Appendix 3.4-2

Aquatic Resources Delineation Report for the Las Camas Solar Development Project

Las Camas Solar Development Project



Aquatic Resources Delineation Report

Merced County

May 2023

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Prepared By:  Date: 5/03/2023

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Summary

This report presents the results of an aquatic resources delineation survey conducted for the Las Cams Solar Development Project (Project). This aquatic resources delineation report provides technical documentation of the wetlands and non-wetland waters identified within the project's survey area.

The Project proponent, EDPR CA Solar Park III LLC (Proponent) a wholly owned subsidiary of EDPR CA Solar Park III LLC, North America LLC., is proposing to develop the approximately 1,740-acre Project site for the purposes of solar energy development. The survey area includes the locations of all proposed Project elements. Included in this report is the delineation data necessary to obtain a jurisdictional determination by the U.S. Army Corps of Engineers (USACE).

The purpose of this delineation is to identify the extent of jurisdictional aquatic resources within and adjacent to the Project to support the federal and state regulatory permitting process. Relevant jurisdictions include federal jurisdiction regulated by the USACE as non-wetland waters of the United States (WOTUS) and wetland WOTUS under Section 404 of the Clean Water Act (CWA); state jurisdiction regulated by the State Water Resources Control Board (SWRCB)/Regional Water Quality Control Board (RWQCB) as WOTUS and wetland WOTUS under Section 401of the CWA; RWQCB surface waters of the State (WoS) regulated under Section 13260 of the Porter-Cologne Water Quality Act (Porter-Cologne Act); and lakes, streams and other aquatic features and associated riparian vegetation regulated by the California Department of Fish and Wildlife (CDFW) under Section 1600 of the California Fish and Game Code.

In summary, a total of 0.614 acres of aquatic resources were delineated in the survey area, consisting entirely of a single ephemeral drainage evaluated as a non-wetland waters. It is the best professional judgement of the ICF delineators that this feature does not qualify as a WOTUS, because the feature does not receive or contribute water flow to a traditional navigable water (e.g., WOTUS). This feature is considered a WoS and jurisdictional under the CDFW 1600 program.

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List of Abbreviated Terms

Abbreviation	Description
°F	degrees Fahrenheit
AJD	approved jurisdictional determination
amsl	above mean sea level
CCR	California Code of Regulations
CDFW	California Department of Fish and Wildlife
CFR	Code of Federal Regulations
CWA	Clean Water Act
EIR	Environmental Impact Report
EPA	Environmental Protection Agency
ED	Ephemeral drainage
HUC	hydrologic unit code
NWI	National Wetlands Inventory
OHWM	Ordinary High Water Mark
ORM	Ombil Regulatory Module
Porter-Cologne Act	Porter-Cologne Water Quality Act
Project	Las Camas Solar Development Project
Proponent	EDPR CA Solar Park III LLC
RAWS	Remote Automatic Weather Station
RWQCB	Regional Water Quality Control Board
SR	State Route
SWRCB	State Water Resources Control Board
USACE	U.S. Army Corps of Engineers
USGS	U.S. Geological Survey
WoS	waters of the State
WOTUS	waters of the United States

Chapter 1 Introduction

1.1 Project Location

The Las Camas Solar Development Project (Project) is located approximately two miles south of the community of Santa Nella and five miles west of the City of Los Banos in western Merced County, California (Figure 1). The Project occurs on the San Luis Dam and Volta U.S. Geological Survey (USGS) 7.5-minute quadrangles.

The approximately 1,740-acre Project is bordered by State Route (SR) 33 to the north, Interstate 5 to the east, and privately owned farmland and the Billy Wright Landfill to the south and west. Billy Wright Road intersects the southeastern most portion of the study area.

1.2 Project Description

The Project proponent, EDPR CA Solar Park III LLC (Proponent) a wholly owned subsidiary of EDPR CA Solar Park III LLC, North America LLC., is proposing to develop the approximately 1,740-acre Project site for the purposes of solar energy development.

1.3 Project Background

Initial project feasibility studies were conducted in 2019 to determine the habitat types within the study area. This study, titled “Biological Resources Evaluation for the Las Camas Solar Development Project” (ICF 2019), focused the present 2022 aquatic resources delineation fieldwork on areas that needed to be revisited to collect soil data and to help determine jurisdiction of potential aquatic resources.

An Environmental Impact Report (EIR) is currently being prepared for the project by ICF.

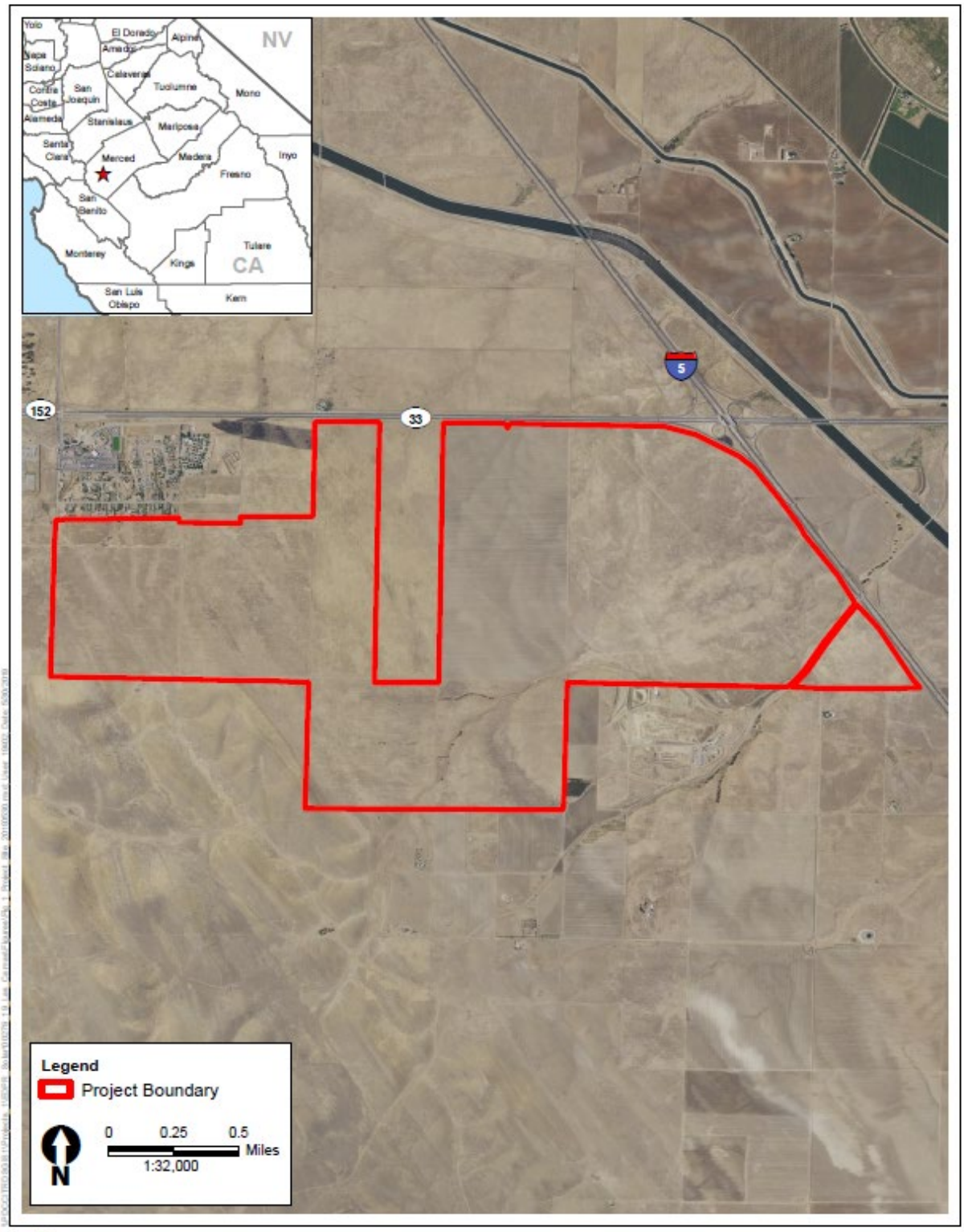


Figure 1
Las Camas solar development project site

Chapter 2 Methods

2.1 Sources of Information

The following sources of information were reviewed in conjunction with field work.

- San Luis Dam and Volta USGS 7.5-minute topographic quadrangles.
- Google Earth aerial imagery (2022).
- National Wetlands Inventory (NWI) maps (U.S. Fish and Wildlife Service 2022).
- Natural Resources Conservation Service soils map (2022).
- Biological Resources Evaluation for the Las Camas Solar Development Project (ICF 2019)
- The above resources were used to assist in identifying the approximate locations of potential aquatic resources subject to regulation by the U.S. Army Corps of Engineers (USACE), Regional Water Quality Control Board (RWQCB), and California Department of Fish and Wildlife (CDFW), within the survey area.

2.2 Field Delineation and Mapping

Initial habitat mapping for the aquatic resource delineation was conducted on May 13-16, 2019, by ICF botanists and wetland ecologists Kate Carpenter and Ali Summers (ICF 2019). Additional aquatic resource delineation fieldwork was conducted on April 25, 2022, by ICF biologist Sean O'Brien and botanist Shannon Henke.

The maps in this report were generated from field measurements, aerial photography, and existing geospatial datasets (Appendix A, Aquatic Resources Delineation Map). Locations within the survey area were identified using an iPad and Trimble R1 external antenna with locational accuracy typically less than 2 horizontal meters. Wetland and OHWM determination data forms are included in this report to document the aquatic resources identified during the survey (Appendix B). A list of plant species observed within the survey area was compiled, and the scientific name and wetland indicator status of each species are provided in Appendix C. Representative photographs were taken of all potential wetland and non-wetland waters at each location within the survey area (Appendix D). Supporting Information (2019 Land Cover Map for Project [ICF 2019], Custom Soil Resource Report, and National Wetland Inventory Map) is provided in Appendix E.

The below subsections provide the aquatic resource delineation methods used per applicable regulatory agency guidance.

2.2.1 U.S. Army Corps of Engineers

The regulation defining the extent of WOTUS has changed a number of times since the enactment of the CWA. On January 18, 2023, the EPA and the USACE published the final rule with a revised definition of WOTUS in the Federal Register (FR doc. 2022-28595); it became

effective March 20, 2023. This Rule replaces the pre-2015 definition of WOTUS, which was recently in effect starting on September 2, 2021. The 2023 WOTUS Rule establishes the scope of USACE and EPA authority under the CWA, and includes five categories of jurisdictional WOTUS in paragraph (a) and eight categories of exclusions or non-jurisdictional aquatic features in paragraph (b).

Paragraph a of the 2022 WOTUS Rule defines WOTUS for the purposes of the CWA as:

(1) Traditional navigable waters, the territorial seas, and interstate waters;

(2) Impoundments of waters of the Unites States;

(3) Tributaries of traditional navigable waters, the territorial seas, interstate waters, or paragraph (a)(2) impoundments when the tributaries meet either the relatively permanent standard or have a significant affect on traditional navigable waters, the territorial seas, or interstate waters (i.e., the significant nexus standard);

(4) Jurisdictional adjacent wetlands – (1) wetlands adjacent to traditional navigable waters, the territorial seas, or interstate waters; (2) wetlands adjacent to and with a continuous surface connection to relatively permanent paragraph (a)(2) impoundments or jurisdictional tributaries when the jurisdictional tributaries meet the relatively permanent standard; or (3) wetlands adjacent to paragraph (a)(2) impoundments or jurisdictional tributaries when the wetlands meet the significant nexus standard. And

(5) Intrastate lakes and ponds, streams, or wetlands not identified in “paragraphs (a)(1) through (4)” above that meet either the relatively permanent standard or the significant nexus standard.

The categories of exclusions, or non-jurisdictional aquatic features are listed in paragraph (b) of the new rule. Under this rule, where a feature satisfies the terms of an exclusion, it is excluded from jurisdiction even where the feature would otherwise be jurisdictional under paragraphs (a)(2) through (5) of this rule. Paragraph (a)(1) waters are not subject to the exclusions. The exclusions, or non-jurisdictional waters include:

(1) Waste treatment systems, including treatment ponds or lagoons, designed to meet the requirements of the Clean Water Act;

(2) Prior converted cropland designated by the Secretary of Agriculture. The exclusion would cease upon a change of use, which means that the area is no longer available for the production of agricultural commodities. Notwithstanding the determination of an area’s status as prior converted cropland by any other Federal agency, for the purposes of the Clean Water Act, the final authority regarding Clean Water Act jurisdiction remains with EPA;

(3) Ditches (including roadside ditches) excavated wholly in and draining only dry land and that do not carry a relatively permanent flow of water;

(4) Artificially irrigated areas that would revert to dry land if the irrigation ceased;

(5) Artificial lakes or ponds created by excavating or diking dry land to collect and retain water and which are used exclusively for such purposes as stock watering, irrigation, settling basins, or rice growing;

(6) Artificial reflecting or swimming pools or other small ornamental bodies of water created by excavating or diking dry land to retain water for primarily aesthetic reasons;

(7) Waterfilled depressions created in dry land incidental to construction activity and pits excavated in dry land for the purpose of obtaining fill, sand, or gravel unless and until the construction or excavation operation is abandoned and the resulting body of water meets the definition of WOTUS; and

- Swales and erosional features (e.g., gullies, small washes) characterized by low volume, infrequent, or short duration flow.

Non-wetland Waters Delineation Methods

If no adjacent wetlands are present, the lateral extent of federal jurisdiction over non-tidal waters of the U.S. is defined by the ordinary high water mark (OHWM). The OHWM is defined in the pre-2015 regulations as "…the line on the [watercourse banks] established by the fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the bank; shelving; changes in the character of soil; destruction of terrestrial vegetation; the presence of litter and debris; or other appropriate means that consider the characteristics of the surrounding areas" (former 33 C.F.R. 328).The lateral limits of non-wetland waters of the U.S. were mapped using guidance provided in A Field Guide to the Identification of the Ordinary High Water Mark in the Arid West Region of the Western United States: A Determination Manual (USACE 2008), Ordinary High Water Flows and the Stage-Discharge Relationship in the Arid West Region (USACE 2011), and Regulatory Guidance Letter 05-05. OHWM Datasheets for representative non-wetland water features located within the survey area were completed and are provided in Appendix C and the location of each OWHM sample point is depicted in Appendix A. The OHWM Datasheet was completed following guidance provided in the Updated Datasheet for the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States (USACE 2010). Common indicators of OWHM include changes in average sediment texture, break in slope, changes in vegetation species, and/or changes in vegetation cover.

Where ephemeral and intermittent non-wetland waters were encountered, the active floodplain was identified as the lateral limit of the watercourse.

2.2.1.1 Wetland Delineation Methods

Section 404 Wetland WOTUS consist of areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions.

The delineation was conducted according to the routine onsite determination methods described in the *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987), the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region* (Version 2.0). The *Field Indicators of Hydric Soils in the United States, Version 8.2*. (U.S. Department of Agriculture and National Resources Conservation Service 2018) was used to identify hydric soil, vascular plants were identified using *The Jepson eFlora* (Jepson Flora Project 2022), and nomenclature and associated wetland ratings follow *The National Wetland Plant List* (U.S. Army Corps of Engineers 2020). Wetland determination data forms for representative wetland features located within the survey area were completed and are provided in Appendix B and the location of each wetland sample point is depicted in Appendix A.

2.2.2 State Water Resources Control Board/Regional Water Quality Control Board

2.2.2.1 Non-wetland Waters Delineation Methods

In California, the State Water Regional Control Board (SWRCB) and nine RWQCBs regulate activities within state and federal waters under Section 401 of the CWA and the Porter-Cologne Water Quality Act (Porter-Cologne Act). The SWRCB defines waters of the State (WoS) broadly to include "any surface water or groundwater, including saline waters, within the boundaries of the state." The SWRCB and RWQCBs do not have regulations or guidance defining the extent of non-wetland WoS. The lateral limits of potential non-wetland WoS were mapped using the same methods for determining OHWM as described above in Section 2.2.1 because the Central Valley RWQCB has accepted this method for delineating WoS.

2.2.2.2 Wetland Delineation

On April 2, 2019, the SWRCB adopted the *State Wetland Definition and Procedures for Discharges of Dredged or Fill Material to waters of the State* (Procedures; State Water Resources Control Board 2019). The Procedures became effective on May 28, 2020 and define wetland WoS as follows:

> An area is wetland if, under normal circumstances, (1) the area has continuous or recurrent saturation of the upper substrate caused by groundwater, or shallow surface water, or both; (2) the duration of such saturation is sufficient to cause anaerobic conditions in the upper substrate; and (3) the area's vegetation is dominated by hydrophytes or the area lacks vegetation.

