APPENDIX D
Jurisdictional Delineation

LITTLE CORONA INFILTRATION PROJECT

Newport Beach, California

DELINEATION OF STATE AND FEDERAL JURISDICTIONAL WATERS

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July 28, 2015

JN 145143

Michael Baker
INTERNATIONAL

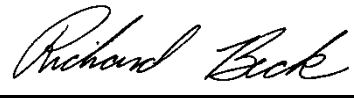
LITTLE CORONA INFILTRATION PROJECT

NEWPORT BEACH, CALIFORNIA

Delineation of State and Federal Jurisdictional Waters

The undersigned certify that this report is a complete and accurate account of the findings and conclusions of a jurisdictional "waters of the U.S." (including wetlands) and "waters of the State" determination for the above-referenced project.

Wesley Salter, PWS, CPESC
Project Manager
Natural Resources/Regulatory Permitting



Richard Beck, PWS, CEP, CPESC
Vice President
Natural Resources/Regulatory Permitting

July 28, 2015

Executive Summary

Introduction: At the request of the City of Newport Beach (City), Michael Baker International (Michael Baker) has prepared this Delineation of Jurisdictional Waters (delineation) for the Little Corona Infiltration Project (project), located in the community of Corona del Mar, City of Newport Beach, Orange County, State of California.

Methods: The field work for this delineation was conducted on March 19 and June 18, 2015. This delineation documents the regulatory authority of the U.S. Army Corps of Engineers Los Angeles District (Corps), Santa Ana Regional Water Quality Control Board (Regional Board), California Department of Fish and Wildlife South Coast Region (CDFW), and the California Coastal Commission (CCC) pursuant to Section 401 and 404 of the Federal Clean Water Act (CWA), the California Porter-Cologne Water Quality Control Act, Section 1600 of the California Fish and Game Code, and the California Coastal Act[1], respectively.

Results: State and federal jurisdictional areas were identified within the project site. Two (2) features, Buck Gully and the Pacific Ocean, were observed within the boundaries of the project site. Placement of fill and/or alteration within these jurisdictional areas is subject to Corps, Regional Board, CDFW, and CCC jurisdiction and approval. Table ES-1 includes the total jurisdiction onsite of each regulatory agency. Table ES-2 includes the proposed summary of impacts that will occur as a result of the proposed project.

Table ES-1: Jurisdictional Areas

Feature	Corps/Regional Board		CDFW	Coastal Commission	
	Non-Wetland (acres / linear feet)	Wetland (acres)	Vegetated Streambed (acres / linear feet)	Wetland (acres)	Stream (acres)
Buck Gully	0.027 / 72	0.02	0.04 / 72	0.03	0.01
Pacific Ocean	0.03	--	--	--	--

[1] The project area was surveyed pursuant to the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region, Version 2.0 (Corps 2008); the Practices for Documenting Jurisdiction under Section 404 of the CWA Regional Guidance Letter (Corps 2007); Minimum Standards for Acceptance of Preliminary Wetland Delineations (Corps 2001); and the Field Guide to Lake and Streambed Alteration Agreements Section 1600-1607 (CDFW 1994).

Table ES-2: Impact Summary

Feature	Corps/Regional Board		CDFW	Coastal Commission	
	Non-Wetland (acres / linear feet)	Wetland (acres)	Vegetated Streambed (acres / linear feet)	Wetland (acres)	Stream (acres)
Buck Gully	Perm: 0.01 / 32	Perm: 0.0003	Perm: 0.002 / 7	Perm: 0.002	--
Pacific Ocean	--	--	--	--	Perm: 0.01

Conclusion: The project applicant shall obtain the following regulatory approvals prior to commencement of any construction activities within the identified jurisdictional areas: Corps CWA Section 404 Permit; Regional Board CWA Section 401 Water Quality Certification; CDFW Section 1602 Streambed Alteration Agreement (SAA)[2], and CCC Coastal Development Permit (CDP). This report presents Michael Baker's best effort at determining the jurisdictional boundaries using the most up-to-date regulations, written policy, and guidance from the regulatory agencies; however, as with any jurisdictional delineation, only the regulatory agencies can make a final determination of jurisdiction. Refer to Sections 1 through 7 for a complete discussion.

[2] Other approvals (in-lieu of an SAA) may be acquired from the CDFW based on a formally-submitted notification package.

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LIST OF ACRONYMS

CDFW	California Department of Fish and Wildlife
CCC	California Coastal Commission
CEQA	California Environmental Quality Act
CWA	Clean Water Act
DBH	Diameter at Breast Height
EPA	Environmental Protection Agency
FAC	Facultative Vegetation
FACU	Facultative Upland Vegetation
FACW	Facultative Wetland Vegetation
GPS	Ground Positioning System
IP	Individual Permit
LF	Linear Feet
MSL	Mean Sea Level
NI	No Indicator
NWP	Nationwide Permit
OBL	Obligate Wetland Vegetation
OHWM	Ordinary High Water Mark
Michael Baker	Michael Baker International
PWS	Professional Wetland Scientist
RCP	Reinforced Concrete Pipe
RPW	Relatively Permanent Waters
SAA	Streambed Alteration Agreement
SBBM	San Bernardino Base and Meridian
SWANCC	Solid Waste Agency of Northern Cook County
TNW	Traditional Navigable Water
UPL	Obligate Upland Vegetation
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
WoUS	Waters of the United States

Section 1 Introduction and Purpose

This Delineation of Jurisdictional Waters (delineation) has been prepared for the City of Newport Beach (City) in order to document the jurisdictional authority of the U.S. Army Corps of Engineers Los Angeles District (Corps), Santa Ana Regional Water Quality Control Board (Regional Board), California Department of Fish and Wildlife South Coast Region (CDFW), and California Coastal Commission (CCC) pursuant to Section 401 and 404 of the Federal Clean Water Act (CWA), the California Porter-Cologne Water Quality Control Act, Section 1600 of the Fish and Game Code, and the California Coastal Act. The field work for this delineation was conducted on March 19 and June 18, 2015.

The Little Corona Infiltration Project, hereinafter referred to as the project or project site, is regionally located in the City of Newport Beach, County of Orange, State of California (refer to Exhibit 1, *Regional Vicinity*). Locally, the project site is located immediately adjacent to the Pacific Ocean on Little Corona Beach at the lower mouth of Buck Gully Canyon (refer to Exhibit 2, *Site Vicinity*). The project is bound by East Coast Highway to the north, Evening Canyon Road to the east, and Hazel Drive to the west. The proposed infiltration system would be installed underground near the existing beach access path.

This delineation has been designed to document the authority of the regulatory agencies, explain the methodology undertaken by Michael Baker International (Michael Baker), to document jurisdictional authority, and to support the findings made by Michael Baker within the boundaries of the project site. This report presents our best effort at determining the jurisdictional boundaries using the most up-to-date regulations, written policy, and guidance from the regulatory agencies; however, only the regulatory agencies can make a final determination of jurisdictional boundaries.

1.1 PROJECT SITE BACKGROUND

The project site is located within the coastal zone and is within a preserve area designated by the Coastal Subregion of Orange County's Natural Community Conservation Plan/Habitat Conservation Plan (refer to Exhibit 3, *Project Site*). The project site is surrounded by residential and recreational uses. Onsite elevations range from approximately 7 feet above mean sea level (msl) to 15 feet above msl. Buck Gully consists of a natural stream draining a watershed of about two (2) square miles. Urbanized effects (i.e. encroachments, sediment loss, reduction in pervious areas, invasive plants, nuisance runoff, etc.) over the past 50 years have impacted the stream; particularly in the downstream reach from East Coast Highway (PCH) to Little Corona Beach. A cement weir feature separates the drainage feature from the beach and causes water to pond prior to discharging to the Pacific Ocean.

