Draft Environmental Impact Report

SCH# 2024041028

Volume 4

Appendix D through G

BUTTONBUSH SOLAR AND STORAGE PROJECT

by 29SC 8me, LLC.

(PP24407)

Site 1
CUP No. 17, Map 98; CUP No. 19, Map 98;
CUP No. 25, Map 99; GPA No. 4, Map 98;
SPA No. 5, Map 98; GPA No. 8, Map 99;
Williamson Act Land Use Contract Cancellations;
Farmland Security Zone Contract Cancellation;
Non-Summary Vacation, Map 99

Site 2
CUP No. 14, Map 77; CUP No. 20, Map 77;
CUP No. 18, Map 98; GPA No. 10, Map 77;
Williamson Act Land Use Contract Cancellations

Site 3
CUP No. 15, Map 77; GPA No. 11, Map 77;
Williamson Act Land Use Contract Cancellations

Site 4
CUP No. 16, Map 77; GPA No. 12, Map 77;
Williamson Act Land Use Contract Cancellation

Site 5
CUP No. 26, Map 99; CUP No. 27, Map 99;
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GPA No. 10, Map 99; GPA No. 31, Map 100;
Williamson Act Land Use Contract Cancellations;
Non-Summary Vacation, Map 99

Site 6
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Site 8
CUP No. 12, Map 54; CUP No. 17, Map 77;
CUP No. 18, Map 77; CUP No. 19, Map 77;
GPA No. 1, Map 54; GPA No. 13, Map 77;
Williamson Act Land Use Contract Cancellations

Kern County
Planning and Natural Resources Department
Bakersfield, CA

November 2025

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Kern County
Planning and Natural Resources Department
Bakersfield, CA

November 2025

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Appendices—Volume 4

NOTE TO REVIEWER OF ELECTRONIC FILES:

To assist you in reviewing this electronic document, "bookmarks" and/or "links" have been provided for easier navigation between sections. When available, bookmarks are located in the panel to the left. Links are highlighted in **BLUE** in the Table of Contents. Clicking on either the bookmarks or links will take you to the selected item. This document may consist of multiple linked PDF files. If saving this document to your computer, you must save all corresponding files to a directory on your hard drive to maintain the manner in which these PDF documents are linked.

Appendix D.1: Biological Resources Technical Report Acreage Memorandum

Appendix D.2: Biological Resources Technical Report

Appendix D.3: Aquatic Resources Delineation Report Acreage Memorandum

Appendix D.4: Aquatic Resources Delineation Report

Appendix D.5: Biological Resources Habitat Assessment

Appendix E.1: Archaeological Resources Inventory and Evaluation Report

Appendix E.2: Assembly Bill 52 Response

Appendix E.3: Built Environment Inventory and Evaluation Report

Appendix F: Desktop Geotechnical Site Assessment Report

Appendix G.1: Paleontological Resources Acreage Memorandum

Appendix G.2: Paleontological Resources Inventory Memorandum

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Appendix D

Biological Resources Materials

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Appendix D.1

Biological Resources Technical Report Acreage Memorandum

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MEMORANDUM

To:	Jack Foster, Planner II, Planning & Natural Resources Department
From:	Ronelle Candia, Project Manager, Dudek
Subject:	Clarification on Project Acreage – Buttonbush Solar & Storage Project, Kern County, CA Biological Resources Technical Report
Date:	October 17, 2025
cc:	Pauline Roberts, Director, Permitting, Avantus, Christa Hudson, Permitting Consultant

Introduction

In May 2025 Dudek prepared the Final Biological Resources Technical Report (Report) for the Buttonbush Solar and Storage Project (Project) in Kern County, California. The Report assumed the Project would be located on 128 parcels across a leased area of approximately 11,989 acres within an approximately 13,868-acre gross parcel boundary.

Project Description Revisions

Subsequent to the final Report, the Project area has been revised to be located on 128 parcels across a leased area of approximately 11,983 acres within an approximately 13,868-acre gross parcel boundary. This resulted in a reduction of total acres developed as part of the Project. The modification in the Project acres is because the acres listed by Assessor's Parcel Number (APN) were used to comprise the original Project site acreage total while survey data refinements and minor landowner lease exclusions reduced the total area.

Findings on Existing Memo

The minor reduction in project acreage will not necessitate revisions to the Report, as it does not introduce new significant environmental effects or substantially increase the severity of previously identified impacts. The proposed mitigation measures within the Report remain applicable and do not require revision, despite the slight reduction in acreage from what was analyzed in the technical study.

Appendix D.2

Biological Resources Technical Report

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Biological Resources Technical Report

Buttonbush Solar and Storage Project

MAY 2025

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Acronyms and Abbreviations

Acronym	Definition
AC	alternating current
ACE	Area of Conservation Emphasis
APN	Assessor's Parcel Number
BCC	Bird of Conservation Concern
BESS	battery energy storage system
BMP	best management practice
BSA	Biological Study Area
CDFW	California Department of Fish and Wildlife
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CFR	Code of Federal Regulations
cm	centimeter
CNDDB	California Natural Diversity Database
CNPS	California Native Plant Society
CRPR	California Rare Plant Rank
CWA	Clean Water Act
EPA	U.S. Environmental Protection Agency
ESA	federal Endangered Species Act
FE	federally listed as endangered
FP	fully protected
gen-tie	generation tie
GHG	greenhouse gas
GIS	geographic information system
HCP	habitat conservation plan
I	Interstate
iPaC	Information for Planning and Consultation
ITP	Incidental Take Permit
KCVFHCP	Kern County Valley Floor Habitat Conservation Plan
kV	kilovolt
MBTA	Migratory Bird Treaty Act
MM	Mitigation Measure
NWW	non-wetland water
O&M	operations and maintenance
OHWM	ordinary high water mark
PG&E	Pacific Gas & Electric Company
PV	photovoltaic
RPS	Renewables Portfolio Standard
RWQCB	Regional Water Quality Control Board
SE	state listed as endangered
SJVAPCD	San Joaquin Valley Air Pollution Control District

Acronym	Definition
SR	State Route
SSC	species of special concern
SWPPP	stormwater pollution prevention plan
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
WEAT	Worker Environmental Awareness Training

1 Introduction

This biological resources technical report (report) documents the results of surveys conducted to identify potential biological resources for the Buttonbush Solar and Storage Project (project) in Kern County, California. Figure 1, Project Location, shows the regional location and the vicinity of the Biological Study Area (BSA).

All figures are provided in Appendix A, Figures, to this report.

1.1 Purpose of Report

The purpose of this report at a project level is to (1) describe the conditions of biological resources within the BSA in terms of vegetation communities, plants, wildlife, wildlife habitats, and wetlands; (2) quantify potential direct and indirect impacts to special-status biological resources that would result from the project; (3) discuss those impacts in terms of biological significance in view of federal, state, and local laws and Kern County (County) General Plan and Municipal Code policies; and (4) specify measures to avoid, minimize, and/or mitigate impacts that would occur on special-status biological resources as a result of project implementation.

1.2 Project Description

1.2.1 Proposed Project

The project as proposed by 29SC 8me LLC (project proponent) would be located on 128 parcels across a leased area of approximately 11,989 acres within a 13,868-acre gross parcel boundary of privately owned land in unincorporated Kern County, California. The majority of the 11,989-acre project area is currently under agricultural use or developed in the valley region of the County.

The project includes the construction and operation of a photovoltaic (PV) solar facility and associated infrastructure necessary to generate up to 2 gigawatts of alternating current (AC) power with an up to 2-gigawatt battery energy storage system (BESS). Additional components of the project include solar modules and racking, inverters, transformers, service roads, a power collection system, communication cables, microwave/ radio towers, meteorological stations, a generation transmission (gen-tie) line with optical ground wire and overhead and underground transmission lines, electrical switchyards, project substations, security fencing, use of on-site water wells, and operations and maintenance (O&M) facilities.

The project would be supported by one or more 500 kilovolt (kV) gen-tie electrical transmission lines originating from one or more on-site substations and terminating at the existing PG&E Midway Substation. The project study area includes the development footprint and gen-tie/collector line, which includes a 200-foot corridor. PG&E will modify the Midway Substation's 500 kV yard within their property boundary to accommodate the proposed project's interconnection. The PG&E Midway Substation parcels comprise approximately 255 acres; however, only a small portion, up to 38.6 acres, will be impacted by the proposed project. PG&E will install and trench underground several fiber-optic lines to the west of the gen-tie line route to facilitate communication between the Midway Substation and the Point of Change of Ownership, approximately 0.25 miles northwest. Up to four 175-foot-tall lattice steel towers (LST) or tubular steel poles (TSPs) would support the proposed transmission line and the project's interconnection.

The proposed facilities are expected to be operational for up to 35 years. The full project description is provided in the project's California Environmental Quality Act (CEQA) environmental impact report and should be referenced for additional details regarding the project description.

1.2.2 Project Location

The project site is in unincorporated Kern County directly north of the community of Buttonwillow, approximately 2 miles west of the City of Shafter and approximately 7 miles southwest of the City of Wasco. The project site straddles Interstate (I) 5 east of Buttonwillow Raceway Park, just north of State Route (SR) 58, and south of SR-46. Several single-family homes and agriculture-related structures are near the project boundary. Properties within the project include a dairy, a few single-family homes, and some varied structures for agricultural use, all of which would be removed during project construction. Vehicular access to the site would likely be from Wasco Way, Merced Avenue, Lerdo Highway, Rowlee Road, Wildwood Road, Riverside Street, Burbank Street, Buttonwillow Drive, 7th Standard Road, Snow Road, SR-58, and Sullivan Road. Many dirt roads crisscross the project site.

1.2.3 Project Characteristics/Additional Information

Specific project characteristics that may particularly affect biological resources are included herein. It is important to note that this report presents only a subset of the overall project characteristics. According to the U.S. Geological Survey (USGS) the project site is within the Wasco SW, Semitropic, Rio Bravo, Buttonwillow, and Lokern USGS 1:24,000 topographic map (7.5-minute quadrangles). The Pacific Gas & Electric Company (PG&E) San Joaquin Valley Operations and Maintenance (O&M) Habitat Conservation Plan (HCP) overlies the proposed project (Jones & Stokes 2006). The HCP applies only to PG&E maintenance projects and does not apply to the currently proposed project site.

Phasing

It is anticipated that the proposed project may implement phased development. Phased development would be based on the successful execution of one or more power purchase agreements (PPAs), each with a specific megawatt capacity. The project includes multiple sites, some of which are discontinuous and separated from each other by multiple non-participating parcels and roads. Phasing may occur with the development of one or more of the sites simultaneously and could include a combination of any of the sites. Where potential impacts have been identified, mitigation has been proposed to reduce, eliminate, avoid, or offset impacts. Because the project may be phased, final impacts and mitigation will be based on which phases are built and the timing of the construction.

Construction and Decommissioning Activities

The construction period for the proposed project, from site preparation through construction, testing, and commercial operation, is expected to extend for up to 60 months. It is estimated that an average of up to 800 workers per day with up to 1,334 workers during peak construction periods would be required during construction of the proposed project. Construction of the proposed project would include the activities associated with the project components listed below:

- Site preparation
- Access and internal circulation roads
- Grading and earthwork

- Concrete foundations
- Structural steelwork
- Panel installation
- Electrical/instrumentation work
- Collector line installation
- Stormwater management facilities
- Gen-tie line(s) including the I-5 overhead crossing

Construction activities would comply with County and local municipalities' noise ordinances. Heavy construction is expected to occur between 7:00 a.m. and 5:00 p.m., Monday through Friday. If weekend work is required, construction would occur between 8:00 a.m. and 9:00 p.m. Additional hours may be necessary to make up schedule deficiencies or to complete critical construction activities. Some activities may continue 24 hours per day, for several days in a given week.[1] Low-level noise activities may potentially occur between the hours of 10:00 p.m. and 7:00 a.m. Nighttime activities could include, but are not limited to, refueling equipment, staging material for the following day's construction activities, gen-tie line crossing work, quality assurance/control, and commissioning.

Solar equipment typically has a lifespan of over 35 years with regular maintenance intervals. The proposed project expects to sell the renewable energy produced by the project under the terms of a long-term Power Purchase Agreement with a utility or other power off-taker. Upon completion of the Power Purchase Agreement term, the project operator may, at its discretion and consistent with necessary approvals, continue to generate and sell power from the project or decommission and remove the system and its components. Upon decommissioning, the solar and storage facility could be converted to other uses in accordance with applicable land use regulations in effect at that time.

Operations

Once the proposed project is constructed, maintenance would generally be limited to the following:

- Cleaning of PV panels
- Monitoring of electricity generation
- Provision of site security
- Facility maintenance—monitoring of equipment and control systems; replacement or repair of inverters, wiring, and PV modules; road maintenance; fence repairs; and vegetation management
- Utility coordination

It is expected that the proposed project could require an operational staff of up to 20 full-time employees. The facility would operate 7 days a week, 24 hours a day, generating electricity during normal daylight hours when solar energy is available. The BESS could dispatch energy at any time during the day or night; however, emergency maintenance may occur outside these timeframes to ensure BESS output and PV panel output when solar energy is available.

[1] Some substation testing will be required prior to the completion of project construction. This testing will include nighttime operation because the substation equipment must be tested continuously for 72 hours for safety reasons.

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2 Regulatory Setting

2.1 Federal

Federal Endangered Species Act

The federal Endangered Species Act (ESA) of 1973 (16 USC 1531 et seq.), as amended, is administered by the U.S. Fish and Wildlife Service (USFWS) for most plant and animal species, and by the National Oceanic and Atmospheric Administration National Marine Fisheries Service for certain marine species. This legislation is intended to provide a means to conserve the ecosystems upon which endangered and threatened species depend and provide programs for the conservation of those species, thus preventing the extinction of plants and wildlife. ESA defines an endangered species as "any species that is in danger of extinction throughout all or a significant portion of its range." A threatened species is defined as "any species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range." Under ESA, it is unlawful to take any listed species; "take" is defined as "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct."

ESA allows for the issuance of Incidental Take Permits (ITPs) for listed species under Section 7, which is generally available for projects that also require other federal agency permits or other approvals, and under Section 10, which provides for the approval of HCPs on private property.

The PG&E San Joaquin Valley O&M HCP overlies the proposed project. The HCP applies only to PG&E maintenance projects and does not apply to the currently proposed project.

Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) prohibits the intentional and unintentional take of any migratory bird or any part, nest, or eggs of any such bird. All native North American bird species, including those considered special status and listed in Section 5.3.2, Special-Status Wildlife, of this report, are protected by the MBTA. Under the MBTA, "take" is defined as pursuing, hunting, shooting, capturing, collecting, or killing, or attempting to do so (16 USC 703 et seq.). Currently, the Migratory Birds Office considers nests that support eggs, nestlings, or juveniles to be active. Additionally, Executive Order 13186, Responsibilities of Federal Agencies to Protect Migratory Birds, requires that any project with federal involvement address impacts of federal actions on migratory birds with the purpose of promoting conservation of migratory bird populations (66 FR 3853–3856). Executive Order 13186 requires federal agencies to work with USFWS to develop a memorandum of understanding. USFWS reviews actions that might affect these species.

Clean Water Act

The Clean Water Act (CWA) is the major federal legislation governing water quality, providing guidance for the restoration and maintenance of the chemical, physical, and biological integrity of the nation's waters. Section 401 of the CWA requires an applicant for a federal license or permit that may result in a discharge of pollutants into waters of the United States to obtain state certification, thereby ensuring that the discharge will comply with provisions of the CWA. The State Water Resources Control Board and Regional Water Quality Control Boards (RWQCBs) administer the 401 certification program in California. Section 402 of the CWA establishes a permitting

system for the discharge of any pollutant (except dredged or fill material) into waters of the United States. Section 404 establishes a permit program administered by the U.S. Army Corps of Engineers (USACE) that regulates the discharge of dredged or fill material into waters of the United States, including wetlands. USACE implementing regulations are found in Title 33 of the Code of Federal Regulations (CFR), Parts 320 to 332. Guidelines for implementation are referred to as the Section 404(b)(1) Guidelines, which were developed by the U.S. Environmental Protection Agency (EPA) in conjunction with USACE (40 CFR 230). The guidelines allow the discharge of dredged or fill material into the aquatic ecosystem only if there is no practicable alternative that would have less adverse impacts.

Wetlands and Other Waters of the United States

The definition of waters of the United States establishes the geographic scope for authority under Section 404 of the CWA; however, the CWA does not specifically define waters of the United States, leaving the definition open to statutory interpretation and agency rulemaking. The definition of what constitutes "waters of the United States" (provided in 33 CFR 328.3[a]) has changed multiple times over the past few decades, starting with the *United States v. Riverside Bayview Homes Inc.* court ruling in 1985. Subsequent court proceedings, rule makings, and congressional acts in 2001 (*SWANCC [Solid Waste Agency of Northern Cook County v. United States Army Corps of Engineers]*), 2006 (*Rapanos [Rapanos v. United States]*), 2015 (Clean Water Rule), 2018 (suspension of the Clean Water Rule), 2019 (formal repeal of the Clean Water Rule), 2020 (Navigable Waters Protection Rule), and 2021 (*Pasqua Tribe et al. v. United States Environmental Protection Agency*, which resulted in remand and vacatur of the Navigable Waters Protection Rule and a return to "the pre-2015 regulatory regime") have attempted to provide greater clarity to the term and its regulatory implementation. On December 30, 2022, the agencies announced the final Revised Definition of "Waters of the United States" rule (Rule) (88 CFR 3004–3144). The Rule was published in the Federal Register on January 18, 2023, and became effective on March 20, 2023, restoring federal jurisdiction over waters that were protected prior to 2015 under the CWA for traditional navigable waters, the territorial seas, interstate waters, and upstream water resources that significantly affect those waters. The Rule represents a re-expansion of federal jurisdiction over certain water bodies and wetlands previously exempt pursuant to the 2020 Navigable Waters Protection Rule. The Rule also considers various subsequent court decisions, including two notable Supreme Court decisions.

There are two key changes that the Rule incorporates. Firstly, the Rule reinstates the "Significant Nexus" test. The Significant Nexus test refers to waters that either alone, or in combination with similarly situated waters in the region, significantly affect the chemical, physical, or biological integrity of traditional navigable waters, interstate waters, or the territorial seas (86 FR 69372–69450). The Significant Nexus test attempts to establish a scientific connection between smaller water bodies, such as ephemeral or intermittent tributaries, and larger, more traditional navigable waters, such as rivers. Significant Nexus evaluations take into consideration hydrologic and ecologic factors including, but not limited to, volume, duration, and the frequency of surface water flow in the resource and its proximity to a traditional navigable water, and the functions performed by the resource on adjacent wetlands. Second, the Rule adopts the "Relatively Permanent Standard" test. To meet the Relatively Permanent Standard, water bodies must be relatively permanent, standing, or continuously flowing and have a continuous surface connection to such waters.

On May 25, 2023, the Supreme Court issued its long-anticipated decision in *Sackett v. EPA*, in which it rejected EPA's claim that waters of the United States, as defined in the CWA, include wetlands with an ecologically significant nexus to traditional navigable waters. The Supreme Court held that only those wetlands with a continuous surface water connection to traditional navigable waterways would be afforded federal protection under the CWA.

Specifically, to assert jurisdiction over an adjacent wetland under the CWA, a party must establish that (1) "the adjacent [body of water constitutes]… 'water[s] of the United States,' (i.e., a relatively permanent body of water connected to traditional interstate navigable waters)" and (2) "the wetland has a continuous surface connection with that water, making it difficult to determine where the 'water' ends and the 'wetland' begins."

On August 29, 2023, EPA and USACE announced the final rule amending the 2023 definition of "waters of the United States," conforming with the *Sackett v. EPA* decision. Some of the key changes include removing the significant nexus test from consideration when identifying tributaries and other waters as federally protected and revising the adjacency test when identifying federally jurisdictional wetlands. Under the EPA's new "waters of the United States" definition, a "water of the United States" is a relatively permanent, standing, or continuously flowing body of water that has an apparent surface connection to a "traditionally navigable water" to fall within federal purview. The new rule applies to wetlands and streams throughout the United States. Although the Sackett opinion did not specifically reference streams, the EPA's new rule extends the "continuous surface connection" standard to streams, thereby removing non-permanent, ephemeral streams that do not meet these standards from federal jurisdiction.

The term "wetlands" (a subset of waters of the United States) is defined in 33 CFR 328.3(c)(16) as "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." In the absence of wetlands, the limits of USACE jurisdiction in non-tidal waters, such as intermittent streams, extend to the ordinary high water mark (OHWM), which is defined in 33 CFR 328.3(c)(7) as "that line on the shore 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."

2.2 State

California Endangered Species Act

The California Endangered Species Act (CESA) (California Fish and Game Code, Chapter 1.5) provides protection and prohibits the take of plant, fish, and wildlife species listed by the State of California. Unlike ESA, under CESA, state-listed plants have the same degree of protection as wildlife, but insects and other invertebrates may not be listed. Take is defined similarly to ESA and is prohibited for both listed and candidate species. However, unlike the ESA, the CESA's definition of "take" does not include "harass" or "harm." The CESA also does not consider habitat modification alone to be "take," while the ESA does. A project applicant may obtain take authorization from the California Department of Fish and Wildlife (CDFW) under CESA Section 2081, which allows incidental take of a listed species so long as any impacts of such take are minimized and fully mitigated. In this case, private developers may consult with CDFW to develop a set of measures and standards for managing the listed species, including full mitigation for impacts, funding of mitigation implementation, and monitoring of mitigation measures.

On October 21, 2019, the California Fish and Game Commission received a petition from the Center for Biological Diversity to list western Joshua tree (*Yucca brevifolia*) (Center for Biological Diversity 2019).[2] On November 1, 2019, the California Fish and Game Commission referred the petition to CDFW for evaluation. CDFW evaluated the scientific information presented in the petition and other relevant information possessed by CDFW at the time of review and prepared a report for submittal to the California Fish and Game Commission. The report states that CDFW recommended that the California Fish and Game Commission accept the petition for further consideration of western Joshua tree under CESA. On September 22, 2020, the California Fish and Game Commission approved the petition to accept the candidacy proposal for western Joshua tree, effective October 9, 2020 (CDFW 2020). When a plant or wildlife species is granted candidacy under CESA, the species is given the same protection as a threatened or endangered species while the California Fish and Game Commission evaluates whether formal listing as threatened or endangered is warranted. In July 2023, the Western Joshua Tree Conservation Act was enacted in California. The Western Joshua Tree Conservation Act protects the western Joshua tree by prohibiting its importation, export, take, possession, purchase, or sale without authorization from CDFW. CDFW can issue permits for incidental take, removal of dead trees, or trimming of live trees under specific conditions, with permittees having the option to pay fees instead of conducting mitigation activities.

California Fish and Game Code

Fully Protected Species

Sections 3511, 4700, 5050, and 5515 of the California Fish and Game Code provide protection for fully protected species of mammals, birds, reptiles, amphibians, and fish. These species amy not be taken or possessed at any time, and the CDFW is generally prohibited from issuing permits or licenses authorizing such take. Exceptions exist under limited circumstances, such as for scientific research, live capture, and relocation to project live stock or as provided under Senate Bill 147.

Signed into law on July 10, 2023, Senate Bill 147 amended the California Fish and Game Code to authorize a 10-year permitting framework for certain renewable energy, transportation, and water infrastructure projects, allowing incidental take of specific fully protected species. Additionally, CDFW is responsible for to maintaining viable populations of all native species. To support this mandate, CDFW designates certain vertebrate species as species of special concern (SSC) due to declining population levels, limited ranges, or ongoing threats that make them vulnerable to extinction.

Sections 1600–1616

CDFW jurisdiction includes ephemeral, intermittent, and perennial watercourses (including dry washes) and lakes characterized by the presence of definable bed and banks, and existing fish or wildlife resources. CDFW takes jurisdiction to the top of bank of the stream or the limit of the adjacent riparian vegetation, which may include oak woodlands in canyon bottoms. Historical court cases have further extended CDFW jurisdiction to include watercourses that seemingly disappear but reemerge elsewhere. Under the CDFW definition, a watercourse need

[2] On October 21, 2019, the California Fish and Game Commission received a petition to list the following as threatened under the CESA: (1) western Joshua tree (*Yucca brevifolia*) throughout its California range, or, in the event the Commission determines that listing of *Yucca brevifolia* throughout its California range is not warranted, then (2) the western Joshua tree population within the northern part of western Joshua tree's California range, or (3) the western Joshua tree population within the southern part of western Joshua tree's California range.

not exhibit evidence of an OHWM to be claimed as jurisdictional. CDFW does not have jurisdiction over ocean or shoreline resources.

Under California Fish and Game Code Sections 1600–1616, CDFW has the authority to regulate work that will substantially divert or obstruct the natural flow of, or substantially change or use any material from, the bed, channel, or bank of any river, stream, or lake. CDFW also has the authority to regulate work that will deposit or dispose of debris, waste, or other material containing crumbled, flaked, or ground pavement where it may pass into any river, stream, or lake. This regulation takes the form of a requirement of a Lake or Streambed Alteration Agreement and is applicable to all projects. Applications to CDFW must include a complete, certified CEQA document.

California Native Plant Protection Act

The California Native Plant Protection Act of 1977 (Section 1900 et seq. of the California Fish and Game Code) directed CDFW to carry out the legislature's intent to "preserve, protect and enhance rare and endangered plants in this State." The California Native Plant Protection Act gave the California Fish and Game Commission the power to designate native plants as endangered or rare, and to protect endangered and rare plants from take. CESA expanded on the original California Native Plant Protection Act and enhanced legal protection for plants, but the California Native Plant Protection Act remains part of the California Fish and Game Code. To align with federal regulations, the categories of "threatened" and "endangered" species were added to CESA. All "rare" animals in CESA were converted to "threatened," but this did not change for rare plants. Thus, there are three listing categories for plants in California: rare, threatened, and endangered. Because rare plants are not included in CESA, mitigation measures for impacts to rare plants are specified in a formal agreement between CDFW and project proponents.

Nesting Birds

Section 3503 of the California Fish and Game Code states that "it is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird, except as otherwise provided by this code or any regulation made pursuant thereto." Section 3503.5 protects all birds of prey (raptors) and their eggs and nests. Section 3511 states that fully protected birds or parts thereof "may not be taken or possessed at any time." Section 3513 states that it is unlawful to take or possess any migratory non-game bird as designated in the MBTA. All native raptor and non-raptor bird species in California, including those considered special status and listed in Section 5.3.2, are protected by these provisions.

California Environmental Quality Act

CEQA requires identification of a project's potentially significant impacts on biological resources, and ways that such impacts can be avoided, minimized, or mitigated. CEQA also provides guidelines and thresholds for use by lead agencies for evaluating the significance of proposed impacts.

The Guidelines for Implementation of the California Environmental Quality Act (CEQA Guidelines) Section 15380(b)(1) defines endangered animals or plants as species or subspecies whose "survival and reproduction in the wild are in immediate jeopardy from one or more causes, including loss of habitat, change in habitat, overexploitation, predation, competition, disease, or other factors." A rare animal or plant is defined in CEQA Guidelines Section 15380(b)(2) as a species that, although not presently threatened with extinction, exists "in such small numbers throughout all or a significant portion of its range that it may become endangered if its environment worsens; or … [t]he species is likely to become endangered within the foreseeable future throughout all or a significant portion of its range and may be considered 'threatened' as that term is used in the federal Endangered

Species Act." Additionally, an animal or plant may be presumed to be endangered, rare, or threatened if it meets the criteria for listing, as defined further in CEQA Guidelines Section 15380(c).

CDFW has developed a list of "Special Animals" as "a broad term used to refer to all the animal taxa tracked by the CDFW California Natural Diversity Database (CNDDB), regardless of their legal or protection status" (CDFW 2024a). This is a broader list than those species that are protected under ESA, CESA, and other California Fish and Game Code provisions, and includes lists developed by other organizations, including, for example, the Audubon Watch List. Guidance documents prepared by other agencies, including the Bureau of Land Management Sensitive Species and USFWS Birds of Special Concern, are also included on this CDFW Special Animals List. Additionally, CDFW has concluded that plant species listed as California Rare Plant Rank (CRPR) 1 and 2 by the California Native Plant Society (CNPS), and potentially some CRPR 3 plants, are covered by CEQA Guidelines Section 15380.

Section IV, Appendix G, Environmental Checklist Form, of the CEQA Guidelines requires an evaluation of impacts to "any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Wildlife or the U.S. Fish and Wildlife Service."

Porter–Cologne Water Quality Control Act

Pursuant to provisions of the Porter–Cologne Water Quality Control Act (Porter–Cologne Act), the RWQCBs regulate discharging waste, or proposing to discharge waste, within any region that could affect a water of the state (California Water Code Section 13260[a]). The State Water Resources Control Board defines a water of the state as "any surface water or groundwater, including saline waters, within the boundaries of the state" (California Water Code Section 13050[e]). All waters of the United States are waters of the state. Waters of the state include wetlands, and the State Water Resources Control Board's definition of wetlands includes the following (SWRCB 2021):

1. Natural wetlands,
2. Wetlands created by modification of a surface water of the state, and
3. Artificial wetlands that meet any of the following criteria:
    a. Approved by an agency as compensatory mitigation for impacts to other waters of the state, except where the approving agency explicitly identifies the mitigation as being of limited duration;
    b. Specifically identified in a water quality control plan as a wetland or other water of the state;
    c. Resulted from historic human activity, is not subject to ongoing operation and maintenance, and has become a relatively permanent part of the natural landscape; or
    d. Greater than or equal to one acre in size, unless the artificial wetland was constructed, and is currently used and maintained, primarily for one or more of the following purposes…:
        i. Industrial or municipal wastewater treatment or disposal,
        ii. Settling of sediment,
        iii. Detention, retention, infiltration, or treatment of stormwater runoff and other pollutants or runoff subject to regulation under a municipal, construction, or industrial permitting program,
        iv. Treatment of surface waters,
        v. Agricultural crop irrigation or stock watering,

vi. Fire suppression,
vii. Industrial processing or cooling,
viii. Active surface mining – even if the site is managed for interim wetlands functions and values,
ix. Log storage,
x. Treatment, storage, or distribution of recycled water, or
xi. Maximizing groundwater recharge (this does not include wetlands that have incidental groundwater recharge benefits); or
xii. Fields flooded for rice growing.

The State Water Resources Control Board further states that wetlands that may not meet all of USACE's wetland delineation criteria are considered wetland waters of the state 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" (SWRCB 2021). Additionally, aquatic resources that USACE determines to not be waters of the United States because they lack a significant nexus to a traditional navigable water or are above the OHWM limit of federal jurisdiction may also be considered waters of the state. If a CWA Section 404 permit is not required for a project, the RWQCB may still require a permit (waste discharge requirements) for impacts to waters of the state under the Porter–Cologne Act.

2.3 Regional

Kern County Draft Valley Floor Habitat Conservation Plan

The BSA is within the management area of the Draft Kern County Valley Floor Habitat Conservation Plan (KCVFHCP). The Draft KCVFHCP area occurs in the western portion of Kern County, except for areas at the base of the Tehachapi Mountains. The area is limited to the southern San Joaquin Valley floor of Kern County, including the BSA.

The KCVFHCP is a pending HCP pursuant to ESA that covers more than 3,110 square miles in Kern County with the purpose of creating a comprehensive strategy to conserve and protect the San Joaquin kit fox (*Vulpes macrotis mutica*), blunt-nosed leopard lizard (*Gambelia sila*), and 23 other sensitive species. In addition, this HCP provides a streamlined program for complying with the requirements of CESA and ESA. The HCP has not yet been approved by USFWS, CDFW, or the Kern County Board of Supervisors.

If and when the KCVFHCP is completed, ITPs for 13 covered species would be issued to participating local jurisdictions and state agencies. However, this incidental take authorization cannot be implemented until the local governments complete the application for ITPs and receive approval from federal and state wildlife agencies.

2.4 Local

Kern County General Plan

The Kern County General Plan identifies the federal, state, and local statutes, ordinances, and policies that govern the conservation of biological resources that must be considered by Kern County during the decision-making process for any project that could affect biological resources.

The following goals, policies, and measures from the Land Use, Open Space, and Conservation Element and the Energy Element of the Kern County General Plan are applicable to the natural resources occurring or potentially occurring on the BSA (County of Kern 2009).

Chapter 1: Land Use, Open Space, and Conservation Element

1.10: General Provisions

Goal 1: Ensure that the County can accommodate anticipated future growth and development while a safe and healthful environment and a prosperous economy by preserving valuable natural resources, guiding development away from hazardous areas, and assuring the provision of adequate public services.

1.10.5: Threatened and Endangered Species

Policy 27: Threatened or endangered plant and wildlife species should be protected in accordance with State and Federal laws.

Policy 28: County should work closely with State and federal agencies to assure that discretionary projects avoid or minimize impacts on fish, wildlife, and botanical resources.

Policy 29: The County will seek cooperative efforts with local, State, and federal agencies to protect listed threatened and endangered plant and wildlife species through the use of conservation plans and other methods promoting management and conservation of habitat lands.

Policy 31: Under the provisions of the California Environmental Quality Act (CEQA), the County, as lead agency, will solicit comments from the California Department of Fish and Game [now CDFW] and the U.S. Fish and Wildlife Service when an environmental document (Negative Declaration, Mitigated Negative Declaration, or Environmental Impact Report) is prepared.

Policy 32: Riparian areas will be managed in accordance with the United States Army Corps of Engineers, and the California Department of Fish and Game [now CDFW] rules and regulations to enhance the drainage, flood control, biological, recreational, and other beneficial uses while acknowledging existing land use patterns.

Implementation Measures

Measure Q: Discretionary projects shall consider effects to biological resources as required by the California Environmental Quality Act.

Measure R: Consult and consider the comments from responsible and trustee wildlife agencies when reviewing a discretionary project subject to the California Environmental Quality Act.

Measure S: Pursue the development and implementation of conservation programs with State and federal wildlife agencies for property owners desiring streamlined endangered species mitigation programs.

Chapter 5: Energy Element

5.2: Importance of Energy to Kern County

Policy 8: The County should work closely with local, state, and federal agencies to assure that energy projects (both discretionary and ministerial) avoid or minimize direct impacts to fish, wildlife, and botanical resources, wherever practical.

Policy 9: The County should develop and implement measures which result in long-term compensation for wildlife habitat, which is unavoidably damaged by energy exploration and development activities.

5.4.5: Solar Energy Development

Policy 4: The County should encourage solar development in the desert and valley regions previously disturbed, and discourage development of energy projects on undisturbed land supporting State or federally protected plant and wildlife species.

Kern County Code of Ordinances

Section 19.81, Dark Skies Ordinance (Outdoor Lighting)

In November 2011, Kern County approved a Dark Skies Ordinance. The purpose of this ordinance is as follows (Kern County Code of Ordinances 19.81.010):

> In order to maintain the existing character of Kern County, a minimal approach shall be taken to outdoor lighting, as excessive illumination can create a glow that may obscure the night sky and excessive illumination or glare may constitute a nuisance. The purpose of this chapter is to provide requirements for outdoor lighting within specified unincorporated areas of Kern County in order to accomplish the following objectives:
>
> 1. Encourage a safe, secure, and less light-oriented night-time environment for residents, businesses and visitors.
> 2. Promote a reduction in unnecessary light intensity and glare, and to reduce light spillover onto adjacent properties.
> 3. Protect the ability to view the night sky by restricting unnecessary upward projections of light.
> 4. Promote a reduction in the generation of greenhouse gases by reducing wasted electricity that can result from excessive or unwanted outdoor lighting.

Buttonwillow Specific Plan

The Buttonwillow Specific Plan (County of Kern 1974) guides development within and surrounding the Buttonwillow community. The Buttonwillow Specific Plan addresses issues of importance in the area by stating goals, policies, and implementation measures to accommodate growth while protecting the community's unique business, agricultural, industrial, and environmental issues. The Buttonwillow Specific Plan works in tandem with the Kern County General Plan and Zoning Ordinance to direct land use and development decisions, establishing a single set of community-wide policies and implementation strategies. It contains Land Use, Housing Standards, Circulation,

Conservation, and Open Space Elements. The Conservation Element includes the following recommendations related to surface waters:

- The quality of surface waters shall be preserved.
- No industrial use that could cause contamination of surface waters through waste discharge shall be permitted.

The proposed project would not contaminate surface waters.

The Conservation Element includes the following implementation measures related to fish and wildlife, particularly blunt-nosed leopard lizard, giant garter snake (*Thamnophis gigas*), and San Joaquin kit fox:

- Encourage programs to locate and determine populations of rare and endangered species
- Encourage establishment of wildlife refuges and habitats for rare and endangered species
- Encourage initiation of educational programs to alert the public of the need to protect rare and endangered species

The proposed project includes mitigation that includes protocol-level surveys and avoidance of blunt-nosed leopard lizard and pre-activity surveys for San Joaquin kit fox; giant garter snake is not expected to occur on site.

3 Methods

Data regarding biological resources present within the BSA was obtained through review of pertinent literature, field reconnaissance, habitat assessments, and protocol/focused surveys, which are described in detail in this chapter. For purposes of this report, special-status resources are defined as follows:

- Special-status plant species include the following:
  - Species that are designated as rare, threatened, or endangered by CDFW or USFWS and are protected under either CESA (California Fish and Game Code Section 2050 et seq.) or ESA (16 USC 1531 et seq.)
  - Species that are candidate species being considered or proposed for listing under ESA or CESA
  - Species with a CRPR of 1 and 2 in the Special Vascular Plants, Bryophytes, and Lichens List (CDFW 2024b)
- Special-status wildlife species include the following:
  - Species that are designated as rare, threatened, or endangered by CDFW or USFWS and are protected under either CESA (California Fish and Game Code Section 2050 et seq.) or ESA (16 USC 1531 et seq.)
  - Species that are candidate species being considered or proposed for listing under ESA or CESA
  - California SSC, as designated by CDFW, and Birds of Conservation Concern (BCC), as designated by USFWS (CDFW 2024a)
  - Wildlife identified as a fully protected (FP) species by CDFW, as described in California Fish and Game Code Sections 4700 and 3511 (CDFW 2024a)
- Special-status vegetation communities are those designated as sensitive by CDFW (i.e., S1, S2, and S3; CDFW 2023a)

3.1 Biological Study Area

The BSA includes the development footprint (for Sites 1–6 and 8) and gen-tie/collector line; a 200-foot corridor was defined around each gen-tie/collector line for the purposes of this review. The BSA totals approximately 12,999.6 acres. The size and configuration of the BSA may differ from the study area used for the analysis of other resource issue areas (e.g., surface aquatic resources, cultural resources, or geology) due to the unique analysis requirements of each issue area and due to the map projections, land survey accuracy, access, or other factors used to define land parcel boundaries.

Additionally, the BSA acreage does not precisely match the acreage of the project site provided in the Project Description (Section 1.2). The BSA acreage may not perfectly match the acreage of the project site precisely because the acres listed by Assessor's Parcel Number (APN) represent a larger area of land that is not leased by the applicant. Additionally, assessor data for many parcels is quite old, and the acres of each parcel will not precisely match the geometry of its polygon shape in ArcGIS; therefore, the geographic information system (GIS)-calculated review area will have minor deviations and will not exactly match the APN-derived project site totals. The proposed project is on a smaller subset of the survey area and these minuscule deviations are de minimis.

3.2 Literature Review

Prior to conducting a field assessment, a literature search and database review were conducted by Dudek biologists to evaluate the natural resources found or potentially occurring within the BSA. The database review included the most recent versions of the CNDDB, special-status species lists (CDFW 2024a, 2024b), the CNPS Rare Plant Inventory (CNPS 2024a), and USFWS's Information for Planning and Consultation (IPaC) occurrence data (USFWS 2024a). The CNDDB and CNPS databases were reviewed to identify sensitive biological resources present or potentially present for the USGS 7.5-minute quadrangles on which the BSA is located (Semitropic, Wasco, Lokern, Buttonwillow, and Rio Bravo) and the 15 surrounding quadrangles (Figure 3, Literature Review Area). The IPaC database query included Sites 1 through 8 only. Once the critical habitat was identified in the IPaC database, GIS data of the critical habitat was reviewed in ArcGIS. Potential and/or historical drainages and aquatic features were investigated based on a review of USGS topographic maps (1:24,000-scale), aerial photographs, the USFWS National Wetland Inventory database (USFWS 2024b), and the Natural Resource Conservation Service's Web Soil Survey (USDA 2024a). For wildlife movement, the following references were reviewed: Caltrans et al. (2010), Penrod et al. (2012), and South Coast Wildlands (2008).

3.3 Field Surveys

Dudek biologist Russell Sweet conducted a reconnaissance-level survey of the BSA, including the gen-tie lines that were buffered by 100 feet on either side to create a 200-foot-wide gen-tie corridor, on November 29 and 30 and December 8, 2022, to identify existing biological resources on the site and confirm potential biological constraints. An aquatic resources jurisdictional delineation was conducted by Dudek biologists on January 11, 12, 13, 24, 25, and 26, 2023; February 3; August 7 and 10, 2023; November 28 and 29, 2023; and May 31, 2024. The purpose of the aquatic resources jurisdictional delineation was to identify and map potential waters of the United States, including wetlands, under USACE jurisdiction pursuant to Section 404 of the federal CWA; under RWQCB jurisdiction pursuant to the Section 401 of the CWA and the Porter–Cologne Act; and under CDFW jurisdiction pursuant to Section 1602 of the California Fish and Game Code. Vegetation mapping was conducted concurrently with the aquatic resources jurisdictional delineation. Special-status plant surveys, burrow mapping, a San Joaquin antelope squirrel (*Ammospermophilus nelsoni*) focused survey, Swainson's hawk (*Buteo swainsoni*) habitat assessment, vernal pool fairy shrimp (*Branchinecta lynchi*) habitat assessment, small mammal trapping, and camera studies for Buena Vista Lake ornate shrew (*Sorex ornatus relictus*) were also conducted in 2024. Burrow mapping included a habitat assessment for blunt-nosed leopard lizard, burrowing owl (*Athene cunicularia*), San Joaquin kit fox, and American badger (*Taxidea taxus*). Additional focused surveys for special-status plants will be conducted in 2025; final schedule will be based on reference populations.

Table 1 lists the dates, focus, scope, conditions, and personnel for each survey.

Table 1. Survey Conditions

Date	Biologists	Type of Survey	Time	Weather Conditions
11/29/2022	RST	Biological reconnaissance survey	8:00 a.m.–4:00 p.m.	39°F–59°F; clear skies; 1–2 mph wind
11/30/2022	RST	Biological reconnaissance survey	8:00 a.m.–4:00 p.m.	39°F–59°F; clear skies; 1–2 mph wind
12/08/2022	RST	Biological reconnaissance survey	7:30 a.m.–2:30 p.m.	38°F–58°F; foggy to clear skies; 1–3 mph wind

Table 1. Survey Conditions

Date	Biologists	Type of Survey	Time	Weather Conditions
01/11/2023	AG, CA, EB	Aquatic resources delineation/vegetation mapping	8:00 a.m.–4:12 p.m.	48°F–58°F; 100% cloud cover; 0–4 mph wind
01/12/2023	AG, CA	Aquatic resources delineation/vegetation mapping	7:42 a.m.–4:32 p.m.	45°F–64°F; 80%–100% cloud cover; 0–3 mph wind
01/13/2023	AG, CA	Aquatic resources delineation/vegetation mapping	8:00 a.m.–11:30 a.m.	55°F–64°F; 100% cloud cover; 0–5 mph wind
01/24/2023	AG, DA, KH, PG, RSK, RST	Aquatic resources delineation/vegetation mapping	8:00 a.m.–4:00 p.m.	37°F–58°F; 0% cloud cover; 0–3 mph wind
01/25/2023	AG, DA, KH, PG, RSK, RST	Aquatic resources delineation/vegetation mapping	8:00 a.m.–4:00 p.m.	36°F–60°F; 0% cloud cover; 0–2 mph wind
01/26/2023	AG, DA, KH, PG, RSK, RST	Aquatic resources delineation/vegetation mapping	7:00 a.m.–12:00 p.m.	34°F–59°F; 0%–100% cloud cover; 0–5 mph wind
02/03/2023	PG, RST	Aquatic resources delineation/vegetation mapping	7:00 a.m.–9:00 a.m.	42°F–43°F; 80%–90% cloud cover; 1–3 mph wind
08/07/2023	PG	Aquatic resources delineation/vegetation mapping	7:00 a.m.–5:16 p.m.	72°F–103°F; 0% cloud cover; 0–3 mph wind
08/09/2023	PG	Aquatic resources delineation/vegetation mapping	8:00 a.m.–11:01 a.m.	69°F–82°F; 0% cloud cover; 0–2 mph wind
11/28/2023	DA, PG, RST	Aquatic resources delineation/vegetation mapping	8:52 a.m.–3:33 p.m.	47°F–67°F; 0% cloud cover; 1–2 mph wind
11/29/2023	DA, PG, RST	Aquatic resources delineation/vegetation mapping	8:36 a.m.–3:33 pm.	45°F–63°F; 0% cloud cover; 2–3 mph wind
05/31/2024	RST	Aquatic resources delineation/vegetation mapping	6:40 a.m.–1:22 p.m.	64°F–94°F; 0% cloud cover; 2–3 mph wind
06/11/2024	PK, RST	Rare plant survey	6:00 a.m.–1:58 p.m.	67°F–101°F; 0% cloud cover; 1–7 mph wind
06/12/2024	PK, RR, RST	Rare plant survey	5:30 a.m.–1:39 p.m.	69°F–101°F; 0% cloud cover; 2–5 mph wind
06/13/2024	PK, RST	Rare plant survey	5:47 a.m.–11:49 a.m.	65°F–91°F; 0% cloud cover; 2–4 mph wind
06/18/2024	DM, NP, RR	Rare plant survey	5:30 a.m.–3:30 p.m.	54°F–96°F; 0–10% cloud cover; 1–5 mph wind
06/19/2024	AS, AV, DM, NP, RST	Rare plant survey	5:30 a.m.–3:30 p.m.	56°F–91°F

Table 1. Survey Conditions

Date	Biologists	Type of Survey	Time	Weather Conditions
06/20/2024	AS, AV, AW, DH, DM, MH, NP, RST	Rare plant survey	6:00 a.m.–3:00 p.m.	65°F–91°F; 0% cloud cover; 0–5 mph wind
06/21/2024	AS, AV, AW, DH, DM, MH, NP	Rare plant survey	6:00 a.m.–1:30 p.m.	68°F–90°F; 0% cloud cover; 0–5 mph wind
06/25/2024	AW, DH, MH	Rare plant survey	6:53 a.m.–3:56 p.m.	N/R
06/26/2024	AW, DH, MH	Rare plant survey	6:48 a.m.–3:00 p.m.	N/R
06/27/2024	AW, DH	Rare plant survey	6:37 a.m.–2:10 a.m.	N/R
08/19/2024	AN, AS, AY, EGH, EW, RST, RT	Burrow mapping[a], San Joaquin antelope squirrel focused survey	6:52 a.m.– 2:30 p.mp.	62°F–92° F; 0% cloud cover; 0–6 mph wind
08/20/2024	AN, AS, AY, EGH, EW, OK, RST, SC	Burrow mapping, San Joaquin antelope squirrel focused survey	6:30 a.m.–3:40 p.m.	67°F–95°F; 0% cloud cover; 0–2 mph wind
08/21/2024	AN, AS, AY, EGH, EW, OK, SC, RST	Burrow mapping[a], San Joaquin antelope squirrel focused survey	6:00 a.m.–3:30 p.m.	72°F–95°F; 0% cloud cover; 0–3 mph wind
08/22/2024	AS, AY, EW, OK, RST, RT	Burrow mapping[a], San Joaquin antelope squirrel focused survey	6:00 a.m.–3:30 p.m.	63°F–93°F; 0% cloud cover; 0–3 mph wind
08/23/2024	AS, AY, EW, OK, RT, RST	Burrow mapping[a], San Joaquin antelope squirrel focused survey	6:00 a.m.–1:29 p.m.	60°F–80°F; 0–10% cloud cover; 0–4 mph wind
08/26/2024	AN	Burrow mapping[a], San Joaquin antelope squirrel focused survey	6:45 a.m.-2:15 p.m.	93°F; 0% cloud cover
08/30/2024	EGH, RST	Burrow mapping[a], San Joaquin antelope squirrel focused survey	7:16 a.m.–9:10 a.m.	65°F–77°F; 0% cloud cover; 1–3 mph wind
08/27/2024	AN, AS, AY, EGH, EW, OK, RST, RT	Swainson's hawk habitat assessment	6:00 a.m.–2:30 p.m.	64°F–97°F; 0% cloud cover; 0–4 mph wind
08/28/2024	AN, AY, EW, OK, RST, RT, SC	Swainson's hawk habitat assessment	6:00 a.m.–1:30 p.m.	65°F–95°F; 0% cloud cover; 0–3 mph wind

Table 1. Survey Conditions

Date	Biologists	Type of Survey	Time	Weather Conditions
08/30/2024	EGH, RST	Burrow mapping[a]	7:16 a.m.–9:10 a.m.	65–77°F; 0% cloud cover; 1–3 mph wind
11/8/2024	LB	Vernal pool fairy shrimp habitat assessment	N/R	N/R
11/18/2024	RST	Buena Vista Lake ornate shrew camera deployment	N/R	N/R
11/25/2024	RST	Buena Vista Lake ornate shrew camera recovery	N/R	N/R
12/12 – 23/24, 1/21 – 25/25, 2/19 – 24/25	AF, AP, AR, AW, BC, CB, CG, CGo, CVHJ, JC, KM, MM, NA, RD, RM, QW	Small mammal trapping	N/R	N/R
12/16/24–12/21/24	RST	Small mammal trapping	N/R	N/R

Personnel: *Dudek:* AN = A. Noble; AS = A. Schneider; AT = A. Touchstone; AV = A. Vartivarian; AY = A. Yazaryan; CA = C. Amoaku; DA = D. Ayers; DM = D. Mahto; EB = E. Bergman; EGH = E. Garcia Hernandez; EW = E. White; KH = K. Higney; LB = Laura Burris; NP = N. Plotkin; OK = O. Koziel; PG = P. Garcia; PK = P. Keating; RR = R. Romero; RSK = R. Swick; RST = R. Sweet; RT = R. Thoeness; SC = Shana Carey.
McCormick Biological Inc.: AF = A. Fetters; AP = A. Pryor (SC-221780002); AR = A. Reyes; AW = A. Welch; BC = B. Christensen; CB = C. Brooks; CG = C. Guthrie; CGo = C. Gonzalez; CVHJ = C. Van Horn Job (SC-221780003); DH = D. Hall; JC = J. Calvillo; KM = K. McDowell; MH = M. Hinson; MM = M. McCormick (SC-232680004); NA = N. Ahmed; RM = R. McCormick (SC-211160006); RD = R. Davis (SC-232310001); QW = Q. Wright.
Notes: mph = miles per hour; N/R = not recorded.
[a] Burrow mapping included a habitat assessment for burrowing owl, San Joaquin kit fox, American badger, giant kangaroo rat (*Dipodomys ingens*), and Tipton kangaroo rat (*Dipodomys nitratoides nitratoides*).

3.3.1 Vegetation Community and Land Cover Mapping

Dudek biologists conducted vegetation mapping on the BSA on January 11, 12, 13, 24, 25, and 26, 2023; February 3, 2023; August 7 and 9, 2023; November 28 and 29, 2023; and May 31, 2024, concurrently with the aquatic resources jurisdictional delineation. The survey dates, biologists, and weather conditions are included in Table 1. Dudek biologists used CDFW's Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities (CDFW 2018) and the California Natural Community List (CDFW 2023a), also referred to as the Natural Community List, based on A Manual of California Vegetation Online (CNPS 2024b), to map the entire BSA. These classification systems focus on a quantified, hierarchical approach that includes both floristic (plant species) and physiognomic (community structure and form) factors as currently observed (as opposed to predicting climax or successional stages). Vegetation communities and land covers were delineated to the vegetation alliance level and, where appropriate, the association level. Some modifications, such as the Preliminary Descriptions of the Terrestrial Natural Communities of California (Holland 1986; Oberbauer et al. 2008), were incorporated to accommodate the lack of conformity of the observed communities to those included in these references.

Vegetation mapping was conducted on foot to visually cover 100% of the undeveloped portions of the BSA. Vegetation communities and land cover types were mapped in the field using an Esri ArcGIS mobile application. The vegetation communities were classified based on site factors, descriptions, distribution, and characteristic species present in each area. Information was recorded, including dominant species and associated cover classes, aspect, canopy height, and visible disturbance factors.

Minimum mapping units were established to standardize the scale and appropriate evaluation of stands, as recommended by CDFW (2022). Mapping standards call for a minimum mapping unit of not greater than 10 acres for upland natural communities not considered sensitive, but usually 1 or 2 acres, and 0.25 acres for sensitive vegetation communities and wetland or riparian vegetation communities. Visible disturbance factors were also noted during vegetation mapping.

Following completion of the fieldwork, Dudek GIS analysts digitized the vegetation boundaries as delineated by the field biologists and created a GIS coverage for vegetation communities.

3.3.2 Flora

Latin and common names for plant species with a CRPR follow the CNPS Inventory of Rare, Threatened, and Endangered Plants of California (CNPS 2024a). For plant species without a CRPR, Latin names follow the Jepson Interchange List of Currently Accepted Names of Native and Naturalized Plants of California (Jepson Flora Project 2024), and common names follow the California Natural Community List (CDFW 2023a) or the U.S. Department of Agriculture's Natural Resources Conservation Service PLANTS Database (USDA 2024b). Plant species observed within the BSA are provided in Appendix C, Plant Compendium.

3.3.3 Fauna

All wildlife species detected during the field surveys by sight, vocalizations, burrows, tracks, scat, or other signs were recorded. The site was visually scanned with and without binoculars to identify wildlife. Latin and common names of animals follow Crother (2017) for reptiles and amphibians, Chesser et al. (2024) for birds, Mammal Diversity Database (2024) for mammals, North American Butterfly Association (NABA 2016) or San Diego Natural History Museum (SDNHM 2002) for butterflies, and Moyle (2002) for fish. Wildlife species observed within the BSA are provided in Appendix D, Wildlife Compendium.

3.3.4 Special-Status and Regulated Resources

3.3.4.1 Special-Status Plant Surveys

Plant species bloom at slightly different times each year depending on temperature, rainfall patterns, elevation, and other environmental factors. Reference population checks involve locating known populations of special-status plant species during a time frame when they are known to be blooming or exhibit other phenological characteristics that allow for species identification. Prior to conducting focused rare plant surveys in June 2024, reference populations were reviewed in the field. On June 11, 2024, a population of Earlimart orache (*Atriplex cordulata* var. *erecticaulis*) northwest of Wasco was visited and observed in fruit even though this variety typically blooms August to September (CNPS 2024a). On June 14, 2024, a population of Lost Hills crownscale (*Atriplex coronata* var. *vallicola*) located northeast of Taft was visited and observed in fruit.

Focused special-status plant surveys conformed to the CNPS Botanical Survey Guidelines (CNPS 2001); Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Sensitive Natural Communities (CDFW 2018); and the U.S. Fish and Wildlife Service's General Rare Plant Survey Guidelines (Cypher 2002). All plant species encountered during the field surveys were identified to subspecies or variety, if applicable, to determine sensitivity status. If target species were encountered, field personnel recorded data points or demarcated the edge of the polygon and assessed the population numbers using the Esri ArcGIS mobile application.

3.3.4.2 Special-Status Wildlife Burrow Surveys

Dudek conducted a survey to assess habitat availability/suitability for several special-status wildlife species on the BSA. The habitat assessment was used to inform coverage for several focused wildlife surveys that were conducted subsequently.

Burrow surveys consisted of single pedestrian transects searching for potential San Joaquin kit fox dens, as well as burrows of other species such as American badger, giant kangaroo rat (*Dipodomys ingens*), Tipton kangaroo rat (*Dipodomys nitratoides nitratoides*), and burrowing owl. The survey area encompassed all areas determined to have potential for these species to occur. Agricultural fields were not surveyed due to ongoing crop production and agricultural management activities. However, the road margins of all agricultural fields were surveyed.

Dudek biologists conducted pedestrian transects, spaced approximately 20 meters (66 feet) apart, and during these transects inspected all areas of the ground surface between transect lines to ensure full visual coverage of the BSA. When any burrow measuring a minimum of 4 inches in diameter was located, the biologists recorded the location of the burrow, burrow dimensions, any sign of recent activity, and any other sign to indicate species involved, including American badger, burrowing owl, and coyote (*Canis latrans*). Sign and burrow characteristics noted included scat, tracks, shape of the burrow opening, and the orientation of claw marks (a potential indication of whether a canid or a badger excavated a burrow).

According to the San Joaquin Kit Fox Survey Protocol for the Northern Range (USFWS 1999), burrows were identified as being either natal dens, active dens, or potential dens. Natal dens are dens at which the presence of pups was confirmed either by observation or sign such as scat and tracks. "Active dens" refers to dens presumed to be occupied at the time of examination, or to have been recently occupied, due to sign such as recent digging, tracks, and/or fresh scat. "Potential dens" include those that were judged to be of a particular species, but that were not recently active, as well as dens that were not confirmed to have been excavated by the species identified due to a lack of definitive sign.

When any burrow measuring a minimum of 3 inches in diameter was located, the biologists recorded the location of the burrows and the burrows were investigated for burrowing owl sign, including regurgitated castings (pellets) of prey remains, scat (whitewash), and feathers, and the locations of any burrowing owls were recorded. Areas of California ground squirrel (*Spermophilus beecheyi*) activity were also noted.

When any burrow measuring from 1.5 to 3 inches in diameter was located, the biologists recorded the location of the burrows and sign unmistakably attributed to giant kangaroo rat or Tipton kangaroo rat; the burrows were mapped as small mammal burrows; and signs such as tail drags, vertical burrows, and haystacks were recorded.

The locations of burrows were marked using Esri ArcGIS Field Maps.

3.3.4.3 Blunt-Nosed Leopard Lizard Habitat Assessment

Dudek conducted a habitat assessment for suitability for blunt-nosed leopard lizard to determine the potential for blunt-nosed leopard lizard to occur on the BSA. The assessment included a desktop literature review of the CNDDB and the IPaC database for reported occurrences on the BSA. A GIS analysis was then employed to review land cover types to create a map potential for occurrences. Following the vegetation mapping, Dudek biologists conducted a field reconnaissance of the BSA in areas with moderate to high potential for occurrence. These areas were associated with natural landcover such as saltbush scrub and/or alkali sink. BSA areas adjacent to these natural areas were also evaluated in the field reconnaissance. Dudek biologists conducted pedestrian transects spaced approximately 20 meters (66 feet) apart, and during these transects inspected all areas of the ground surface between transect lines to ensure full visual coverage of the BSA. When any small mammal burrow measuring 1 to 3 inches in diameter was located, the biologists recorded the location of the burrow on Esri Field Maps. Although surveys were not conducted per protocol, the assessment was conducted in favorable weather conditions, when temperatures, cloud cover, and time of day could potentially result in the incidental observation of blunt-nosed leopard lizards.

3.3.4.4 San Joaquin Antelope Squirrel Surveys

No published protocol exists for surveying for San Joaquin antelope squirrel (otherwise known as Nelson's antelope squirrel). As this species is active aboveground throughout the year and during the daytime, it is readily detectable during diurnal surveys. Surveys were conducted by walking transects and visually scanning the ground, and surveys were conducted at temperatures of 68°F or greater and at a time of day when San Joaquin antelope squirrels are active. If a San Joaquin antelope squirrel was encountered, surveyors recorded the location using Esri Field Maps. The locations of occupied burrows (any burrow that a San Joaquin antelope squirrel was observed emerging from or entering) were recorded. No attempt was made to record San Joaquin antelope squirrel burrows based on burrow characteristics. The information was collected with the intent of identifying areas used by San Joaquin antelope squirrel, and not to develop a population estimate. The gen-tie line within the Buttonwillow Ecological Reserve was not surveyed due to lack of access permission.

3.3.4.5 Swainson's Hawk Foraging and Nesting Habitat Analysis

Based on CDFW's Staff Report Regarding Mitigation for Impacts to Swainson's Hawks in the Central Valley of California (CDFG 1994) (CDFG Staff Report) and the results of the literature review, Dudek first defined the study area for this analysis as a 10-mile-radius circle centered on Swainson's hawk nests within 0.5 miles of the seven project sites (Site 1 through 6 and Site 8) and reported as active within the last 5 years. However, no nests were reported within 0.5 miles in the past 5 years, and protocol surveys were not conducted prior to the analysis. Therefore, Dudek defined the study area as a 10-mile-radius circle around centroidal locations of each of the seven project sites; this equates to a total of 397,852 acres, or 622 square miles. Despite its age, the CDFG Staff Report is still referred to by many consultants and CDFW biologists when assessing a project's impact on Swainson's hawk foraging habitat, and "the ten-mile radius standard is [based on] the flight distance between active (and successful) nest sites and suitable foraging habitats" (CDFG 1994). Given that the only other recent study investigating Swainson's hawk movement (Fleishman et al. 2016) found that most adults remained within 6 miles of their nest site. The closest CNDDB recorded active Swainson's hawk nest (CNDDB Nest 2523, updated in 2022) is approximately 3.5 miles west/southwest of Sites 1 through 3, respectively. Dudek determined that 10 miles was a reasonable distance at which to include an evaluation of foraging habitat availability for this Swainson's hawk nest, which would presumably most likely be affected by future development of the project.

Following the literature review, and encompassing the area discussed above, Dudek created a project-specific habitat map to facilitate characterization of Swainson's hawk foraging and nesting habitat in the BSA vicinity. CDFW's Biogeographic Information and Observation System (BIOS) (CDFW 2024c) and Kern County Crop Map (County of Kern 2024) were used to create the initial map. Dudek biologists, working with a Dudek GIS analyst, refined the map using a combination of aerial photointerpretation and field reconnaissance. The vegetation map was developed using Kern County Crop Map aerial imagery from 2024 (County of Kern 2024) and CDFW habitat mapping models (2024c). Because cropping patterns change regularly, we used more recent imagery (Google Earth 2024) for the desktop photointerpretation.

Using an ArcGIS web map, Dudek biologists reviewed vegetation mapping within the BSA for inconsistencies with the 2024 base imagery. For example, some areas mapped as Uncultivated Agriculture had 2024 aerial signatures showing agricultural activity (e.g., crop irrigation patterns). In contrast, some areas mapped as Irrigated Row and Field Crops appeared fallow, weedy, or abandoned in the 2024 base imagery. Areas showing inconsistency between the vegetation map and 2024 base imagery were marked for additional field reconnaissance by adding notes to the web map (i.e., drawing polygons or adding points to areas of interest). Dudek also reviewed other imagery (e.g., Google Earth) within 5 years of the base imagery and noted parcels for potential remapping if any evidence of active agricultural use (i.e., green aerial signature) was observed.

Following the identification of the BSA and vegetation mapping standard, Dudek biologists conducted a field reconnaissance of the BSA to verify desktop photointerpretation and confirm whether updates to the vegetation mapping were needed. Using the notes added to the web map, biologists visited each area to verify the presence or absence of agricultural activity and updated or added notes accordingly. Notes and preliminary adjustments to GIS polygons were conducted in ArcGIS Field Maps on a digital tablet.

Using the information compiled during the literature review and based on professional field experience, Dudek biologist Keith Babcock developed Swainson's hawk foraging and nesting suitability classifications for each habitat type. A simple "None/Low/Moderate/High" classification was determined to be adequate to capture the variation in available habitat types in the BSA. These suitability classifications for Swainson's hawk foraging and nesting habitats are defined as follows:

- **None.** Unsuitable for Swainson's hawk foraging.
- **Low.** Low-value Swainson's hawk foraging habitat. Swainson's hawk may occasionally forage along edges or over openings of this habitat type if prey species are present, but extended foraging not expected.
- **Moderate.** Moderate-value Swainson's hawk foraging habitat. Swainson's hawk will forage over this habitat type if prey species are present.
- **High.** High-value Swainson's hawk foraging habitat. These habitat types often support abundant populations of gophers, ground squirrels, and/or voles and have been documented in the literature or by personal observation as being regularly used by foraging Swainson's hawk.

Foraging habitat types were classified similarly to those outlined in the Swainson's hawk regional study conducted as described in the Distribution and Abundance of Nesting Swainson's Hawks in the Vicinity of the Proposed RE Tranquility LLC Solar Generation Facility (Estep 2011), a widely respected analysis of Swainson's hawk use of nesting and foraging habitat associated with solar facilities in the Central Vally of California. The Tranquility LLC Solar Facility is located in the Central Valley, where distribution and land use characterizations are closely related to those within the Buttonbush project sites. Crop types on the Buttonbush project sites cover a variety of use from seasonal crops, such as cotton (*Gossypium* sp.), melons, and tomatoes, to perennial crops, such as vineyards and

orchards (Estep 2011). Crop types and other cover types were then classified using Estep (2011) with some additional changes to fit the current use of the BSA, as follows:

- **Irrigated Cropland.** This crop type is defined by Estep (2011) as areas that are dominated by crop patterns that involve annual or seasonal cultivation and rotation. A typical crop rotation includes cotton, wheat, and tomatoes. Dairies support the continuation of a variety of silage and hay crops, including corn, wheat, sorghum (*Sorghum* sp.), and triticale.
- **Alfalfa.** Alfalfa (*Medicago sativa*) is an ungrazed irrigated hay crop used for livestock feed. Alfalfa typically remains uncultivated for 4 to 5 years, and occasionally longer. During this time, it is not rotated to other crop types. Alfalfa is considered to be the cover type with the highest foraging value to Swainson's hawks due to its relatively low vegetation structure and the practice of regular mowing and flood irrigating during the breeding season.
- **Irrigated Pasture.** Irrigated pastures are irrigated grasses that are grazed by livestock and may be cut periodically for hay.
- **Natural Land.** Natural land refers to landscapes that have kept some natural topography, vegetation characteristics, or other values. These lands can occur as remnant patches of native scrub land on the valley floor, river bottom land along the edges of watercourses, or foothills along the western edge of the valley.
- **Managed Wetland.** In the Central Valley, most managed wetlands are agricultural fields or former agricultural fields periodically flooded to provide habitat for wintering waterfowl or managed seasonal wetlands on state or federal wildlife refuges. During the spring and summer months, these areas are typically dry and provide upland habitat for foraging raptors and other wildlife (Estep 2011).
- **Vineyards and Orchards.** These are perennial crops that develop a vegetative overstory that precludes access by foraging Swainson's hawk and most other raptors. This would include almonds, even though they are good for nesting habitat.
- **Developed Land.** Developed land refers to urban, developed, disturbed, industrial, rural residential, and city areas, which generally consist of areas that lack natural or cultivated landscapes that provide no foraging habitat value.
- **Riparian.** Riparian is streamside trees, characterized by trees such as cottonwoods, willows, and oaks. Eucalyptus are often found within streamsides and will be considered as part of riparian when observed within streamsides.
- **Trees.** This is generally categorized for various trees observed throughout the BSA. This would include tree rows, isolated trees, roadside trees, farmyard trees, and rural residential trees. Orchards, described in a previous bullet point, are not part of this habitat type.
- **Uncultivated Agriculture.** For the purposes of this assessment, uncultivated agriculture refers to those areas that were fallow or disked during the field reconnaissance. These fields showed no sign of current or past use, exhibited no evidence of irrigation system use, and were not recorded on the Kern County Crop Maps. These fields could be fallow fields that have been disked for weed and fire abatement.

Nesting habitat types were also classified similarly to those outlined in Estep 2011, with some changes to fit the current use of the BSA, as follows:

- **Almond Orchard.** Orchards were previously considered to be low suitability for nesting Swainson's hawk due to ongoing maintenance involved with orchard production. However, in recent years, Swainson's hawks have been observed using almond orchards for nesting.
- **Deciduous Orchard.** Deciduous orchards are described as all other orchards on the BSA other than almonds, such as pistachio, pomegranate, citrus, and other stone fruits. These have a different growth habitat, such as too small, too dense or too fragile a structure for nesting, and are not considered suitable for nesting habitat.
- **Riparian.** Riparian is characterized by streamside trees such as cottonwoods, willows, and oak. Eucalyptus are often found within streamsides and will be considered as part of riparian when observed within streamsides, as described above.
- **Trees.** This is generally categorized for various trees observed throughout the BSA. This would include tree rows, isolated trees, roadside trees, farmyard trees, and rural residential trees, each of which is described below. Orchards are not part of this habitat type, as described in a previous bullet.

Table 2 lists the foraging habitat types on the BSA and corresponding Swainson's hawk foraging habitat suitability classifications, and Table 3 lists the nesting habitat types on the BSA and corresponding nesting suitability. Each table provides a brief rationale for each suitability classification.

Table 2. Swainson's Hawk Foraging Habitat Suitability on the BSA

Habitat Type	SWHA Foraging Habitat Suitability on the BSA	Rationale
Natural Land	Moderate	Areas of natural foothill and valley grassland and native scrub where prey may be available but not as heavily as intensively farmed agricultural fields.
Alfalfa	High	Included in list of preferred foraging habitats in CDFG (1994). Considered to be the highest foraging value due to high prey occurrence and low vegetation growth throughout the growing season.
Developed	None	Typically includes roadsides, vacant lots, laydown yards for agriculture, houses and/or buildings, barns, equipment paddocks, etc. Consistently lacks habitat for prey items.
Irrigated pasturelands	Low to moderate	Prey more accessible during harvest for hay but lower suitability just before harvest, due to density of vegetation.
Deciduous orchard or vineyard	Low	SWHA may occasionally forage along edges, but vegetation structure prohibits long-term foraging (CDFG 1994; Swolgaard et al. 2008).
Riparian	Low	SWHA may occasionally forage along riparian edges but are rarely seen using riparian corridors as foraging habitat (Babcock, pers. comm., 2024).
Tree row, tree grove, isolated trees	Low	SWHA may occasionally forage along edges but are rarely used as foraging habitat (Babcock, pers. comm., 2024).

Table 2. Swainson's Hawk Foraging Habitat Suitability on the BSA

Habitat Type	SWHA Foraging Habitat Suitability on the BSA	Rationale
Managed wetlands	Low to moderate	Water districts periodically flooded for groundwater recharge, managed wetlands by refuges and duck clubs, typically dry during summer months.
Irrigated cropland	Low to high	Included in list of preferred foraging habitats in CDFG (1994). However, based on the type of crop and timing of the growing season, and growth stage this could be considered low. For example, tall growing crops such as corn, tomatoes or sorghum could be more often used for foraging during the infant growing stages versus when the crop is at its mature stage therefore providing little foraging opportunity besides along the edges as seen with orchards and vineyards.
Uncultivated agriculture	Low	Typically, areas of disked fields with no evidence of irrigation or the crop types used in rotation or if it was a vacant field and disked for fire and weed abatement practices. However, if these are disked on an annual basis, some small amount of rodent and insect activity could be present at some point in time.

Notes: SWHA = Swainson's hawk; CDFG = California Department of Fish and Game.

Table 3. Swainson's Hawk Nesting Habitat Suitability on the BSA

Habitat Type	SWHA Nesting Habitat Suitability on the BSA	Rationale
Almond orchards	Low to moderate	Dudek has personal experience with observations of SWHA using almond orchards for nesting on various project sites within the Central Valley.
Riparian	Low to moderate	Approximately 1.5 miles of the Kern River and 30 miles of the Kern Rivers Flood Canal are within the BSA area. Trees in these corridors are a mosaic of species including cottonwood, willow, and eucalyptus; riparian trees that typically utilized by SWHA for nesting throughout the Central Valley. No CNDDB records occur along these corridors (i.e., Kern River and Kern Rivers Flood Control) within the BSA. A record from 1978 was recorded associated with the small riparian area along the pond within the Tule Elk Reserve; however, updated records in 2016 state that the riparian habitat on site has been highly degraded over the years (CDFW 2024d) resulting in a lower suitability characterization than would typically occur for this species. However, a field evaluation of the current quality was not conducted for this location in 2024.
Tree row	Moderate to high	Several tree rows of eucalyptus and ornamental pines were observed within the BSA. While there are currently no CNDDB records of tree row nesting within the BSA, the trees themselves are suitable for nesting.
Isolated tree	Moderate to high	Isolated trees can often be used by SWHA for nesting. Lack of disturbance and proximity to foraging habitat can be factors for choice of nest location. A CNDDB record from 2019 was recorded in an isolated tree within a water district next to a holding pond

Table 3. Swainson's Hawk Nesting Habitat Suitability on the BSA

Habitat Type	SWHA Nesting Habitat Suitability on the BSA	Rationale
		(CDFW 2024d). Two others were recorded within the Kern Water Bank Authority in 2001 and 2016 (CDFW 2024d).
Roadside tree	Moderate to high	Roadside trees are located throughout the BSA. As described above, these trees have an amount of noise and human disturbances; however, this does not preclude SWHA from nesting. A CNDDB record from 2018 is located within the BSA along Interstate 5 and the Buttonwillow rest area (CDFW 2024d). The most notable and updated SWHA nest record is along SR-58 and Lokern Road. This has been a perennial nesting site first recorded in 2017 and last updated in 2020 (CDFW 2024d).
Farmyard tree	Moderate to high	Several farmyard trees were observed within the BSA. The majority of these trees were eucalyptus. These trees provide nesting opportunities for SWHA.
Rural residential trees	Low to moderate	Several rural residents have trees planted for windbreaks or shade cover. Often used by red-tailed hawks for nesting; however, SWHA have been known to occur in areas of high human activity such as college campuses (Babcock 1995). A CNDDB record from 2017 was located at the intersection of SR-58 and Tracey Avenue in the parking lot of the hotel. The nest was observed with two adults but was never verified if successful (CDFW 2024d).

Notes: SWHA = Swainson's hawk; CNDDB = California Natural Diversity Database; SR = State Route.

3.3.4.6 Vernal Pool Fairy Shrimp Habitat Assessment

Prior to the site visit, Dudek reviewed relevant materials to identify targeted areas with potential suitable habitat for branchiopods. These materials include prior wetland mapping and branchiopod observations from surveys conducted by Dudek in 2023 and 2024. Dudek also reviewed the National Wetlands Inventory and National Hydrography Dataset to identify potential aquatic habitats within the BSA (USFWS 2024b; USGS 2024). Dudek Senior Biologist Laura Burris (federal recovery permit for Listed Large Branchiopods PER0057548-0) visited targeted areas on November 8, 2024, to confirm mapping of potential wetland habitat and visually assess habitat suitability for branchiopods. Suitable habitat was mapped in the field using Esri Field Maps on a mobile device.

3.3.4.7 Small Mammal Trapping

Prior to the trapping effort, a small mammal burrow survey was conducted on the BSA (see Table 1). The trap locations were based on burrow density to ensure maximum trap coverage (Figures 20A–20G and 21A–21G; Appendix G, Small Mammal Trapping Reports).

Trapping was conducted following the full 2013 protocol recommended by USFWS to detect San Joaquin Valley kangaroo rat species and collect baseline data (USFWS 2013). As required by protocol, the trapping period consisted of at least 5 consecutive trap nights using 12-inch Sherman live-traps (USFWS 2013). Traps were baited with millet and opened at dusk. Due to lower temperatures forecasted, traps were checked starting no less than 3 hours after setting traps and sunset. Because of the time of year and lower temperatures, additional trap nights were added. Captured animals were recorded by species, sex, weight, and any additional notable observations.

Animals were marked with a non-toxic marker on the hip or belly to identify recaptures, and animals were released in the same location where they were captured. The trapping was led by Investigator Russell Sweet (USFWS PER00046430-0 and CDFW Memorandum of Understanding/Scientific Collecting Permit S-221230002-22143), Randi McCormick (SC-211160006), Christine Van Horn Job (SC-221780003), Rainey Davis (SC-232310001), Ashleigh Pryor (SC-221780002), or Megan McCormick (SC-232680004). Ms. R. McCormick, Ms. Van Horn Job, Ms. Davis, Ms. Pryor, and Ms. M. McCormick are included on the List of Authorized Individuals under Federal Recovery Permit 59559C-2 and California Scientific Collecting Permit S-211160001-22059-001. Field assistants for the trapping effort included Alex Welch, Andy Reyes, Quinn Wright, Noor Ahmed, Kyle McDowell, Amy Fetters, Julian Calvillo, Carl Brooks, Colin Guthrie, Cristina Gonzalez, and Bailey Christensen.

Prior to trapping, notifications with the trapping plan were provided to USFWS and CDFW (Appendix H, CDFW and USFWS Email Notification of Field Activities and USFWS Email Notification to Proceed)

3.3.4.8 Buena Vista Lake Ornate Shrew

Dudek installed Reconyx HC600 Hyperfire Covert Invisible (black-out) infrared flash digital game cameras with close focus (i.e., minimum 40-centimeter [cm] focal length) within suitable habitat for Buena Vista Lake ornate shrew. Cypher et al. (2017) determined that close-focus game cameras were much more capable of and efficient in detecting Buena Vista Lake ornate shrew than trapping or other means. This was further bolstered by Tennant et al. (2020). Where simple detection is all that is required, cameras are the best option.

Cameras were set with no trigger delay, five photos per trigger, sub-second trigger to exposure interval, and maximum (e.g., 1 second) interval between triggers. Cameras were set approximately 20–30 cm above the ground on a 90 cm "T"-post. Bait stations were placed on the ground approximately 40–50 cm from the cameras in small (approximately 9 cm diameter × 7 cm deep) containers. The bait containers were buried and secured to the ground by large nails leaving the lid exposed at ground level. Each container was baited using 10–12 live mealworms with sawdust and dried oats. Each lid was perforated with several holes for air. Live worms were used as an olfactory and aural attractant. No less than 40 dried mealworms were placed on top of the bait station as a "treat" for Buena Vista Lake ornate shrew due to disruption of normal foraging cycles. A photo of each camera set-up and of the camera viewshed was taken from the lens position for each station. Cameras were deployed for 7 consecutive nights. Cameras stations and bait containers were checked and refreshed after 3 nights.

3.3.4.9 Aquatic Resources Delineation

The jurisdictional delineation was conducted by Dudek biologists in January, February, August, and November 2023 and May 2024 (Table 1). An aquatics resources delineation was prepared for the project and should be reviewed for more details on the methods (Dudek 2025). Prior to conducting the jurisdictional delineation, USFWS's National Wetlands Inventory data (USFWS 2024b) was reviewed to determine if the review area contained any features mapped by USFWS. Site-specific topographical data was reviewed in conjunction with aerials, both current and historical, to determine the potential presence of potential aquatic features. Vegetation mapping was reviewed to assess whether the review area supported hydrophytic vegetation and potential wetlands; several areas supporting hydrophytic vegetation were also assessed for the presence of wetland hydrology and hydric soils to determine whether they were three-parameter wetlands. Jurisdictional boundaries were mapped in the field using Esri Field Maps on a mobile device using a sub-meter GPS unit. Remote sensing was not used for the delineation.

USACE: The aquatic resources delineation was conducted in accordance with the 1987 USACE Wetlands Delineation Manual (USACE 1987) and the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (USACE 2008a). A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States: A Delineation Manual (USACE 2008b) was used to determine the limits of non-wetland waters (NWWs). NWWs were delineated on topographical maps in conjunction with Esri Field Maps on a mobile device. The widths of each NWW were determined in the field according to the OHWM manual.

RWQCB: Waters of the state regulated by the RWQCB were mapped in accordance with the State Wetland Definition and Procedures for Discharges of Dredged or Fill Material to Waters of the State (SWRCB 2021). As described in these procedures, wetland waters of the state are mapped based on the procedures in USACE's 1987 Corps of Engineers Wetlands Delineation Manual (USACE 1987) and its 2008 Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0) (USACE 2008a). NWWs are mapped at the OHWM based on the procedures defined in USACE's 2008 A Field Guide to Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States (USACE 2008b).

CDFW: The delineation defined areas under the jurisdiction of CDFW pursuant to Sections 1600–1603 of the California Fish and Game Code. CDFW asserts jurisdiction over rivers, streams, and lakes to the extent of the "top of bank." The term "bank" is interpreted to encompass the physical bank of the stream that rises vertically above and horizontally away from it (Vyverberg 2010). The top of bank was mapped as the physical break in slope between the channel and surrounding upland. CDFW also asserts jurisdiction over riparian vegetation associated with these features. A predominance of hydrophytic vegetation, where associated with a stream channel, was used to determine CDFW-regulated riparian areas. Streambeds under the jurisdiction of CDFW were delineated using the Cowardin method of waters classification, which defines waters boundaries by a single parameter (i.e., hydric soils, hydrophytic vegetation, or hydrology) (Cowardin et al. 1979). Additionally, waters of the state were delineated based on watercourse characteristics present in the field, which include surface flow, sediment transportation and sorting, physical indicators of channel forms, channel morphology, and riparian habitat associated with a streambed.

3.3.5 Survey Limitations

Limitations of the surveys include a diurnal bias and the absence of focused surveys for some special-status species, trapping for reptiles, amphibians, and small mammals at night. The surveys were conducted during the daytime to maximize the detection of most wildlife. Most birds are diurnal, so daytime surveys maximize the number of bird observations. Conversely, daytime surveys usually result in few observations of mammals, many of which are nocturnal. In addition, many species of reptiles and amphibians are secretive in their habits and are difficult to observe using standard meandering transects. The burrow mapping included observations of sign (e.g., dens, burrows, scat, tracks, prey remains, whitewash).

Although a buffer of project impacts was not surveyed because survey permissions were limited to the project footprint, the literature review included a review of data available for the quadrangles that the BSA overlaps and the surrounding quadrangles (Figure 3). In addition to the literature review, project-specific factors were considered in assessing potential indirect impacts, including site configuration constrained by existing disturbed roads, adjacency to major infrastructure such as I-5 and SR 58, and required development setbacks imposed by the County (e.g., battery energy storage system [BESS] setbacks, irrevocable offer of dedication [IOD] areas). A biological buffer was applied for the gen-tie line routes, and where access was restricted, qualified biologists utilized binoculars or conducted visual surveys from property boundaries where feasible to assess adjacent habitats.

The surveys and analysis in this report reflect land use and conditions at the time of the survey, which can change over time.

The project site acres is a combination of land parcel acres reported by the County Assessor for each Assessor's Parcel Number (APN) within the project, which for some parcels were refined based on land surveys conducted for the project. The acres of each parcel will not precisely match the geometry of its polygon shape in ArcGIS, and so the geographic information system (GIS) calculated BSA will not match the APN-derived project site totals.

4 Environmental Setting

The purpose of this chapter is to describe the general existing conditions on and adjacent to the BSA to document the baseline conditions for this report and subsequent analysis. The full project description is provided in the project's CEQA environmental impact report and should be referenced for details regarding the project description, including the meaning of the sites.

4.1 Climate

The climate of the in the project region is typical of the Central Valley of California, with hot dry summers and cool, mild winters. Daytime temperatures in the summer are often in the upper 90s (degrees Fahrenheit [°F]), and some highs extend into the low 100s (°F). Nighttime lows are typically in the 60s (°F). In winter, daytime temperatures are usually in the low 40s (°F). Precipitation averages approximately 12 inches, and rainfall occurs mostly in the months of December and January.

4.2 Topography

The BSA is relatively flat throughout, with elevations ranging from approximately 250 feet above mean sea level in the northwest to approximately 320 feet above mean sea level in the southeast.

4.3 Soils

According to the U.S. Department of Agriculture Natural Resources Conservation Service (USDA 2024a), the following soil series occur within the boundaries of the BSA: (1) Calflax clay loam, saline-sodic, 0% to 2% slopes; (2) Granoso loamy sand, 0% to 2% slopes; (3) Kimberlina fine sandy loam, 0% to 2% slopes; (4) Milham sandy loam, 0% to 2% slopes; (5) Panoche clay loam, 0% to 2% slopes; (6) Buttonwillow clay, drained; (7) Buttonwillow, partially drained; (8) Garces silt loam; (9) Garces silt loam, hard substratum; (10) Garces silt loam, moderately wet; (11) Jerryslu loam; (12) Lerdo clay loam, saline-alkaline, partially drained; (13) Lerdo complex, drained; (14) Lokern clay, drained; and (15) Lokern clay, saline–alkali, drained. There were also areas mapped as water. Table 4 provides a summary soil series within the review area. The soil series are described in more detail following the table and are presented in Figure 4, Soils.

Table 4. Soils (Acres)

Soil Series Name	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 8	Gen Tie	BSA Total
Buttonwillow clay, drained	64.1	33.8	N/A	N/A	N/A	N/A	909.3	3.3	1010.6
Buttonwillow clay, partially drained	N/A	N/A	N/A	N/A	N/A	N/A	60.0	N/A	60.0
Calflax clay loam, saline–sodic, 0% to 2% slopes	N/A	N/A	N/A	N/A	433.3	490.9	N/A	125.1	1,049.3

Table 4. Soils (Acres)

Soil Series Name	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 8	Gen Tie	BSA Total
Garces silt loam	387.2	218.3	96.2	194.1	376.1	1,503.5	265.2	336.3	3,376.9
Garces silt loam, hard substratum	N/A	N/A	N/A	N/A	N/A	N/A	N/A	20.3	20.3
Garces silt loam, moderately wet	N/A	N/A	N/A	N/A	N/A	N/A	2.8	N/A	2.8
Granoso loamy sand, 0% to 2% slopes	N/A	N/A	N/A	N/A	131.5	N/A	N/A	N/A	131.5
Jerryslu loam	31.2	N/A	N/A	31.7	N/A	135.8	151.0	20.0	369.7
Kimberlina fine sandy loam, 0% to 2% slopes	73.7	N/A	N/A	N/A	1,752.9	N/A	63.8	35.8	1,926.3
Lerdo clay loam, saline–alkali, partially drained	N/A	N/A	N/A	N/A	N/A	N/A	94.4	N/A	94.4
Lerdo complex, drained	N/A	N/A	N/A	N/A	N/A	N/A	629.4	12.0	641.4
Lokern clay, drained	11.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	11.0
Lokern clay, saline–alkali, drained	48.6	292.4	563.7	N/A	N/A	N/A	N/A	61.9	966.4
Milham sandy loam, 0% to 2% slopes	1,676.3	N/A	N/A	175.0	N/A	217.4	843.8	332.5	3,245
Panoche clay loam, 0% to 2% slopes	N/A	N/A	N/A	N/A	N/A	65.7	N/A	3.2	68.9
Water	N/A	N/A	N/A	N/A	N/A	N/A	25.1	N/A	25.1
								Total	**12,999.6**

Notes: gen-tie = generation transmission line route; N/A = not applicable.

Buttonwillow Series consists of deep, somewhat poorly drained soils formed in alluvium weathered mainly from granite. Buttonwillow soils are in basins and have slopes of 0% to 2%. The mean annual precipitation is approximately 5 inches, and the mean annual temperature is 63°F (USDA 2024c).

Calflax Series consists of very deep, moderately well-drained soils on fan skirts. These soils formed in alluvium derived from calcareous sedimentary rock. The slope is 0% to 2%. The mean annual precipitation is approximately 7 inches, and the mean annual temperature is about 63°F (USDA 2024c).

Garces Series consists of very deep, well-drained saline-sodic soils that formed in granitic alluvium. Garces soils are on alluvial fans, terraces, and basin rims and have slopes of 0% to 2%. The mean annual precipitation is approximately 6 inches, and the mean annual temperature is about 64°F (USDA 2024c).

Granoso Series consists of very deep, somewhat excessively drained soils that formed in alluvium derived from rocks of mixed mineralogy. The Granoso soils are on alluvial fans and floodplains. The slope is 0% to 5%. The mean annual precipitation is approximately 6 inches (152 millimeters), and the mean annual temperature is approximately 64°F (USDA 2024c).

Jerryslu Series consists of moderately deep to a duripan, moderately well-drained saline–alkali soils that rest abruptly on an indurated lime–silica cemented duripan. Jerryslu soils are developed from granitic alluvium on basin rims and fan terraces and have slopes of 0% to 2%. The mean annual precipitation is approximately 6 inches, and the mean annual air temperature is about 64°F (USDA 2024c).

Kimberlina Series consists of very deep, well-drained soils on flood plains and recent alluvial fans. These soils formed in mixed alluvium derived dominantly from igneous and/or sedimentary rock sources. The slope is 0% to 9%. The mean annual precipitation is approximately 6 inches, and the mean annual temperature is approximately 64°F (USDA 2024c).

Lerdo Series consists of deep, somewhat poorly drained soils formed in granitic or sedimentary alluvium. Lerdo soils are on alluvial plains and saline–alkali basins and have slopes of 0% to 2%. The mean annual precipitation is approximately 5 inches, and the mean annual temperature is approximately 64°F (USDA 2024c).

Lokern Series consists of deep, somewhat poorly drained clayey soils formed from mixed but predominantly granitic alluvium. Lokern soils are on basins and have slopes of 0% to 2%. The mean annual precipitation is approximately 5 inches, and the mean annual temperature is approximately 63°F (USDA 2024c).

Milham Series consists of very deep, well-drained soils on alluvial fans, plains, low terraces, and fan remnants. These soils formed in mixed calcareous alluvium weathered from granitic and sedimentary rock. The slope is 0% to 9%. The mean annual precipitation is approximately 7 inches, and the mean annual temperature is approximately 64°F (USDA 2024c).

Panoche Series consists of very deep, well-drained soils on alluvial fans and flood plains. These soils formed in loamy calcareous alluvium from sedimentary rock. The slope is 0% to 15%. The mean annual precipitation is approximately 6 inches, and the mean annual temperature is approximately 63°F (USDA 2024c).

Westhaven Series consists of very deep, well-drained soils that formed in stratified mixed alluvium weathered from sedimentary and/or igneous rocks. Westhaven soils are on alluvial fans and flood plains. The slope is 0% to 5%. The mean annual precipitation is approximately 7 inches, and the mean annual temperature is approximately 64°F (USDA 2024c).

4.4 Land Uses

The BSA is located in the western San Joaquin Valley, where croplands of the valley floor are dominant. The BSA straddles I-5, is east of the Buttonwillow Raceway Park just north of SR-58, and is south of SR-46. Several single-

family homes and agriculture-related structures are near the project boundary. Several properties within the project boundary contain agriculture structures and single-family homes. One single-family home on APN 087-040-04 would be removed during project construction. Midway Switching Center, which is legally sited at 2205 Wasco Way and 40534 SR-58, is a 280-acre utilitarian property developed with a large electrical substation.

Land use in the BSA is primarily agricultural, including large areas cultivated for almonds, pistachios, alfalfa, and cotton. The natural communities that were historically present have been substantially altered because of agricultural production activities. Non-disturbed alkali sink, saltbush scrub, and non-native grassland occur in patches in the north, south, and east. Portions of the Buttonwillow Ecological Reserve, an approximately 1,400-acre reserve that is owned and managed by CDFW, are located adjacent to Sites 5 and 6. In addition, a small portion of the gen-tie line route occurs within the Buttonwillow Ecological Reserve. Agricultural croplands occur surrounding the BSA.

4.5 Watersheds and Hydrology

The BSA is in the South Valley Hydrologic Unit within the Semitropic Hydrologic Area (558.70) and the Kern Delta Hydrologic Area (557.10) (Figure 5, Watershed).

The BSA is within the Tulare–Buena Vista Lakes Watershed (HUC6 180300) and the following subunits: West Side Canal, Goose Lake Canal, Goose Lake Slough–Jerry Slough, and Lower Poso Creek. The National Hydrography Dataset includes human-made (canals and ditches) and natural (streams and rivers) features mapped within the review area. The National Wetlands Inventory has freshwater ponds and freshwater emergent wetlands mapped within the review area.

5 Results

This chapter describes the results of the literature review, field surveys, and habitat assessments on the BSA.

5.1 Vegetation Communities and Land Covers

A total of 20 vegetation communities or land cover types were mapped on the BSA (Table 5). The spatial distribution of the vegetation communities and land covers is presented on Figures 6A through 6N, Vegetation Communities and Land Cover Types.

State rankings of 1, 2, or 3 are considered sensitive, and impacts to these communities typically require mitigation. There are four vegetation communities considered sensitive biological resources by CDFW under CEQA (CDFW 2023a). The vegetation communities marked with an asterisk (*) in Table 5 are considered sensitive vegetation communities.

Approximately 12,472.3 acres, or 96% of the BSA (comprised of the development footprint and gen-tie line route), are disturbed/developed, including the following land cover types: orchards, general agriculture, disturbed habitat, urban/developed lands, open water, and ornamental plantings.

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Table 5. Existing Vegetation Communities, Vegetation Alliances and Associations, and Land Cover Types on the BSA (Acres)

General Category of Vegetation	Common Name of Vegetation	Scientific Name of Vegetation	Classification of Vegetation	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 8	Gen Tie	Percent of BSA	BSA Total[a]
Bog and marsh	Bush seepweed scrub	*Suaeda moquinii* association (*Suamoq*)*	Association	N/A	46.5	89.9	N/A	N/A	N/A	33.8	6.7	1.4%	176.9
		Isocoma acradenia alkaline wet association (*IsoacrAlkWet*)*	Association	N/A	N/A	1.9	N/A	N/A	N/A	13.6	N/A	0.1%	15.6
	Cattail marshes	*Typha* (*angustifolia, domingensis, latifolia*) alliance (*Typangdomlat*)	Alliance	N/A	0.3	N/A	N/A	N/A	N/A	N/A	N/A	<0.1%	0.3
	Salt grass flats	*Distichlis spicata* association (*Disspi*)	Association	N/A	N/A	N/A	N/A	N/A	N/A	18.3	N/A	0.1%	18.3
	Spinescale scrub	*Atriplex spinifera* association (*Atrspi*)*	Association	N/A	N/A	N/A	N/A	N/A	N/A	0.2	N/A	<0.1%	0.2
	Tar plant fields	*Centromadia (pungens)* alliance*	Alliance	N/A	N/A	11.9	N/A	N/A	N/A	N/A	0.4	0.1%	12.4
			Bog and Marsh Total[a]	**N/A**	**46.8**	**103.8**	**N/A**	**N/A**	**N/A**	**65.9**	**7.1**	**1.7%**	**223.7**
Disturbed and developed	Orchards	Orchards (ORC)	None/general habitat/group	854.8	0.5	N/A	221.9	535.9	832.2	716.6	244.2	26.2%	3,406.1
	General agriculture	General agriculture (AGR)	None/general habitat/group	1,132.3	474.9	449.9	158.1	2,003.9	1,324.5	1,978.5	201.8	59.4%	7,723.4
	Disturbed habitat	Disturbed habitat (DH)	None/general habitat/group	260.1	19.6	17.5	20.0	140.3	92.3	188.3	290.8	7.9%	1,028.9
	Urban/developed	Urban/developed (DEV)	None/general habitat/group	5.9	1.9	N/A	N/A	12.4	153.7	4.6	119.1	2.3%	297.6
	Open water	Open water (OW)	None/general habitat/group	1.0	0.32	N/A	0.82	1.2	2.0	1.4	0.7	0.1%	7.6
	Ornamental plantings	Ornamental plantings (ORN)	None/general habitat/group	N/A	N/A	N/A	N/A	N/A	2.3	6.2	0.2	0.1%	8.7
			Disturbed and Developed Total[a]	**2,254.1**	**497.2**	**467.4**	**400.8**	**2,693.7**	**2,407**	**2,895.6**	**856.8**	**95.9%**	**12,472.3**
Grass and herb dominated	Russian thistle–dyers woad–fivehook bassia fields	*Bassia* (*hyssopifolia, scoparia*) Association (*Bashyssco*)	Pending association	N/A	N/A	N/A	N/A	N/A	1.1	0.9	N/A	<0.1%	2.0
	N/A	Non-native grassland general habitat (NNG)	None/general habitat/group	N/A	N/A	89.3	N/A	N/A	N/A	0.1	20.0	0.8%	109.4
			Grass and Herb Dominated Total[a]	**N/A**	**N/A**	**89.3**	**N/A**	**N/A**	**1.1**	**0.1**	**20.0**	**0.8%**	**111.4**
Riparian	Tamarisk thickets	*Tamarix* spp. association (Tam)	Semi-natural association	N/A	0.75	N/A	N/A	N/A	3.0	6.7	N/A	0.1%	10.5
			Riparian Total[a]	**N/A**	**0.75**	**N/A**	**N/A**	**N/A**	**3.0**	**6.7**	**N/A**	**0.1%**	**10.5**
Scrub	Fourwing saltbush scrub	*Atriplex canescens association (Atrcan)*	Association	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1.5	<0.1%	1.5
	Allscale scrub	*Atriplex polycarpa* association (*Atrpol*)	Association	37.8	N/A	N/A	N/A	N/A	N/A	51.7	64.3	1.2%	153.8
		Atriplex polycarpa sparse playa association (*Atrpolspapla*)	Association	N/A	N/A	N/A	N/A	N/A	N/A	21.6	<0.01	0.2%	21.6
			Scrub Total[a]	**37.8**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**73.3**	**65.8**	**1.4%**	**176.9**
Unvegetated	Unvegetated channel	Unvegetated channel (UVC)	None/general habitat/group	N/A	N/A	N/A	N/A	N/A	N/A	2.1	N/A	<0.1%	2.1
			Unvegetated Total[a]	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**2.1**	**N/A**	**<0.1%**	**2.1**
Woodland	N/A	*Eucalyptus* (*globulus, camaldulensis*) association (*Eucglocam*)	Semi-natural association	N/A	N/A	N/A	N/A	N/A	2.1	2.1	0.8	<0.1%	5.0
			Woodland Total[a]	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**2.1**	**2.1**	**0.8**	**<0.1%**	**5.0**
			Total[a]	**2,292.9**	**544.6**	**659.9**	**400.8**	**2,693.8**	**2,413.2**	**3,044.8**	**950.7**	**100%**	**12,999.6**

Notes: gen-tie = generation transmission line route; N/A = not applicable.
Vegetation communities with a "*" after the name are considered sensitive vegetation communities.
[a] Totals may not sum precisely due to rounding.

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5.1.1 Bog and Marsh

Approximately 1.7% of the BSA is composed of bog and marsh vegetation communities, described below.

Bush Seepweed Scrub

Within the bush seepweed scrub alliance, bush seepweed (*Suaeda moquinii*) or alkali goldenbush (*Isocoma acradenia*) is dominant or codominant in the shrub canopy. The alliance usually displays an open to continuous canopy less than 5 feet (1.5 meters) in height; the herbaceous layer is sparse to intermittent. This alliance typically occurs in flat to gently sloping valley bottoms, playas, and toe slopes, adjacent to alluvial fans and bajadas. The soils are typically deep and saline or alkaline (CNPS 2024b).

The bush seepweed association is within the bush seepweed alliance and was observed on Sites 2, 3, 8, and the gen-tie line route (see Figures 6A–6N).

Also, within the bush seepweed alliance is the alkali goldenbush alkaline wet association, which also occurs on the BSA; this association occurs on the northern parcel. Both of these associations are considered sensitive under CEQA (CDFW 2023a).

Cattail Marshes

Narrowleaf cattail (*Typha angustifolia*), southern cattail (*Typha domingensis*), or broadleaf cattail (*Typha latifolia*) is dominant or codominant in the herbaceous layer of the cattail marshes alliance. Cover in this alliance in intermittent to continuous. This alliance is semi-permanently flooded freshwater or brackish marsh, and the soils are clayey or silty (CNPS 2024b). The cattails marsh alliance was observed only within Site 2, in the western portion of the BSA (Figures 6A–6N). This alliance is not considered sensitive under CEQA (CDFW 2023a).

Salt Grass Flats

The salt grass flats alliance is a vegetation community where salt grass flats, spiny rush (*Juncus acutus*), and/or Cooper's rush (*Juncus cooperi*) are dominant or codominant in the herbaceous layer. This alliance usually displays an open to continuous cover with herbs less than 1.5 meters (5 feet) in height. The salt grass flats alliance typically occurs in coastal salt marshes and inland habitats such as playas, swales, and terraces along wash that may be intermittently flooded. This alliance occurs on soils that are often deep, alkaline or saline, and poorly drained. When the soil is dry, the surface usually has salt accumulations (CNPS 2024b).

The salt grass flats association is within the salt grass flats alliance and was only observed within Site 8, in the northern portion of the BSA (Figures 6A–6N). The salt grass flats association is not considered sensitive under CEQA (CDFW 2023a).

Spinescale Scrub

The spinescale scrub alliance is a vegetation community where spinescale (*Atriplex spinifera*) is dominant or codominant in the shrub canopy with cheesebush (*Ambrosia salsola*), allscale (*Atriplex polycarpa*), California joint fir (*Ephedra californica*), alkali heath (*Frankenia salina*), California match weed (*Gutierrezia californica*), alkali goldenbush, and bud sagebrush (*Artemisia spinescens*). In this alliance, shrubs are less than 2 meters (6.5 feet), and the canopy is open; the herbaceous layer is variable with seasonal annuals reaching high cover. The spinescale

scrub alliance occurs in alluvial fans and old lake beds perched above current drainages. The soils in this alliance are moderately sandy clay loams to fine, silty clays that may be carbonate rich (CNPS 2024b).

The spinescale scrub association is within the spinescale scrub alliance and was only observed on Site 8, in the northern portion of the BSA (Figures 6A–6N). The spinescale scrub association is considered sensitive under CEQA (CDFW 2023a).

Tar Plant Fields

The tar plant fields alliance is a vegetation community where tar plant (*Centromadia pungens* and/or another *Centromadia* species) is conspicuous to dominant in the herbaceous layer with *Atriplex* spp., *Bromus* spp., *Deschampsia danthonioides*, *Downingia bella*, *Erodium cicutarium*, *Frankenia salina*, *Hirschfeldia incana*, *Hordeum murinum*, *Lasthenia californica*, *Lasthenia fremontii*, *Trifolium depauperatum*, and *Trifolium variegatum*. Emergent shrubs may be present at low cover, including *Suaeda moquinii*. In this alliance, herbs are less than 1 meter (3 feet) and cover is intermittent. The tar plant fields alliance occurs in vernally wet habitats, including edges of alkaline pools, bottoms of shallow pools, and alkaline flats with periodic or intermittent inundation. Soils are fine-textured alluvium, sometimes underlain by claypan or another impervious layer, and poorly drained (CNPS 2024b).

The majority of the tar plant fields alliance was observed on Site 3, and a small amount of this alliance was also observed on the gen-tie line route, in the central-western portion of the site (Figures 6A–6N). The tar plant fields alliance is considered sensitive under CEQA (CDFW 2023a).

5.1.2 Disturbed and Developed

Approximately 96% of the BSA is disturbed/developed, including the following land cover types: orchards, general agriculture, disturbed habitat, urban/developed lands, open water, and ornamental plantings, described below.

Disturbed Habitat

Disturbed habitat refers to areas where soils have been recently or repeatedly disturbed by grading, compaction, or clearing of vegetation. Structures are typically not present within disturbed habitats, and these areas provide relatively low value for most plant and wildlife species. When vegetated, disturbed habitat supports predominantly non-native plant species, such as ornamentals or ruderal exotic species that take advantage of disturbance.

Disturbed habitat is not a listed vegetation community under the California Natural Community List (CDFW 2023a), but it has been used in this report because it best describes what was observed in the field. As such, this land cover is not globally or state ranked and is not considered a sensitive natural community under CEQA (CDFW 2023a).

Within the BSA, disturbed habitat is primarily disked, tilled, or cleared fields that are not irrigated. It also includes human-made basins, ditches, and settling ponds; soil stockpiles; unpaved access roads; and staging areas. Disturbed habitat was observed on all sites and the gen-tie line route (Figures 6A–6N).

Urban/Developed

Urban/developed land covers refer to areas that have been constructed on or otherwise physically altered to the point where vegetation is no longer present. Developed areas are characterized by permanent or semi-permanent structures, hardscapes, and landscaped areas that require irrigation.

Urban/developed land is not a listed vegetation community under the California Natural Community List (CDFW 2023a), but it has been used in this report because it best describes what was observed in the field. As such, this community is not globally or state ranked and is not considered a sensitive natural community under CEQA (CDFW 2023a).

Within the BSA, urban/developed areas included roads and structures associated with residential, agricultural, industrial development, such as substations, solar arrays, and intensive agricultural operations (i.e., dairies). Urban areas were observed on the gen-tie line route and all sites except Sites 3 and 4 (Figures 6A–6N).

Orchards

Orchards refer to areas where trees, shrubs, or crop plants such as grapevines have been intentionally planted, (i.e., to produce food or for other commercial purposes). Orchards and vineyards are typically artificially irrigated, and plants may be supported with structures such as trellises. Orchards and vineyards typically support a limited understory of grasses or herbs (Oberbauer et al. 2008). Orchards were observed on the gen-tie line route and all sites except Site 3 (Figures 6A–6N).

General Agriculture

Agricultural lands are an anthropogenic habitat and are not described in CDFW (2023a). Within the BSA, agricultural lands consisted of alfalfa, almonds, pistachios, and cotton and occupied more than half of the BSA. On-site farming practices include soil disking, plowing, and herbicide application, as well as regular anthropogenic maintenance and disturbance associated with ongoing management actions. General agriculture areas were observed on all sites and the gen-tie line route (Figures 6A–6N).

Open Water

The open water within the BSA includes 7.6 acres of standing or flowing freshwater associated with basins and canals located within Sites 1 and 2, 4 through 6, 8, and the gen-tie line route (Table 5; Figures 6A–6N). See the stand-alone Aquatic Resources Delineation Report (Dudek 2025) for more detailed information.

Ornamental Plantings

The ornamental plantings within the BSA included Australian pine (*Casuarina equisetifolia*) lining the outside of the property. Additionally, lawn and other ornamental species associated with residences were the other ornamental plants on the BSA. Ornamental plantings were observed on Sites 6 and 8 and the gen-tie line route (Figures 6A–6N).

5.1.3 Grass and Herb Dominated

Approximately 0.8% of the BSA is composed of grass and herb dominated vegetation communities, described below.

Russian Thistle–Dyers Woad–Fivehook Bassia Fields

The pending Russian thistle (*Salsola tragus*)–dyer's woad (*Isatis tinctoria*)–fivehook bassia (*Bassia* spp.) fields semi-natural alliance is not described in CNPS (2024b). This semi-natural alliance is ranked GNA SNA, indicating that rankings are not applicable, given that it is dominated by non-native species and is not considered sensitive under CEQA (CDFW 2023a).

Within the BSA, an association in this semi-natural alliance was mapped, the *Bassia* (*hyssopifolia, scoparia*) association. This association is also dominated by non-native species and is not considered sensitive under CEQA (CDFW 2023a). The *Bassia* (*hyssopifolia, scoparia*) association was observed on Sites 6 and 8 (Figures 6A–6N).

Non-Native Grassland

Non-native grasslands are grasslands that are dominated by non-native species. These grasslands typically occur in areas with a history of disturbance. Some associated species include common oat (*Avena sativa*), bromes (*Bromus* spp.), and barleys (*Hordeum* spp.) (CNPS 2024b). Within the BSA, this general habitat occurs in upland habitat in the non-agricultural extent of the BSA.

Common non-native grasses that dominate these areas include red brome (*Bromus rubens*) and ripgut brome (*Bromus diandrus*), foxtail barley (*Hordeum murinum*), perennial rye grass (*Festuca perennis*), and Bermudagrass (*Cynodon dactylon*). Other herbaceous species commonly present within non-native grasslands include a variety of non-native species, such as redstem stork's bill (*Erodium cicutarium*), shortpod mustard (*Hirschfeldia incana*), Russian thistle, and yellow star-thistle (*Centaurea solstitialis*), as well as occasional native herbaceous species, such as sacred thorn-apple (*Datura wrightii*), common sunflower (*Helianthus annuus*), and seaside heliotrope (*Heliotropium curassavicum* var. *oculatum*). Native shrubs, such as allscale and alkali goldenbush, are present at low cover in some areas of non-native grassland.

Non-native grasslands were not mapped to the alliance or association level because all alliances and associations are not considered sensitive under CEQA as they are dominated by non-native species. Non-native grasslands were observed on Sites 3 and 8 and the gen-tie line route (Figures 6A–6N).

5.1.4 Riparian

Approximately 0.1% of the BSA is composed of riparian vegetation communities, described below.

Tamarisk Thickets

Tamarisk thickets alliance includes tamarisk (*Tamarix ramosissima*) as the dominant species in the shrub canopy and occurs along lake margins, ditches, wash, rivers, and other watercourses (CNPS 2024b). Shrub canopy is open to continuous with shrubs less than 26 feet (8 meters) in height; herbaceous layer is sparse. The tamarisk thickets alliance is considered a semi-natural alliance and is therefore not considered sensitive under CEQA (CDFW 2023a). Within the BSA there is one association in the tamarisk thickets association, as described below.

The tamarisk (*Tamarix* spp.) association is within the tamarisk thickets alliance and was observed on the BSA on the northern parcel, the northwestern parcel, and the eastern parcel. The tamarisk association is not considered sensitive under CEQA (CDFW 2023a). The tamarisk association was observed on Sites 2, 6, and 8 (Figures 6A–6N).

5.1.5 Scrub

Approximately 1.4% of the BSA is composed of scrub vegetation communities, described below.

Fourwing Saltbush Scrub

Within the fourwing saltbush scrub alliance, fourwing saltbush (*Atriplex canescens*) typically dominates or shares dominance in the shrub canopy alongside species such as white bursage (*Ambrosia dumosa*), cheesebush (*Ambrosia salsola*), shadscale (*Atriplex confertifolia*), allscale, yellow rabbitbrush (*Chrysothamnus viscidiflorus*), bladderpod (*Peritoma arborea*), Mormon tea (*Ephedra viridis*), spiny hop sage (*Grayia spinosa*), creosote bush (*Larrea tridentata*), and bush seepweed (*Suaeda nigra*). Occasionally, emergent trees such as honey mesquite (*Prosopis glandulosa*) may be found at low cover. Shrub density is sparse and typically less than 3 meters in height, and the herbaceous layer exhibits variability with seasonal herbs and non-native grasses. This alliance thrives in diverse habitats including playas, old beaches, lake deposits, dissected alluvial fans, rolling hills, and channel beds. Soils are characterized as carbonate-rich, alkaline, and predominantly sandy or sandy clay loams (CNPS 2024c).

The fourwing saltbush scrub alliance is ranked by CDFW (2023a) as a G5S4 alliance. This ranking indicates that globally, the alliance is secure, and within California, the alliance is apparently secure (CDFW 2023a; NatureServe 2024).

Within the fourwing saltbush scrub alliance, there is one association on the BSA, the fourwing saltbush scrub association. The fourwing saltbush association is limited to three polygons within the BSA, all three of which are on the gen-tie line route in the northern portion of the BSA (Figures 6A–6N). This association is not sensitive under CEQA (CDFW 2023a).

Allscale Scrub

Within the allscale scrub alliance, allscale is the dominant shrub species, with additional cover from other shrubs including cheesebush, fourwing saltbush, alkali goldenbush, and bladderpod (*Physaria* spp.). Some emergent trees may be present at low cover, including honey mesquite. Shrub cover is open to continuous with seasonal herbaceous cover. This alliance occurs a variety of contexts, including in washes, playa lakebeds, and shores; alluvial fans; rolling hills; and edges of large, low-gradient washes. Soils are typically rich, alkaline, sandy or sandy clay loam (CNPS 2024b).

The allscale scrub alliance is ranked by CDFW (2023a) as a G4S4 alliance. This ranking indicates that both globally and within California, the alliance is apparently secure (CDFW 2023a; NatureServe 2023).

Within the allscale scrub alliance, there are two associations on the BSA, the allscale association and allscale sparse playa association. The allscale association occurs on Sites 1 and 8 and the gen-tie line route (Figures 6A–6N). The allscale sparse playa association occurs on Site 8 and the gen-tie line route. Neither of these associations is sensitive under CEQA (CDFW 2023a).

5.1.6 Unvegetated

Less than 0.1% of the BSA is composed of unvegetated landcover types, described below.

Unvegetated Channel

Although not recognized by the Manual of California Vegetation Online (CNPS 2024b) or the California Natural Community List (CDFW 2023a), unvegetated channels (or non-vegetated floodplains) are described by Oberbauer et al. (2008). Oberbauer et al. (2008) describes non-vegetated floodplains or channels as sandy, gravelly, or rocky areas along waterways or flood channels that are unvegetated on a relatively permanent basis due to variable water levels. Vegetation, if present, consists of non-native grasses at the outer edges with usually less than 10% absolute cover. Unvegetated channel is not a listed vegetation community under the California Natural Community List (CDFW 2023a); however, it best describes what was observed in the field. Unvegetated channel includes natural drainages or modified channels that potentially connect to state waters.

Approximately 2.1 acres of unvegetated channels occur within Site 8 (Figures 6A–6N; Table 5). See stand-alone Aquatic Resources Delineation Report (Dudek 2025) for more detailed information.

5.1.7 Woodland

Less than 0.1% of the BSA is composed of woodland vegetation communities, described below.

Eucalyptus–Tree of Heaven–Black Locust Groves

Within the eucalyptus–tree of heaven–black locust groves semi-natural alliance, eucalyptus (*Eucalyptus* spp.), tree of heaven (*Ailanthus altissima*), or black locust (*Acacia melanoxylon*) is dominant in the tree canopy (CNPS 2024b). Tree canopy is open to continuous and less than 197 feet (60 meters) in height; shrub and herbaceous layer is sparse to intermittent. This semi-natural alliance is planted as trees, groves, and windbreaks and naturalized on uplands or bottomlands and adjacent to stream courses, lakes, or levees.

Within the eucalyptus–tree of heaven–black locust groves semi-natural alliance, there is one association on the BSA, the eucalyptus association. It is located on Sites 6 and 8 and the gen-tie line route (Figures 6A–6N). The eucalyptus association is considered a semi-natural stand and is therefore not considered sensitive under CEQA (CDFW 2023a).

5.2 Plants and Wildlife Observed

5.2.1 Plants

A total of 121 species of native or naturalized plants, 48 native (40%) and 73 non-native (60%), were recorded on the site, as listed in Appendix C.

5.2.2 Wildlife

A total of 72 common and special-status wildlife species, consisting of 65 native species (90%) and 7 non-native species (10%), were recorded within the BSA or vicinity during surveys (Appendix D). Special-status wildlife species are described in Section 5.3.2.

In addition to direct observations of wildlife, Dudek biologists conducted additional focused surveys, including small mammal trapping and Buena Vista Lake ornate shrew surveys, and burrow mapping surveys within the BSA from August 19, 2024, to February 24, 2025 (Table 1), and assessed the species that could potentially utilize burrows observed on site, based on burrow size and shape and the presence of wildlife sign. The results of the burrow mapping surveys are listed in Table 6.

Table 6. Burrows Observed On Site

Potential Species Utilizing Burrow	Site 1[a]	Site 2	Site 3	Site 4	Site 5	Site 6	Site 8	Gen Tie Line
American badger	N/A	N/A	1	N/A	N/A	8	5	4
Burrowing owl	1	N/A	11	3	15	72	74	97
Kit fox	4	N/A	6	1	9	76	56	72
Small mammal	56	98	2,031	N/A	39	87	808	755
Coyote	N/A	N/A	2	N/A	N/A	N/A	1	5
Total[b]	**61**	**98**	**2,051**	**4**	**63**	**243**	**944**	**933**

Notes: gen-tie = generation transmission line route.
[a] The PG&E Midway Substation is within Site 1.
[b] Burrows suitable for more than one wildlife species were counted for both species.

5.3 Special-Status and Regulated Resources

5.3.1 Special-Status Plants

Special-status plants include those listed, or candidates for listing, as threatened or endangered by USFWS and CDFW, and species identified as rare by CNPS (i.e., CRPR 1 and 2).

Dudek biologists performed an extensive desktop review of literature, existing documentation, and GIS data to evaluate the potential for special-status plant species to occur within the BSA. Each special-status plant species was assigned a rating of "not expected," "low," "moderate," or "high" potential to occur based on relative location to known occurrences, vegetation community, soil, and elevation.[3] Based on the results of the literature review and database searches, one special-status species has a high potential to occur and is listed in Table 7. Based on

[3] The potential-to-occur ratings are defined as follows:
Not Expected: Habitat within the project site is unsuitable or project site is outside of species historical range (i.e., over 20 years old) or surveys have been conducted during the appropriate blooming period.
Low: Habitat with the project site is marginal and/or documented occurrences of species are historical (i.e., over 20 years old); or recent records are more than 5 miles from the project site.
Moderate: Habitat within the project site is suitable and species has been document within 5 miles of the project site in recent records (i.e., within 20 years).
High: Habitat within the project site is suitable and species has been documented either within the project site or immediately adjacent to project boundary in recent records (i.e., within 20 years).

focused surveys conducted in June 2024, three special-status plants were observed; Figure 7, Special-Status Plants, shows the location of these species on the BSA. Plant species with a low potential to occur or plant species that are not expected to occur are listed in Appendix E; these species are not discussed further because no significant direct, indirect, or cumulative impacts to these species are expected to result from the proposed project.

Table 7. Special-Status Plants with Potential to Occur on the BSA

Scientific Name	Common Name	Status (Federal/ State/CRPR)	Primary Habitat Associations/Life Form/ Blooming Period/Elevation Range (ft amsl)	Potential to Occur
Atriplex cordulata var. *cordulata*	heartscale	None/None/1B.2	Chenopod scrub, meadows and seeps, valley and foothill grassland (sandy); alkaline (sometimes)/annual herb/Apr–Oct/0–1,835	***Present***. There are approximately 22,642 individuals within the BSA. Site 1: 20,000 individuals observed. Site 2: 10 individuals observed. Site 4: 1 individual observed. Gen-tie line: 2,631 individuals observed (Figure 7).
Atriplex minuscula	lesser saltscale	None/None/1B.1	Chenopod scrub, playas, valley and foothill grassland; alkaline, sandy/annual herb/May–Oct/50–655	***Present***. There are approximately 3,817 individuals within the BSA, all in Site 8 (Figure 7).
Eremalche parryi ssp. *kernensis*	Kern mallow	FE/None/1B.2	Chenopod scrub, pinyon and juniper woodland, valley and foothill grassland; clay (sometimes), dry, openings, sandy (sometimes)/annual herb/Jan(Feb)Mar–May/230–4,230	***High potential to occur***. This species is known to occur approximately 1 mile from the BSA (CDFW 2024d) (Figure 7). Additionally, Sites 1, 3, and 8 and the gen-tie line route contain suitable chenopod scrub and/or grassland habitat to support this species.
Lasthenia chrysantha	alkali-sink goldfields	None/None/1B.1	Vernal pools; alkaline/annual herb/Feb–Apr/0–655	***Present.*** There are approximately 50 individuals within the BSA, all in Site 3 (Figure 7).

Note: CRPR = California Rare Plant Rank; ft amsl = feet above mean sea level.
Status Legend
Federal
FE: Federally listed as endangered
State
SE: State listed as endangered
California Rare Plant Rank
1B: Plants rare, threatened, or endangered in California and elsewhere
Threat Rank
0.1 – Seriously threatened in California (over 80% of occurrences threatened/high degree and immediacy of threat)
0.2 – Moderately threatened in California (20%–80% occurrences threatened/moderate degree and immediacy of threat)

5.3.2 Special-Status Wildlife

Special-status wildlife include those listed, or candidates for listing, as threatened or endangered by USFWS and CDFW, those designated as SSC by CDFW, and those listed as Birds of Conservation Concern by USFWS.

Like special-status plants, Dudek biologists performed an extensive desktop review of literature, existing documentation, and GIS data to evaluate the potential for special-status wildlife species to occur within the BSA. Each special-status wildlife species was assigned a rating of "not expected," "low," "moderate," or "high" potential to occur based on relative location to known occurrences and vegetation community/habitat association.[4] Listed species with any potential to occur and non-listed special-status species with a moderate or higher potential to occur are discussed in Table 8. The occurrence data provided in Table 8 represent the closest occurrences to the BSA and the most recent records. Those special-status wildlife species that are not expected or have low potential to occur on the BSA are included in Appendix F; however, these species are not discussed further because no significant direct or indirect impacts to these species are expected.

Two special-status invertebrates, one special-status amphibian, five special-status reptiles, four special-status birds, and four special-status mammals have a moderate to high potential to occur on the BSA (Table 8) based on the results of the literature review, database searches, biological reconnaissance surveys, the Swainson's hawk habitat assessment, vernal pool fairy shrimp habitat assessment, Buena Vista Lake ornate shrew camera surveys, small mammal trapping, and the focused survey for San Joaquin antelope squirrel, as well as burrow mapping surveys that included a habitat assessment for blunt-nosed leopard lizard, burrowing owl, San Joaquin kit fox, and American badger. Additionally, federally listed species with any potential to occur on the BSA were also included in Table 8.

Construction of facilities along the proposed collector lines and within the solar array footprint would result in ground disturbance. Direct permanent impacts to the natural vegetation communities could impact special-status species and their habitats. Field verification assessments and site suitability modeling for state and federally listed candidate, threatened, and endangered species were used to determine the potential for these species to occur, predict where they might occur within the project footprint, and determine preliminary impact assessments.

[4] Potential-to-occur ratings are defined as follows:
Not Expected: Habitat within the project site is unsuitable or project site is outside of species historical range (i.e., over 20 years old).
Low: Habitat with the project site is marginal and/or documented occurrences of species are historical (i.e., over 20 years old); or recent records are more than 5 miles from the project site.
Moderate: Habitat within the project site is suitable and species has been document within 5 miles of the project site in recent records (i.e., within 20 years); or recent records are more than 5 miles from the project site.
High: Habitat within the project site is suitable and species has been documented either within the project site or immediately adjacent to project boundary in recent records (i.e., within 20 years).

Table 8. Special-Status Wildlife Species with Potential to Occur on the BSA

Scientific Name	Common Name	Status (Federal/ State)	Habitat	Potential to Occur
Invertebrates				
Bombus crotchii	Crotch's bumble bee	None/SC	Generally, open grassland and scrub communities supporting suitable floral resources. However, no formal decisions regarding its preferred habitat. A generalist in vegetation community, elevation, and preferred nectar plants. Mostly nests in found burrows, but may also occasionally nest in tree holes, debris, and in bunch grass clusters. Can fly kilometers between forage and nest areas. CDFW is currently working on an official survey protocol and refined habitat description (CDFW 2023b).	***Observed on Site 1. Moderate potential to occur.*** The BSA supports floral resources for feeding and other habitat for nesting. In addition, there are CNDDB locations from Shafter (1953) (CDFW 2024c), approximately 3.0 miles east of the BSA along SR-43 (CDFW 2024d). Additional occurrences are scattered throughout the region further east near Cawelo and north of Oildale, south near Elk Hills (1950s to 1980s), and southwest along the Temblor Range (1980s to 2017; CDFW 2024d). This species was incidentally observed flying/foraging during 2024 botanical surveys and has a moderate potential to occur in portions of Sites 1, 2, 3, 5, 6, and 8 and in portions of the gen-tie line route (see Figures 8A–8G, Crotch's Bumble Bee Wildlife Potential, and Table 13).
Branchinecta lynchi	vernal pool fairy shrimp	FT/None	Vernal pools, seasonally ponded areas within vernal swales, ephemeral freshwater habitats, ephemeral pools, ditches, puddles, and other sources of temporary standing water.	***Not Observed. Moderate to high potential to occur.*** Although there are no nearby CNDDB occurrences for this species (CDFW 2024d), the BSA contains areas of ephemeral ponded areas suitable for this species. Additionally, an unknown species of fairy shrimp (*Branchinecta* sp.) was observed within the BSA during 2023 biological surveys. This species has a moderate to high potential to occur in portions of Sites 1, 2, 3, 4, and 8 and portions of the gen-tie line route (see Figures 9A–9G, Vernal Pool Fairy Shrimp Wildlife Potential, and Table 13).

Table 8. Special-Status Wildlife Species with Potential to Occur on the BSA

Scientific Name	Common Name	Status (Federal/ State)	Habitat	Potential to Occur
Amphibians				
Spea hammondii	western spadefoot	FPT/SSC	Primarily grassland and vernal pools, but also in ephemeral wetlands that persist at least 3 weeks in chaparral, coastal scrub, valley–foothill woodlands, pastures, and other agriculture.	***Observed in Site 8. Low to moderate potential to breed on site.*** Observed during small mammal trapping on Site 8 (Figure 10, Spadefoot Spotlighting Survey Area). In addition, the CNDDB includes three recent (2019 to 2022) occurrences of the species between the project parcels and the gen-tie line route(s), including within and outside Buttonwillow Ecological Reserve. Multiple additional occurrences are located throughout the region (CDFW 2024d). This species likely has potential to breed during wet years in suitable ponded areas. Because of the specific microhabitat requirements of this species (ponded areas), suitable habitat was not modeled.
Reptiles				
Anniella grinnelli	Bakersfield legless lizard	None/SSC, SCE	Southern San Joaquin Valley. Known from two disjunct areas: the east side of the Carrizo Plain and portions of the city limits of Bakersfield. Often found underneath leaf litter, rocks, and logs.	***Not Observed. Moderate potential to occur.*** The BSA supports suitable habitats for this species in areas of saltbush scrub and alkali sink. A CNDDB search does not show a recorded location of this species within 5 miles of the project. The closest record is from 2020 and approximately 6 miles south of the project. This species has a moderate potential to occur in portions of Sites 1, 2, 3, 5, 6, and 8 and in portions of the gen-tie line route (Figures 11A–11G, Bakersfield Legless Lizard Wildlife Potential, and Table 13).
Arizona elegans occidentalis	California glossy snake	None/SSC	Arid scrub, rocky washes, grasslands, chaparral, open areas with loose soil.	***Not Observed. Moderate potential to occur.*** The BSA has arid scrub and grasslands with loose soils to support this species. This species has a moderate potential to occur in portions of Sites 1, 2, 3, 5, 6, and 8 and in portions of the gen-tie line route (Figures 12A–12G, California Glossy Snake and San Joaquin Coachwhip Wildlife Potential, and Table 13).

Table 8. Special-Status Wildlife Species with Potential to Occur on the BSA

Scientific Name	Common Name	Status (Federal/ State)	Habitat	Potential to Occur
Coluber flagellum ruddocki	San Joaquin coachwhip	None/SSC	Open, dry, treeless areas including grassland and saltbush scrub.	***Not Observed. Moderate potential to occur.*** The BSA contains suitable grassland and saltbush scrub to support this species. This species has a moderate potential to occur in portions of Sites 1, 2, 3, 5, 6, and 8 and in portions of the gen-tie line route (Figures 12A–12G and Table 13).
Gambelia sila	blunt-nosed leopard lizard	FE/FP, SE	Sparsely vegetated alkali and desert scrubs, including semi-arid grasslands, alkali flats, and washes.	***Not Observed. Moderate to high potential to occur.*** The BSA supports suitable habitats for this species. In addition, numerous CNDDB occurrences are located throughout the region, including the Buttonwillow Ecological Reserve, which abuts Sites 5 and 6 and the project collector lines (CDFW 2024d). This species has a high to moderate potential to occur in portions of Sites 1, 3, 5, 6, and 8 and in portions of the gen-tie line route (see Figures 13A–13G, Blunt-Nosed Leopard Lizard Wildlife Potential, and Table 13).
Phrynosoma blainvillii	coast horned lizard (also known as Blainville's horned lizard)	None/SSC	Open areas of sandy soil in valleys, foothills, and semi-arid mountains including coastal scrub, chaparral, valley–foothill hardwood, conifer, riparian, pine–cypress, juniper, and annual grassland habitats.	***Not Observed. Moderate potential to occur.*** The BSA supports suitable habitat for this species. In addition, CNDDB includes multiple relatively recent occurrences in Buttonwillow Ecological Reserve located between the project areas (CDFW 2024d). This species has potential to occur in suitable habitat on Site 8 and in portions of the gen-tie line route (see Figures 14A–14G, Coast Horned Lizard Wildlife Potential, and Table 13).
Birds				
Agelaius tricolor (nesting colony)	tricolored blackbird	BCC/SSC, ST	Nests near freshwater, emergent wetland with cattails or tules, but also in Himalayan blackberry; forages in grasslands, woodland, and agriculture.	***Not Observed. Moderate potential to forage and nest.*** The BSA supports suitable preferred nesting habitat (freshwater and wetland habitats) as well as other nesting substrates (e.g., grain fields, thistles, nettle, tamarisk). Suitable foraging habitats occur mostly where grasslands occur and are absent in areas dominated by scrub habitats and orchards. In

Table 8. Special-Status Wildlife Species with Potential to Occur on the BSA

Scientific Name	Common Name	Status (Federal/ State)	Habitat	Potential to Occur
				addition, numerous CNDDB occurrences are located throughout the region (CDFW 2024d; UC Davis 2023). This species has a moderate potential to occur in small portions of Sites 1, 2, 4, 5, 6, and 8 (see Figures 15A–15G, Tricolored Blackbird Wildlife Potential, and Table 13).
Athene cunicularia (burrow sites and some wintering sites)	burrowing owl	BCC/SC	Nests and forages in grassland, open scrub, and agriculture, particularly with ground squirrel burrows.	***Observed on Sites 2 and 5. High to moderate potential to occur in other sites.*** The BSA and region support suitable habitat and populations of burrowing mammals, including ground squirrels. In addition, numerous CNDDB occurrences are located throughout the region, including Buttonwillow Ecological Reserve, between the project areas (CDFW 2024d). This species was observed on Site 5, where a single burrowing owl and burrow with sign was observed during 2024 biological surveys. This species has high potential to occur in portions of Sites 3 and 8, and low to moderate potential to occur in portions of all sites and in portions of the gen-tie line route (see Figures 16A–16G, Burrowing Owl Wildlife Potential, and Table 13).
Buteo swainsoni (nesting)	Swainson's hawk	None/ST	Nests in open woodland and savanna, riparian, and in isolated large trees; forages in nearby grasslands and agricultural areas such as wheat and alfalfa fields and pasture.	***Observed. Low to high potential to occur.*** The BSA supports areas of isolated and clustered trees for nesting and open areas for hunting. In addition, CNDDB occurrences are located between the project areas, with additional occurrences scattered across the region. The closest active nest is located approximately 3.5 miles southwest of the BSA (CDFW 2024d). This species was observed flying/foraging during biological studies and has potential to nest in portions of Sites 1, 4, 5, 6, and 8 and in portions of the gen-tie line route. This species has potential to forage in all sites and the gen-tie line route (see Figures 17A.A–17A.G, Swainson's Hawk Nesting

Table 8. Special-Status Wildlife Species with Potential to Occur on the BSA

Scientific Name	Common Name	Status (Federal/ State)	Habitat	Potential to Occur
				Suitability, and 17B.A–17B.G, Swainson's Hawk Foraging Suitability, and Tables 10 and 12).
Lanius ludovicianus (nesting)	loggerhead shrike	None/SSC	Nests and forages in open habitats with scattered shrubs, trees, or other perches.	***Observed; high potential to nest.*** This species was observed during field visits in 2022–2024 in Sites 5 and 8. This species is likely to nest in or adjacent to the BSA where suitable nesting trees or shrubs occur within open habitats on Sites 1 and 8 and in small portions of the gen-tie line route. It has potential to forage on all sites and along the gen-tie line route (see Figures 18A–18G, Loggerhead Shrike Wildlife Potential, and Table 13).
Mammals				
Ammospermophilus nelsoni	San Joaquin (Nelson's) antelope squirrel	None/ST	Arid annual grassland and shrubland with saltbushes (*Atriplex* spp.), California joint fir (*Ephedra californica*), bladderpod (*Physaria* spp.), goldenbushes (*Ericameria* spp.), and snakeweed (*Gutierrezia* spp.).	***Not Observed. Low to moderate potential to occur***. The BSA supports suitable grassland and shrubland habitats. In addition, numerous CNDDB occurrences are located in the region, including in the Buttonwillow Ecological Reserve located between the project areas (CDFW 2023d). However, this species was not observed during extensive field studies conducted on site, including surveys focusing on San Joaquin antelope squirrel conducted in conjunction with burrow mapping surveys. This species has a low potential to occur within portions of Sites 1, 2, 3, 5, 6, and 8 and portions of the gen-tie line route, as well as moderate potential to occur on portions of Sites 5 and 6 and portions of the gen-tie line route (see Figures 19A–19G, San Joaquin [Nelson's] Antelope Squirrel Wildlife Potential, and Table 13).
Dipodomys ingens	giant kangaroo rat	FE/SE	On fine sandy loam soils with sparse forb vegetation and low-density alkali desert scrub.	***Not Observed. Moderate potential to occur.*** Although the majority of CNDDB occurrences are located along and west of the California Aqueduct, approximately 3.0 miles west of the BSA, the BSA supports suitable soils and low-density habitat preferred by the species. CNDDB occurrences east of the

Table 8. Special-Status Wildlife Species with Potential to Occur on the BSA

Scientific Name	Common Name	Status (Federal/ State)	Habitat	Potential to Occur
				aqueduct are located around Buena Vista Lake, over 10 miles south of the site (CDFW 2024d). This species has a moderate potential to occur on portions of Sites 1, 3, 5, 6, and 8 and in portions of the gen-tie line route (see Figures 20A–20G, Giant Kangaroo Rat and American Badger Wildlife Potential, and Table 13).
Dipodomys nitratoides nitratoides	Tipton kangaroo rat	FE/SE	Alluvial fan and floodplain soils; habitat with one or two species of sparsely scattered shrubs and a ground cover of introduced and native annual grasses and forbs.	***Observed on Site 6. Moderate to high potential to occur in other sites.*** The BSA supports suitable soils and habitats for this species. In addition, numerous CNDDB occurrences are located between the project areas and region (CDFW 2024d). A dead individual Tipton kangaroo rat was observed on Site 6 during 2024 (August 22, 2024) burrow mapping surveys. A single individual was observed during small mammal trapping. Additionally, this species has a moderate to high potential to occur on portions of Sites 1 to 3, 5, 6, and 8 and in portions of the gen-tie line route (see Figures 21A–21G, Tipton Kangaroo Rat Wildlife Potential, and Table 13).
Taxidea taxus	American badger	None/SSC	Dry, open, treeless areas; grasslands, coastal scrub, agriculture, and pastures, especially with friable soils.	***Not Observed. Moderate potential to occur.*** This wide-ranging species known to occur across the San Joaquin Valley (CDFW 2024d). In addition, the BSA supports large open areas, suitable habitats, soils suitable for burrowing, and prey to support the species. This species has a moderate potential to occur on portions of Sites 1, 3, 5, 6, and 8 and in portions of the gen-tie line route (see Figures 20A–20G and Table 13).
Vulpes macrotis mutica	San Joaquin kit fox	FE/ST	Grasslands and scrublands, including those that have been modified; oak woodland, alkali sink scrubland, vernal pool, and alkali meadow.	***Not Observed. Moderate to high potential to occur.*** This species is known to occur across the San Joaquin Valley (CDFW 2024d). In addition, the BSA supports large open areas, suitable habitats, soils suitable for burrowing, and prey to support the species.

Table 8. Special-Status Wildlife Species with Potential to Occur on the BSA

Scientific Name	Common Name	Status (Federal/ State)	Habitat	Potential to Occur
				This species has high potential to occur on portions of Sites 3 and 8, and a low to moderate potential to occur in portions of all sites and in portions of the gen-tie line route (see Figures 22A–22G, San Joaquin Kit Fox Wildlife Potential, and Table 13). Potential dens suitable for use as denning or refugia by SJKF were observed throughout the project. However, none had sign (scat, fresh digging, prey remains, tracks, etc.) of SJKF use.

Notes: CDFW = California Department of Fish and Wildlife; CNDDB = California Natural Diversity Database; gen-tie = generation transmission line route; SR = State Route; SJKF = San Joquin kit fox.

Status Legend

Federal

BCC: U.S. Fish and Wildlife Service Bird of Conservation Concern
FE: Federally listed as endangered
FPT: Federally proposed for listing as threatened
FT: Federally listed as threatened

State

FP: CDFW Fully Protected species
SC: State candidate for listing as threatened or endangered
SE: State listed as endangered
SSC: CDFW species of special concern
ST: State listed as threatened

5.3.2.1 Crotch's Bumble Bee

Crotch's bumble bee (*Bombus crotchii*) is a state candidate for listing as threatened. This species ranges throughout much of central and Southern California, along the central and Southern California coasts, through the Central Valley, and in the surrounding foothills. However, it now appears to be absent from much of its former range, and its population appears to have declined drastically, especially in its former stronghold in the Central Valley (Xerces Society et al. 2018; CDFW 2024d).

Crotch's bumble bee occurs in open grassland and scrub communities supporting suitable floral resources. Data from a variety of resources states that Crotch's bumble bee is most commonly associated with the species from the following families, in descending order based on number of observations: Fabaceae, Apocynaceae, Asteraceae, Lamiaceae, and Boraginaceae (Richardson 2014, as cited in Xerces Society et al. 2018). Williams et al. (2014) cited the genera *Asclepias*, *Chaenactis*, *Lupinus*, *Medicago*, *Phacelia*, and *Salvia* as example food plants. The species nests primarily underground and may be reliant on small mammal burrows. Little is known about winter hibernacula, but the species is presumed to rely on microhabitats for overwintering similar to those of other bumble bees, including loose disturbed soil, leaf litter, and other debris (Xerces Society et al. 2018; CDFW 2019a).

Crotch's bumble bee was incidentally observed flying and foraging in Site 1 during 2024 botanical surveys. Crotch's bumble bee has a moderate potential to occur in portions of Sites 1 through 3, 5, 6, and 8 and in portions of the gen-tie line route (Figures 8A–8G, Crotch's Bumble Bee Wildlife Potential), as these areas contain open grassland, saltbush scrub, and alkali sink, which has floral resources including the genera *Phacelia*, *Clarkia*, *Eriogonum*, and *Eschscholzia* present for part of the blooming season in the spring (see Section 5.3.2.19, Modeling Results). Crotch's bumble bee is a generalist forager and could forage anywhere within the BSA where suitable floral resources are present. The BSA supports limited suitable floral resources; the actual area occupied by specific resources with potential to support nesting for the species is likely a much smaller portion of the entire BSA. Nesting is primarily located underground in abandoned holes made by ground squirrels, mice, and rats, but may be aboveground in abandoned bird nests or empty cavities (Osborne et al. 2008; Williams et al. 2014).

5.3.2.2 Vernal Pool Fairy Shrimp

Vernal pool fairy shrimp (*Branchinecta lynchi*) is federally listed under the ESA. Vernal pool fairy shrimp are small freshwater crustaceans belonging to the branchiopod order Anostraca. They are 0.4 to 1.0 inches (11 to 25 millimeters) long with an elongated body shape, stalked compound eyes, and 11 pairs of phyllopods (feathery-looking structures that function as both gills and swimming legs) (Eng et al. 1990; USFWS 2005).

Vernal pool fairy shrimp are found primarily in vernal pools (79% of all occurrences) but can occur in a wide variety of other seasonal wetland habitats, including alkaline pools, artificial and natural seasonal wetlands, ephemeral drainages, dozer scrapes and road ruts, rock outcrop pools, roadside ditches, stream oxbows, stock ponds, vernal swales, and artificial or roadside vernal pools (Helm 1998, Table 5-1). Helm noted that in sampling for vernal pool fairy shrimp in 27 California counties, the vernal pool fairy shrimp has never been known to occupy permanent bodies of water (Helm 1998).

Vernal pool fairy shrimp are restricted to their aquatic habitats during their larval and adult stages, but the eggs can be passively dispersed via overland flooding or migratory birds (Simovich 1998; USFWS 2005). This dispersal pattern creates gene flow between nearby pools, but limits gene flow to pools farther away; therefore, populations are best

defined by vernal pool complexes rather than individual vernal pools (King et al. 1996). Vernal pool fairy shrimp are opportunistic filter feeders, consuming algae, bacteria, protozoa, rotifers, and pond detritus (USFWS 2005).

Although there are no nearby occurrences of this species documented in the California Natural Diversity Database (CDFW 2024d), the BSA is within the known range of vernal pool fairy shrimp. During the jurisdictional surveys, several areas were observed to contain fairy shrimp within pooled water (Figures 9A–9G, Vernal Pool Fairy Shrimp Wildlife Potential). Dip netting was not conducted to collect specimens for determination of special-status fairy shrimp or common fairy shrimp. Areas of agriculture and orchards have low potential for vernal pool fairy shrimp to occur due to intensive agricultural practices. Relatively untouched areas of alkali sink, saltbush scrub, and open areas of grasslands where water pools for several days or weeks could have vernal pool fairy shrimp. Several areas in the northern portion of the BSA where *Branchinecta* species were observed provide high quality vernal pool habitat. Additional habitat where *Branchinecta* species were observed was less typical, including seasonally inundated roadside wetlands. During the November 2024 habitat assessment, the BSA contained approximately 104 acres of potentially suitable branchiopod habitat. Specifically, vernal pool fairy shrimp have potential to occur in portions of Sites 1, 2, 3, 4, and 8 (Figures 9A–9G; Section 5.3.2.19). This was based on prior aquatic resource mapping, available online data, and observable characteristics in the field. The conditions in the BSA were dry at the time of the November 2024 site assessment and thus may not capture all potentially suitable habitat within the BSA. Additionally, this acreage may be reduced due to ongoing farming practices including discing and plowing, and final acreage will be determined and mapped during surveys once habitat is inundated.

5.3.2.3 Western Spadefoot

Western spadefoot is proposed for federal listing as a threatened species. It is also a California SSC. Western spadefoot is a medium-sized toad up to 2.5 inches long (DOD 2022). It has loose, spotted skin; a wide head; and gold eyes with vertical pupils. Its most notable feature is a black “spade” on each heel. Its coloration includes light stripes and dark blotches with a whitish or yellowish belly. Males often have dark throat patches (Jennings and Hayes 1994; DOD 2022).

Western spadefoots are mostly terrestrial, spending 8 to 10 months underground in burrows, emerging after rain to breed (USFWS 2005). They are nocturnal and avoid light. Breeding occurs from January to May in vernal pools formed by winter or spring rains, and males’ calls attract other individuals. Though usually non-territorial, males can show aggression at breeding sites (Whitford 1967). Rain is a key factor in their movements, with more rain increasing the likelihood of emergence and travel distance (Holland and Goodman 1998).

One spadefoot was incidentally observed along the northern edge of the BSA during small mammal trapping in Site 8 (Figure 10, Spadefoot Spotlighting Survey Area). Although no specific breeding pond surveys have been conducted, this species has low to moderate potential to breed during wet years in small suitable areas of the BSA and along the Buttonwillow Ecological Reserve.

5.3.2.4 Bakersfield Legless Lizard

The Bakersfield legless lizard is a California SSC. This species is a fossorial lizard that is distinguished from all other *Anniella* species by a grayish-red ventral coloration. California legless lizards have traditionally been described as one species; however, recent studies have identified the Bakersfield legless lizard as one of five legless lizard species in California. The known range of the Bakersfield legless lizard is restricted to the southern San Joaquin

Valley and the eastern side of the Carrizo Plain. This species has been collected within the city limits of Bakersfield, and specimens were noted to be found below cover objects on sandy soils (Papenfuss and Parham 2013).

The BSA supports loose soils for burrowing and other refugia. Although not incidentally observed during biological surveys conducted to date, this species has a low to moderate potential to occur in suitable habitat on Sites 1, 2, 3, 5, 6, and 8 and in portions of the gen-tie line route (Figures 11A–11G, Bakersfield Legless Lizard Wildlife Potential).

5.3.2.5 California Glossy Snake

California glossy snake is a California SSC. This species is nocturnal and spends the day in burrows. It is generally active from late February until November, with peak activity in May. California glossy snake feeds on lizards and small mammals. California glossy snake is found in a wide variety of habitat types, including grasslands, shrublands, and chaparral. California glossy snake occurs in the central San Joaquin Valley south to the Tehachapi Mountains and along the base of the Coast Range mountains farther south to San Quintin, Baja California (Thomson et al. 2016).

The BSA supports suitable scrub and grassland habitats for California glossy snake. Although not incidentally observed during biological surveys conducted to date, this species has moderate potential to occur in suitable habitat on Sites 1, 2, 3, 5, 6, and 8 and in portions of the gen-tie line route (Figures 12A–12G, California Glossy Snake and San Joaquin Coachwhip Wildlife Potential).

5.3.2.6 San Joaquin Coachwhip

The San Joaquin coachwhip is a California SSC. It is known for its fast-moving, slender body and smooth scales. It inhabits arid environments with sparse vegetation, often burrowing in rodent holes for refuge and oviposition. This diurnal snake feeds on small mammals, lizards, insects, birds, and other snakes and prefers warm temperatures for activity. Endemic to California, its range includes various counties from Colusa to San Luis Obispo.

The BSA supports suitable scrub and grassland habitats for San Joaquin coachwhip. Although not incidentally observed during biological surveys conducted to date, this species has moderate potential to occur in suitable habitat on Sites 1, 2, 3, 5, 6, and 8 and in portions of the gen-tie line route (Figures 12A–12G).

5.3.2.7 Blunt-Nosed Leopard Lizard

The blunt-nosed leopard lizard (leopard lizard) is a relatively large (3.5 to 5 inches snout to vent length) carnivorous lizard typically found in sparsely vegetated plains, alkali flats, washes, arroyos, canyon floors, and low foothills in areas of gentle topography. It generally does not utilize areas of greater than 30%–40% slope (Germano and Williams 1992, as cited in Ahlborn 2010). Good quality habitat is open with scattered shrubs, little grass cover, and abundant rodent burrows, which the lizard uses as escape cover, thermal cover, and resting areas. The leopard lizard will also use shrubs as hiding and thermal cover. The historical range of the leopard lizard extended from the San Joaquin Valley and adjacent foothills from Stanislaus County southward to Kern County and the extreme northeast tip of Santa Barbara County (Germano and Williams 1992, as cited in USFWS 2010). Due to the expansion of agriculture and grazing, oil extraction, and urban development in this historical range, the leopard lizard is now excluded from 94% of its former habitat (Jennings 1995). The leopard lizard's current range is primarily the foothills of the western San Joaquin Valley from Merced County southward to Kern County, the Carrizo Plain and

California Valley areas of San Luis Obispo County, and a small portion of the foothills of the eastern San Joaquin Valley within Kern County (Jennings 1995).

The blunt-nosed leopard lizard is a diurnal, opportunistic carnivore, capturing and consuming grasshoppers and other insects, small mice, and other lizards (notably the side-blotched lizard [*Uta stansburiana*]). They are also known to cannibalize juvenile blunt-nosed leopard lizards (Germano and Williams 1994). Apparently as an adaptation to minimize this circumstance, the adult peak activity period ends around July, when adults go underground to enter winter torpor. Hatchlings emerge around the end of July and are active until early November (Germano and Williams 1994). Thus, there is a temporal separation between the adult and the juvenile peak activity periods. During the active period, leopard lizards are most active on the surface when temperatures are between 77°F and 95°F (Tollestrup 1976, as cited in CDFG 2004), although they have been observed aboveground at temperatures as high as 106°F. Known predators of the leopard lizard include birds of prey, roadrunners, skunks, and snakes (CDFG and CIWTG 2008).

Based on the habitat assessment and CNDDB database records, blunt-nosed leopard lizard has a moderate to high potential to occupy all areas of the BSA that contain natural open space generalized as the alkali sink and saltbush scrub vegetation communities, including Sites 1, 3, 5, 6, and 8 and portions of the gen-tie line route (Figures 13A–13G, Blunt-Nosed Leopard Lizard Wildlife Potential; Section 5.3.2.19) (CDFW 2024d). Additionally, several collector lines are proposed along areas of saltbush scrub and alkali sink, including the Buttonwillow Ecological Reserve along 7th Standard Road (Figures 9A–9G). CNDDB records occur within these areas, which have also been the locations for blunt-nosed leopard lizard training workshops conducted by the Wildlife Society in conjunction with CDFW; therefore, these collector lines do have potential for leopard lizard presence (CDFW 2024d). Burrow surveys conducted for special-status wildlife species resulted in several small mammal burrows that could be used by leopard lizard within the natural areas of saltbush scrub and alkali sink, including the Buttonwillow Ecological Reserve. Surveys were conducted along the margins of all agricultural fields adjacent to these natural areas. A few small mammal burrows were recorded within the agricultural edges for orchards. None of these burrows were observed along edges of intensively managed, irrigated crop fields, as burrows would likely be flooded during irrigation. However, this does not preclude the potential for leopard lizard to use the adjacent agricultural fields for hunting prey. No leopard lizards were observed during the habitat assessment or incidentally during the jurisdictional delineation, vegetation mapping, or botanical surveys conducted in June 2024, during the active period of the leopard lizard, or during burrow mapping/San Joaquin Antelope squirrel focused surveys conducted in August, when juveniles hatch (ESRP 2024).

5.3.2.8 Coast Horned Lizard

Coast horned lizard is a California SSC. This species has a large range that covers much of central and Southern California, extending from Shasta County in the north, south to San Diego County. Coast horned lizards occur in valley–foothill hardwood forests and conifer, riparian, pine–cypress, juniper, and annual grassland habitats (CWHR 2024).

This species is diurnal and feeds primarily on ants and small beetles when abundant (Pianka and Parker 1975; Stebbins 1954). The reproductive season for the coast horned lizard extends from May to June in Southern California (Pianka and Parker 1975). Females may lay clutch sizes ranging from 6 to 16 eggs (Tollestrup 1981). These lizards are preyed upon by leopard lizards (*Gambelia* spp.), sidewinder (*Crotalus cerastes*), striped whipsnake (*Masticophis taeniatus*), other snakes, loggerhead shrike (*Lanius ludovicianus*), and hawks (CWHR 2024).

The BSA supports suitable grassland and riparian habitat with sandy soils for this species. Although not incidentally observed during biological surveys conducted to date, this species has moderate potential to occur in suitable habitat on Site 8 and in portions of the gen-tie line route (Figures 14A–14G, Coast Horned Lizard Wildlife Potential).

5.3.2.9 Tricolored Blackbird

Tricolored blackbird (*Agelaius tricolor*) is threatened under CESA and is a California SSC that is protected for its nesting colonies. It typically nests in freshwater marshes with dense growths of emergent vegetation dominated by cattails or bulrushes (*Schoenoplectus* spp.) but has also established colonies in willows (*Salix* spp.), blackberries (*Rubus* spp.), and a variety of other types of dense, herbaceous vegetation, such as thistles (*Cirsium* spp., *Centaurea* spp.) and nettles (*Urtica* sp.). Tricolored blackbirds forage in a variety of habitats, such as grasslands and croplands, where high densities of suitable insect prey are found.

This species, which nests in colonies where males perch and sing within nesting habitat, and where birds make regular trips between sometimes distant foraging habitat and the nesting colony when young are present, is highly visible when nesting. In addition, this species tends to rely on locally abundant sources of invertebrate prey (such as grasshoppers or caterpillars) during the nesting season (Beedy et al. 2020). Tricolored blackbirds are often observed in flocks at the site of these resources, such as at planted fields, grasslands, or marshes.

Suitable nesting habitats were observed during the habitat assessment at various constructed farm ponds within the BSA at Sites 1, 2, 4, and 5; a small portion of Site 6; and Site 8 (Figures 15A–15G, Tricolored Blackbird Wildlife Potential; Section 5.3.2.19). The farm ponds were observed to have cattails and bulrushes; however, no tricolored blackbirds were observed.

5.3.2.10 Burrowing Owl

Burrowing owl is a state candidate for listing as threatened. With a relatively wide-ranging distribution throughout the west, burrowing owls are considered to be habitat generalists (Lantz et al. 2004). In California, burrowing owls are year-round residents of open, dry grassland and desert habitats, and in grass, forb, and open shrub stages of pinyon–juniper and ponderosa pine habitats (Zeiner et al. 1990a). Preferred habitat is typified by short, sparse vegetation with few shrubs, level to gentle topography, and well-drained soils (Poulin et al. 2020).

The presence of burrows is the most essential component of burrowing owl habitat because they are required for nesting, roosting, cover, and caching prey (Coulombe 1971; Green and Anthony 1989; Martin 1973; Poulin et al. 2020). In California, western burrowing owls most commonly live in burrows created by California ground squirrels. Burrowing owls may occur in human-altered landscapes, such as agricultural areas, ruderal grassy fields, vacant lots, and pastures, if the vegetation structure is suitable (i.e., open and sparse), usable burrows are available, and foraging habitat occurs in close proximity (Gervais et al. 2008). Debris piles, riprap, culverts, and pipes can be used for nesting, secondary shelter sites, and roosting.

The BSA is a mix of general agriculture, orchard, and natural habitats such as saltbush scrub and alkali sink, all of which are known to be occupied or have potential for occupation by burrowing owl. Of these, saltbush scrub and alkali sink areas have the highest potential for nesting and foraging due to a high presence of prey species such as kangaroo rats, insects, and reptiles. Burrowing owl has potential to occur in all sites and portions of the gen-tie line route that contain suitable habitat (Figures 16A–16G, Burrowing Owl Wildlife Potential; Section 5.3.2.19) (USFWS 1998). General agriculture areas within the BSA consisting of cotton, alfalfa or other row crops occupy the largest

land area throughout the BSA (Figures 16A–16G). Due to the amount of maintenance necessary for this area, it is considered a low to moderate potential for burrowing owl to forage within these types of land covers due to a limited prey base of kangaroo rats and ground squirrels. However, these sites do contain a potential for denning along the margins due to a less active maintenance regime and more abundant California ground squirrel burrows, which are often used by burrowing owl. Orchards, the second largest land cover on the BSA, are considered to be less likely for both nesting and foraging for burrowing owl (Figures 16A–16G). The intensive management within orchards, along with rodenticide usage, limits the prey base for owls. No burrowing owls were observed during the habitat assessment or incidentally during the jurisdictional delineation or vegetation mapping.

Numerous potentially suitable burrowing owl burrows (burrows approximately 3 inches in size or greater) or burrow complexes were observed during focused survey effort for burrowing owl burrows conducted in August 2024 (Figures 16A–16G). Suitable burrowing owl burrows noted within each site were as follows: 1 in Site 1, 11 in Site 2, 3 in Site 4, 15 in Site 5, 72 in Site 6, 74 in Site 8, and 97 in the gen-tie line route (see Table 6, Burrows Observed On Site, and Section 5.3.2.19). One occupied burrowing owl burrow was observed in Site 5 during the botanical survey effort in June 2024. Burrowing owl was also detected at Site 2 during small mammal trapping (Figures 16A–16G). The burrow was documented with likely one owl present, as well as whitewash and pellets laid about the burrow opening. Biologists detected no burrowing owls or burrowing owl sign (whitewash, pellets, feathers, or prey remains) during the field survey within the other sites. Protocol-level surveys were not conducted for burrowing owl. Project timing was too late in the nesting season to conduct protocol-level surveys for nesting owls.

5.3.2.11 Swainson's Hawk

Swainson's hawk is state listed as threatened under CESA. It nests in California in the Central Valley and smaller adjacent valleys, the Klamath Basin, the Northeastern Plateau, Lassen County, and the Mojave Desert. It breeds in riparian areas, stands of trees in agricultural environments, oak savanna, Joshua trees (*Yucca brevifolia*) in the Mojave Desert, and juniper–sage flats. In the San Joaquin Valley, it nests in riparian areas and in isolated tree clusters, often near rural residences or other areas with some human disturbance. In addition, recent observations have recorded Swainson's hawks using lattice towers and almond orchards for nesting.

Across their breeding range, Swainson's hawks forage in open habitats dominated by grasses, as well as some open shrublands and open, small woodlands (Bechard et al. 2010). However, the species has adapted to agricultural, fields, particularly in the Central Valley of California where such areas have proliferated at the expense of natural vegetation communities and where remaining natural areas have been permanently altered by the introduction of non-native plant species that now dominate these areas (Estep 1989; CDFG 1993). Although Swainson's hawks nesting around the periphery of the Central Valley will forage in various natural vegetation communities, most Swainson's hawks in the region are concentrated in the center of the valley, which is dominated by irrigated crops (Estep 2009). While alfalfa fields are regarded as important foraging habitat for the species, fallow fields, wheat fields, irrigated pastures, and annual grasslands are also frequently used. A variety of crops with vegetation structures that provide access to prey for at least part of the breeding season and where the small mammals that Swainson's hawks rely on are available can be part of a mosaic of crop types that provide a constant source of food over the large home ranges of the species (Estep 1989, 2009; Swolgaard et al. 2008).

Swainson's hawks rely heavily on vertebrates as prey during the nesting season, with California voles (*Microtus californica*) serving as an important element of the species' overall diet in California (Estep 1989). Swainson's hawks also will take a variety of other small mammals, birds, and insects (CDFG 1993; Bechard et al. 2010).

Nonbreeding Swainson's hawks within the species breeding range are known to rely heavily on invertebrates, notably grasshoppers (Johnson et al. 1987).

Most of the BSA is disturbed as a result of ongoing agricultural activities; as a result, it provides little in the way of suitable nesting habitat for Swainson's hawks. However, a few isolated trees and small woodland areas are scattered within the project sites, primarily along roadsides or in association with residences or farmyards, and provide suitable nesting resources for Swainson's hawk (Figures 17A.A–17A.G, Swainson's Hawk Nesting Suitability). Additionally, orchards, mainly almonds, are present on the BSA and provide low to moderate potential for Swainson's hawk nesting. Swainson's hawk has potential to nest in Sites 1, 4 through 6, and 8 and in portions of the gen-tie line route that contain suitable habitat (Figures 7A.A–17A.G). The general agriculture of alfalfa and wheat, grasslands, saltbush scrub, and alkali sink areas provides suitable foraging with a prey base of small rodents and insects (Figures 17B.A–17B.G, Swainson's Hawk Foraging Suitability). A total of 33 Swainson's hawks were incidentally observed perched, foraging/hunting, or soaring over Sites 2, 3, 5, 6, and 8 between April and August 2024 during jurisdictional delineations, vegetation mapping, botanical surveys, and habitat assessments. Sites 6 and 8 had the most observations, with 11 at each site. Sites 2 and 5 each had 4 observations in August 2024, and Site 3 had 1 observation in April 2024. The gen-tie line route had 2 observations in August 2024. However, no nesting Swainson's hawks were incidentally observed. The closest active nest is located approximately 3.5 miles southwest of the BSA (CDFW 2024d).

Although protocol nesting surveys were not conducted for Swainson's hawk in 2024, an evaluation of suitable foraging and nesting habitat was conducted. A 10-mile radius was developed around each individual project site (all seven sites). A larger radius was then drawn around the total of each individual radius area for one combined study area; thus, the results present a conservative analysis given the larger study area. The following discussion provides the results of both foraging and nesting habitat within the larger combined study area, each individual project site, and each development footprint of each site.

Most land (29.9%) in the 10-mile combined study area (397,852 acres) of all seven sites was determined to be moderately suitable for Swainson's hawk foraging (see Figure 23A.A–23A.H, Swainson's Hawk Nesting Suitability). The combined study area was dominated by orchards (204,836 acres), which are considered low-quality habitat for foraging, and natural land (93,575 acres), which is considered as moderate foraging habitat, accounting for 51% and 24% of the total 397,854 acres in these categories, respectively. Alfalfa, considered the highest quality foraging habitat for Swainson's hawk (CDFG 1994), makes up approximately 2%, or 9,329 acres, of the study area. Irrigated croplands occupy 44,390 acres and managed wetlands occupy approximately 16,248 acres, accounting for 11% and 4% of the study area, respectively.

When considering each site separately, habitat classifications that are suitable for foraging Swainson's hawk varied per site. Each 10-mile study area encompassed approximately 201,062 acres. High-value Swainson's hawk foraging habitat, such as alfalfa, composes approximately 3% of all sites. Natural lands, classified as moderate, was the most abundant in most sites, ranging from 7% to 30% of each study area. Habitat classifications such as irrigated row crops (cotton, tomatoes, corn, etc.), which are rotated annually or often during the same growing season, composed a similar level of cover in all sites, ranging from 14% to 16%. These areas are considered low to high value for Swainson's hawk, depending on the crop in rotation. For example, a crop such as cotton or tomatoes, which has a high presence of rodents or insects, would be considered of high value to Swainson's hawk during the new growth period where individual hawks can sit on the ground and hunt for prey. However, as these crops grow, their value as Swainson's hawk foraging habitat lowers because the crops grow taller and provide less access to prey during foraging. Orchards and vineyards are also considered to be low in value as foraging habitat due to the

tree canopy density and limited access to the ground for foraging. Orchards and vineyards make up the majority of each site, ranging from 42% to 65%. Developed land primarily consists of urban or rural residential areas that lack natural vegetation communities or agricultural areas and provide no foraging habitat value. These areas represent a small percentage of each site, ranging from 2% to 5%.

When considering the 10-mile study area of CNDDB Nest 2523, high-value alfalfa composed approximately 2% of the study area. Natural land was the most abundant within the study area, at approximately 49%. Orchards and vineyards make up the third-most abundant, at approximately 26%, with irrigated crop at 10%. The remaining habitat classifications were 4% or less of the study area.

Foraging habitat within proposed impact areas of each of the seven sites also varied. Alfalfa, orchards, and irrigated croplands were the dominant vegetation classifications at each site, ranging from 0% to 63% alfalfa, 26% to 61% orchards, and 8% to 47% irrigated cropland. Sections of the gen-tie line routes that are between each project site and do not fall within each demarcated area in the map set were evaluated separately (see Figures 23B.A–23B.H, Swainson's Hawk Foraging Suitability). The dominant foraging classifications within these gen-tie line route sections were orchard/vineyard, irrigated cropland, and natural lands, accounting for 62%, 17%, and 12%, respectively.

Foraging habitat within the proposed impact areas and within the 10-mile buffer of CNDDB Nest 2523 were evaluated. Of all sites, Sites 1 through 4 are completely within the 10-mile radius, and partial impact areas of Sites 5, 6, and 8 are within the 10-mile radius. A total combined potential impact area of 13,668 acres of all sites is within the 10-mile radius for CNDDB Nest 2523. High-value alfalfa made up less than 1% of foraging habitat of all sites within the 10-mile radius. A combined 3.2% of low to moderate and moderate habitat (natural lands, irrigated pasturelands, irrigated crops, and managed wetlands) are present within the 10-mile radius. The most abundant foraging habitat classification was the low-value habitat classification of deciduous orchard and/or vineyards, composing approximately 2.5% of all sites within the 10-mile radius. Impacts to less than 1% of foraging within the impact areas in relation to the overall alfalfa available, 2%, within the 10-mile radius of the nest would not substantially impact the foraging habitat available when also considering that approximately 49.3% moderate foraging habitat is available and irrigated cropland, considered low to high value, is approximately 10.4% available, leaving approximately 8.8% after impacts to the project sites. Low-value deciduous orchard and vineyards is 25.7% within the 10-mile radius, leaving approximately 23.2% available for foraging within 10 miles of the nest after impacts to the project sites.

Table 9 provides Swainson's hawk foraging habitat suitability classification, acreage, and percent cover within each 10-mile study area for each site, and Table 10 provides the foraging habitat suitability classification, acreage, and percent cover within each site.

Suitable nesting habitat was evaluated within the 10-mile combined sites study area, individual site 10-mile study area, and on each individual project site. Nesting habitat associated with the gen-tie line route that is not associated with each individual site was evaluated separately. Swainson's hawk nesting habitat is present throughout each of the sites and was found in the following three nest habitat classifications: Almond Orchard, Riparian, and Trees. The Tree classification included tree rows, isolated trees, roadside trees, farmyard trees, and rural residential trees. Deciduous orchards were considered for nesting; however, during communication with Mr. Babcock (pers. comm., 2024), it was decided that orchards would provide little nesting suitability due to citrus trees generally being too dense when large enough for potential nesting, and pomegranate, pistachio and stone fruit trees being too fragile structurally for nesting.

Approximately 25% of nesting habitat within the combined 10-mile study area consisted of almond orchards, occupying 100,071 acres. Almond orchards were once not considered suitable habitat due to extensive maintenance and management of the orchards; however, Dudek biologists have observed Swainson's hawk using almond orchards throughout the Central Valley. Therefore, the almond orchards are considered low- to moderate-value habitat for nesting. Approximately 1,120 acres of the combined study area was classified as trees, and riparian trees encompassed 124 acres; combined, these make up less than 1% of the study area.

When considering each site separately, nesting classifications suitable for foraging Swainson's hawk varied within the 10-mile study area. Almond orchards were the dominant nesting habitat within all sites, ranging from 17% to 38%. Riparian and tree classifications were less than 1% of each 10-mile study area. Each site followed suit, with almond orchards being the dominant nesting classification, ranging from 8% to 59% in five locations (Sites 1, 4, 5, 6, and 8) and on the gen-tie line route. No riparian areas were recorded within any site, and trees were recorded in three sites, including the gen-tie line route, but occupying less than 1% of each of the three sites.