The Procedures provide that RWQCBs shall rely on a wetland delineation from a final ARDR verified by the USACE to determine the extent of wetland WoS where USACE has verified such a delineation. If any potential wetland areas have not been delineated in a final ARDR verified by the USACE, the limits of such potential wetland WoS shall be identified using the same wetland delineation methods per the USACE as described in Section 2.2.1, except that a lack of vegetation (i.e., less than 5 percent areal coverage of plants during the peak of the growing season) does not preclude an area from meeting the definition of a wetland when hydric soils and wetland hydrology are present (State Water Resources Control Board 2019).

2.2.3 California Department of Fish and Wildlife Jurisdiction

Pursuant to Sections 1600 et. al. of the California Fish and Game Code, CDFW regulates any activity that would substantially divert or obstruct the natural flow—or substantially change or use any material from the bed, channel, or bank—of any river, stream, or lake. CDFW jurisdiction relies on the presence of a lake and/or streambed and associated riparian habitat. CDFW regulation under California Fish and Game Code Section 1602 requires that all lakes and streams on a project site are identified in order to assess the proposed activity's potential impacts on these aquatic resources.

Lake, Streambed, and Associated Riparian Habitat Delineation

CDFW defines lakes as "natural lakes or man-made reservoirs" (14 California Code of

Regulations [CCR] § 1.56). With respect to streams, it has been the practice of CDFW to define a stream as “a body of water that flows perennially or episodically and that is defined by the area in which water currently flows, or has flowed, over a given course during the historic hydrologic course regime, and where the width of its course can reasonably be identified by physical or biological indicators.” (Brady and Vyverberg 2014). The historic hydrologic regime is defined as circa 1800 to the present. In addition, streams include “watercourses having a surface or subsurface flow that supports riparian vegetation" (14 CCR § 1.72). Riparian habitat refers to vegetation and habitat associated with a stream. CDFW-jurisdictional habitat includes all riparian shrub or tree canopy that may extend beyond the banks of a stream. Isolated riparian habitat (i.e., where riparian vegetation does not appear associated with a stream channel) is not considered CDFW-jurisdictional.

Historical court cases have further extended CDFW jurisdiction to include watercourses that seemingly disappear but re-emerge elsewhere. Under the CDFW definition, a watercourse need not exhibit evidence of an OHWM to be claimed as jurisdictional. Water features such as vernal pools and other seasonal swales—where the defined bed and bank are absent and the feature is not contiguous or closely adjacent to other jurisdictional features—are generally not asserted to fall within CDFW jurisdiction under Section 1600. CDFW generally does not assert jurisdiction over human-made water bodies unless they are located where such natural features were previously located or where they are contiguous with existing or prior natural jurisdictional areas.

Based on the above, potential CDFW-jurisdictional aquatic resources included lakes and/or streambeds and their associated riparian habitats. The lateral extent of potential CDFW jurisdiction is interpreted to be “bank to bank” for a streambed or to the “dripline” of riparian habitat and/or wetland boundary if present. In addition, wetlands identified below the top of bank of a streambed are also considered under the jurisdiction of CDFW.

Chapter 3 Setting

3.1 Climate

- This Project region generally reflects a Mediterranean climate with cool, wet winters and warm, dry summers. It occurs along the boundary of warm temperate (Csa, eastern portions) and temperate semiarid (BSk, western portion according to the updated Koppen-Geiger Climate Classification Map (Kottek et al. 2006). This indicates potential evaporation and precipitation may be near equal (Bailey 2014). The arid conditions of the region are due in part to rain shadow effect where moist air coming from the Pacific Ocean rises once it reaches the mountains of the California coast range where the water vapor condenses and falls as precipitation and results in arid conditions, or a rain shadow, on the leeward side of the mountains.
- The closest weather station to the Project with sufficient data is in a Remote Automatic Weather Station (RAWS) in Los Banos, California. The RAWS is located approximately 1.5 miles west of the Project area at an elevation of approximately 350 feet above mean sea level (amsl) (Western Regional Climate Center 2022). A summary of the analysis of 15- years of the RAWS data (from 2008 to 2022) is provided. The annual mean high temperature is 75.1 degrees Fahrenheit (°F), with average daily highs ranging from 57.1 °F in January to 93.5 °F in July. The annual mean low temperature is 54.2 °F, with average daily lows ranging from 43.2 °F in December to 66.0 °F in July and August. The 15-year average annual precipitation is 7.93 inches, mostly falling during October through April with December and January having the most significant precipitation.

3.2 Recent Weather and Precipitation Before and During Fieldwork

- The delineation occurred during the spring of the 2022 water-year (October 1 of the previous year through September 30 of the referenced year). As of April 29, 2022, precipitation for the Project vicinity is recorded at 5.36 inches for the 2022 water-year, below the 15-year average of 7.93 inches (Western Regional Climate Center 2022). Ongoing extreme drought conditions are present in the Project region (National Drought Mitigation Center 2022), with the 2021 and 2022 water-years also having below average precipitation at 4.92 and 7.22 inches, respectively (Western Regional Climate Center 2022).
- The timing of fieldwork was conducive to accurately delineating WOTUS/WoS at the Project. Despite the below average rainfall year, vegetation throughout the Project was in bloom and readily identifiable during fieldwork. Additionally, wetland hydrology indicators were apparent and discernable where present.

3.3 Topography

- The Project is situated the low rolling hills off the eastern edge of the Diablo Range as there is a transition to the western edge of the San Joaquin Valley with slope and aspect varying across the site. Elevation ranges from 410 feet amsl near the center and to 216 feet amsl at the southeast portion of the Project area.

3.4 Hydrology

- The Project occurs in the San Luis Holding Reservoir subwatershed (hydrologic unit code 12 [HUC] 180400011901), which is located in the Lower Los Banos Creek subwatershed (HUC10: 1804000119), which is further located within the Middle San Joaquin-Lower Chowchilla watershed (HUC8: 18040001) (U.S. Fish and Wildlife Service 2022).
- The sources of hydrology in the survey area are direct precipitation and surface runoff. The single ephemeral drainage mapped in the Project area flows from higher elevation in the west to lower elevations in the east. This drainage flows under Interstate-5 via a culvert and continues east until it appears to diffuse at the western toe slope of the California Aqueduct.

3.5 National Wetlands Inventory

- The NWI provides maps and information on the status, extent, characteristics, and functions of wetland, riparian, deep-water, and related aquatic habitats in priority areas to promote the understanding and conservation of these resources. The mapping uses the U.S. Fish and Wildlife Service definition of wetland. The NWI mapping cannot be used to delineate wetlands and other WOTUS but can provide useful background information on the broad types of wetland and riparian vegetation communities in the survey area and vicinity.
- A review of NWI online mapping (U.S. Fish and Wildlife Service 2022) shows riverine, freshwater emergent wetland, and freshwater pond mapped within the Project (Appendix E). These features were mapped using aerial imagery from 1987, most of which are not presently found onsite. These features were mapped incorrectly or have possibly subsided over time due to surrounding developments and agricultural water use (Appendix D, Photos 1 and 2). Two areas of abandoned ditch were observed onsite. Please refer to Section 3.8.1.1 Abandoned Ditch for a more detailed discussion of these features and their regulatory status.

3.6 Land Use

The Project consists of land that has been used for agricultural crop cultivation, predominantly from dry farming grain and hay crops such as wheat and alfalfa, and sheep-grazing. Currently, most of the Project area is fallowed/abandoned agricultural land that has transitioned into nonnative annual grassland with minimal plant diversity and supporting low quality habitat. Portions of the annual grassland habitat onsite may be utilized for hay production.

The surrounding area has similar land use of agricultural crop cultivation and grazing. In addition, an isolated residential subdivision, a small commercial area, and a Pacific Gas & Electric substation occur at the junction of SR 152 and SR 33, directly northwest of the Project. The Merced County Disposal Site (also referred to as “Billy Wright Landfill”) occurs immediately southeast of the Project. The recently developed Wright Solar Facility occurs approximately 1 mile south of the Project. Small patches of orchard are also present in surrounding lands.

3.7 Soils

- Soil map units in the survey area are listed in Table 1 below. The major soil map units within the survey area are all well drained and none are considered hydric soils (National Resources Conservation Service 2022). Additional information on the soils, including a soil map, is provided in Appendix E.

Table 1. Soil Map Units in the Survey Area

Soil Map Unit	Map Symbol	Major Component (M) or Inclusion (I)	Landform	Drainage Class	Hydric Criteria	Percent of Survey Area
Merced County, California, Western Part						
Apollo clay loam, 2 to 8 percent slopes	109	Apollo (M)	Hills	Well drained	N	58.9%
		Apollo, 15 to 30% slopes (I)	-	-	N	
		Los banos (I)	-	-	N	
		Apollo, 8 to 15% slopes (I)	-	-	N	
		Oneil (I)	-	-	N	
		Damluis (I)	-	-	N	
Apollo clay loam, 8 to 15 percent slopes	110	Apollo (M)	Hills	Well drained	N	20.5%
		Damluis (I)	-	-	N	
		Apollo, 15 to 30% slopes (I)	-	-	N	
		Apollo, 2 to 8% slopes (I)	-	-	N	
Apollo clay loam, 15 to 30 percent slopes	111	Apollo (M)	Hills	Well drained	N	1.9%
		Apollo, 2 to 8% slopes (I)	-	-	N	
		Apollo, 8 to 15% slopes (I)	-	-	N	
Ayar clay, 5 to 8 percent slopes	123	Ayar (M)	Hills	Well drained	N	1.5%
		Oneill (I)	-	-	N	
		Ayar, 8 to 15% slopes (I)	-	-	N	
		Ayar, 15 to 30% slopes (I)	-	-	N	
		Apollo (I)	-	-	N	
		Arburua (I)	-	-	N	
Ayar clay, 8 to 15 percent slopes	124	Ayar (M)	Hills	Well drained	N	0.1%
		Arburua (I)	-	-	N	
		Ayar, 15 to 30% slopes (I)	-	-	N	
		Ayar, 5 to 8% slopes (I)	-	-	N	
		Apollo (I)	-	-	N	
		Oneill (I)	-	-	N	
		Wisflat (I)	-	-	N	
Ayar clay, 30 to 50 percent slopes	126	Ayar (M)	Hills	Well drained	N	0.2%
		Los banos (I)	-	-	N	
		Ayar, 15 to 30% slopes (I)	-	-	N	
		Arburua (I)	-	-	N	
		Oneill (I)	-	-	N	
		Oquin (I)	-	-	N	
Ballvar loam, 2 to 8 percent slopes	131	Ballvar (M)	Alluvial fans	Well drained	N	2.8%
		Oneill, 8 to 15% slopes (I)	-	-	N	
		Unamed (I)	-	-	N	

Soil Map Unit	Map Symbol	Major Component (M) or Inclusion (I)	Landform	Drainage Class	Hydric Criteria	Percent of Survey Area
		Bapos (I)	-	-	N	
		Vernalis (I)	-	-	N	
Damluis clay loam, 0 to 2 percent slopes	161	Damluis (M)	Terraces	Well drained	N	1.2%
		Woo (I)	-	-	N	
		Damluis (I)	-	-	N	
		Stanislaus (I)	-	-	N	
Damluis clay loam, 2 to 8 percent slopes	162	Damluis (M)	Terraces	Well drained	N	1.5%
		Herito (I)	-	-	N	
		Stanislaus (I)	-	-	N	
		Oneill (I)	-	-	N	
		Damluis, 0 to 2% slopes (I)	-	--	N	
		Bapos (I)	-	-	N	
Los Banos clay loam, 2 to 8 percent slopes	207	Las Banos (M)	Terraces	Well drained	N	7.9%
		Arburua (I)	-	-	N	
		Apollo (I)	-	-	N	
		Los banos (I)	-	-	N	
Los Banos clay loam, 8 to 15 percent slopes	208	Las Banos (M)	Terraces	Well drained	N	0.2%
		Unamed (I)	-	-	N	
		San timoteo, 15 to 30% slopes (I)	-	-	N	
		Arburua, 15 to 30% slopes (I)	-	-	N	
		Chaqua (I)	-	-	N	
		Los banos, 2 to 8% slopes (I)	-	-	N	
Oneil silt loam, 15 to 30 percent slope	222	Oneil (M)	Hills	Well drained	N	0.1%
		Rock outcrop (I)	-	-	N	
		Arburua (I)	-	-	N	
		Damluis (I)	-	-	N	
		Wisflat (I)	-	-	N	
		Ayar (I)	-	-	N	
Oneil silt loam, 30 to 50 percent slopes	223	Oneil (M)	Hills	Well drained	N	0.9%
		Wisflat (I)	-	-	N	
		Conosta (I)	-	-	N	
		Rock outcrop (I)	-	-	N	
		Ayar (I)	-	-	N	
		Arburua (I)	-	-	N	
Oquin fine sandy loam, 15 to 30 percent slopes	225	Oquin (M)	Hills	Well drained	N	0.1%
		San timoteo (I)	-	-	N	
		Wisflat (I)	-	-	N	
		Oneil (I)	-	-	N	
		Rock outcrop (I)	-	-	N	
San Timoteo-Wisflat sandy loams complex, 8 to 15 percent slopes	250	San Timoteo (M)	Hills	Well drained	N	2.2%
		Wisflat (M)	Hills	Well drained	N	
		Arburua (I)	-	-	N	
		Rock outcrop (I)	-	-	N	
		San timoteo, 15 to 30% slopes (I)	-	-	N	

3.8 Vegetation

The Project area occurs within the Great Valley region and the San Joaquin geographic subdivision of the California Floristic Province (Baldwin et al. 2012) and within the USACE Arid West region. Wetland indicator status for each plant species reflects the Arid West National Wetlands Plant List and uses the abbreviations provided in Table 2 (U.S. Army Corps of Engineers 2020).

Table 2. Wetland Indicator Status Definitions

Abbreviation	Wetland Indicator Status	Description
OBL	Obligate	Almost always occurs in wetlands (>99% probability of occurrence).
FACW	Facultative wetland	Usually occurs in wetlands (66–99% probability of occurrence).
FAC	Facultative	Equally likely to occur in wetlands or nonwetlands (34–66% probability of occurrence).
FACU	Facultative upland	Usually occurs in nonwetlands but occasionally in wetlands (1–33% probability of occurrence).
UPL	Upland	Almost always occurs in nonwetlands (>99% probability of occurrence).

Three upland and one aquatic land cover types occur within the Project area. A description of each land cover type is provided.

3.8.1 Upland Land Cover Types

Three upland land cover types are present in the study area: abandoned ditch, nonnative annual grassland, and tree stand. A general description of each upland land cover type is provided.

3.8.1.1 Abandoned Ditch

The abandoned ditch land cover type consists of an upland area of historically constructed features that were once used to convey water, presumably to flood irrigate for pastureland. These features form linear depressions on the landscape; however, no evidence of recent water flows was identified in the field. Analysis of historic aerial photographs and observations from field work determined that flow was cut off during construction activities related to the adjacent landfill. Specifically, the portion of the drainage system that is directly north of the landfill appears to have been used as a borrow area. Generally, the vegetation within these features is not discernable from the surrounding nonnative annual grassland. Instances where there is a compositional shift in vegetation, it is likely dues to differences in the disturbance regime as the abandon ditch feature does not receive routine discing/light ripping disturbance that occurs frequently in the adjacent nonnative annual grasslands/dryland farming agricultural fields or is

likely the result of previous planting and irrigation in the case of the scattered trees present, as evidence by the inactive irrigation tubing observed at the base of the trees.

The abandoned ditches are dominated by herbaceous vegetation consistent with the nonnative upland annual grassland community and ruderal species. Common species include foxtail barley (*Hordeum murinum,* FACU), ripgut brome (*Bromus diandrus,* NI), coastal heron's bill (*Erodium cicutarium,* NI), cheeseweed (*Malva parviflora,* NI), Russian thistle (*Salsola tragus,* FACU) and redscale (*Atriplex rosea*, FACU). Patches of the highly invasive perennial pepperweed (*Lepidium latifolium*, FAC) are present and infrequent patches of salt grass (*Distichlis spicata*, FAC) and seaside heliotrope (*Heliotropium curassavicum* var. *oculatum*, FACU) are also present. Red iron bark (*Eucalyptus sideroxylon*, NI) trees are present along the upper north banks of most of these features. Wetland or riparian vegetation was not observed within the abandoned ditches. Representative photos of the abandoned ditch land cover can be found in Appendix D. As this land cover type represents an upland area, it is not considered a potentially jurisdictional aquatic resource and is not further discussed in this report.