NOT TO SCALE

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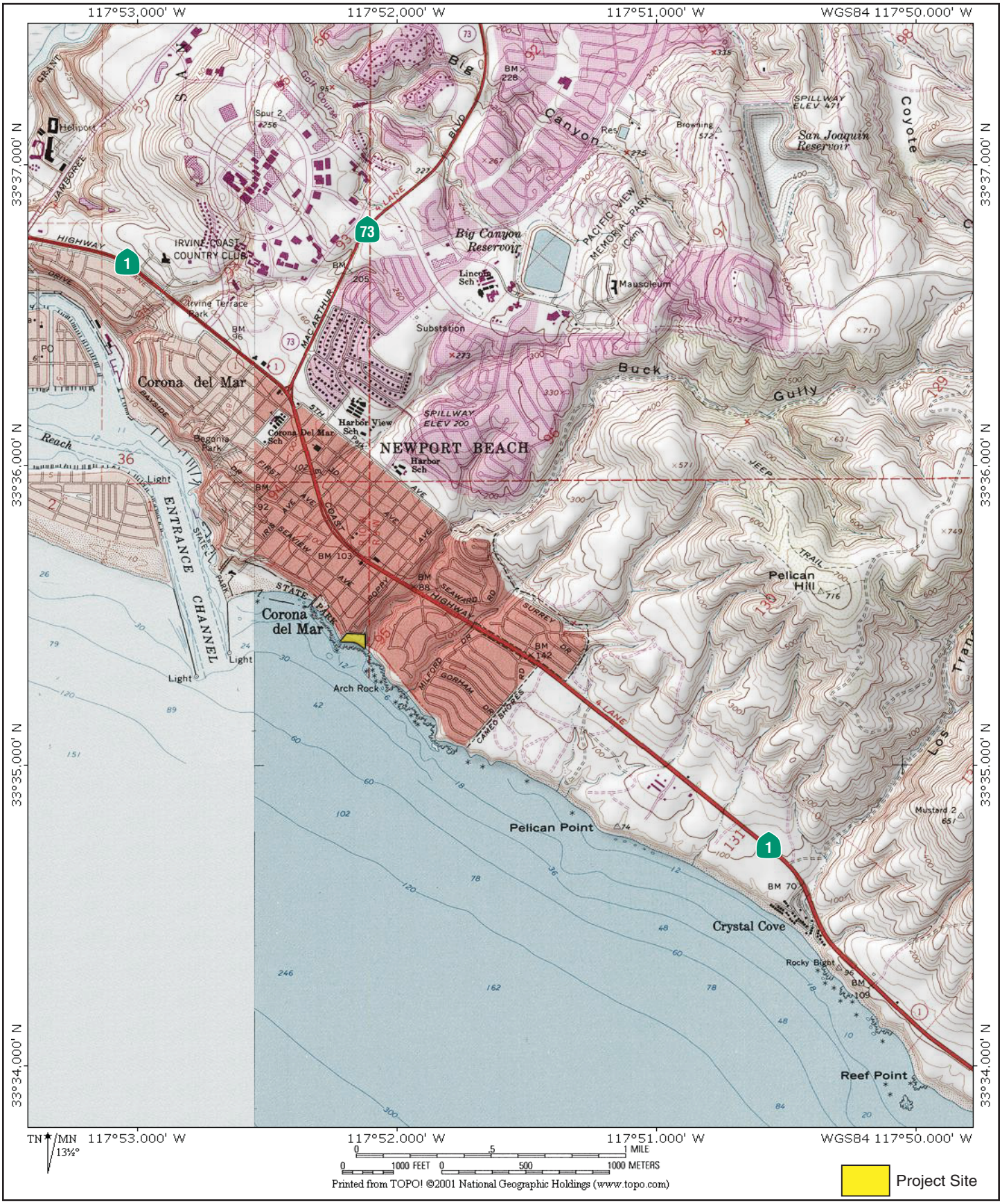
LITTLE CORONA INFILTRATION PROJECT
DELINEATION OF STATE AND FEDERAL WATERS

Regional Vicinity

Exhibit 1



LITTLE CORONA INFILTRATION PROJECT
DELINEATION OF STATE AND FEDERAL WATERS

Site Vicinity

Exhibit 2

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0 25 Feet

Source: Google Earth Imagery 2013

LITTLE CORONA INFILTRATION PROJECT

Project Site

Exhibit 3

1.2 PROJECT DESCRIPTION

The proposed project would consist of the installation of a diversion structure at the upstream side of the existing concrete weir at the Buck Gully Channel discharge. The diverted water flow will be conveyed through a proposed 8-inch polyvinyl chloride (PVC) pipe into a 48-inch continuous deflection system (CDS) that will serve to remove sediment. The sediment flows from the CDS unit will be directed into a proposed 3,182 square-foot underground infiltration system. Nearly all improvements would be located below ground surface. The primary components of the project are as follows:

- *Diversion Vault*: A reinforced concrete vault is proposed upstream of the existing Buck Gully concrete weir wall. The system will be designed with a capacity to divert the design dry weather flow of approximately 0.77 cubic feet per second (cfs). The structure will be rectangular in plan and will include a 15-foot long concrete wall located 2-foot upstream and parallel to the existing weir wall and two side walls joining the existing wall at just outside the limits of the existing low flow weir notch on the east side and approximately 3-feet beyond the notch limits on the west side. The vault bottom will be a 12-foot thick reinforced concrete slab. The proposed vault will be 2-foot deep on the upstream side and 3.5-foot deep at the downstream side. The vault top will be an upstream slanting stainless steel grate set at approximately 27 degrees slope. The grate will sit on the existing wall on the downstream side and slope down towards the upstream proposed wall which is 1.5-foot lower. Water flowing from up the channel will fall through the screen and large debris will slide down to fall upstream of the proposed 2-foot wall to be washed down during large storm events.

  A 4-foot high by 1.5-foot high opening will be added on the downstream side of the vault by saw-cutting through the existing wall. The opening will be sealed using a removable Modified Waterman's SS-250 slide gate that can be opened as needed to sweep out any accumulated sand from inside the vault. The slide gate will be modified to include a non-rising stem, a right angle gearbox, and an extension stem mounted to the gearbox with a 2-inch operating nut mounted below existing top of weir wall. This modification will allow the gate to be opened by sliding horizontally along the weir wall and ensure that nothing protrudes above this existing wall. Flow that enters the vault will be conveyed through an 8-inch PVC pipe that will run west along the upstream side of the existing weir wall. The invert of the 8-inch pipe will be set at 1-foot above the vault bottom, to allow for sand that passes through the grated top to fall to the bottom below the pipe invert. This material will be swept downstream through the 4-foot by 1.5-foot opening when the slide gate is opened as part of the regular vault maintenance.

A hole will be core-drilled through the existing weir wall to run the 8-inch PVC pipe through to discharge the dry weather flows into a proposed CDS unit.

- *Continuous Deflection System (CDS)*: Dry weather flows diverted from Buck Gully Channel will be directed into the CDS. The CDS hydrodynamic separator uses swirl concentration and patented continuous deflective separation to screen, separate and trap trash, debris, sediment, and hydrocarbons from stormwater runoff. The CDS captures and retains 100% of floatables and neutrally buoyant debris 2.4-millimeter or larger, and effectively removes sediment. The treated dry weather flows will be conveyed through a proposed 8-inch PVC pipe downstream into the infiltration system. The system was sized in consultation with the manufacturer and has a capacity above the proposed dry weather flows.

- *Flo-tank Filtration System*: A Flo-Tank Filtration system is proposed for the underground system to infiltrate the dry weather flows. The system is manufactured by Atlantis and will serve as an underground storage that allows water to infiltrate into the ground, using underground infiltration techniques. The system is designed to infiltrate the dry weather flows within 24 hours. The Atlantis system provides a void space of over 90% and with a smaller footprint achieves the same storage capacity as most other available underground tank systems. The system is made of Polypropylene (PP) lightweight design and this will make installation comparatively quicker, safer and cheaper. The system will be installed with inspection ports spaced within the gallery limits to allow for flashing out of any sediment as needed. Based on the manufacturer history of use of these systems, sediment flashing is minimal if the system is installed with a pre-treatment system to ensure that no sediment enters the system.

  The Flo-tanks come in different modular systems ranging from a mini that measures 16-inches by 30-inches to a penta that measures 16-inches by 83-inches. For this project, the proposed module is the double Flo-Tank modular systems that measures 16-inches wide by 26.77-inches long by 34.65-inches high. This will be installed on the south side of the existing life guard tower, and will be arranged to provide a total of storage of approximately 8,432 cubic feet. The total beach surface area used by the system is approximately 3,182 square feet. Based on the geotechnical investigation, the existing soils have an infiltration rate of 2.48 inches per hour at the installation depth, which is high enough to allow infiltration of the entire tank capacity at design flow rate within less than 14 hours.

With implementation of the improvements described above, existing nuisance flows at Little Corona Beach from the Buck Gully Channel discharge would be reduced significantly and allowed to infiltrate into the ground within an underground filtration system.

Section 2 Summary of Regulations

There are four key agencies that regulate activities within coastal streams, wetlands, and riparian areas in California. The Corps Regulatory Division regulates activities pursuant to Section 404 of the Federal Clean Water Act (CWA), Section 10 of the Rivers and Harbors Act, and Section 103 of the Marine Protection, Research and Sanctuaries Act. Of the State agencies, the CDFW regulates activities under the Fish and Game Code Section 1600-1616, the Regional Board regulates activities pursuant to Section 401 of the CWA and the California Porter-Cologne Water Quality Control Act, and the CCC regulates activities under the California Coastal Act.