CNDDB Nest 2523 nesting classifications were similar within the 10-mile study area, with almond orchards being the dominant nesting habitat; however, almonds were a much lower percentage, composing approximately 6% of the study area. Riparian and trees were both less than 1% cover within the study area. Nesting habitat within the proposed impact areas and within the 10-mile radius of CNDDB Nest 2523 were also evaluated. As mentioned above, Sites 1 through 4 are completely within the 10-mile radius, and partial impact areas of Sites 5, 6, and 8 are within the 10-mile radius. As expected, almond trees were the dominant nesting habitat classification within all sites and within 10 miles of CNDDB Nest 2523, composing approximately 11% of the area. Moderate- to high-quality nesting habitats such as riparian and trees composed approximately 51.5 and 133.2 acres, respectively, of the area, and only a combined 1% of nesting habitat within each site within the 10-mile radius of CNDDB Nest 2523.

Table 11 provides Swainson's hawk nesting habitat suitability classification, acreage, and percent cover per 10-mile study area for each site, and Table 12 provides the nesting habitat classification, acreage, and percent cover within each site.

Table 9. Swainson's Hawk Foraging Habitat Suitability Classification and Acreage and Percent Cover per 10-Mile Study Area for Each Site

Habitat Type	SWHA Foraging Habitat Suitability	Site 1 (Acres/ % Cover)	Site 2 (Acres/ % Cover)	Site 3 (Acres/ % Cover)	Site 4 (Acres/ % Cover)	Site 5 Acres/ (% Cover)	Site 6 (Acres/ % Cover)	Site 8 (Acres/ % Cover)	CNDDB Nest 2523
Alfalfa	High	7,586.4 3.7%	6,583.9 3.3%	6,208.6 3.1%	7,068.7 3.5%	6,036.2 3.0%	6,550.7 3.3%	7,199.2 3.6%	4121.4 2.0%
Natural Land	Moderate	62,307.9 30.9%	61,903.2 30.9%	52,601.9 26.2%	43,618.8 21.7%	34,895.1 17.4%	14,494.5 7.2%	27,228.7 13.5%	99,251.2 49.3%
Irrigated pasturelands	Low to moderate	17.1 0.0%	0.0 0.0%	0.0 0.0%	0.0 0.0%	52.6 <1.0%	52.6 <1.0%	0.0 0.0%	0.0 0.0%
Irrigated Cropland	Low to high	29,931.0 14.8%	28,569.3 14.2%	28,806.8 14.3%	32,032.5 15.9%	30,839.2 15.3%	32,751.4 16.3%	28,653.9 14.3%	20,925.8 10.4%
Managed Wetlands	Low to moderate	3,050.9 1.6%	1,909.6 <1.0%	3,610.3 1.8%	3,364.1 1.7%	10,681.4 5.3%	2,846.1 1.4%	5,594.0 2.9%	175.9 <1.0%
Deciduous Orchard or Vineyard	Low	86,230.6 42.9%	91,232.4 45.4%	98,922.6 49.2%	105,820.0 52.7%	104,635.0 52.0%	129,562.0 64.5%	120,607.0 60.0%	51,725.1 25.7%
Riparian	Low	35.7 <1.0%	63.2 <1.0%	79.5 <1.0%	66.9 <1.0%	33.7 <1.0%	7.0 <1.0%	90.7 <1.0%	51.5 <1.0%
Tree Row, Tree Grove, Isolated Trees	Low	228.4 <1.0%	190.1 <1.0%	217.2 <1.0%	203.5 <1.0%	834.7 <1.0%	306.8 <1.0%	371.5 <1.0%	133.2 <1.0%
Uncultivated Agriculture	Low	4,048.9 2.2%	5,090.0 2.5%	5,302.0 2.6%	5,024.3 2.6%	2,914.0 1.4%	4,025.0 0.0%	6,113.7 3.1%	4,115.7 2.0%
Developed	None	7,624.9 3.8%	5,520.2 2.7%	5,313.0 2.6%	3,863.3 2.0%	10,140.0 5.1%	10,465.8 5.2%	5,203.4 2.6%	7,558.1 3.8%

Notes: SWHA = Swainson's hawk; CNDDB = California Natural Diversity Database.

Table 10. Swainson's Hawk Foraging Habitat Suitability Classification and Acreage and Percent Cover per Site

Habitat Type	SWHA Foraging Habitat Suitability	Site 1 (Acres/ % Cover)	Site 2 (Acres/ % Cover)	Site 3 (Acres/ % Cover)	Site 4 (Acres/ % Cover)	Site 5 (Acres/ % Cover)	Site 6 (Acres/ % Cover)	Site 8 (Acres/ % Cover)	Gen Tie (Acres/ % Cover)	CNDDB Nest 2523*
Alfalfa	High	309.2 13.5%	347.5 63.8%	0.0 0.0%	45.1 11.3%	458.4 17.0%	603.6 25.0%	0.0 0.0%	30.6 3.2%	1,789.6 <1.0%
Natural land	Moderate	41.8 1.8%	6.8 1.2%	163.9 24.8%	0.0 0.0%	1.3 <1.0%	4.0 <1.0%	124.7 4.1%	116.6 12.3%	3,148.4 1.6%
Irrigated pasturelands	Low to moderate	0.0 0.0%	0.0 0.0%	0.0 0.0%	0.0 0.0%	0.0 0.0%	0.0 0.0%	0.0 0.0%	0.0 0.0%	0.0 0.0%
Irrigated cropland	Low to high	756.9 33.0%	44.8 8.2%	311.9 47.3%	113.8 28.4%	997.0 37.0%	608.4 25.2%	1,246.6 40.9%	159.9 16.8%	3,244.3 1.6%
Managed wetlands	Low to moderate	0.0 0.0%	0.0 0.0%	0.0 0.0%	0.0 0.0%	0.0 0.0%	0.0 0.0%	0.0 0.0%	0.0 0.0%	0.0 0.0%
Deciduous orchard or vineyard	Low	965.2 42.1%	143.0 26.3%	184.0 27.9%	228.6 57.0%	922.7 34.3%	1,110.9 46.0%	1,147.1 37.7%	588.6 61.9%	4,988.0 2.5%
Riparian	Low	0.0 0.0%	0.0 0.0%	0.0 0.0%	0.0 0.0%	0.0 0.0%	0.0 0.0%	0.0 0.0%	0.0 0.0%	0.0 0.0%
Tree row, tree grove, isolated trees	Low	0.0 0.0%	0.0 0.0%	0.0 0.0%	0.0 0.0%	0.0 0.0%	1.9 <1.0%	9.2 <1.0%	2.1 <1.0%	13.2 <1.0%

Table 10. Swainson's Hawk Foraging Habitat Suitability Classification and Acreage and Percent Cover per Site

Habitat Type	SWHA Foraging Habitat Suitability	Site 1 (Acres/ % Cover)	Site 2 (Acres/ % Cover)	Site 3 (Acres/ % Cover)	Site 4 (Acres/ % Cover)	Site 5 (Acres/ % Cover)	Site 6 (Acres/ % Cover)	Site 8 (Acres/ % Cover)	Gen Tie (Acres/ % Cover)	CNDDB Nest 2523*
Uncultivated agriculture	Low	152.1 6.6%	0.0 0.0%	0.0 0.0%	0.0 0.0%	314.5 11.7%	76.4 3.2%	517.2 17.0%	10.2 1.1%	1,070.9 <1.0%
Developed	None	66.7 2.9%	2.4 <1.0%	0.0 0.0%	0.1 <1.0%	0.0 0.0%	7.9 <1.0%	0.0 0.0%	42.8 4.5%	206.0 <1.0%

Notes: SWHA = Swainson's hawk; gen-tie = generation transmission line route; CNDDB = California Natural Diversity Database.
* % cover of each site combined within 10-mile radius of CNDDB Nest 2523.

Table 11. Swainson's Hawk Nesting Habitat Suitability Classification and Acreage and Percent Cover per 10-Mile Study Area for Each Site

Habitat Type	SWHA Nesting Habitat Suitability	Site 1 (Acres/ % Cover)	Site 2 (Acres/ % Cover)	Site 3 Acres/ Cover)	Site 4 (Acres/ % Cover)	Site 5 (Acres/ % Cover)	Site 6 (Acres/ % Cover)	Site 8 (Acres/ % Cover)	CNDDB Nest 2523
Almond orchard	Low to moderate	34,123.8 17.0%	31,182.5 15.5%	33,604.5 16.7%	44,796.7 22.3%	52,877.0 26.3%	73,894.2 36.8%	54,820.0 27.3%	13,004.0 6.5%
Riparian	High	35.7 <1.0%	63.2 <1.0%	79.5 <1.0%	66.9 <1.0%	33.7 <1.0%	7.0 <1.0%	90.7 <1.0%	51.5 <1.0%
Tree row, tree grove, isolated, farmyard and rural trees	Moderate to high	228.4 <1.0%	190.1 <1.0%	217.2 <1.0%	203.5 <1.0%	834.7 <1.0%	306.8 <1.0%	371.5 <1.0%	133.2 <1.0%

Notes: SWHA = Swainson's hawk; CNDDB = California Natural Diversity Database.

Table 12. Swainson's Hawk Nesting Habitat Suitability Classification and Acreage and Percent Cover per Site

Habitat Type	SWHA Nesting Habitat Suitability	Site 1 (Acres/ % Cover)	Site 2 (Acres/ % Cover)	Site 3 (Acres/ % Cover)	Site 4 (Acres/ % Cover)	Site 5 (Acres/ % Cover)	Site 6 (Acres/ % Cover)	Site 8 (Acres/ % Cover)	Gen Tie (Acres/ % Cover)	CNDDB Nest 2523*
Almond orchard	Low to moderate	880.1 38.4%	0.0 0.0%	0.0 0.0%	224.9 59.2%	770.6 28.6%	603.6 25.0%	768.1 25.2%	81.4 8.6%	1,581.6 11.6%
Riparian	High	0.0 0.0%	0.0 0.0%	0.0 0.0%	0.0 0.0%	0.0 0.0%	0.0 0.0%	0.0 0.0%	0.0 0.0%	51.5 <1.0%
Tree row, tree grove, isolated, farmyard and rural trees	Moderate to high	0.0 0.0%	0.0 0.0%	0.0 0.0%	0.0 0.0%	0.0 0.0%	1.9 <1.0%	9.2 <1.0%	2.1 <1.0%	133.2 <1.0%

Notes: SWHA = Swainson's hawk; gen-tie = generation transmission line route; CNDDB = California Natural Diversity Database.
* % cover of each site combined within 10-mile radius of CNDDB Nest 2523.

5.3.2.12 Loggerhead Shrike

Loggerhead shrike (shrike) is a USFWS Bird of Conservation Concern (BCC) and a California SSC. It is widespread throughout the United States, Mexico, and portions of Canada (Humple 2008). The species is a year-round resident in most of the United States, including from California east to Virginia and south to Florida, and in Mexico. In California, although shrikes are widespread at the lower elevations in the state, the largest breeding populations are in portions of the Central Valley, the Coast Ranges, and the southeastern deserts (Humple 2008).

Preferred habitats for loggerhead shrike are open areas that include scattered shrubs, trees, posts, fences, utility lines, or other structures that provide hunting perches with views of open ground, as well as nearby spiny vegetation or human-made structures (such as the top of chain-link fences or barbed wire) that provide a location to impale prey upon for storage or manipulation (Humple 2008). Shrikes occur most frequently in riparian areas along woodland edges, grasslands with sufficient perch and butcher sites, scrublands, and open canopied woodlands, although they can be quite common in agricultural and grazing areas, and can sometimes be found in mowed roadsides, cemeteries, and golf courses. Shrikes occur only rarely in heavily urbanized areas. For nesting, the height of shrubs and presence of canopy cover are most important (Yosef 1996).

This species was observed during field visits in 2022 through 2024 in Sites 5 and 8. There is high potential for this species to nest in or adjacent to the BSA where suitable nesting trees or shrubs occur within open habitats on Sites 1 and 8 and along small portions of the gen-tie line route; it has potential to forage on all sites and along the gen-tie line route (Figures 18A–18G, Loggerhead Shrike Wildlife Potential).

5.3.2.13 Giant Kangaroo Rat

The giant kangaroo rat is listed as endangered under the ESA and CESA. It is endemic to the San Joaquin and Tulare Basins in the southern end of the Great Central Valley in California. Conversion of native valley grassland habitats to agriculture has reduced extant giant kangaroo rat distribution to approximately 2% to 3% of its historic range (Williams 1980). The giant kangaroo rat's range is discontinuous and comprises six major populations, including the Panoche region in western Fresno and eastern San Benito Counties, the Kettleman Hills in western Kings County, San Juan Creek Valley in San Luis Obispo County, the Lokern region and surrounding uplands in western Kern County, the Carrizo Plain Natural Area in San Luis Obispo County, and the Cuyama Valley in San Luis Obispo and Santa Barbara Counties. Each of the six major populations is further fragmented by steep topography and unsuitable vegetation, as well as human-induced barriers such as cropland, roads, and urban development (USFWS 1998). The giant kangaroo rat's habitat consists of annual grasslands, although the species may also utilize alkali or saltbush scrub habitats at elevations up to 2,850 feet (USFWS 1998). Giant kangaroo rats are primarily seed eaters but also eat green plants and insects (USFWS 1998). Individuals in many populations make large stacks of seed heads, or "haystacks," on the surface around their burrows to cure the material before storage underground (USFWS 1998). Giant kangaroo rats require level terrain and sandy loam soils for burrowing.

The giant kangaroo rat is nocturnal and lives in burrow systems called precincts. Precincts have a radius of about 3 to 4 meters (10 to 13 feet), and each contains a shallow burrow that is deep enough for the kangaroo rat to escape the afternoon heat and avoid predators (USFWS 1998). The surfaces of typical precincts are elliptical, show little or no mounding above surrounding terrain, and have one to five separate burrow openings, with three being typical (Williams et al. 1993). Individual precincts are usually connected to other precincts by well-worn paths and are relatively easy to detect, even from a distance (Williams 1980). The aboveground portion of the precinct is used for both foraging and sand bathing. Cultivation and irrigation of habitat, the use of rodenticides, and the

development of infrastructure for petroleum exploration have all contributed to the decline of the giant kangaroo rat (USFWS 1998). In addition to giant kangaroo rat activity on site, additional sign (including haystacks, burrows, and hind feet and tail drag marks) of giant kangaroo rat was observed at a reference site located approximately 2.5 miles southeast of the BSA at the CDFW Lokern Ecological Preserve.

The majority of CNDDB occurrences of this species is located to the west of the BSA; however, the BSA does provide suitable soils and sparse vegetative areas which have moderate to high potential for giant kangaroo rat to occur in Sites 1, 3, 5, 6, and 8 and a portion of the gen-tie line route (Figures 20A–20G, Giant Kangaroo Rat and American Badger Wildlife Potential).

Burrow surveys conducted within the BSA resulted in several small mammal burrows suitable in size and shape for giant kangaroo rat within all project sites. As expected, most small mammal burrows were observed within the natural areas of saltbush scrub, alkali sink and non-native grassland areas; however, burrows were not limited to only these natural areas but did occur within the margins of the agricultural areas in the proximity of the natural areas. Additionally, several collector lines are proposed along areas of saltbush scrub and alkali sink, including the Buttonwillow Ecological Reserve along 7th Standard Road (Figures 20A–20G). Although no CNDDB records occur within these areas, the overall soil and vegetation in these areas provides suitable habitat for giant kangaroo rat (CDFW 2024d). Sites 1, 3, and 5 through 8 and the collector lines had both small mammal burrows and suitable habitat with potential to support giant kangaroo rat (Figures 20A–20G; Table 6; Section 5.3.2.19, Table 13).

Although numerous small mammal burrows were observed in the small mammal trapping survey area with many that were characteristic of kangaroo rat activity, no distinctive giant kangaroo rat burrowing activity was noted within the vicinity of the trap lines sampled. Not enough of the area was sampled to reach a conclusion regarding giant kangaroo rat presence or lack of presence in the project area (Appendix G).

5.3.2.14 Tipton Kangaroo Rat

The Tipton kangaroo rat is listed as endangered under the ESA and CESA and is a nocturnal species of rodent that is native to the San Joaquin Valley, California. Tipton kangaroo rats prefer open, desert communities with large alkali scalds, no evidence of past or present agriculture activity, sparse ground cover with bush seepweed, and few invasive grasses (Cypher et al. 2016). Tipton kangaroo rats have been limited to valley saltbush scrub, valley sink scrub, and grassland habitats with shrubs such as saltbushes (*Atriplex* sp.), iodine bush (*Allenrolfea occidentalis*), pale-leaf goldenbush (*Isocoma acradenia*), honey mesquite, and seepweed (USFWS 1998, 2020; Williams 1985). The highest densities are in areas with sparse to moderate shrub coverage and in soft soils with high salinity (USFWS 1998). Burrow systems are less than 10 inches (25 centimeters) deep, which are commonly found in elevated mounds, berms of roads, canal embankments, railroad beds, and bases of shrubs and fences where windblown soils accumulate (USFWS 1998).

With a diet of mostly seeds; small amounts of green, herbaceous vegetation; and insects, their aboveground activities consist principally of foraging. They seem to consume seeds opportunistically from the surrounding grasses and forbs, both native and non-native, depending on availability. The seeds of woody shrubs, especially saltbushes, seem to be diligently sought out by Tipton kangaroo rat. Like most kangaroo rats, Tipton kangaroo rat will cache seeds for later consumption (USFWS 1998). Cultivation and irrigation of habitat, the use of rodenticides, and the development of infrastructure for petroleum exploration have all contributed to their decline (USFWS 1998).

Based on the habitat assessment and CNDDB records, Tipton kangaroo rat has moderate to high potential to occupy all areas of natural open space, generalized here as the alkali sink and saltbush scrub areas, in Sites 1, 3, 5, 6, and 8 and in a portion of the gen-tie line route (Figures 21A–21G, Tipton Kangaroo Rat Wildlife Potential) (CDFW 2024c). Tipton kangaroo rats are known to occur within the Goose Lake area northwest of the BSA (CDFW 2024c). The northern edge of the BSA abuts the southernmost edge of Goose Lake (Figures 21A–21G). Goose Lake is approximately 3,000 acres. The land covers in this area are a mixture of agriculture, shrublands, grassland, wetlands, and vernal pools. Because of the proximity of the BSA to Goose Lake and CNDDB records, there is a potential for Tipton kangaroo rat to occupy the untouched natural areas that are not under agricultural production (Figures 21A–21G).

Burrow surveys conducted on the BSA resulted in several small mammal burrows suitable in size and shape for Tipton kangaroo rat on all project sites. As expected, most small mammal burrows were observed within the natural areas of saltbush scrub, alkali sink, and non-native grassland areas; however, burrows were not limited to only these natural areas but also occurred within the margins of the agricultural areas in the proximity of the natural areas. Additionally, several collector lines are proposed along areas of saltbush scrub and alkali sink, including the Buttonwillow Reserve properties along 7th Standard Road, and CNDDB records occur within these areas (CDFW 2024d) (Figures 21A–21G). During burrow surveys, one dead Tipton kangaroo rat was incidentally observed along the eastern edge of Site 6 (see Figures 21A–21G). The kangaroo rat had been dead for a while and was identified only by the missing fifth toe on the hind feet and measurements from head to tail. Sites 1 through 3 and 5 through 8 and the collector lines had small mammal burrows and suitable habitat with potential to support Tipton kangaroo rat (Figures 21A–21G; Tables 6 and 13).

During small mammal trapping, one Tipton kangaroo rat individual was detected during session 4 (Figures 21A–21G). The trap at that location was removed, and this individual was recaptured approximately 25 meters (80 feet) north at one of the remaining traps on the same trap line. With one Tipton kangaroo rat capture, it can be concluded that Tipton kangaroo rat are present in the vicinity of the capture location. This capture location was along a parcel that borders the CDFW Buttonwillow Ecological Reserve. The separation between the properties was a barbed wire fence. Small mammal burrows were observed near the fence, and wildlife could pass between the properties under the fence. The lack of Tipton kangaroo rat captures along the other trap lines sampled does not necessarily indicate lack of presence due to the limited extent and coverage of the trap lines (Appendix G).

5.3.2.15 Buena Vista Lake Ornate Shrew

The Buena Vista Lake ornate shrew (shrew) is currently listed under the ESA and is considered a California SSC (USFWS 1998). Precise distribution of the shrew in California is unknown (Brown et al. 2006; Zeiner et al. 1990b). Kern National Wildlife Refuge, Kern Fan Water Recharge Area, Kern Lake, Semitropic Ecological Reserve, and Atwell Island have detected the shrew across the years. Of the additional four sites that were surveyed from 2013 to 2020, three had no shrew presence detected in either year (Buena Vista Recreation Area, Tule Elk Reserve, Lake Woollomes) and one had a detection only in 2020 (Pixley National Wildlife Refuge).

The shrews are commonly found near open water in areas with a thick layer of leaf litter or a dense vegetative understory (78 FR 39836–39867; USFWS 2017). These areas are characterized by moist soil and dense cover from riparian or emergent marsh vegetation, such as rushes, sedges, or cattails (Cypher et al. 2017; Williams and Harpster 2001). Areas with moist soil and downed logs and branches are common at sites where shrews have been found and are likely important to shrew habitat because they attract prey species, such as insects, other invertebrates, and earthworms, and also provide protection from predators (USFWS 2017, 2020).

The north edge of the BSA abuts the southernmost edge of Goose Lake and has been designated as critical habitat for the shrew (Figure 24, Buena Vista Lake Ornate Shrew Camera Study Locations). Because of the proximity of the BSA to Goose Lake and critical habitat, the untouched natural areas that are not under agricultural production in Site 8 were surveyed via camera for Buena Vista Lake ornate shrew (Figure 24). Camera surveys were conducted in suitable habitat within Site 8 at seven locations. No other areas of the BSA provide suitable habitat for this species to occur. Camera surveys were negative for this species.

5.3.2.16 San Joaquin Kit Fox

The San Joaquin kit fox (kit fox) is listed as endangered under the ESA and threatened under the CESA. The kit fox is in the family Canidae and is a year-round resident of arid and semi-arid regions of the San Joaquin Valley and surrounding valleys, Sierra Nevada foothills, and Coast Ranges from northern Santa Barbara and Ventura Counties north to Contra Costa and San Joaquin Counties (USFWS 1998). This species lives in annual grasslands or grassy open habitats with scattered shrubby vegetation. It requires loose-textured sandy soils for burrowing and a suitable prey base of rodents. Kit foxes in the northern portion of the range are mostly associated with annual grassland and valley oak woodland (USFWS 1998). Where kit foxes are found in annual grassland, such as in surrounding valleys, they are generally associated with brome grasses, fescue (*Festuca* spp.), wild oats (*Avena fatua*), barley (*Hordeum* spp.), and filaree (*Erodium* spp.).

Much of the San Joaquin kit fox's geographic range has been altered by human activities such as agriculture, and various studies have examined its use of these altered habitats. Past studies cited kit fox use of agricultural lands for foraging, but more recent studies have found low prey abundance in agricultural lands, and important prey species such as kangaroo rats are absent (Williams and Germano 1992; Warrick et al. 2007). Warrick et al. (2007) observed kit foxes using agriculture in intensively farmed areas, particularly orchards, at night, but these foxes used the few natural areas disproportionately to their availability, did not occupy agriculture during the day, and did not use agriculture for long periods.

The BSA is a mix of general agriculture, orchard, and natural habitats, generalized here as saltbush scrub and alkali sink, all of which are known to be occupied or have potential for occupation by kit fox. Of these, saltbush scrub and alkali sink areas have the highest potential for kit fox to use for denning and foraging due to a high presence of prey species such as kangaroo rats, insects, rabbits and hares, but all sites and portions of the gen-tie line route contain at least low to moderate potential for San Joaquin kit fox (Figures 22A–22G, San Joaquin Kit Fox Wildlife Potential; Table 13) (Cypher et al. 2000). General agriculture areas within the BSA consisted of cotton, alfalfa, or other row crops, occupying the largest land cover throughout the BSA. Due to the amount of maintenance necessary for this area, it is considered a low to moderate potential for kit fox to forage within these types of land covers due to a limited prey base of kangaroo rats and ground squirrels. However, these sites do contain a potential for denning along the margins due to a less active maintenance regime. Orchards, the second largest land cover within the BSA, are less likely for both denning and foraging for kit fox. The intensive management within orchards along with rodenticide usage limits the prey base kit fox are seeking.

Den surveys for San Joaquin kit fox were conducted on several dates in August 2024 (Table 1). During the surveys, several burrows or burrow complexes meeting the minimum size criteria were identified and examined (Figures 22A–22G; Table 6). Of these, none were confirmed to be San Joaquin kit fox natal dens or active dens. Furthermore, no sign (e.g., scat, prey remains, digging) or evidence of recent use by San Joaquin kit fox was observed.

Because the number of kit foxes can vary greatly from year to year, and successful dispersal may allow individuals to occupy areas between established populations, it is possible that transient individual San Joaquin kit foxes could occur intermittently within the BSA during foraging or dispersal events. Although it is unlikely that a kit fox would be denning within an active orchard or general agricultural field, it cannot be ruled out that they could move into an area left fallow or that they could use the area for movement.

5.3.2.17 American Badger

American badger is a California SSC. American badger typically occurs in open, sparsely vegetated habitats, but also uses modified habitats such as agriculture. It is found in dry, open areas with friable soils.

The BSA supports large open areas, suitable habitats, soils suitable for burrowing, and prey to support the species. Although not incidentally observed during biological surveys conducted to date, this species has moderate potential to occur in suitable habitat on Sites 1, 3, 5, 6, and 8 and in portions of the gen-tie line route (Figures 20A–20G).

5.3.2.18 San Joaquin Antelope Squirrel

The San Joaquin antelope squirrel historically ranged over approximately 3,456,000 acres within an area that stretched from western Merced County in the northwest, southward along the western side of the San Joaquin Valley to its southern end (USFWS 1998). Loss of habitat from agricultural production and other development had resulted in the loss of 80% of this area by 1987 (USFWS 1998; CDFG 1987). Robust populations are currently confined to the Lokern and Elk Hills in western Kern County, and the Carrizo and Elkhorn Plains in eastern San Luis Obispo County (USFWS 1998).

San Joaquin antelope squirrels are primarily diurnal, usually active early or late in the day, and inhabit the arid (less than 10 inches of rain per year) annual grassland and shrubland areas with sparsely vegetated loam soils, primarily associated with *Ephedra* sp. and saltbushes (*Atriplex* spp.) (USFWS 1998; Ahlborn 2005). This species is typically found on open, gently sloping land with shrubs, at an elevation of 200 to 1,200 feet above mean sea level, and requires widely scattered shrubs as well as forbs and grasses in terrain broken with gullies and washes. San Joaquin antelope squirrels live in burrows either of their own construction or dug by kangaroo rats or other small mammals. They are omnivorous and will eat green vegetation, fungi, and insects more often than seeds, and occasionally eat harvester ants. They largely depend on insects from mid-April to December, but also consume some small vertebrates (Best 1999). The breeding period is from late winter to early spring. Young are born in March and April and stay underground for approximately 30 days after birth. They feed on green vegetation when they emerge from burrows (USFWS 1998). San Joaquin antelope squirrels are somewhat sensitive to temperature extremes, remaining below ground in temperatures under approximately 50°F and during the hottest periods of the day or year (Best 1999; Hawbecker 1958).

San Joaquin antelope squirrel was not observed during the survey efforts conducted in Sites 1, 2, 3, and 8; therefore, their potential to occur on these sites is determined to be low. There is a low to moderate potential for San Joaquin antelope squirrel to occur in Sites 5 and 6 and in portions of the gen-tie line route (see Figures 19A–19G and Table 13). These areas were not accessible during the survey effort and are located adjacent to the Buttonwillow Ecological Reserve.

5.3.2.19 Modeling Results

Table 13 summarizes the potentially suitable habitat that was modeled for the special-status wildlife species that have at least a moderate potential to occur on the BSA. See Tables 9–12 for acreage of modeled suitable habitat for Swainson's hawk. In addition, no model was developed for western spadefoot since that species has specific microhabitat requirements (i.e., ponded areas).

Table 13. Special-Status Wildlife Potentially Suitable Modeled Habitat on the BSA (Acres)

Species	Potential	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 8	Gen Tie	BSA Total[a]
American badger	Moderate	36	—	160	—	37	10	112	113	468
Bakersfield legless lizard	Low	<1	45	160	—	5	4	6	49	270
	Moderate	36	—	—	—	4	5	116	68	230
Bakersfield legless lizard total		**36**	**45**	**160**	**—**	**10**	**10**	**122**	**117**	**499**
Blunt-nosed leopard lizard	High	36	---	160	—	33	10	112	71	422
	Moderate	—	—	—	—	4	—	11	43	57
Blunt-nosed leopard lizard total		**36**	**—**	**160**	**—**	**37**	**10**	**122**	**113**	**479**
Burrowing owl	High	—	—	160	—	—	—	112	—	272
	Low to Moderate for nesting and foraging	1,234	520	494	158	2,004	1,324	1,982	230	7,946
	Low for Nesting and Foraging	854	1	—	222	536	832	717	221	3,383
Burrowing owl total		**2,088**	**521**	**654**	**380**	**2,540**	**2,157**	**2,810**	**451**	**11,600**
California glossy snake	Moderate	36	45	160	—	10	10	122	117	499
coast horned lizard	Moderate	—	—	—	—	—	—	<1	19	19
Crotch's bumble bee	Moderate	36	45	160	—	10	10	122	110	493
Crotch's bumble bee total		**36**	**45**	**160**	**—**	**10**	**10**	**122**	**110**	**493**
Giant kangaroo rat	Moderate	36	—	160	—	37	10	112	113	468
Giant kangaroo rat total		**36**	**—**	**160**	**—**	**37**	**10**	**112**	**113**	**468**
Loggerhead shrike	Foraging	1,987	523	642	380	2,540	2,163	2,768	473	11,477
	Nesting and Foraging	38	—	—	—	—	—	74	67	178
	Nesting	—	—	—	—	—	—	9	1	10

Table 13. Special-Status Wildlife Potentially Suitable Modeled Habitat on the BSA (Acres)

Species	Potential	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 8	Gen Tie	BSA Total[a]
Loggerhead shrike total		**2,025**	**523**	**642**	**380**	**2,540**	**2,163**	**2,851**	**541**	**11,665**
San Joaquin antelope squirrel	Low	36	45	160	—	5	4	122	97	470
	Moderate	—	—	—	—	4	5		17	27
San Joaquin antelope squirrel total		**36**	**45**	**160**	**—**	**10**	**10**	**122**	**113**	**496**
San Joaquin coachwhip	Moderate	36	45	160	—	10	10	122	117	499
San Joaquin kit fox	High	—	—	160	—	—	—	112	—	272
	Low to moderate for foraging and denning	1,234	520	494	158	2,004	1,324	1,982	230	7,946
	Low for foraging and denning	854	1	—	222	536	832	717	221	3,383
San Joaquin kit fox total		**2,088**	**520**	**654**	**380**	**2,539**	**2,156**	**2,810**	**451**	**11,600**
Tipton kangaroo rat	High	36	—	160	—	37	10	126	103	472
	Moderate	—	---	—	—	—	—	—	11	11
Tipton kangaroo rat total		**36**	**—**	**160**	**—**	**37**	**10**	**126**	**114**	**482**
Tricolored blackbird	Moderate	1	4	—	1	3	<1	1	—	10
Tricolored blackbird total		**1**	**4**	**—**	**1**	**3**	**<1**	**1**	**—**	**10**
Vernal pool fairy shrimp[b]	High	—	—	242	—	—	—	145	—	387
	Moderate	—	45	—	—	—	—	11	<1	56
Vernal pool fairy shrimp total		**—**	**45**	**242**	**—**	**—**	**—**	**155**	**<1**	**443**

Note: gen-tie = generation transmission line route.

[a] These acres cannot be summed cumulatively because many of the habitats overlap.

[b] In addition to modeled suitable habitat, other features that may support vernal pool fairy shrimp were identified during the jurisdictional delineation/vernal pool fairy shrimp habitat assessment and are shown on Figures 9A–9G.

5.3.3 Potential Aquatic Resources

The jurisdictional aquatic resources delineation identified numerous isolated channels, canals/ditches, ponds, and wetlands within the BSA. The results of the jurisdictional delineation concluded that there are 104.2 acres of CDFW jurisdictional features, including 6.1 acres of lake, 91.3 acres of riparian, and 6.8 acres of streambed. These same features are also jurisdictional under the RWQCB. There are 104.2 acres of RWQCB-jurisdictional features, including 91.3 acres of wetlands and 13.0 acres of non-wetlands (Figures 25A–25Q, Potential Jurisdictional Aquatic Resources). Tables 14 and 15 summarize the potentially jurisdictional features within the BSA. Quantities

presented in Table 14 and Table 15 should not be considered cumulatively, as they represent the same aquatic features.

The BSA has been extensively disturbed over the years by anthropogenic influences, chiefly past and present agricultural activities. Many of the features assessed within the BSA are irrigation ditches used for conveying water to orchards and agricultural fields, as well as human-made basins draining the orchards and fields. There are some meandering, earthen-bottom channels within the site that are isolated from traditional navigable waters, although there is evidence to suggest that these features have also been subject to some dredging and other manipulation. The BSA contains several isolated ponded areas, sparsely vegetated alkaline areas, and some wetlands. These features are not likely subject to USACE jurisdiction because these features are isolated and do not meet the relatively permanent or significant nexus standard as a water of the United States.

Table 14. Potential Aquatic Resources Summary–CDFW (Acres)

Feature Type	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 8	Gen Tie	BSA Total
Lake	N/A	N/A	1.0	N/A	N/A	N/A	5.1	N/A	6.1
Riparian	N/A	N/A	61.0	N/A	N/A	N/A	30.3	N/A	91.3
Streambed	0.9	0.3	0.3	N/A	N/A	N/A	5.4	N/A	6.8
Site Subtotals	*0.9*	*0.3*	*62.3*	*N/A*	*N/A*	*N/A*	*40.8*	*N/A*	*N/A*
								Total	**104.2**

Notes: CDFW = California Department of Fish and Wildlife; gen-tie = generation transmission line route; N/A = not applicable.
Totals may not sum precisely due to rounding.

Table 15. Potential Aquatic Resources Summary–RWQCB (Acres)

Feature Type	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 8	Gen Tie	BSA Total
Wetlands	N/A	N/A	61.0	N/A	N/A	N/A	30.3	N/A	91.3
Non-Wetlands	0.9	0.3	1.3	N/A	N/A	N/A	10.5	N/A	13.0
Site Subtotals	*0.9*	*0.3*	*62.3*	*N/A*	*N/A*	*N/A*	*40.8*	*N/A*	*N/A*
							Total	**N/A**	**104.2**

Notes: RWQCB = Regional Water Quality Control Board; gen-tie = generation transmission line route; N/A = not applicable.
Totals may not sum precisely due to rounding.

5.4 Wildlife Corridors and Habitat Linkages

Wildlife corridors are linear features that connect large patches of natural open space and provide avenues for the migration of animals. Wildlife corridors contribute to population viability by ensuring continual exchange of genes between populations, providing access to adjacent habitat areas for foraging and mating, and providing routes for recolonization of habitat after local extirpation or ecological catastrophes (e.g., fires). Habitat linkages are small patches that join larger blocks of habitat and help reduce the adverse effects of habitat fragmentation. Habitat linkages provide a potential route for gene flow and long-term dispersal of plants and animals and may also serve as primary habitat for smaller animals, such as reptiles and amphibians. Habitat linkages may be continuous habitat or discrete habitat islands that function as steppingstones for dispersal.

The BSA is not mapped as an Essential Connectivity Area (ds620; Caltrans et al. 2010), Natural Landscape Block (ds823; Caltrans et al. 2010), linkage for the California Desert Linkage Network (ds822; Penrod et al. 2012), or part of the South Coast Missing Linkages Project (ds419; South Coast Wildlands 2008). The majority of the site is mapped as an Area of Conservation Emphasis (ACE; ds2734) Rank 1 (Limited Connectivity Opportunity). A small northeastern portion of the BSA is mapped as ACE Rank 2 (Large Natural Habitat Areas), and a small portion of the central-eastern BSA, associated with the Buttonwillow Ecological Reserve, is mapped as ACE Rank 3 (Connections with Implementation Flexibility) (Figure 26, Wildlife Movement). Last, the Goose Lake area is also mapped as a Natural Landscape Block (ds621) (Figure 26), and additional smaller and irregular patches of natural and agricultural lands are mapped as Natural Small Areas (ds1073). CDFW (2019c) definitions for ACE Ranks 1 to 3 are as follows:

> **ACE Rank 1: Limited connectivity opportunity.** Areas where land use may limit options for providing connectivity (e.g., agriculture, urban) or no connectivity importance has been identified in models. Includes lakes. Some DOD [Department of Defense] lands are also in this category because they have been excluded from models due to lack of conservation opportunity, although they may provide important connectivity habitat.
>
> **ACE Rank 2: Large natural habitat areas.** These are large blocks of natural habitat (>2000 acres) where connectivity is generally intact. This includes natural landscape blocks from the 2010 CEHC [California Essential Habitat Connectivity Project] and updated with the 2016 Statewide Intactness dataset. Any area mapped as a CEHC NLB [Natural Landscape Block] and not included in the categories above was included in this rank.
>
> **ACE Rank 3: Connections with implementation flexibility.** These are other areas that have been identified as having connectivity importance, but have not been identified as channelized areas, species corridors, or habitat linkages at this time. This may change with future changes in surrounding land use or regional specific information. Hexagons included in this category include areas mapped as "intensified" in the TNC [The Nature Conservancy] Omniscape study, core habitat areas, and hexagons on the periphery of mapped habitat linkages when not included in the categories above.

Overall, the CDFW databases described above support the observation that the BSA is situated across in a patchy landscape of natural areas that support wildlife diversity. It is important to note that SR-58 runs along the southern border of the BSA, which is a major barrier to wildlife movement and breaks the connectivity between the site and potential habitat to the south. I-5 is also a major barrier to wildlife moving east to west. These areas are particularly prominent within the Buttonwillow Ecological Reserve, which is situated between project parcels. The topography across the BSA is flat with the vast majority consisting of agricultural lands, orchards, and disturbed habitats (Table 4). Wildlife moving across the landscape generally can move freely through the open and agricultural landscape; however, impediments to moving in this environment include paved roads, fenced facilities, and to some extent the California Aqueduct approximately 4.5 miles west of the BSA. While these features may constrain some wildlife movement, the relatively low traffic volume, along with light human presence, likely does not preclude wildlife from utilizing the BSA or surrounding areas.

However, the BSA does not currently function as a corridor or linkage between two larger habitat blocks. In addition, the proposed project areas are large patches of disjunct parcels that, after development and the establishment of proposed 8-foot-high fencing around the parcels, would continue to provide agricultural and open spaces across

the region for movement. Although the BSA may function as local dispersal habitat for wildlife movement and/or foraging/hunting, the proposed project would not create a substantial impediment to wildlife movement that would warrant a wildlife corridor study.

6 Project Impacts

This chapter addresses direct, indirect, and cumulative impacts to special-status biological resources that would result from implementation of the project. Proposed mitigation is provided in Chapter 7, Mitigation.

6.1 Definition of Impacts

Direct permanent impacts refer to complete loss of a biological resource. For purposes of this report, it refers to the area where vegetation clearing, grubbing, or grading replaces biological resources. Direct permanent impacts were quantified by overlaying the proposed impact limits on the biological resources map. Direct permanent impacts would occur from construction of the project.

Direct temporary impacts refer to impacts that would be restored to existing conditions after the project activity is complete. For this project, there are no temporary impacts.

Indirect impacts are reasonably foreseeable effects caused by a project's implementation on remaining or adjacent biological resources outside the direct disturbance zone. For purposes of this report, indirect impacts may affect areas outside the disturbance. Indirect impacts may be short-term and construction-related, or long-term and associated with development in proximity to biological resources.

Cumulative effects refer to the combined environmental effects of a project and other relevant projects. These effects may be minor when analyzed individually but become collectively significant as they occur over time. The cumulative projects study area was defined by projects planned within 6 miles of the BSA. Twenty-five projects within those surrounding areas were identified and evaluated to determine the extent of cumulative impacts on biological resources (Table 16).

Table 16. Cumulative Projects[5]

Name	Project Location	Request	APN	Zone Map	Section/ Township/ Range	Approx. Acreage
Cumulative Projects within a 1-Mile Radius						
1. 23-00916	Approx. 300 feet west of Lerdo Hwy and Rowlee Rd	CUP for RV Park	087-070-36	77	Sec 10/T 28 S/R 23 E	17.49
2. 20-01432 Winston Solar	On the eastern corner of Wildwood Rd and Seventh Standard Rd	CUP to construct and operate a 200 MW solar and battery storage facility with associated electrical interconnection facilities	Various[a]	77, 98, and 99	Sec 25/T 28 S/R 23 E; Sec 36/T 28 S/R 23 E; Sec 1/T 29 S/R 23 E; Sec 6/T 29 S/R 24 E	1,350

5 The cumulative projects were provide to the applicant by the County on October 2, 2024.

Table 16. Cumulative Projects[5]

Name	Project Location	Request	APN	Zone Map	Section/ Township/ Range	Approx. Acreage
1. 19-00732	On Seventh Standard Rd, approx. half a mile east of Tracy Ave and Seventh Standard Rd	CUP to construct and operate a biogas upgrading facility to receive biogas from nearby dairy digesters for the production of RNG; also includes installation and operation of a gas meter set assembly or point of receipt, gas pipeline extension, and any additional ancillary facilities required to connect to a local existing natural gas pipeline system	103-020-31	99	Sec 4/ T 29 S/R 24 E	240
4. 22-01114 Cal Centre Warehouse Development	On Buttonwillow Dr, approx. 600 feet from Buttonwillow Dr and Rudnick Rd	GPA, ZCC, CUP, PD - Cal Centre Warehouse Development	087-190-18	77	Sec 35/ T 28 S/R 23 E	18.69
Cumulative Projects within a 6-Mile Radius, Unincorporated Kern County						
5. 20-00538	24586 Lerdo Hwy, Bakersfield	PD plan for a commercial development to include a 5,520-square-foot convenience store and auto service station with fuel canopy	087-080-35	77	Sec 7/T 28 S/R 23 E	6.69-acre lot
6. 20-01376	20672 Tracy Ave, Buttonwillow	PD to change the use from restaurant to Truck Fueling Station	103-300-02 and 103-300-03	99-16	Sec 16/ T 29 S/ R 24 E	0.8
7. 21-01378 Carbon Terra Vault I, LLC	Elk Hills oilfield, west of Elk Hills Road and north of Skyline Road	CUP to allow a carbon capture and sequestration facility for permanent underground storage	Multiple	118, 119, 120, 138	Mult/T 30 S/R 23 E; Mult/T 30 S/R 22 E; Sec 30-31/ T 30 S/R 24 E; Sec 1/T 31 S/R 23 E	9,104

Table 16. Cumulative Projects[5]

Name	Project Location	Request	APN	Zone Map	Section/ Township/ Range	Approx. Acreage
8. 22-00034	7th Standard and Cherry Avenue, adjacent to Shafter city limits	A Precise Development Plan to construct a one-story, 14,280-square-foot metal building warehouse and a 6,700-square-foot two-story office building) on two parcels of record totaling an approximate 3.57 acres in the M-2 PD (Medium Industrial - Precise Development Combining) District	090-340-42 and 090-340-53	79-35	Sec 35/T 28 S/R 25 E	3.57
9. 23-00747 HD Holding International LLC	Approx. 500 feet north of Tracy Ave and Willow Dr	PD Plan for truck stop	103-280-55 and 103-280-70	99	Sec 16/T 29 S/R 24 E	7.94
10. 22-00035	On the corner of Stoner Dr and Stockdale Hwy	PD to construct a convenience store with gas service pumps	160-340-45	121	Sec 6/T 30 S/R 25 E	0.64
11. 22-00045	NW corner of Cherry Ave and Denbeste Ct	PD for a trucking facility	090-340-45 and 090-340-46	79	Sec 35/T 28 S/R 25 E	3.82
12. 21-00041 Shafter Solar	On the southeastern corner of Merced Ave and Scaroni Ave	CUP for a solar facility	089-070-90	79	Sec 5/ T 28 S/ R 25 E	18.38
13. 22-00093 Flying Goose Solar	On the southwest corner of Corcoran Rd and Kurt Rd	CUP to develop a photovoltaic facility and associated infrastructure necessary to generate a combined 3,000 kW of renewable electrical energy with future battery energy storage	069-162-06	53	Sec 10/ T 27 S/ R 22 E	40
14. 22-00262	Approx 700 ft east of the corner of	PD Plan to permit a 300-space general trucking facility and cargo	090-180-26	79-26	Sec 26/ T 28 S/	20

Table 16. Cumulative Projects[5]

Name	Project Location	Request	APN	Zone Map	Section/ Township/ Range	Approx. Acreage
	San Diego St and Beech Ave	container storage distribution facility			R 25 E	
15. 23-00937	18478 Polar Ave, Shafter	CUP for ag trucking facility and Cargo Containers	090-080-20	79	Sec 21/T 28 S/R 25 E	4.8
City of Shafter						
16. Tract 6614	Northeast corner of E Tulare Ave and Beech Ave	Final Map for 431 lots	089-090-32 and 089-090-33	79	Sec 11/T 28 S/R 25 E	140.3
17. Tract 7318	Northwest corner of W Tulare Ave and Mettler Ave	Final Map for 158 lots	026-010-33	79	Sec 9/T 28 S/R 25 E	39.3
18. Tract 6490	Northeast corner of E Los Angeles Ave and S Mannel Ave	Final Map for 440 lots	028-180-81	79	Sec 11/T 28 S/R 25 E	140
19. Tract 6713	Northwest corner of Elizabeth Ave and Elmendorf Ct	Final Map for 28 lots[b]	Various	N/A	Sec 16/T 28 S/R 25 E	9.8
20. GPA 24-40 and ZC 24-73	Northwest corner of E Lerdo Hwy and Golds Ave	Change from E to R-1	089-090-29	79	Sec 11/T 28 S/R 25 E	40.6
21. GPA 23-39 and 23-72	Northwest corner of E Los Angeles Ave and S Mannel Ave	Change from R-1 to R-3	028-180-57	79	Sec 15/T 28 S/R 25 E	8.7
City of Wasco						
22. Central Park	1990 Central Avenue	New park	490-010-56	55	Sec 55/ T 27 S/R 24 E	2
23. CNG Station	15200 Scofield Ave	Compressed Natural Gas Station Installation	487-140-01	55	Sec 9/T 27 S/R 24 E	13.15

Table 16. Cumulative Projects[5]

Name	Project Location	Request	APN	Zone Map	Section/ Township/ Range	Approx. Acreage
24. Prison Ranch Solar Farm	1990 Scofield Ave	Solar Commercial Ground Mounted: V System to offset on-site usage	487-140-02	55	Sec 9/T 27 S/R 24 E	1.2
25. Wasco Union High School District Ag Farm and MOT Relocation	3717 7th Street	Wasco Union High School District Ag Farm and MOT Building (Maintenance, Operations, and Transportation) Relocation	487-140-47	55	Sec 10/T 27 S/R 24 E	7.24

Notes:
[a] Exact APNs undisclosed. This analysis used location and acreage information to approximate the project extent.
[b] Tract 6713 – Elmendorf Ct does not exist in the roads data, and Elizabeth Ave is not in the Section/Township/Range that is listed. Therefore, this project was not included in the cumulative effects.

The cumulative projects are shown on Figure 27, Cumulative Projects. Only two CEQA documents related to the 25 projects in Table 16 could be found; therefore, the cumulative impact analysis relies on regional vegetation data to evaluate cumulative impacts to biological resources (CDFW 2016).

The evaluation of project impacts is organized below using Appendix G of the CEQA Guidelines.

6.2 Impacts Analysis

The entire site would be permanently impacted. Figures 28A through 28N, Potential Permanent Impacts, depict the areas where permanent impacts are anticipated to occur.

6.2.1 Impact BIO-1: Special-Status Species

Proposed mitigation measures referenced in this section are provided in Chapter 7.

6.2.1.1 Impacts to Special-Status Plants

6.2.1.1.1 Direct Impacts

Three special-status plants were observed on the BSA: heartscale (*Atriplex cordulata* var. *cordulata*; CRPR 1B.2), lesser saltscale (*Atriplex minuscula;* CRPR 1B.1), and alkali-sink goldfields (*Lasthenia chrysantha;* CRPR 1B.1). Approximately 22,642 total heartscale individuals were observed during 2023 botanical surveys (20,000 on Site 1; 10 on Site 2; 1 on Site 4; and 2,631 on the gen-tie line route). Approximately 3,817 lesser saltscale individuals were observed during 2023 botanical surveys, all on Site 8. Finally, approximately 50 alkali-sink goldfields were observed during 2023 botanical surveys, all on Site 2 (Figure 7).

Heartscale occurs in chenopod scrub, meadows and seeps, and valley and foothill grassland. Lesser saltscale occurs in chenopod scrub, playas, and valley and foothill grassland. Kern mallow occurs in chenopod scrub, pinyon and juniper woodland, and valley and foothill grassland (CNPS 2024a). On site, there are approximately 510 acres of suitable chenopod scrub and grassland habitat for heartscale, lesser saltscale, and Kern mallow that could be subject to direct impacts. Alkali-sink goldfields occurs in vernal pools (CNPS 2024a). There are approximately 91.3 acres of suitable wetland habitat for alkali-sink goldfields that could be subject to direct impacts.

Additionally, based on the results of the literature review and database searches, one special-status species, Kern mallow (*Eremalche parryi* ssp. *kernensis*; federally endangered [FE], CRPR 1B.2), has a high potential to occur on the BSA and thus has a high potential to be directly impacted by the proposed project.

Not all sites within the BSA contain suitable habitat resources to support the above species. Therefore, Table 17 summarizes expected impacts (i.e., where special-status plant species were observed during 2023 biological surveys) and potential impacts to special-status plants broken down by site and the gen-tie line area.

Table 17. Special-Status Plant Species Expected and Potential Impacts

Special Status Plant Species	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 8	Gen Tie
heartscale	**X**	**X**	x	**X**	—	—	x	**X**
lesser saltscale	x	x	x	—	—	—	**X**	x
alkali-sink goldfields	—	**X**	x	—	—	—	x	—
Kern mallow	x	x	x	—	—	—	x	x

Notes: Gen-tie = generation transmission line route; **X =** expected impact; x = potential impact.

The BSA does not occur within federally designated critical habitat for special-status plant species.

Mitigation Measure (MM) BIO-1 (Special-Status Plant Surveys) and **MM-BIO-2** (Avoidance of Known Special-Status Plants) would avoid and minimize potential direct impacts to special-status plants by requiring surveys during the blooming period and then requiring avoidance whenever feasible, or salvage and translocation if avoidance is not feasible. Success criteria associated with special-status plant salvage and translocation would require replacement of individuals and/or occupied area. **MM-BIO-3** (Worker Environmental Awareness Training [WEAT]) would avoid and minimize direct impacts to special-status plant species because the training would require the project biologist to conduct a WEAT program for all construction/contractor personnel to ensure compliance with the mitigation measures. **MM-BIO-4** (On-Site Biological Monitoring) ensures that the biological monitor has the authority to halt work, if necessary, during construction to protect biological resources.

Implementation of **MM-BIO-1** through **MM-BIO-4** would reduce potential direct impacts to special-status plants.

6.2.1.1.2 Indirect Impacts

Construction-related, short-term indirect impacts may include inadvertent spillover impacts outside the construction footprint, the spread of invasive species during construction, dust accumulation on special-status or listed species with any potential to occur, chemical spills, and stormwater erosion and sedimentation.

Potential long-term (post-construction) indirect impacts from O&M activities are not anticipated due to the type of project. All O&M activities would occur within the direct project footprint, and long-term indirect impacts from maintenance would be minimal.

Implementation of **MM-BIO-5** (Invasive Species Control) requires the control of invasive species during construction. **MM-BIO-6** (BMPs to Avoid Indirect Impacts to Special-Status Plants) requires that best management practices (BMPs) be implemented to control dust pollution, prevent the discharge of potentially harmful chemicals, and prevent changes in hydrology. To reduce fugitive dust resulting from project construction and to minimize adverse air quality impacts, the project would employ dust mitigation measures in accordance with the San Joaquin Valley Air Pollution Control District (SJVAPCD) Regulation VIII that limit the amount of fugitive dust generated during construction.

A stormwater pollution prevention plan (SWPPP) would be prepared and implemented to prevent all construction pollutants from contacting stormwater during construction activities, with the intent of keeping sediment and any other pollutants from moving off site and into receiving waters. BMP categories employed on site would include erosion control, sediment control, and non-stormwater good housekeeping. Preparation and implementation of a SWPPP would help to avoid and minimize the potential effects of stormwater erosion during construction.

Implementation of **MM-BIO-5** (Invasive Species Control) and **MM-BIO-6** (BMPs to Avoid Indirect Impacts to Special-Status Plants) would reduce potential indirect impacts to special-status plants.

6.2.1.1.3 Cumulative Effects

The project is expected to result in impacts to heartscale, lesser saltscale, and alkali-sink goldfields. It may also result in impacts to potentially occurring Kern mallow. Based on regional vegetation mapping, there are 46,661 acres of suitable habitat (alkali desert scrub, annual grassland, marsh/seep, and saline emergent wetland) for these species in the cumulative study area. Cumulative projects would affect up to 7,875 acres of suitable habitat for these species (17% of the cumulative study area), of which 490 acres constitute impacts from the Buttonbush Solar and Storage Project (6% of the cumulative effect). Cumulative effects assume that the entire project APN would be subject to impacts. In addition, suitable habitat for those species does not indicate presence. Therefore, the cumulative effect is overestimated.

Special-status plant surveys and avoidance of known special-status plants would reduce project-level impacts to special-status plant species. It is expected that other projects on the cumulative projects list would incorporate similar measures for the protection of special-status plant species should they occur or be expected to occur.

6.2.1.2 Impacts to Special-Status Wildlife

6.2.1.2.1 Direct Impacts

Direct impacts can potentially occur to special-status wildlife species from impacts to habitat and impacts to the species from injury or mortality of individuals from construction activities. Absent the proposed mitigation measures, impacts causing injury or mortality of individuals could include, for example, crushing of low-mobility species during grading, entombment of burrowing species during grading, collisions with construction equipment, and destruction of bird nests during vegetation removal or grading. Pursuant to Sections 3503 and 3503.5 of the California Fish and Game Code, direct impacts can also include activities that would cause disturbances to, or the destruction of, active bird nests that would result in injury or mortality of eggs or young.

The project could result in direct impacts to 17 special-status wildlife species with a moderate or high potential to occur, which are listed below by taxonomic group.

As with special-status plants, not all sites within the BSA contain suitable habitat resources to support the special-status species in question. Therefore, Table 18 summarizes potential impacts to special-status wildlife broken down by site and the gen-tie line route.

Table 18. Special-Status Wildlife Species Potential Impacts

Special Status Wildlife Species	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 8	Gen Tie Line
Invertebrates								
Crotch's bumble bee	x	x	x	—	x	x	x	x
Vernal pool fairy shrimp	x	x	x	x	—	—	x	x
Amphibians								
Western spadefoot	x	x	x	x	x	x	x	x
Reptiles								
Bakersfield legless lizard	x	x	x	—	x	x	x	x
California glossy snake	x	x	x	—	x	x	x	x
Blunt-nosed leopard lizard	x	--	x	—	x	x	x	x
Coast horned lizard	—	—	—	—	—	---	x	x
San Joaquin coachwhip	x	x	x	—	x	x	x	x
Birds[a]								
Tricolored blackbird	x	x	—	x	x	x	x	—
Burrowing owl	x	x	x	x	x	x	x	x
Swainson's hawk (nesting)	x	x	—	x	x	x	x	x
Loggerhead shrike (nesting)	x	—	—	—	—	—	x	x
Mammals								
Giant kangaroo rat	x	—	x	—	x	x	x	x
Tipton kangaroo rat	x	---	x	—	x	x	x	x
San Joaquin antelope squirrel	x	x	x	—	x	x	x	x
American badger	x	—	x	—	x	x	x	x
San Joaquin kit fox	x	x	x	x	x	x	x	x

Notes: gen-tie = generation transmission line route; x = potential impact.

[a] Potential impacts to bird species nesting habitat (not foraging habitat) were considered.

The following mitigation measures are applicable to all direct impacts to special-status wildlife. **MM-BIO-7** (Pre-Construction Wildlife Clearance Surveys) would minimize potential direct impacts to special-status wildlife by performing a final clearance survey, species specific pre-construction surveys prior to construction, and habitat avoidance and mitigation measures. **MM-BIO-3** (WEAT) would avoid and minimize direct impacts to special-status wildlife species because the training would require the project biologist to conduct a WEAT program for all construction/contractor personnel to ensure compliance with the mitigation measures. **MM-BIO-4** (On-Site Biological Monitoring) ensures that the biological monitor has the authority to halt work, if necessary, during construction to protect biological resources.

Special-Status Invertebrates

Crotch's bumble bee (SC) and vernal pool fairy shrimp (FT) both have the potential to occur on the BSA and thus have a potential to be impacted by the proposed project.

Crotch's Bumble Bee (SC)

Crotch's bumble bee is a state candidate for listing as endangered. It occurs in open grassland and scrub communities supporting suitable floral resources. It was not observed during surveys but has a potential to occur on the BSA. The proposed project could result in direct impacts to individuals of this uncommon species or could cause the loss of suitable floral resources. Additionally, based on habitat modeling, the proposed project would result in the permanent loss of approximately 493 acres of moderately suitable Crotch's bumble bee habitat on Sites 1 through 3, 5, 6, and 8 and the gen-tie line route (see Table 13).

Implementation of **MM-BIO-7** (Pre-Construction Wildlife Clearance Surveys) would require a pre-construction survey for Crotch's bumble bee, avoidance of nesting resources, if present, until the nesting period has concluded, and mitigation for occupied habitat, if present. Additionally, implementation of **MM-BIO-3** (WEAT) and **MM-BIO-4** (On-Site Biological Monitoring) would reduce direct impacts to Crotch's bumble bee.

Vernal Pool Fairy Shrimp (FT)

Vernal pool fairy shrimp is a branchiopod that is federally listed as threatened. It occurs in vernal pools or seasonally ponded areas within swales and ephemeral freshwater habitats and has potential to occur on the BSA. The proposed project could result in direct impacts to individuals if the species is present. Additionally, based on habitat modeling, the proposed project would result in the permanent loss of 443 acres of moderate- to high-suitability vernal pool fairy shrimp habitat on Sites 1, 2, 3, 5, and 8 and portions of the gen-tie line route (see Table 13).

Implementation of **MM-BIO-7** (Pre-Construction Wildlife Clearance Surveys) would reduce potential direct impacts by requiring pre-construction surveys for vernal pool fairy shrimp and avoidance, monitoring, BMPs, and compensatory mitigation if vernal pool fairy shrimp are present. Additionally, implementation of **MM-BIO-3** (WEAT) and **MM-BIO-4** (On-Site Biological Monitoring) would reduce direct impacts to vernal pool fairy shrimp.

Special-Status Amphibians

Western spadefoot (*Spea hammondii*) has suitable habitat and a potential to occur within suitable ponded areas throughout the BSA and therefore has a potential to be impacted by the proposed project.

Western Spadefoot (Federally Proposed for Listing as Threatened, SSC)

Western spadefoot is federally proposed for listing as a threatened species and is a California SSC. It primarily breeds in ponded areas that persist at least 3 weeks in grasslands, chaparral, coastal scrub, valley–foothill woodlands, pastures, and other agriculture. Spadefoot was incidentally observed in Site 8 and the proposed project could result in direct impacts to individuals.

Additionally, implementation of **MM-BIO-7** (Pre-Construction Wildlife Clearance Surveys) would reduce potential direct impacts by requiring pre-construction breeding pond checks prior to the rainy season) before the start of construction to determine if there is potential habitat for western spadefoot, and if suitable habitat is found, surveys

will be conducted. If spadefoot is detected, the animals will be relocated to suitable open space outside the construction area. Additionally, implementation of **MM-BIO-3** (WEAT) and **MM-BIO-4** (On-Site Biological Monitoring) would reduce direct impacts to western spadefoot.

Special-Status Reptiles

California glossy snake (*Arizona elegans occidentalis*; SSC), Bakersfield legless lizard (SSC), coast horned lizard (SSC), blunt-nosed leopard lizard (FE, FP, SE), and San Joaquin coachwhip (*Coluber flagellum ruddocki*; SSC) all have the potential to occur on the BSA and thus have a potential to be impacted by the proposed project.

Bakersfield Legless Lizard (SSC)

Bakersfield legless lizard is an SSC. It is known from two disjunct areas: the east side of the Carrizo Plain and portions of the city limits of Bakersfield. It is often found underneath leaf litter, rocks, and logs (CDFW 2024d). The proposed project could result in direct impacts to individuals if the species is present. Additionally, based on existing vegetation mapped on the BSA, the proposed project would result in the permanent loss of 499 acres of suitable scrub habitat on Sites 1, 2, 3, 5, 6, and 8 and the gen-tie line route (see Table 13). However, due to the surrounding vacant lands available with comparable suitable habitat, the loss of suitable habitat for Bakersfield legless lizard would be nominal.

Implementation of **MM-BIO-7** (Pre-Construction Wildlife Clearance Surveys), **MM-BIO-3** (WEAT), and **MM-BIO-4** (On-Site Biological Monitoring) would reduce direct impacts to Bakersfield legless lizard.

Blunt-Nosed Leopard Lizard (SE, FP, FE)

Blunt-nosed leopard lizard is state listed as endangered and fully protected and federally listed as endangered. No blunt-nosed leopard lizards were observed during site visits. There is suitable habitat for this species within the BSA. If blunt-nosed leopard lizards are present within suitable habitat within the BSA, direct impacts could include injury or mortality during construction activities. Without appropriate avoidance and minimization measures for blunt-nosed leopard lizards, impacts associated with ground-disturbing activities include burrow collapse, reduced reproductive success, or direct mortality. Additionally, based on habitat modeling, the proposed project would result in the permanent loss of 480 acres of high to moderately suitable blunt-nosed leopard lizard habitat on Sites 1, 3, 5, 6, and 8 and the gen-tie line route (see Table 13).

Implementation of **MM-BIO-7** (Pre-Construction Wildlife Clearance Surveys) would reduce potential direct impacts to blunt-nosed leopard lizard by requiring pre-construction, protocol-level surveys at disturbance locations and within 50 feet of burrows according to the Approved Blunt-Nosed Leopard Lizard Survey Methodology (CDFW 2019b), and requiring that if blunt-nosed leopard lizards are observed, the leopard lizard(s) and a 50-foot buffer would be avoided. If leopard lizards are observed, CDFW and USFWS would be consulted, ensuring that any unavoidable impacts to blunt-nosed leopard lizard habitat are offset with mitigation of habitat, at a ratio to be determined in consultation with USFWS and CDFW. **MM-BIO-7** would also require solar panel fields to be sited to avoid mammal or other fossorial burrows to the extent practicable. Additionally, implementation of **MM-BIO-3** (WEAT), and **MM-BIO-4** (On-Site Biological Monitoring) would reduce direct impacts to leopard lizard.

Coast Horned Lizard (SSC)

Coast horned lizard is an SSC. It occurs in open areas of sandy soil in valleys, foothills, and semi-arid mountains including coastal scrub, chaparral, valley–foothill hardwood, conifer, riparian, pine-cypress, juniper, and annual

grassland habitats. The proposed project could result in direct impacts to individuals if the species is present. Additionally, based on existing vegetation mapped on the BSA, the proposed project would result in the permanent loss of 19 acres of suitable grassland and unvegetated habitat on Site 8 and the gen-tie line route (see Table 13). However, the surrounding lands available have comparable suitable habitat.

Implementation of **MM-BIO-7** (Pre-Construction Wildlife Clearance Surveys), **MM-BIO-3** (WEAT), and **MM-BIO-4** (On-Site Biological Monitoring) would reduce direct impacts to coast horned lizard.

California Glossy Snake and San Joaquin Coachwhip (SSC)

California glossy snake and San Joaquin coachwhip are both SSC. They both occur in grasslands and scrub. The proposed project could result in direct impacts to individuals if the species are present. Additionally, based on existing vegetation mapped on the BSA, the proposed project would result in the permanent loss of 499 acres of suitable grassland and scrub habitat on Sites 1, 2, 3, 5, 6, and 8 and the gen-tie line route (see Table 13). However, the surrounding lands available have comparable suitable habitat.

Implementation of **MM-BIO-7** (Pre-Construction Wildlife Clearance Surveys), **MM-BIO-3** (WEAT), and **MM-BIO-4** (On-Site Biological Monitoring) would reduce direct impacts to California glossy snake and San Joaquin coachwhip.

Special-Status Birds

Tricolored blackbird (BCC, SSC, ST), burrowing owl (SC, BCC, SSC), Swainson's hawk (ST), and loggerhead shrike (SSC) all have the potential to occur on the BSA and thus have a potential to be directly impacted by the proposed project. The potential direct impact to these species would be a violation of the federal MBTA, as well as various provisions of the California Fish and Game Code. The destruction of any active nests of these species would also be a violation of Section 3503 (for all avian species) and/or Section 3503.5 (for raptor species).

Tricolored Blackbird (BCC, SSC, ST)

Tricolored blackbird is a USFWS Bird of Conservation Concern, SSC, and a state-listed threatened species. It nests near freshwater and emergent wetlands with cattails or tules, but also in Himalayan blackberry (*Rubus armeniacus*), and forages in grasslands, woodlands, and agricultural areas. Direct impacts to tricolored blackbird could occur if construction activities occur near an active nest colony or in foraging habitat during the nesting season. Additionally, based on habitat modeling, the proposed project would result in the permanent loss of 10 acres of moderately suitable tricolored blackbird habitat on Sites 1, 2, 4 through 6, and 8 (see Table 13).

Additionally, implementation of **MM-BIO-7** (Pre-Construction Wildlife Clearance Surveys) would require pre-construction nesting bird surveys 14 days prior to the start of construction during the nesting bird season. With respect to this species, the surveys will specifically evaluate the presence/absence of tricolored blackbird nesting colonies. If an active tricolored blackbird nesting colony is found during pre-construction surveys, a no-disturbance buffer will be established in accordance with CDFW's Staff Guidance Regarding Avoidance of Impacts to Tricolored Blackbird Breeding Colonies on Agriculture Fields in 2015 (CDFW 2015). Unavoidable impacts to occupied tricolored blackbird suitable habitat shall be compensated in conjunction with mitigation for the loss of RWQCB/CDFW aquatic resources, or at another ratio to be determined in consultation with CDFW. Additionally, implementation of **MM-BIO-3** (WEAT), and **MM-BIO-4** (On-Site Biological Monitoring) would reduce direct impacts to tricolored blackbird and avoid violations of the MBTA and Section 3503 of the California Fish and Game Code.

Burrowing Owl (SC, BCC, SSC)

Burrowing owl is a state candidate for listing as threatened, USFWS Bird of Conservation Concern, and SSC. Burrowing owl nests and forages in grassland, open scrub, and agriculture, particularly with ground squirrel burrows. Individual burrowing owls could be injured or killed if they disperse through the project area during construction activities. Additionally, based on habitat modeling, the proposed project would result in the permanent loss of 272 acres of high-suitability burrowing owl habitat on Sites 3 and 8, and 7,946 acres of low- to moderate-suitability habitat on all sites and the gen-tie line route (see Table 13).

Implementation of **MM-BIO-7** (Pre-Construction Wildlife Clearance Surveys) would reduce potential direct impacts to burrowing owl by requiring pre-activity surveys for burrowing owl within 500 feet of ground-disturbing activities and establishing avoidance buffers around active burrows if burrows or owls are detected. If avoidance of active buffers is not feasible, burrow exclusion would be conducted before breeding behavior is exhibited and burrows are confirmed empty. Replacement burrows would also be required. If impacts to burrowing owl cannot be feasibly avoided, the project applicant will consult with CDFW. Unavoidable impacts to occupied burrows shall be compensated at a ratio to be determined in consultation with CDFW.

Additionally, a qualified biologist will remain on call throughout construction in the event that a burrowing owl occurs on site during construction in order to determine if avoidance buffers are required. If **MM-BIO-8** (Bird Flight Diverters) requires that guy wires be installed with bird flight diverters at no less than 15-foot spacing to reduce the potential for collision with flying birds. Implementation of **MM-BIO-7** (Pre-Construction Wildlife Clearance Surveys), **MM-BIO-3** (WEAT), **MM-BIO-4** (On-Site Biological Monitoring), and **MM-BIO-8** would reduce potential direct impacts to burrowing owl and avoid violations of the MBTA and Sections 3503 and 3503.5 of the California Fish and Game Code.

Swainson's Hawk (ST)

Swainson's hawk is a state-listed threatened species. It nests in open woodland and savanna, riparian, and in isolated large trees, and forages in nearby grasslands and agricultural areas such as wheat and alfalfa fields and pasture. Impacts to individual nesting Swainson's hawks could occur if construction activities occur near an active nest. Additionally, based on habitat modeling, the proposed project would result in the permanent loss of 13 acres of moderate- to high-suitability Swainson's hawk nesting habitat in Sites 6 and 8 and the gen-tie line route, and 3,328 acres of low to moderately suitable Swainson's hawk nesting habitat in Sites 1, 4 through 6, and 8 and the gen-tie line route (see Table 12 for acres of suitable habitat per site). An analysis of impacts and mitigation for occupied Swainson's hawk habitat will be provided after pre-activity surveys for Swainson's hawk nests, as described in **MM-BIO-7** (Pre-Construction Wildlife Clearance Surveys), are completed.

Implementation of **MM-BIO-7** would reduce potential direct impacts by requiring pre-activity surveys for Swainson's hawk nests during the nesting season in accordance with the Recommended Timing and Methodology for Swainson's Hawk Nesting Surveys in California's Central Valley (CDFG 2000). If an active Swainson's hawk nest is discovered at any time during the protocol surveys for the project, a qualified biologist shall complete an assessment of the potential for current construction activities to impact the nest. To protect the nest, buffers, monitoring, and potentially stopping work may all be required, depending on the conditions. Implementation of **MM-BIO-7** (Pre-Construction Wildlife Clearance Surveys), **MM-BIO-3** (WEAT), and **MM-BIO-4** (On-Site Biological Monitoring) would reduce direct impacts to Swainson's hawk and avoid violations of the MBTA and Sections 3503 and 3503.5 of the California Fish and Game Code.

Loggerhead Shrike (SSC)

Loggerhead shrike is an SSC. It nests and forages in open habitats with scattered shrubs, trees, or other perches. Impacts to loggerhead shrike could occur if construction activities occur near an active nest or in foraging habitat during the nesting season. Additionally, based on existing vegetation mapped on the BSA, the proposed project would result in the permanent loss of 177 acres of suitable scrub nesting habitat in Sites 1 and 8 and the gen-tie line route and up to 11,477 acres of suitable foraging habitat (see Table 13). However, the surrounding vacant lands available have comparable suitable habitat.

Implementation of **MM-BIO-7** (Pre-Construction Wildlife Clearance Surveys) would reduce potential direct impacts by requiring pre-construction nesting bird surveys 14 days prior to the start of construction during the nesting bird season. If a nesting loggerhead shrike is detected during the breeding season, a 250-foot avoidance buffer will be placed around the nest. **MM-BIO-8** (Bird Flight Diverters) requires that guy wires be installed with bird flight diverters at no less than 15-foot spacing to reduce the potential for collision with flying birds. Additionally, **MM-BIO-3** (WEAT) and **MM-BIO-4** (On-Site Biological Monitoring) would reduce direct impacts to loggerhead shrike and avoid violations of the MBTA and Section 3503 of the California Fish and Game Code.

Special-Status Mammals

Giant kangaroo rat (FE, SE), Tipton kangaroo rat (FE, SE), American badger (SSC). and San Joaquin kit fox (FE, ST) all have the potential to occur on the BSA and therefore have a potential to be directly impacted by the proposed project.

Giant Kangaroo Rat (FE, SE)

Giant kangaroo rat is federally listed as endangered and state listed as endangered. It occurs on fine sandy loam soils with sparse forb vegetation and low-density alkali desert scrub. If this species were present within the impact footprint, direct impacts including injury or mortality could occur. Additionally, based on habitat modeling, the proposed project would result in the permanent loss of 468 acres of moderately suitable giant kangaroo rat habitat on Sites 1, 3, 5, 6, and 8 and the gen-tie line route (see Table 13). Small mammal trapping was conducted in December 2024 through February 2025. No giant kangaroo rats were captured during the trapping effort; however, all potential sites were not trapped or only a sample size of the potential habitat was trapped. It cannot be determined that giant kangaroo rats are not present or absent from the trapping effort.

Implementation of **MM-BIO-7** (Pre-Construction Wildlife Clearance Surveys) would reduce potential direct impacts by requiring solar panel fields and the gen-tie line route to be sited to avoid potential giant kangaroo rat burrows to the extent practicable, because giant kangaroo rats depend on burrows for critical life functions. However, if giant kangaroo rat burrows cannot be avoided by ground-disturbing activities within a 50-foot buffer, then verification trapping for presence of kangaroo rat species would be conducted using the Survey Protocol for Determining Presence of San Joaquin Kangaroo Rats (USFWS 2013). If giant kangaroo rat is determined to be present on site, **MM-BIO-7** dictates that the loss of occupied habitat be compensated at an agreed-upon ratio with the appropriate agencies. Additionally, implementation of **MM-BIO-3** (WEAT) and **MM-BIO-4** (On-Site Biological Monitoring) would reduce direct impacts to giant kangaroo rat.

Tipton Kangaroo Rat (FE, SE)

Tipton kangaroo rat is federally and state listed as endangered. It occurs on alluvial fan and floodplain soils, where its habitat includes one or two species of sparsely scattered shrubs and a ground cover of introduced and native annual grasses and forbs. This species was identified during small mammal trapping. If this species were present within the impact footprint, direct impacts including injury or mortality could occur. Additionally, based on habitat modeling, the proposed project would result in the permanent loss of 482 acres of high- to moderate-suitability Tipton kangaroo rat habitat on Sites 1, 3, 5, 6, and 8 and the gen-tie line route (see Table 13).

Implementation of **MM-BIO-7** (Pre-Construction Wildlife Clearance Surveys) would reduce potential direct impacts by requiring solar panel fields and the gen-tie line route to be sited to avoid potential Tipton kangaroo rat burrows to the extent practicable, because Tipton kangaroo rats depend on mammal burrows for critical life functions. However, if potential Tipton kangaroo rat burrows cannot be avoided by ground-disturbing activities within a 50-foot buffer, then verification trapping for presence of kangaroo rat species would be conducted using the Survey Protocol for Determining Presence of San Joaquin Kangaroo Rats (USFWS 2013). If Tipton kangaroo rat is determined to be present on site, **MM-BIO-7** dictates that the loss of occupied habitat be compensated at an agreed-upon ratio with the appropriate agencies. Additionally, implementation of **MM-BIO-3** (WEAT), and **MM-BIO-4** (On-Site Biological Monitoring) would reduce direct impacts to Tipton kangaroo rat.

American Badger (SSC)

American badger is an SSC. It is known to occur in dry, open, treeless areas; grasslands; coastal scrub; agriculture; and pastures, especially with friable soils. Because this species is highly mobile, individual badgers could be injured or killed if they disperse through the project impact footprint or gen-tie line areas during construction activities. Although American badger is sometimes known to occupy agricultural areas, the active agriculture within the BSA is generally composed of alfalfa, cotton, and sorghum, which are heavily irrigated and managed, providing only low-quality habitat for badger. Similarly, areas mapped as disturbed within the BSA are primarily disked, tilled, or cleared fields, which also only provide low-quality habitat. As such, agricultural and disturbed land covers were not included in the total impacted habitat area. Therefore, based on existing vegetation mapped on the BSA, the proposed project would result in the permanent loss of 468 acres of suitable grassland and scrub habitat on Sites 1, 3, 5, 6, and 8 and portions of the gen-tie line route (see Table 13). However, the surrounding lands available have comparable suitable habitat.

Implementation of **MM-BIO-7** (Pre-Construction Wildlife Clearance Surveys) would reduce potential direct impacts by requiring pre-activity surveys for American badger within 500 feet of ground-disturbing activities, and if dens are detected, then avoidance buffers would be established depending on the den type. Additionally, a qualified a biologist will remain on call throughout construction in the event that an American badger occurs on site during construction in order to determine if avoidance buffers are required. Additionally, implementation **MM-BIO-3** (WEAT) and **MM-BIO-4** (On-Site Biological Monitoring) would reduce direct impacts to American badger.

San Joaquin Kit Fox (FE, ST)

San Joaquin kit fox is a federally listed endangered and state-listed threatened species. It is known to occur in grasslands and scrublands, including those that have been modified; oak woodland; alkali sink scrubland; vernal pool; and alkali meadows. Because this species is highly mobile, kit foxes could be injured or killed if they disperse through the project area during construction or operations activities. Direct impacts could also include entrapment in trenches or pipes during construction. Additionally, based on habitat modeling, the proposed project would result

in the permanent loss of 227 acres of high-suitability San Joaquin kit fox habitat on Sites 3 and 8, and 7,946 acres of low- to moderate-suitability habitat on all sites and the gen-tie line route (see Table 13).

Implementation of **MM-BIO-7** (Pre-Construction Wildlife Clearance Surveys), **MM-BIO-9** (Standard Avoidance and Minimization Measures for the Protection of San Joaquin Kit Fox), and **MM-BIO-10** (Fence Design and Site Permeability) would reduce potential direct impacts by requiring pre-activity surveys for San Joaquin kit fox within 500 feet of ground-disturbing activities, and if dens are detected, then avoidance buffers would be established depending on the den type and requiring fencing that is permeable to San Joaquin kit fox. Additionally, a qualified biologist will remain on call throughout construction in the event that a San Joaquin kit fox occurs on site during construction in order to determine if avoidance buffers are required. **MM-BIO-7** also dictates that the loss of occupied habitat shall be compensated at an agreed-upon ratio with the appropriate agencies. **MM-BIO-9** would avoid and minimize impacts to the species from the project during construction and would reduce potential direct impacts. Additionally, implementation **MM-BIO-3** (WEAT) and **MM-BIO-4** (On-Site Biological Monitoring) would reduce direct impacts to San Joaquin kit fox.

San Joaquin Antelope Squirrel (ST)

San Joaquin antelope squirrel is a federally listed threatened species. It is known to occur in arid annual grassland and shrubland with saltbushes (*Atriplex* spp.), California joint fir, bladderpod (*Physaria* spp.), goldenbushes (*Ericameria* spp.), and snakeweed (*Gutierrezia* spp.). Focused surveys conducted in August 2024 for San Joaquin antelope squirrel were negative. Therefore, this species has a low potential to occur within the BSA, and direct impacts to the species caused by injury or death of individuals is not expected

Although this species was not observed on Sites 1, 2, and 8 during burrow surveys or surveys focusing on San Joaquin antelope squirrel, Sites 5 and 6 and portions of the gen-tie line were not accessible to survey; therefore, San Joaquin antelope squirrel has a moderate potential to occur in these areas and portions of the gen-tie line route. It also has low potential to occur throughout the BSA except for Site 4 (see Table 13). Implementation of **MM-BIO-7** (Pre-Construction Wildlife Clearance Surveys) would further reduce potential direct impacts by requiring solar panel fields to be sited to avoid mammal or other fossorial burrows to the extent practicable, because San Joaquin antelope squirrel depends on mammal burrows for critical life functions. Additionally, **MM-BIO-3** (WEAT) and **MM-BIO-4** (On-Site Biological Monitoring) would reduce direct impacts to San Joaquin antelope squirrel.

Nesting Birds

The project impact area contains suitable habitat for a wide variety of nesting bird species. Altered behaviors in nesting adults could result from construction activities and increased human presence, which could lead to nest failure.

Implementation of **MM-BIO-7** (Pre-Construction Wildlife Clearance Surveys) would reduce potential direct impacts by requiring pre-construction nesting bird surveys 14 days prior to the start of construction during the nesting bird season. If active nests are found, an avoidance buffer ranging from 50 feet to 500 feet may be required. The avoidance buffer will remain in place until the biologist has determined that the young are no longer reliant on the adults or the nest, or if breeding attempts have otherwise been unsuccessful. Work may occur within the avoidance buffer under the approval and guidance of the biologist, but full-time monitoring may be required. The biologist shall have the ability to stop construction if nesting adults show any sign of distress. **MM-BIO-8** (Bird Flight Diverters) requires that guy wires be installed with bird flight diverters at no less than 15-foot spacing to reduce the potential for collision with flying birds.

6.2.1.2.2 Indirect Impacts

Indirect impacts to special-status wildlife species are those that occur during construction to species present near the site, but not within the construction zone. These include fugitive dust that can degrade habitat and result in health implications for wildlife species; noise and vibration that can stress wildlife species or cause them to leave an area of otherwise suitable habitat, or that can result in disruption of bird nesting and the abandonment of active nests (which would be a violation of the federal MBTA as well as various provisions of the California Fish and Game Code); nighttime lighting, which can disrupt the activity patterns of nocturnal species, including many mammals and some birds, amphibians, and reptiles; and release of chemical pollutants, such as from oil leaks from construction vehicles and machinery.

To reduce fugitive dust resulting from project construction and to minimize adverse air quality impacts, the project would employ dust mitigation measures in accordance with the SJVAPCD Regulation VIII that limit the amount of fugitive dust generated during construction.

A SWPPP would be prepared and implemented to prevent all construction pollutants from contacting stormwater during construction activities, with the intent of keeping sediment and any other pollutants from moving off site and into receiving waters. BMP categories employed on site would include erosion control, sediment control, and non-stormwater good housekeeping. Preparation and implementation of a SWPPP would help to avoid and minimize the potential effects of stormwater erosion during construction.

MM-BIO-11 (Hazardous Waste Cleanup) would avoid and minimize indirect impacts by requiring the project proponent to stop work and repair and clear up any fuel or hazardous waste leaks or spills at the time of occurrence or as soon as it safe to do so. **MM-BIO-12** (Delineation of Property Boundaries) would avoid and minimize indirect impacts of constructing outside of the project footprint by clearly delineating the project impact boundaries prior to construction. **MM-BIO-13** (Lighting Design) would avoid and minimize the indirect impacts of light during construction by directing lighting away from natural areas during construction.

Crotch's Bumble Bee (SC)

The proposed project could result in indirect impacts to individuals of Crotch's bumble bee due to noise and vibration and other indirect effects. Implementation of **MM-BIO-7** (Pre-Construction Wildlife Clearance Surveys) would reduce potential indirect impacts from noise and vibration by requiring a pre-construction survey for Crotch's bumble bee, avoidance of nesting resources, and a 100-foot buffer, if Crotch's bumble bees are present, until the nesting period has concluded. Implementation of dust mitigation would avoid and minimize dust impacts, and implementation of a SWPPP would avoid and minimize pollutants and provide BMPs to assist with erosion control and sediment control. These measures, along with **MM-BIO-11** (Hazardous Waste Cleanup), **MM-BIO-12** (Delineation of Property Boundaries), and **MM-BIO-13** (Lighting Design), would mitigate indirect impacts to Crotch's bumble bee.

Vernal Pool Fairy Shrimp (FT)

The proposed project could result in indirect impacts to individuals of vernal pool fairy shrimp due to noise and vibration and other indirect effects. Implementation of **MM-BIO-7** (Pre-Construction Wildlife Clearance Surveys) would reduce potential indirect impacts from noise and vibration by requiring a pre-construction survey for vernal pool fairy shrimp, and avoidance of the area and establishment of a 250-foot buffer, if vernal pool fairy shrimp are present. Implementation of dust mitigation would avoid and minimize dust impacts, and implementation of a

SWPPP would avoid and minimize pollutants and provide BMPs to assist with erosion control and sediment control. These measures, along with **MM-BIO-11** (Hazardous Waste Cleanup), **MM-BIO-12** (Delineation of Property Boundaries), and **MM-BIO-13** (Lighting Design), would mitigate indirect impacts to vernal pool fairy shrimp.

Special-Status Amphibians

Western spadefoot has the potential to occur on the BSA and thus has a potential to be indirectly impacted by the proposed project.

Western Spadefoot (Federally Proposed for Listing as Threatened, SSC)

The proposed project could result in indirect impacts to individuals of western spadefoot due to noise and vibration and other indirect effects. Implementation of **MM-BIO-7** (Pre-Construction Wildlife Clearance Surveys) would reduce potential indirect impacts by requiring pre-construction pond checks prior to the rainy season before the start of construction to determine if there is potential habitat for western spadefoot; if there is, surveys will be conducted. If spadefoot is detected, the animals will be relocated to suitable open space outside of construction away from noise and vibration**.** Implementation of dust mitigation would avoid and minimize dust impacts, and implementation of a SWPPP would avoid and minimize pollutants and provide BMPs to assist with erosion control and sediment control. These measures, along with **MM-BIO-11** (Hazardous Waste Cleanup), **MM-BIO-12** (Delineation of Property Boundaries), and **MM-BIO-13** (Lighting Design), would mitigate indirect impacts to western spadefoot.

Special-Status Reptiles

Bakersfield legless lizard (SSC), California glossy snake (SSC), blunt-nosed leopard lizard (FE, FP, SE), San Joaquin coachwhip (SSC), and coast horned lizard (SSC) all have the potential to occur on the BSA and therefore have a potential to be indirectly impacted by the proposed project.

Bakersfield Legless Lizard (SSC), California Glossy Snake (SSC), San Joaquin Coachwhip (SSC), Coast Horned Lizard (SSC)

The proposed project could result in indirect impacts to individuals of Bakersfield legless lizard, California glossy snake, San Joaquin coachwhip, and coast horned lizard due to noise and vibration and other indirect effects. Implementation of **MM-BIO-7** (Pre-Construction Wildlife Clearance Surveys) would reduce potential indirect impacts by requiring surveys and moving the species out of harm's way from noise and vibration. Implementation of dust mitigation would avoid and minimize dust impacts, and implementation of a SWPPP would avoid and minimize pollutants and provide BMPs to assist with erosion control and sediment control. These measures, along with **MM-BIO-11** (Hazardous Waste Cleanup), **MM-BIO-12** (Delineation of Property Boundaries), and **MM-BIO-13** (Lighting Design), would mitigate indirect impacts to the special-status reptiles listed above.

Blunt-Nosed Leopard Lizard (SE, FP, FE)

The proposed project could result in indirect impacts to individuals of blunt-nosed leopard lizard due to noise and vibration and other indirect effects. Implementation of **MM-BIO-7** (Pre-Construction Wildlife Clearance Surveys) would reduce potential indirect impacts from noise and vibration by requiring a pre-construction survey for blunt-nose leopard lizard, and avoidance of the area with a buffer, if the species is present. Implementation of dust mitigation would avoid and minimize dust impacts, and implementation of a SWPPP would avoid and minimize pollutants and provide BMPs to assist with erosion control and sediment control. These measures, along with **MM-**

BIO-11 (Hazardous Waste Cleanup), **MM-BIO-12** (Delineation of Property Boundaries), and **MM-BIO-13** (Lighting Design), would mitigate indirect impacts to blunt-nosed leopard lizard.

Special-Status Birds

Tricolored blackbird (BCC, SSC, ST), burrowing owl (SC, BCC, SSC), Swainson's hawk (ST), and loggerhead shrike (SSC) all have the potential to occur on the BSA and therefore have a potential to be indirectly impacted by the proposed project.

Tricolored Blackbird (BCC, SSC, ST)

The proposed project could result in indirect impacts to individuals of tricolored blackbird due to noise and vibration and other indirect effects. Implementation of **MM-BIO-7** (Pre-Construction Wildlife Clearance Surveys) would reduce potential indirect impacts by requiring pre-construction nesting bird surveys 14 days prior to the start of construction during the nesting bird season; with respect to this species, the surveys will specifically evaluate the presence/ absence of tricolored blackbird nesting colonies. If an active tricolored blackbird nesting colony is found during pre-construction surveys, a no-disturbance buffer to avoid indirect impacts from noise and vibration will be established in accordance with CDFW's 2015 Staff Guidance Regarding Avoidance of Impacts to Tricolored Blackbird Breeding Colonies on Agriculture Fields (CDFW 2015). Implementation of dust mitigation would avoid and minimize dust impacts, and implementation of a SWPPP would avoid and minimize pollutants and provide BMPs to assist with erosion control and sediment control. These measures, along with **MM-BIO-11** (Hazardous Waste Cleanup), **MM-BIO-12** (Delineation of Property Boundaries), and **MM-BIO-13** (Lighting Design), would mitigate indirect impacts to tricolored blackbird and avoid violations of the MBTA and Section 3503 of the California Fish and Game Code.

Burrowing Owl (SC, BCC, SSC)

The proposed project could result in indirect impacts to individuals of burrowing owl due to noise and vibration and other indirect effects. Implementation of **MM-BIO-7** (Pre-Construction Wildlife Clearance Surveys) would reduce potential indirect impacts by requiring pre-activity surveys for burrowing owl within 500 feet of ground-disturbing activities, and if burrows or owls are detected, then avoidance buffers would be established depending on the breeding season to avoid noise and vibration impacts. If buffers are not feasible, burrow exclusion would be conducted before breeding behaving is exhibited and burrows are confirmed empty. Replacement burrows would also be required. Additionally, a qualified biologist will remain on call throughout construction in the event that a burrowing owl occurs on site during construction in order to determine if avoidance buffers are required. Implementation of dust mitigation would avoid and minimize dust impacts, and implementation of a SWPPP would avoid and minimize pollutants and provide BMPs to assist with erosion control and sediment control. These measures, along with **MM-BIO-11** (Hazardous Waste Cleanup), **MM-BIO-12** (Delineation of Property Boundaries), and **MM-BIO-13** (Lighting Design), would mitigate indirect impacts to burrowing owl and avoid violations of the MBTA and Section 3503 of the California Fish and Game Code.

Swainson's Hawk (ST)

The proposed project could result in indirect impacts to individuals of Swainson's hawk due to noise and vibration and other indirect effects. Implementation of **MM-BIO-7** (Pre-Construction Wildlife Clearance Surveys) would reduce potential indirect impacts by requiring pre-activity surveys for Swainson's hawk nests during the nesting season in accordance with the Recommended Timing and Methodology for Swainson's Hawk Nesting Surveys in California's Central Valley (CDFG 2000). No mature trees that could be used by Swainson's hawk will be removed. If an active

Swainson's hawk nest is discovered at any time within 0.5 miles of active construction, a qualified biologist should complete an assessment of the potential for current construction activities to impact the nest. To protect the nest (including from impacts from noise and vibration), buffers, monitoring, and potentially stopping work all may be required, depending on the conditions. Implementation of dust mitigation would avoid and minimize dust impacts, and implementation of a SWPPP would avoid and minimize pollutants and provide BMPs to assist with erosion control and sediment control. These measures, along with **MM-BIO-11** (Hazardous Waste Cleanup), **MM-BIO-12** (Delineation of Property Boundaries), and **MM-BIO-13** (Lighting Design), would mitigate indirect impacts to Swainson's hawk and avoid violations of the MBTA and Section 3503 of the California Fish and Game Code.

Loggerhead Shrike (SSC)

The proposed project could result in indirect impacts to individuals of loggerhead shrike due to noise and vibration and other indirect effects. Implementation of **MM-BIO-7** (Pre-Construction Wildlife Clearance Surveys) would reduce potential indirect impacts by requiring pre-construction nesting bird surveys 14 days prior to the start of construction during the nesting bird season. If a nesting loggerhead shrike is detected during the breeding season, a 250-foot avoidance buffer to reduce impacts from noise and vibration will be placed around the nest. Implementation of dust mitigation would avoid and minimize dust impacts, and implementation of a SWPPP would avoid and minimize pollutants and provide BMPs to assist with erosion control and sediment control. These measures, along with **MM-BIO-11** (Hazardous Waste Cleanup), **MM-BIO-12** (Delineation of Property Boundaries), and **MM-BIO-13** (Lighting Design), would mitigate indirect impacts to loggerhead shrike and avoid violations of the MBTA and Section 3503 of the California Fish and Game Code.

Special-Status Mammals

Giant kangaroo rat (FE, SE), Tipton kangaroo rat (FE, SE), American badger (SSC), San Joaquin antelope squirrel (ST), and San Joaquin kit fox (FE, ST) all have a potential to occur on the BSA and therefore could be indirectly impacted by the proposed project.

Giant Kangaroo Rat (FE, SE), Tipton Kangaroo Rat (FE, SE), San Joaquin Antelope Squirrel (ST)

The proposed project could result in indirect impacts to individuals of giant kangaroo rat, Tipton kangaroo rat, and San Joaquin antelope squirrel due to noise and vibration and other indirect effects.

Implementation of **MM-BIO-7** (Pre-Construction Wildlife Clearance Surveys) would reduce potential indirect impacts by requiring solar panel fields to be sited to avoid mammal or other fossorial burrows. These species depend on mammal burrows for critical life functions. Implementation of dust mitigation would avoid and minimize dust impacts, and implementation of a SWPPP would avoid and minimize pollutants and provide BMPs to assist with erosion control and sediment control. These measures, along with **MM-BIO-11** (Hazardous Waste Cleanup), **MM-BIO-12** (Delineation of Property Boundaries), and **MM-BIO-13** (Lighting Design), would mitigate indirect impacts to the special-status mammals listed above.

American Badger (SSC)

The proposed project could result in indirect impacts to individuals of American badger due to noise and vibration and other indirect effects. Implementation of **MM-BIO-7** (Pre-Construction Wildlife Clearance Surveys) would reduce potential indirect impacts by requiring pre-activity surveys for American badger within 500 feet of ground-disturbing

activities, and if dens are detected, avoidance buffers would be established depending on the den type. Additionally, a qualified biologist will remain on call throughout construction and in the event that an American badger occurs on site during construction, the biologist will determine if avoidance buffers are required. Implementation of dust mitigation would avoid and minimize dust impacts, and implementation of a SWPPP would avoid and minimize pollutants and provide BMPs to assist with erosion control and sediment control. These measures, along with **MM-BIO-11** (Hazardous Waste Cleanup), **MM-BIO-12** (Delineation of Property Boundaries), and **MM-BIO-13** (Lighting Design), would mitigate indirect impacts to American badger.

San Joaquin Kit Fox (FE, ST)

The proposed project could result in indirect impacts to individuals of San Joaquin kit fox due to noise and vibration and other indirect effects. Implementation of **MM-BIO-7** (Pre-Construction Wildlife Clearance Surveys) and **MM-BIO-9** (Standard Avoidance and Minimization Measures for the Protection of San Joaquin Kit Fox) would reduce potential indirect impacts by requiring pre-activity surveys for San Joaquin kit fox within 500 feet of ground-disturbing activities, and if dens are detected, avoidance buffers would be established depending on the den type. Additionally, a qualified biologist will remain on call throughout construction and in the event that a San Joaquin kit fox occurs on site during construction, the biologist will determine if avoidance buffers are required. **MM-BIO-9** would avoid and minimize impacts to the species from the project during construction and would reduce potential indirect impacts. Implementation of dust mitigation would avoid and minimize dust impacts, and implementation of a SWPPP would avoid and minimize pollutants and provide BMPs to assist with erosion control and sediment control. These measures, along with **MM-BIO-11** (Hazardous Waste Cleanup), **MM-BIO-12** (Delineation of Property Boundaries), and **MM-BIO-13** (Lighting Design), would mitigate indirect impacts to San Joaquin kit fox.

Nesting Birds

The proposed project could result in indirect impacts to nesting birds due to noise and vibration and other indirect effects. Implementation of **MM-BIO-7** (Pre-Construction Wildlife Clearance Surveys) would reduce potential indirect impacts by requiring pre-construction nesting bird surveys 14 days prior to the start of construction during the nesting bird season. If active nests are found, an avoidance buffer ranging from 50 feet to 500 feet may be required. The avoidance buffer will remain in place until the biologist has determined that the young are no longer reliant on the adults or the nest, or if breeding attempts have otherwise been unsuccessful. Work may occur within the avoidance buffer under the approval and guidance of the biologist, but full-time monitoring may be required. The biologist shall have the ability to stop construction if nesting adults show any sign of distress. Implementation of dust mitigation would avoid and minimize dust impacts, and implementation of a SWPPP would avoid and minimize pollutants and provide BMPs to assist with erosion control and sediment control. These measures, along with **MM-BIO-11** (Hazardous Waste Cleanup), **MM-BIO-12** (Delineation of Property Boundaries), and **MM-BIO-13** (Lighting Design), would mitigate indirect impacts to nesting birds.

6.2.1.2.3 Cumulative Effects

The project is expected to result in impacts to special-status invertebrates (Crotch's bumble bee, vernal pool fairy shrimp), amphibians (western spadefoot), reptiles (Bakersfield legless lizard, blunt-nosed leopard lizard, California glossy snake, coast horned lizard, San Joaquin coachwhip), birds (tricolored blackbird, burrowing owl, Swainson's hawk, loggerhead shrike), and mammals (giant kangaroo rat, Tipton kangaroo rat, American badger, San Joaquin kit fox). Based on regional vegetation mapping, there are 55,974 acres of suitable habitat (all habitats except for agricultural land and urban) for these species in the cumulative study area. Cumulative projects would affect up to 9,724 acres (17% of the cumulative study area) of suitable habitat for these species, of which 579 acres (6% of

the cumulative effect) constitute impacts from the Buttonbush Solar and Storage Project. Cumulative effects assume that the entire project APN would be subject to impacts. In addition, suitable habitat for those species does not indicate presence. Therefore, the cumulative effect is overestimated.

Pre-construction wildlife clearance surveys, WEAT, on-site biological monitoring, bird flight diverters, standard avoidance and minimization measures for the protection of San Joaquin Kit Fox, and fence design and site permeability would reduce project-level impacts to special-status wildlife species. It is expected that other projects on the cumulative projects list would incorporate similar measures for the protection of special-status wildlife species should they occur or be expected to occur.

6.2.2 Impact BIO-2: Sensitive Vegetation Communities

Table 19 summarizes the total impacts to vegetation communities and land cover types associated with the proposed project.

6.2.2.1 Direct Impacts

Because the project may be phased and/or adjusted to avoid sensitive resources, the final impacts and mitigation will be based on which phases are built and refinement of the project design. Therefore, the impact acreages cited herein are estimates of impacts if the entire project is built. With project implementation, there would be 205.1 acres of direct impacts to sensitive vegetation communities, all of which are in the bog and marsh general vegetation category and are commonly named bush seepweed scrub, spinescale scrub, and tar plant fields (see Table 19 and Figures 28A–28N). Implementation of **MM-BIO-14** (Sensitive Vegetation Avoidance and Mitigation) will mitigate direct impacts to 205.1 acres of direct impacts to sensitive vegetation communities. Additionally, the following measures would reduce impacts to sensitive vegetation communities: **MM-BIO-3** (WEAT) would avoid and minimize direct impacts to sensitive vegetation communities because the training would require the project biologist to conduct a WEAT program for all construction/contractor personnel to ensure compliance with the mitigation measures, and **MM-BIO-4** (On-Site Biological Monitoring) would ensure that the biological monitor has the authority to halt work, if necessary, during construction to protect biological resources.

6.2.2.2 Indirect Impacts

Implementation of **MM-BIO-4** (On-Site Biological Monitoring) gives the project's designated biologist the authority to stop work if construction is not compliant with this CEQA document and requires that an experienced biologist oversee compliance with the protective measures, including limiting impacts to the project impact footprint. **MM-BIO-3** (WEAT) would provide construction personnel with training related to sensitive vegetation communities that could occur adjacent to the impact footprint. **MM-BIO-12** (Delineation of Property Boundaries) requires that impacts occur within the fenced, staked, or flagged area that is clearly delineated within the project impact footprint. Thus, implementation of **MM-BIO-4**, **MM-BIO-3**, and **MM-BIO-12** would enable the project to avoid and minimize inadvertent spillover impacts outside of the approved impact footprint.

To reduce fugitive dust resulting from project construction and to minimize adverse air quality impacts, the project would employ dust mitigation measures in accordance with the SJVAPCD Regulation VIII that limit the amount of fugitive dust generated during construction.

MM-BIO-11 (Hazardous Waste Cleanup) would ensure that a prompt and effective response to any accidental chemical spills would be implemented, and that repair and cleanup of any hazardous waste occurs. Thus, implementation of **MM-BIO-11** would help to avoid and minimize indirect impacts to sensitive vegetation communities that could occur adjacent to the impact footprint from any construction-related chemical spills.

A SWPPP would be prepared and implemented to prevent all construction pollutants from contacting stormwater during construction activities, with the intent of keeping sediment and any other pollutants from moving off site and into receiving waters. BMP categories employed on site would include erosion control, sediment control, and non-stormwater good housekeeping. Preparation and implementation of a SWPPP would help to avoid and minimize the potential effects of stormwater erosion during construction.

Construction of the project would introduce potential ignition sources to the BSA, including the use of heavy machinery and the potential for sparks during welding activities or other hot work. However, the project would be required to comply with state requirements for fire safety practices to reduce the possibility of fires during construction activities. Further, vegetation would be removed from the site prior to the start of construction. Adherence to state regulatory standards during project construction would reduce the risk of wildfire ignition and spread during construction activities. Therefore, indirect impacts involving wildland fires would not be substantial.

Implementation of **MM-BIO-4** (On-Site Biological Monitoring), **MM-BIO-3** (WEAT), **MM-BIO-11** (Hazardous Waste Cleanup), and **MM-BIO-12** (Delineation of Property Boundaries) would reduce potential indirect impacts to sensitive vegetation communities that could occur adjacent to the impact footprint.

Table 19. Direct Impacts to Vegetation Communities and Land Cover Types

General Category of Vegetation	Common Name of Vegetation	Scientific Name of Vegetation	Classification of Vegetation	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 8	Gen Tie Line	BSA Total Acres[a]
Sensitive Vegetation Communities												
Bog and marsh	Bush seepweed scrub	*Suaeda moquinii* Association (Suamoq)	Association	N/A	46.4	89.9	N/A	N/A	N/A	33.8	6.8	176.9
		Isocoma acradenia Alkaline Wet Association (IsoacrAlkWet)	Association	N/A	N/A	1.9	N/A	N/A	N/A	13.6	N/A	15.6
	Spinescale scrub	*Atriplex spinifera* Association (Atrspi)	Association	N/A	N/A	N/A	N/A	N/A	N/A	0.2	N/A	0.2
	Tar plant fields	*Centromadia (pungens)* Alliance	Alliance	N/A	N/A	11.9	N/A	N/A	N/A	N/A	0.4	12.4
			Sensitive Vegetation Communities Subtotal[a]	*N/A*	*46.4*	*103.8*	*N/A*	*N/A*	*N/A*	*47.6*	*7.2*	*205.1*
Other Non-Sensitive Vegetation Communities and Land Cover Types												
Bog and marsh	Cattail marshes	*Typha* (*angustifolia, domingensis, latifolia*) alliance (*Typangdomlat*)	Alliance	N/A	0.3	N/A	N/A	N/A	N/A	N/A	N/A	0.3
	Salt grass flats	*Distichlis spicata* association (*Disspi*)	Association	N/A	N/A	N/A	N/A	N/A	N/A	18.3	N/A	18.3
Disturbed and developed	Orchards	Orchards (ORC)	None/general habitat/group	854.8	0.5	N/A	221.9	535.9	832.2	716.6	244.2	3,406.1
	General agriculture	General agriculture (AGR)	None/general habitat/group	1,132.3	474.9	449.9	158.1	2,003.9	1,324.5	1,978.5	201.8	7,723.4
	Disturbed habitat	Disturbed habitat (DH)	None/general habitat/group	260.1	19.6	17.5	20.0	140.3	92.3	188.3	290.8	1,028.9
	Urban/developed	Urban/developed (DEV)	None/general habitat/group	5.9	1.9	N/A	N/A	12.4	153.7	4.6	119.1	297.6
	Open water	Open water (OW)	None/general habitat/group	1.0	0.32	N/A	0.82	1.2	2.0	1.4	0.7	7.6
	Ornamental plantings	Ornamental plantings (ORN)	None/general habitat/group	N/A	N/A	N/A	N/A	N/A	2.3	6.2	0.2	8.7
Grass and herb dominated	Russian thistle–dyers woad–fivehook bassia fields	Bassia (hyssopifolia, scoparia) Association (Bashyssco)	Pending association	N/A	N/A	N/A	N/A	N/A	1.1	0.9	N/A	2.0
	N/A	Non-native grassland general habitat (NNG)	None/general habitat/group	N/A	N/A	89.3	N/A	N/A	N/A	0.1	20.0	109.4
Riparian	Tamarisk thickets	Tamarix spp. association (Tam)	Semi-natural association	N/A	0.75	N/A	N/A	N/A	3.0	6.7	N/A	10.5
Scrub	Fourwing saltbush scrub	Atriplex canescens association (Atrcan)	Association	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1.5	1.5
	Allscale scrub	Atriplex polycarpa association (Atrpol)	Association	37.8	N/A	N/A	N/A	N/A	N/A	51.7	64.3	153.8
		Atriplex polycarpa sparse playa association (Atrpolspapla)	Association	N/A	N/A	N/A	N/A	N/A	N/A	21.6	<0.01	21.6
Unvegetated	Unvegetated channel	Unvegetated channel (UVC)	None/general habitat/group	N/A	N/A	N/A	N/A	N/A	N/A	2.1	N/A	2.1
Woodland	N/A	Eucalyptus (globulus, camaldulensis) association (Eucglocam)	Semi-natural association	N/A	N/A	N/A	N/A	N/A	2.1	2.1	0.8	5.0
			Other Non-Sensitive Vegetation Communities and Land Cover Types Subtotal[a]	*2,291.9*	*498.2*	*556.1*	*400.8*	*2,693.8*	*2,413.2*	*2,997.2*	*943.4*	*12,794.5*
			Total[a]	**2,292.9**	**544.6**	**659.9**	**400.8**	**2,693.8**	**2,413.2**	**3,044.8**	**950.7**	**12,999.6**

Notes: N/A = not applicable.

[a] Totals may not sum due to rounding.

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6.2.2.3 Cumulative Effects

The project is expected to result in impacts to sensitive vegetation, including bush seepweed scrub, spinescale scrub, and tar plant fields. Based on regional vegetation mapping, there are 4,749 acres of these vegetation communities in the cumulative study area. Cumulative projects would affect up to 205.1 acres (4% of the cumulative study area) of these sensitive vegetation communities, all of which constitute impacts from the Buttonbush Solar and Storage Project. Cumulative effects assume that the entire project APN would be subject to impacts; however, the cumulative study area is not entirely mapped to a detailed enough level to determine sensitivity. Therefore, the cumulative effect could be overestimated or underestimated.

Sensitive vegetation avoidance and mitigation, WEAT, and on-site biological monitoring would reduce potential project-level impacts to sensitive vegetation. It is expected that other projects on the cumulative projects list would incorporate similar measures for the protection of sensitive vegetation should they occur or be expected to occur.

6.2.3 Impact BIO-3: State or Federally Protected Wetlands

6.2.3.1 Direct Impacts

Because the project may be phased and/or adjusted to avoid sensitive aquatic resources, the final impacts and mitigation will be based on which phases are built and refinement of the project design. Therefore, the impact acreages cited herein are estimates of impacts if the entire project is built. The project would result in direct impacts to up to 13.0 acres of potential NWWs and up to 91.3 acres of wetlands of the state under RWQCB jurisdiction. See Table 20 for a summary of impacts to RWQCB regulated resources by site; these are illustrated on Figures 28A through 28N. Quantities presented in Table 20 and Table 21 should not be considered cumulatively, because much of the aquatic features overlap.

Table 20. Impacts to RWQCB Jurisdictional Waters (Acres)

Feature Type	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 8	Gen Tie	BSA Total
Wetlands	N/A	N/A	61.0	N/A	N/A	N/A	30.3	N/A	91.3
Non-Wetlands	0.9	0.3	1.3	N/A	N/A	N/A	10.5	N/A	13.0
Site Subtotals	*0.9*	*0.3*	*62.3*	*N/A*	*N/A*	*N/A*	*40.8*	*N/A*	*N/A*
								Total	**104.2**

Notes: gen-tie = generation transmission line route; N/A = not applicable.

The project would result in direct impacts up to 6.1 acres of lake, up to 91.3 acres of riparian, and up to 6.8 acres of streambed under CDFW jurisdiction. See Table 21 for a summary of impacts to CDFW-regulated resources by site; these are illustrated on Figures 28A through 28N.

Table 21. Impacts to CDFW-Jurisdictional Waters (Acres)

Feature Type	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 8	Gen Tie	BSA Total
Lake	N/A	N/A	1.0	N/A	N/A	N/A	5.1	N/A	6.1
Riparian	N/A	N/A	61.0	N/A	N/A	N/A	30.3	N/A	91.3

Table 21. Impacts to CDFW-Jurisdictional Waters (Acres)

Feature Type	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 8	Gen Tie	BSA Total
Streambed	0.9	0.3	0.3	N/A	N/A	N/A	5.4	N/A	6.8
Site Subtotals	*0.9*	*0.3*	*62.3*	*N/A*	*N/A*	*N/A*	*40.8*	*N/A*	*N/A*
								Total	**104.2**

Notes: gen-tie = generation transmission line route; N/A = not applicable.

The ultimate decisions on the amount and location of jurisdictional resources are made by the resource agencies (i.e., USACE, CDFW, and RWQCB).

Due to direct permanent impacts to NWWs, wetlands, and streams/lakes that are regulated under the California Porter–Cologne Act and California Fish and Game Code, permits would be required from each of the regulatory agencies and typically entail providing mitigation to offset the impacts and loss of beneficial uses, functions, and values to the jurisdictional waters and habitats. RWQCB regulates waters of the state under California's Porter–Cologne Act. California Fish and Game Code Sections 1600–1616 give CDFW regulatory powers over streams and lakes, as well as vegetation associated with these features. **MM-BIO-15** (Aquatic Resources Mitigation) would require mitigating impacts at a minimum of a 1:1 mitigation ratio and obtaining permits from both regulatory agencies (RWQCB and CDFW). Based on the project design, it is assumed that the project would require a waste discharge requirement; therefore, an application must be submitted to the RWQCB. A Streambed Alteration Agreement would be required for impacts to jurisdictional streambed under CDFW.

Additionally, the following measures would reduce impacts to jurisdictional waters: **MM-BIO-3** (WEAT) would avoid and minimize direct impacts to jurisdictional waters because the training would require the project biologist to conduct a WEAT program for all construction/contractor personnel to ensure compliance with the mitigation measures, and **MM-BIO-4** (On-Site Biological Monitoring) would ensure that the biological monitor has the authority to halt work if necessary, during construction to protect biological resources. Implementation of **MM-BIO-3**, **MM-BIO-4**, and **MM-BIO-15** would reduce potential direct impacts to jurisdictional aquatic resources.

6.2.3.2 Indirect Impacts

Implementation of **MM-BIO-4** (On-Site Biological Monitoring) gives the project's designated biologist the authority to stop work if construction is not compliant with the certified CEQA document and requires that an experienced biologist oversee compliance with the protective measures, including limiting impacts to the project impact footprint. **MM-BIO-3** (WEAT) would provide construction personnel with training related to jurisdictional waters that could occur adjacent to the impact footprint. **MM-BIO-12** (Delineation of Property Boundaries) requires that impacts occur within the fenced, staked, or flagged area that is clearly delineated within the project impact footprint. Thus, implementation of **MM-BIO-3**, **MM-BIO-4**, and **MM-BIO-12** would enable the project to avoid and minimize inadvertent spillover impacts outside of the approved impact footprint.

To reduce fugitive dust resulting from project construction and to minimize adverse air quality impacts, the project would employ dust mitigation measures in accordance with the SJVAPCD Regulation VIII that limit the amount of fugitive dust generated during construction. **MM-BIO-15** (Aquatic Resources Mitigation) also mitigates for indirect impacts by requiring the implementation of BMPs to avoid and minimize any indirect impacts on jurisdictional waters.

MM-BIO-11 (Hazardous Waste Cleanup) would ensure that a prompt and effective response to any accidental chemical spills would be implemented and that repair and cleanup of any hazardous waste occurs. Thus, implementation of **MM-BIO-11** would help to avoid and minimize indirect impacts to jurisdictional waters that could occur adjacent to the impact footprint from any construction-related chemical spills.

A SWPPP would be prepared and implemented to prevent all construction pollutants from contacting stormwater during construction activities, with the intent of keeping sediment and any other pollutants from moving off site and into receiving waters. BMP categories employed on site would include erosion control, sediment control, and non-stormwater good housekeeping. Preparation and implementation of a SWPPP would help to avoid and minimize the potential effects of stormwater erosion during construction.

Implementation of **MM-BIO-3** (WEAT), **MM-BIO-4** (On-Site Biological Monitoring), **MM-BIO-11** (Hazardous Waste Cleanup), **MM-BIO-12** (Delineation of Property Boundaries), and **MM-BIO-15** (Aquatics Resources Mitigation) would reduce potential indirect impacts to sensitive vegetation communities that could occur adjacent to the impact footprint.

6.2.3.3 Cumulative Effects

The project is expected to result in impacts to potential NWWs and wetlands of the state under RWQCB jurisdiction, as well as lake, riparian, and streambed under CDFW jurisdiction. The cumulative effect to state or federally protected wetlands is unknown. However, project-level impacts to state or federally protected wetlands would be reduced through aquatic resources mitigation requiring a minimum of a 1:1 mitigation ratio and obtaining permits from both regulatory agencies (RWQCB and CDFW), as well as WEAT and on-site biological monitoring. It is expected that other projects on the cumulative projects list would incorporate similar measures for the protection of state or federally protected wetlands should they occur or be expected to occur.

6.2.4 Impact BIO-4: Wildlife Corridors and Habitat Linkages

6.2.4.1 Direct Impacts

No substantial direct permanent impacts would occur on wildlife movement or use of native wildlife nursery sites associated with project activities. The BSA does not currently function as a corridor or linkage between two larger habitat blocks. In addition, the proposed project areas are large patches of disjunct parcels that, after development and the establishment of proposed raised or permeable wildlife-friendly operational fencing around the parcels, would continue to provide agricultural and open spaces across the region for movement. Existing nearby habitat linkages and wildlife corridor functions would remain intact while construction activities are conducted and following project completion. Wildlife movement may be temporarily disrupted during the construction phase of the project, although this effect would be both localized and short term. Further, the BSA does not contain nursery sites, such as bat colony roosting sites, or habitat to support substantial colonial bird nesting areas.

6.2.4.2 Indirect Impacts

Construction-related short-term noise and work in the vicinity would be temporary and would not be expected to substantially disrupt wildlife movement due to ambient noise conditions and the ability for wildlife to continue to move around the construction area and upland portions of the BSA during and after construction. Temporary

disturbance to local species may occur but would not substantially degrade the quality or use of the vegetation communities in the vicinity. Work activities are not currently proposed during the nighttime.

Potential long-term (post-construction) indirect impacts from O&M activities could disrupt wildlife movement around the BSA due to increased lighting from buildings. **MM-BIO-13** (Lighting Design) would ensure that all lighting during operations and within 50 feet of the outside edge of the impact footprint containing habitat for special-status wildlife would be directed away from natural areas.

Implementation of **MM-BIO-13** would reduce potential indirect impacts to wildlife movement.

6.2.4.3 Cumulative Effects

Because the project would not result in substantial direct permanent impacts to wildlife corridors and habitat linkages, no cumulatively substantial effects to wildlife corridors and habitat linkages are expected to occur.

6.2.5 Impact BIO-5: Local Policies and Ordinances

The proposed project does not conflict with the County General Plan or zoning ordinances. Therefore, there would be no impacts with respect to local policies and ordinances, and no mitigation measures are necessary.

6.2.6 Impact BIO-6: Habitat Conservation Plans

The PG&E San Joaquin Valley O&M HCP overlies the proposed project. The HCP applies only to PG&E maintenance projects and does not apply to the currently proposed project (Jones & Stokes 2006). The project does not conflict with any provision of this HCP. The single-permittee HCPs and natural community conservation plans in the region do not apply to this project, which means this project is not covered and the applicant is not a permittee. Therefore, the proposed project does not conflict with the provisions of an adopted HCP, natural community conservation plan, or other approved local, regional, or state HCP.

7 Mitigation

MM-BIO-1 Special-Status Plant Surveys. Prior to the start of construction activities, a qualified biologist knowledgeable in the identification of special-status plant species (i.e., CRPR 1 and 2, federally and state-listed, and state rare) shall conduct a pedestrian survey of areas of proposed disturbance within suitable habitat plus a 100-foot buffer where permissible, to determine if any spring-blooming special-status plant species are present prior to construction. Rare plant surveys were conducted with the BSA in June of 2024 and only spring-blooming plants need to be surveyed for within the BSA. These surveys shall be floristic in nature and shall be conducted during the optimal blooming periods of the target species (March to May for Kern mallow, and February to April for alkali-sink goldfields) prior to start of construction activities in this area. Locations of any special-status plant species observed shall be mapped. If special-status plants are not identified during the survey(s), no further action is required.

MM-BIO-2 Avoidance of Known Special-Status Plants. If any special-status plant species are found during the pre-construction floristic surveys (MM-BIO-1) or have been otherwise identified on site, then Environmentally Sensitive Area fencing shall be established at a 50-foot radius around these individuals to ensure that they are not destroyed during project activities. Pursuant to Section 1913(c) of the California Fish and Game Code, if project activities cannot avoid those areas, the California Department of Fish and Wildlife (CDFW) and U.S. Fish and Wildlife Service (USFWS) (if there are federally or state listed species) shall be notified and provided the opportunity to salvage any of these plants that would be removed. CDFW may enter into agreement with the project proponent to retain a qualified entity for the relocation of special-status plants to an approved location. Any salvage shall be undertaken in accordance with a salvage plan to be developed in consultation with CDFW and USFWS (if there are federally or state listed species). The plan shall include methods for transplanting and watering (if appropriate), success criteria for salvaged plants, monitoring the health and survivorship of salvaged plants during at least 5 years following salvage, and contingency measures if plant survivorship requirements are not satisfied. This requires that the project proponent salvage and transplant all special-status species that cannot be avoided.

MM-BIO-3 Worker Environmental Awareness Training (WEAT). Prior to the initiation of construction activities, all construction personnel shall attend a WEAT program developed by a qualified biologist. Any personnel associated with construction who did not attend the initial training shall attend the recorded WEAT prior to working on the project site. Any employee responsible for the operations and maintenance or decommissioning of the project facilities shall also attend the WEAT program prior to starting work on the project and on an annual basis.

The program shall be developed and presented by the project qualified biologist(s) or designee approved by the qualified biologist(s). The program shall include information on the life histories of special-status species with potential to occur on the project site, their legal status, the recommended course of action should these species be encountered on site, and avoidance and minimization measures to protect these species. It shall include the components described below:

a. Information on the life history and identification of special-status species that may occur or that may be affected by project activities shall be provided. The program shall also discuss the

legal protection status of each such species, the definition of "take" under the federal Endangered Species Act and California Endangered Species Act, measures the project proponent/operator shall implement to protect the species, reporting requirements, specific measures for workers to avoid take of special-status plant and wildlife species, and penalties for violation of the requirements outlined in the California Environmental Quality Act mitigation measures and agency permit requirements.

b. An acknowledgment form signed by each worker indicating that the WEAT program has been completed shall be kept on file at the construction site.

c. A copy of the training transcript and/or training video, a list of the names of all personnel who attended the WEAT program, and signed acknowledgment forms shall be submitted to the Kern County Planning and Natural Resources Department.

d. A copy of the training transcript, training video, or informational binder for specific procedures shall be kept available for all personnel to review and familiarize themselves with as necessary.

e. A sticker shall be placed on hard hats indicating that the worker has completed the WEAT program. Construction workers shall not be permitted to operate equipment within the construction areas unless they have attended the WEAT program and are wearing hard hats with the required sticker.

f. The construction crews and contractor(s) shall be responsible for preventing unauthorized impacts from project activities to sensitive biological resources that are outside the areas defined as subject to impacts by project permits. Unauthorized impacts may result in project stoppage, and/or fines depending on the impact and coordination with the California Department of Fish and Wildlife and/or U.S. Fish and Wildlife Service.

MM-BIO-4 On-Site Biological Monitoring. During construction of any portion of the project site, including the generation tie line, a biological monitor with halt-work authority shall be present to observe activities. During construction, the qualified biologist shall have the authority to order a halt to construction activities in the following instances: (1) a biological monitor observes activities that may result in mortality or harm to a listed or fully protected species (e.g., blunt-nosed leopard lizard [*Gambelia sila*]); (2) a biological monitor observes that any of the mitigation and avoidance measures from the final environmental impact report certified by the County are not being implemented properly; (3) special-status species are detected in or immediately adjacent to the project site and may be harmed if construction activity is permitted to continue; or (4) if warranted to allow special-status species to traverse to and from burrows. Construction will resume when either the listed species moves out of harm's way on its own or the avoidance and minimization measures that are not being implemented properly are rectified.

MM-BIO-5 Invasive Species Control. Invasive plant species have the potential to out-compete native special-status plant species, so the introduction and spread of invasive and non- native plant species shall be avoided and controlled wherever possible during construction and operations, both within the project footprint and in surrounding areas. This may be achieved through measures such as cleaning vehicles and equipment before they enter construction areas, removing invasive plant species that exist on the site and disposing of the removed debris in a manner that prohibits their spread on and off site, and applying chemical deterrents as recommended by a Pest Control Advisor or implementing appropriate revegetation actions (e.g., seeding, weed control) to establish native vegetation in disturbed areas to discourage growth of invasive species. During operations, an

annual weed and invasive species control program shall be implemented within the project footprint.

MM-BIO-6 BMPs to Avoid Indirect Impacts to Special-Status Plants. To reduce any indirect impacts to special-status plants that may be in the project footprint, best management practices (BMPs) shall be implemented to control dust pollution, prevent discharge of potentially harmful chemicals, and prevent changes in hydrology. BMPs shall be consistent with the California Stormwater Quality Association (CASQA) 2023 Construction BMP Handbook, or most current version of this document, and shall include, but not be limited to, installing erosion and sedimentation control devices, applying water to control dust, placing drip pans under equipment when not in use, refueling in designated areas, and containing concrete washout properly, among other practices.

MM-BIO-7 Pre-Construction Wildlife Clearance Surveys. Pre-construction clearance surveys for special-status wildlife shall be conducted by a qualified project biologist within 14 days of the initiation of ground disturbance or vegetation clearing within and adjacent to construction areas. Surveys shall be appropriate for detecting potentially occurring species, such as but not limited to American badger, San Joaquin kit fox, blunt-nosed leopard lizard, Bakersfield legless lizard, California glossy snake, coast horned lizard, and San Joaquin coachwhip. Other special-status species shall be avoided during construction in accordance with the specific avoidance measures listed below. If western spadefoot toad becomes federally listed, the relocation would require an ITP. Surveys need not be conducted in all areas simultaneously, as long as they are conducted within 14 days of the initiation of ground disturbance or vegetation clearing in each area individually. If special-status species are detected, appropriate buffers shall be established, as necessary and as appropriate for the species, unless it is not feasible to avoid the species. If possible, non-listed special-status wildlife species may be captured and relocated to suitable habitat nearby where they are safe from construction activities. Surveys and relocation of these species shall be conducted only by the qualified project biologist.

- If non-listed special-status reptiles are detected, they shall be moved out of harm's way.
- The project biologist shall remain available at all times after initiation of ground disturbance or vegetation clearing, in case special-status wildlife species enter the construction area. If non-listed special-status species are detected in the construction area after initiation of ground disturbance or vegetation clearing, the qualified project biologist shall take measures to move the species, or encourage it to move, to a safe place away from construction activities.

Pre-Construction Survey for Crotch's Bumble Bee. A pre-construction survey for Crotch's bumble bee (*Bombus crotchii*) shall occur within the construction area where suitable habitat has been identified during the primary flight period for workers and males (March 1 through June 30) prior to the start of construction activities. The survey shall ensure that no nests for Crotch's bumble bee are located within the construction area. Crotch's bumble bee is a habitat generalist, ground-nesting bee. Surveys and other relevant recommendations shall be in accordance with the most recent protocol available at the time of the surveys.

If nest resources occupied by Crotch's bumble bee are detected within the construction area, no construction activities shall occur within 100 feet of the occupied nest resources, or as determined by a qualified biologist through evaluation of topographic features or distribution of floral resources. The nest resources shall be avoided for the duration of the Crotch's bumble bee nesting period

(February 1 through October 31). Outside of the nesting season, it is assumed that no live individuals would be present within the nest, because the daughter queens (gynes) usually leave by September, and all other individuals (original queen, workers, males) die. The gynes are highly mobile and can independently disperse to outside the construction footprint to the proposed open space or other suitable areas beyond that have suitable hibernaculum resources. Because construction will have occurred in the area outside the occupied nesting resources, no suitable habitat will be present in the impact area, and it is assumed that new queens will disperse to habitat outside the construction area.

In the event that the project proponent determines an Incidental Take Permit (ITP) is needed, mitigation for direct impacts to Crotch's bumble bee shall be fulfilled through compensatory mitigation with nesting habitat replacement of equal or better functions and values to those impacted by the project, or as otherwise determined through the ITP process. Mitigation shall be accomplished either through off-site conservation or through a mitigation bank approved by the California Department of Fish and Wildlife. If mitigation is not purchased through a mitigation bank and lands are conserved separately, a cost estimate shall be prepared to estimate the initial start-up costs and ongoing annual costs of management activities for the management of the conservation easement area(s) in perpetuity. The funding source shall be in the form of an endowment to help the qualified natural lands management entity that is ultimately selected to hold the conservation easement(s). The endowment amount shall be established following the completion of a project-specific Property Analysis Record to calculate the costs of in-perpetuity land management. The Property Analysis Record shall take into account all management activities required in the ITP to fulfill the requirements of the conservation easement(s), which are currently in review and development.

Branchiopod Surveys. Protocol-level surveys for federally listed large branchiopods in suitable habitat shall be conducted in accordance with guidance outlined in the 2017 U.S. Fish and Wildlife Service Survey Guidelines for Listed Large Branchiopods. Surveys shall include mapping areas of suitable habitat in the project site and conducting both wet season sampling and dry season sampling. As a preliminary step, survey notification shall be submitted to the regional USFWS office for survey approval.

Wet season sampling shall begin with the onset of the rainy season and shall include inundation checks prior to full survey efforts. Once potential habitat has been inundated for the appropriate time, surveys shall commence in all appropriate habitat on site every 10 days until it dries or a minimum of 90 consecutive days of inundation has occurred, whichever comes first. Sampling shall be reinitiated within 10 days of an individual habitat drying and inundating during the same wet season. Dry season surveys entail soil sample collection and processing from individual habitat within 90 days of completion of surveys.

Branchiopod Avoidance and Mitigation. Vernal pool fairy shrimp (*Branchinecta lynchi*) have potential to occur within portions of the project site, and protocol surveys shall be performed prior to construction within Sites 2, 3, and 8, where the species has high to moderate potential to occur. If surveys are negative, nothing further is required.

If surveys are positive, the full extent of listed branchiopod occurrence within the survey area shall be recorded using GPS. The location of occupied features shall be mapped and the number of individuals for each occurrence documented. The outer extent of each occupied listed branchiopod feature shall be flagged at the time of the survey. If full avoidance is infeasible then consultation with the U.S. Fish and Wildlife Service (USFWS) shall occur, and/or take authorization may be obtained from USFWS through Section 7 consultation, if applicable, or a Section 10 habitat conservation plan for impacts to federally listed branchiopods.

Avoidance, minimization, and mitigation measures shall be implemented and shall include, at a minimum, the following:

1. **Establishment of Environmentally Sensitive Areas (ESAs).** Prior to the start of any ground- or vegetation-disturbing activities, a qualified biologist shall establish ESAs to protect and avoid occupied federally listed branchiopod habitat area that occur outside of the project disturbance areas and within 250 feet of project disturbance areas. The locations of ESAs shall be clearly delineated through brightly colored fencing or other highly visible means and shall include a designated avoidance buffer developed in consultation with USFWS to prevent construction from affecting the vernal pool and its associated watershed. Construction crews shall be directed not to encroach beyond the limits of construction.
2. **Monitoring.** A qualified biologist shall be present during construction within 500 feet of occupied or assumed occupied vernal pool habitat(s) to conduct daily monitoring of the ESAs that protect occupied federally listed branchiopod habitat. The monitor shall have the authority to stop construction activities in the vicinity (within 250 feet) of an ESA if it is determined as a result of monitoring that corrective actions are necessary to avoid and protect the ESA.
3. **Best Management Practices (BMPs).** All fueling and maintenance of vehicles and other equipment and staging areas shall occur at least 500 feet from vernal pool or aquatic habitat.
4. **Compensatory Mitigation**. If avoidance is not feasible, the project shall abide by all conditions imposed by USFWS resulting from the consultation process. Such conditions may include preparation of a mitigation monitoring and management plan and/or creation/restoration/ enhancement of suitable vernal pool habitat. Alternatively, impacts to occupied listed branchiopod habitat may be mitigated by purchasing mitigation credits at a minimum replacement value of 1:1 for temporary and permanent impacts at a USFWS-approved mitigation bank for listed branchiopods.

Western Spadefoot Toad. A pre-construction check to determine if potential breeding resources occur for western spadefoot (*Spea hammondii*) (e.g., temporary puddles, stock ponds, slow-moving water courses) should be performed prior to the rainy season before start of construction activities. If no potential habitat for western spadefoot is found during the survey, no further mitigation is required.

1. If potentially suitable breeding areas for western spadefoot are identified, a 1,500-foot survey buffer, circumscribed by keyed-in construction fencing appropriate for amphibian exclusion, shall be installed around the construction area and breeding area. A pre-construction daytime and nighttime pond check and pre-construction nighttime surveys for western spadefoot shall be conducted the winter prior to grading activities within the construction area. Surveys for spadefoot will begin during or the night after the first three significant rain (≥ 0.25 inches)

events, as early as October or November, though peak breeding season typically occurs February through April. Surveys for spadefoot eggs and tadpoles can be done during the day and do not require nighttime surveys.

2. Daytime surveys will be conducted by walking slowly along pool margins visually searching for (but not disturbing) eggs, larvae, and juveniles. Spadefoot may breed in a variety of ephemeral and perennial habitats from side pools of large rivers to road ruts.
3. Nighttime surveys will occur between 1 hour after dusk and midnight and should be timed either during a rain event or the night after a rain event. Nighttime surveys (assuming eggs, larvae, and/or juveniles have not been detected) will be conducted by walking slowly and carefully along water features and between and through suspected breeding and upland habitats.
4. Transect-based nocturnal eyeshine surveys shall be conducted for upland nighttime surveys. These are performed through adjacent upland habitat within 1,500 feet of breeding locations or known occupied areas, using an approximate 30-meter transect width (less if there is denser grass, shrubs). Surveys must be conducted as silently as possible, because talking or other human-generated noises may cause western spadefoots to stop calling, hide, or leave the area. Surveyor shall rotate 360 degrees approximately every 200–300 meters (within the limits of their headlamp) and look backward along their transect with more frequency as the toads may watch the surveyor as they pass. Strong headlights or flashlights held at surveyor eye level should be used to visually locate and identify adult western spadefoots, and flash photography may be used to document sightings of solitary individuals.
5. If western spadefoot is detected during surveys within the fenced construction footprint, then biologists shall collect western spadefoot adults for relocation. Adults shall be relocated outside the construction footprint to portions of open space that have suitable breeding habitat and appropriate upland habitat, are of suitable size to support the translocated individuals, and contain few or no western spadefoot individuals. A relocation plan will be prepared and approved by the wildlife agencies and lead agency prior to implementation. The plan will include details regarding specifically how the western spadefoot will be captured, held, moved, and released; where they will be released; what data will be collected regarding the released individuals; timing; reporting; and other important factors. Relocation of western spadefoot shall follow the latest amphibian handling guidelines provided by the U.S. Geological Survey. It is advisable to also capture and release other native herpetofauna that are found as well. Implementation of this may require an Memorandum of Understanding and/or Scientific Collecting Permit from the California Department of Fish and Wildlife (CDFW) and, if listed by then, a Section 7 or 10 take permit from USFWS.

Because positive identification of western spadefoot was made in Site 8, list items 1 and 4 will be required. See Figure 10 in the project's biological resources technical report for the required buffer for transect-based nocturnal eyeshine surveys.

Protocol-Level Surveys and Avoidance of Blunt-Nosed Leopard Lizard. The project site contains suitable habitat for blunt-nosed leopard lizard. If project activities in this area cannot be avoided and if small mammal burrows cannot be avoided by ground-disturbing activities (e.g. excavation or grading) with a 50-foot buffer, qualified biologists shall conduct protocol-level surveys for blunt-nosed leopard lizard at disturbance locations within the 50-foot burrow buffer Protocol

BNLL surveys will follow the California Department of Fish and Wildlife's (CDFW) 2019 approved methodologies for disturbances leading to habitat removal. A total of 17 surveys days will be completed on all the project areas for the 2025 survey season. The project sites total 422 acres of high potential BNLL habitat and 58 acres of moderate potential BNLL habitat. These areas will be surveyed by groups of 2 to 7 biologists at 20-meter transect spacing. It is assumed that the linear survey locations are where the project areas border suitable BNLL habitat and within the MV/HV right-of-way. The survey will include groups of two biologists (Level 1 and Level 2 BNLL surveyors) that will survey the linear project areas. Each surveyor will conduct one transect each at 20-meter transect spacing. Since access to adjacent property is unknown, surveyors will use binoculars to scan adjacent property when necessary. Surveyors will map and GPS locations of any observations or sign of all special-status species, including San Joquin kit fox (*Vulpes macrotis mutica*) observation and sign and San Joaquin antelope squirrel (*Ammospermophilus nelsoni*) observations.

Project activity outside the specified 50-foot buffer may proceed while surveys are conducted. Overland travel not requiring ground disturbance may be permitted within the 50-foot buffer under the direct supervision of a qualified biologist. If no blunt-nosed leopard lizard is observed during the survey, no further action is required. If blunt-nosed leopard lizards are observed during the survey, then the measures below shall be implemented:

- Avoidance of mammal burrows shall be implemented to avoid all blunt-nosed leopard lizards that might be present in underground burrows. This would only be required in areas where blunt-nosed leopard lizards were determined to be present.
- All construction activities occurring during the active blunt-nosed leopard lizard season in areas where blunt-nosed leopard lizard were determined to be present shall require that on-site biological monitors be present at each site where activities are occurring within those areas. If a blunt-nosed leopard lizard is present within 50 feet of the construction activities, the monitor shall halt all activities until the blunt-nosed leopard lizard leaves the 50-foot area of its own accord.
- Consultation with CDFW and USFWS shall occur and an Incidental Take Permit (ITP) shall be sought from USFWS and CDFW if take of blunt-nosed leopard lizard habitat (as defined by the federal and state Endangered Species Act) cannot be avoided. An ITP would ensure that any impacted habitat is offset with mitigation at ratio to be determined in consultation with USFWS and CDFW.

Protocol-Level Surveys and Avoidance of Tipton Kangaroo Rat and Giant Kangaroo Rat.

Tipton kangaroo rat (*Dipodomys nitratoides nitratoides*) and giant kangaroo rat (*Dipodomys ingens*), depend on mammal burrows for critical life functions. Any construction of solar panel fields within the project footprint, access roads, and tower locations for the generation tie (gen-tie) line routes in non-cultivated habitat, undeveloped land types shall be sited to avoid suitable kangaroo rat burrows to the extent practicable. Avoidance is not required for previously developed or heavily disturbed areas, such as existing roads, compacted surfaces, or other infrastructure. If avoidance is not feasible, surveys for both giant and Tipton kangaroo rat species would first include a more focused habitat assessment to identify where suitable burrow clusters occur as described below.

To avoid potential impacts to the federally and state-listed San Joaquin kangaroo rat (TKR) and giant kangaroo rat (GKR), all trapping efforts shall be conducted by Permitted Biologists in accordance with the U.S. Fish and Wildlife Service (USFWS) 2013-approved Survey Protocol. The following measures shall be implemented:

- A Permitted Biologist shall identify up to 1,000 trap locations in areas with the highest quality habitat within a 10% sample area (approximately 48.2 acres). No more than 100 traps shall be managed by each biologist per trapping session.
- Traps shall be baited with sterilized proso millet to prevent germination and shall be checked at least once per night or more frequently as required by the Biologist's Memorandum of Understanding (MOU) and/or recovery permits.
- All captured TKR and GKR individuals shall be immediately released into a nearby suitable burrow. Trapping shall cease within a Zone once presence of TKR or GKR has been confirmed in that Zone.
- Trapping shall occur during the species' peak activity period (April 1–October 31) for up to 5 consecutive nights. If a target species is captured earlier, trapping will cease in that Zone.
- All traps shall be closed during inclement weather, including a forecast of 40% or greater chance of rain, temperatures exceeding 105°F, or dropping below 50°F. When temperatures drop below 50°F, traps shall be checked at least every 3 hours, and supplemented with unbleached paper towels and additional food. Trapping shall cease if captured animals show signs of hypothermia.
- If a lactating female or dependent young is captured, trapping will immediately cease in the area, at the discretion of the Permitted Biologist.
- A 50-foot buffer shall be established around all anthropogenic features (e.g., roads, pipelines) for safety.
- All trapping efforts shall be documented using standardized data sheets. Observations shall include biologist name, date, trap times, weather conditions, and species data (e.g., GPS location, time of capture, sex, age, weight, and general health).
- A California Natural Diversity Database (CNDDB) report shall be submitted within 60 days for any captures of listed species. A brief trapping report shall be submitted to 29SC 8me LLC, CDFW, and USFWS for review and approval.

If it is determined that giant and/or Tipton kangaroo rat are absent, then no further measures are warranted. If present, the following measures shall be implemented:

- The loss of occupied habitat shall be compensated at an agreed-upon ratio with the CDFW and the USFWS.
- Consultations with USFWS and CDFW shall occur, and Incidental Take Permits shall be acquired if take of listed species cannot be avoided.
- If Tipton kangaroo rat or giant kangaroo rat are detected a Relocation Plan shall be prepared by a qualified biologist and reviewed by and implemented in consultation with the USFWS and CDFW.

Pre-Activity Surveys for Nesting Birds. If project construction activities are initiated during the nesting season (February 1 to September 15), a pre-activity nesting bird survey shall be conducted

within 14 days prior to the start of construction within the area where construction is to be conducted. The surveys shall encompass the project site where construction is to be conducted and accessible or land visible from accessible areas within a 250-foot buffer for songbirds and a 500-foot buffer for raptors. The surveys may be phased with construction of the project. The surveys shall also evaluate presence/absence of tricolored blackbird (*Agelaius tricolor*) nesting colonies in proximity to project activities and to evaluate whether there is a potential for project-related impacts to affect the nesting colonies. If no active nests are found, no further action is required. However, existing nests may become active, and new nests may be built at any time prior to and throughout the nesting season, including when construction activities are in progress. Surveys for burrowing owl (*Athene cunicularia*) shall follow current California Department of Fish and Wildlife (CDFW) protocol (CDFW 2012).

If active nests are found during the survey or at any time during construction of the project, an avoidance buffer ranging from 50 feet to 500 feet may be required, with the avoidance buffer from any specific nest being determined by a qualified biologist. The avoidance buffer shall remain in place until the biologist has determined that the young are no longer reliant on the adults or the nest, or if breeding attempts have otherwise been unsuccessful. Work may occur within the avoidance buffer under the approval and guidance of the biologist, but full-time monitoring may be required. The biologist shall have the ability to stop construction if nesting adults show any sign of distress.

If an active tricolored blackbird nesting colony is found during pre-construction surveys, a no-disturbance buffer shall be established in accordance with CDFW's 2015 Staff Guidance Regarding Avoidance of Impacts to Tricolored Blackbird Breeding Colonies on Agriculture Fields. This buffer shall depend on the nature of the activity being conducted near the colony. For disturbances that are short in duration, a 60-foot buffer would be appropriate. More intensive construction activities may require a buffer of up to 500 feet at the discretion of the biological monitor. The buffer shall remain in place until the breeding season has ended or until a qualified biologist has determined that nesting has ceased, the birds have fledged, and the young are no longer reliant upon the colony or parental care for survival.

Unavoidable impacts to occupied tricolored blackbird suitable habitat shall be compensated at a in conjunction with mitigation for the loss of RWQCB/CDFW jurisdictional aquatic resources, as outlined in **MM-BIO-15** (Aquatic Resources Mitigation) below.

Avoidance and Mitigation for Burrowing Owl, American Badger, and San Joaquin Kit Fox. Within 14 days prior to the start of project ground-disturbing activities, a pre-activity survey with a 500-foot buffer where land access is permitted shall be conducted by a qualified biologist knowledgeable in the identification of these species and approved by the California Department of Fish and Wildlife (CDFW). Surveys need not be conducted for all areas at one time; they may be phased so that surveys occur within 14 days of the portion of the project site that will be disturbed. If dens/burrows that could support any of these species are discovered during the pre-activity survey, the avoidance buffers outlined below shall be established. No work shall occur within these buffers unless the biologist approves and monitors the activity.

Burrowing Owl (Active Burrows)

- Nonbreeding season (September 1–January 31): 160 feet
- Breeding season (February 1–August 31): 250 feet

American Badger/San Joaquin Kit Fox

- Potential or atypical den: 50 feet
- Known den: 100 feet
- Natal or pupping den: 500 feet, unless otherwise specified by CDFW

If burrowing owls are detected, a Burrowing Owl Management and Relocation Plan shall be prepared by a qualified biologist and reviewed by, and implemented in consultation with, CDFW. Unless otherwise approved by CDFW, disturbance to occupied burrows shall be avoided. Disturbance to suitably sized burrows (>11 cm wide) shall be avoided during the breeding season (February 1 through August 31) unless proven to be unoccupied. Buffers shall be established around occupied burrows in accordance with guidance provided in CDFW's Staff Report on Burrowing Owl Mitigation (CDFW 2012: or most recent guidance). No project activities shall be allowed to encroach into established buffers without the notification to CDFW. The buffer shall remain in place until it is determined that occupied burrows have been vacated.

Outside of the nesting season (September 1 through January 31), passive owl relocation techniques as outlined in the Burrowing Owl Management and Relocation Plan shall be implemented with notification to CDFW.

As directed above, if impacts to burrowing owl or San Joaquin kit fox cannot be feasibly avoided, the project applicant will confer with CDFW/USFWS to determine if take authorization from CDFW/USFWS through the California Endangered Species Act (CESA) Incidental Take Permit process, or federal Endangered Species Act (FESA) Incidental Take Permit process or other agency-approved method is recommended. If recommended, the ITP or other agency-approved permit shall provide suitable avoidance and minimization measures to reduce potential impacts, and adequate mitigation. Mitigation of occupied habitat at a ratio to be determined in consultation with the appropriate agencies may be through on- or off-site preservation with permanent protection and long-term funding, or through purchase of equivalent credits through a mitigation bank if available in addition to implementing all other measures and conditions of the permit.

Burrowing Owl, American Badger, and San Joaquin Kit Fox Avoidance. A qualified biologist shall remain on call throughout the construction phase in the event that a burrowing owl, American badger, or San Joaquin kit fox is observed on the site during construction. If one of these species occurs on site, the biologist shall be contacted immediately to determine whether biological monitoring or avoidance buffers may be warranted.

Pre-Activity Surveys for Swainson's Hawk Nests. If project construction activities are initiated during the Swainson's hawk nesting season (March 1 to September 15), pre-construction activity surveys shall be conducted for Swainson's hawk nests in suitable habitat areas in accordance with the Recommended Timing and Methodology for Swainson's Hawk Nesting Surveys in California's

Central Valley (Swainson's Hawk Technical Advisory Committee, 2000). As per the protocol, "To meet the minimum level of protection for the species, surveys should be completed for at least the two survey periods immediately prior to a project's initiation. For example, if a project is scheduled to begin on June 20, you should complete 3 surveys in Period III and 3 surveys in Period V. However, it is always recommended that surveys be completed in Periods II, III and V. Surveys should not be conducted in Period IV" (SHTAC 2000). If construction is scheduled within Period II (where two survey periods are not applicable prior to construction) a minimum of three surveys shall be conducted prior to construction. Timing and number of phases of surveys can be adjusted based on the timing of the construction schedule. The surveys shall be phased to coincide with active construction areas plus a 0.5-mile buffer from those areas, as required by the survey protocol.

Swainson's Hawk Nest Avoidance. If an active Swainson's hawk nest is discovered at any time during the protocol surveys the project, based on this assessment, the biologist shall determine if construction activities can proceed and the level of nest monitoring, if any, that may be required. Construction activities shall not occur within a minimum of 500 feet of an active nest unless the qualified biologist determines that a smaller distance is appropriate. On-site monitoring to evaluate the effects of construction activities on nesting Swainson's hawks may be required if construction activities would occur within 500 feet of an active nest to assess whether or not such activities at a closer distance to the nest are indirectly impacting the nest. The qualified biologist shall have the authority to stop work if it is determined that project construction is disturbing the nest. These buffers may need to increase depending on the sensitivity of the nesting Swainson's hawk to disturbances and at the discretion of the qualified biologist. Once it has been determined by the qualified biologist that the young of an active nest have fledged and are no longer dependent upon the nest for survival, the no-disturbance buffers can be eliminated. No avoidance shall be needed if construction occurs near a known Swainson's hawk nest outside the Swainson's hawk nesting season (March 1 to September 15). If an ITP is obtained from the CDFW, complete nest avoidance during construction may not be required, and the monitoring and nest avoidance measures outlined in the ITP shall take precedence over the measures described herein.

MM-BIO-8 Bird Flight Diverters. If guy wires are required for any project infrastructure, such use shall be minimized to the extent possible. Any guy wires shall be installed with bird flight diverters at no less than 15-foot spacing to reduce the potential for collision with flying birds.

MM-BIO-9 Standard Avoidance and Minimization Measures for the Protection of San Joaquin Kit Fox. The following avoidance and minimization measures shall be implemented during all phases of the project to reduce the potential for impact to San Joaquin kit fox from the project. These measures are modified from Appendix E of the U.S. Fish and Wildlife Service Standardized Recommendations for Protection of the Endangered San Joaquin Kit Fox prior to or during ground disturbance.

a. All food-related trash items such as wrappers, cans, bottles, and food scraps shall be disposed of in securely closed containers and removed at least once a week from the construction or project site.
b. Construction-related vehicle traffic shall be restricted to established roads and predetermined ingress and egress corridors, staging, and parking areas. Vehicle speeds shall not exceed 20 miles per hour within the project site.

c. To prevent inadvertent entrapment of San Joaquin kit fox or other animals during construction, the contractor shall cover all excavated, steep-walled holes or trenches more than 2 feet deep at the close of each workday with plywood or similar materials. If holes or trenches cannot be covered, one or more escape ramps constructed of earthen fill or wooden planks shall be installed in the trench. Before such holes or trenches are filled, the contractor shall thoroughly inspect them for entrapped animals.

d. San Joaquin kit foxes are attracted to den-like structures such as pipes and may enter stored pipes and become trapped or injured. All construction pipes, culverts, or similar structures with a diameter of 4 inches or greater that are stored at a construction site for one or more overnight periods shall be thoroughly inspected for kit foxes before the pipe is subsequently buried, capped, or otherwise used or moved in any way. If a kit fox is discovered inside a pipe, that section of pipe shall not be moved until USFWS and the California Department of Fish and Wildlife (CDFW) have been consulted. If necessary, and under the direct supervision of the biologist, the pipe may be moved only once to remove it from the path of construction activity, until the fox has escaped.

e. No pets, such as dogs or cats, shall be permitted on the project site to prevent harassment or mortality of San Joaquin kit foxes or destruction of dens.

f. Use of anti-coagulant rodenticides and herbicides in the project site shall be restricted. This is necessary to prevent primary or secondary poisoning of San Joaquin kit foxes and the depletion of prey populations on which they depend. All uses of such compounds shall observe label and other restrictions mandated by the U.S. Environmental Protection Agency, California Department of Food and Agriculture, and other state and federal legislation, as well as additional project-related restrictions in areas of suitable habitat deemed necessary by USFWS and CDFW. If rodent control must be conducted, zinc phosphide shall be used because of the proven lower risk to kit foxes.

g. A construction representative shall be appointed by the project proponent who will be the contact source for any employee or contractor who might inadvertently kill or injure a San Joaquin kit fox or who finds a dead, injured, or entrapped kit fox. The representative shall be identified during the employee education program and their name and telephone number shall be provided to USFWS.

h. The Sacramento Fish and Wildlife Office of USFWS and CDFW shall be notified in writing within 3 working days of the accidental death or injury to a San Joaquin kit fox during project-related activities. Notification must include the date, time, and location of the incident or of the finding of a dead or injured animal and any other pertinent information. The USFWS contact is the Chief of the Division of Endangered Species, at the addresses and telephone numbers below. The CDFW contact can be reached at 559.243.4014 and R4CESA@wildlifeca.gov.

i. All sightings of the San Joaquin kit fox shall be reported to the California Natural Diversity Database. A copy of the reporting form and a topographic map clearly marked with the location of where the kit fox was observed shall also be provided to USFWS at the address below.

j. USFWS at Endangered Species Division, 2800 Cottage Way, Suite W 2605, Sacramento, California 95825-1846, phone: 916.414.6620 or 916.414.6600.

MM-BIO-10 Fence Design and Site Permeability. The project site shall be fenced to keep terrestrial wildlife species from entering the project site during construction, but will provide openings post-

construction to enable wildlife to move freely through the project site during operation (e.g., by creating 4- to 7-inch portals or openings in the fence or raising the fence 7 inches above the ground and knuckling the bottom of the fence [i.e., wrapping the fencing material back to form a smooth edge] to protect wildlife passing underneath). Fencing shall be installed prior to issuance of grading or building permits and shall be maintained during all phases of construction and decommissioning. The fencing shall be inspected by a qualified biologist at a regular interval and immediately after all major rainfall events through the duration of construction and decommissioning activities. Any needed repairs to the fence shall be performed on the day of their discovery. Outside temporarily fenced exclusion areas, the project operator shall limit the areas of disturbance. Parking areas, new roads, staging, storage, excavation, and disposal site locations shall be confined to the smallest areas possible. These areas shall be flagged and disturbance activities, vehicles, and equipment shall be confined to these flagged areas.

MM-BIO-11 Hazardous Waste Cleanup. The applicant shall immediately stop work in the affected area and, pursuant to pertinent federal and state statutes and regulations, arrange for repair and cleanup by qualified individuals of any fuel or hazardous waste leaks or spills at the time of occurrence, or as soon as it is safe to do so.

MM-BIO-12 Delineation of Property Boundaries. Prior to the issuance of grading or building permits, the contractor shall, in consultation with the designated biologist, clearly delineate the boundaries of construction activities with fencing, stakes, or flags, consistent with the grading plan, within which project impacts will take place. All impacts outside the fenced, staked, or flagged areas shall be avoided, and all fencing, stakes, and flags shall be maintained until the completion of impacts in that area. Construction activities along the gen-tie line routes, redundance communication, and the SCE Midway Substation upgrades would not be delineated with fencing, stakes, or flagging.

MM-BIO-13 Lighting Design. Lighting for construction activities and operations within 50 feet of the outside edge of the impact footprint containing habitat for special-status wildlife shall be directed away from natural areas.

MM-BIO-14 Sensitive Vegetation Avoidance and Mitigation. The project area supports sensitive vegetation communities, including bush seepwood scrub, salt grass flats, spinescale scrub, and tar plant fields. If sensitive vegetation communities are fully avoided, no further mitigation will be required.

If full avoidance is not possible, prior to construction activities, the applicant shall mitigate for direct impacts to sensitive vegetation communities at a ratio no less than 1:1 for each sensitive natural community impacted through either a mitigation bank or applicant-responsible mitigation. If applicant-responsible mitigation is performed, a mitigation plan must be prepared. The mitigation plan shall include the following elements: (1) the mitigation type (e.g., preservation, creation); (2) location of mitigation; (3) evaluation of how the functions and values of the impacted vegetation communities will be mitigated; (4) an implementation plan; (5) maintenance requirements; (6) monitoring requirements; (7) reporting requirements; (8) contingency measures; (9) long-term management; and (10) funding assurances.

MM-BIO-15 Aquatic Resources Mitigation. The project site supports aquatic resources that are considered jurisdictional under the Regional Water Quality Control Board (RWQCB) and the California Department of Fish and Wildlife (CDFW). Prior to construction activity, the applicant shall

coordinate with RWQCB to ensure conformance with the requirements of the Porter–Cologne Water Quality Control Act (waste discharge requirement). Prior to activity within CDFW jurisdictional streambed or associated riparian habitat, the applicant shall coordinate with CDFW relative to conformance to the Lake and Streambed Alteration permit requirements.

Because the project may be phased, the final impacts and mitigation will be based on which phases are built. Therefore, the impact acreages cited herein are estimates of impacts if the entire project is built. Additionally, mitigation for aquatic resources may also mitigate for impacts to special-status species and their habitat. The project shall mitigate at a minimum of 1:1 with purchase of credits or through other applicant-sponsored and approved mitigation. Based on final site design, mitigation shall be provided for up to 104.2 acres of RWQCB/CDFW for impacts to aquatic resources. Mitigation shall be completed through use of a mitigation bank or other applicant-sponsored mitigation. Final mitigation ratios and credits shall be determined in consultation with RWQCB and/or CDFW based on agency evaluation of current resource functions and values and through each agency's respective permitting process. Should applicant-sponsored mitigation be implemented, a habitat mitigation and monitoring plan (HMMP) shall be prepared and approved by the agencies in accordance with the proposed program permits. The HMMP shall include a conceptual planting plan including planting zones, grading, and irrigation, as applicable; a conceptual plant palette; a long-term maintenance and monitoring plan; annual reporting requirements; and proposed success criteria. Any off-site applicant-sponsored mitigation shall be conserved and managed in perpetuity.

Best management practices shall be implemented to avoid any indirect impacts on jurisdictional waters, including the following:

- Vehicles and equipment shall not be operated in ponded or flowing water except as described in permits.
- Water containing mud, silt, or other pollutants from grading or other activities shall not be allowed to enter jurisdictional waters or be placed in locations that may be subjected to high storm flows.
- Spoil sites shall not be located within 30 feet from the boundaries of jurisdictional waters or in locations that may be subject to high storm flows, where spoils might be washed back into drainages.
- Raw cement/concrete or washings thereof, asphalt, paint or other coating material, oil or other petroleum products, or any other substances that could be hazardous to vegetation or wildlife resources resulting from project-related activities shall be prevented from contaminating the soil and/or entering avoided jurisdictional waters.
- No equipment maintenance shall be performed within 100 feet of jurisdictional waters, including wetlands and riparian areas, where petroleum products or other pollutants from the equipment may enter these areas.

