultural Resources Records Search and Survey Report for a Pacific Bell Mobile Services Telecommunications Facility: Cm 005-15 in the City of Irvine, California	1998	0.5-1.0	Tustin

Report Number (OR-)	Author(s)	Report Title	Year	Distance from APE (miles)	USGS 7.5' Maps
02681	Duke, Curt	Cultural Resource Assessment AT & T Wireless Services Facility No. 13085a Orange County, California	2002	0.5-1.0	Tustin
02880	McLean, Deborah K.	Results of Cultural Resources Monitoring for the San Diego Creek North/Fletcher Jones Motor Cars Project, City of Newport Beach, Orange County, California	1997	0.25-0.5	Tustin
03182	Kyle, Carolyn E.	Cultural Resource Assessment for Cingular Wireless Facility Sc083-03 City of Irvine Orange County, California	2002	0.5-1.0	Tustin
03185	Bonner, Wayne H.	Records Search Results and Site Visit for Cingular Wireless Facility Candidate Sc-472-01 (William R. Mason Regional Park) 18712 University Drive, Irvine, Orange County, California	2004	0.5-1.0	Tustin
03204	Padon, Beth	Archaeological and Paleontological Monitoring at the Campus Center Multi-family Apartments Expansion, Building C, in the City of Irvine	2006	0-0.25	Tustin
03232	Harper, Caprice D.	Archaeological Survey Report for State Route 73/Jamboree Road Overcrossing Newport Beach, Orange County, California	2005	0.25-0.5	Tustin
03242	Strudwick, Ivan H.	Results of Cultural Resource Shovel Test Pit Excavation for the Carlson Marsh Regrade Project (IRWD Project No. 20173; LSA Project No. IRW330)	2004	0-0.25	Tustin
03245	Shepard, Richard S.	Preliminary Cultural Resources Assessment for Campus-Cornell Signalization, City of Irvine, Orange County, Caltrans District 12	2004	0.5-1.0	Tustin
03253	Brown, Joan C., and Patrick Maxon	Cultural Resources Monitoring for the Proposed Multi-family Rental Project, University of California, Irvine, Orange County, California	2006	0.5-1.0	Tustin
03254	Shepard, Richard S.	Cultural Constraints Assessment: Modifications to San Diego Creek Channel (f05), Irvine and Newport Beach, Orange County, California	2003	0-0.25	Tustin
03261	Commendador-Dudgeon, Amy, Beth Padon, and J. D. Stewart	Archaeological and Paleontological Monitoring for the Plaza Irvine Development, Phase 1, City of Irvine, Orange County, California	2006	0-0.25	Tustin
03264	Peterson, Patricia A., and Mason, Roger D.	Cultural Resources Monitoring Report for the Riparian View and Duck Club Road Improvements Project, San Joaquin Marsh Area, Orange County, California	2002	0.25-0.5	Tustin
03353	Schneeberger, Sandra L., Mark L. Roeder, and Beth Padon	Paleontologic Resource Assessment Report of a ~3.5 Acre Site, Located at 18880 Douglas Drive, 92612 for the Carlyle Project, a Part of the Irvine Business Center (IBC) Development APN# 445-013-02	2006	0.5-1.0	Tustin

Report Number (OR-)	Author(s)	Report Title	Year	Distance from APE (miles)	USGS 7.5' Maps
03354	Schneeberger, Sandra L., Christopher Drover, and Corry Schulga	Phase I Archaeological Resource Survey of a ~3.5 Acre Site, Located at 18880 Douglas Drive, City of Irvine, County of Orange, California, 92612 for the Carlyle Project, a Part of the Irvine Business Center (IBC) Development APN# 445-013-02	2006	0.5-1.0	Tustin
03499	Brown, Joan C.	Cultural Resources Monitoring for the Irvine Plaza III Project, City of Irvine, Orange County, California	2007	0-0.25	Tustin
03502	Wood, Catherine M.	Archaeological Survey Report San Diego Creek (Facility F05) Upper Newport Bay to I-405 Freeway Programmatic Maintenance Project, Orange County, California	2007	Within-1.0	Tustin
03648	Unknown	Methodology for the Excavation of Archaeological Sites on the J.M. Peters Bayview Planned Community Site		0.5-1.0	Tustin
03674	Bonner, Wayne H.	Cultural Resources Records Search and Site Visit Results for T-Mobile Candidate LA02927C (RSJ Golf Course), 1 San Joaquin, Irvine, Orange County, California	2007	0.5-1.0	Tustin
03704	Brown, Joan C.	Cultural Resources Monitoring for the Irvine Plaza IV Project, City of Irvine, Orange County, California	2008	0-0.25	Tustin
03705	Getchel, Barbie, and John E. Atwood	Cultural Resources Inventory of the San Joaquin Freshwater Marsh Reserve Phase II Enhancement Plan Project Area In the City of Irvine, Orange County, California	2007	Within-0.25	El Toro
03876	Padon, Beth, and J.D. Stewart	Archaeological and Paleontological Monitoring for California Avenue Widening, University of California, Irvine, California	2010	0-0.25	Tustin
03946	Bedell, Joan, and Ed Moore	ORA 119 (Town Center Site)	1984	0-0.25	Tustin
03972	Kim, Steve	Proposed Federal Aviation Administration (FAA) Airport Surface Detection Equipment, Model X (ASDE-X) System to Serve John Wayne-Orange County Airport (SNA), Santa Ana, California	2007	0.5-1.0	Laguna Beach, Los Alamitos, Newport Beach, Tustin
03979	Chung, Jae	University of California at Irvine has submitted an application for Department of the Army authorization, under section 404 of the Clean Water Act to discharge fill materials associated with the expansion of the health science center in unnamed tributary	2007	0-0.25	Tustin
04031	Padon, Beth	Subject: Phase I Archaeological Study Report for Alumni Center at the University of California Irvine Campus	2011	0-0.25	Tustin

Report Number (OR-)	Author(s)	Report Title	Year	Distance from APE (miles)	USGS 7.5' Maps
04103	Fulton, Phil	Finding of Effect for the Route 73 Basin Sedimentation Project, Orange County, California, EA 0H4400	2009	0.25-0.5	Laguna Beach, Newport Beach, San Juan Capistrano, Tustin
04106	Bray, Madeleine	IRWD Biosolids Handling and Energy Recovery Facilities Project Draft Phase I Cultural Resources Study	2011	0.25-0.5	Tustin
04165	Padon, Beth	Paleontological Monitoring Gavin Herbert Eye Institute, University of California, Irvine	2012	0.5-1.0	Tustin
04515	Tang, Bai "Tom"	Evaluation of Potential Historical Resource Phineas Banning Alumni House (Building #233), University of California, Irvine, City of Irvine, Orange County	2015	0.5-1.0	Tustin
04574	Brunzell, David	Cultural Resources Assessment of the Crown Castle USA Southern California Metro PCS DAS Project, Orange and Los Angeles Counties, California (BCR Consulting Project No. SYN1007)	2011	0-0.25	El Toro, La Habra, Laguna Beach, Newport Beach, Orange, San Juan Capistrano, Tustin, Yorba Linda
04622	Gust, Sherri, Victoria Harvey, and Tria Belcourt	Cultural Resources Assessment for the OC-44 Pipeline Rehabilitation/Replacement Project, City Of Newport Beach, Orange County, California	2014	0.25-0.5	Tustin
04623	Michael Baker International	Archaeological Construction Monitoring Treatment Plan for the OC-44 Pipeline Rehabilitation Project	2018	0.25-0.5	Tustin

CONFIDENTIAL APPENDIX D. RESOURCE LOCATION MAPS WITH PROPOSED WORK AREAS

CONFIDENTIAL APPENDIX E. DPR SITE RECORD UPDATES

Appendix E
Paleontological Resources Assessment Report

cogstone
PALEONTOLOGY - ARCHAEOLOGY - HISTORY

PALEONTOLOGICAL RESOURCES ASSESSMENT REPORT FOR THE UNIVERSITY OF CALIFORNIA NATURAL RESERVE SYSTEM SAN JOAQUIN MARSH RESERVE WATER CONVEYANCE AND DRAINAGE IMPROVEMENT PROJECT, CITY OF IRVINE, ORANGE COUNTY, CALIFORNIA

Prepared for:
Moffatt and Nichol
4225 East Conant Street, Long Beach, CA 90808

Authors:
Kelly Vreeland, M.S. and Kim Scott, M.S.

Principal Investigator and Orange County Qualified Paleontologist:
Kim Scott, M.S.

Updated March 2021

Cogstone Project Number: 5084
Type of Study: Paleontological resources assessment
Localities within the Project area: none
USGS 7.5' Topographic Quadrangle: Tustin
Area: approximately 199 acres
Key Words: Negative Survey, Paleontological Resources Assessment, modern artificial fill (no fossil potential), Holocene and late Pleistocene young axial channel deposits (fossil potential low to moderate depending on cut depths), late to middle Pleistocene old paralic deposits overlain by alluvial-fan deposits (fossil potential low to moderate depending on cut depths)

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LIST OF ABBREVIATIONS AND ACRONYMS

†	the taxon is extinct, although there may be living relatives in same genus or family
?	With a scientific name: indicates that species identification is "uncertain" with a greater uncertainty than cf.; OR questionably identified (similar to "cf.")
B.A.	Bachelor of Arts
BLM	Bureau of Land Management
B.S.	Bachelor of Science
CEQA	California Environmental Quality Act
cf.	indicates that the identification is provisional; short for the Latin *confer/conferatur*, both meaning "compare"; OR similar to but not definitely the same as
Cogstone	Cogstone Resource Management, Inc.
e.g.	for example
Elements	conceptual design elements
et al.	and others
etc.	et cetera
GIS	Geographic Information System
IRWD	Irvine Ranch Water District
LACM	Natural History Museum of Los Angeles County
M.S.	Master of Science
NEPA	National Environmental Policy Act
PBDB	Paleobiological Database
PFYC	Potential Fossil Yield Classification
Project	University of California (UC) Natural Reserve System (NRS) San Joaquin Marsh Reserve Water Conveyance and Drainage Improvement Project (SJMRCDI)
sp.	species cannot be confirmed
UCI	University of California, Irvine
UCMP	University of California, Museum of Paleontology
USGS	United States Geological Survey

SUMMARY OF FINDINGS

The purpose of this study is to determine the potential for impacts to paleontological resources resulting from proposed construction of the University of California (UC) Natural Reserve System (NRS) San Joaquin Marsh Reserve Water Conveyance and Drainage Improvement Project (SJMRCDI; Project) in the City of Irvine, Orange County, California. The proposed Project anticipates to help the University of California, Irvine better manage existing water sources within the marsh to improve circulation and long term soil and water chemistry through providing drainage, by increasing capacity for wetland habitat, and improving controls to retain water in priority management cells during drought. The anticipated maximum depth of excavation is five feet.