2.1 U.S. ARMY CORPS OF ENGINEERS

Since 1972, the Corps and U.S. Environmental Protection Agency (EPA) have jointly regulated the filling of "waters of the U.S." (WoUS), including wetlands, pursuant to Section 404 of the CWA. The Corps has regulatory authority over the discharge of dredged or fill material into the WoUS under Section 404 of the CWA. The Corps and EPA define "fill material" to include any "material placed in waters of the United States where the material has the effect of: (i) replacing any portion of a water of the United States with dry land; or (ii) changing the bottom elevation of any portion of the waters of the United States." Examples include, but are not limited to, sand, rock, clay, construction debris, wood chips, and "materials used to create any structure or infrastructure in the waters of the United States."

The term WoUS is defined under CWA regulations 33 CFR §328.3(a). Wetlands, a subset of jurisdictional waters, are jointly defined by the Corps and EPA under CWA regulations 33 CFR §328.3(b).

2.2 REGIONAL WATER QUALITY CONTROL BOARD

Applicants for a federal license or permit for activities which may discharge to WoUS must seek Water Quality Certification from the state or Indian tribe with jurisdiction. [3] Such Certification is based on a finding that the discharge will meet water quality standards and other applicable requirements. In California, there are nine Regional Boards that issue or deny Certification for discharges within their geographical jurisdiction. Water Quality Certification must be based on a finding that the proposed discharge will comply with water quality standards, which are defined as numeric and narrative objectives in each Regional Board's Basin Plan. Where applicable, the State Water Resources Control Board has this responsibility for projects affecting waters within multiple Regional Boards. The Regional Board's jurisdiction extends to all waters of the State and to all WoUS, including wetlands.

[3] Title 33, United States Code, Section 1341; Clean Water Act Section.

Additionally, the California Porter-Cologne Water Quality Control Act gives the State very broad authority to regulate waters of the State, which are defined as any surface water or groundwater, including saline waters. The Porter-Cologne Act has become an important tool post *Solid Waste Agency of Northern Cook County v. United States Corps of Engineers*[4] (SWANCC) and *Rapanos v. United States*[5] (Rapanos) court cases regulatory environment, with respect to the state's authority over isolated and insignificant waters. Generally, any person proposing to discharge waste into a water body that could affect its water quality must file a Report of Waste Discharge in the event that there is no Section 404/401 nexus. Although "waste" is partially defined as any waste substance associated with human habitation, the Regional Board also interprets this to include fill discharged into water bodies.

2.3 CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE

California Fish and Game Code Sections 1600-1616 establishes a fee-based process to ensure that projects conducted in and around lakes, rivers, or streams do not adversely impact fish and wildlife resources, or, when adverse impacts cannot be avoided, ensures that adequate mitigation and/or compensation is provided.

Fish and Game Code Section 1602 requires any person, state, or local governmental agency or public utility to notify the CDFW before beginning any activity that will do one or more of the following:

(1) substantially obstruct or divert the natural flow of a river, stream, or lake;

(2) substantially change or use any material from the bed, channel, or bank of a river, stream, or lake; or

(3) deposit or dispose of debris, waste, or other material containing crumbled, flaked, or ground pavement where it can pass into a river, stream, or lake.

Fish and Game Code Section 1602 applies to all perennial, intermittent, and ephemeral rivers, streams, and lakes in the state.

2.4 CALIFORNIA COASTAL COMMISSION

The CCC was established by voter initiative in 1972 (Proposition 20) and later made permanent by the Legislature through adoption of the California Coastal Act of 1976. The CCC, in partnership with coastal cities and counties, plans and regulates the use of land and water in the coastal zone. Development activities, which are broadly defined by the Coastal Act to include (among others) construction of buildings, divisions of land, and activities that change the intensity of use of land or public access to coastal waters, generally require a coastal permit from either the CCC or the local government.

[4] Solid Waste Agency of Northern Cook County v. U.S. Army Corps of Engineers, 531 U.S. 159 (2001)

[5] Rapanos v. United States, 547 U.S. 715 (2006)

Section 3 Methods

The analysis presented in this document is supported by field surveys and verification of current conditions conducted on March 19 and June 18, 2015. While in the field, jurisdictional areas were recorded onto a base map at a scale of 1" = 50' using the topographic contours and visible landmarks as guidelines. Data points were obtained with a Garmin 62 Ground Positioning System (GPS) Map62 in order to record and identify specific ordinary high water marks (OHWM), soil pits, picture locations, and drainage features. This data was then transferred via USB port as a .shp file and added to the project's jurisdictional maps. The jurisdictional maps were prepared in ESRI ArcInfo Version 10.3.

3.1 WATERS OF THE U.S.

In the absence of adjacent wetlands, the limits of the Corps' jurisdiction in non-tidal waters extend to the OHWM, which is defined in CWA regulations 33 CFR §328.3(e). Indicators of an OHWM are defined in *A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States* (Corps 2008). An OHWM can be determined by, but not limited to, the observation of benches, break in bank slope, particle size distribution, sediment deposits, drift, litter, and/or change in plant community. The Regional Board shares the Corps' jurisdictional methodology, unless State Waters are present.

For this project location, Corps jurisdictional wetlands are delineated using the methods outlined in the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region, Version 2.0* (Corps, 2008). This document is one of a series of Regional Supplements to the 1987 Corps Wetland Delineation Manual (Corps Manual). According to the Corps Manual, identification of wetlands is based on a three-parameter approach involving indicators of hydrophytic vegetation, hydric soil, and wetland hydrology. In order to be considered a wetland, an area must exhibit at least minimal characteristics within these three parameters. The Regional Supplement presents wetland indicators, delineation guidance, and other information that is specific to the Arid West Region. In the field, vegetation, soils, and evidence of hydrology have been examined using the appropriate methodology and documented on Corps' wetland data sheets, when applicable. It should be noted that both the Regional Board and the CDFW jurisdictional wetlands encompass those of the Corps.

3.2 WATERS OF THE STATE

The Regional Board's jurisdiction is mapped similarly to the Corps, by defining an OHWM and utilizing the three-parameter approach for wetlands (described in Section 3.1 above).

The CDFW's jurisdiction applies to all perennial, intermittent, and ephemeral rivers, streams, and lakes in the state. The CDFW's regulatory authority extends to include riparian habitat (including wetlands) supported by a river, stream, or lake regardless of the presence or absence of hydric soils and saturated soil conditions. Generally, the CDFW jurisdiction is mapped to the top of bank of the stream or to the outer drip line of the adjacent riparian vegetation, whichever is greater.

The CCC utilizes the Cowardin Wetland Classification System, which was developed for the U.S. Fish and Wildlife Service (USFWS) in order to create the National Inventory of Wetlands. Under this hierarchical system, classification is based on hydrologic regime, vegetative community, and to a lesser extent on water chemistry and soils. The classification includes both wetlands and deepwater habitats. The CCC accepts the USFWS' definition and uses it as a guide in identifying wetlands and in implementing their wetland policies. The Coastal Act (PRC Section 30121) defines "wetlands" as "lands within the Coastal Zone which may be covered periodically or permanently with shallow water and include saltwater marshes, freshwater marshes, open or closed brackish water marshes, swamps, mudflats, and fens." In addition, the Coastal Act (PRC Section 30107.5) defines environmentally sensitive areas in a manner that would include rivers, streams or other aquatic habitat.

Section 4 Literature Review

Review of relevant literature and materials often aids in preliminarily identifying areas that may fall under an agency's jurisdiction. A summary of Michael Baker's literature review is provided below (refer to Section 8.0 for a complete list of references used during the course of this delineation).

4.1 WATERSHED REVIEW

The project site is located within the Newport Coast Watershed. According to the City of Newport Beach Newport Coast Watershed Project website, the Newport Coast Watershed covers approximately 10 square miles and extends south of Corona del Mar in Newport Beach to Morro Canyon. Most of this watershed area was annexed by the City of Newport Beach on January 1, 2002. The watershed encompasses eight coastal canyons, two of which are 303(d) listed for bacteria impacts. Seven of the canyons fall within Regional Board Region 8 and City of Newport Beach limits. The eighth canyon, Morro Canyon, is part of Region 9 and is within the County of Orange's jurisdiction. This compact watershed area includes a very large percentage of native vegetation on undisturbed terrain.

4.2 LOCAL CLIMATE

The local climate is typical of the Southern California Coastal Region. Winters are cool and moist; nearly all of the precipitation falls in winter. Summers are mild, warm, and dry, with an average annual temperature of 61°F. Average mean annual rainfall at most of the lower elevations of the region is approximately 14 inches. For the purposes of this delineation, the growing season is considered to be 365 days a year.

4.3 USGS TOPOGRAPHIC QUADRANGLE

The project site is located within Township 7 South, Range 9 and 10 West, San Bernardino Meridian on the *Laguna Beach, California* USGS quadrangle. Onsite topography is approximately 10 to 15 feet above msl. The project site is within an area indicated as Buck Gully. According to the topographic map, the project site consists primarily of vacant, undeveloped land. A blue line stream flows through the project site in a north to south direction. Additional surrounding land uses consist of undeveloped land, residential developments, and recreational areas.