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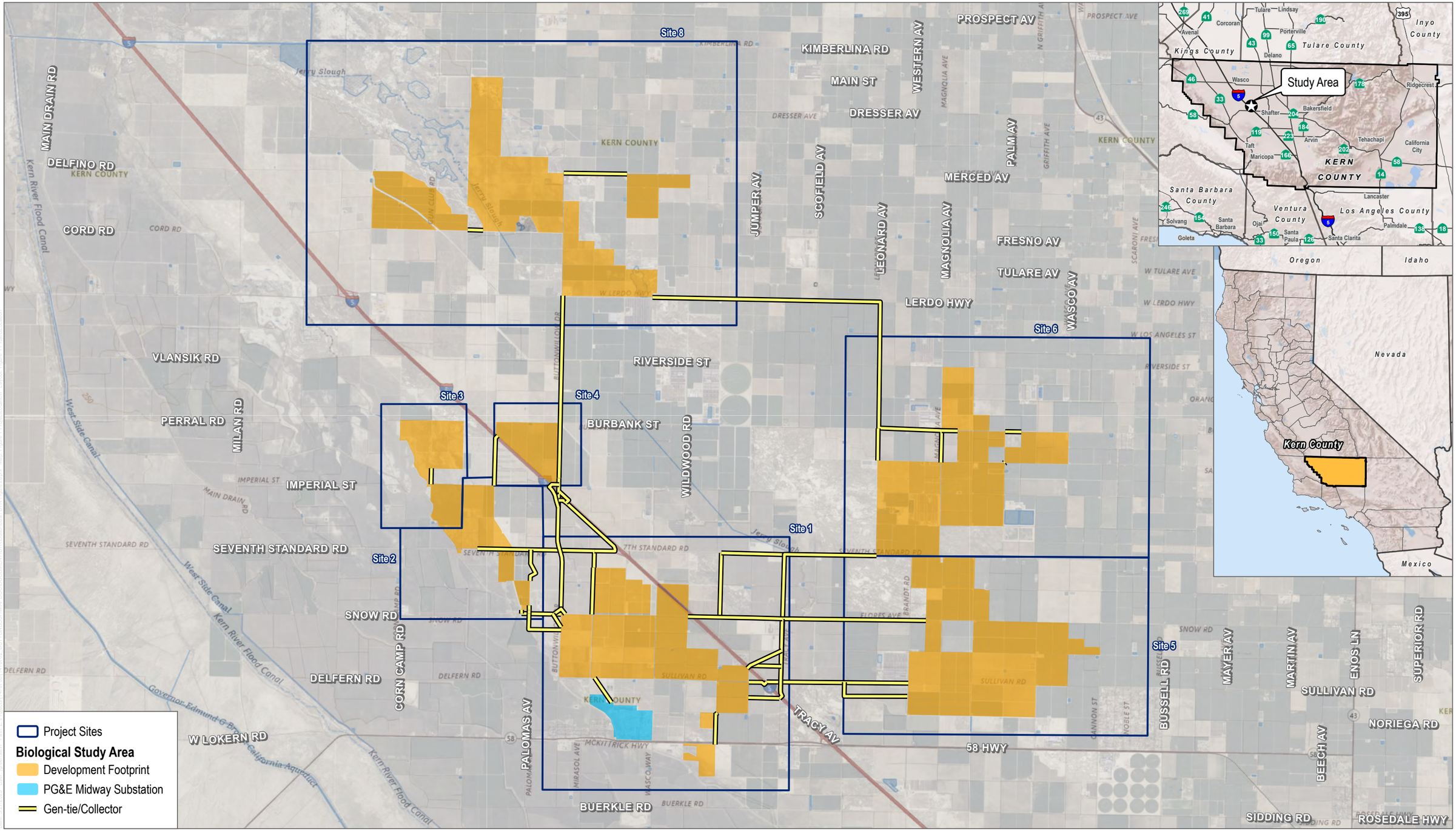
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Appendix A
Figures



SOURCE: Avantus LLC. 2024; USGS National Map 2022; Bing Maps 2022; Kern County 2022

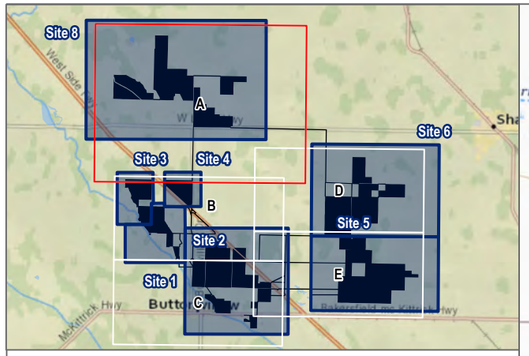
DUDEK

0 3,500 7,000 Feet

FIGURE 1

Project Location

Buttonbush Solar Energy Project



Project Sites

Biological Study Area

Development Footprint

Gen-tie/Collector

Site Plan

Solar Array

Drill Pad

BESS Location

Laydown Yard

Project Substation

Well and 10-ft Setback

SOURCE: Avantus LLC. 2024; USGS National Map 2024

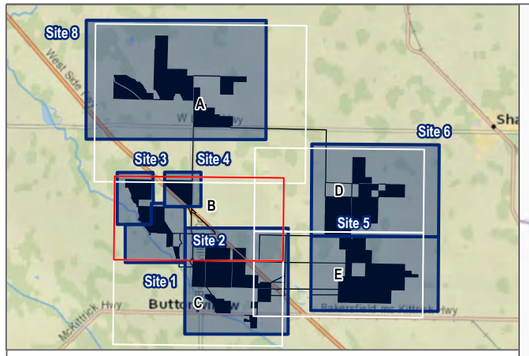
DUDEK

0 1,500 3,000 Feet

FIGURE 2A

Site Plan

Buttonbush Solar Energy Project



Project Sites

Biological Study Area

Development Footprint

Gen-tie/Collector

Site Plan

Solar Array

Drill Pad

BESS Location

Laydown Yard

Project Substation

Well and 10-ft Setback

SOURCE: Avantus LLC. 2024; USGS National Map 2024

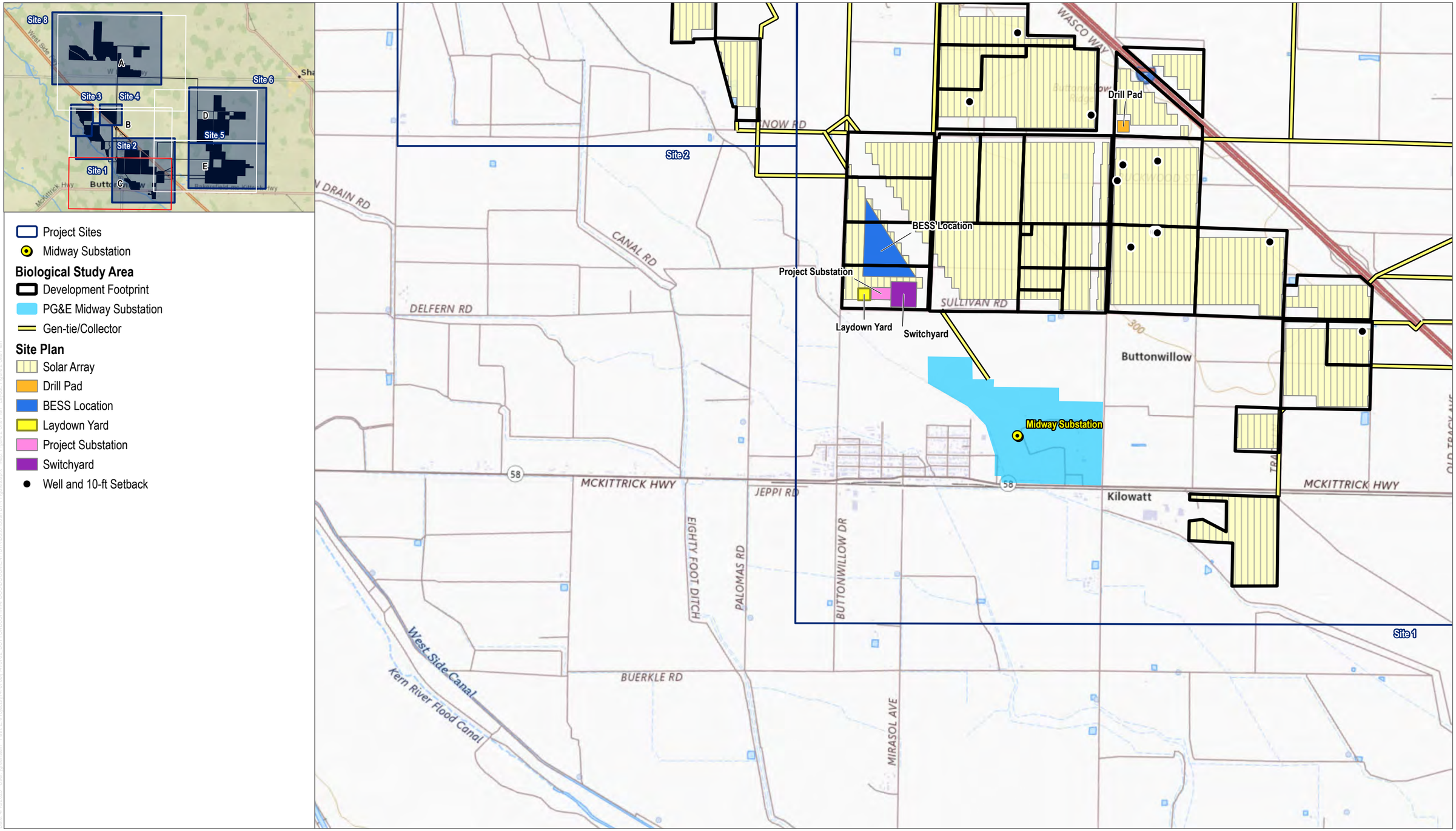
DUDEK

0 1,250 2,500 Feet

FIGURE 2B

Site Plan

Buttonbush Solar Energy Project



SOURCE: Avantus LLC. 2024; USGS National Map 2024

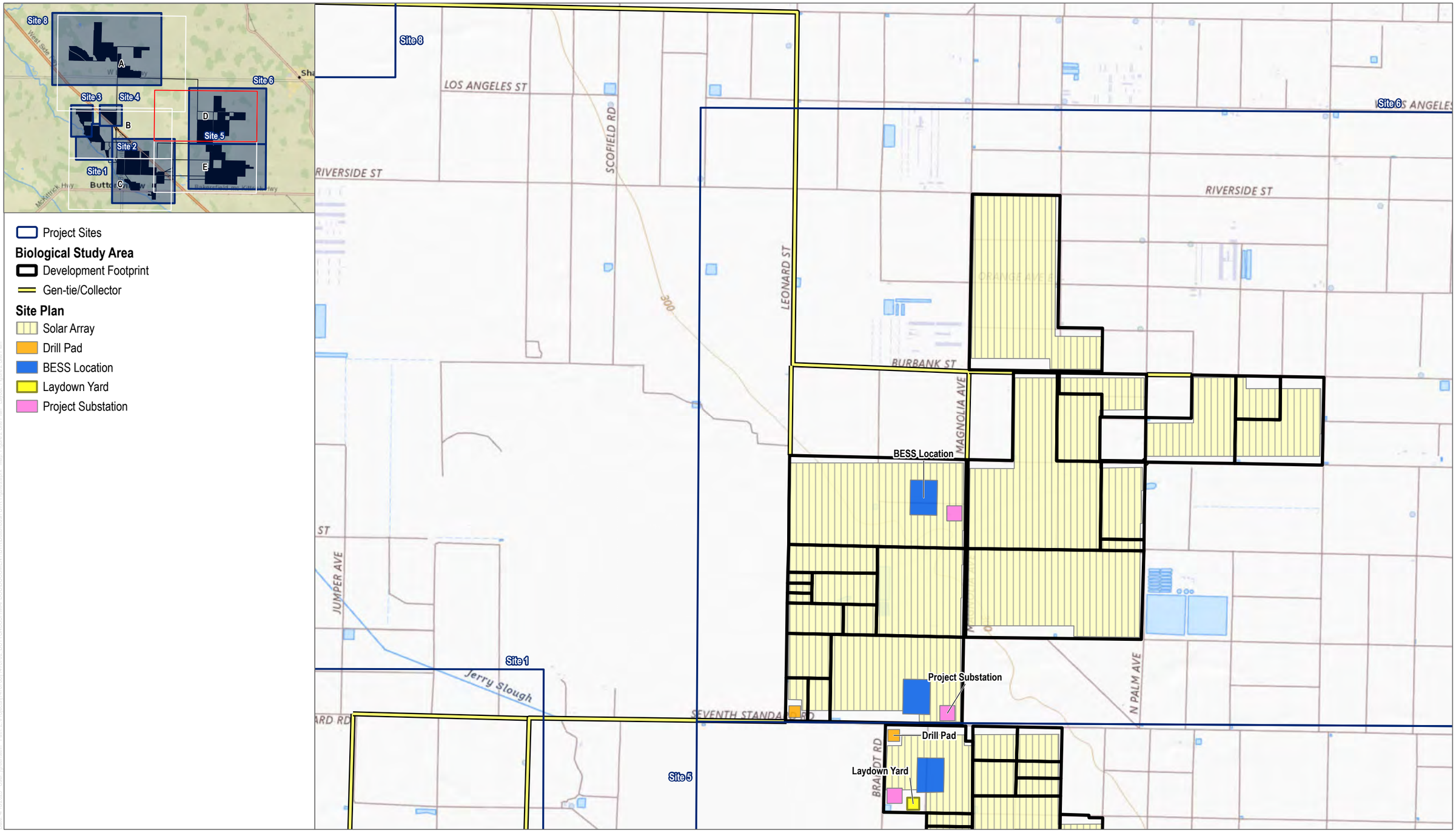
DUDEK

0 1,250 2,500 Feet

FIGURE 2C

Site Plan

Buttonbush Solar Energy Project



SOURCE: Avantus LLC. 2024; USGS National Map 2024

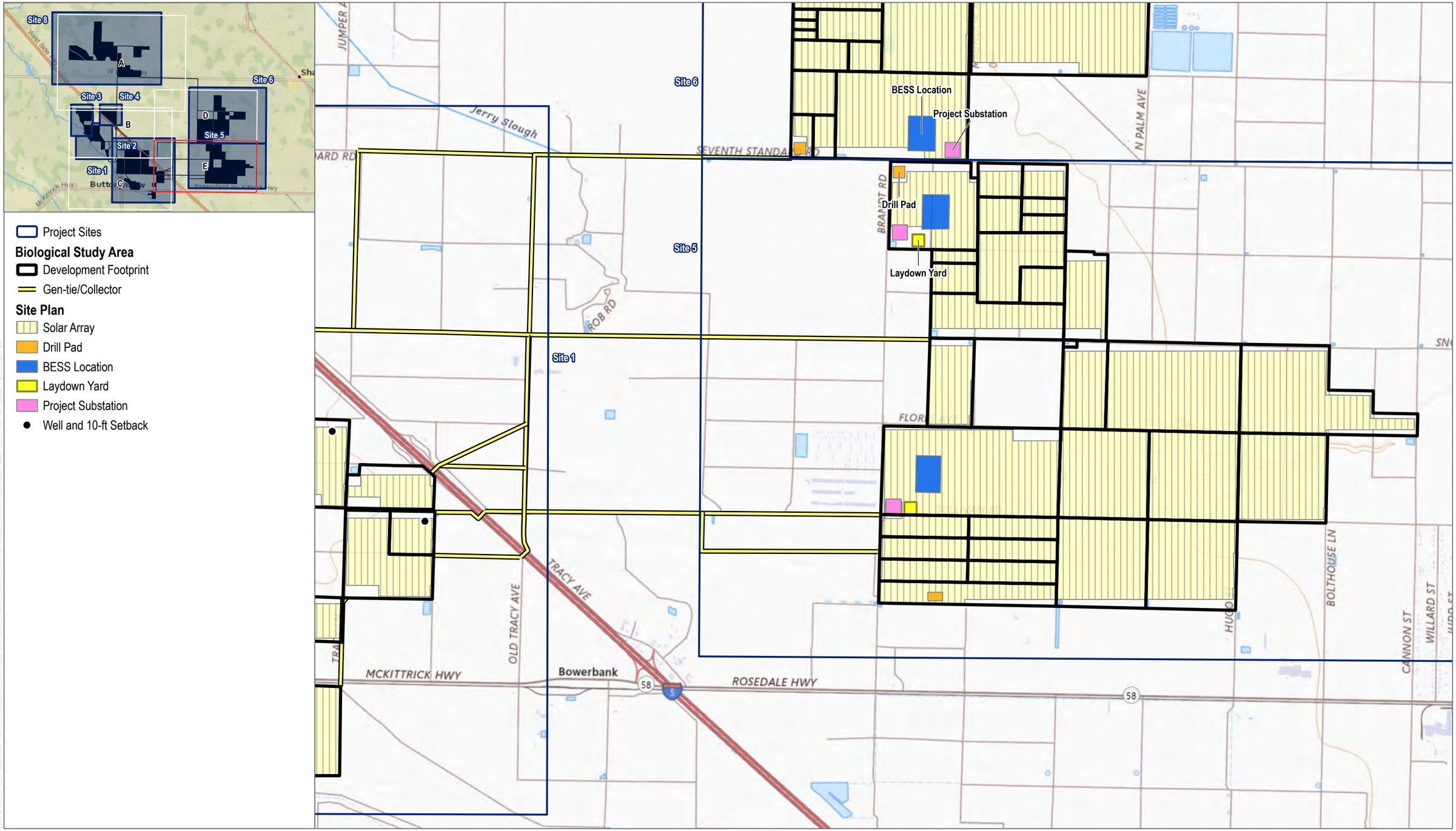
DUDEK

0 1,250 2,500 Feet

FIGURE 2D

Site Plan

Buttonbush Solar Energy Project



SOURCE: Avantus LLC. 2024; USGS National Map 2024

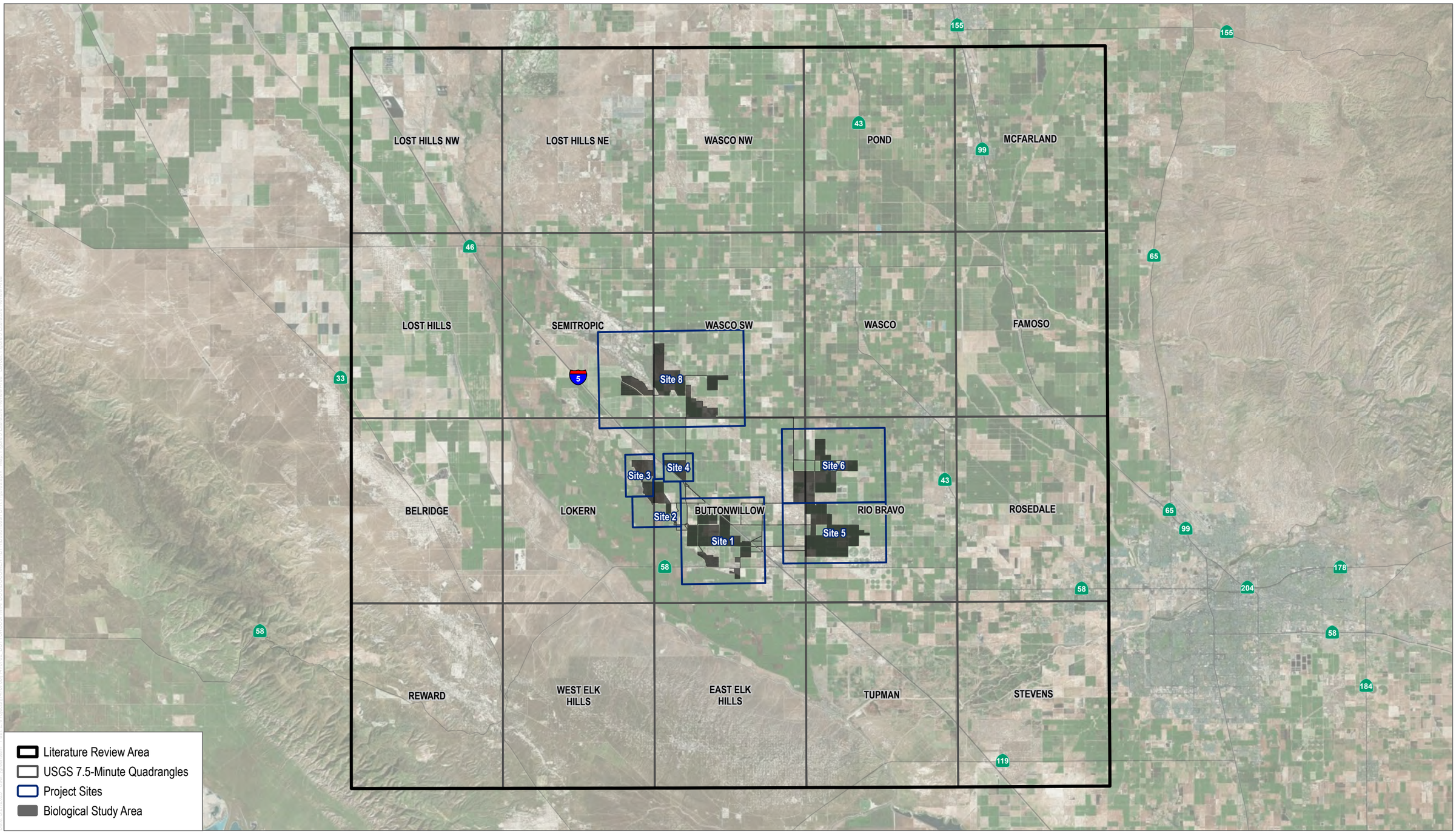
DUDEK

0 1,250 2,500 Feet

FIGURE 2E

Site Plan

Buttonbush Solar Energy Project



SOURCE: Avantus LLC. 2024; Bing Maps 2022; Kern County 2022

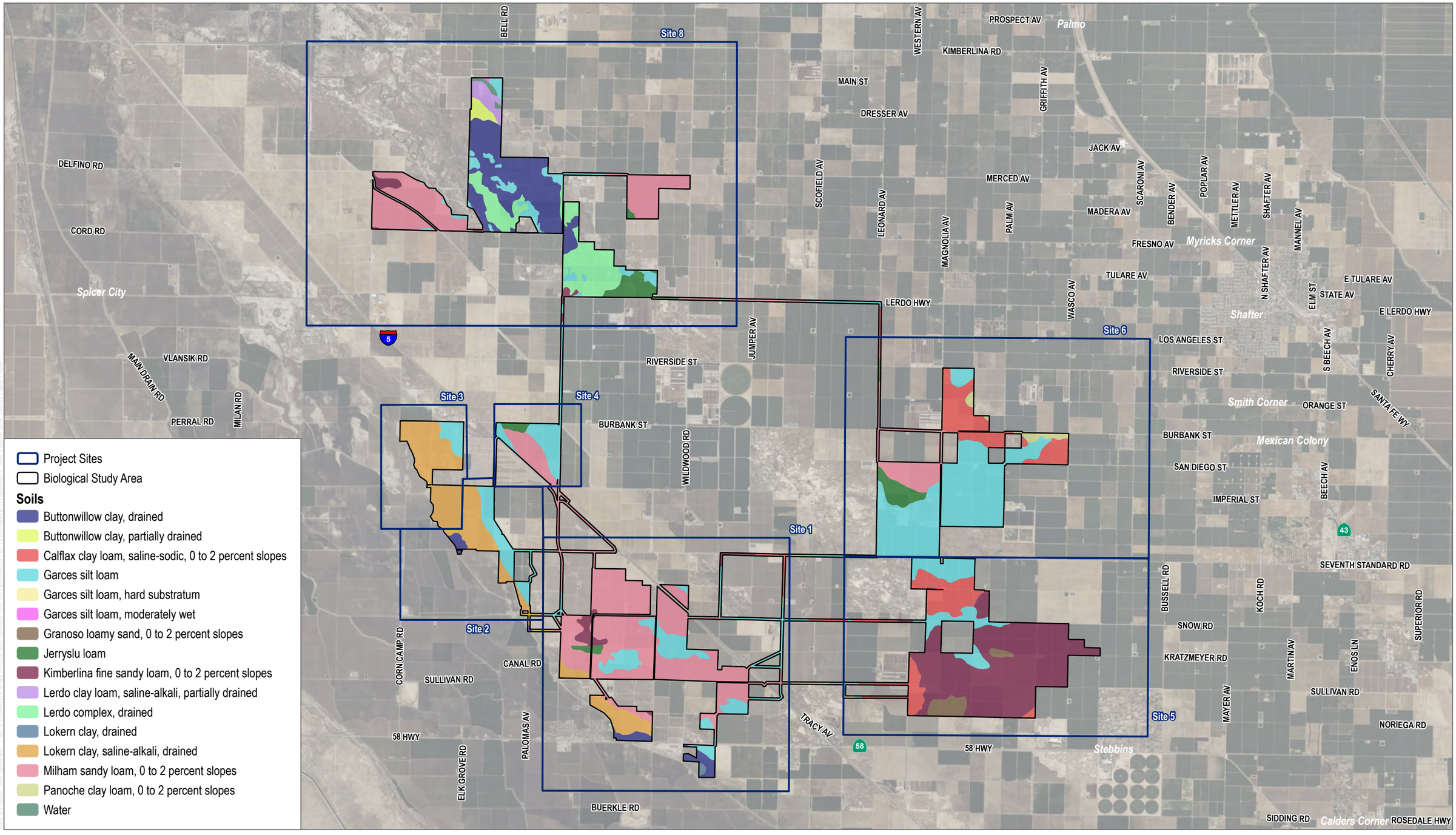
DUDEK

0 10,000 20,000 Feet

FIGURE 3

Literature Review Area

Buttonbush Solar Energy Project



SOURCE: Avantus LLC. 2024; Bing Maps 2022; Kern County 2022; USDA SSURGO

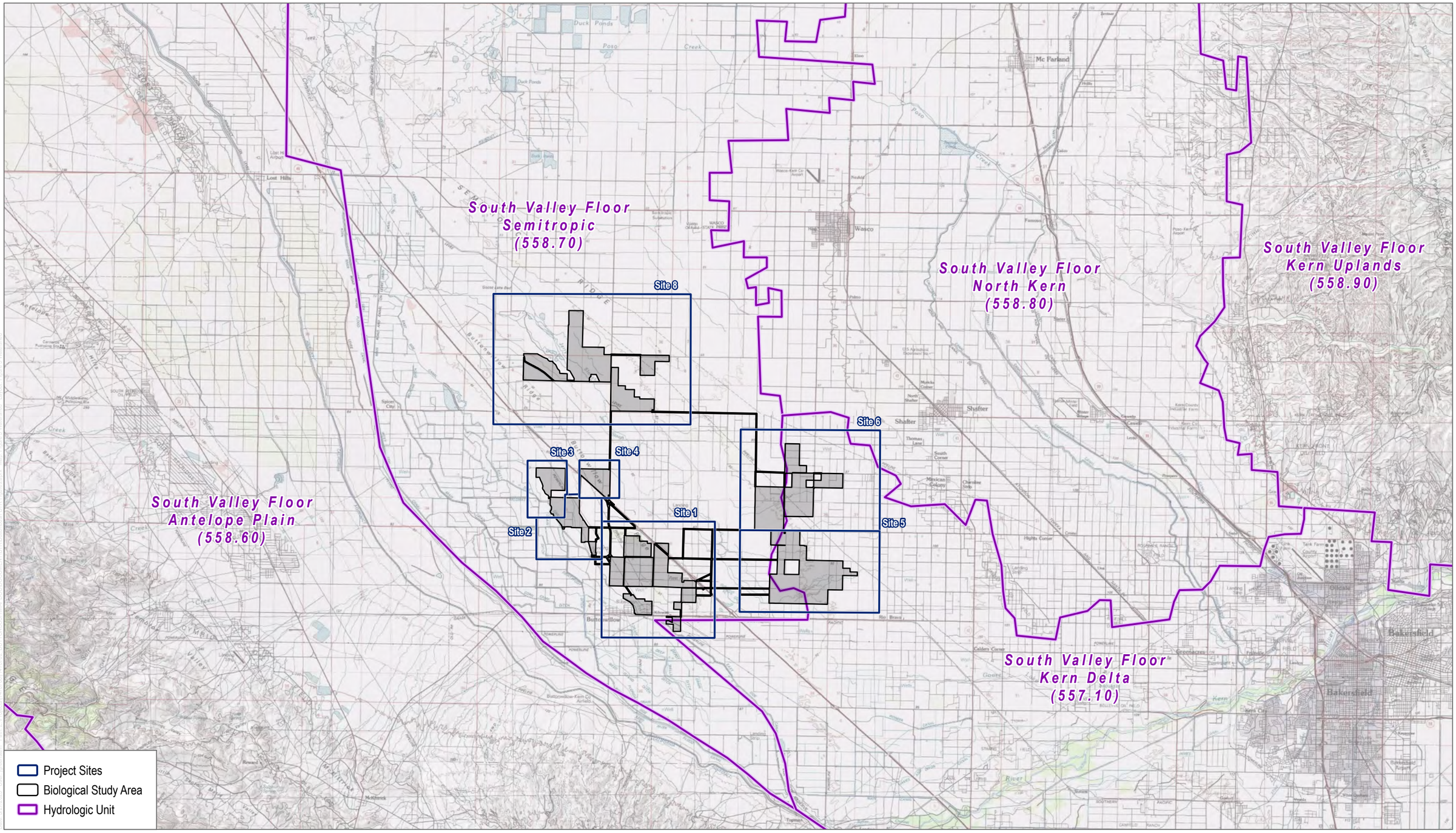
DUDEK

0 3,500 7,000 Feet

FIGURE 4

Soils

Buttonbush Solar Energy Project



SOURCE: Avantus LLC. 2024; ESRI 2024; USGS Topo Map Series 2024; DWR 2024

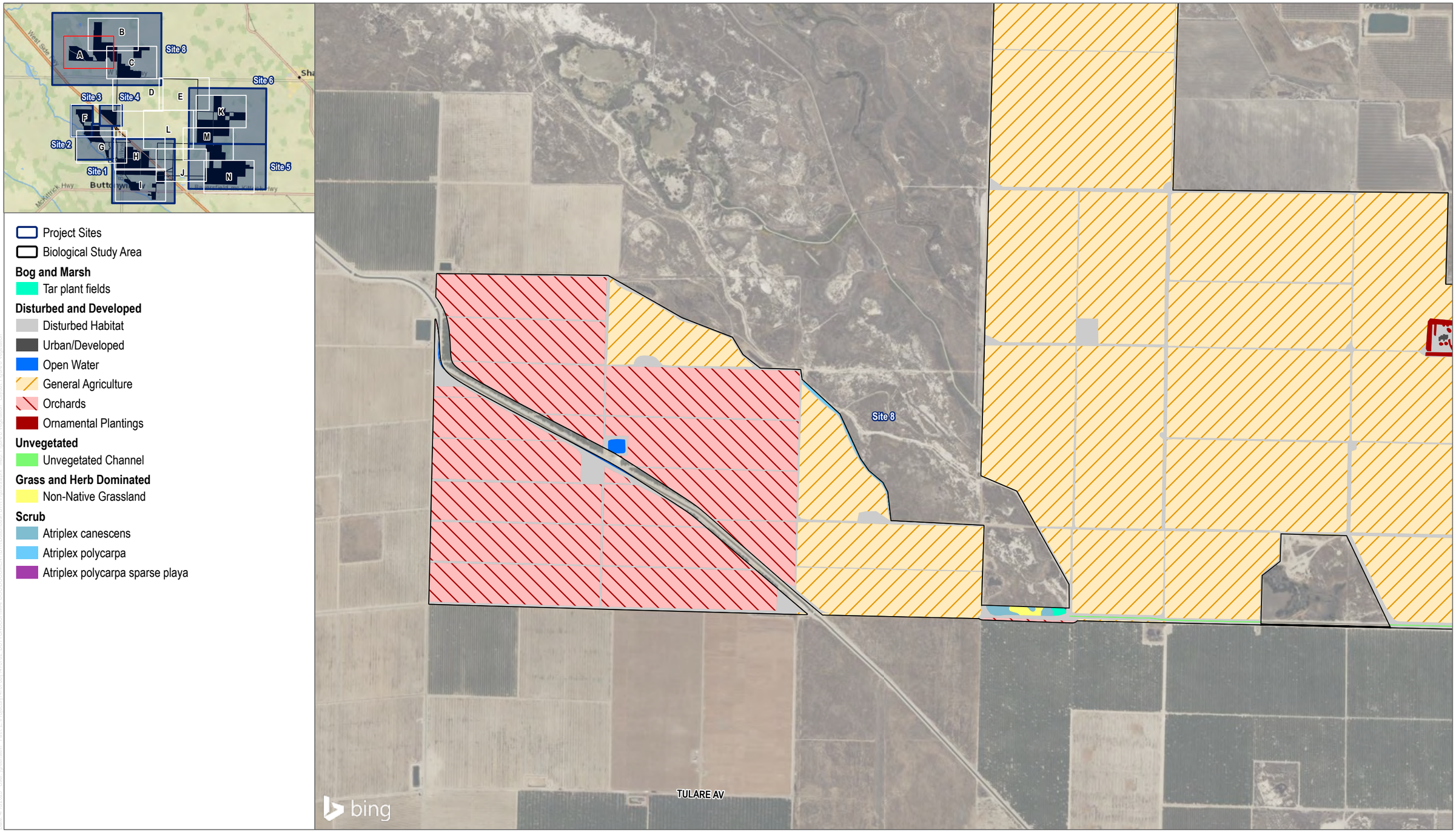
DUDEK

0 2 4 Miles

FIGURE 5

Watershed

Buttonbush Solar Energy Project



SOURCE: Avantus LLC. 2024; Bing Maps 2022; Kern County 2022

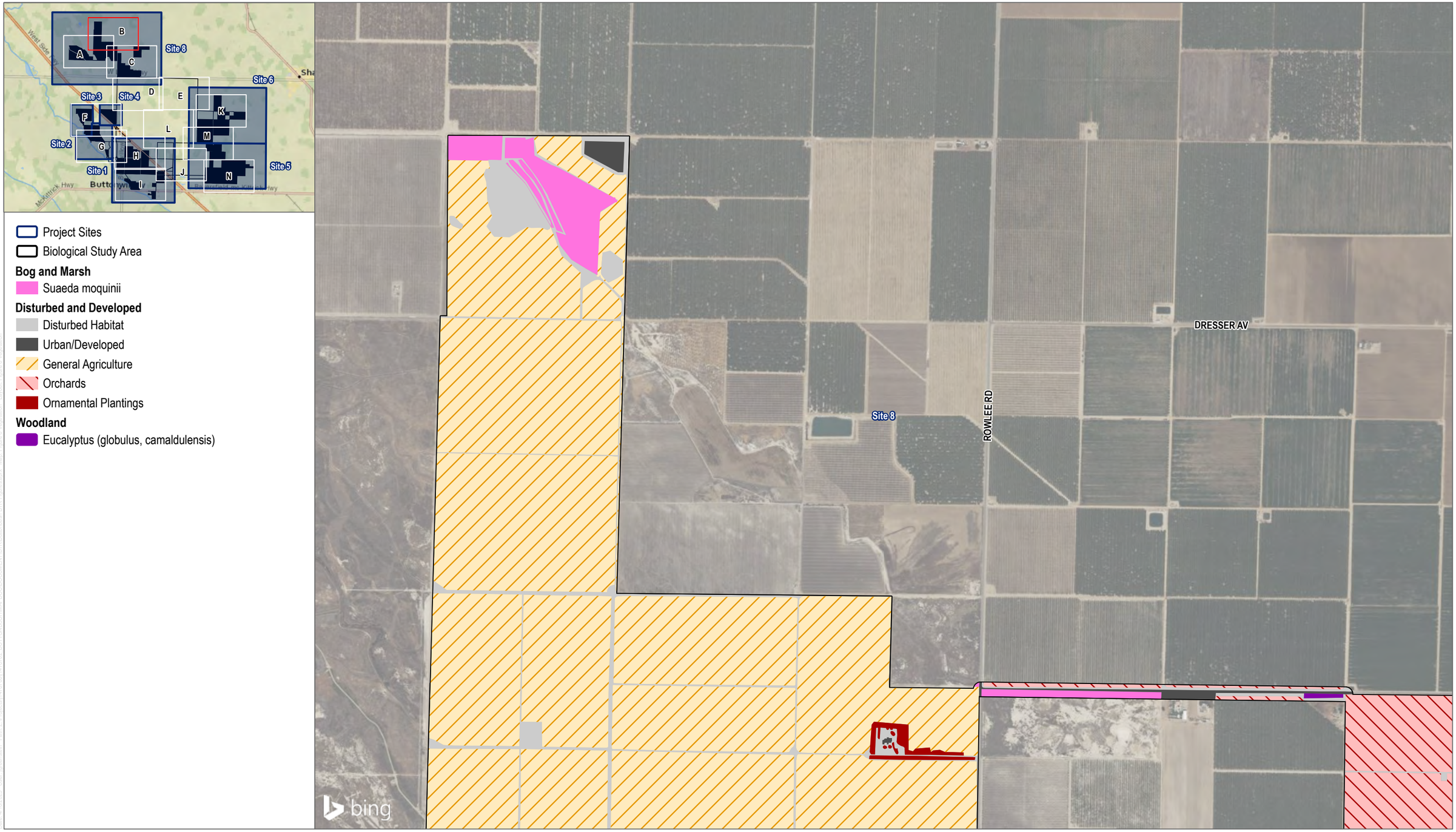
DUDEK

0 500 1,000 Feet

FIGURE 6A

Vegetation Communities and Land Cover Types

Buttonbush Solar Energy Project



SOURCE: Avantus LLC. 2024; Bing Maps 2022; Kern County 2022

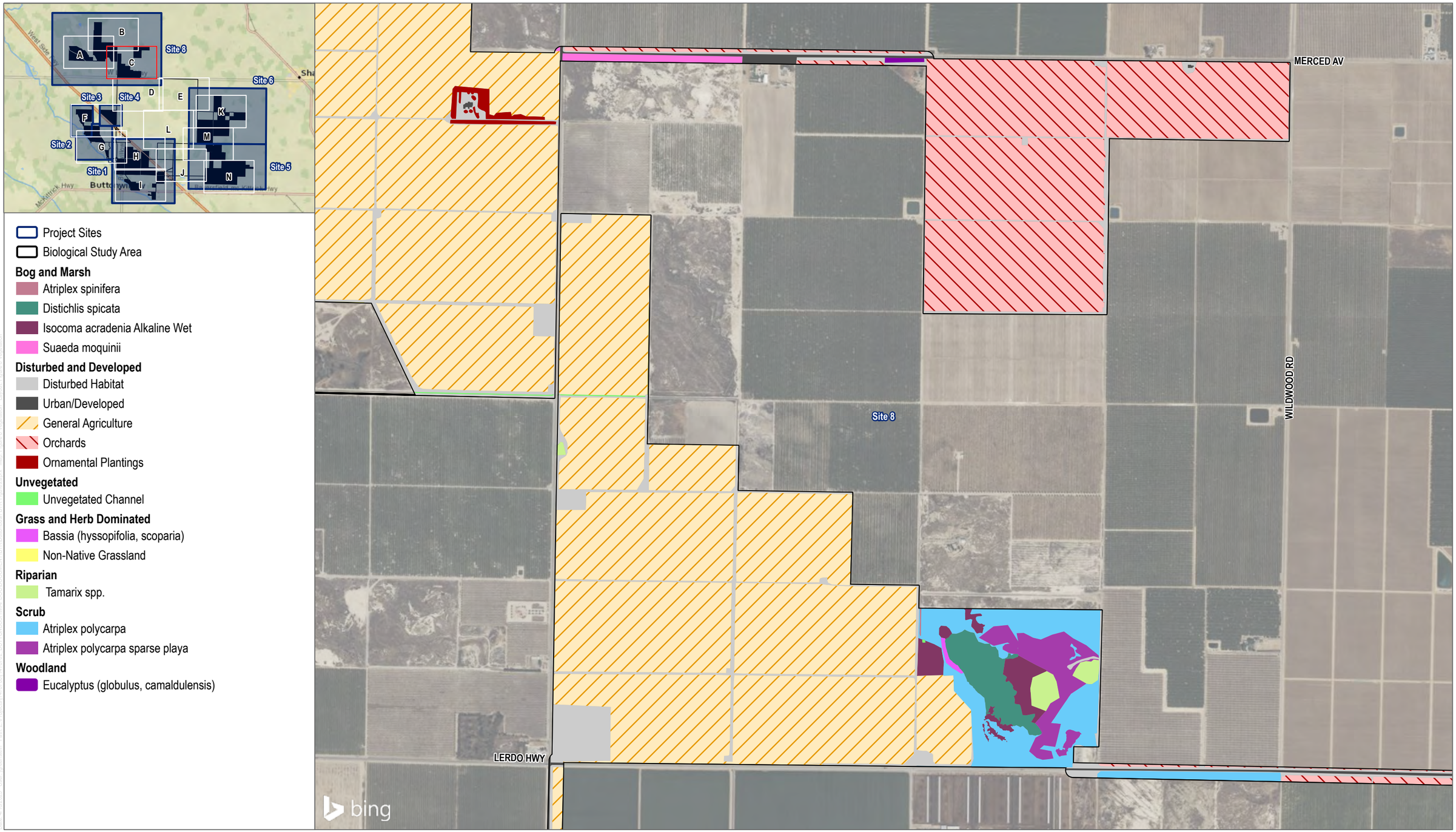
DUDEK

0 500 1,000 Feet

FIGURE 6B

Vegetation Communities and Land Cover Types

Buttonbush Solar Energy Project



SOURCE: Avantus LLC. 2024; Bing Maps 2022; Kern County 2022

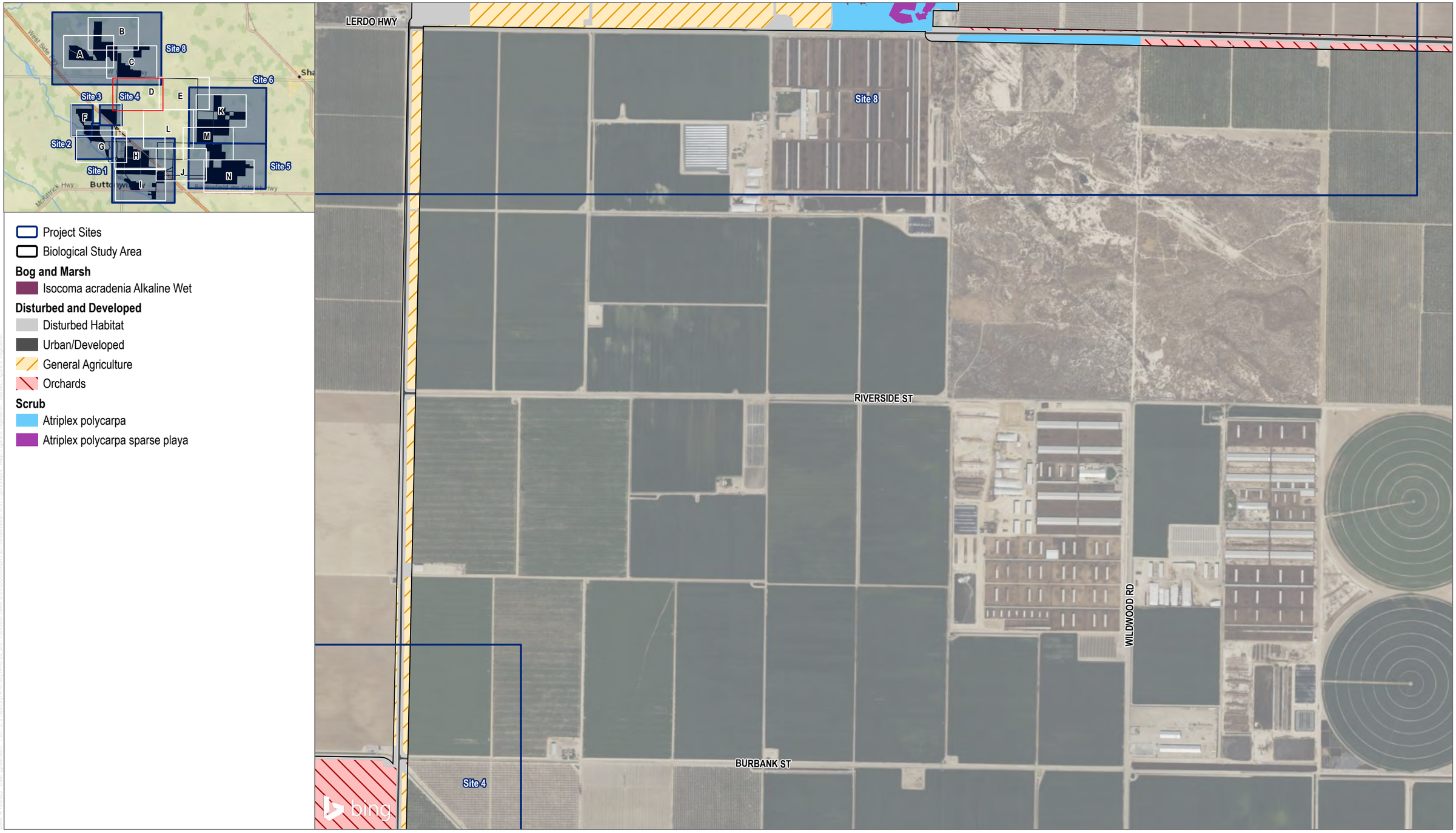
DUDEK

0 500 1,000 Feet

FIGURE 6C

Vegetation Communities and Land Cover Types

Buttonbush Solar Energy Project



SOURCE: Avantus LLC. 2024; Bing Maps 2022; Kern County 2022

DUDEK

0 500 1,000 Feet

FIGURE 6D

Vegetation Communities and Land Cover Types

Buttonbush Solar Energy Project



SOURCE: Avantus LLC. 2024; Bing Maps 2022; Kern County 2022

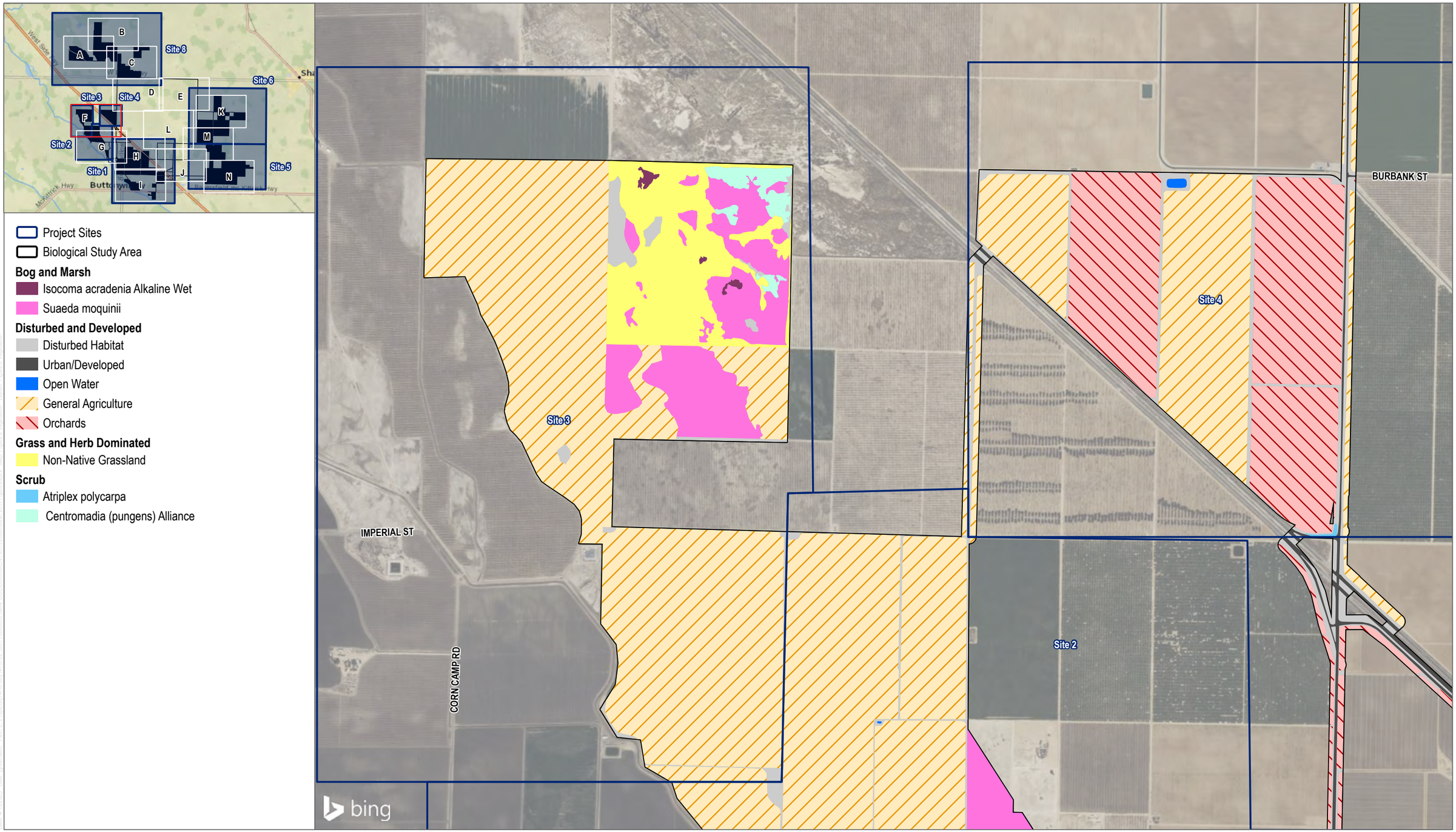
DUDEK

0 500 1,000 Feet

FIGURE 6E

Vegetation Communities and Land Cover Types

Buttonbush Solar Energy Project



SOURCE: Avantus LLC. 2024; Bing Maps 2022; Kern County 2022

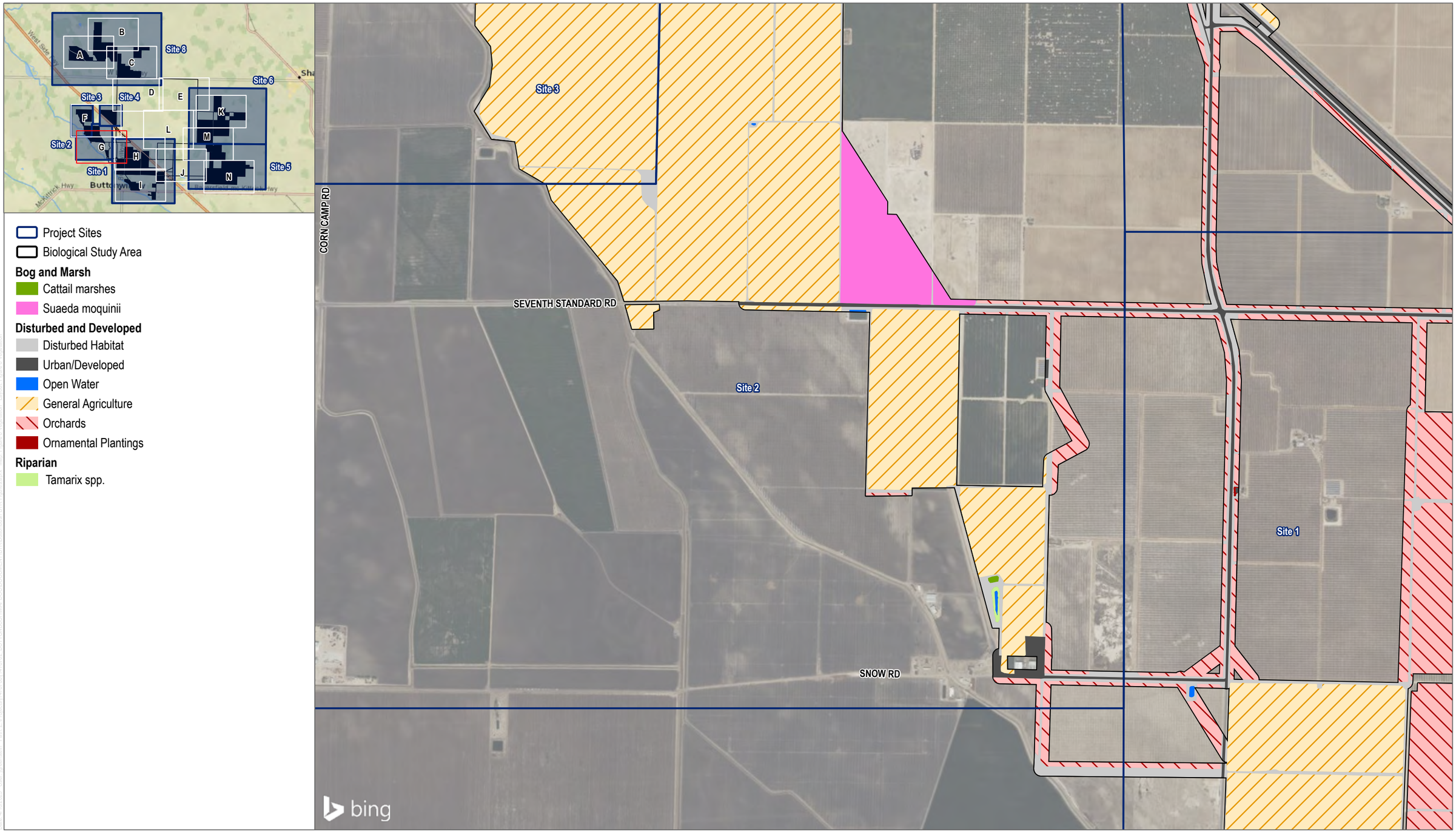
DUDEK

0 500 1,000 Feet

FIGURE 6F

Vegetation Communities and Land Cover Types

Buttonbush Solar Energy Project



SOURCE: Avantus LLC. 2024; Bing Maps 2022; Kern County 2022

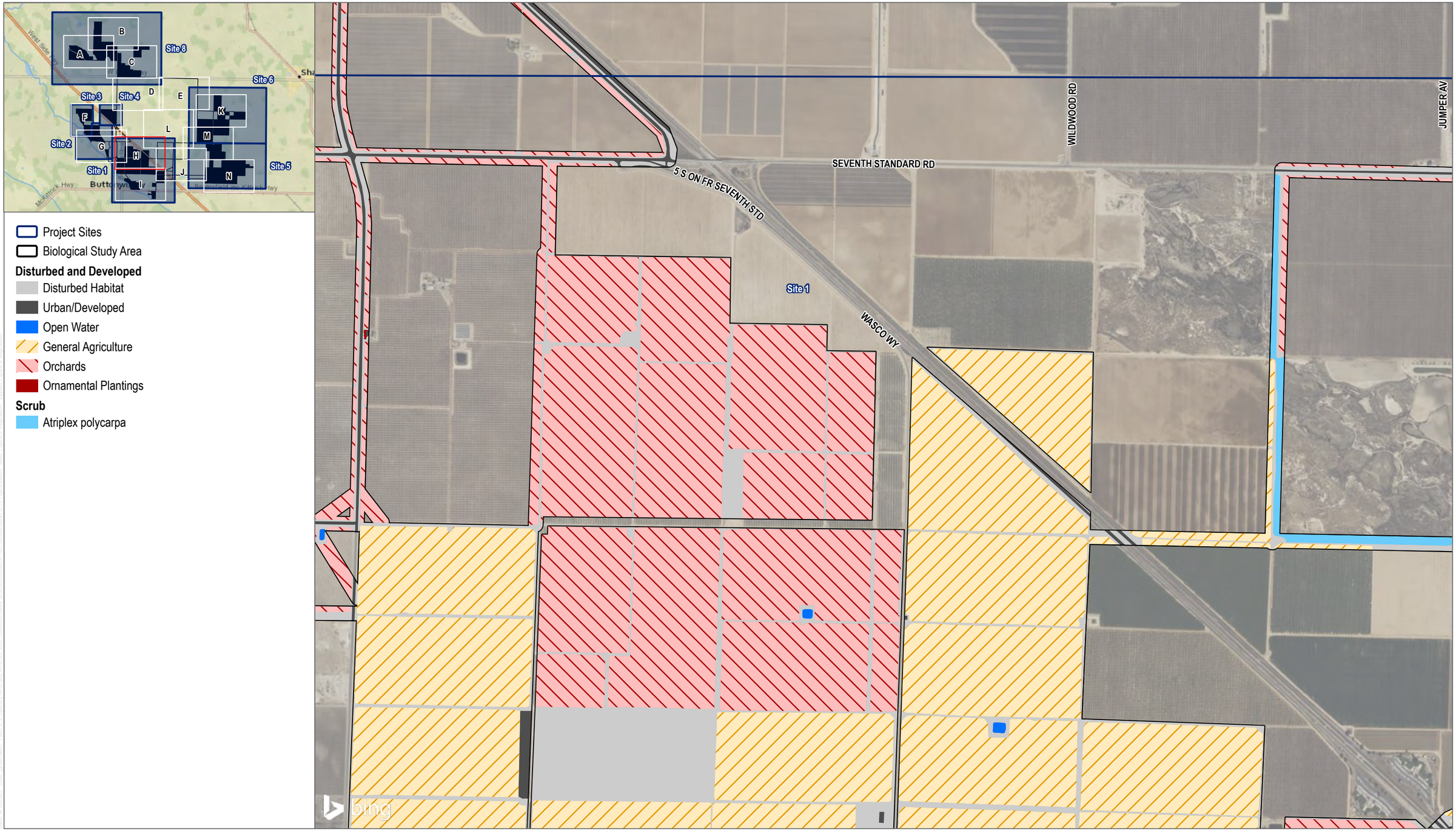
DUDEK

0 500 1,000 Feet

FIGURE 6G

Vegetation Communities and Land Cover Types

Buttonbush Solar Energy Project



SOURCE: Avantus LLC. 2024; Bing Maps 2022; Kern County 2022

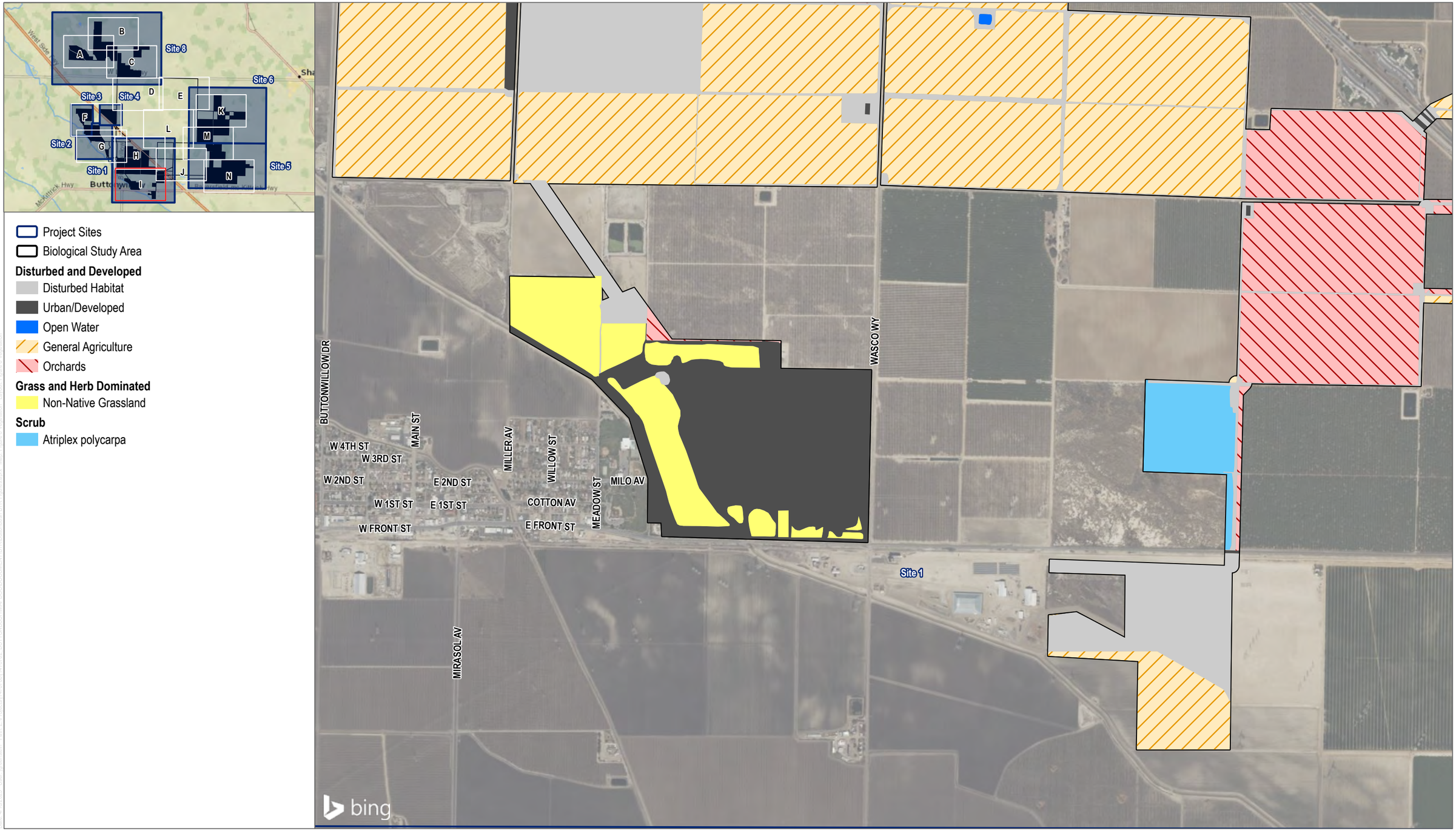
DUDEK

0 500 1,000 Feet

FIGURE 6H

Vegetation Communities and Land Cover Types

Buttonbush Solar Energy Project



SOURCE: Avantus LLC. 2024; Bing Maps 2022; Kern County 2022

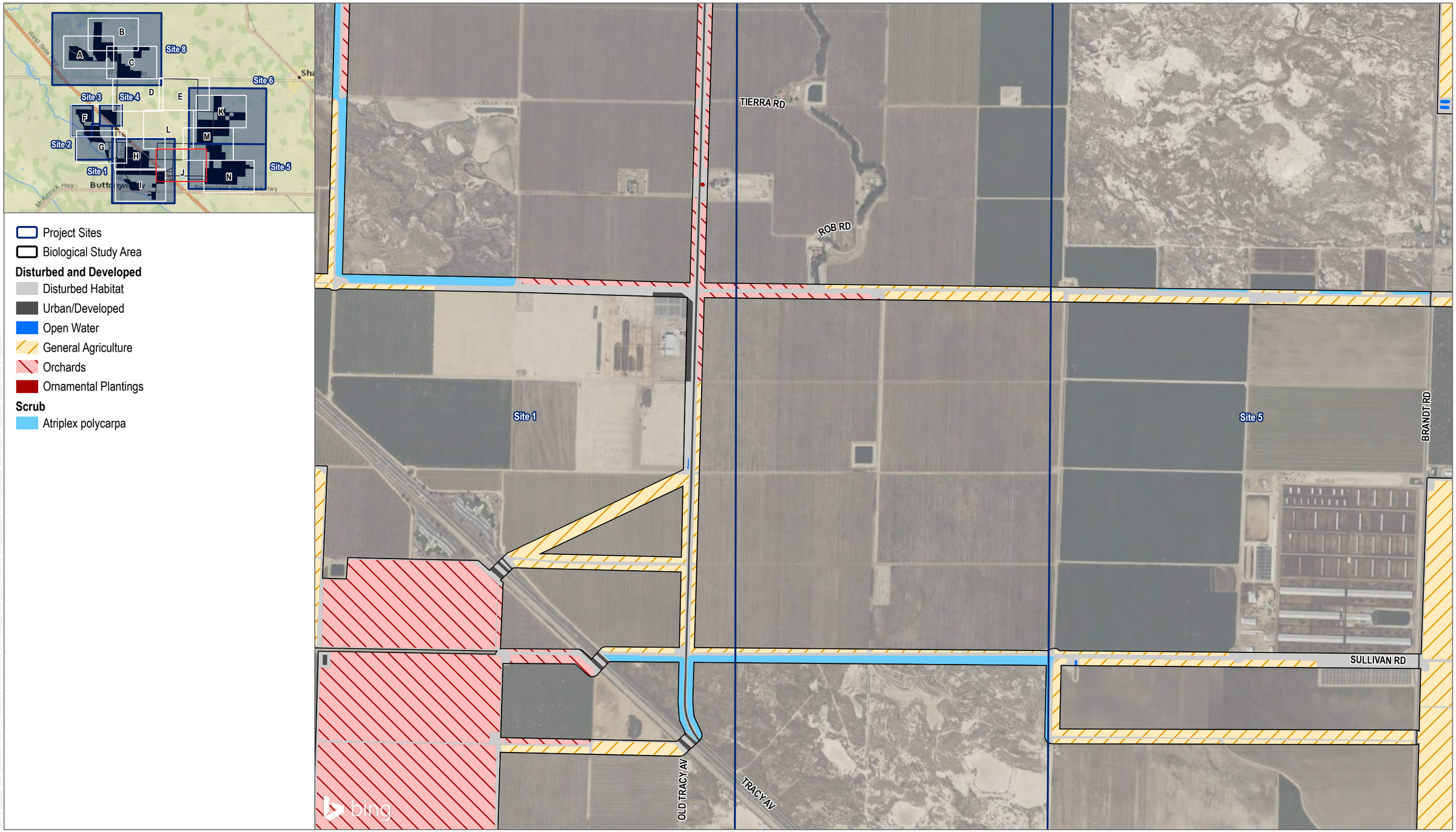
DUDEK

0 500 1,000 Feet

FIGURE 6I

Vegetation Communities and Land Cover Types

Buttonbush Solar Energy Project



SOURCE: Avantus LLC. 2024; Bing Maps 2022; Kern County 2022

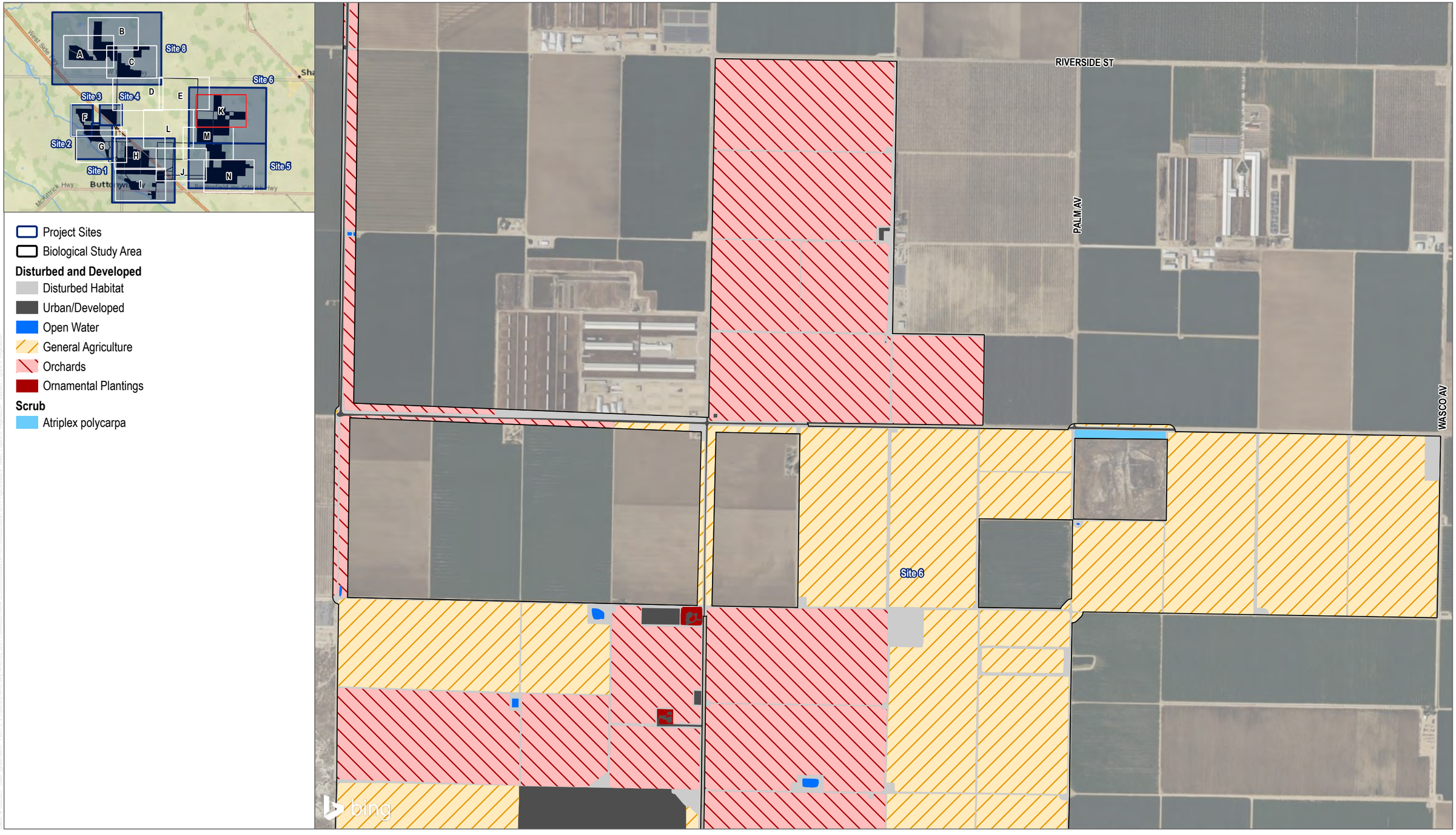
DUDEK

0 500 1,000 Feet

FIGURE 6J

Vegetation Communities and Land Cover Types

Buttonbush Solar Energy Project



SOURCE: Avantus LLC. 2024; Bing Maps 2022; Kern County 2022

DUDEK

0 500 1,000 Feet

FIGURE 6K

Vegetation Communities and Land Cover Types

Buttonbush Solar Energy Project



SOURCE: Avantus LLC. 2024; Bing Maps 2022; Kern County 2022

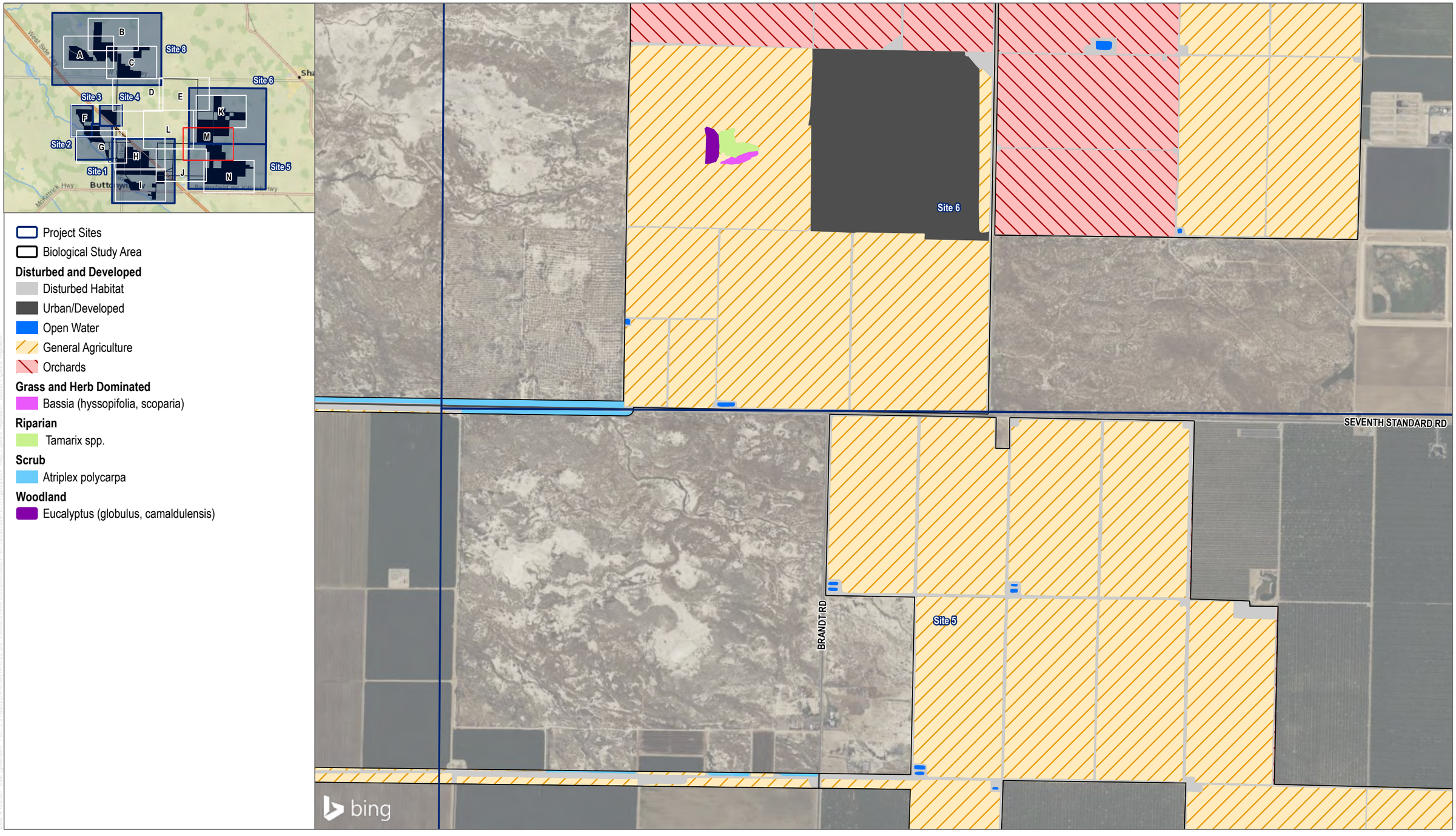
DUDEK

0 500 1,000 Feet

FIGURE 6L

Vegetation Communities and Land Cover Types

Buttonbush Solar Energy Project



SOURCE: Avantus LLC. 2024; Bing Maps 2022; Kern County 2022

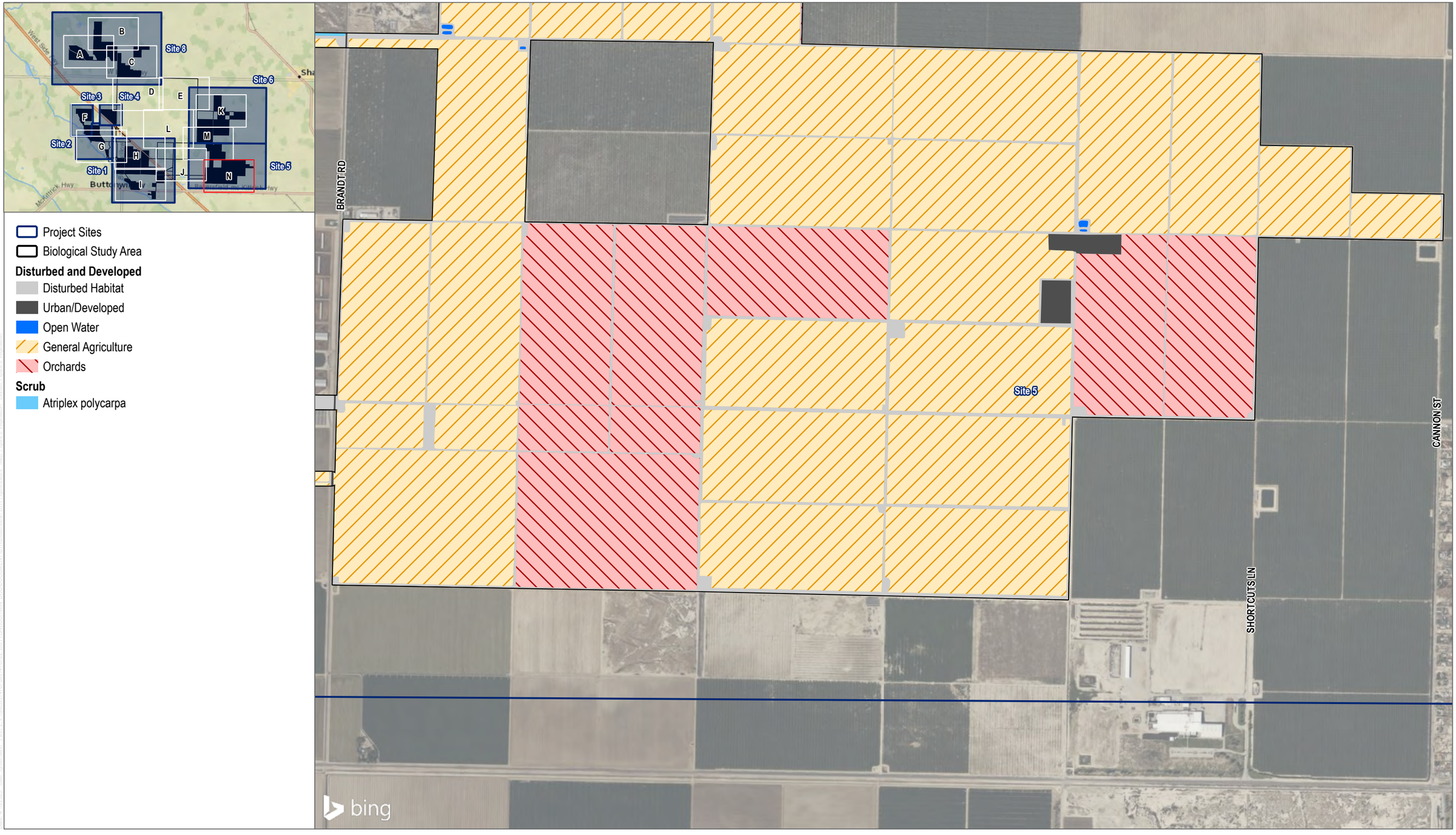
DUDEK

0 500 1,000 Feet

FIGURE 6M

Vegetation Communities and Land Cover Types

Buttonbush Solar Energy Project



SOURCE: Avantus LLC. 2024; Bing Maps 2022; Kern County 2022

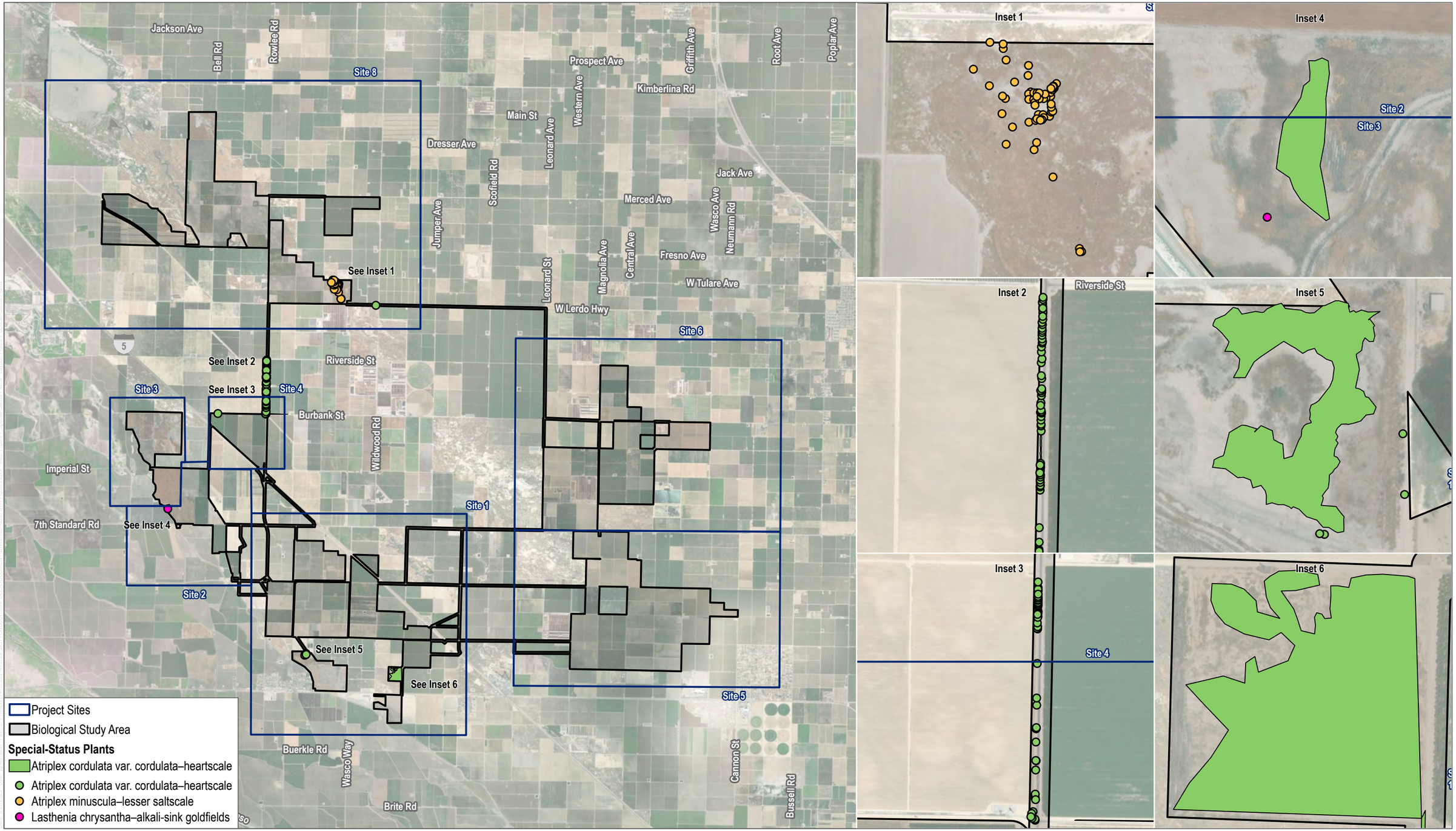
DUDEK

0 500 1,000 Feet

FIGURE 6N

Vegetation Communities and Land Cover Types

Buttonbush Solar Energy Project



SOURCE: Maxar 2023; Open Street Maps 2023

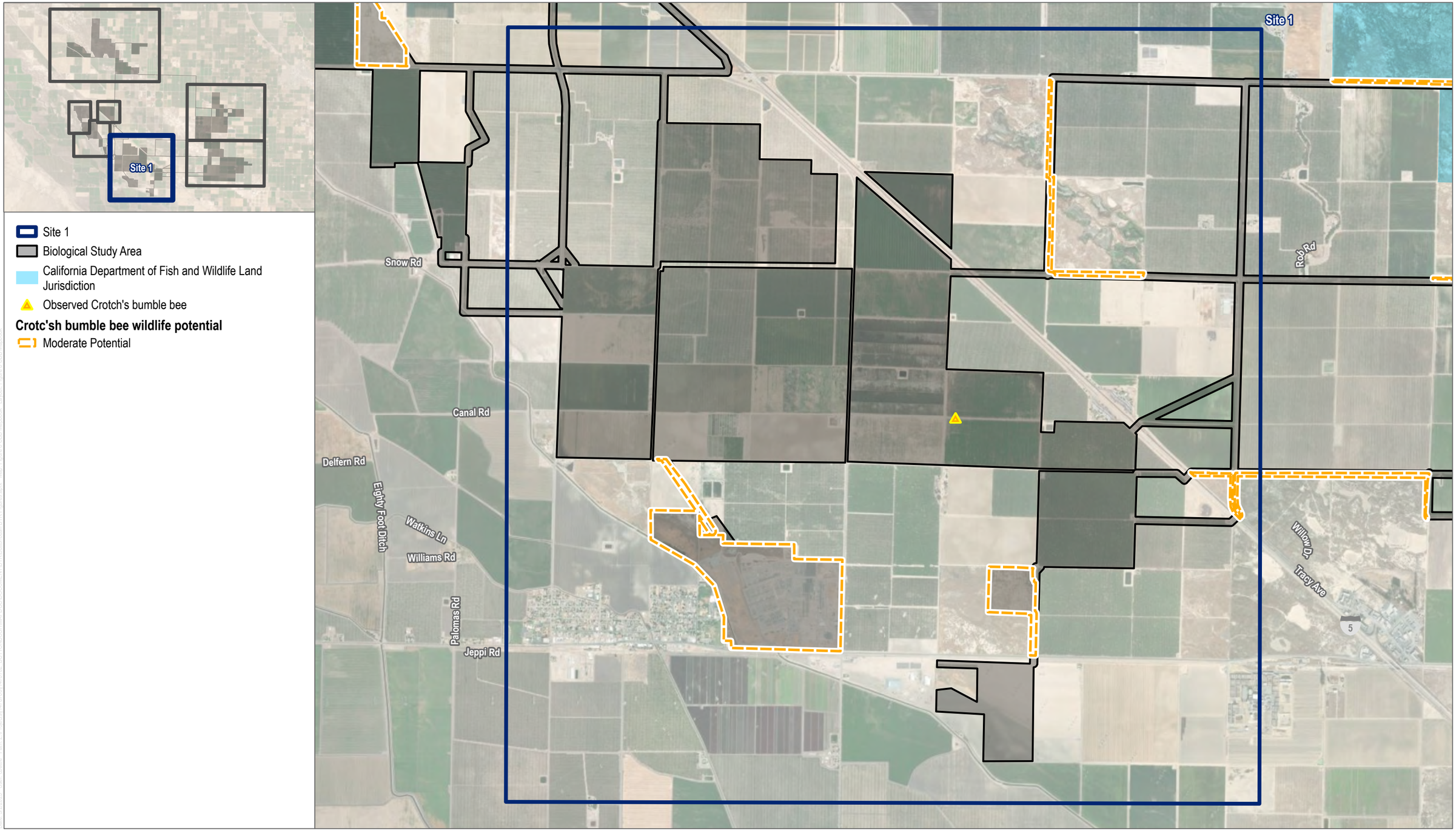
DUDEK

0 4,000 8,000 Feet

FIGURE 7

Special-Status Plants

Buttonbush Solar Energy Project



SOURCE: Maxar 2023; Open Street Maps 2023; CDFW 2024

DUDEK

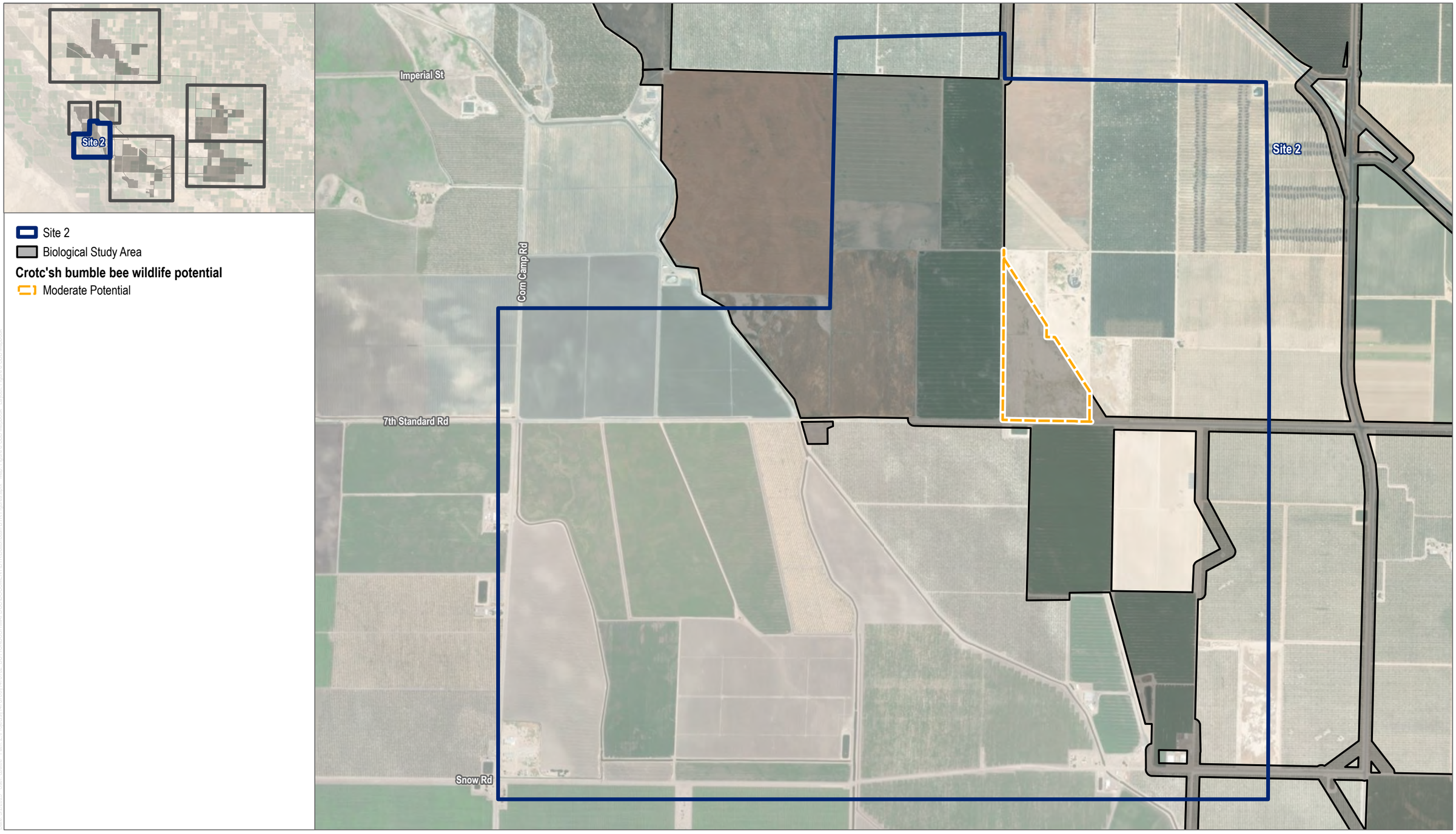
N

0 1,000 2,000 Feet

FIGURE 8A

Site 1: Crotch's Bumble Bee Wildlife Potential

Buttonbush Solar Energy Project



SOURCE: Maxar 2023; Open Street Maps 2023; CDFW 2024

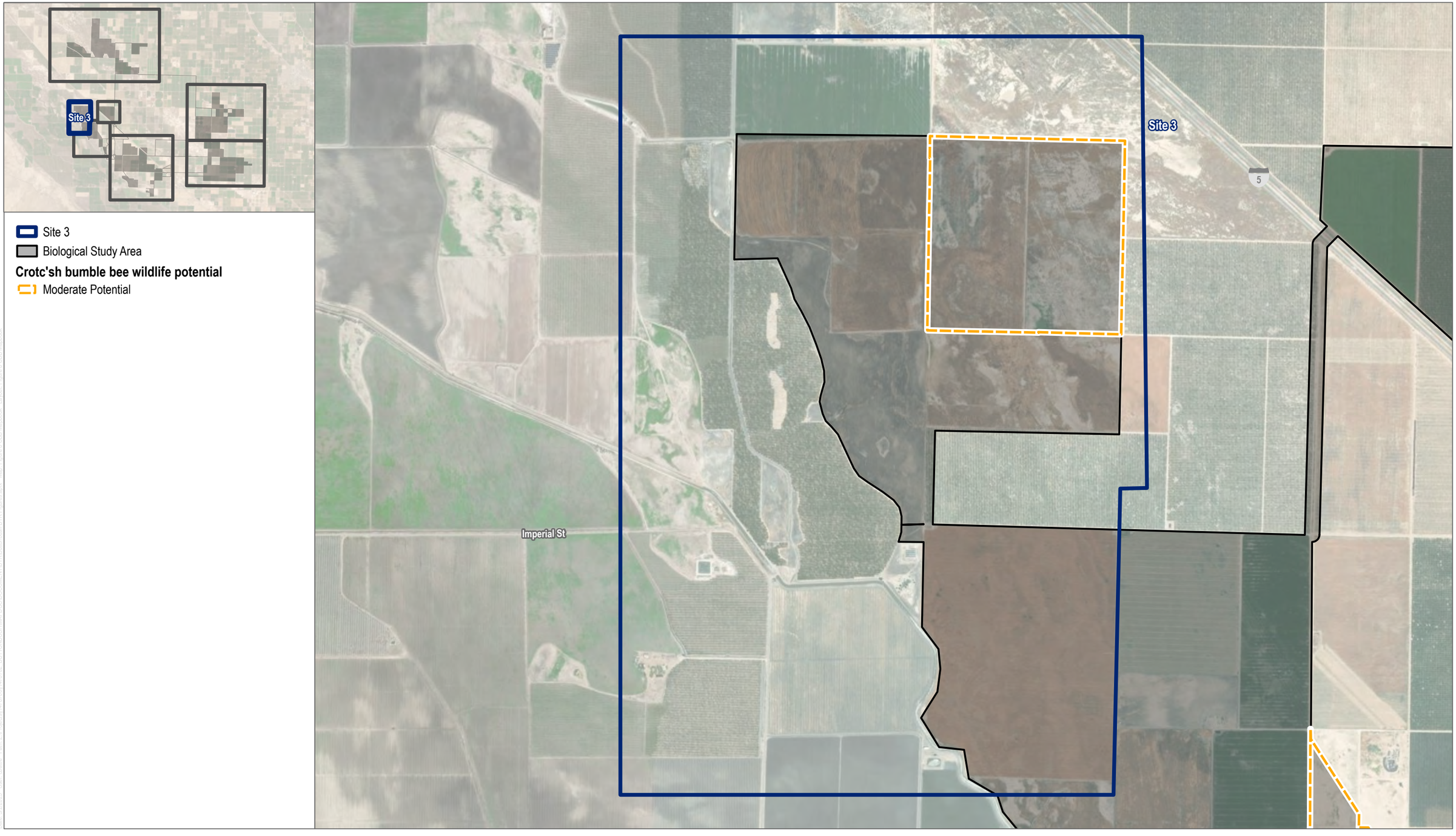
DUDEK

0 500 1,000 Feet

FIGURE 8B

Site 2: Crotch's Bumble Bee Wildlife Potential

Buttonbush Solar Energy Project



SOURCE: Maxar 2023; Open Street Maps 2023; CDFW 2024

DUDEK

N

0 500 1,000 Feet

FIGURE 8C

Site 3: Crotch's Bumble Bee Wildlife Potential

Buttonbush Solar Energy Project



SOURCE: Maxar 2023; Open Street Maps 2023; CDFW 2024

DUDEK

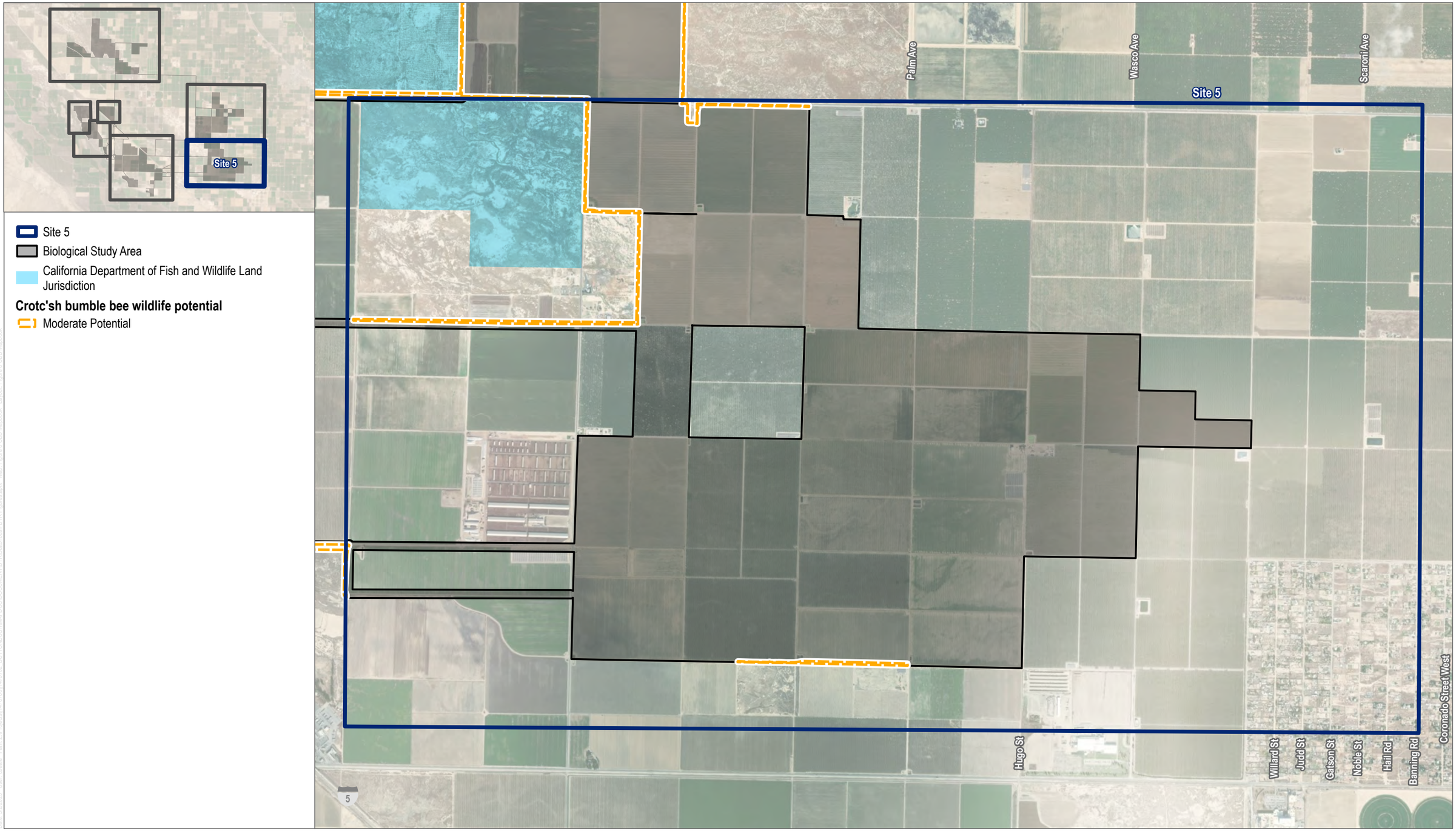
N

0 400 800 Feet

FIGURE 8D

Site 4: Crotch's Bumble Bee Wildlife Potential

Buttonbush Solar Energy Project



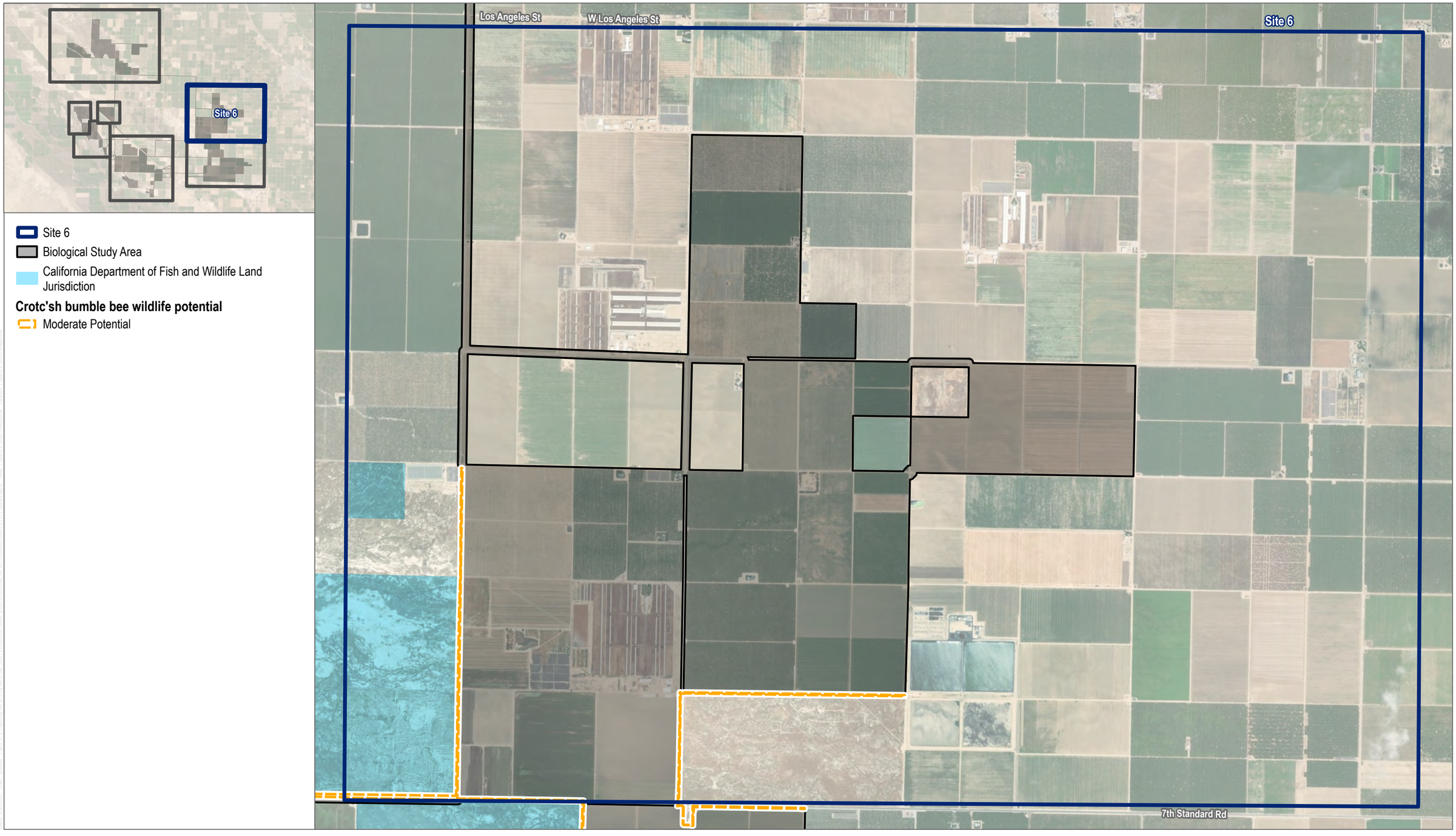
SOURCE: Maxar 2023; Open Street Maps 2023; CDFW 2024

FIGURE 8E

Site 5: Crotch's Bumble Bee Wildlife Potential

Buttonbush Solar Energy Project

DUDEK



SOURCE: Maxar 2023; Open Street Maps 2023; CDFW 2024

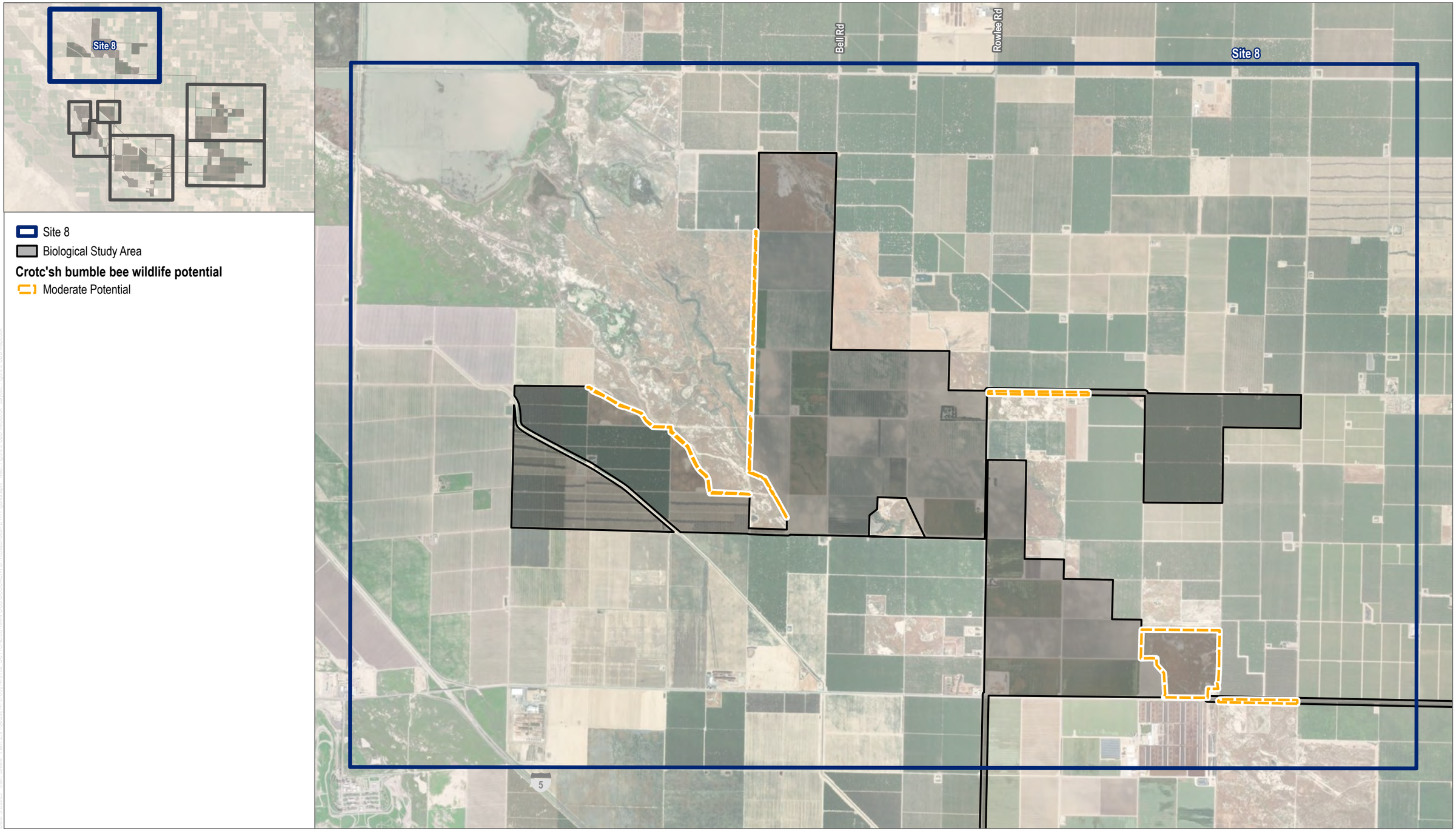
DUDEK

0 1,000 2,000 Feet

FIGURE 8F

Site 6: Crotch's Bumble Bee Wildlife Potential

Buttonbush Solar Energy Project



SOURCE: Maxar 2023; Open Street Maps 2023; CDFW 2024

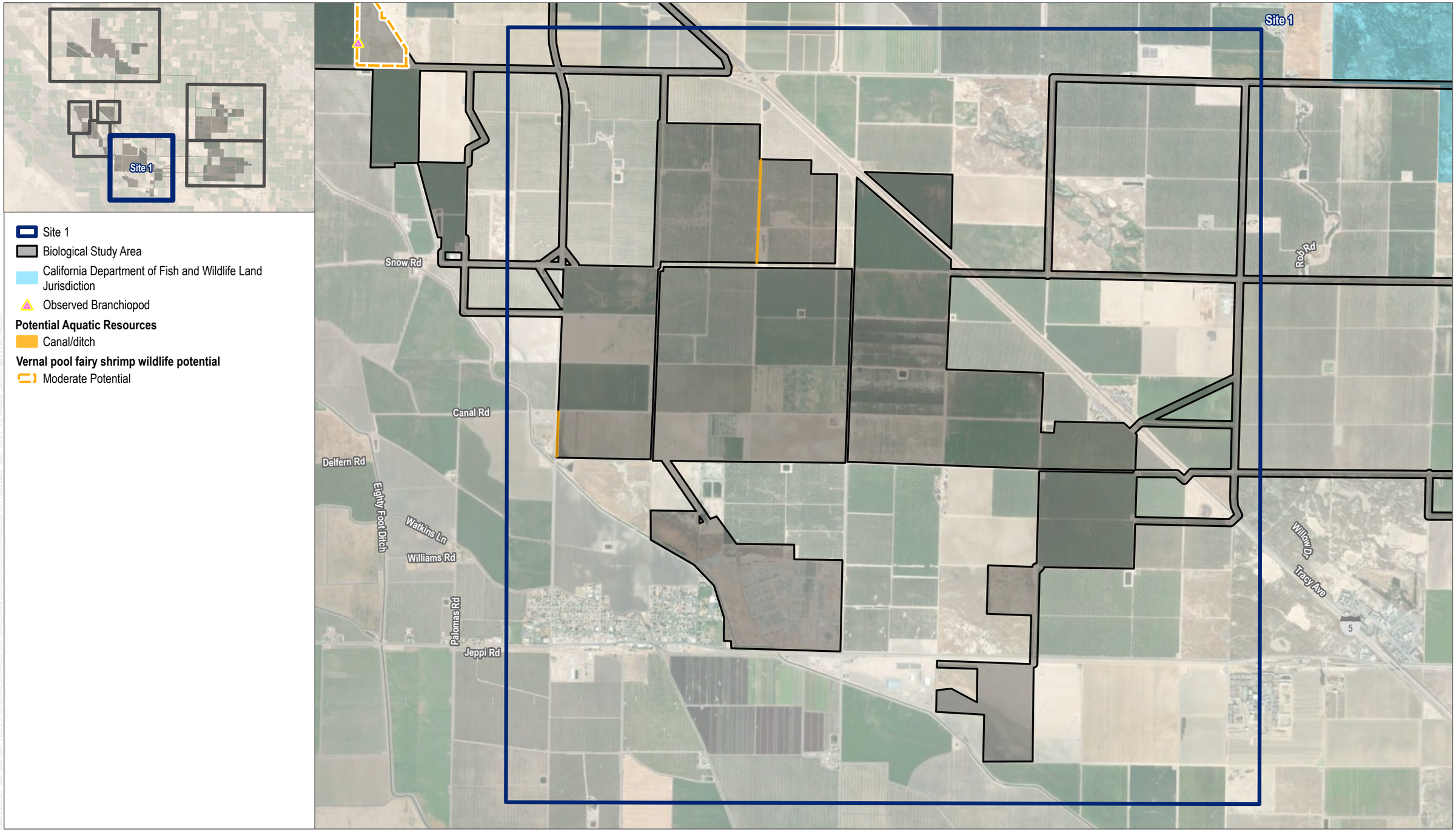
DUDEK

0 1,250 2,500 Feet

FIGURE 8G

Site 8: Crotch's Bumble Bee Wildlife Potential

Buttonbush Solar Energy Project



SOURCE: Maxar 2023; Open Street Maps 2023; CDFW 2024

DUDEK

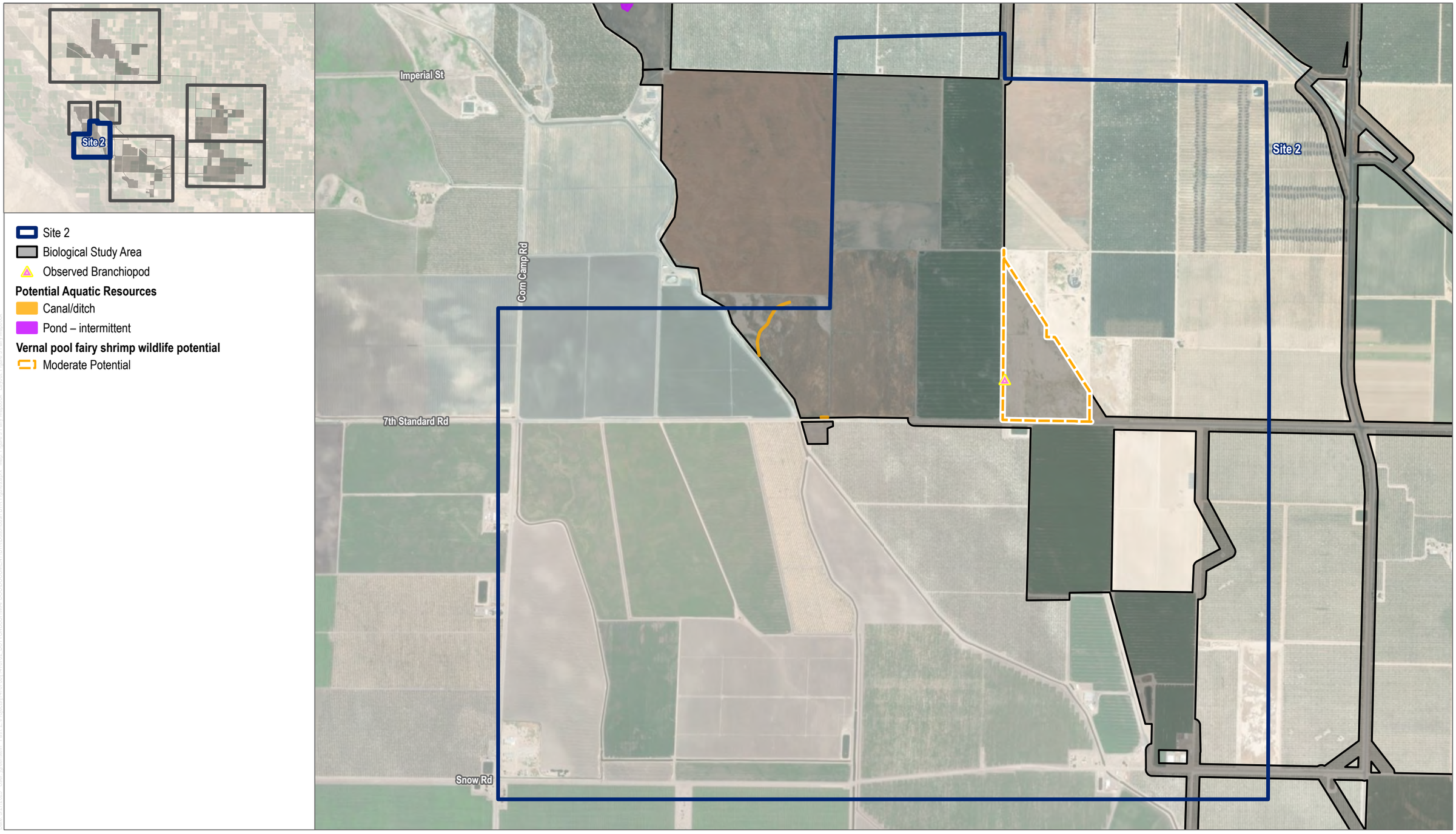
N

0 1,000 2,000 Feet

FIGURE 9A

Site 1: Vernal Pool Fairy Shrimp Wildlife Potential

Buttonbush Solar Energy Project



SOURCE: Maxar 2023; Open Street Maps 2023; CDFW 2024

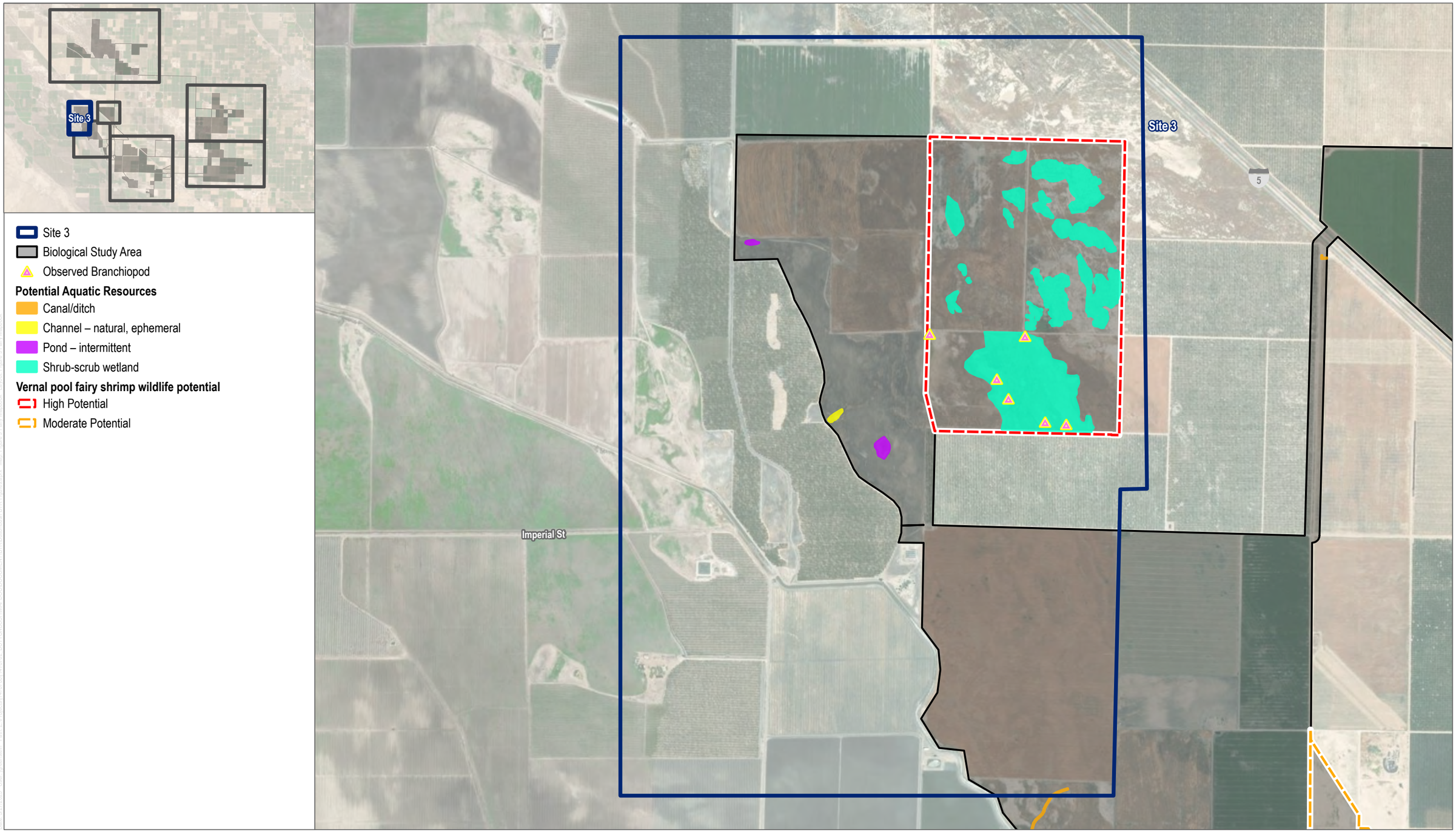
DUDEK

0 500 1,000 Feet

FIGURE 9B

Site 2: Vernal Pool Fairy Shrimp Wildlife Potential

Buttonbush Solar Energy Project



SOURCE: Maxar 2023; Open Street Maps 2023; CDFW 2024

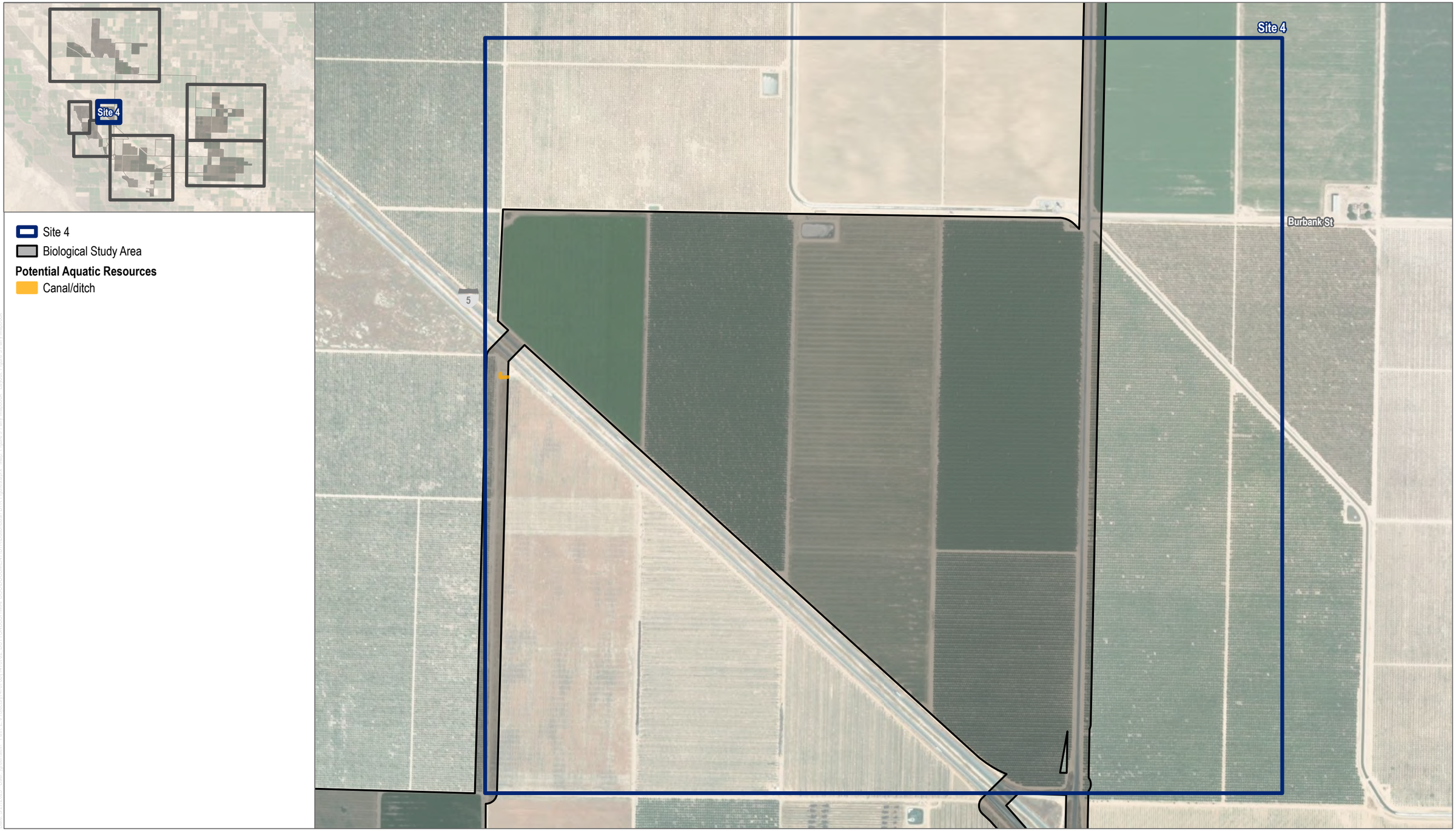
DUDEK

0 500 1,000 Feet

FIGURE 9C

Site 3: Vernal Pool Fairy Shrimp Wildlife Potential

Buttonbush Solar Energy Project



SOURCE: Maxar 2023; Open Street Maps 2023; CDFW 2024

DUDEK

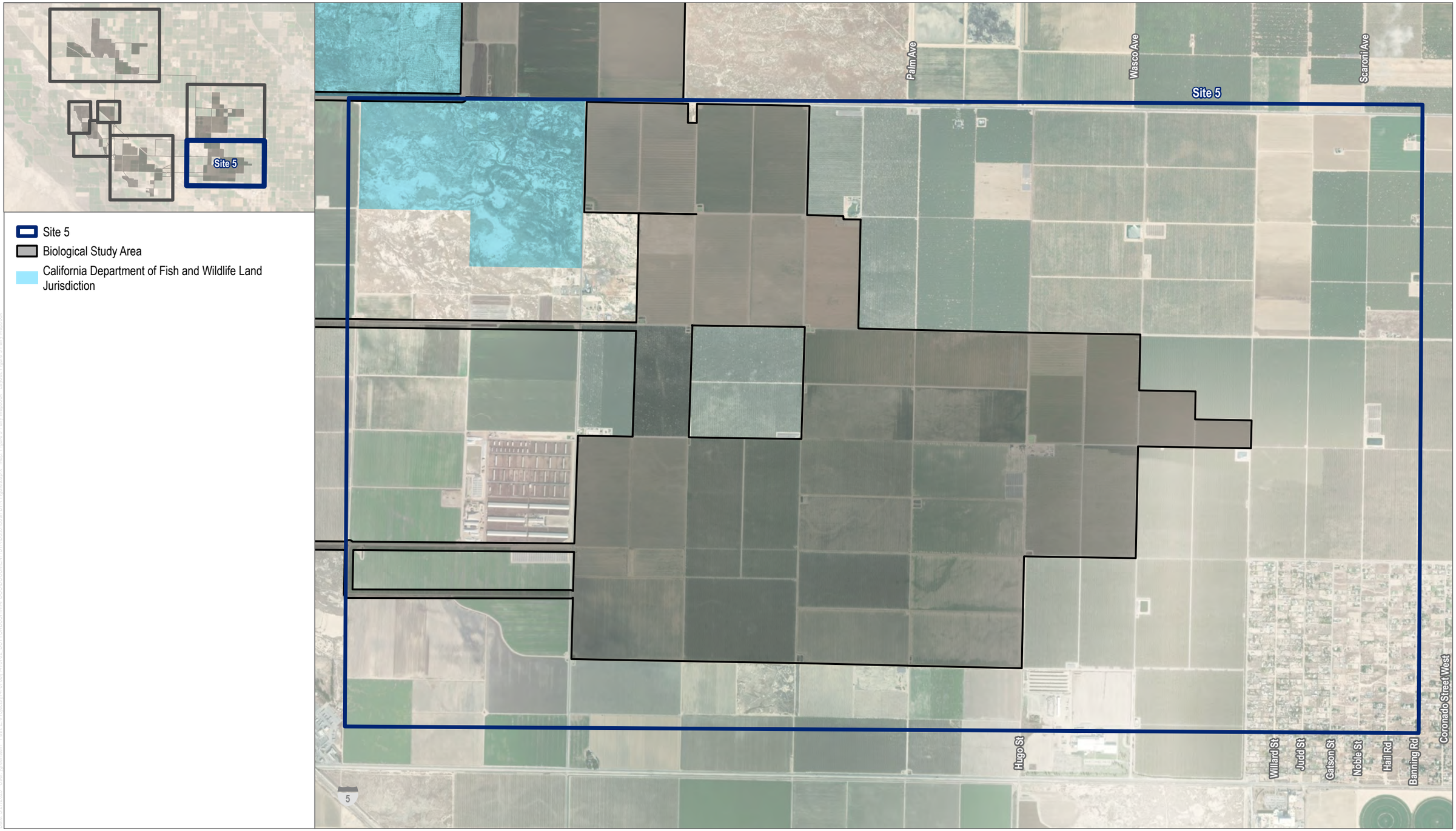
N

0 400 800 Feet

FIGURE 9D

Site 4: Vernal Pool Fairy Shrimp Wildlife Potential

Buttonbush Solar Energy Project



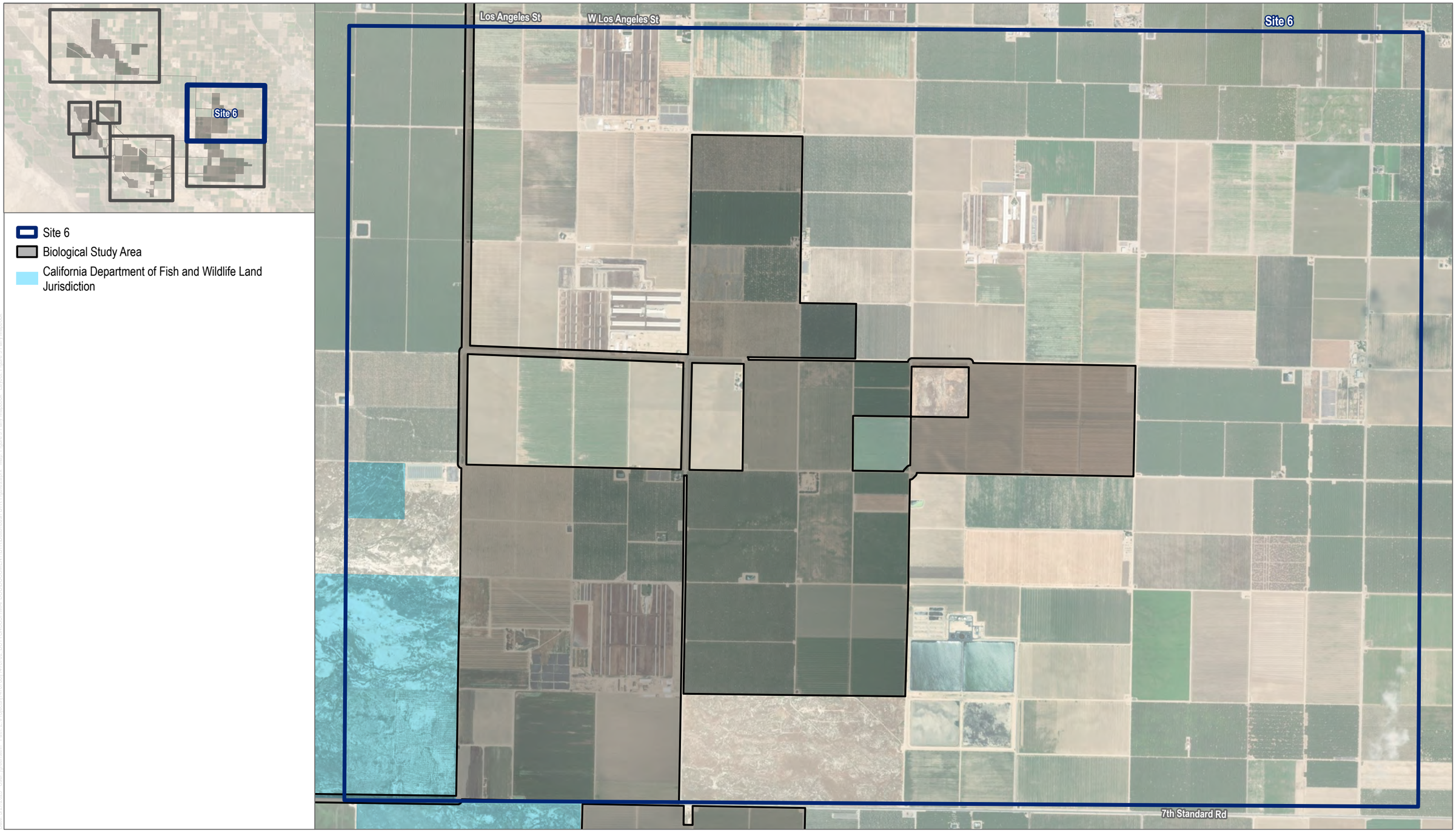
SOURCE: Maxar 2023; Open Street Maps 2023; CDFW 2024

DUDEK

FIGURE 9E

Site 5: Vernal Pool Fairy Shrimp Wildlife Potential

Buttonbush Solar Energy Project



SOURCE: Maxar 2023; Open Street Maps 2023; CDFW 2024

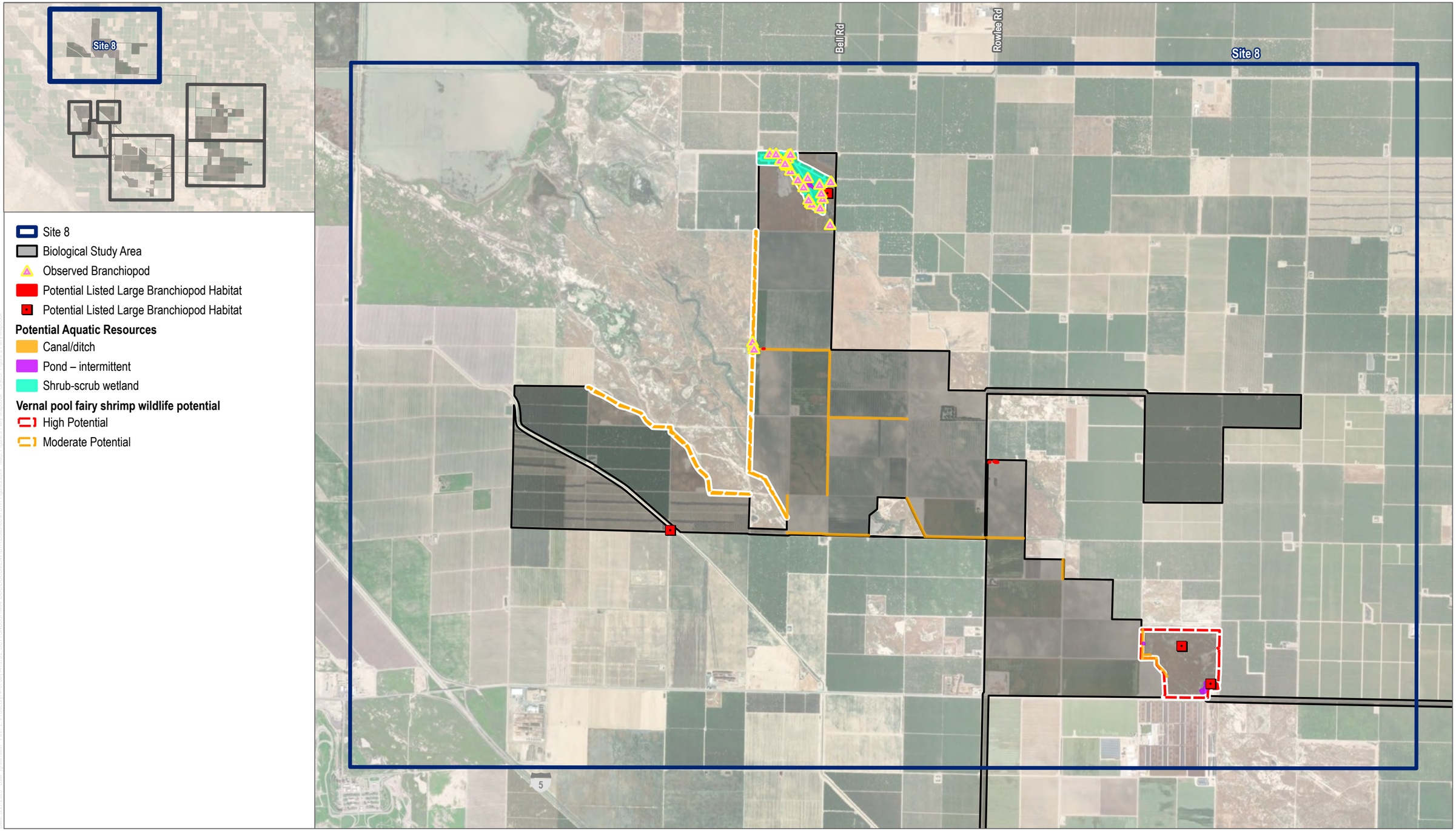
DUDEK

0 1,000 2,000 Feet

FIGURE 9F

Site 6: Vernal Pool Fairy Shrimp Wildlife Potential

Buttonbush Solar Energy Project



SOURCE: Maxar 2023; Open Street Maps 2023; CDFW 2024

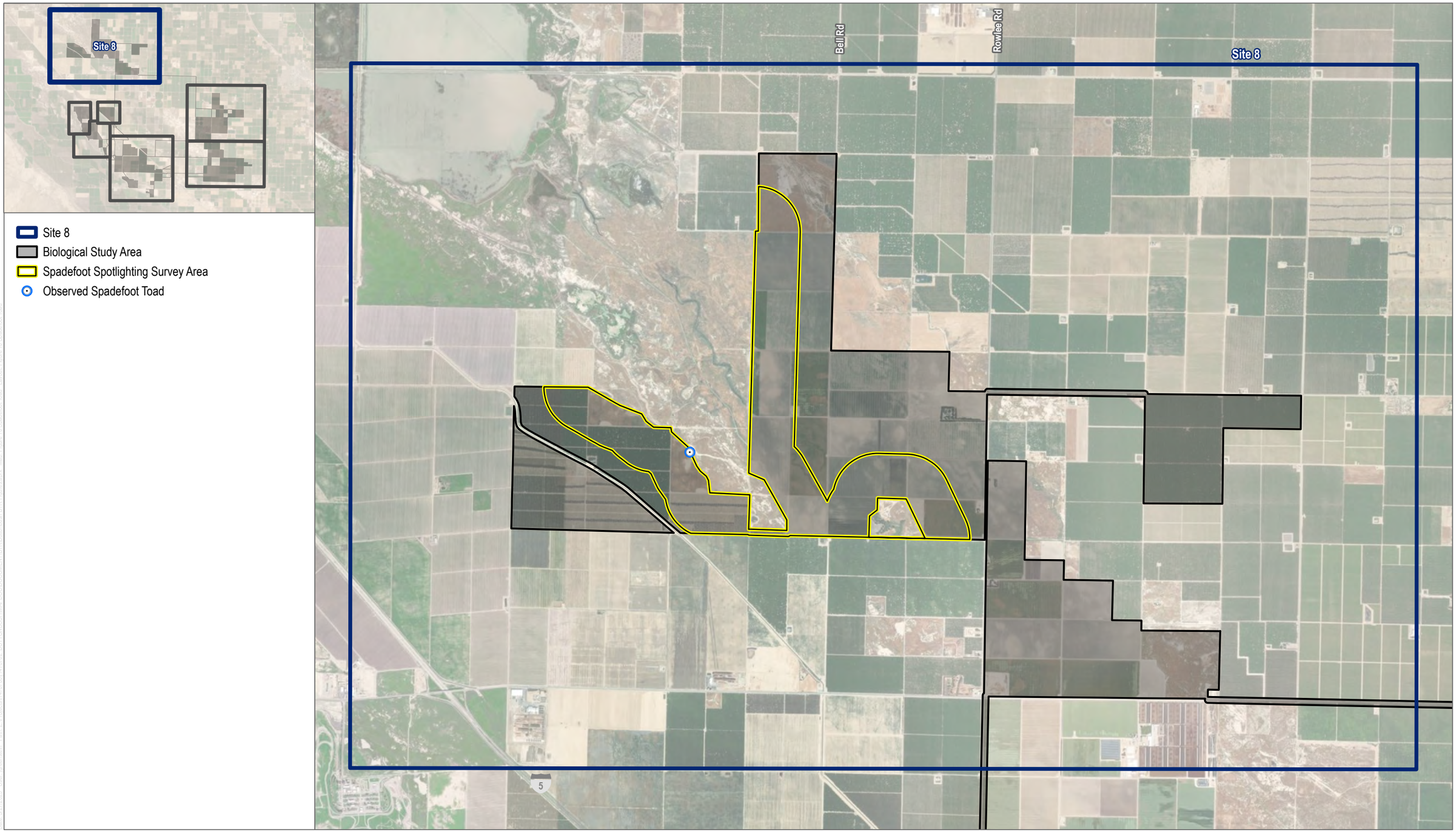
DUDEK

0 1,250 2,500 Feet

FIGURE 9G

Site 8: Vernal Pool Fairy Shrimp Wildlife Potential

Buttonbush Solar Energy Project



SOURCE: Maxar 2023; Open Street Maps 2023

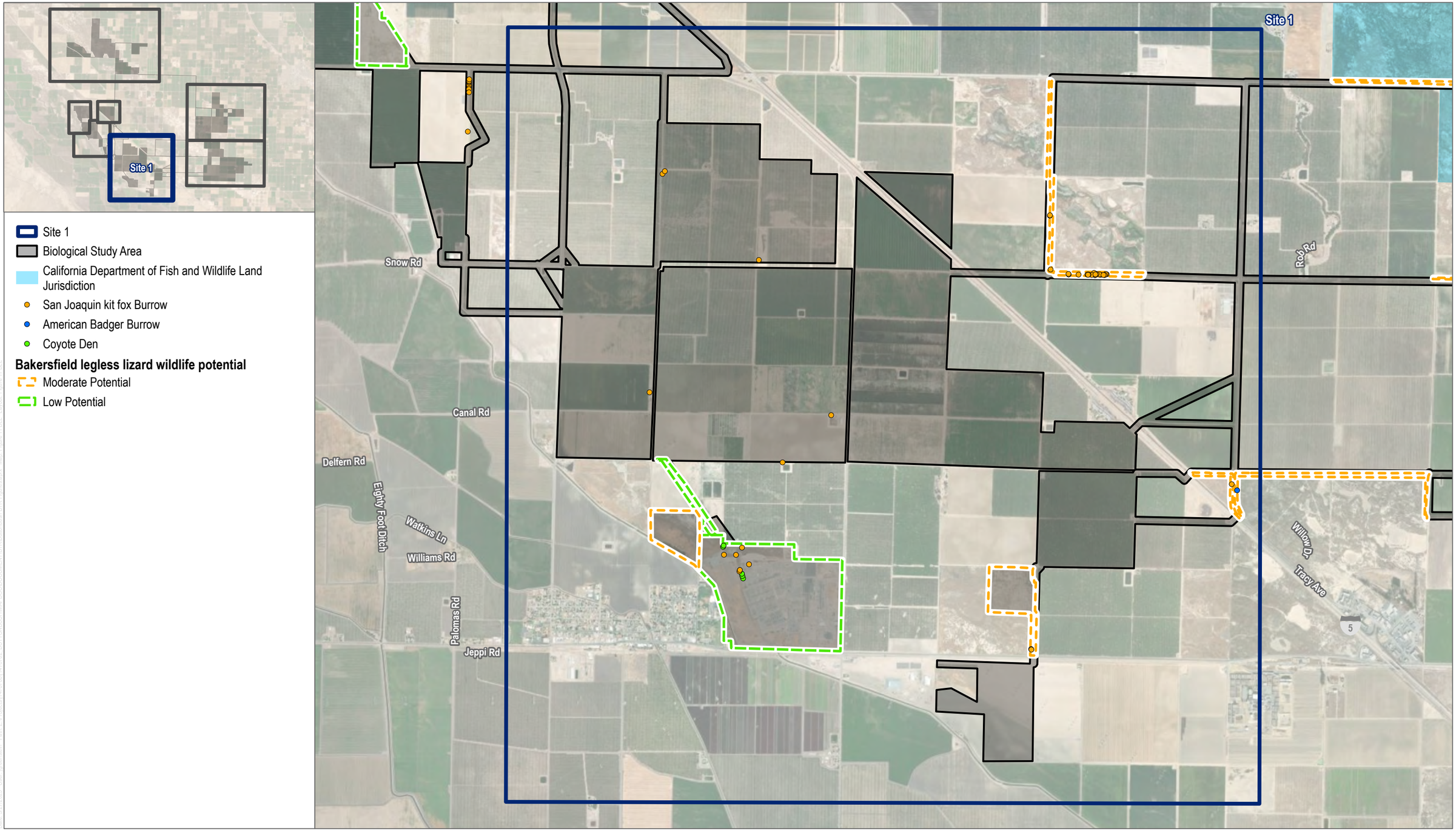
DUDEK

0 1,250 2,500 Feet

FIGURE 10

Spadefoot Spotlighting Survey Area

Buttonbush Solar Energy Project



SOURCE: Maxar 2023; Open Street Maps 2023; CDFW 2024

DUDEK

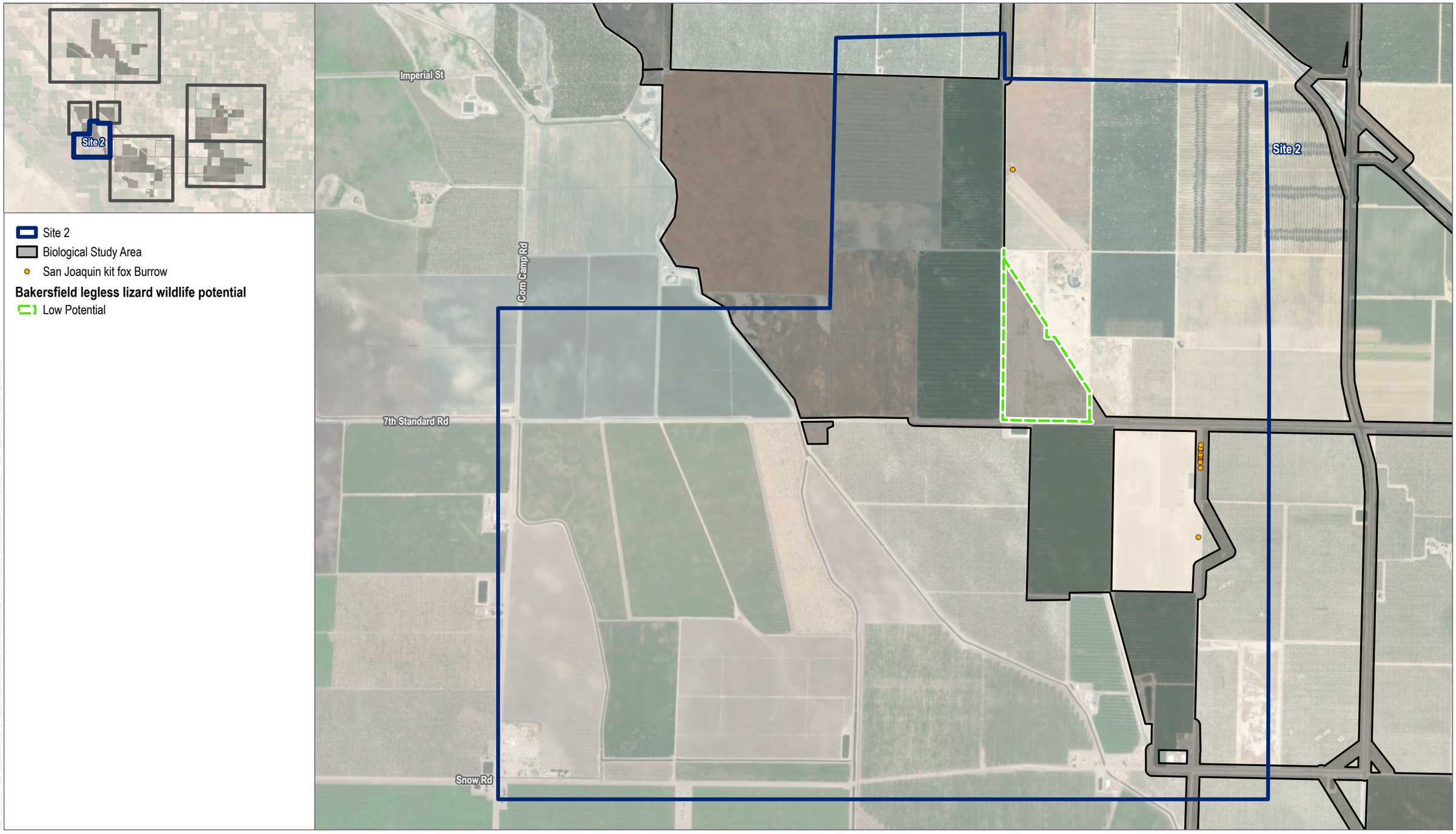
N

0 1,000 2,000 Feet

FIGURE 11A

Site 1: Bakersfield Legless Lizard Wildlife Potential

Buttonbush Solar Energy Project



SOURCE: Maxar 2023; Open Street Maps 2023; CDFW 2024

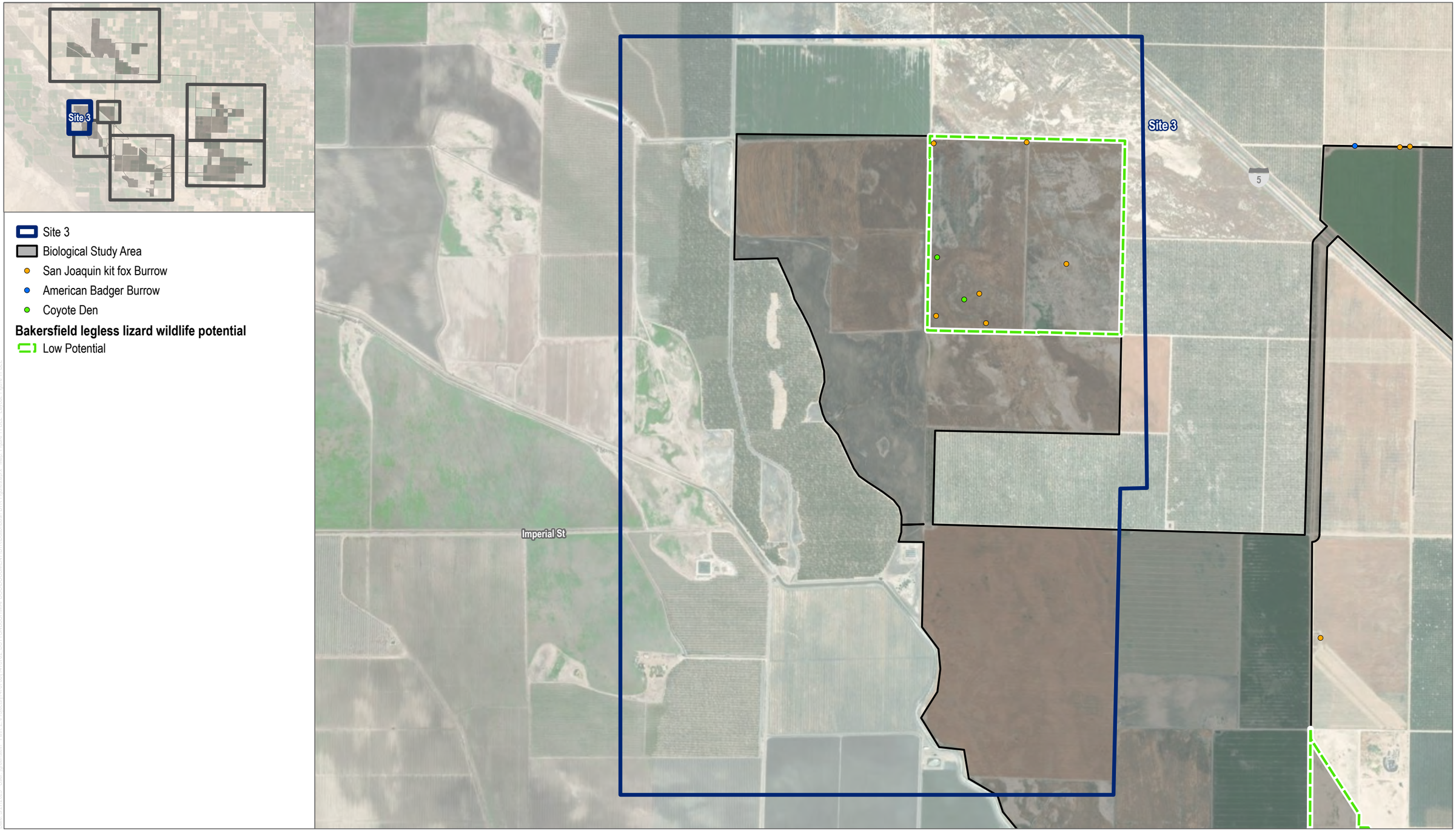
DUDEK

0 500 1,000 Feet

FIGURE 11B

Site 2: Bakersfield Legless Lizard Wildlife Potential

Buttonbush Solar Energy Project



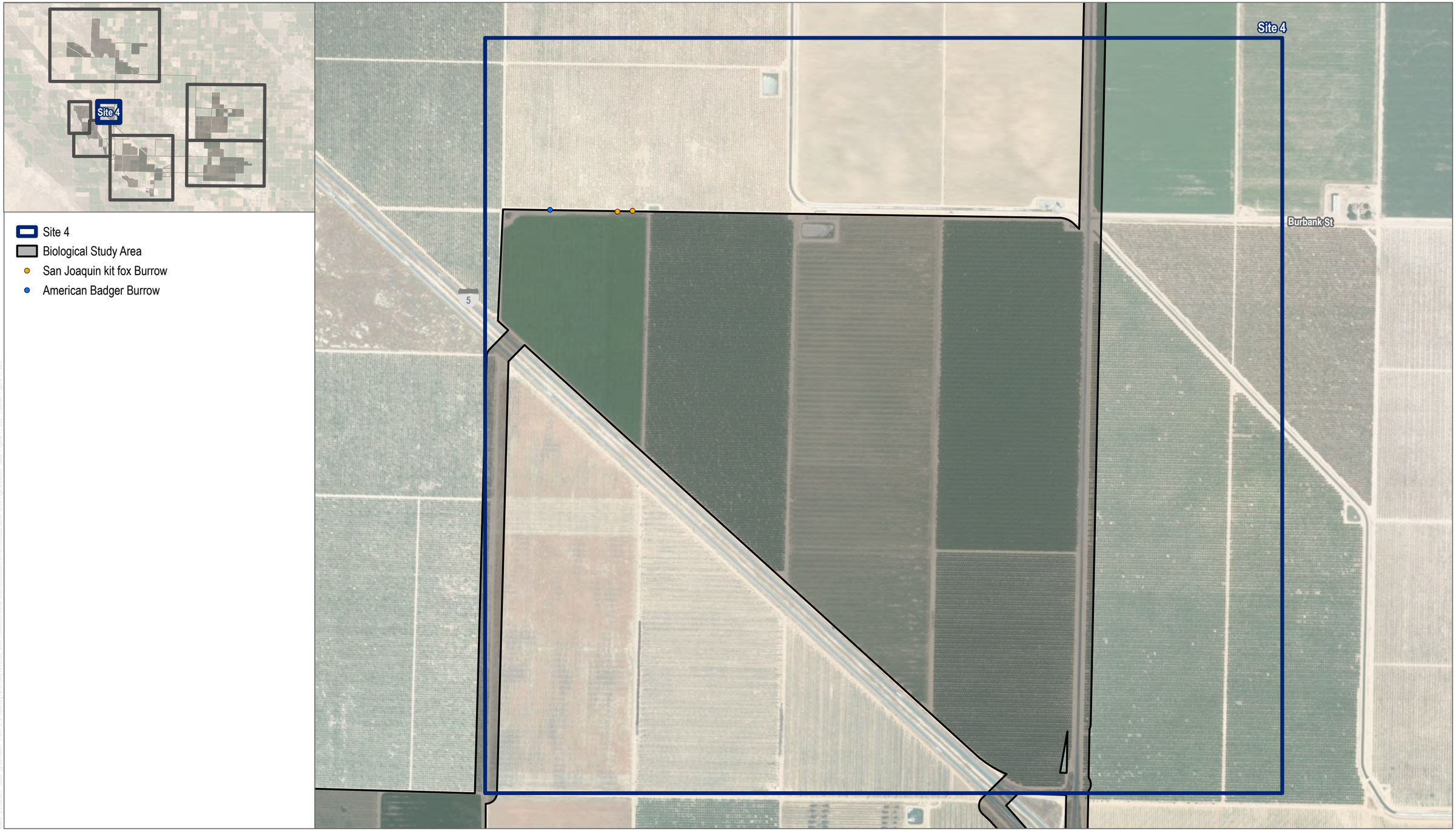
SOURCE: Maxar 2023; Open Street Maps 2023; CDFW 2024

DUDEK

FIGURE 11C

Site 3: Bakersfield Legless Lizard Wildlife Potential

Buttonbush Solar Energy Project



SOURCE: Maxar 2023; Open Street Maps 2023; CDFW 2024

DUDEK

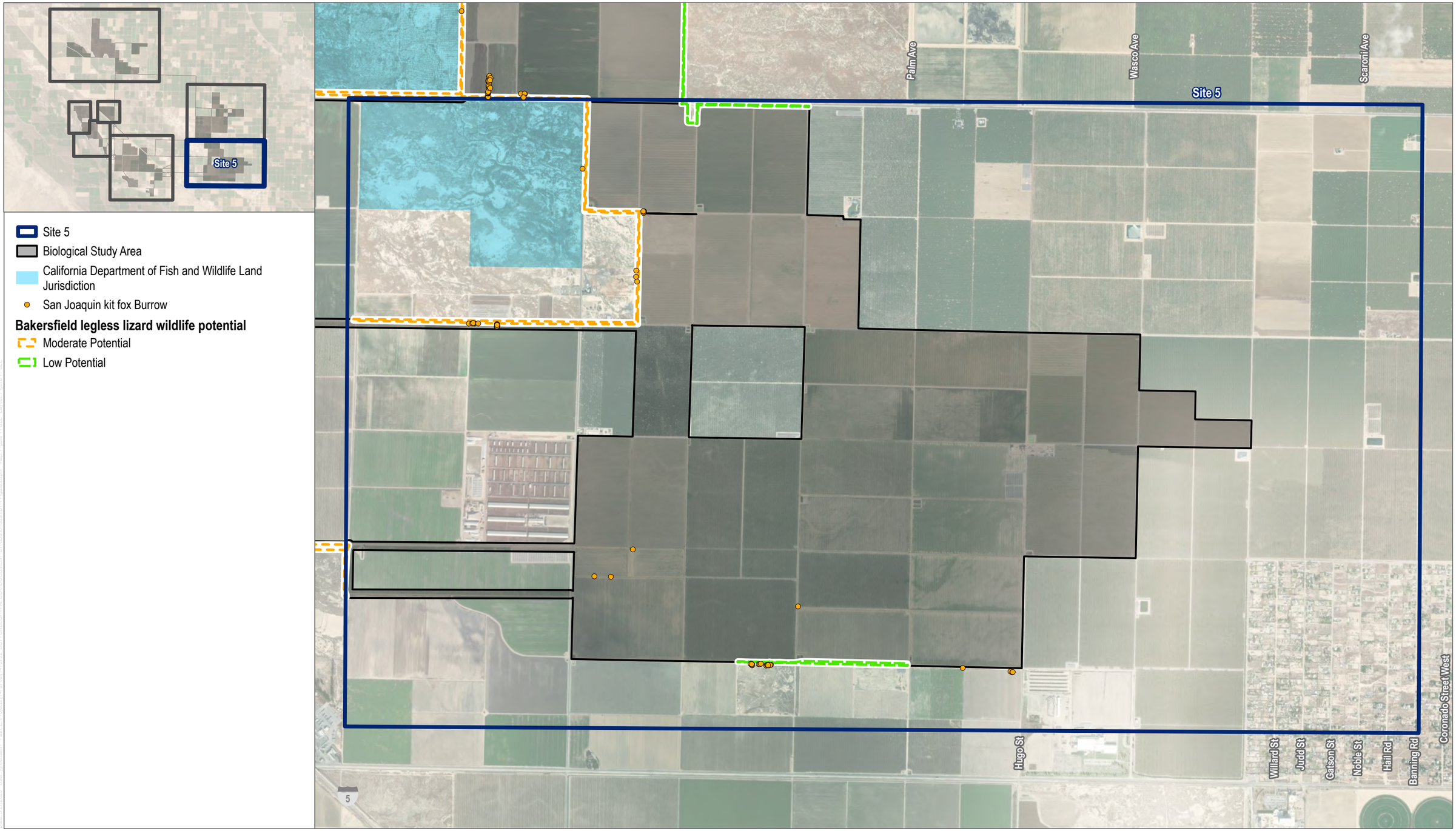
N

0 400 800 Feet

FIGURE 11D

Site 4: Bakersfield Legless Lizard Wildlife Potential

Buttonbush Solar Energy Project



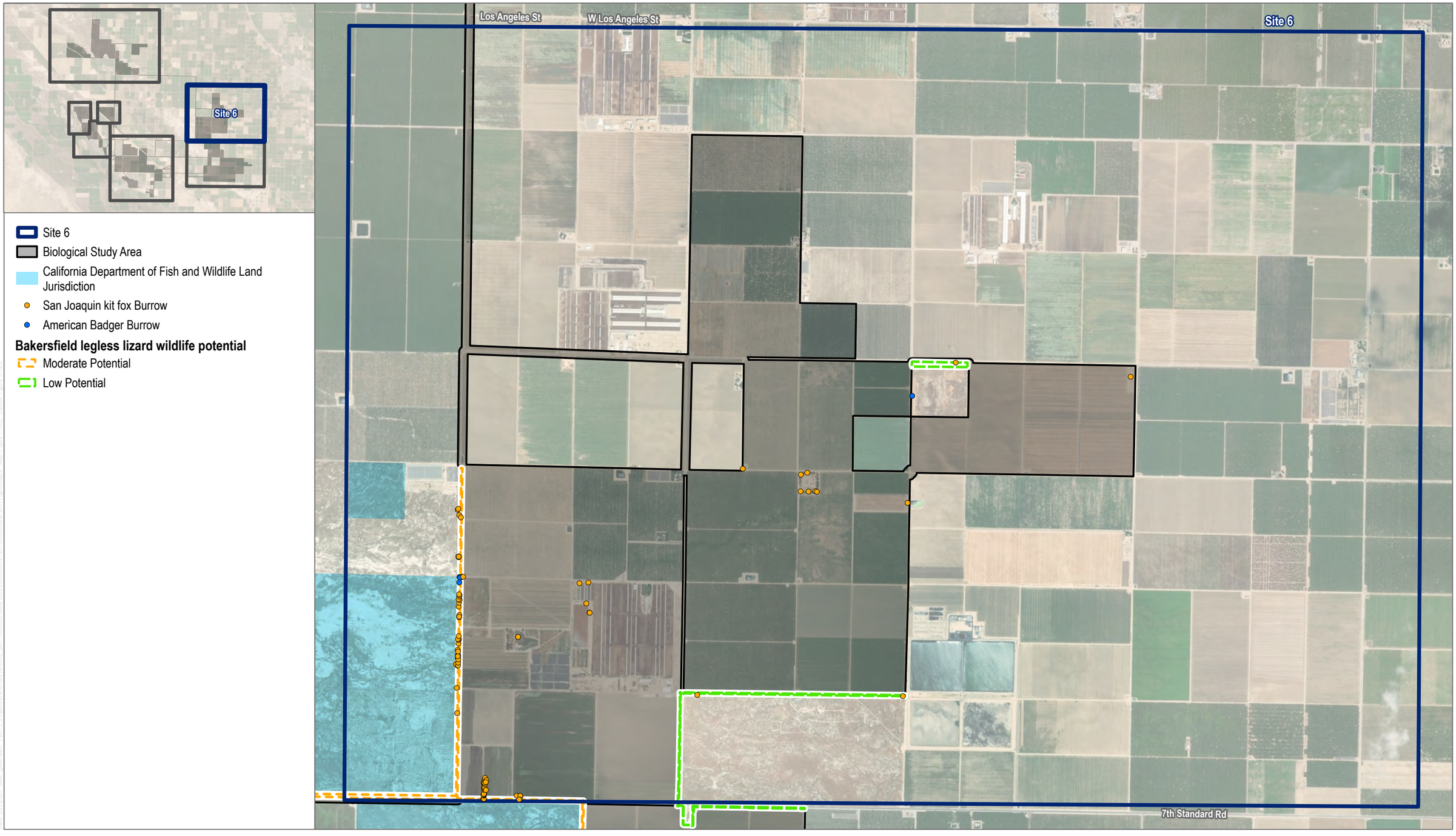
SOURCE: Maxar 2023; Open Street Maps 2023; CDFW 2024

DUDEK

FIGURE 11E

Site 5: Bakersfield Legless Lizard Wildlife Potential

Buttonbush Solar Energy Project



SOURCE: Maxar 2023; Open Street Maps 2023; CDFW 2024

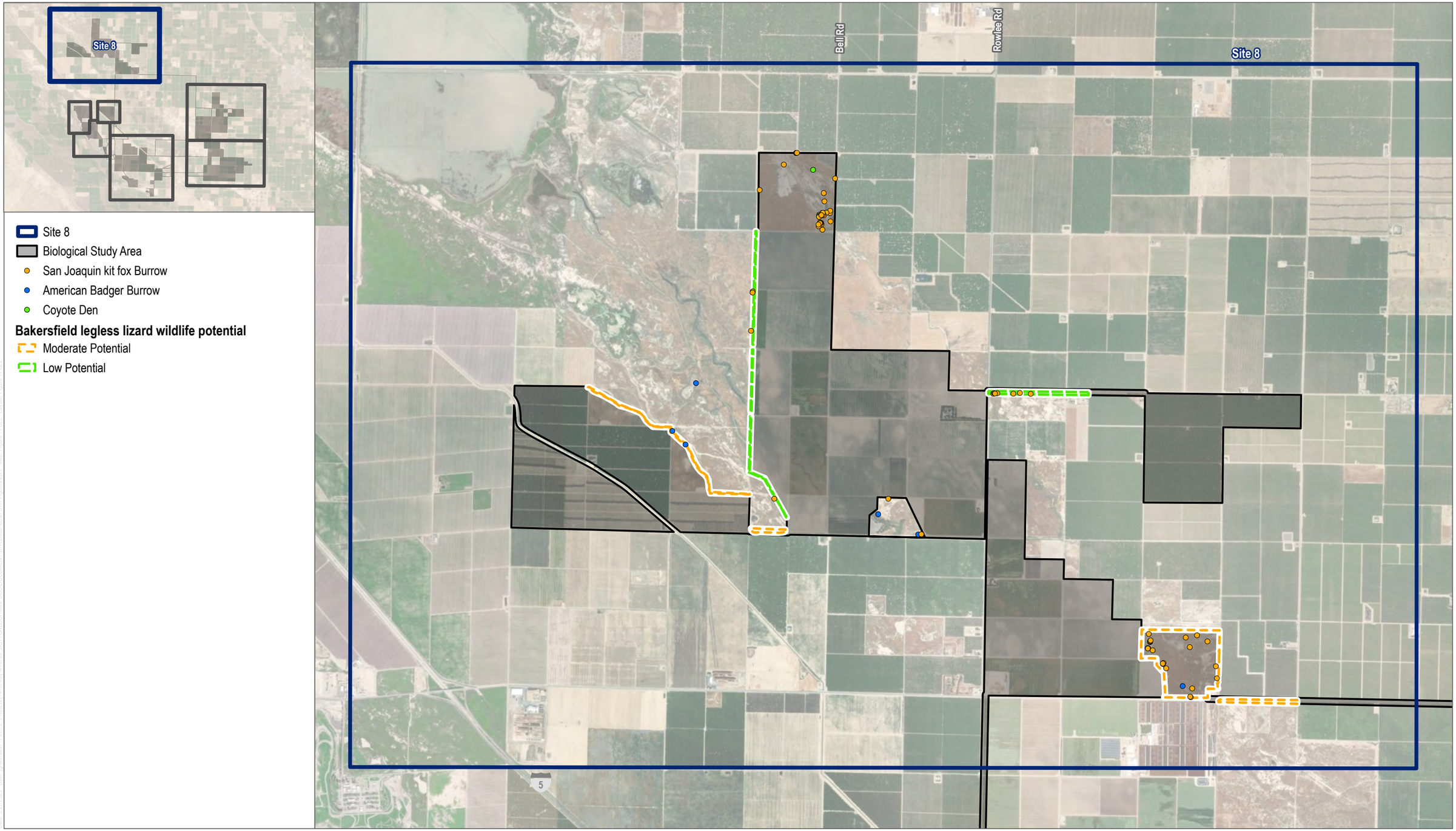
DUDEK

0 1,000 2,000 Feet

FIGURE 11F

Site 6: Bakersfield Legless Lizard Wildlife Potential

Buttonbush Solar Energy Project



SOURCE: Maxar 2023; Open Street Maps 2023; CDFW 2024

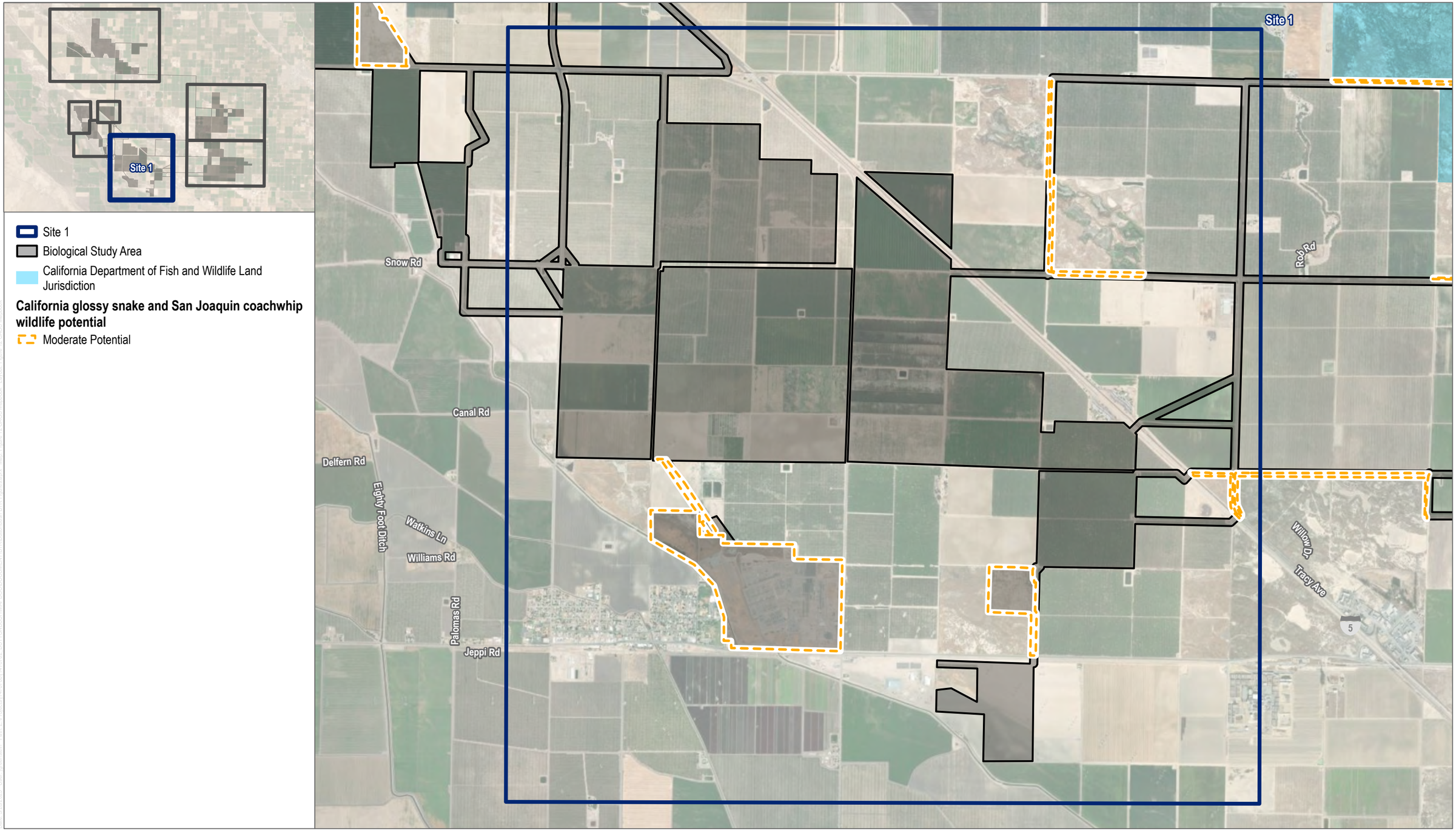
DUDEK

0 1,250 2,500 Feet

FIGURE 11G

Site 8: Bakersfield Legless Lizard Wildlife Potential

Buttonbush Solar Energy Project



SOURCE: Maxar 2023; Open Street Maps 2023; CDFW 2024

DUDEK

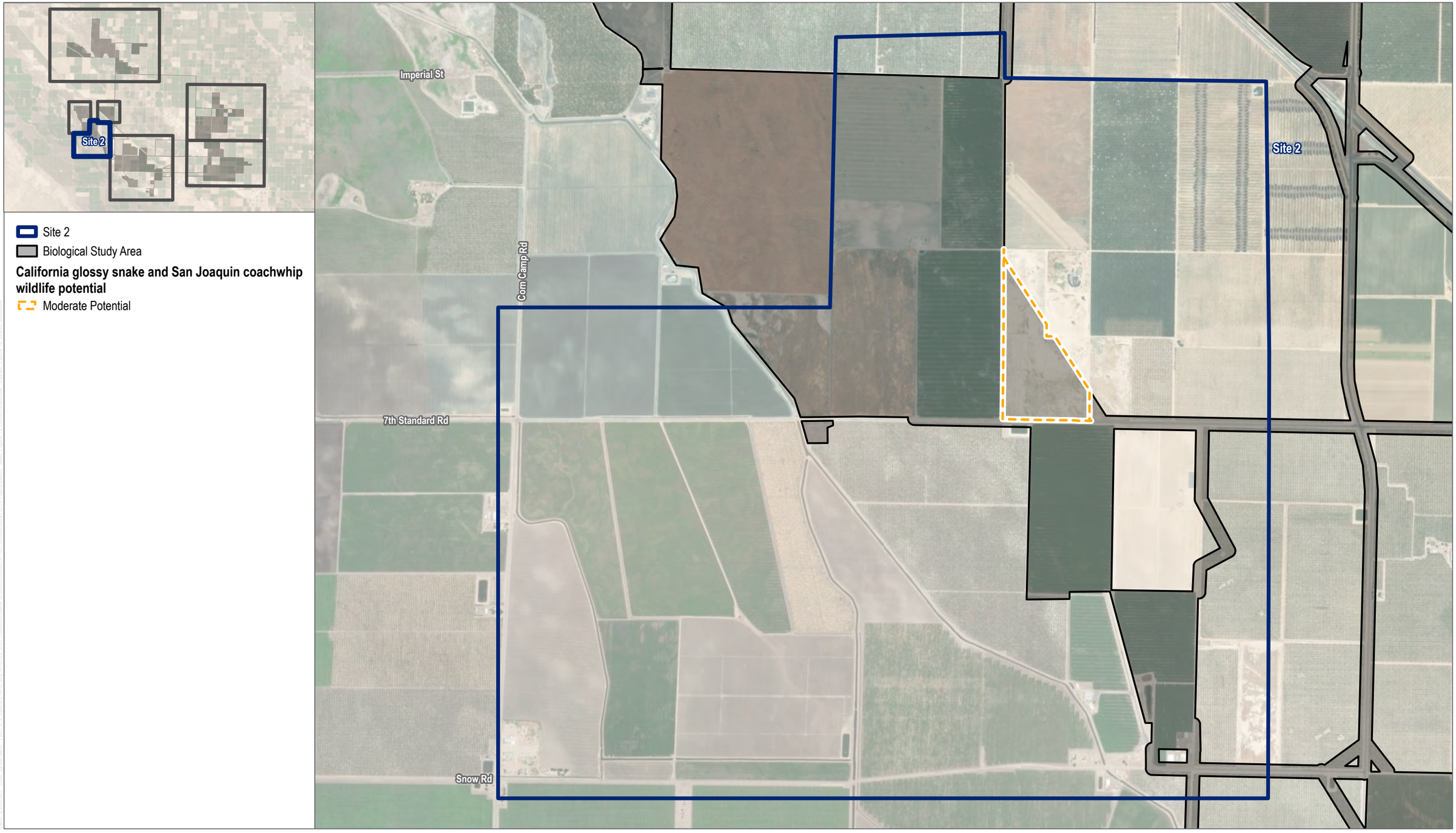
N

0 1,000 2,000 Feet

FIGURE 12A

Site 1: California Glossy Snake and San Joaquin Coachwhip Wildlife Potential

Buttonbush Solar Energy Project



SOURCE: Maxar 2023; Open Street Maps 2023; CDFW 2024

DUDEK

0 500 1,000 Feet

FIGURE 12B

Site 2: California Glossy Snake and San Joaquin Coachwhip Wildlife Potential

Buttonbush Solar Energy Project

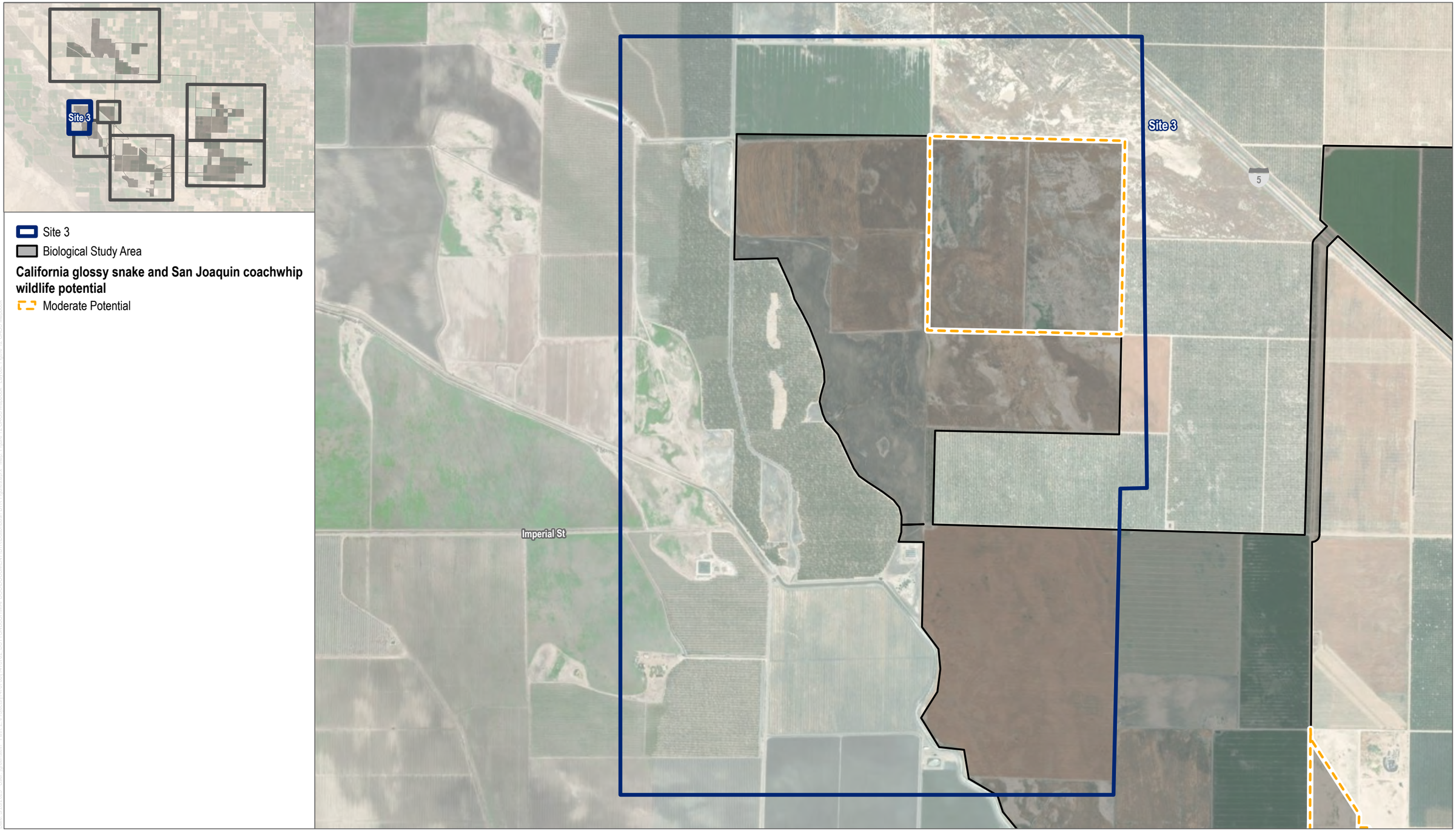
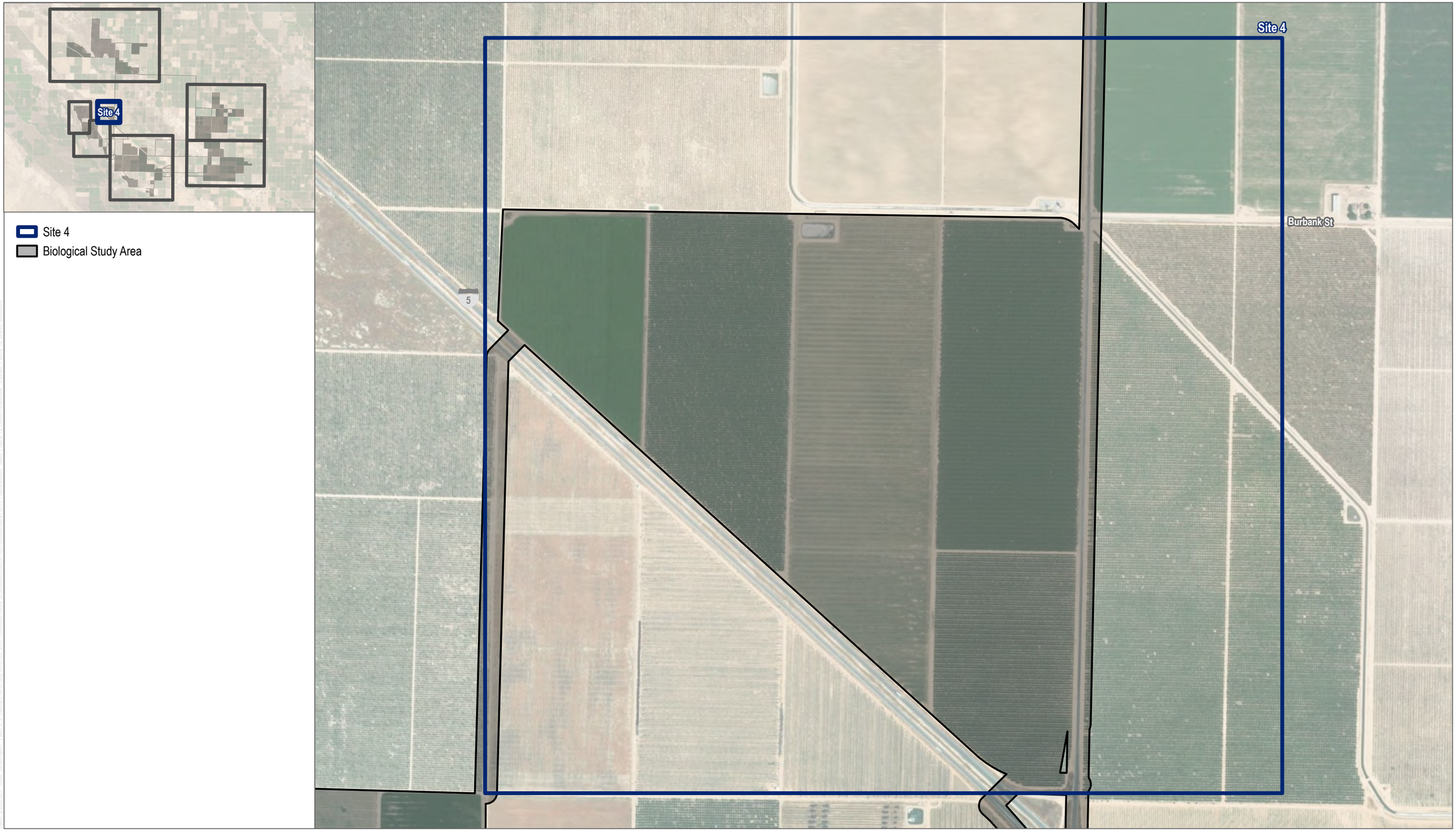