The Project surface is mapped with modern artificial fill, Holocene and late Pleistocene young axial-channel deposits, and late to middle Pleistocene old paralic deposits overlain by alluvial-fan deposits. The record search revealed no fossil localities from similarly aged deposits from within the Project, however localities are known from sediments the same age as sediments found within the study area near to the Project. Similarly aged deposits in southern Orange County have produced extinct Pleistocene megafauna, including sabre-toothed cat, Harlan's ground sloth, dire wolf, yesterday's camel, antique bison, and Columbian mammoth.

Sediments mapped as Holocene on the surface are assigned a low potential for fossils (Potential Fossil Yield Classification [PFYC] 2) for sediments less than eight feet below the modern surface, due to the lack of fossils in these deposits from nearby locations. Deeper than eight feet below the surface the potential for fossils increases to moderate (PFYC 3). Sediments mapped as Pleistocene on the surface are assigned a low potential for fossils (PFYC 2) for sediments less than five feet below the modern surface due to the lack of fossils in these deposits from nearby locations. More than five feet below the surface the potential for fossils increases to moderate (PFYC 3).

Based on the current planned construction, fossils are unlikely to be impacted during excavations. If augering occurs, the auger may bring fossil fragments to the surface, but any such specimens will lack context such as depth/elevation, formation identification, and other data that are critical to determining scientific significance. No mitigation is therefore recommended for augering activities.

If unanticipated discoveries of paleontological resources occur during construction, all work within 25 feet of the discovery should be halted until the find has been evaluated by an Orange County qualified paleontologist.

INTRODUCTION

PURPOSE OF STUDY

The purpose of this study is to determine the potential impacts to paleontological resources during the University of California (UC) Natural Reserve System (NRS) San Joaquin Marsh Reserve Water Conveyance and Drainage Improvement Project (SJMRCDI; Project; Figures 1, 2, and 3) in the City of Irvine, Orange County, California. The University of California system is the lead agency for this Project under the California Environmental Quality Act (CEQA). The work in this report has been prepared under the guidelines set forth by CEQA. Due to the proximity of the Project to the San Diego Creek, the Project also requires a Clean Water Act Section 404 permit from the United States Army Corps of Engineers and must comply with the National Environmental Policy Act (NEPA). The United States Army Corps of Engineers is the lead agency under NEPA.

PROJECT LOCATION

The Project encompasses approximately 199 acres and is mapped within Sections 7, 8, 17, and 18, of Township 6 South, Range 9 West, in the Tustin United States Geological Survey (USGS) 7.5' quadrangle within the San Bernardino Base and Meridian (Figure 2). It is bound by University Drive to the south, Campus Drive to the east, Jamboree Road to the north, and MacArthur Boulevard to the west.

Figure 1. Project vicinity

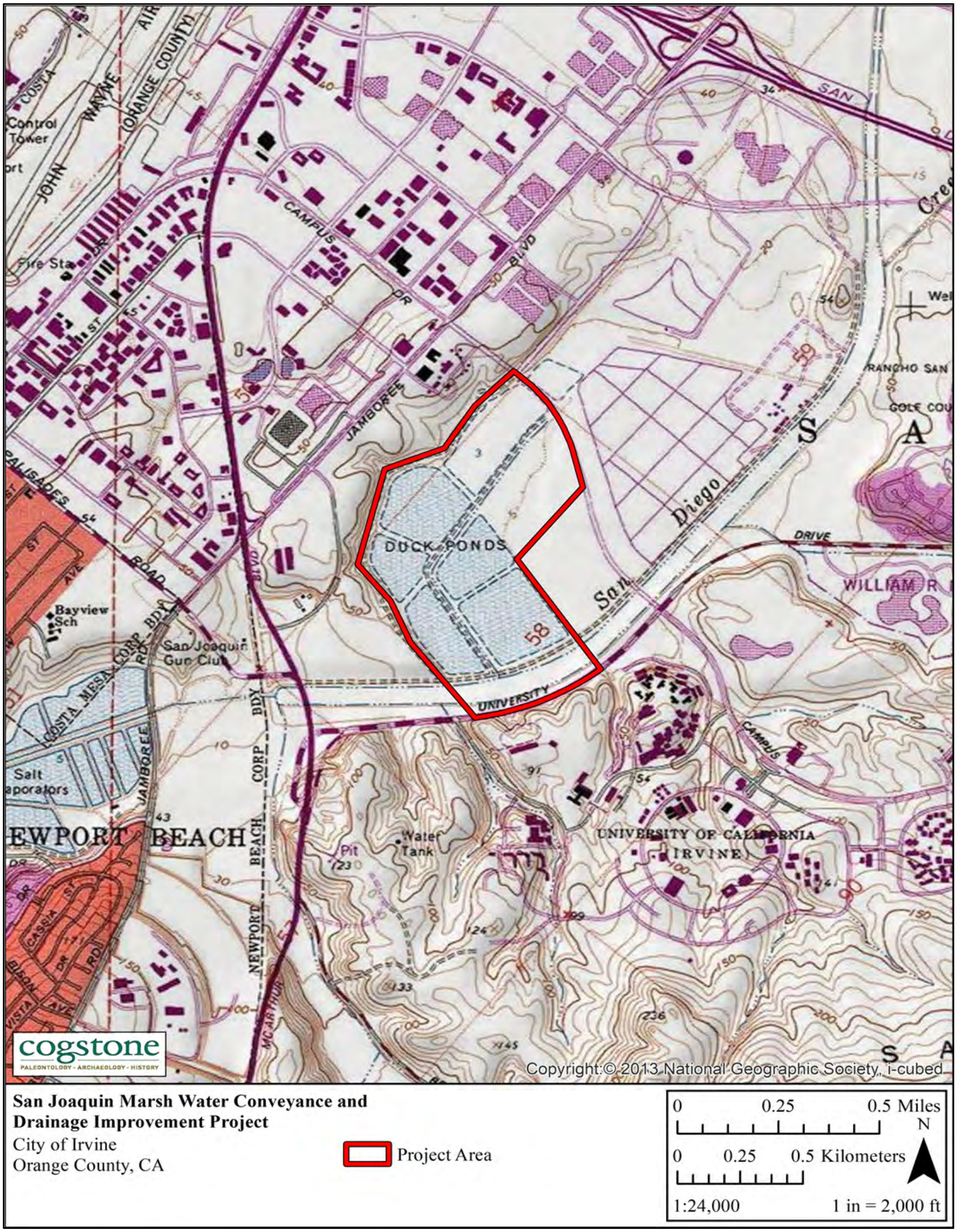

Figure 2. Project topographic map

Figure 3. Project aerial map

PROJECT DESCRIPTION

The proposed Project activities are intended to improve the long-term water management and habitat value of the Marsh Reserve. One of the Project's design goals proposes infrastructure establishment and/or modifications that anticipate impacts of climate change (e.g., drought, flooding, and sea level rise), primarily associated with the Lower Marsh. This Design Goal is for Lower Marsh Drainage Conveyance and Hoag Pond Water Control Features ("Design Goal 1"). Design Goal 1 includes Project Elements 1 through 5 as described in detail below. A second design goal, "Design Goal 2", focuses on water sourcing, treatment and measurement (from Irvine Ranch Water District [IRWD] or San Diego Creek). Design Goal 2 is for IRWD Water Conveyance and Retention in Experimental and Water Catchment Basins, which includes Project Elements 6 through 8 as described in detail below.

Temporary construction activities include excavation that will enhance water distribution and expansion of wetland habitat, raising berms/dirt roads to increase storage capacity and duration and efficiency of passive drainage, and the installation of new and/or replacement water control mechanisms such as culverts, headwalls, pipes, and slide gates. The proposed Project is necessary to ensure better management of existing water sources within the Marsh Reserve, thus improving circulation and long-term soil and water chemistry by providing improved drainage, increasing water capacity for wetland habitat, and enhancing controls to retain water in priority management cells during drought. The Project does not propose the use of additional water sources; however, the proposed elements would allow for additional water capacity should additional water inputs become available in the future. The proposed Project improvements have been separated into individual conceptual design elements (Elements). The location of these various Project Elements are described in Table 1 and are shown on Figure 4 (Moffatt and Nichol 2020). Because these Elements are in the conceptual design stage, minor changes could occur as a result of additional analysis and/or trustee/responsible agency input received during future advanced design phases. In general, minor changes to the Project Elements would neither change their intended purpose nor would they be anticipated to result in a substantial change in associated impacts from those discussed, analyzed and presented in this document.

Table 1. SJMRCDI Project Conceptual Design Elements Conceptual Design Elements. Elements 1-5 are part of Design Goal 1 and Elements 6-8 are part of Design Goal 2 (Moffat and Nichols 2020).