3.8.1.2 Nonnative Annual Grassland

Nonnative annual grassland upland land cover type is characterized by herbaceous vegetation dominated by nonnative grasses and herbs. This community lacks woody vegetation and many areas receives routine disturbance such as discing/light ripping, and other practices used in dryland farming and grazing. Common species in this community include slim oat (*Avena barbata,* NI), ripgut brome, foxtail barely, coastal heron's bill, and Russian thistle. Other infrequent species include native perennial grasses; saltgrass, beardless wild rye (*Elymus triticoides*, FAC), and the invasive perennial (rhizomatous) plant, Russian knapweed (*Acroptilon repens,* NI). Representative photos of the nonnative annual grassland community can be found in Appendix D.

3.8.1.3 Tree Stands

Forest and woodland habitats do not occur at the Project area. However, scattered individuals and small stands of trees are present. The most common tree species present is the nonnative red iron bark, which is also present in the abandon ditch habitat. Additionally, there is one area with scattered native tree that are characteristic of a declining historical remnant riparian woodland. The trees and shrubs in this area appear to be old, decadent, and senescing individuals. The herbaceous vegetation present in the vicinity is composed of upland species consistent with the nonnative annual grassland community. Scatter tree and shrub species include red willow (*Salix laevigata,* FACW), Fremont cottonwood (*Populus fremontii*, FAC), and mule fat (*Baccharis salicifolia*, FAC). A review of historical imagery indicates canopy cover significantly decreased starting in by April 2015 through the present (Google Earth 2022). Representative photos of the tree stand land cover type can be found in Appendix D.

3.8.2 Aquatic Land Cover Types

A general description of the one aquatic land cover types observed within the survey area is provided. A detailed description with jurisdictional rational of each aquatic feature is provided within Chapter 4 *Results*.

3.8.2.1 Non-Wetland Waters

Non-wetland waters mapped within the survey area includes an ephemeral drainage.

Ephemeral Drainage

One ephemeral drainage is present within the study area. The drainage is anticipated to be inundated seasonally during years with above-normal rainfall, primarily during or immediately following rainfall events. The bed of the ephemeral stream varied in vegetation density and ranged from sparsely vegetated with patches of bare ground to densely vegetated. Dominated species being seaside barley (*Hordeum marinum,* FAC), foxtail barley, and perennial pepperweed. Other infrequent species includes purple sand spurry (*Spergularia rubra,* FAC), alkali weed (*Cressa truxillensis*, FACW). Areas above the OHWM tended to have high vegetation cover consistent with the dominant species present in the ephemeral streambed in addition to Mojave silverscale (*Atriplex argentea* var. *expansa,* FAC), redscale, salt grass, beardless wild rye, and seaside heliotrope. Other nonnative annual grassland species also intergrade from the adjacent community such as seaside heron's bill and ripgut brome. The bank slope at the OHWM for ephemeral streams in the survey area varied from roughly 10% to 30%.

A small area within the ephemeral drainage was previously mapped as a seasonal pond (ICF 2019) (Appendix E – 2019 Land Cover Map for Project). This pond may have been constructed to capture and detain water during large storm events to minimize downstream flooding within the ephemeral drainage for livestock purposes and appears to contain surface water during above average rain years (Google Earth 2022). However, this area did not contain hydrophytic vegetation (dominated by foxtail barely [FACU] and Russian thistle [FACU]) and did not meet the 3-parameter definition of a wetland (Appendix B). Therefore, this area was consolidated into the ephemeral drainage habitat because it is hydrologically connected (via surface water) and likely still flows water during storm events (albeit at a slower rate due to the artificial berm constriction).

Representative photos of the ephemeral drainage can be found in Appendix D.

Chapter 4 Results

A total of 0.614 acres of aquatic resources were identified in the survey area (Table 3 and Appendix A). The information provided in this report reflects the best professional judgement of the ICF delineators but has not been independently verified by the USACE Sacramento District, Central Valley RWQCB, or CDFW. There is no additional bank or riparian habitat present outside of the OHWM, so the feature is mapped with the same boundaries for RWQCB and CDFW jurisdictions.

Wetland and OHWM determination data forms are provided in Appendix B. A list of plants observed in the survey area during the delineation is provided in Appendix C. Representative photographs of the delineated features are provided in Appendix D.

Table 3. Aquatic Resources in the Survey Area

Feature ID	Feature Type	Acres*	Datasheet Number[a]	Photo Number[b]	Agency Jurisdiction[c]
Non-Wetland Waters					
ED-01	Ephemeral drainage	0.614	OHWM 1 and 2	7, 8, and 9	None
Non-Wetland Waters Acreage Subtotal		*0.614**			
Aquatic Resources Acreage Total		**0.614**			

* Acreages may vary due to rounding
[a] Appendix B OHWM datasheets
[b] Appendix D Representative Photographs
[c] Agency Jurisdiction = USACE (404), RWQCB (401), SWQCB (Porter-Cologne Act), CDFW (1600)

4.1 Jurisdictional Features in the Survey Area

A preliminary jurisdictional determination for features that meet agency guidelines to be considered jurisdictional is provided after the features' descriptions and above in Table 4.

4.1.1 Non-Wetland Waters

4.1.1.1 Ephemeral Drainage

One ephemeral drainage was delineated in the survey area. The bed of the feature varied in vegetation density and ranged from sparsely vegetated with patches of bare ground to densely vegetated. In contrast, areas above the OHWM tended to have higher vegetation cover. The bank slope at the OHWM for ephemeral streams in the survey area varied from roughly 10% to 30%.

Connectivity to jurisdictional non-wetland waters could not be confirmed for the single mapped ephemeral drainage (ED-1). ED-1 displayed OHWM indicators (Appendix B and Photographs 7, 8, and 9; Appendix D). However, after the drainage flows under Interstate-5 via a culvert, it continues northeast until the drainage diffuses into upland annual grassland habitat at the western toe slope of the California Aqueduct (approximately 0.35 miles northeast of the Project).

ED-01 is not relatively permanent and does not have a continuous surface connection to any traditional navigable water; interstate water; territorial sea; and would not meet the standard for jurisdiction under the 2023 WOTUS Rule. ICF staff has not completed an analysis of the level of effect ED-01 and similarly situated waters would have on any traditional navigable water; territorial sea, or interstate water, but do not anticipate that any such analysis would demonstrate a significant affect due to the distance from any of these other water features (about 22.75 miles) and the physical barriers (HWY 33/152, Delta Mendota Canal, and Main Canal) that exist between ED-01 and those features that would prevent impacts to ED-01 from being observed in any traditional navigable water; interstate water; or territorial sea. It is ICF staff's best professional judgement that ED-01 does not meet the criteria of WOTUS.

ED-1 exhibits an OHWM, bed, and bank, is considered a WoS as regulated by the RWQCB under Porter-Cologne, and is considered a stream that is regulated under the CDFW 1600 program.

Chapter 5 Summary of Jurisdictional Delineation Results

Based on the investigation and analysis documented in this report, there are no potential CWA Section 404 and 401 USACE/RWQCB jurisdictional resources documented within the survey area. Feature ED-1 is jurisdictional under the Porter-Cologne Act and CDFW 1600 LSAA program.

An Ombil Regulatory Module (ORM) upload sheet is included as Appendix F. All jurisdictional determinations in this report are based on ICF's best judgement.

Regulatory Uncertainty

The federal regulations defining WOTUS have changed multiple times in the last decade with the 2015 Clean Water Rule, Navigable Waters Protection Rule (NWPR), and Pre-2015 definition referenced above being in effect for short periods of time. Additionally, the USACE and USEPA have recently adopted a new definition of WOTUS, described in detail above. This rule is subject to several separate legal challenges, and has been stayed in roughly half of the States, although it currently remains in effect in California. In addition, the Supreme Court is currently reviewing the scope of WOTUS. To address the possibility that the WOTUS definition will change again, we have also assessed the likelihood that the delineated feature discussed above would be considered jurisdictional under the 2015 Clean Water Rule, NWPR, or the Pre-2015 definition.

Feature ED-01, the only mapped feature within the project area, is an ephemeral feature that flows to the northeast out of the project area. It flows through a culvert under Interstate 5, continues to the northeast through agricultural lands before flowing under the California Aqueduct. The feature dissipates into overland flows between the California Aqueduct and Highway 33/152. The closest creek with the potential to be a tributary to a traditional navigable water is located more than 3.5 miles to the east.

2015 Clean Water Rule

ICF assessed the potential for ED-01 to be jurisdictional under the 2015 Clean Water Rule. As an ephemeral feature, it does not qualify as a traditional navigable water. In order to be considered an adjacent water, it would need to be located within both the 100-year floodplain and between 100 and 1500 feet from the ordinary high water mark of a jurisdictional water. To be considered a jurisdictional isolated or "other" waters, ED-01 would need to be within either the 100-year floodplain of a traditional navigable water and show a significant nexus to the water or be within 4000 feet of a jurisdictional water and show a significant nexus to that water. As the closest stream with potential to be tributary to a traditional navigable water, and thus jurisdictional under the 2015 Clean Water Rule, is over 3.5 miles away (>18,000 feet) from where ED-01 terminates, it is ICF staff's best professional judgment that this feature would not meet the criteria to be considered federally jurisdictional under the 2015 Clean Water Rule.

Navigable Waters Protection Rule

ICF assessed the potential for ED-01 to be jurisdictional under the NWPR. The NWPR excluded ephemeral features including ephemeral streams (33 U.S.C. 1251§120.2(2)(iii)). Feature ED-01 is an ephemeral stream and would be excluded from jurisdiction under the NWPR.

Pre-2015 WOTUS Regulatory Framework

The pre-2015 definition of WOTUS, which refers to the suite of regulations and guidance that was in effect prior to the 2015 Rule that has since been rescinded and the Navigable Waters Protection Rule that was vacated by *Pascua Yaqui Tribe vs. EPA* in September 2021. The pre-2015 definition went back into effect on September 3, 2021, in all states and territories (U.S Army Corps of Engineers and Environmental Protection Agency 2021). It has since been replaced by the 2022 WOTUS Rule. If a court were to stay or vacate the 2022 WOTUS Rule, however, the pre-2015 definition would likely return to effect.

The pre-2015 WOTUS definition establishes the scope of USACE and Environmental Protection Agency (EPA) authority under the CWA and includes seven categories of jurisdictional WOTUS (codified at 33 CFR 328.3(a)(1) – (7) prior to August 2015) . The seven categories of jurisdictional WOTUS are as follows:

1. All waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide (former 33 CFR 328.3(a)(1));
2. All interstate waters including interstate wetlands (former 33 CFR 328.3(a)(2));
3. All other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation or destruction of which could affect interstate or foreign commerce including any such waters (former 33 CFR 328.3(a)(3)):

- i. Which are or could be used by interstate or foreign travelers for recreational or other purposes (former 33 CFR 328.3(a)(3)(i)); or,
- ii. From which fish or shellfish are or could be taken and sold in interstate or foreign commerce (former 33 CFR 328.3(a)(3)(ii)); or,
- iii. Which are used or could be used for industrial purpose by industries in interstate commerce (former 33 CFR 328.3(a)(3)(iii)).

4. All impoundments of waters otherwise defined as waters of the United States (WOTUS) under the definition (former 33 CFR 328.3(a)(4));
5. Tributaries of waters identified in paragraphs (a) (1) through (4) of this section (former 33 CFR 328.3(a)(5));
6. The territorial seas (former 33 CFR 328.3(a)(6));
7. Wetlands adjacent to waters (other than waters that are themselves wetlands) identified in paragraphs (a) (1) through (6) of this section; waste treatment systems, including treatment ponds or lagoons designed to meet the requirements of CWA (other than cooling ponds as defined in former 40 CFR 423.11(m) which also meet the criteria of this definition) are not waters of the United States (former 33 CFR 328.3(a)(7)).

- *Wetlands* are defined in former 33 C.F.R. 328.3(b) as follows:
- The term "wetlands" means those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.
- *Adjacent* is defined in former 33 C.F.R. 328.3(c) as follows:
- The term ‘adjacent’ means bordering, contiguous, or neighboring. Wetlands separated from other waters of the United States by man-made dikes or barriers, natural river berms, beach dunes and the likes are “adjacent wetlands.”

The extent of waters of the U.S. under the pre-2015 definition is further restricted based on the Solid Waste Agency of Northern Cook County v. USACE and Rapanos/Carabell U.S. Supreme Court decisions, and subsequent guidance issued by the U.S. Environmental Protection Agency and USACE (USEPA and USACE 2003, 2008). The Solid Waste Agency of Northern Cook County decision excludes from CWA jurisdiction isolated aquatic features that have no connection to a traditional navigable water or tie to commerce other than use by migratory birds. The Rapanos/Carabell decision states that these federal agencies will assert jurisdiction over traditionally navigable waters, adjacent wetlands, and relatively permanent waters (RPW). Typically, traditionally navigable waters and RPWs are perennial and intermittent streams. Federal agencies will only assert jurisdiction over non-RPWs, and wetlands adjacent to non-RPWs or adjacent to but not directly abutting RPWs, if a “significant nexus” exists. A “significant nexus exists if the tributary, in combination with all of its adjacent wetlands has more than a speculative or insubstantial effect on the chemical, physical, and/or biological integrity of a [traditionally navigable water]” (USEPA and USACE 2008). Federal agencies will not assert jurisdiction over any wetland or non-RPW water that does not have a significant nexus to a traditionally navigable water.

Since ED-1 does not receive or contribute water flow to a traditional navigable water (e.g., WOTUS), this feature does not meet the criteria of WOTUS under the pre-2015 definition of WOTUS.

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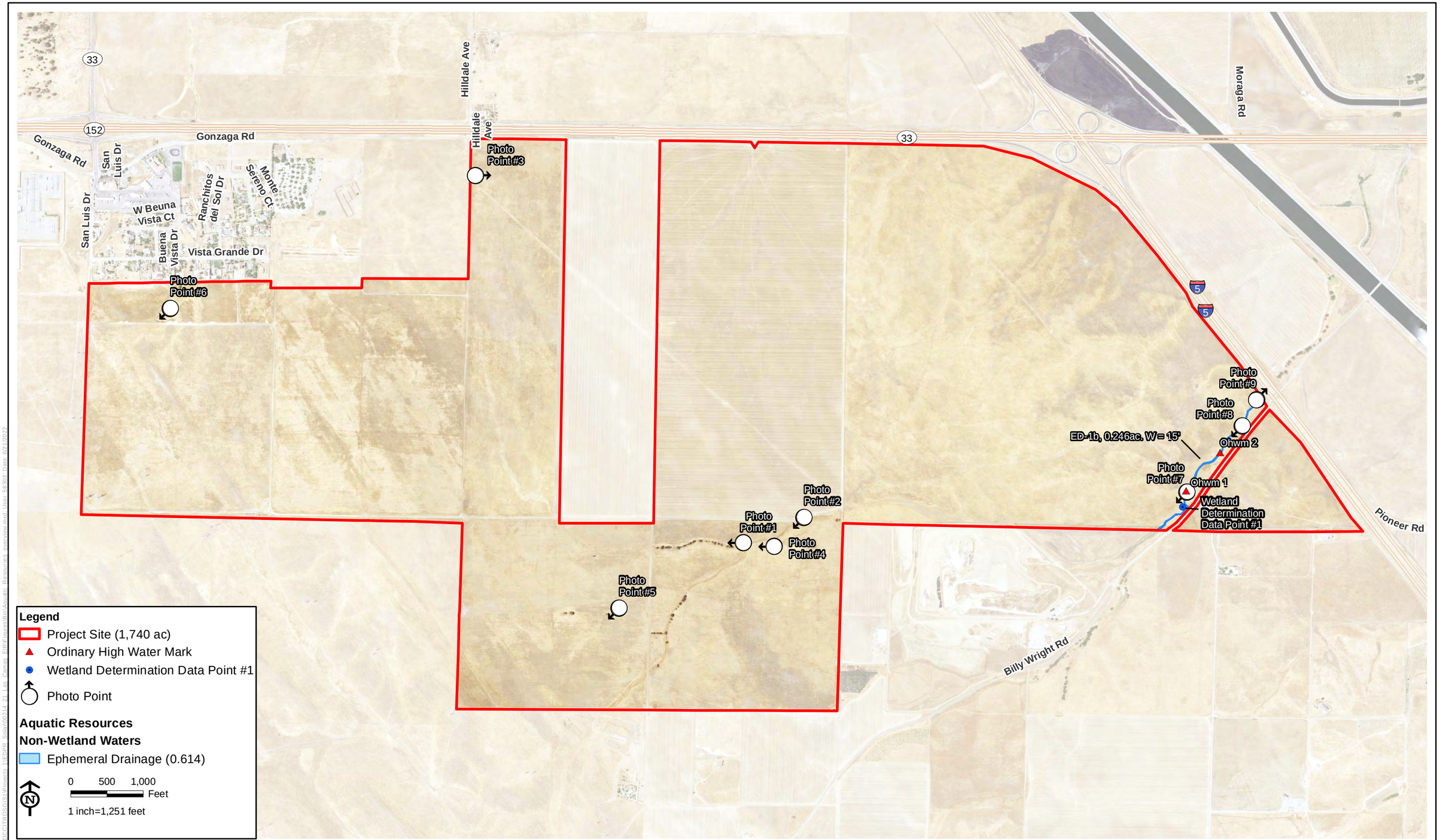
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Appendix A Aquatic Resources Delineation Map