FIGURE 12C

Site 3: California Glossy Snake and San Joaquin Coachwhip Wildlife Potential

Buttonbush Solar Energy Project



SOURCE: Maxar 2023; Open Street Maps 2023; CDFW 2024

DUDEK

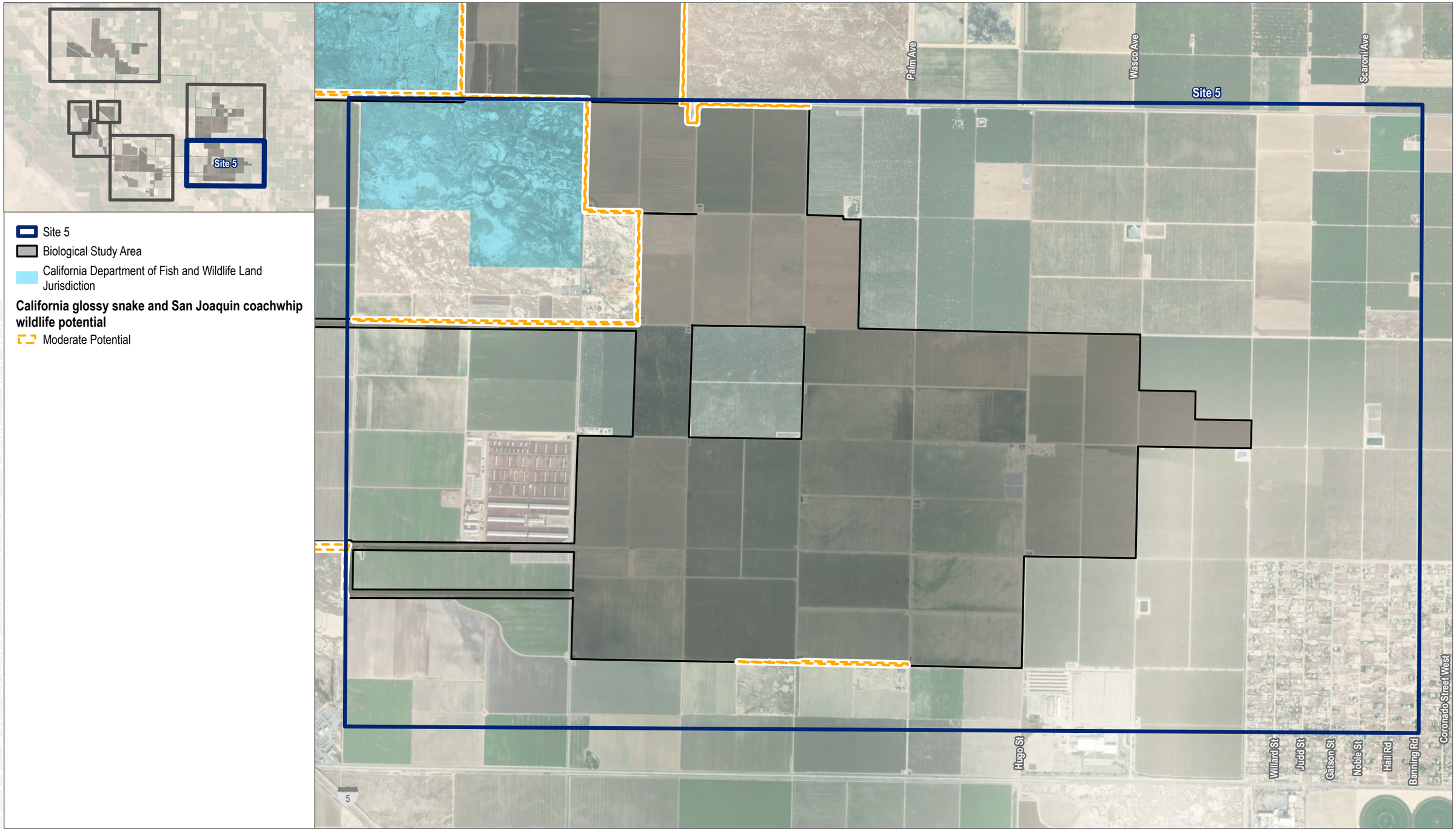
N

0 400 800 Feet

FIGURE 12D

Site 4: California Glossy Snake and San Joaquin Coachwhip Wildlife Potential

Buttonbush Solar Energy Project

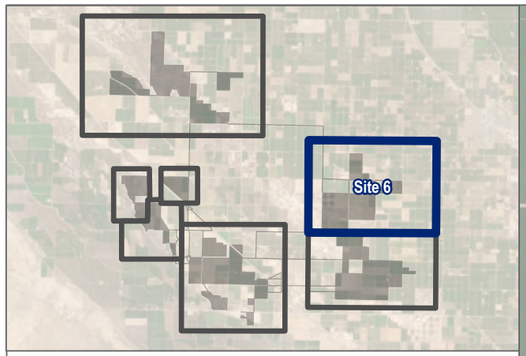


SOURCE: Maxar 2023; Open Street Maps 2023; CDFW 2024

FIGURE 12E

Site 5: California Glossy Snake and San Joaquin Coachwhip Wildlife Potential

Buttonbush Solar Energy Project



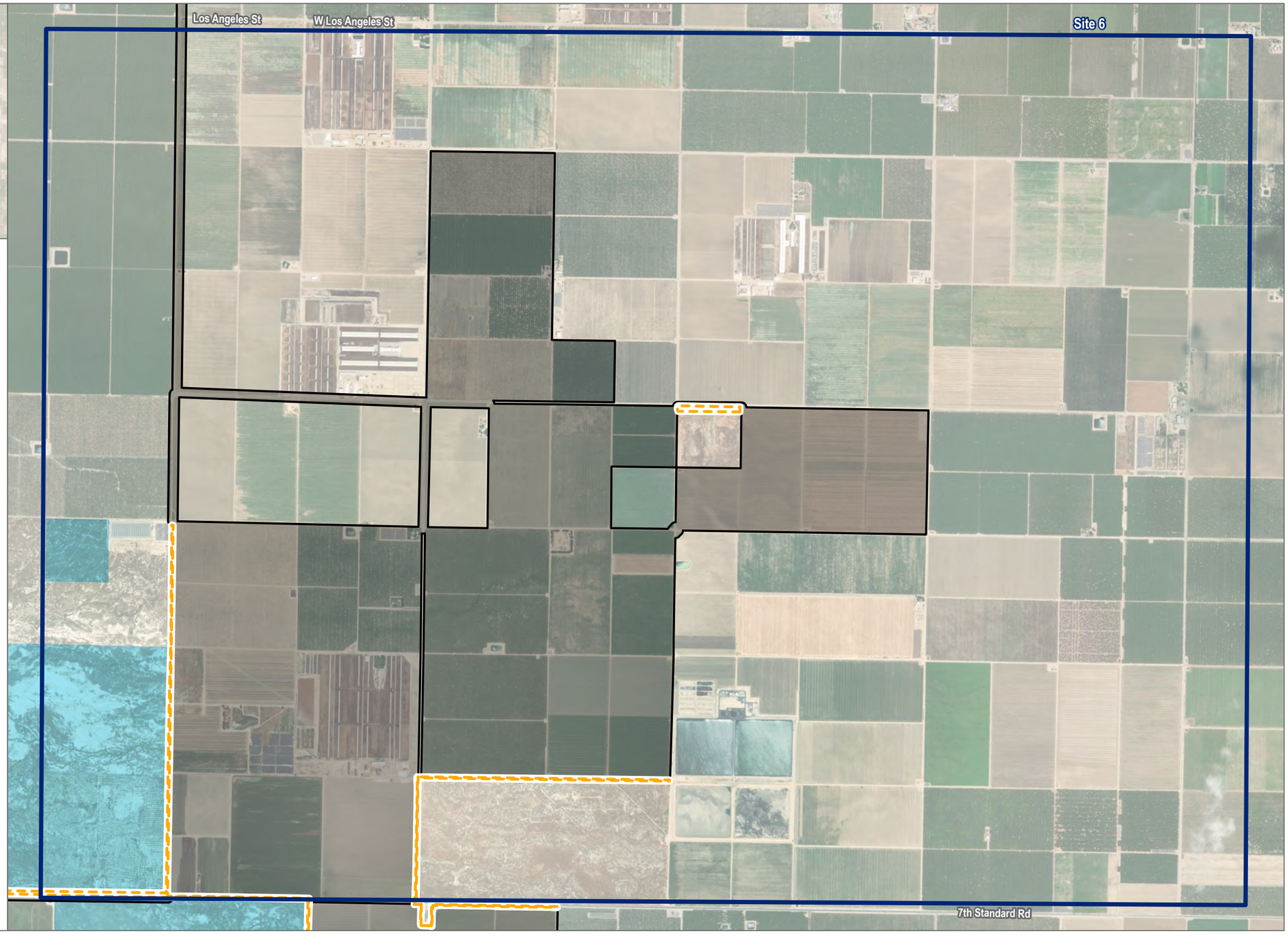
Site 6

Biological Study Area

California Department of Fish and Wildlife Land Jurisdiction

California glossy snake and San Joaquin coachwhip wildlife potential

Moderate Potential



SOURCE: Maxar 2023; Open Street Maps 2023; CDFW 2024

DUDEK

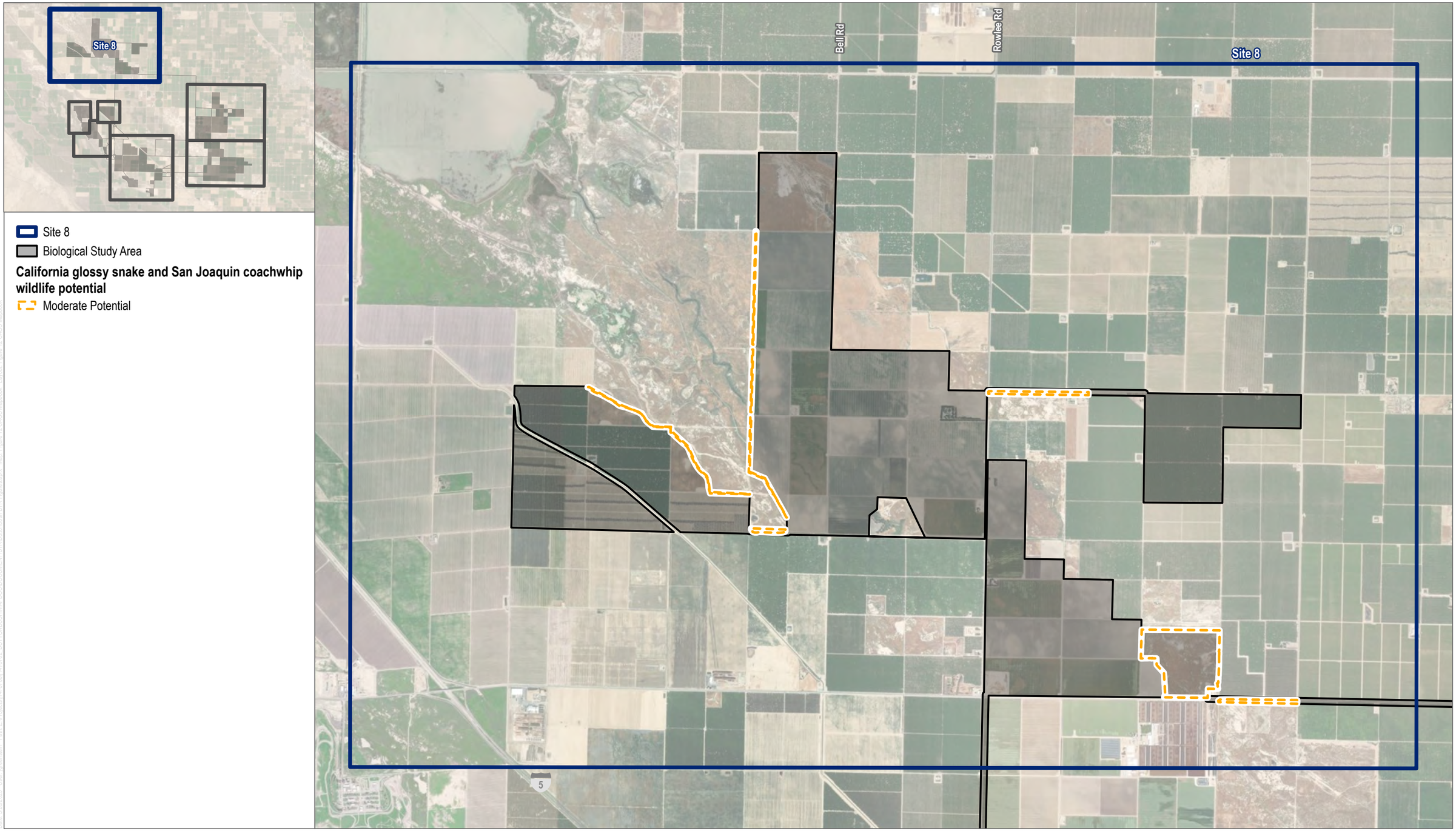
N

0 1,000 2,000 Feet

FIGURE 12F

Site 6: California Glossy Snake and San Joaquin Coachwhip Wildlife Potential

Buttonbush Solar Energy Project



Site 8

Biological Study Area

California glossy snake and San Joaquin coachwhip wildlife potential

Moderate Potential

SOURCE: Maxar 2023; Open Street Maps 2023; CDFW 2024

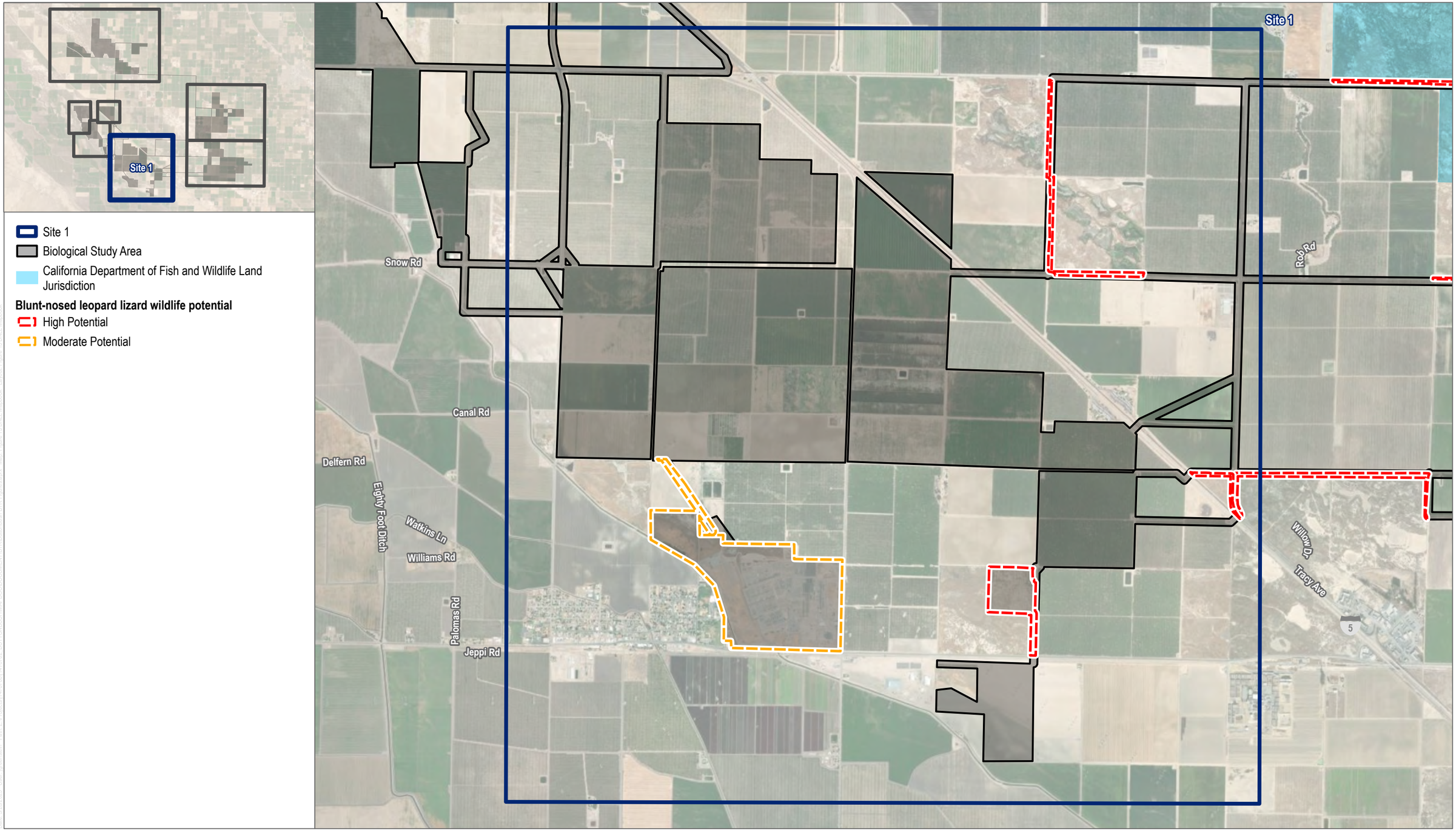
DUDEK

0 1,250 2,500 Feet

FIGURE 12G

Site 8: California Glossy Snake and San Joaquin Coachwhip Wildlife Potential

Buttonbush Solar Energy Project



SOURCE: Maxar 2023; Open Street Maps 2023; CDFW 2024

DUDEK

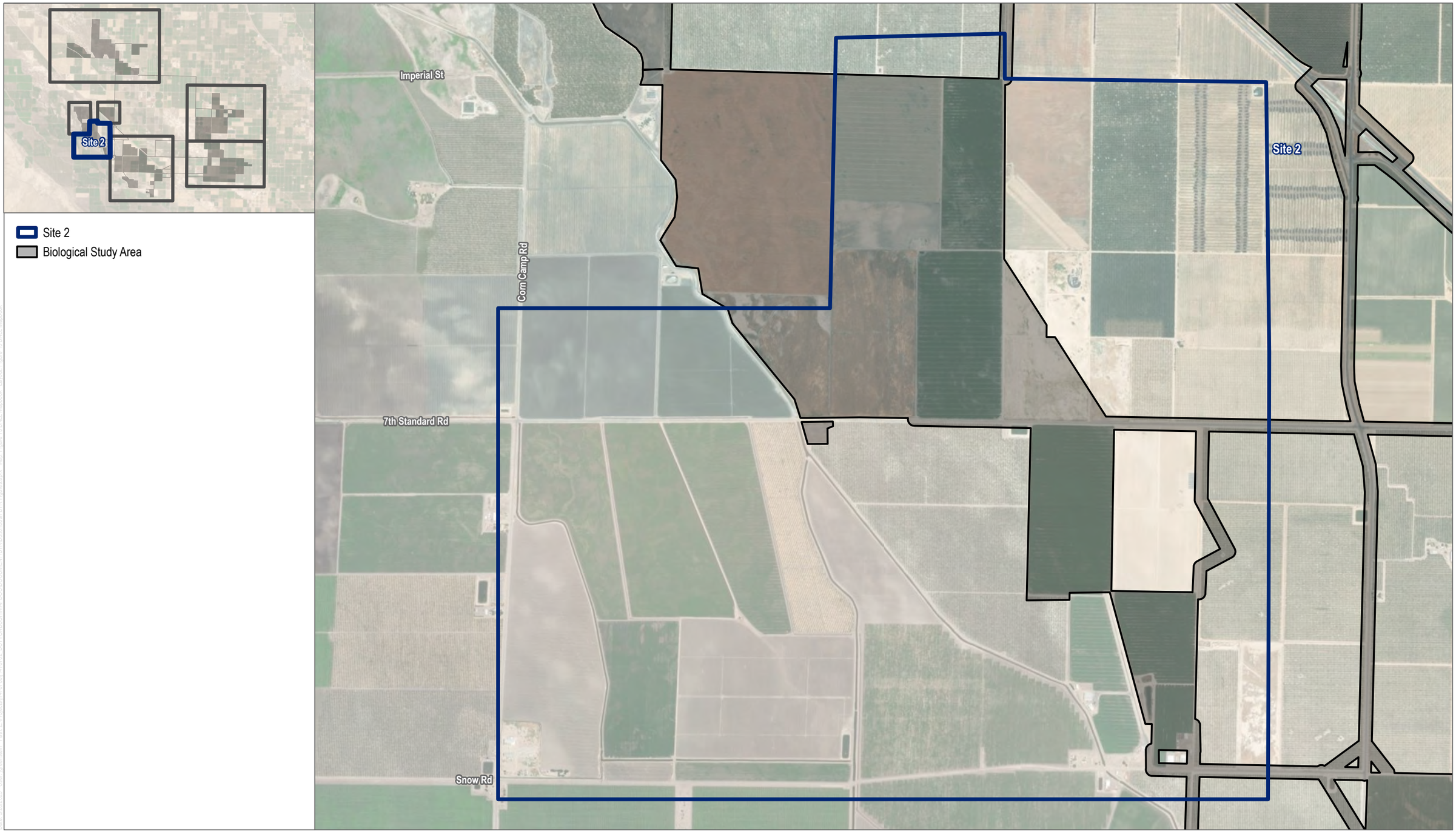
N

0 1,000 2,000 Feet

FIGURE 13A

Site 1: Blunt-Nosed Leopard Lizard Wildlife Potential

Buttonbush Solar Energy Project



SOURCE: Maxar 2023; Open Street Maps 2023; CDFW 2024

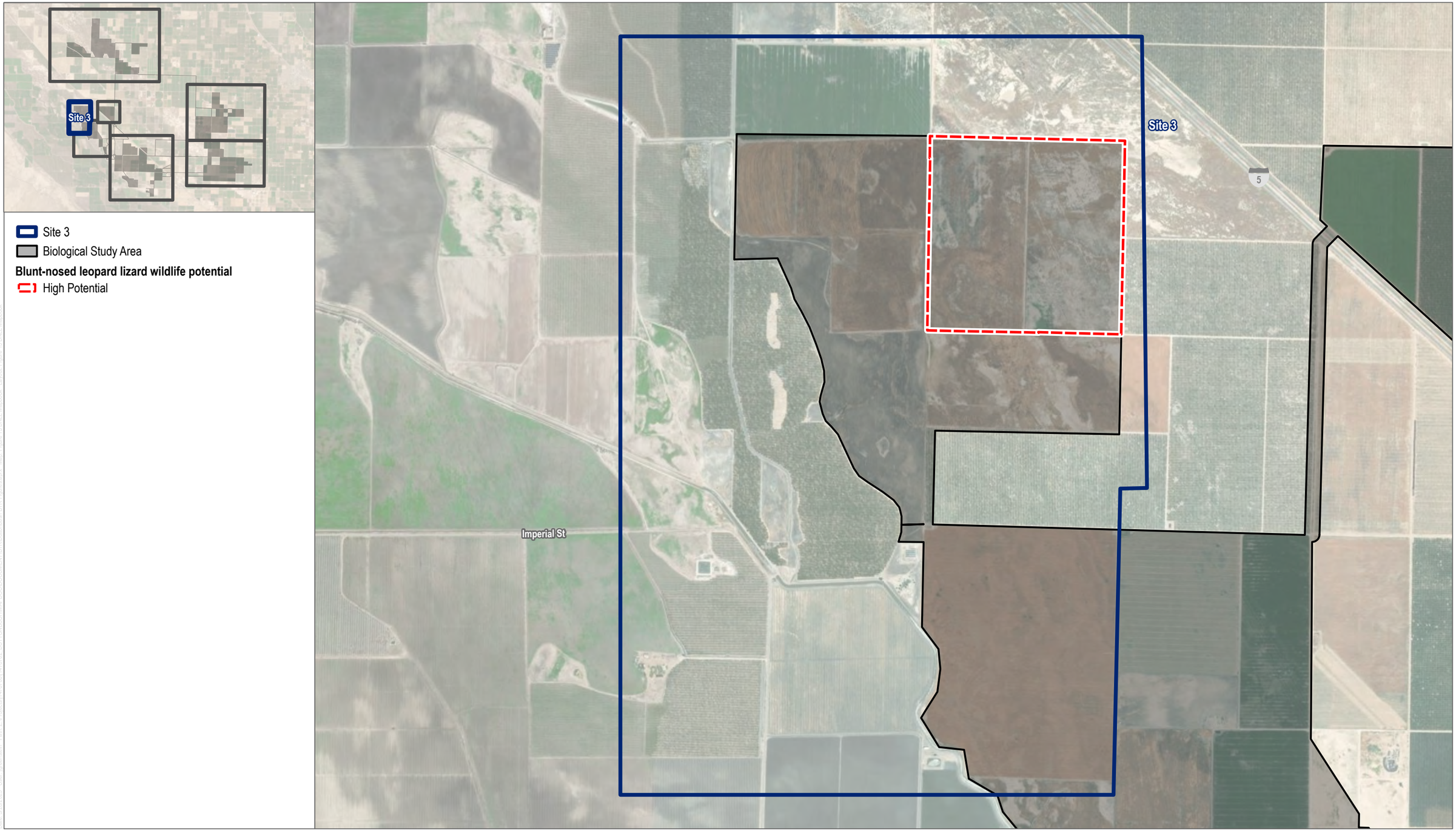
DUDEK

0 500 1,000 Feet

FIGURE 13B

Site 2: Blunt-Nosed Leopard Lizard Wildlife Potential

Buttonbush Solar Energy Project



SOURCE: Maxar 2023; Open Street Maps 2023; CDFW 2024

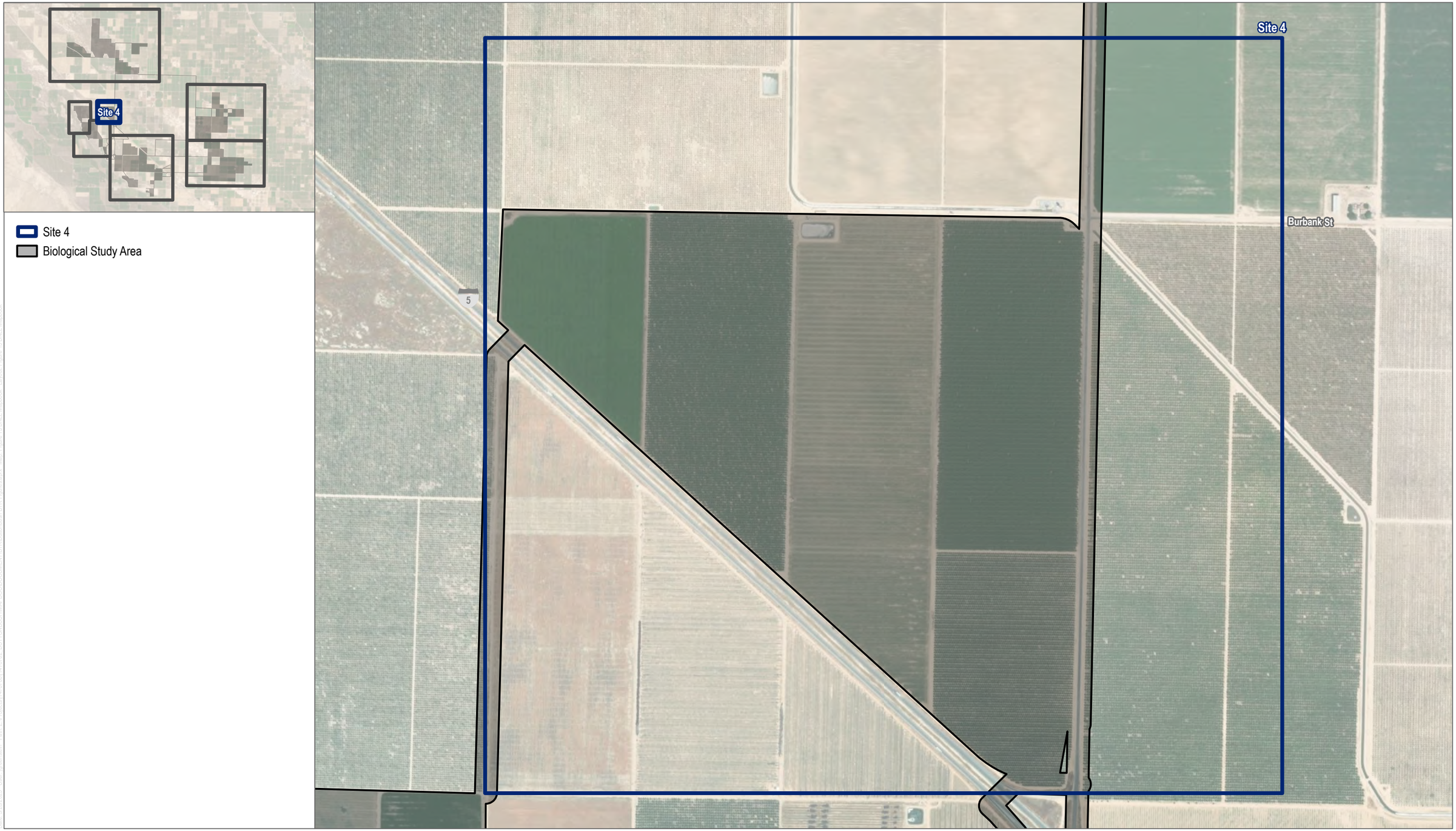
DUDEK

0 500 1,000 Feet

FIGURE 13C

Site 3: Blunt-Nosed Leopard Lizard Wildlife Potential

Buttonbush Solar Energy Project



SOURCE: Maxar 2023; Open Street Maps 2023; CDFW 2024

DUDEK

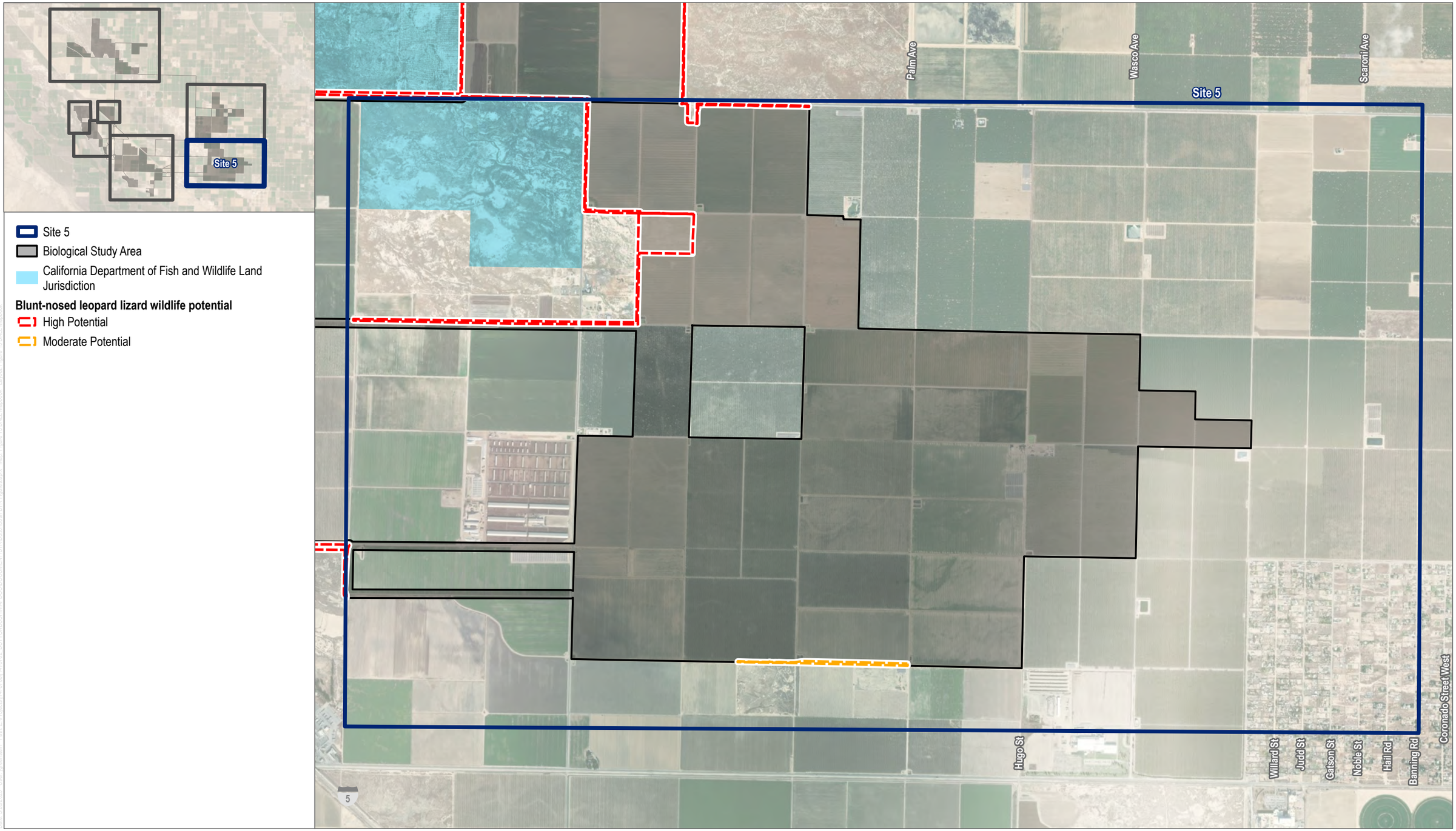
N

0 400 800 Feet

FIGURE 13D

Site 4: Blunt-Nosed Leopard Lizard Wildlife Potential

Buttonbush Solar Energy Project



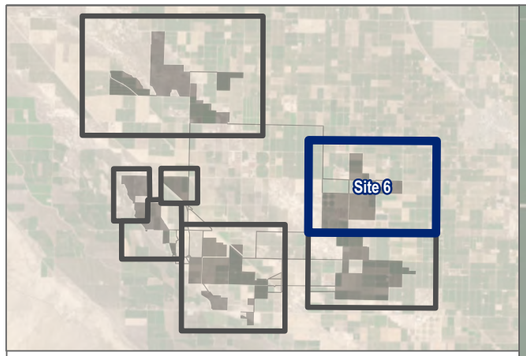
SOURCE: Maxar 2023; Open Street Maps 2023; CDFW 2024

FIGURE 13E

Site 5: Blunt-Nosed Leopard Lizard Wildlife Potential

Buttonbush Solar Energy Project

DUDEK



Site 6

Biological Study Area

California Department of Fish and Wildlife Land Jurisdiction

Blunt-nosed leopard lizard wildlife potential

High Potential

Moderate Potential

SOURCE: Maxar 2023; Open Street Maps 2023; CDFW 2024

DUDEK

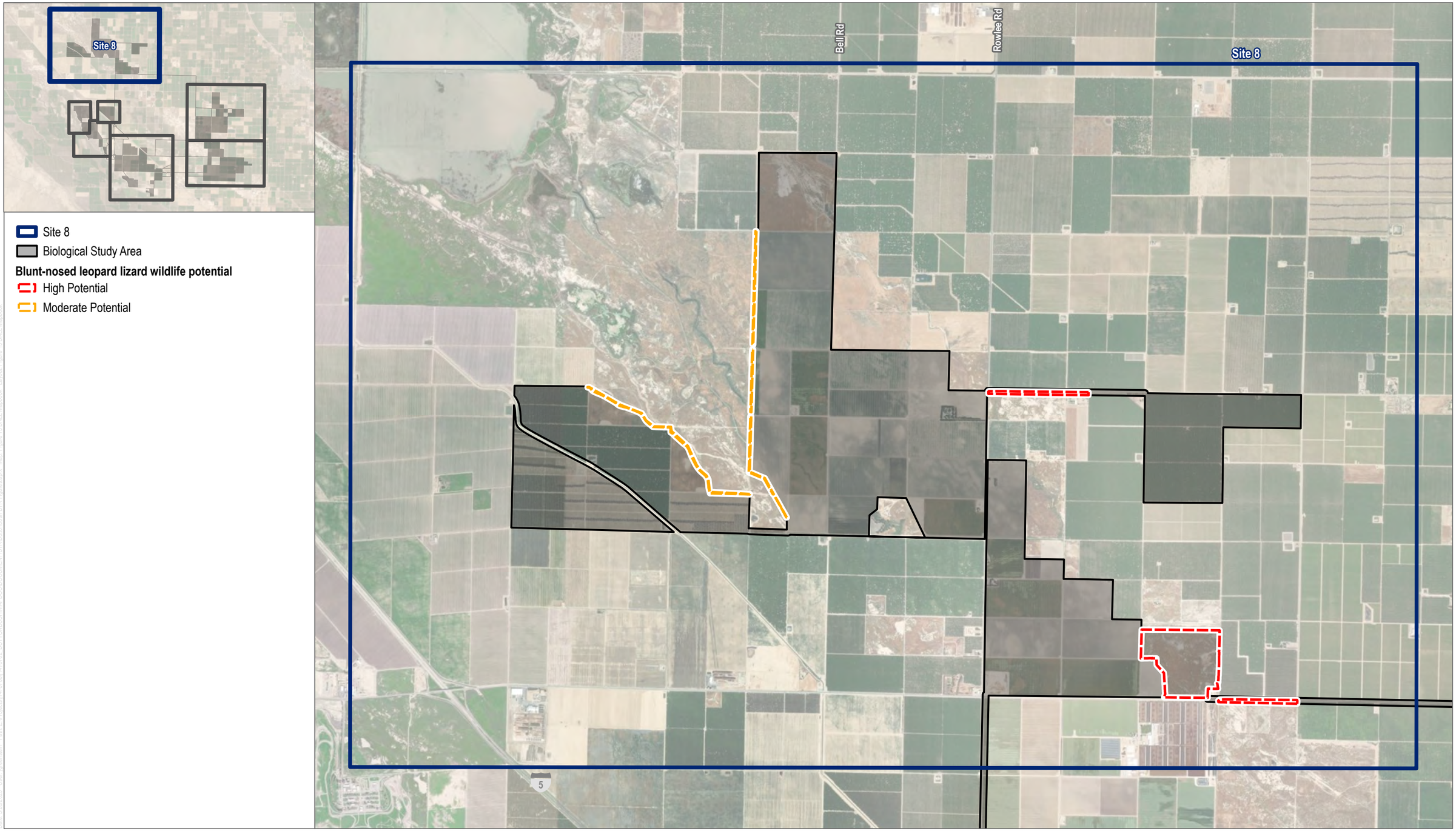
N

0 1,000 2,000 Feet

FIGURE 13F

Site 6: Blunt-Nosed Leopard Lizard Wildlife Potential

Buttonbush Solar Energy Project



SOURCE: Maxar 2023; Open Street Maps 2023; CDFW 2024

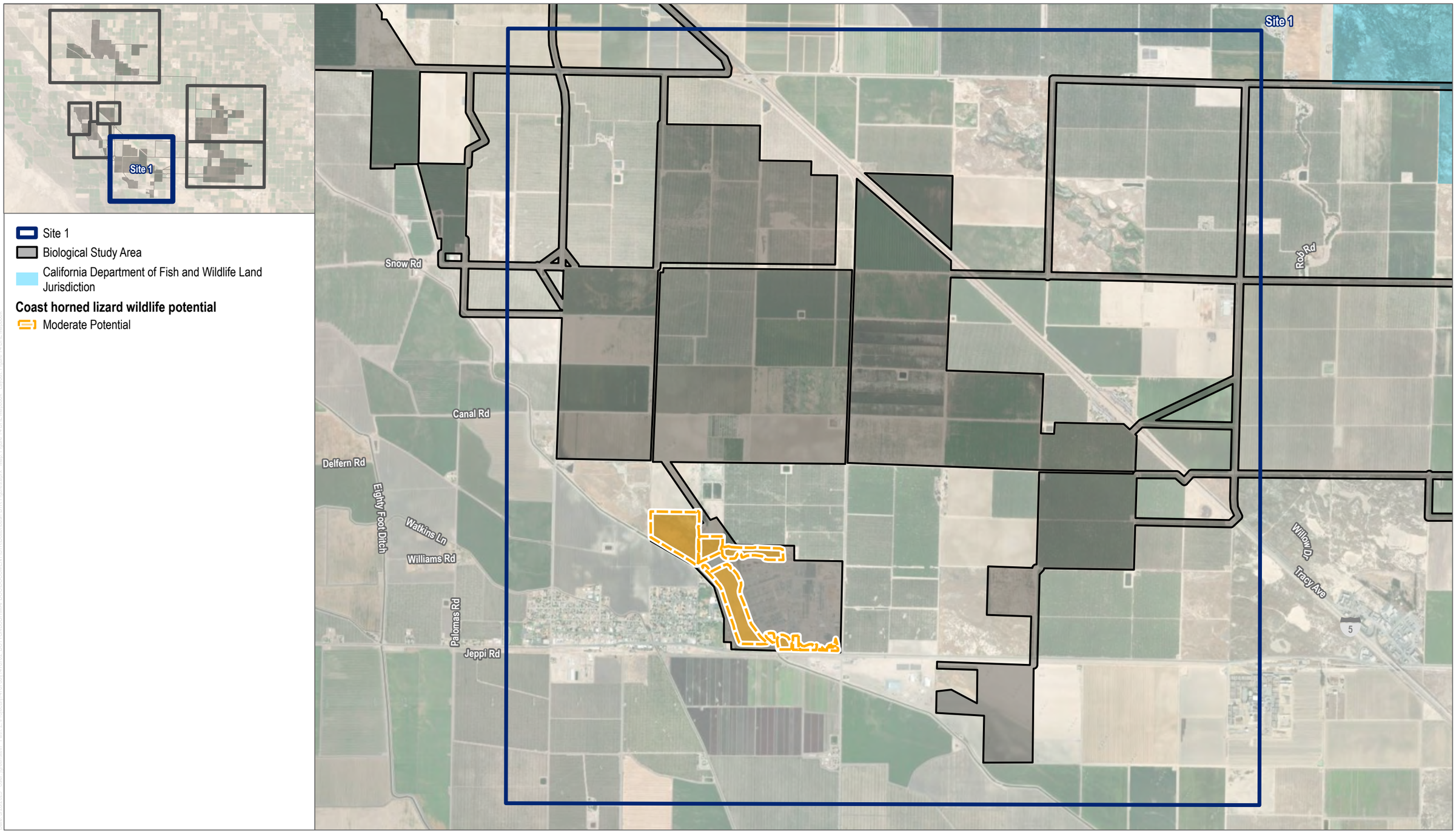
DUDEK

0 1,250 2,500 Feet

FIGURE 13G

Site 8: Blunt-Nosed Leopard Lizard Wildlife Potential

Buttonbush Solar Energy Project



SOURCE: Maxar 2023; Open Street Maps 2023; CDFW 2024

DUDEK

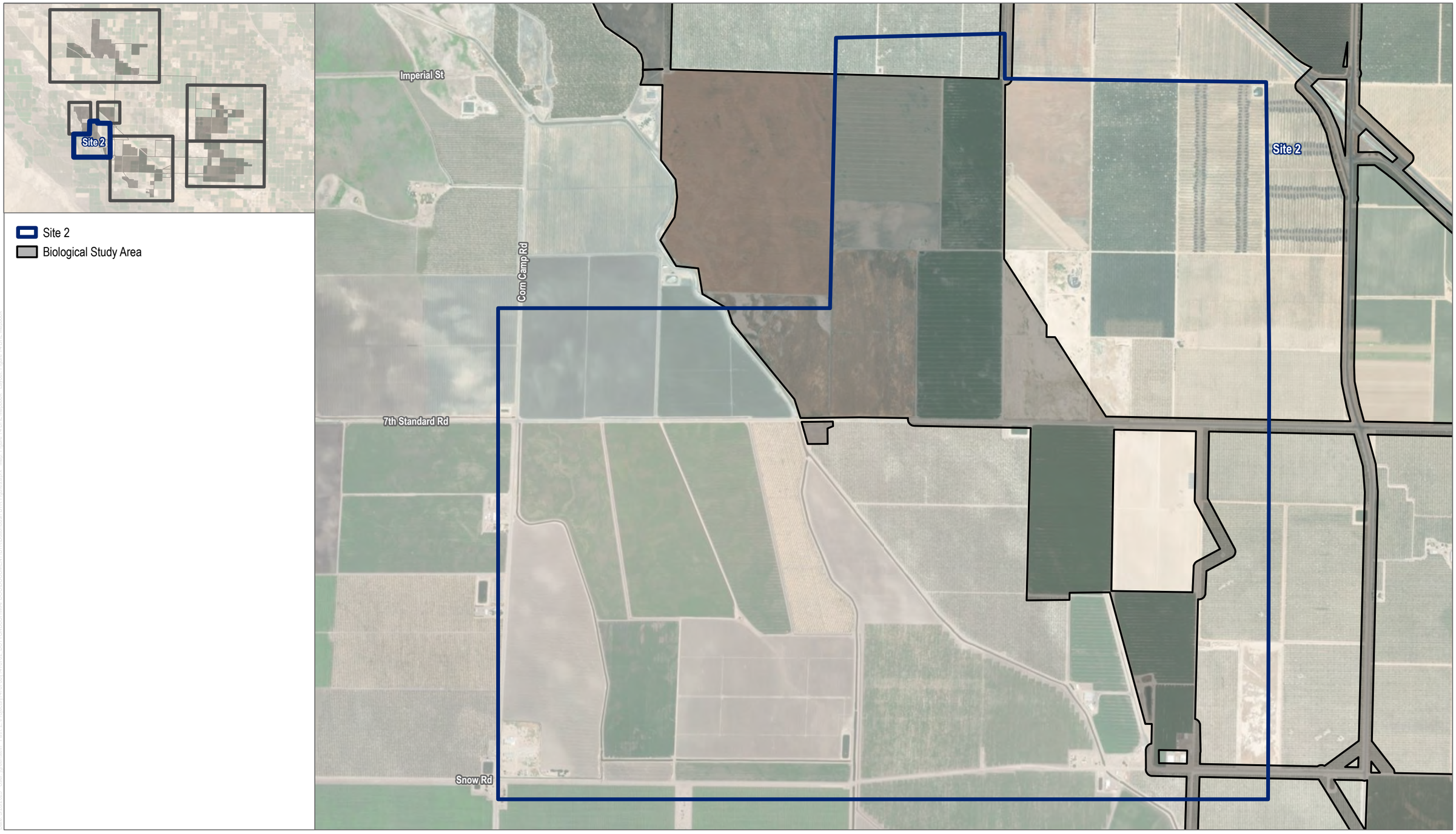
N

0 1,000 2,000 Feet

FIGURE 14A

Site 1: Coast Horned Lizard Wildlife Potential

Buttonbush Solar Energy Project



SOURCE: Maxar 2023; Open Street Maps 2023; CDFW 2024

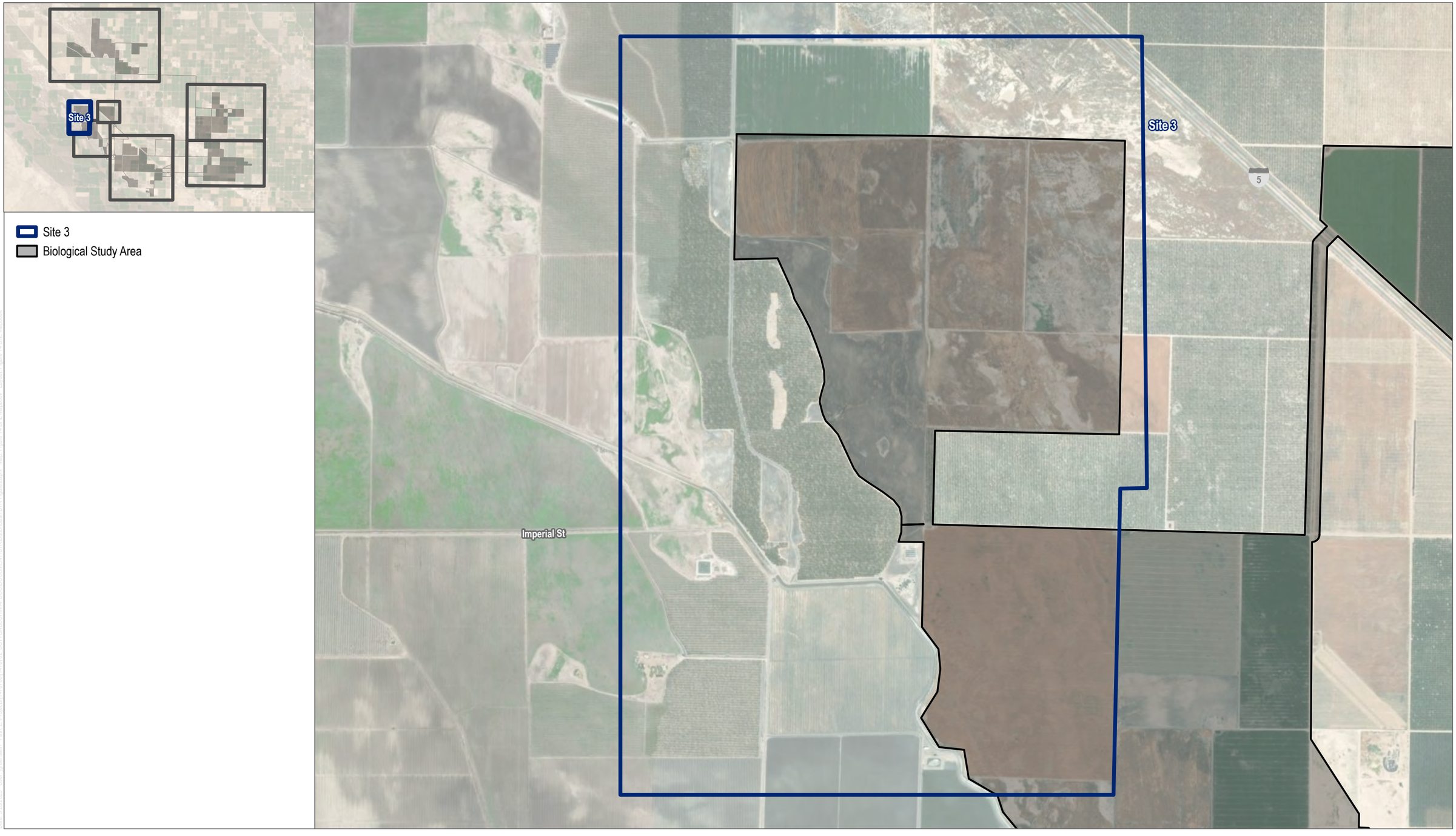
DUDEK

0 500 1,000 Feet

FIGURE 14B

Site 2: Coast Horned Lizard Wildlife Potential

Buttonbush Solar Energy Project



SOURCE: Maxar 2023; Open Street Maps 2023; CDFW 2024

DUDEK

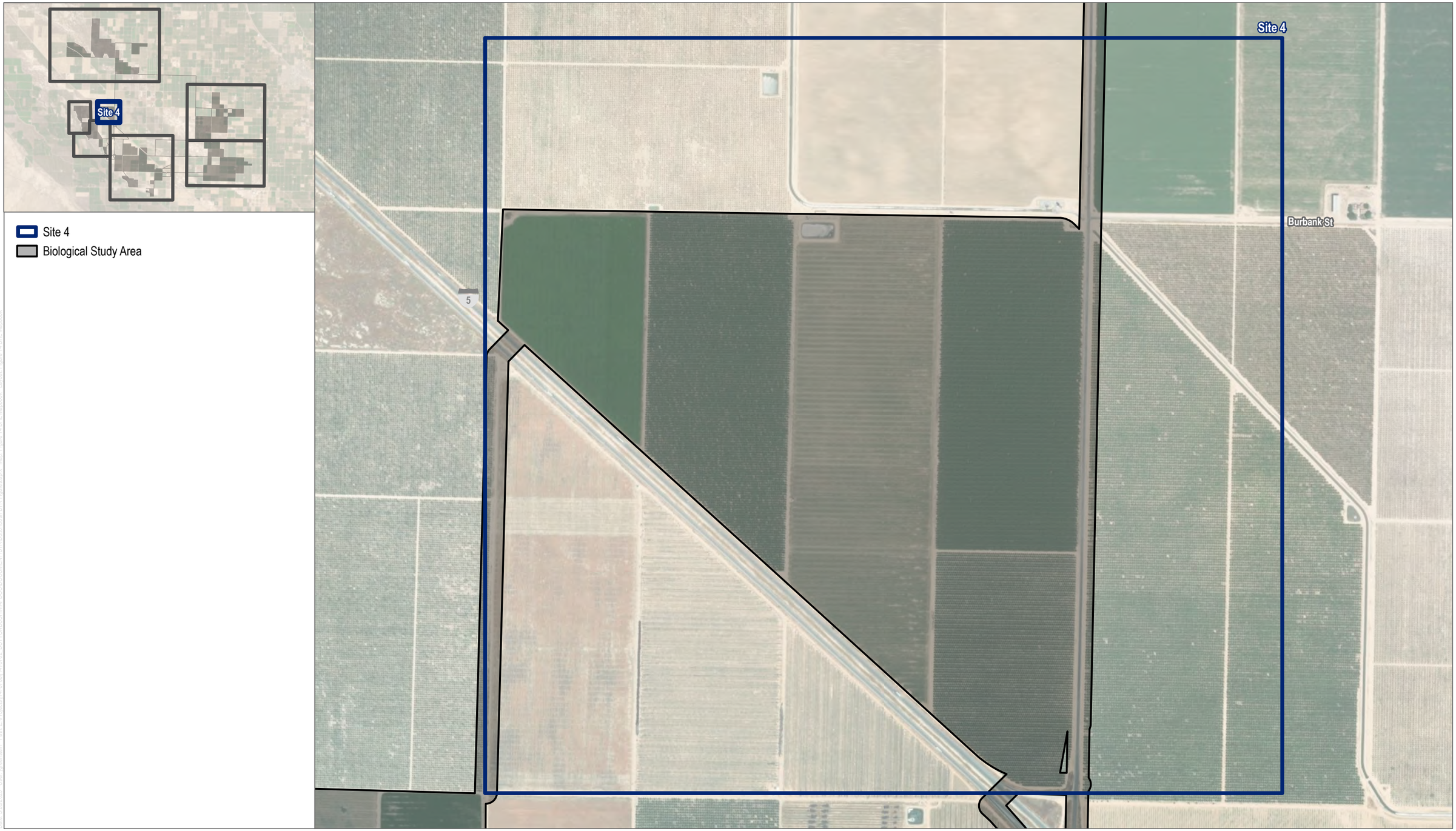
N

0 500 1,000 Feet

FIGURE 14C

Site 3: Coast Horned Lizard Wildlife Potential

Buttonbush Solar Energy Project



SOURCE: Maxar 2023; Open Street Maps 2023; CDFW 2024

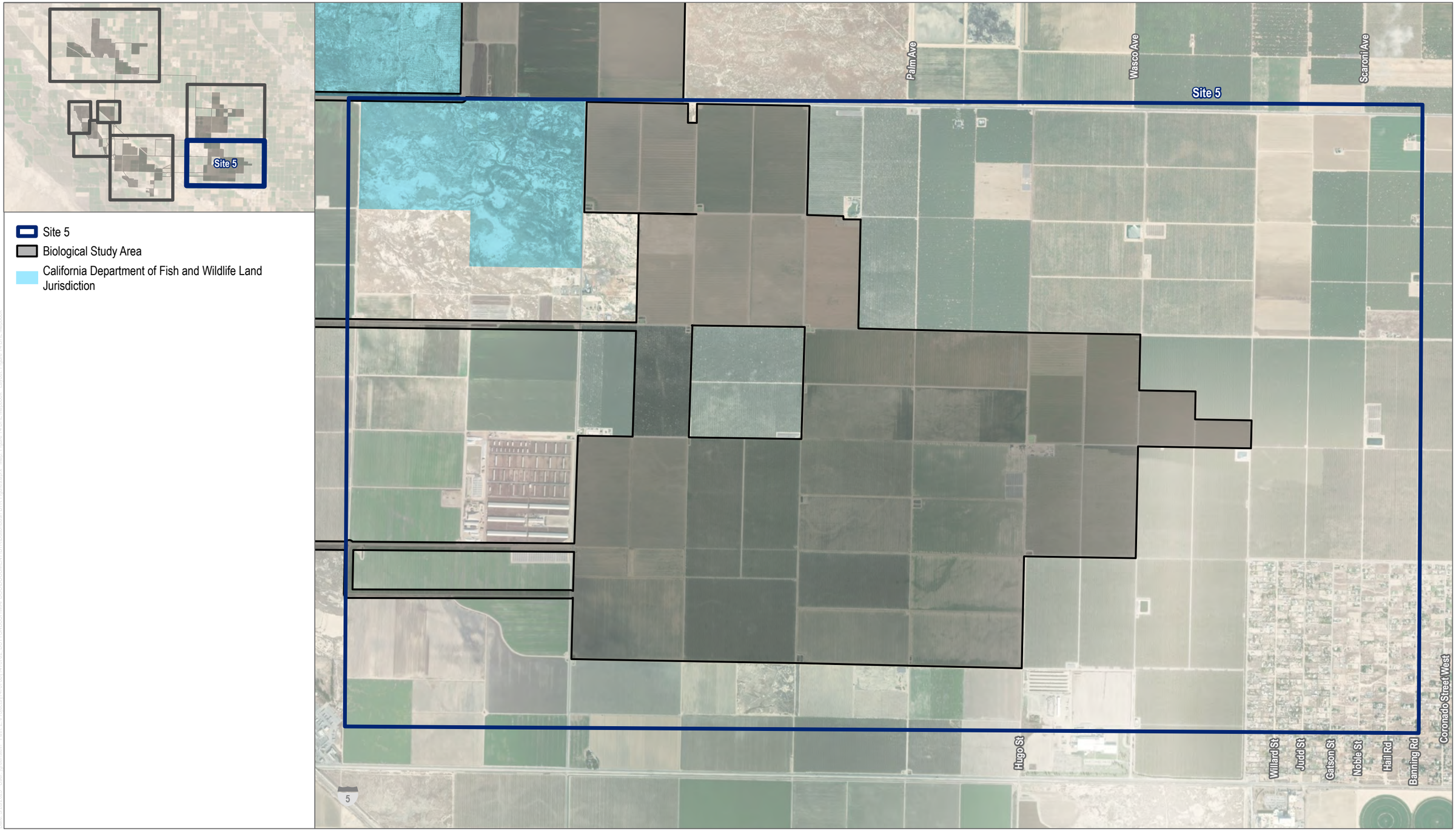
DUDEK

0 400 800 Feet

FIGURE 14D

Site 4: Coast Horned Lizard Wildlife Potential

Buttonbush Solar Energy Project



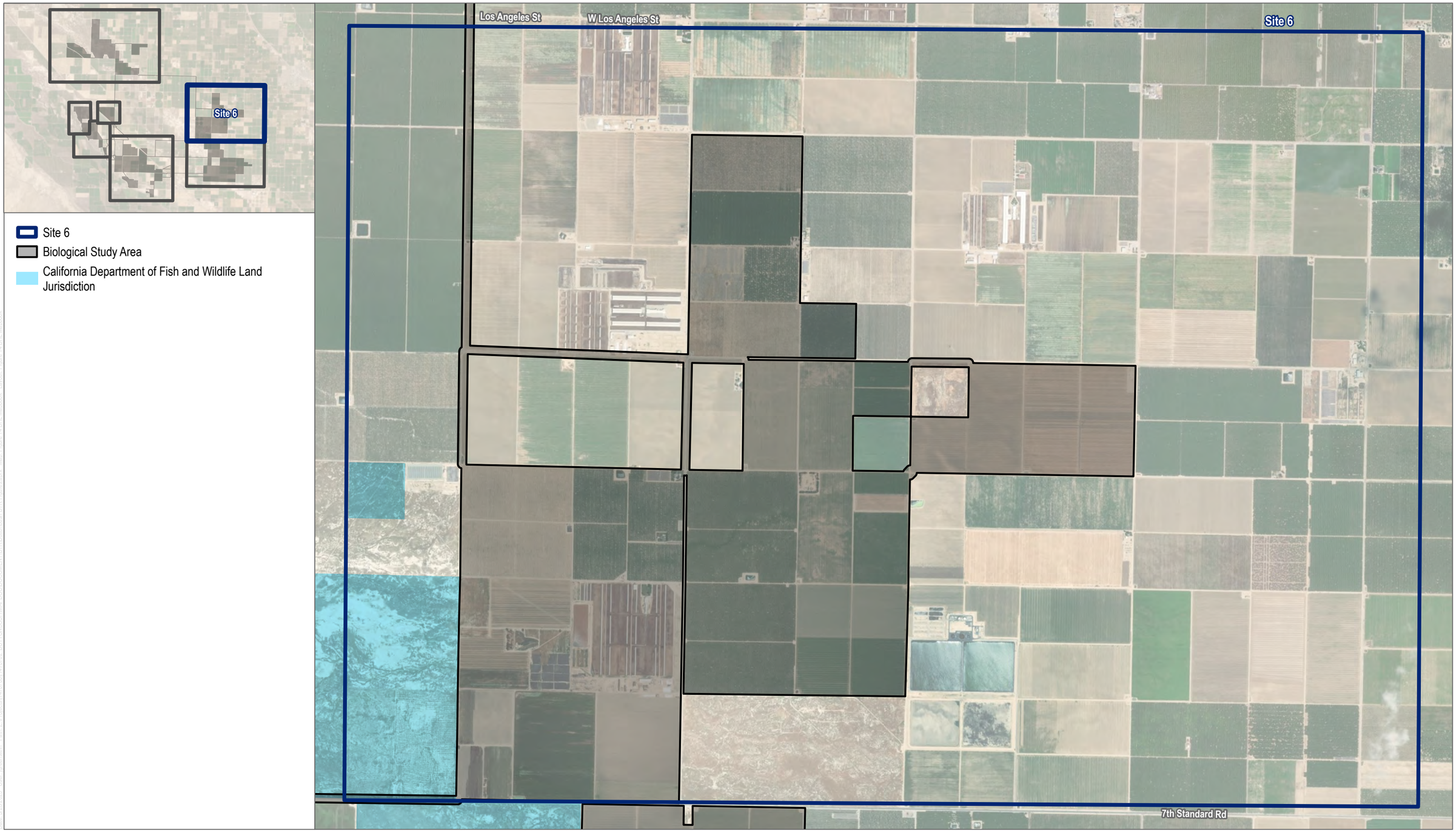
SOURCE: Maxar 2023; Open Street Maps 2023; CDFW 2024

DUDEK

FIGURE 14E

Site 5: Coast Horned Lizard Wildlife Potential

Buttonbush Solar Energy Project



SOURCE: Maxar 2023; Open Street Maps 2023; CDFW 2024

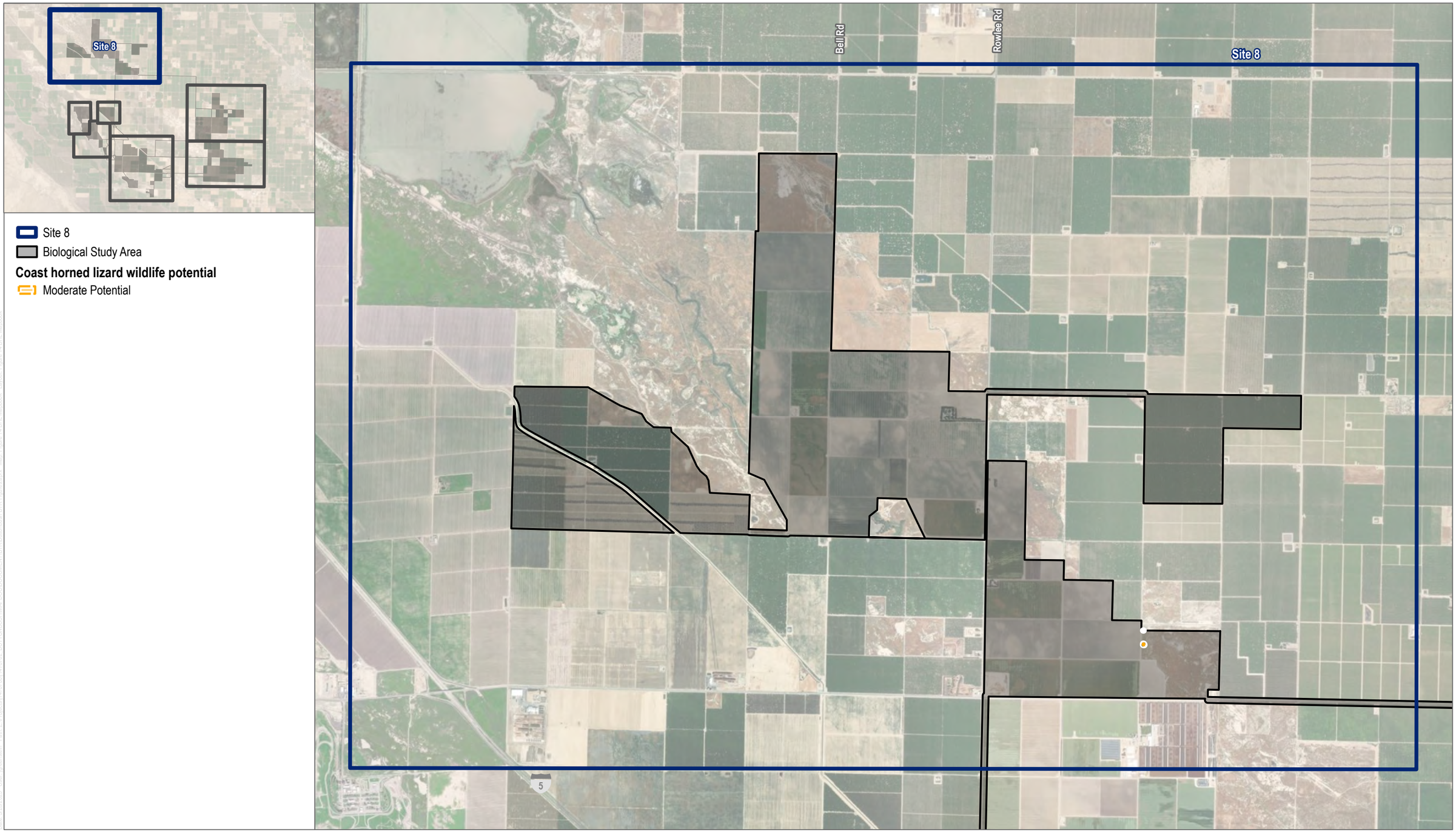
DUDEK

0 1,000 2,000 Feet

FIGURE 14F

Site 6: Coast Horned Lizard Wildlife Potential

Buttonbush Solar Energy Project



Site 8

Biological Study Area

Coast horned lizard wildlife potential

Moderate Potential

SOURCE: Maxar 2023; Open Street Maps 2023; CDFW 2024

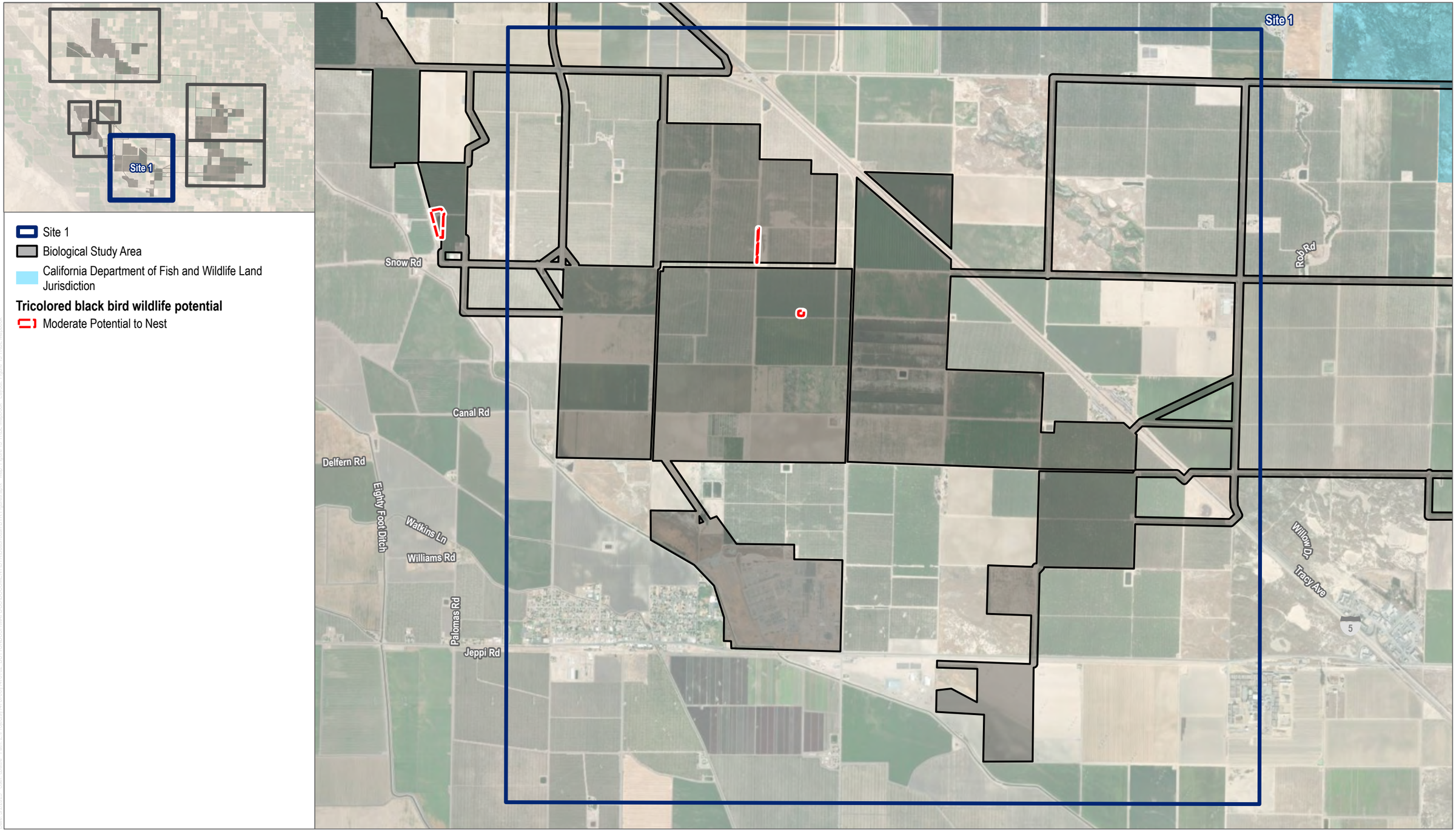
DUDEK

0 1,250 2,500 Feet

FIGURE 14G

Site 8: Coast Horned Lizard Wildlife Potential

Buttonbush Solar Energy Project



SOURCE: Maxar 2023; Open Street Maps 2023; CDFW 2024

DUDEK

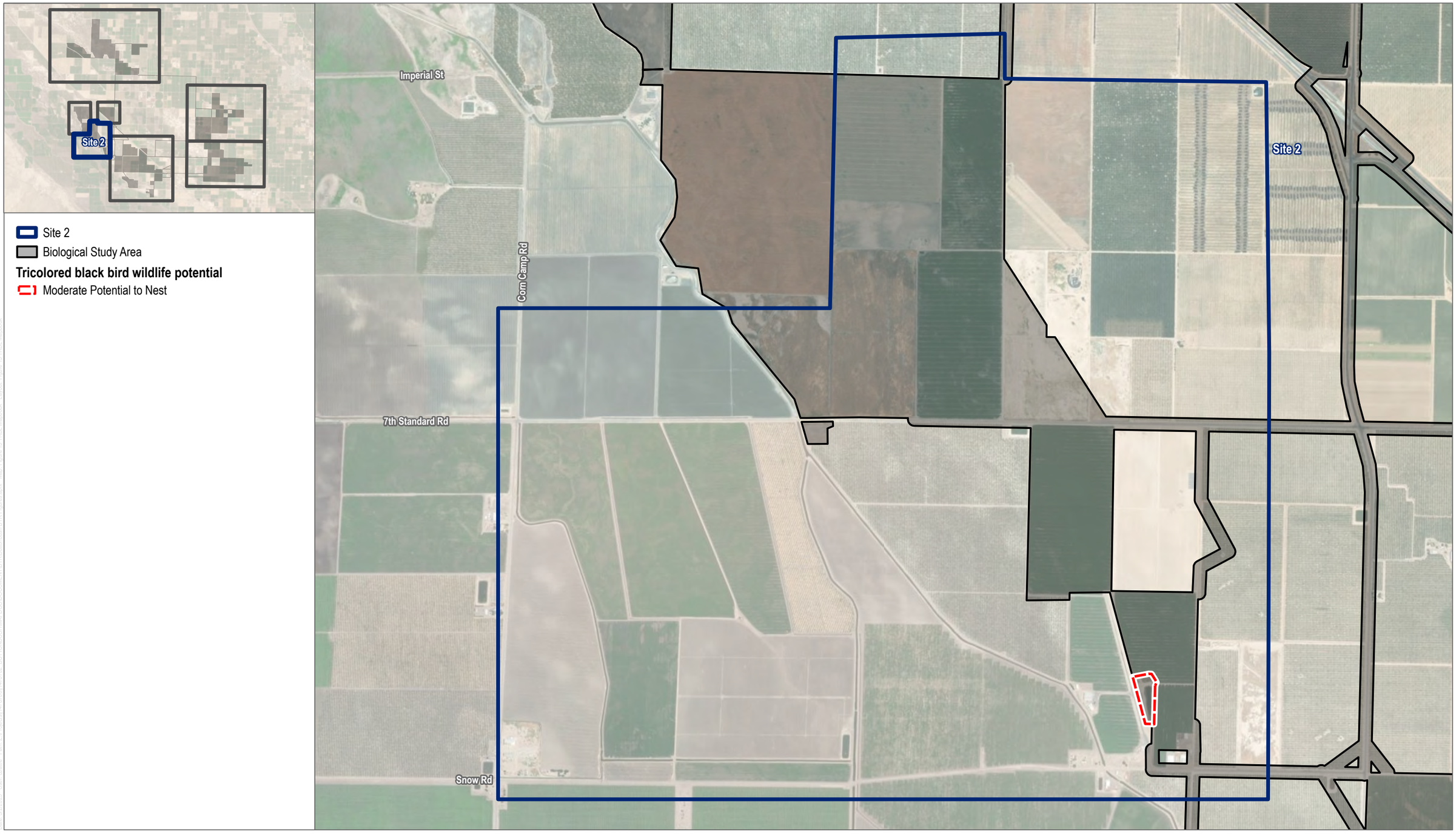
N

0 1,000 2,000 Feet

FIGURE 15A

Site 1: Tricolored Black Bird Wildlife Potential

Buttonbush Solar Energy Project



SOURCE: Maxar 2023; Open Street Maps 2023; CDFW 2024

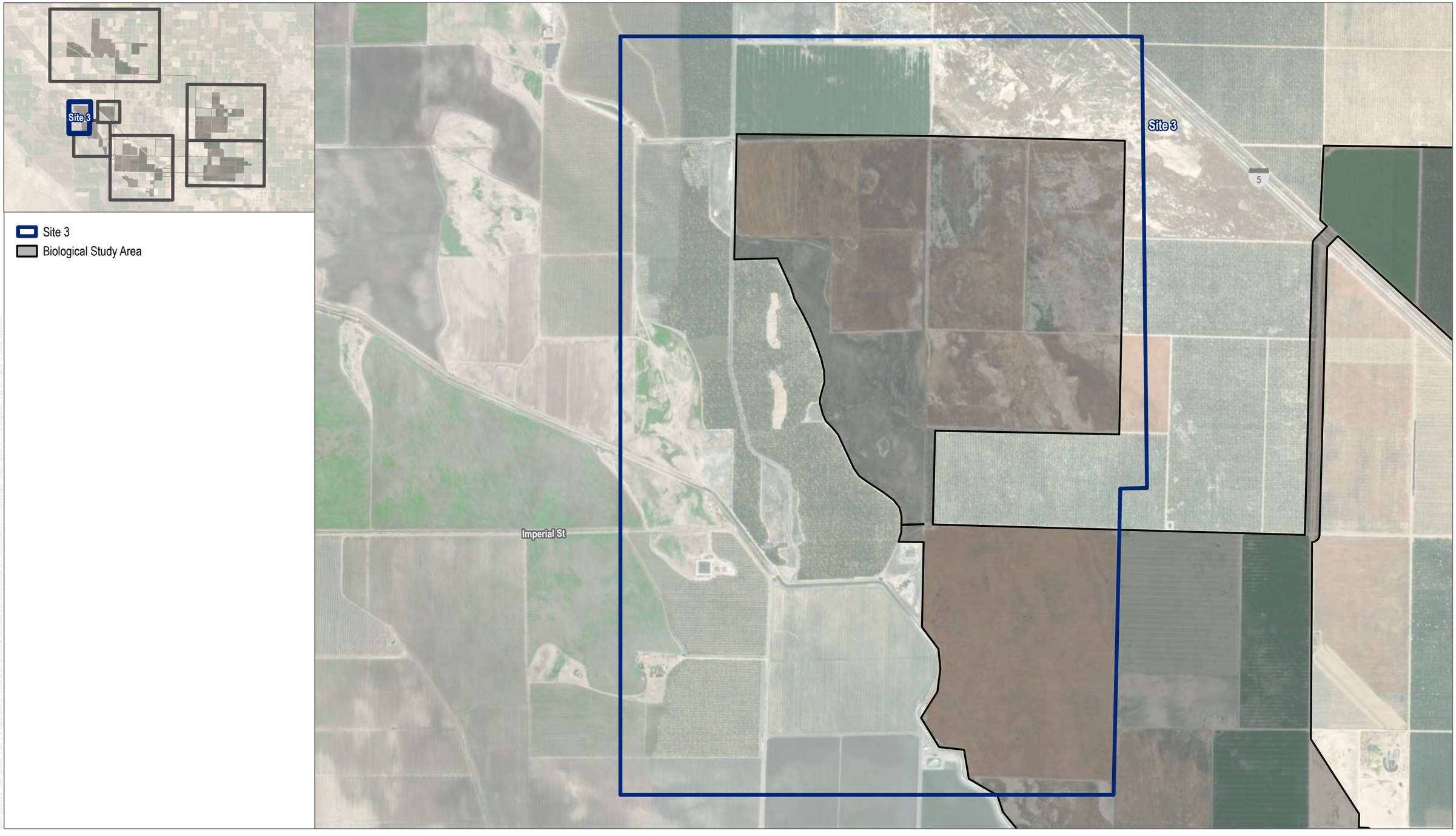
DUDEK

0 500 1,000 Feet

FIGURE 15B

Site 2: Tricolored Black Bird Wildlife Potential

Buttonbush Solar Energy Project



SOURCE: Maxar 2023; Open Street Maps 2023; CDFW 2024

DUDEK

N

0 500 1,000 Feet

FIGURE 15C

Site 3: Tricolored Black Bird Wildlife Potential

Buttonbush Solar Energy Project

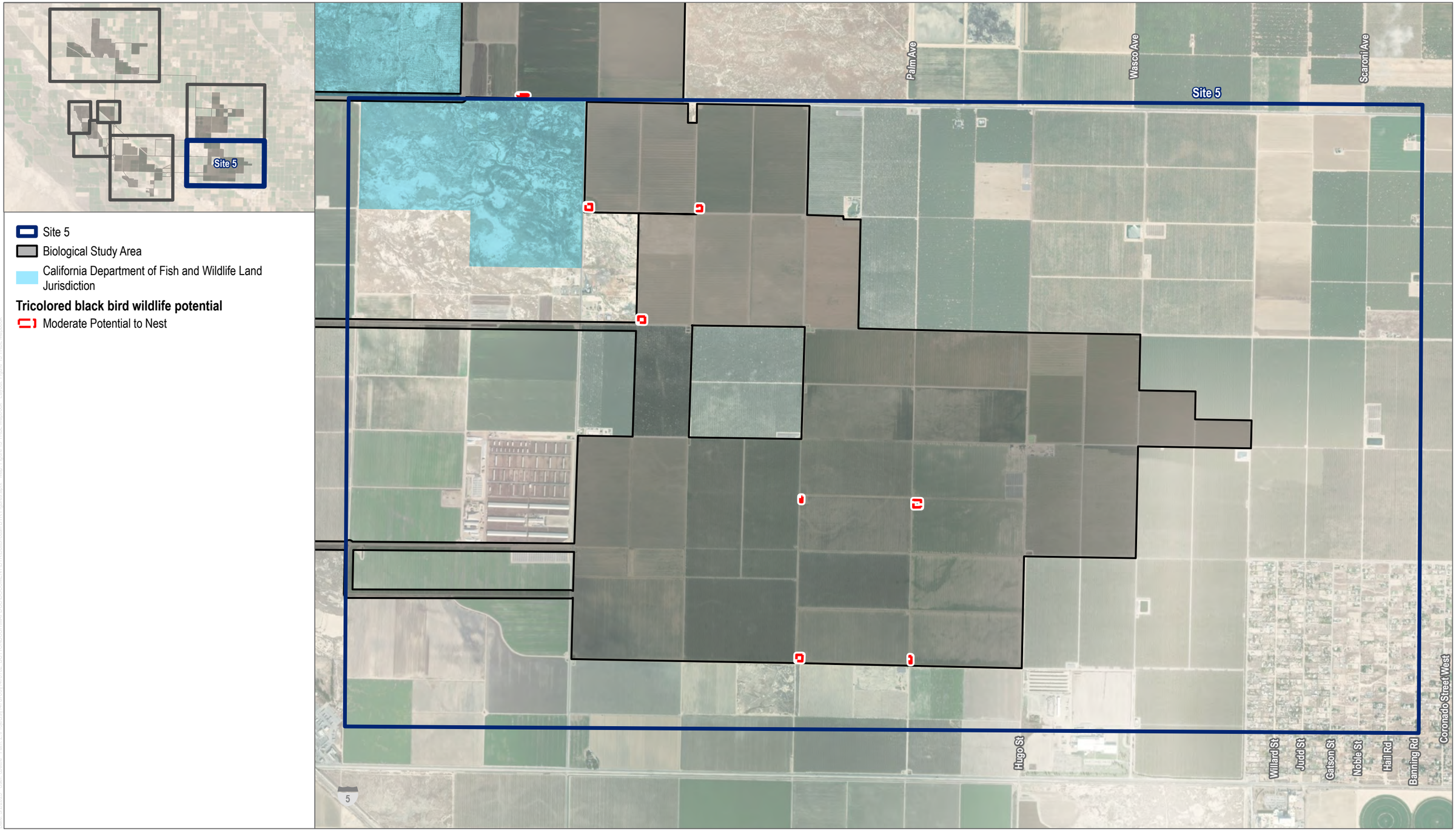


SOURCE: Maxar 2023; Open Street Maps 2023; CDFW 2024

FIGURE 15D

Site 4: Tricolored Black Bird Wildlife Potential

Buttonbush Solar Energy Project

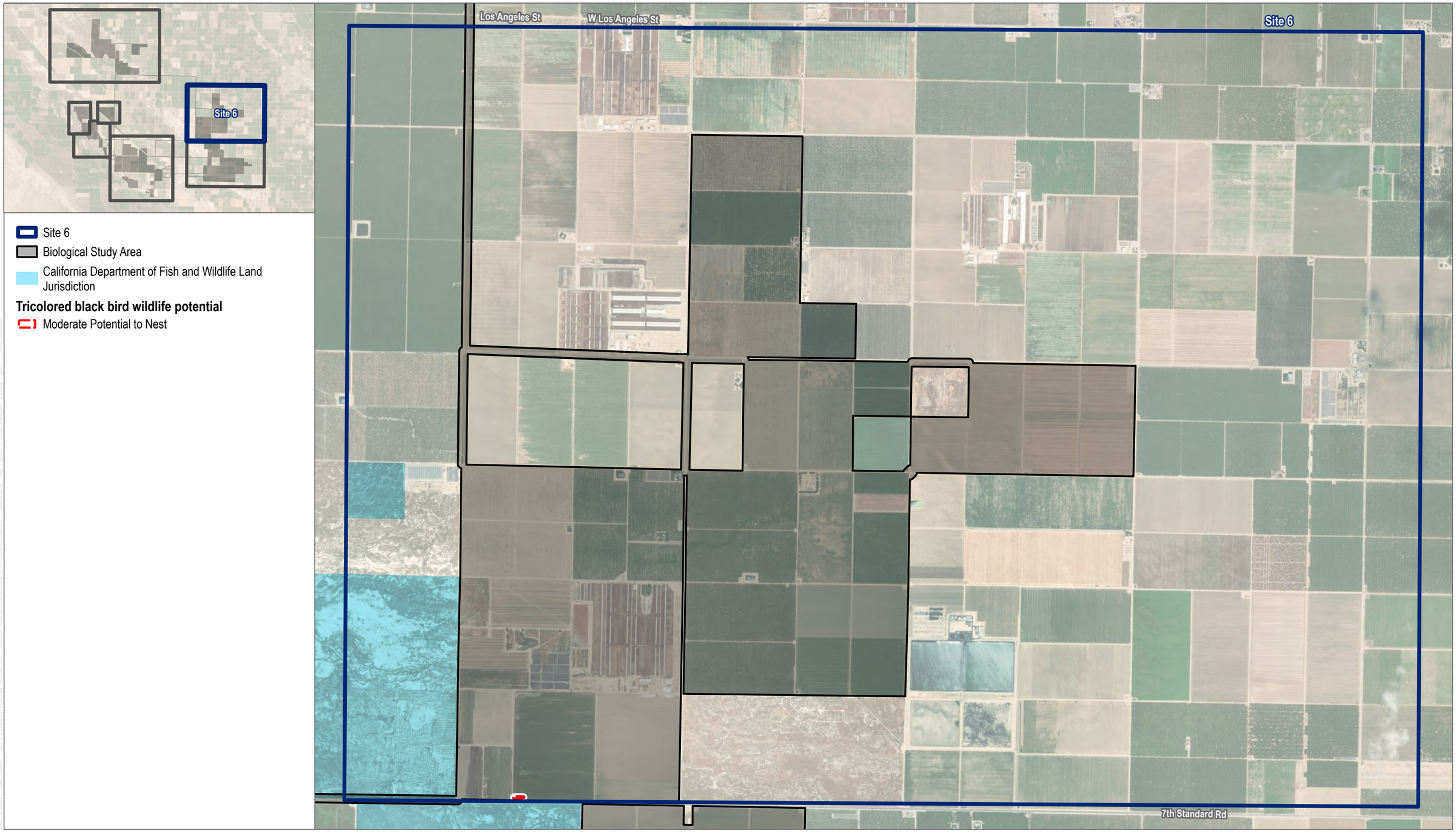


SOURCE: Maxar 2023; Open Street Maps 2023; CDFW 2024

FIGURE 15E

Site 5: Tricolored Black Bird Wildlife Potential

Buttonbush Solar Energy Project



SOURCE: Maxar 2023; Open Street Maps 2023; CDFW 2024

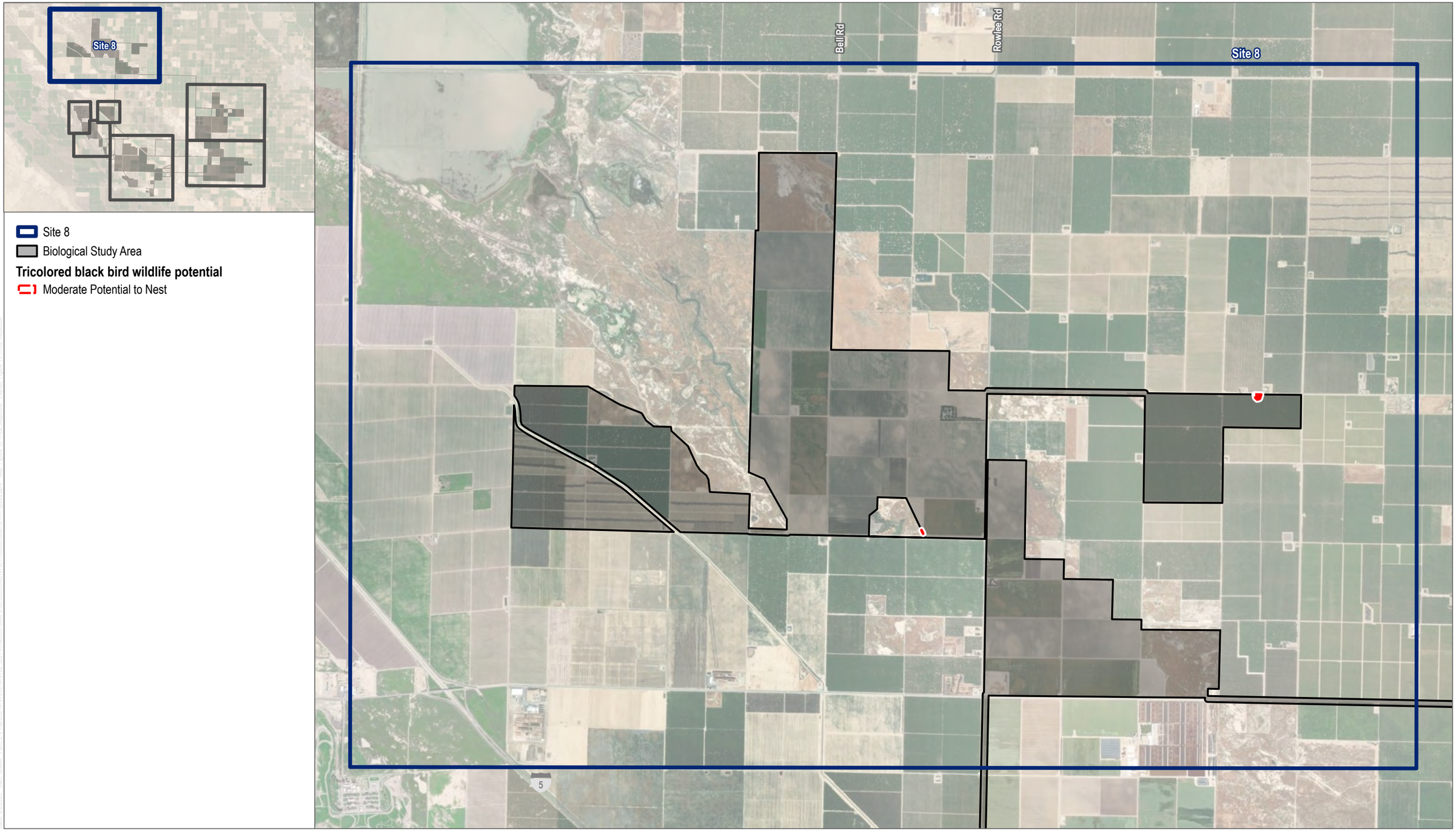
DUDEK

0 1,000 2,000 Feet

FIGURE 15F

Site 6: Tricolored Black Bird Wildlife Potential

Buttonbush Solar Energy Project



Site 8

Biological Study Area

Tricolored black bird wildlife potential

Moderate Potential to Nest

SOURCE: Maxar 2023; Open Street Maps 2023; CDFW 2024

DUDEK

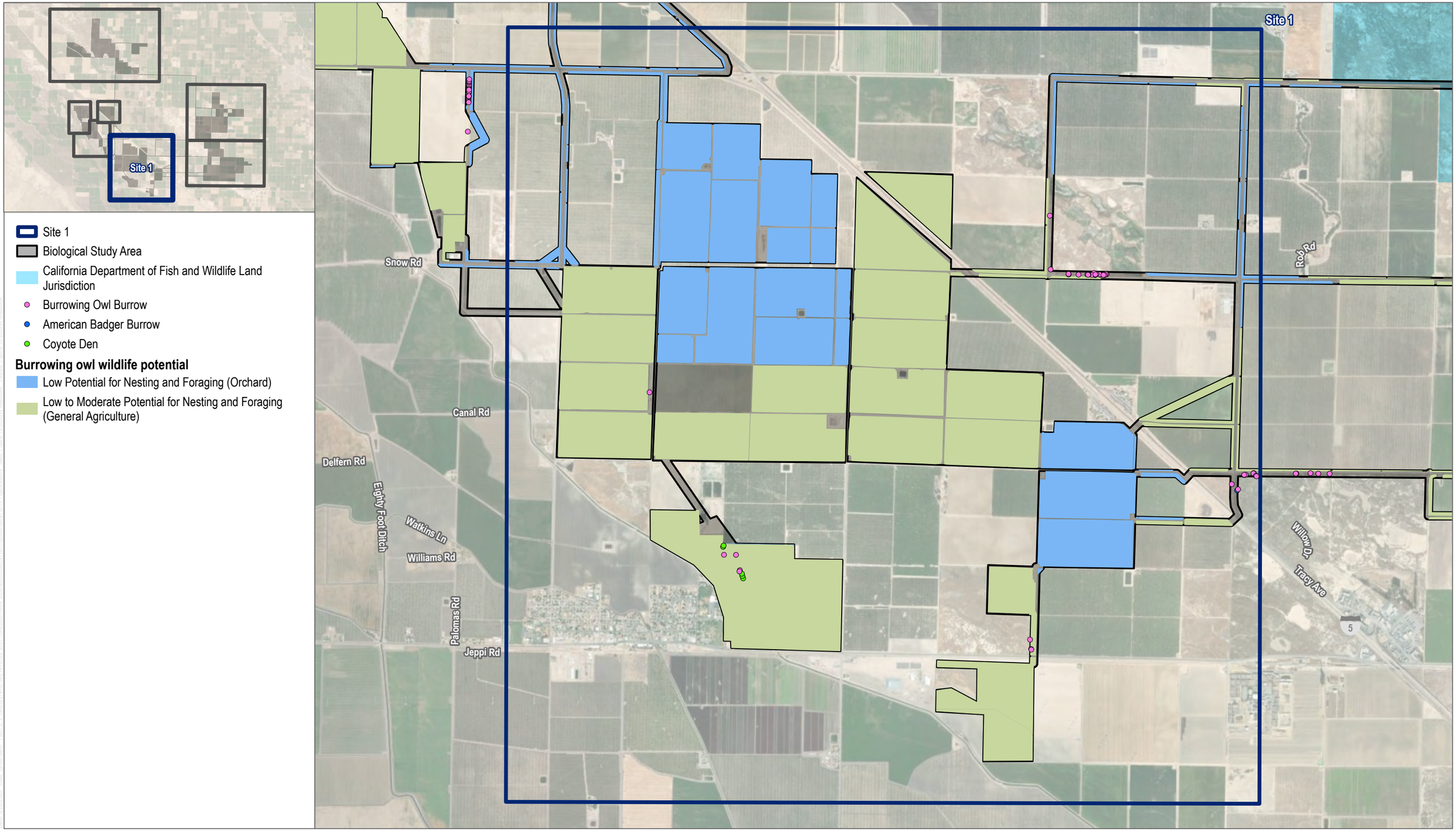
N

0 1,250 2,500 Feet

FIGURE 15G

Site 8: Tricolored Black Bird Wildlife Potential

Buttonbush Solar Energy Project



SOURCE: Maxar 2023; Open Street Maps 2023; CDFW 2024

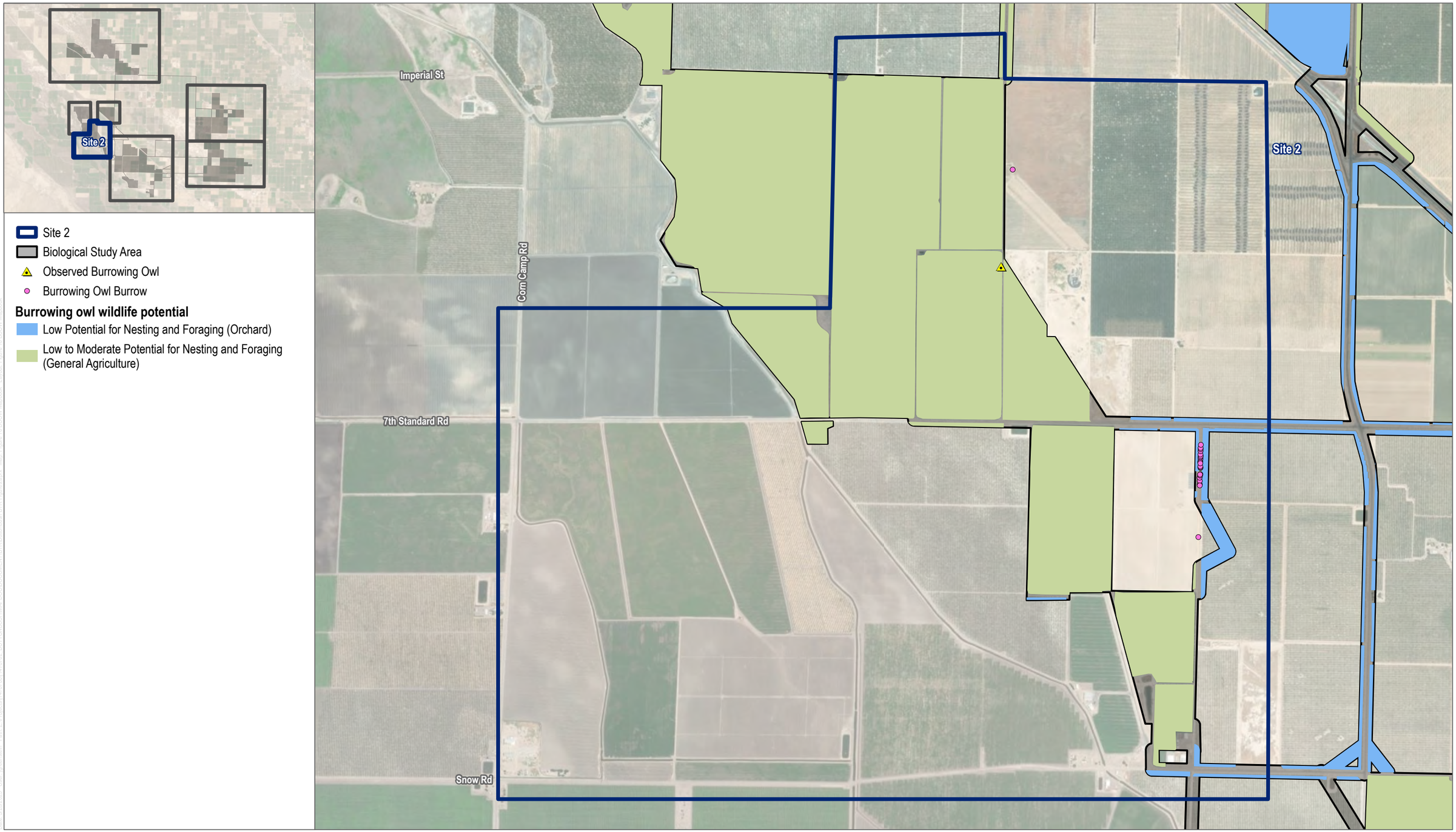
DUDEK

0 1,000 2,000 Feet

FIGURE 16A

Site 1: Burrowing Owl Wildlife Potential

Buttonbush Solar Energy Project



SOURCE: Maxar 2023; Open Street Maps 2023; CDFW 2024

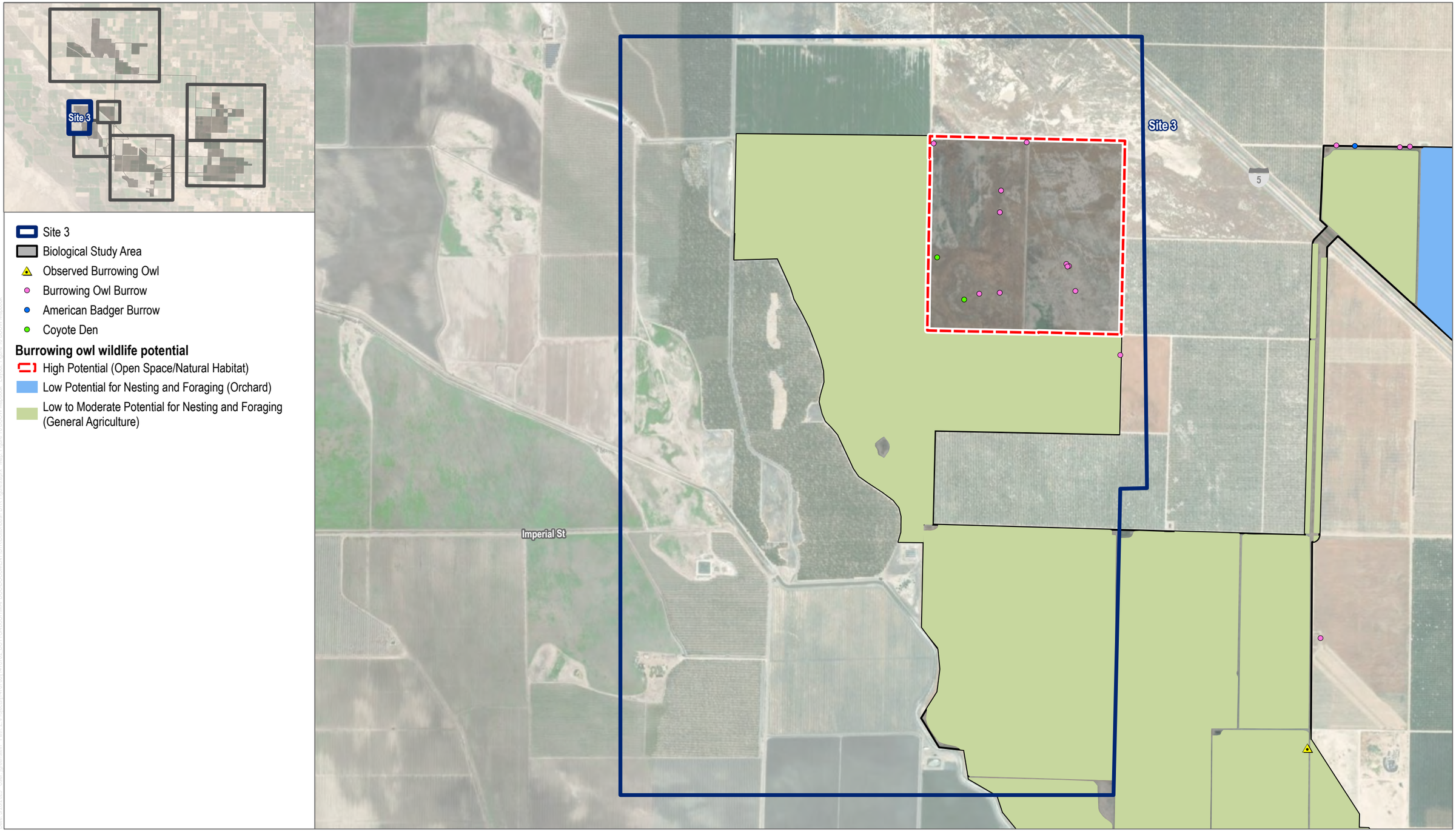
DUDEK

0 500 1,000 Feet

FIGURE 16B

Site 2: Burrowing Owl Wildlife Potential

Buttonbush Solar Energy Project



SOURCE: Maxar 2023; Open Street Maps 2023; CDFW 2024

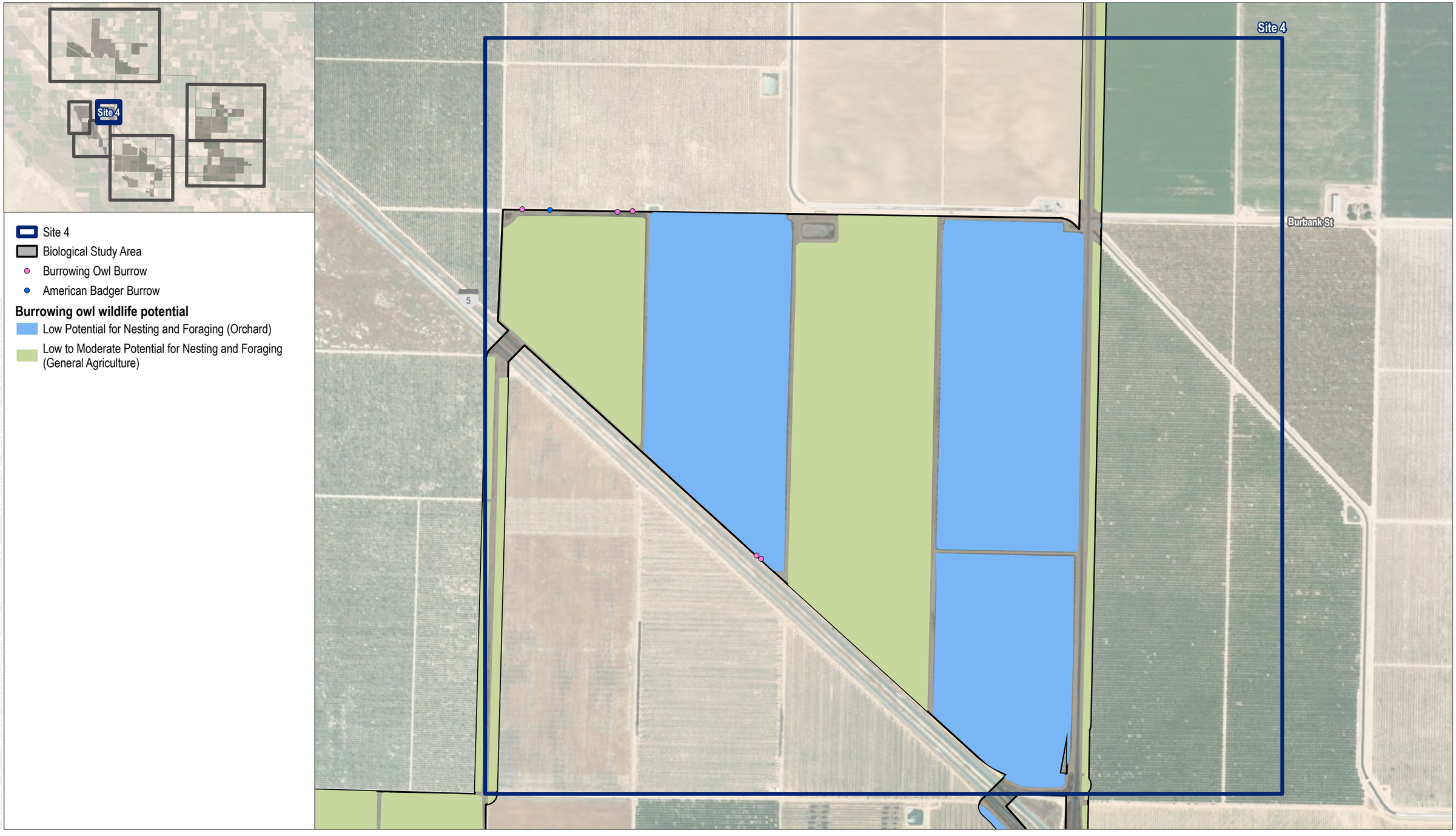
DUDEK

0 500 1,000 Feet

FIGURE 16C

Site 3: Burrowing Owl Wildlife Potential

Buttonbush Solar Energy Project



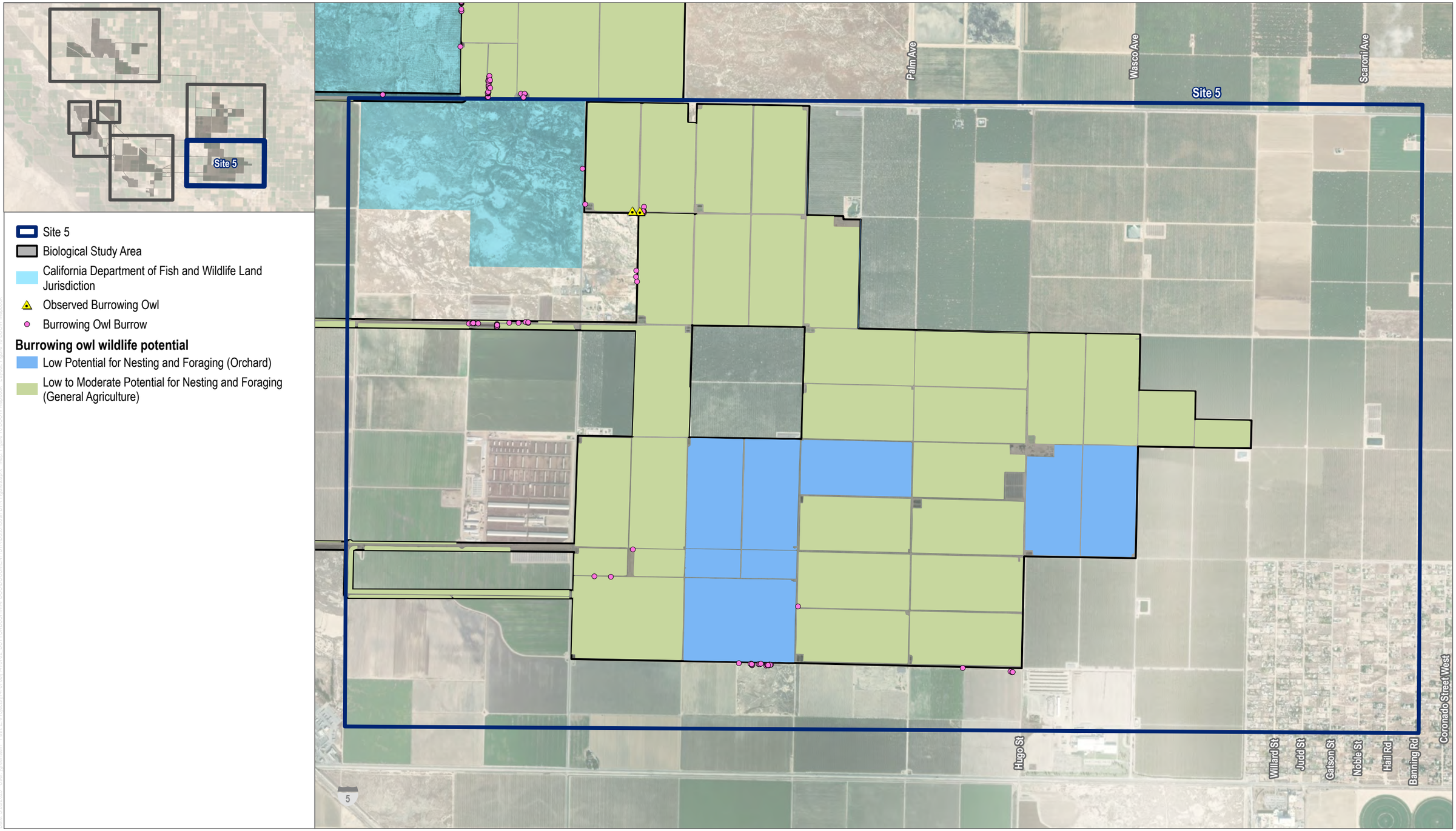
SOURCE: Maxar 2023; Open Street Maps 2023; CDFW 2024

DUDEK

FIGURE 16D

Site 4: Burrowing Owl Wildlife Potential

Buttonbush Solar Energy Project



SOURCE: Maxar 2023; Open Street Maps 2023; CDFW 2024

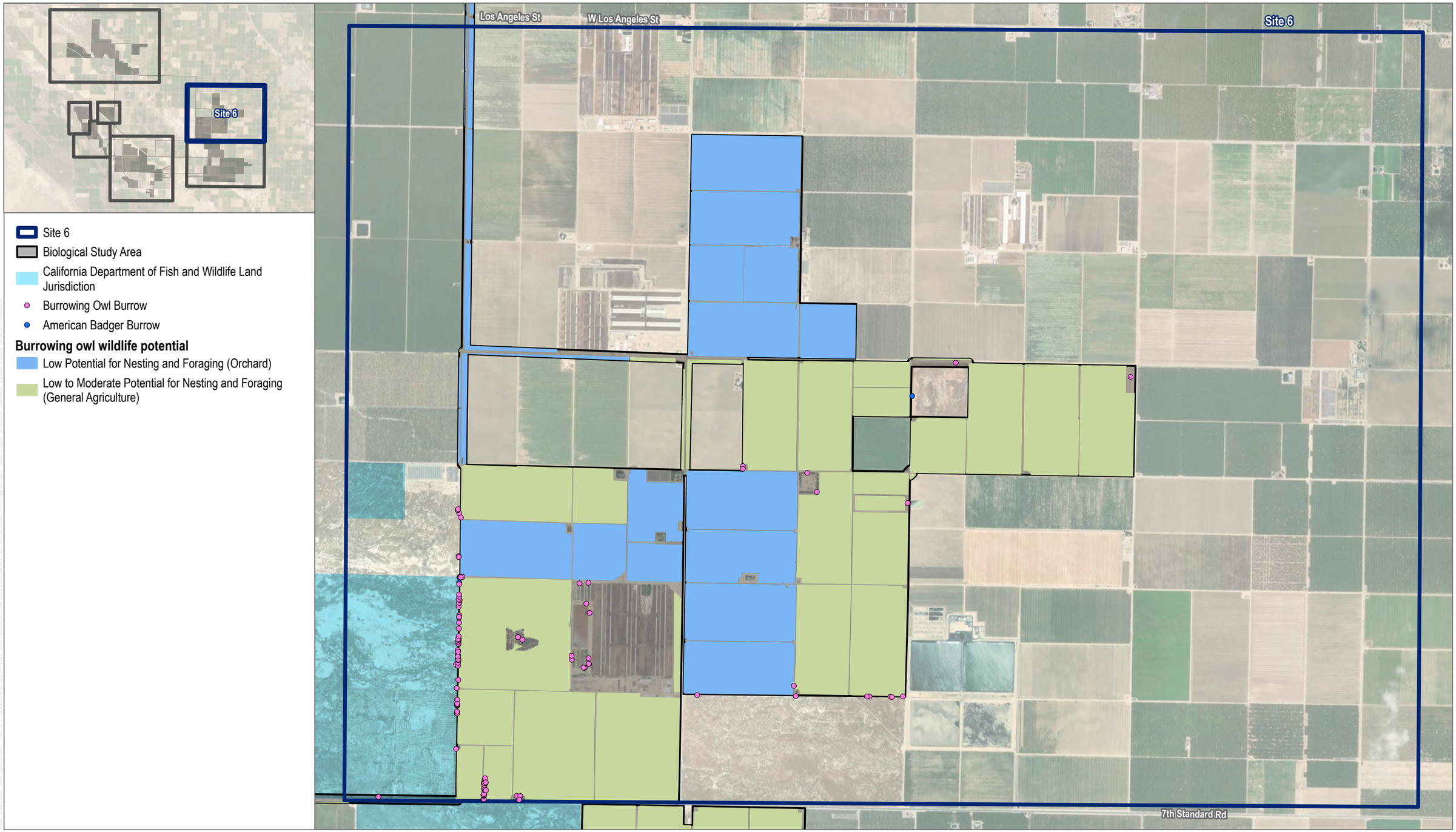
DUDEK

0 1,000 2,000 Feet

FIGURE 16E

Site 5: Burrowing Owl Wildlife Potential

Buttonbush Solar Energy Project



SOURCE: Maxar 2023; Open Street Maps 2023; CDFW 2024

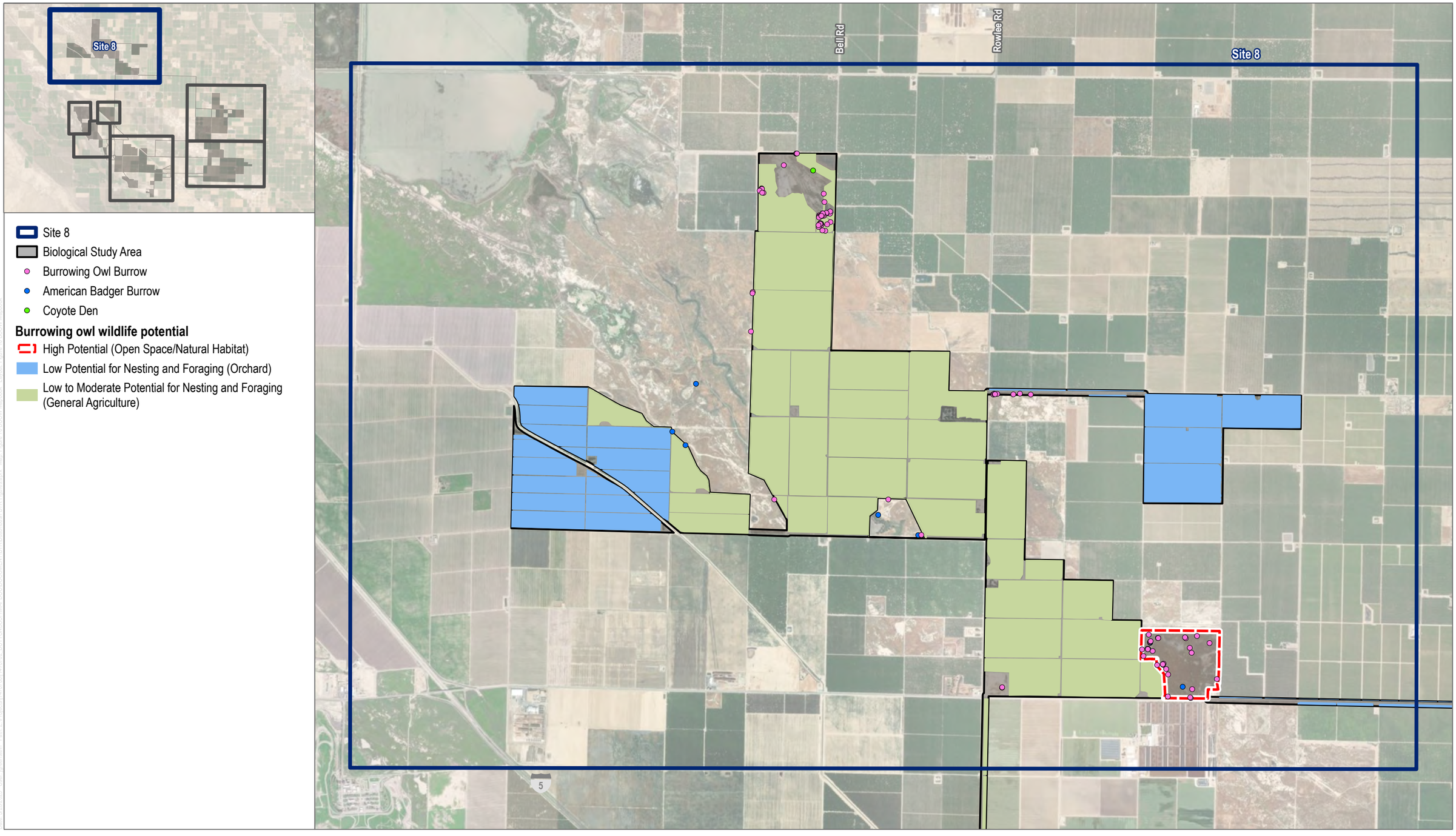
DUDEK

0 1,000 2,000 Feet

FIGURE 16F

Site 6: Burrowing Owl Wildlife Potential

Buttonbush Solar Energy Project



SOURCE: Maxar 2023; Open Street Maps 2023; CDFW 2024

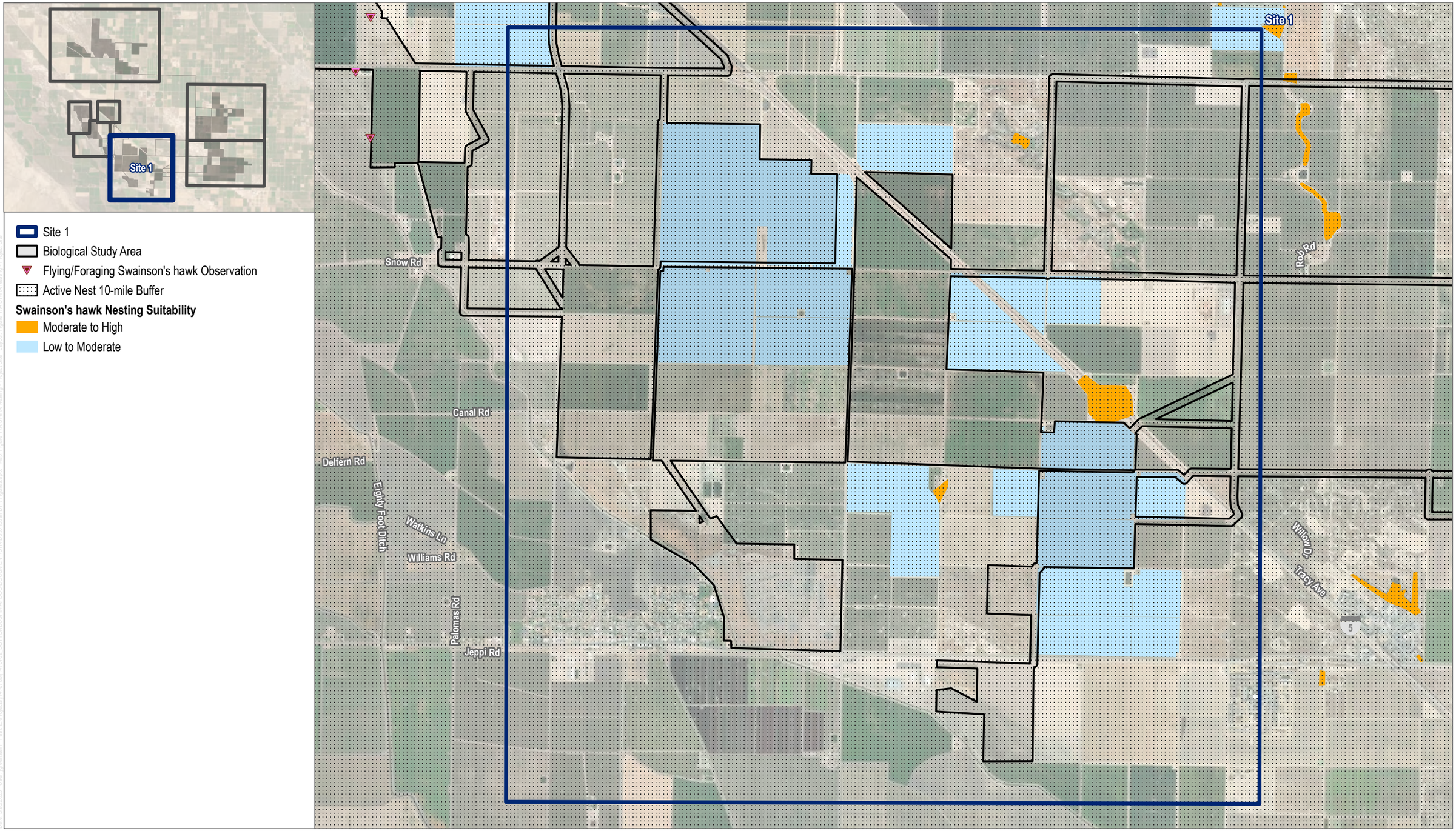
DUDEK

0 1,250 2,500 Feet

FIGURE 16G

Site 8: Burrowing Owl Wildlife Potential

Buttonbush Solar Energy Project



SOURCE: Maxar 2023; Open Street Maps 2023; CDFW 2024

DUDEK

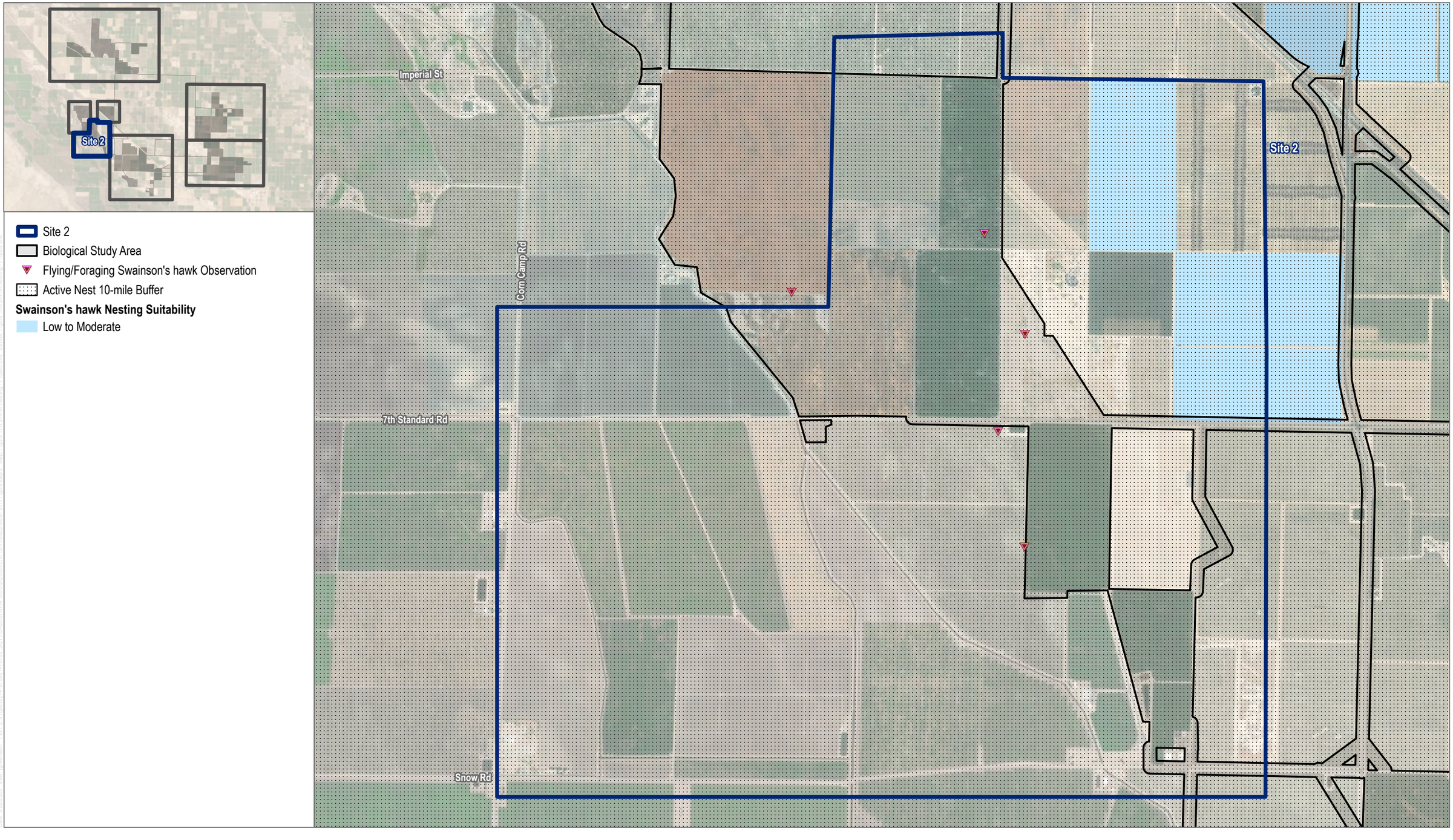
N

0 1,000 2,000 Feet

FIGURE 17A.A

Site 1: Swainson's Hawk Nesting Suitability

Buttonbush Solar Energy Project

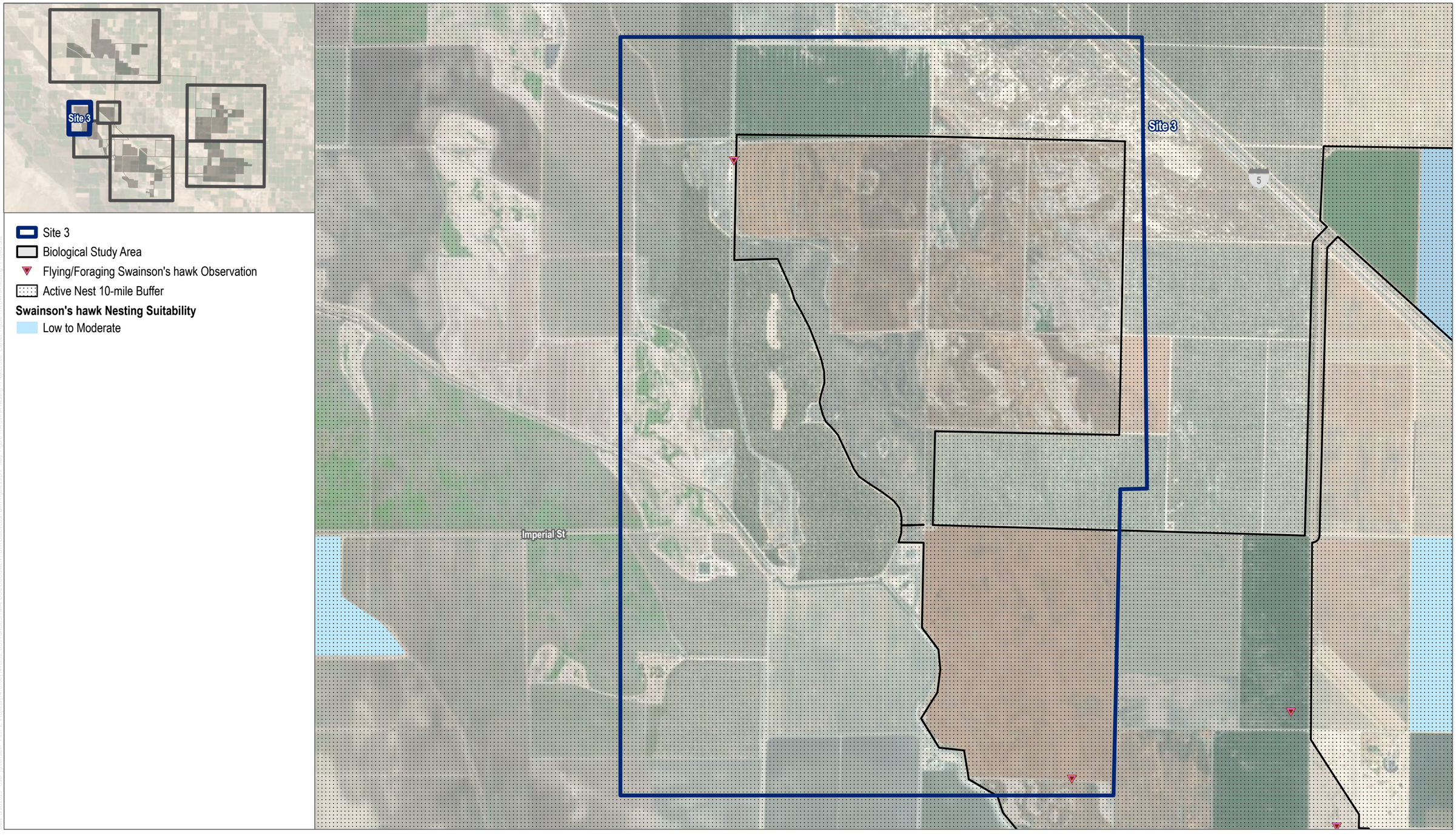


SOURCE: Maxar 2023; Open Street Maps 2023; CDFW 2024

FIGURE 17A.B

Site 2: Swainson's Hawk Nesting Suitability

Buttonbush Solar Energy Project



SOURCE: Maxar 2023; Open Street Maps 2023; CDFW 2024

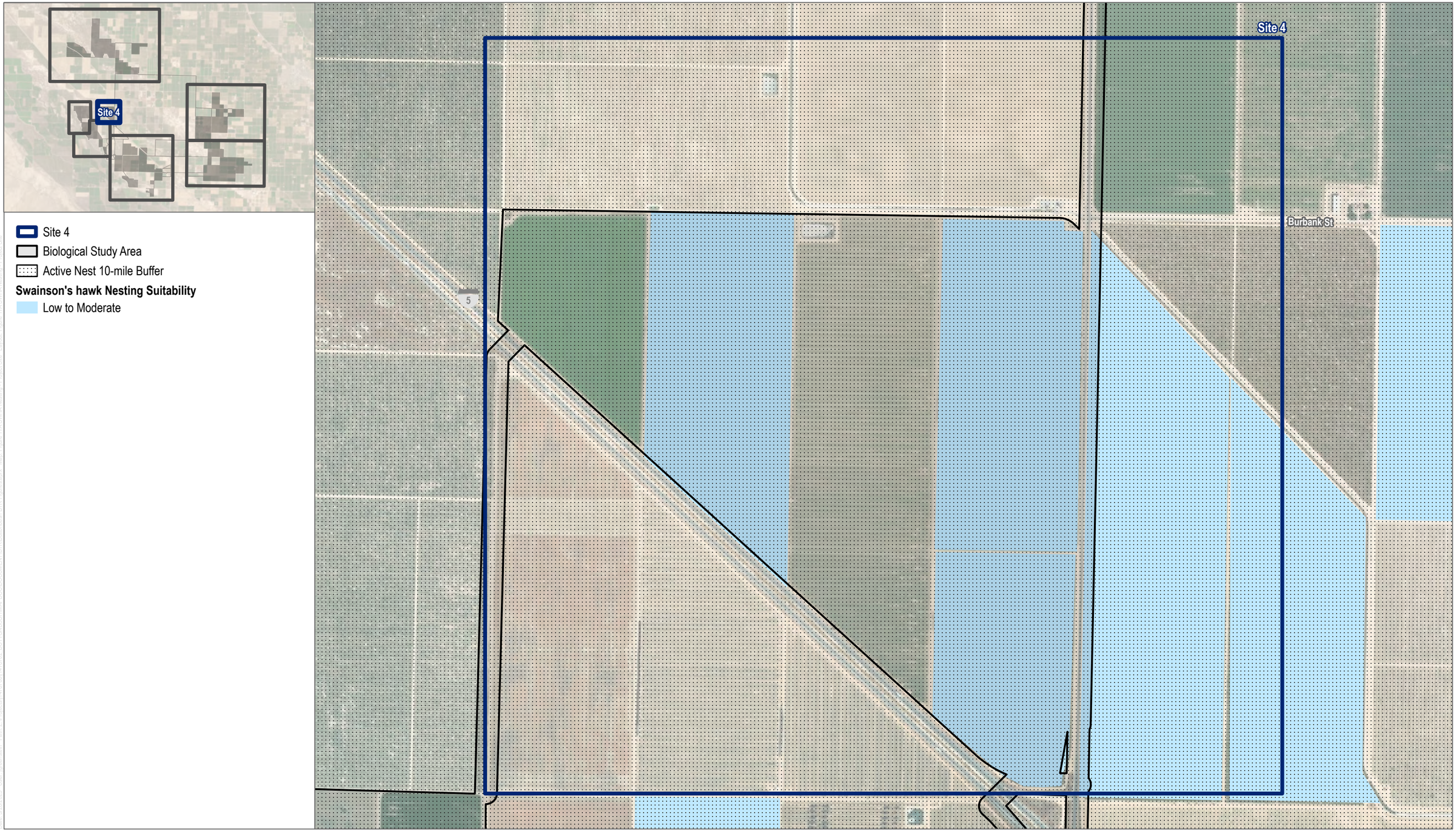
DUDEK

0 500 1,000 Feet

FIGURE 17A.C

Site 3: Swainson's Hawk Nesting Suitability

Buttonbush Solar Energy Project



SOURCE: Maxar 2023; Open Street Maps 2023; CDFW 2024

DUDEK

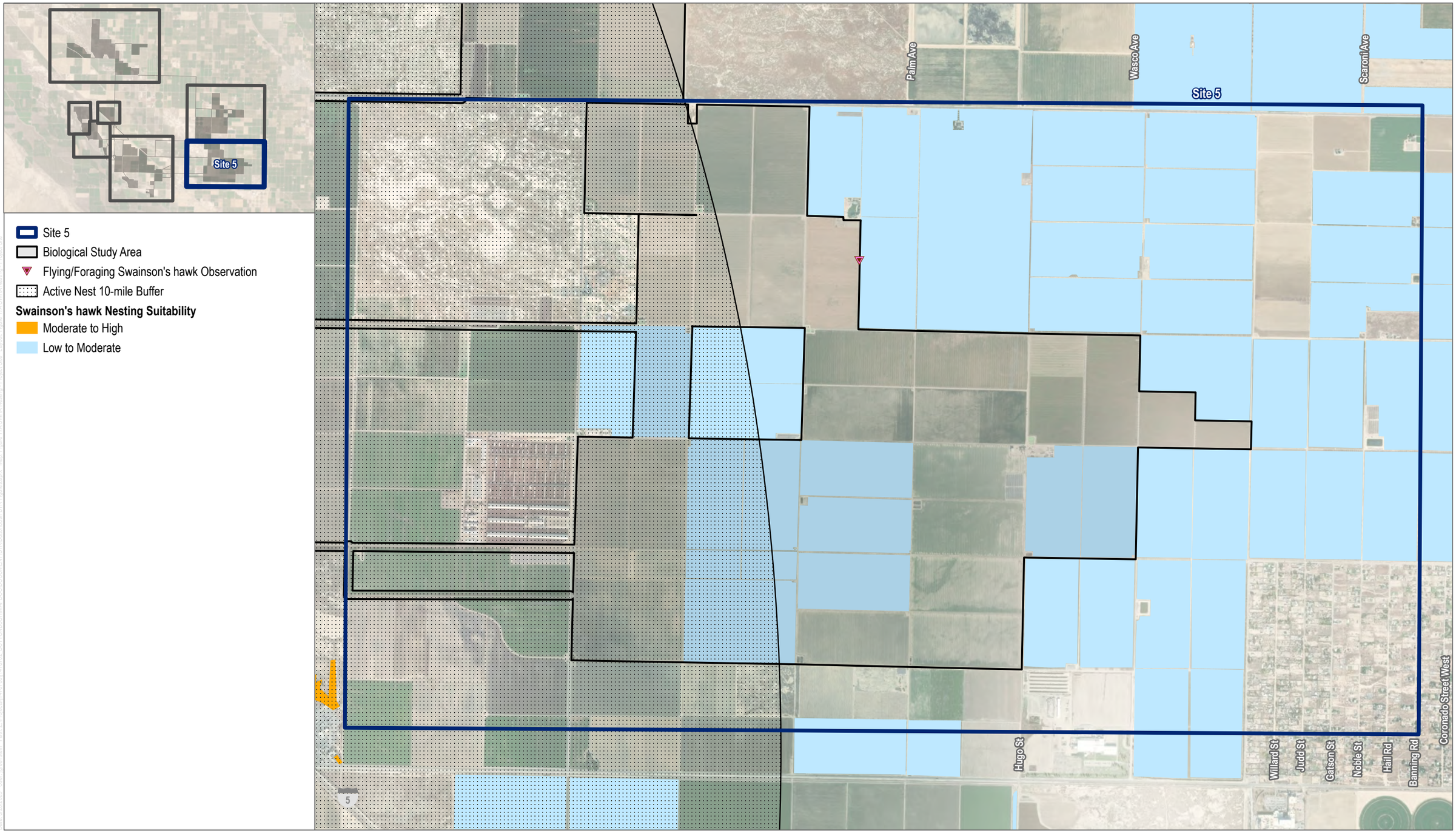
N

0 400 800 Feet

FIGURE 17A.D

Site 4: Swainson's Hawk Nesting Suitability

Buttonbush Solar Energy Project



SOURCE: Maxar 2023; Open Street Maps 2023; CDFW 2024

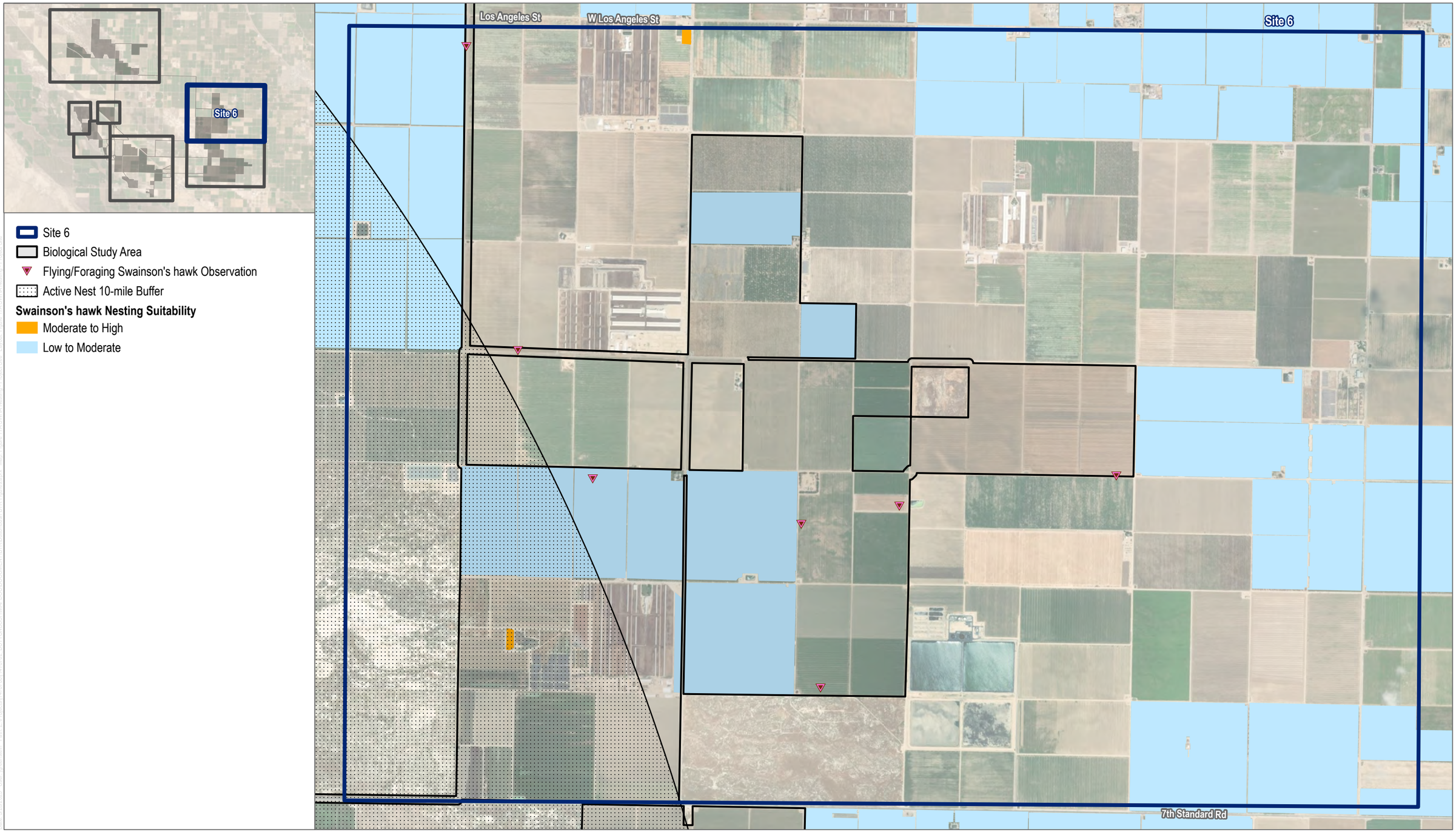
DUDEK

0 1,000 2,000 Feet

FIGURE 17A.E

Site 5: Swainson's Hawk Nesting Suitability

Buttonbush Solar Energy Project



SOURCE: Maxar 2023; Open Street Maps 2023; CDFW 2024

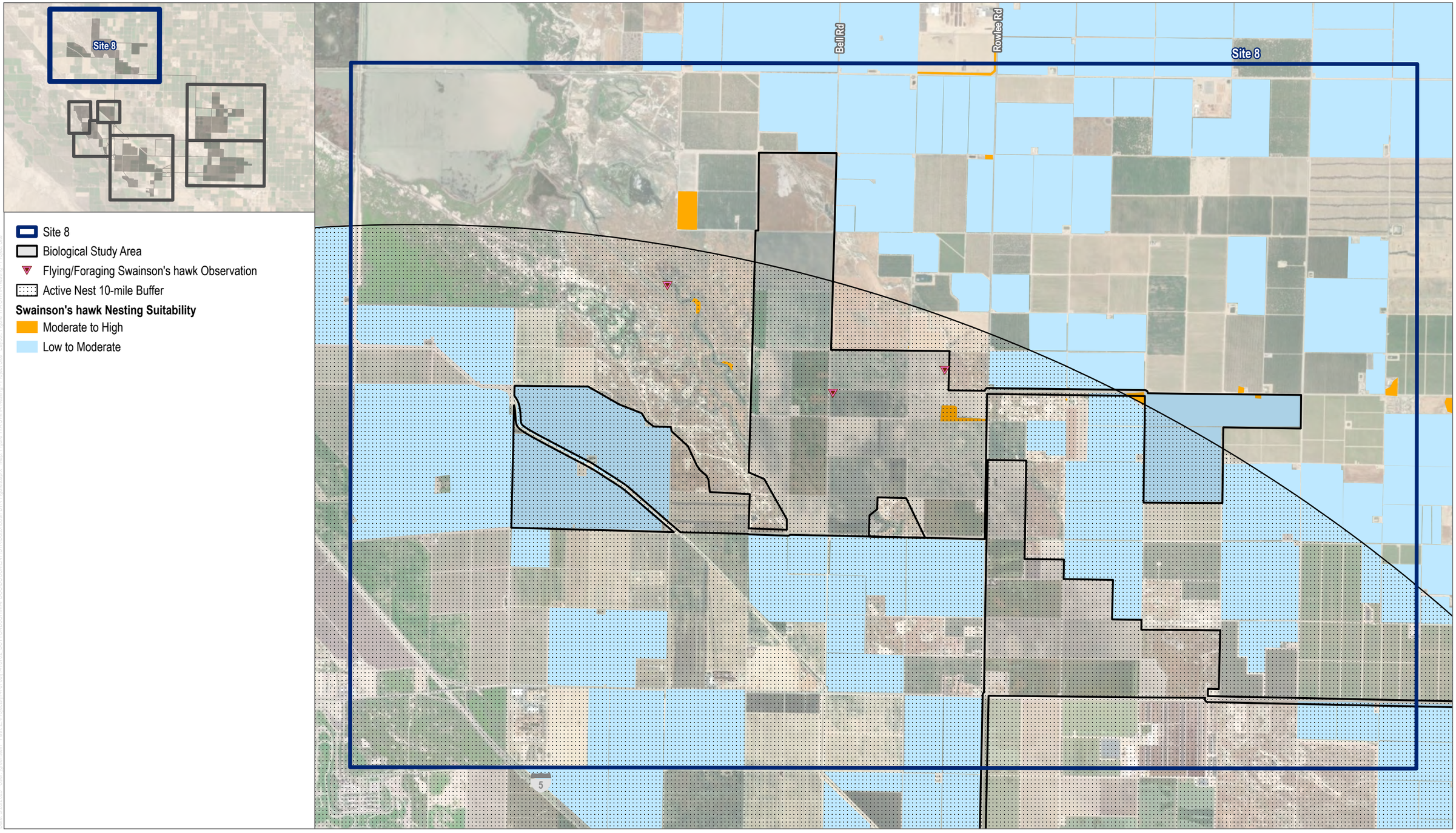
DUDEK

0 1,000 2,000 Feet

FIGURE 17A.F

Site 6: Swainson's Hawk Nesting Suitability

Buttonbush Solar Energy Project



SOURCE: Maxar 2023; Open Street Maps 2023; CDFW 2024

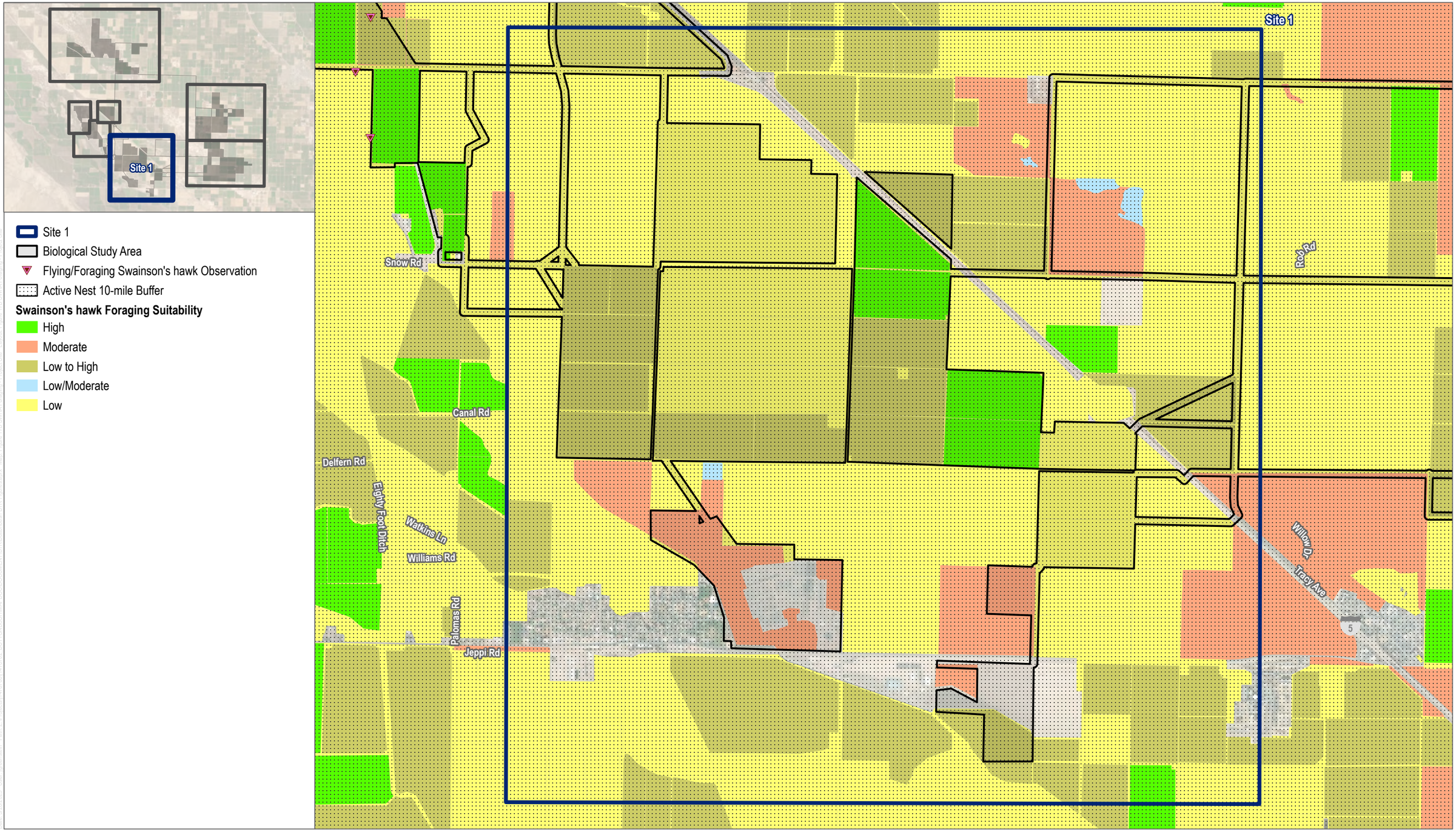
DUDEK

0 1,250 2,500 Feet

FIGURE 17A.G

Site 8: Swainson's Hawk Nesting Suitability

Buttonbush Solar Energy Project



SOURCE: Maxar 2023; Open Street Maps 2023; CDFW 2024

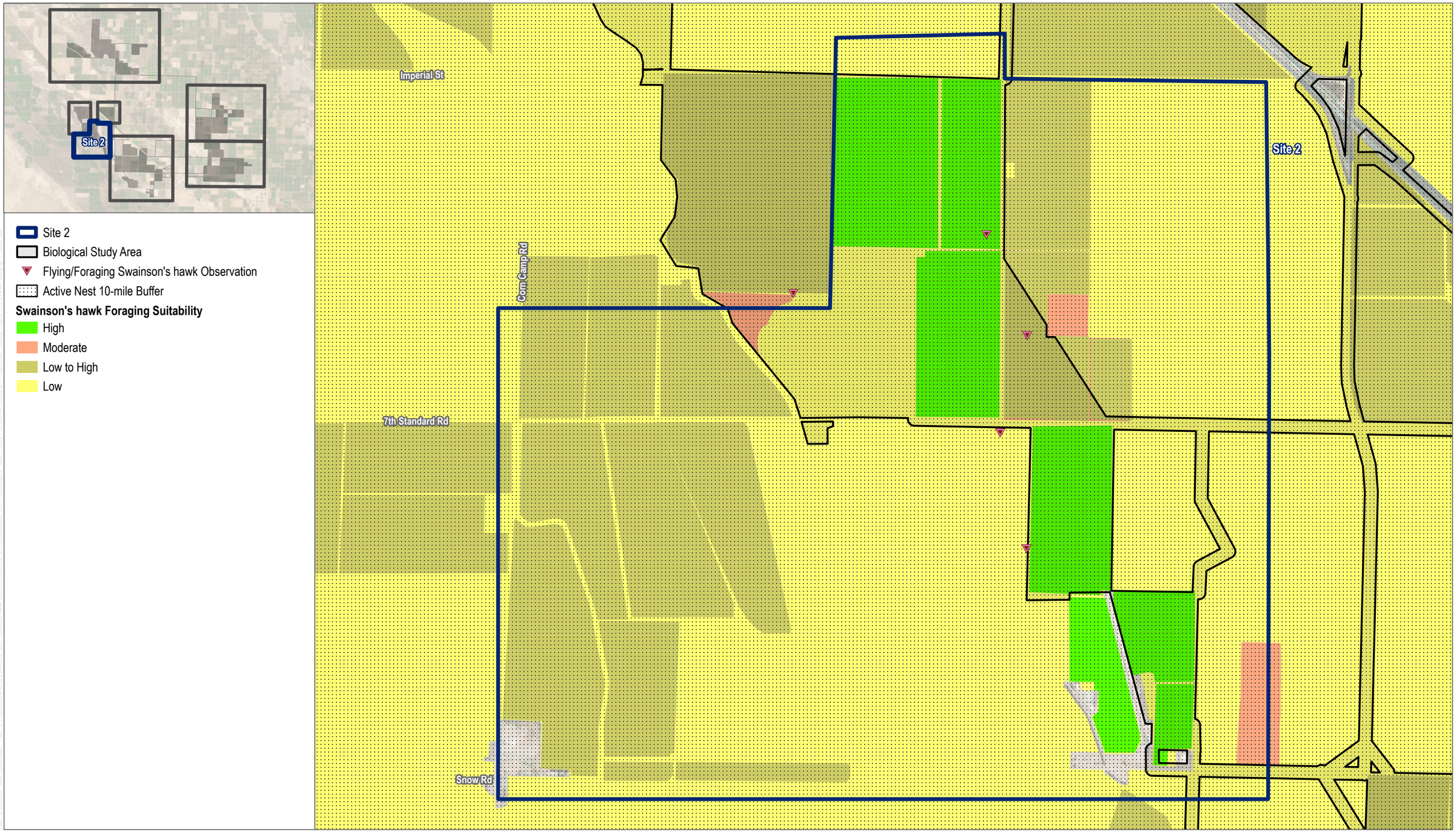
DUDEK

0 1,000 2,000 Feet

FIGURE 17B.A

Site 1: Swainson's Hawk Foraging Suitability

Buttonbush Solar Energy Project



SOURCE: Maxar 2023; Open Street Maps 2023; CDFW 2024

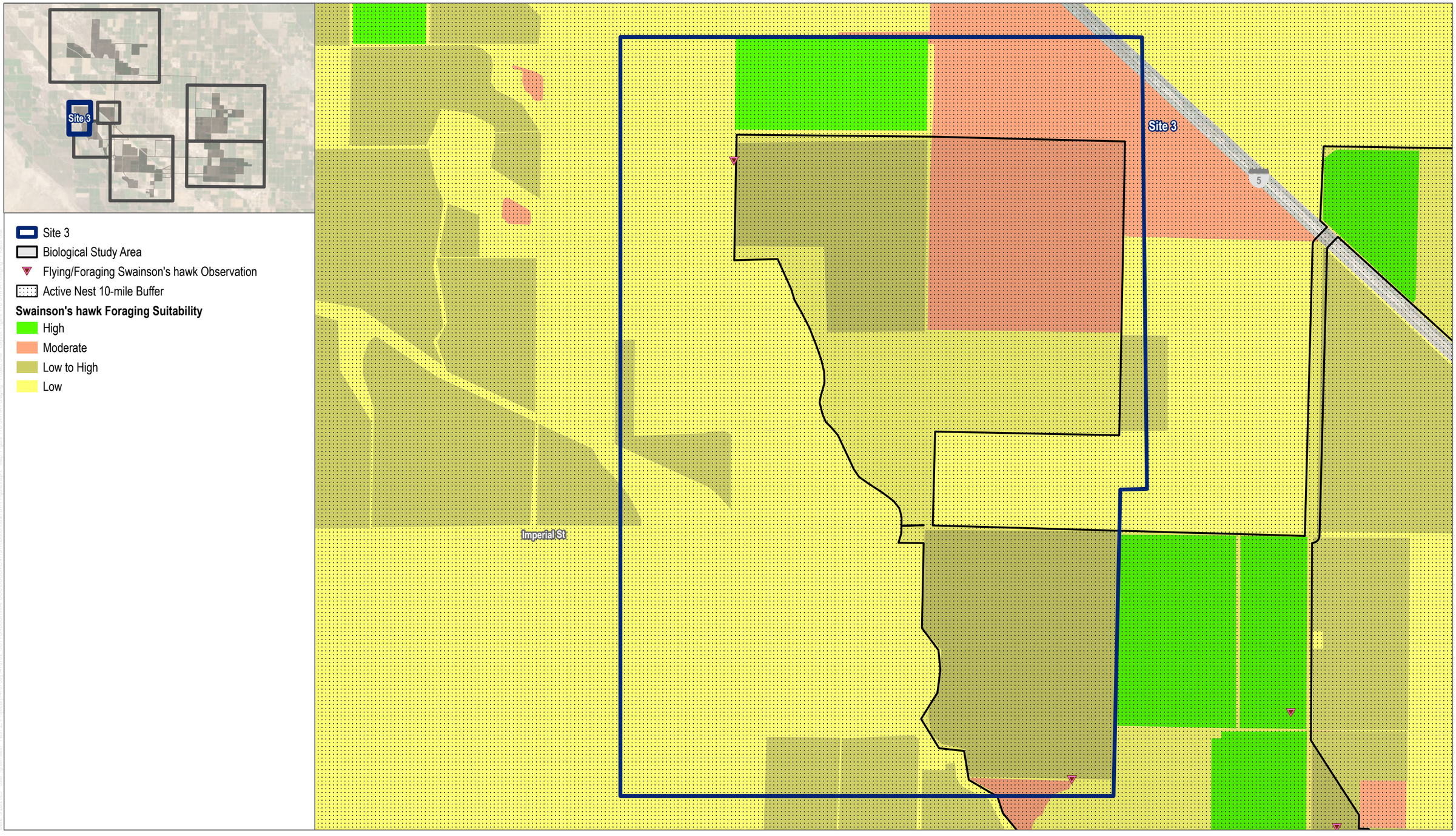
DUDEK

0 500 1,000 Feet

FIGURE 17B.B

Site 2: Swainson's Hawk Foraging Suitability

Buttonbush Solar Energy Project



SOURCE: Maxar 2023; Open Street Maps 2023; CDFW 2024

DUDEK

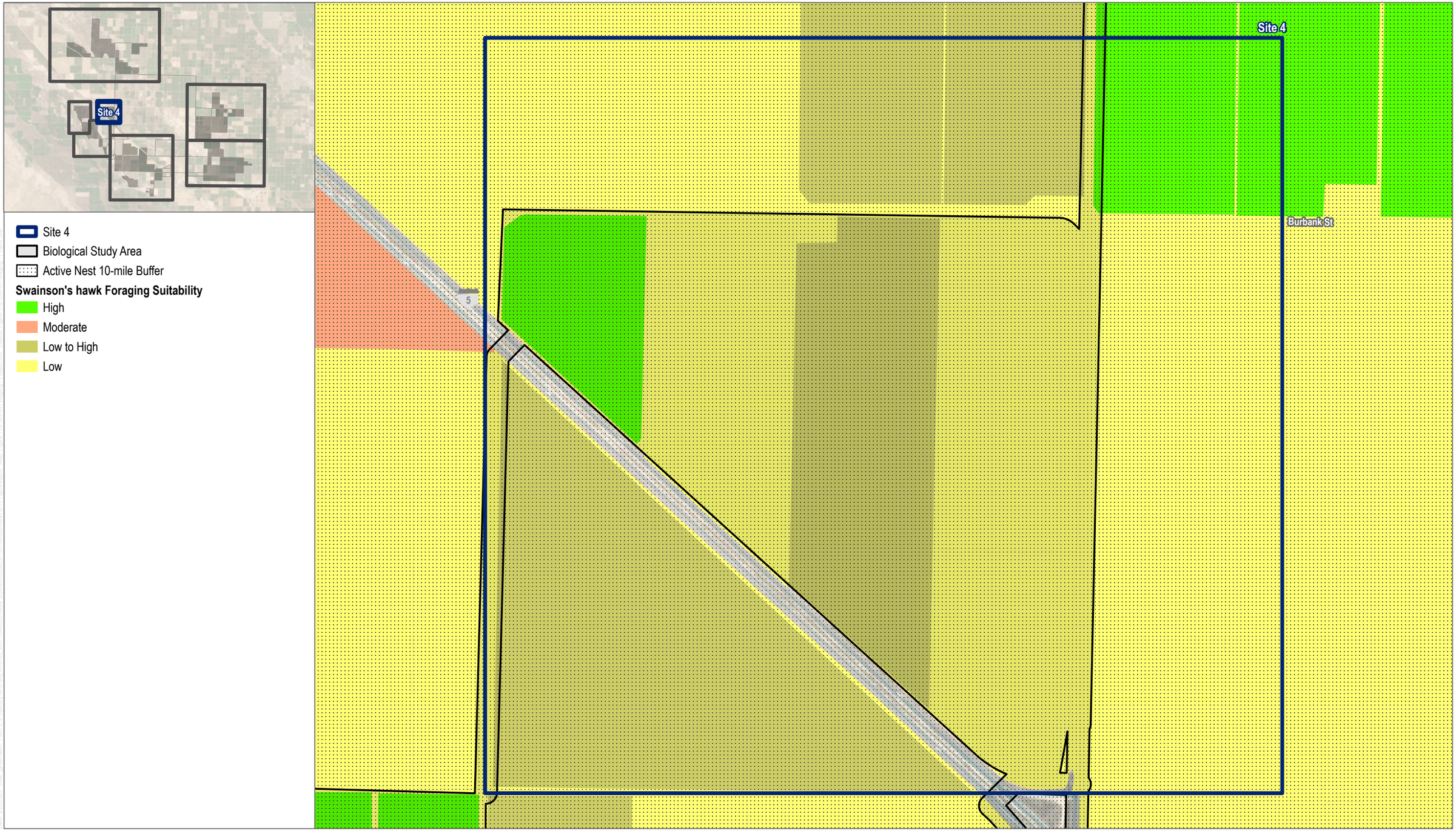
N

0 500 1,000 Feet

FIGURE 17B.C

Site 3: Swainson's Hawk Foraging Suitability

Buttonbush Solar Energy Project



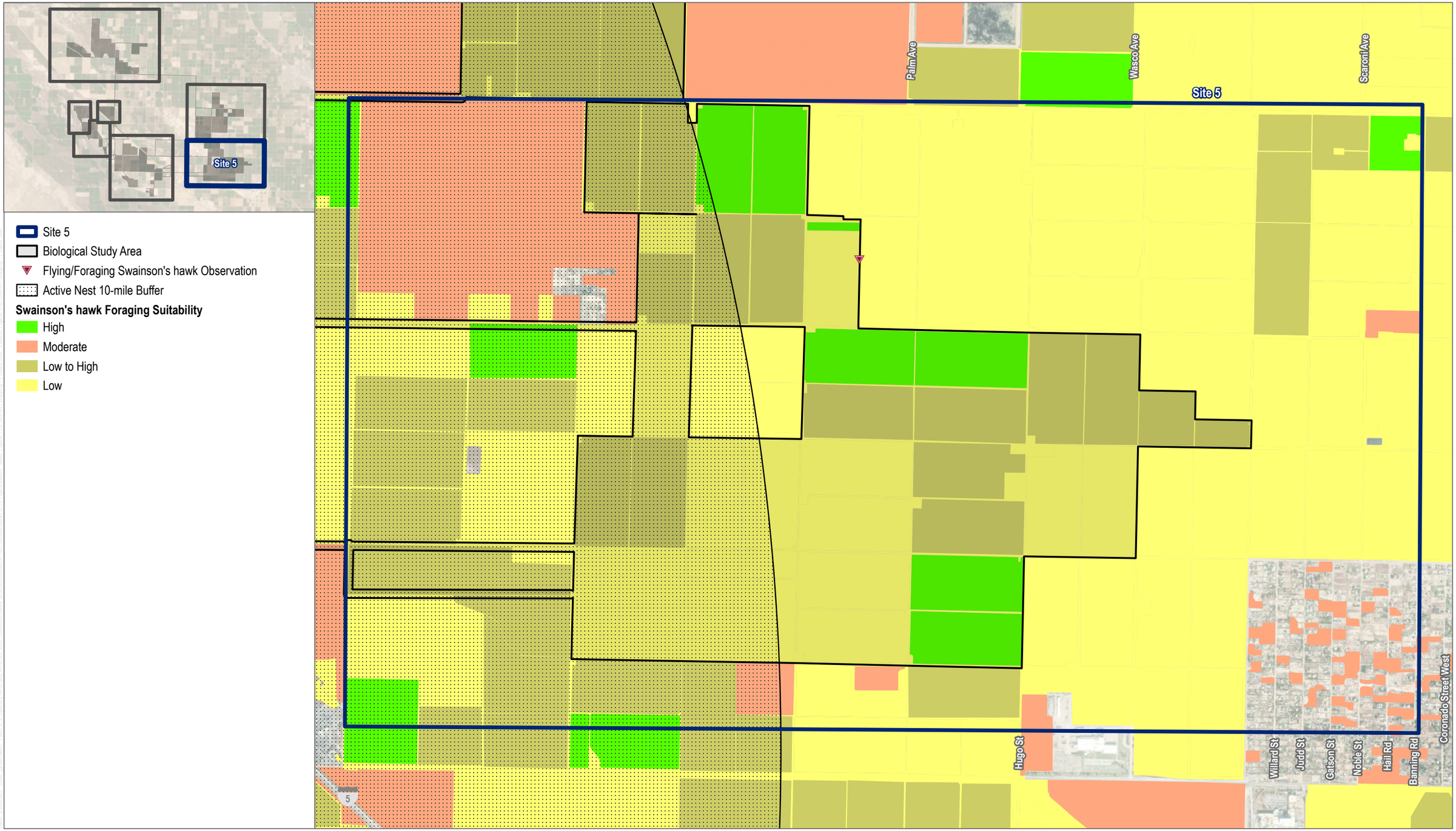
SOURCE: Maxar 2023; Open Street Maps 2023; CDFW 2024