4.4 AERIAL PHOTOGRAPH

Prior to the field visit, Michael Baker reviewed a current aerial photograph dated March 24, 2015 from Google Earth Imaging for the project site. Aerial photographs can be useful during

the delineation process, as the photographs often indicate drainages and vegetation (i.e., riparian vegetation) present within the boundaries of the project site (if any).

According to the aerial photograph, the project site appears to consist of undeveloped land within Buck Gully. The northern boundary of the project site is bordered by undeveloped land within Buck Gully. The southern boundary of the project site is within Little Corona Beach. The perennial stream feature enters the project site along the northern boundary and exits to the Pacific Ocean. The project site is surrounded by steep canyon walls that confine the flow of the stream path. A cement weir feature separates the drainage feature from the beach and causes water to pond prior to discharging to the Pacific Ocean. A lifeguard tower is located within the boundaries of the project site.

4.5 SOIL SURVEY

Onsite soils were researched prior to the site visit. The presence of hydric soils is initially investigated by comparing the mapped soil series for the site to the County list of hydric soils. Soil surveys furnish soil maps and interpretations originally needed in giving technical assistance to farmers and ranchers; in guiding other decisions about soil selection, use, and management; and in planning, research, and disseminating the results of the research. In addition, soil surveys are now heavily utilized in order to obtain soil information with respect to potential wetland environments and jurisdictional areas (i.e., soil characteristics, drainage, and color).

According to the Orange County and Western Part of Riverside County, California Soil Survey, dated 1978, the project site is situated on the Myford association. The Myford association consists of moderately well drained soils on marine terraces. Two (2) soil series are reported within the boundaries of the project site, and consist of the following (refer to Appendix B, *Documentation*, for a complete soils report):

Myford sandy loam, 9 to 30 percent slopes, eroded (177): This strongly sloping to moderately steep soil generally occurs on side slopes of terraces. The profile is similar to the one described as typical of the series, but is very shallow because of erosion. On as much as 50 percent of the acreage, the subsoil is exposed or deep gullies have formed that prevent tillage. The Myford series consists of moderately well drained soils formed in sandy sediments. In a typical profile the surface layer is pale brown (10YR 4/3 moist) and pinkish gray (7.5YR 4/2 moist), medium acid sandy loam, about 4 inches thick. The upper 6 inches of the subsoil is brown (7.5YR 3/2 moist), medium acid sandy clay. The soil is very slowly permeable. If the soil is bare, runoff is rapid and the erosion hazard is high. Available water capacity is 1.5 to 3.5 inches. Present land use is range, watershed, wildlife and urban development.

Beaches (115): This soil series consists of sandy, gravelly, or cobbly coastal shores that are washed and rewashed by tidal and wave action. These areas may be partly covered with water during high tides or stormy periods and support little to no vegetation. Runoff is slow and the erosion hazard is high.

4.6 HYDRIC SOILS LIST OF CALIFORNIA

Michael Baker reviewed the Hydric Soils List of California (April 2012), provided by the NRCS, in an effort to verify whether or not on-site soils are considered to be hydric. It should be noted that lists of hydric soils along with soil survey maps are good off-site ancillary tools to assist in wetland determinations, but they are not a substitute for onsite investigations. According to the soils list, Beaches (115) is listed as hydric.

4.7 NATIONAL WETLANDS INVENTORY

Michael Baker reviewed the U.S. Fish and Wildlife Service's National Wetland Inventory (NWI) maps. Wetland features were noted within the project site and consisted of *freshwater emergent wetland* (PEMC), *estuarine and marine wetland* (M2USP), and *estuarine and marine deepwater* (E1UBL) (refer to Appendix B, *Documentation*, for the NWI Map).

4.8 FLOOD ZONE

Michael Baker searched the Federal Emergency Management Agency website for flood data for the project site. Based on the Flood Insurance Rate Map Number 06059C0403J, the project site is located within Zone AE, which is within the 100-year flood zone, and Zone X, which is outside of the 100-year flood zone (refer to Appendix B, *Documentation*, for the FEMA Map).

Section 5 Site Conditions

Michael Baker regulatory specialists Wesley Salter, PWS, and Daniel Cardoza visited the project site on March 19 and June 18, 2015 to verify existing conditions and document potential jurisdictional areas. The temperature during the site visits was approximately 70°F. Refer to Exhibits 4A and 4B, *On-Site Photographs*, for representative photographs taken throughout the project site.

5.1 BUCK GULLY

Buck Gully is a perennial stream that receives year-round nuisance flows from the surrounding urbanized areas. Buck Gully conveys flows from north to south, is considered a RPW, and is tributary to the Pacific Ocean. Evidence of an OHWM was noted within the drainage, including drift deposits and destruction of terrestrial vegetation. Surface water was present at the time of the site visit. Substrate consists primarily of sand. The drainage feature is constricted by a cement weir structure at Little Corona Beach, causing flows to pond immediately upstream of the beach outlet. Buck Gully, within the boundaries of the project site, is approximately 10 feet in width.

Vegetation occurring within and adjacent to the project site is comprised of a mixture of hydrophytic (indicator identified after species) and upland species, including yerba mansa (*Anemopsis californica*, OBL), Spanish false fleabane (*Pulicaria paludosa*, FAC), wild celery (*Apiastrum angustifolium*, UPL), cattail (*Typha* sp., OBL), bristly oxtongue (*Helminthotheca echioides*, FACU), cocklebur (*Xanthium strumarium*, FAC), watercress (*Nasturtium officinale*, OBL), mulefat (*Baccharis salicifolia*, FAC), and coast golden bush (*Isocoma menziesii* var. *menziesii*, FAC). Vegetation outside of the stream course included hottentot fig (*Carpobrotus edulis*, UPL), boxthorn (*Lycium californica*, UPL), California sage brush (*Artemisia californica*, UPL), California brittlebush (*Encelia californica*, UPL), and coast prickly pear (*Opuntia littoralis*, UPL).

Two soil pits (SP-1 and SP-2) were dug within the project site to document potential hydric soil indicators and determine the extent of potential wetland features within the boundaries of the project site. SP-1 was dug to a depth of 12 inches before hitting a restrictive gravel layer. The layer from 0 to 4 inches displayed a matrix color of 10YR 2.5/2 with no redox features or other inclusions and consisted of sand. The layer from 4 to 12 inches exhibited a matrix color of N 2.5/- with no redox features or other inclusions and consisted of sandy loam. The loamy gleyed matrix indicator (F2), typically associated with extremely wet settings similar to the location of SP-1, requires the gleyed matrix to have a hue of N and a value of 4 or more. Based on previous site visits and Michael Baker's knowledge of the surrounding project area, it is well-known that the area surrounding SP-1 is saturated year-round. Additionally, the non-

Photo 1: Project site overview. Facing southeast.

Photo 2: Profile view of cement weir. Facing east-southeast.

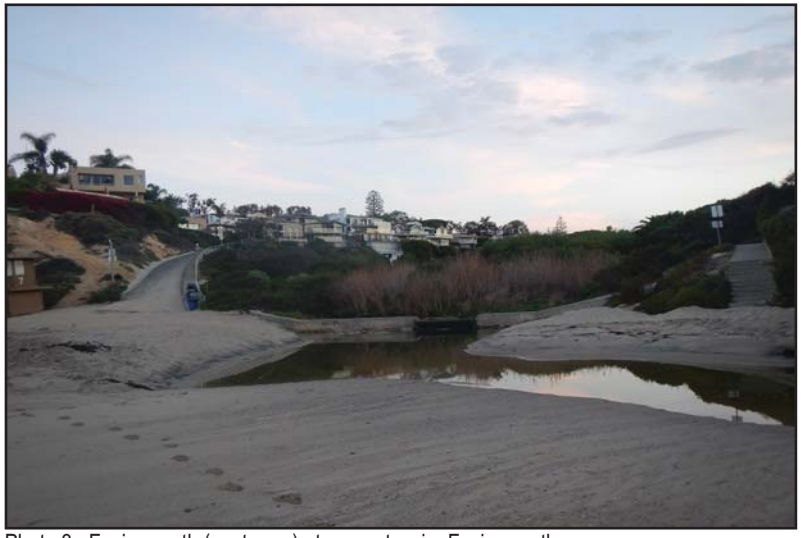


Photo 3: Facing north (upstream) at cement weir. Facing north.

Photo 4: Upland area at west end of project site. Facing north.

Photo 5: Wetland area. Facing north.

Photo 6: SP-2 showing standing water in soil pit. Facing northwest.