Appendix A
Aquatic Resources Delineation Map

Las Camas
June 2022
Sheet 1 of 26

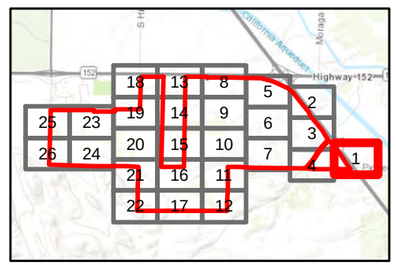
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- Project Site (1,740 ac)
- Ordinary High Water Mark
- Culvert
- Wetland Determination Data Point #1
- Photo Point
- 10' Interval Contour

Aquatic Resources

Non-Wetland Waters

- Ephemeral Drainage (0.614)
- Flow Line



0 50 100 200
Feet
1 inch = 249.166667 feet

Notes:

Base Map Source: ICF, 2022
Imagery Source: NAIP 2020
USGS Topo Quad:San Luis Dam and Volta
PLSS: Section, Township, Range

Prepared By: ICF 916.737.3000
Delineated By: S. O'Brien
Delineation Date: April, 25 2022
Drawn By: A. Angier

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Appendix A
Aquatic Resources Delineation Map

Las Camas
June 2022
Sheet 2 of 26

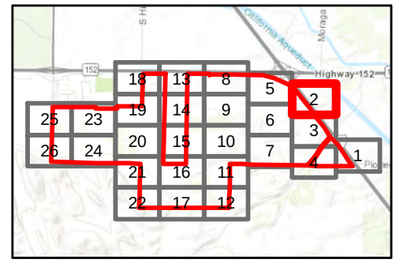
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Appendix A
Aquatic Resources Delineation Map

Las Camas
June 2022
Sheet 3 of 26

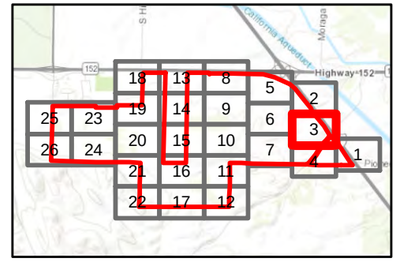
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Appendix A
Aquatic Resources Delineation Map

Las Camas
June 2022
Sheet 4 of 26

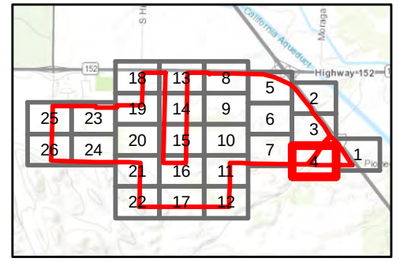
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Non-Wetland Waters

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- Flow Line



0 50 100 200
Feet

1 inch = 249.166667 feet

Notes:

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Delineation Date: April, 25 2022
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Appendix A
Aquatic Resources Delineation Map

Las Camas
June 2022
Sheet 5 of 26

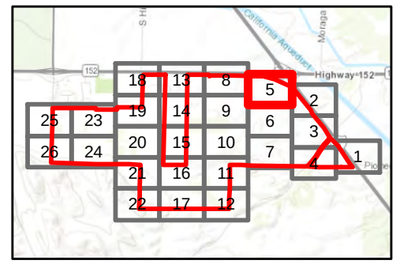
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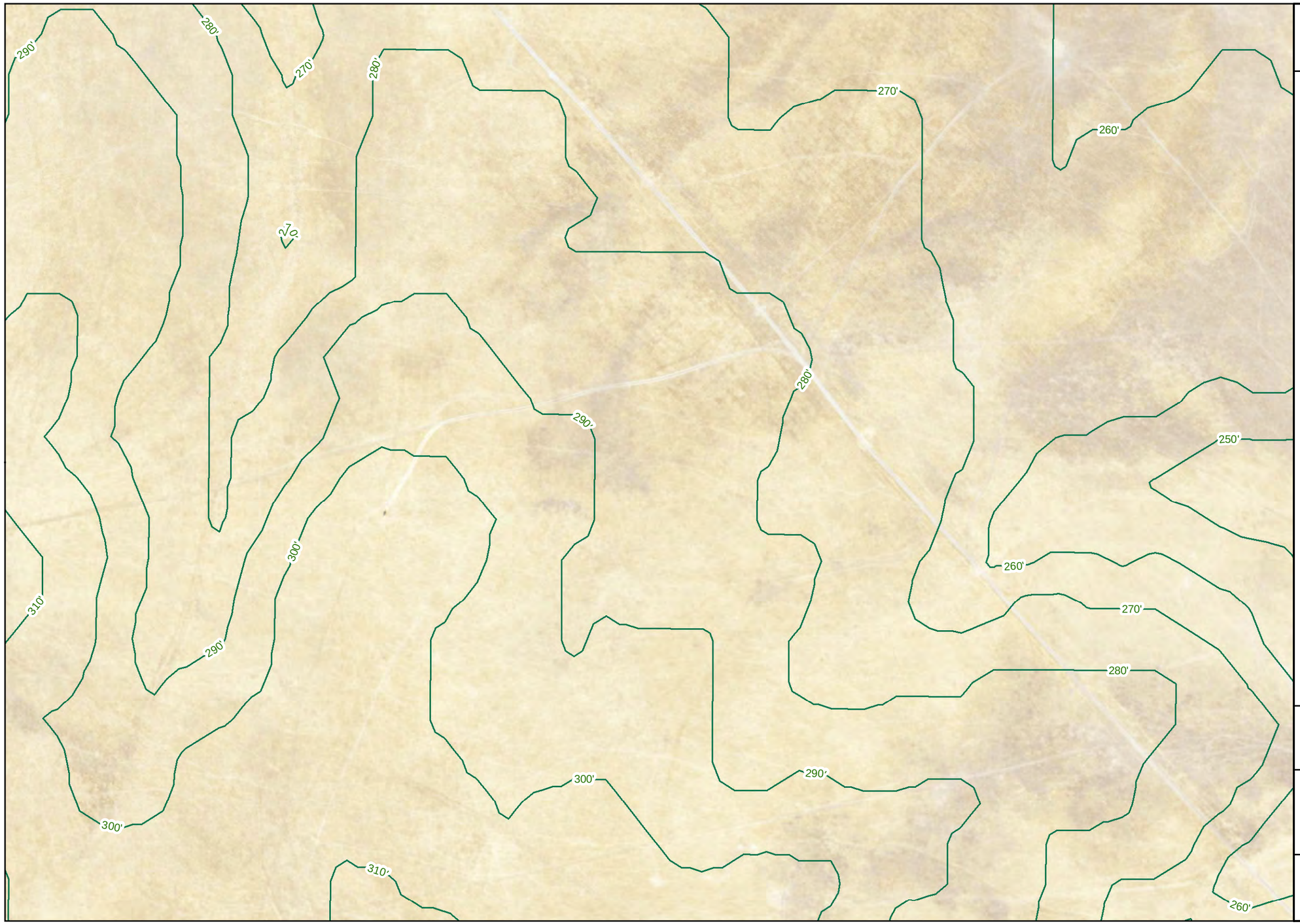
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Appendix A
Aquatic Resources Delineation Map



Las Camas
June 2022
Sheet 6 of 26

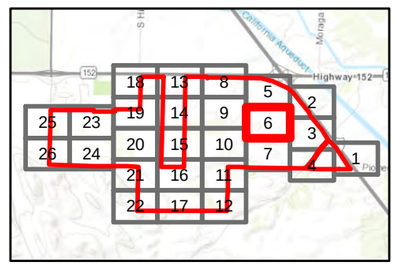
Legend

- Project Site (1,740 ac)
- Ordinary High Water Mark
- Culvert
- Wetland Determination Data Point #1
- Photo Point
- 10' Interval Contour

Aquatic Resources

Non-Wetland Waters

- Ephemeral Drainage (0.614)
- Flow Line



0 50 100 200
Feet

1 inch = 249.166667 feet

Notes:

Base Map Source: ICF, 2022
Imagery Source: NAIP 2020
USGS Topo Quad:San Luis Dam and Volta
PLSS: Section, Township, Range

Prepared By: ICF 916.737.3000
Delineated By: S. O'Brien
Delineation Date: April, 25 2022
Drawn By: A. Angier

Path: \\PDCCITRDSGIS1\Projects_1\EDPR_Solar\100214_21_Las_Camas_EIR\Figures\Bio\Aquatic_Resources.mxd;Author: ; Date: 6/22/2022

Appendix A
Aquatic Resources Delineation Map

Las Camas
June 2022
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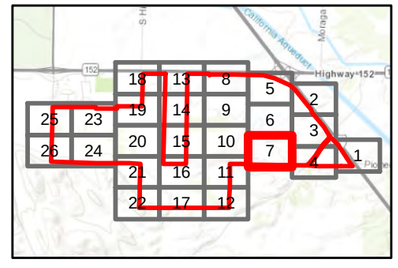
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Appendix A
Aquatic Resources Delineation Map

Las Camas
June 2022
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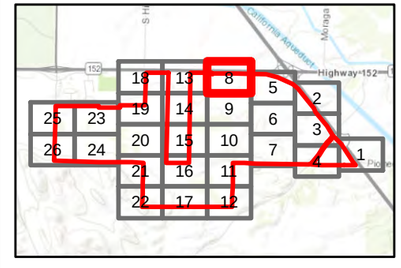
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Appendix A
Aquatic Resources Delineation Map

Las Camas
June 2022
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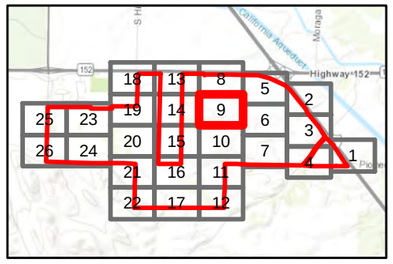
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Path: \\PDCCITRDSGIS1\Projects_1\EDPR_Sola\00214_21_Las_Camas_EIR\Figures\Bio\Aquatic_Resources.mxd; Author: ; Date: 6/22/2022

Appendix A
Aquatic Resources Delineation Map

Las Camas
June 2022
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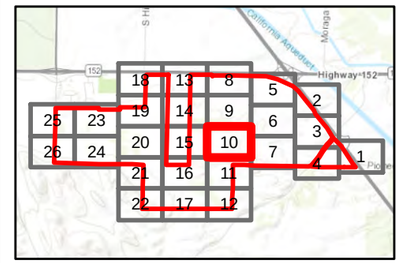
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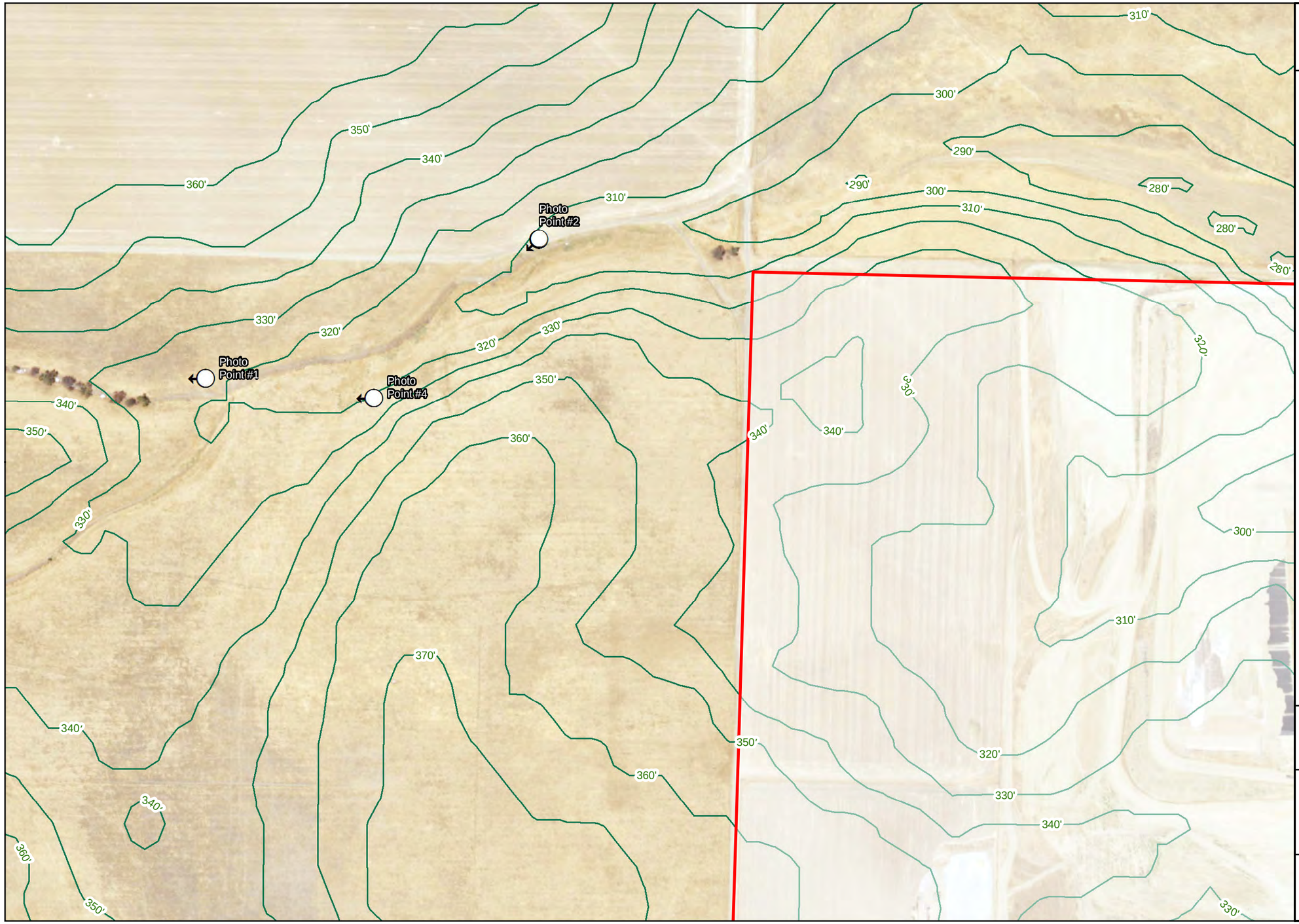
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Drawn By: A. Angier

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Appendix A
Aquatic Resources Delineation Map



Las Camas
June 2022
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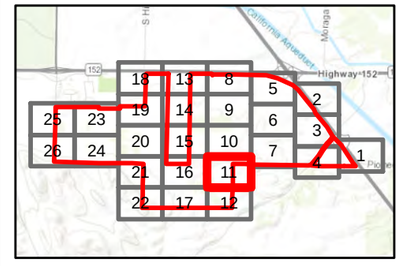
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Delineation Date: April, 25 2022
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Appendix A
Aquatic Resources Delineation Map

Las Camas
June 2022
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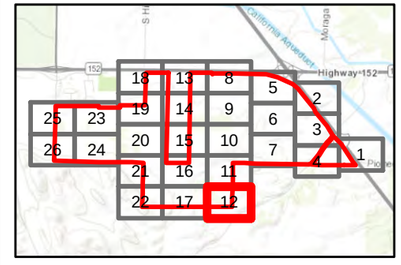
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Appendix A
Aquatic Resources Delineation Map

Las Camas
June 2022
Sheet 13 of 26

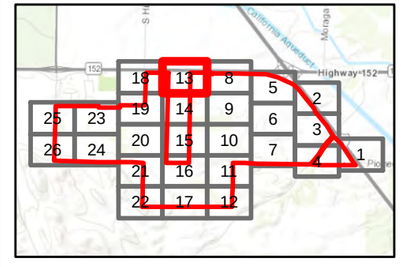
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Appendix A
Aquatic Resources Delineation Map