FIGURE 17B.D

Site 4: Swainson's Hawk Foraging Suitability

Buttonbush Solar Energy Project

DUDEK



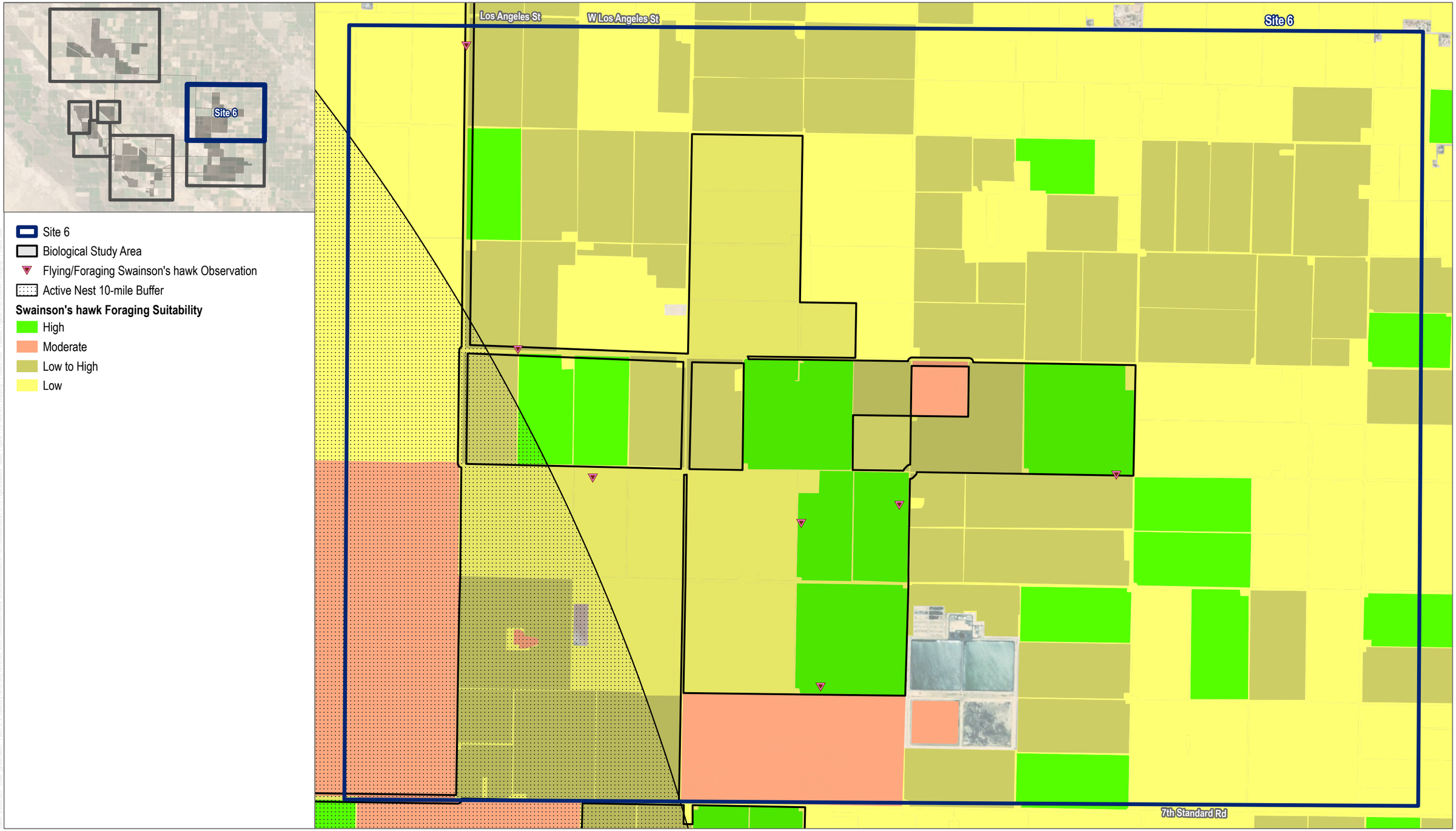
SOURCE: Maxar 2023; Open Street Maps 2023; CDFW 2024

DUDEK

FIGURE 17B.E

Site 5: Swainson's Hawk Foraging Suitability

Buttonbush Solar Energy Project



SOURCE: Maxar 2023; Open Street Maps 2023; CDFW 2024

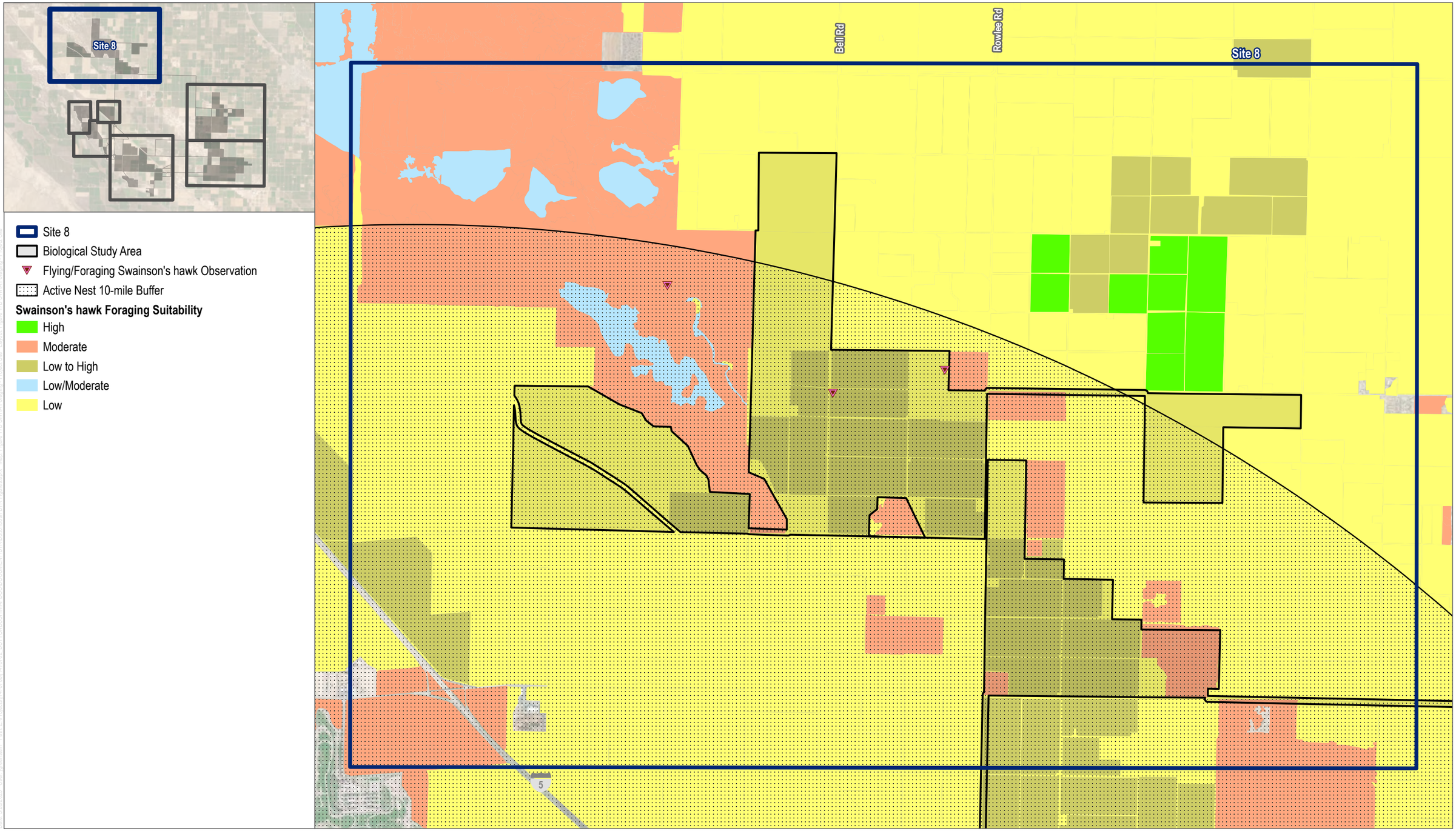
DUDEK

0 1,000 2,000 Feet

FIGURE 17B.F

Site 6: Swainson's Hawk Foraging Suitability

Buttonbush Solar Energy Project



SOURCE: Maxar 2023; Open Street Maps 2023; CDFW 2024

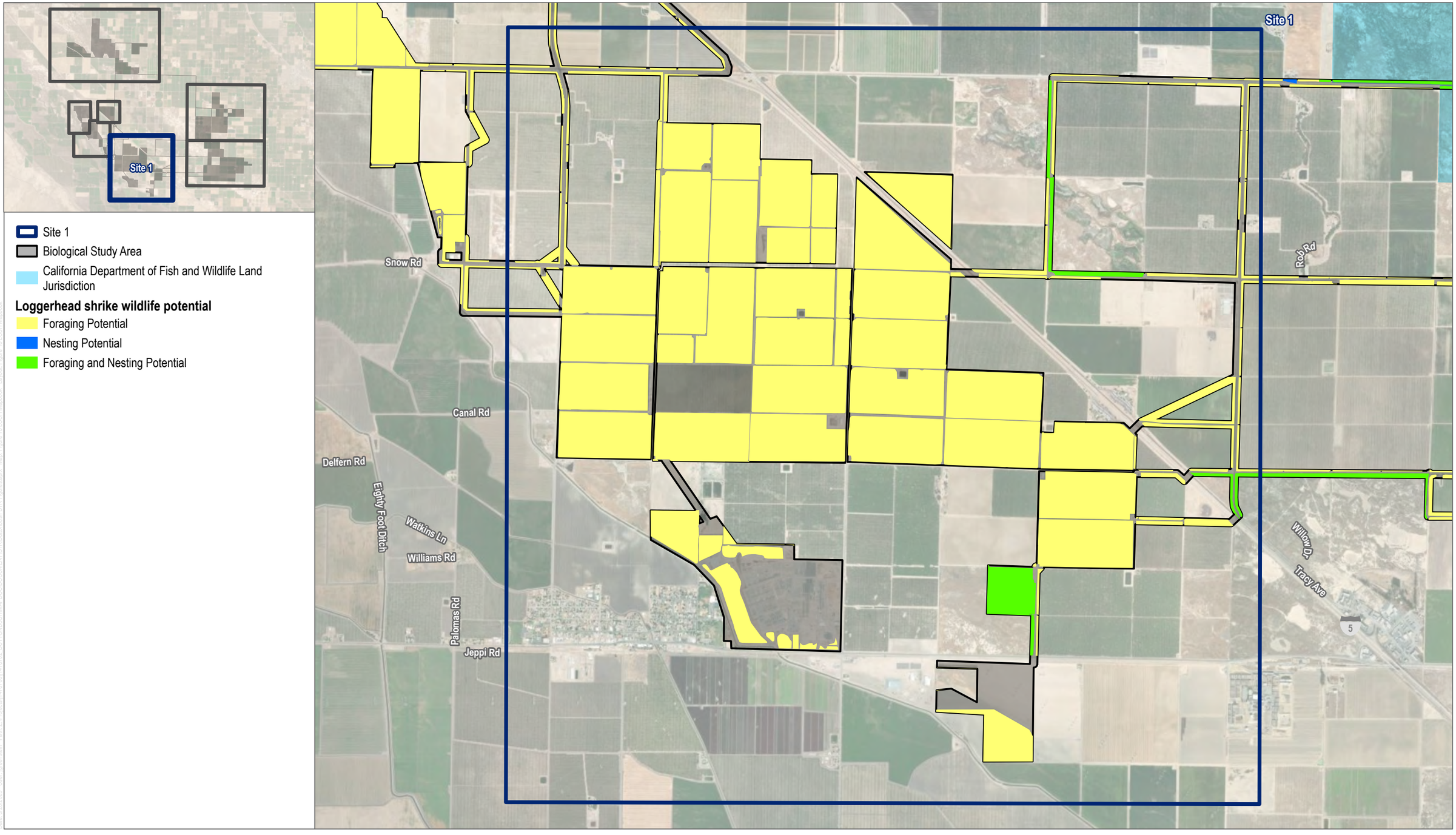
DUDEK

0 1,250 2,500 Feet

FIGURE 17B.G

Site 8: Swainson's Hawk Foraging Suitability

Buttonbush Solar Energy Project



SOURCE: Maxar 2023; Open Street Maps 2023; CDFW 2024

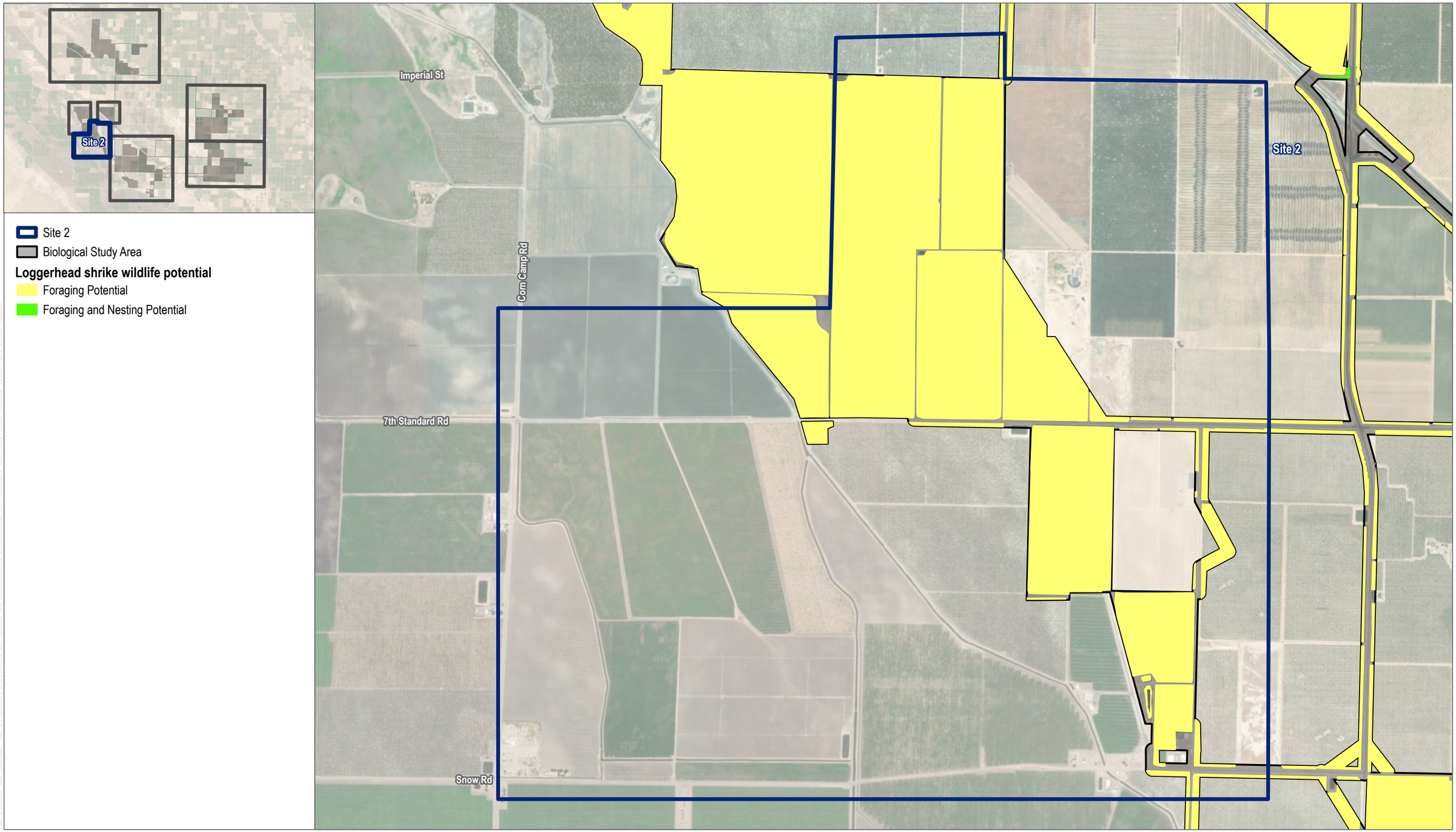
DUDEK

0 1,000 2,000 Feet

FIGURE 18A

Site 1: Loggerhead Shrike Wildlife Potential

Buttonbush Solar Energy Project



SOURCE: Maxar 2023; Open Street Maps 2023; CDFW 2024

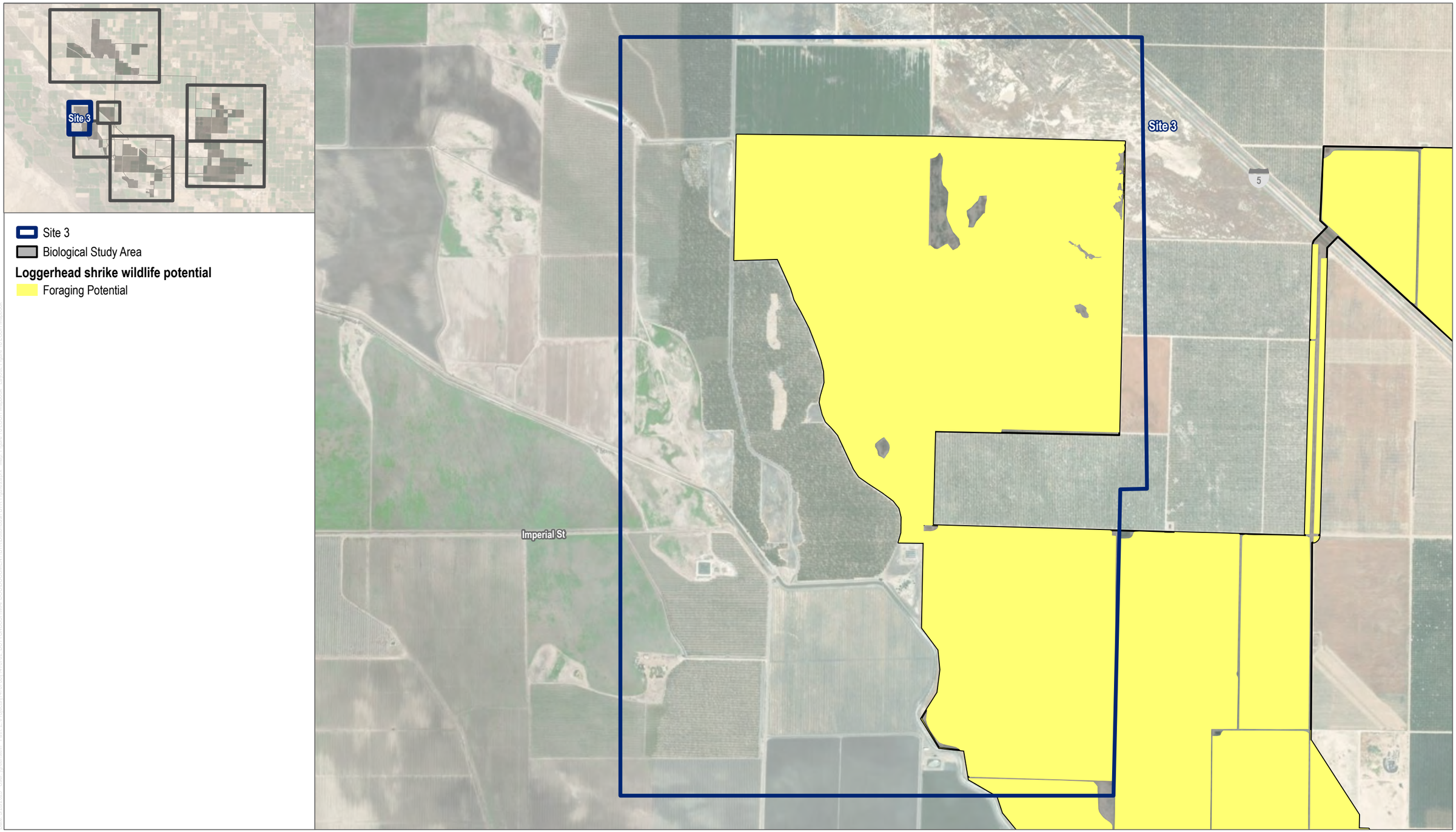
DUDEK

0 500 1,000 Feet

FIGURE 18B

Site 2: Loggerhead Shrike Wildlife Potential

Buttonbush Solar Energy Project



SOURCE: Maxar 2023; Open Street Maps 2023; CDFW 2024

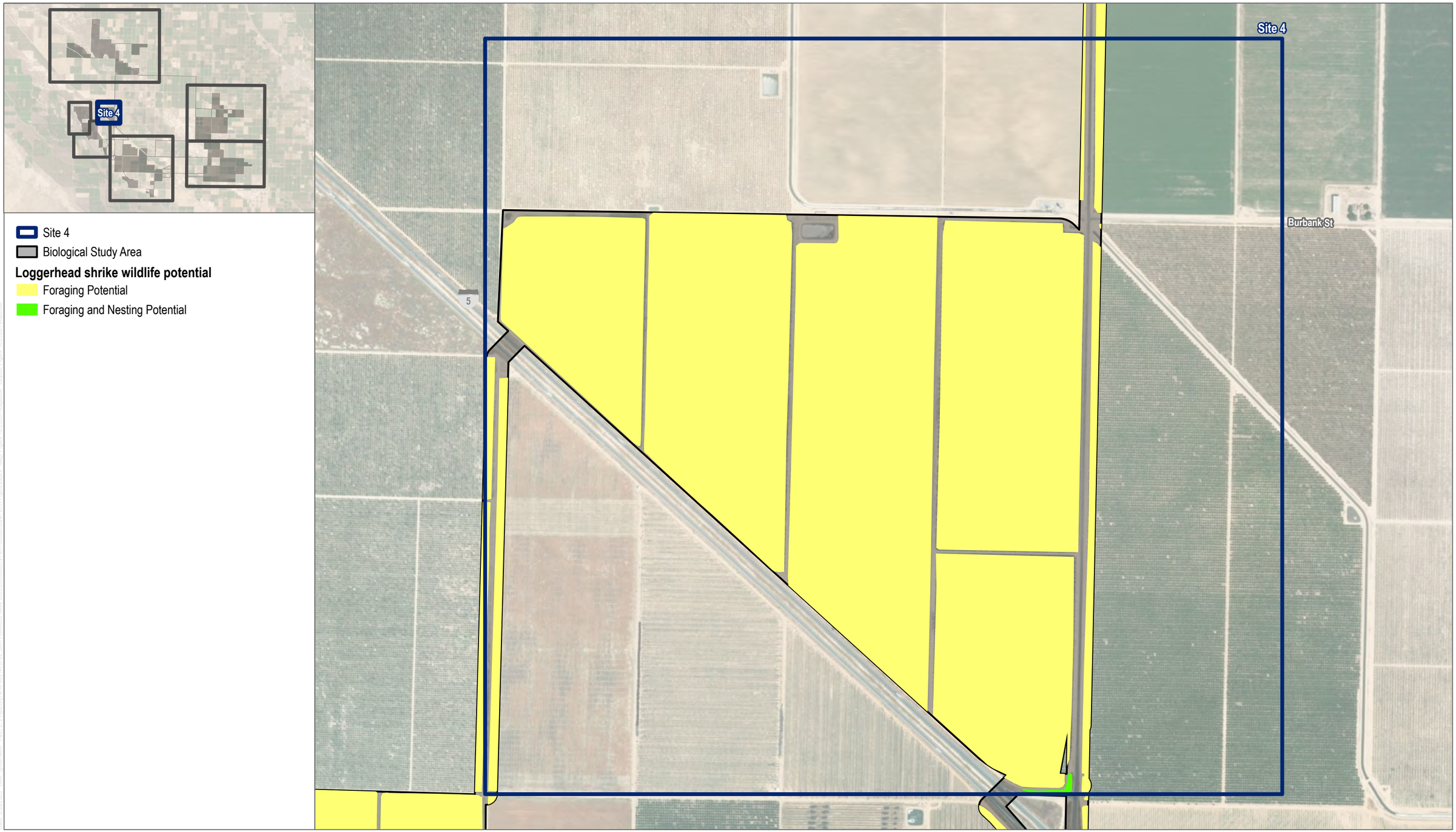
DUDEK

0 500 1,000 Feet

FIGURE 18C

Site 3: Loggerhead Shrike Wildlife Potential

Buttonbush Solar Energy Project



SOURCE: Maxar 2023; Open Street Maps 2023; CDFW 2024

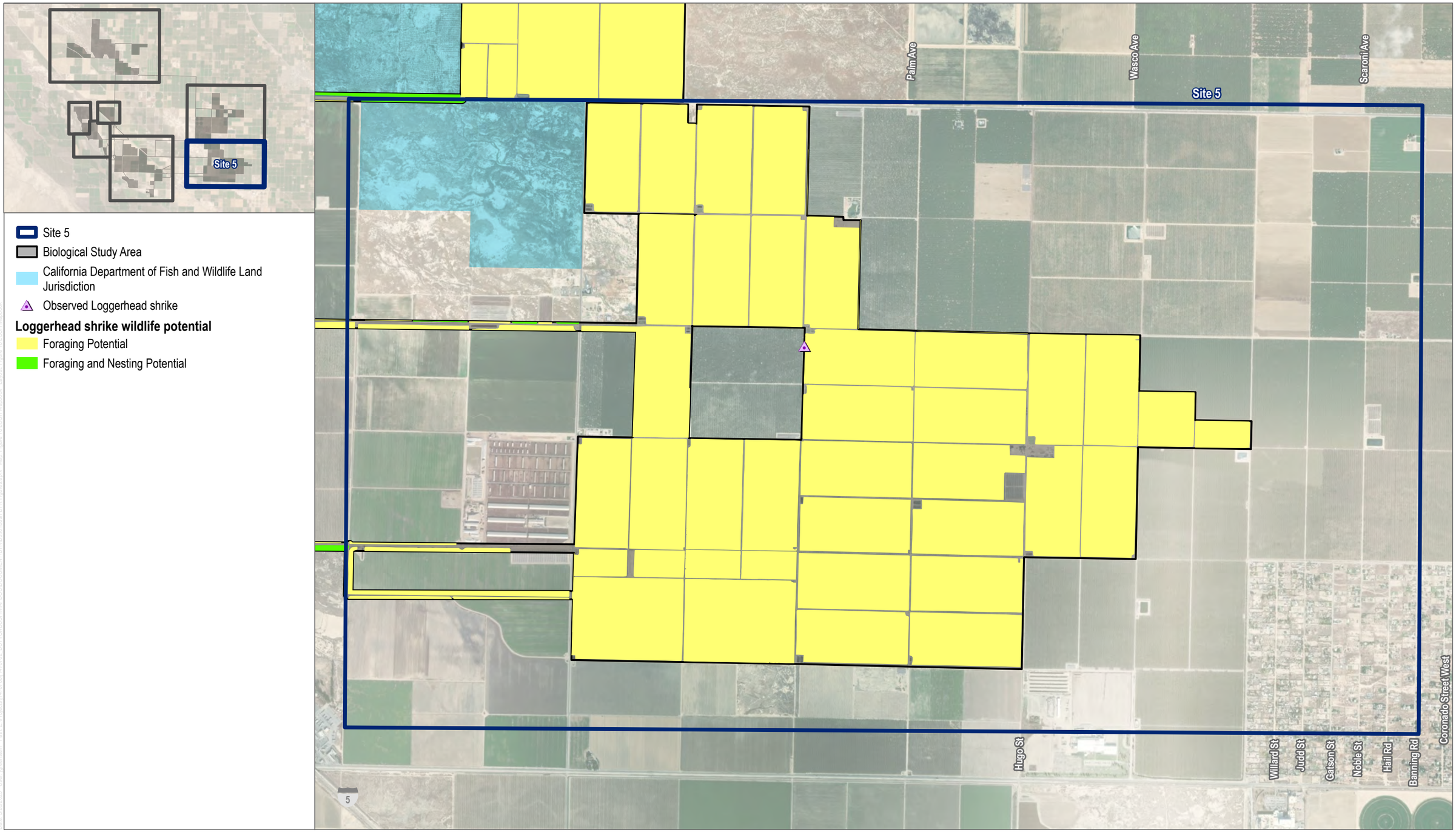
DUDEK

0 400 800 Feet

FIGURE 18D

Site 4: Loggerhead Shrike Wildlife Potential

Buttonbush Solar Energy Project



SOURCE: Maxar 2023; Open Street Maps 2023; CDFW 2024

DUDEK

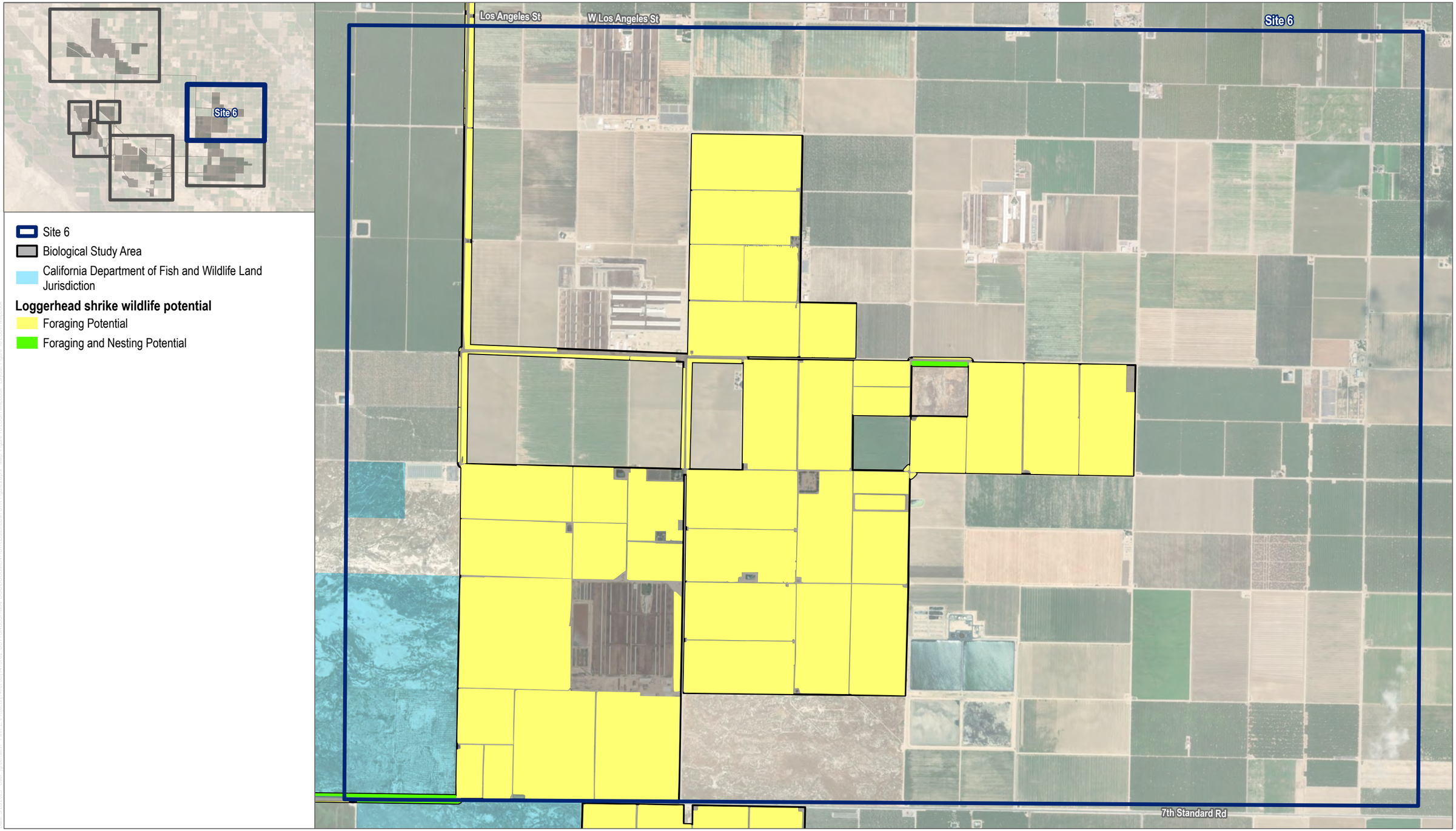
N

0 1,000 2,000 Feet

FIGURE 18E

Site 5: Loggerhead Shrike Wildlife Potential

Buttonbush Solar Energy Project



SOURCE: Maxar 2023; Open Street Maps 2023; CDFW 2024

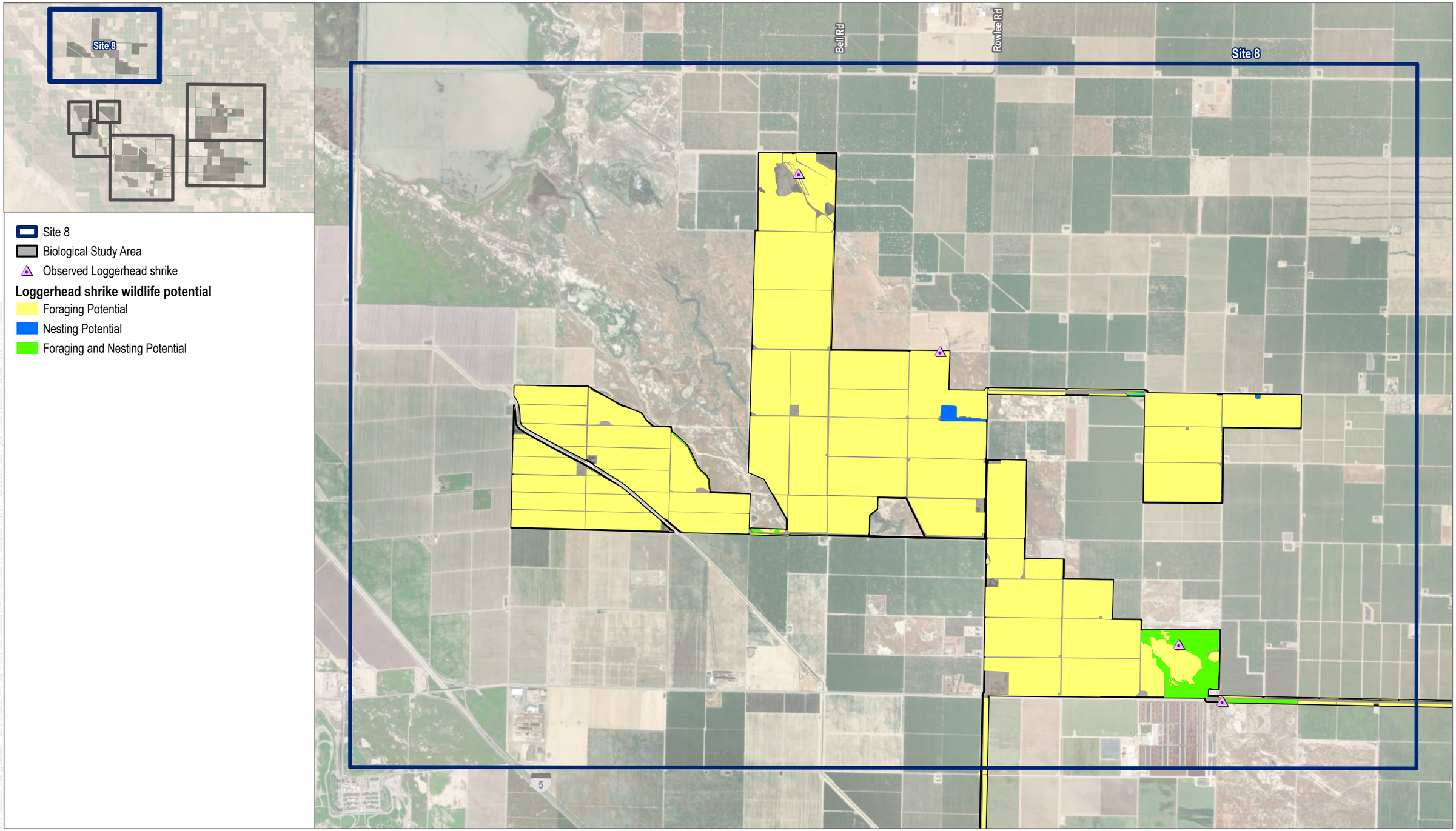
DUDEK

0 1,000 2,000 Feet

FIGURE 18F

Site 6: Loggerhead Shrike Wildlife Potential

Buttonbush Solar Energy Project



SOURCE: Maxar 2023; Open Street Maps 2023; CDFW 2024

DUDEK

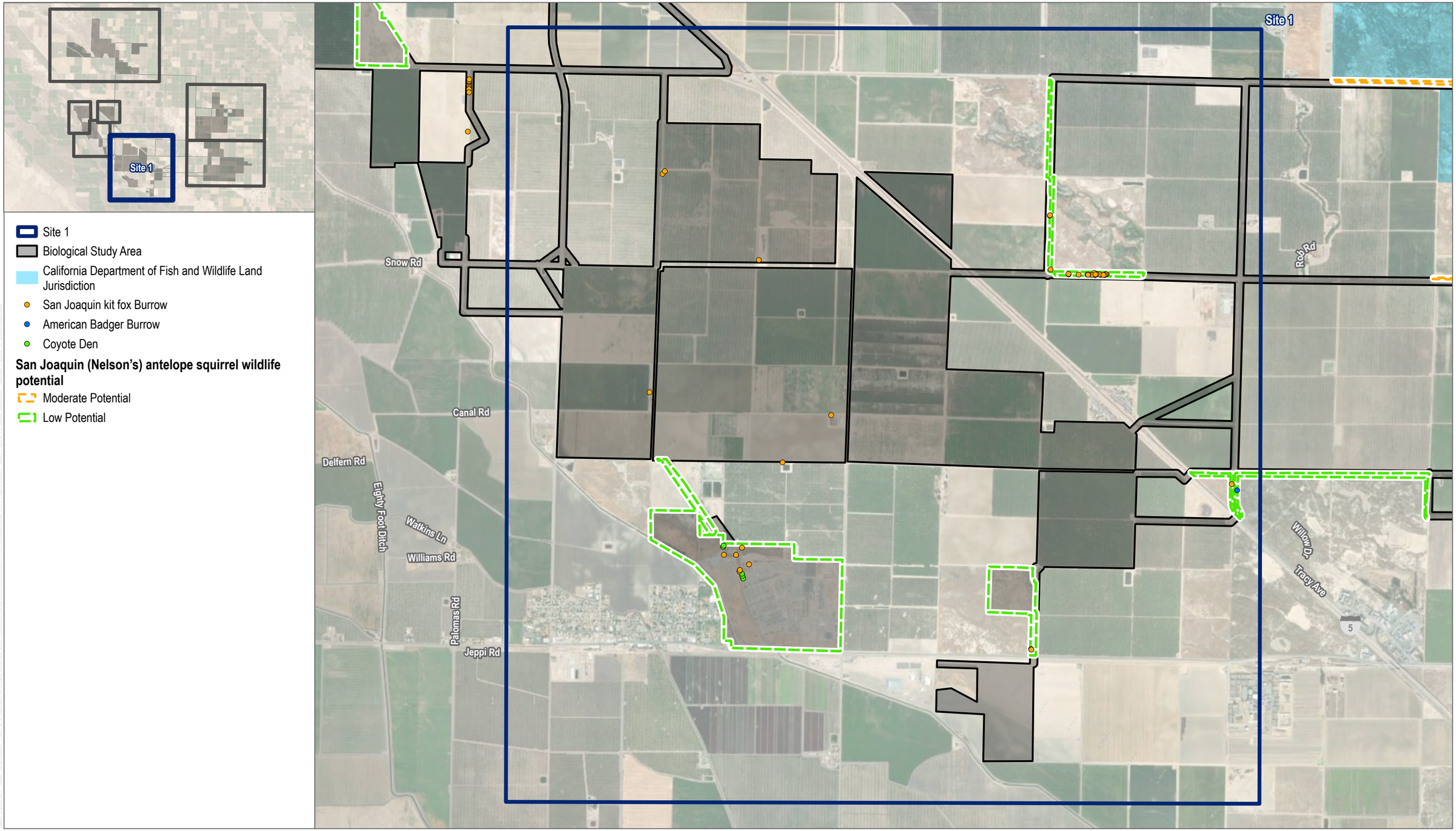
N

0 1,250 2,500 Feet

FIGURE 18G

Site 8: Loggerhead Shrike Wildlife Potential

Buttonbush Solar Energy Project



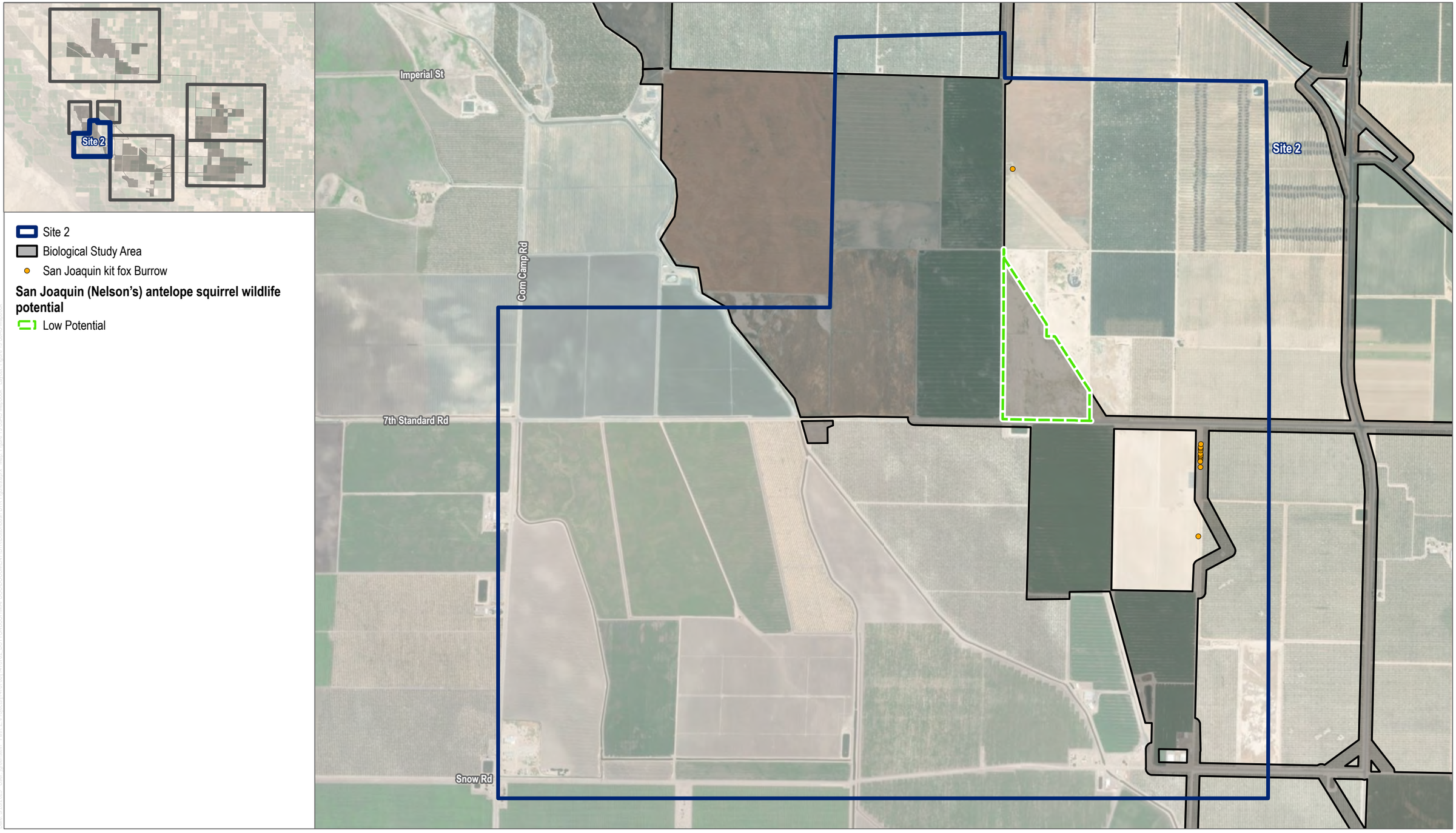
SOURCE: Maxar 2023; Open Street Maps 2023; CDFW 2024

DUDEK

FIGURE 19A

Site 1: San Joaquin (Nelson's) Antelope Squirrel Wildlife Potential

Buttonbush Solar Energy Project



SOURCE: Maxar 2023; Open Street Maps 2023; CDFW 2024

DUDEK

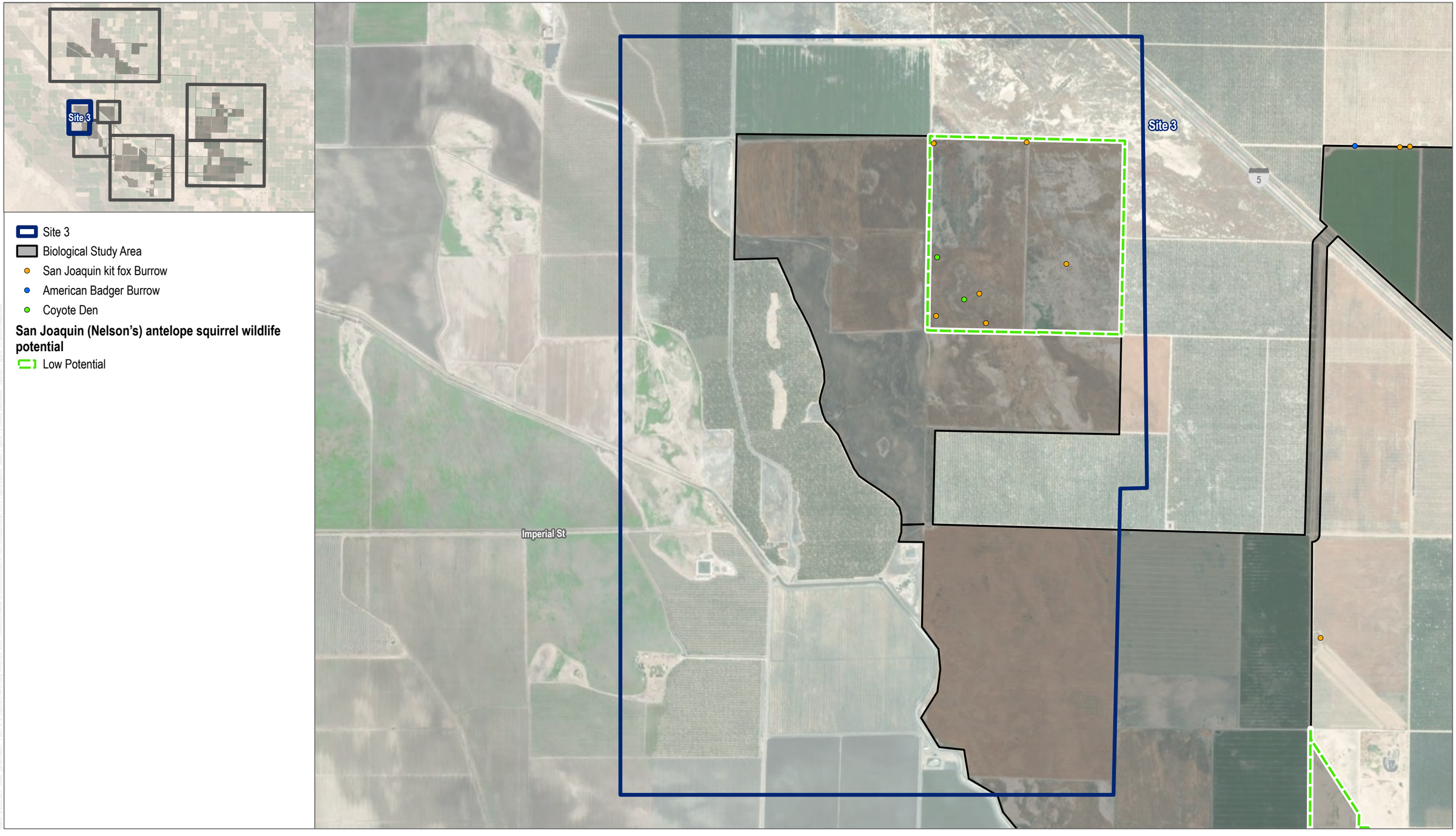
N

0 500 1,000 Feet

FIGURE 19B

Site 2: San Joaquin (Nelson's) Antelope Squirrel Wildlife Potential

Buttonbush Solar Energy Project

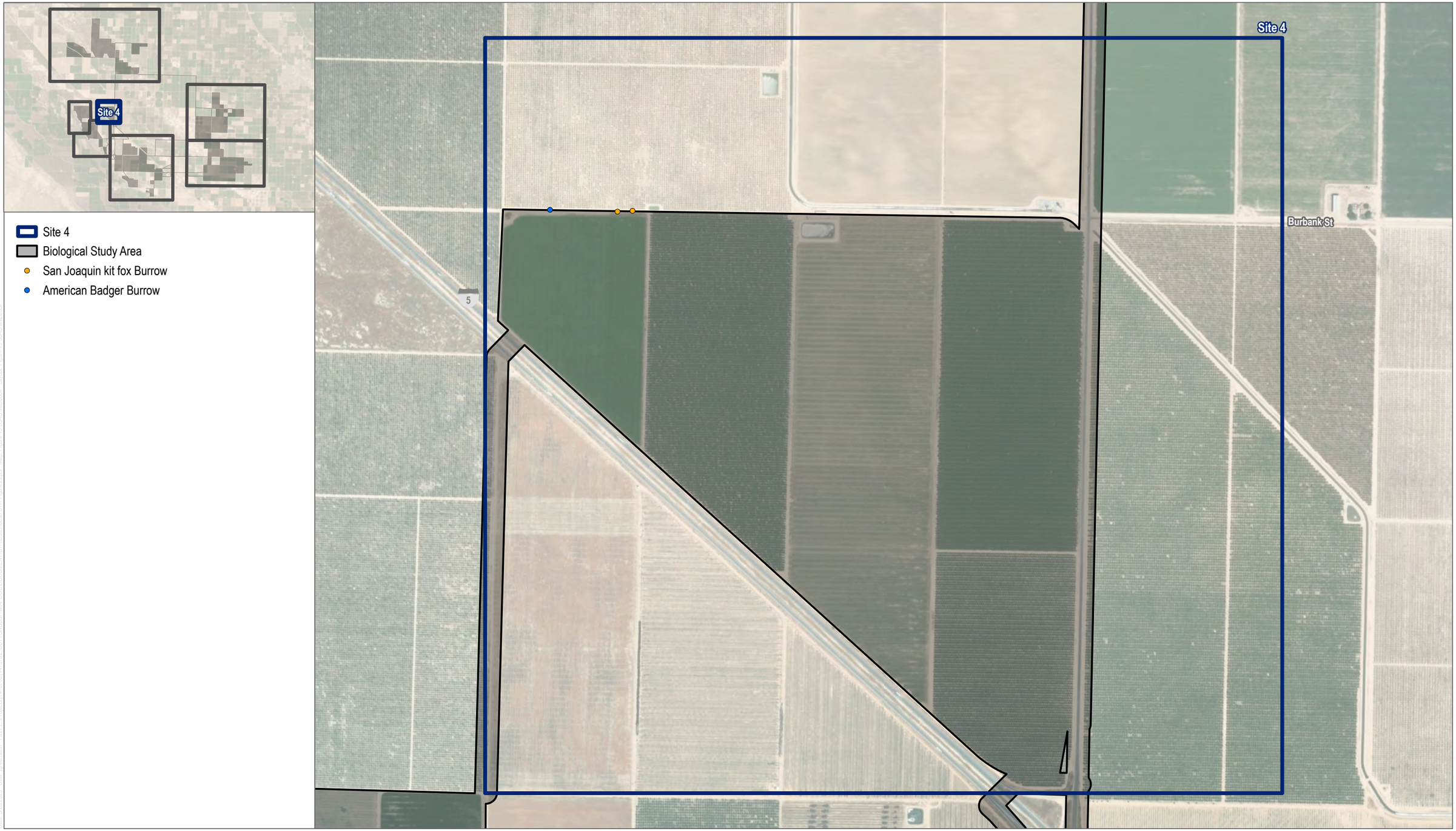


SOURCE: Maxar 2023; Open Street Maps 2023; CDFW 2024

FIGURE 19C

Site 3: San Joaquin (Nelson's) Antelope Squirrel Wildlife Potential

Buttonbush Solar Energy Project

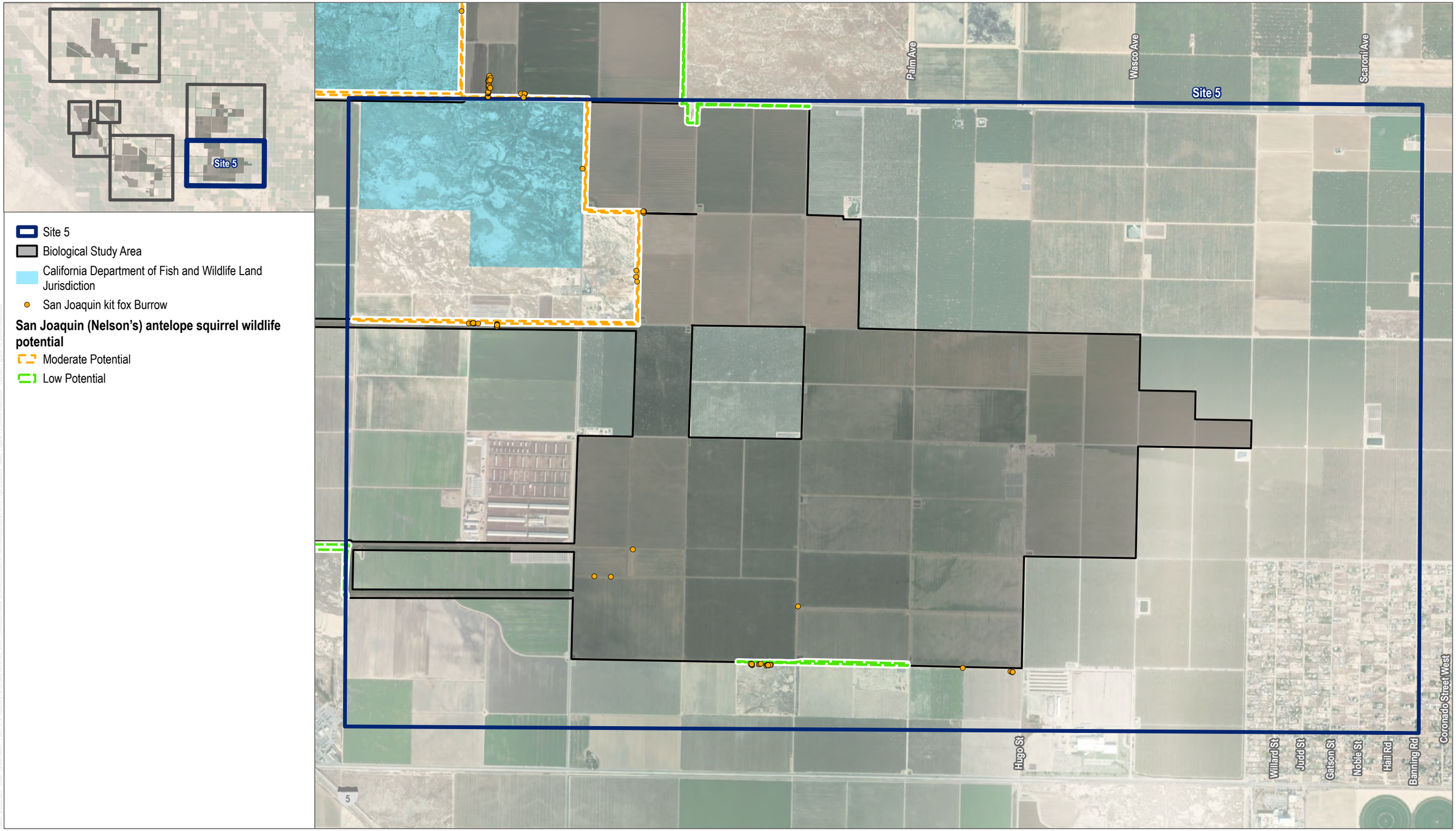


SOURCE: Maxar 2023; Open Street Maps 2023; CDFW 2024

FIGURE 19D

Site 4: San Joaquin (Nelson's) Antelope Squirrel Wildlife Potential

Buttonbush Solar Energy Project

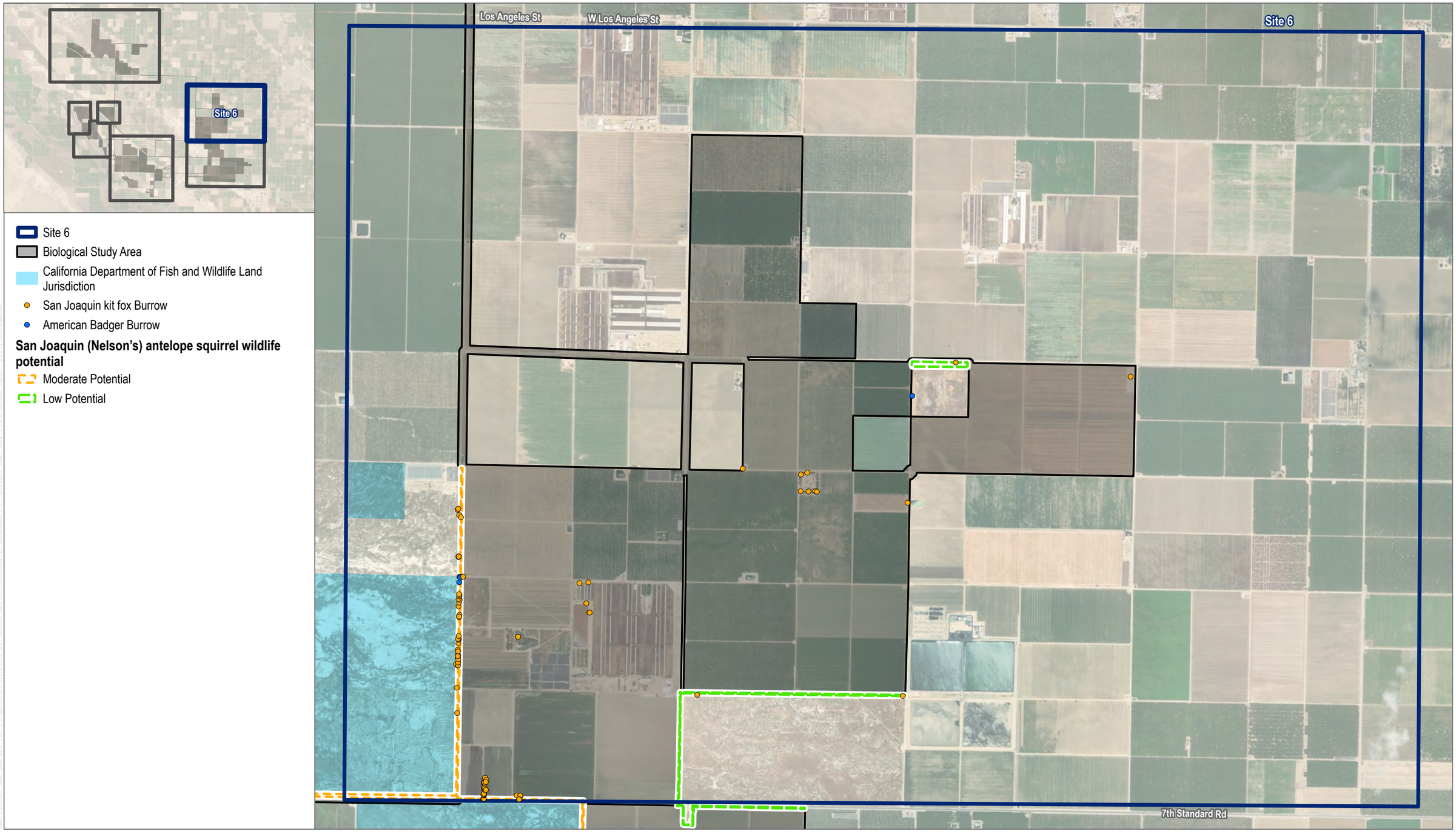


SOURCE: Maxar 2023; Open Street Maps 2023; CDFW 2024

FIGURE 19E

Site 5: San Joaquin (Nelson's) Antelope Squirrel Wildlife Potential

Buttonbush Solar Energy Project



SOURCE: Maxar 2023; Open Street Maps 2023; CDFW 2024

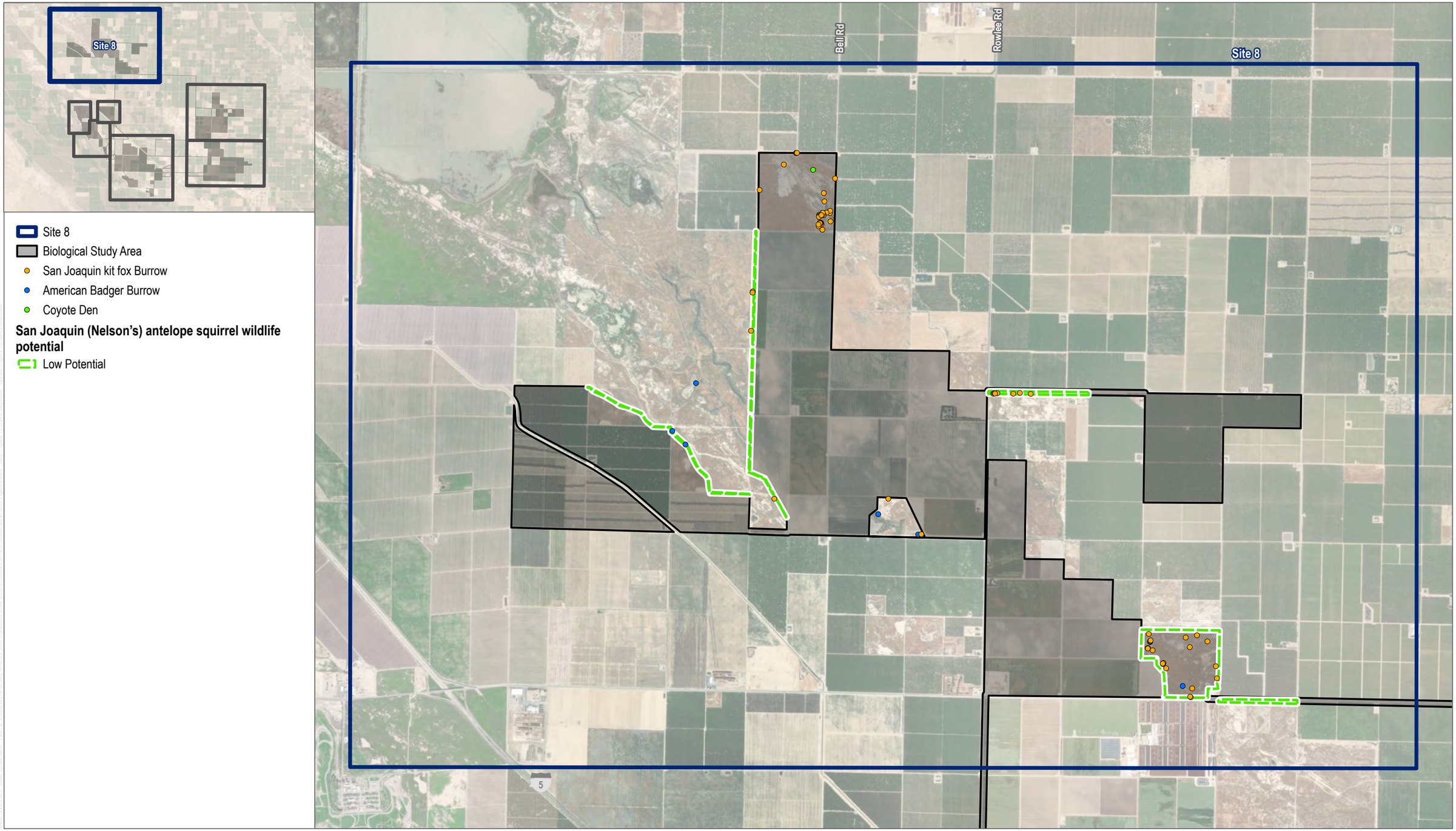
DUDEK

0 1,000 2,000 Feet

FIGURE 19F

Site 6: San Joaquin (Nelson's) Antelope Squirrel Wildlife Potential

Buttonbush Solar Energy Project



SOURCE: Maxar 2023; Open Street Maps 2023; CDFW 2024

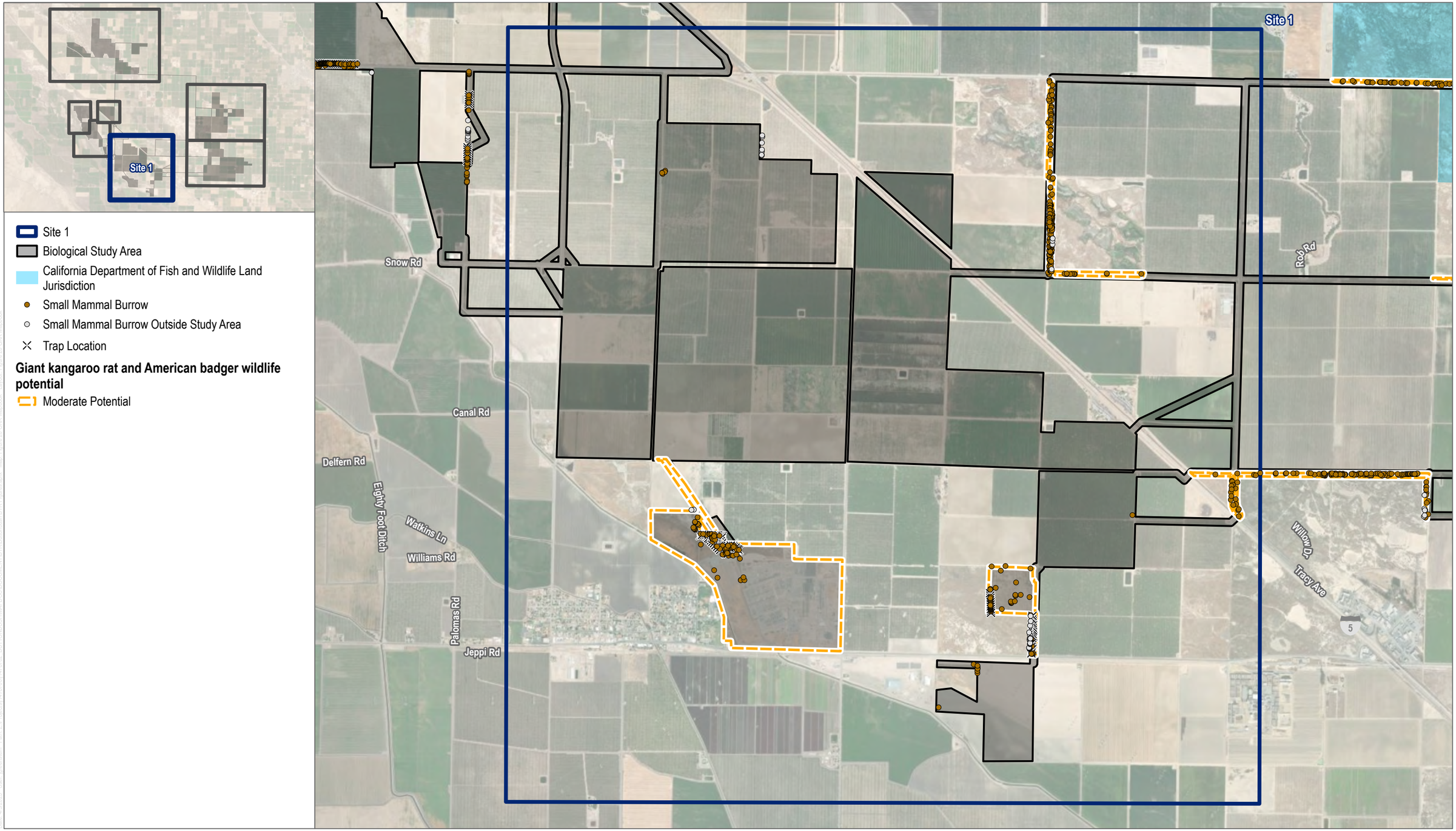
DUDEK

0 1,250 2,500 Feet

FIGURE 19G

Site 8: San Joaquin (Nelson's) Antelope Squirrel Wildlife Potential

Buttonbush Solar Energy Project



SOURCE: Maxar 2023; Open Street Maps 2023; CDFW 2024

DUDEK

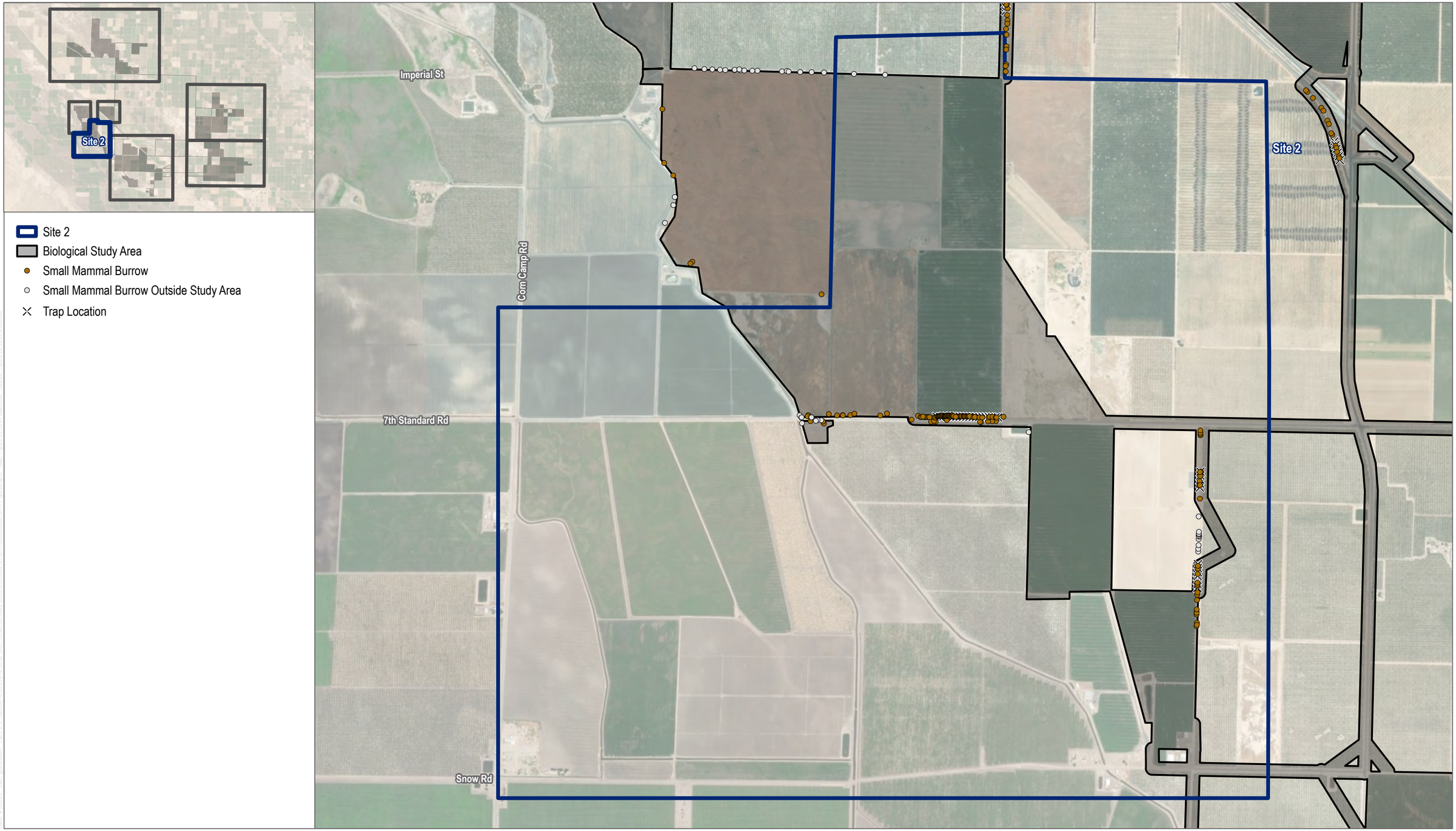
N

0 1,000 2,000 Feet

FIGURE 20A

Site 1: Giant Kangaroo Rat and American Badger Wildlife Potential

Buttonbush Solar Energy Project



SOURCE: Maxar 2023; Open Street Maps 2023; CDFW 2024

DUDEK

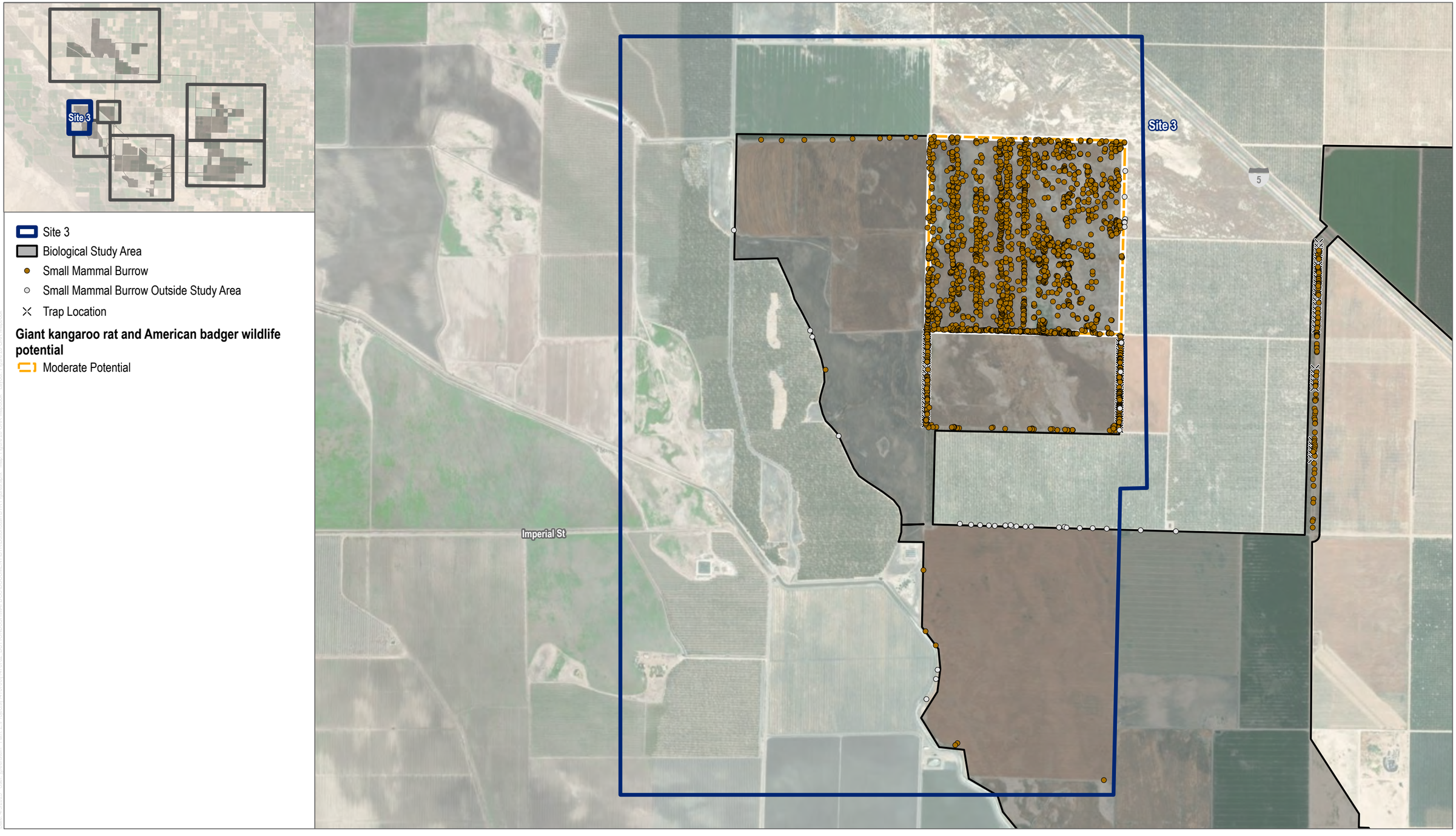
N

0 500 1,000 Feet

FIGURE 20B

Site 2: Giant Kangaroo Rat and American Badger Wildlife Potential

Buttonbush Solar Energy Project



SOURCE: Maxar 2023; Open Street Maps 2023; CDFW 2024

DUDEK

N

0 500 1,000 Feet

FIGURE 20C

Site 3: Giant Kangaroo Rat and American Badger Wildlife Potential

Buttonbush Solar Energy Project



SOURCE: Maxar 2023; Open Street Maps 2023; CDFW 2024

DUDEK

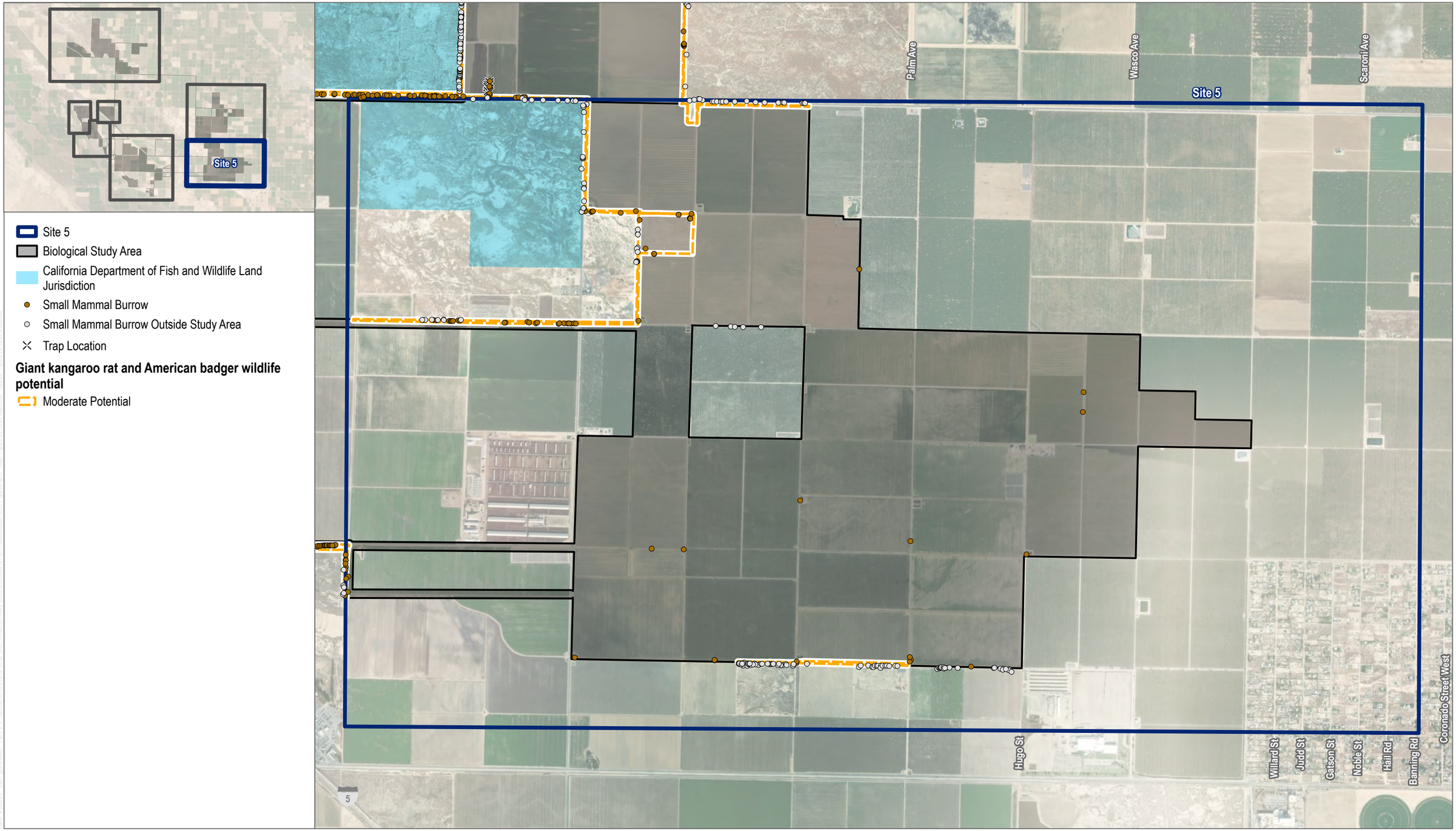
N

0 400 800 Feet

FIGURE 20D

Site 4: Giant Kangaroo Rat and American Badger Wildlife Potential

Buttonbush Solar Energy Project

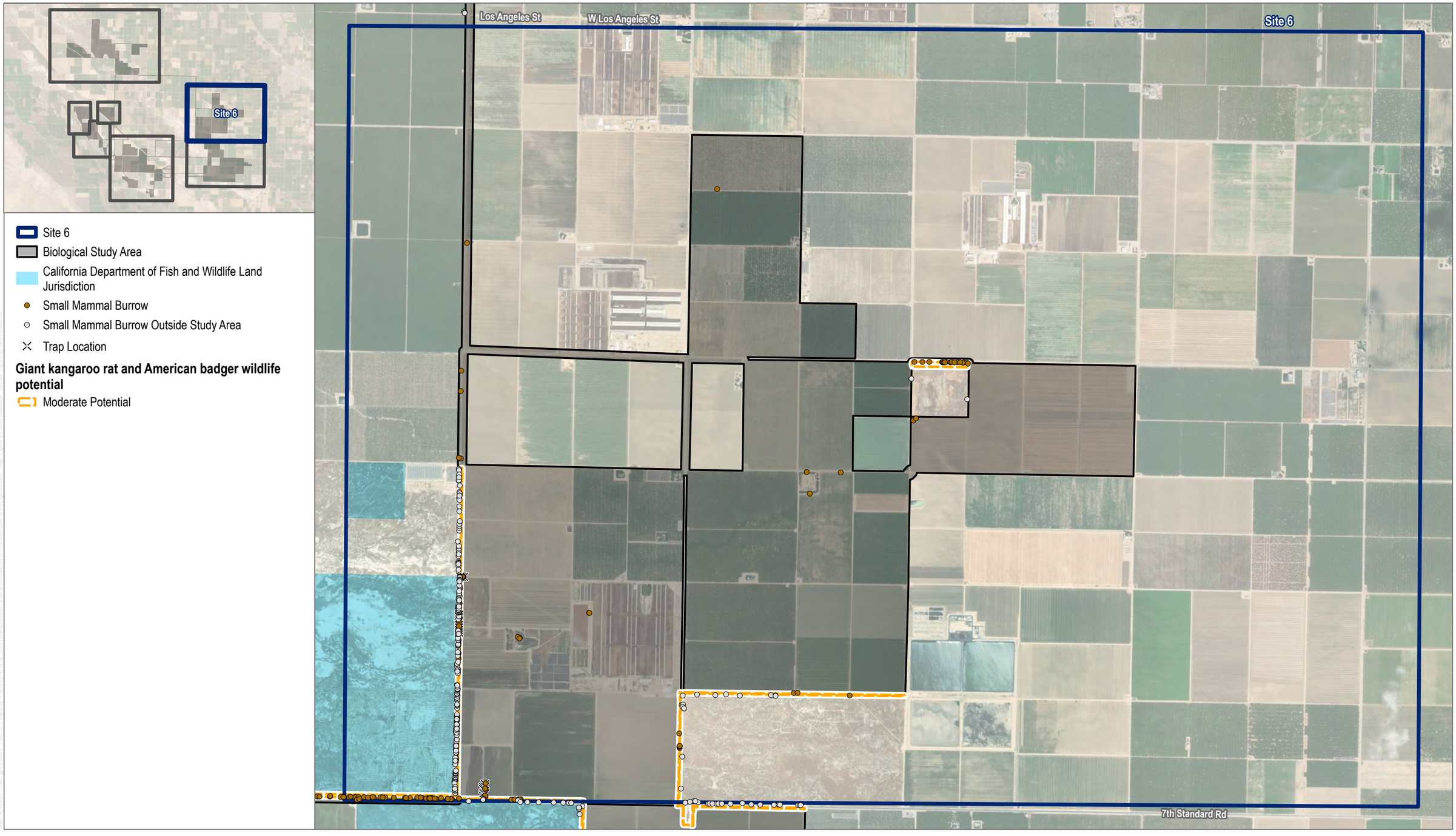


SOURCE: Maxar 2023; Open Street Maps 2023; CDFW 2024

FIGURE 20E

Site 5: Giant Kangaroo Rat and American Badger Wildlife Potential

Buttonbush Solar Energy Project



SOURCE: Maxar 2023; Open Street Maps 2023; CDFW 2024

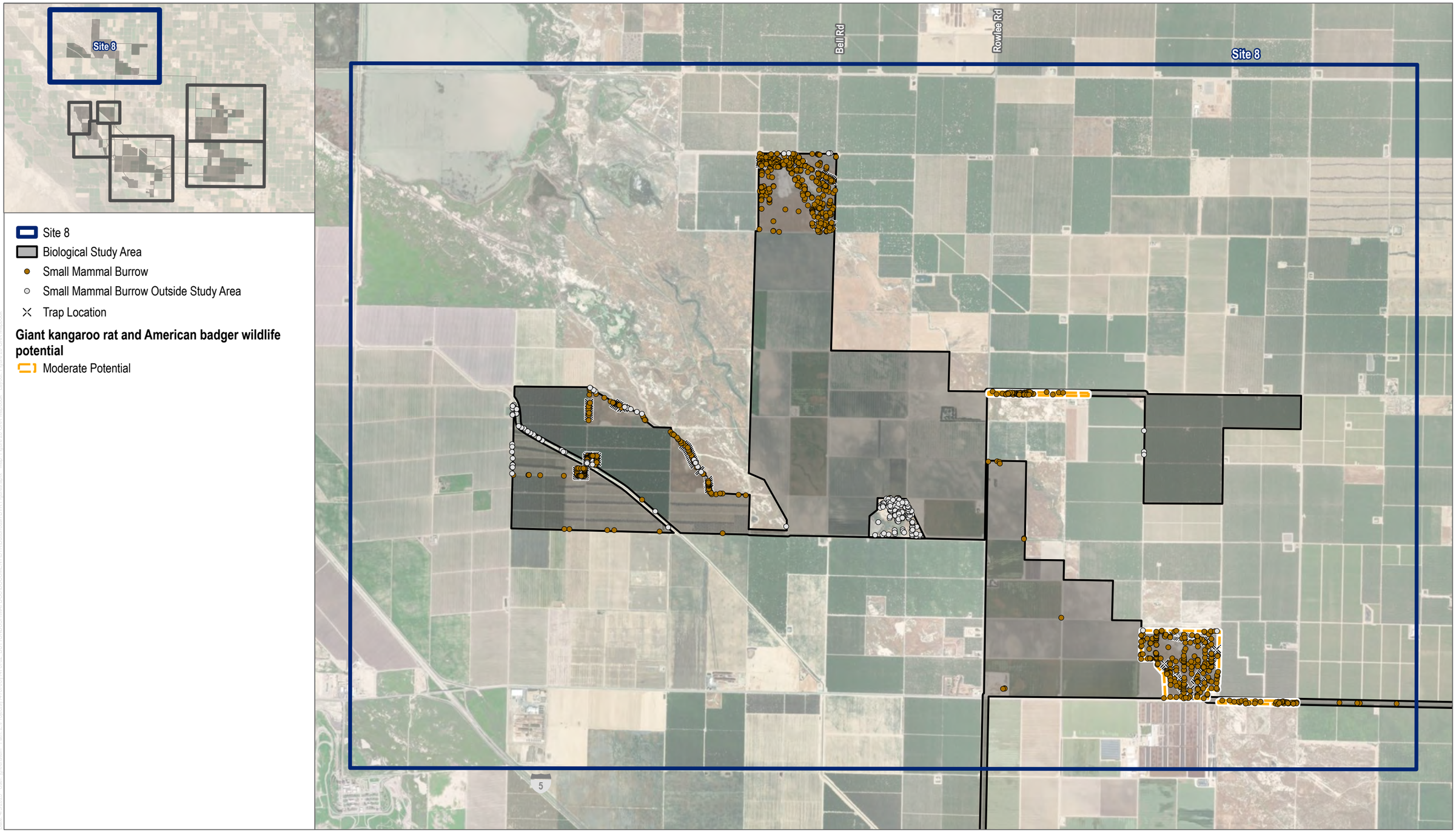
DUDEK

0 1,000 2,000 Feet

FIGURE 20F

Site 6: Giant Kangaroo Rat and American Badger Wildlife Potential

Buttonbush Solar Energy Project



SOURCE: Maxar 2023; Open Street Maps 2023; CDFW 2024

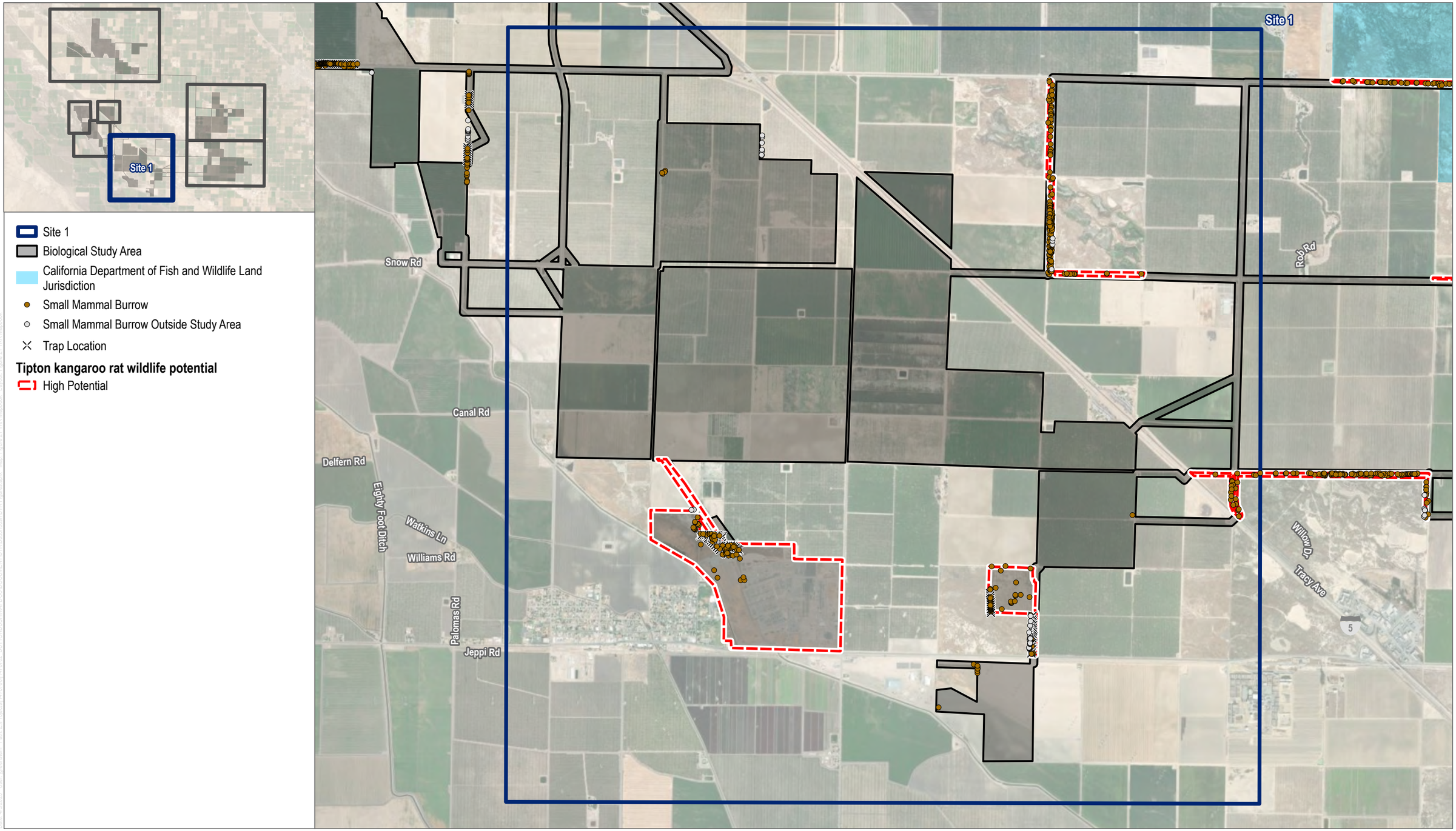
DUDEK

0 1,250 2,500 Feet

FIGURE 20G

Site 8: Giant Kangaroo Rat and American Badger Wildlife Potential

Buttonbush Solar Energy Project



SOURCE: Maxar 2023; Open Street Maps 2023; CDFW 2024

DUDEK

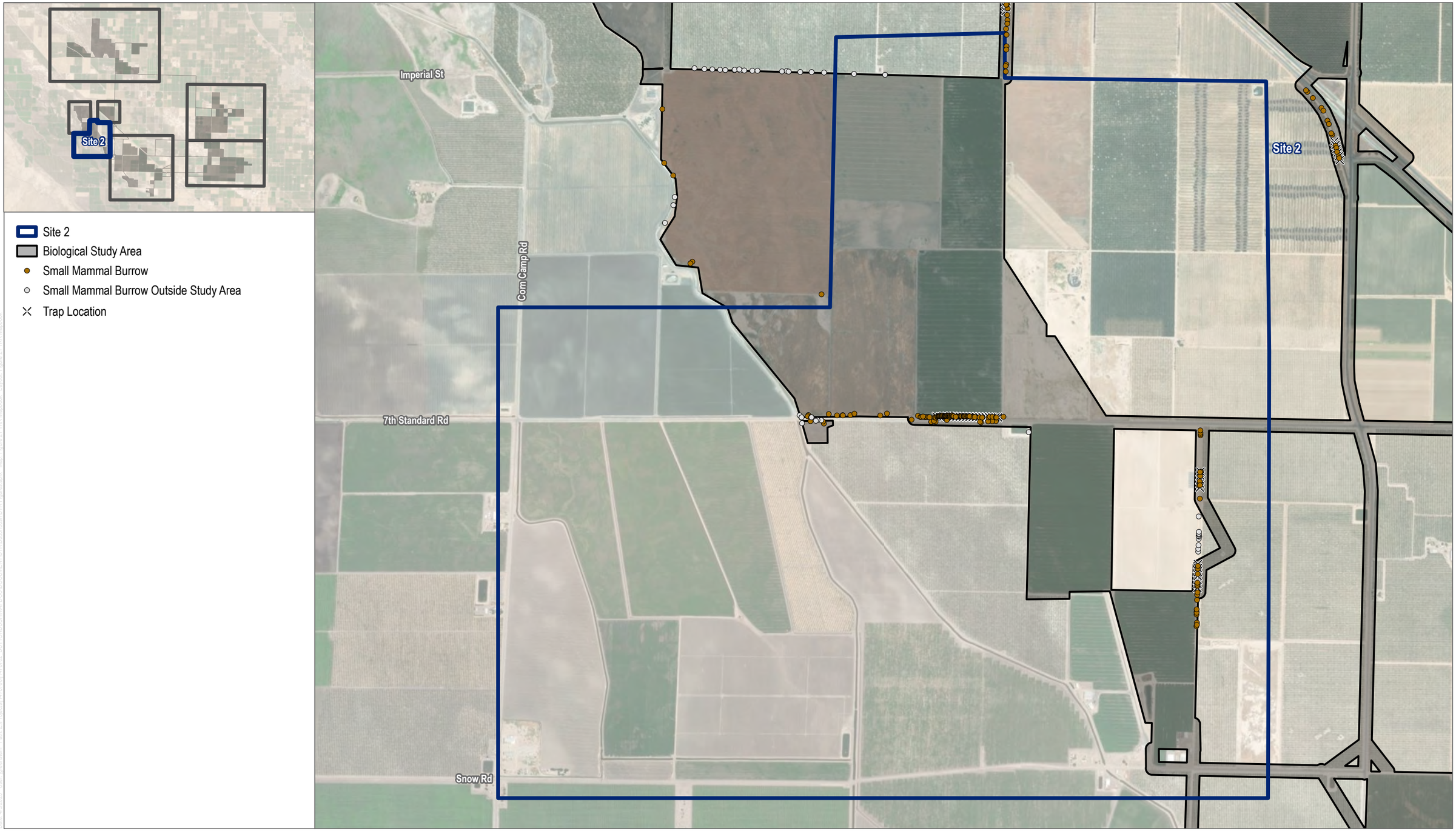
N

0 1,000 2,000 Feet

FIGURE 21A

Site 1: Tipton Kangaroo Rat Wildlife Potential

Buttonbush Solar Energy Project



SOURCE: Maxar 2023; Open Street Maps 2023; CDFW 2024

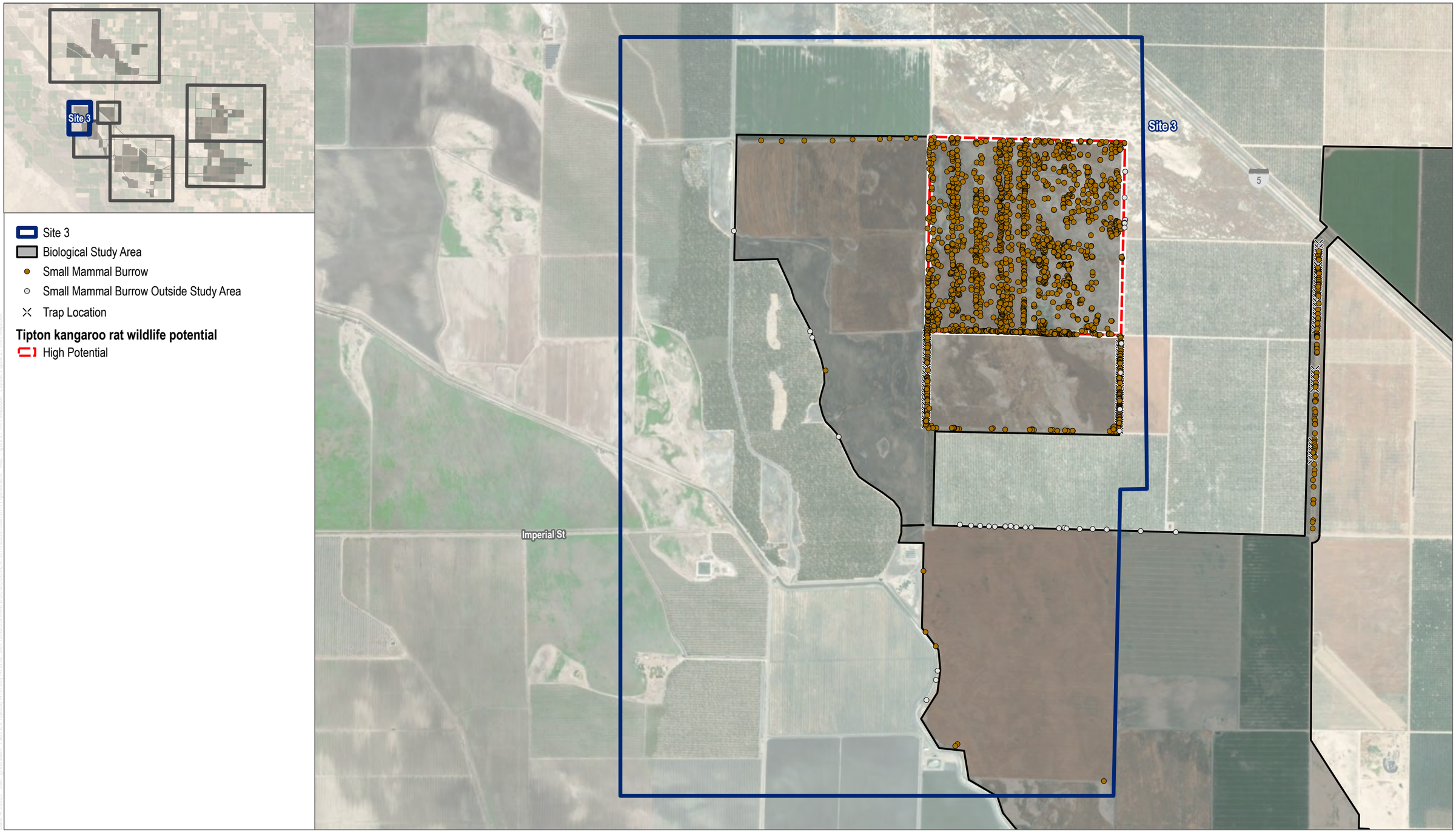
DUDEK

0 500 1,000 Feet

FIGURE 21B

Site 2: Tipton Kangaroo Rat Wildlife Potential

Buttonbush Solar Energy Project



SOURCE: Maxar 2023; Open Street Maps 2023; CDFW 2024

FIGURE 21C

Site 3: Tipton Kangaroo Rat Wildlife Potential

Buttonbush Solar Energy Project

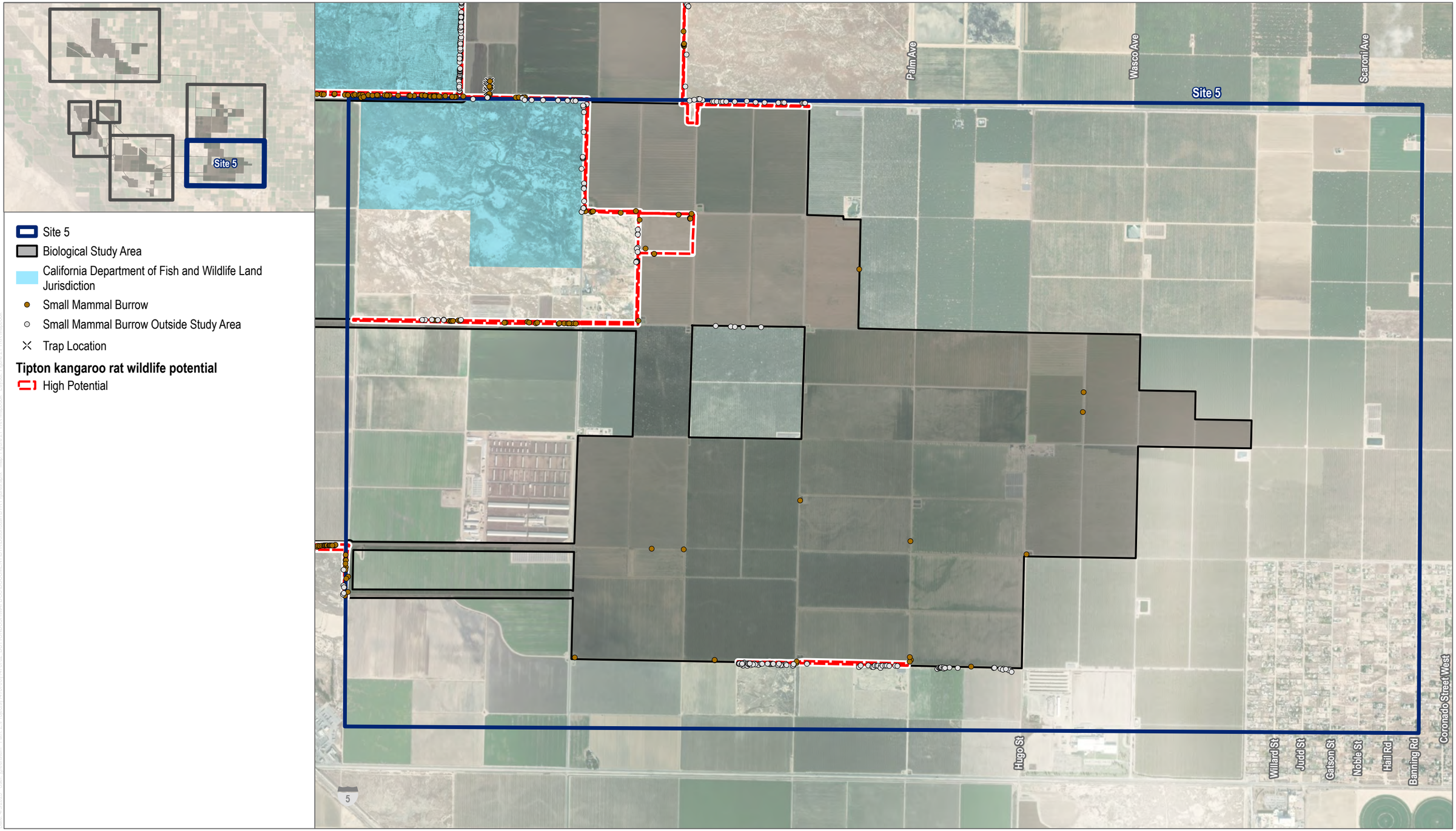


SOURCE: Maxar 2023; Open Street Maps 2023; CDFW 2024

FIGURE 21D

Site 4: Tipton Kangaroo Rat Wildlife Potential

Buttonbush Solar Energy Project



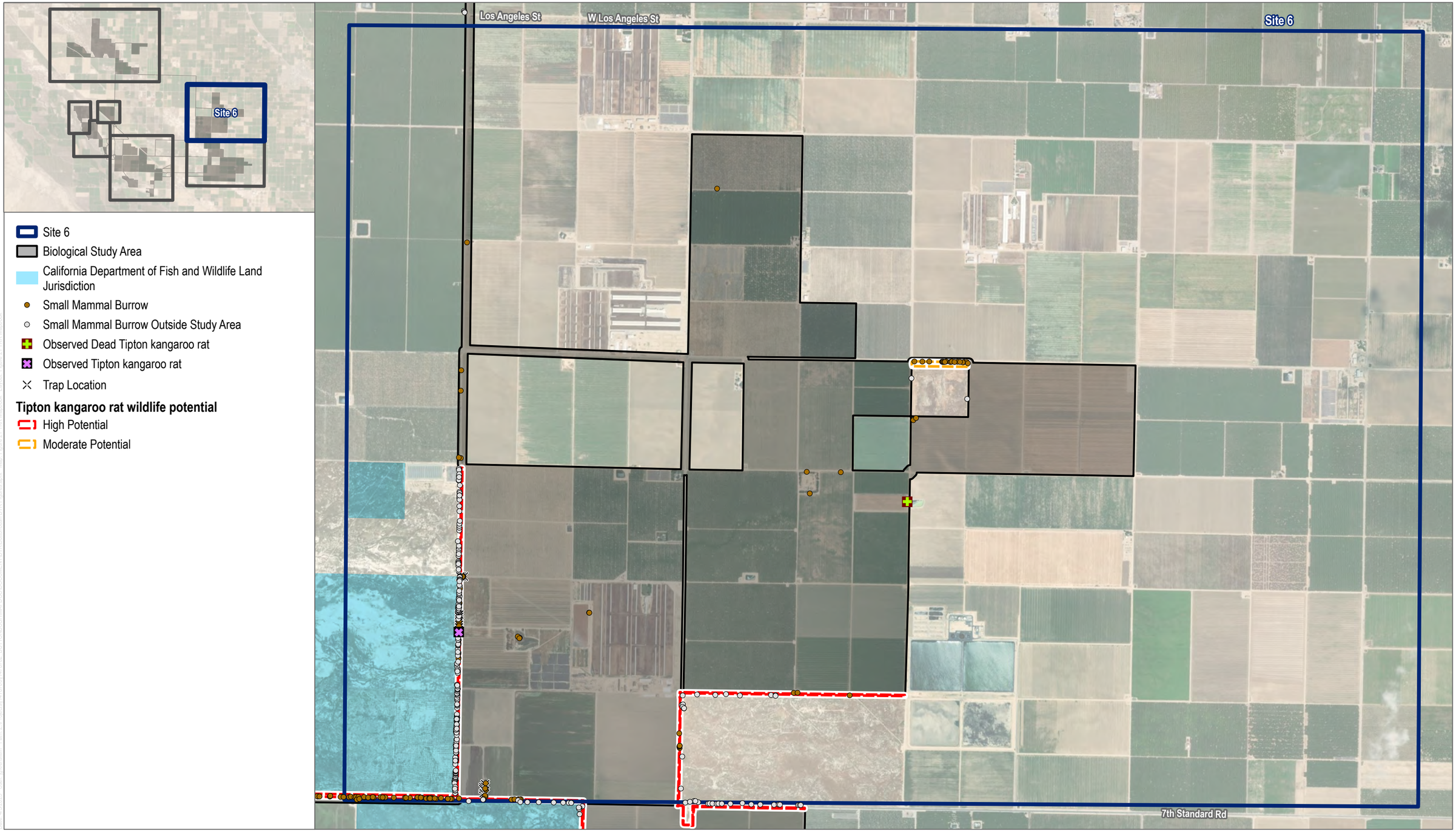
SOURCE: Maxar 2023; Open Street Maps 2023; CDFW 2024

FIGURE 21E

Site 5: Tipton Kangaroo Rat Wildlife Potential

Buttonbush Solar Energy Project

DUDEK



SOURCE: Maxar 2023; Open Street Maps 2023; CDFW 2024

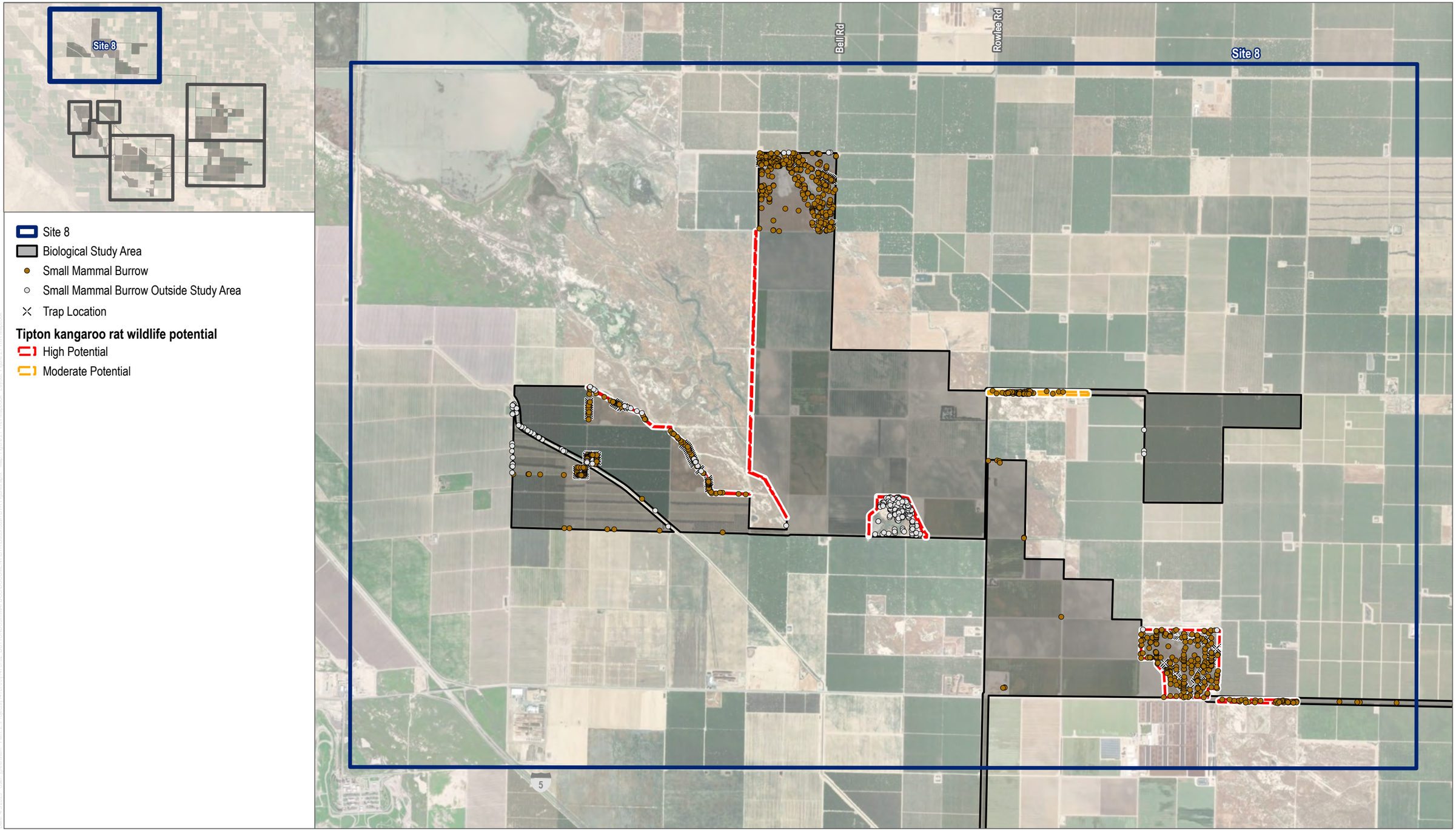
DUDEK

0 1,000 2,000 Feet

FIGURE 21F

Site 6: Tipton Kangaroo Rat Wildlife Potential

Buttonbush Solar Energy Project



SOURCE: Maxar 2023; Open Street Maps 2023; CDFW 2024

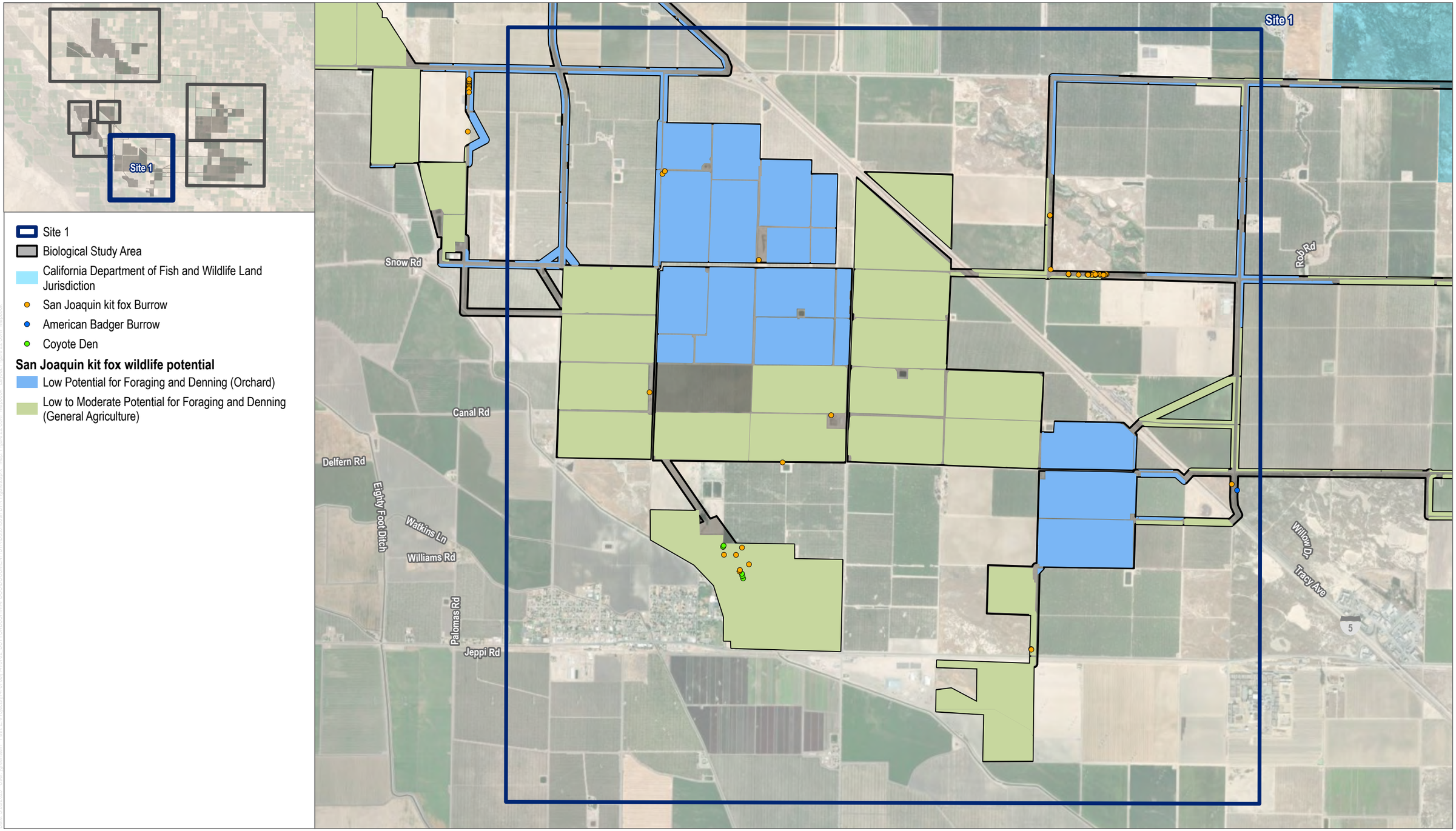
DUDEK

0 1,250 2,500 Feet

FIGURE 21G

Site 8: Tipton Kangaroo Rat Wildlife Potential

Buttonbush Solar Energy Project



SOURCE: Maxar 2023; Open Street Maps 2023; CDFW 2024

DUDEK

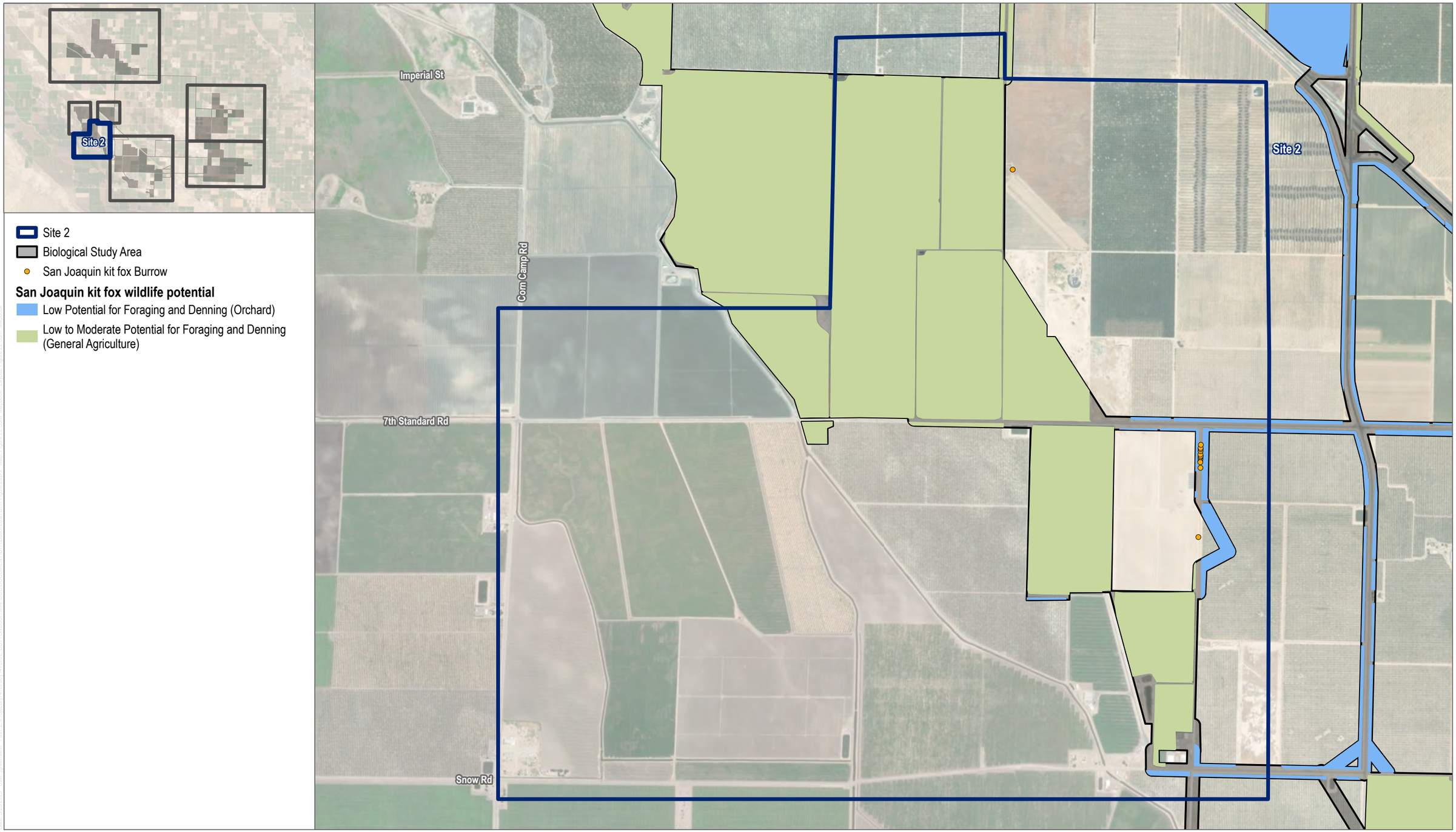
N

0 1,000 2,000 Feet

FIGURE 22A

Site 1: San Joaquin Kit Fox Wildlife Potential

Buttonbush Solar Energy Project



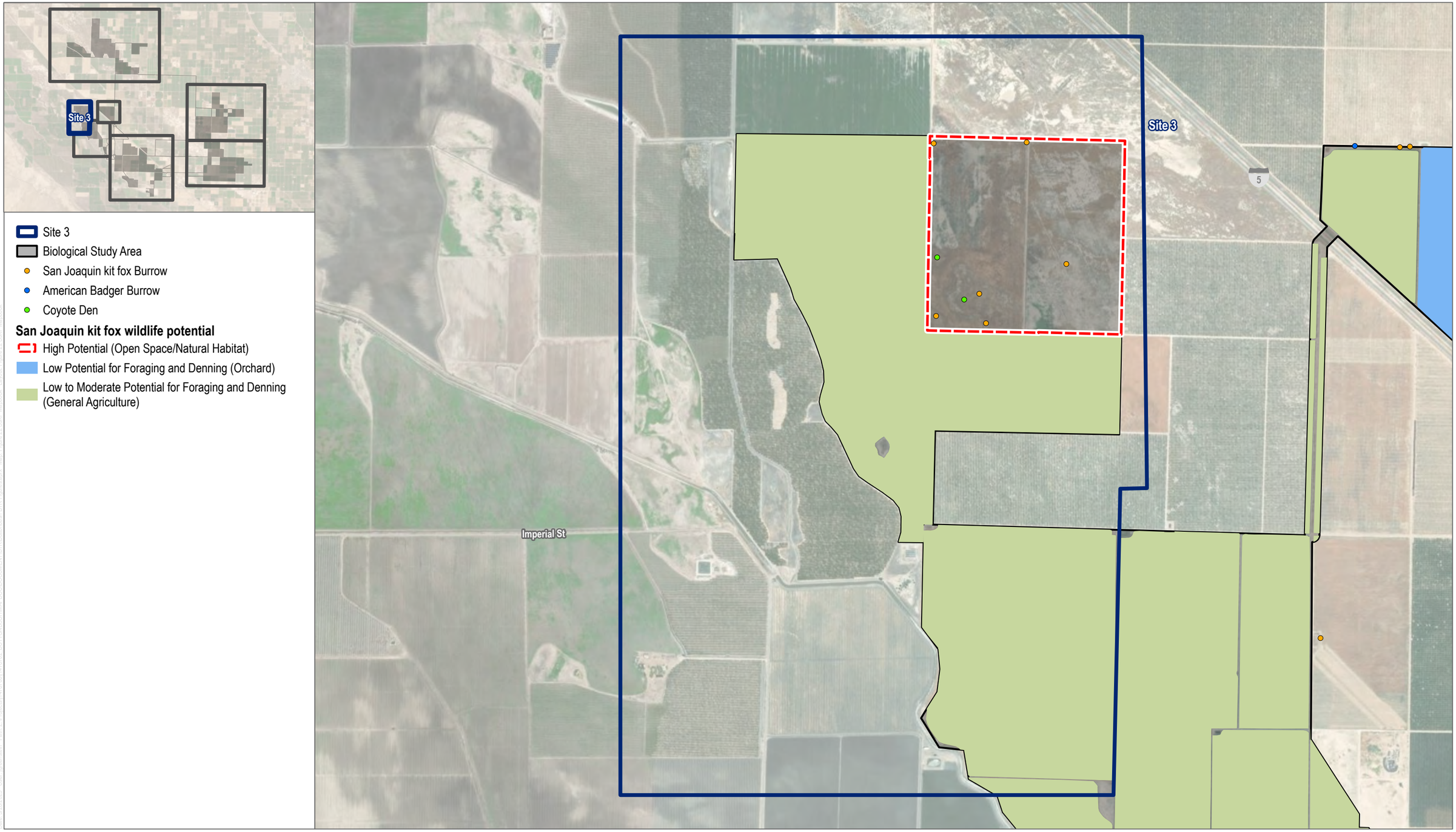
SOURCE: Maxar 2023; Open Street Maps 2023; CDFW 2024

DUDEK

FIGURE 22B

Site 2: San Joaquin Kit Fox Wildlife Potential

Buttonbush Solar Energy Project



SOURCE: Maxar 2023; Open Street Maps 2023; CDFW 2024

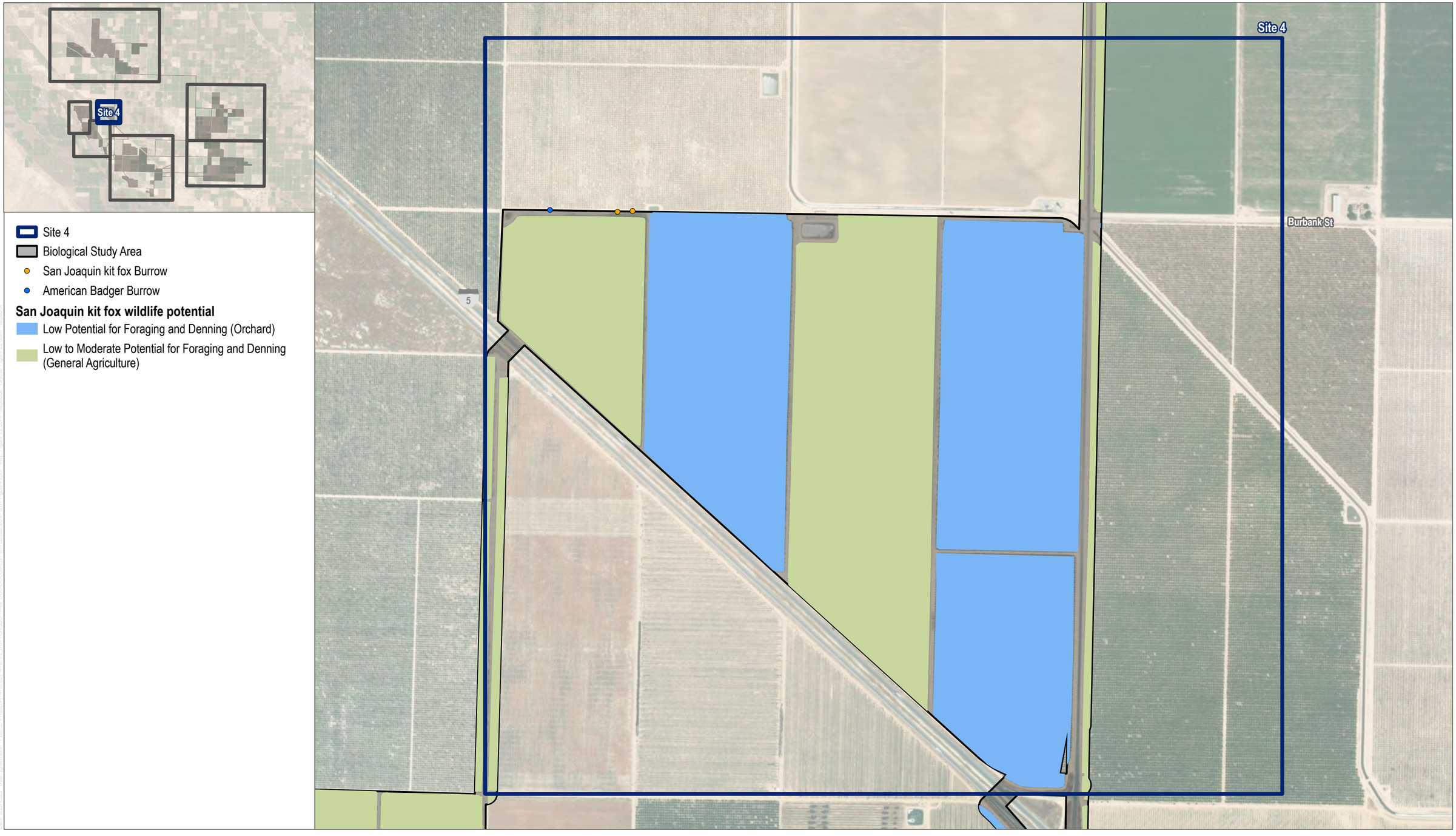
DUDEK

0 500 1,000 Feet

FIGURE 22C

Site 3: San Joaquin Kit Fox Wildlife Potential

Buttonbush Solar Energy Project



SOURCE: Maxar 2023; Open Street Maps 2023; CDFW 2024

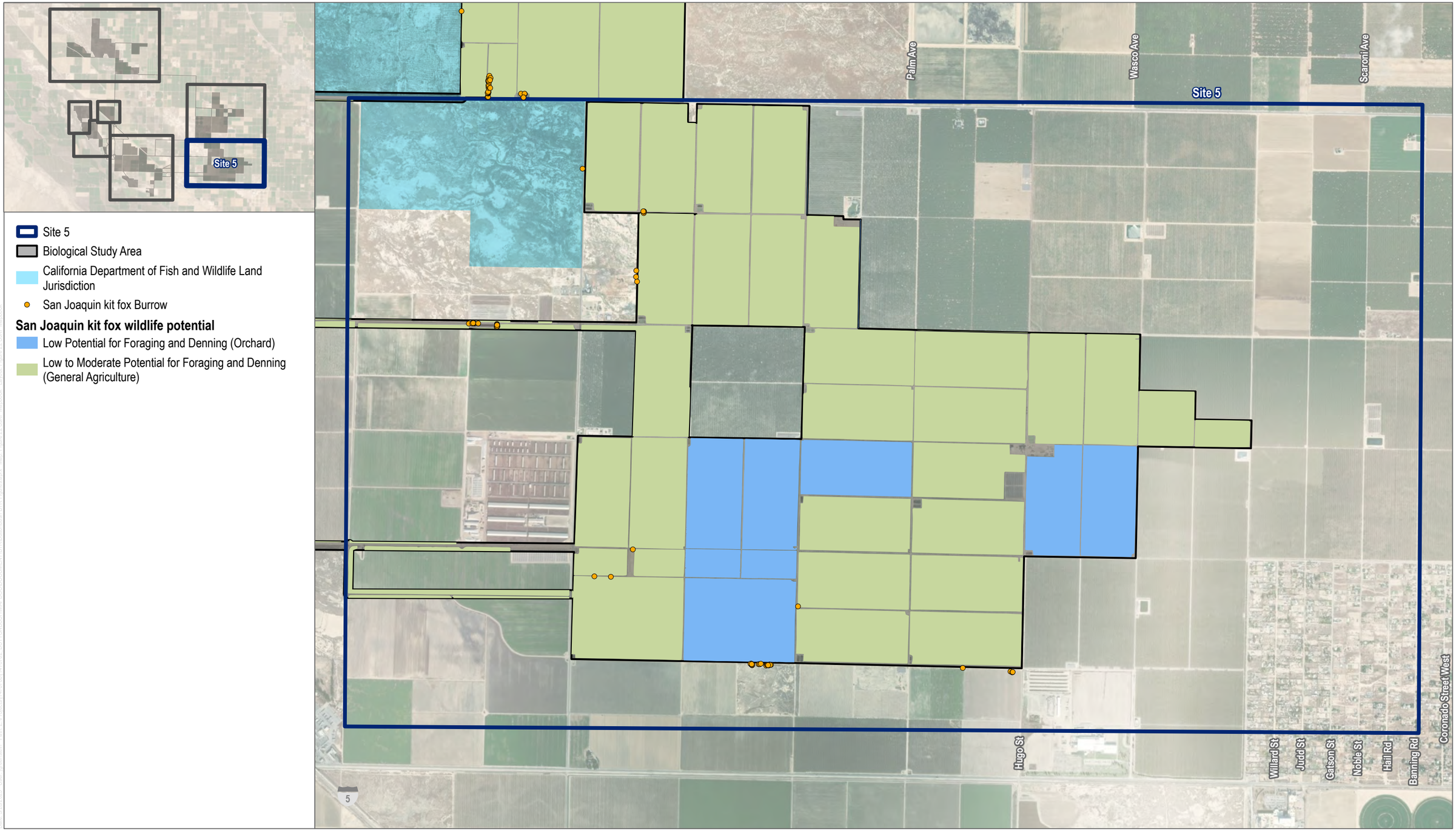
DUDEK

0 400 800 Feet

FIGURE 22D

Site 4: San Joaquin Kit Fox Wildlife Potential

Buttonbush Solar Energy Project



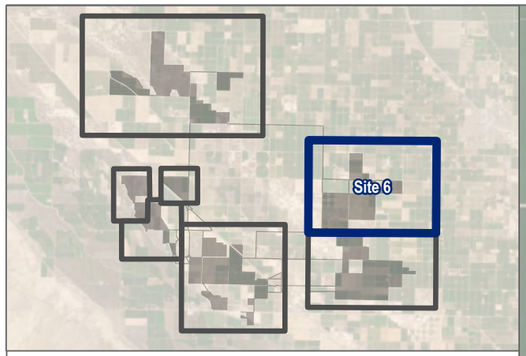
SOURCE: Maxar 2023; Open Street Maps 2023; CDFW 2024

DUDEK

FIGURE 22E

Site 5: San Joaquin Kit Fox Wildlife Potential

Buttonbush Solar Energy Project



Site 6

Biological Study Area

California Department of Fish and Wildlife Land Jurisdiction

San Joaquin kit fox Burrow

American Badger Burrow

San Joaquin kit fox wildlife potential

Low Potential for Foraging and Denning (Orchard)

Low to Moderate Potential for Foraging and Denning (General Agriculture)

SOURCE: Maxar 2023; Open Street Maps 2023; CDFW 2024

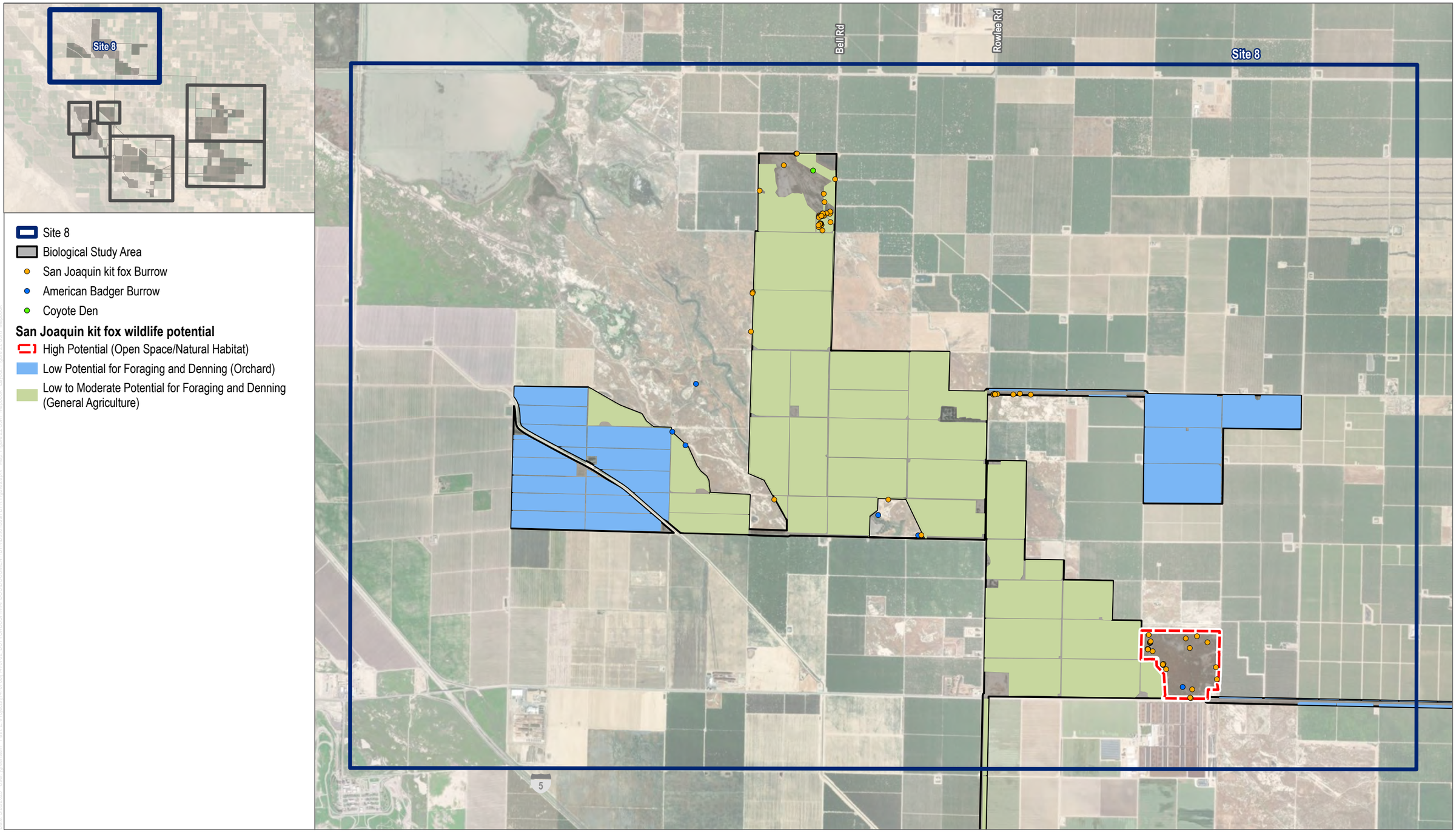
DUDEK

0 1,000 2,000 Feet

FIGURE 22F

Site 6: San Joaquin Kit Fox Wildlife Potential

Buttonbush Solar Energy Project



SOURCE: Maxar 2023; Open Street Maps 2023; CDFW 2024

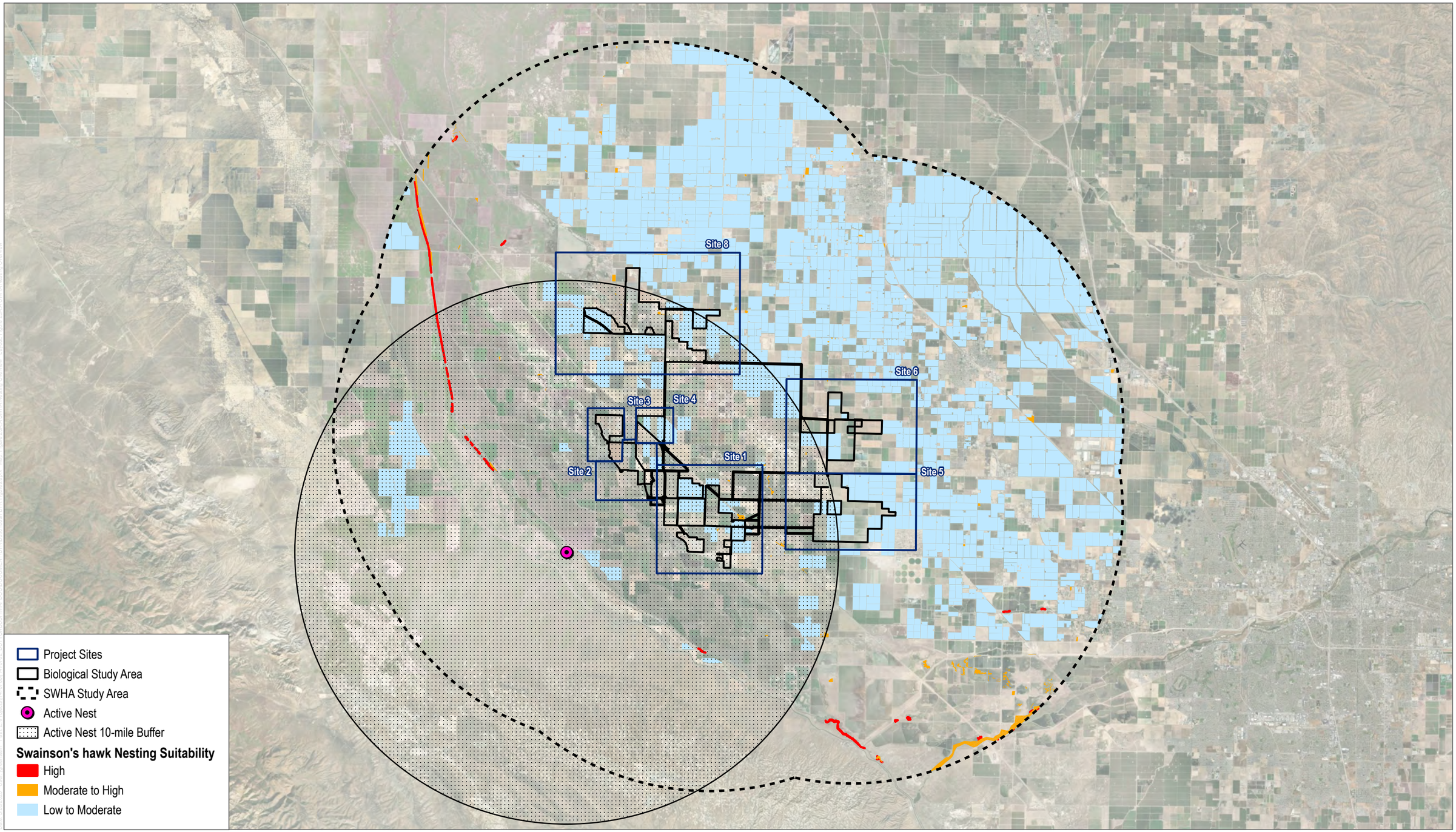
DUDEK

0 1,250 2,500 Feet

FIGURE 22G

Site 8: San Joaquin Kit Fox Wildlife Potential

Buttonbush Solar Energy Project



SOURCE: Maxar 2023; Open Street Maps 2023

DUDEK

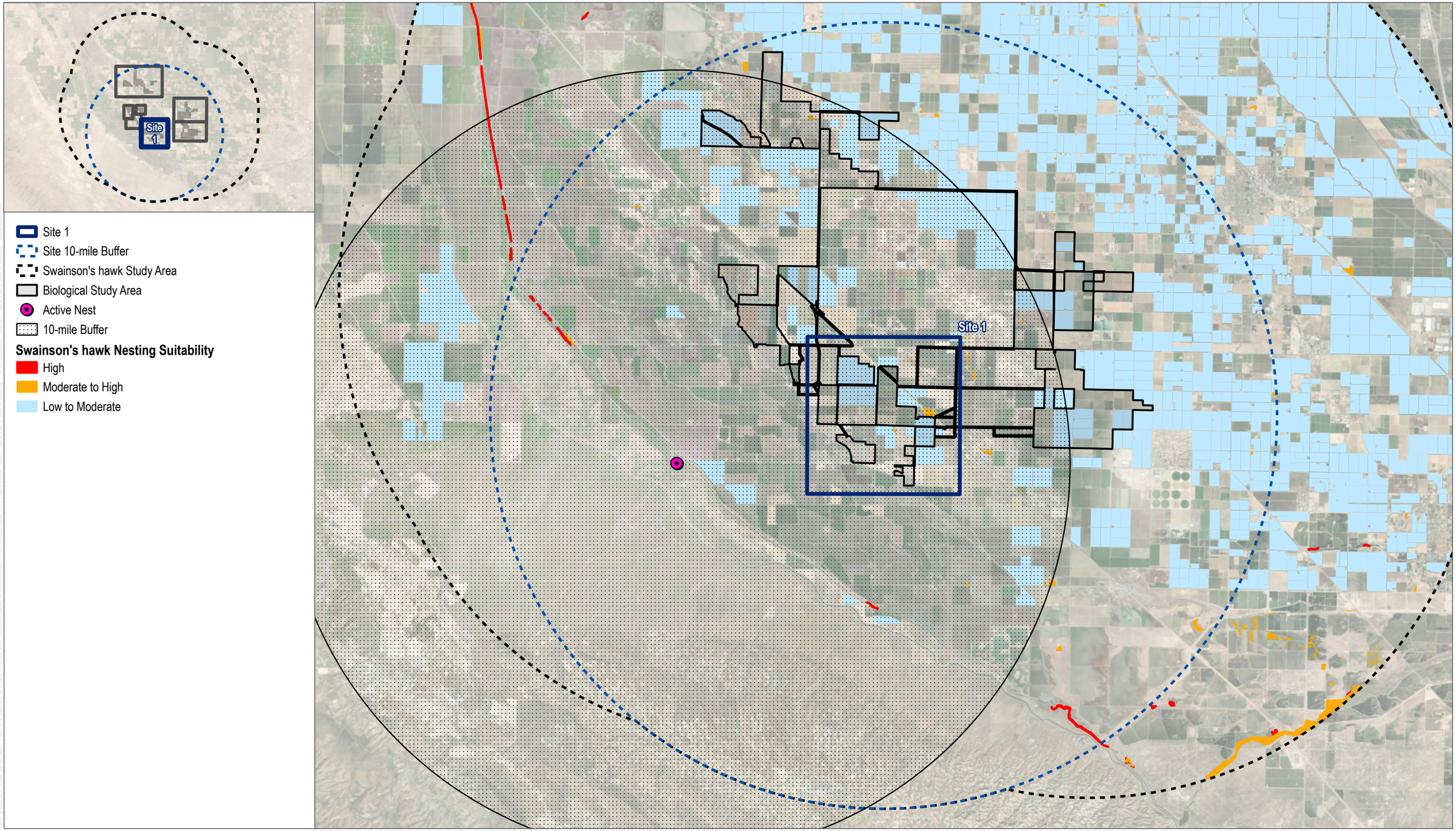
N

0 10,000 20,000 Feet

FIGURE 23A.A

Swainson's Hawk Nesting Suitability Overview

Buttonbush Solar Energy Project



SOURCE: Maxar 2023

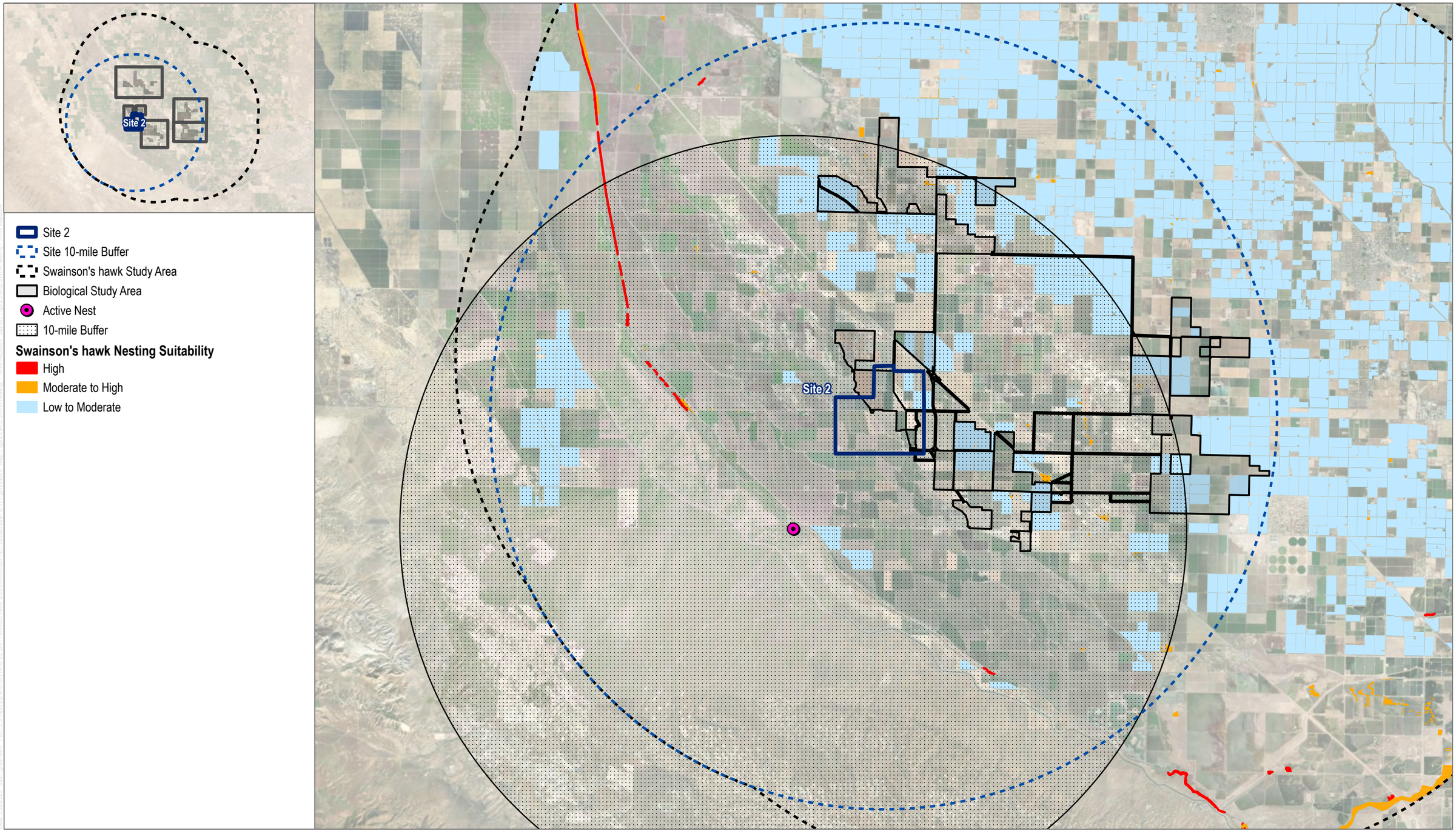
DUDEK

0 5,000 10,000 Feet

FIGURE 23A.B

Site 1: Swainson's Hawk Nesting Suitability

Buttonbush Solar Energy Project



SOURCE: Maxar 2023

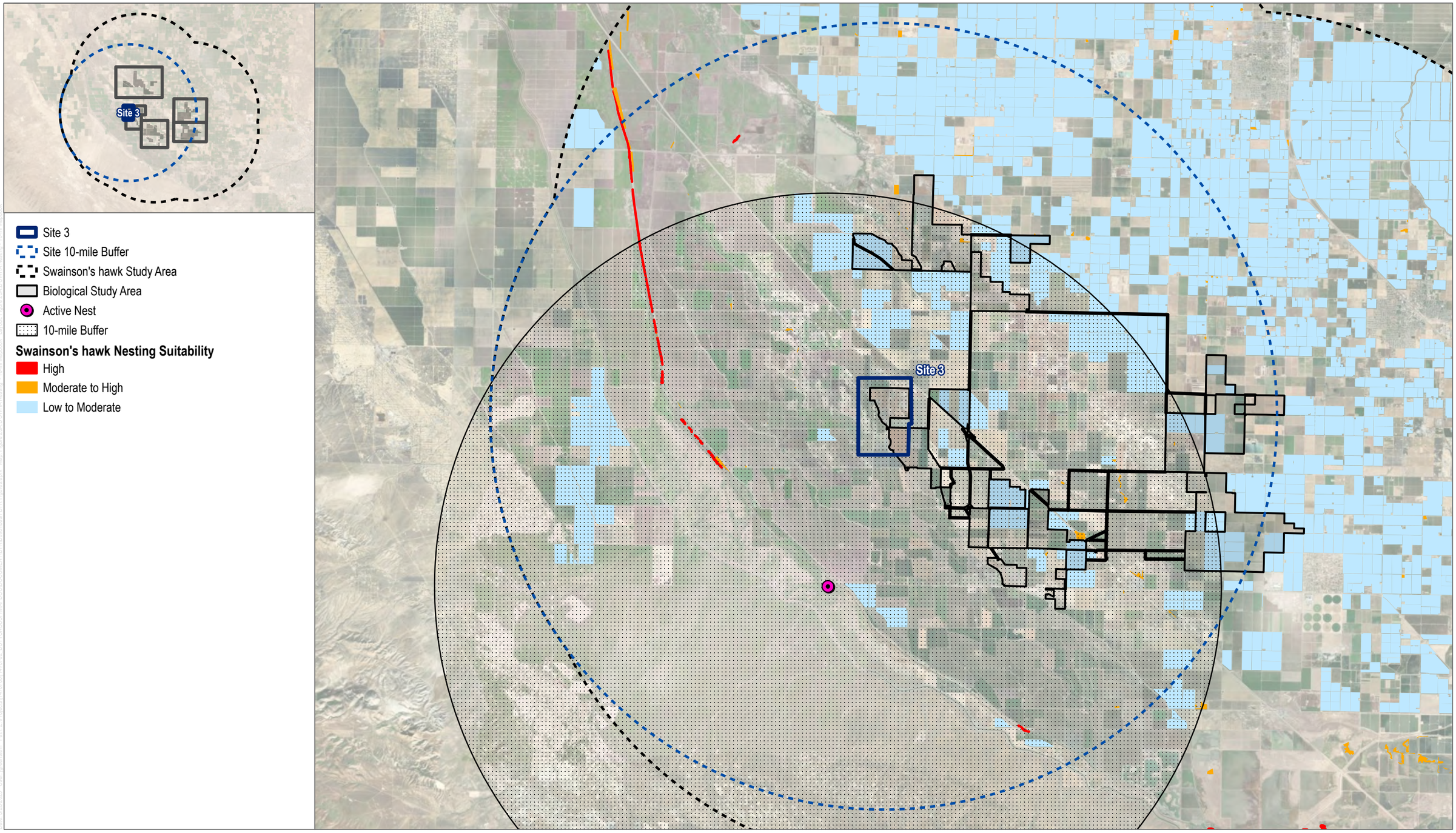
DUDEK

0 5,000 10,000 Feet

FIGURE 23A.C

Site 2: Swainson's Hawk Nesting Suitability

Buttonbush Solar Energy Project



SOURCE: Maxar 2023

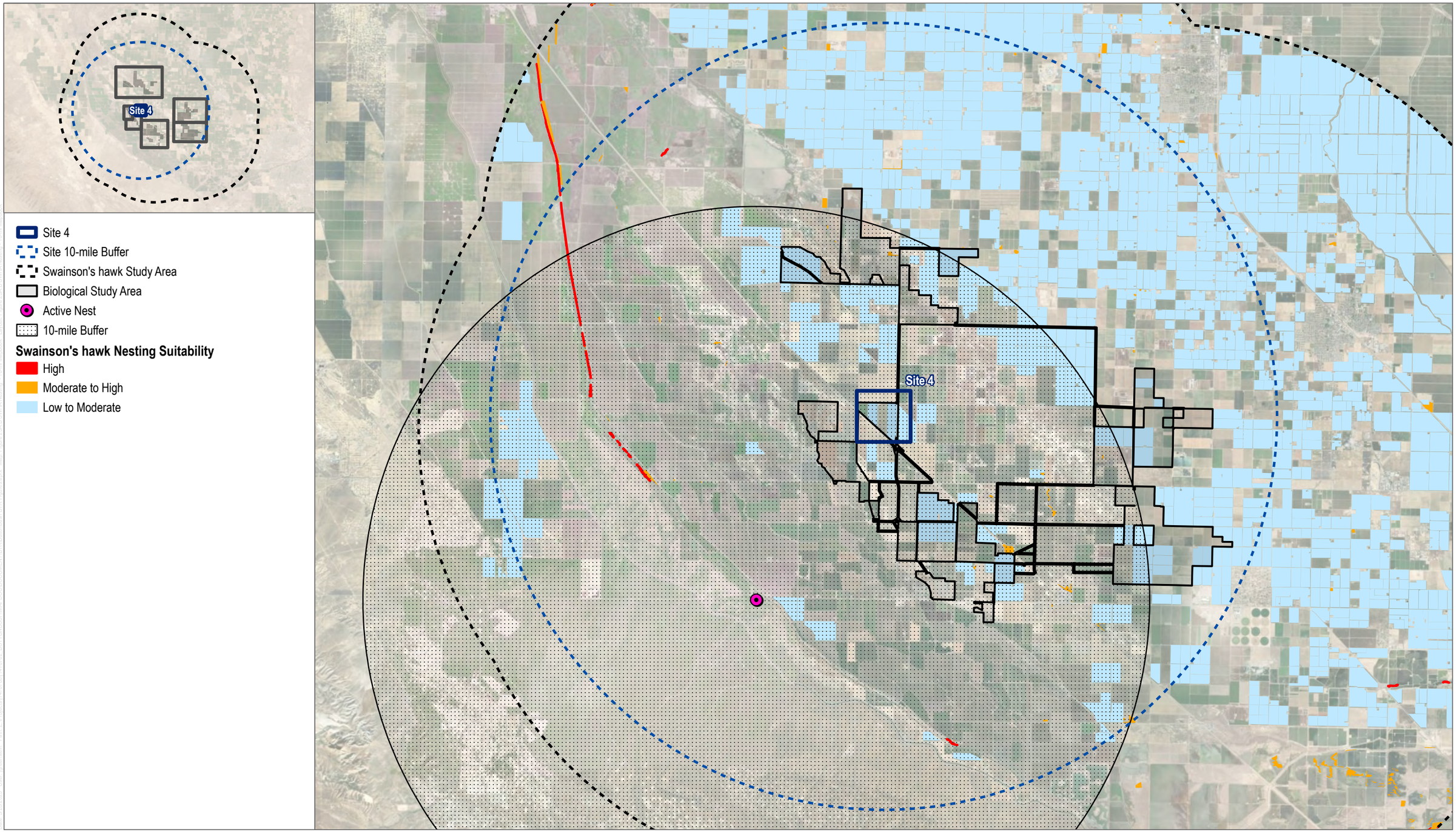
DUDEK

0 5,000 10,000 Feet

FIGURE 23A.D

Site 3: Swainson's Hawk Nesting Suitability

Buttonbush Solar Energy Project



SOURCE: Maxar 2023

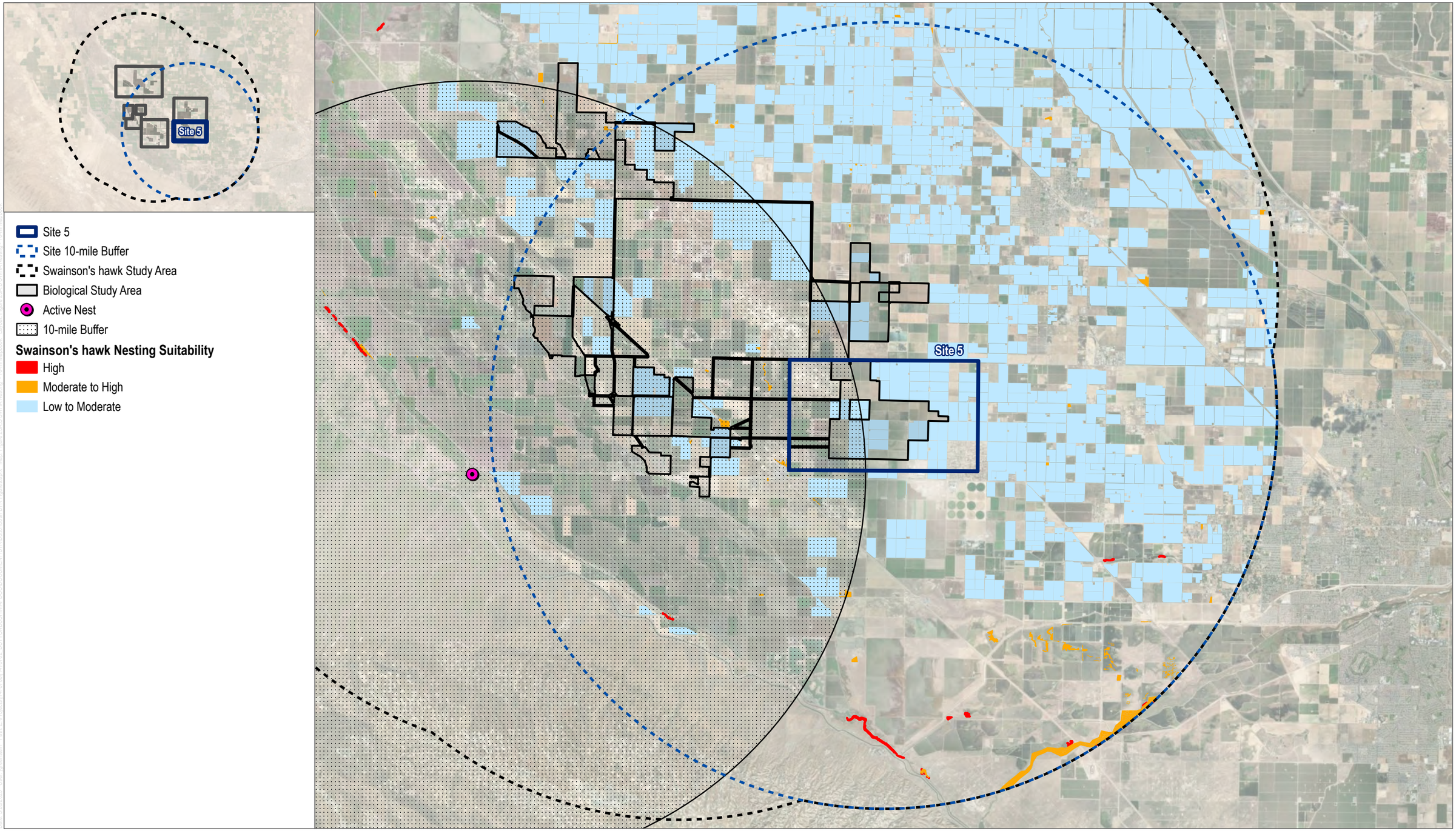
DUDEK

0 5,000 10,000 Feet

FIGURE 23A.E

Site 4: Swainson's Hawk Nesting Suitability

Buttonbush Solar Energy Project



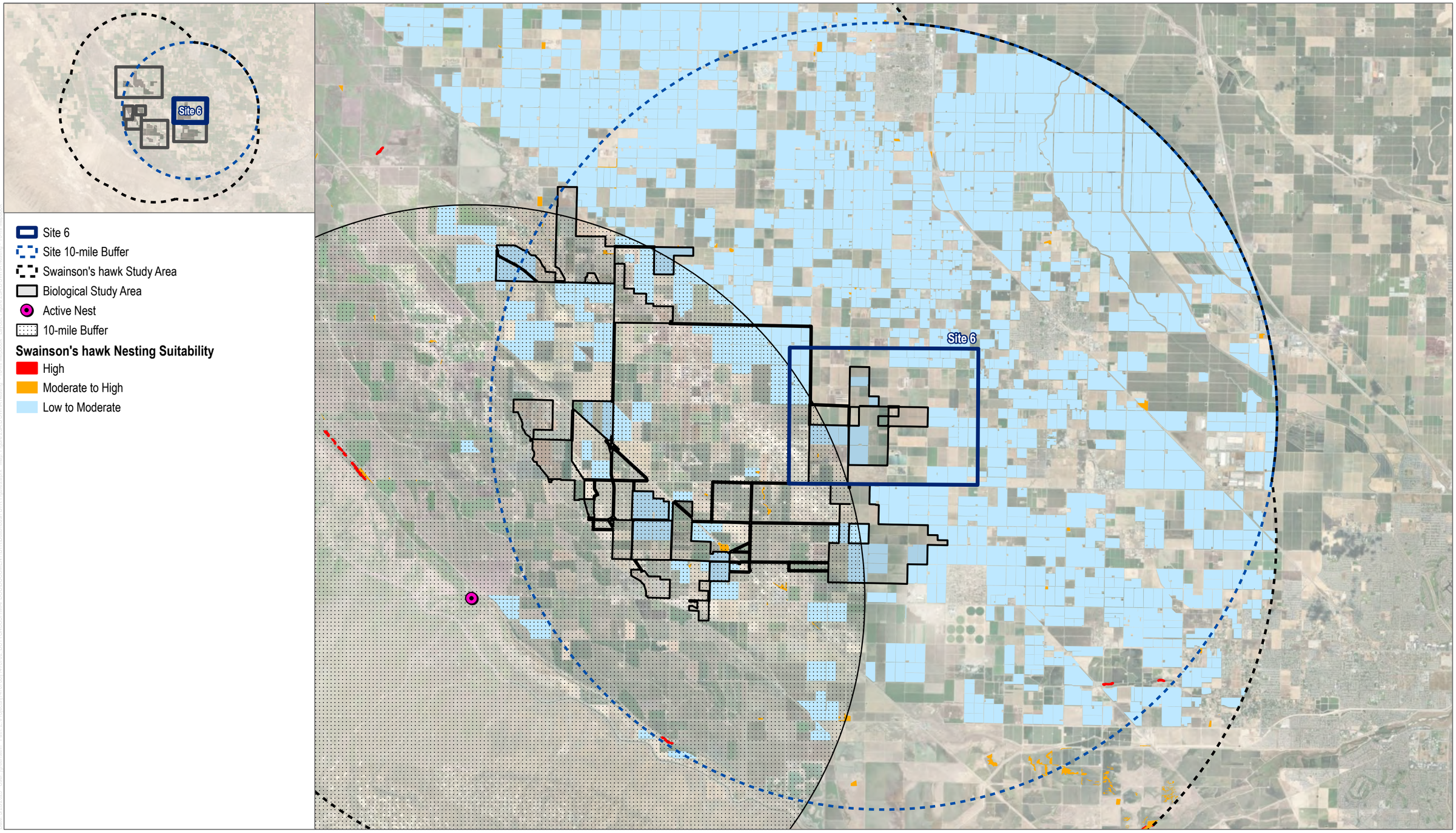
SOURCE: Maxar 2023

DUDEK

FIGURE 23A.F

Site 5: Swainson's Hawk Nesting Suitability

Buttonbush Solar Energy Project



SOURCE: Maxar 2023

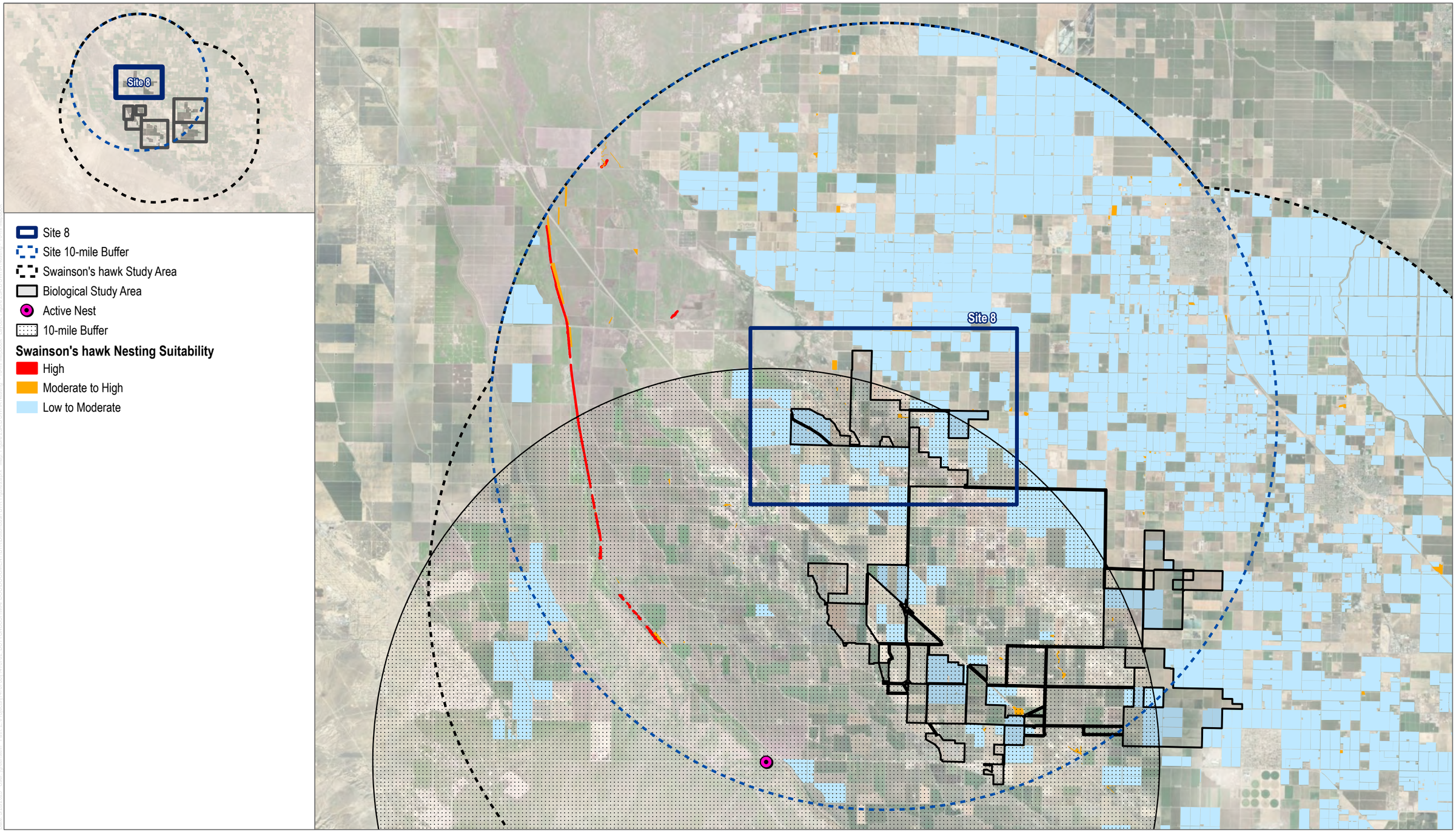
DUDEK

0 5,000 10,000 Feet

FIGURE 23A.G

Site 6: Swainson's Hawk Nesting Suitability

Buttonbush Solar Energy Project



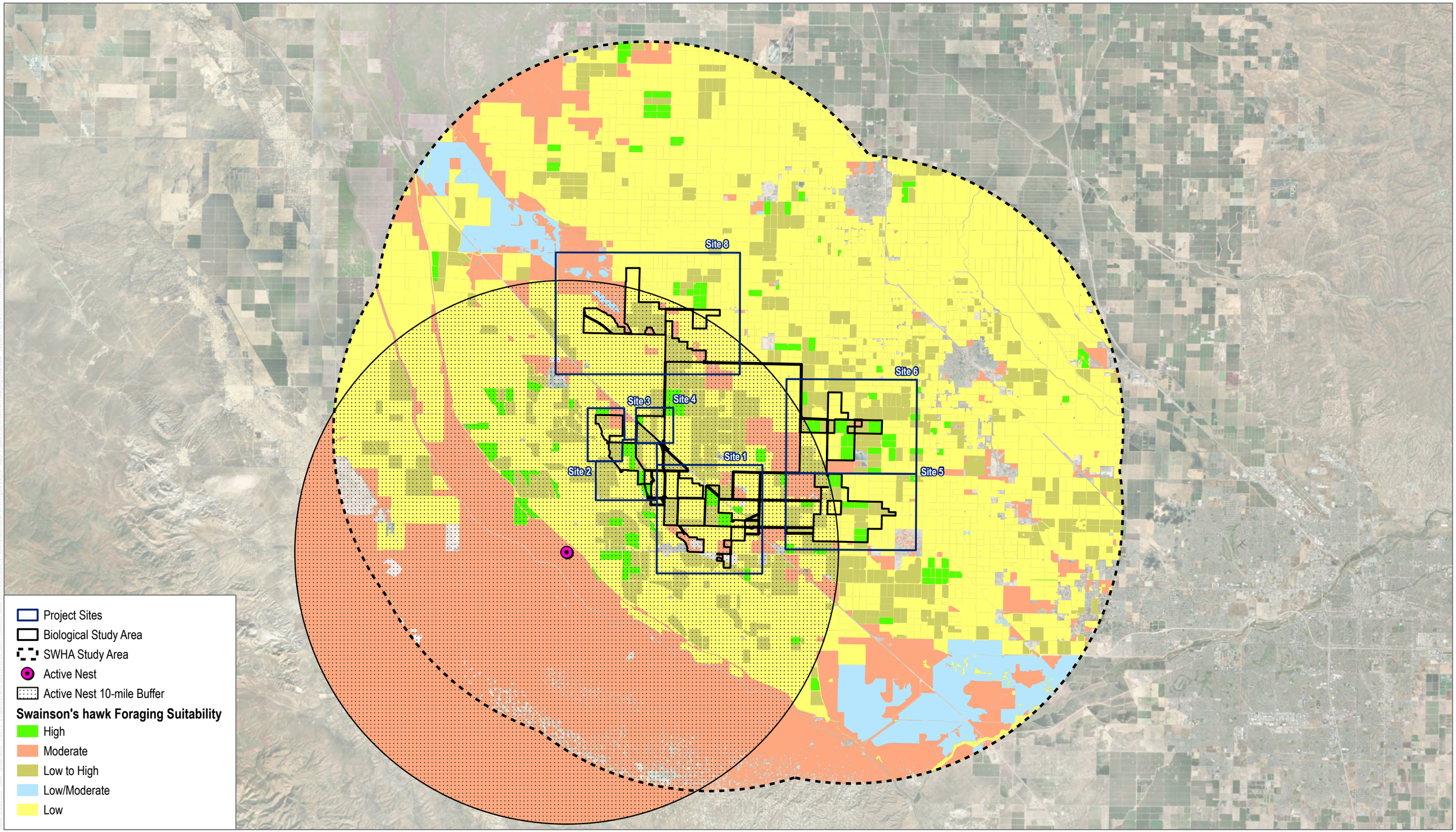
SOURCE: Maxar 2023

DUDEK

FIGURE 23A.H

Site 8: Swainson's Hawk Nesting Suitability

Buttonbush Solar Energy Project



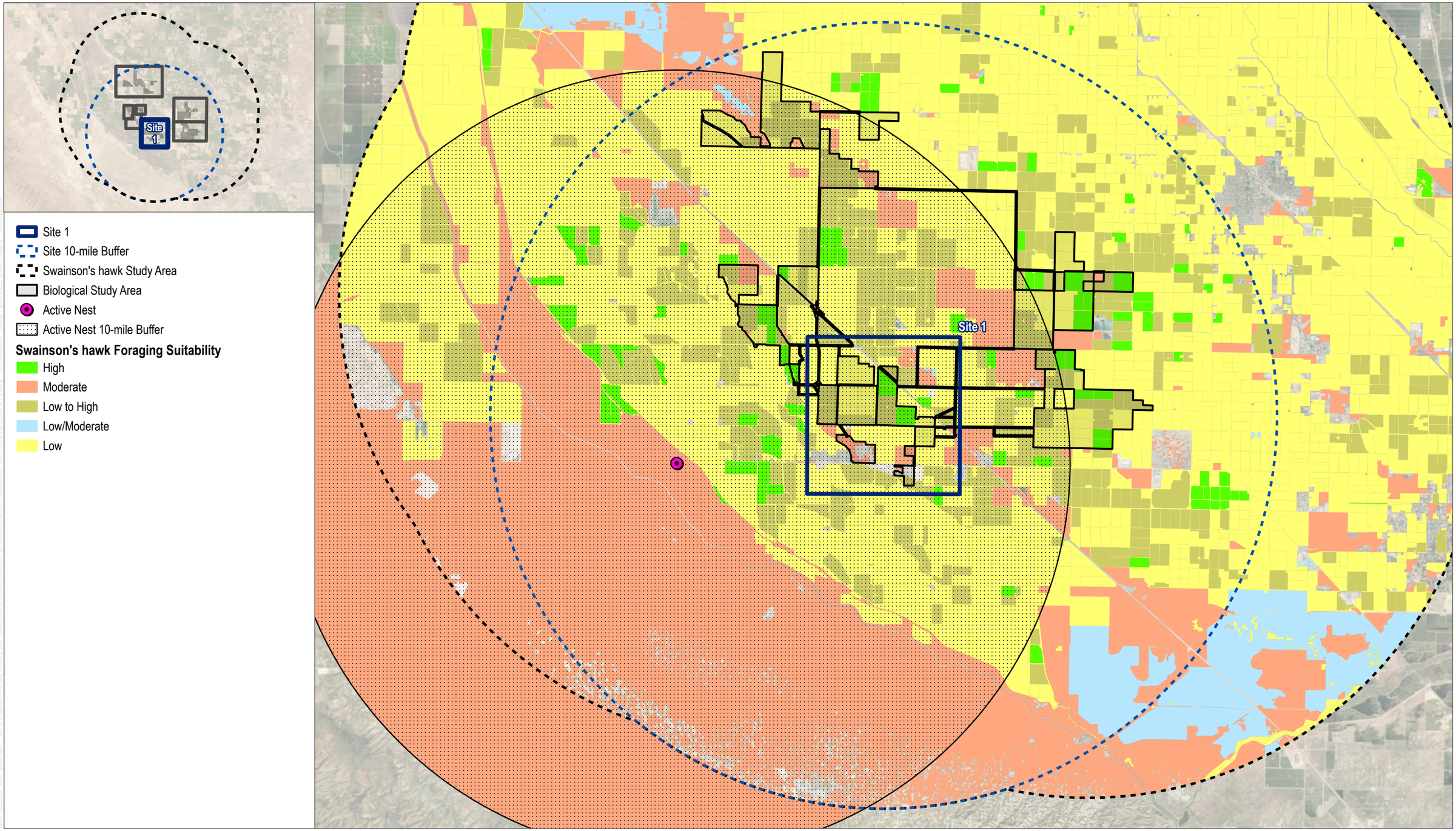
SOURCE: Maxar 2023; Open Street Maps 2023