Photo 7: Profile view of cement weir. Facing northwest.

natural rock restrictive layer found at 12 inches is likely prohibiting proper hydric soil development. Therefore, although the soil in SP-1 did not meet the value requirement for the F2 indicator, it is Michael Baker's best professional judgment that SP-1 contains hydric soils based on its year-round saturation and constraints associated with the restrictive rock layer. Evidence of wetland hydrology was noted through the presence of a high water table (A2) and saturation (A3).

SP-2 was dug to a depth of 12 inches before hitting a restrictive gravel layer. The layer from 0 to 6 inches displayed a matrix color of 10YR 2.5/2 with no redoximorphic features or other inclusions and consisted of sand. The layer from 6 to 12 inches exhibited a matrix color of N 2.5/ with no redoximorphic features or other inclusions and consisted of sandy loam. Similar to SP-1, the soil in SP-2 did not meet the value requirement for the loamy gleyed matrix (F2) indicator, though it is Michael Baker's best professional judgment that SP-2 contains hydric soils based on its year-round saturation and constraints associated with the restrictive rock layer. Evidence of wetland hydrology was noted through the presence of saturation (A3).

5.2 PACIFIC OCEAN

The Pacific Ocean (Traditional Navigable Water) is a navigable waterway that occurs within the southwestern extent of the project site. The mean high tide line (MHTL) was determined to be 8 feet above msl using data from the closest National Oceanic and Atmospheric Administration's tide gauge station.[6] No vegetation occurs below the MHTL and no soil pits were dug for this feature.

[6] National Oceanic and Atmospheric Administration Tide Gauge Station ID 941580, Newport Beach, Newport Bay Entrance, California

Section 6 Findings

This delineation has been prepared for the City in order to delineate the Corps, Regional Board, CDFW, and CCC jurisdictional authority within the project site. This report presents Michael Baker's best effort at determining the jurisdictional boundaries using the most up-to-date regulations, written policy, and guidance from the regulatory agencies. However, as with any jurisdictional delineation, only the regulatory agencies can make a final determination of jurisdictional boundaries within a project site/property.

6.1 U.S. ARMY CORPS OF ENGINEERS DETERMINATION

6.1.1 Waters of the United States Determination

Evidence of an OHWM was noted within and adjacent to the project site. The MHTL was mapped at 8 feet. The onsite drainage feature exhibits a direct hydrological connection to downstream waters (Pacific Ocean) and is considered WoUS, which falls within the Corps' jurisdiction. Approximately 0.06-acre of non-wetland WoUS occurs within the project site. Refer to Table 1, *Jurisdictional Areas Summary*, for a summary of Corps/Regional Board jurisdiction on-site, and Exhibit 5a, *Corps/Regional Board Jurisdictional Map*, for an illustration of on-site jurisdictional areas. Refer to Table 2, *Impact Summary*, for a summary of proposed impacts to Corps/Regional Board jurisdictional areas, and Exhibit 5b, *Corps/Regional Board Jurisdictional Impact Map* for an illustration of proposed impacts.

6.1.2 Wetland Determination

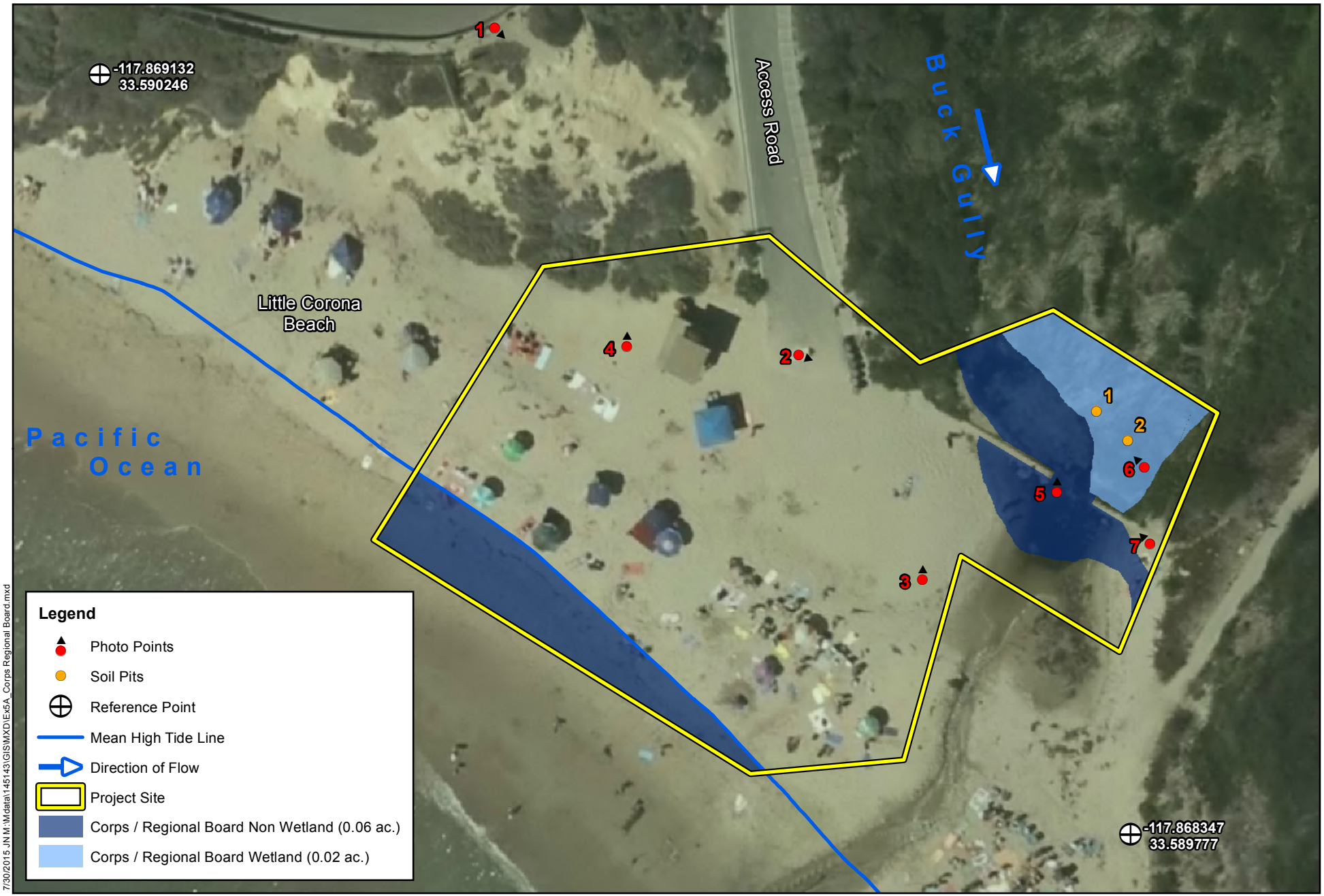
As previously noted, an area must exhibit all three wetland parameters described in the Corps Regional Supplement to be considered a jurisdictional wetland. Based on the results of the site visit, it was determined that one area met all three parameters, resulting in 0.02-acre of Corps jurisdictional wetlands within the boundaries of the project site. Refer to Table 2 and Exhibit 5b.

6.2 REGIONAL WATER QUALITY CONTROL BOARD DETERMINATION

No isolated or Rapanos conditions were observed within the boundaries of the project site; therefore, the Regional Board follows that of Corps jurisdiction.

6.3 CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE DETERMINATION

The on-site drainage features exhibited a bed and bank and qualify as CDFW jurisdictional streambed. Based on the results of the field investigation, approximately 0.04-acre of vegetated streambed occur within the project site.