Las Camas
June 2022
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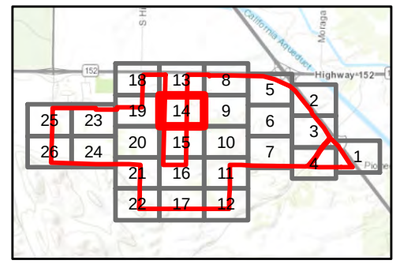
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0 50 100 200
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N

Notes:

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Appendix A
Aquatic Resources Delineation Map

Las Camas
June 2022
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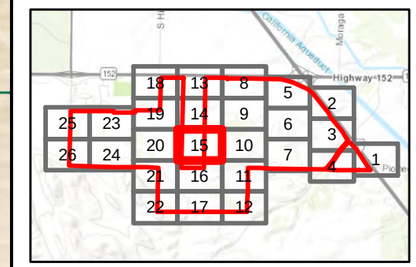
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Appendix A
Aquatic Resources Delineation Map

Las Camas
June 2022
Sheet 16 of 26

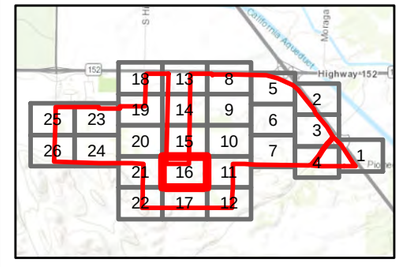
Legend

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Notes:

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Appendix A
Aquatic Resources Delineation Map

Las Camas
June 2022
Sheet 17 of 26

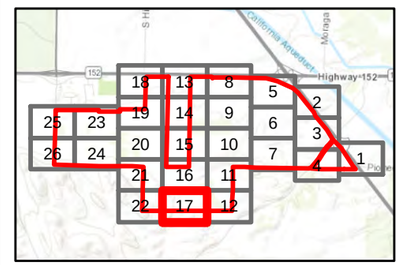
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Appendix A
Aquatic Resources Delineation Map

Las Camas
June 2022
Sheet 18 of 26

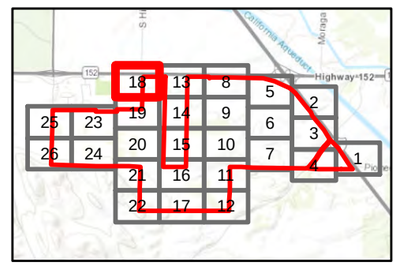
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Appendix A
Aquatic Resources Delineation Map

Las Camas
June 2022
Sheet 19 of 26

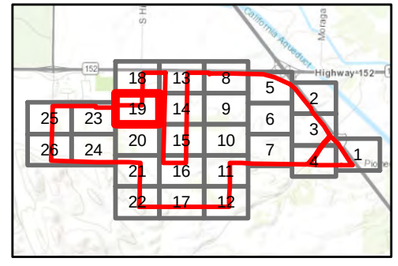
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Appendix A
Aquatic Resources Delineation Map

Las Camas
June 2022
Sheet 20 of 26

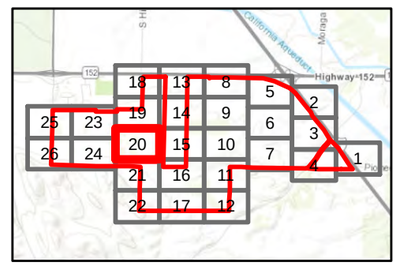
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Appendix A
Aquatic Resources Delineation Map

Las Camas
June 2022
Sheet 21 of 26

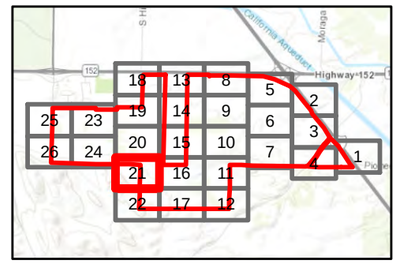
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Appendix A
Aquatic Resources Delineation Map

Las Camas
June 2022
Sheet 22 of 26

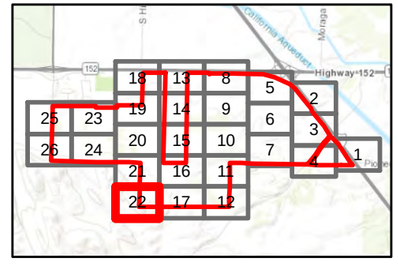
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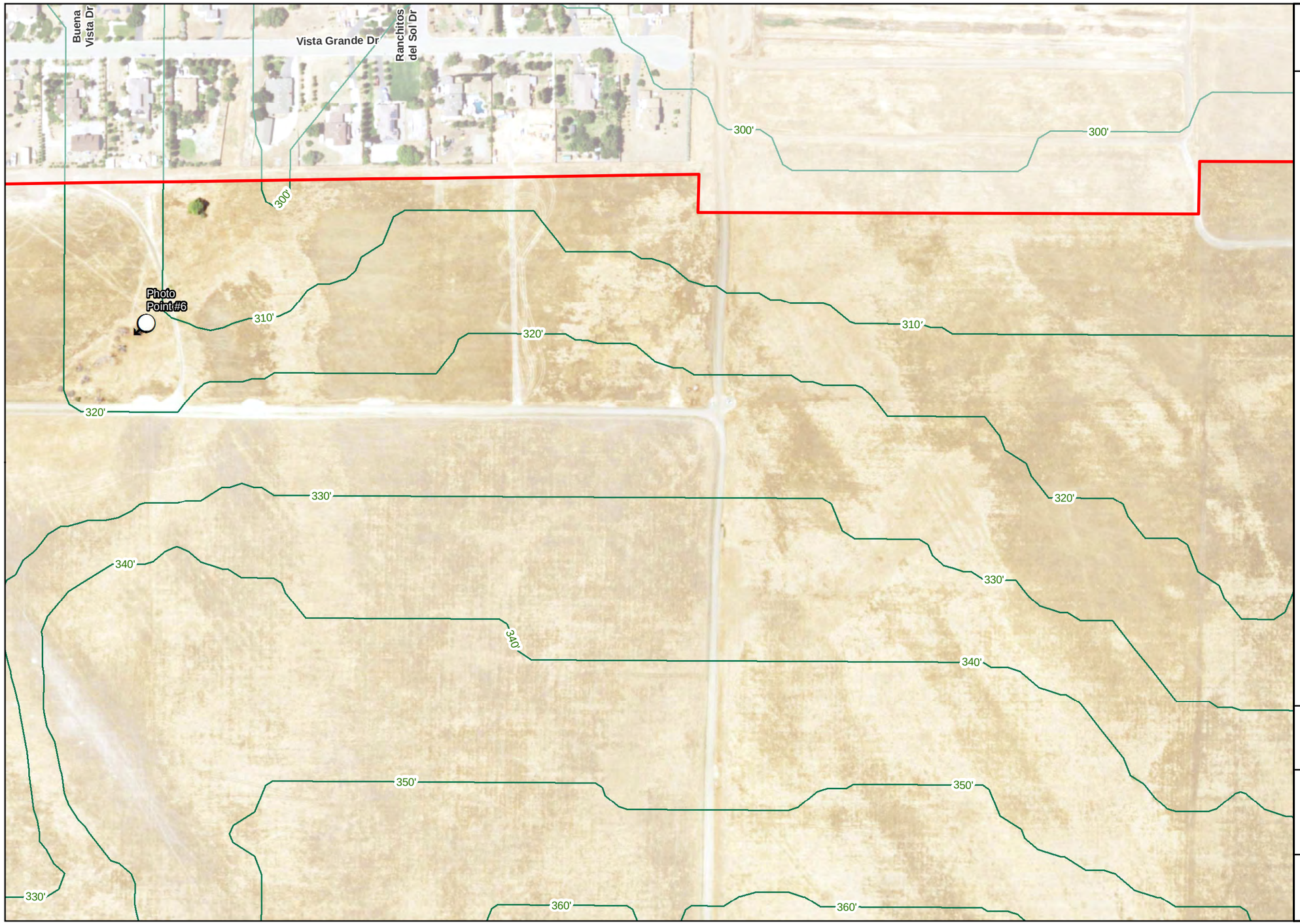
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Prepared By: ICF 916.737.3000
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Path:\\PDOC\TRDSGIS\1\Projects_1\EDPR_Solar\00214-21_Las_Camas_EIR\Figures\BioAquatic_Resources.mxd, Author: , Date: 6/22/2022

Appendix A
Aquatic Resources Delineation Map



Las Camas
June 2022
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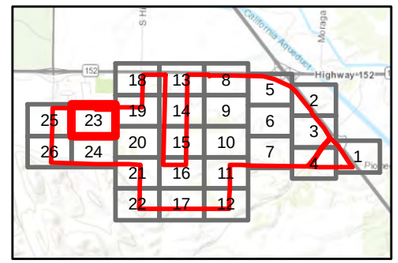
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Appendix A
Aquatic Resources Delineation Map

Las Camas
June 2022
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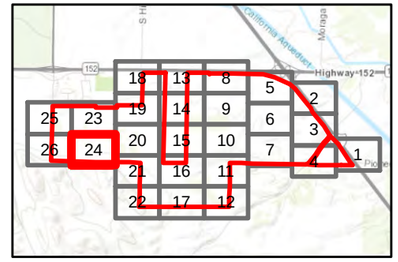
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1 inch = 249.166667 feet

N

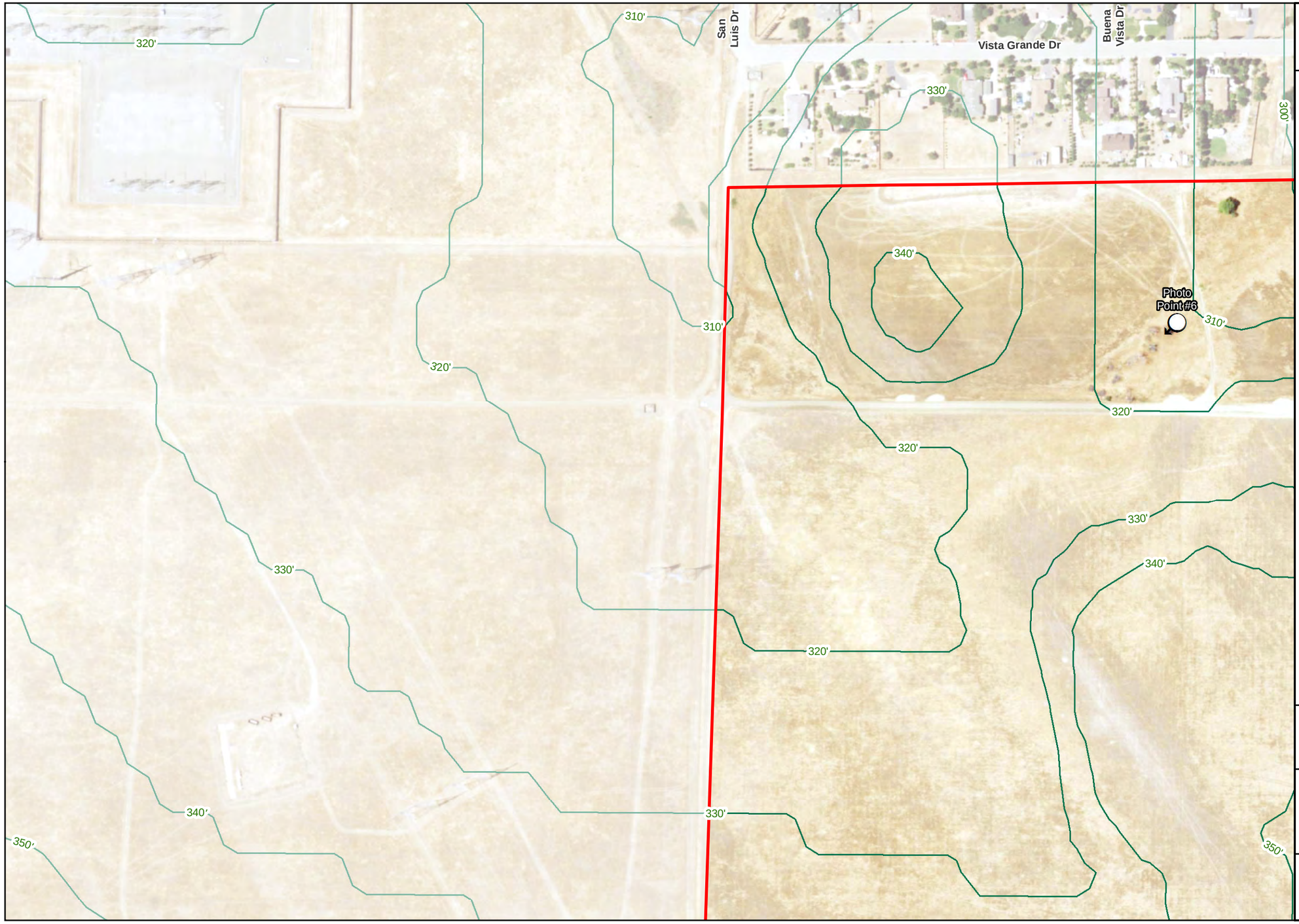
Notes:

Base Map Source: ICF, 2022
Imagery Source: NAIP 2020
USGS Topo Quad:San Luis Dam and Volta
PLSS: Section, Township, Range

Prepared By: ICF 916.737.3000
Delineated By: S. O'Brien
Delineation Date: April, 25 2022
Drawn By: A. Angier

Path: \\PDOCITRDSGIS1\Projects_1\EDPR_Solar\00214.21_Las_Camas_EIR\Figures\BioAquatic_Resources.mxd, Author: , Date: 6/22/2022

Appendix A
Aquatic Resources Delineation Map



Las Camas
June 2022
Sheet 25 of 26

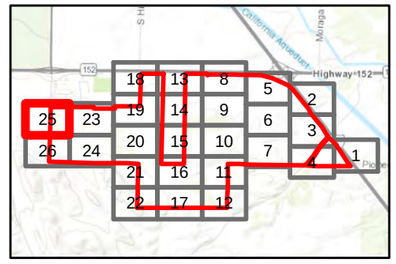
Legend

- Project Site (1,740 ac)
- Ordinary High Water Mark
- Culvert
- Wetland Determination Data Point #1
- Photo Point
- 10' Interval Contour

Aquatic Resources

Non-Wetland Waters

- Ephemeral Drainage (0.614)
- Flow Line



0 50 100 200
Feet
1 inch = 249.166667 feet

Notes:

Base Map Source: ICF, 2022
Imagery Source: NAIP 2020
USGS Topo Quad:San Luis Dam and Volta
PLSS: Section, Township, Range

Prepared By: ICF 916.737.3000
Delineated By: S. O'Brien
Delineation Date: April, 25 2022
Drawn By: A. Angier

Path: \\PDCCITRDSGIS\LP\projects_1\EDPR_Solar\00214_21_Las_Camas_EIR\Figures\Bio\Aquatic_Resources.mxd; Author: ; Date: 6/22/2022

Appendix A
Aquatic Resources Delineation Map

Las Camas
June 2022
Sheet 26 of 26

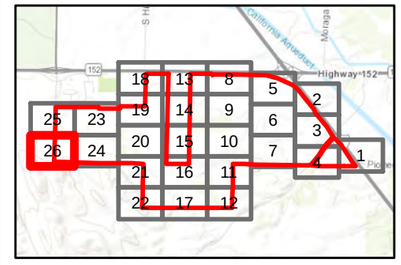
Legend

- Project Site (1,740 ac)
- Ordinary High Water Mark
- Culvert
- Wetland Determination Data Point #1
- Photo Point
- 10' Interval Contour

Aquatic Resources

Non-Wetland Waters

- Ephemeral Drainage (0.614)
- Flow Line



0 50 100 200
Feet
1 inch = 249.166667 feet

Notes:

Base Map Source: ICF, 2022
Imagery Source: NAIP 2020
USGS Topo Quad:San Luis Dam and Volta
PLSS: Section, Township, Range

Prepared By: ICF 916.737.3000
Delineated By: S. O'Brien
Delineation Date: April, 25 2022
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Path: \\PDC\CITRDSGIS1\Projects_1\EDPR_Solar\100214_21_Las_Camas_EIR\Figures\Bio\Aquatic_Resources.mxd; Author: ; Date: 6/22/2022

Appendix A
Aquatic Resources Delineation Map

Appendix B Wetland and OHWM Determination Data Forms

OHWM Delineation Cover Sheet #1 Page 1 of 6

Project: Las Camas **Date:** 4/25/2022

Location: Santa Nella **Investigator(s):** S. O'Brien, S. Henke

Project Description: Solar Development Project

Describe the river or stream's condition (disturbances, in-stream structures, etc.):

Grazing, Berm built in-stream.