DUDEK

FIGURE 23B.A

Swainson's Hawk Foraging Suitability Overview

Buttonbush Solar Energy Project



SOURCE: Maxar 2023

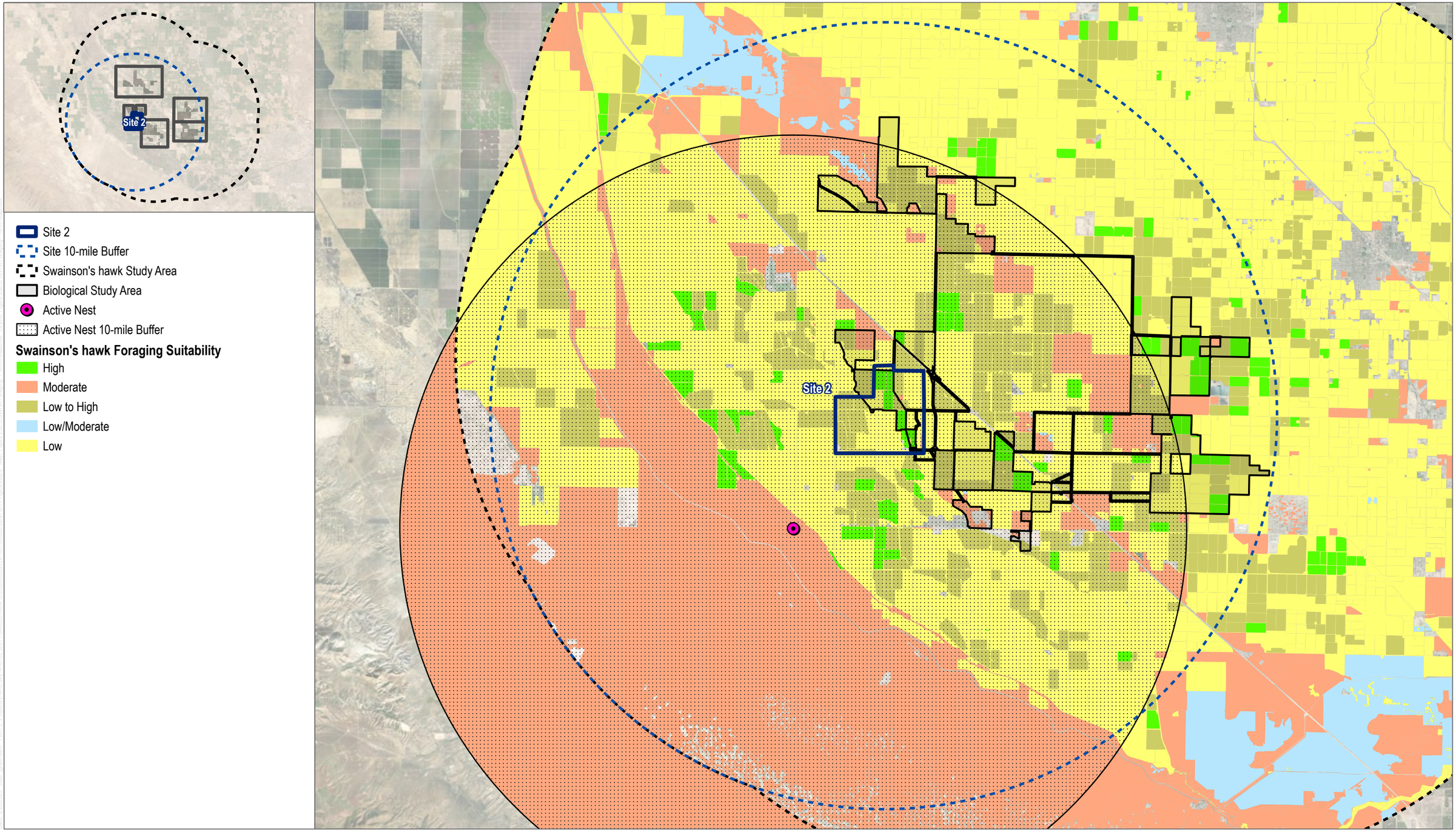
DUDEK

0 5,000 10,000 Feet

FIGURE 23B.B

Site 1: Swainson's Hawk Foraging Suitability

Buttonbush Solar Energy Project



SOURCE: Maxar 2023

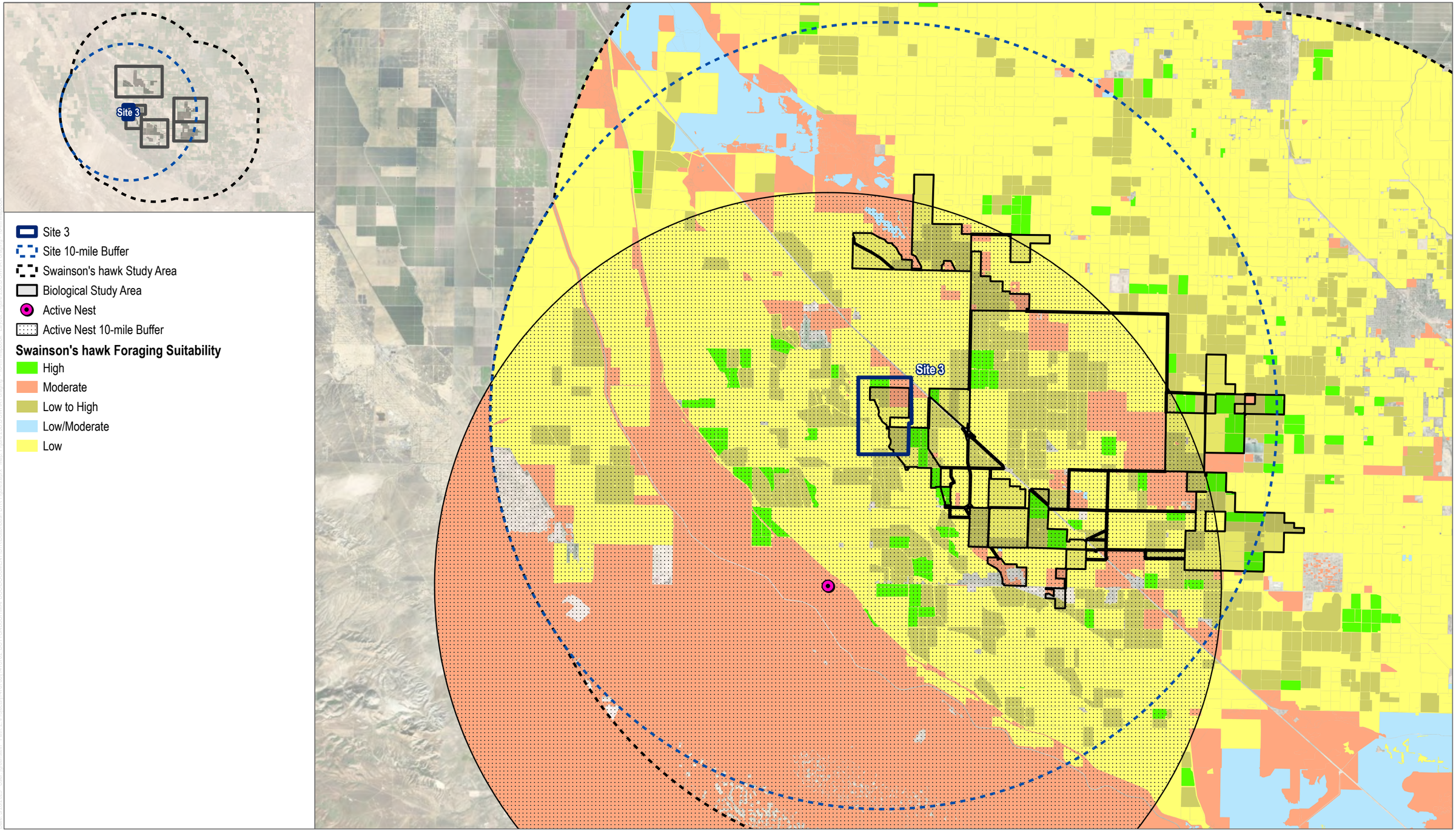
DUDEK

0 5,000 10,000 Feet

FIGURE 23B.C

Site 2: Swainson's Hawk Foraging Suitability

Buttonbush Solar Energy Project



SOURCE: Maxar 2023

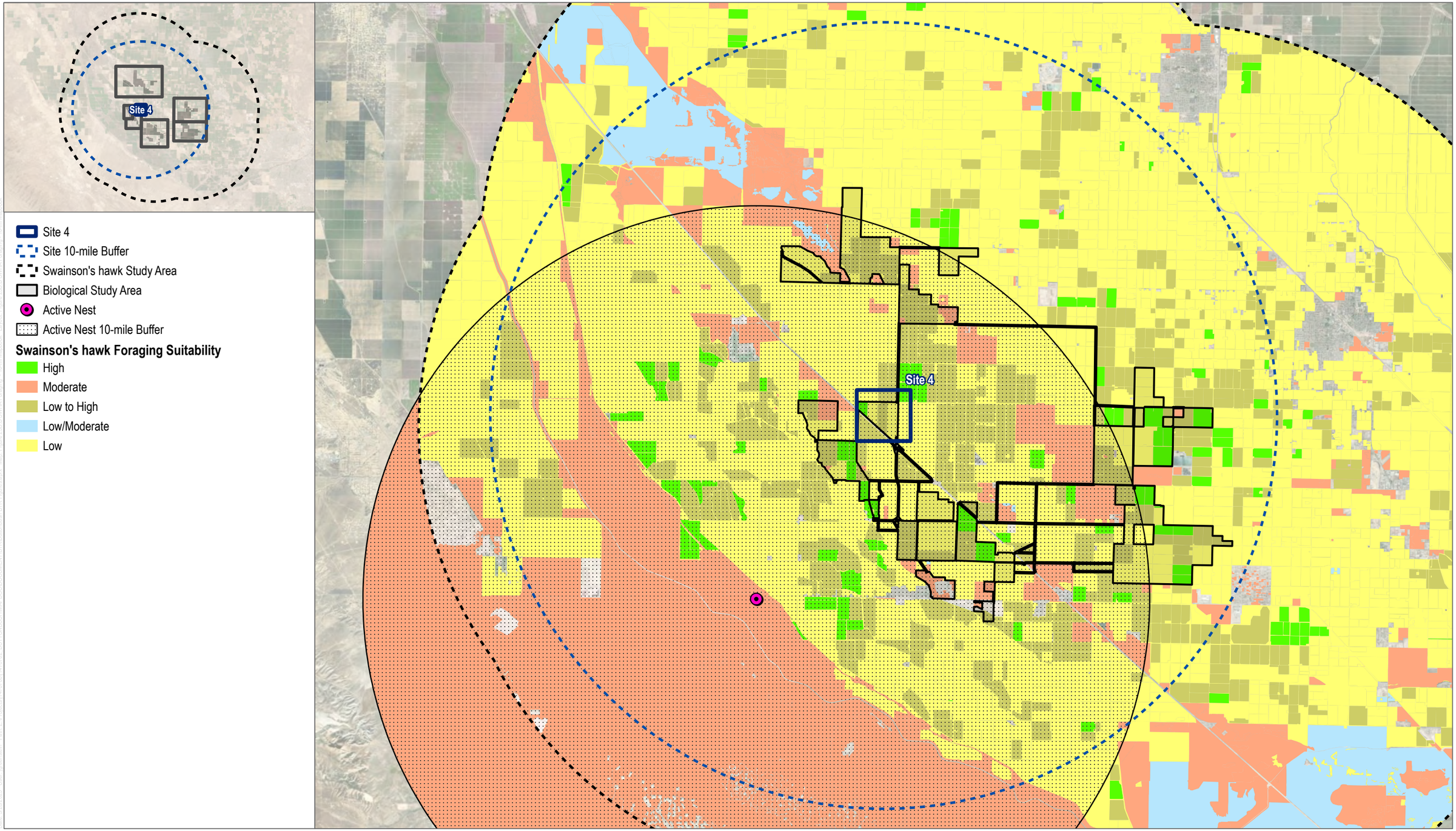
DUDEK

0 5,000 10,000 Feet

FIGURE 23B.D

Site 3: Swainson's Hawk Foraging Suitability

Buttonbush Solar Energy Project



SOURCE: Maxar 2023

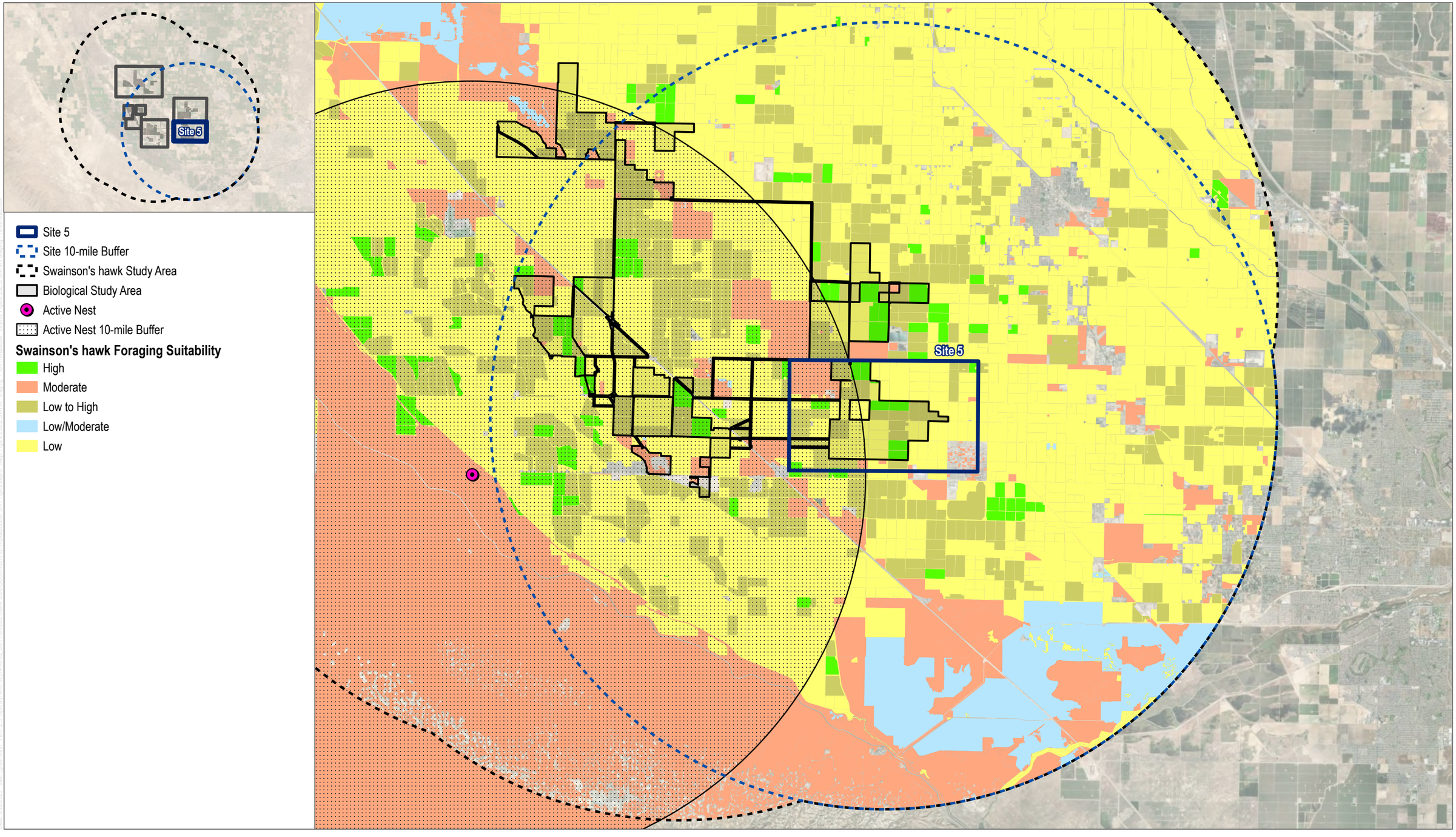
DUDEK

0 5,000 10,000 Feet

FIGURE 23B.E

Site 4: Swainson's Hawk Foraging Suitability

Buttonbush Solar Energy Project



SOURCE: Maxar 2023

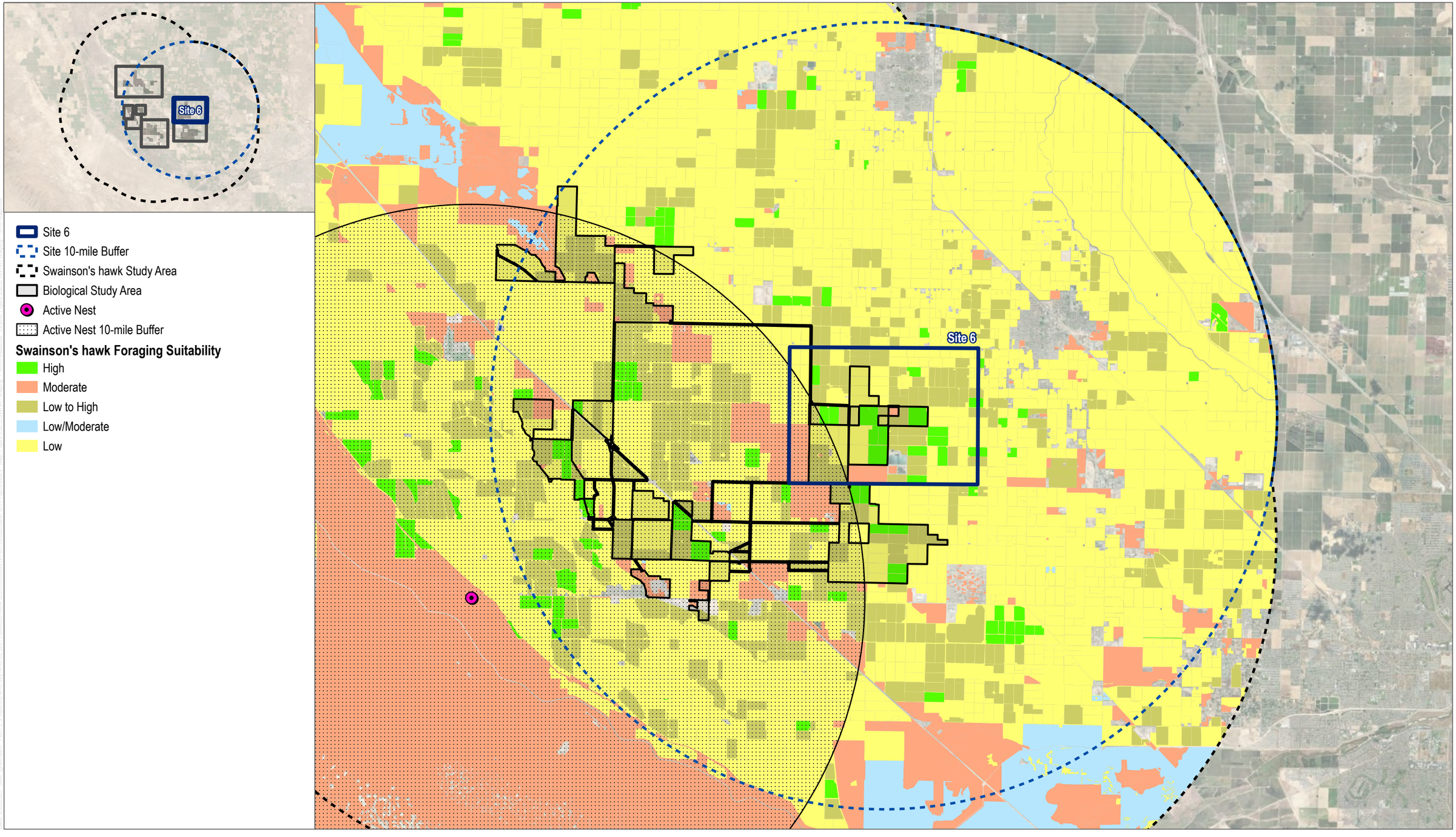
DUDEK

0 5,000 10,000 Feet

FIGURE 23B.F

Site 5: Swainson's Hawk Foraging Suitability

Buttonbush Solar Energy Project



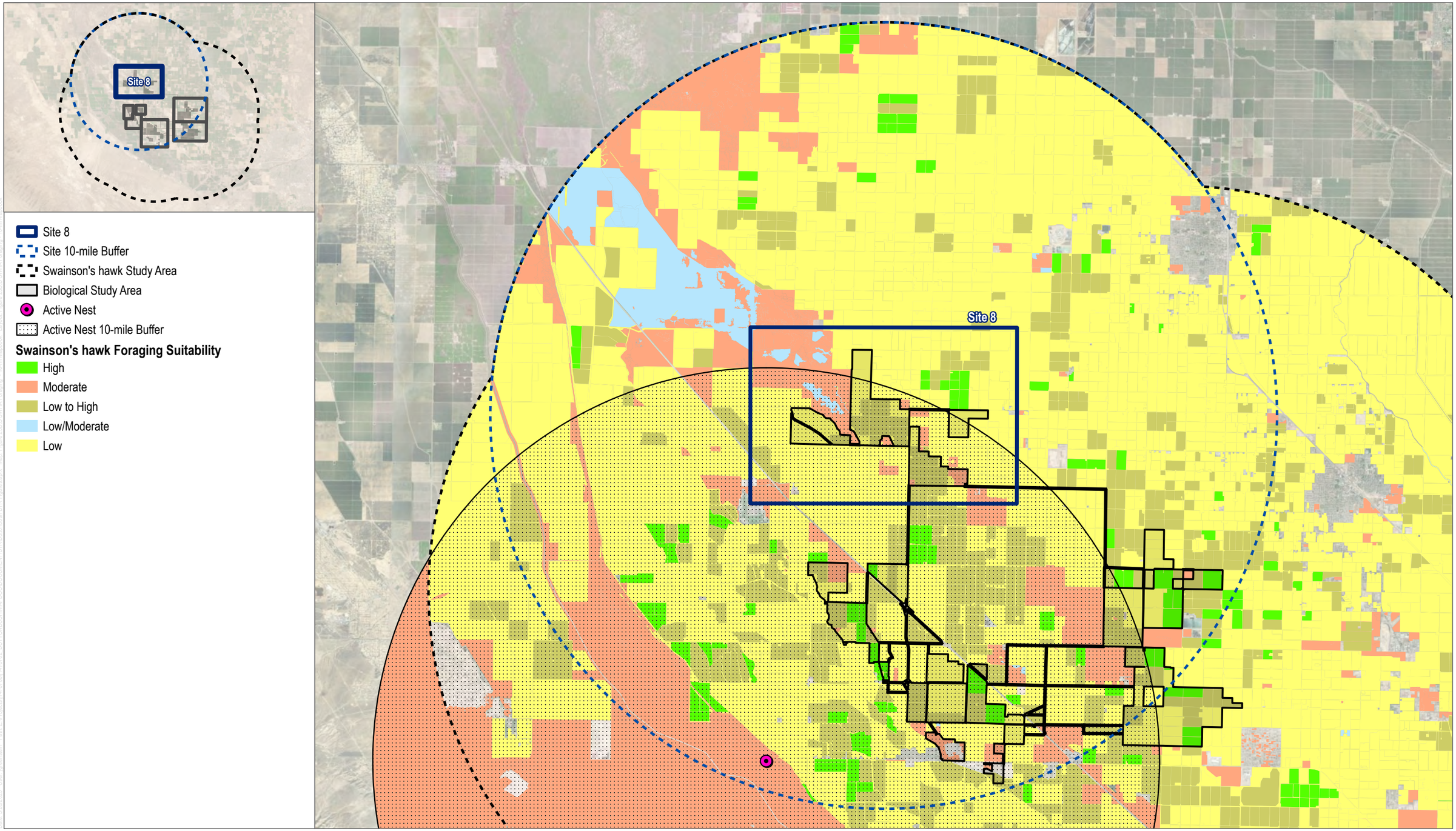
SOURCE: Maxar 2023

DUDEK

FIGURE 23B.G

Site 6: Swainson's Hawk Foraging Suitability

Buttonbush Solar Energy Project



SOURCE: Maxar 2023

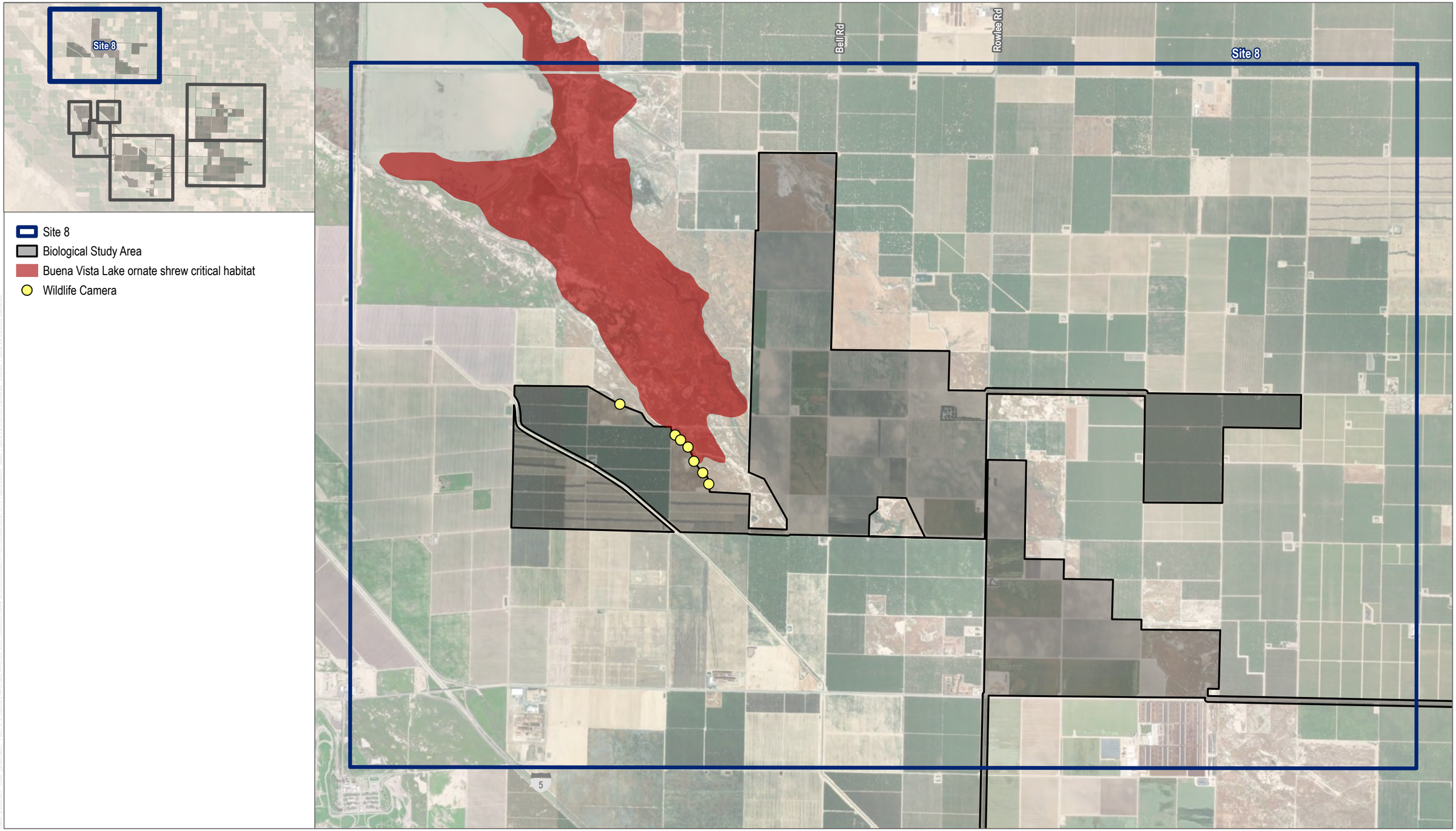
DUDEK

0 5,000 10,000 Feet

FIGURE 23B.H

Site 8: Swainson's Hawk Foraging Suitability

Buttonbush Solar Energy Project



SOURCE: Maxar 2023; Open Street Maps 2023; CDFW 2024; USFWS 2024

DUDEK

0 1,250 2,500 Feet

FIGURE 24

Buena Vista Lake Ornate Shrew Camera Study Locations

Buttonbush Solar Energy Project



SOURCE: Avantus LLC. 2024; Bing Maps 2022; Kern County 2022

DUDEK

0 200 400 Feet

FIGURE 25A

Potential Jurisdictional Aquatic Resources

Buttonbush Solar Energy Project



SOURCE: Avantus LLC. 2024; Bing Maps 2022; Kern County 2022

DUDEK

0 200 400 Feet

FIGURE 25B

Potential Jurisdictional Aquatic Resources

Buttonbush Solar Energy Project



SOURCE: Avantus LLC. 2024; Bing Maps 2022; Kern County 2022

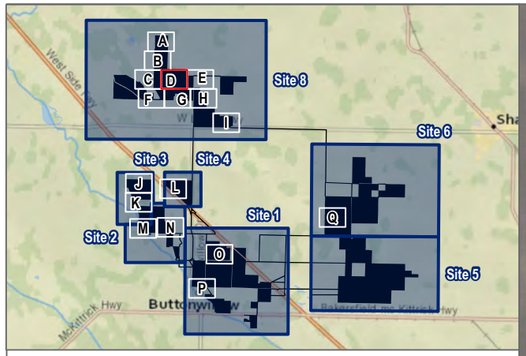
DUDEK

0 200 400 Feet

FIGURE 25C

Potential Jurisdictional Aquatic Resources

Buttonbush Solar Energy Project



Project Sites

Biological Study Area

Jurisdiction

CDFW/RWQCB

Potential Aquatic Resources

Canal/ditch



SOURCE: Avantus LLC. 2024; Bing Maps 2022; Kern County 2022

DUDEK

0 200 400 Feet

FIGURE 25D

Potential Jurisdictional Aquatic Resources

Buttonbush Solar Energy Project



SOURCE: Avantus LLC. 2024; Bing Maps 2022; Kern County 2022

DUDEK

0 200 400 Feet

FIGURE 25E

Potential Jurisdictional Aquatic Resources

Buttonbush Solar Energy Project



SOURCE: Avantus LLC. 2024; Bing Maps 2022; Kern County 2022

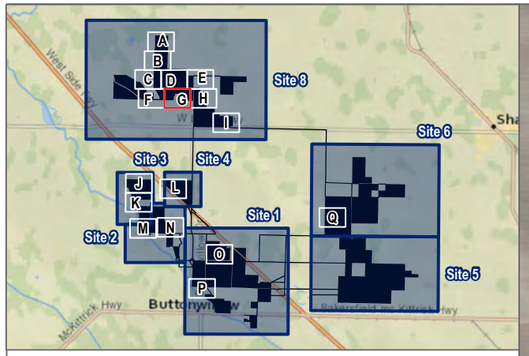
DUDEK

0 200 400 Feet

FIGURE 25F

Potential Jurisdictional Aquatic Resources

Buttonbush Solar Energy Project



Project Sites

Biological Study Area

Jurisdiction

CDFW/RWQCB

Potential Aquatic Resources

Canal/ditch



SOURCE: Avantus LLC. 2024; Bing Maps 2022; Kern County 2022

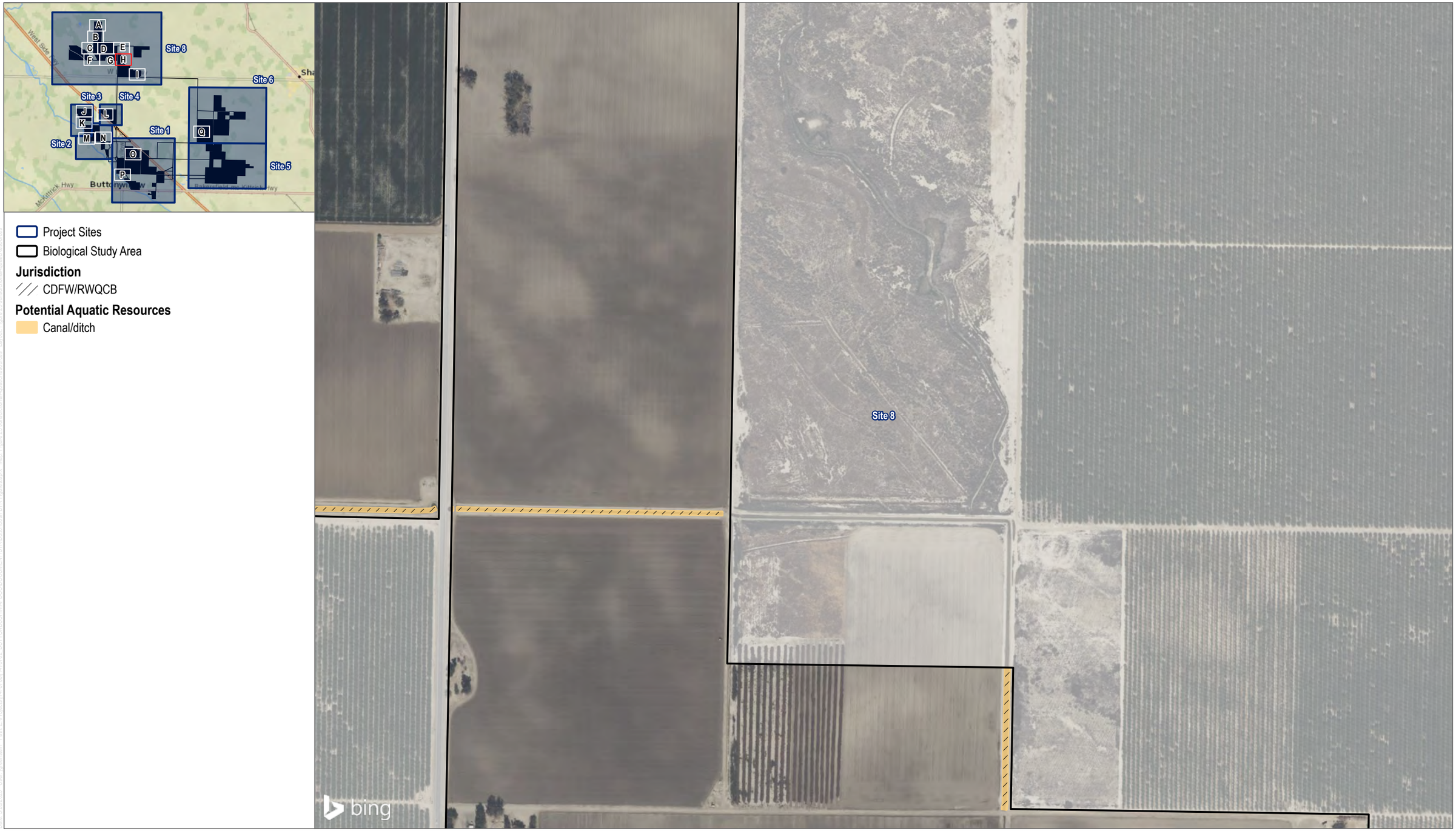
DUDEK

0 200 400 Feet

FIGURE 25G

Potential Jurisdictional Aquatic Resources

Buttonbush Solar Energy Project



SOURCE: Avantus LLC. 2024; Bing Maps 2022; Kern County 2022

DUDEK

0 200 400 Feet

FIGURE 25H

Potential Jurisdictional Aquatic Resources

Buttonbush Solar Energy Project



SOURCE: Avantus LLC. 2024; Bing Maps 2022; Kern County 2022

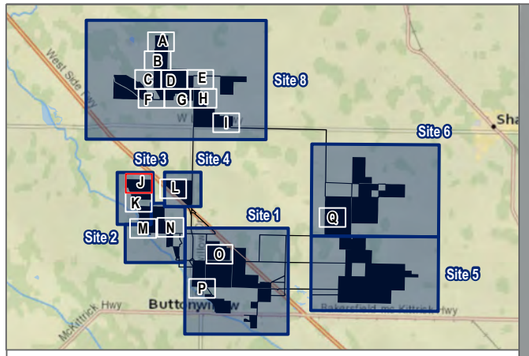
DUDEK

0 200 400 Feet

FIGURE 25I

Potential Jurisdictional Aquatic Resources

Buttonbush Solar Energy Project



Project Sites

Wetland Sampling Point

Biological Study Area

Jurisdiction

CDFW/RWQCB

Potential Aquatic Resources

Pond – intermittent

Shrub-scrub wetland



SOURCE: Avantus LLC. 2024; Bing Maps 2022; Kern County 2022

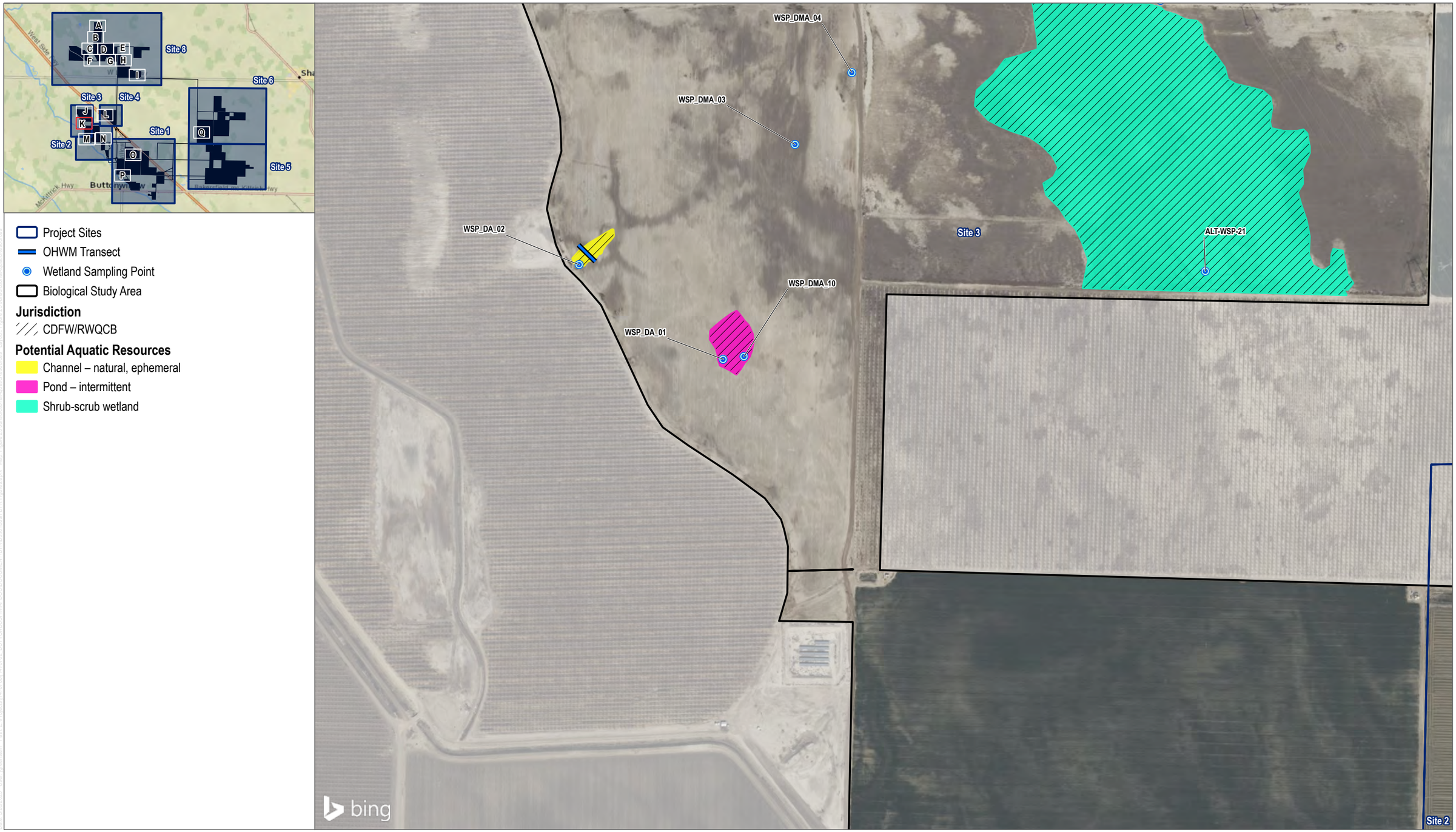
DUDEK

0 200 400 Feet

FIGURE 25J

Potential Jurisdictional Aquatic Resources

Buttonbush Solar Energy Project



SOURCE: Avantus LLC. 2024; Bing Maps 2022; Kern County 2022

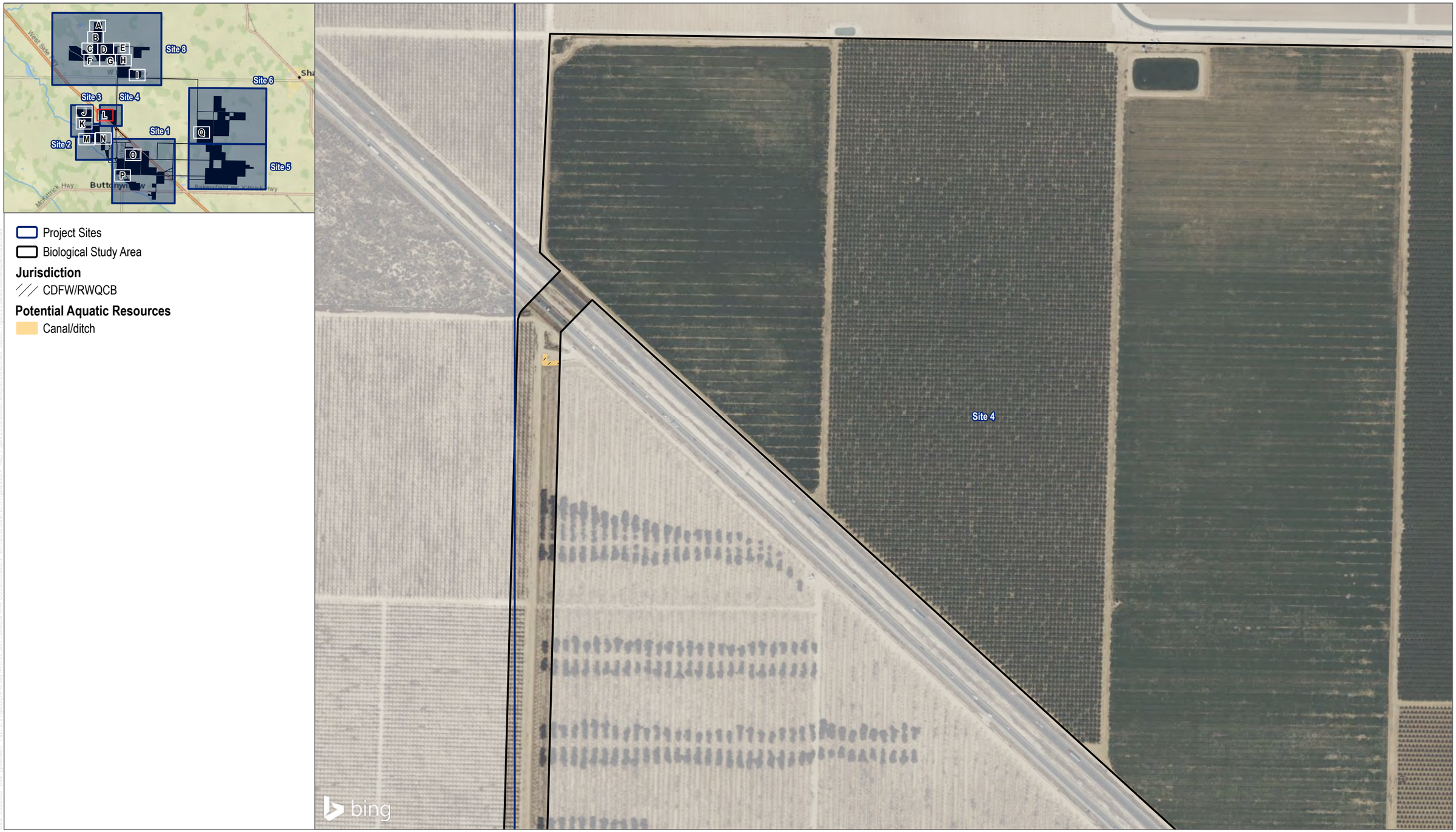
DUDEK

0 200 400 Feet

FIGURE 25K

Potential Jurisdictional Aquatic Resources

Buttonbush Solar Energy Project



SOURCE: Avantus LLC. 2024; Bing Maps 2022; Kern County 2022

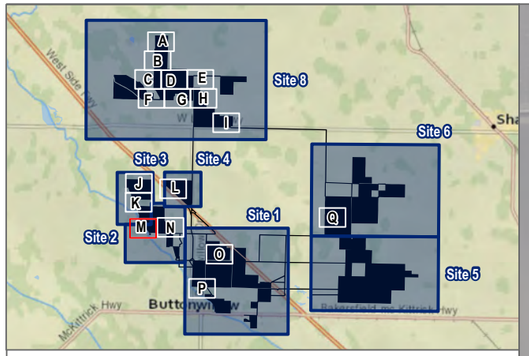
DUDEK

0 200 400 Feet

FIGURE 25L

Potential Jurisdictional Aquatic Resources

Buttonbush Solar Energy Project



Project Sites
OHWM Transect
Wetland Sampling Point
Biological Study Area

Jurisdiction

CDFW/RWQCB

Potential Aquatic Resources

Canal/ditch



SOURCE: Avantus LLC. 2024; Bing Maps 2022; Kern County 2022

DUDEK

0 200 400 Feet

FIGURE 25M

Potential Jurisdictional Aquatic Resources

Buttonbush Solar Energy Project



SOURCE: Avantus LLC. 2024; Bing Maps 2022; Kern County 2022

DUDEK

0 200 400 Feet

FIGURE 25N

Potential Jurisdictional Aquatic Resources

Buttonbush Solar Energy Project



SOURCE: Avantus LLC. 2024; Bing Maps 2022; Kern County 2022

FIGURE 2O

Potential Jurisdictional Aquatic Resources

Buttonbush Solar Energy Project

DUDEK



SOURCE: Avantus LLC. 2024; Bing Maps 2022; Kern County 2022

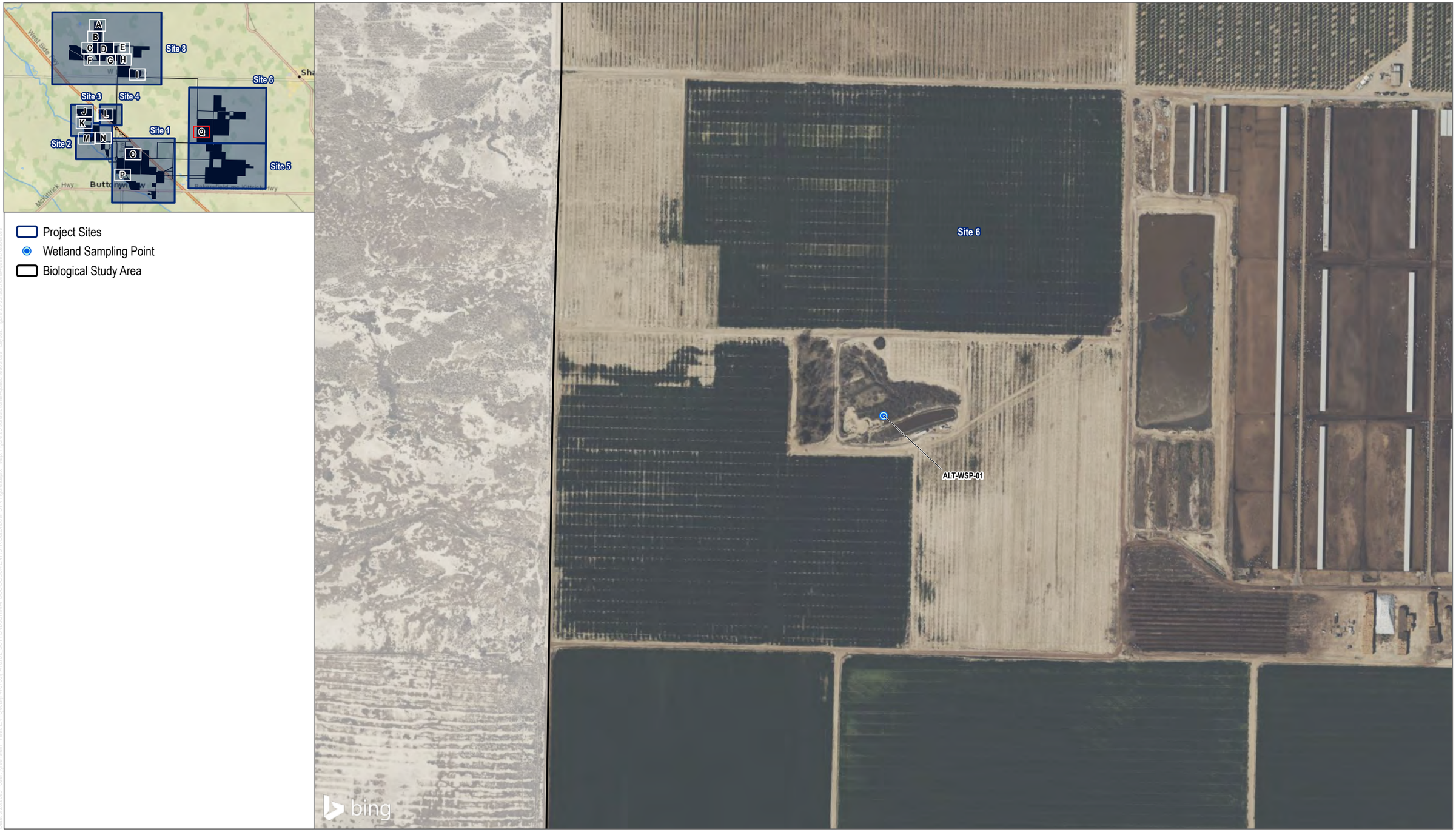
DUDEK

0 200 400 Feet

FIGURE 25P

Potential Jurisdictional Aquatic Resources

Buttonbush Solar Energy Project



SOURCE: Avantus LLC. 2024; Bing Maps 2022; Kern County 2022

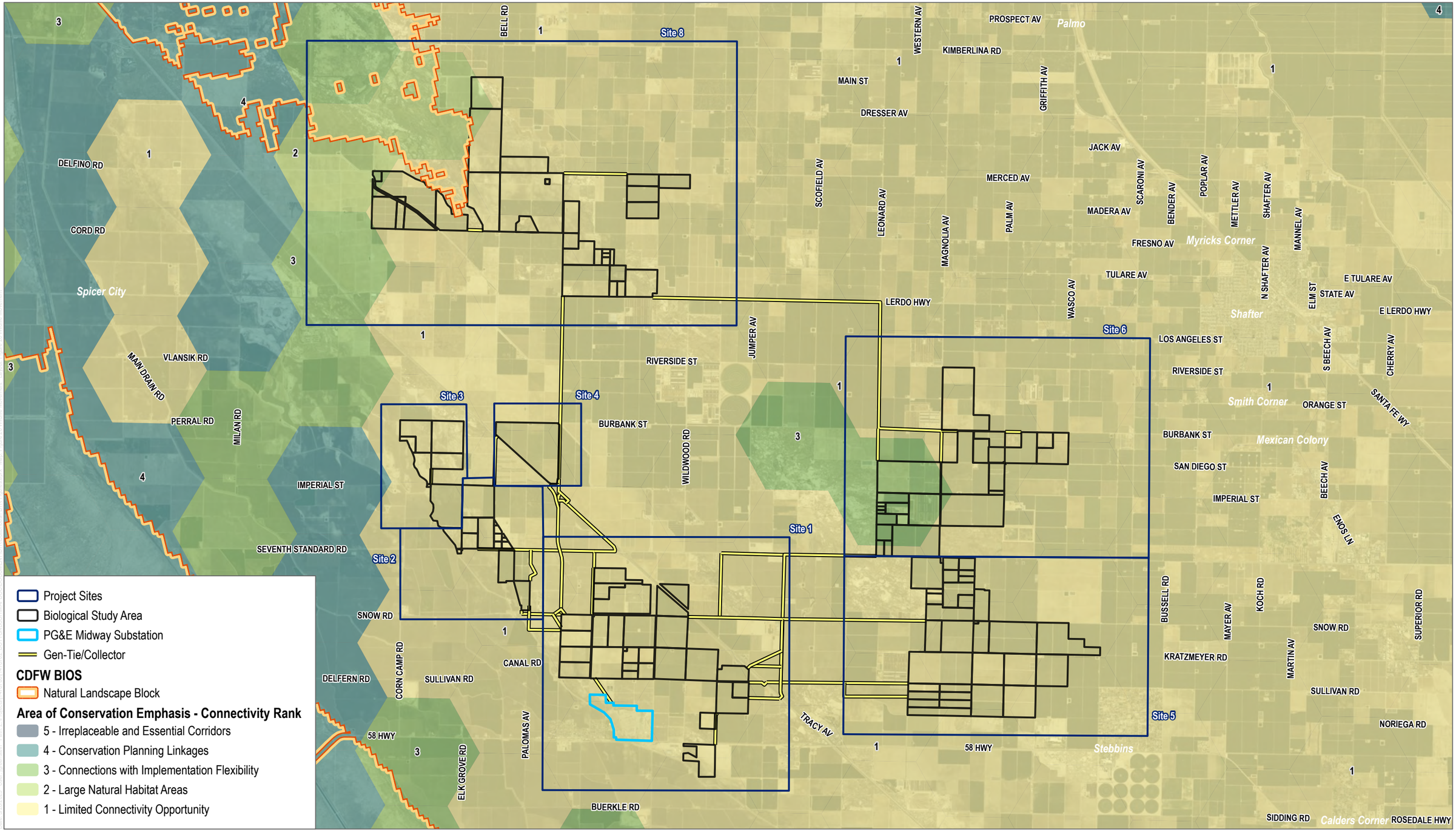
DUDEK

0 200 400 Feet

FIGURE 25Q

Potential Jurisdictional Aquatic Resources

Buttonbush Solar Energy Project



SOURCE: Avantus LLC. 2024; Bing Maps 2022; Kern County 2022; CDFW

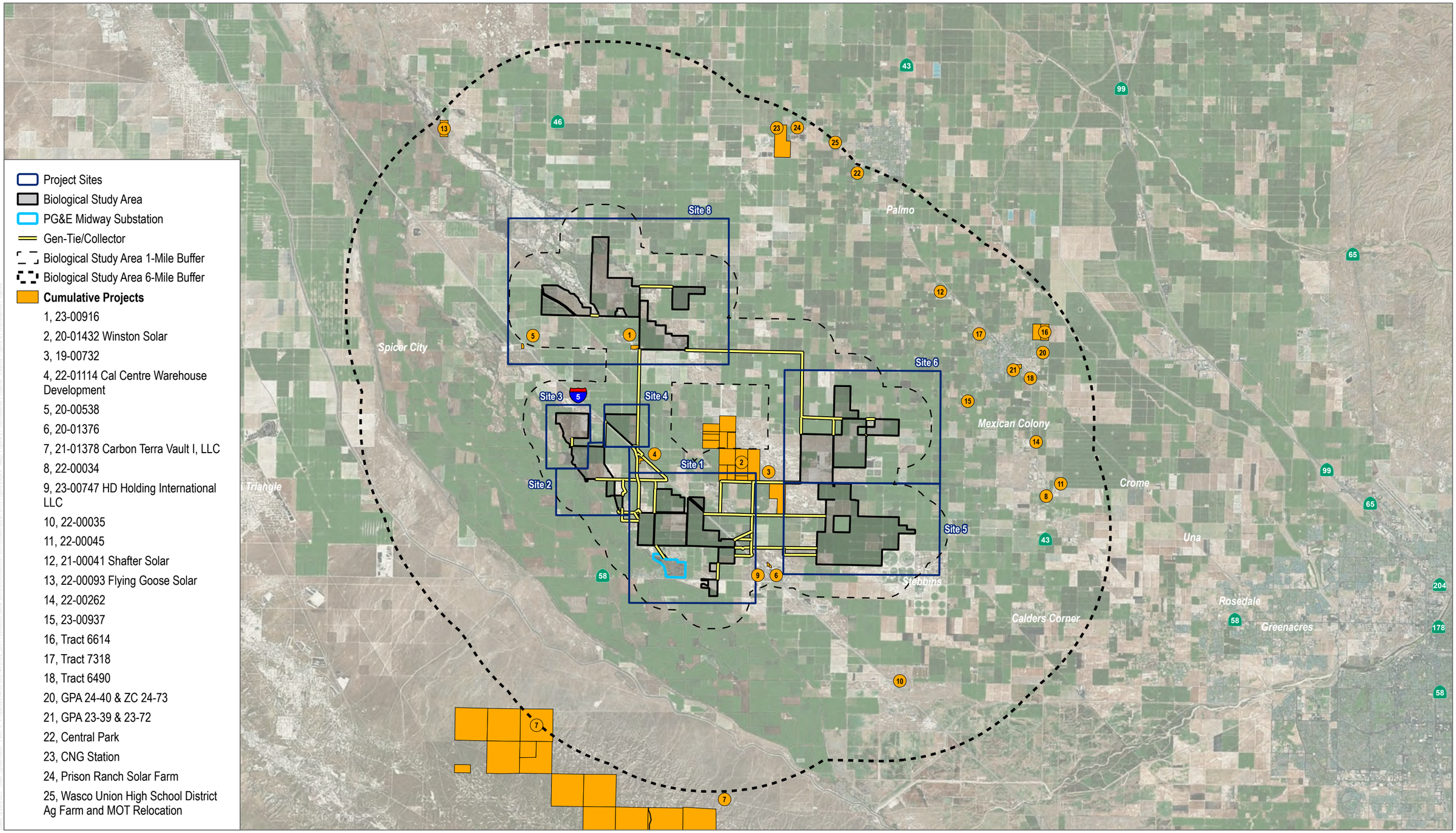
DUDEK

0 3,500 7,000 Feet

FIGURE 26

Wildlife Movement

Buttonbush Solar Energy Project



SOURCE: Avantus LLC. 2024; Bing Maps 2022; Kern County 2022

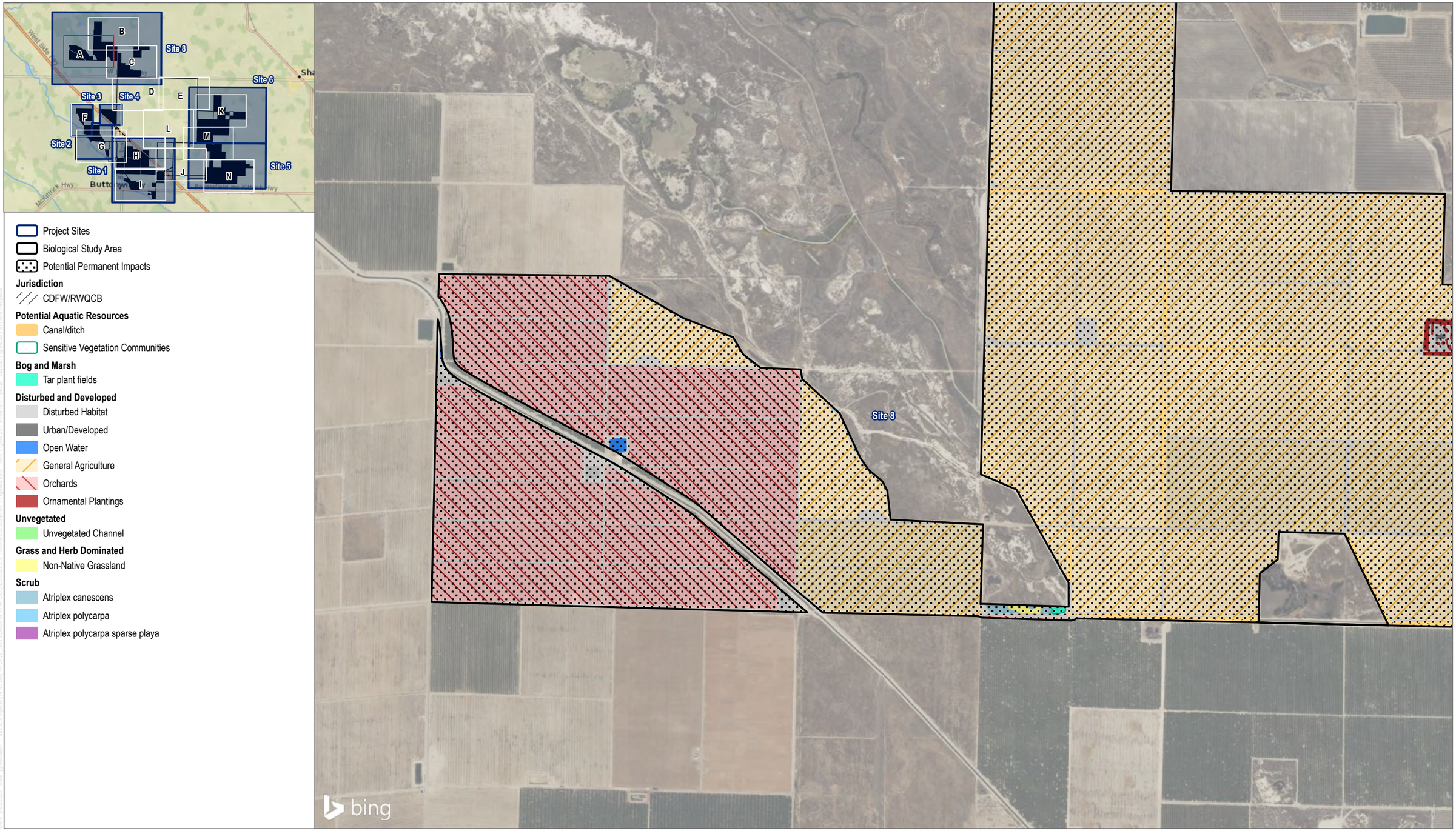
DUDEK

0 5,000 10,000 Feet

FIGURE 27

Cumulative Projects

Buttonbush Solar Energy Project



SOURCE: Avantus LLC. 2024; Bing Maps 2022; Kern County 2022

DUDEK

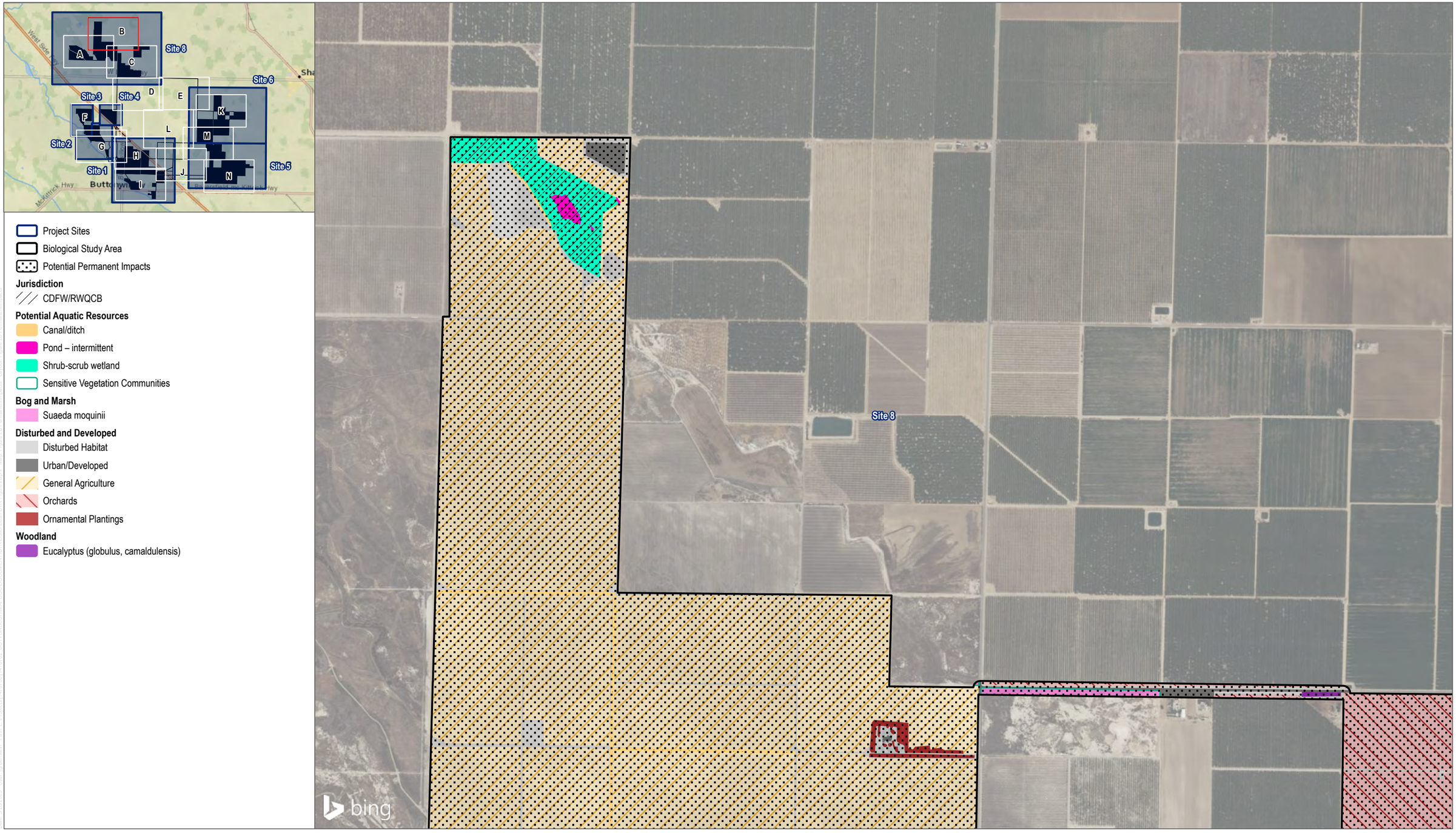
N

0 500 1,000 Feet

FIGURE 28A

Potential Permanent Impacts

Buttonbush Solar Energy Project



SOURCE: Avantus LLC. 2024; Bing Maps 2022; Kern County 2022

DUDEK

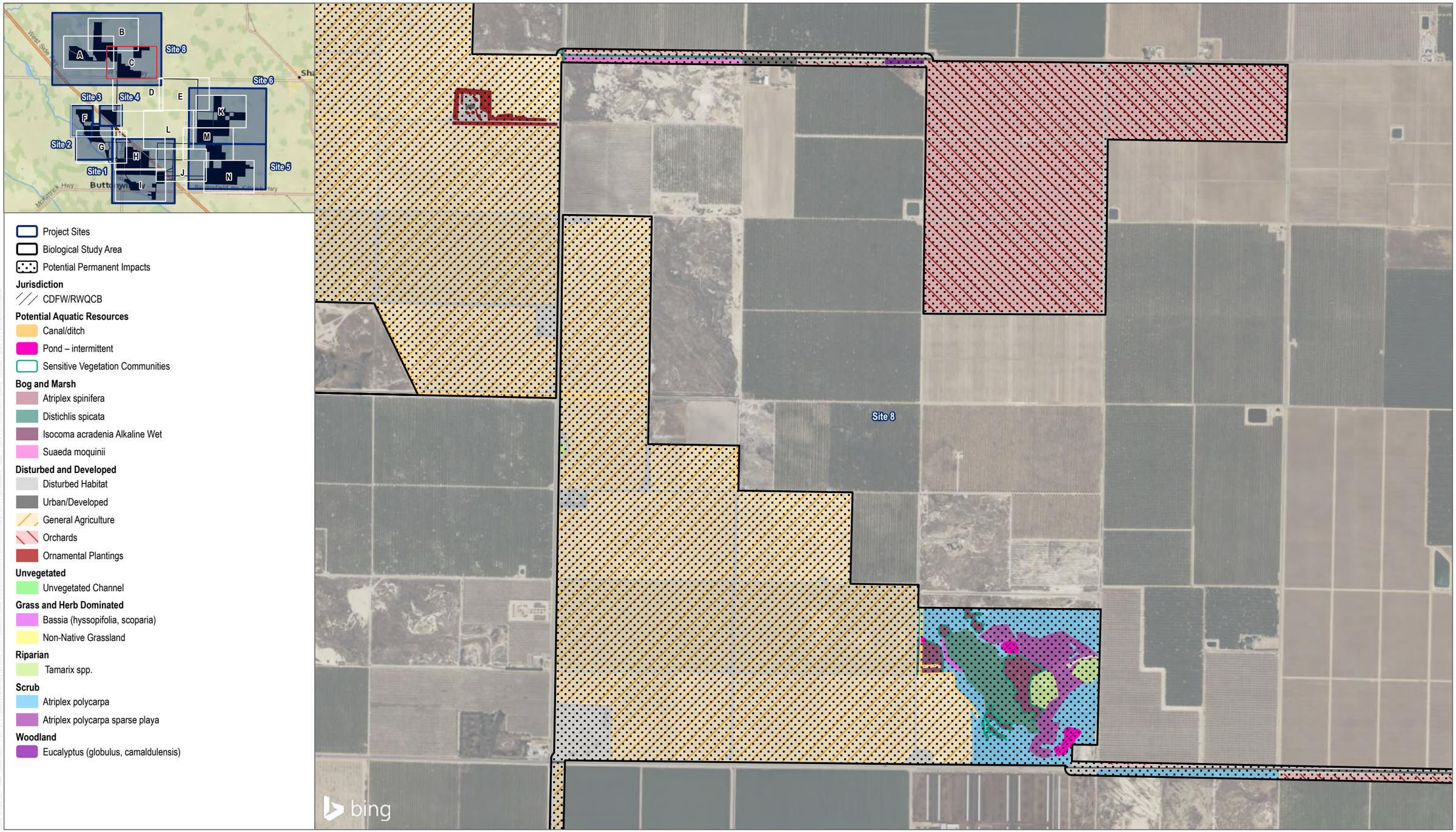
N

0 500 1,000 Feet

FIGURE 28B

Potential Permanent Impacts

Buttonbush Solar Energy Project



SOURCE: Avantus LLC. 2024; Bing Maps 2022; Kern County 2022

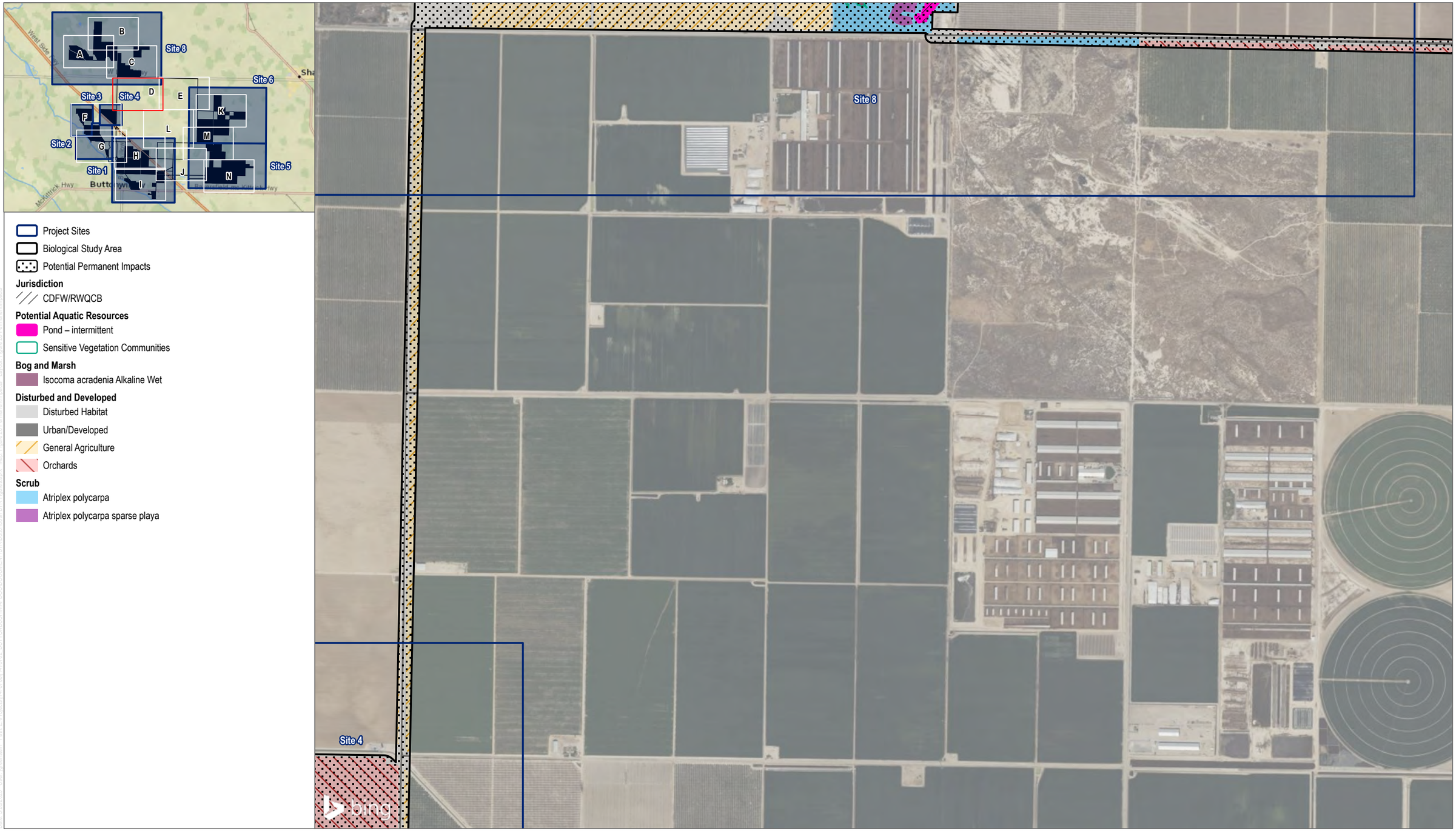
DUDEK

0 500 1,000 Feet

FIGURE 28C

Potential Permanent Impacts

Buttonbush Solar Energy Project



SOURCE: Avantus LLC. 2024; Bing Maps 2022; Kern County 2022

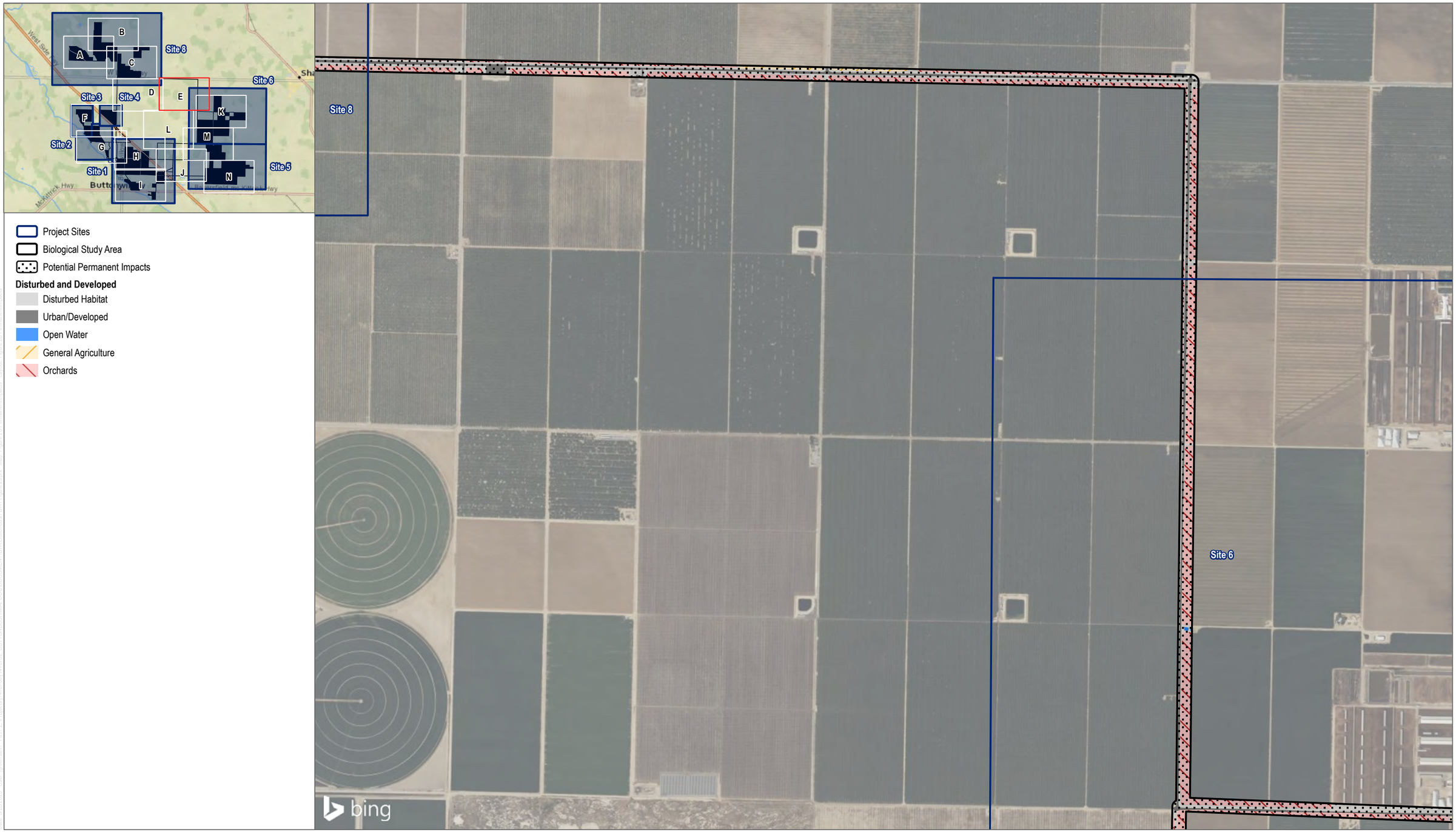
DUDEK

0 500 1,000 Feet

FIGURE 28D

Potential Permanent Impacts

Buttonbush Solar Energy Project



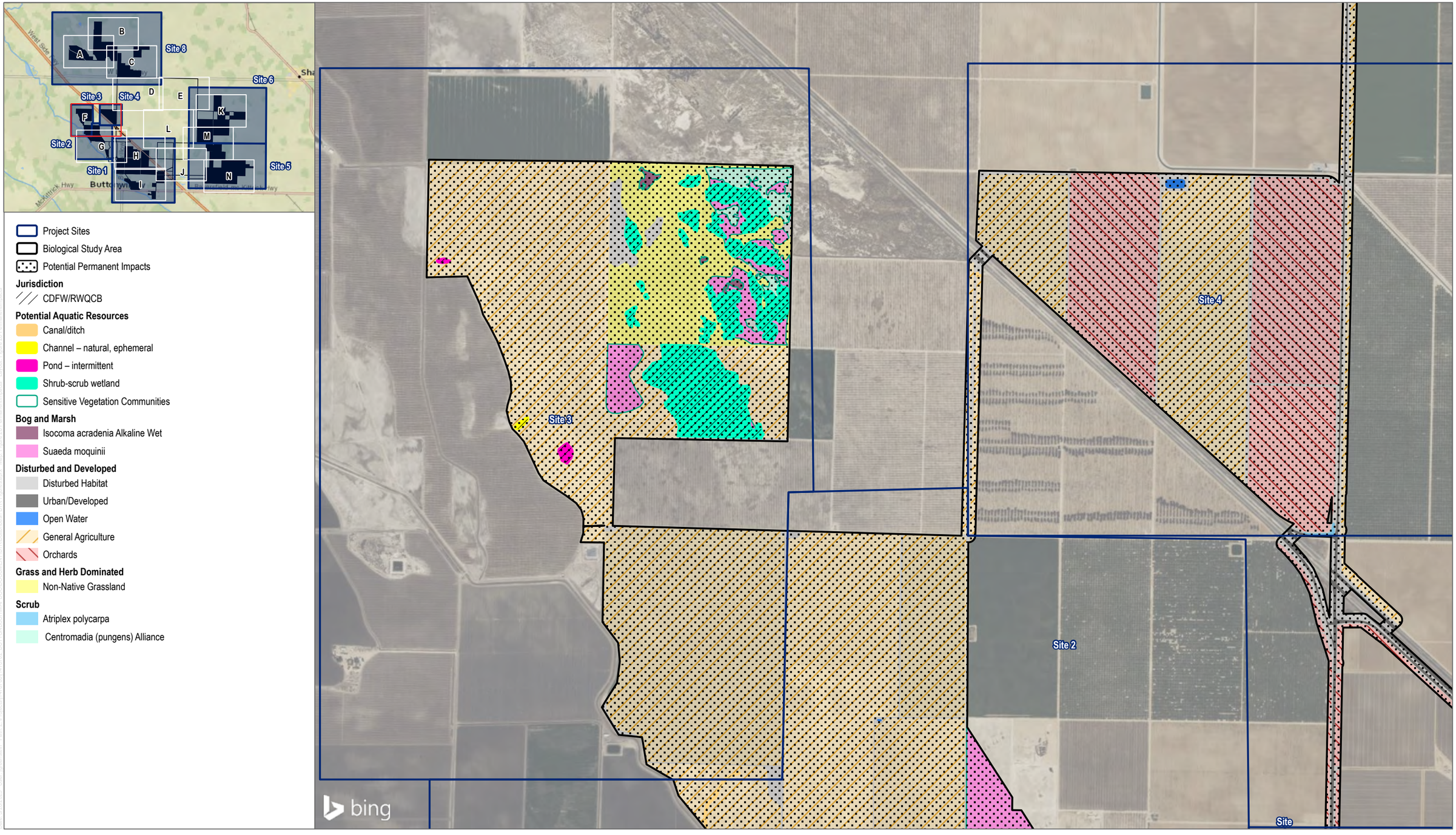
SOURCE: Avantus LLC. 2024; Bing Maps 2022; Kern County 2022

FIGURE 28E

Potential Permanent Impacts

Buttonbush Solar Energy Project

DUDEK



SOURCE: Avantus LLC. 2024; Bing Maps 2022; Kern County 2022

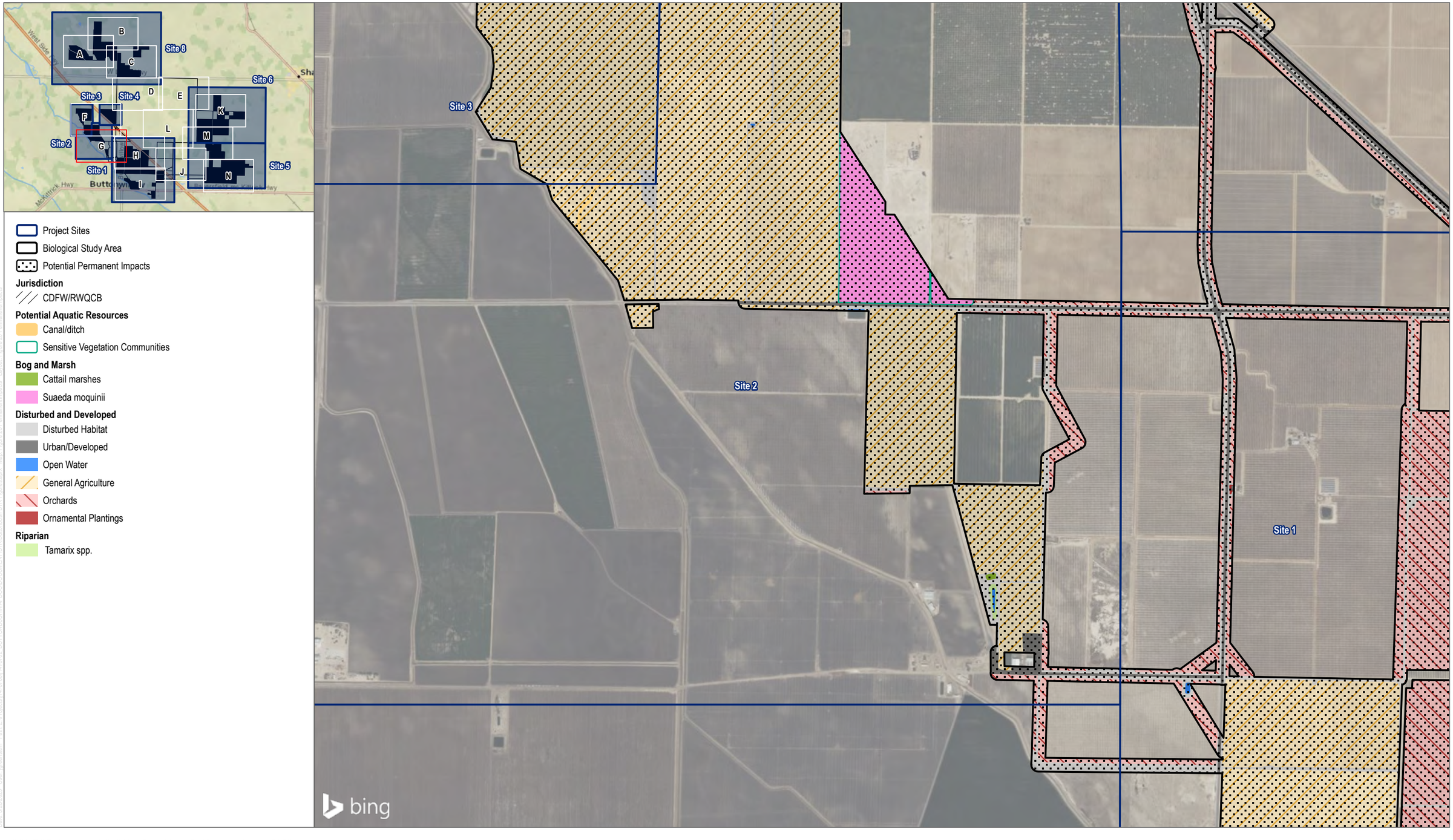
DUDEK

0 500 1,000 Feet

FIGURE 28F

Potential Permanent Impacts

Buttonbush Solar Energy Project



SOURCE: Avantus LLC. 2024; Bing Maps 2022; Kern County 2022

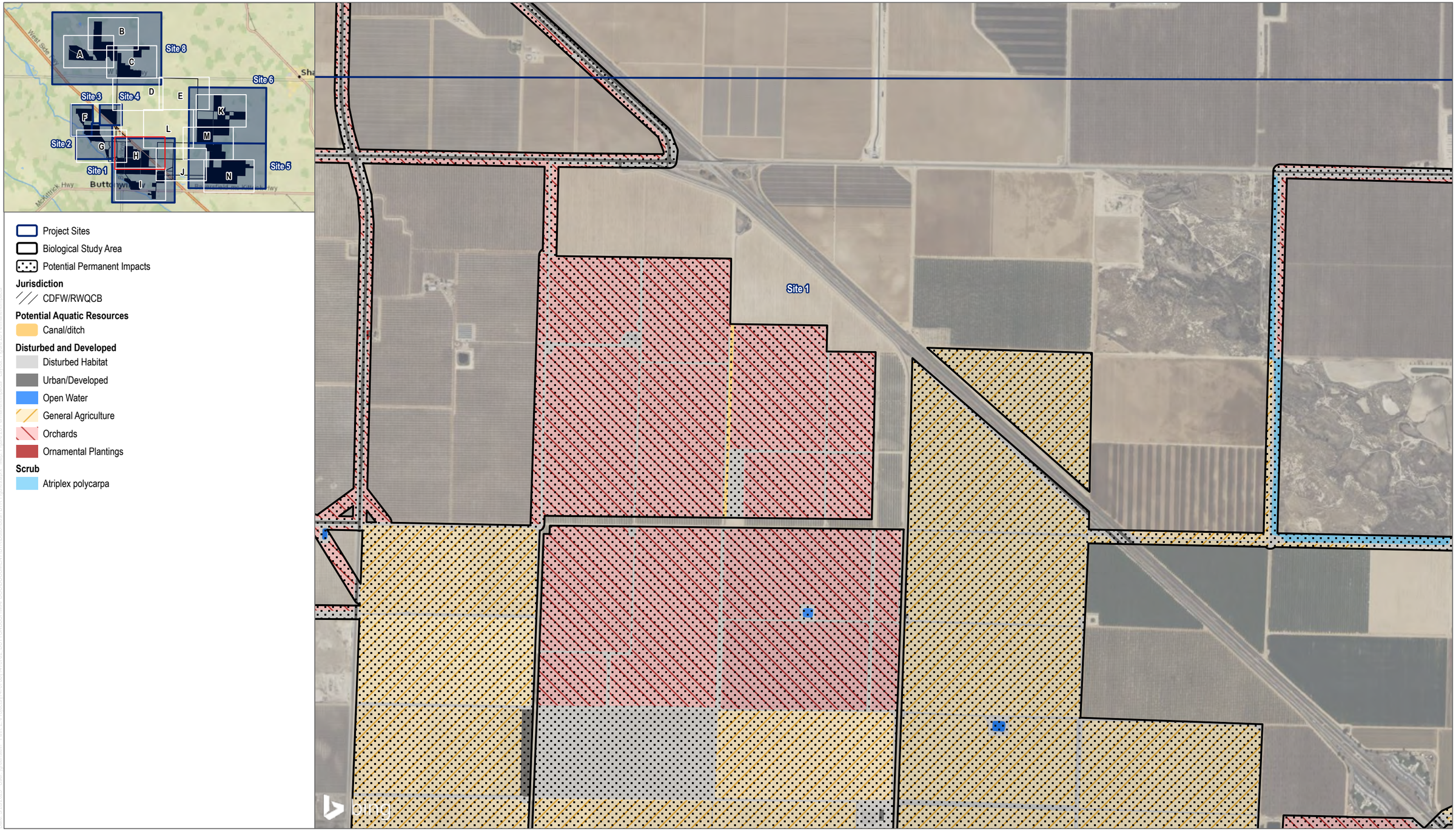
DUDEK

0 500 1,000 Feet

FIGURE 28G

Potential Permanent Impacts

Buttonbush Solar Energy Project



SOURCE: Avantus LLC. 2024; Bing Maps 2022; Kern County 2022

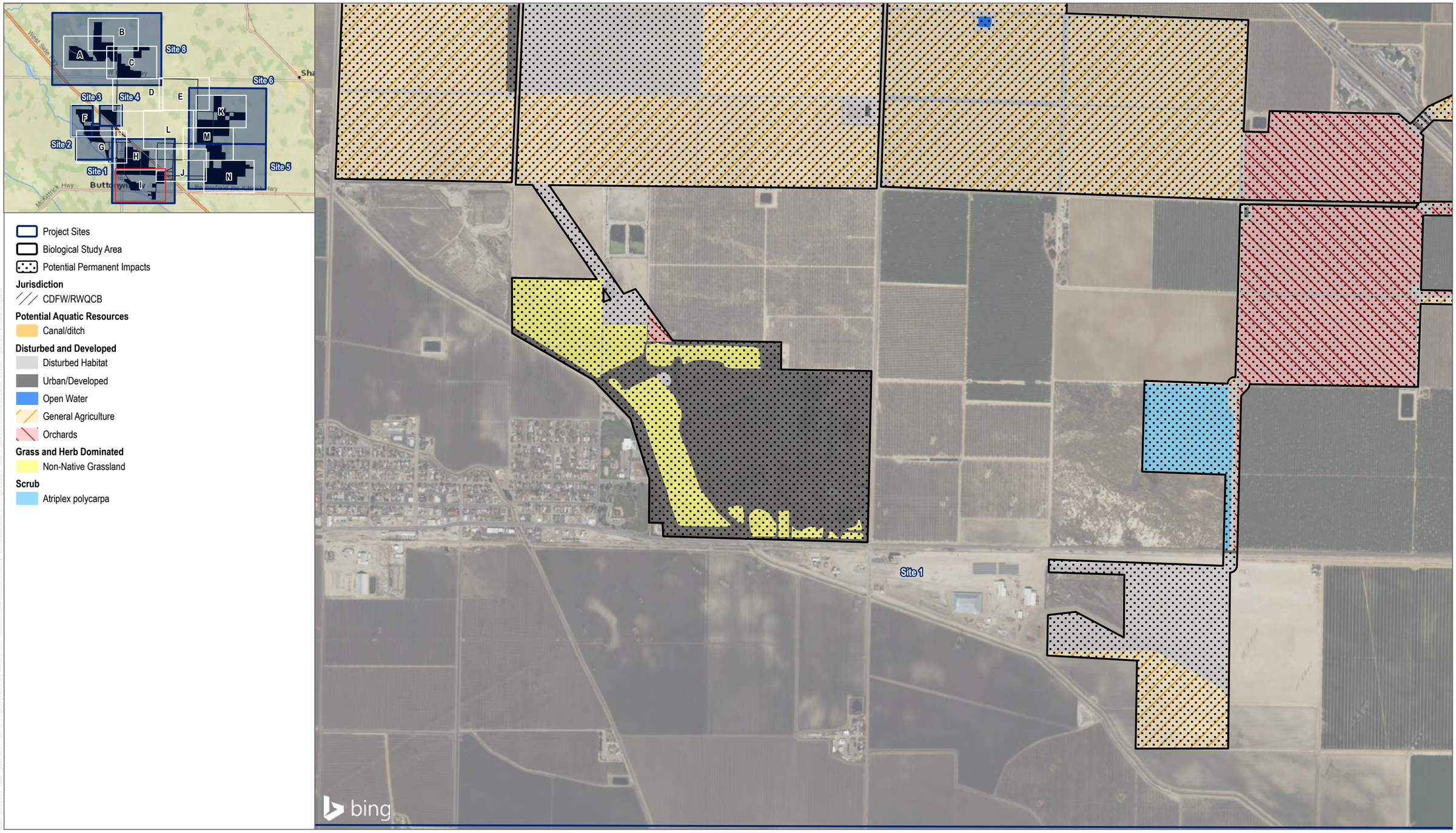
DUDEK

0 500 1,000 Feet

FIGURE 28H

Potential Permanent Impacts

Buttonbush Solar Energy Project



SOURCE: Avantus LLC. 2024; Bing Maps 2022; Kern County 2022

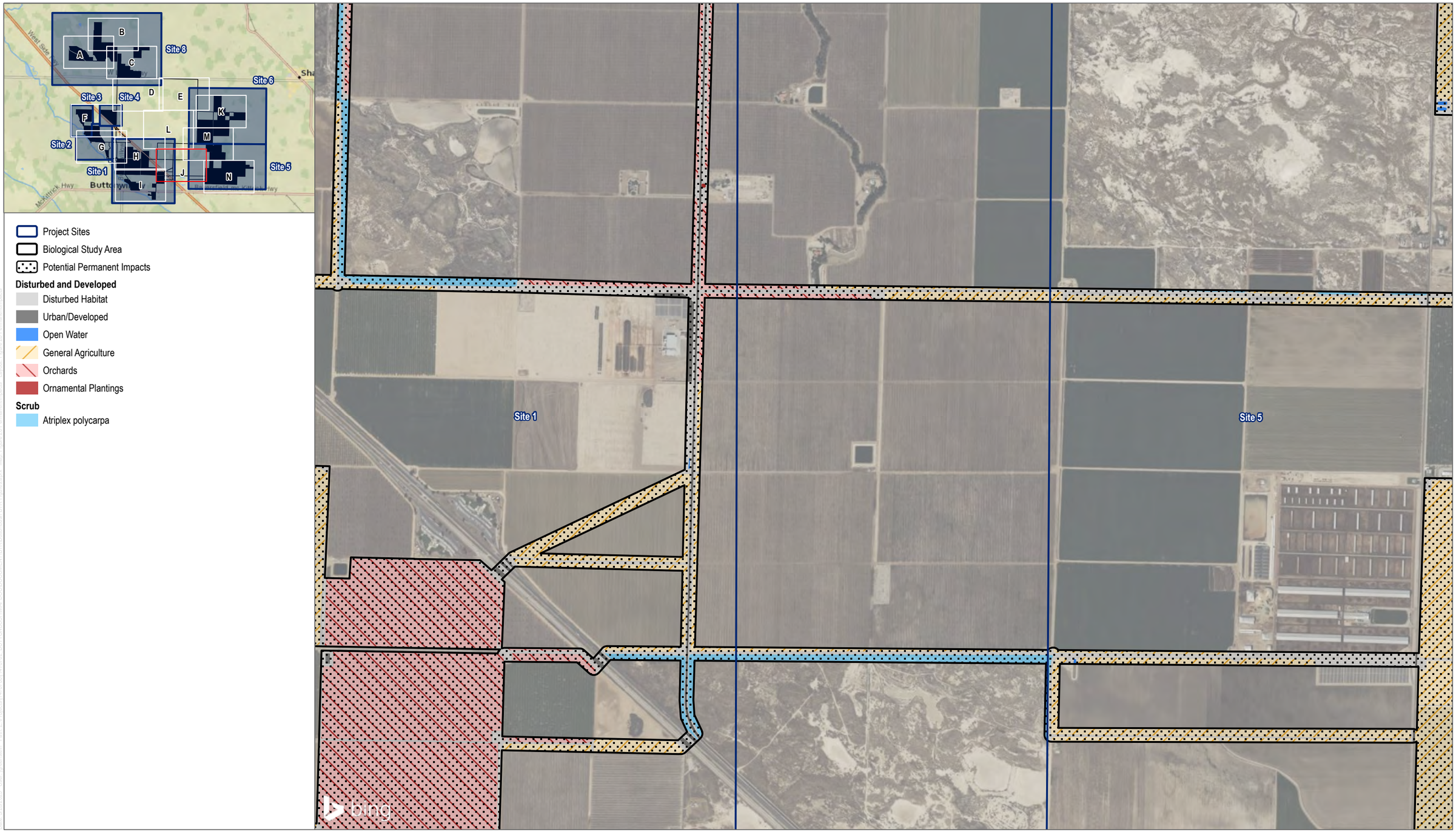
DUDEK

0 500 1,000 Feet

FIGURE 28I

Potential Permanent Impacts

Buttonbush Solar Energy Project



SOURCE: Avantus LLC. 2024; Bing Maps 2022; Kern County 2022

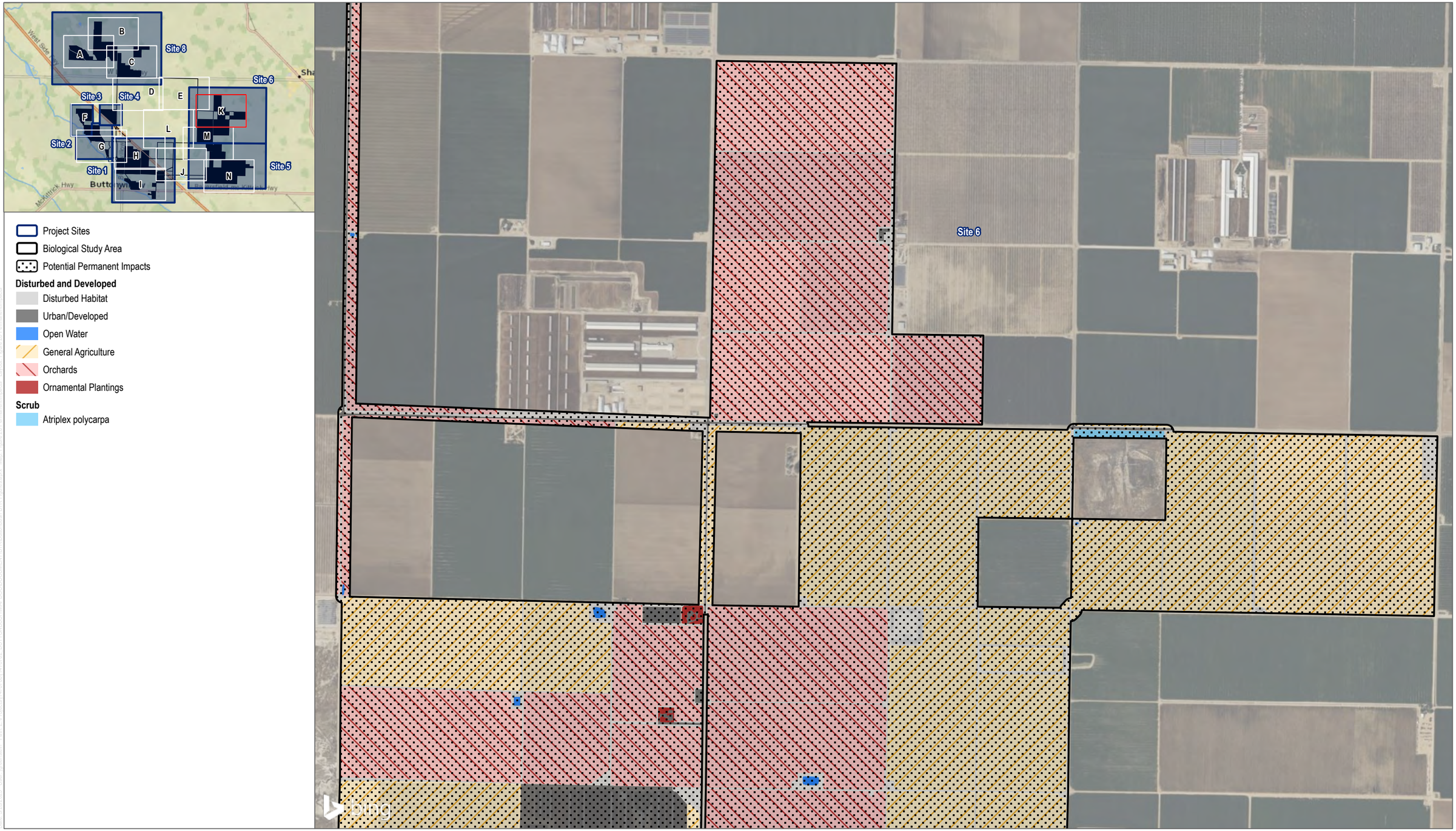
DUDEK

0 500 1,000 Feet

FIGURE 28J

Potential Permanent Impacts

Buttonbush Solar Energy Project



SOURCE: Avantus LLC. 2024; Bing Maps 2022; Kern County 2022

FIGURE 28K

Potential Permanent Impacts

Buttonbush Solar Energy Project

DUDEK



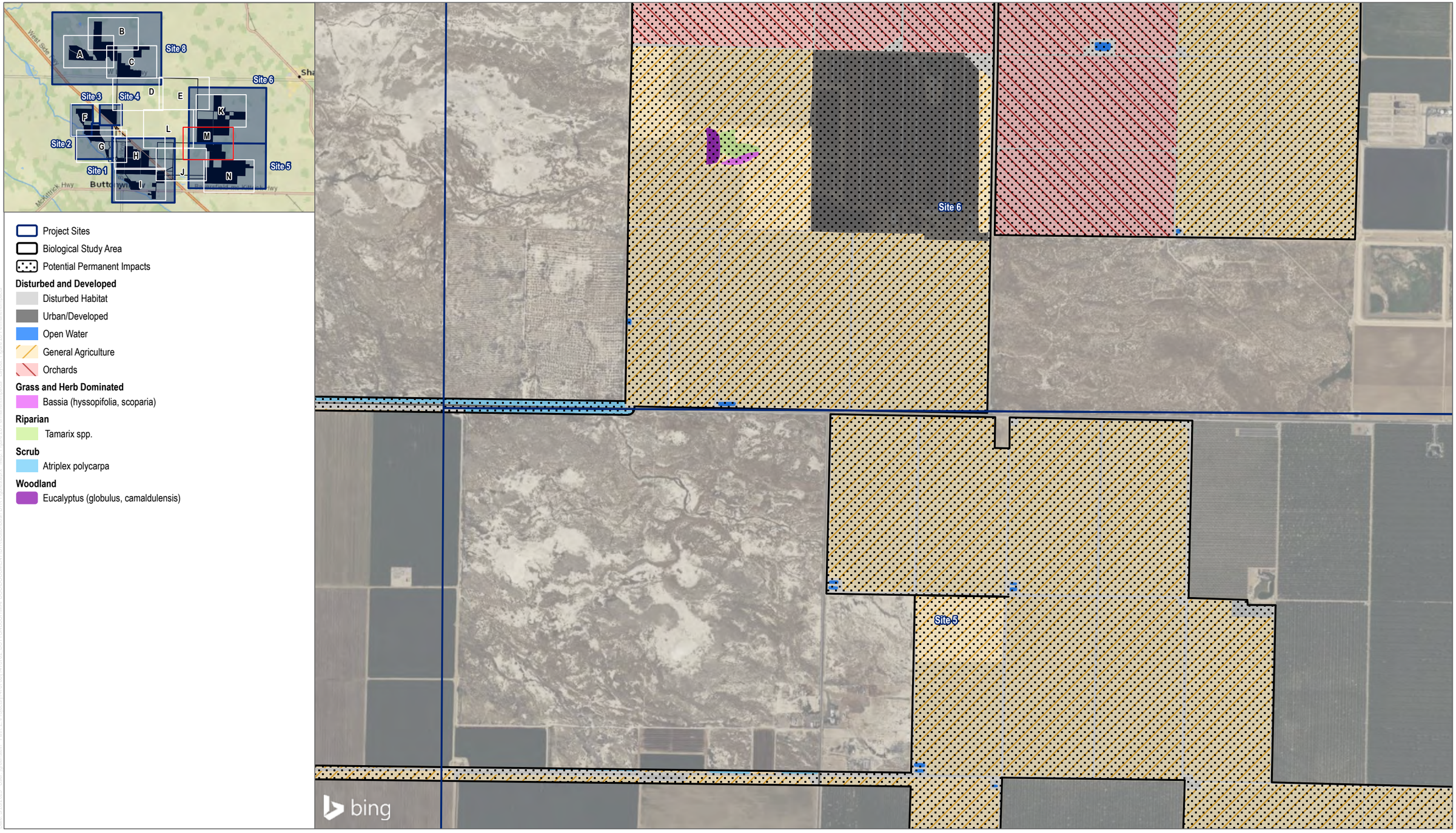
SOURCE: Avantus LLC. 2024; Bing Maps 2022; Kern County 2022

FIGURE 28L

Potential Permanent Impacts

Buttonbush Solar Energy Project

DUDEK



SOURCE: Avantus LLC. 2024; Bing Maps 2022; Kern County 2022

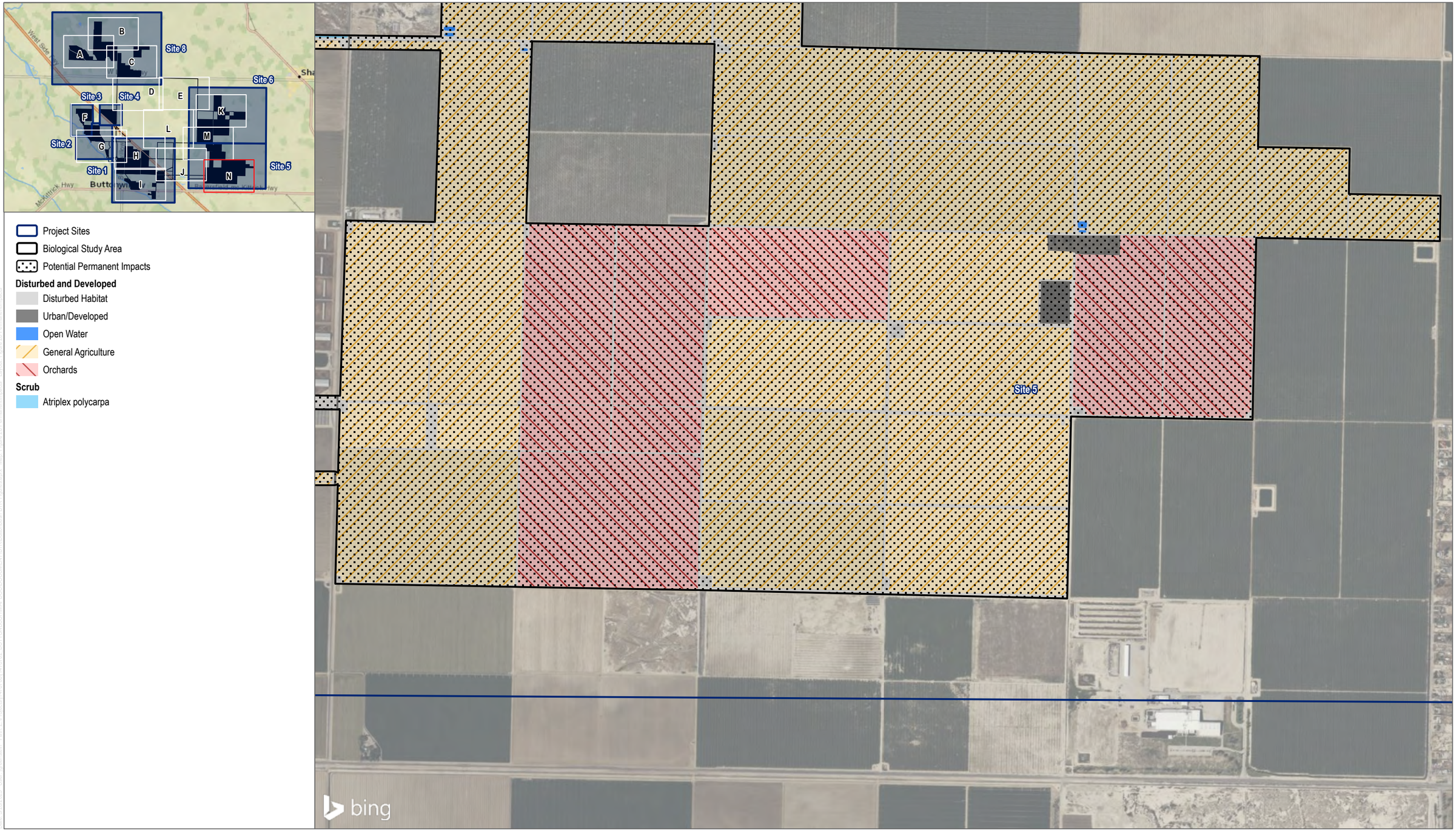
DUDEK

0 500 1,000 Feet

FIGURE 28M

Potential Permanent Impacts

Buttonbush Solar Energy Project



SOURCE: Avantus LLC. 2024; Bing Maps 2022; Kern County 2022

DUDEK

0 500 1,000 Feet

FIGURE 28N

Potential Permanent Impacts

Buttonbush Solar Energy Project

Appendix B
Project APNs

Project Assessor's Parcel Numbers, Zone Map, Existing Map Code Designations, Existing Zoning, Williamson Act Status, Site, Project Acreage, and Parcel Acreage

APN	Zone Map	Existing Map Code Designation	Existing Zoning	Williamson Act Status	Site	Project Acreage	Parcel Acreage
069-340-28	54	8.1/2.3	A	Active	Site 8	120	120
069-350-07	54	8.1/2.3	A	N/A	Site 8	160	160
069-350-09	54	8.1/2.3	A	Active	Site 8	315	560*
087-010-11	77	8.1/(8.1/2.3)	A	Active	Site 8	78	78
087-010-18	77	8.1	A	Active	Site 8	60	60
087-010-20	77	8.1	A	Active	Site 8	80	80
087-010-22	77	8.1	A	Active	Site 8	66	66
087-020-01	77	8.1	A	Active	Site 8	80	80
087-040-01	77	8.1/2.3	A	Active	Site 8	374	590*
087-040-04	77	8.1/2.3	A	N/A	Site 8	3	3
087-040-07	77	8.1/(8.1/2.3)	A	Active	Site 8	543	588*
087-050-18	77	(8.1/2.3)/8.4	A	Active	Site 8	118	118
087-050-28	77	8.1/2.3	A	Active	Site 8	11	11
087-050-29	77	8.1/(8.1/2.3)	A	Active	Site 8	345	392*
087-050-38	77	8.1/(8.1/2.3)	A	Active	Site 8	37	37
087-060-01	77	8.5	A	Active	Site 8	39	39
087-060-05	77	8.1	A	Active	Site 8	20	20
087-060-06	77	8.1	A	Active	Site 8	5	5
087-060-07	77	8.1	A	Active	Site 8	5	5
087-060-08	77	8.1	A	Active	Site 8	10	10
087-060-09	77	8.1	A	N/A	Site 8	10	10
087-060-11	77	8.1	A	Active	Site 8	40	40
087-060-12	77	8.1	A	Active	Site 8	20	20
087-060-13	77	8.1	A	Active	Site 8	20	20
087-060-14	77	8.1/8.5	A	Active	Site 8	235	235
087-060-15	77	8.5	A	Active	Site 8	99	99
087-060-39	77	8.1	A	Active	Site 8	136	136
087-160-01	77	8.1	A	Active	Site 3	160	160
087-160-19	77	8.1	A	Active	Site 3	80	80
087-160-53	77	8.1	A	Active	Site 4	395	395
087-170-04	77	8.1	A	Active	Site 3	67	160*
087-170-12	77	8.1	A	Active	Site 3	120	120
087-170-13	77	8.1	A	Active	Site 3	20	40*
087-200-02	77	8.1	A	Active	Site 2	160	160
087-200-03	77	8.1	A	N/A	Site 2	80	80
087-200-05	77	8.1	A	Active	Site 2	41	41
087-200-16	77	8.1	A	Active	Site 2	2	10*
087-200-28	77	8.1	A	Active	Site 2	3	5*
087-200-29	77	8.1	A	Active	Site 2	10	10

Project Assessor's Parcel Numbers, Zone Map, Existing Map Code Designations, Existing Zoning, Williamson Act Status, Site, Project Acreage, and Parcel Acreage

APN	Zone Map	Existing Map Code Designation	Existing Zoning	Williamson Act Status	Site	Project Acreage	Parcel Acreage
087-200-30	77	8.1	A	N/A	Site 2	10	10
087-200-31	77	8.1	A	Active	Site 2	8	10*
087-200-35	77	8.1	A	Active	Site 3	195	195*
087-200-37	77	8.1	A	N/A	Site 2	47	47
087-200-39	77	8.1	A	Active	Site 2	40	40
087-200-54	77	8.1	A	Active	Site 2	12	44*
087-210-10	77	8.1	A	Active	Site 3	2	36*
088-150-01	78	8.1	A	Active	Site 6	352	625*
088-180-02	78	8.1	A	Active	Site 6	317	317
088-180-04	78	8.1	A	N/A	Site 6	58	58
088-180-06	78	8.3	A	N/A	Site 6	70	70
088-180-07	78	8.3	A	N/A	Site 6	10	10
088-180-10	78	8.1	A	Active	Site 6	119	119
088-180-11	78	8.1	A	Active	Site 6	39	39
088-180-12	78	8.1	A	Active	Site 6	117	117
088-180-34	78	8.1	A	Active	Site 6	61	61
088-190-20	78	8.1	A	Active	Site 6	318	318
088-210-01	78	8.1	A	Active	Site 6	318	318
088-220-15	78	8.1	A	N/A	Site 6	50	50
088-220-16	78	8.3	A	N/A	Site 6	158	158
088-220-17	78	8.1	A	N/A	Site 6	235	235
088-220-19	78	8.1	A	N/A	Site 6	40	40
088-220-20	78	8.1	A	N/A	Site 6	35	35
088-220-21	78	8.1	A	N/A	Site 6	20	20
088-220-22	78	8.1	A	N/A	Site 6	40	40
088-220-23	78	8.1	A	N/A	Site 6	5	5
088-220-24	78	8.1	A	N/A	Site 6	5	5
088-220-25	78	8.1	A	N/A	Site 6	5	5
088-220-31	78	8.1	A	N/A	Site 6	20	20
088-220-32	78	8.1	A	N/A	Site 6	17	17
100-010-13	98	8.1/8.4	A	Active	Site 1	224	267*
100-010-14	98	8.1	A	Active	Site 1	50	50
100-010-22	98	8.1	A	Active	Site 1	85	205*
100-020-19	98	8.5	A	Active	Site 2	128	220*
100-030-08	98	8.1	A	N/A	Site 2	4	4
100-100-03	98	8.1/8.4	A	Active	Site 1	158	158
100-100-04	98	4.1	A	N/A	Site 1	3	3
100-100-05	98	4.1	A	Active	Site 1	38	38
100-100-06	98	4.1	A	Active	Site 1	39	39

Project Assessor's Parcel Numbers, Zone Map, Existing Map Code Designations, Existing Zoning, Williamson Act Status, Site, Project Acreage, and Parcel Acreage

APN	Zone Map	Existing Map Code Designation	Existing Zoning	Williamson Act Status	Site	Project Acreage	Parcel Acreage
100-100-07	98	4.1	A	Active	Site 1	39	39
100-100-08	98	4.1	A	Active	Site 1	20	20
100-100-09	98	4.1	A	Active	Site 1	20	20
100-100-10	98	4.1	A	Active	Site 1	158	158
100-100-19	98	8.1	A	Active	Site 1	78	78
100-100-26	98	8.1	A	Active	Site 1	78	152*
100-100-27	98	4.1	A	Active	Site 1	76	76
100-100-29	98	4.1	A	Active	Site 1	78	109*
100-100-31	98	8.1	A	Active	Site 1	78	78
100-100-32	98	8.1	A	Active	Site 1	80	80
103-010-18	99	8.1	A	Active	Site 5	31	31
103-010-19	99	8.1	A	Active	Site 5	32	32
103-010-20	99	8.1	A	Active	Site 5	31	31
103-010-21	99	8.1	A	Active	Site 5	16	16
103-010-25	99	8.1	A	Active	Site 5	104	104
103-010-28	99	8.1	A	Active	Site 5	153	153
103-010-30	99	8.1	A	Active	Site 5	16	16
103-010-31	99	8.1	A	Active	Site 5	32	32
103-010-32	99	8.1	A	Active	Site 5	94	94
103-010-39	99	8.1	A	Active	Site 5	13	26*
103-010-40	99	8.1	A	Active	Site 5	27	53*
103-010-43	99	8.1	A	Active	Site 5	75	160*
103-030-45	99	8.1	A	Active	Site 1	55	55
103-030-46	99	8.1/8.4	A	Active	Site 1	87	87
103-040-02	99	8.1	A	Active	Site 1	156	156
103-040-08	99	8.1/8.4	A	N/A	Site 1	74	99*
103-040-14	99	8.1/8.4	A	Active	Site 1	159	159
103-040-24	99	8.1/8.4	A	Active	Site 1	158	158
103-060-04	99	8.1	A	Active	Site 5	79	318*
103-060-05	99	8.1	A	Active	Site 5	318	318
103-060-08	99	8.1	A	Active	Site 5	78	78
103-060-09	99	8.1	A	Active	Site 5	2	2
103-060-10	99	8.1	A	Active	Site 5	240	240
103-060-11	99	8.1	A	Active	Site 5	160	160
103-060-12	99	8.1	A	Active	Site 5	160	160
103-070-07	99	8.1	A	Active	Site 5	160	160
103-070-08	99	8.1	A	Active	Site 5	160	160
103-070-13	99	8.1	A	Active	Site 5	40	40
103-070-14	99	8.1	A	Active	Site 5	40	40

Project Assessor's Parcel Numbers, Zone Map, Existing Map Code Designations, Existing Zoning, Williamson Act Status, Site, Project Acreage, and Parcel Acreage

APN	Zone Map	Existing Map Code Designation	Existing Zoning	Williamson Act Status	Site	Project Acreage	Parcel Acreage
103-070-15	99	8.1	A	Active	Site 5	40	40
103-070-16	99	8.1	A	Active	Site 5	40	40
103-070-17	99	8.1	A	Active	Site 5	40	40
103-070-18	99	8.1	A	Active	Site 5	40	40
103-070-19	99	8.1	A	Active	Site 5	80	80
103-100-01	99	8.1/8.4	A	Active	Site 1	119	119
103-100-02	99	8.1/8.4	A	Active	Site 1	39	39
103-100-23	99	8.1	A	N/A	Site 1	40	150*
103-120-30	99	8.5	A	N/A	Site 1	103	103
104-050-01	100	8.1	A	Active	Site 5	217	217
104-050-08	100	8.1	A	Active	Site 5	158	158

Notes:
APN = Assessor's Parcel Number; N/A = not applicable
* Only a portion of the parcel would be developed as part of the proposed project.
Map Code Designations: 2.3 = Shallow Groundwater; 4.1 = Accepted Community Plan Areas (Buttonwillow Community Development Plan); 8.1 = Intensive Agriculture (Min. 20-Acre Parcel Size); 8.3 = Extensive Agriculture (Min. 5-Acre Parcel Size); 8.4 = Mineral and Petroleum (Min. 5-Acre Parcel Size); 8.5 = Resource Management (Min. 20- or 80- Acre Parcel Size).
Zoning Classification: A (Exclusive Agriculture).

Appendix C
Plant Compendium

Vascular Plant Species

Eudicots

AMARANTHACEAE — AMARANTH FAMILY

* *Amaranthus albus* — prostrate pigweed
  Amaranthus blitoides — mat amaranth
  Amaranthus palmeri — carelessweed

ANACARDIACEAE — SUMAC OR CASHEW FAMILY

* *Pistacia vera* — pistachio nut

APOCYNACEAE — DOGBANE FAMILY

Asclepias fascicularis — Mexican whorled milkweed

ASTERACEAE — SUNFLOWER FAMILY

Baccharis salicifolia — mulefat
* *Centaurea melitensis* — Maltese star-thistle
* *Centaurea solstitialis* — yellow star-thistle
Centromadia pungens ssp. *pungens* — common tarweed
Centromadia pungens — common tarweed
Deinandra fasciculata — clustered tarweed
Ericameria linearifolia — narrowleaf goldenbush
* *Erigeron bonariensis* — asthmaweed
Erigeron canadensis — Canadian horseweed
Gutierrezia californica — California match weed
Helianthus annuus — common sunflower
Isocoma acradenia var. *acradenia* — alkali goldenbush
Isocoma acradenia — alkali goldenbush
* *Lactuca serriola* — prickly lettuce
Laennecia coulteri — Coulter's horseweed
Lepidospartum squamatum — scale broom
* *Rhaponticum repens* — hardheads
* *Senecio vulgaris* — old-man-in-the-spring
* *Silybum marianum* — blessed milkthistle
* *Sonchus asper* — spiny sowthistle
* *Sonchus oleraceus* — common sowthistle
Xanthium strumarium — cocklebur

BORAGINACEAE — BORAGE FAMILY

Amsinckia intermedia — common fiddleneck
Amsinckia menziesii — Menzies' fiddleneck
Amsinckia tessellata — bristly fiddleneck
Heliotropium curassavicum var. *oculatum* — seaside heliotrope
Heliotropium curassavicum — salt heliotrope

BRASSICACEAE — MUSTARD FAMILY

* *Capsella bursa-pastoris* — shepherd's purse
* *Hirschfeldia incana* — shortpod mustard
* *Lepidium latifolium* — perennial pepper weed
* *Sisymbrium altissimum* — tall tumblemustard
* *Sisymbrium irio* — London rocket

CARYOPHYLLACEAE — PINK FAMILY

* *Spergularia rubra* — red sandspurry

CHENOPODIACEAE — GOOSEFOOT FAMILY

Atriplex argentea — silverscale saltbush
Atriplex lentiformis — quailbush
Atriplex polycarpa — allscale
* *Atriplex rosea* — tumbling saltweed
* *Atriplex semibaccata* — Australian saltbush
Atriplex serenana var. *serenana* — bractscale
Atriplex spinifera — spinescale
* *Bassia hyssopifolia* — fivehorn smotherweed
* *Chenopodium album* — lambsquarters
* *Chenopodium murale* — nettleleaf goosefoot
* *Salsola tragus* — prickly Russian thistle
Suaeda nigra — bush seepweed

CONVOLVULACEAE — MORNING-GLORY FAMILY

* *Convolvulus arvensis* — field bindweed

CRASSULACEAE — STONECROP FAMILY

Crassula connata — sand pygmyweed

EUPHORBIACEAE — SPURGE FAMILY

Croton setiger — dove weed

FABACEAE — LEGUME FAMILY

* *Medicago lupulina* — black medick
* *Medicago sativa* — alfalfa
* *Melilotus albus* — yellow sweetclover
* *Melilotus indicus* — annual yellow sweetclover

FRANKENIACEAE — FRANKENIA FAMILY

Frankenia salina — alkali heath

GERANIACEAE — GERANIUM FAMILY

* *Erodium cicutarium* — redstem stork's bill
* *Erodium moschatum* — musky stork's bill

LAMIACEAE — MINT FAMILY

* *Marrubium vulgare* — horehound

LYTHRACEAE — LOOSESTRIFE FAMILY

Lythrum californicum — California loosestrife

MALVACEAE — MALLOW FAMILY

* *Gossypium hirsutum* — upland cotton
* *Malva parviflora* — cheeseweed mallow

Malvella leprosa — alkali mallow

MORACEAE — MULBERRY FAMILY

* *Morus alba* — white mulberry

MYRTACEAE — MYRTLE FAMILY

* *Eucalyptus camaldulensis* — river redgum
* *Eucalyptus globulus* — Tasmanian bluegum
* *Eucalyptus tereticornis* — forest redgum

OLEACEAE — OLIVE FAMILY

* *Olea europaea* — olive

POLYGONACEAE — BUCKWHEAT FAMILY

Eriogonum maculatum — spotted buckwheat

Persicaria lapathifolia — smartweed

* *Persicaria maculosa* — spotted ladysthumb
* *Polygonum aviculare* — prostrate knotweed
* *Rumex crispus* — curly dock
* *Rumex dentatus* — toothed dock

PORTULACACEAE — PURSLANE FAMILY

* *Portulaca oleracea* — little hogweed

ROSACEAE — ROSE FAMILY

* *Prunus avium* — sweet cherry
* *Prunus dulcis* — sweet almond

SALICACEAE — WILLOW FAMILY

Populus fremontii — Fremont cottonwood

SOLANACEAE — NIGHTSHADE FAMILY

Datura wrightii — sacred thorn-apple
* *Nicotiana glauca* — tree tobacco
Solanum americanum — American black nightshade
* *Solanum elaeagnifolium* — silverleaf nightshade

TAMARICACEAE — TAMARISK FAMILY

* *Tamarix parviflora* — smallflower tamarisk
* *Tamarix ramosissima* — tamarisk

URTICACEAE — NETTLE FAMILY

Urtica dioica — stinging nettle
* *Urtica urens* — dwarf nettle

ZYGOPHYLLACEAE — CALTROP FAMILY

* *Tribulus terrestris* — puncturevine

Monocots

ARECACEAE — PALM FAMILY

* *Washingtonia robusta* — Washington fan palm

CYPERACEAE — SEDGE FAMILY

Bolboschoenus maritimus — salt marsh bulrush
Cyperus eragrostis — tall flatsedge
Schoenoplectus californicus — California bulrush

JUNCACEAE — RUSH FAMILY

Juncus acutus — spiny rush

POACEAE — GRASS FAMILY

* *Avena sativa* — common oat
* *Bromus catharticus* — rescuegrass

* *Bromus diandrus* — ripgut brome
* *Bromus hordeaceus* — soft brome
* *Bromus madritensis* — compact brome
* *Bromus rubens* — red brome
* *Cynodon dactylon* — Bermudagrass
* *Digitaria sanguinalis* — hairy crabgrass
  Distichlis spicata — salt grass
* *Echinochloa crus-galli* — barnyardgrass
* *Elymus repens* — quackgrass
  Elymus triticoides — creeping ryegrass
* *Festuca perennis* — perennial rye grass
* *Hordeum marinum* — seaside barley
* *Hordeum murinum* — mouse barley
* *Hordeum vulgare* — common barley
  Leptochloa fusca ssp. *uninervia* — Mexican sprangletop
  Leptochloa fusca — Malabar sprangletop
* *Phalaris canariensis* — annual canarygrass
* *Poa annua* — annual bluegrass
* *Polypogon monspeliensis* — annual rabbitsfoot grass
* *Schismus arabicus* — Arabian schismus
* *Schismus barbatus* — common Mediterranean grass
* *Sorghum bicolor* — sorghum
* *Sorghum halepense* — Johnsongrass
  Sporobolus airoides — alkali sacaton

TYPHACEAE — CATTAIL FAMILY

Typha latifolia — broadleaf cattail

* Signifies introduced (non-native) species.

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Appendix D
Wildlife Compendium

Amphibians

Frogs

HYLIDAE – TREEFROGS

Pseudacris cadaverina – California treefrog

RANIDAE – TRUE FROGS

* *Lithobates catesbeianus* – American bullfrog

Toads

PELOBATIDAE – SPADEFOOTS

Spea hammondii – western spadefoot

Birds

Blackbirds, Orioles and Allies

ICTERIDAE – BLACKBIRDS

Agelaius phoeniceus – red-winged blackbird

Euphagus cyanocephalus – Brewer's blackbird

Sturnella neglecta – western meadowlark

* *Molothrus ater* – brown-headed cowbird

Falcons

FALCONIDAE – CARACARAS AND FALCONS

Falco columbarius – merlin

Falco sparverius – American kestrel

Finches

FRINGILLIDAE – FRINGILLINE AND CARDUELINE FINCHES AND ALLIES

Haemorhous mexicanus – house finch

Flycatchers

TYRANNIDAE – TYRANT FLYCATCHERS

Sayornis nigricans – black phoebe
Sayornis saya – Say's phoebe
Tyrannus verticalis – western kingbird

Goatsuckers

CAPRIMULGIDAE – GOATSUCKERS

Chordeiles acutipennis – lesser nighthawk

Hawks

ACCIPITRIDAE – HAWKS, KITES, EAGLES, AND ALLIES

Accipiter cooperii – Cooper's hawk
Buteo jamaicensis – red-tailed hawk
Buteo lineatus – red-shouldered hawk
Buteo regalis – ferruginous hawk
Circus hudsonius – northern harrier

Herons and Bitterns

ARDEIDAE – HERONS, BITTERNS, AND ALLIES

Ardea alba – great egret
Ardea herodias – great blue heron

Ibises and Spoonbills

THRESKIORNITHIDAE – IBISES AND SPOONBILLS

Plegadis chihi – white-faced ibis

Jays, Magpies and Crows

CORVIDAE – CROWS AND JAYS

Aphelocoma californica – California scrub-jay
Corvus brachyrhynchos – American crow
Corvus corax – common raven

Larks

ALAUDIDAE – LARKS

Eremophila alpestris – horned lark

Mockingbirds and Thrashers

MIMIDAE – MOCKINGBIRDS AND THRASHERS

Mimus polyglottos – northern mockingbird

New World Vultures

CATHARTIDAE – NEW WORLD VULTURES

Cathartes aura – turkey vulture

Old World Sparrows

PASSERIDAE – OLD WORLD SPARROWS

* *Passer domesticus* – house sparrow

Owls

TYTONIDAE – BARN OWLS

Tyto furcata – American barn owl

STRIGIDAE – TYPICAL OWLS

Athene cunicularia – burrowing owl

Bubo virginianus – great horned owl

Pigeons and Doves

COLUMBIDAE – PIGEONS AND DOVES

Zenaida macroura – mourning dove

* *Columba livia* – rock pigeon (rock dove)

* *Streptopelia decaocto* – Eurasian collared-dove

Roadrunners and Cuckoos

CUCULIDAE – CUCKOOS, ROADRUNNERS, AND ANIS

Geococcyx californianus – greater roadrunner

Shorebirds

CHARADRIIDAE – LAPWINGS AND PLOVERS

Charadrius vociferus – killdeer

SCOLOPACIDAE – SANDPIPERS, PHALAROPES, AND ALLIES

Calidris alpina – dunlin
Calidris minutilla – least sandpiper
Gallinago delicata – Wilson's snipe
Limnodromus griseus – short-billed dowitcher
Tringa melanoleuca – greater yellowlegs

Shrikes

LANIIDAE – SHRIKES

Lanius ludovicianus – loggerhead shrike

Starlings and Allies

STURNIDAE – STARLINGS

* *Sturnus vulgaris* – European starling

Thrushes

TURDIDAE – THRUSHES

Turdus migratorius – American robin

Wagtails and Pipits

MOTACILLIDAE – WAGTAILS AND PIPITS

Anthus rubescens – American pipit

Waterfowl

ANATIDAE – DUCKS, GEESE, AND SWANS

Anas platyrhynchos – mallard

Wood Warblers and Allies

PARULIDAE – WOOD-WARBLERS

Setophaga coronata – yellow-rumped warbler

Woodpeckers

PICIDAE – WOODPECKERS AND ALLIES

Colaptes auratus – northern flicker

Wrens

TROGLODYTIDAE – WRENS

Thryomanes bewickii – Bewick's wren

New World Sparrows

PASSERELLIDAE – NEW WORLD SPARROWS

Artemisiospiza belli – Bell's sparrow
Chondestes grammacus – lark sparrow
Melospiza lincolnii – Lincoln's sparrow
Melospiza melodia – song sparrow
Passerculus sandwichensis – savannah sparrow
Pipilo maculatus – spotted towhee
Zonotrichia leucophrys – white-crowned sparrow

Invertebrates

Bees

APIDAE – BEES

Bombus crotchii – Crotch's bumble bee

Mammals

Canids

CANIDAE – WOLVES AND FOXES

Canis latrans – coyote

Domestic

CANIDAE – WOLVES AND FOXES

* *Canis familiaris* – domestic dog

Hares and Rabbits

LEPORIDAE – HARES AND RABBITS

Lepus californicus – black-tailed jackrabbit

Sylvilagus audubonii – desert cottontail

Kangaroo Rats

HETEROMYIDAE – POCKET MICE & KANGAROO RATS

Dipodomys heermanni – Heermann's kangaroo rat

Dipodomys nitratoides nitratoides – Tipton kangaroo rat

Perognathus inornatus – San Joaquin pocket mouse

Mustelids

MEPHITIDAE – SKUNKS

Mephitis mephitis – striped skunk

Squirrels

SCIURIDAE – SQUIRRELS

Otospermophilus beecheyi – California ground squirrel

Rats, Mice, & Voles

CRICETIDAE – RATS, MICE, & VOLES

Peromyscus maniculatus – eastern deermouse

Reithrodontomys megalotis – western harvest mouse

Reptiles

Lizards

PHRYNOSOMATIDAE – IGUANID LIZARDS

Uta stansburiana – common side-blotched lizard

TEIIDAE – WHIPTAIL LIZARDS

Aspidoscelis tigris – tiger whiptail

* signifies introduced (non-native) species

Appendix E

Special-Status Plant Species with Low or No Potential to Occur

Scientific Name	Common Name	Status (Federal/ State/CRPR)	Primary Habitat Associations/ Life Form/Blooming Period/ Elevation Range (ft amsl)	Potential to Occur
Astragalus hornii var. *hornii*	Horn's milk-vetch	None/None/1B.1	Meadows and seeps, playas; alkaline, lake margins/annual herb/May–Oct/ 195–2,785	***Not expected to occur.*** This species was not observed during focused surveys conducted in June 2024. Known to occur less than 1 mile from project site (CDFW 2024).
Atriplex cordulata var. *erecticaulis*	Earlimart orache	None/None/1B.2	Valley and foothill grassland/annual herb/ Aug–Sep(Nov)/130–330	***Not expected to occur***. A reference check for this species in June 2024 detected the species and it was in fruit. It would have been visible during rare plant surveys if present. Known to occur less than 0.5 miles from project site (CDFW 2024).
Atriplex coronata var. *vallicola*	Lost Hills crownscale	None/None/1B.2	Chenopod scrub, valley and foothill grassland, vernal pools; alkaline/ annual herb/Apr–Sep/165–2,080	***Not expected to occur.*** This species was not observed during focused surveys conducted in June 2024.
Atriplex subtilis	subtle orache	None/None/1B.2	Valley and foothill grassland; alkaline/ annual herb/(Apr)June–Sep(Oct)/ 130–330	***Low potential to occur.*** This species was not observed during focused surveys conducted in June 2024. CNDDB occurrence on the project site. (CDFW 2024).
Calochortus striatus	alkali mariposa-lily	None/None/1B.2	Chaparral, chenopod scrub, meadows and seeps, Mojavean desert scrub; alkaline, mesic/perennial bulbiferous herb/April–June/230–5,235	***Not expected to occur.*** This species was not observed during focused surveys conducted in June 2024. Known to occur in the vicinity of the project.
Caulanthus californicus	California jewelflower	FE/SE/1B.1	Chenopod scrub, pinyon and juniper woodland, valley and foothill grassland; sandy/annual herb/Feb–May/200–3,280	***Not expected to occur***. The project site is within the species' known elevation range and contains suitable chenopod scrub and/or grassland habitat to support this species. However, there are no records of this species within 5 miles of the project site, and documented records of this species within 10 miles of the project site

Scientific Name	Common Name	Status (Federal/ State/CRPR)	Primary Habitat Associations/ Life Form/Blooming Period/ Elevation Range (ft amsl)	Potential to Occur
				are historical or extirpated (CDFW 2024d; CCH 2024).
Caulanthus lemmonii	Lemmon's jewelflower	None/None/1B.2	Pinyon and juniper woodland, valley and foothill grassland/annual herb/ Feb–May/260–5,180	***Low potential to occur***. The project site is within the species' known elevation range and contains suitable grassland habitat to support this species. However, the project site is outside of the species' known geographic range, with the majority of records occurring in the foothills of the southern coast range mountains. Additionally, records are historical, ranging in date from 1932-1965 (CCH 2024).
Cirsium crassicaule	slough thistle	None/None/1B.1	Chenopod scrub, marshes and swamps (sloughs), riparian scrub/ annual/ perennial herb/May–Aug/10–330	***Low potential to occur.*** This species was not observed during focused surveys conducted in June 2024. CNDDB occurrence on the project site (CDFW 2024).
Delphinium recurvatum	recurved larkspur	None/None/1B.2	Chenopod scrub, cismontane woodland, valley and foothill grassland; alkaline/ perennial herb/Mar–June/10–2,590	***Not expected to occur.*** This species was not observed during focused surveys conducted in June 2024. Known to occur approximately 1.5 miles from project site (CDFW 2024).
Eriogonum temblorense	Temblor buckwheat	None/None/1B.2	Valley and foothill grassland (clay, sandstone)/annual herb/(Apr)May–Sep/ 985–3,280	***Not expected to occur***. The site is outside of the species' known elevation range.
Eryngium spinosepalum	spiny-sepaled button-celery	None/None/1B.2	Valley and foothill grassland, vernal pools/ annual/perennial herb/Apr–June/ 260–3,195	***Not expected to occur.*** This species was not observed during focused surveys conducted in June 2024. Known to occur in the vicinity of the project.
Eschscholzia lemmonii ssp. *kernensis*	Tejon poppy	None/None/1B.1	Chenopod scrub, valley and foothill grassland/annual herb/(Feb)Mar–May/ 525–3,280	***Not expected to occur***. The site is outside of the species' known elevation range.

Scientific Name	Common Name	Status (Federal/ State/CRPR)	Primary Habitat Associations/ Life Form/Blooming Period/ Elevation Range (ft amsl)	Potential to Occur
Hordeum intercedens	vernal barley	None/None/3.2	Coastal dunes, Coastal scrub, Valley and foothill grassland (depressions, saline flats), Vernal pools/annual herb/ Mar–June/15–3280	**Low potential to occur**. The project site is within the species' known elevation range and contains grassland habitat that may support this species. However, the project site is outside of the species known geographic range, with the majority of records occurring in coastal regions along the southern California coast (CCH 2024). Additionally, this species was not observed during June 2024 focused rare plant surveys when this species would have been in bloom and identifiable.
Lasthenia glabrata ssp. *coulteri*	Coulter's goldfields	None/None/1B.1	Marshes and swamps (coastal salt), playas, vernal pools/annual herb/Feb–June/5–4,000	***Low Potential to Occur.*** This species was not observed during focused surveys conducted in June 2024. No CNDDB records have been recorded of this species within 5 miles of the project site (CDFW 2024c). There are no suitable vegetation communities present.
Layia heterotricha	pale-yellow layia	None/None/1B.1	Cismontane woodland, coastal scrub, pinyon and juniper woodland, valley and foothill grassland; alkaline (sometimes), clay (sometimes)/annual herb/ Mar–June/985–5,590	***Not expected to occur***. The site is outside of the species' known elevation range.
Layia munzii	Munz's tidy-tips	None/None/1B.2	Chenopod scrub, valley and foothill grassland (alkaline clay)/annual herb/Mar–Apr/490–2,295	***Not expected to occur.*** The site is outside of the species' known elevation range.
Madia radiata	showy golden madia	None/None/1B.1	Cismontane woodland, valley and foothill grassland/annual herb/Mar–May/80–3,985	***Low potential to occur***. The project site is within the species' known elevation range and contains suitable grassland habitat to support this species. However, the project site is outside of the species' known

Scientific Name	Common Name	Status (Federal/ State/CRPR)	Primary Habitat Associations/ Life Form/Blooming Period/ Elevation Range (ft amsl)	Potential to Occur
				geographic range, with the majority of records occurring in the foothills of the southern coast range mountains. Additionally, records are historical, ranging in date from 1883-2005 (CCH 2024).
Monolopia congdonii	San Joaquin woollythreads	FE/None/1B.2	Chenopod scrub, valley and foothill grassland (sandy)/annual herb/Feb–May/195–2,620	***Low potential to occur.*** The project site is within the species' known elevation range and contains suitable grassland and scrub habitat to support this species. However, there is only one record of this species within 5 miles of the project site and it is historical, from 1990 (CDFW 2024).
Puccinellia simplex	California alkali grass	None/None/1B.2	Chenopod scrub, meadows and seeps, valley and foothill grassland, vernal pools; alkaline, flats, lake margins, vernally mesic/annual herb/Mar–May/ 5–3,050	***Low potential to occur.*** The project site is within the species' known elevation range and contains suitable grassland and scrub habitat to support this species. However, there is only one record of this species within 5 miles of the project site and it is historical, from 1983 (CDFW 2024).
Stylocline citroleum	oil neststraw	None/None/1B.1	Chenopod scrub, coastal scrub, valley and foothill grassland; clay/annual herb/ Mar–Apr/165–1,310	***Low potential to occur***. The project site is within the species' known elevation range and contains suitable grassland and scrub habitat to support this species. However, there are only three records of this species within 5 miles of the project site and they are all historical, from 1950, 1988, and 1995 (CDFW 2024).
Stylocline masonii	Mason's neststraw	None/None/1B.1	Chenopod scrub, pinyon and juniper woodland; sandy/annual herb/Mar–May/ 330–3,935	***Low potential to occur.*** The project site is within the species' known elevation range and contains suitable chenopod scrub habitat to support this species. However, there is only one record of this species within 10 miles of the project site, and it is historical from 1998 (CDFW 2024).

Scientific Name	Common Name	Status (Federal/ State/CRPR)	Primary Habitat Associations/ Life Form/Blooming Period/ Elevation Range (ft amsl)	Potential to Occur
Tropidocarpum californicum	Kings gold	None/None/1B.1	Chenopod scrub/annual herb/Feb–Mar/ 215–590	**Low potential to occur.** The project site is within the species' known elevation range and contains suitable chenopod scrub habitat which could support this species. However, there are no records of this species within 10 miles of the project site (CDFW 2024).

Status Legend
CRPR: California Rare Plant Rank
1B: Plants rare, threatened, or endangered in California and elsewhere
Threat Rank
0.1 – Seriously threatened in California (over 80% of occurrences threatened/high degree and immediacy of threat)
0.2 – Moderately threatened in California (20%–80% occurrences threatened/moderate degree and immediacy of threat)
Note: ft amsl = feet above mean sea level.

References

CCH (Consortium of California Herbaria). 2024. CCH2 Portal. Accessed September 2024. https://cch2.org/portal/index.php.

CDFW (California Department of Fish and Wildlife). 2024. RareFind 5, Version 5.2.14. California Natural Diversity Database. Sacramento: CDFW, Biogeographic Data Branch. Accessed July 2024. https://map.dfg.ca.gov/rarefind/view/RareFind.aspx.

Appendix F

Special-Status Wildlife Species with Low or No Potential to Occur

Scientific Name	Common Name	Status (Federal/State)	Habitat	Potential to Occur
Fishes				
Hypomesus transpacificus	Delta smelt	FT/SE	Sacramento–San Joaquin Delta; seasonally in Suisun Bay, Carquinez Strait, and San Pablo Bay	***Not expected to occur***. Project is outside the known range for this species.
Invertebrates				
Danaus plexippus	Monarch butterfly	FC/None	Wind-protected tree groves with nectar sources and nearby water sources.	***Low potential to occur***. Although three historic overwintering sites are mapped northeast of Bakersfield (Xerces 2023), this species is known to overwinter primarily along the coast of California.
Reptiles				
Anniella alexanderae	Temblor legless lizard	None/SC, SSC	Sandy soil at the southeast base of the Temblor Ranges, southwestern San Joaquin Valley, Kern County. Often found underneath leaf litter, rocks, and logs.	***Not expected to occur***. Although the project site supports loose soils for burrowing and other refugia, the nearest CNDDB occurrence (CDFW 2023) is located 6.6 miles southwest of the project site on the west side of the California Aqueduct. The known range and all occurrences of this species do not extend eastward into the mostly agricultural lands east of the California Aqueduct, but are associated with the areas of more contiguous natural habitat near the base of the Temblor Range.
Emys marmorata	western pond turtle	None/SSC	Slow-moving permanent or intermittent streams, ponds, small lakes, and reservoirs with emergent basking sites; adjacent uplands used for nesting and during winter	***Low potential to occur***. Although a few agricultural ponds are located within the project site, these ponds lack basking sites and uplands for nesting/wintering.
Thamnophis gigas	giant gartersnake	FT/ST	Freshwater marsh habitat and low-gradient streams; also uses canals and irrigation ditches. Current range extends from Fresno County north to Butte/ Glenn counties.	***Not expected to occur***. Project is outside the known range for this species.