7/30/2015 JN M:\Mdata\145143\GIS\MXD\Ex5A_Corps Regional Board.mxd

Michael Baker INTERNATIONAL

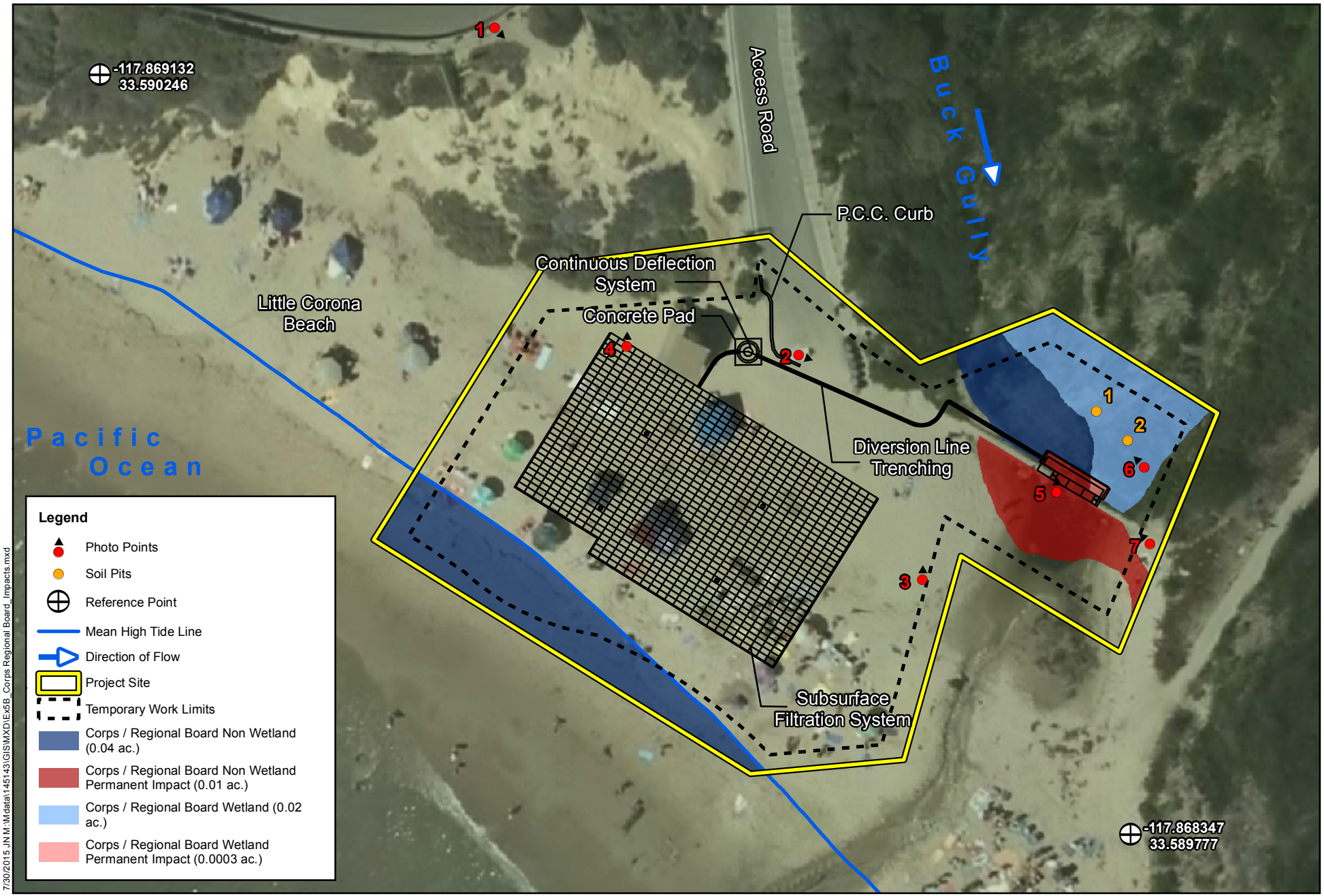
0 30 Feet

Source: Eagle Aerial 2014

LITTLE CORONA INFILTRATION PROJECT

Corps / Regional Board Jurisdictional Map

Exhibit 5A



7/30/2015 JN M:\Mdata\145143\GIS\MXD\Ex5B_Corps Regional Board_Impacts.mxd

Michael Baker INTERNATIONAL

0 30 Feet

Source: Eagle Aerial 2014

LITTLE CORONA INFILTRATION PROJECT

Corps / Regional Board Jurisdictional Impact Map

Exhibit 5B

Refer to Table 1 for a summary of CDFW jurisdiction on-site, and Exhibit 6a, *CDFW/CCC Jurisdictional Map*, for an illustration of on-site jurisdictional areas. Refer to Table 2 for a summary of proposed impacts to CDFW jurisdictional areas, and Exhibit 6b, *CDFW/CCC Jurisdictional Map*, for an illustration of proposed impacts.

6.4 CALIFORNIA COASTAL COMMISSION DETERMINATION

The on-site drainage feature qualifies as a CCC jurisdictional stream and wetlands. Based on the results of the field investigation, approximately 0.03-acre of CCC jurisdictional wetlands and 0.01-acre of jurisdictional stream occurs within the project site. Refer to Table 1 for a summary of CCC jurisdiction on-site and Exhibit 6a, *CDFW/CCC Jurisdictional Map*, for an illustration of on-site jurisdictional areas. Refer to Table 2 for for a summary of proposed impacts to CCC jurisdictional areas and Exhibit 6b for an illustration of proposed impacts.

Table 1: Jurisdictional Areas

Feature	Corps/Regional Board		CDFW	Coastal Commission	
	Non-Wetland (acres / linear feet)	Wetland (acres)	Vegetated Streambed (acres / linear feet)	Wetland (acres)	Stream (acres)
Buck Gully	0.027 / 72	0.02	0.04 / 72	0.03	0.01
Pacific Ocean	0.03	--	--	--	--

Table 2: Impact Summary

Feature	Corps/Regional Board		CDFW	Coastal Commission	
	Non-Wetland (acres / linear feet)	Wetland (acres)	Vegetated Streambed (acres / linear feet)	Wetland (acres)	Stream (acres)
Buck Gully	Perm: 0.01 / 32	Perm: 0.0003	Perm: 0.002 / 7	Perm: 0.002	Perm: 0.01
Pacific Ocean	--	--	--	--	--

7/30/2015 JN M:\Mdata\145143\GIS\MXD\Ex6A_CDFW_CCC.mxd

Michael Baker INTERNATIONAL

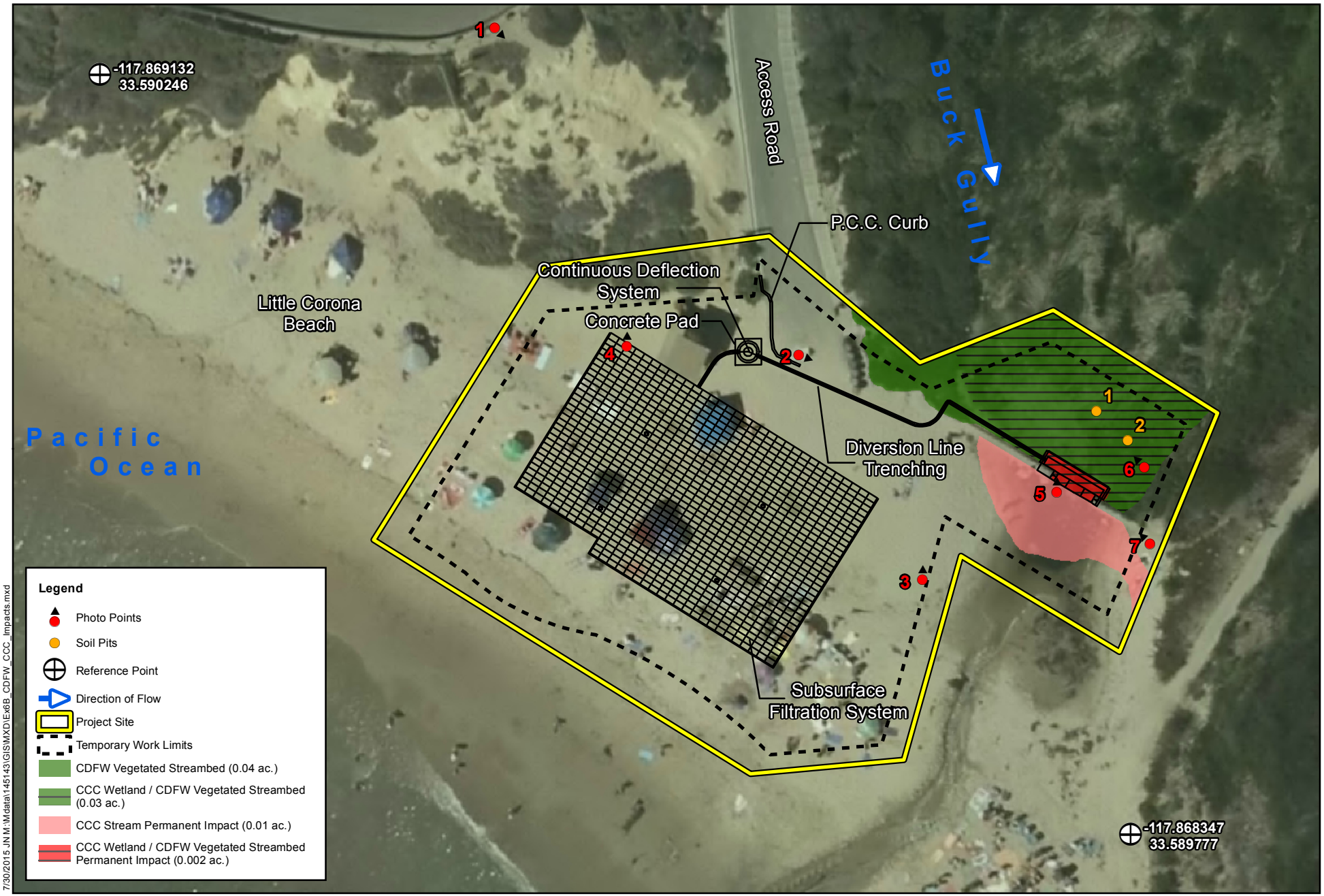
0 30 Feet

Source: Eagle Aerial 2014

LITTLE CORONA INFILTRATION PROJECT

CDFW / CCC Jurisdictional Map

Exhibit 6A



7/30/2015 JN M:\Mdata\145143\GIS\MXD\Ex6B_CDFW_CCC_Impacts.mxd

Michael Baker INTERNATIONAL

0 30 Feet

Source: Eagle Aerial 2014

LITTLE CORONA INFILTRATION PROJECT

CDFW / CCC Jurisdictional Impact Map

Exhibit 6B

Section 7 Regulatory Approval Process

The following is a summary of the various permits, agreements, and certifications required before construction activities take place within the jurisdictional areas.