Element		Location	Goal	Equipment
1	Replace existing open pipe with culvert and slide gate	Existing levee between Middle Marsh and Lower Marsh	Control water movement from the Middle Marsh to the Lower Marsh to maintain Middle Marsh refugia in dry years and expand habitat in the Lower Marsh in wet years.	Excavation equipment, concrete and delivery trucks
2	Restore or replace a non-functioning outlet to San Diego Creek	Existing non-functioning south culvert between the Lower Marsh and San Diego Creek	Restore a viable connection through the south culvert, between the Lower Marsh and San Diego Creek allowing water circulation and discharge during extreme flood events. Provide future capability for flow from San Diego Creek into the Marsh with future sea level rise.	Excavation equipment, delivery trucks, vacuum truck
3	Excavate a curvilinear swale	Along the lower 2/3rds of the Lower Marsh, beginning below a new raised berm defining an upper pooled area to the restored South Culvert draining to San Diego Creek	Create swale to concentrate and direct water, allow wetland habitat to persist during wet years, and provide directed drainage during flood years. Protect in place deeper pooled areas along the upper, west edge of the Lower Marsh by allowing a rise in elevation prior to the beginning of the swale directing water to the drainage culvert. Funding permitting, possible broadening of the swale on marsh side of South Culvert, to function as additional habitat and to accommodate future sedimentation.	Excavation equipment marsh buggy, backhoe, front-end loader, grader
4	Install culvert with slide gate	Between Hoag Pond and Experimental Pond 3	Increase the function of Hoag Pond as an optional water source for the Experimental Pond pipe network through the Pond 3 connection to the system. It is the most suitable cell due to its large area and depth, and it is adjacent to San Diego Creek.	Excavation equipment, concrete and delivery trucks
5	Raise berm	Between Hoag Pong and Experimental Pond 3	Increase the water capacity and water surface elevation of Hoag Pond and Experimental Pond 3 to support wetland habitat in these areas, in addition to passive flow to other connected Experimental Ponds when needed.	Dump trucks, front-end loader, backhoe, grader
6	Raise berm and modify or replace the existing culvert	Along Middle Marsh berm road and existing headwall at Middle Marsh slide gate leading to Seasonal Marsh.	Allow the Middle Marsh to fill to capacity without overtopping its existing headwall.	Concrete and delivery trucks, front-end loader, backhoe, grader
7a	Install water measurement sensor	Existing IRWD Inlet in the Upper Marsh adjacent to Campus Drive.	Measure water quantity coming from IRWD.	Hand tools

Element		Location	Goal	Equipment
7c	Convey IRWD water more directly to the Experimental Pond pipe network by installing pipe(s) or a swale.	From the Campus Drive culvert at the Upper Marsh gate (7c), determine the best path from the existing Upper Marsh swale, under the dirt road separating the Upper Marsh and Seasonal Marsh, to a lower pooled area in the southwest corner of Seasonal Marsh. From this pooled area, water would be pumped through a newly installed pipe (with one-way flap) under the road to a connection with the existing Experimental Pond pipe network. The connection to the Experimental Pond pipe network may be established by going through Pond 10 or the Middle Marsh, whichever is deemed most effective and least impactful to existing habitat.	Enable the conveyance of water from IRWD to the Experimental Ponds pipe network, allowing for semi-permanent to perennial wetland/pond conditions in this area without needing to first fill the Middle Marsh. Minimize long term habitat impacts and maintenance costs.	Delivery trucks, excavation equipment, marsh buggy, backhoe, front-end loader, grader
7b	Install headwall w/ gate	From the Campus Drive culvert at the Upper Marsh gate (7c), determine the best divergence point from the existing Upper Marsh swale to establish a headwall and gate to convey water under the dirt road separating the Upper Marsh and Seasonal Marsh. The best stretch of existing swale to add a connection under the road is approximately 75 ft- 250 ft down steam of the existing swale. Net excess excavation material can be beneficially re-used to create a low-profile island in the Middle Marsh.	Improve the distribution of water from IRWD to the Experimental Ponds more directly, bypassing the Middle Marsh. A slide gate will connect a pooled swale or pipe from Upper Marsh or Seasonal Marsh to a pipe in Pond 10 or the Middle Marsh leading to the culvert at the end of the Experimental Pond pipe network. The Experimental Ponds are managed as semi-permanent marsh and perennial ponds, and thus need to receive water later in the year than other marsh areas. This is also important for managing mosquito populations to not have all units filled year-round. The Middle Marsh island can provide a dry habitat area for turtles and birds.	Excavation equipment, concrete and delivery trucks
8	Expand and modify Water Catchment Basin and Pond 1 area		Allow for greater capacity adjacent to the existing Water Catchment Basin and Pond 1.	Excavation Front-end loader, backhoe

IRWD – Irvine Ranch Water District

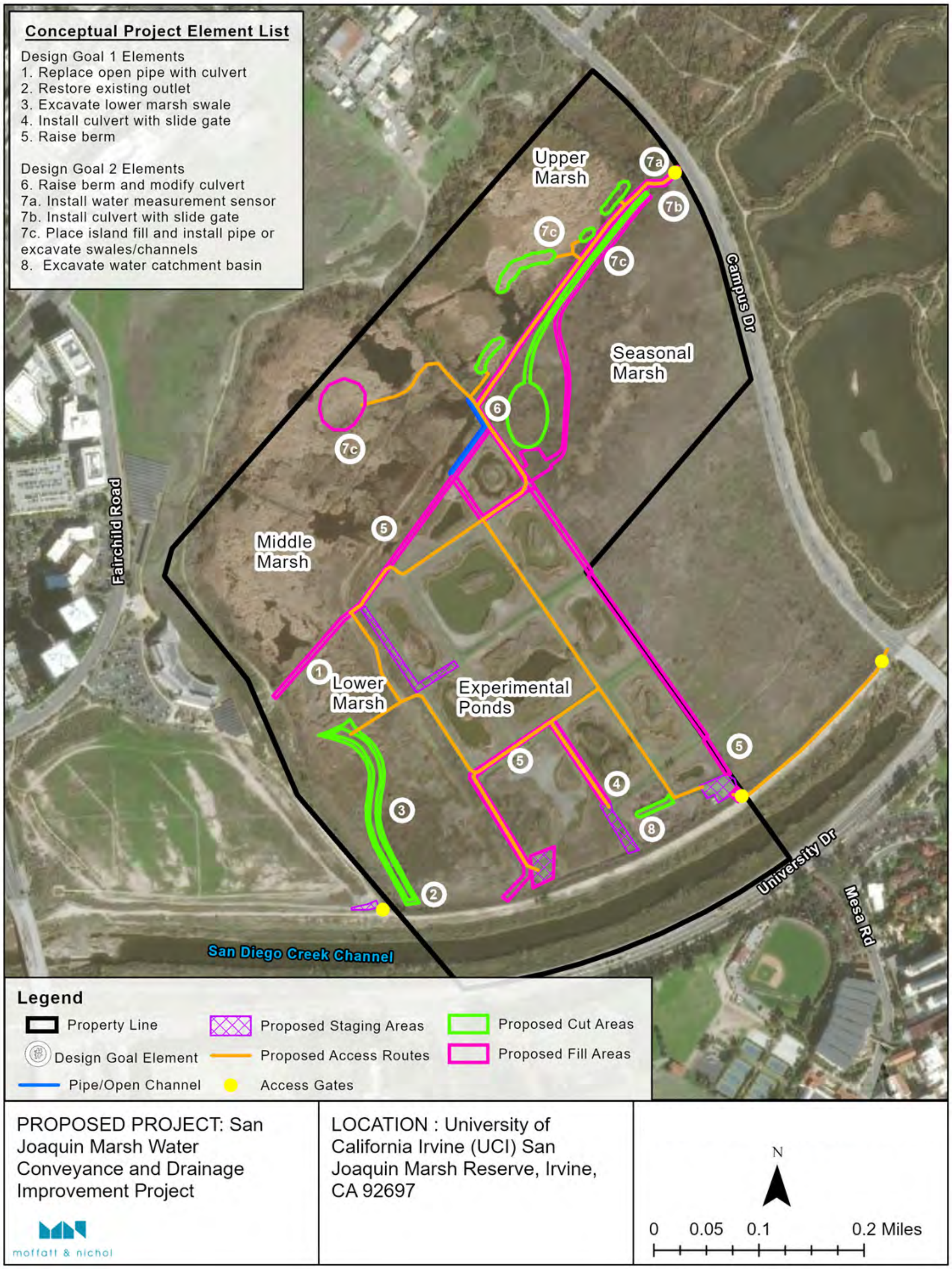

Figure 4. Project elements map (Moffatt and Nichol 2020)

PROJECT PERSONNEL

Cogstone Resource Management, Inc. (Cogstone), conducted the paleontological resources studies; a brief resume for the senior staff is appended (Appendix A).

- Kim Scott served as the principal paleontologist for the Project and reviewed this report for quality control. Kim has an M.S. in biology, with an emphasis in paleontology, from California State University, San Bernardino, and a B.S. in geology, with an emphasis in paleontology, from the University of California, Los Angeles, as well as more than 25 years of experience in California paleontology and geology.
- Kelly Vreeland wrote this report. Kelly has an M.S. and B.S. in geology, with an emphasis in paleontology, from California State University, Fullerton, as well as 10 years of experience in California paleontology and geology.
- Sandy Duarte conducted the intensive pedestrian survey. Sandy holds a BA in Anthropology from the University of California, Santa Barbara, and has more than 15 years of experience in southern California archaeology, and is cross-trained in paleontology.
- Logan Freeberg prepared the geographic information system (GIS) maps used throughout this report. Logan has a B.A. in anthropology from the University of California, Santa Barbara and a certificate in GIS from California State University, Fullerton, as well as 15 years of experience in California archaeology.
- Debbie Webster provided technical editing.

REGULATORY ENVIRONMENT

FEDERAL LAWS AND REGULATIONS

If the presence of a significant environmental, cultural, or paleontological resource is identified during the scoping process, Federal agencies and their agents must take the resource into consideration when evaluating project effects when a project is proposed for development on Federal land, or land under Federal jurisdiction. The level of consideration depends upon the Federal agency involved.

NATIONAL ENVIRONMENTAL POLICY ACT

The National Environmental Policy Act (NEPA; 42 USC 4321-4347) mandates the protection of cultural resources within its general policy for environmental protection. It requires the preservation of important historic, cultural, and natural aspects of our national heritage, and the maintenance, wherever possible, of an environment that supports diversity and a variety of individual choice. Regulations promulgated by the Advisory Council on Historic Preservation provide for the coordination of NEPA and National Historic Preservation Act (NHPA) compliance, under 36 CFR Part 800.14(a). Regulations for implementing the procedural provisions of NEPA are available at 40 CFR Part 1500-1508.

STATE LAWS AND REGULATIONS

CALIFORNIA ENVIRONMENTAL QUALITY ACT

CEQA includes paleontological, archaeological, and historic resources as integral features of the environment. CEQA states that: It is the policy of the state that public agencies should not approve projects as proposed if there are feasible alternatives or feasible mitigation measures available which would substantially lessen the significant environmental effects of such projects, and that the procedures required are intended to assist public agencies in systematically identifying both the significant effects of proposed project and the feasible alternatives or feasible mitigation measures which will avoid or substantially lessen such significant effects.

CEQA declares that it is state policy to: “take all action necessary to provide the people of this state with...historic environmental qualities.” It further states that public or private projects financed or approved by the state are subject to environmental review by the state. All such projects, unless entitled to an exemption, may proceed only after this requirement has been satisfied. CEQA requires detailed studies that analyze the environmental effects of a proposed project. In the event that a project is determined to have a potential significant environmental effect, the act requires that alternative plans and mitigation measures be considered.