Scientific Name	Common Name	Status (Federal/State)	Habitat	Potential to Occur
Birds				
Charadrius montanus (wintering)	mountain plover	BCC/SSC	Winters in shortgrass prairies, plowed fields, open sagebrush, and sandy deserts	***Low potential to occur***. Although the species has been known to historically winter in San Joaquin Valley (eBird 2023; CDFW 2023), largest wintering populations occur in Imperial Valley.
Charadrius nivosus nivosus (nesting)	western snowy plover	FT, BCC/SSC	On coasts nests on sandy marine and estuarine shores; in the interior nests on sandy, barren, or sparsely vegetated flats near saline or alkaline lakes, reservoirs, and ponds	***Not expected to occur***. The project site lacks suitable nesting substrates for this species.
Gymnogyps californianus	California condor	FE/FP, SE	Nests in rock formations, deep caves, and occasionally in cavities in giant sequoia trees (Sequoiadendron giganteus); forages in relatively open habitats where large animal carcasses can be detected	***Not expected to occur***. Project is outside the known range for this species.
Toxostoma lecontei	LeConte's thrasher	BCC/SSC	Nests and forages in desert wash, desert scrub, alkali desert scrub, desert succulent, and Joshua tree habitats; nests in spiny shrubs or cactus	***Low potential to occur***. Although the species has been known to occasionally occur in the San Joaquin Valley, this species has more regular occurrences along the Elk Hills and the Tremblor Range and beyond (eBird 2023).
Vireo bellii pusillus (nesting)	least Bell's vireo	FE/SE	Nests and forages in low, dense riparian thickets along water or along dry parts of intermittent streams; forages in riparian and adjacent shrubland late in nesting season	***Not expected to occur***. Project is outside the known breeding range for this species.
Mammals				
Dipodomys nitratoides brevinasus	short-nosed kangaroo rat	None/SSC	Friable soils on flat or gently rolling terrain in grassland and desert-shrub vegetation	***Not expected to occur***. Project is outside the known range for this species.

Scientific Name	Common Name	Status (Federal/State)	Habitat	Potential to Occur
Eumops perotis californicus	western mastiff bat	None/SSC	Chaparral, coastal and desert scrub, coniferous and deciduous forest and woodland; roosts in crevices in rocky canyons and cliffs where the canyon or cliff is vertical or nearly vertical, trees, and tunnels	***Low potential to occur***. The project site lacks cliffs, caves, rocks preferred by this species. In addition, only two historical (1950s and undated) CNDDB occurrences are located within 5 miles of the site (CDFW 2023).
Onychomys torridus tularensis	Tulare grasshopper mouse	None/SSC	Low, open scrub, and semi-scrub habitats in arid Lower Sonoran associations.	***Low potential to occur.*** The project site supports suitable open habitats. However, there are only three records of this species within 5 miles of the project site, and two of them are located west of the California Aqueduct, which may serve as a barrier to movement. One record occurs between the project area and the Buttonwillow Ecological Reserve; however, it is historical, from 1999 (CDFW 2023).
Sorex ornatus relictus	Buena Vista Lake ornate shrew	FE/SSC	Marshes, wetlands, streams, and sloughs along lake basins in southern San Joaquin Valley; historical occurrences include Buena Vista, Tulare, and Kern Lakes; distribution poorly known.	***Not Observed.*** The nearest recent occurrence is along Kern River (2000) approximately 9.0 miles southeast of the project site. There are suitable water sources, moist soils, and areas of dense cover within the project site to support this species. In addition, the proposed Goose Lake Conservation Area (northwest project site) is federally designated critical habitat for this species (78 FR 39835–39867). However, focused camera studies for this species were conducted for suitable habitat within Site 8 at seven locations in 2024 and were negative.

Note: CNDDB = California Natural Diversity Database.
Status Legend
Federal
BCC: Bird of Conservation Concern (USFWS)
FC: Candidate for federal listing as threatened or endangered
FE: Federally listed as endangered
FT: Federally listed as threatened

State
FP: CDFW Fully Protected species
SC: State candidate for listing as threatened or endangered
SE: State listed as endangered
ST: State listed as threatened
SSC: CDFW Species of Special Concern

References

CDFW (California Department of Fish and Wildlife). 2023. RareFind 5, Version 5.2.14. California Natural Diversity Database. Sacramento, California: CDFW, Biogeographic Data Branch. Accessed 2023. https://map.dfg.ca.gov/rarefind/view/RareFind.aspx.

eBird. 2023. eBird: An online database of bird distribution and abundance [web application]. Ithaca, New York: Cornell Lab of Ornithology. http://www.ebird.org.

Xerces (Xerces Society for Invertebrate Conservation). 2023. “Western Monarch Overwintering Site Viewer” [map]. https://www.westernmonarchcount.org/map-of-overwintering-sites/.

Appendix G
Small Mammal Trapping Reports

Buttonbush Solar and Storage Project
Kern County, California

Small Mammal Trapping Report

December 12 – 23, 2024
January 21 – 25, 2025
February 19 – 24, 2025

McCormick Biological, Inc.
Federal Recovery Permit: 59559C-2
California Scientific Collecting Permit: S-211160001-22059-001

Randi McCormick, Principal Biologist
rmccormick@mcbioinc.com (661-343-1078)

Report Submitted on March 21, 2025

Overview:

The Buttonbush Solar and Storage Project (Project) nocturnal trapping occurred between December 12 – 23, 2024, January 21 – 25, 2025, and February 19 – 24, 2025. The trapping locations associated with the Project were north of Buttonwillow and northwest of Bakersfield, Kern County, California. (Attachment 1, Figures 1 and 2). The sites that were trapped are near agricultural lands with some areas of remnant natural lands (Attachment 1, Figure 3). The non-agricultural lands have been impacted to varying degrees by historic surface disturbance, utility corridors, and nearby agricultural practices.

All handling activities were conducted under the supervision of a permitted biologist. For this project, either Randi McCormick (SC-211160006), Christine Van Horn Job (SC-221780003), Rainey Davis (SC-232310001), Ashleigh Pryor (SC-221780002), or Megan McCormick (SC-232680004) led onsite activities. Ms. R. McCormick, Ms. Van Horn Job, Ms. Davis, Ms. Pryor, and Ms. M. McCormick are included on the List of Authorized Individuals (LAI) under Federal Recovery Permit 59559C-2 and California Scientific Collecting Permit S-211160001-22059-001. Field assistants for this trapping effort included Alex Welch, Andy Reyes, Quinn Wright, Noor Ahmed, Kyle McDowell, Amy Fetters, Julian Calvillo, Carl Brooks, Colin Guthrie, Cristina Gonzalez, and Bailey Christensen. The notification was submitted to United States Fish and Wildlife Service (USFWS) on November 27, 2024, with authorization received on December 2, 2024 (Attachment 2). California Department of Fish and Wildlife (CDFW) was notified on November 27, 2024, with no further communication received.

The purpose of trapping was to sample and report baseline information in areas where existing kangaroo rat species occurrence information was not available and small mammal burrows potentially occupied by kangaroo rats were identified. The target listed species were Tipton kangaroo rat (*Dipodomys nitratoides nitratoides*, TKR), which were historically documented within some of the natural lands in the Project vicinity, and giant kangaroo rat (*Dipodomys ingens*, GKR), which were not previously documented in the Project vicinity. The closest GKR records are between 2.5 and 3.5 miles southwest of the town of Buttonwillow and outside of the general area sampled.

Methods:

The trapping effort was conducted over either five or six consecutive nights in four different sessions by distributing 343 Sherman XLK live traps along sample lines at approximately 15-meter (50-foot) spacing (Attachment 1, Figures 3a-c).

Sunset during the trapping sessions ranged between approximately 4:45 pm and 5:45 pm. The traps were opened no earlier than one hour before sunset, baited with millet, and provisioned with crumpled, unbleached paper towels and polyester batting.

Overnight lows dropped below 50°F during the trapping period and the traps were checked once each night and not more than three hours after baiting. Temperatures during trap checks ranged between 37°F and 65°F. All small mammals, except for deer mice (*Peromyscus maniculatus;* PEMA), were marked with a non-toxic felt tip pen, weighed, sexed, and released at the point of capture. General health condition of each captured small mammal was also noted. Deer mice were not handled or tracked as unique individuals and were released

immediately upon species identification at the point of capture. Marked animals were identified as "recapture" on field forms and were not processed.

Results:

Traps were opened for six consecutive nights on 3 out of 4 of the trapping sessions. Traps were not opened on the last night of one session due to impending rain. No GKR individuals were captured during any of the trapping sessions. Species captured included, TKR, PEMA, Heermann's kangaroo rat (*Dipodomys heermanni;* HKR), and western harvest mouse (*Reithrodontomys megalotis*, WHM). Based on mark-recapture data collected, 1 TKR, 125 HKR and 8 WHM individuals were captured. One TKR individual was detected during Session 4 (35.453020°N, -119.385850°W; see Figure 3c). The trap at that location was removed, and this individual was recaptured approximately 25 meters (80 feet) to the north at one of the remaining traps on the same trap line. A total of 228 PEMA captures were recorded over the trapping sessions; however, the number of individuals is unknown since this species was not marked or otherwise handled.

Other notable species observed during trapping activities included ferruginous hawk (*Buteo regalis*), merlin (*Falco columbarius*), burrowing owl (*Athene cunicularia*), and western spadefoot (*Spea hammondii*) (Figured 3a and 3b; Table 2).

Table 1. Buttonbush Solar and Storage Project Nocturnal Trapping Results

Species*	Total Captures	Individuals	Notes
TKR	4	1	Captures at one trap location
HKR	341	125	Captures during all sessions on most trap lines
WHM	11	8	Captures limited to 2 lines during the 4 trap sessions (see Figure 3b)
PEMA	228	N/A	Captures on all trap lines

*Species Codes: TKR – Tipton kangaroo rat (*Dipodomys nitratoides nitratoides*); HKR – Heermann's kangaroo rat (*Dipodomys heermanni*); PEMA – deer mouse (*Peromyscus maniculatus*);); WHM – Western harvest mouse (*Reithrodontomys megalotis*)

Table 2. Buttonbush Solar and Storage Project Other Notable Wildlife Observations

Species	Coordinates	Notes
Ferruginous hawk	35.524401°N, -119.526901°W	1 adult observed on ground; flushed into pistachio orchard to the west. Observers: Randi McCormick, Megan McCormick
Merlin	35.528901°N, -119.519159°W	1 adult observed perched on pistachio tree; flushed northwest into natural land parcel. Observers: Randi McCormick, Megan McCormick
Burrowing owl	35.448967°N, -119.492845°W	1 adult observed adjacent to access road, flying. Observers: Christine Van Horn Job, Carl Brooks
Western spadefoot	35.522618°N, -119.508148°W	1 adult observed crossing trap line from plowed field north into natural land parcel. Observers: Randi McCormick, Megan McCormick

Discussion:

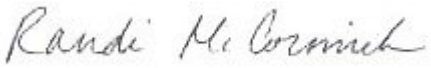
Although numerous small mammal burrows were observed in the Survey Area with many that were characteristic of kangaroo rat activity, no distinctive GKR burrowing activity was noted within the vicinity of the trap lines sampled.

The number of overall captures indicates that small mammal activity was relatively high in the areas sampled. Not enough of the area was sampled to reach a conclusion regarding GKR presence or lack of presence in the Project area.

Similarly, with one TKR capture, it can be concluded that TKR are present in the vicinity of the capture location. This capture location was along a parcel that borders the California Department of Fish and Wildlife Buttonwillow Ecological Reserve. The separation between the properties was a barbed wire fence. Small mammal burrows were observed near the fence and wildlife could pass between the properties under the fence. The lack of TKR captures along the other trap lines sampled does not necessarily indicate lack of presence due to the limited extent and coverage of the trap lines.

Trapping was conducted under the following authorizations: ES59559C (expiration 2026-09-13) and SCP S-211160001-22059-001 (expiration 2026-11-06).

I certify that the information in this survey report and attached exhibits fully and accurately represent our work.



Randi McCormick
Principal Biologist

Attachment 1
Location Maps

Buttonbush Solar and Storage Project

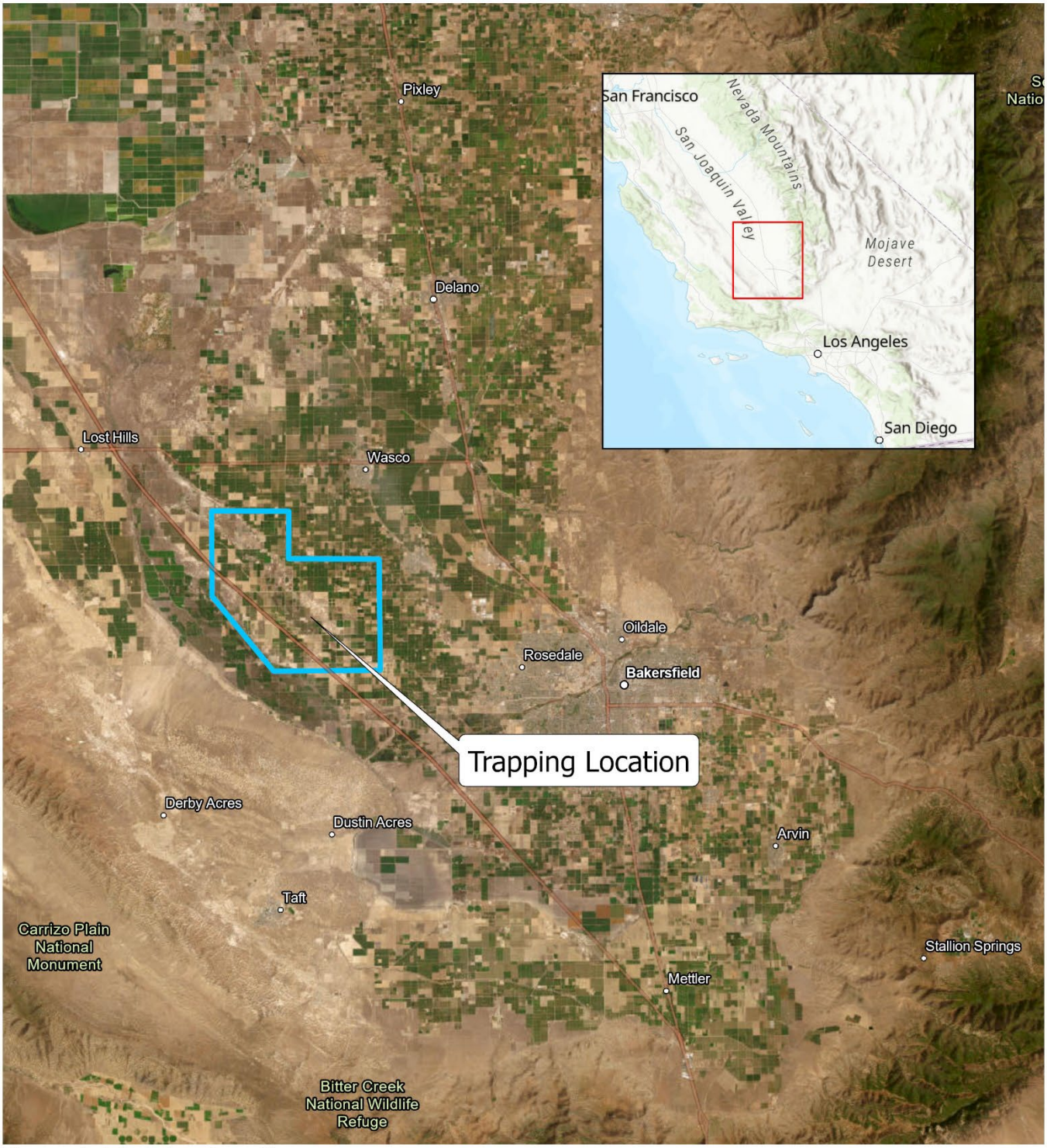


Figure 1: Trapping Location

N
W E
S

Miles
0 10 20
0 10 20
Kilometers

McCORMICK BIOLOGICAL INC.

Buttonbush Solar and Storage Project

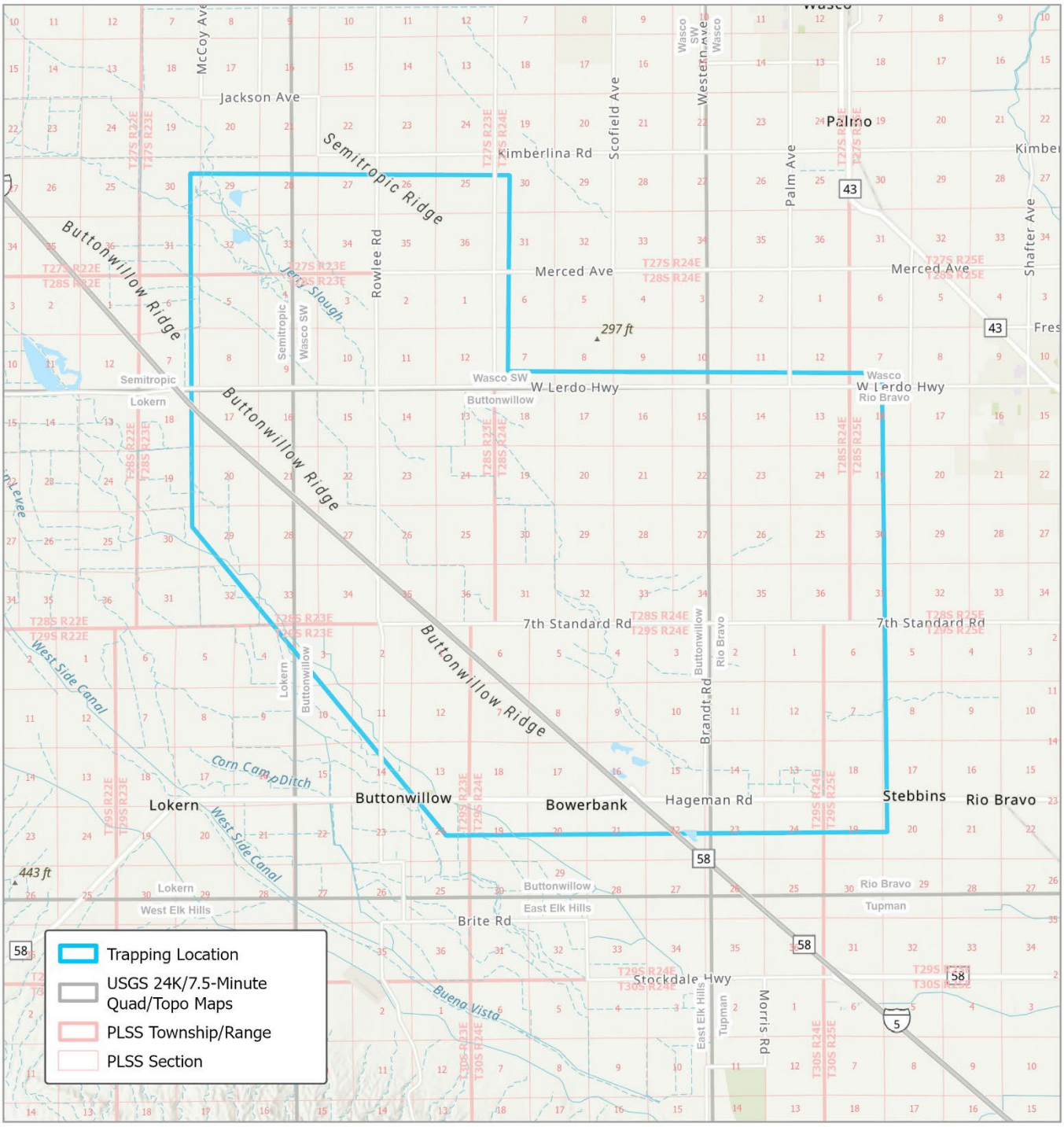


Figure 2: Trapping Location - USGS 7.5-minute Buttonwillow, Lokern, Rio Bravo, Semitropic, Wasco, and Wasco SW Quadrangles.

N
W E
S

Miles
0 2.5 5
0 2.5 5
Kilometers

McCORMICK BIOLOGICAL INC

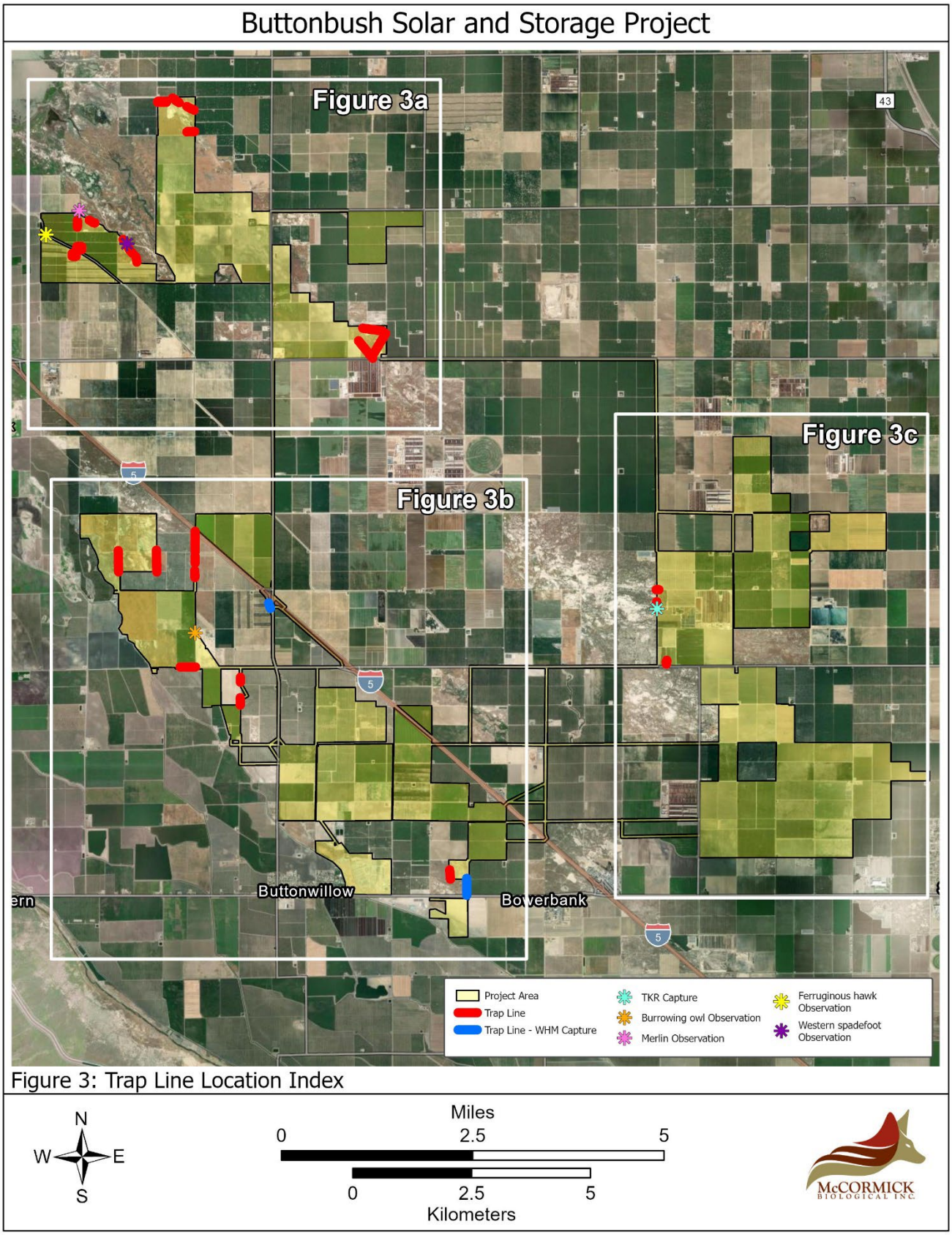


Figure 3: Trap Line Location Index

Buttonbush Solar and Storage Project

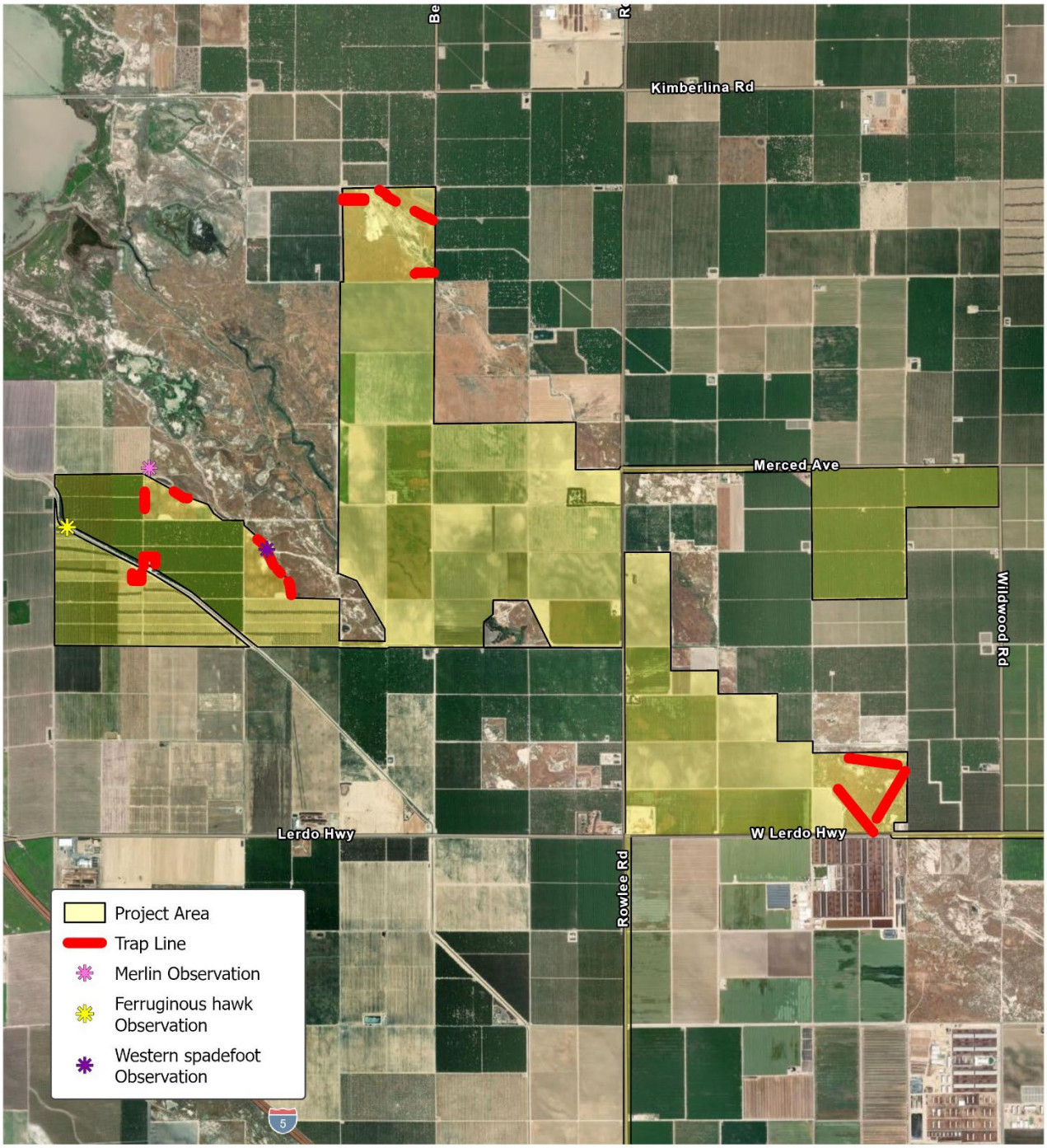
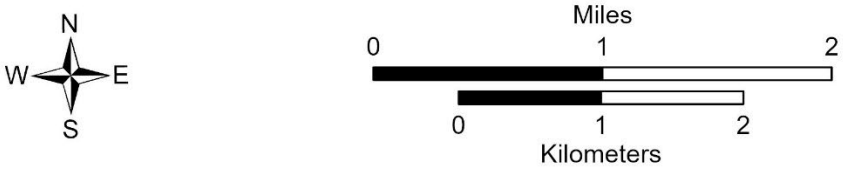


Figure 3a: Trap Line Locations



Buttonbush Solar and Storage Project

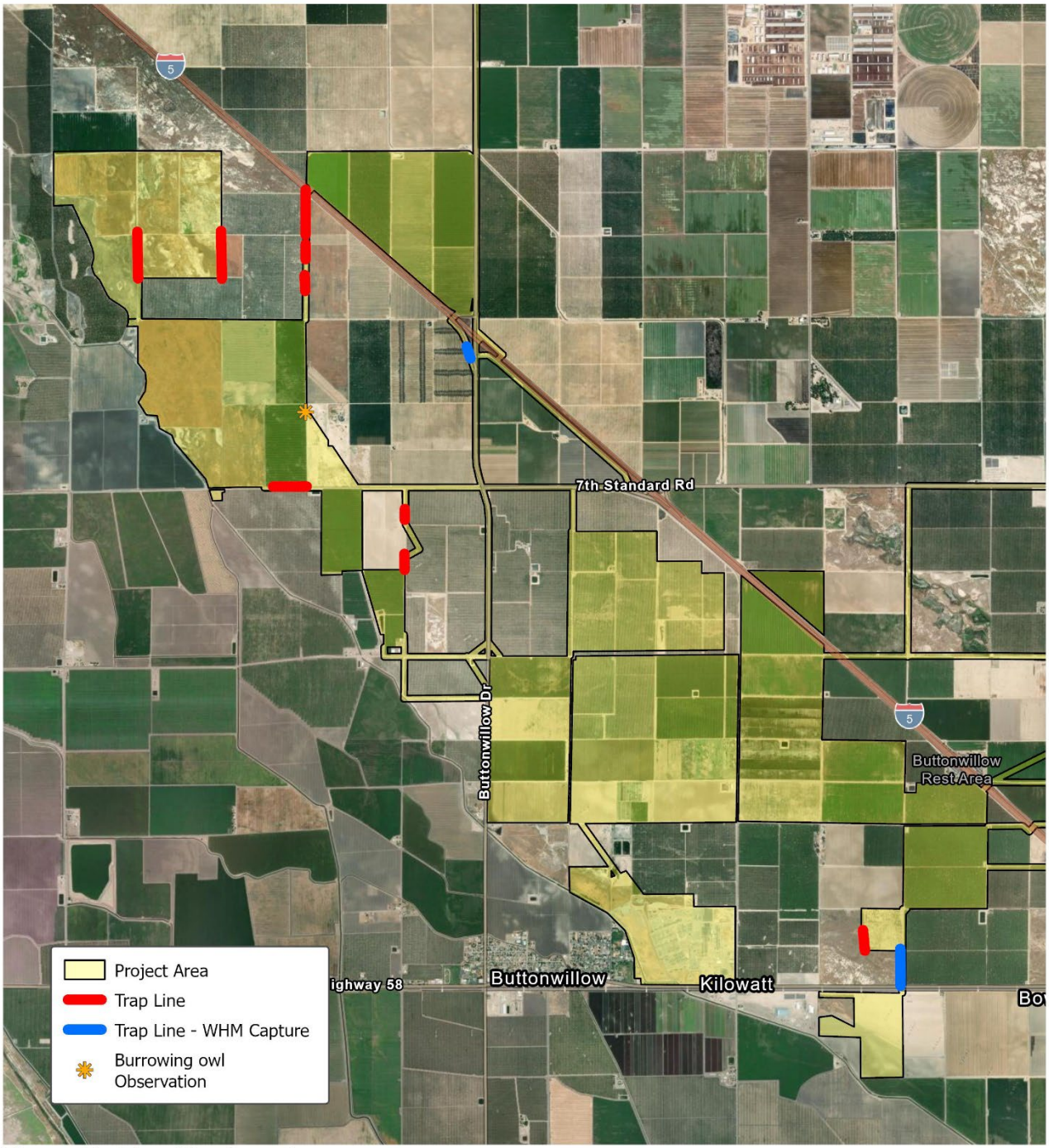


Figure 3b: Trap Line Locations

N
W E
S

Miles
0 1 2
0 1 2
Kilometers

McCORMICK BIOLOGICAL INC.

Buttonbush Solar and Storage Project

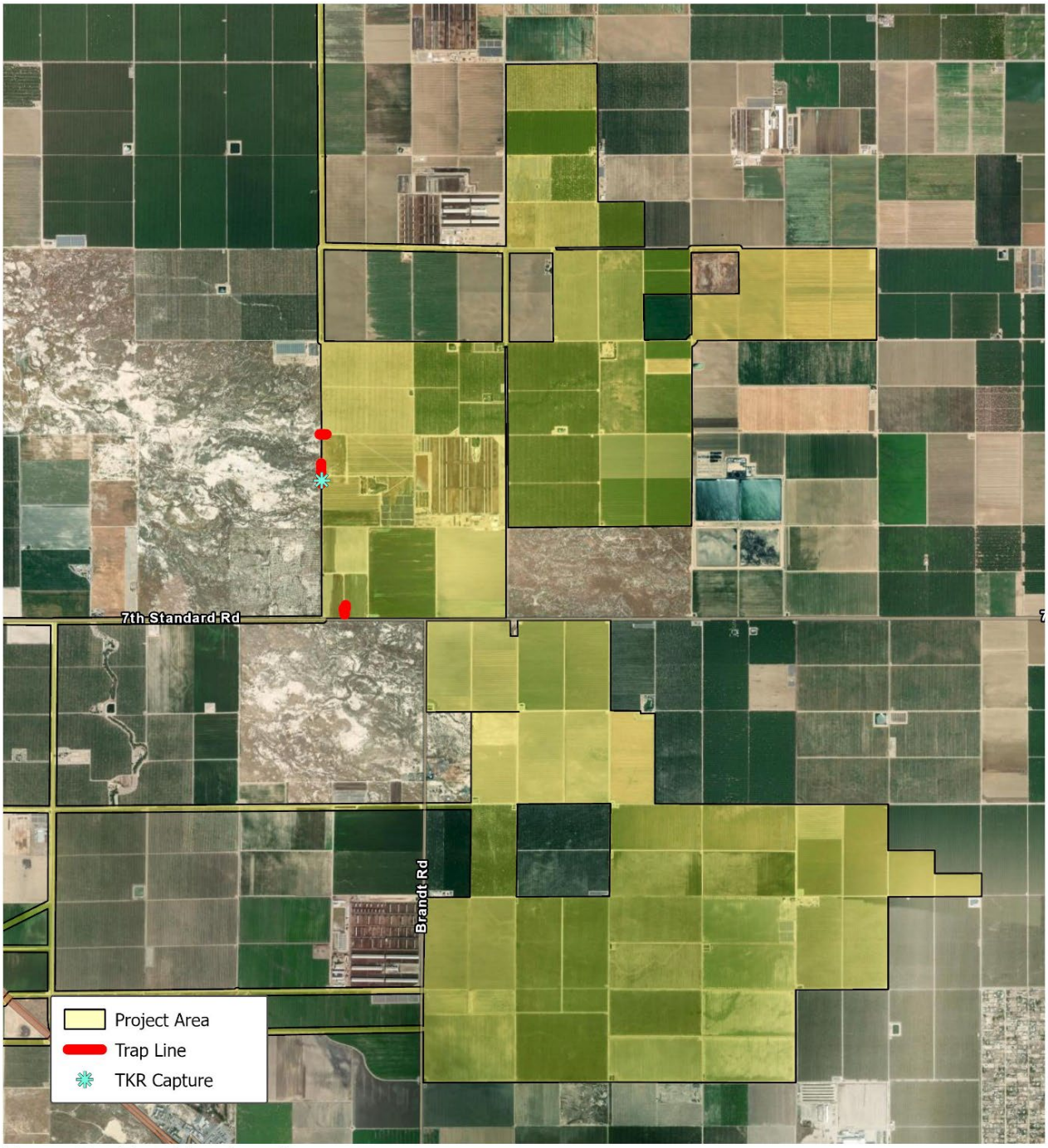


Figure 3c: Trap Line Locations

N
W E
S

Miles
0 1 2
0 1 2
Kilometers

McCORMICK BIOLOGICAL INC.

Attachment 2
USFWS Authorization E-mail

From:	SFWO Permits, FW8
To:	Randi McCormick
Cc:	Sloan, Justin
Subject:	Re: [EXTERNAL] Fed Recovery Permit ES59559C & CA SCP S-211160001-22059-001 (Nocturnal Trapping - TKR/GKR)
Date:	Monday, December 2, 2024 1:57:52 PM

EXTERNAL MESSAGE: Use caution when clicking links or attachments.

Hello,

We have received your notification to perform surveys following the U.S. Fish and Wildlife Service Survey Protocols. You may commence protocol-level survey activities 15 calendar days following the submittal of your notification, unless authorization is denied or a different start date was indicated. Please follow the reporting guidelines and Special Terms and Conditions within your recovery permit.

If this is an activity covered under a Service-approved management plan (e.g. Biological Opinion, Incidental Take Permit, Habitat Conservation Plan), you must follow the pre-activity notification and reporting guidelines as described in the management plan. Re-submit this notification to the Service contact listed in the management plan, unless this activity is outside the management plan.

Within 45 days following completion of the final presence/absence survey associated with this request, a survey report shall be submitted to fw8_sfwo_permits@fws.gov and the San Joaquin Valley Division Supervisor, Justin Sloan (justin_sloan@fws.gov). For surveys with negative results and for incomplete surveys (e.g., projects put on hold or withdrawn) a survey report is still required. Survey reports shall include:

1. i) Title, ii) permit number, iv) permittee name and their respective contact details, v) the location/GPS coordinates, vi) number and dates of surveys, vii) the activities completed, and viii) date of preparation on the report;
2. GIS data or GPS coordinates and maps (at a minimum, a 7.5-minute U.S. Geological Survey (USGS) topographic map at 1:24,000 scale) depicting the location and boundary of the survey area(s).
3. The following certification statement signed by each surveyor performing activities in independent status pursuant to this permit: "I certify that the information in this survey report and attached exhibits fully and accurately represents my work." The date of signature and the surveyor's permit number shall be included; and
4. All other information required in the applicable U.S. Fish and Wildlife Service Survey Protocol and 45-Day Survey Report section of this permit.

Please email fw8_sfwo_permits@fws.gov if you have additional questions.

Thank you,

Sacramento Fish and Wildlife Office

10(a)(1)(A) Recovery Permitting | **Sacramento Fish and Wildlife Office**
Pacific Southwest Region | U.S. Fish and Wildlife Service

DUDEK
4900 CALIFORNIA AVENUE
TOWER B 2ND FLOOR
BAKERSFIELD, CALIFORNIA 93309
T 661.208.4127

February 14, 2025 14787.06

Patricia Cole
U.S. Fish and Wildlife Service
2800 Cottage Way, W-2605
Sacramento, CA 95285

Subject: Results of Presence/Absence Trapping Survey for Special-Status Kangaroo Rat Species for the PG&E Parcel of the Buttonbush Solar and Storage Project, Kern County, California

Dear Patricia Cole,

This letter provides the results of the nocturnal trapping conducted December 16-21, 2024, to detect special-status kangaroo rat species that may occur within the PG&E parcel of the Buttonbush Solar and Storage Project, Kern County, California (Attachment A, Figure 1). The proposed project site is within the owned property of PG&E at their Midway Substation immediately east the community of Buttonwillow, California. The project site boundaries are illustrated on Figure 1 through 7. The project site us immediately north of State Route 58 andapproximately 3-miles west of Interstate 5 (Figure 2).

The PG&E parcel is part of the larger Buttonbush Solar and Storage Project being trapped by McCormick Biological Inc. Upon time of this letter report, it was unclear if Dudek biologist Russell Sweet would be helping with additional trapping efforts were to be conducted for the larger Buttonbush Solar and Storage Project. Thus, the gap in date from completion time to report submission. The PG&E parcel and the larger Buttonbush Solar and Storage Project were both within the pre-project notifications sent to California Department of Fish and Wildlifeand U.S. Fish and Wildlife Service per permit requirements (Attachments D and E).

According to the U.S. Geological Survey (USGS), the project site is within the Wasco SW, Semitropic, Rio Bravo, Buttonwillow, and Lokern USGS 1:24,000 topographic map (7.5-minute quadrangles). More specifically, the project site is located as follows: Township 27 S, Range 23 E, in portions of Sections 27, 28, 32, and 33–36; Township 28 S, Range 23 E, portions of Sections 1–15, 20, 22, 23, 26–29, and 32–35; Township 28 S, Range 24 E, in portions of Sections 7–10, 14–18, 21–28, and 31–35; and Township 29 S, Range 24 E, in portions of Sections 1–20. (Figure 3). Table 1, below, provides the Sections, Townships and Ranges for the prospective trapping locations.

Table 1. Township, Range, Sections and APN Numbers of Proposed Trap Locations

Township	Range	Section(s)	APN Numbers
27 South	23 East	28	069-350-07
28 South	23 East	2, 4, 5, 12, 13, 28, 33, 34	087-060-39, 087-090-04, 087-010-01, 087-160-01, 087-160-19, 087-160-49, 087-160-50, 087-170-04, 087-200-03, 087-200-13, 087-040-01, 087-050-29, 087-050-31, 087-050-38
28 South	24 East	33, 34	088-180-37

29 South	23 East	3, 13	101-020-08, 101-020-30, 101-020-33, 101-020-23, 100-020-19
29 South	24 East	3, 5, 6, 16, 18	103-080-48, 103-080-49, 103-080-57, 103-080-59, 103-100-23, 103-020-08, 103-030-04, 103-030-05, 103-030-19, 103-030-20, 103-030-44

Project Description

The Buttonbush Solar and Storage Project proponent (29SC 8me LLC) proposes to develop a photovoltaic solar facility and associated infrastructure necessary to generate up to 2 gigawatts of AC power with an up to 2-gigawatt energy storage system on approximately 12,048 acres located on 128 privately owned parcels in the valley region of Kern County. The Buttonbush Solar and Storage Project would be supported by a 500-kilovolt (kV) overhead generation tie (gen-tie) and/or underground electrical transmission line(s) originating from one or more on-site substations and terminating at the PG&E Midway Substation.

As part of the proposed Buttonbush Solar and Storage Project, interconnection requests have been submitted to the California Independent System Operator Corporation (CAISO) for the project that would interconnect to PG&E's Midway Substation. PG&E will modify the Midway Substation's 500 kV yard, within PG&E's Midway Substation property boundary, to accommodate the proposed Buttonbush Solar and Storage project's interconnection along with other upgrades. To support the proposed Buttonbush Solar and Storage Project's communication infrastructure, PG&E will install several fiber-optic lines to the west of the Buttonbush gen-tie route to facilitate communication between the Midway Substation and the Point of Change of Ownership, approximately 0.25 miles northwest (Figure 2). This fiber-optic line is critical for the safe and efficient operation of the proposed project. The fiber-optic line route will be trenched underground from the Midway Substation to the Point of Change of Ownership, minimizing aboveground impacts to local wildlife and sensitive species during operations.

To accommodate the interconnection request, PG&E proposes to enlarge Midway Substation's 500 kV yard within the Midway Substation property boundaries. Specifically, PG&E proposes to remove the existing precast security wall at the northwestern side of Midway Substation and replace it with a new 12-foot-tall wall, approximately 510 feet north and 140 feet west of the existing walls of the 500 kV yard in Midway Substation. Grading of the connection area would be required, but all expansion would be within the parcel. Within the newly graded area of Midway Substation, PG&E would install approximately one 550 kV, 3,000 ampere, 63 kiloampere high-voltage circuit breaker. This would include installing equipment foundations and concrete trenches, equipment cabinets, bus structures, communication lines, conduits, pull boxes, and concrete-encased conduit duct banks inside the substation as required. As noted above, in addition to substation modifications, PG&E anticipates installing up to 2,000 feet of new 500 kV single-circuit transmission line, creating a new, direct tie from Midway Substation to the point of interconnection for the proposed Buttonbush Solar and Storage Project. The new transmission line would be supported by up to four approximately 175-foot-tall lattice steel towers (LSTs) or tubular steel poles (TSPs). The towers would be supported by concrete foundations. The foundations would be designed to support the design loads based on local conditions.

Site Conditions

The Study Area is relatively flat throughout, with elevations ranging from approximately 272 feet above mean sea level in the northwest to approximately 285 feet above mean sea level in the southeast. One vegetation

community and three land cover types were mapped on the Study Area (Table 2). The spatial distribution of the vegetation communities and land covers are presented on Figure 4. Approximately 19.9 acres or 51.5% of the Study Area are disturbed/developed, including the following land cover types: orchards, disturbed habitat, and urban/developed lands. Table 2 provides the land covers and vegetation communities with respective acreages and percent cover. Attachment B has representative photos of the Study Area.

Table 2. Existing Land Covers and Vegetation Communities in the Study Area

General Category of Vegetation	Common Name of Vegetation	Scientific Name of Vegetation	Classification of Vegetation	Study Area Acreages	Percentage of Vegetation Comments/ Land Covers
Disturbed and developed	Orchards	Orchards (ORC)	NA/General Habitat/Group	2.2	5.6%
	Disturbed habitat	Disturbed Habitat (DH)	NA/General Habitat/Group	7.1	18.3%
	Urban/developed	Urban/Developed (DEV)	NA/General Habitat/Group	10.7	27.6%
			Disturbed and Developed Total	*19.9*	*51.5%*
Grass and Herb Dominated Community	Non-native grassland	Non-Native Grassland General Habitat (NNG)	NA/General Habitat/Group	18.7	48.5%
			Grass and Herb Dominated Total	*18.7*	*48.5%*
			Total	**38.6**	**100%**

Disturbed Habitat

Disturbed habitat refers to areas where soils have been recently or repeatedly disturbed by grading, compaction, or clearing of vegetation. Structures are typically not present within disturbed habitats, and these areas provide relatively low value for most plant and wildlife species. When vegetated, disturbed habitat supports predominantly non-native plant species, such as ornamentals or ruderal exotic species that take advantage of disturbance.

Within the Study Area, disturbed habitat consists of soil stockpiles, grading, and vegetation clearance for fuel modification and totals 7.1 acres (18.3%).

Urban/Developed

Urban/developed land covers refer to areas that have been constructed on or otherwise physically altered to the point where vegetation is no longer present. Developed areas are characterized by permanent or semi-permanent structures, hardscapes, and landscaped areas that require irrigation.

Within the Study Area, approximately 10.7 acres (27.6%) are urban/developed areas and include the existing substation, roads, and parking.

Orchards

Orchards refer to areas where trees, shrubs, or crop plants such as grapevines have been intentionally planted (i.e., to produce food or for other commercial purposes). Orchards and vineyards are typically artificially irrigated,

and plants may be supported with structures such as trellises. Orchards and vineyards typically support a limited understory of grasses or herbs (Oberbauer et al. 2008).

Within the Study Area there are 2.2 acres (5.6%) of orchards within the Study Area.

Non-Native Grassland

Non-native grasslands are grasslands that are dominated by non-native species. These grasslands typically occur in areas with a history of disturbance. Some associated species include common oat (*Avena sativa*), bromes (*Bromus* spp.), and barleys (*Hordeum* spp.) (CNPS 2024). On the Study Area, this general habitat occurs in upland habitat in the non-agricultural portions of the Study Area.

Common non-native grasses that dominant these areas include compact brome (*Bromus madritensis*), mouse barley (*Hordeum murinum*), and common Mediterranean grass (*Schismus barbatus*).

Within the Study Area, there are 18.7 acres (48.5%) non-native grasslands on site.

Soils

According to the U.S. Department of Agriculture Natural Resources Conservation Service (USDA 2024a), the following soil series occur within the boundaries of the Study Area: Lokern clay, saline-alkali, drained and (2) Milham sandy loam, 0% to 2% slopes. The soil series are described in more detail below and are presented in Figure 5.

- **Lokern Series** consists of deep, somewhat poorly drained, clayey soils formed from mixed but predominantly granitic alluvium. Lokern soils are on basins and have slopes of 0% to 2%. The mean annual precipitation is approximately 5 inches, and the mean annual temperature is approximately 63°F (USDA 2024b).
- **Milham Series** consists of very deep, well-drained soils on alluvial fans, plains, low terraces, and fan remnants. These soils formed in mixed calcareous alluvium weathered from granitic and sedimentary rock. The slopes are 0% to 9%. The mean annual precipitation is approximately 7 inches, and the mean annual temperature is approximately 64°F (USDA 2024b).

Targeted Special-status Wildlife Species

Special-status wildlife species targeted for the small mammal trapping effort included those listed, or candidates for listing, as threatened or endangered by USFWS and CDFW; and those designated as Species of Special Concern by CDFW. Based on the results of the literature review, database searches, and biological reconnaissance survey, two special-status kangaroo rat species, giant kangaroo rat and Tipton kangaroo rat, have a moderate to high potential to occur within the Study Area. Information on these species is summarized below.

Giant Kangaroo Rat (*Dipodomys ingens*; GKR)

The giant kangaroo rat is listed as endangered under the federal Endangered Species Act and CESA. It is endemic to the San Joaquin and Tulare Basins in the southern end of the Great Central Valley in California. Conversion of

native valley grassland habitats to agriculture has reduced extant giant kangaroo rat distribution to approximately 2% to 3% of its historic range (Williams 1980). The giant kangaroo rat's range is discontinuous and comprises six major populations, including the Panoche region in western Fresno and eastern San Benito Counties, the Kettleman Hills in western Kings County, San Juan Creek Valley in San Luis Obispo County, the Lokern region and surrounding uplands in western Kern County, the Carrizo Plain Natural Area in San Luis Obispo County, and the Cuyama Valley in San Luis Obispo and Santa Barbara Counties. Each of the six major populations is further fragmented by steep topography and unsuitable vegetation, as well as human-induced barriers such as cropland, roads, and urban development (USFWS 1998). The giant kangaroo rat's habitat consists of annual grasslands although the species may also utilize alkali or saltbush scrub habitats at elevations up to 2,850 feet (USFWS 1998). Giant kangaroo rats are primarily seedeaters but also eat green plants and insects (USFWS 1998). Individuals in many populations make large stacks of seed heads, or "haystacks," on the surface around their burrows to cure the material before storage underground (USFWS 1998). Giant kangaroo rats require level terrain and sandy loam soils for burrowing.

The giant kangaroo rat is nocturnal and lives in burrow systems called precincts. Precincts have a radius of about 3 to 4 meters (10 to 13 feet), and each contains a shallow burrow that is deep enough for the kangaroo rat to escape the afternoon heat and avoid predators (USFWS 1998). The surfaces of typical precincts are elliptical, show little or no mounding above surrounding terrain, and have one to five separate burrow openings, with three being typical (Williams et al. 1993). Individual precincts are usually connected to other precincts by well-worn paths and are relatively easy to detect, even from a distance (Williams 1980). The above ground portion of the precinct is used for both foraging and sand bathing. Cultivation and irrigation of habitat, the use of rodenticides, and the development of infrastructure for petroleum exploration have all contributed to the decline of the giant kangaroo rat (USFWS 1998).

Tipton Kangaroo Rat (*Dipodomys nitratoides nitratoides*; TKR)

The Tipton kangaroo rat is listed as endangered under the federal Endangered Species Act and CESA. It is endemic to the San Joaquin Valley from Lemoore south along the west side of the valley to Lost Hills, Buena Vista Lake and the southern edge of the valley east to Rose Station, and along the eastern side of the valley from the vicinity of Visalia south to Bakersfield. Currently, the largest populations of Tipton kangaroo rat, which occur in large patches of suitable habitat such as the Lokern Ecological Reserve and adjacent lands, continue to do well, yet Tipton kangaroo rat populations have declined throughout their range during the past decade (USFWS 2020). Currently, Tipton kangaroo rat has one of the smallest geographic ranges of any species in the genus in a landscape that has been intensively modified (Patton et al. 2019). Tipton kangaroo rat forage on seeds of native and non-native grasses and forbs, as well as seeds from saltbush shrubs, iodine bush, and bush seepweed, and eat green vegetation and insects seasonally (USFWS 1998). The species burrows on slightly elevated mounds on soft friable soils at the bases of shrubs, along fences, road berms, canal embankments, and railroad beds (USFWS 2024; CDFW 2024). Burrows of Tipton kangaroo rats are commonly located in slightly elevated mounds, the berms of roads (where placed above ground level), canal embankments, railroad beds, and bases of shrubs and fences where windblown soils accumulate above the level of surrounding terrain.

The main threat to the Tipton kangaroo rat has been habitat loss due to the conversion of valley floor scrub habitat to agricultural land uses and the transformation of the grassland community by non-native grasses into a community too dense for Tipton kangaroo rat. The construction of roads, canals, railroads, and structures has also contributed to habitat loss. Small remaining populations are vulnerable to the overuse of rodenticides,

flooding, disease, and predation (53 FR 25608-25611). An estimated 3.7% of the historical habitat remains, and the Tipton kangaroo rat is extremely rare, with small populations found in parts of its former range (Cypher et al. 2021; USFWS 2020).

Methods

Prior to the trapping effort, a small mammal burrow survey was conducted on the project site on August 30, 2024, and again prior to setting up trap locations on December 16, 2024. The entire site proposed for grading was surveyed for small mammal burrows suitable for kangaroo rat species (Figure 6). The survey was conducted by Dudek Senior Biologist Russell Sweet and Emily Garcia Hernandez. The survey was conducted from 0716-0910, air temperature ranging from 65°F to 77°F with 0% cloud cover and wind speeds ranging from 1-3 miles per hour.

Trapping was conducted following full 2013 protocol recommended by the USFWS to detect San Joaquin Valley kangaroo rat species and collect baseline data. Based on numbers of burrows present, trapping consisted of 372 trap nights (one 6-day session with 62 traps per night) using 12-inch Sherman live-traps. One to two traps were sign-set and placed in proximity to previously observed small mammal burrows on the project site (Figure 6). Traps were baited with millet and opened at dusk. Due to lower temperatures forecasted, traps were checked starting no less than three hours after setting traps and sunset. Because of the time of year and lower temperatures, an additional trap night was added. Captured animals were recorded by species, sex, weight, and any additional notable observations. Animals were marked with a non-toxic marker on the hip or belly to identify recaptures and animals were released in the same location where they were captured. If a target species was captured during the trapping session, all trapping would have ceased and USFWS would have been notified. The trapping was conducted by Investigator Russell Sweet (USFWS - PER00046430-0 and CDFW MOU/SCP S-221230002-22143). Table 3, below, provides dates, time, weather conditions and personnel who conducted trapping and baiting.

Table 3. Trap Set and Check, Date, Biologist, Time, and Conditions

Trap Night	Date	Biologist	Time Set	Conditions	Time Checked	Conditions
1	12-16-2024	Russell Sweet	1528-1715	Air Temp: 57°F–60°F; 90% cloud cover; 1-2 mph wind	2109-2155	Air Temp: 48°F; 90% cloud cover; 3 mph wind
2	12-17-2024	Russell Sweet	1530-1620	Air Temp: 56°F–58°F; 50% cloud cover; 2 mph wind	2100-2135	Air Temp: 45°F–46°F; 50% cloud cover; 1-2 mph wind
3	12-18-2024	Russell Sweet	1514-1550	Air Temp: 53°F–54°F; 65% cloud cover; 1-4 mph wind	2057-2154	Air Temp: 44°F–46°F; 70% cloud cover; 1 mph wind
4	12-19-2024	Russell Sweet	1515-1555	Air Temp: 57°F; 70% cloud cover; 2 mph wind	2105-2155	Air Temp: 45°F–47°F; 75% cloud cover; 1 mph wind
5	12-20-2024	Russell Sweet	1610-1650	Air Temp: 64°F–66°F; 40% cloud cover; 2 mph wind	2100-2150	Air Temp: 48°F–51°F; 50% cloud cover; 2 mph wind
6	12-21-2024	Russell Sweet	1605-1656	Air Temp: 62°F–66°F; 55% cloud cover; 1 mph wind	2057-2150	Air Temp: 51°F–52°F; 60% cloud cover; 2 mph wind

mph = miles per hour

Results

After a six-night trapping effort, a total of twelve small mammals were captured including one recapture. No giant kangaroo rats or Tipton kangaroo rats were captured during the 372 trap-night period. No other threatened or endangered small mammals were captured.

Two other small mammal species were captured; Heermann's kangaroo rat (*Dipodomys heermanni*), and San Joaquin pocket mouse (*Perognathus inornatus*). Hind foot measurements were taken for all kangaroo rats captured to determine between giant kangaroo rat and Heermann's kangaroo rat. All kangaroo rats captured were five-toed; therefore, no Tipton kangaroo rats were captured. Weight of kangaroo rats were determined to be too low to be giant kangaroo rat with weights ranging from 58 to 65 grams. The hind foot measurements ranged from 37 to 38 mm. All small mammals were processed as described above in methodology, with the exception of deer mouse (*Peromyscus maniculatus*) which are associated with hantavirus; therefore, deer mice were immediately release without handling. Figure 7 provides the location of captured animals. Table 4 provides the number of captures of each species and the dates of each trap night. Datasheets and are found in Attachment C.

Table 4. Summary of Small Mammals Captured out of 372 Trap Nights

Date	Heermann's Kangaroo Rat	San Joaquin Pocket Mouse	Deer Mouse
12-16-2024	1/0	0/0	0
12-17-2024	0/0	0/0	0
12-18-2024	0/0	0/0	1
12-19-2024	1/0	0/0	4
12-20-2024	1/0	0/0	1
12-21-2024	0/1*	1/0	1
Total Captured	3	1	7

* new/recapture – recaptures are not included in the total

Discussion

The trapping effort was conducted within approximately 40-acres of PG&E property. California Natural Diversity Database searches resulted in no known records of either giant kangaroo rat or Tipton kangaroo rat within the Study Area. The closest known giant kangaroo rat records are approximately 3.6 to 4 miles south and southwest of the Study Area. The land covers between this area and the project site is dominated by agricultural production and would provide little habitat suitable for giant kangaroo. The closest Tipton kangaroo rat records are approximately 1.6 miles northeast of the Study Area and 3.2 miles west of the Study Area. As discussed above, these locations are fragmented with suitable habitat for Tipton kangaroo rats based on extensive development and agricultural development. The relatively undisturbed grassland present within the Study Area and the open grassland to the northwest does provides moderate potential for these species to occur. However, no special-status small mammal species were captured during the trapping effort.

Heermann's kangaroo rats (HKR) were the most abundant, with the exception of deer mouse which included an unknown number of recaptures. A total of four HKR, including one recapture, were captured throughout the effort. The majority were observed within the old retention basin on the east edge of the Study Area. Because all kangaroo rats had five toes, it is determined that no Tipton kangaroo rats were present on the site. In addition, based on the weights, hind foot lengths and timing of the trapping effort being later in the season when juvenile giant kangaroo rats would not be expected, it is determined that no giant kangaroo rats were present on site. Based on the species captured and the site conditions, it is my opinion that project commencement would not impact any special status small mammals.

I certify that the information in this survey report and attached exhibits fully and accurately represents my work.

Please contact me at (805) 859-9445 if there are any questions concerning the survey, or if you need any additional information.

Sincerely,



_____

Russell Sweet
Senior Biologist

Att.: *Attachment A - Figures 1-7*
Attachment B - Representative Photos
Attachment C – Field Forms
Attachment D – CDFW and USFWS E-mail Notification of Field Activities
Attachment E – USFWS Authorization E-mail to Proceed

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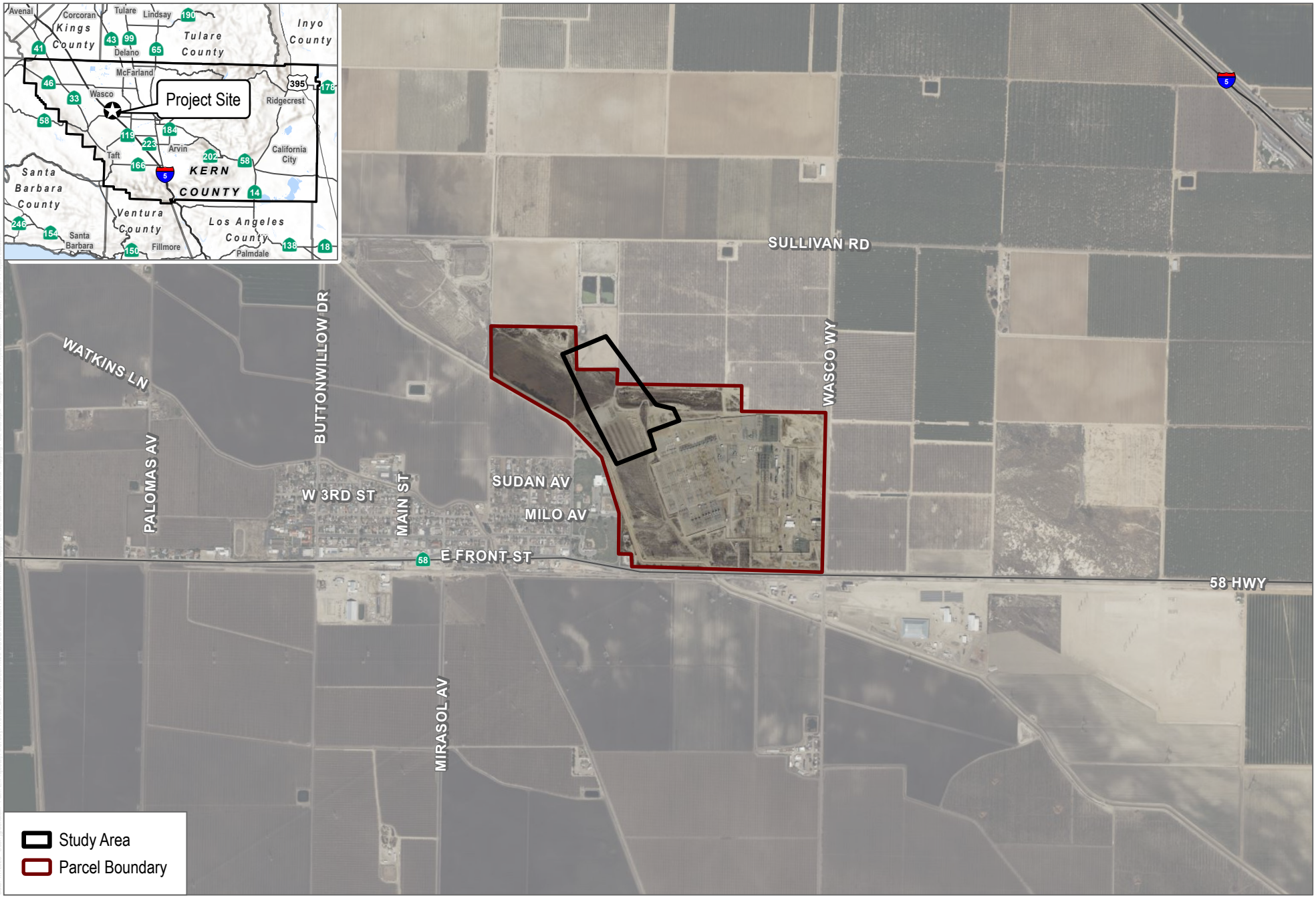
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Attachment A

Figures 1 through 7



SOURCE: USGS National Map 2023; Bing Maps 2023; Open Street Map 2023

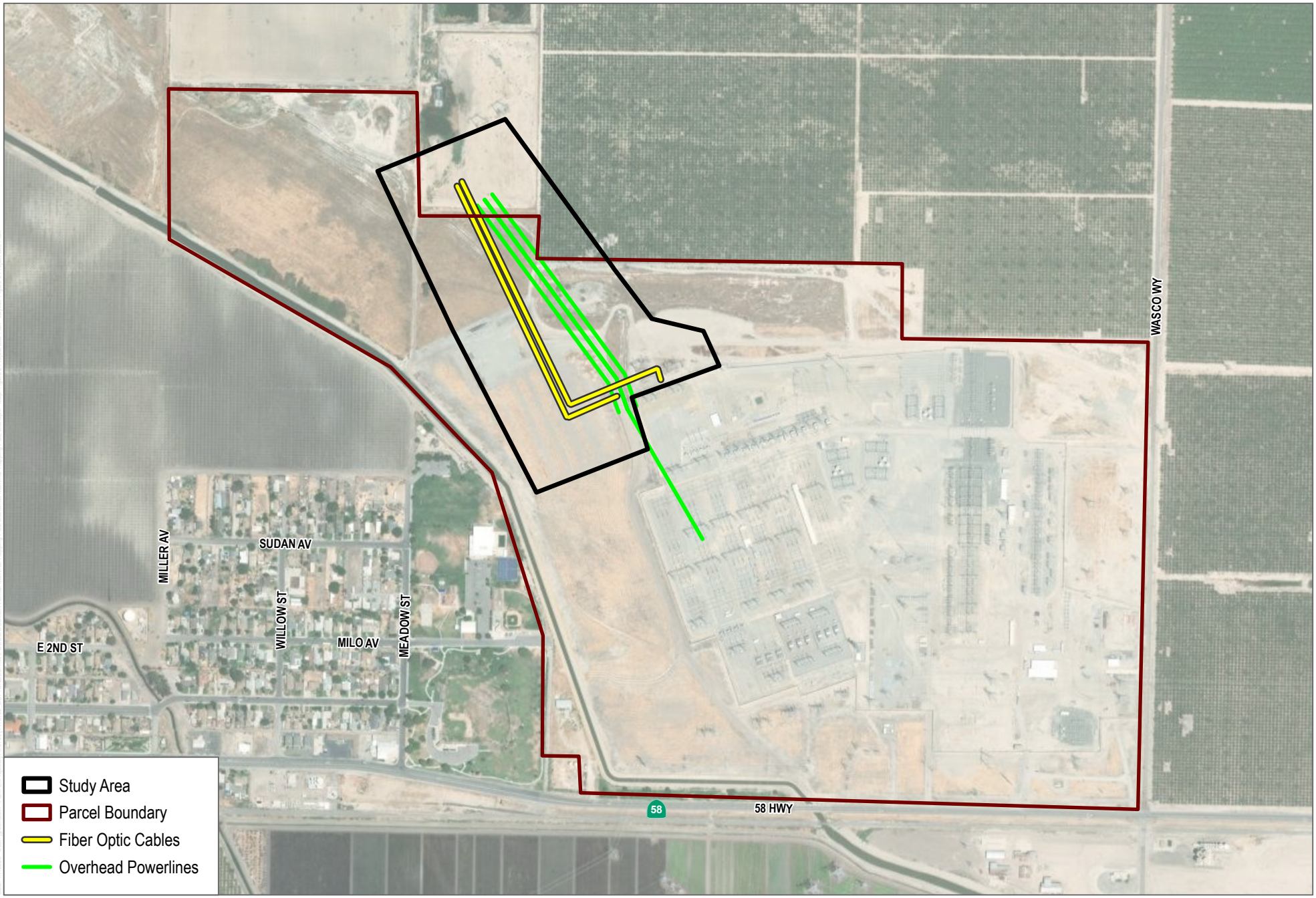
DUDEK

0 1,000 2,000 Feet

FIGURE 1

Project Location

PG&E Midway Substation



SOURCE: Maxar 2023; Open Street Map 2023

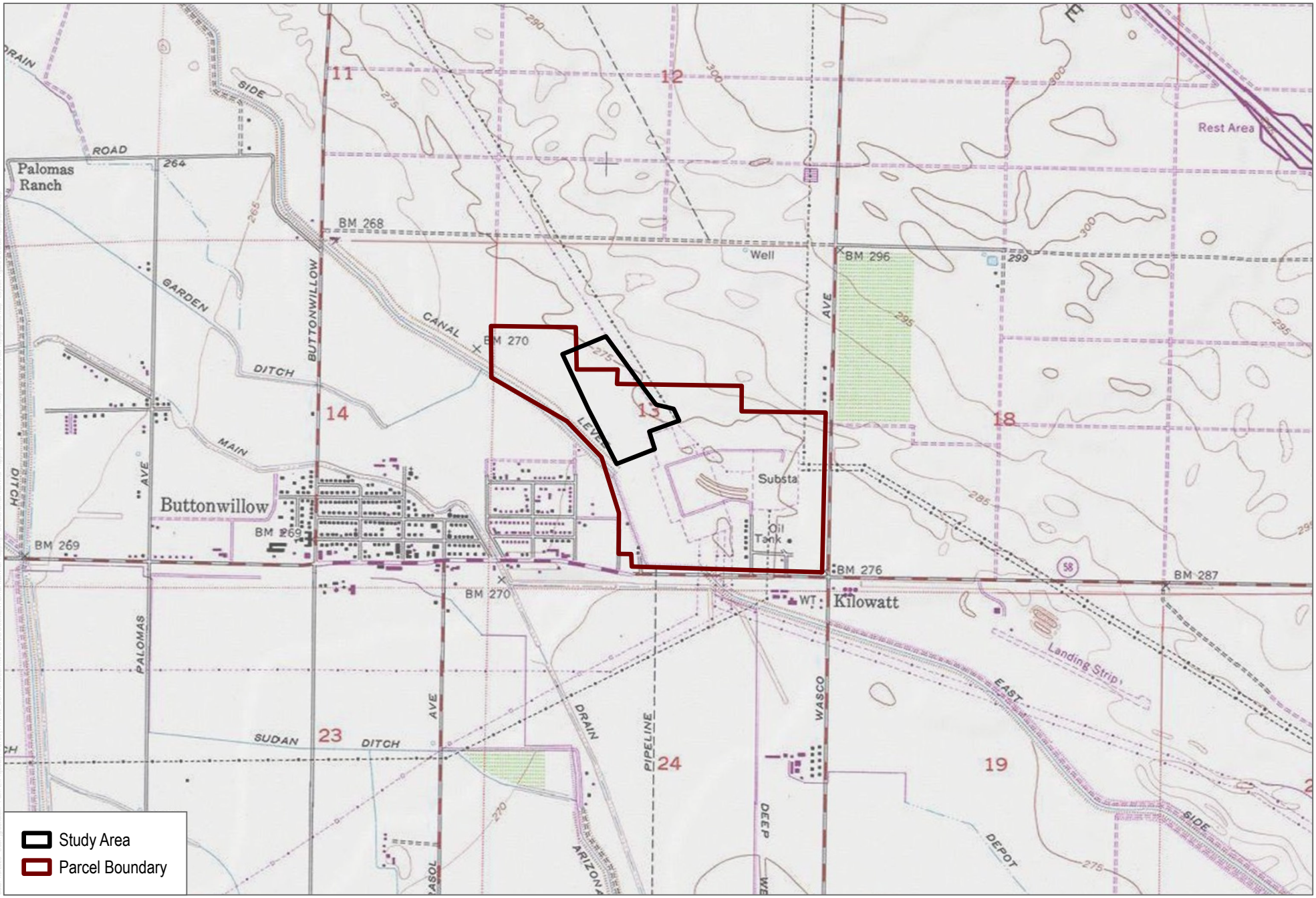
DUDEK

0 250 500 Feet

FIGURE 2

Project Site Plan

PG&E Midway Substation



SOURCE: USGS USA Topographic Map

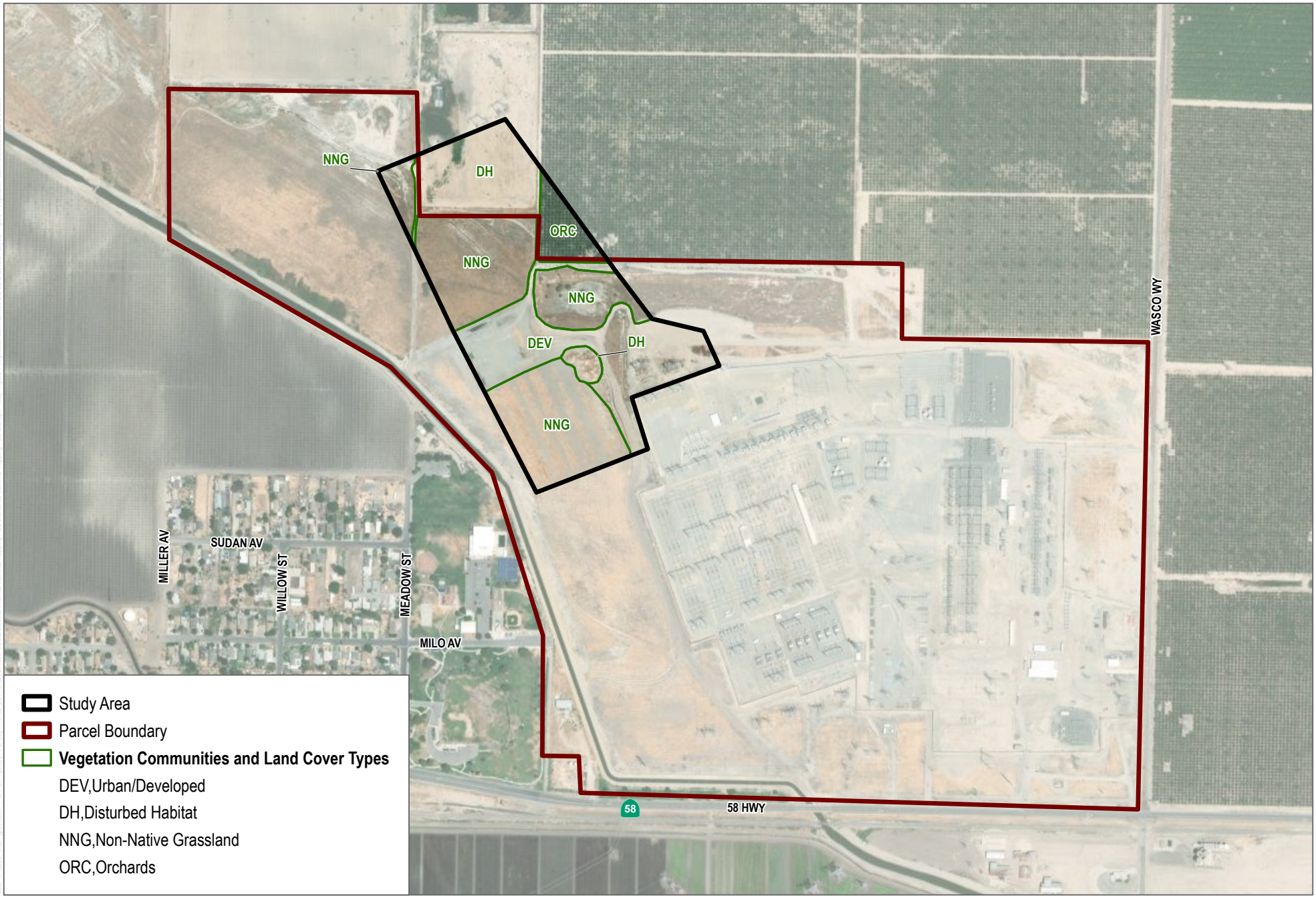
DUDEK

0 1,000 2,000 Feet

FIGURE 3

USGS Topographic Map

PG&E Midway Substation



SOURCE: Maxar 2023; Open Street Map 2023

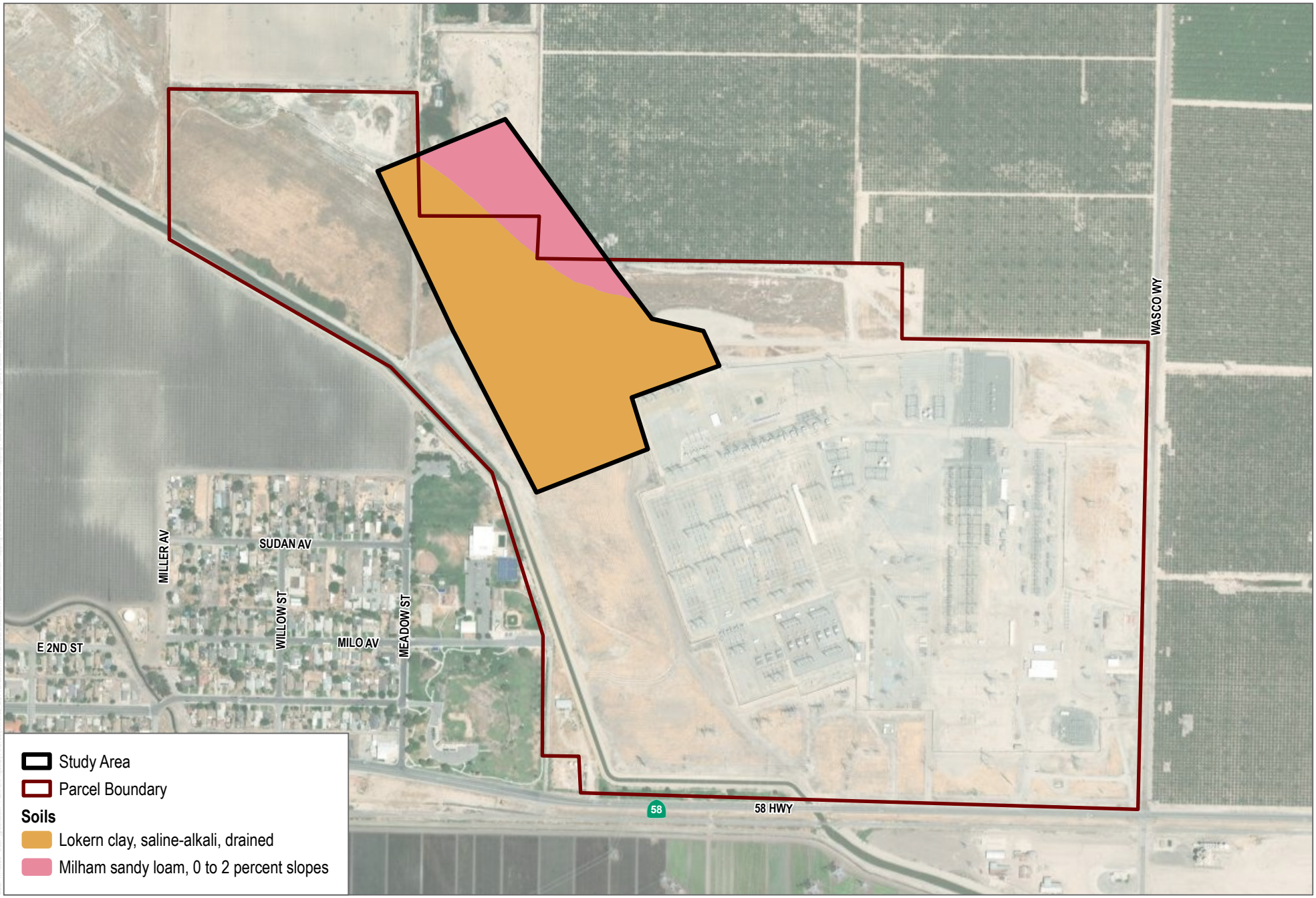
DUDEK

0 250 500 Feet

FIGURE 4

Vegetation Communities and Land Covers

PG&E Midway Substation



SOURCE: Maxar 2023; Open Street Map 2023; USDA SSURGO

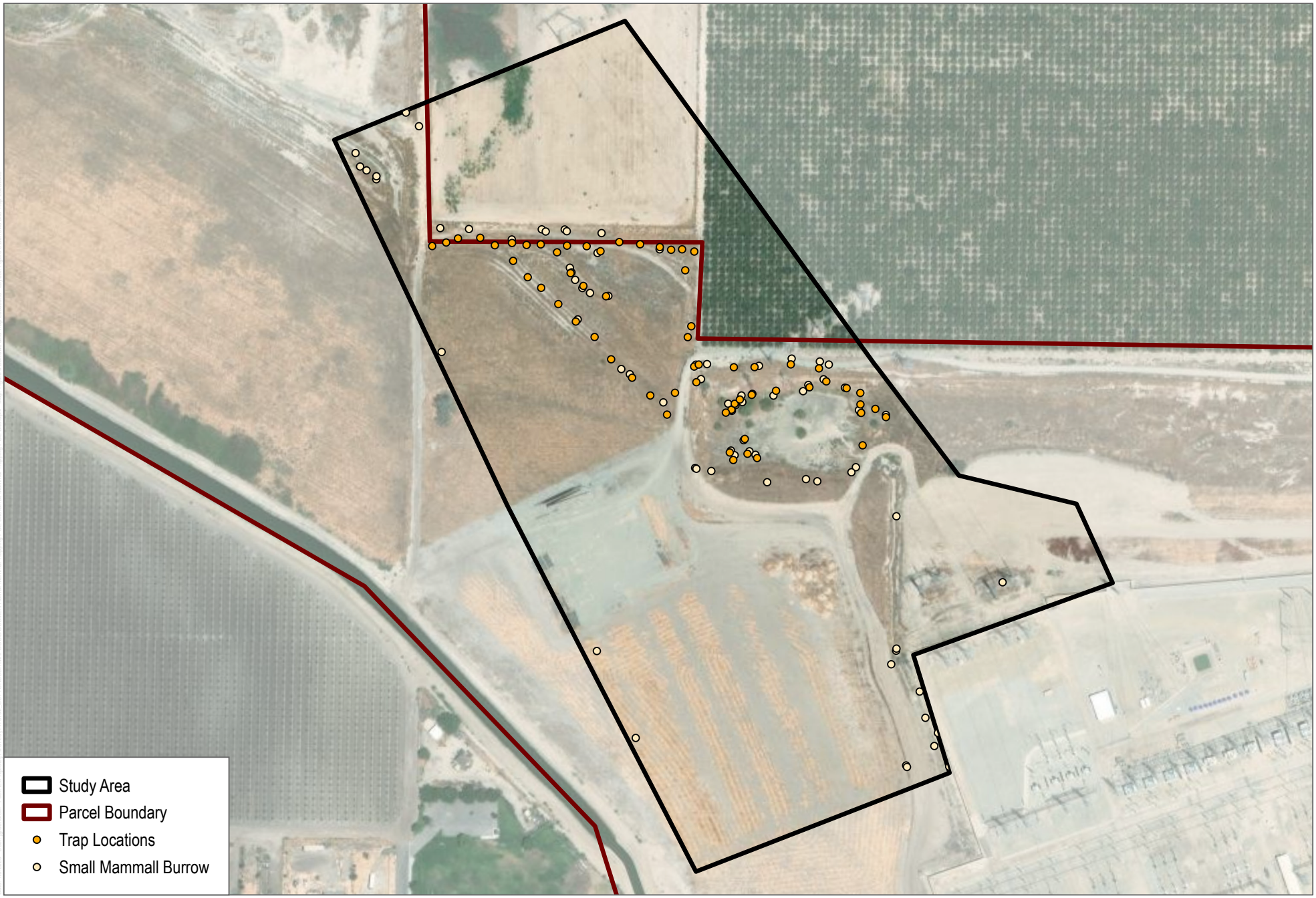
DUDEK

0 250 500 Feet

FIGURE 5

Soils

PG&E Midway Substation



SOURCE: Maxar 2023; Open Street Map 2023

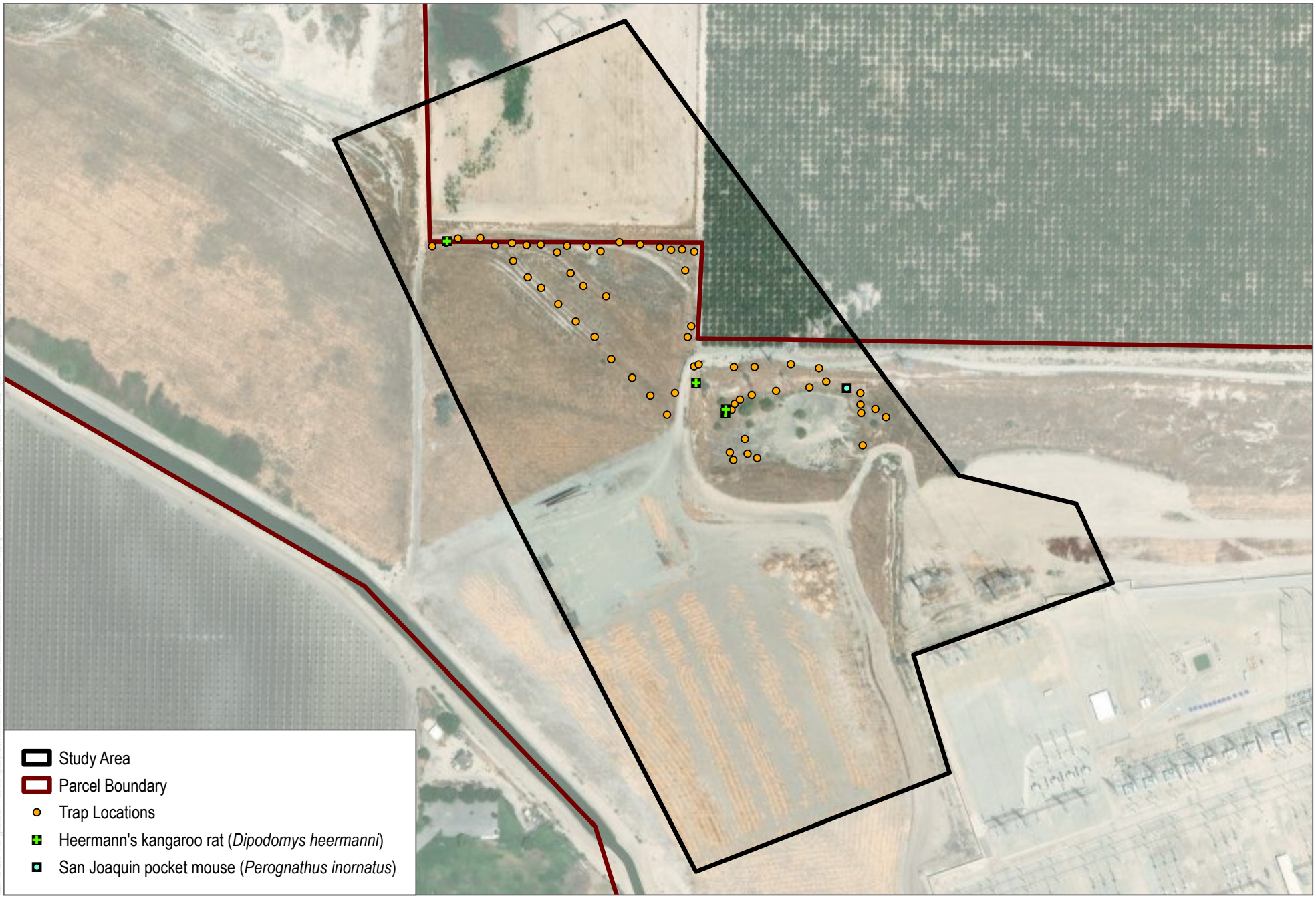
DUDEK

0 250 500 Feet

FIGURE 6

Burrows and Trap Locations

PG&E Midway Substation



SOURCE: Maxar 2023; Open Street Map 2023

DUDEK

0 250 500 Feet

FIGURE 7

Wildlife Trapped Locations

PG&E Midway Substation

Attachment B

Representative Photos

Attachment B
Representative Photos PG&E Parcel of the Buttonbush Solar and Storage Project



Photo 1. Looking northwest at nonnative grassland where traplines were set up.



Photo 2. Looking east along the north edge of the PG&E property.



Photo 3. Looking south along the east edge of PG&E property.

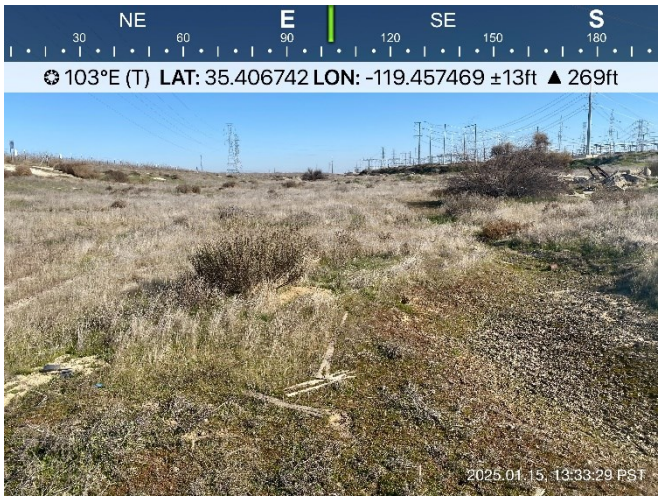


Photo 4. Looking east at nonnative grassland in the old sump area.

Attachment B
Representative Photos PG&E Parcel of the Buttonbush Solar and Storage Project

	
Photo 5. Looking north old basin where traplines were set.	Photo 6. Looking east at old basin where trapline were set.
	
Photo 7. Sample of trap set near burrow.	Photo 8. Looking east at open traps.

Attachment B
Representative Photos PG&E Parcel of the Buttonbush Solar and Storage Project



Photo 9. Heermann's kangaroo rat.



Photo 10. Five toes of a Heermann's kangaroo rat.

Attachment B
Representative Photos PG&E Parcel of the Buttonbush Solar and Storage Project



Photo 11. Five toes of a Heermann's kangaroo rat.



Photo 12. Deer mouse in trap.

Appendix C

Field Forms

Small Mammal Trapping

Project: Buttonbush Solar		Location: PG&E	
Biologist(s): Russell Sweet		Trap Night: 1	
Trap Set Date: 12/16/24		Trap Check Date: 12/16/24	
Start Time: 1528	End Time: 1715	Start Time: 2109	End Time: 2155
Start Temp (F): 60	End Temp (F): 57	Start Temp (F): 48	End Temp (F): 48
Start Wind (mph): 2	End Wind (mph): 1	Start Wind (mph): 3	End Wind (mph): 3
Start Cloud Cover (%): 90	End Cloud Cover (%): 90	Start Cloud Cover (%): 90	End Cloud Cover (%): 90

Trap #	New/Recap	Species	Sex	Adult/Juv	Mass (g)	HF (mm)	Notes
1	–						
2	–						
3	–						
4	–						
5	–						
6	–						
7	–						
8	–						
9	–						
10	–						
11	–						
12	–						
13	–						
14	N	HKR	F	A	58	38	5 toes
15	–						
16	–						
17	–						
18	–						
19	–						
20	–						
21	–						
22	–						
23	–						
24	–						
25	–						
26	–						
27	–						
28	–						
29							
30	–						
31	–						
32	–						
33	–						
34	–						
35	–						
36	–						

GKR – giant kangaroo rat; **TKR** – Tipton kangaroo rat; **SNKR** – short-nosed kangaroo rat; **PEMA** – deer mouse; **REMA** – western harvest mouse; **PEIN** – San Joaquin pocket mouse; **SJAS** – San Joaquin antelope squirrel; **ONTU** – Tulare grasshopper mouse; **HKR** – Heermann's kangaroo rat

Project: Bettor Brush	Trapline: Right	Night: 1	Date: 12/14/24	Page 2 of 2

Trap #	New/Recap	Species	Sex	Adult/Juv	Mass (g)	HF (mm)	Notes
37	–						
38	–						
39	–						
40	–						
41	–						
42	–						
43	–						
44	–						
45	–						
46	–						
47	–						
48	–						
49	–						
50	–						
51	–						
52	–						
53	–						
54	–						
55	–						
56	–						
57	–						
58	–						
59	–						
60	–						
61	–						
62	–						

GKR – giant kangaroo rat; **TKR** – Tipton kangaroo rat; **SNKR** – short-nosed kangaroo rat; **PEMA** – deer mouse; **REMA** – western harvest mouse; **PEIN** – San Joaquin pocket mouse; **SJAS** – San Joaquin antelope squirrel; **ONTU** – Tulare grasshopper mouse; **HKR** – Heermann's kangaroo rat

Small Mammal Trapping

Project: Buttonbush Solar		Location: PG&E	
Biologist(s): Russell Sweet		Trap Night: 2	
Trap Set Date: 12/17/24		Trap Check Date: 12/17/24	
Start Time: 1530	End Time: 1630	Start Time: 2100	End Time: 2135
Start Temp (F): 58	End Temp (F): 56	Start Temp (F): 46	End Temp (F): 45
Start Wind (mph): 2	End Wind (mph): 2	Start Wind (mph): 1	End Wind (mph): 2
Start Cloud Cover (%): 50	End Cloud Cover (%): 50	Start Cloud Cover (%): 50	End Cloud Cover (%): 50

Trap #	New/Recap	Species	Sex	Adult/Juv	Mass (g)	HF (mm)	Notes
1	–						
2	–						
3	–						
4	–						
5	–						
6	–						
7	–						
8	–						
9	–						
10	–						
11	–						
12	–						
13	–						
14	–						
15	–						
16	–						
17	–						
18	–						
19	–						
20	–						
21	–						
22	–						
23	–						
24	–						
25	–						
26	–						
27	–						TRIGGERED BUT EMPTY
28	–						
29	–						
30	–						
31	–						
32	–						
33	–						
34	–						
35	–						
36	–						

GKR – giant kangaroo rat; **TKR** – Tipton kangaroo rat; **SNKR** – short-nosed kangaroo rat; **PEMA** – deer mouse; **REMA** – western harvest mouse; **PEIN** – San Joaquin pocket mouse; **SJAS** – San Joaquin antelope squirrel; **ONTU** – Tulare grasshopper mouse; **HKR** – Heermann's kangaroo rat

Project: Buttonbrush Solar | Trapline: Rose | Trap Night: 2 | Date: 12/17/24 | Page 2 of 2

Trap #	New/Recap	Species	Sex	Adult/Juv	Mass (g)	HF (mm)	Notes
37	-						
38	-						
39	-						
40	-						
41	-						
42	-						
43	-						
44							
45	-						
46	-						
47	-						
48	-						
49	-						
50	-						
51	-						
52	-						
53	-						
54	-						
55	-						
56	-						
57	-						
58	-						
59	-						
60	-						
61	-						
62	-						

GKR – giant kangaroo rat; **TKR** – Tipton kangaroo rat; **SNKR** – short-nosed kangaroo rat; **PEMA** – deer mouse; **REMA** – western harvest mouse; **PEIN** – San Joaquin pocket mouse; **SJAS** – San Joaquin antelope squirrel; **ONTU** – Tulare grasshopper mouse; **HKR** – Heermann's kangaroo rat

Small Mammal Trapping

Project: Bultenbush Solar		Location: PE:E	
Biologist(s): Russell Swart		Trap Night: 3	
Trap Set Date: 12/18/24		Trap Check Date: 12/18/24	
Start Time: 1514	End Time: 1550	Start Time: 2057	End Time: 2154
Start Temp (F): 54	End Temp (F): 53	Start Temp (F): 46	End Temp (F): 44
Start Wind (mph): 1	End Wind (mph): 4	Start Wind (mph): 1	End Wind (mph): 1
Start Cloud Cover (%): 65	End Cloud Cover (%): 65	Start Cloud Cover (%): 70	End Cloud Cover (%): 70

Trap #	New/Recap	Species	Sex	Adult/Juv	Mass (g)	HF (mm)	Notes
1	–						
2	–						
3	–						
4	–						
5	–						
6	–						
7	–						
8	–						
9	–						
10	–						
11	–						
12	–						
13	–						
14	–						
15	–						
16	–						
17	–						
18	–						
19	–						
20		PEMA					
21	–						
22	–						
23	–						
24	–						
25	–						
26	–						
27	–						
28	–						
29	–						
30	–						
31	–						
32	–						
33	–						
34	–						
35	–						
36	–						

GKR – giant kangaroo rat; **TKR** – Tipton kangaroo rat; **SNKR** – short-nosed kangaroo rat; **PEMA** – deer mouse; **REMA** – western harvest mouse; **PEIN** – San Joaquin pocket mouse; **SJAS** – San Joaquin antelope squirrel; **ONTU** – Tulare grasshopper mouse; **HKR** – Heermann's kangaroo rat

Project: Buttonbush Solar	Trapline: RBaB	Trap Night: 3	Date: 12/13/24	Page 2 of 2

Trap #	New/Recap	Species	Sex	Adult/Juv	Mass (g)	HF (mm)	Notes
37	—						
38	✓						
39	—						
40	✓						
41	—						
42	—						
43	—						
44	—						
45	—						
46	✓						
47	—						
48	—						
49	—						
50	—						
51	✓						
52	—						
53	—						
54	—						
55	—						
56	—						
57	—						
58	—						
59	—						
60	—						
61	—						
62	—						

GKR – giant kangaroo rat; **TKR** – Tipton kangaroo rat; **SNKR** – short-nosed kangaroo rat; **PEMA** – deer mouse; **REMA** – western harvest mouse; **PEIN** – San Joaquin pocket mouse; **SJAS** – San Joaquin antelope squirrel; **ONTU** – Tulare grasshopper mouse; **HKR** – Heermann's kangaroo rat

Small Mammal Trapping

Project: Buttonbush Solar		Location: RESE	
Biologist(s): Russell Sweet		Trap Night: 4	
Trap Set Date: 12/17/24		Trap Check Date: 12/18/24	
Start Time: 1515	End Time: 1555	Start Time: 2105	End Time: 2155
Start Temp (F): 51	End Temp (F): 57	Start Temp (F): 47	End Temp (F): 45
Start Wind (mph): 2	End Wind (mph): 2	Start Wind (mph): 1	End Wind (mph): 1
Start Cloud Cover (%): 70	End Cloud Cover (%): 70	Start Cloud Cover (%): 75	End Cloud Cover (%): 75

Trap #	New/Recap	Species	Sex	Adult/Juv	Mass (g)	HF (mm)	Notes
1	–						
2	–						
3	–						
4	–						
5	–						
6	✓						
7	✓						
8	✓						
9	✓						
10	✓						
11	✓						
12	✓						
13	–						
14	✓						
15	✓						
16	✓						
17	✓						
18	✓						
19	–						
20	–						
21		PEMA					
22	–						
23	–						
24	–						
25	✓						
26	–						
27	–						
28	–						
29		PEMA					
30	–						
31	–						
32	–						
33	–						
34	–						
35	–						
36		PEMA					

GKR – giant kangaroo rat; **TKR** – Tipton kangaroo rat; **SNKR** – short-nosed kangaroo rat; **PEMA** – deer mouse; **REMA** – western harvest mouse; **PEIN** – San Joaquin pocket mouse; **SJAS** – San Joaquin antelope squirrel; **ONTU** – Tulare grasshopper mouse; **HKR** – Heermann's kangaroo rat

Project: Buttonbush Solar				Trapline: 北3三	Trap Night: 4	Date: 12/19/24	Page 2 of 2
Trap #	**New/Recap**	**Species**	**Sex**	**Adult/Juv**	**Mass (g)**	**HF (mm)**	**Notes**
37	–						
38	–						
39	/						
40	/						
41	/						
42	/						
43	/						
44	/						
45	/						
46	/						
47	–						
48	–						
49	–						
50	–						
51	/						
52		PEMA					
53	–						
54	–						
55	/						
56	N	HKR	F	A	65	37	5 toes
57	–						
58	–						
59	–						
60	–						
61	–						
62	–						

GKR – giant kangaroo rat; **TKR** – Tipton kangaroo rat; **SNKR** – short-nosed kangaroo rat; **PEMA** – deer mouse; **REMA** – western harvest mouse; **PEIN** – San Joaquin pocket mouse; **SJAS** – San Joaquin antelope squirrel; **ONTU** – Tulare grasshopper mouse; **HKR** – Heermann's kangaroo rat

Small Mammal Trapping

Project: Buttonbush Solar		Location: PS-E	
Biologist(s): Russell Sweet		Trap Night: 5	
Trap Set Date: 12/20/24		Trap Check Date: 12/20/24	
Start Time: 1610	End Time: 1650	Start Time: 2400	End Time: 250
Start Temp (F): 46	End Temp (F): 64	Start Temp (F): 51	End Temp (F): 48
Start Wind (mph): 2	End Wind (mph): 2	Start Wind (mph): 2	End Wind (mph): 2
Start Cloud Cover (%): 40	End Cloud Cover (%): 40	Start Cloud Cover (%): 50	End Cloud Cover (%): 50

Trap #	New/Recap	Species	Sex	Adult/Juv	Mass (g)	HF (mm)	Notes
1	–						
2	–						
3	–						
4	–						
5	–						
6	–						
7	–						
8	–						
9	–						
10	–						
11	–						
12	–						
13	–						
14	–						
15	–						
16	–						
17	–						
18	–						
19	–						
20	–						
21	–						
22	–						
23	–						
24	–						
25	–						
26	–						
27	–						
28	–						
29	–						
30	–						
31	–						
32	–						
33	–						
34	–						
35	–						
36	–						

GKR – giant kangaroo rat; **TKR** – Tipton kangaroo rat; **SNKR** – short-nosed kangaroo rat; **PEMA** – deer mouse; **REMA** – western harvest mouse; **PEIN** – San Joaquin pocket mouse; **SJAS** – San Joaquin antelope squirrel; **ONTU** – Tulare grasshopper mouse; **HKR** – Heermann's kangaroo rat

Project: Buttonbush Solar | Trapline: PBSE | Trap Night: 5 | Date: 12/20/24 | Page 2 of 2

Trap #	New/Recap	Species	Sex	Adult/Juv	Mass (g)	HF (mm)	Notes
37							
38							
39							
40							
41							
42							
43							
44							
45							
46							
47							
48							
49							
50		PEMA					
51							
52							
53							
54							
55							
56							
57	↓	HKR	M	A	60	38	5 Toes
58							
59							
60							
61							
62							

GKR – giant kangaroo rat; **TKR** – Tipton kangaroo rat; **SNKR** – short-nosed kangaroo rat; **PEMA** – deer mouse; **REMA** – western harvest mouse; **PEIN** – San Joaquin pocket mouse; **SJAS** – San Joaquin antelope squirrel; **ONTU** – Tulare grasshopper mouse; **HKR** – Heermann's kangaroo rat

Small Mammal Trapping

Project: Ambush Solar		Location: PGSC	
Biologist(s): Russell Sweet		Trap Night: 6	
Trap Set Date: 12/21/24		Trap Check Date: 12/21/24	
Start Time: 1605	End Time: 1656	Start Time: 2057	End Time: 2150
Start Temp (F): 44	End Temp (F): 62	Start Temp (F): 51	End Temp (F): 52
Start Wind (mph): 1	End Wind (mph): 1	Start Wind (mph): 2	End Wind (mph): 2
Start Cloud Cover (%): 55	End Cloud Cover (%): 55	Start Cloud Cover (%): 60	End Cloud Cover (%): 60

Trap #	New/Recap	Species	Sex	Adult/Juv	Mass (g)	HF (mm)	Notes
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
21		REMA					
22							
23							
24							
25							
26							
27							
28							
29							
30							
31							
32							
33							
34							
35							
36							

GKR – giant kangaroo rat; **TKR** – Tipton kangaroo rat; **SNKR** – short-nosed kangaroo rat; **PEMA** – deer mouse; **REMA** – western harvest mouse; **PEIN** – San Joaquin pocket mouse; **SJAS** – San Joaquin antelope squirrel; **ONTU** – Tulare grasshopper mouse; **HKR** – Heermann's kangaroo rat

Project: Buttonbush Solar				Trapline: Point	Trap Night: 6		Date: 12/21/24	Page 2 of 2
Trap #	**New/Recap**	**Species**	**Sex**	**Adult/Juv**	**Mass (g)**	**HF (mm)**	**Notes**	
37								
38								
39								
40								
41								
42								
43								
44								
45								
46								
47								
48	N	PEIN	F	A	13		ESCAPED TRYING TO TAKE PICTURE	
49								
50								
51								
52								
53								
54								
55								
56	2	HKR		A				
57								
58								
59								
60								
61								
62								

GKR – giant kangaroo rat; **TKR** – Tipton kangaroo rat; **SNKR** – short-nosed kangaroo rat; **PEMA** – deer mouse; **REMA** – western harvest mouse; **PEIN** – San Joaquin pocket mouse; **SJAS** – San Joaquin antelope squirrel; **ONTU** – Tulare grasshopper mouse; **HKR** – Heermann's kangaroo rat

Appendix D

CDFW and USFWS E-mail Notification of Field Activities

Ronelle Candia

From: Russell Sweet
Sent: Monday, November 25, 2024 9:01 AM
To: katrina.smith@wildlife.ca.gov; Hirano, Chad@Wildlife; Hurt, Kevin@Wildlife; Sinclair, Crystal@Wildlife
Subject: Notification of Field Activities - Trapping Plan for Proposed Buttonbush Solar - Russell Sweet MOU and Specific Use Permit S-221230002-22143-001
Attachments: CDFW Notification of Field Activities for Presence-Absence Kangaroo Rat Trapping - Buttonbush Solar.pdf

Good afternoon,

Please find the attached notification of field activities in preparation to conduct kangaroo rat species trapping for the proposed Buttonbush Solare project in Kern County, CA. Please review the attached memo and let me know if you have any questions or need additional information.

Thank you,
Russell

Russell Sweet
Senior Biologist
DUDEK

O: 661 843 2065 **C:** 661 859 9445
dudek.com



DUDEK
4900 CALIFORNIA AVENUE
TOWER B 2ND FLOOR
BAKERSFIELD, CALIFORNIA 93309
T 661.208.4127

MEMORANDUM

To:	Justin Garcia, California Department of Fish and Wildlife (CDFW) Chad Hirano, CDFW Crystal Sinclair, CDFW Kevin Hurt, CDFW
From:	Russell Sweet, Senior Biologist, Dudek
Subject:	Notification of Presence/Absence Trapping Survey for Small Mammal Trapping for the Buttonbush Solar and Storage Project, Kern County, California.
Date:	11/25/2024
cc:	Christa Hudson-Gonzalez, Permitting Consultant, Avantus Ronelle Candia, Project Manager, Dudek
Attachment(s):	Figure 1: Project Location Figures 2A-2F: USGS Topographic Map

Please consider this memo (and email) as formal 14-day notification regarding intent to conduct nocturnal trapping to detect special-status kangaroo rat species that may occur within the proposed Buttonbush solar and Storage Project, Kern County, California. The project site is in unincorporated Kern County directly north of the community of Buttonwillow, approximately 2 miles west of the City of Shafter and approximately 7 miles southwest of the City of Wasco. The project site boundaries are illustrated on Figure 1 and Figures 2A through 2F. The project site straddles Interstate 5 (I-5) east of Buttonwillow Raceway Park, just north of State Route (SR) 58, and south of SR-46 (Figure 1).

According to the U.S. Geological Survey (USGS), the project site is within the Wasco SW, Semitropic, Rio Bravo, Buttonwillow, and Lokern USGS 1:24,000 topographic map (7.5-minute quadrangles). More specifically, the project site is located as follows: Township 27 S, Range 23 E, in portions of Sections 27, 28, 32, and 33–36; Township 28 S, Range 23 E, portions of Sections 1–15, 20, 22, 23, 26–29, and 32–35; Township 28 S, Range 24 E, in portions of Sections 7–10, 14–18, 21–28, and 31–35; and Township 29 S, Range 24 E, in portions of Sections 1–20. (Figure 2). Table 1, below, provides the Sections, Townships and Ranges for the prospective trapping locations.

Table 1. Township, Range, Sections and APN Numbers of Proposed Trap Locations

Township	Range	Section(s)	APN Numbers
27 South	23 East	28	069-350-07
28 South	23 East	2, 4, 5, 12, 13, 28, 33, 34	087-060-39, 087-090-04, 087-010-01, 087-160-01, 087-160-19, 087-160-49, 087-160-50, 087-170-04, 087-200-03, 087-200-13, 087-040-01, 087-050-29, 087-050-31, 087-050-38

28 South	24 East	33, 34	088-180-37
29 South	23 East	3, 13	101-020-08, 101-020-30, 101-020-33, 101-020-23, 100-020-19
29 South	24 East	3, 5, 6, 16, 18	103-080-48, 103-080-49, 103-080-57, 103-080-59, 103-100-23, 103-020-08, 103-030-04, 103-030-05, 103-030-19, 103-030-20, 103-030-44

This trapping effort is being conducted to detect and identify kangaroo rat species within the project area (Figures 1 and 2). The project would include the construction and operation of a photovoltaic (PV) solar facility, associated infrastructure and a battery energy storage system (BESS). The project as proposed by the project proponent would be located on 128 parcels across a leased area of approximately 12,048 acres within a 13,888-acre gross parcel boundary, the majority of which is either in agricultural use or developed in the valley region of Kern County. Small mammal burrow surveys resulted in several potential kangaroo rat burrows within the project margins where the active agricultural fields abuts to nonnative grassland, alkali sink and saltbush scrub. Few locations resulted in small mammal burrows within the margins of agricultural fields not abutting natural landscapes but within close vicinity.

Trapping will be conducted following full 2013 protocol recommended by the United States Fish and Wildlife Service to detect San Joaquin Valley kangaroo rat species and collect baseline data. Based on numbers of burrows present, trapping will consist of up to five 5-day sessions with up to 100 traps per session using 12-inch Sherman live-traps. Traps will be set-up in traplines along the margins between natural lands and agricultural production as well as areas of high density of burrows suitable for kangaroo rats. Traps will be set approximately 40 to 50 feet (12-15 m) apart. Captured animals will be recorded by species, sex, weight, and any additional notable observations. Animals will be marked with a non-toxic marker on the hip or belly to keep track of recaptures and released in the same location captured. Traps will be set at dusk and checked and closed at dawn. Traps may be checked more often if weather conditions (i.e., a predicted 40 percent or greater chance of rain; traps will not be opened when temperatures are 99°F or above, etc.) warrant, as determined by the permit holding biologist. If predicted nighttime temperatures are expected to drop below 50°F (10°C), all traps will be checked at a minimum interval of every three hours and synthetic batting or other insulating material, as well as additional food, will be placed in the open trap to reduce the effects of colder weather on trapped animals. Trapping will cease if captured animals are found to be lethargic or otherwise exhibiting signs of a decrease in body temperature. Trapping will not commence until temperatures rise to a safer temperature to ensure the safety of the animals. Therefore, trapping may be conducted over several months with pauses of trapping based on the timing of the year and temperatures.

It is understood that per the protocol, if a target species is captured during the trapping session, all trapping should cease and CDFW be notified. However, it is proposed to continue to trap the 5-consecutive nights after a target species is captured. The intent of this process is to determine the distribution of target species within the proposed project site for additional data to help in the construction, mitigation, and minimization design of the project. Please note that this plan is contingent on the client's approval; otherwise, trapping will stop at first capture of a target species. In addition, trapping will only be within acquired property (Figure 1 and 2).

Trapping will be conducted by Investigator Russell Sweet under an approved MOU and Specific Use Permit S-221230002-22143-001. Following completion of the surveys, a letter report will be prepared and submitted

to you withing 45-days. The trapping will commence as soon as possible after notification to California Department of Fish and Wildlife. According to the permit/protocol, surveys may begin as soon as December 10, 2024.

Thank you very much for your consideration.

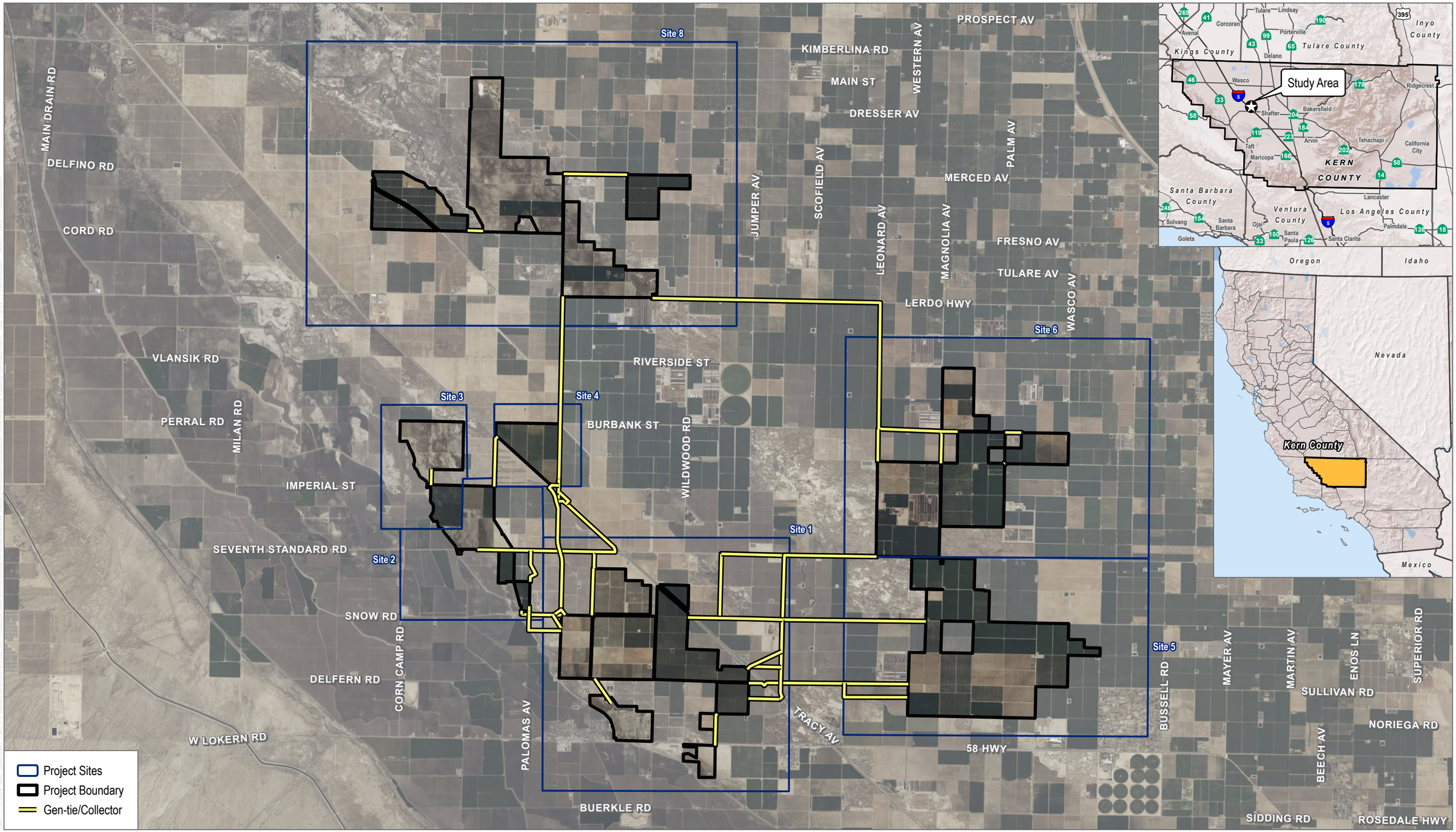
Please contact me at (805) 859-9445 if there are any questions concerning the survey, or if you need any additional information.
Sincerely,



Russell Sweet
Senior Biologist

Att.: *Figure 1. Project Location*
Figure 2. USGS Topographic Map

cc: *Christa Hudson-Gonzalez, Permitting Consultant, Avantus*
Ronelle Candia, Project Manager, Dudek



SOURCE: Avantus LLC. 2024; USGS National Map 2022; Bing Maps 2022; Kern County 2022

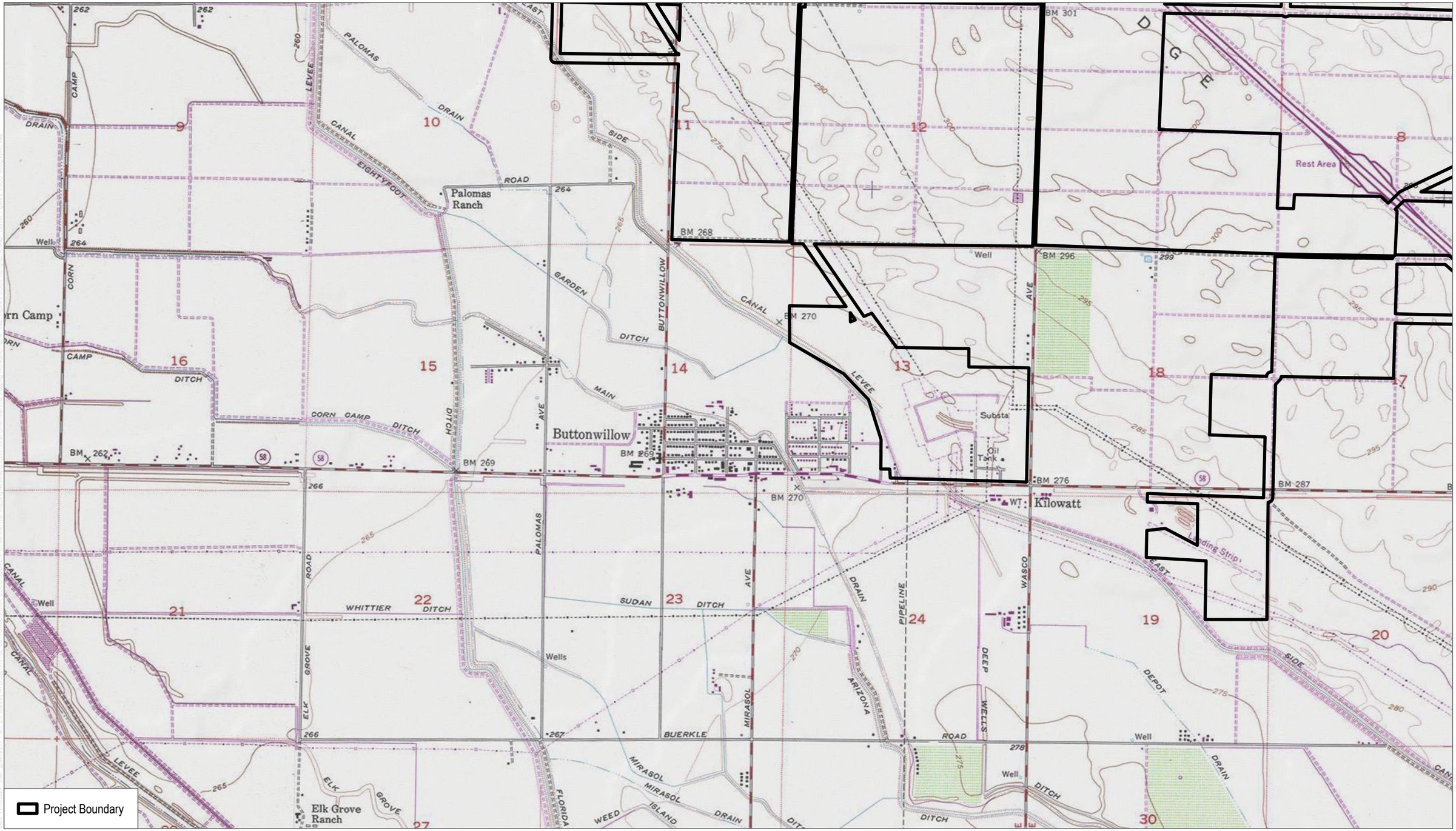
DUDEK

0 3,500 7,000 Feet

FIGURE 1

Project Location

Buttonbush Solar Energy Project



SOURCE: USGS USA Topographic Map

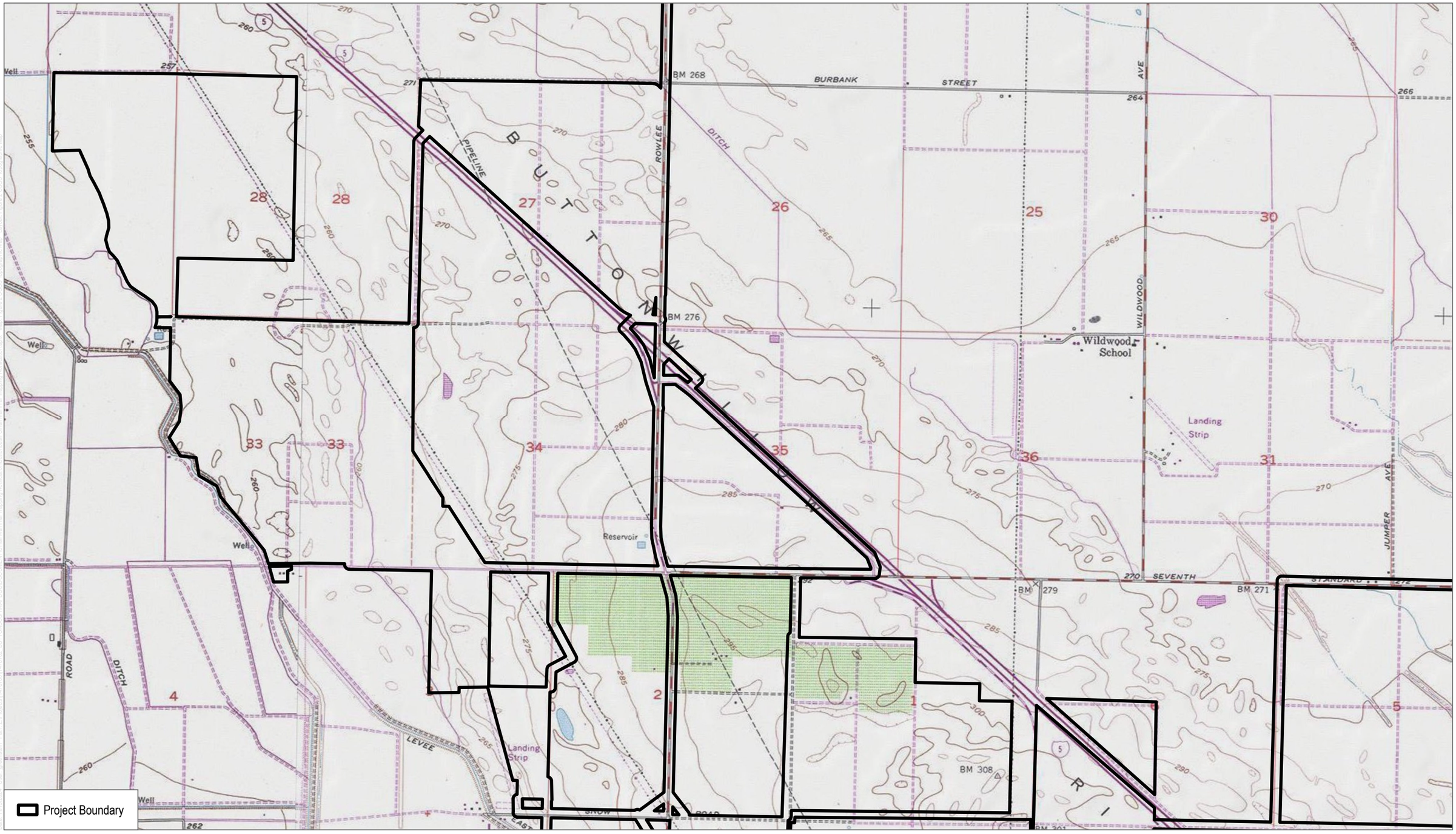
DUDEK

0 1,000 2,000 Feet

FIGURE 2A

Topographic Map

Buttonbush Solar Energy Project



SOURCE: USGS USA Topographic Map

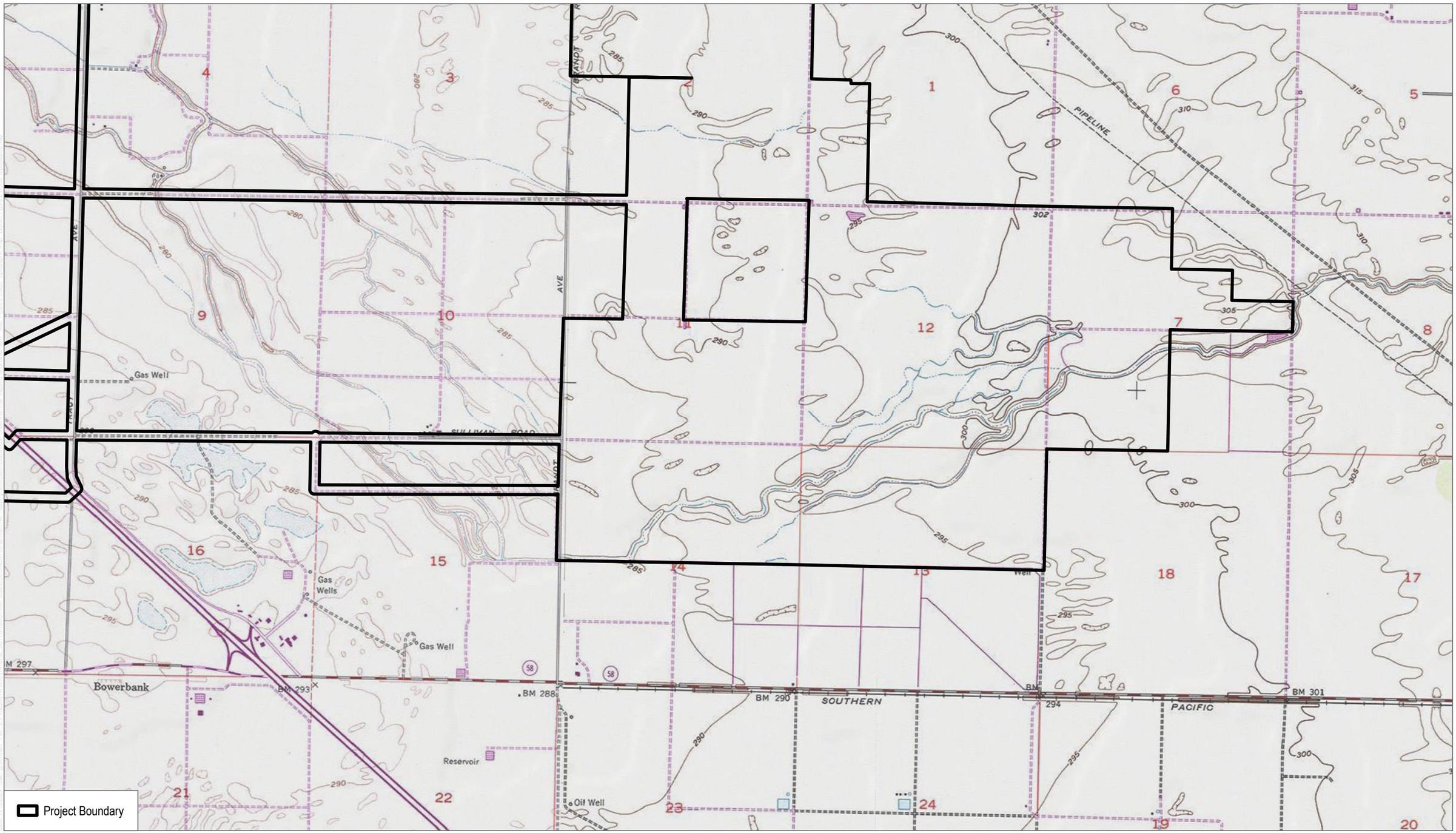
DUDEK

0 1,000 2,000 Feet

FIGURE 2B

Topographic Map

Buttonbush Solar Energy Project



SOURCE: USGS USA Topographic Map

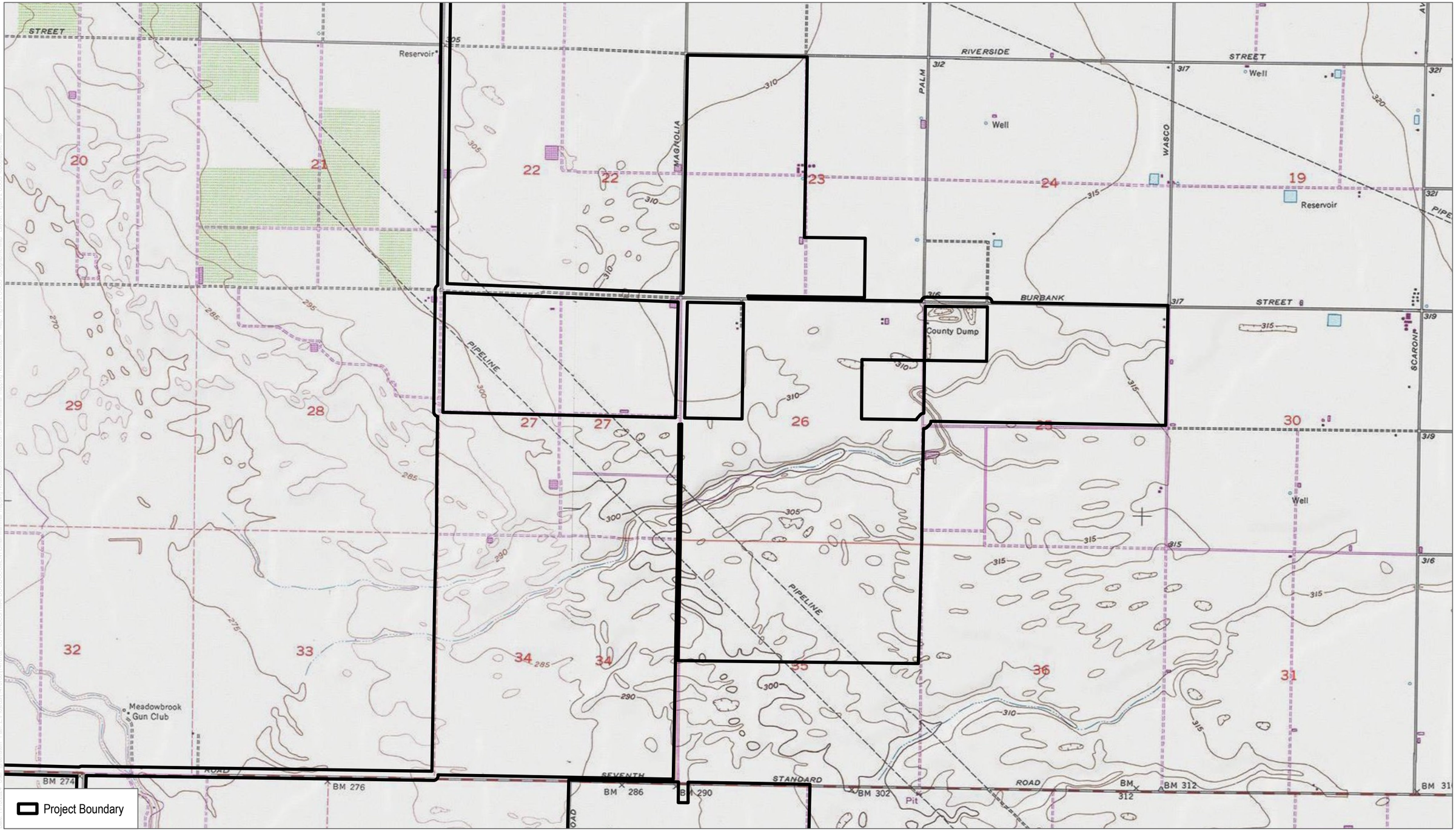
DUDEK

0 1,000 2,000 Feet

FIGURE 2C

Topographic Map

Buttonbush Solar Energy Project



SOURCE: USGS USA Topographic Map

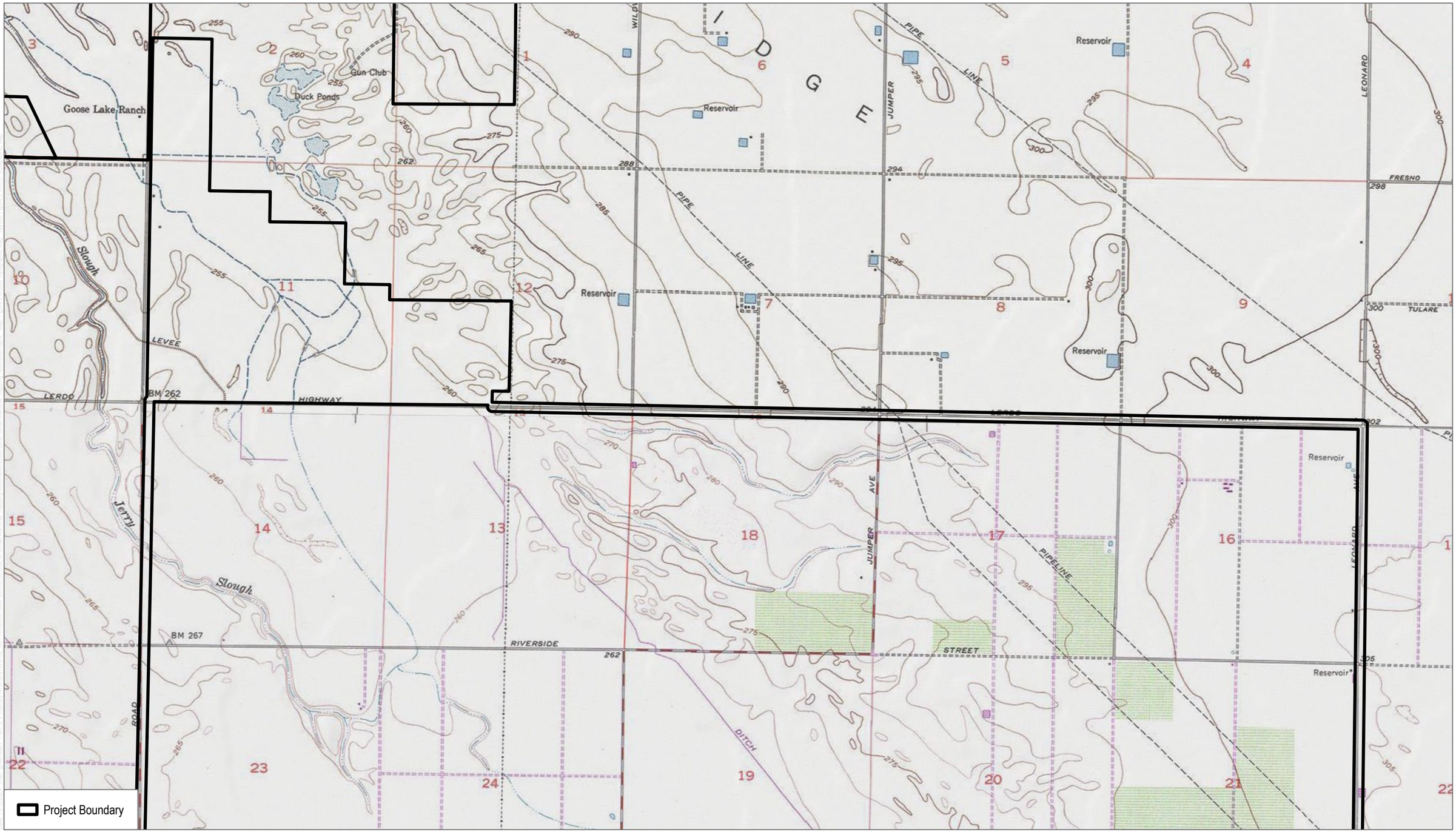
DUDEK

0 1,000 2,000 Feet

FIGURE 2D

Topographic Map

Buttonbush Solar Energy Project



SOURCE: USGS USA Topographic Map

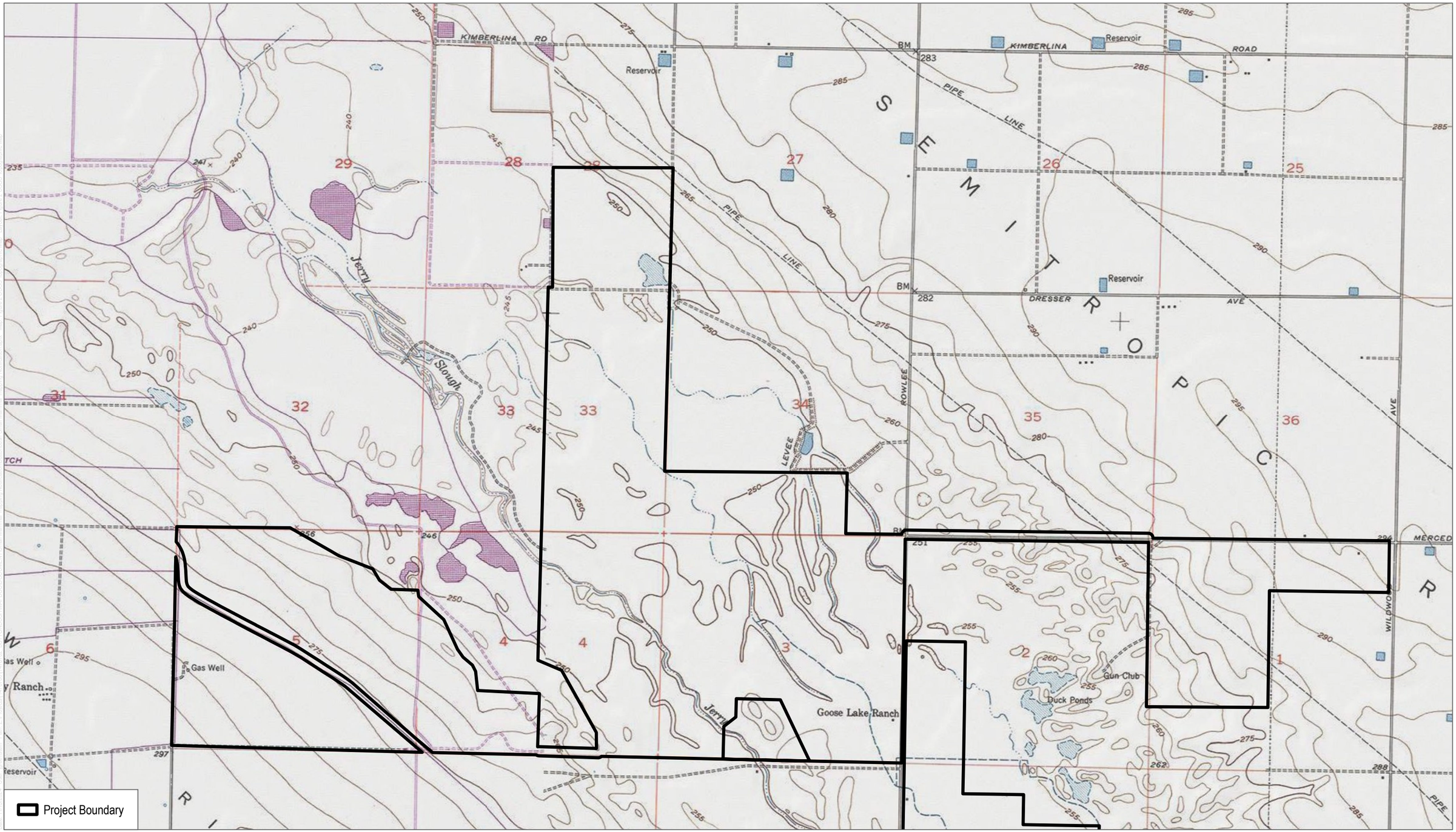
DUDEK

0 1,000 2,000 Feet

FIGURE 2E

Topographic Map

Buttonbush Solar Energy Project



SOURCE: USGS USA Topographic Map

DUDEK

0 1,000 2,000 Feet

FIGURE 2F

Topographic Map

Buttonbush Solar Energy Project

Ronelle Candia

From: Russell Sweet
Sent: Monday, November 25, 2024 9:03 AM
To: SFWO Permits, FW8
Subject: Notification of Field Activities - Trapping Plan for Proposed Buttonbush Solar - Russell Sweet (PER00046430-0)
Attachments: USFWS Notification of Field Activities for Presence-Absence Kangaroo Rat Trapping - Buttonbush Solar.pdf

Good afternoon,

Please find the attached 15-day notification of field activities in preparation to conduct kangaroo rat species trapping for the proposed Buttonbush Solar project in Kern County, CA. Please review the attached memo and let me know if you have any questions or need additional information.

Thank you,
Russell

Russell Sweet
Senior Biologist
DUDEK

O: 661 843 2065 **C:** 661 859 9445
dudek.com



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4900 CALIFORNIA AVENUE
TOWER B 2ND FLOOR
BAKERSFIELD, CALIFORNIA 93309
T 661.208.4127

MEMORANDUM

To:	My Nguyen, US Fish and Wildlife Service (USFWS)
From:	Russell Sweet, Senior Biologist, Dudek
Subject:	Notification of Presence/Absence Trapping Survey for Small Mammal Trapping for the Buttonbush Solar and Storage Project, Kern County, California.
Date:	11/25/2024
cc:	Christa Hudson-Gonzalez, Permitting Consultant, Avantus Ronelle Candia, Project Manager, Dudek
Attachment(s):	Figure 1: Project Location Figure 2A-2F: USGS Topographic Map

Please consider this memo (and email) as formal 15-day notification regarding intent to conduct nocturnal trapping to detect special-status kangaroo rat species that may occur within the proposed Buttonbush solar and Storage Project, Kern County, California. The project site is in unincorporated Kern County directly north of the community of Buttonwillow, approximately 2 miles west of the City of Shafter and approximately 7 miles southwest of the City of Wasco. The project site boundaries are illustrated on Figure 1 and Figures 2A through 2F. The project site straddles Interstate 5 (I-5) east of Buttonwillow Raceway Park, just north of State Route (SR) 58, and south of SR-46 (Figure 1).

According to the U.S. Geological Survey (USGS), the project site is within the Wasco SW, Semitropic, Rio Bravo, Buttonwillow, and Lokern USGS 1:24,000 topographic map (7.5-minute quadrangles). More specifically, the project site is located as follows: Township 27 S, Range 23 E, in portions of Sections 27, 28, 32, and 33–36; Township 28 S, Range 23 E, portions of Sections 1–15, 20, 22, 23, 26–29, and 32–35; Township 28 S, Range 24 E, in portions of Sections 7–10, 14–18, 21–28, and 31–35; and Township 29 S, Range 24 E, in portions of Sections 1–20. (Figure 2). Table 1, below, provides the Sections, Townships and Ranges for the prospective trapping locations.

Table 1. Township, Range, Sections and APN Numbers of Proposed Trap Locations

Township	Range	Section(s)	APN Numbers
27 South	23 East	28	069-350-07
28 South	23 East	2, 4, 5, 12, 13, 28, 33, 34	087-060-39, 087-090-04, 087-010-01, 087-160-01, 087-160-19, 087-160-49, 087-160-50, 087-170-04, 087-200-03, 087-200-13, 087-040-01, 087-050-29, 087-050-31, 087-050-38
28 South	24 East	33, 34	088-180-37
29 South	23 East	3, 13	101-020-08, 101-020-30, 101-020-33, 101-020-23, 100-020-19

29 South	24 East	3, 5, 6, 16, 18	103-080-48, 103-080-49, 103-080-57, 103-080-59, 103-100-23, 103-020-08, 103-030-04, 103-030-05, 103-030-19, 103-030-20, 103-030-44

This trapping effort is being conducted to detect and identify kangaroo rat species within the project area (Figures 1 and 2). The project would include the construction and operation of a photovoltaic (PV) solar facility, associated infrastructure and a battery energy storage system (BESS). The project as proposed by the project proponent would be located on 128 parcels across a leased area of approximately 12,048 acres within a 13,888-acre gross parcel boundary, the majority of which is either in agricultural use or developed in the valley region of Kern County. Small mammal burrow surveys resulted in several potential kangaroo rat burrows within the project margins where the active agricultural fields abuts to nonnative grassland, alkali sink and saltbush scrub. Few locations resulted in small mammal burrows within the margins of agricultural fields not abutting natural landscapes but within close vicinity.

Trapping will be conducted following full 2013 protocol recommended by the United States Fish and Wildlife Service to detect San Joaquin Valley kangaroo rat species and collect baseline data. Based on numbers of burrows present, trapping will consist of up to five 5-day sessions with up to 100 traps per session using 12-inch Sherman live-traps. Traps will be set-up in traplines along the margins between natural lands and agricultural production as well as areas of high density of burrows suitable for kangaroo rats. Traps will be set approximately 40 to 50 feet (12-15 m) apart. Captured animals will be recorded by species, sex, weight, and any additional notable observations. Animals will be marked with a non-toxic marker on the hip or belly to keep track of recaptures and released in the same location captured. Traps will be set at dusk and checked and closed at dawn. Traps may be checked more often if weather conditions (i.e., a predicted 40 percent or greater chance of rain; traps will not be opened when temperatures are 99°F or above, etc.) warrant, as determined by the permit holding biologist. If predicted nighttime temperatures are expected to drop below 50°F (10°C), all traps will be checked at a minimum interval of every three hours and synthetic batting or other insulating material, as well as additional food, will be placed in the open trap to reduce the effects of colder weather on trapped animals. Trapping will cease if captured animals are found to be lethargic or otherwise exhibiting signs of a decrease in body temperature. Trapping will not commence until temperatures rise to a safer temperature to ensure the safety of the animals. Therefore, trapping may be conducted over several months with pauses of trapping based on the timing of the year and temperatures.

It is understood that per the protocol, if a target species is captured during the trapping session, all trapping should cease and USFWS be notified. However, it is proposed to continue to trap the 5-consecutive nights after a target species is captured. The intent of this process is to determine the distribution of target species within the proposed project site for additional data to help in the construction, mitigation, and minimization design of the project. Please note that this plan is contingent on the client's approval; otherwise, trapping will stop at first capture of a target species. In addition, trapping will only be within acquired property (Figure 1 and 2).

Trapping will be conducted by Investigator Russell Sweet under an approved PER00046430-0. Following completion of the surveys, a letter report will be prepared and submitted to you withing 45-days. The trapping will commence as soon as possible after notification to USFWS. According to the permit/protocol, surveys may begin as soon as December 10, 2024.

Thank you very much for your consideration.

Please contact me at (805) 859-9445 if there are any questions concerning the survey, or if you need any additional information.

Sincerely,

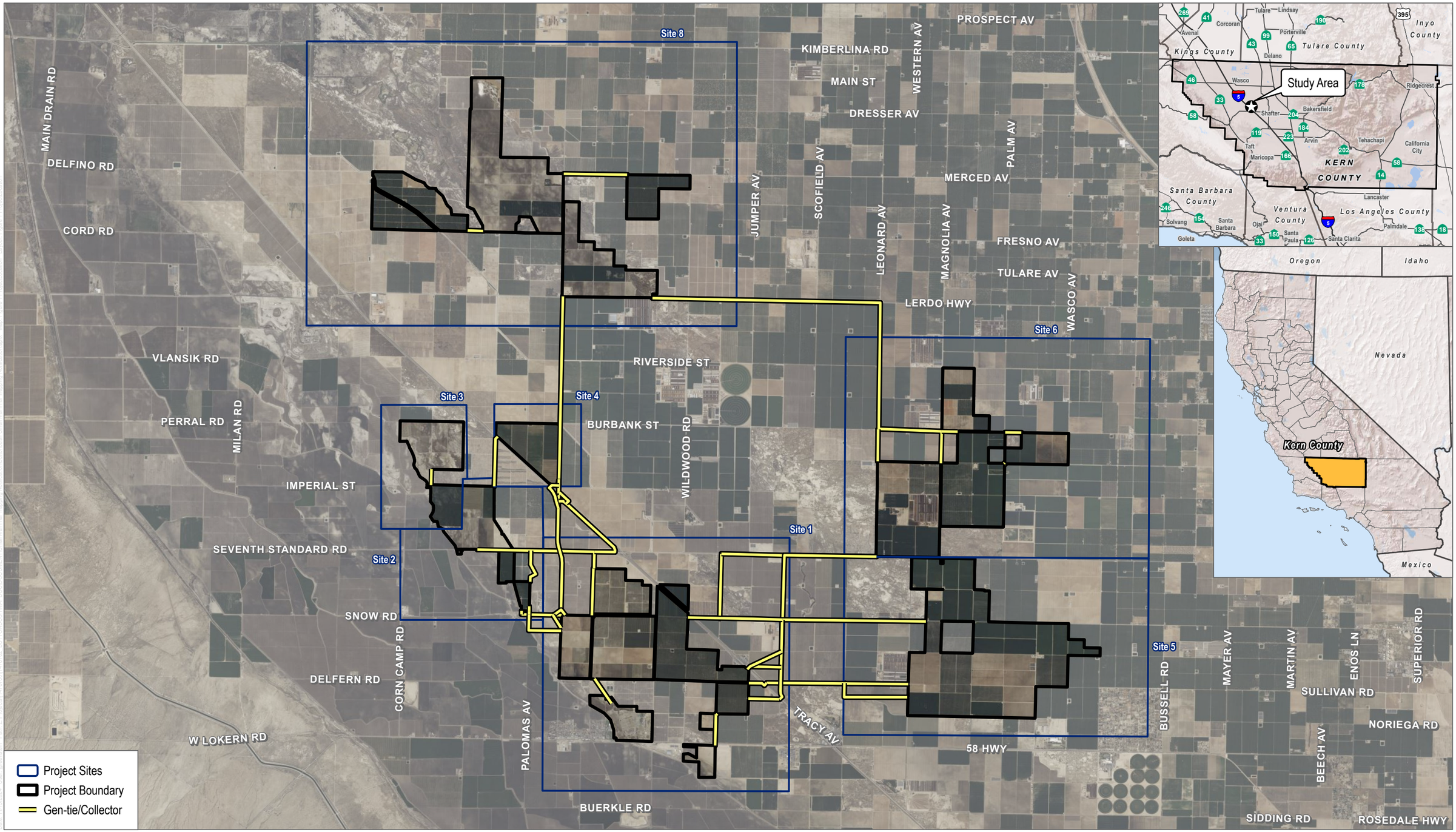


_____

Russell Sweet
Senior Biologist

Att.: *Figure 1. Project Location*
Figure 2. USGS Topographic Map

cc: *Christa Hudson-Gonzalez, Permitting Consultant, Avantus*
Ronelle Candia, Project Manager, Dudek



SOURCE: Avantus LLC. 2024; USGS National Map 2022; Bing Maps 2022; Kern County 2022

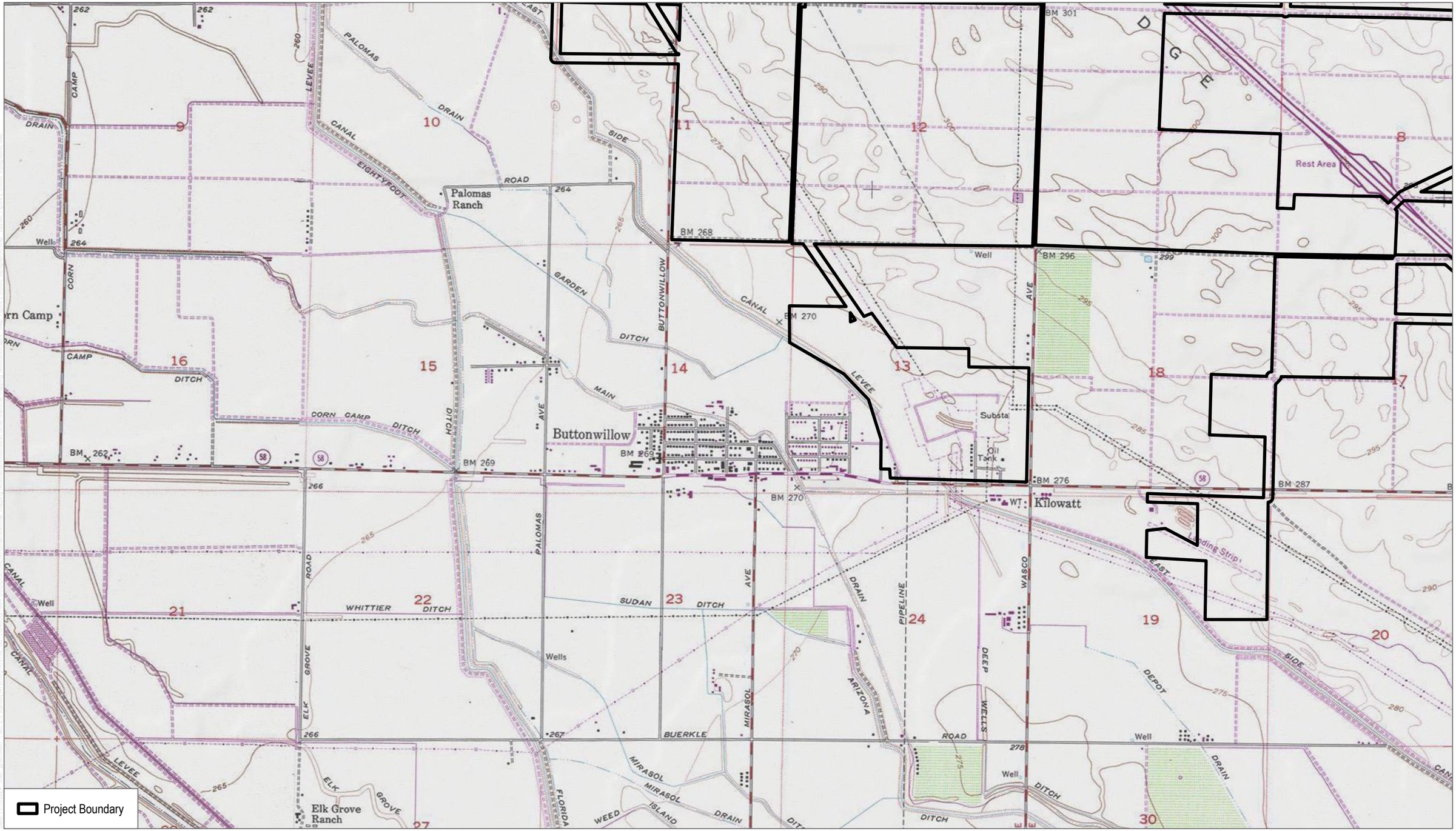
DUDEK

0 3,500 7,000 Feet

FIGURE 1

Project Location

Buttonbush Solar Energy Project



SOURCE: USGS USA Topographic Map

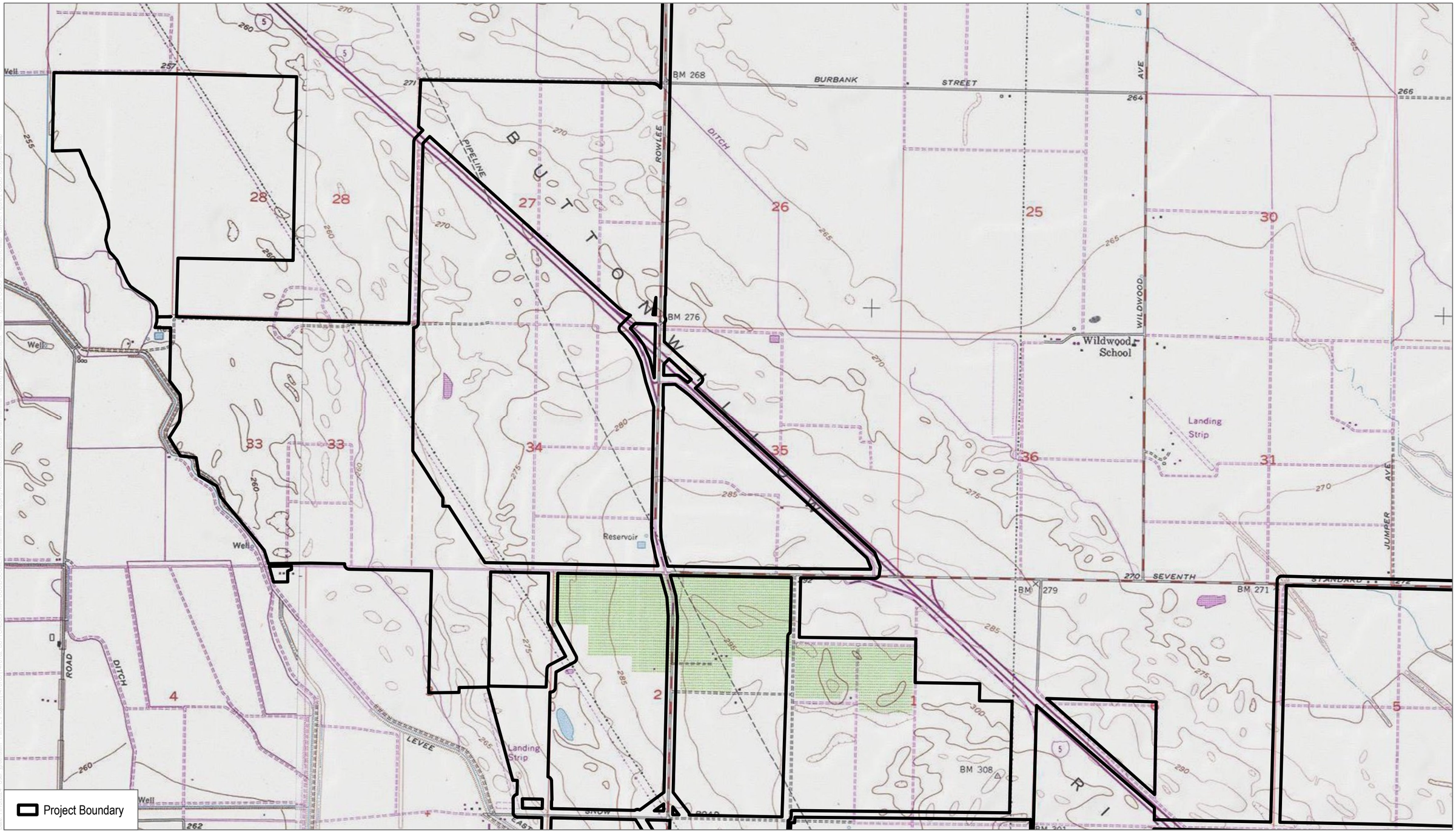
DUDEK

0 1,000 2,000 Feet

FIGURE 2A

Topographic Map

Buttonbush Solar Energy Project



SOURCE: USGS USA Topographic Map

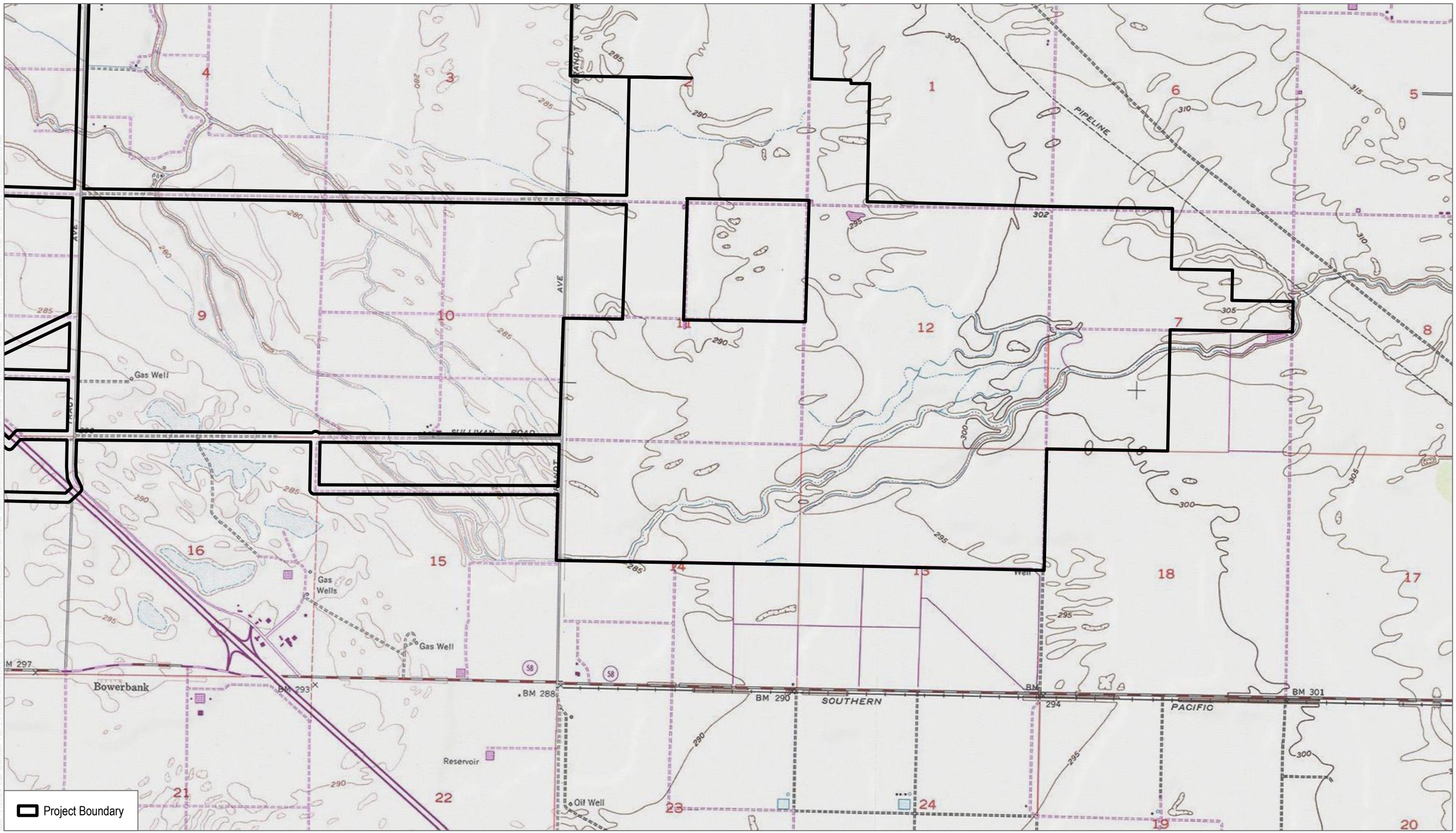
DUDEK

0 1,000 2,000 Feet

FIGURE 2B

Topographic Map

Buttonbush Solar Energy Project



SOURCE: USGS USA Topographic Map

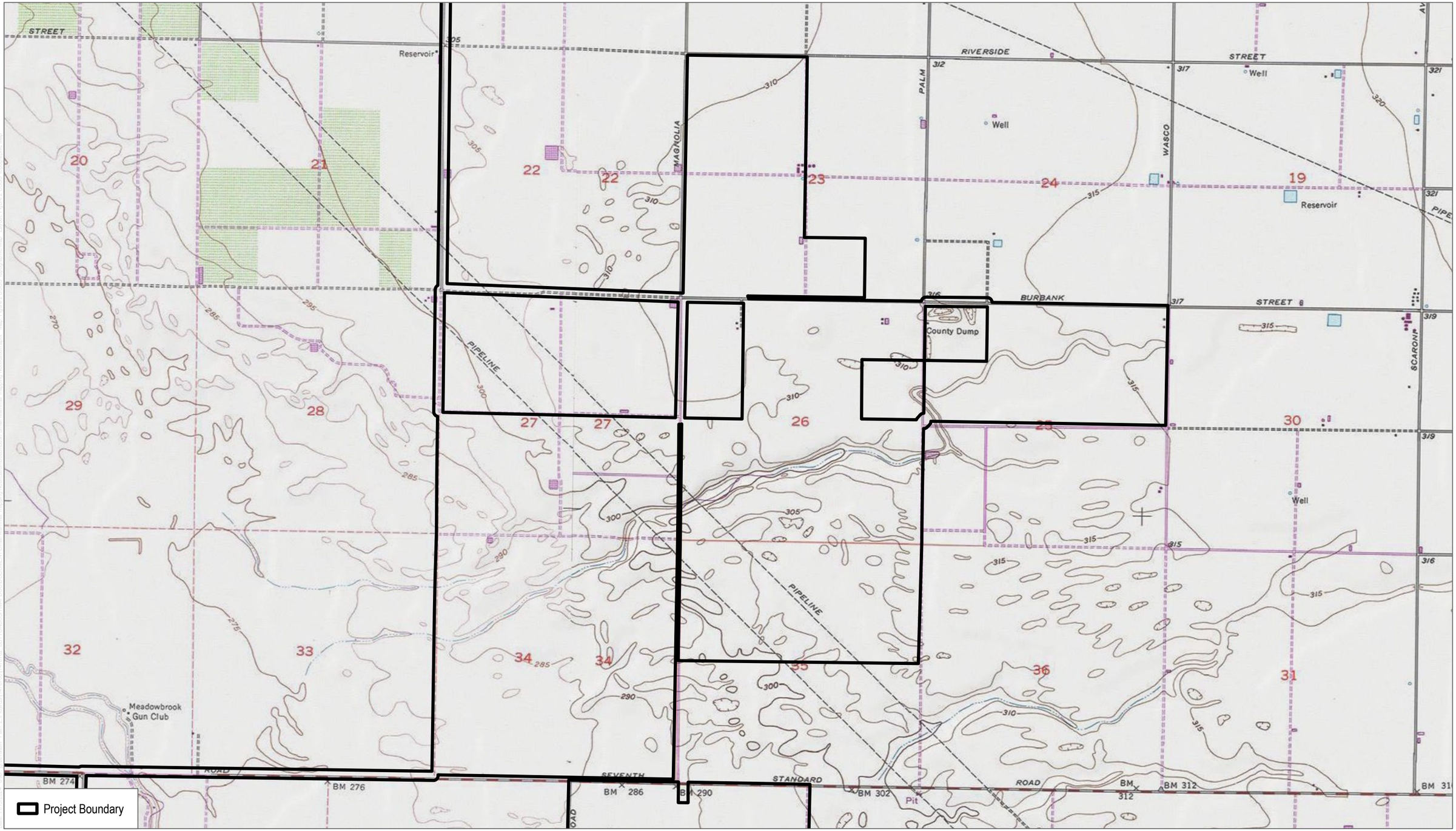
DUDEK

0 1,000 2,000 Feet

FIGURE 2C

Topographic Map

Buttonbush Solar Energy Project



SOURCE: USGS USA Topographic Map

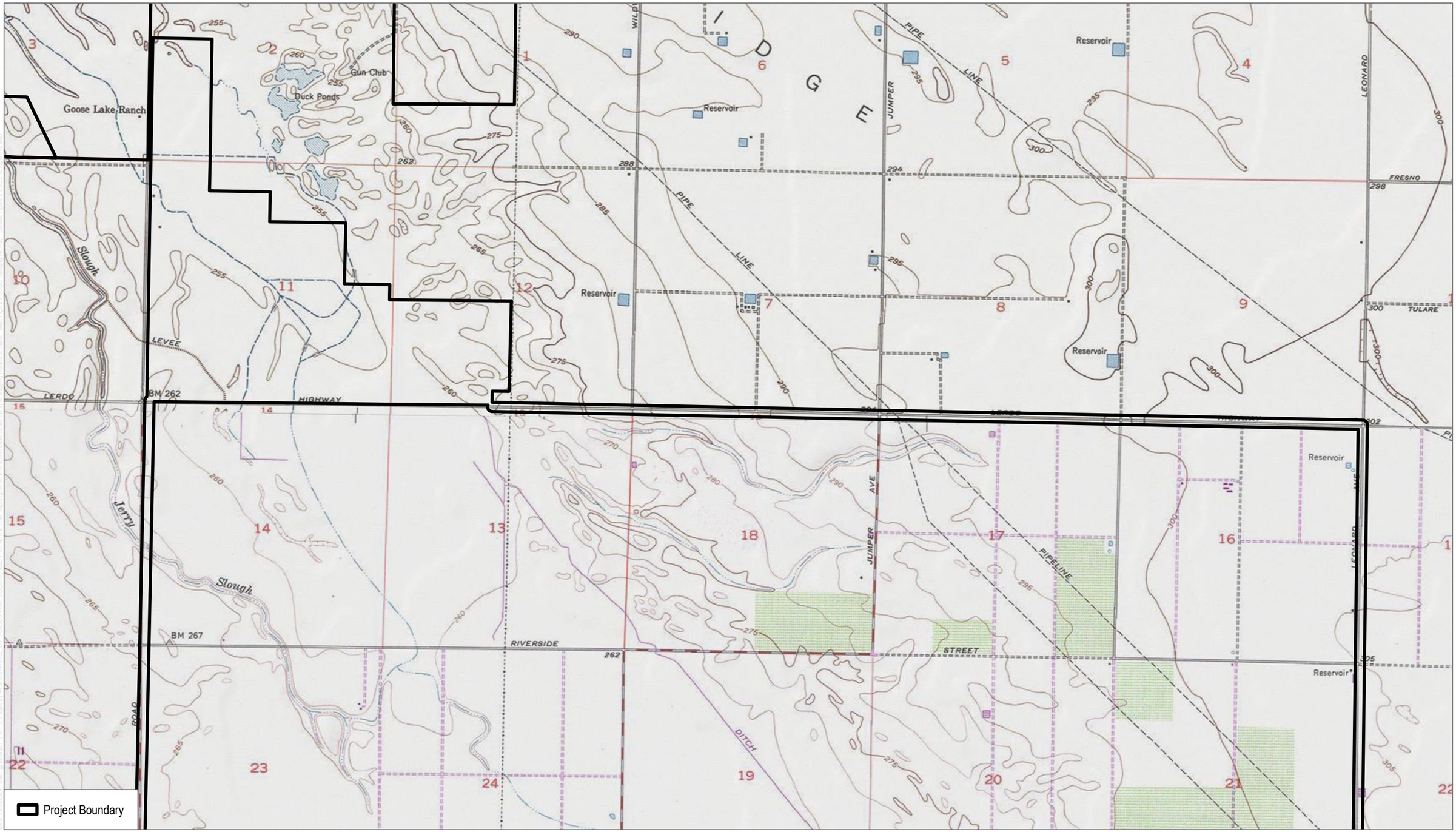
DUDEK

0 1,000 2,000 Feet

FIGURE 2D

Topographic Map

Buttonbush Solar Energy Project



SOURCE: USGS USA Topographic Map

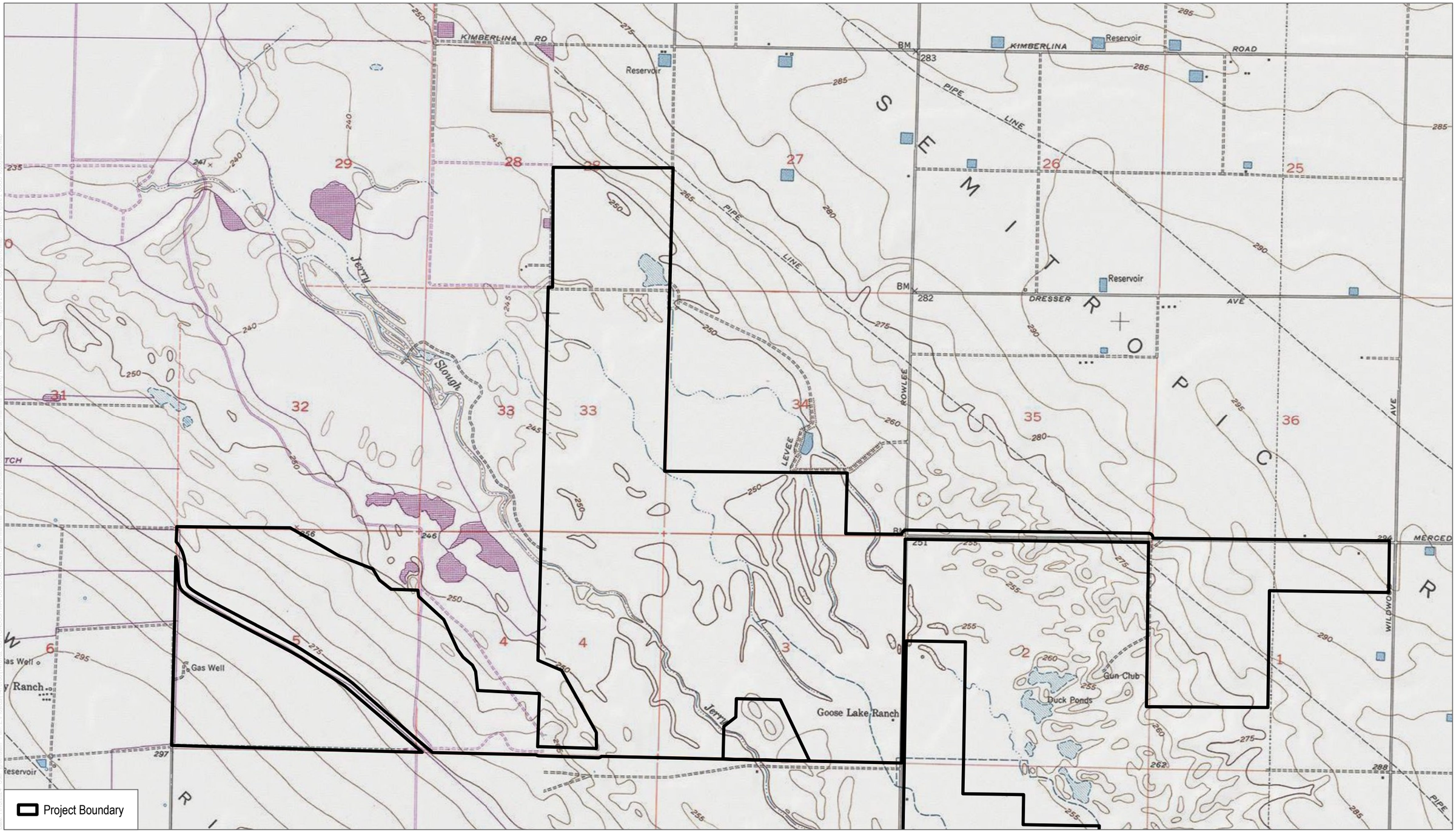
DUDEK

0 1,000 2,000 Feet

FIGURE 2E

Topographic Map

Buttonbush Solar Energy Project



SOURCE: USGS USA Topographic Map

DUDEK

0 1,000 2,000 Feet

FIGURE 2F

Topographic Map

Buttonbush Solar Energy Project

Appendix E

USFWS E-mail Notification to Proceed

Russell Sweet

From: SFWO Permits, FW8 <FW8_SFWO_Permits@fws.gov>
Sent: Monday, December 2, 2024 2:03 PM
To: Russell Sweet
Cc: Sloan, Justin
Subject: Re: [EXTERNAL] Notification of Field Activities - Trapping Plan for Proposed Buttonbush Solar - Russell Sweet (PER00046430-0)

Hello,

We have received your notification to perform surveys following the U.S. Fish and Wildlife Service Survey Protocols. You may commence protocol-level survey activities 15 calendar days following the submittal of your notification, unless authorization is denied or a different start date was indicated. Please follow the reporting guidelines and Special Terms and Conditions within your recovery permit.