Off-site Information

Remotely sensed image(s) acquired? ☑ **Yes** ☐ **No** [If yes, attach image(s) to datasheet(s) and indicate approx. locations of transects, OHWM, and any other features of interest on the image(s); describe below] Description:

Google Earth

Hydrologic/hydraulic information acquired? ☐ **Yes** ☑ **No** [If yes, attach information to datasheet(s) and describe below.] Description:

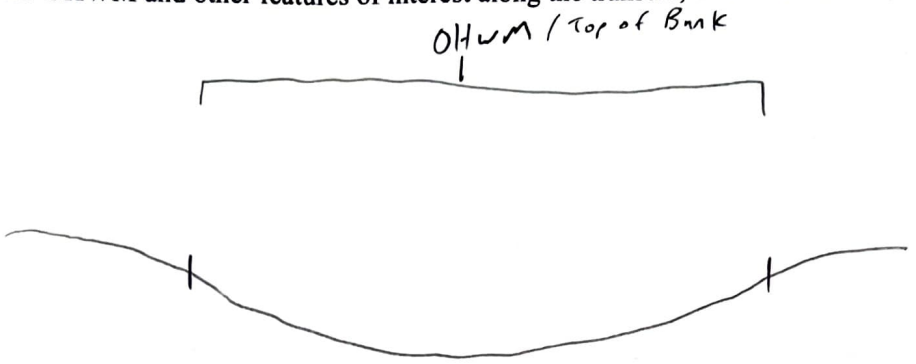
List and describe any other supporting information received/acquired:

- Preliminary Mapping

Instructions: Complete one cover sheet and one or more datasheets for each project site. Each datasheet should capture the dominant characteristics of the OHWM along some length of a given stream. Complete enough datasheets to adequately document up- and/or downstream variability in OHWM indicators, stream conditions, etc. Transect locations can be marked on a recent aerial image or their GPS coordinates noted on the datasheet.

Datasheet # 1 **OHWM Delineation Datasheet # 1** Page ___ of ___

Transect (cross-section) drawing: (choose a location that is representative of the dominant stream characteristics over some distance; label the OHWM and other features of interest along the transect; include an estimate of transect length)



Break in Slope at OHWM: ☐ Sharp (> 60°) | ☐ Moderate (30–60°) | ☒ Gentle (< 30°) | ☐ None

Notes/Description:

Sediment Texture: Estimate percentages to describe the general sediment texture above and below the OHWM

	Clay/Silt <0.05mm	Sand 0.05 – 2mm	Gravel 2mm – 1cm	Cobbles 1 – 10cm	Boulders >10cm	Developed Soil Horizons (Y/N)
Above OHWM	95	5				N
Below OHWM	90	10				Y

Notes/Description:

Vegetation: Estimate absolute percent cover to describe general vegetation characteristics above and below the OHWM

	Tree (%)	Shrub (%)	Herb (%)	Bare (%)
Above OHWM			90	10
Below OHWM			20	80

Notes/Description:

Above = Hordeum murinum ssp. leporinum, Bromus diandrus, Distichlis spicata

Below: Hordeum marinum, Hordeum murinum ssp. leporinum, spergularia rubra, Cressa truxillensis, Distichlis spicata, salsola tragus

Other Evidence: List/describe any additional field evidence and/or lines of reasoning used to support your delineation

- Surface soil crack
- Culvert at northern ends
- Drainage pattern
- Saturation in Spots

OHWM Delineation Cover Sheet #2 Page ____ of ____

Project: Las Camas **Date:** April 25, 2022

Location: Santa Nella **Investigator(s):** SH, SO

Project Description:

Solar development

Describe the river or stream's condition (disturbances, in-stream structures, etc.):

Swale is disturbed with road dividing the feature into two segments. Small pile of river rock near bank, used as rangeland. Swale dominated by the invasive perennial pepperweed

Off-site Information

Remotely sensed image(s) acquired? ☒ **Yes** ☐ **No** [If yes, attach image(s) to datasheet(s) and indicate approx. locations of transects, OHWM, and any other features of interest on the image(s); describe below] Description:

Used Google Earth

Hydrologic/hydraulic information acquired? ☐ **Yes** ☒ **No** [If yes, attach information to datasheet(s) and describe below.] Description:

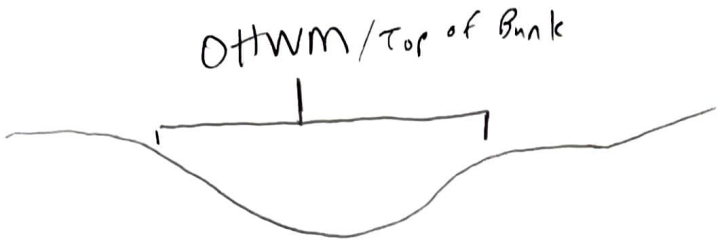
List and describe any other supporting information received/acquired:

Preliminary report for project

Instructions: Complete one cover sheet and one or more datasheets for each project site. Each datasheet should capture the dominant characteristics of the OHWM along some length of a given stream. Complete enough datasheets to adequately document up- and/or downstream variability in OHWM indicators, stream conditions, etc. Transect locations can be marked on a recent aerial image or their coordinates noted on the datasheet.

Datasheet # 2 **OHWM Delineation Datasheet # 2** Page ___ of ___

Transect (cross-section) drawing: (choose a location that is representative of the dominant stream characteristics over some distance; label the OHWM and other features of interest along the transect; include an estimate of transect length)



Break in Slope at OHWM: ☐ Sharp (> 60°) | ☐ Moderate (30–60°) | ☒ Gentle (< 30°) | ☐ None

Notes/Description:

near 30% at steep section but gentle in other locations.

Sediment Texture: Estimate percentages to describe the general sediment texture above and below the OHWM

	Clay/Silt <0.05mm	Sand 0.05 – 2mm	Gravel 2mm – 1cm	Cobbles 1 – 10cm	Boulders >10cm	Developed Soil Horizons (Y/N)
Above OHWM	95	5	-	-	-	N
Below OHWM	90	10	-	-	-	Y

Notes/Description:

Vegetation: Estimate absolute percent cover to describe general vegetation characteristics above and below the OHWM

	Tree (%)	Shrub (%)	Herb (%)	Bare (%)
Above OHWM	0	0	90%	10%
Below OHWM	0	0	95%	5%

Notes/Description:

Above is dominated by Hordeum murinum, Erodium cicutarium, Bromus diandrus

Below ~ Hordeum marinum, H. murinum, Lepidium latifolium,

Other Evidence: List/describe any additional field evidence and/or lines of reasoning used to support your delineation

There is a culvert at each end of the feature

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Las Camus City/County: Santa Nella / Merced Sampling Date: 4/25/22

Applicant/Owner: EDPR State: CA Sampling Point: 1

Investigator(s): SH, SO Section, Township, Range: Section 22, Township 10S, Range 9E

Landform (hillslope, terrace, etc.): [illegible] Local relief (concave, convex, none): concave Slope (%): 0%

Subregion (LRR): Mediterranean California (LRR C) Lat: 37.042708 Long: -120.984721 Datum: WGS84

Soil Map Unit Name: Apollo clay loam, 8-15% slopes (110) NWI classification: Freshwater Pond

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation N, Soil N, or Hydrology N 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 X	**Is the Sampled Area within a Wetland?** Yes ____ No X
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1. NA			
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1. NA			
2.			
3.			
4.			
5.			
Total Cover:			
Herb Stratum			
1. Hordeum murinum FACU	55		
2. Salsola tragus FACU	15		
3.			
4.			
5.			
6.			
7.			
8.			
Total Cover:	70		
Woody Vine Stratum			
1. NA			
2.			
Total Cover:	0		

% Bare Ground in Herb Stratum 30 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 = 0
FACW species	x 2 = 0
FAC species	x 3 = 0
FACU species 70	x 4 = 280
UPL species	x 5 =
Column Totals: 70 (A)	280 (B)

Prevalence Index = B/A = 4.0

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes ____ No X

Remarks:

Depression "pond" like feature

SOIL

Sampling Point: 1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-7	10YR 4/1	72	5YR 4/6	8	C	M	silty clay	
	10YR 6/2	20						Possible Fill material
7-18	10YR 4/1	87	5YR 4/6	8	C	M	silty clay	
	10YR 6/2	5						

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, 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)
- X 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.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes X No ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ___ 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)
- X Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- X 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 Plowed Soils (C6)
- ___ 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)
- ___ Thin Muck Surface (C7)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): _____

Water Table Present? Yes ___ No X Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): _____

Wetland Hydrology Present? Yes X No ___

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

Remarks:

Appendix C Plant Species Observed in the Survey Area

Table C-1. Plant Species Observed in the Survey Area

Scientific Name[a]	Common Name	Wetland Indicator Status[b]	Origin	Special Status
Trees				
Eucalyptus sideroxylon	Red iron bark	UPL	Introduced	None
Populus fremontii	Fremont cottonwood	FAC	Native	None
Salix laevigata	Red willow	FACW	Native	None
Shrubs				
Baccharis salicifolia	Mule fat	FAC	Native	None
Herbs				
Acroptilon repens	Russian knapweed	UPL	Introduced	None
Atriplex argentea var. *expansa*	Mojave silverscale	FAC	Native	None
Atriplex rosea	Redscale	FACU	Introduced	None
Bassia hyssopifolia	Five horn bassia	FACU	Introduced	None
Centaurea melitensis	Tocalote	UPL	Introduced	None
Centaurea solstitialis	Yellow starthistle	UPL	Introduced	None
Convolvulus arvensis	Field bindweed	UPL	Introduced	None
Cressa truxillensis	Alkali weed	FACW	Native	None
Croton setiger	Turkey-mullein	UPL	Native	None
Erodium cicutarium	Coastal heron's bill	UPL	Introduced	None
Festuca perennis	Italian rye grass	FAC	Introduced	None
Grindelia camporum	Gumweed	FACW	Native	None
Heliotropium curassavicum var. *oculatum*	Seaside heliotrope	FACU	Native	None
Hirschfeldia incana	Mustard	UPL	Introduced	None
Lepidium latifolium	Perennial pepperweed	FAC	Introduced	None
Malva parviflora	Cheeseweed	UPL	Introduced	None
Medicago polymorpha	California burclover	FACU	Introduced	None
Polygonum aviculare	Prostrate knotweed	FAC	Introduced	None
Rumex crispus	Curly dock	FAC	Introduced	None
Salsola tragus	Russian thistle	FACU	Introduced	None
Senecio vulgaris	Common groundsel	FACU	Introduced	None
Silybum marianum	Milk thistle	UPL	Introduced	None
Sisymbrium irio	London rocket	UPL	Introduced	None
Solanum elaeagnifolium	Horse nettle	UPL	Introduced	None
Spergularia rubra	Purple sand spurry	FAC	Introduced	None

Scientific Name[a]	Common Name	Wetland Indicator Status[b]	Origin	Special Status
Grasss				
Avena barbata	Slim oat	UPL	Introduced	None
Bromus diandrus	Ripgut brome	UPL	Introduced	None
Bromus hordeaceus	Soft chess	FACU	Introduced	None
Bromus madritensis	Foxtail chess	UPL	Introduced	None
Distichlis spicata	Salt grass	FAC	Native	None
Elymus triticoides	Beardless wild rye	FAC	Native	None
Hordeum marinum	Seaside barley	FAC	Introduced	None
Hordeum murinum	Foxtail barley	FACU	Introduced	None

[a] Nomenclature follows Jepson eFlora (2022)

[b] Wetland indicator status categories defined on the National Wetland Plant List by the U.S. Army Corps of Engineers (2020)

OBL = Obligate, almost always occurs in wetlands (>99% probability of occurrence).

FACW = Facultative wetland, usually occurs in wetlands (66–99% probability of occurrence).

FAC = Facultative, equally likely to occur in wetlands or nonwetlands (34–66% probability of occurrence).

FACU = Facultative upland, usually occurs in nonwetlands but occasionally in wetlands (1–33% probability of occurrence).

UPL = Upland or not included on the wetland indicator list.

Appendix D Representative Photographs



Photo 1. Abandoned ditch upland cover type is composed of species consistent with nonnative annual grassland with occasional red bark trees on the banks. View west, April 26, 2022.



Photo 2. Abandoned ditch upland cover type with an infestation of perennial peppergrass which extends into the adjacent hillslopes. View southwest, April 26, 2022.



Photo 3. Portions of the nonnative annual grassland are subjected to routine disturbance such as light discing which are commonly dominated by slim oat. View east, April 26, 2022.



Photo 4. Nonnative annual grassland dominated by brome species (*Bromus* spp.) and coastal heron's bill on low rolling hills of the Project area and adjacent to an abandoned ditch (right). View west, April 26, 2022.



Photo 5. A tree stand of red iron bark trees surrounded by nonnative annual grassland. View southwest, April 26, 2022.



Photo 6. Scattered red willow (FACW), and other native riparian trees and shrubs in decline, with foxtail barley dominating the nonnative annual grassland in the herbaceous layer. View northeast, April 26, 2022.



Photo 7. A portion of ephemeral drainage (ED-1) that is relatively sparsely vegetated and associated with OHWM Data Form #1. Note the OHWM demonstrated by a break in slope and change in vegetation composition. View southwest, April 26, 2022

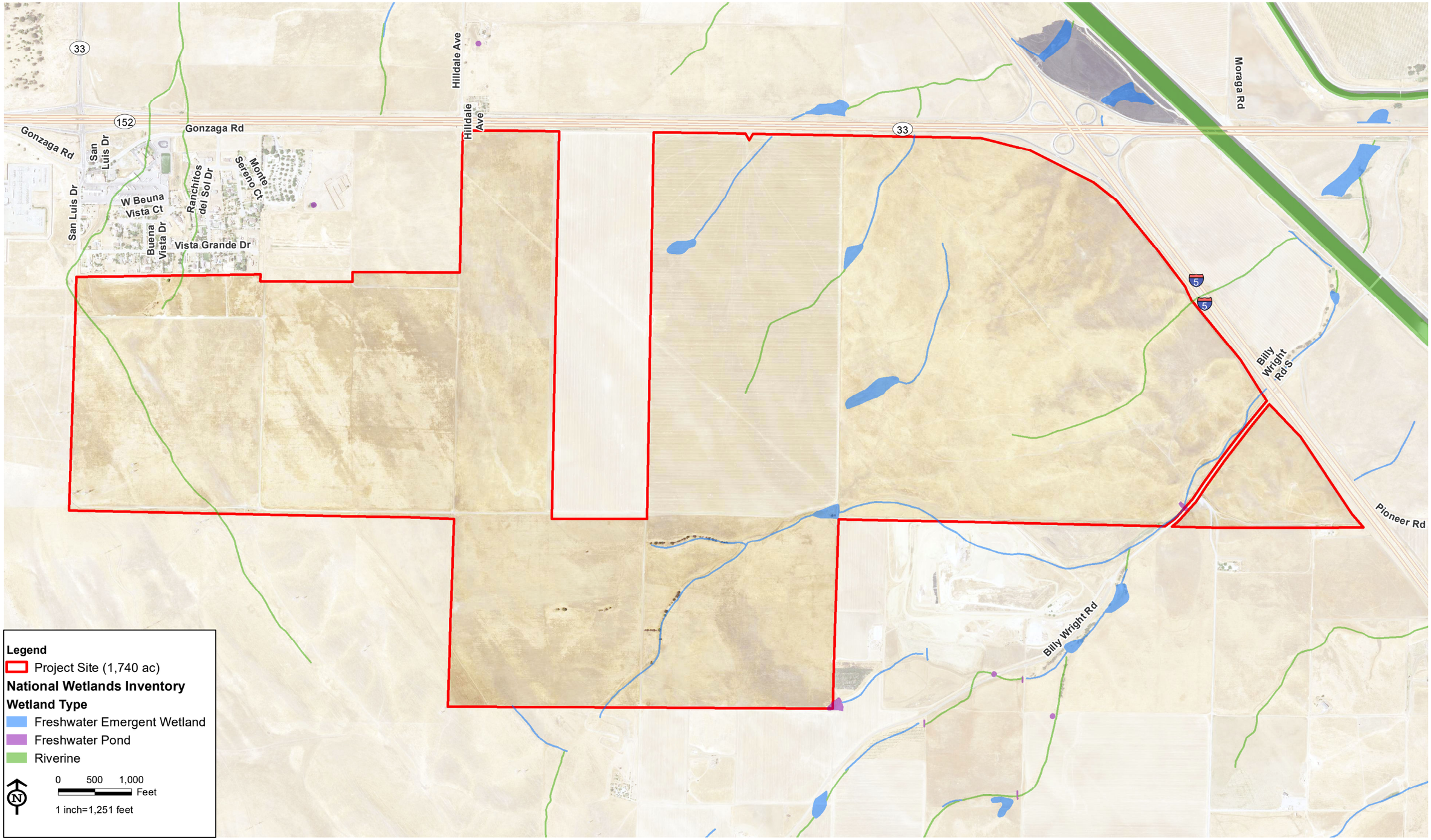


Photo 8. A portion of ephemeral drainage (ED-1) dominated by dense perennial pepperweed (FAC), an invasive plant, and associated with OHWM Data Form #2. Note the OHWM demonstrated by a break in slope and change in vegetation composition. View southwest, April 26, 2022



Photo 9. Portion of ephemeral drainage (ED-1) which conveys water to the northeast through a culvert that spans Interstate 5 and continues outside of the study area. View northeast, April 26, 2022.