If paleontological resources are identified as being within the proposed project study area, the sponsoring agency must take those resources into consideration when evaluating project effects. The level of consideration may vary with the importance of the resource.

PUBLIC RESOURCES CODE

Section 5097.5: No person shall knowingly and willfully excavate upon, or remove, destroy, injure or deface any historic or prehistoric ruins, burial grounds, archaeological or vertebrate paleontological site, including fossilized footprints, inscriptions made by human agency, or any other archaeological, paleontological or historical feature, situated on public lands (lands under state, county, city, district or public authority jurisdiction, or the jurisdiction of a public corporation), except with the express permission of the public agency having jurisdiction over such lands. Violation of this section is a misdemeanor. As used in this section, "public lands" means lands owned by, or under the jurisdiction of, the state, or any city, county, district, authority, or public corporation, or any agency thereof.

CALIFORNIA ADMINISTRATIVE CODE, TITLE 14, SECTION 4307

This section states that "No person shall remove, injure, deface or destroy any object of paleontological, archeological or historical interest or value."

DEFINITION AND EVALUATION OF SCIENTIFIC SIGNIFICANCE FOR FOSSILS

Only qualified, trained paleontologists with specific expertise in the type of fossils being evaluated can determine the scientific significance of paleontological resources. Fossils are considered to be scientifically significant if one or more of the following criteria apply:

1. The fossils provide information on the evolutionary relationships and developmental trends among organisms, living or extinct;
2. The fossils provide data useful in determining the age(s) of the rock unit or sedimentary stratum, including data important in determining the depositional history of the region and the timing of geologic events therein;
3. The fossils provide data regarding the development of biological communities or interaction between paleobotanical and paleozoological biotas;
4. The fossils demonstrate unusual or spectacular circumstances in the history of life;
5. The fossils are in short supply and/or in danger of being depleted or destroyed by the elements, vandalism, or commercial exploitation, and are not found in other geographic locations (Scott and Springer 2003; Scott et al. 2004).

Scientific significance is assessed subsequent to the recovery and identification of fossils, usually by the scientific institution receiving the fossils. Typically, all identifiable vertebrate fossils are to be curated in perpetuity at an accredited repository after excavations have finished. Nonvertebrate fossils (plants, shells, trace fossils, etc.) may be collected as a representative sample when numerous fossils of the same species are present. Although initial identifications can be made in the field, final determination on fossil identifications and significance must be made by the repository.

In the case of unidentifiable fossils, unless they can be used for radiometric dating these typically do not meet the significance criteria listed above. In the case of isolated finds or single bones, while they may not initially appear to meet the scientific significance criteria listed above by themselves, they cannot immediately be discounted as not scientifically significant. This is because the evaluation of evolutionary relationships, development of biological communities, interaction between paleobotanical and paleozoological biotas, or unusual or spectacular circumstances in the history of life (criteria 1, 3, and 4 above) require a large quantity of data to assess. The accumulation of information on localities of similar age with identifiable fossils recovered in a geographic area is necessary to build these data sets.

BACKGROUND

GEOLOGICAL SETTING

The Project is in the northern extent of the California Geomorphic Province known as the Peninsular Ranges. The Peninsular Ranges geomorphic province extends from Mount San Jacinto in the north, through the tip of Baja, Mexico in the south. Subparallel to these ranges on the east is the San Andreas Fault Zone. The northwestwards motion of the Pacific Plate has created these ranges and their corresponding valleys (Wagner 2002).

STRATIGRAPHY

The Project surface is mapped as modern artificial fill less than 200 years old, Holocene and late Pleistocene young axial-channel sediments deposited less than 126,000 years ago, and late to middle Pleistocene old paralic deposits overlain by alluvial-fan deposits emplaced between 774,000 - 11,700 years ago (Morton and Miller 2006; Figure 5).

ARTIFICIAL FILL, MODERN

Artificial fill is typically less than a few feet thick, however it can be substantially thicker in the areas of overpasses, freeways, and other large earthworks. Any fossils that may be encountered therein are not scientifically significant. It is highly likely that the fill was obtained from the surrounding estuary (Figure 5).

YOUNG AXIAL CHANNEL DEPOSITS, LATE PLEISTOCENE TO HOLOCENE

Axial channel deposits were emplaced adjacent to streams in through-going stream valleys. Sediments are slightly to moderately indurated and consist of silts to pebbles (Morton and Miller 2006). Much of the Project area is mapped as young axial channel deposits.

OLD PARALIC DEPOSITS OVERLAIN BY ALLUVIAL FAN DEPOSITS, MIDDLE TO LATE PLEISTOCENE

Paralic deposits were emplaced adjacent to the ocean and include interfingered strandline, beach, estuarine, and colluvial deposits. These poorly sorted, moderately permeable, reddish-brown, deposits are composed of silt, sand, and cobbles. The top of the unit is capped by thin but extensive sand-rich alluvial fan deposits derived from local sources (Morton and Miller 2006). These deposits are mapped in the northwestern portion of the Project area and likely underlie the entire project at unknown depths.

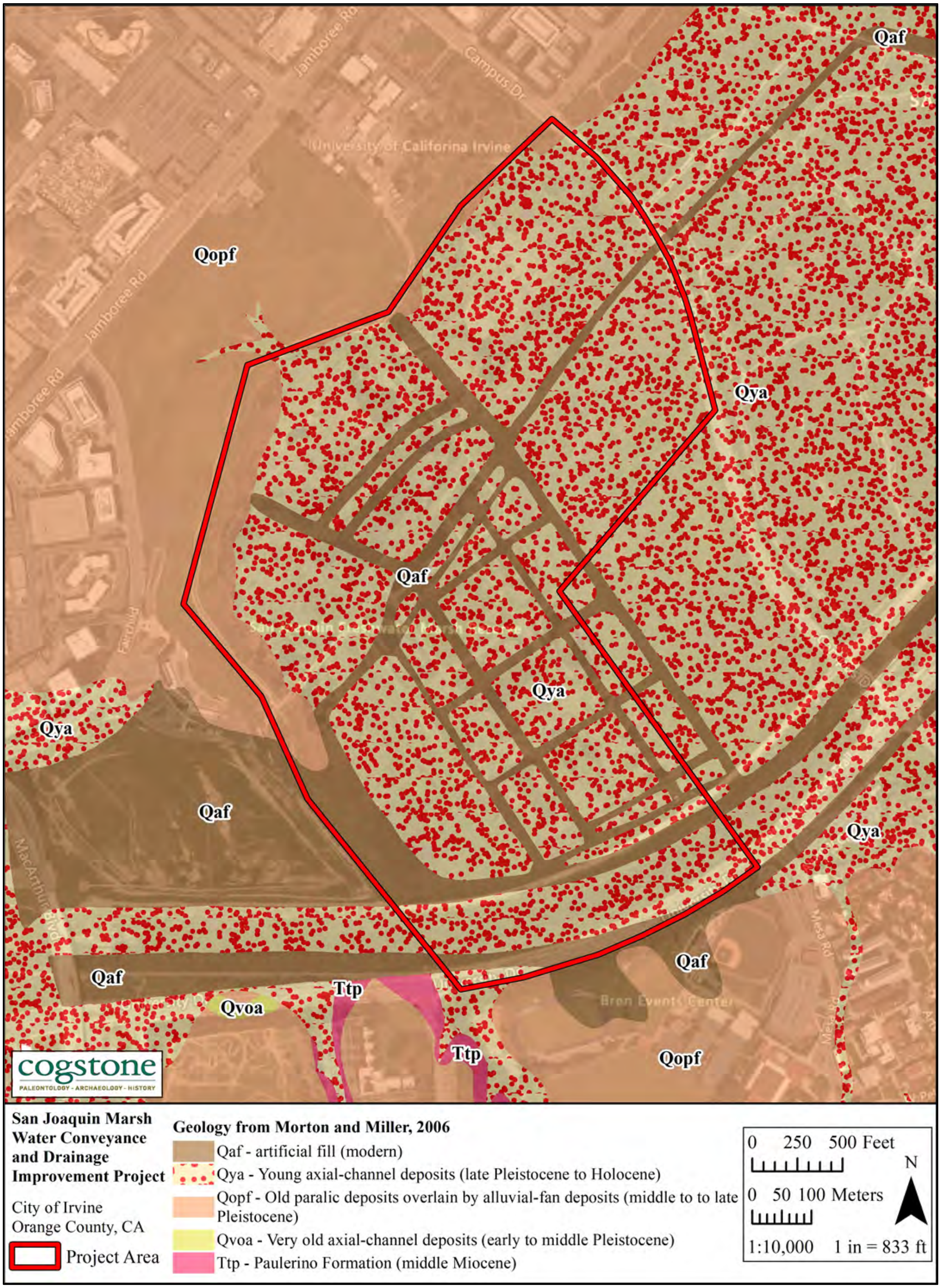

Figure 5. Project geology map

GENERAL OVERVIEW OF REGIONAL PALEONTOLOGY

In general, the entire western margin of North America is rich with marine fossils. This is because the coastline has been tectonically active for millions of years, creating numerous marine basins that received large amounts of sediment from the adjacent continental land mass. Each such basin possesses a sequence of stacked sediments and fossils that records the history of the basin. A typical basin goes through several stages including rifting, deepening, and filling with sediment. Some basins fill with enough sediment to form shallow terrestrial plains that accumulate river, lake, and alluvial fan deposits. Although some fossilization occurs in lakes and rivers, very little occurs in other environments. This makes terrestrial fossils, and especially vertebrates, rare when compared to marine fossils.

The southern California coastal region is important in geologic and paleontological studies of western North America because the stratigraphic sequence of its sediments is very complete; there are only a few gaps in a nearly continuous sequence of sedimentary deposits from the late Cretaceous (~70 million years ago) through the present.

In southern California, marine deposits of late Cretaceous age (~70 - ~65 million years ago) near the coast yield fossil mollusks predominantly, with vertebrate remains discovered only infrequently. Fishes and marine reptiles are better known from more inland Cretaceous age deposits, such as the Moreno Formation in the Coalinga area. Although some dinosaurs and small mammals are known from California formations, they are extremely rare. Most of California was under water during the Cretaceous, so any terrestrial animal or plant would have had to have been washed out to sea to be preserved in our fossil record.