7.1 U.S. ARMY CORPS OF ENGINEERS

The Corps regulates discharges of dredged or fill materials into WoUS and wetlands pursuant to Section 404 of the CWA, Section 10 of the Rivers and Harbors Act, and Section 103 of the Marine Protection, Research, and Sanctuaries Act. Therefore, it will be necessary for the project applicant to obtain a CWA Section 404 Nationwide Permit prior to impacts occurring within Corps jurisdictional areas.

7.2 REGIONAL WATER QUALITY CONTROL BOARD

The Regional Board regulates discharges to surface waters pursuant to Section 401 of the CWA and the California Porter-Cologne Water Quality Control Act. Therefore, it will be necessary for the project applicant to obtain CWA Section 401 Water Quality Certification from the Regional Board prior to impacts occurring within Regional Board jurisdictional areas.

7.3 CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE

The CDFW regulates alterations to streambed under the California Fish and Game Code. Therefore, it will be necessary for the project applicant to obtain a Section 1602 Streambed Alteration Agreement from the CDFW prior to impacts occurring within CDFW jurisdictional areas.

7.4 CALIFORNIA COASTAL COMMISSION

For projects in or affecting the coastal zone, the federal Coastal Zone Management Act requires the applicant to obtain concurrence from the CCC that the project is consistent with the State's Coastal Zone Management Plan prior to issuing the Corps authorization for the project. Therefore, the CCC requires permittees to either receive a concurrence or waiver of consistency certification before the Corps permit is validated. It will be necessary for the project applicant to obtain a Coastal Development Permit from the CCC prior to impacts occurring within CCC jurisdictional areas.

7.5 GLOBAL RECOMMENDATIONS

It is highly recommended that the delineation be forwarded to each of the regulatory agencies for their concurrence.

Section 8 References

The following resources were utilized during preparation of this Delineation of State and Federal Jurisdictional Waters:

California Coastal Commission, *Laws, Regulations, and Legislative Information*. (http://www.coastal.ca.gov/ccatc.html)

California Department of Fish and Wildlife, *Lake and Streambed Alteration Program*. (https://www.wildlife.ca.gov/Conservation/LSA)

"Corona del Mar, California." 33°35'24.02" N and 117°52'6.33" W. Google Earth, April 23, 2014. March 23, 2015.

Environmental Laboratory. 1987. *Corps of Engineers wetlands delineation manual*. Technical Report Y-87-1. Vicksburg, MS: U.S. Army Engineer Waterways Experiment Station.

Faber, Phyllis M., *Common Riparian Plants of California*, Pickleweed Press 1996

Faber, Phyllis M., *Common Wetland Plants of Coastal California*, Pickleweed Press 1996

Google Earth, Aerial Imagery, March 24, 2015

Munsell, *Soil Color Charts*, 2009 Year Revised/2009 Production

National Oceanic and Atmospheric Administration, *Tidal Data, Station ID 9410583, Balboa Pier, Newport Beach, CA* (http://tidesandcurrents.noaa.gov/stationhome.html?id=9410580)

Natural Resources Conservation Service, *Hydric Soils List of California*, April 2012 (http://soils.usda.gov/use/hydric/)

Robert W. Lichvar and John T. Kartesz. 2009. North American Digital Flora: National Wetland Plant List, version 3.1 (https://wetland_plants.usace.army.mil). U.S. Army Corps of Engineers, Engineer Research and Development Center, Cold Regions Research and Engineering Laboratory, Hanover, NH, and BONAP, Chapel Hill, NC.

U.S. Army Corps of Engineers, *A Field Guide to the Identification of the Ordinary High Water Mark in the Arid West Region of the Western United States*, August 2008.

U.S. Army Corps of Engineers, *Distribution of Ordinary High Water Mark Indicators and their Reliability in Identifying the Limits of "Waters of the United States" in the Arid Southwestern Channels*, February 2006.

U.S. Army Corps of Engineers, *Final Summary Report: Guidelines for Jurisdictional Determinations for Waters of the United States in the Arid Southwest*, June 2001.

U.S. Army Corps of Engineers, *Los Angeles District Regulatory Program.* (http://www.spl.usace.army.mil/Missions/Regulatory.aspx)

U.S. Army Corps of Engineers, *Minimum Standards for Acceptance of Preliminary Wetland Delineations*, November 20, 2001.

U.S. Army Corps of Engineers, *Practices for Documenting Jurisdiction under Section 404 of the CWA*, Regional Guidance Letter 07-01, June 5, 2007.

U.S. Army Corps of Engineers, *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. Nobel. ERDC/EL TR-08-28. Vicksburg, MS: U.S. Army Engineer Research and Development Center, 2008.

U.S. Army Corps of Engineers, *Special Public Notice: Map and Drawing Standards for the Los Angeles District Regulatory Division*, September 2010.

U.S. Army Corps of Engineers, *Updated Datasheet for the Identification of the Ordinary High Water Mark in the Arid West Region of the Western United States*, July 2010.

U.S. Department of Agriculture, Natural Resources Conservation Service, *Web Soil Survey.* (http://websoilsurvey.nrcs.usda.gov/app/)

U.S. Department of Agriculture, Soil Conservation Service and Forest Service, *Soil Survey of Orange County and Western Part of Riverside County, California*, issued September 1978

U.S. Department of Homeland Security, Federal Emergency Management Agency, National Flood Insurance Program, *Flood Insurance Rate No.* 06059C0403J revised December 3, 2009

U.S. Fish and Wildlife Service, Department of Habitat and Resource Conservation, *Wetland Geodatabase*. (http://wetlandsfws.er.usgs.gov/NWI/index.html)

U.S. Geological Survey, 7.5 Minute Series Topographic Quadrangless, *Laguna Beach, California*, 1965, photorevised 1981

Western Regional Climate Center, *Newport Beach, California.* (http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?canewp)

Appendix A Wetland Data Forms

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Little Corona Infiltration Project City/County: Corona Del Mar/Orange Sampling Date: 3/19/2015

Applicant/Owner: City of Newport Beach State: CA Sampling Point: SP1

Investigator(s): W. Salter, D. Cardoza Section, Township, Range: S 94-95, T 7 S, R 9-10 W

Landform (hillslope, terrace, etc.): Toeslope Local relief (concave, convex, none): None Slope (%): 2

Subregion (LRR): C - Mediterranean Lat: 33.590049° Long: -117.868389° Datum: NAD83

Soil Map Unit Name: Beaches NWI classification: PEMC

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:

Significant drought conditions present.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: --)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	_____ = Total Cover		
Sapling/Shrub Stratum (Plot size: --)			
1.			
2.			
3.			
4.			
5.			
	_____ = Total Cover		
Herb Stratum (Plot size: 5')			
1. Anemopsis californica	20	Y	OBL
2. Pulicaria paludosa	20	Y	FAC
3. Typha sp.	10	N	OBL
4. Nasturtium officinale	10	N	OBL
5. Xanthium strumarium	2	N	FAC
6. Apiastrum angustifolium	2	N	UPL
7.			
8.			
	65 = Total Cover		
Woody Vine Stratum (Plot size: --)			
1.			
2.			
	_____ = Total Cover		

% Bare Ground in Herb Stratum 35 % Cover of Biotic Crust 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	40	x 1 =	40
FACW species	_____	x 2 =	_____
FAC species	22	x 3 =	66
FACU species	_____	x 4 =	_____
UPL species	2	x 5 =	10
Column Totals:	64 (A)		116 (B)

Prevalence Index = B/A = 1.8

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: SP1

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
0-4	10YR 2.5/2	100					Sand	
4-12	N 2.5/	100					SaLo	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ✔ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: Rock

Depth (inches): 12

Hydric Soil Present? Yes ✔ No ___

Remarks:

Soil meets hue requirement of F2 but does not meet value requirement (4 or greater) for F2 indicator. Site is saturated year-round and has restrictive rock layer that is likely prohibiting proper hydric soil development.