Appendix E Supporting Information (2019 Land Cover Map for Project, Custom Soil Resource Report, and National Wetland Inventory Map)

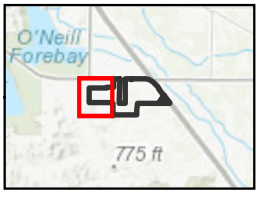


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Appendix E
USFWS National Wetlands Inventory Data



	Land Cover/Habitat Type	Acres
Terrestrial Habitat	Abandoned Ditch	1.85
	Cropland	309.07
	Nonnative Annual Grassland	1,477.57
	Tree Stand	3.02
	Subtotal	*1,791.51*
Aquatic Habitat	Ephemeral Drainage	0.57
	Pond	0.04
	Subtotal	*0.61*
	Total	*1,792.12*

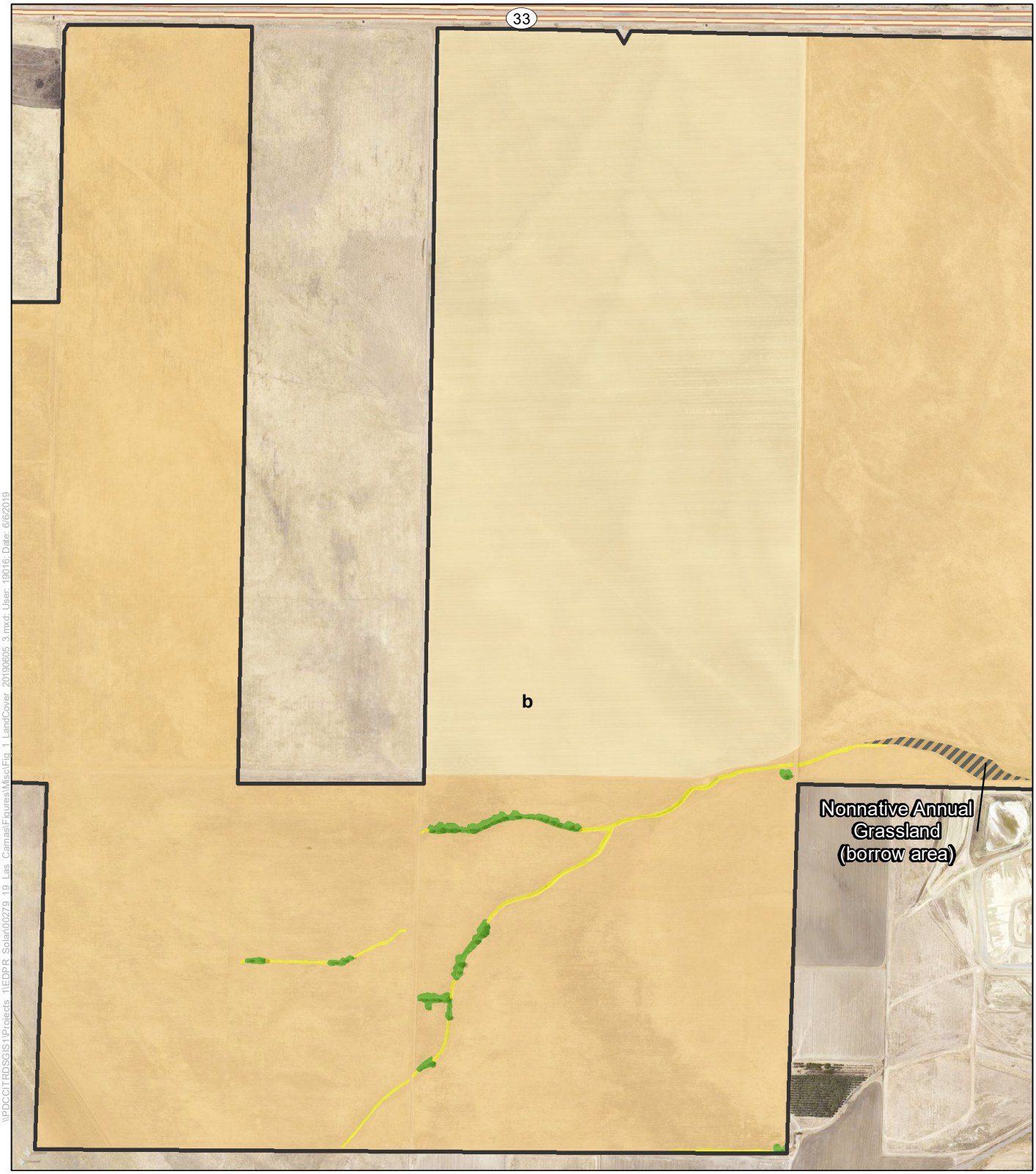


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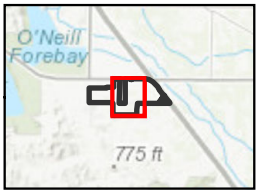
Figure 2a
Land Cover

\\PDCCITRDSGIS1\Projects_1\EDPR_Solar\00279_19_Las_Camas\Figures\Misc\Fig_1_LandCover_20190605_3.mxd, User: 19016, Date: 6/6/2019



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	Land Cover/Habitat Type	Acres
Terrestrial Habitat	Abandoned Ditch	1.85
	Cropland	309.07
	Nonnative Annual Grassland	1,477.57
	Tree Stand	3.02
	Subtotal	*1,791.51*
Aquatic Habitat	Ephemeral Drainage	0.57
	Pond	0.04
	Subtotal	*0.61*
	Total	*1,792.12*



0 500 1,000 Feet

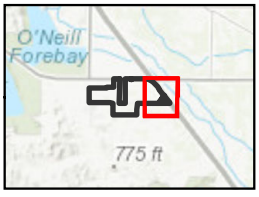
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N

Figure 2b
Land Cover



	Land Cover/Habitat Type	Acres
Terrestrial Habitat	Abandoned Ditch	1.85
	Cropland	309.07
	Nonnative Annual Grassland	1,477.57
	Tree Stand	3.02
	Subtotal	*1,791.51*
Aquatic Habitat	Ephemeral Drainage	0.57
	Pond	0.04
	Subtotal	*0.61*
	Total	*1,792.12*



0 500 1,000 Feet

1:11,830

N

Figure 2c
Land Cover

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United States Department of Agriculture

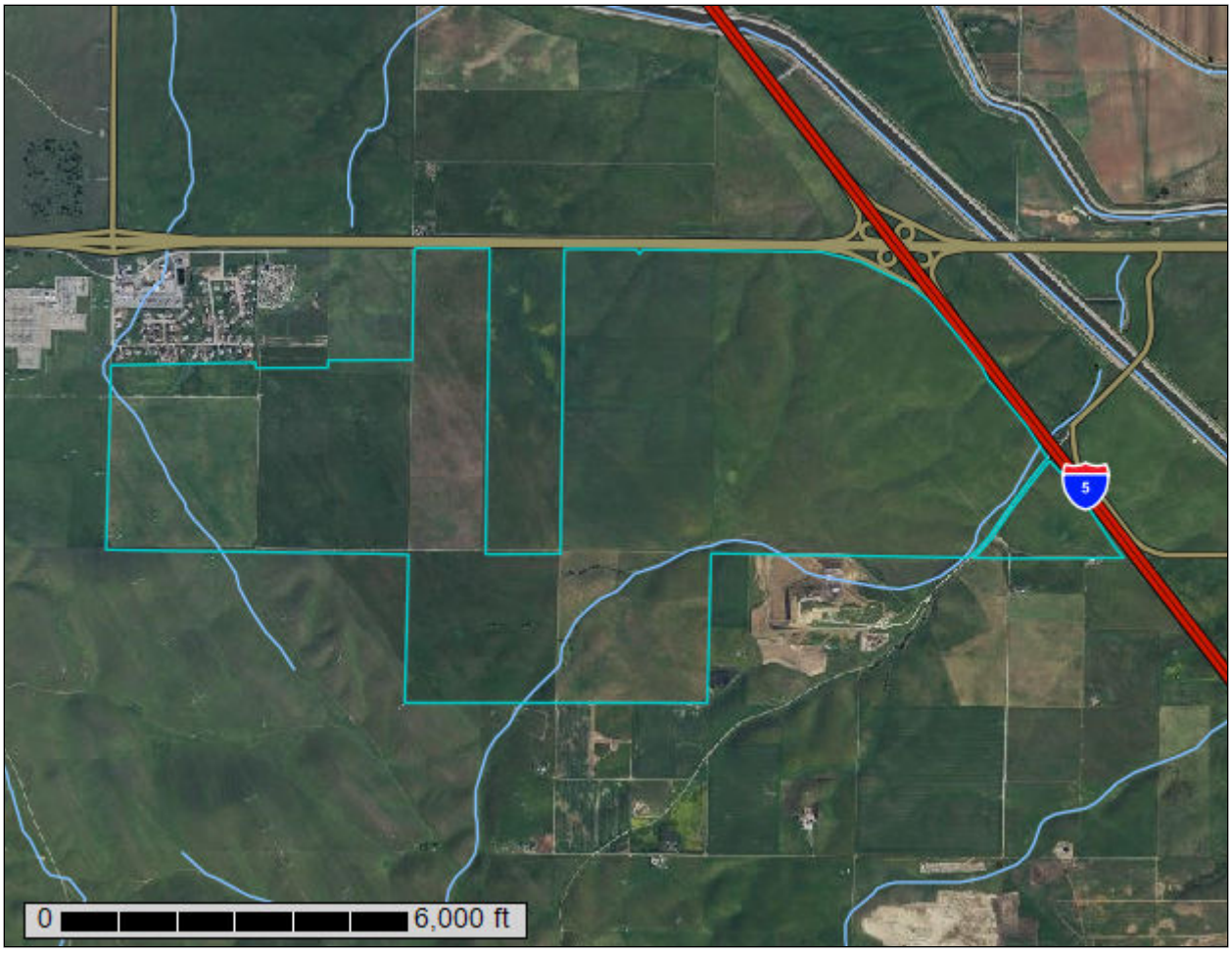
NRCS

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 Merced County, California, Western Part

Las Camas Solar Development Project



June 15, 2022

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 (https://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.

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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.

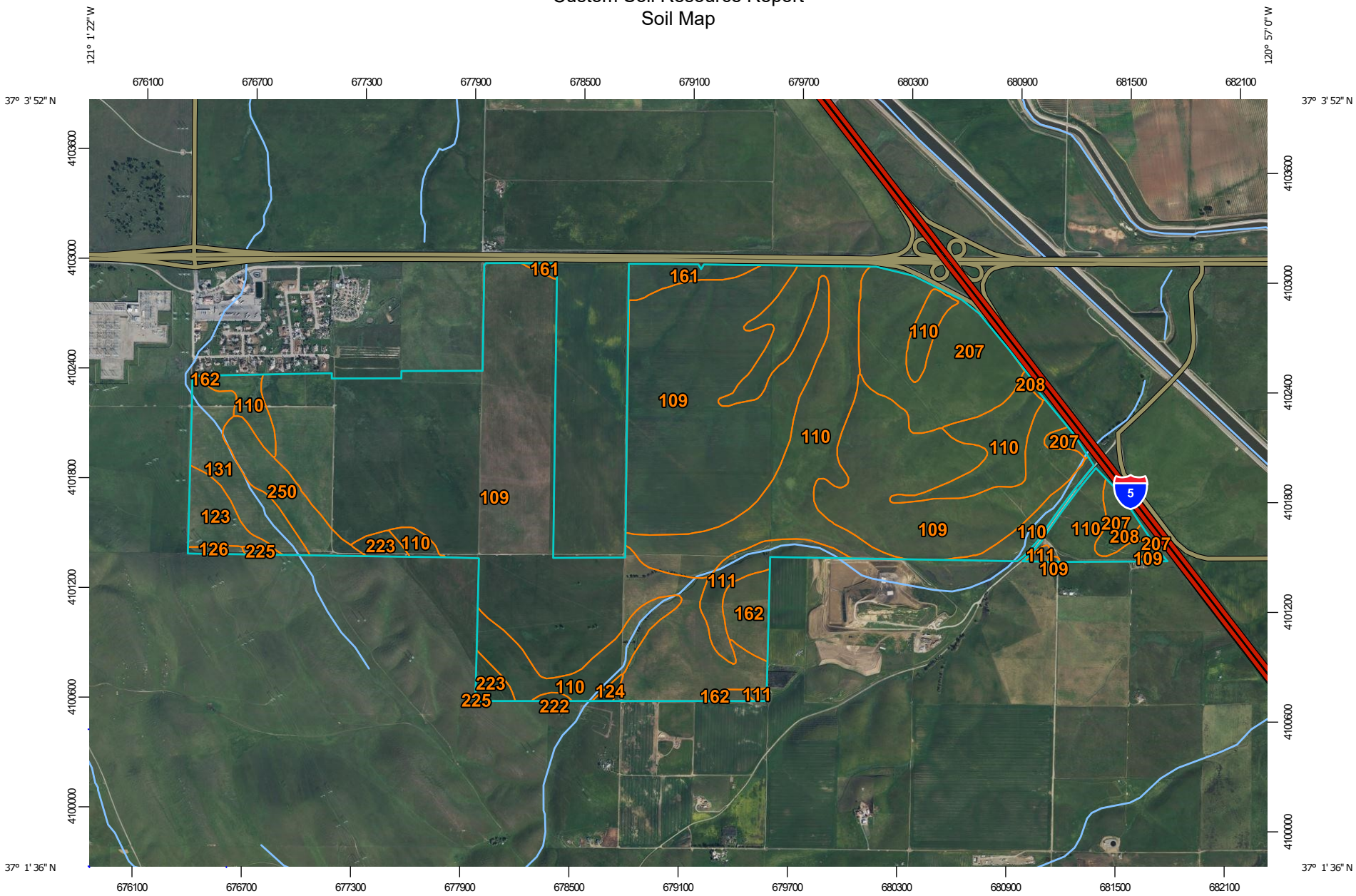
After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

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 Scale: 1:29,600 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 400 800 1600 2400

Feet: 0 1000 2000 4000 6000

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84

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.

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

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
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: Merced County, California, Western Part
Survey Area Data: Version 17, Sep 7, 2021

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

Date(s) aerial images were photographed: Mar 11, 2019—Nov 17, 2019

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

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
109	Apollo clay loam, 2 to 8 percent slopes	1,055.1	58.9%
110	Apollo clay loam, 8 to 15 percent slopes	368.0	20.5%
111	Apollo clay loam, 15 to 30 percent slopes	34.6	1.9%
123	Ayar clay, 5 to 8 percent slopes	26.2	1.5%
124	Ayar clay, 8 to 15 percent slopes	2.5	0.1%
126	Ayar clay, 30 to 50 percent slopes	3.5	0.2%
131	Ballvar loam, 2 to 8 percent slopes	50.2	2.8%
161	Damluis clay loam, 0 to 2 percent slopes	20.9	1.2%
162	Damluis clay loam, 2 to 8 percent slopes	27.0	1.5%
207	Los Banos clay loam, 2 to 8 percent slopes	141.9	7.9%
208	Los Banos clay loam, 8 to 15 percent slopes	2.9	0.2%
222	Oneil silt loam, 15 to 30 percent slope	1.8	0.1%
223	Oneil silt loam, 30 to 50 percent slopes	16.1	0.9%
225	Oquin fine sandy loam, 15 to 30 percent slopes	1.8	0.1%
250	San Timoteo-Wisflat sandy loams complex, 8 to 15 percent slopes	39.8	2.2%
Totals for Area of Interest		**1,792.2**	**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.