The record of Paleocene (~65 - ~55 million years ago) life in the region is primarily that of invertebrates and the occasional shark and bony fish. The mass extinction at the end of the Cretaceous killed all dinosaurs except for birds, all marine reptiles except for turtles and the marine cephalopods known as ammonites. This left major ecological niches that mammals would come to dominate in the next 65 million years, but during the Paleocene, mammals were still small and had not colonized the oceans yet.

Early Californian coastal deposits of Eocene (~55 - ~34 million years ago) and Oligocene (~34 - ~23 million years ago) age have yielded abundant invertebrate assemblages with infrequent vertebrate fossils. If they were to produce vertebrate fossils, they would most likely be of sharks, bony fishes, marine turtles, birds, early cetaceans, and the occasional terrestrial mammal that had been washed out to sea.

It is not until the Miocene (~23 - ~5 million years ago) that marine deposits in the coastal zone began to preserve diverse marine vertebrate assemblages in addition to abundant assemblages of fossil invertebrates. These vertebrate assemblages include sharks, bony fishes, turtles, birds, sea cows, sea lions, walruses, dolphins, and whales.

During the Pliocene Epoch (~5 - ~2 million years ago) coastal California began to emerge progressively from the sea, and most deposits of this age represent relatively shallow, near shore marine environments. More modern-appearing groups of animals are thus present in deposits of this age. The mollusks are increasingly represented by living genera, and even by some living species. The cetaceans and pinnipeds of Pliocene age usually are members of living families and genera. As most of these deposits were still marine, fossils of terrestrial animals continued to be rare.

In general, although the California coastal region is not known for a wealth of Miocene and Pliocene marine vertebrate fossils, there have been enough specimens found to indicate the high potential for significant new discoveries in any rocks of this age in the area. Among the fossil marine mammal specimens that have been reported in the literature there are a relatively high percentage of holotype specimens that have been used to describe new species.

As the ocean continued to recede (or the land to rise), coastal California changed from shallow marine to terrestrial by the Pleistocene Epoch (~2.6 million – ~11, 000 years ago). The developing terrestrial landscape had a climate that was moister than the present, with free flowing streams and relatively abundant standing water. Numerous water sources provided numerous opportunities for fossilization, giving us a fairly complete view of Pleistocene life. An increase in water also allowed the vegetation to flourish and would have resembled the flora that is now found near Monterey, California. Megafauna present in the region included ground sloths, mammoth, mastodon, horse, camel, bison, antelope, peccary, wolf, and saber-toothed cat. Small animals were abundant and included most of the same species found in the same areas today.

RECORDS SEARCH

The following are confidential museum records. As such no maps of the localities are provided unless the locality may be impacted by the Project. Cogstone requested a records search from the Natural History Museum of Los Angeles County, Department of Vertebrate Paleontology (LACM) that covered the Project area as well as a one-mile radius (Bell 2020; Appendix B). Additional records from the Orange County Paleontology Collection (OCPC 2018), the University of California Museum of Paleontology database (UCMP 2020), the PaleoBiology Database (PBDB 2020), and print sources were searched for fossil records.

RECORDS SEARCH RESULTS

The LACM has no record of fossils that lie directly within the Project area, but they do have fossil localities nearby from sedimentary deposits similar in age to sediments that occur at the surface in the Project area (Tables 2 and 3). Records from Bell (2020) for formations not likely to be impacted during this Project are omitted from these results.

Numerous localities within the City have produced fossils of Pleistocene terrestrial animals. Most of these have been concentrated in the San Joaquin Marsh area between MacArthur Blvd, Highway 405, and the San Diego Canal. These localities are within a mile and half of the study area, primarily to the northeast to the northwest of the Project. Six localities within the City have produced Pleistocene marine invertebrates from approximately 60 feet deep just north of Jamboree and Michelson, approximately 1.5 miles to the northeast of the Project (Cogstone 2018).

Three localities near to the Tustin Marine Corps Airbase, approximately 6.5 miles to the northeast of the Project, have also produced the fossils of extinct animals (Jefferson 1991a, 1991b; Govean 1992, Conking 1997, Michalsky and Sample 2002, Lander 2008, Smith 2009 Cogstone 2018, McLeod 2018, OCPC 2018). These localities have produced fossils of ground sloth, dire wolf, coyote, bear, American lion, saber-toothed cat, mammoth, mastodon, horse, tapir, camel, llama, ancient bison, diminutive pronghorn, bat, rodent, bird, reptile, and amphibian.

In the City of Newport Beach, a rich fauna of both marine and nonmarine Pleistocene fossils have been recovered from 16 localities along the eastern side of Newport Bay, between 0 and 3.5 miles to the southwest of the study area (Miller 1971; Jefferson 1991a, 1991b; McLeod 2018). These localities have produced fossils of ground sloth, dire wolf, American lion, mammoth, mastodon, horse, tapir, camel, ancient and long-horned bison, shrew, rodent, bat, bird, reptile, amphibian, marine bony fish, sharks, rays, and marine invertebrates. Another eighteen localities, mostly from the Newport Bay area, have produced numerous marine invertebrates at or near to the surface (McLeod 2018, UCMP 2020)

In the City of Laguna Hills, Costeau Pit, located 10 miles to the southeast of the study area, has produced coyote, dire wolf, saber-toothed cat, camel, llama, diminutive pronghorn, long-horned bison, rabbits, rodents, and birds (Table 2).

Table 2. Fossils from Pleistocene terrestrial deposits within 10 miles of the Project

Common Name	Taxon	San Joaquin Marsh Fauna	Costeau Pit, Laguna Hills	other localities
Harlan's ground sloth	†*Paramylodon harlani*	X	X	X
ground sloth	†*Paramylodon* sp.	X		
Jefferson's ground sloth	†*Megalonyx jeffersoni*	X		X
ground sloth	†cf. *Megalonyx* sp.			X
dire wolf	†*Canis dirus*	X	cf,	
coyote	*Canis latrans*	X	cf,	
grey fox	*Urocyon cinereoargenteus*	X		
red fox	*Vulpes (fulva) vulpes*	X		
short faced bear	†*Ursus arctodus*			X
black bear	*Ursus americanus*	X		
saber-toothed cat	†*Smilodon fatalis*	X	cf,	
American lion	†*Felis atrox*			X
cougar	*Felis concolor*	X		
bobcat	*Lynx rufus*	X		
raccoon	*Procyon lotor*	X		
long-tailed weasel	*Mustela frenata*	X	X	
American badger	*Taxidae taxus*	X		
striped skunk	*Mephitis mephitis*	X		
sea otter	*Enhydra lutris*	X		
Columbian mammoth	†*Mammuthus columbi*	X	X	
mammoth	†*Mammuthus* sp.			X
American mastodon	†*Mammut americanum*	X		cf,
mammoth or mastodon	†Proboscidea			X
horse	†*Equus occidentalis*	X		X
horse	†*Equus* sp.	X	X	X
tapir	†*Tapirus californicus*	X		
tapir	†*Tapirus* sp.	X		
yesterday's camel	†*Camelops hesternus*	X	cf,	
camel	†*Camelops* sp.	X		
llama	†*Hemiauchenia* sp.		X	
llama	†?*Palaeolama* sp.	X		
diminutive pronghorn	†*Capromeryx minor*	X		
diminutive pronghorn	†*Capromeryx* sp.		X	
mule deer	*Odocoileus hemionus*	X		

Common Name	**Taxon**	**San Joaquin Marsh Fauna**	**Costeau Pit, Laguna Hills**	**other localities**
elk	*Cervas* cf. *elaphus*	X		
deer	Cervidae		X	
ancient bison	†*Bison antiquus*	X	X	X
long-horned bison	†*Bison latifrons*		X	X
bison	†*Bison* sp.	X		
peccary	‡*Platygonus compressus*	X		
desert shrew	*Notiosorex crawfordi*		X	
shrew	*Sorex* sp.			X
desert cottontail	*Sylvilagus audubonii*	X	X	
brush rabbit	*Sylvilagus bachmani*	X	cf,	
black-tailed jack rabbit	*Lepus californicus*	X	cf,	
California ground squirrel	*Otospermophilus beecheyi*	X	X	
Botta’s pocket gopher	*Thomomys bottae*	X	X	
Pacific kangaroo rat	*Dipodomys agilis*	X		
kangaroo rat	*Dipodomys* sp.	X	X	
California pocket mouse	*Perognathus californicus*		cf,	
eastern harvest mouse	*Reithrodontomys humulis*	X	cf,	
western harvest mouse	*Reithrodontomys megalotus*	X		
imperfect mouse	*Peromyscus imperfectus*	X		
deer mouse	*Peromyscus maniculatus*	X	X	
deer mouse	*Peromyscus* sp.	X		
dusky footed woodrat	*Neotoma fuscipes*	X		
desert woodrat	*Neotoma lepida*	X		
wood rat	*Neotoma* sp.		X	
southern grasshopper mouse	*Onychomys torridus*	X		
California meadow vole	*Microtus californicus*	X		
vole	*Microtus* sp.		X	
muskrat	*Ondatra* sp.		X	
broad footed mole	*Scapanus latimanus*	X		
duck	*Anas* sp.	X	X	
hawk	*Buteogallus* sp.		X	
raptor	Acciprtridae	X		
black vulture	†*Corygyps occidentalis*	X		
quail	*Callipepla* sp.		X	
American coot	*Fulica americana*		cf.	
owl	*Athene* sp.		X	
passerine bird	Passeriformes		X	
fence lizard	*Sceloporus* sp.		X	
whip-tailed lizard	*Cnemidophorus* sp.		X	
alligator lizard	*Elegaria* sp.	X		
Mojave green rattlesnake	*Crotalus viridis*		X	
rattlesnake	*Crotalus* sp.	X		X
ringnecked snake	?*Diapophis* sp.	X		

Common Name	**Taxon**	**San Joaquin Marsh Fauna**	**Costeau Pit, Laguna Hills**	**other localities**
kingsnake	*Lampropeltis getulus*	X		
pine snake	*Pituophis melanoleucus*	X	X	
gopher snake	*Pituophis* sp.			X
garter snake	*Thamnophis sp.*	X		
horned lizard	*Phrynosoma sp.*	X		
pond turtle	*Actinemys marmorata*	X	X	
western pond turtle	cf. *Actinemys marmorata*		X	
desert tortoise	‡*Gopherus* sp.		X	
western toad	*Anaxyrus boreas*		X	
northern red-legged frog	*Rana aurora*		X	
arboreal salamander	*Anedes lugubris*		X	
mole salamander	*Ambystoma* sp.			X
frog	Anura	X		X
oak	*Quercus* sp.	X		

cf. indicates that the fossil compares favorably to that taxon. So a cf. mark for *Smilodon fatalis* indicates that it should be read *Smilodon* sp. cf. S. *fatalis*
Extinct animals are noted by †. Extirpated animals are noted by a ‡
Costeau Pit data from Jefferson 1991a, 1991b.
San Joaquin Marsh Fauna and other locality data from Govean 1992, Conking 1997, Michalsky and Sample 2002, Lander 2008, Smith 2009 Cogstone 2018, McLeod 2018, OCPC 2018.