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): 10

Saturation Present? (includes capillary fringe) Yes ✔ No ___ Depth (inches): 4

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: Little Corona Infiltration Project City/County: Corona Del Mar/Orange Sampling Date: 3/19/2015

Applicant/Owner: City of Newport Beach State: CA Sampling Point: SP2

Investigator(s): W. Salter, D. Cardoza Section, Township, Range: S 94-95, T 7 S, R 9-10 W

Landform (hillslope, terrace, etc.): Toeslope Local relief (concave, convex, none): None Slope (%): 2

Subregion (LRR): C - Mediterranean Lat: 33.590030° Long: -117.868365° Datum: NAD83

Soil Map Unit Name: Beaches NWI classification: PEMC

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:

Significant drought conditions present.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: --)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	_____ = Total Cover		
Sapling/Shrub Stratum (Plot size: --)			
1.			
2.			
3.			
4.			
5.			
	_____ = Total Cover		
Herb Stratum (Plot size: 5')			
1. Anemopsis californica	20	Y	OBL
2. Pulicaria paludosa	10	Y	FAC
3. Apiastrum angustifolium	5	N	UPL
4. Typha sp.	2	N	OBL
5. Helminthotheca echioides	2	N	FACU
6.			
7.			
8.			
	39 = Total Cover		
Woody Vine Stratum (Plot size: --)			
1.			
2.			
	_____ = Total Cover		

% Bare Ground in Herb Stratum 50 % Cover of Biotic Crust 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	22	x 1 =	22
FACW species	_____	x 2 =	_____
FAC species	10	x 3 =	30
FACU species	2	x 4 =	2
UPL species	5	x 5 =	25
Column Totals:	39 (A)		79 (B)

Prevalence Index = B/A = 2.03

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: SP2

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
0-6	10YR 2.5/2	100					Sand	
4-12	N 2.5/-	100					SaLo	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ✔ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: Rock

Depth (inches): 10

Hydric Soil Present? Yes ✔ No ___

Remarks:

Soil meets hue requirement of F2 but does not meet value requirement (4 or greater) for F2 indicator. Site is saturated year-round and has restrictive rock layer that is likely prohibiting proper hydric soil development.

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): 4

Wetland Hydrology Present? Yes ✔ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Appendix B Documentation

U.S. Fish and Wildlife Service

National Wetlands Inventory

Little Corona Infiltration Project

Mar 23, 2015

Wetlands

- Freshwater Emergent
- Freshwater Forested/Shrub
- Estuarine and Marine Deepwater
- Estuarine and Marine
- Freshwater Pond
- Lake
- Riverine
- Other

Riparian

- Herbaceous
- Forested/Shrub

Riparian Status

- Digital Data

User Remarks:

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations tables in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations tables should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Universal Transverse Mercator (UTM) Zone 11. The **horizontal datum** was NAD 83, GRS80 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713-3242**, or visit its website at http://www.ngs.noaa.gov.

Base map information shown on this FIRM was derived from the National Agriculture Imagery Program, dated 2005.

This map reflects more detailed and up-to-date **stream channel configurations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables in the Flood Insurance Study Report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on this map.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

Contact the **FEMA Map Service Center** at 1-800-358-9616 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, a Flood Insurance Study report, and/or digital versions of this map. The FEMA Map Service Center may also be reached by Fax at 1-800-358-9620 and its website at http://msc.fema.gov.

If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call **1-877-FEMA MAP** (1-877-336-2627) or visit the FEMA website at http://www.fema.gov.

LEGEND

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D	Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

1% annual chance floodplain boundary

0.2% annual chance floodplain boundary

Floodway boundary

Zone D boundary

CBRS and OPA boundary

Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.

513 — Base Flood Elevation line and value; elevation in feet*

(EL 987) — Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988

Cross section line

Transect line

87°07'45", 32°22'30" — Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), Western Hemisphere

1000-meter Universal Transverse Mercator grid values, zone NAD 1983 UTM Zone 11N

600000 FT — 5000-foot grid ticks: California State Plane coordinate system, zone VI (FIPSZONE 0406), Lambert Conformal Conic projection

DX5510 — Bench mark (see explanation in Notes to Users section of this FIRM panel)

M1.5 — River Mile

MAP REPOSITORY
Refer to listing of Map Repositories on Map Index

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
September 15, 1989

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL
February 5, 1992 - November 3, 1993 - January 3, 1997 - February 18, 2004 - December 3, 2009 : for description of revisions, see Notice to Users page in the Flood Insurance Study report.

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your Insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 500'

250 0 500 1000 FEET

150 0 150 300 METERS

NFIP

PANEL 0403J

FIRM

FLOOD INSURANCE RATE MAP

ORANGE COUNTY, CALIFORNIA AND INCORPORATED AREAS

PANEL 403 OF 539

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
NEWPORT BEACH, CITY OF	060227	0403	J

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER 06059C0403J

MAP REVISED DECEMBER 3, 2009

Federal Emergency Management Agency

NATIONAL FLOOD INSURANCE PROGRAM

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Orange County and Part of Riverside County, California

Little Corona Infiltration Project

March 26, 2015

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (http://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means

for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the

individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Orange County and Part of Riverside County, California
Survey Area Data: Version 8, Sep 19, 2014

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: May 3, 2010—Jun 19, 2010

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Orange County and Part of Riverside County, California (CA678)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
115	Beaches	0.4	98.7%
177	Myford sandy loam, 9 to 30 percent slopes, eroded	0.0	1.3%
Totals for Area of Interest		**0.4**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Orange County and Part of Riverside County, California

115—Beaches

Map Unit Setting

National map unit symbol: hclq
Elevation: 0 to 10 feet
Mean annual precipitation: 42 to 48 inches
Mean annual air temperature: 52 to 57 degrees F
Frost-free period: 190 to 210 days
Farmland classification: Not prime farmland

Map Unit Composition

Beaches: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Beaches

Setting

Landform: Beaches

Typical profile

H1 - 0 to 6 inches: sand
H2 - 6 to 60 inches: coarse sand, sand, fine sand
H2 - 6 to 60 inches:
H2 - 6 to 60 inches:

Properties and qualities

Slope: 0 to 5 percent
Natural drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: About 0 to 72 inches
Frequency of flooding: Frequent
Salinity, maximum in profile: Very slightly saline to moderately saline (4.0 to 16.0 mmhos/cm)
Available water storage in profile: Moderate (about 6.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8w

177—Myford sandy loam, 9 to 30 percent slopes, eroded

Map Unit Setting

National map unit symbol: hcnq
Elevation: 100 to 4,000 feet
Mean annual precipitation: 12 to 35 inches
Mean annual air temperature: 57 to 64 degrees F
Frost-free period: 200 to 350 days
Farmland classification: Not prime farmland

Map Unit Composition

Myford and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Myford

Setting

Landform: Terraces
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Riser
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from mixed

Typical profile

A - 0 to 7 inches: sandy loam
Bt - 7 to 11 inches: sandy clay
Btk - 11 to 21 inches: sandy clay loam
Bt - 21 to 64 inches: sandy clay loam
C - 64 to 79 inches: sandy loam

Properties and qualities

Slope: 9 to 30 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 5 percent
Salinity, maximum in profile: Nonsaline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Very low (about 2.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: D
Ecological site: Claypan (1975) (R019XD061CA)

Minor Components

Myford, sandy loam

Percent of map unit: 10 percent
Landform: Terraces
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Riser
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Claypan (1975) (R019XD061CA)

Cieneba, sandy loam

Percent of map unit: 3 percent
Landform: Hills
Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Side slope
Down-slope shape: Concave, convex
Across-slope shape: Convex
Ecological site: Shallow loamy (1975) (R019XD060CA)

Yorba, cobbly sandy loam

Percent of map unit: 2 percent
Landform: Terraces
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Riser
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Claypan (1975) (R019XD061CA)

References

American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.

American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deep-water habitats of the United States. U.S. Fish and Wildlife Service FWS/OBS-79/31.

Federal Register. July 13, 1994. Changes in hydric soils of the United States.

Federal Register. September 18, 2002. Hydric soils of the United States.

Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.

National Research Council. 1995. Wetlands: Characteristics and boundaries.

Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_054262

Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service, U.S. Department of Agriculture Handbook 436. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053577

Soil Survey Staff. 2010. Keys to soil taxonomy. 11th edition. U.S. Department of Agriculture, Natural Resources Conservation Service. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053580

Tiner, R.W., Jr. 1985. Wetlands of Delaware. U.S. Fish and Wildlife Service and Delaware Department of Natural Resources and Environmental Control, Wetlands Section.

United States Army Corps of Engineers, Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Waterways Experiment Station Technical Report Y-87-1.

United States Department of Agriculture, Natural Resources Conservation Service. National forestry manual. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/home/?cid=nrcs142p2_053374

United States Department of Agriculture, Natural Resources Conservation Service. National range and pasture handbook. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/landuse/rangepasture/?cid=stelprdb1043084

United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2_054242

United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053624

United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210. http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052290.pdf