Merced County, California, Western Part

109—Apollo clay loam, 2 to 8 percent slopes

Map Unit Setting

National map unit symbol: hjjs
Elevation: 200 to 500 feet
Mean annual precipitation: 11 inches
Mean annual air temperature: 63 degrees F
Frost-free period: 200 to 280 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

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

Description of Apollo

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from sedimentary rock

Typical profile

H1 - 0 to 10 inches: clay loam
H2 - 10 to 41 inches: clay loam
H3 - 41 to 64 inches: bedrock

Properties and qualities

Slope: 2 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 35 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 7.7 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Ecological site: R015XY008CA - Hills <20"ppt
Hydric soil rating: No

Minor Components

Apollo, 15 to 30% slopes
Percent of map unit: 3 percent
Hydric soil rating: No

Los banos
Percent of map unit: 3 percent
Hydric soil rating: No

Apollo, 8 to 15% slopes
Percent of map unit: 3 percent
Hydric soil rating: No

Oneil
Percent of map unit: 3 percent
Hydric soil rating: No

Damluis
Percent of map unit: 3 percent
Hydric soil rating: No

110—Apollo clay loam, 8 to 15 percent slopes

Map Unit Setting
National map unit symbol: hjjt
Elevation: 200 to 500 feet
Mean annual precipitation: 11 inches
Mean annual air temperature: 63 degrees F
Frost-free period: 200 to 280 days
Farmland classification: Not prime farmland

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

Description of Apollo

Setting
Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from sedimentary rock

Typical profile
H1 - 0 to 10 inches: clay loam
H2 - 10 to 41 inches: clay loam
H3 - 41 to 45 inches: bedrock

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: 41 to 45 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 35 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 7.7 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Ecological site: R015XE020CA - Fine Loamy 9-13
Hydric soil rating: No

Minor Components

Damluis

Percent of map unit: 5 percent
Hydric soil rating: No

Apollo, 15 to 30% slopes

Percent of map unit: 5 percent
Hydric soil rating: No

Apollo, 2 to 8% slopes

Percent of map unit: 5 percent
Hydric soil rating: No

111—Apollo clay loam, 15 to 30 percent slopes

Map Unit Setting

National map unit symbol: hjjv
Elevation: 200 to 500 feet
Mean annual precipitation: 11 inches
Mean annual air temperature: 63 degrees F
Frost-free period: 200 to 280 days
Farmland classification: Not prime farmland

Map Unit Composition

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

Description of Apollo

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from sedimentary rock

Typical profile

H1 - 0 to 10 inches: clay loam
H2 - 10 to 41 inches: clay loam
H3 - 41 to 45 inches: bedrock

Properties and qualities

Slope: 15 to 30 percent
Depth to restrictive feature: 41 to 45 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 35 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 7.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C
Ecological site: R015XE020CA - Fine Loamy 9-13
Hydric soil rating: No

Minor Components

Apollo, 2 to 8% slopes

Percent of map unit: 10 percent
Hydric soil rating: No

Apollo, 8 to 15% slopes

Percent of map unit: 5 percent
Hydric soil rating: No

123—Ayar clay, 5 to 8 percent slopes

Map Unit Setting

National map unit symbol: hjk7
Elevation: 200 to 3,300 feet

Mean annual precipitation: 10 to 25 inches
Mean annual air temperature: 59 to 64 degrees F
Frost-free period: 200 to 330 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

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

Description of Ayar

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from sandstone and shale

Typical profile

H1 - 0 to 15 inches: clay
H2 - 15 to 47 inches: clay
H3 - 47 to 51 inches: bedrock

Properties and qualities

Slope: 5 to 8 percent
Depth to restrictive feature: 47 to 51 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 7.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Ecological site: R015XE075CA - Clayey Upland 9-13
Hydric soil rating: No

Minor Components

Oneill

Percent of map unit: 3 percent
Hydric soil rating: No

Ayar, 8 to 15% slopes

Percent of map unit: 3 percent
Hydric soil rating: No

Ayar, 15 to 30% slopes

Percent of map unit: 3 percent

Hydric soil rating: No

Apollo

Percent of map unit: 3 percent
Hydric soil rating: No

Arburua

Percent of map unit: 3 percent
Hydric soil rating: No

124—Ayar clay, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: hjk8
Elevation: 200 to 3,300 feet
Mean annual precipitation: 10 to 25 inches
Mean annual air temperature: 59 to 64 degrees F
Frost-free period: 200 to 330 days
Farmland classification: Not prime farmland

Map Unit Composition

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

Description of Ayar

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from sandstone and shale

Typical profile

H1 - 0 to 15 inches: clay
H2 - 15 to 47 inches: clay
H3 - 47 to 51 inches: bedrock

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: 47 to 51 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent

Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 7.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Ecological site: R015XE075CA - Clayey Upland 9-13
Hydric soil rating: No

Minor Components

Arburua

Percent of map unit: 3 percent
Hydric soil rating: No

Ayar, 15 to 30% slopes

Percent of map unit: 3 percent
Hydric soil rating: No

Ayar, 5 to 8% slopes

Percent of map unit: 3 percent
Hydric soil rating: No

Apollo

Percent of map unit: 2 percent
Hydric soil rating: No

Oneill

Percent of map unit: 2 percent
Hydric soil rating: No

Wisflat

Percent of map unit: 2 percent
Hydric soil rating: No

126—Ayar clay, 30 to 50 percent slopes

Map Unit Setting

National map unit symbol: hjkb
Elevation: 200 to 3,300 feet
Mean annual precipitation: 10 to 25 inches
Mean annual air temperature: 59 to 64 degrees F
Frost-free period: 200 to 330 days
Farmland classification: Not prime farmland

Map Unit Composition

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

Description of Ayar

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from sandstone and shale

Typical profile

H1 - 0 to 15 inches: clay
H2 - 15 to 47 inches: clay
H3 - 47 to 51 inches: bedrock

Properties and qualities

Slope: 30 to 50 percent
Depth to restrictive feature: 47 to 51 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 7.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C
Ecological site: R015XE075CA - Clayey Upland 9-13
Hydric soil rating: No

Minor Components

Los banos

Percent of map unit: 3 percent
Hydric soil rating: No

Ayar, 15 to 30% slopes

Percent of map unit: 3 percent
Hydric soil rating: No

Arburua

Percent of map unit: 3 percent
Hydric soil rating: No

Oneill

Percent of map unit: 3 percent
Hydric soil rating: No

Oquin

Percent of map unit: 3 percent
Hydric soil rating: No

131—Ballvar loam, 2 to 8 percent slopes

Map Unit Setting

National map unit symbol: hjkh
Elevation: 200 to 1,400 feet
Mean annual precipitation: 11 inches
Mean annual air temperature: 63 degrees F
Frost-free period: 200 to 280 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

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

Description of Ballvar

Setting

Landform: Alluvial fans
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from sedimentary rock

Typical profile

H1 - 0 to 15 inches: loam
H2 - 15 to 45 inches: loam
H3 - 45 to 62 inches: loam

Properties and qualities

Slope: 2 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 3 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 9.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Ecological site: R017XE041CA - Fine Loamy 8-10" P.Z.
Hydric soil rating: No

Minor Components

Oneill, 8 to 15 % slopes
Percent of map unit: 4 percent
Hydric soil rating: No

Unnamed
Percent of map unit: 4 percent
Hydric soil rating: No

Bapos
Percent of map unit: 4 percent
Hydric soil rating: No

Vernalis
Percent of map unit: 3 percent
Hydric soil rating: No

161—Damluis clay loam, 0 to 2 percent slopes

Map Unit Setting
National map unit symbol: hjlg
Elevation: 120 to 400 feet
Mean annual precipitation: 9 to 12 inches
Mean annual air temperature: 61 to 63 degrees F
Frost-free period: 210 to 280 days
Farmland classification: Prime farmland if irrigated

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

Description of Damluis

Setting
Landform: Terraces
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium

Typical profile
H1 - 0 to 22 inches: clay loam
H2 - 22 to 44 inches: clay
H3 - 44 to 52 inches: clay loam
H4 - 52 to 60 inches: very gravelly sandy loam

Properties and qualities
Slope: 0 to 2 percent

Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 25 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 9.5 inches)

Interpretive groups

Land capability classification (irrigated): 2s
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: C
Ecological site: R017XE041CA - Fine Loamy 8-10" P.Z.
Hydric soil rating: No

Minor Components

Woo

Percent of map unit: 5 percent
Hydric soil rating: No

Damluis

Percent of map unit: 5 percent
Hydric soil rating: No

Stanislaus

Percent of map unit: 5 percent
Hydric soil rating: No

162—Damluis clay loam, 2 to 8 percent slopes

Map Unit Setting

National map unit symbol: hjlh
Elevation: 120 to 400 feet
Mean annual precipitation: 9 to 12 inches
Mean annual air temperature: 61 to 63 degrees F
Frost-free period: 210 to 280 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

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

Description of Damluis

Setting

Landform: Terraces
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium

Typical profile

H1 - 0 to 22 inches: clay loam
H2 - 22 to 44 inches: clay
H3 - 44 to 52 inches: clay loam
H4 - 52 to 60 inches: very gravelly sandy loam

Properties and qualities

Slope: 2 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 25 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 9.5 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Ecological site: R017XE041CA - Fine Loamy 8-10" P.Z.
Hydric soil rating: No

Minor Components

Herito

Percent of map unit: 3 percent
Hydric soil rating: No

Stanislaus

Percent of map unit: 3 percent
Hydric soil rating: No

Oneill

Percent of map unit: 3 percent
Hydric soil rating: No

Damluis, 0 to 2% slopes

Percent of map unit: 3 percent
Hydric soil rating: No

Bapos

Percent of map unit: 3 percent
Hydric soil rating: No

207—Los Banos clay loam, 2 to 8 percent slopes

Map Unit Setting

National map unit symbol: hjmy
Elevation: 130 to 2,000 feet
Mean annual precipitation: 10 inches
Mean annual air temperature: 63 degrees F
Frost-free period: 200 to 280 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

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

Description of Los Banos

Setting

Landform: Terraces
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium

Typical profile

H1 - 0 to 9 inches: clay loam
H2 - 9 to 55 inches: clay loam
H3 - 55 to 63 inches: stratified cobbly sandy clay loam to very gravelly clay loam

Properties and qualities

Slope: 2 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 30 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 9.0 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Ecological site: R017XE041CA - Fine Loamy 8-10" P.Z.
Hydric soil rating: No

Minor Components

Arburua
Percent of map unit: 5 percent
Hydric soil rating: No

Apollo
Percent of map unit: 5 percent
Hydric soil rating: No

Los banos
Percent of map unit: 5 percent
Hydric soil rating: No

208—Los Banos clay loam, 8 to 15 percent slopes

Map Unit Setting
National map unit symbol: hjmz
Elevation: 130 to 2,000 feet
Mean annual precipitation: 10 inches
Mean annual air temperature: 63 degrees F
Frost-free period: 200 to 280 days
Farmland classification: Not prime farmland

Map Unit Composition
Los banos and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Los Banos

Setting
Landform: Terraces
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium

Typical profile
H1 - 0 to 9 inches: clay loam
H2 - 9 to 55 inches: clay loam
H3 - 55 to 63 inches: stratified cobbly sandy clay loam to very gravelly clay loam

Properties and qualities
Slope: 8 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)

Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 30 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 9.0 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: C
Ecological site: R017XE041CA - Fine Loamy 8-10" P.Z.
Hydric soil rating: No

Minor Components

Unnamed

Percent of map unit: 3 percent
Hydric soil rating: No

San timoteo, 15 to 30% slopes

Percent of map unit: 3 percent
Hydric soil rating: No

Arburua, 15 to 30% slopes

Percent of map unit: 3 percent
Hydric soil rating: No

Chaqua

Percent of map unit: 3 percent
Hydric soil rating: No

Los banos, 2 to 8% slopes

Percent of map unit: 3 percent
Hydric soil rating: No

222—Oneil silt loam, 15 to 30 percent slope

Map Unit Setting

National map unit symbol: hjnf
Elevation: 200 to 1,400 feet
Mean annual precipitation: 10 to 12 inches
Mean annual air temperature: 61 to 63 degrees F
Frost-free period: 200 to 280 days
Farmland classification: Not prime farmland

Map Unit Composition

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

Description of Oneil

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from sandstone and shale

Typical profile

H1 - 0 to 21 inches: silt loam
H2 - 21 to 29 inches: silt loam
H3 - 29 to 33 inches: bedrock

Properties and qualities

Slope: 15 to 30 percent
Depth to restrictive feature: 29 to 33 inches to lithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 14 percent
Available water supply, 0 to 60 inches: Low (about 5.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C
Ecological site: R015XE020CA - Fine Loamy 9-13
Hydric soil rating: No

Minor Components

Rock outcrop

Percent of map unit: 3 percent
Hydric soil rating: No

Arburua

Percent of map unit: 3 percent
Hydric soil rating: No

Damluis

Percent of map unit: 3 percent
Hydric soil rating: No

Wisflat

Percent of map unit: 3 percent
Hydric soil rating: No

Ayar

Percent of map unit: 3 percent
Hydric soil rating: No

223—Oneil silt loam, 30 to 50 percent slopes

Map Unit Setting

National map unit symbol: hjng
Elevation: 200 to 1,400 feet
Mean annual precipitation: 10 to 12 inches
Mean annual air temperature: 61 to 63 degrees F
Frost-free period: 200 to 280 days
Farmland classification: Not prime farmland

Map Unit Composition

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

Description of Oneil

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from sandstone and shale

Typical profile

H1 - 0 to 21 inches: silt loam
H2 - 21 to 29 inches: silt loam
H3 - 29 to 33 inches: bedrock

Properties and qualities

Slope: 30 to 50 percent
Depth to restrictive feature: 29 to 33 inches to lithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 14 percent
Available water supply, 0 to 60 inches: Low (about 5.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: C
Ecological site: R015XE020CA - Fine Loamy 9-13
Hydric soil rating: No

Minor Components

Wisflat
Percent of map unit: 3 percent
Hydric soil rating: No

Conosta
Percent of map unit: 3 percent
Hydric soil rating: No

Rock outcrop
Percent of map unit: 3 percent
Hydric soil rating: No

Ayar
Percent of map unit: 3 percent
Hydric soil rating: No

Arburua
Percent of map unit: 3 percent
Hydric soil rating: No

225—Oquin fine sandy loam, 15 to 30 percent slopes

Map Unit Setting
National map unit symbol: hjnj
Elevation: 250 to 500 feet
Mean annual precipitation: 10 to 12 inches
Mean annual air temperature: 61 to 64 degrees F
Frost-free period: 210 to 280 days
Farmland classification: Not prime farmland

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

Description of Oquin

Setting
Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from calcareous sandstone

Typical profile
H1 - 0 to 24 inches: fine sandy loam
H2 - 24 to 31 inches: sandy loam
H3 - 31 to 35 inches: bedrock

Properties and qualities

Slope: 15 to 30 percent
Depth to restrictive feature: 31 to 35 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 10 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 4.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Ecological site: R015XE009CA - COARSE LOAMY
Hydric soil rating: No

Minor Components

San timoteo

Percent of map unit: 4 percent
Hydric soil rating: No

Wisflat

Percent of map unit: 4 percent
Hydric soil rating: No

Oneil

Percent of map unit: 4 percent
Hydric soil rating: No

Rock outcrop

Percent of map unit: 3 percent
Hydric soil rating: No

250—San Timoteo-Wisflat sandy loams complex, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: hjpb
Elevation: 200 to 3,500 feet
Mean annual precipitation: 9 to 20 inches
Mean annual air temperature: 61 to 64 degrees F
Frost-free period: 190 to 310 days
Farmland classification: Not prime farmland

Map Unit Composition

San timoteo and similar soils: 50 percent

Wisflat and similar soils: 40 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of San Timoteo

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from sandstone and shale

Typical profile

H1 - 0 to 16 inches: sandy loam
H2 - 16 to 32 inches: loam
H3 - 32 to 36 inches: bedrock

Properties and qualities

Slope: 9 to 15 percent
Depth to restrictive feature: 32 to 36 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 10 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 4.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: B
Ecological site: R015XE009CA - COARSE LOAMY
Hydric soil rating: No

Description of Wisflat

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from sandstone and shale

Typical profile

H1 - 0 to 6 inches: sandy loam
H2 - 6 to 14 inches: sandy loam
H3 - 14 to 16 inches: bedrock
H4 - 16 to 20 inches: bedrock

Properties and qualities

Slope: 9 to 15 percent

Depth to restrictive feature: 16 to 20 inches to lithic bedrock
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very low (about 1.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: D
Ecological site: R015XF033CA - Shallow Coarse Loamy 9-13
Hydric soil rating: No

Minor Components

Arburua

Percent of map unit: 4 percent
Hydric soil rating: No

Rock outcrop

Percent of map unit: 4 percent
Hydric soil rating: No

San timoteo, 15 to 30% slopes

Percent of map unit: 2 percent
Hydric soil rating: No

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Appendix F Aquatic Resource Excel Spreadsheet (Ombil Regulatory Module Worksheet)

To be Submitted Electronically