Table 3. Terrestrial Pleistocene localities and fossils within 10 miles of the study area

Common Name	Taxon	Depth below original surface	Age/ dates	Locality	Location	Reference
mammal	Mammalia	unknown	Quaternary	LACM 1069	South side of University Dr. east of MacArthur Blvd.; less than 0.5 miles southwest of the Project	McLeod 2018
ground sloth	†Edentata	unknown	Pleistocene	LACM 1089	General McArthur Blvd. Bridge, Newport Beach; less than 0.5 miles west of the Project	Jefferson 1991b
even-toed ungulate	Artiodactyla	unknown	Quaternary	LACM 3978	Adjacent to the southeastern side of the intersection of University Dr. and MacArthur Blvd.; less than 0.5 miles southwest of the Project	McLeod 2018
turkey	*Meleagris* sp.					
ground sloth	†*Paramylodon sp.*	unknown	Pleistocene	LACM 186	Along MacArthur Blvd. and north of intersection with Jamboree Rd, Irvine; less than 1 mile northwest of the Project	
ground sloth	†*Paramylodon sp.*	unknown	late Pleistocene, Rancholabrean	LACM 1068	East of MacArthur Blvd. and north of what is now Bison Ave., Irvine; 1 mile southwest of the Project	McLeod 2018
tapir	†*Tapirus californicus*					
horse	†*Equus* sp.					
yesterday's camel	†*Camelops* sp.					
deer	*Odocoileus* sp.					
bison	†*Bison sp.*					
rabbit	*Sylvilagus* sp.					
Harlan's ground sloth	†*Paramylodon harlani*	12-20 feet	late Pleistocene, Rancholabrean	OCPC, no number as yet	North of Jamboree Rd. and Michelson Ave., Irvine; less than 1.5 miles north of the Project	Cogstone data
ground sloth	†*Paramylodon* sp.					
sabre-toothed cat	†*Smilodon fatalis*					
carnivore?	Carnivora?					
western horse?	†*Equus occideantalis?*					
yesterday's camel	†*Camelops hesternus*					
ancient bison	†*Bison antiquus*					
bison	†*Bison* sp.					
Columbian mammoth	†*Mammuthus columbi*					
rabbit?	Leporidae?					
Botta's pocket gopher	*Thomomys bottae*					
gopher	Geomyidae					
squirrel	Sciuridae					
rodent	Rodentia					
mammal	Mammalia					
black vulture	†*Corygyps occidentalis*					

Common Name	Taxon	Depth below original surface	Age/ dates	Locality	Location	Reference
bird	Aves	12-20 feet	late Pleistocene, Rancholabrean	OCPC, no number as yet	North of Jamboree Rd. and Michelson Ave., Irvine; less than 1.5 miles north of the Project	Cogstone data
rattlesnake	*Crotalus* sp.					
pine snake	*Pituophis melanoleucus*					
snakes	Serpentes					
alligator lizard	*Elegaria* sp.					
oak	*Quercus* sp.					
camel	†Camelidae	~30 feet	Pleistocene	LACM 4219	roadcut for Newport Blvd. near Santa Isabel Ave., Costa Mesa; less than 3 miles west of the Project	McLeod 2018
sea turtle	Cheloniidae					
elephant	†Proboscidea	unknown	Pleistocene	LACM 3267	near 19th Street and Anaheim Ave., Costa Mesa; 4 miles west of the Project	McLeod 2019
mammoth	†*Mammuthus* sp.	~15 feet	Pleistocene	LACM 1339	Adams Ave. east of the Santa Ana River, Costa Mesa; less than 5 miles northwest of the Project	McLeod 2018
camel	†Camelidae					
ground sloth	†Mylodontidae	shallow but unknown	Pleistocene	LACM 7713	southwest side Highway (Hwy) 133 or Hwy 405 interchange, Irvine; less than 5.2 miles west of the Project	McLeod 2015
horse	†*Equus* sp.	unknown	Pleistocene	LACM 6370	Hoag Hospital lower campus near Superior Ave. and the Pacific Coast Hwy, Costa Mesa; less than 5.3 miles southwest of the Project	McLeod 2019

PALEONTOLOGICAL FIELD RECONNAISSANCE

METHODS

The paleontological resources survey is a crucial part of a Project's environmental assessment phase. One purpose is to verify the exact location of all previously identified, accessible paleontological localities within a Project area and to check if more fossil materials are present. The survey is also to assess the potential for the Project area sediments to contain fossil resources and to confirm that field observations conform to the geological maps of the Project area. All undeveloped ground surface areas that may be impacted within the proposed Project area are examined. Portions of the Project where potentially fossiliferous sediments were present at the surface or where existing ground disturbances (e.g., cutbanks, ditches, animal burrows, etc.) incised into potentially fossiliferous sediments were intensely surveyed. Photographs of the Project area, including ground surface visibility and items of interest, are taken with a digital camera.

RESULTS

Cogstone archaeologist and cross-trained paleontologist Sandy Duarte surveyed the Project area on October 8, 2020. Ground visibility within the Project area was very poor (less than 3 percent) due to dense vegetation within marsh and surrounding areas (Figure 6). Some areas were not accessible due to marsh and overgrowth of vegetation. The survey consisted of one to three meter wide transects in accessible areas. The marsh and surrounding areas are covered with sycamore trees, arundo, mule fat, wild tobacco, wild rye, prickly pear, and an abundance of other native and non-native flora. Visible sediments within the Project area are consistent with mapping by Morton and Miller (2006; Figure 7).

Figure 6. Overview of marsh and northwest boundary facing southwest

Figure 7. Close up of sediments at northwest boundary

PALEONTOLOGICAL SENSITIVITY

A multilevel ranking system was developed by professional resource managers within the Bureau of Land Management (BLM) as a practical tool to assess the sensitivity of sediments for fossils. The Potential Fossil Yield Classification (PFYC) system (BLM 2016; Appendix C) has a multi-level scale based on demonstrated yield of fossils. The PFYC system provides additional guidance regarding assessment and management for different fossil yield rankings.

Fossil resources occur in geologic units (e.g., formations or members). The probability for finding significant fossils in a Project area can be broadly predicted from previous records of fossils recovered from the geologic units present in and/or adjacent to the study area. The geological setting and the number of known fossil localities help determine the paleontological sensitivity according to PFYC criteria.

All alluvial deposits may increase or decrease in fossiliferous potential depending on how coarse the sediments are. Sediments that are close to their basement rock source are typically coarse; those farther from the basement rock source are finer. The chance of fossils being preserved greatly increases once the average size of the sediment particles is reduced to 5 mm or less in diameter. Moreover, fossil preservation also greatly increases with rapid burial in flood-plains, rivers, lakes, oceans, etc. Remains left on the ground surface become weathered by the sun or consumed by scavengers and bacterial activity, usually within 20 years or less. So the sands, silts, and clays of flood-plains, rivers, lakes, and oceans are the most likely sediments to contain fossils.

Using the PFYC system, geologic units are classified according to the relative abundance of vertebrate fossils or scientifically significant invertebrate or plant fossils and their sensitivity to adverse impacts within the known extent of the geological unit. Although significant localities may occasionally occur in a geologic unit, a few widely scattered important fossils or localities do not necessarily indicate a higher PFYC value; instead, the relative abundance of localities is intended to be the major determinant for the value assignment.

Based on recorded localities in other California valleys, Pleistocene fossils typically begin appearing about eight to ten feet deep. Shallower sediments in the valleys usually do not contain the remains of extinct animals, although Holocene (less than 11,700 years old) remains may be present.

The modern artificial fill deposits are assigned no potential for fossils (PFYC 1; Table 4). The late Pleistocene to Holocene young axial channel deposits less than eight feet below the modern surface are considered to have low potential (PFYC 2) for fossils due to the lack of fossils in these deposits. More than eight feet below the surface the potential for fossils increases to moderate (PFYC 3). The middle to late Pleistocene old paralic deposits overlain by alluvial-fan deposits are assigned a low potential for fossils (PFYC 2) for sediments less than five feet below the modern surface due to the lack of shallow fossils in these deposits. More than five feet below the surface the potential for fossils increases to moderate (PFYC 3).

Table 4. Potential Fossil Yield Classification of Project Sediments

	Paleontological Sensitivity				
Unit	**1: none**	**2: low**	**3: moderate**	**4: high**	**5: very high**
artificial fill, modern	X				
young axial-channel deposits, late Pleistocene to Holocene		less than 8 feet deep	more than 8 feet deep		
old paralic deposits overlain by alluvial-fan deposits, early to middle Pleistocene		less than 5 feet deep	more than 5 feet deep		

CONCLUSIONS AND RECOMMENDATIONS

The Project surface is mapped with late Holocene artificial fill, Holocene and late Pleistocene young axial-channel deposits, and late to middle Pleistocene old paralic deposits overlain by alluvial-fan deposits. The record search revealed no fossil localities from similarly aged deposits from within the Project, however localities are known from sediments the same age as sediments found within the study area near to the Project.

The modern artificial fill deposits are assigned no potential for fossils (PFYC 1). Sediments mapped as Holocene on the surface are assigned a low potential for fossils (PFYC 2) for sediments less than eight feet below the modern surface due to the lack of fossils in these deposits. Deeper than eight feet below the surface the potential for fossils increases to moderate (PFYC 3). Sediments mapped as Pleistocene on the surface are assigned a low potential for fossils (PFYC 2) for sediments less than five feet below the modern surface due to the lack of fossils in these deposits. More than five feet below the surface the potential for fossils increases to moderate (PFYC 3).

Planned vertical impacts are anticipated to be a maximum of five feet. Based on the current planned construction, fossils are unlikely to be impacted during excavations. If augering occurs, the auger may bring fossil fragments to the surface but the specimens will lack context such as depth/elevation, formation identification, and other data that are critical to scientific significance. No mitigation is recommended for augering activities.

If unanticipated discoveries of paleontological resources occur during construction, all work within 25 feet of the discovery should be halted until the find has been evaluated by a qualified paleontologist.

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APPENDIX A. QUALIFICATIONS

cogstone
PALEONTOLOGY - ARCHAEOLOGY - HISTORY

KIM SCOTT
Principal Investigator for Paleontology

EDUCATION

2013 M. S., Biology with Paleontology Emphasis, California State University San Bernardino
2000 B. S., Geology, University of California, Los Angeles

SUMMARY QUALIFICATIONS

Ms. Scott has more than 20 years of experience in California as a paleontologist and sedimentary geologist and 17 years with Cogstone. She has written over 100 paleontological assessments, paleontological mitigation plans, and monitoring compliance reports to all agency requirements. She has experience with street, roadway, interchange, bridge, and grade separation projects. She has managed multiple projects and prepared technical reports with Caltrans/FHWA/FTA/FRA as the lead agency and is knowledgeable of the processes and procedures required to obtain NEPA, NHPA Section 106 and CEQA environmental approvals. Ms. Scott meets the qualifications outlined in Attachment 1 to Caltrans Section 106 Programmatic Agreement with the FHWA; and Chapter 1, Volume 8, on paleontology of the Caltrans Standard Environmental Reference (SER). Ms. Scott serves as company safety officer and is the author of the company safety and paleontology manuals. She is a Member of the Society of Vertebrate Paleontology and the Pacific Section of the Society of Economic Paleontologists and Mineralogists.

SELECTED PROJECTS

City of Irvine General Plan update, Orange County, CA. The project assessed the City of Irvine for paleontologically sensitive sediments as well as previously recorded fossil localities. Prepared a Cultural and Paleontological Assessment. Sub to PlaceWorks. Principal Paleontologist. 2019

City of Lake Forest General Plan update, Orange County, CA. The project assessed the City of Lake Forest for paleontologically sensitive sediments as well as previously recorded fossil localities. Prepared a Cultural and Paleontological Assessment. Sub to De Novo Planning Group. Principal Paleontologist. 2019

I-405 from SR-73 to I-605 Improvements Project, Caltrans District 12, Orange and Los Angeles counties, CA (EA 0H100). The project is to improve 16-miles of Interstate 405 (I-405) by adding General Purpose lanes (GP) and a tolled Express Lane in each direction as well as other improvements to ramps and bridges. Prepared a Paleontological Mitigation and Monitoring Plan (PMMP). Currently supervising paleontological monitoring. Sub to OC405 Partners Joint Venture. Principal Paleontologist. 2017 to present

Purple Line Extension (Westside Subway), Los Angeles County Metropolitan Transportation Authority, Los Angeles County, CA. The project involves extension of the subway in Westwood for 9 miles. Currently supervising paleontological monitoring and fossil recovery of excavations and fossil preparation in the lab. Ms. Scott is also serving as the paleontological consultant for the construction management team's design-build of three stations. Sub to Sub to WEST (Stantec/Jacobs JV). Paleontology Director and co-author. 2014-present

State Route 57 Northbound Widening Project, Caltrans District 12/ Orange County Transportation Authority (OCTA), City of Anaheim, Orange County, CA. Caltrans is widening of State Route 57 between Orangewood and Katella Avenues. Paleontological Identification Report (PM 11.5/12.5; EA 0M9700). Under contract to WSP. Principal Paleontologist and report author. 2017.

Interstate 605 and Katella Interchange Improvement Project, Caltrans District 12/ Orange County Transportation Authority (OCTA), City of Anaheim, Orange County, CA. Caltrans is updating the southbound onramp to the interchange at Katella Avenues. Combined Paleontological Identification and Evaluation Report (PM 1.1/1.6; EA 0K8700). Under contract to Michael Baker International. Principal Paleontologist and report author. 2017.

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PALEONTOLOGY - ARCHAEOLOGY - HISTORY

KELLY VREELAND
Paleontologist

EDUCATION

2010 B.S., Geology with paleontology emphasis, California State University, Fullerton
2014 M.S., Geology with a paleontology emphasis, California State University, Fullerton

SUMMARY QUALIFICATIONS

Vreeland is a Paleontologist with over 10 years of experience in paleontology and geology. Her field and laboratory experience includes fieldwork, fossil preparation and curation, and research projects throughout California and Nevada, as well as conducting fieldwork and surficial geologic mapping in Montana.

SELECTED PROJECTS

South Campus Student Housing Project, City of Sacramento, Sacramento County, CA. Work on this project included preparation of the Paleontological Resources Monitoring and Mitigation Plan as well as developing and conducting the Workers Environmental Awareness Program (WEAP) training for the South Campus Student Housing Project in Sacramento. This involved the construction and operation of student housing facilities for upper-division university students adjacent to the California State University, Sacramento campus. 2020

Alameda Corridor East Grade Separation Projects, various cities, Los Angeles County, CA. Tasks included on-call paleontological resource monitoring for various railway grade separation projects and preparation of Paleontological Mitigation Plans. 2019-2020

American Kings Solar Project, Kings County, CA. This project involved a Paleontological Analysis for the proposed construction, operation, maintenance, and decommissioning of an up to 128-megawatt alternating current photovoltaic solar power-generating facility. 2019

Camino Del Norte Improvements Project, City of Lake Elsinore, Riverside County, CA. The project consisted of extending the alignment of Camino del Norte to join with the intersection of Franklin Street/Grunder Drive and Canyon View Drive and Canyon Estates Drive in Lake Elsinore. Work conducted included preparing the Paleontological Resources Impact Mitigation Program, paleontological resource monitoring, and preparation of the final monitoring report for the project. 2019

High Desert Gateway West Project, City of Hesperia, San Bernardino County, CA. The project includes construction of nine retail buildings totaling 126,763 sf and 939 vehicle parking spaces, including 11 Americans with Disabilities Act-accessible stalls. Work conducted included preparation of the Paleontological Resources Technical Letter Report for the project, paleontological resource monitoring, and a final paleontological monitoring report. 2019

I-15/Railroad Canyon Road Project, Cities of Wildomar and Lake Elsinore, Riverside County, CA. The project involved reconstructing the northbound diagonal ramps to a hook configuration at Grape Street, maintaining a diamond configuration for the southbound ramps at Railroad Canyon Road, widening the southbound entrance ramp to two lanes at Railroad Canyon Road merging to a single lane as it connects with the planned auxiliary lane to southbound I-15, and constructing an acceleration lane at the entrance ramps and a deceleration lane at the exit ramps. Responsibilities included preparation of the Paleontological Mitigation Plan for the project, paleontological resources monitoring, and preparation of a final monitoring report. 2019

La Pata Avenue Road Extension Project, City of San Juan Capistrano, Orange County, CA. This project consisted of a massive undertaking to extend La Pata Avenue and Camino del Rio in San Juan Capistrano, and involved the removal of 14.8 million cubic yards of earth material. Responsibilities included paleontological resource monitoring; fossil salvage, preparation, and identification; and preparation of a final monitoring report. 2015-2016

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PALEONTOLOGY - ARCHAEOLOGY - HISTORY

SANDY DUARTE
Archaeologist and Cross-trained Paleontologist

EDUCATION

2002 B.A., Cultural Anthropology, University of California, Santa Barbara

TRAINING AND CERTIFICATIONS

HAZWOPER Certified - Certified American Red Cross CPR; Certified American Red Cross Standard First Aid
Applied Archaeology of Southern California, USDA Forest Service, San Bernardino National Forest
Railroad Security Certified

SUMMARY OF QUALIFICATIONS

Ms. Duarte is a paleontologist and archaeologist with over 15 years of experience in paleontological and archaeological monitoring, surveying, and excavation in southern California. Duarte has experience with Native American consultation as required by Section 106 of the National Historic Preservation Act (NHPA) and under Senate Bill 18 for the protection and management of cultural resources. Duarte previously worked for the U.S. Forest Service in the Biology, Timber, and Geology Department as an archaeologist, including serving as a trained wild-land firefighter to preserve archaeological sites forest fires. Additional skills include paleontological identification, fossil preparation, artifact identification and preparation, and final report preparation.

SELECTED PROJECTS

Bell Gardens Water Reservoir Project, City of Bell Gardens, Los Angeles County, CA. Cogstone conducted a cultural and paleontological resources assessment to determine the potential impacts to cultural and paleontological resources during improvements which included a new two-million-gallon reservoir, booster pump station, well to be drilled, and other components. Services included record searches, Sacred Lands File search from the Native American Heritage Commission, and an intensive-pedestrian survey of the 1.7-acre project area. Sub to Infrastructure Engineers. Archaeologist/Co-Author. 2019-2020

OC-44 Pipeline Rehabilitation Project, City of Newport Beach, Orange County, CA. Cogstone conducted cultural resources monitoring during ground-disturbing activities following a Cultural Resource Assessment of the APE in 2014 by Cogstone pursuant to the involvement of land managed by United States Army Corps of Engineers (Section 404 of the Clean Water Act), California Department of Fish and Wildlife, and California Coastal Commission (CCC). Although no cultural resources were identified within the APE, cultural resources and Native American monitoring were required as was stipulated in the Conditions of Approval by the CCC, as detailed in the Archaeological Construction Monitoring Treatment Plan for the project. Sub to Michael Baker. Archaeologist. 2019-2020

Santiago Canyon Estates Fuel Mod Project, unincorporated Orange County, CA. Cogstone conducted a cultural resources assessment to determine the potential for surface cultural resources for compliance with Orange County Fire Authority's Precise Fuel Modification Plan for zones of the Santiago Canyon Estates Community. Services included a cultural resources records search, Sacred Lands File search from the Native American Heritage Commission, and conducted a reconnaissance survey. Sub to Fire Safe Council East Orange County Canyons. Archaeologist/Co-Author. 2020

Rockcroft Parcels, City of Malibu, Los Angeles County, CA. This study was conducted to determine the potential impacts to cultural resources during the proposed construction of a single residence. Cogstone assessed two parcels; conducted a record search, Sacred Lands File search, pedestrian survey; and produced a cultural resources assessment. The assessment complied with the requirements of CEQA and included all information required by the City of Malibu Archaeology Guidelines. Sub to Advance Construction. Archaeologist and Report Author. 2020

APPENDIX B. PALEONTOLOGICAL RECORDS SEARCH

Natural History Museum
of Los Angeles County
900 Exposition Boulevard
Los Angeles, CA 90007

tel 213.763.DINO
www.nhm.org

Research & Collections

e-mail: paleorecords@nhm.org

August 28, 2020

Cogstone Resource Management
1518 W Taft Ave Orange, Ca 92865

Attn: Logan Freeberg

re: Paleontological resources for the San Joaquin Marsh Restoration Project (Cogstone project #5084)

Dear Logan:

I have conducted a thorough search of our paleontology collection records for the locality and specimen data for proposed development the San Joaquin Marsh Restoration Project (Cogstone project #5084) project area as outlined on the portion of the Tustin USGS topographic quadrangle map that you sent to me via e-mail on August 27, 2020. We do not have any fossil localities that lie directly within the proposed project area, but we do have fossil localities nearby from the same sedimentary deposits that occur in the proposed project area, either at the surface or at depth.

The following table shows the closest known localities in the collection of the Natural History Museum of Los Angeles County.

Locality Number	Location	Formation	Taxa	Depth
LACM 186	Along MacArthur Blvd. N of intersection with Jamboree Rd	Unknown (Pliocene)	Ground sloth (*Megalonyx*)	Unknown (described as "large pit")
LACM IP 31330	SW corner of Jamboree Rd. and Bristol St.	Palos Verdes Sand	Invertebrates	Unknown (described as "in artificial cut")
LACM VP 3977, 3978	SE of the intersection of University Dr & MacArthur Blvd	Fernando Formation (alternating beds of fine white sand & gravelly white sand overlying yellow silty sand)	Turkey family (Meleagridae); Artiodactyla; invertebrates (brachiopods, molluscs indet.)	Roadcut 11-25 ft above roadbed
LACM VP 3986/ LACM IP 5867	SE of the intersection of University Dr & MacArthur Blvd	Fernando Formation	Fish, invertebrate shell bed	Roadcut 35 ft above roadbed

LACM VP 3980	E side of MacArthur Blvd, S of Bonita Canyon Rd	Fernando Formation	Baleen whale (*Mysticeti*)	surface
LACMIP 6281	On the S side of a bluff, S of Bayview School and W of the San Joaquin Gun Club	Palos Verdes Sand	Invertebrates	Surface

VP, Vertebrate Paleontology; IP, Invertebrate Paleontology; bgs, below ground surface

This records search covers only the records of the Natural History Museum of Los Angeles County ("NHMLA"). It is not intended as a paleontological assessment of the project area for the purposes of CEQA or NEPA. Potentially fossil-bearing units are present in the project area, either at the surface or in the subsurface. As such, NHMLA recommends that a full paleontological assessment of the project area be conducted by a paleontologist meeting Bureau of Land Management or Society of Vertebrate Paleontology standards.

Sincerely,

Alyssa Bell

Alyssa Bell, Ph.D.
Natural History Museum of Los Angeles County

enclosure: invoice

APPENDIX C. PALEONTOLOGICAL SENSITIVITY RANKING CRITERIA

PFYC Description Summary (BLM 2016)	PFYC Rank
Very Low. The occurrence of significant fossils is non-existent or extremely rare. Includes igneous (excluding air-fall and reworked volcanic ash units), metamorphic, or Precambrian rocks. Assessment or mitigation of paleontological resources is usually unnecessary except in very rare or isolated circumstances that result in the unanticipated presence of fossils.	1
Low. Sedimentary geologic units that are unlikely to contain vertebrate or scientifically significant nonvertebrate fossils. Includes rock units less than 10,000 years old and sediments with significant physical and chemical changes (e.g., diagenetic alteration) which decrease the potential for fossil preservation. Assessment or mitigation of paleontological resources is not likely to be necessary.	2
Moderate. Units are known to contain vertebrate or scientifically significant nonvertebrate fossils, but these occurrences are widely scattered and/or of low abundance. Common invertebrate or plant fossils may be found and opportunities may exist for casual collecting. Paleontological mitigation strategies will be based on the nature of the proposed activity. Management considerations cover a broad range of options that may include record searches, pre-disturbance surveys, monitoring, mitigation, or avoidance. Surface-disturbing activities may require assessment by a qualified paleontologist to determine whether significant paleontological resources occur in the area of a proposed action, and whether the action could affect the paleontological resources.	3
High. Geologic units containing a high occurrence of significant fossils. Fossils must be abundant per locality. Vertebrates or scientifically significant invertebrate or plant fossils are known to occur and have been documented, but may vary in occurrence and predictability. Mitigation plans must consider the nature of the proposed disturbance, such as removal or penetration of protective surface alluvium or soils, potential for future accelerated erosion, or increased ease of access that could result in looting. Detailed field assessment is normally required and on-site monitoring or spot-checking may be necessary during land disturbing activities. In some cases avoidance of known paleontological resources may be necessary.	4
Very High. Highly fossiliferous geologic units that consistently and predictably produce vertebrate or scientifically significant invertebrate or plant fossils. Vertebrate fossils or scientifically significant invertebrate fossils are known or can reasonably be expected to occur in the impacted area. Paleontological resources are highly susceptible to adverse impacts from surface disturbing activities. Paleontological mitigation may be necessary before or during surface disturbing activities. The area should be assessed prior to land tenure adjustments. Pre-work surveys are usually needed and on-site monitoring may be necessary during land use activities. Avoidance or resource preservation through controlled access, designation of areas of avoidance, or special management designations should be considered.	5
Unknown. An assignment of "Unknown" may indicate the unit or area is poorly studied and field studies are needed to verify the presence or absence of paleontological resources. The unit may exhibit features or preservational conditions that suggest significant fossils could be present, but little information about the actual unit or area is known. Literature searches or consultation with professional colleagues may allow an unknown unit to be provisionally assigned to another Class, but the geological unit should be formally assigned to a Class after adequate survey and research is performed to make an informed determination.	U
Water or Ice. Typically used only for areas which have been covered thus preventing an examination of the underlying geology.	W, I

Appendix F
Noise and Vibration Calculations

SJMRCDI Noise Calculations

Project Related Noise Levels

Reference Source Distance	Noise Level during Fill Activities	Distance Attenuation at Property Line	Max Exterior Noise Level at Property Line	Distance to Building Shell	Distance Attenuation at Building Shell	Max Noise Level at Building Shell	Max Interior Noise with Windows open	Max Interior Noise with Windows closed
50	82.98							
Receiver location @:	Distance to Property Line						17	25
UCI Health Child Development School	1157	-27.3	**56**	1245	-27.9	55	**38**	**30**
UCI Student Housing	650	-22.3	**61**	945	-25.5	57	**40**	**32**
USDA Federal Government Office	193	-11.7	**71**	289	-15.2	68	**51**	**43**

Reference Source Distance	Noise Level during Cut Activities	Distance Attenuation at Property Line	Max Exterior Noise Level at Property Line	Distance to Building Shell	Distance Attenuation at Building Shell	Max Noise Level at Building Shell	Max Interior Noise with Windows open	Max Interior Noise with Windows closed
50	83.9							
Receiver location @:	Distance to Property Line						17	25
UCI Health Child Development School	1363	-28.7	**55**	1451	-29.3	55	**38**	**30**
UCI Student Housing	845	-24.6	**59**	1117	-27.0	57	**40**	**32**
USDA Federal Government Office	335	-16.5	**67**	561	-21.0	63	**46**	**38**

Calculations made according to guidance from Transit Noise and Vibration Impact Assessment Manual (FTA 2018)

Equipment (Per Project Description)	**Noise Level**	**Source**
Excavator	81 dB at 50 feet	Highway Traffic Noise Analysis and Abatement Policy and Guidance (FHWA 2018)
Backhoe	78 dB at 50 feet	Highway Traffic Noise Analysis and Abatement Policy and Guidance (FHWA 2018)
Dump Truck	76 dB at 50 feet	Highway Traffic Noise Analysis and Abatement Policy and Guidance (FHWA 2018)
Grader	79 dB at 50 feet	Washington Department of Transportation Construction Noise Impact Assessment (WSDOT 2020); actual measured noise level unavailable from FHWA 2018
Front loader	79 dB at 50 feet	Highway Traffic Noise Analysis and Abatement Policy and Guidance (FHWA 2018)

Assumptions

Fill areas assume max simultaneous equipment in one location at edge of work area: 1 grader, 1 front loader and periodic truck dumping dirt.
Cut area assume max simultaneous equipment in one location at edge of work area: 1 excavator, 1 front loader and periodic truck picking up dirt.
Distances measured using Google Earth.

SJMRCDI Vibration Calculations

Large Bulldozer

$PPV_{Large\ Bulldozer} = PPV_{Ref}\ (25/D)^n$ (in/sec)

PPV_{Ref}	0.089	in/sec
n	1.3	(for sandy clays)

Noise-Sensitive Location	Distance from construction and Receiver Property	Resultant Vibration Level (in/sec)
UCI Health Child Development School	1150	0.001
UCI student housing facilities	940	0.001
USDA Federal Government Office	190	0.006
Distance needed to be less than "barely perceptible"	130	0.010

Source:
Transit Noise and Vibration Impact Assessment Manual (FTA 2018) Table 7-4 Vibration Source Levels for Construction Equipment
Transportation and Construction Vibration Guidance Manual (Caltrans, Spetember 2013) Table 17 Measured and Suggested "n" Values Based on Soil Class
Note:
Large similar reference equiment was usded for this analysis. In this case, a large bulldozer was used for a conservative analysis.
Large Bulldozer at 25 ft = 0.089 PPV
Loaded Trucks at 25 ft = 0.076 PPV

SJMRCDI Noise Calculations

Distances Required to Reach Exterior Noise Standards			
Reference Source Distance	Noise Level during Activities	Distance Attenuation from Property Line	Max Exterior Noise Level at Property Line
50	83.9		
Zone 1 and 2 Exterior Standard	**Distance from Work to Meet Max Noise Standard**		
55 DBA (30min/hr)	**1400**	-28.9	54.957
60 DBA (15min/hr)	**750**	-23.5	60.378
65 DBA (5min/hr)	**425**	-18.6	65.31
70 DBA (1min/hr)	**240**	-13.6	70.28
75 DBA (Not to exceed)	**140**	-8.9	74.96