If this is an activity covered under a Service-approved management plan (e.g. Biological Opinion, Incidental Take Permit, Habitat Conservation Plan), you must follow the pre-activity notification and reporting guidelines as described in the management plan. Re-submit this notification to the Service contact listed in the management plan, unless this activity is outside the management plan.

Within 45 days following completion of the final presence/absence survey associated with this request, a survey report shall be submitted to fw8_sfwo_permits@fws.gov and the San Joaquin Valley Division Supervisor, Justin Sloan (justin_sloan@fws.gov). For surveys with negative results and for incomplete surveys (e.g., projects put on hold or withdrawn) a survey report is still required. Survey reports shall include:

1. i) Title, ii) permit number, iv) permittee name and their respective contact details, v) the location/GPS coordinates, vi) number and dates of surveys, vii) the activities completed, and viii) date of preparation on the report;

2. GIS data or GPS coordinates and maps (at a minimum, a 7.5-minute U.S. Geological Survey (USGS) topographic map at 1:24,000 scale) depicting the location and boundary of the survey area(s).

3. The following certification statement signed by each surveyor performing activities in independent status pursuant to this permit: “I certify that the information in this survey report and attached exhibits fully and accurately represents my work.” The date of signature and the surveyor’s permit number shall be included; and

4. All other information required in the applicable U.S. Fish and Wildlife Service Survey Protocol and 45-Day Survey Report section of this permit.

Please email fw8_sfwo_permits@fws.gov if you have additional questions.

Thank you,

Sacramento Fish and Wildlife Office

From: Russell Sweet <rsweet@dudek.com>
Sent: Monday, November 25, 2024 9:03 AM
To: SFWO Permits, FW8 <FW8_SFWO_Permits@fws.gov>
Subject: [EXTERNAL] Notification of Field Activities - Trapping Plan for Proposed Buttonbush Solar - Russell Sweet (PER00046430-0)

This email has been received from outside of DOI - Use caution before clicking on links, opening attachments, or responding.

Good afternoon,

Please find the attached 15-day notification of field activities in preparation to conduct kangaroo rat species trapping for the proposed Buttonbush Solar project in Kern County, CA. Please review the attached memo and let me know if you have any questions or need additional information.

Thank you,
Russell

Russell Sweet
Senior Biologist
DUDEK

O: 661 843 2065 **C:** 661 859 9445
dudek.com



Appendix H

CDFW and USFWS Email Notification of Field Activities and USFWS Email Notification to Proceed

Ronelle Candia

From: Russell Sweet
Sent: Monday, November 25, 2024 9:01 AM
To: katrina.smith@wildlife.ca.gov; Hirano, Chad@Wildlife; Hurt, Kevin@Wildlife; Sinclair, Crystal@Wildlife
Subject: Notification of Field Activities - Trapping Plan for Proposed Buttonbush Solar - Russell Sweet MOU and Specific Use Permit S-221230002-22143-001
Attachments: CDFW Notification of Field Activities for Presence-Absence Kangaroo Rat Trapping - Buttonbush Solar.pdf

Good afternoon,

Please find the attached notification of field activities in preparation to conduct kangaroo rat species trapping for the proposed Buttonbush Solare project in Kern County, CA. Please review the attached memo and let me know if you have any questions or need additional information.

Thank you,
Russell

Russell Sweet
Senior Biologist
DUDEK

O: 661 843 2065 **C:** 661 859 9445
dudek.com



DUDEK
4900 CALIFORNIA AVENUE
TOWER B 2ND FLOOR
BAKERSFIELD, CALIFORNIA 93309
T 661.208.4127

MEMORANDUM

To:	Justin Garcia, California Department of Fish and Wildlife (CDFW) Chad Hirano, CDFW Crystal Sinclair, CDFW Kevin Hurt, CDFW
From:	Russell Sweet, Senior Biologist, Dudek
Subject:	Notification of Presence/Absence Trapping Survey for Small Mammal Trapping for the Buttonbush Solar and Storage Project, Kern County, California.
Date:	11/25/2024
cc:	Christa Hudson-Gonzalez, Permitting Consultant, Avantus Ronelle Candia, Project Manager, Dudek
Attachment(s):	Figure 1: Project Location Figures 2A-2F: USGS Topographic Map

Please consider this memo (and email) as formal 14-day notification regarding intent to conduct nocturnal trapping to detect special-status kangaroo rat species that may occur within the proposed Buttonbush solar and Storage Project, Kern County, California. The project site is in unincorporated Kern County directly north of the community of Buttonwillow, approximately 2 miles west of the City of Shafter and approximately 7 miles southwest of the City of Wasco. The project site boundaries are illustrated on Figure 1 and Figures 2A through 2F. The project site straddles Interstate 5 (I-5) east of Buttonwillow Raceway Park, just north of State Route (SR) 58, and south of SR-46 (Figure 1).

According to the U.S. Geological Survey (USGS), the project site is within the Wasco SW, Semitropic, Rio Bravo, Buttonwillow, and Lokern USGS 1:24,000 topographic map (7.5-minute quadrangles). More specifically, the project site is located as follows: Township 27 S, Range 23 E, in portions of Sections 27, 28, 32, and 33–36; Township 28 S, Range 23 E, portions of Sections 1–15, 20, 22, 23, 26–29, and 32–35; Township 28 S, Range 24 E, in portions of Sections 7–10, 14–18, 21–28, and 31–35; and Township 29 S, Range 24 E, in portions of Sections 1–20. (Figure 2). Table 1, below, provides the Sections, Townships and Ranges for the prospective trapping locations.

Table 1. Township, Range, Sections and APN Numbers of Proposed Trap Locations

Township	Range	Section(s)	APN Numbers
27 South	23 East	28	069-350-07
28 South	23 East	2, 4, 5, 12, 13, 28, 33, 34	087-060-39, 087-090-04, 087-010-01, 087-160-01, 087-160-19, 087-160-49, 087-160-50, 087-170-04, 087-200-03, 087-200-13, 087-040-01, 087-050-29, 087-050-31, 087-050-38

28 South	24 East	33, 34	088-180-37
29 South	23 East	3, 13	101-020-08, 101-020-30, 101-020-33, 101-020-23, 100-020-19
29 South	24 East	3, 5, 6, 16, 18	103-080-48, 103-080-49, 103-080-57, 103-080-59, 103-100-23, 103-020-08, 103-030-04, 103-030-05, 103-030-19, 103-030-20, 103-030-44

This trapping effort is being conducted to detect and identify kangaroo rat species within the project area (Figures 1 and 2). The project would include the construction and operation of a photovoltaic (PV) solar facility, associated infrastructure and a battery energy storage system (BESS). The project as proposed by the project proponent would be located on 128 parcels across a leased area of approximately 12,048 acres within a 13,888-acre gross parcel boundary, the majority of which is either in agricultural use or developed in the valley region of Kern County. Small mammal burrow surveys resulted in several potential kangaroo rat burrows within the project margins where the active agricultural fields abuts to nonnative grassland, alkali sink and saltbush scrub. Few locations resulted in small mammal burrows within the margins of agricultural fields not abutting natural landscapes but within close vicinity.

Trapping will be conducted following full 2013 protocol recommended by the United States Fish and Wildlife Service to detect San Joaquin Valley kangaroo rat species and collect baseline data. Based on numbers of burrows present, trapping will consist of up to five 5-day sessions with up to 100 traps per session using 12-inch Sherman live-traps. Traps will be set-up in traplines along the margins between natural lands and agricultural production as well as areas of high density of burrows suitable for kangaroo rats. Traps will be set approximately 40 to 50 feet (12-15 m) apart. Captured animals will be recorded by species, sex, weight, and any additional notable observations. Animals will be marked with a non-toxic marker on the hip or belly to keep track of recaptures and released in the same location captured. Traps will be set at dusk and checked and closed at dawn. Traps may be checked more often if weather conditions (i.e., a predicted 40 percent or greater chance of rain; traps will not be opened when temperatures are 99°F or above, etc.) warrant, as determined by the permit holding biologist. If predicted nighttime temperatures are expected to drop below 50°F (10°C), all traps will be checked at a minimum interval of every three hours and synthetic batting or other insulating material, as well as additional food, will be placed in the open trap to reduce the effects of colder weather on trapped animals. Trapping will cease if captured animals are found to be lethargic or otherwise exhibiting signs of a decrease in body temperature. Trapping will not commence until temperatures rise to a safer temperature to ensure the safety of the animals. Therefore, trapping may be conducted over several months with pauses of trapping based on the timing of the year and temperatures.

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Trapping will be conducted by Investigator Russell Sweet under an approved MOU and Specific Use Permit S-221230002-22143-001. Following completion of the surveys, a letter report will be prepared and submitted

to you withing 45-days. The trapping will commence as soon as possible after notification to California Department of Fish and Wildlife. According to the permit/protocol, surveys may begin as soon as December 10, 2024.

Thank you very much for your consideration.

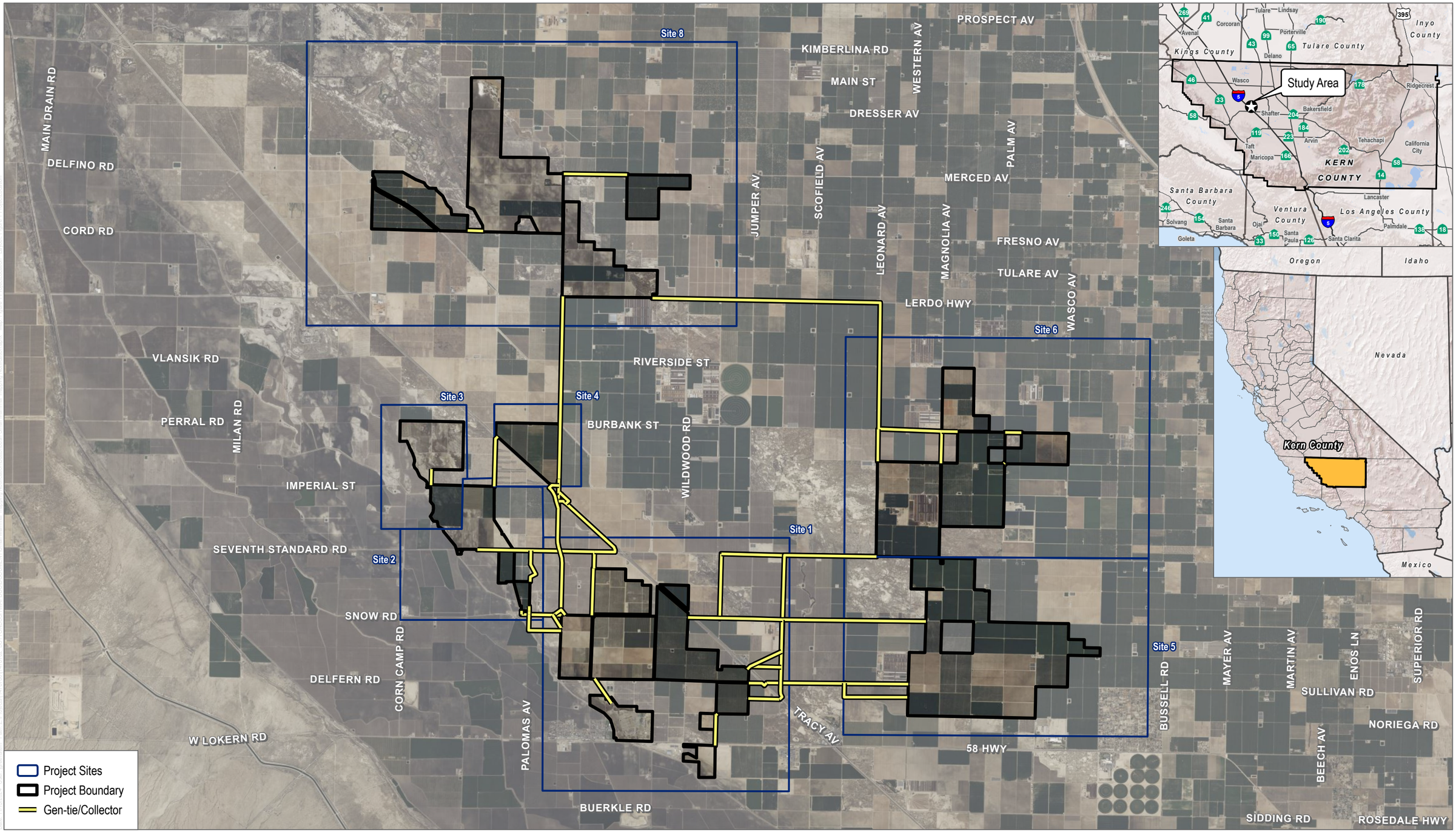
Please contact me at (805) 859-9445 if there are any questions concerning the survey, or if you need any additional information.
Sincerely,



Russell Sweet
Senior Biologist

Att.: *Figure 1. Project Location*
Figure 2. USGS Topographic Map

cc: *Christa Hudson-Gonzalez, Permitting Consultant, Avantus*
Ronelle Candia, Project Manager, Dudek



SOURCE: Avantus LLC. 2024; USGS National Map 2022; Bing Maps 2022; Kern County 2022

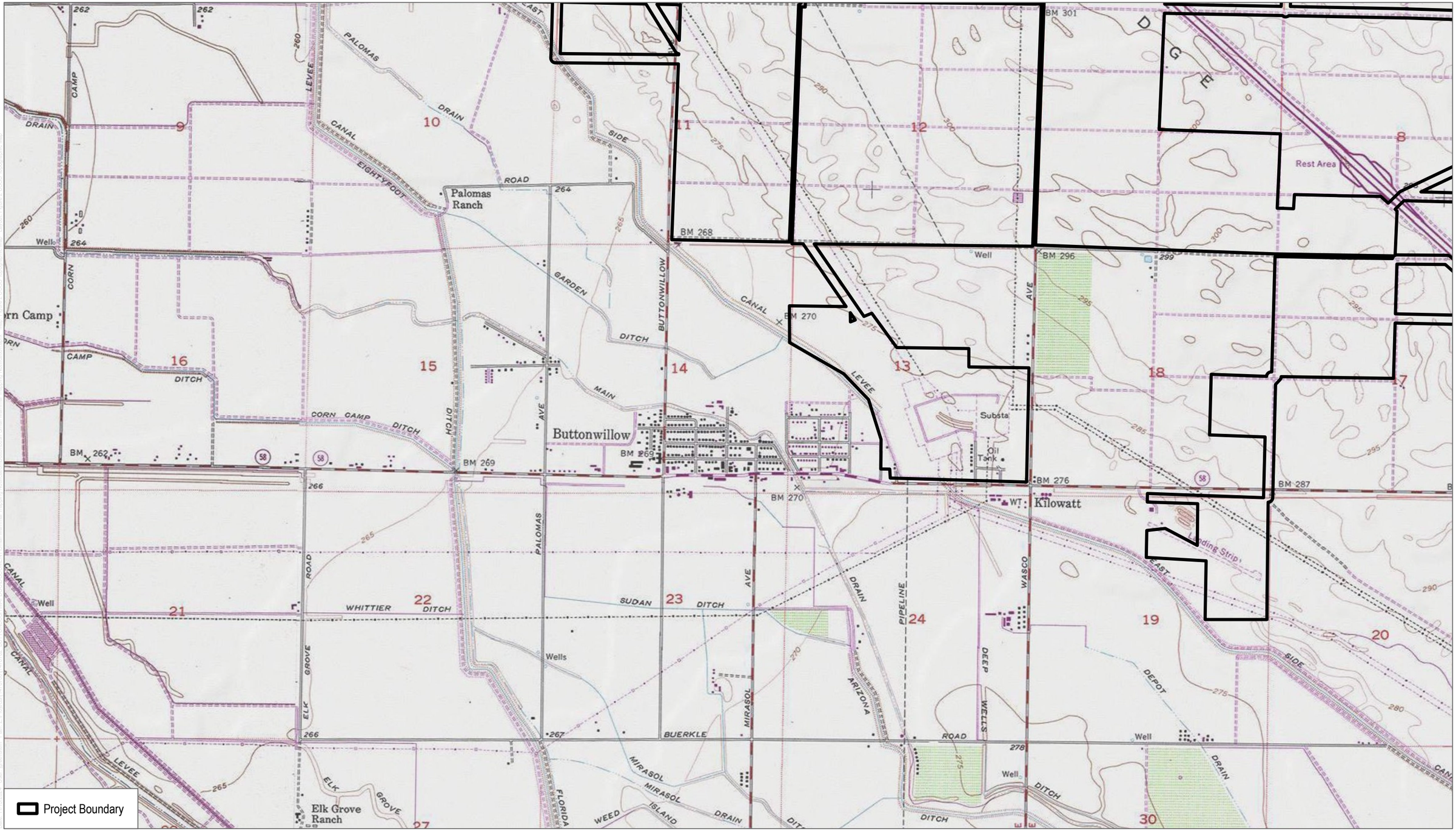
DUDEK

0 3,500 7,000 Feet

FIGURE 1

Project Location

Buttonbush Solar Energy Project



SOURCE: USGS USA Topographic Map

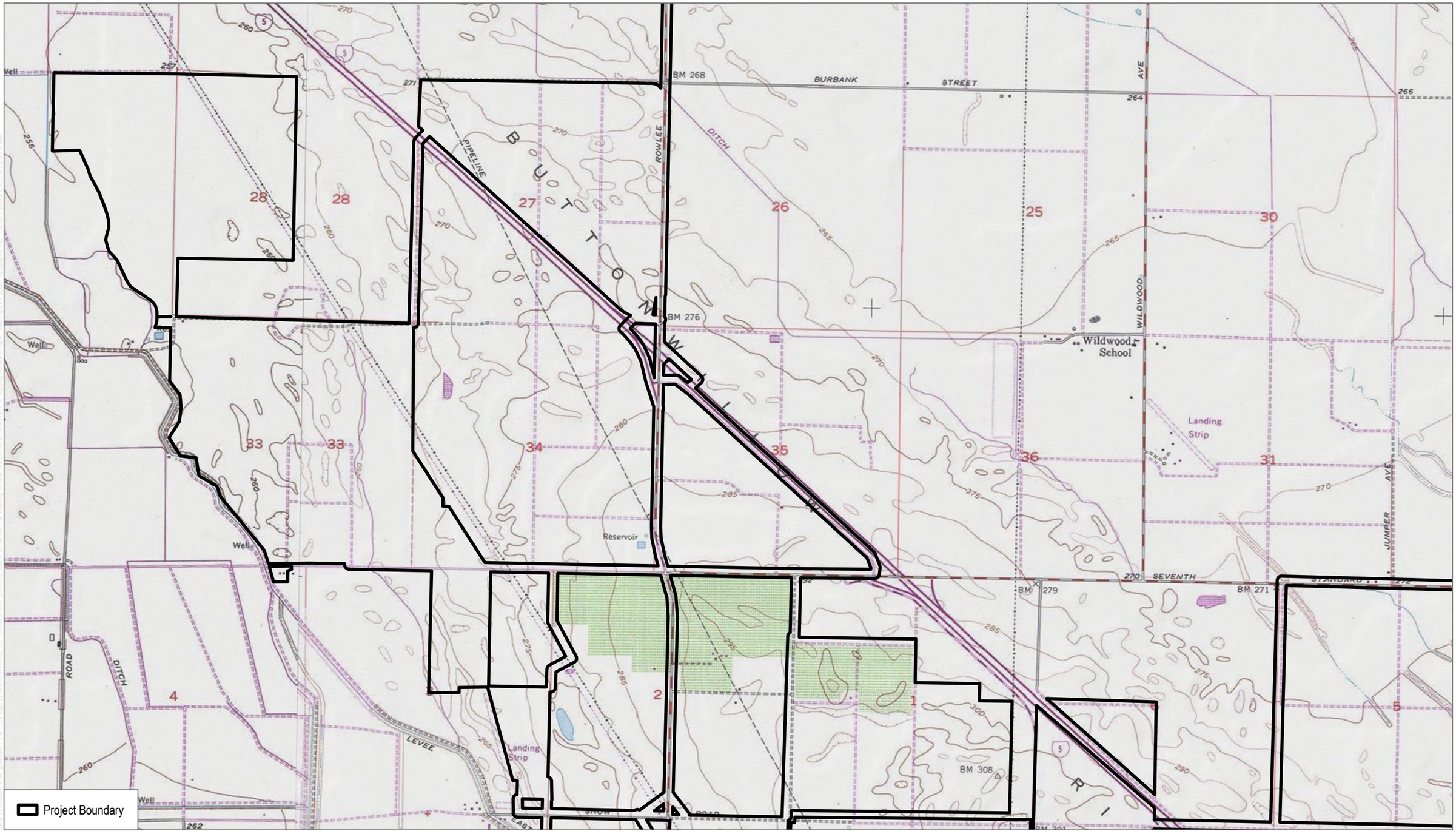
DUDEK

0 1,000 2,000 Feet

FIGURE 2A

Topographic Map

Buttonbush Solar Energy Project



SOURCE: USGS USA Topographic Map

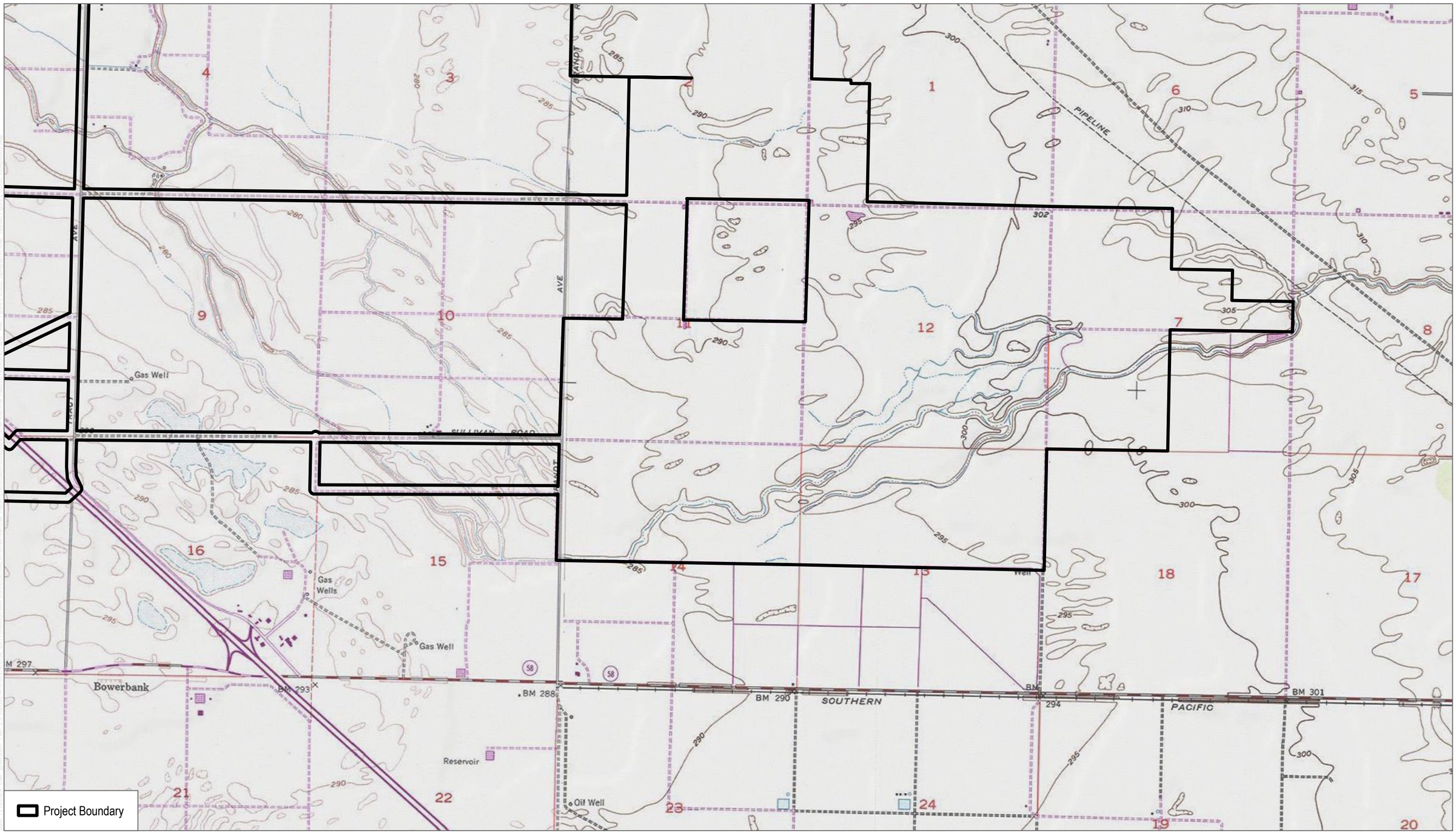
DUDEK

0 1,000 2,000 Feet

FIGURE 2B

Topographic Map

Buttonbush Solar Energy Project



SOURCE: USGS USA Topographic Map

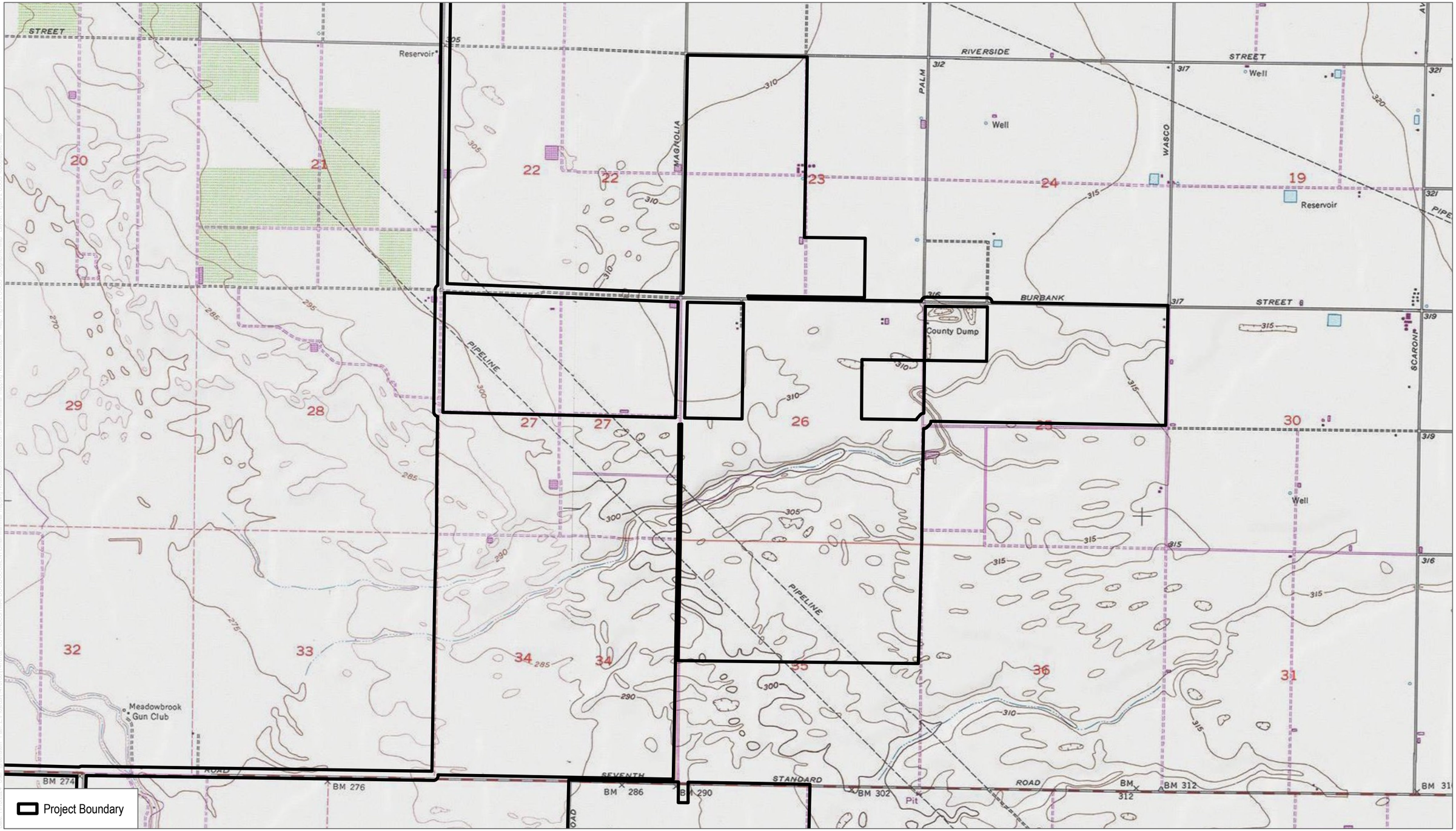
DUDEK

0 1,000 2,000 Feet

FIGURE 2C

Topographic Map

Buttonbush Solar Energy Project



SOURCE: USGS USA Topographic Map

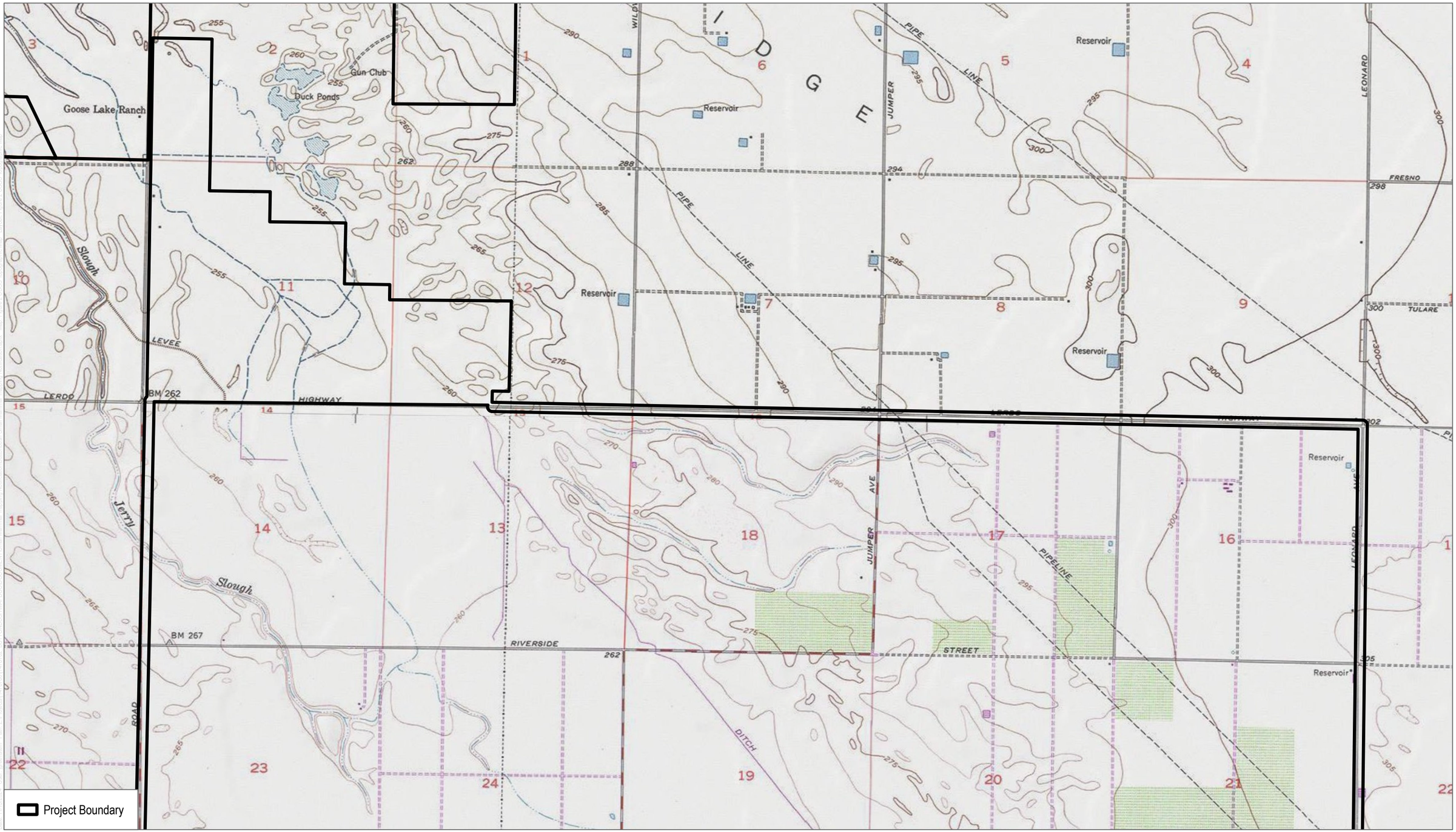
DUDEK

0 1,000 2,000 Feet

FIGURE 2D

Topographic Map

Buttonbush Solar Energy Project



SOURCE: USGS USA Topographic Map

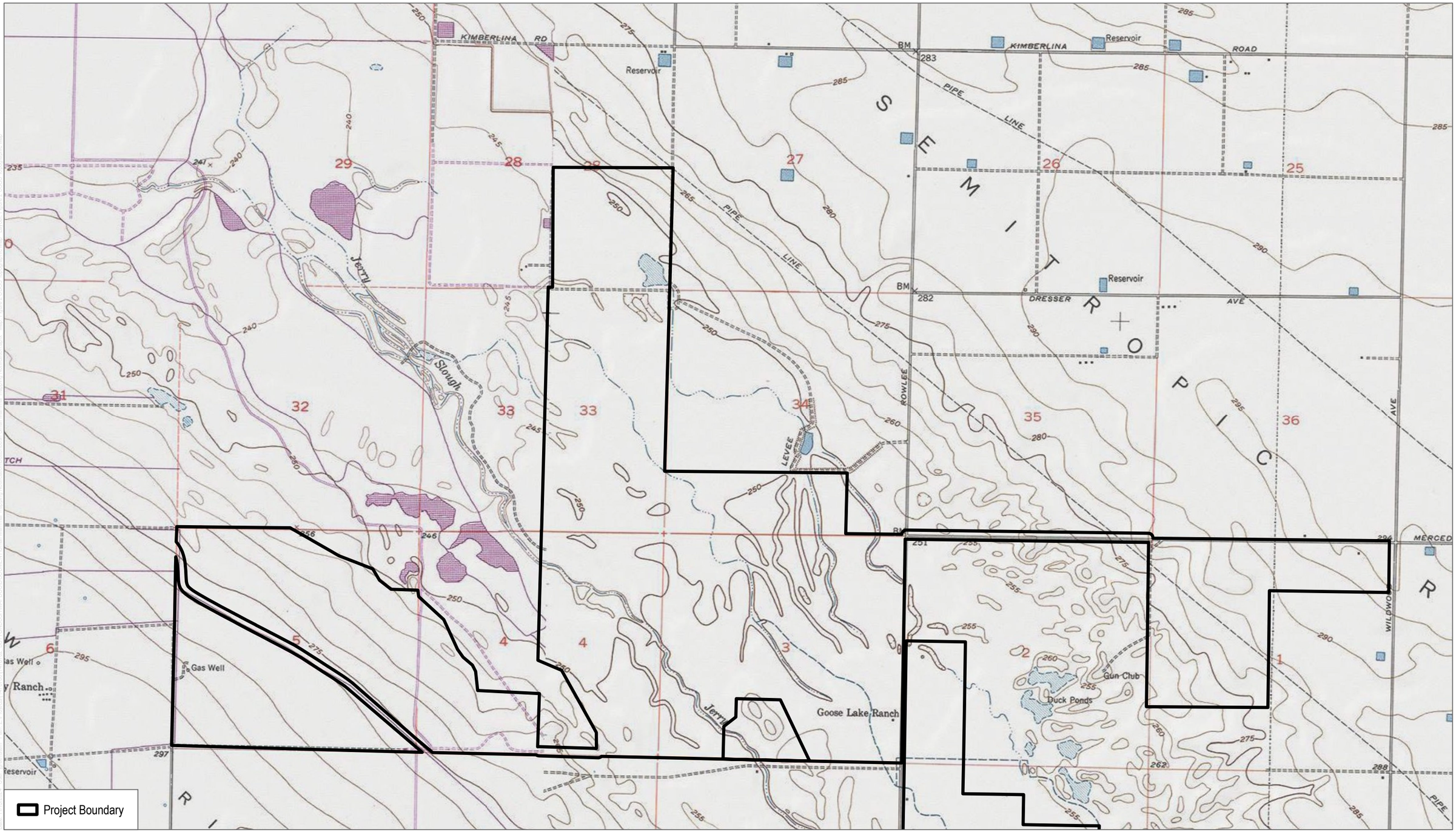
DUDEK

0 1,000 2,000 Feet

FIGURE 2E

Topographic Map

Buttonbush Solar Energy Project



SOURCE: USGS USA Topographic Map

DUDEK

0 1,000 2,000 Feet

FIGURE 2F

Topographic Map

Buttonbush Solar Energy Project

Ronelle Candia

From: Russell Sweet
Sent: Monday, November 25, 2024 9:03 AM
To: SFWO Permits, FW8
Subject: Notification of Field Activities - Trapping Plan for Proposed Buttonbush Solar - Russell Sweet (PER00046430-0)
Attachments: USFWS Notification of Field Activities for Presence-Absence Kangaroo Rat Trapping - Buttonbush Solar.pdf

Good afternoon,

Please find the attached 15-day notification of field activities in preparation to conduct kangaroo rat species trapping for the proposed Buttonbush Solar project in Kern County, CA. Please review the attached memo and let me know if you have any questions or need additional information.

Thank you,
Russell

Russell Sweet
Senior Biologist
DUDEK

O: 661 843 2065 **C:** 661 859 9445
dudek.com



DUDEK
4900 CALIFORNIA AVENUE
TOWER B 2ND FLOOR
BAKERSFIELD, CALIFORNIA 93309
T 661.208.4127

MEMORANDUM

To:	My Nguyen, US Fish and Wildlife Service (USFWS)
From:	Russell Sweet, Senior Biologist, Dudek
Subject:	Notification of Presence/Absence Trapping Survey for Small Mammal Trapping for the Buttonbush Solar and Storage Project, Kern County, California.
Date:	11/25/2024
cc:	Christa Hudson-Gonzalez, Permitting Consultant, Avantus Ronelle Candia, Project Manager, Dudek
Attachment(s):	Figure 1: Project Location Figure 2A-2F: USGS Topographic Map

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This trapping effort is being conducted to detect and identify kangaroo rat species within the project area (Figures 1 and 2). The project would include the construction and operation of a photovoltaic (PV) solar facility, associated infrastructure and a battery energy storage system (BESS). The project as proposed by the project proponent would be located on 128 parcels across a leased area of approximately 12,048 acres within a 13,888-acre gross parcel boundary, the majority of which is either in agricultural use or developed in the valley region of Kern County. Small mammal burrow surveys resulted in several potential kangaroo rat burrows within the project margins where the active agricultural fields abuts to nonnative grassland, alkali sink and saltbush scrub. Few locations resulted in small mammal burrows within the margins of agricultural fields not abutting natural landscapes but within close vicinity.

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Thank you very much for your consideration.

Please contact me at (805) 859-9445 if there are any questions concerning the survey, or if you need any additional information.

Sincerely,

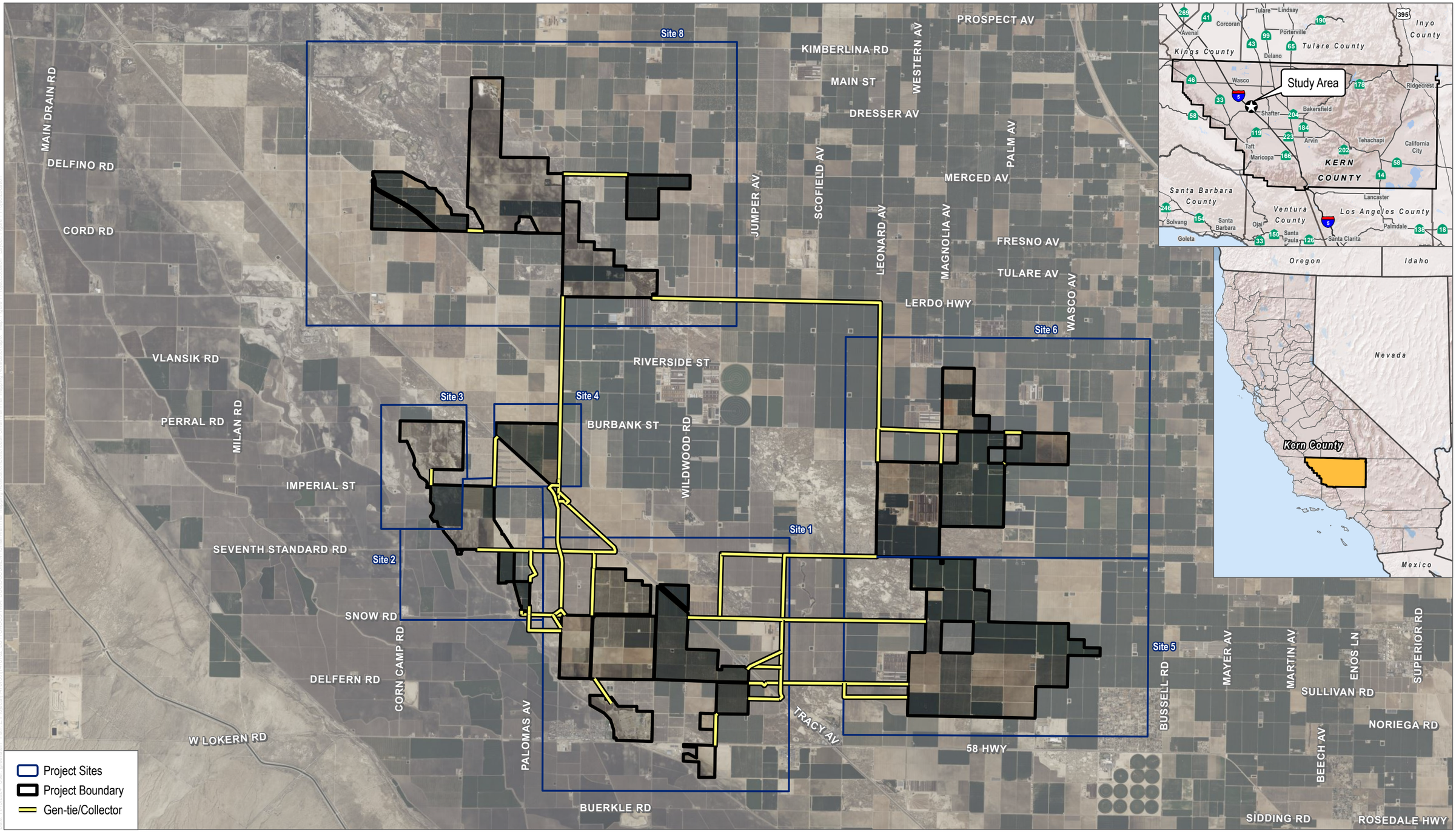


_____

Russell Sweet
Senior Biologist

Att.: *Figure 1. Project Location*
Figure 2. USGS Topographic Map

cc: *Christa Hudson-Gonzalez, Permitting Consultant, Avantus*
Ronelle Candia, Project Manager, Dudek



SOURCE: Avantus LLC. 2024; USGS National Map 2022; Bing Maps 2022; Kern County 2022

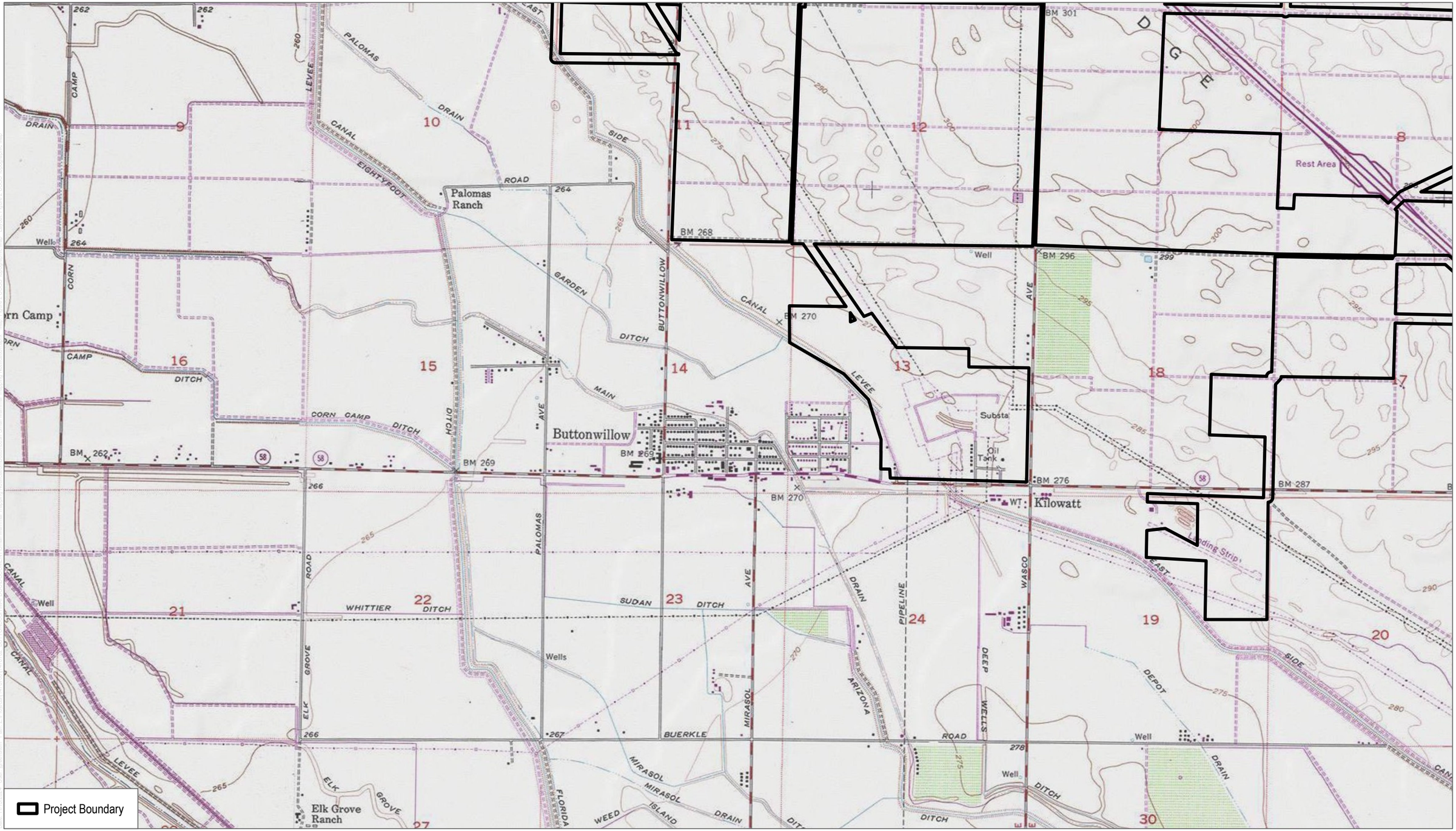
DUDEK

0 3,500 7,000 Feet

FIGURE 1

Project Location

Buttonbush Solar Energy Project



SOURCE: USGS USA Topographic Map

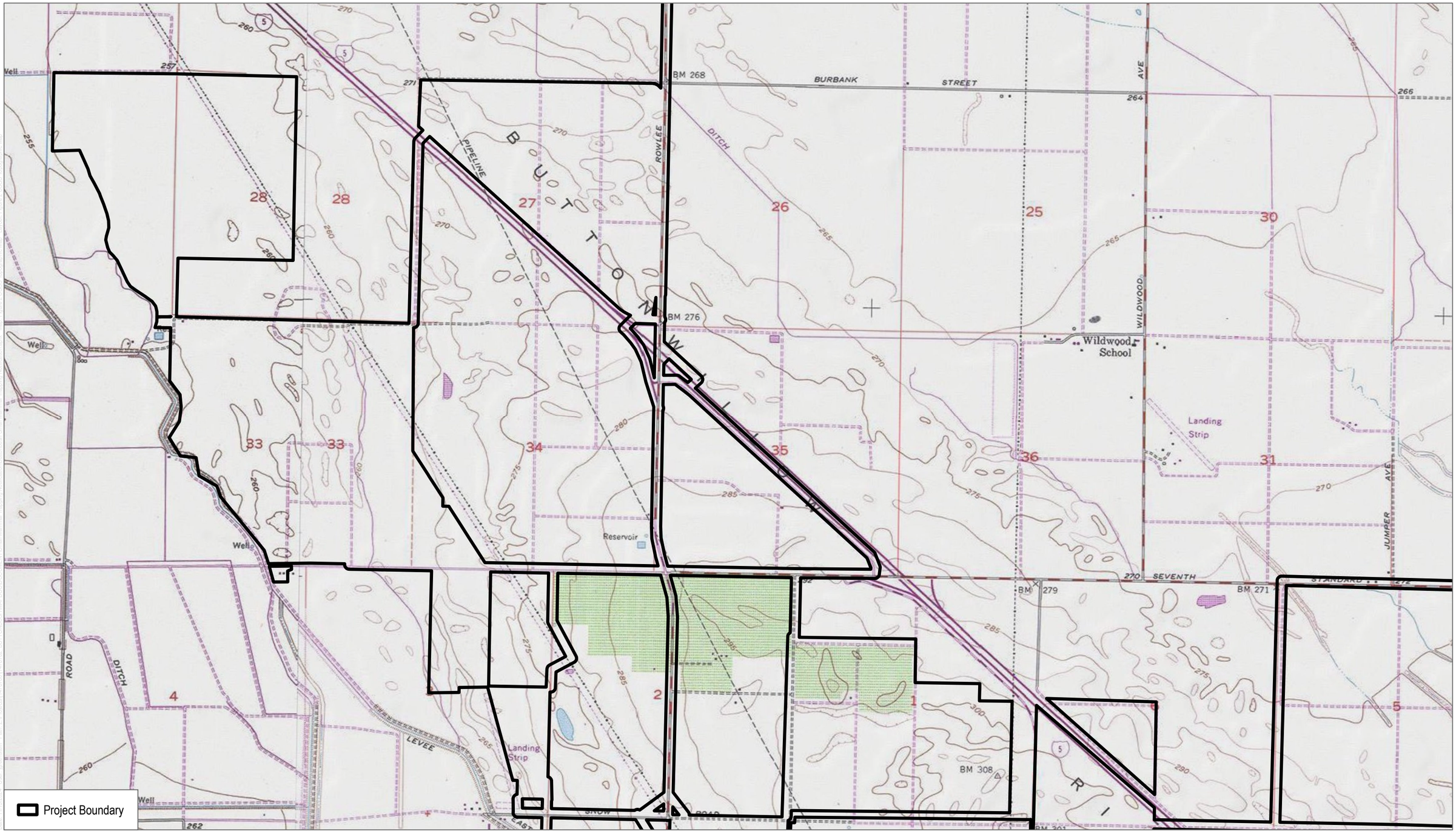
DUDEK

0 1,000 2,000 Feet

FIGURE 2A

Topographic Map

Buttonbush Solar Energy Project



SOURCE: USGS USA Topographic Map

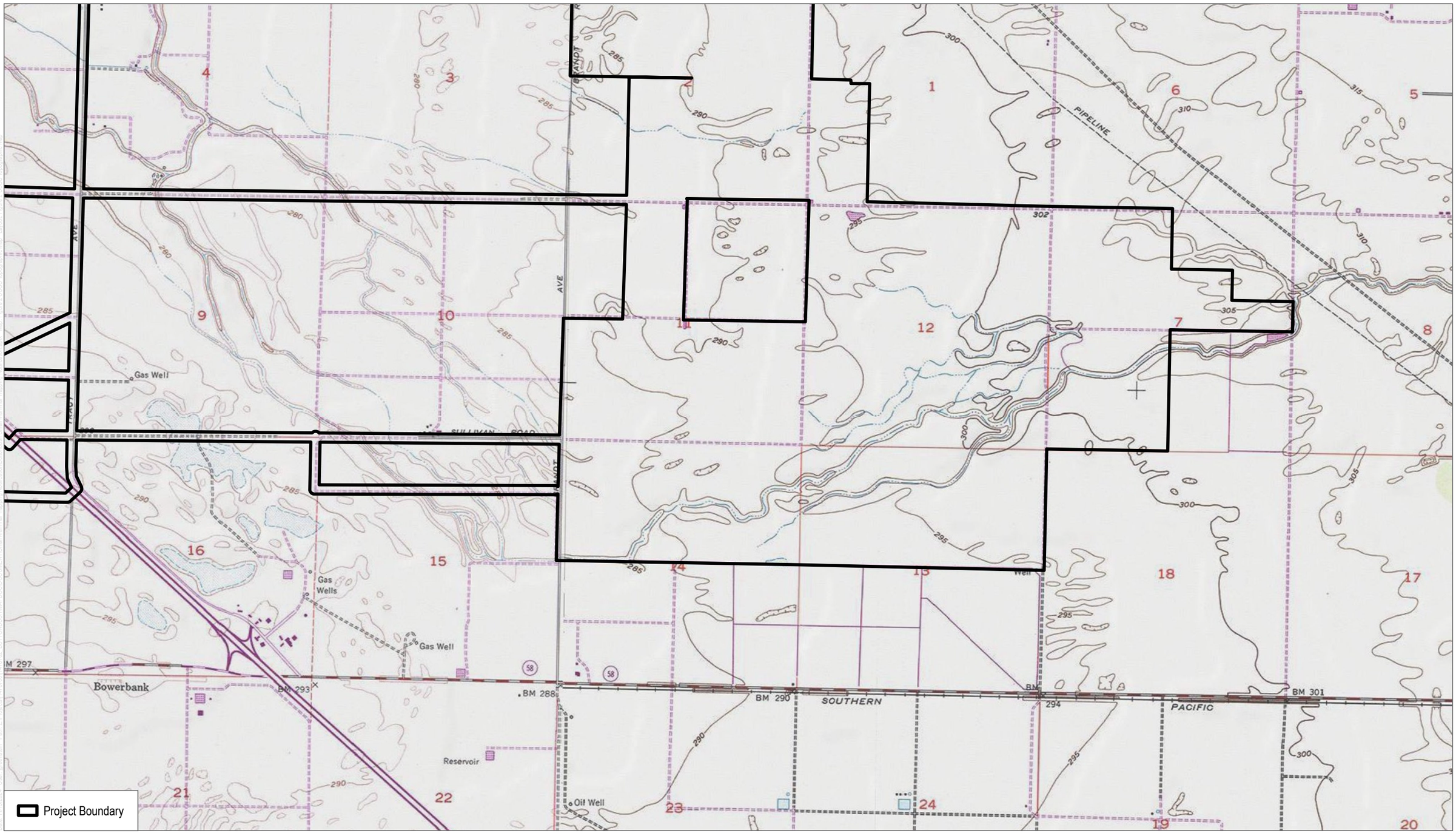
DUDEK

0 1,000 2,000 Feet

FIGURE 2B

Topographic Map

Buttonbush Solar Energy Project



SOURCE: USGS USA Topographic Map

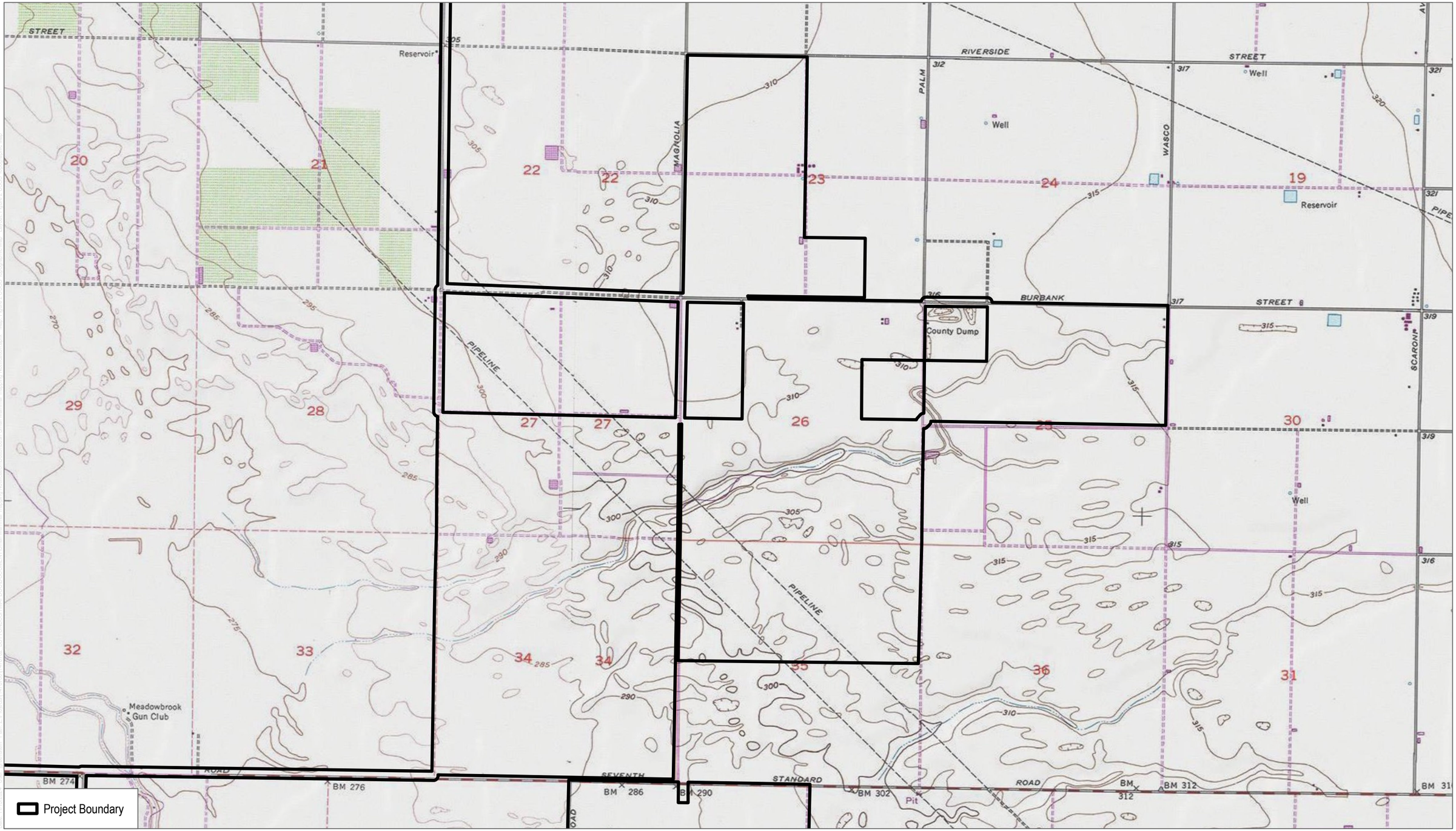
DUDEK

0 1,000 2,000 Feet

FIGURE 2C

Topographic Map

Buttonbush Solar Energy Project



SOURCE: USGS USA Topographic Map

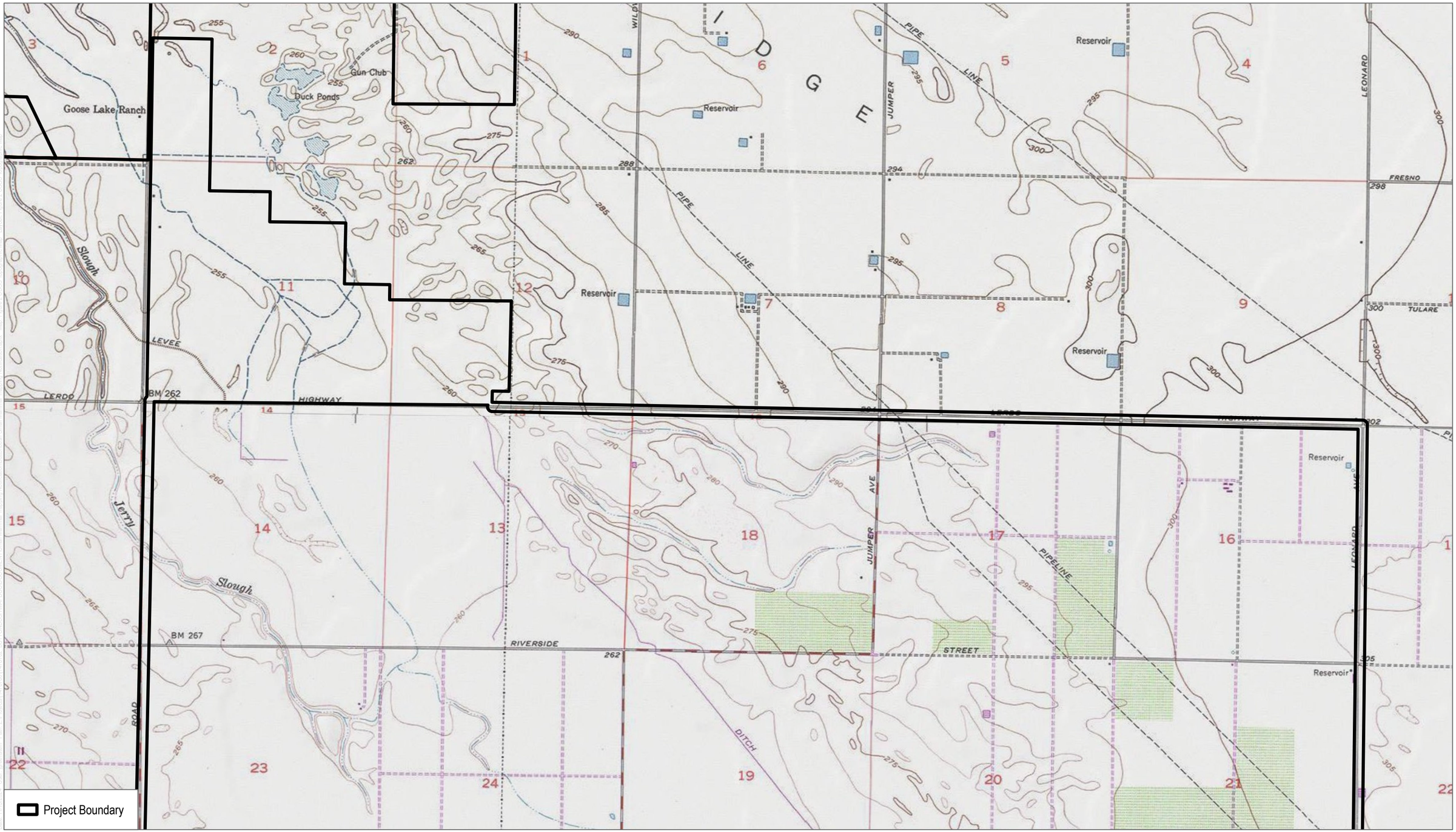
DUDEK

0 1,000 2,000 Feet

FIGURE 2D

Topographic Map

Buttonbush Solar Energy Project



SOURCE: USGS USA Topographic Map

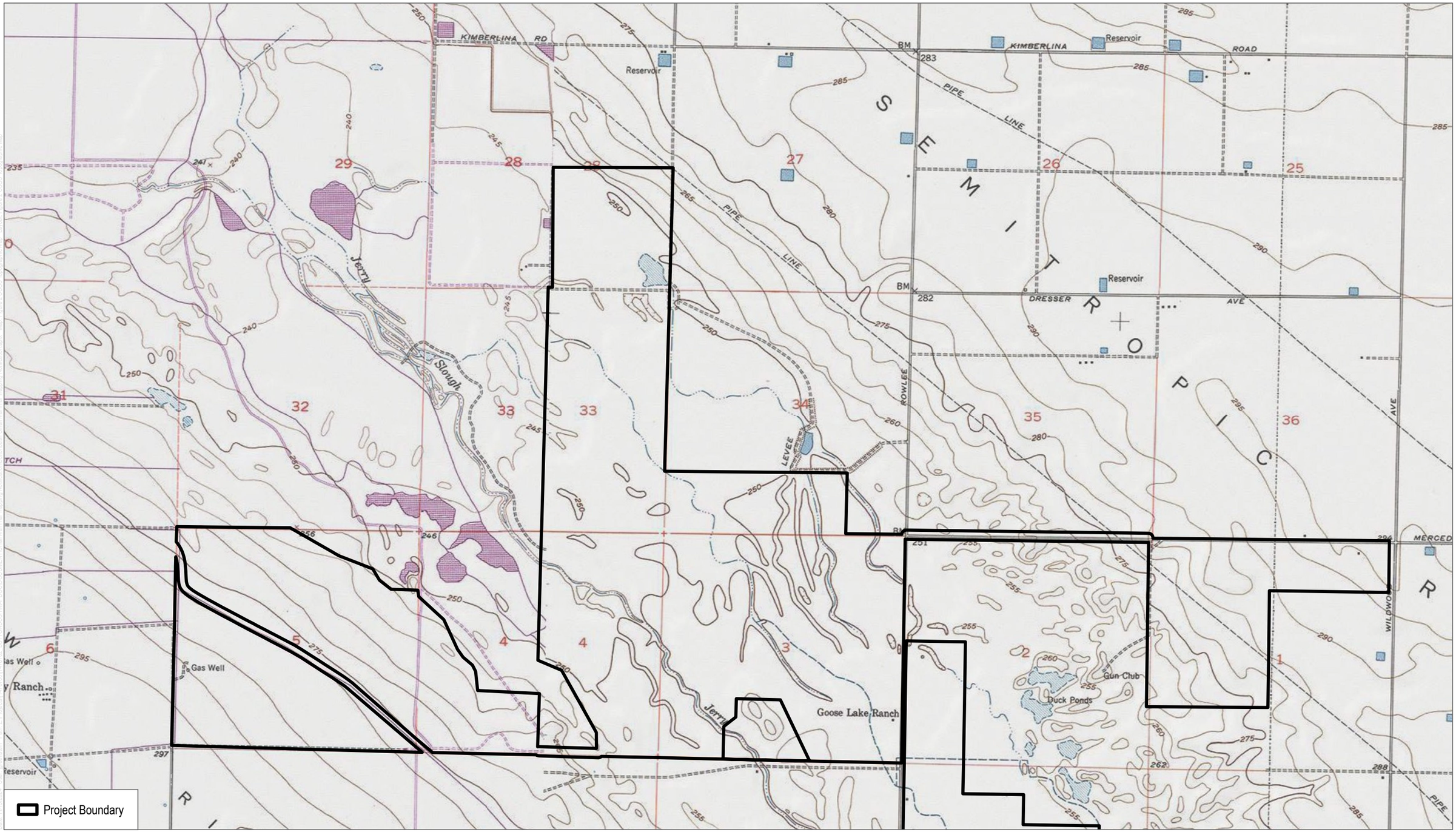
DUDEK

0 1,000 2,000 Feet

FIGURE 2E

Topographic Map

Buttonbush Solar Energy Project



SOURCE: USGS USA Topographic Map

DUDEK

0 1,000 2,000 Feet

FIGURE 2F

Topographic Map

Buttonbush Solar Energy Project

Russell Sweet

From: SFWO Permits, FW8 <FW8_SFWO_Permits@fws.gov>
Sent: Monday, December 2, 2024 2:03 PM
To: Russell Sweet
Cc: Sloan, Justin
Subject: Re: [EXTERNAL] Notification of Field Activities - Trapping Plan for Proposed Buttonbush Solar - Russell Sweet (PER00046430-0)

Hello,

We have received your notification to perform surveys following the U.S. Fish and Wildlife Service Survey Protocols. You may commence protocol-level survey activities 15 calendar days following the submittal of your notification, unless authorization is denied or a different start date was indicated. Please follow the reporting guidelines and Special Terms and Conditions within your recovery permit.

If this is an activity covered under a Service-approved management plan (e.g. Biological Opinion, Incidental Take Permit, Habitat Conservation Plan), you must follow the pre-activity notification and reporting guidelines as described in the management plan. Re-submit this notification to the Service contact listed in the management plan, unless this activity is outside the management plan.

Within 45 days following completion of the final presence/absence survey associated with this request, a survey report shall be submitted to fw8_sfwo_permits@fws.gov and the San Joaquin Valley Division Supervisor, Justin Sloan (justin_sloan@fws.gov). For surveys with negative results and for incomplete surveys (e.g., projects put on hold or withdrawn) a survey report is still required. Survey reports shall include:

1. i) Title, ii) permit number, iv) permittee name and their respective contact details, v) the location/GPS coordinates, vi) number and dates of surveys, vii) the activities completed, and viii) date of preparation on the report;

2. GIS data or GPS coordinates and maps (at a minimum, a 7.5-minute U.S. Geological Survey (USGS) topographic map at 1:24,000 scale) depicting the location and boundary of the survey area(s).

3. The following certification statement signed by each surveyor performing activities in independent status pursuant to this permit: “I certify that the information in this survey report and attached exhibits fully and accurately represents my work.” The date of signature and the surveyor’s permit number shall be included; and

4. All other information required in the applicable U.S. Fish and Wildlife Service Survey Protocol and 45-Day Survey Report section of this permit.

Please email fw8_sfwo_permits@fws.gov if you have additional questions.

Thank you,

Sacramento Fish and Wildlife Office

From: Russell Sweet <rsweet@dudek.com>
Sent: Monday, November 25, 2024 9:03 AM
To: SFWO Permits, FW8 <FW8_SFWO_Permits@fws.gov>
Subject: [EXTERNAL] Notification of Field Activities - Trapping Plan for Proposed Buttonbush Solar - Russell Sweet (PER00046430-0)

This email has been received from outside of DOI - Use caution before clicking on links, opening attachments, or responding.

Good afternoon,

Please find the attached 15-day notification of field activities in preparation to conduct kangaroo rat species trapping for the proposed Buttonbush Solar project in Kern County, CA. Please review the attached memo and let me know if you have any questions or need additional information.

Thank you,
Russell

Russell Sweet
Senior Biologist
DUDEK

O: 661 843 2065 **C:** 661 859 9445
dudek.com



Appendix D.3

Aquatic Resources Delineation Report Acreage Memorandum

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MEMORANDUM

To:	Jack Foster, Planner II, Planning & Natural Resources Department
From:	Ronelle Candia, Project Manager, Dudek
Subject:	Clarification on Project Acreage – Buttonbush Solar & Storage Project, Kern County, CA Aquatic Resources Delineation Report
Date:	June 17, 2025
cc:	Pauline Roberts, Director, Permitting, Avantus, Christa Hudson, Permitting Consultant

Introduction

In May 2025 Dudek prepared the Final Aquatic Resources Delineation Report (Report) for the Buttonbush Solar and Storage Project (Project) in Kern County, California. The Memo assumed the Project would be located on 128 parcels across a leased area of approximately 11,989 acres within an approximately 13,868-acre gross parcel boundary.

Project Description Revisions

Subsequent to the final Report, the Project area has been revised to be located on 128 parcels across a leased area of approximately 11,983 acres within an approximately 13,868-acre gross parcel boundary. This resulted in a reduction of total acres developed as part of the Project. The modification in the Project acres is because the acres listed by Assessor's Parcel Number (APN) were used to comprise the original Project site acreage total while survey data refinements and minor landowner lease exclusions reduced the total area.

Findings on Existing Memo

The minor reduction in project acreage will not necessitate revisions to the Report, as it does not introduce new significant environmental effects or substantially increase the severity of previously identified impacts. The proposed mitigation measures within the Report remain applicable and do not require revision, despite the slight reduction in acreage from what was analyzed in the technical study.

Appendix D.4

Aquatic Resources Delineation Report

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Aquatic Resources Delineation Report

Buttonbush Solar and Storage Project

MAY 2025

Prepared for:

29SC 8ME LLC
4370 Town Center Boulevard, Suite 110
El Dorado Hills, California 95762

Prepared by:

DUDEK

605 Third Street
Encinitas, California 92024
Contact: Callie Amoaku

Ronelle Candia
Project Manager

Callie Amoaku
Biologist

Printed on 30% post-consumer recycled material.

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APPENDICES

A Antecedent Precipitation Tool Output
B Data Forms
C Review Area Photos

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Acronyms and Abbreviations

Acronym/Abbreviation	Definition
APT	Antecedent Precipitation Tool
CDFW	California Department of Fish and Wildlife
CFR	Code of Federal Regulations
CWA	Clean Water Act
EPA	U.S. Environmental Protection Agency
HUC	Hydraulic Unit Code
NWW	non-wetland water
OHWM	ordinary high water mark
PDSI	Palmer Drought Severity Index
project	Buttonbush Solar Energy Project
RWQCB	Regional Water Quality Control Board
USACE	U.S. Army Corps of Engineers

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Executive Summary

This aquatic resources delineation report was prepared in accordance with the Minimum Standards for Acceptance of Aquatic Resources Delineation Reports (USACE 2016).

Dudek biologists conducted field delineations in 2023 and 2024 to identify aquatic resources in the approximately 12,999.6 acres (13,000-acre)[1] review area potentially subject to jurisdiction by the U.S. Army Corps of Engineers pursuant to Section 404 of the Clean Water Act, the Regional Water Quality Control Board pursuant to Section 401 of the Clean Water Act and the Porter–Cologne Water Quality Control Act, and the California Department of Fish and Wildlife pursuant to Sections 1600–1603 of the California Fish and Game Code. Table ES-1 summarizes the delineation findings for aquatic resources and isolated aquatic resources. A description of each potential aquatic resource, discussed in Section 5, Aquatic Resource Narrative, is preliminary until verified by the U.S. Army Corps of Engineers, Sacramento District, Regional Water Quality Control Board, and California Department of Fish and Wildlife.

Table ES-1. Potentially Jurisdictional Aquatic Resources Summary[1]

Feature Type	Acreage	Linear Feet
Wetland Waters		
Shrub-scrub wetland	91.28	15,824
Wetlands Subtotal	*91.28*	*15,824*
Non-Wetland Waters		
Canal/ditch	6.56	28,016
Natural channel	0.28	236
Pond	6.13	2,323
Non-wetlands Subtotal	*12.97*	*30,575*
Grand Total[2]	**104.25**	**46,399**

Notes:

1 As described further in this report, the aquatic resources outline in this table are potentially jurisdictional by the Regional Water Quality Control Board and California Department of Fish and Wildlife; however, they are not anticipated to be U.S. Army Corps of Engineers-jurisdictional via the Approved Jurisdictional Determination process.

2 Totals may not sum due to rounding.

1 The Buttonbush Solar and Storage Project (project) as proposed by 29SC 8me LLC (project proponent) would be located on 128 parcels across a leased area of approximately 11,989 acres within a 13,868-acre gross parcel boundary of privately owned land.

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1 Introduction

This aquatic resources delineation report was prepared in accordance with the Minimum Standards for Acceptance of Aquatic Resources Delineation Reports (USACE 2016). This report and supporting appendices provide the 20 items listed in the Minimum Standards for Acceptance of Aquatic Resources Delineation Reports. This report presents the results of the jurisdictional aquatic resource delineation conducted by Dudek for the proposed Buttonbush Solar Energy Project (project) located in Kern County, California. The delineation was conducted to identify and map existing aquatic resources potentially subject to the regulatory jurisdiction of the U.S. Army Corps of Engineers (USACE) pursuant to Section 404 of the Clean Water Act (CWA) (33 USC 1344), waters of the state potentially subject to the regulatory jurisdiction of the Regional Water Quality Control Board (RWQCB) pursuant to Section 401 of the CWA and the Porter–Cologne Water Quality Control Act, and stream and riparian habitats potentially subject to the jurisdiction of the California Department of Fish and Wildlife (CDFW) pursuant to Section 1602 of the California Fish and Game Code (collectively defined as jurisdictional aquatic resources).

1.1 Disclaimer Statement

This report presents Dudek's best effort to quantify the extent of aquatic resources potentially regulated by USACE, RWQCB, and CDFW (i.e., regulatory agencies) within the identified review areas using the current regulations, written policies, and guidance from these regulatory agencies. The potential jurisdictional boundaries described in this report are subject to verification by the regulatory agencies. Only the regulatory agencies can make a final determination on whether the features present are subject to USACE, RWQCB, and/or CDFW regulation.

1.2 Contact Information

Contact information for the project applicant and agent are provided in Table 1. Access to the review area is restricted, and if a site visit is requested, the project applicant or agent will accompany regulatory staff to the review area. 29SC 8me LLC is the project applicant.

Table 1. Contact Information

Project Applicant	29SC 8me LLC	**Agent**	Dudek
Contact Name	Pauline Roberts	**Contact Name**	Megan Enright
Address	4370 Town Center Boulevard, Suite 110 El Dorado Hills, California 95762	**Address**	605 Third Street Encinitas, California 92024
Phone	840.999.1241	**Phone**	760.479.4281
Email	proberts@avantus.com	**Email**	menright@dudek.com

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2 Review Area Description and Landscape Setting

The Buttonbush Solar and Storage Project (project) as proposed by 29SC 8me LLC (project proponent) would be located on 128 parcels across a leased area of approximately 11,989 acres within a 13,868-acre gross parcel boundary of privately owned land in unincorporated Kern County, California. The majority of the 11,989-acre project area is currently under agricultural use or developed in the valley region of the County.

The review area includes the development footprint (for Sites 1–6 and 8) and gen-tie/collector line; a 200-foot corridor was defined around each gen-tie/collector line for the purposes of this review. The review area is approximately 12,999.6 acres.[2] The review area acreage does not match the acreage of the project site precisely because the acres listed by Assessor's Parcel Number (APN) were used to come up with the project site acreage total. The acres of each parcel will not precisely match the geometry of its polygon shape in ArcGIS, and so the geographic information system (GIS) calculated review area will not match the APN-derived project site totals.

The review area is located east of Buttonwillow in Kern County, spanning privately owned agricultural, developed, and undeveloped land northwest of Bakersfield between Buttonwillow and Lost Hills in unincorporated Kern County, California (Figure 1, Project Location; Figure 2, Review Area). The review area consists of active orchards, dairy farms, rural residences, disked fields, and disturbed and developed areas. There are a few undeveloped parcels located within the agricultural areas that support sparse, native scrub and herbaceous cover. The review area spans several sections, townships, and ranges:

- Township 27S/Range 23E/Sections 27, 28, 32-35
- Township 28S/Range 23E/Sections 01-15, 20, 22-29, 32-35
- Township 28S/Range 24E/Sections 07-10, 14-35
- Township 29S/Range 23E/Sections 01-04, 10-14
- Township 29S/Range 24E/Sections 01-20
- Township 29S/Range 25E/Section 06-08, 18

Regional access to the review area is provided via Interstate 5 northwest of Bakersfield, with access to the parcels generally available from Seventh Standard Road, Burbank Street, Rowlee Road, Lerdo Highway, and local agricultural roads.

2.1 Project Description

The project as proposed by 29SC 8me LLC (project proponent) would be located on 128 parcels across a leased area of approximately 11,989 acres within a 13,868-acre gross parcel boundary of privately owned land in unincorporated Kern County, California. The majority of the 11,989-acre project area is currently under agricultural use or developed in the valley region of the County.

[2] For ease of reading, a 13,000-acre BSA was utilized in most resource reports, including this report.

The project includes the construction and operation of a photovoltaic (PV) solar facility and associated infrastructure necessary to generate up to 2 gigawatts of alternating current (AC) power with an up to 2-gigawatt battery energy storage system (BESS). Additional components of the project include solar modules and racking, inverters, transformers, service roads, a power collection system, communication cables, microwave/ radio towers, meteorological stations, a generation-transmission (gen-tie) line with optical ground wire and overhead and underground transmission lines, electrical switchyards, project substations, security fencing, use of on-site water wells, and operations and maintenance (O&M) facilities.

The project would be supported by one or more 500 kilovolt (kV) gen-tie electrical transmission lines originating from one or more on-site substations and terminating at the existing PG&E Midway Substation. The review area includes the development footprint (for Sites 1–6 and 8) and gen-tie/collector line, which includes a 200-foot corridor. PG&E will modify the Midway Substation's 500 kV yard within their property boundary to accommodate the proposed project's interconnection. The PG&E Midway Substation parcels comprise approximately 255 acres; however, only a small portion, up to 38.6 acres, will be impacted by the proposed project. PG&E will install and trench underground several fiber-optic lines to the west of the gen-tie route to facilitate communication between the Midway Substation and the Point of Change of Ownership, approximately 0.25 miles northwest. Up to four 175-foot-tall lattice steel towers (LST) or tubular steel poles (TSPs) would support the proposed transmission line and the project's interconnection.

The proposed facilities are expected to be operational for up to 35 years. The full project description is provided in the project's California Environmental Quality Act (CEQA) environmental impact report and should be referenced for additional details regarding the project description.

2.2 Soils and Topography

The review area is relatively flat throughout with elevations ranging from approximately 250 feet above mean sea level in the northwest to approximately 320 feet above mean sea level in the southeast. According to the U.S. Department of Agriculture Natural Resources Conservation Service (USDA 2023), the following soil series occur within the boundaries of the review area: Buttonwillow clay, drained; Buttonwillow clay, partially drained; Calflax clay loam, saline-sodic, 0% to 2% slopes, MLRA 17; Garces silt loam; Garces silt loam, hard substratum; Garces silt loam, moderately wet; Granoso loamy sand, 0% to 2% slopes; Jerryslu loam; Kimberlina fine sandy loam, 0% to 2% slopes, MLRA 17; Lerdo clay loam, saline-alkali, partially drained; Lerdo complex, drained; Lokern clay, drained; Lokern clay, saline-alkali, drained; Milham sandy loam, 0% to 2% slopes, MLRA 17; Panoche clay loam, 0% to 2% slopes; and water. Soil types within the project area are shown in Table 2 and on Figure 3, Soils (USDA 2023).

Table 2. Soils

Soil Category	pH	Hydric Rating	Acreage
Buttonwillow clay, drained	8.2	Yes	1,010.6
Buttonwillow clay, partially drained	8.2	Yes	60.0
Calflax clay loam, saline-sodic, 0% to 2% slopes, MLRA 17	7.4	Yes	1,049.3
Garces silt loam	8.7	Yes	3,376.9
Garces silt loam, hard substratum	8.7	Yes	20.3
Garces silt loam, moderately wet	8.7	Yes	2.8
Granoso loamy sand, 0% to 2% slopes	8.0	Yes	131.5
Jerryslu loam	8.5	Yes	369.7

Table 2. Soils

Soil Category	pH	Hydric Rating	Acreage
Kimberlina fine sandy loam, 0% to 2% slopes, MLRA 17	8.0	Yes	1,926.3
Lerdo clay loam, saline-alkali, partially drained	8.5	Yes	94.4
Lerdo complex, drained	8.5	Yes	641.4
Lokern clay, drained	8.2	Yes	11.0
Lokern clay, saline-alkali, drained	8.2	Yes	966.4
Milham sandy loam, 0% to 2% slopes, MLRA 17	8.3	No	3,245.0
Panoche clay loam, 0% to 2% slopes	7.8	No	68.9
Water	N/A	Yes	25.1
		Total[1]	12,999.6

Source: USDA 2023.
Note: N/A = not applicable.
1 Totals may not sum due to rounding.

Nearly all soil series mapped on the site are characterized as moderately to very strongly alkaline (pH of 7.9 or higher) and are thus considered naturally problematic due to the conditions that can inhibit the formation of redoximorphic concentrations used to identify hydric soils in the field (USACE 2008a). Salt accumulation and deposits were also observed on and in soils during the delineation, indicating saline conditions. Given these conditions and a lack of observed hydric soil indicators in the field, Dudek followed guidance in Chapter 5 of the USACE Arid West Regional Supplement and assumed that soils were hydric at sample points that possessed hydrophytic vegetation, wetland hydrology indicators, and a landscape position consistent with wetlands in the area.

2.3 Vegetation

The vegetation communities and land cover types observed within the review area are shown on the Figure 4 series, Vegetation Communities and Land Cover Types. A total of 20 vegetation communities or land cover types were mapped during field surveys. Table 3 summarizes the vegetation communities and land cover types within the review area.[3]

Table 3. Summary of Vegetation Communities and Land Cover Types

General Category of Vegetation	Vegetation Community/Land Cover Type	Acreage
Bog and marsh	Bush seepweed scrub	192.5
	Cattail marshes	0.3
	Salt grass flats	18.3
	Spinescale scrub	0.2
	Tar plant fields	12.4
Disturbed and developed	Orchards	3,406.1
	General agriculture	7,723.4
	Disturbed habitat	1,028.9

3 The ARDR is using alliance-leveling mapping rather than the more specific association-level mapping. For example, there are two associations within the bush seepweed scrub alliance described in the BTR, but the acreage is provided for the entire bush seepweed scrub alliance in the ARDR. The acreages at the alliance level are consistent for both documents.

Table 3. Summary of Vegetation Communities and Land Cover Types

General Category of Vegetation	Vegetation Community/Land Cover Type	Acreage
	Urban/developed land	297.6
	Open water	7.6
	Ornamental plantings	8.7
Grass and herb dominated	Russian thistle – dyers woad – five-hook bassia fields	2.00
	Non-native grassland	109.4
Riparian	Tamarisk thickets	10.5
Scrub	Fourwing saltbush scrub	1.5
	Allscale scrub	175.4
Unvegetated	Unvegetated channel	2.1
Woodland	Eucalyptus – tree of heaven – black locust groves	5.0
	Total[1]	**12,999.6**

Note:
[1] Totals may not sum due to rounding.

2.3.1 Bog and Marsh

2.3.1.1 Alkali Heath Marsh Alliance (52.500.00)

The alkali heath alliance is a vegetation community where alkali heath (*Frankenia salina*) is greater than 30% relative cover in the herbaceous layer, sometimes co-dominant with salt grass (*Distichlis spicata*) or other herbs and subshrubs. Cover in this community is open to continuous. This community occurs in coastal salt marshes, brackish marshes, alkali meadows, and alkali playas. Soils associated within this community are saline, sandy to clayey alluvium (CNPS 2023). The alkali heath alliance is located on the northern parcel.

Within the review area, there is one association in the alkali heath alliance—the alkali heath–salt grass association. The percent cover of relative cover of alkali heath was 35%, salt grass was 25%, and creeping wildrye turfs (*Leymus triticoides*) was 25%. The alkali heath–salt grass association is located on the northern parcel.

2.3.1.2 Ashy Ryegrass–Creeping Wildrye Turfs

The ashy rye grass–creeping wildrye turfs alliance is a vegetation community where ashy rye grass (*Leymus cinereus*) and/or creeping wildrye turfs are dominant or co-dominant in the herbaceous layer. This alliance usually displays an open to continuous cover with herbs less than 1.5 meters in height. This alliance typically occurs on poorly drained floodplains, playas, drainage and valley bottoms, mesic flat to sloping topography, and marsh margins. It occurs on soils that are clays and loams that are often alkaline or saline (CDFW 2023).

One association, creeping wildrye turfs, in the ashy rye grass–creeping wildrye turfs alliance, was observed within the review area. The creeping wildrye turfs association is located on the northern parcel.

2.3.1.3 Bush Seepweed Scrub

Within the bush seepweed scrub alliance, bush seepweed (*Suaeda nigra*) or alkali goldenbush (*Isocoma acradenia*) are dominant or co-dominant in the shrub canopy. The alliance usually displays an open to continuous canopy less than 5 feet (1.5 meters) in height; the herbaceous layer is sparse to intermittent. This alliance typically occurs in flat to gently sloping valley bottoms, playas, and toe slopes, adjacent to alluvial fans and bajadas. The soils are typically deep and saline or alkaline (CNPS 2023).

The bush seepweed association is in the bush seepweed alliance and was observed within the review area on the north and northwest parcel.

Also, within the bush seepweed alliance is the alkali goldenbush alkaline wet association, which also occurs within the review area; this association occurs on the northern parcel. Alkali goldenbush is a facultative upland species, which usually occurs in non-wetlands but is occasionally found in wetlands. These areas were not associated with wetland waters.

2.3.1.4 Cattail Marshes

Narrowleaf cattail (*Typha angustifolia*), southern cattail (*Typha domingensis*), or broadleaf cattail (*Typha latifolia*) are dominant or co-dominant in the herbaceous layer of the cattail marshes alliance. Cover in this alliance in intermittent to continuous. This alliance is semi-permanently flooded freshwater or brackish marsh, and the soils are clayey or silty (CNPS 2023). Within the review area, the cattails marsh alliance is on the northwest parcel.

2.3.1.5 Salt Grass Flats

The salt grass flats alliance is a vegetation community where salt grass flats, spiny rush (*Juncus acutus*), and/or Cooper's rush (*Juncus cooperi*) are dominant or co-dominant in the herbaceous layer. This alliance usually displays an open to continuous cover with herbs less than 1.5 meters in height. The salt grass flats alliance typically occurs in coastal salt marshes and inland habitats such as playas, swales, and terraces along wash that may be intermittently flooded. This alliance occurs on soils that are often deep, alkaline or saline, and poorly drained. When the soil is dry, the surface usually has salt accumulations (CDFW 2023).

The salt grass flats association is within the salt grass flats alliance and was observed within the review area on the north parcel.

2.3.1.6 Spinescale Scrub

The spinescale scrub alliance is a vegetation community where spinescale (*Atriplex spinifera*) is dominant or co-dominant in the shrub canopy with cheesebush (*Ambrosia salsola*), allscale (*Atriplex polycarpa*), California joint fir (*Ephedra californica*), alkali heath, California match weed (*Gutierrezia californica*), alkali goldenbush, and bud sagebrush (*Artemisia spinescens*). In this alliance, shrubs are less than 2 meters in height, and the canopy is open; the herbaceous layer is variable with seasonal annuals reaching high cover. The spinescale scrub alliance occurs in alluvial fans and old lake beds perched above current drainages. The soils in this alliance are moderately sand clay loams to fine, silty clays that may be carbonate rich (CDFW 2023).

The spinescale scrub association is in the spinescale scrub alliance and was observed within the review area on the north parcel.

2.3.1.7 Tar Plant Fields

The tar plant fields vegetation community is composed chiefly of common tarweed (*Centromadia pungens*), which is dominant in the herbaceous layer with *Atriplex* spp., bromes (*Bromus* spp.), annual hairgrass (*Deschampsia danthonioides*), Hoover's calicoflower (*Downingia bella*), redstem stork's bill (*Erodium cicutarium*), alkali heath, shortpod mustard (*Hirschfeldia incana*), mouse barley (*Hordeum murinum*), California goldfields (*Lasthenia californica*), Fremont's goldfields (*Lasthenia fremontii*), cowbag clover (*Trifolium depauperatum*), and Pacific Grove clover (*Trifolium variegatum*), with emergent shrubs possibly present at low cover (CDFW 2023). This vegetation community is associated with vernally wet habitats, such as alkaline pools or flats with periodic or intermittent inundation, and is recognized as facultative.

Within the review area, this vegetation community is dominated by common tarweed with dwarf barley (*Hordeum depressum*), bush seepweed, red brome (*Bromus rubens*), annual yellow sweetclover (*Melilotus indicus*), and soft brome (*Bromus hordeaceus*). Tar plant fields are found on the northern parcel and along roads in the center of the review area.

2.3.2 Grass and Herb Dominated

2.3.2.1 Russian Thistle–Dyers Woad–Five-Hook Bassia Fields

The pending Russian thistle–dyer's woad–five-hook bassia fields alliance is not described in CNPS (2023).

Within the review area, *Bassia* (*hyssopifolia, scoparia*) association, an association in this alliance, was mapped on the southeastern parcel.

2.3.2.2 Non-Native Grassland

Non-native grasslands typically occur in areas with a history of disturbance, allowing non-native grasses and herbs to overtake native species. Common non-native grasses that dominate these areas include red brome and ripgut brome (*Bromus diandrus*), mouse barley, perennial rye grass (*Festuca perennis*), and Bermudagrass (*Cynodon dactylon*). Other herbaceous species commonly present within non-native grasslands include a variety of non-native species, such as redstem stork's bill, shortpod mustard, Russian thistle (*Salsola tragus*), and yellow star-thistle (*Centaurea solstitialis*), as well as occasional native herbaceous species, such as sacred thorn-apple (*Datura wrightii*), common sunflower (*Helianthus annuus*), and seaside heliotrope (*Heliotropium curassavicum* var. *oculatum*). Native shrubs, such as allscale and alkali goldenbush, are present at low cover in some areas of non-native grassland.

Within the review area, this habitat occurs in association with upland habitats and was typically not associated with agricultural operations. Non-native grassland is located on the northern, southwestern, and southeastern parcels.

2.3.3 Riparian

2.3.3.1 Tamarisk Thickets

Tamarisk thickets semi-natural alliance includes tamarisk (*Tamarix ramosissima*) as the dominant species in the shrub canopy and occurs along lake margins, ditches, wash, rivers, and other watercourses (CNPS 2023). Shrub canopy is open to continuous with shrubs less than 26 feet (8 meters) in height; herbaceous layer is sparse. The tamarisk thickets alliance is considered a semi-natural alliance. Within the review area there is one association in the tamarisk thicket semi-natural alliance, as described below.

The tamarisk (*Tamarix* spp.*)* association is in the tamarisk thickets alliance and was observed within the review area on the northern parcel, the northwestern parcel, and the eastern parcel. Most of the tamarisk on site are not associated with potential aquatic resources.

2.3.4 Scrub

2.3.4.1 Allscale Scrub

Within the allscale scrub alliance, allscale is the dominant shrub species with additional cover from other shrubs including cheesebush, fourwing saltbush (*Atriplex canescens*), alkali goldenbush, and bladderpod (*Peritoma arborea*). Some emergent trees may be present at low cover, including honey mesquite (*Prosopis glandulosa*). Shrub cover is open to continuous with seasonal herbaceous cover. This alliance occurs in a variety of contexts, including in washes, playa lake beds and shores, alluvial fans, rolling hills, and edges of large, low gradient washes. Soils are typically rich, alkaline, and sandy or sandy clay loam (CNPS 2023).

Within the review area in the allscale scrub alliance, there are two associations on site, the allscale association and the allscale sparse playa association. The allscale association occurs on the north parcel and on the south parcel. The allscale sparse playa association occurs on the northern parcel.

2.3.5 Woodland

2.3.5.1 Eucalyptus–Tree of Heaven–Black Locust Groves

Within the eucalyptus–tree of heaven–black locust groves alliance, eucalyptus (*Eucalyptus* spp.), tree of heaven (*Ailanthus altissima*), or black locust (*Acacia melanoxylon*) is dominant in the tree canopy (CNPS 2023). Tree canopy is open to continuous and less than 197 feet (60 meters) in height; shrub and herbaceous layer is sparse to intermittent. This semi-natural alliance is planted as trees, groves, and windbreaks and naturalized on uplands or bottomlands and adjacent to stream courses, lakes, or levees.

Within the eucalyptus–tree of heaven–black locust groves semi-natural alliance, there is one association within the review area—the eucalyptus association. It is located on the southeastern parcel.

2.3.6 Disturbed and Developed

2.3.6.1 Disturbed Habitat

Disturbed habitat refers to areas where soils have been recently or repeatedly disturbed by grading, compaction, or clearing of vegetation. Structures are typically not present within disturbed habitats, and these areas provide relatively low value for most plant and wildlife species. When vegetated, disturbed habitat supports predominantly non-native plant species such as ornamentals or ruderal exotic species that take advantage of disturbance.

Disturbed habitat is not a listed vegetation community under the California Natural Community List (CDFW 2023), but it has been used in this report because it best describes what was observed in the field. Within the review area, disturbed habitat is primarily disced, tilled, or cleared fields that are not irrigated. It also includes human-made basins, ditches, and settling ponds; soil stockpiles; unpaved access roads; and staging areas. This land cover was observed within all sections of the review area.

2.3.6.2 Urban/Developed Land

Urban/developed land cover refers to areas that have been constructed on or otherwise physically altered to the point where vegetation is no longer present. Developed areas are characterized by permanent or semi-permanent structures, hardscapes, and landscaped areas that require irrigation.

Developed land is not a listed vegetation community under the California Natural Community List (CDFW 2023), but it has been used in this report because it best describes what was observed in the field. Within the review area, developed areas included roads and structures associated with residential, agricultural, or industrial development, such as substations, solar arrays, and intensive agricultural operations (i.e., dairies). This land cover was observed throughout the review area.

2.3.6.3 Orchards

Orchards are areas where trees, shrubs, or crop plants such as grapevines have been intentionally planted, i.e., to produce food or for other commercial purposes. Orchards and vineyards are typically artificially irrigated, and plants may be supported with structures such as trellises. Orchards and vineyards typically support a limited understory of grasses or herbs (Oberbauer et al. 2008). This land cover was observed throughout portions of the review area.

2.3.6.4 General Agriculture

General agriculture is an anthropogenic land cover and is not described in the California Natural Community List (CDFW 2023). General agriculture typically refers to areas that may contain dryland farming or more extensive row crops. Within the review area, general agriculture lands consisted of alfalfa, almonds, pistachios, and cotton, occupying more than half of the review area. On-site farming practices include soil disking, plowing, herbicide application, and regular anthropogenic maintenance and disturbance associated with ongoing management actions.

2.3.6.5 Open Water

The open water within the review area includes standing water, impounded water, or flowing freshwater associated with basins and ditches/canals. This land cover was observed throughout the review area.

2.3.6.6 Ornamental Plantings

The ornamental plantings within the review area included Australian pine (*Casuarina equisetifolia*) lining the outside of the property. Additionally, lawn and other ornamental species associated with residences were the other ornamental plants within the review area. This land cover was observed in the northern parcel.

2.3.7 Unvegetated

2.3.7.1 Unvegetated Channel

Although not recognized by the Manual of California Vegetation, Online Edition (CNPS 2023), or the Natural Communities List (CDFW 2023), unvegetated channels (or non-vegetated floodplains) are described by Oberbauer et al. (2008). Oberbauer et al. (2008) describes non-vegetated floodplains or channels as sandy, gravelly, or rocky areas along waterways or flood channels that are unvegetated on a relatively permanent basis due to variable water levels. Vegetation, if present, comprises non-native grasses at the outer edges with usually less than 10% absolute cover. Unvegetated channel is not a listed vegetation community under the California Natural Communities List (CDFW 2023); however, it best describes what was observed in the field. Unvegetated channel includes natural drainages or modified channels that potentially connect to state waters. Within the review area, this land cover was mapped on the northern and southwestern parcels.

2.4 Watershed and Hydrology

The project review area is situated within the RWQCB-defined San Joaquin Hydrologic Basin in the South Valley Hydrologic Unit (557.00; 558.00), and the Semitropic Hydrologic Area (558.70) and the Kern Delta Hydrologic Area (557.10) (Figure 5, Hydrologic Setting).

The review area also occurs within the Tulare–Buena Vista Lakes (Hydrologic Unit Code [HUC] 6 [180300]), Lake Bed (HUC 8 [18030012]), and the Upper Poso (HUC 8 [18030004]) watersheds and the following subunits: West Side Canal (HUC 10 [1803001209]), Goose Lake Slough-Jerry Slough (HUC 10 [1803001208]), and Lower Poso Creek (HUC 10 [1803000404]) (Figure 5). The U.S. Geological Survey National Hydrography Dataset maps human-made (i.e., canals and ditches) and natural (i.e., streams and rivers) features within the review area. The U.S. Fish and Wildlife Service National Wetlands Inventory indicates that freshwater ponds and freshwater emergent wetlands may occur within the review area (USFWS 2023).

2.5 Review Area Alterations, Current and Past Land Use

The review area is located in the western half of the San Joaquin Valley, where croplands and orchards dominant the relatively flat valley floor. Land use in the review area is primarily agricultural, including large areas cultivated for alfalfa, almonds, pistachios, and cotton; three dairy farms are also adjacent or within the review area. The natural communities that were historically present have been substantially altered because of agricultural production

activities. According to historic aerial imagery, many of the agricultural parcels in and around the review area have been converted from their natural states within the last century (Historic Aerials 2023), leaving a patchwork of disturbed and non-disturbed habitats. Non-disturbed alkali sink, saltbush scrub, and non-native grassland occur in disjointed sections in the north, south, and east. Land uses outside the review area include similar agricultural operations, plus livestock grazing, mineral and petroleum extraction, recreation, commercial and industrial development, transportation, and open space.

3 Precipitation Data and Analysis

3.1 Regional

The review area is located in a semi-arid region where annual temperatures range from 34°F to 98°F, with an average annual temperature range of 49°F to 78°F (WRCC 2023). The area around the review area receives an average of 5.64 inches of precipitation annually, with the highest average rainfall recorded in February (1.07 inches) (WRCC 2023).

The USACE-developed Antecedent Precipitation Tool (APT) was used to assess whether the delineation date occurred in a drier, average, or wetter than normal period (USACE 2023). USACE developed the APT to determine what constitutes a "typical year." The information generated from the APT can help to determine whether normal hydrologic and/or climatic conditions were present during the site visit and assist with completing the Wetland Determination Data Form.

The APT provides three climatological parameters: Palmer Drought Severity Index (PDSI), season, and antecedent precipitation condition. The PDSI is a standardized index calculated monthly with PDSI value outputs ranging from −4 (extreme drought) to +4 (very wet) (NOAA 2023) to assess drought conditions (i.e., PDSI Class). The APT determines wet vs. dry season based on related procedures provided in the applicable regional supplement for the review area (in this case, the Arid West Supplement). If the antecedent precipitation condition score is less than 10, conditions are classified as drier than normal; normal conditions are present with an antecedent runoff condition score of 10 to 14; conditions are wetter than normal when an antecedent runoff condition score is greater than 14 (USACE 2023).

Table 4 summarizes the key data extrapolated from the APT output: estimated drought conditions (PDSI Class), wet or dry season determination, antecedent runoff condition score, and antecedent precipitation condition. Based on the APT output provided in Appendix A and summarized in Table 4, the precipitation and climatic conditions for the review area were typically wetter than normal or normal during the time of the delineation. The APT is less likely to consider extreme precipitation events that are highly localized when incorporating data from weather stations located outside of the drainage area.

Table 4. Antecedent Precipitation Tool Data for the Review Area

Main Field Survey Date	PDSI Class	Season	APC Score	Antecedent Precipitation Condition
1/11/2023	Severe wetness	Wet season	18	Wetter than normal
1/12/2023	Severe wetness	Wet season	18	Wetter than normal
01/13/2023	Severe wetness	Wet season	18	Wetter than normal
01/24/2023	Severe wetness	Wet season	18	Wetter than normal
01/25/2023	Severe wetness	Wet season	18	Wetter than normal
01/26/2023	Severe wetness	Wet season	17	Wetter than normal
02/03/2023	Severe wetness	Wet season	18	Wetter than normal
08/07/2023	Moderate wetness	Dry season	18	Wetter than normal

Table 4. Antecedent Precipitation Tool Data for the Review Area

Main Field Survey Date	PDSI Class	Season	APC Score	Antecedent Precipitation Condition
08/09/2023	Moderate wetness	Dry season	18	Wetter than normal
11/28/2023	Incipient wetness	Dry season	14	Normal conditions
11/29/2023	Incipient wetness	Dry season	14	Normal conditions
05/31/2024	Incipient drought	Dry season	11	Normal conditions

Notes: PDSI = Palmer Drought Severity Index; APC = antecedent precipitation condition.

4 Investigation Methods

The jurisdictional delineation was conducted by Dudek biologists in January, February, August, and November 2023; and May 2024 (Table 5). Prior to conducting the jurisdictional delineation, Dudek reviewed U.S. Fish and Wildlife Service National Wetlands Inventory data (USFWS 2023) to determine the potential location of aquatic resources within the review area. Site-specific topographical data was reviewed in conjunction with aerials, both current and historical, to determine the potential presence of potential aquatic features. Vegetation mapping was reviewed to assess whether the review area supported hydrophytic vegetation and potential wetlands; several areas supporting hydrophytic vegetation were also assessed for the presence of wetland hydrology and hydric soils to determine whether they were three-parameter wetlands. Jurisdictional boundaries were mapped in the field using ESRI Field Maps on a mobile device using a submeter GPS unit. Remote sensing was not used for the delineation.

Table 5. Schedule of the Aquatic Resources Delineation

Date	Hours	Personnel	Conditions
01/11/2023	8:00 a.m.–4:12 p.m.	Anna Godinho, Callie Amoaku, Erin Bergman	48°F–58°F; 100% cloud cover; 0–4 mph wind
01/12/2023	7:42 a.m.–4:32 p.m.	Anna Godinho, Callie Amoaku, Erin Bergman	45°F–64°F; 80%–100% cloud cover; 0–3 mph wind
01/13/2023	8:00 a.m.–11:30 a.m.	Anna Godinho, Callie Amoaku	55°F–64°F; 100% cloud cover; 0–5 mph wind
01/24/2023	8:00 a.m.–4:00 p.m.	Anna Godinho, Dylan Ayers, Kelsey Higney, Pedro Garcia, Rachel Swick, Russell Sweet	37°F–58°F; 0% cloud cover; 0–3 mph wind
01/25/2023	8:00 a.m.–4:00 p.m.	Anna Godinho, Dylan Ayers, Kelsey Higney, Pedro Garcia, Rachel Swick, Russell Sweet	36°F–60°F; 0% cloud cover; 0–2 mph wind
01/26/2023	7:00 a.m.–12:00 p.m.	Anna Godinho, Dylan Ayers, Kelsey Higney, Pedro Garcia, Rachel Swick, Russell Sweet	34°F–59°F; 0%–100% cloud cover; 0–5 mph wind
02/03/2023	7:00 a.m.–9:00 a.m.	Pedro Garcia, Russell Sweet	42°F–43°F; 80%–90% cloud cover; 1–3 mph wind
08/07/2023	7:00 a.m.–5:16 p.m.	Pedro Garcia	72°F–103°F; 0% cloud cover; 0–3 mph wind
08/09/2023	8:00 a.m.–11:01 a.m.	Pedro Garcia	69°F–82°F; 0% cloud cover; 0–2 mph wind
11/28/2023	8:52 a.m.–3:33 p.m.	Dylan Ayers, Pedro Garcia, Russell Sweet	47°F–67°F; 0% cloud cover; 1–2 mph wind
11/29/2023	8:36 a.m.–3:33 p.m.	Dylan Ayers, Pedro Garcia, Russell Sweet	45°F–63°F; 0% cloud cover; 2–3 mph wind
05/31/2024	6:40 a.m.–1:22 p.m.	Russell Sweet	64°F–94°F; 0% cloud cover; 2–3 mph wind

4.1 U.S. Army Corps of Engineers

The aquatic resources delineation was conducted in accordance with the 1987 USACE Wetlands Delineation Manual (USACE 1987) and the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (USACE 2008a). A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States: A Delineation Manual (USACE 2008b) was used to determine the limits of non-wetland waters (NWWs). NWWs were delineated on topographical maps in conjunction with ESRI Field Maps on a mobile device. The widths of each NWW were determined in the field according to the OHWM manual.

Wetland Data Determination Forms were taken at certain points within drainages or vegetation communities where a predominance of hydrophytic vegetation was present; hydrology, vegetation, and soils were assessed to determine whether USACE three-parameter wetlands were present. USACE OHWM Forms were completed at representative cross-sections of NWWs to capture their characteristics and widths. All data forms can be found in Appendix B.

Pursuant to Section 404 of the CWA, USACE regulates the discharge of dredged and/or fill material into "waters of the United States." The term "wetlands" (a subset of waters of the United States) is defined in 33 Code of Federal Regulations (CFR) 328.3(c)(1) as "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." The term "adjacent" is defined in 33 CFR 328.3(c)(2) as "having a continuous surface connection." In the absence of wetlands, the limits of USACE jurisdiction in non-tidal waters, such as intermittent streams, extend to the "ordinary high water mark," which is defined in 33 CFR 328.3(c)(4) as "that line on the shore 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."

Jurisdictional boundaries were mapped in the field using a Trimble R1 GNSS Receiver with submeter accuracy. The delineators mapped potential aquatic resources using the OHWM as outlined in A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States (USACE 2008b) and the Updated Datasheet for the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States (USACE 2010). Potential wetlands were assessed using the 1987 Corps of Engineers Wetlands Delineation Manual (USACE 1987) and Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (USACE 2008a). Following the fieldwork, aquatic resources were digitized using ArcGIS. A discussion of the three wetland indicators is provided below.

Hydrophytic Vegetation Indicators. The 1987 USACE Wetlands Delineation Manual defines hydrophytic vegetation as the "community of macrophytes that occurs in areas where inundation or soil saturation is either permanent or of sufficient frequency and duration to exert a controlling influence on the plant species present. The manual uses a plant-community approach to evaluate vegetation. Hydrophytic vegetation decisions are based on the assemblage of plant species growing on a site, rather than the presence or absence of particular indicator species. Hydrophytic vegetation is present when the plant community is dominated by species that can tolerate prolonged inundation or soil saturation during the growing season."

Hydric Soil Indicators. The National Technical Committee for Hydric Soils defines a hydric soil as a soil that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic

conditions in the upper part (USACE 2008a). The Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (USACE 2008a) includes guidance for problematic hydric soils, specifically moderately to very strongly alkaline soils: "Identifiable iron or manganese features do not readily form in saturated soils with high pH. High pH (7.9 or higher) can be caused by many factors. In the Arid West, salt content is a common cause of high soil pH. If the pH is high, indicators of hydrophytic vegetation and wetland hydrology are present, and landscape position is consistent with wetlands in the area, then the soil may be hydric even in the absence of a recognized hydric soil indicator."

Wetland Hydrology Indicators. The 1987 USACE Wetlands Delineation Manual defines wetland hydrology as "all hydrologic characteristics of areas that are periodically inundated or have soils saturated to the surface at some time during the growing season.... Such characteristics are usually present in areas that are inundated or have soils that are saturated to the surface for sufficient duration to develop hydric soils and support vegetation typically adapted for life in periodically anaerobic soil conditions."

4.2 Regional Water Quality Control Board

Waters of the state regulated by the RWQCB were mapped in accordance with the State Wetland Definition and Procedures for Discharges of Dredged or Fill Material to Waters of the State (SWRCB 2021). As described in these procedures, wetland waters of the state are mapped based on the procedures in USACE's 1987 Corps of Engineers Wetlands Delineation Manual (USACE 1987) and its 2008 Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0) (USACE 2008a). NWWs are mapped at the OHWM based on the procedures defined in USACE's 2008 A Field Guide to Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States (USACE 2008b).

4.3 California Department of Fish and Wildlife

The delineation defined areas under the jurisdiction of CDFW pursuant to Sections 1600–1603 of the California Fish and Game Code. CDFW asserts jurisdiction over rivers, streams, and lakes to the extent of the "top of bank." The term "bank" is interpreted to encompass the physical bank of the stream that rises vertically above and horizontally away from it (Vyverberg 2010). The top of bank was mapped as the physical break in slope between the channel and surrounding upland. CDFW also asserts jurisdiction over riparian vegetation associated with these features. A predominance of hydrophytic vegetation, where associated with a stream channel, was used to determine CDFW-regulated riparian areas. Streambeds under the jurisdiction of CDFW were delineated using the Cowardin method of waters classification, which defines waters boundaries by a single parameter (i.e., hydric soils, hydrophytic vegetation, or hydrology) (Cowardin et al. 1979). Additionally, waters of the state were delineated based on watercourse characteristics present in the field, which include surface flow, sediment transportation and sorting, physical indicators of channel forms, channel morphology, and riparian habitat associated with a streambed.

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5 Aquatic Resource Narrative

5.1 Waters of the United States (U.S. Army Corps of Engineers)

On May 25, 2023, the Supreme Court issued its decision in *Sackett v. Environmental Protection Agency* (EPA), in which it rejected the EPA's claim that "waters of the United States," as defined in the CWA, includes wetlands with an ecologically significant nexus to traditional navigable waters. The Supreme Court held that only those wetlands with a continuous surface water connection to traditional navigable waterways would be afforded federal protection under the CWA. Specifically, to assert jurisdiction over an adjacent wetland under the CWA, a party must establish that (1) the adjacent body of water constitutes water[s] of the United States' (i.e., a relatively permanent body of water connected to traditional interstate navigable waters), and (2) the wetland has a continuous surface connection with that water, making it difficult to determine where the water ends and the wetland begins. On August 29, 2023, the EPA and USACE announced the final rule amending the 2023 definition of "waters of the United States," conforming with the *Sackett v. EPA* decision. Some of the key changes include removing the significant nexus test from consideration when identifying tributaries and other waters as federally protected and revising the adjacency test when identifying federally jurisdictional wetlands.

Under EPA's new "waters of the United States" definition, a water of the United States is a relatively permanent, standing, or continuously flowing body of water that has an apparent surface connection to a traditionally navigable water. The new rule applies to wetlands and streams throughout the United States. In the *Sackett* ruling, the Court concluded that "the [Clean Water Act]'s use of 'waters' encompasses 'only those relatively permanent, standing or continuously flowing bodies of water "forming geographic[al] features" that are described in ordinary parlance as "streams, oceans, rivers, and lakes." ' " *Id.* at 1336 (quoting *Rapanos,* 547 U.S. at 739). The Court thereby eliminated all ephemeral waterbodies from the definition of waters of the United States.

5.1.1 Aquatic Resources Discussion

The review area has been extensively disturbed over the years by anthropogenic influences, chiefly past and present agricultural activities. Many of the features assessed within the review area are irrigation ditches used for conveying water to orchards and agricultural fields, as well as human-made basins draining the orchards and fields. There are some meandering, earthen-bottom channels within the site that are isolated from traditional navigable waters, though there is evidence to suggest that these features have also been subject to some dredging and other manipulation. The review area contains several isolated ponded areas, sparsely vegetated alkaline areas, and some wetlands (Figure 6, Potential Jurisdictional Aquatic Resources – Overview). Photos of the features and areas evaluated within the review area are provided in Appendix C. The locations of these photos are shown in the Figure 7 series, Potential Jurisdictional Aquatic Resources. All of the aquatic resources described under Section 5.2, Waters of the State, below, are potentially jurisdictional USACE resources; however, they are anticipated to be considered non-jurisdictional.

5.1.1.1 Wetlands

All of the wetlands mapped within the review area (i.e., approximately 91.28 acres) met the three wetland parameters required to quality as wetland waters of the United States; however, the features are isolated and do not have a direct surface connection to a traditional navigable water. Further, based on the *Sackett v. EPA* decision, the wetlands lack a continuous surface water connection to traditional navigable waterways and therefore would not be considered a water of the United States. The isolated wetland waters lack a continuous surface connection to (a)(1), (a)(2), or (a)(3) waters (33 CFR 328, Definition of Waters of the United States).

5.1.1.2 Non-Wetland Waters

Similar to the wetlands, NWWs with natural or artificial OHWM indicators (i.e., approximately 6.41 acres of pond and natural channel features as well as approximately 6.56 acres of ditches that connect to natural channels) are all isolated features. The isolated NWWs are not tributaries to (a)(1) or (a)(2) waters (33 CFR 328, Definition of Waters of the United States), and the majority of these features are not relatively permanent, standing or continuously flowing bodies of water.

5.1.1.3 Ditches and Other Created Features

Much of the review area and surrounding landscapes have been altered through agricultural practices, flood control, water storage and irrigation, and other infrastructure since the late 1800s. This has resulted in a variety of features created in upland areas (e.g., ditches, basins) that the Dudek team reviewed during the jurisdictional delineation and determined would meet the definition of excluded features. Excluded features are described in 33 CFR 328.3(b)(1) through (b)(8) as follows:

> (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 waters of the United States; and (8) Swales and erosional features (e.g., gullies, small washes) characterized by low volume, infrequent, or short duration flow.

The review area contains approximately 6.56 acres of ditches used for irrigation or road runoff conveyance, and basins within agricultural areas. These are not connected to an (a)(1), (a)(2), or (a)(3) waters and therefore are excluded under the 2023 Revised Definition of "Waters of the United States"; Conforming Rule (88 FR 61964–

61969; 33 CFR 328.3[b][3]): "(3) Ditches (including roadside ditches) excavated wholly in and draining only dry land and that do not carry a relatively permanent flow of water" or (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.

5.2 Waters of the State

The review area contains numerous ditches used for irrigation or road runoff conveyance, and basins within agricultural areas. Dudek personnel reviewed these features for connectivity to natural features. Those with a continuous surface connection to waters of the state are considered a potentially regulated feature and are included in the features described below. Although the isolated features are not likely to be considered waters of the United States jurisdictional by the USACE under CWA Section 404 or the RWQCB under CWA Section 401, they may be subject to regulation by the RWQCB under the Porter–Cologne Water Quality Control Act and CDFW pursuant to Sections 1600–1603 of the California Fish and Game Code (Table 6).

The features described in Table 6 and shown on the Figure 7 series, include natural channels, modified channels, ponds, wetlands, as well as ditches that may connect to a natural channel.

Table 6. Potentially Jurisdictional Aquatic Resources Summary (RWQCB and CDFW)

Feature Type	Acreage	Linear Feet
Wetland Waters		
Shrub-scrub wetland	91.28	15,824
Wetlands Subtotal	*91.28*	*15,824*
Non-wetland Waters		
Canal/ditch	6.56	28,016
Natural channel	0.28	236
Pond	6.13	2,323
Non-Wetland Waters Subtotal	*12.97*	*30,575*
Grand Total[1]	**104.25**	**46,399**

Notes: Regional Water Quality Control Board = RWQCB; CDFW = California Department of Fish and Wildlife.
[1] Totals may not sum due to rounding.

5.2.1 Wetlands

Within the review area, there are approximately 18 potential wetland waters of the state comprising 91.28 acres. They are characterized by their flat, bottomland landscape position likely to collect or concentrate water; some areas had a high percentage of barren ground indicating a period of seasonal inundation that would preclude the dominance of upland species present throughout the surrounding non-native grassland and scrub. Where present, vegetation consisted of facultative to obligate wetland plant species such as bush seepweed, saltgrass, seaside barley (*Hordeum marinum*), alkali heath, spiny rush, little hogweed (*Portulaca oleracea*), creeping wildrye turfs, California loosestrife (*Lythrum californicum*), Mexican whorled milkweed (*Asclepias fascicularis*), California bulrush (*Schoenoplectus californicus*), and stinging nettle (*Urtica dioica*). Wetland hydrology was confirmed by surface water, water marks, aquatic invertebrates, surface soil cracks, and/or biotic crusts within these features. Soils were naturally problematic due to high alkalinity and were therefore assumed to be hydric due when appropriate

hydrophytic vegetation and wetland hydrology indicators were present. To further support this determination, most of the soil mapping units within these features have a hydric rating.

The National Wetlands Inventory identifies several additional areas within the review area classified as freshwater emergent wetland (PEM1), freshwater pond (PUBFx, PUSA, PUSC), and riverine (R4SBC, R5UBF) (USFWS 2023). The locations of these historical features were investigated for presence of wetland indicators and/or OHWM during the delineation but not identified as potentially jurisdictional features due to the lack of current wetland indicators such as hydrophytic vegetation, soils, or hydrology. The absence of current wetland indicators likely results from past farming practices that included channelizing water, tilling, and leveling. Thus, these areas are not considered jurisdictional as they are uplands.

5.2.2 Non-Wetland Waters

The majority of the NWWs on site are located within the northern portion of the review area. There are several isolated natural, meandering channels within the undeveloped areas (i.e., outside of agricultural areas), channels that appear to be modified and connect to isolated wetlands, and ponded areas. The soils within much of the review area have higher clay content and are subject to shrinking and swelling, causing soil cracks that are not considered a hydrology indicator (i.e., vertisols). Therefore, other indicators were used in conjunction with soil cracks to determine the extent of potential NWWs, including surface water, biotic crust, and landscape position (e.g., depression).

The primary drainage within the review area is from ditches, most of which do not connect to a water of the state and are entirely contained within an area. In the northwest portion of the review area, the channels and ditches appear to connect to a larger wetland complex off site referred to as Jerry Slough on the U.S. Geological Survey's 7.5-minute Semitropic quadrangle (Figure 2). Dudek personnel reviewed these ditches and canals for connectivity to natural features; those connected to a potential water of the state are considered a potentially regulated feature. Those that do not have been excluded as state waters because they do not exhibit a natural streambed.

6 Results and Conclusions

Based on the aquatic resources delineation and review of regulatory information provided in this aquatic resources delineation report, 91.28 acres of wetlands and 12.97 acres of non-wetland waters/streambeds and ponds that may be regulated by the RWQCB and CDFW were delineated within the review area.

These features are considered isolated wetland waters and lack a continuous surface connection to (a)(1), (a)(2), or (a)(3) waters (33 CFR 328, Definition of Waters of the United States). Furthermore, the isolated NWWs and ditches are not tributaries to (a)(1) or (a)(2) waters, and the majority of these features are not relatively permanent, standing, or continuously flowing bodies of water. As such, there are no waters subject to USACE regulation. These findings are preliminary until verified by the USACE, Sacramento District, RWQCB, and CDFW.

The geographic information system data for the delineation is provided digitally.

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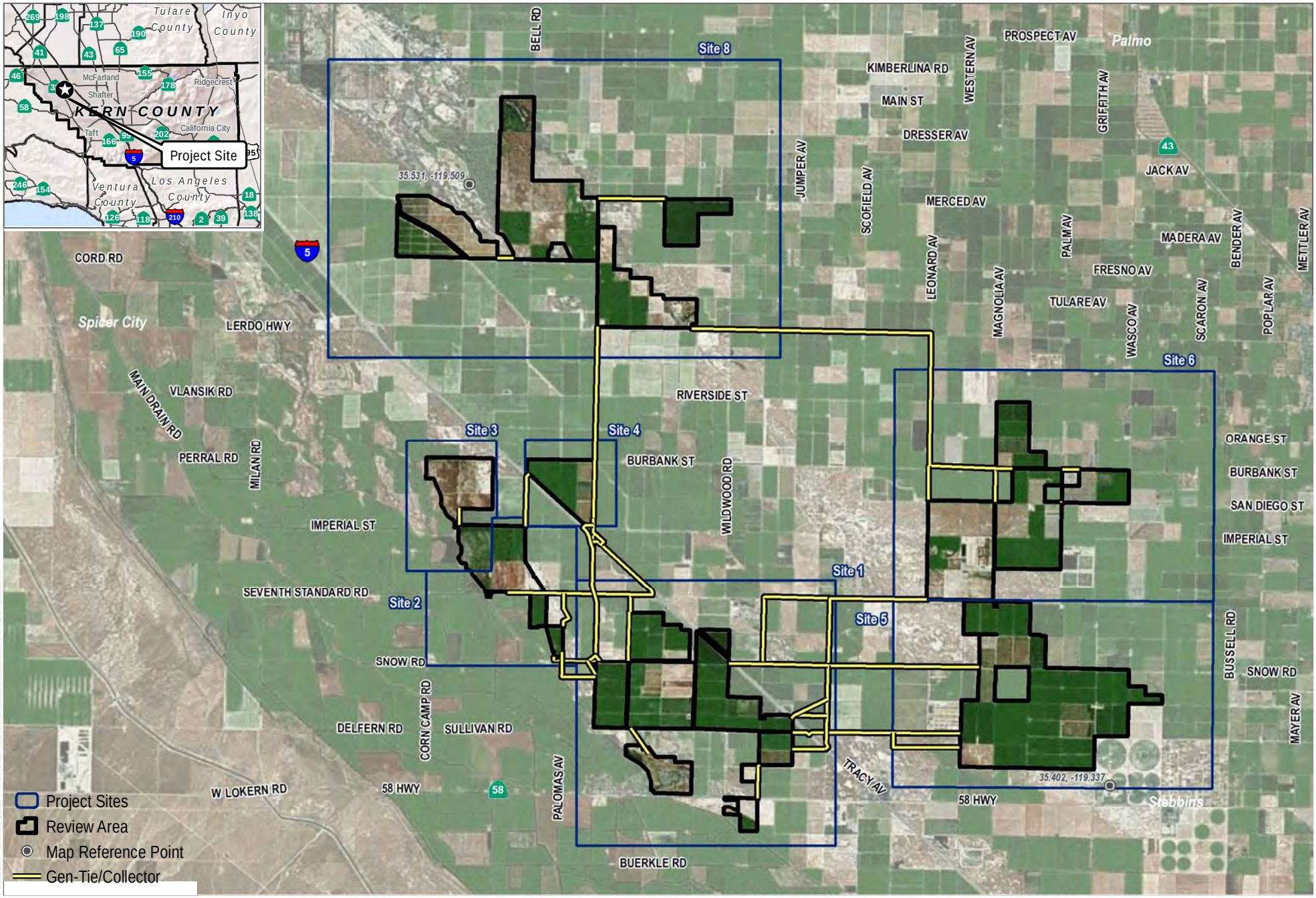
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SOURCE: Avantus LLC., 2024; Kern County; Bing Maps

Coordinate System: NAD 1983 StatePlane California V FIPS 0405 Feet
Projection: Lambert Conformal Conic
Datum: North American 1983
Vertical Datum: NAVD88
U.S. Feet
Created on August 6, 2024

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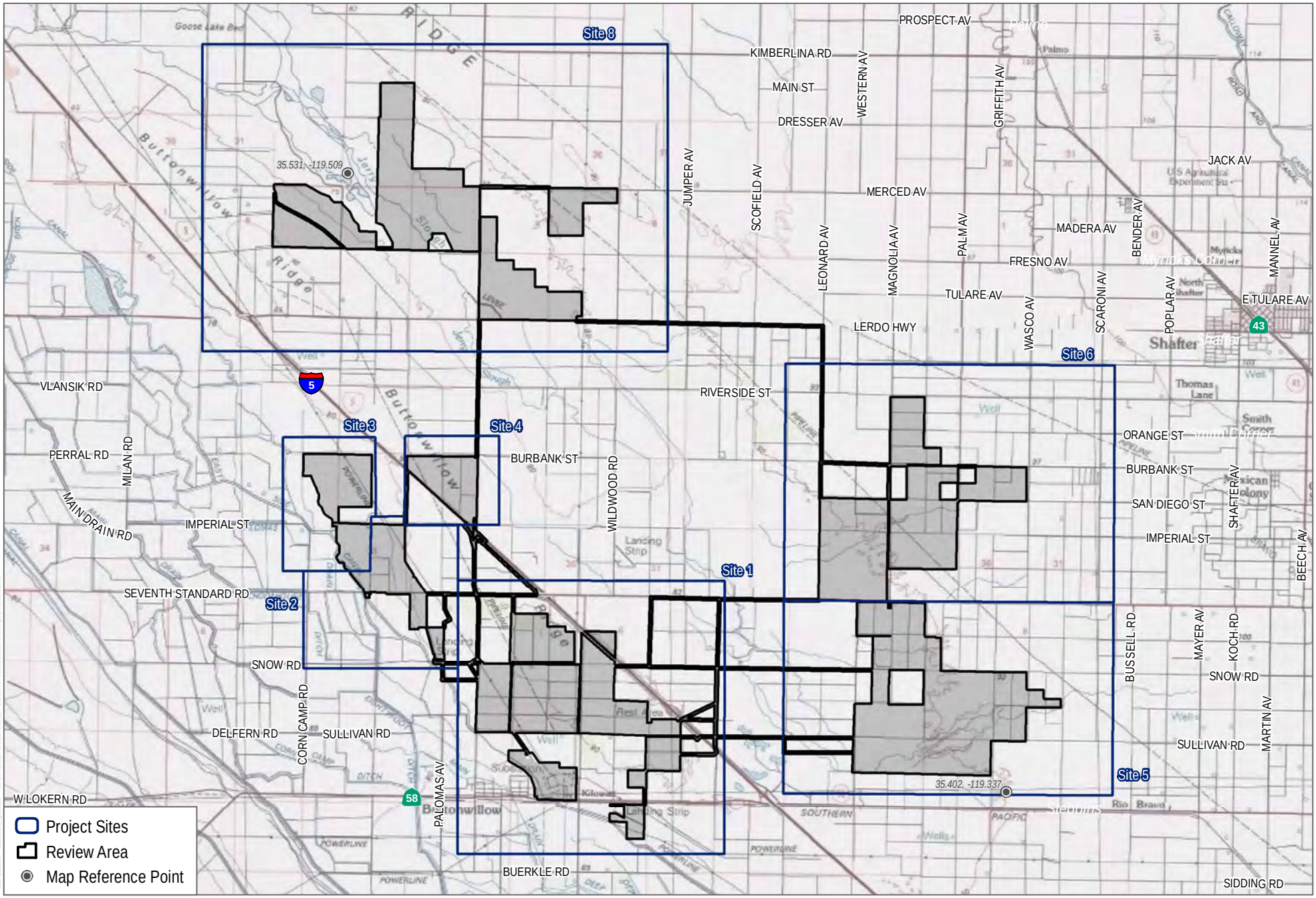
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FIGURE 1

Project Location

Buttonbush Solar Energy Project Aquatic Resources Delineation Report

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SOURCE: Avantus LLC., 2024; Kern County; USGS Topo Map Series

Coordinate System: NAD 1983 StatePlane California V FIPS 0405 Feet
Projection: Lambert Conformal Conic
Datum: North American 1983
Vertical Datum: NAVD88
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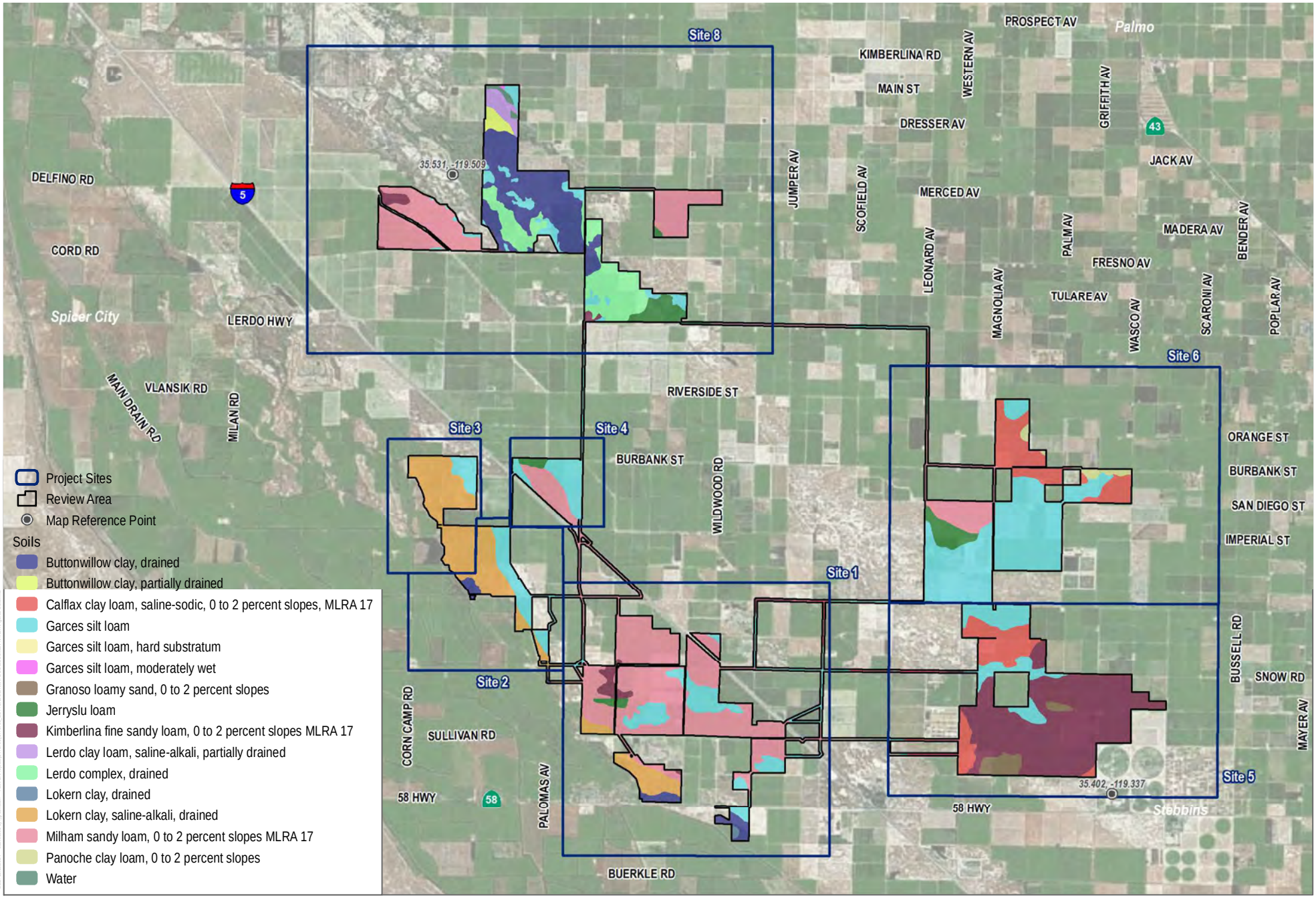
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FIGURE 2

Review Area

Buttonbush Solar Energy Project Aquatic Resources Delineation Report

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SOURCE: Avantus LLC., 2024; Kern County; Bing Maps; SSURGO

Coordinate System: NAD 1983 StatePlane California V FIPS 0405 Feet
Projection: Lambert Conformal Conic
Datum: North American 1983
Vertical Datum: NAVD88
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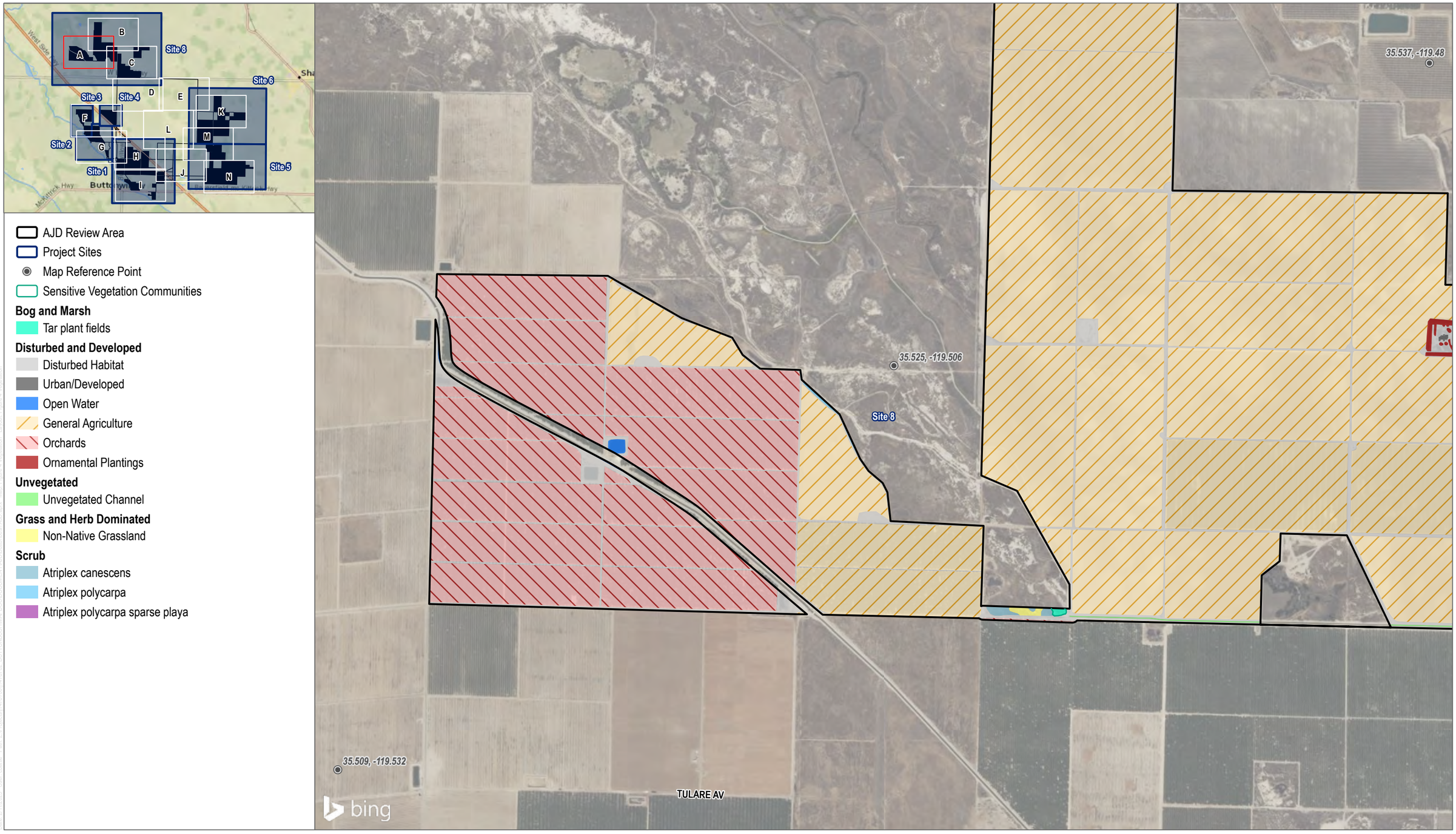
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FIGURE 3

Soils

Buttonbush Solar Energy Project Aquatic Resources Delineation Report

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SOURCE: Avantus LLC. 2024; Bing Maps 2022; Kern County 2022

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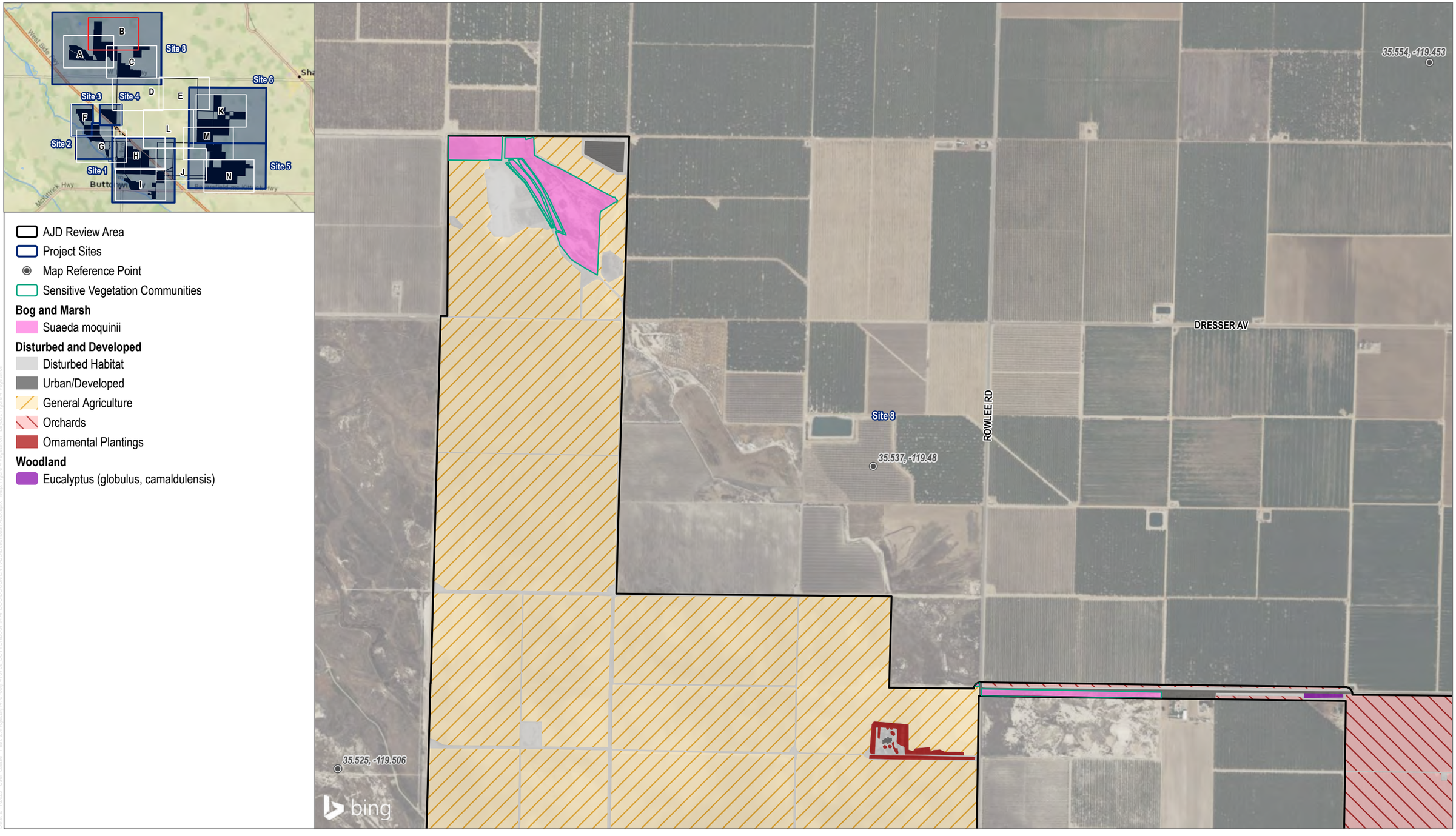
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FIGURE 4A

Vegetation Communities and Land Cover Types

Buttonbush Solar Energy Project Approved Jurisdictional Determination Request

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SOURCE: Avantus LLC. 2024; Bing Maps 2022; Kern County 2022

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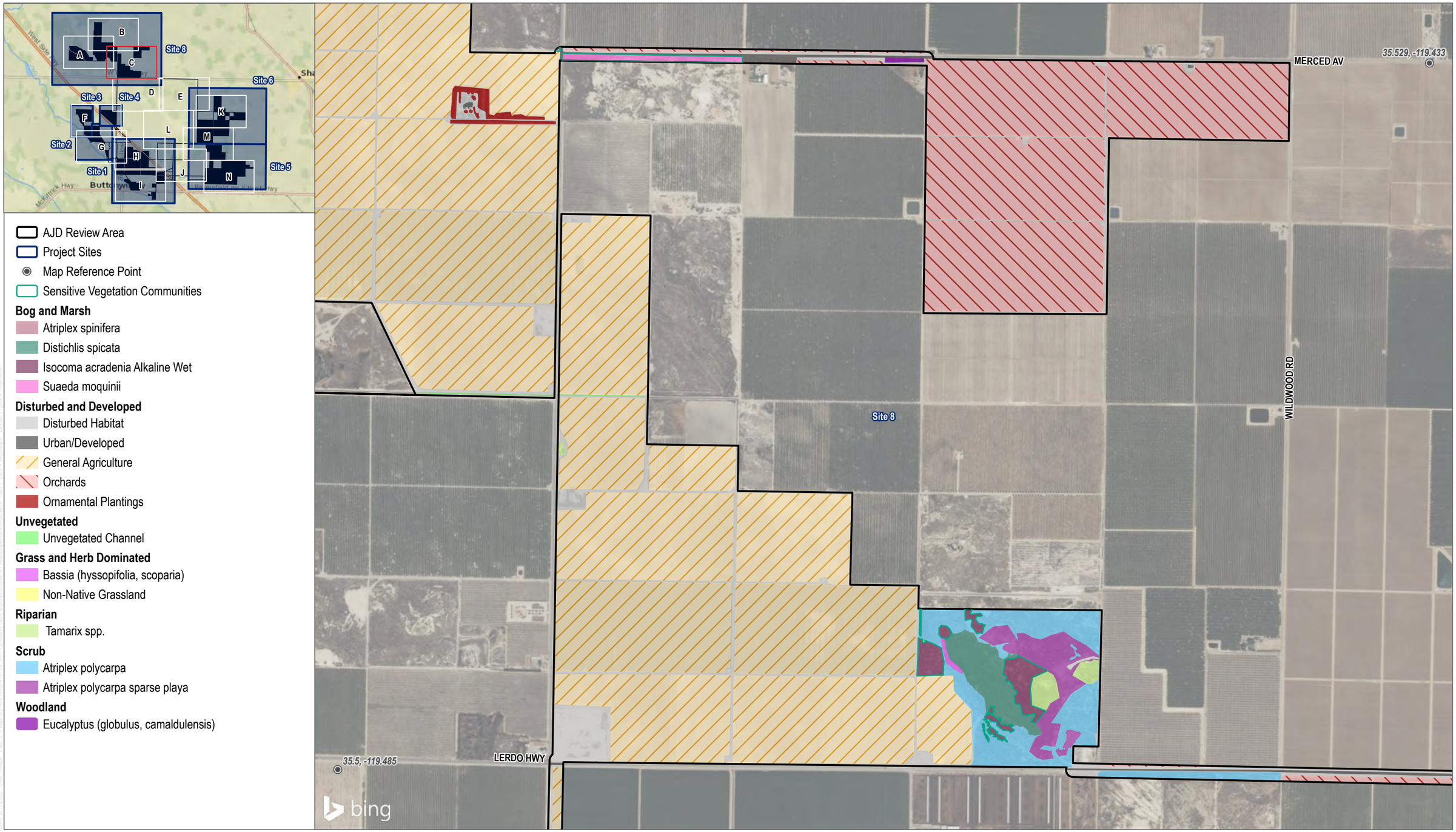
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FIGURE 4B

Vegetation Communities and Land Cover Types

Buttonbush Solar Energy Project Approved Jurisdictional Determination Request

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SOURCE: Avantus LLC. 2024; Bing Maps 2022; Kern County 2022

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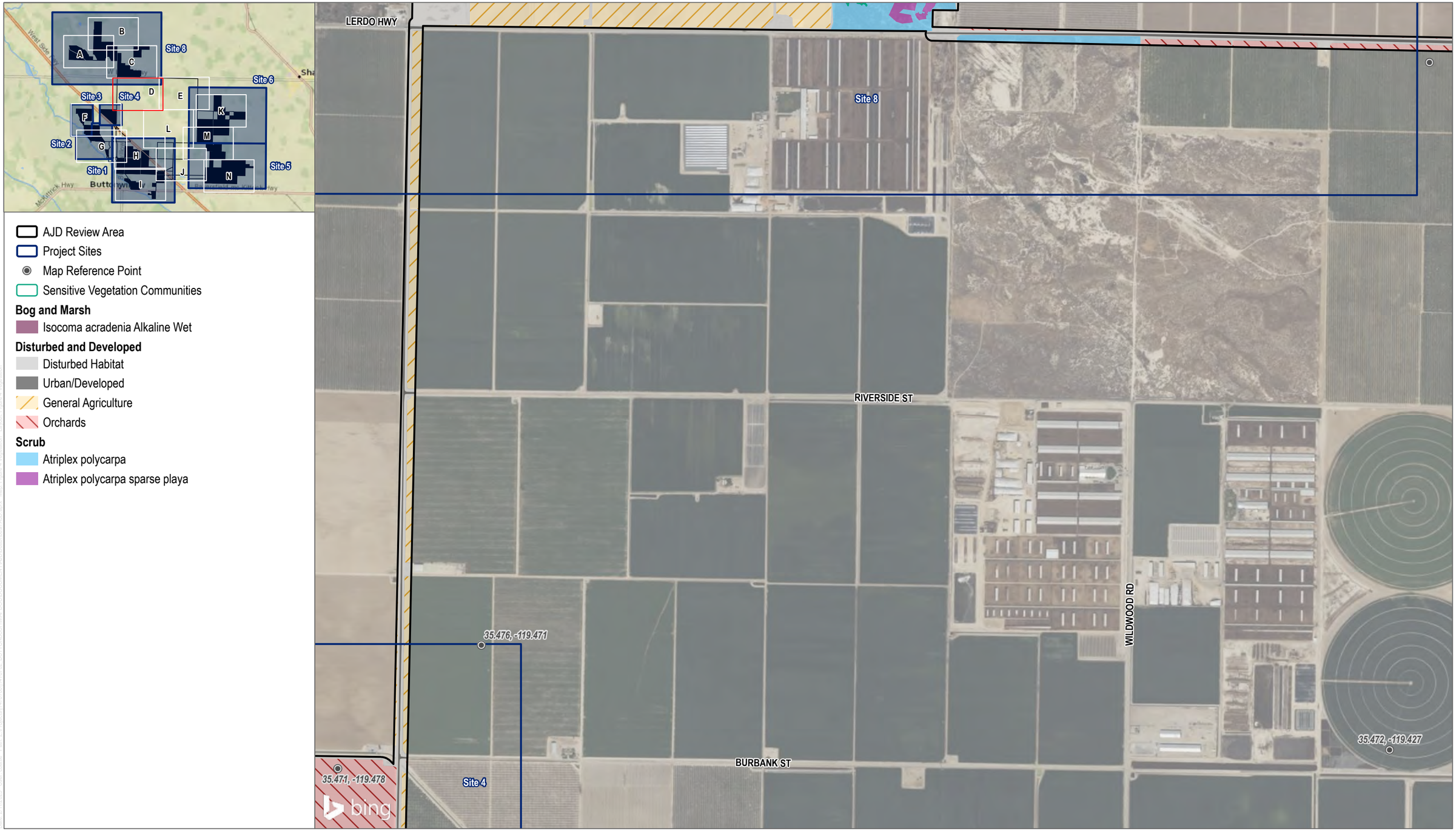
0 500 1,000 Feet

FIGURE 4C

Vegetation Communities and Land Cover Types

Buttonbush Solar Energy Project Approved Jurisdictional Determination Request

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SOURCE: Avantus LLC. 2024; Bing Maps 2022; Kern County 2022

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0 500 1,000 Feet

FIGURE 4D

Vegetation Communities and Land Cover Types

Buttonbush Solar Energy Project Approved Jurisdictional Determination Request

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SOURCE: Avantus LLC. 2024; Bing Maps 2022; Kern County 2022

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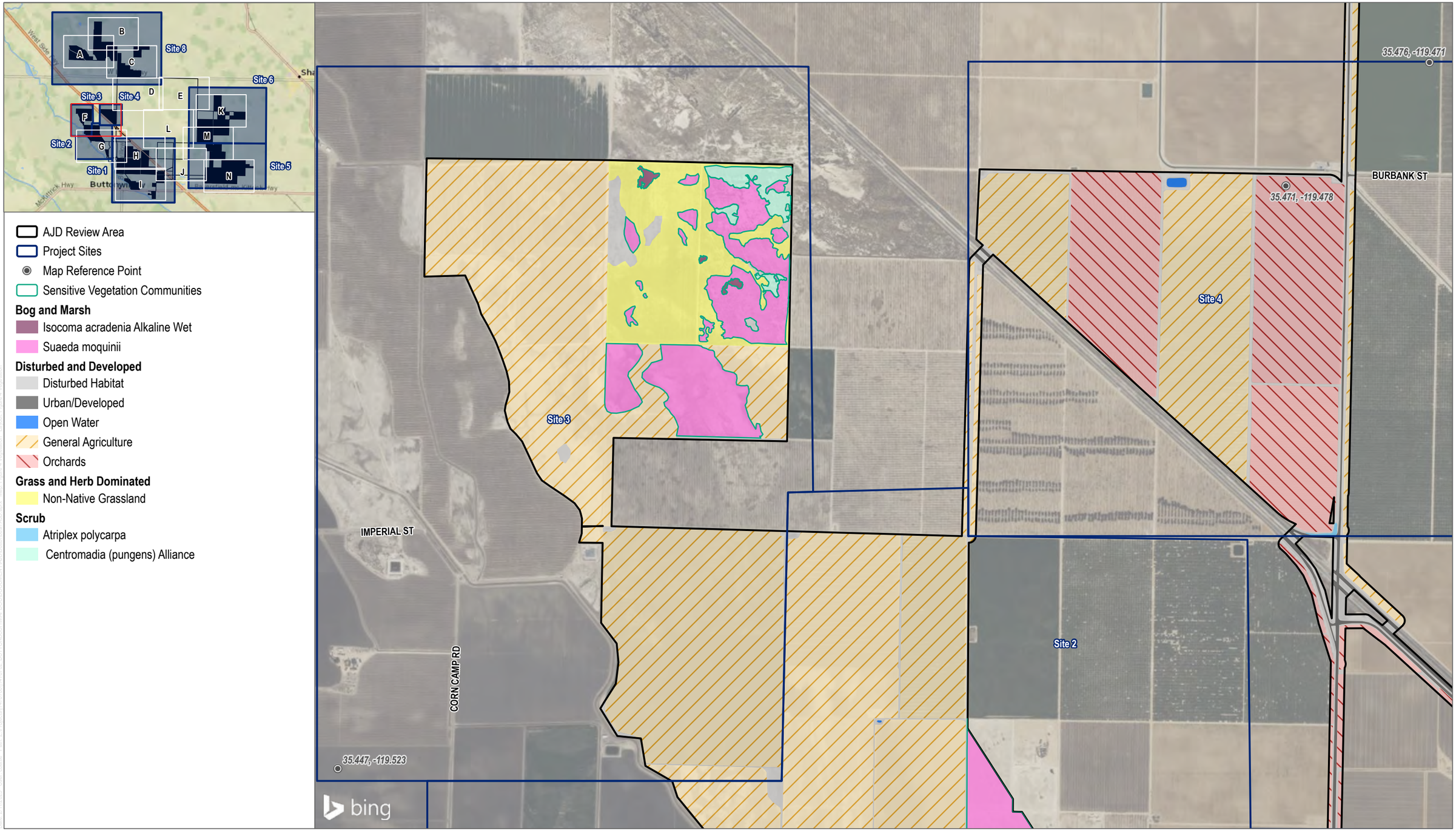
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FIGURE 4E

Vegetation Communities and Land Cover Types

Buttonbush Solar Energy Project Approved Jurisdictional Determination Request

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SOURCE: Avantus LLC. 2024; Bing Maps 2022; Kern County 2022

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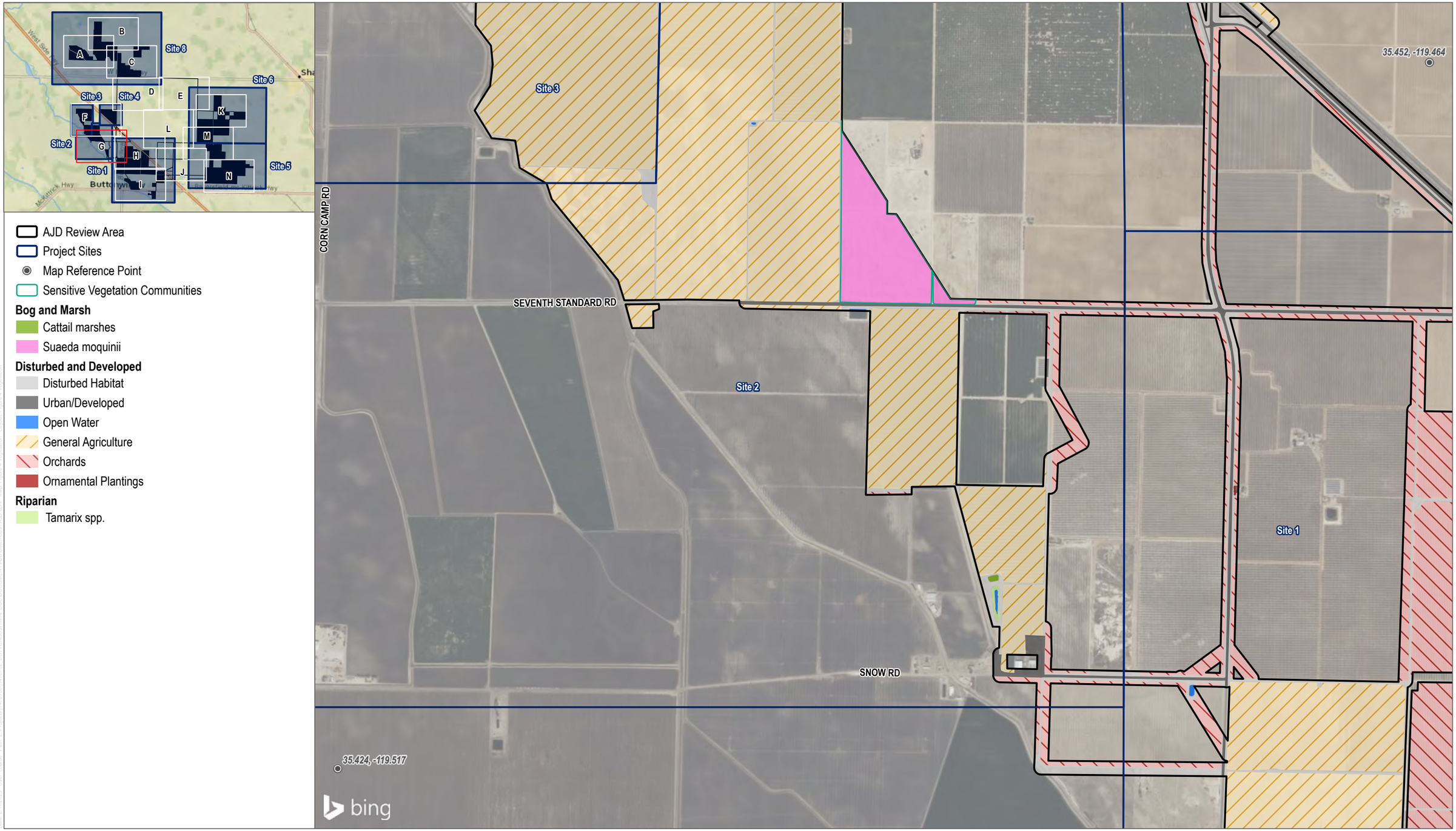
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FIGURE 4F

Vegetation Communities and Land Cover Types

Buttonbush Solar Energy Project Approved Jurisdictional Determination Request

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SOURCE: Avantus LLC. 2024; Bing Maps 2022; Kern County 2022

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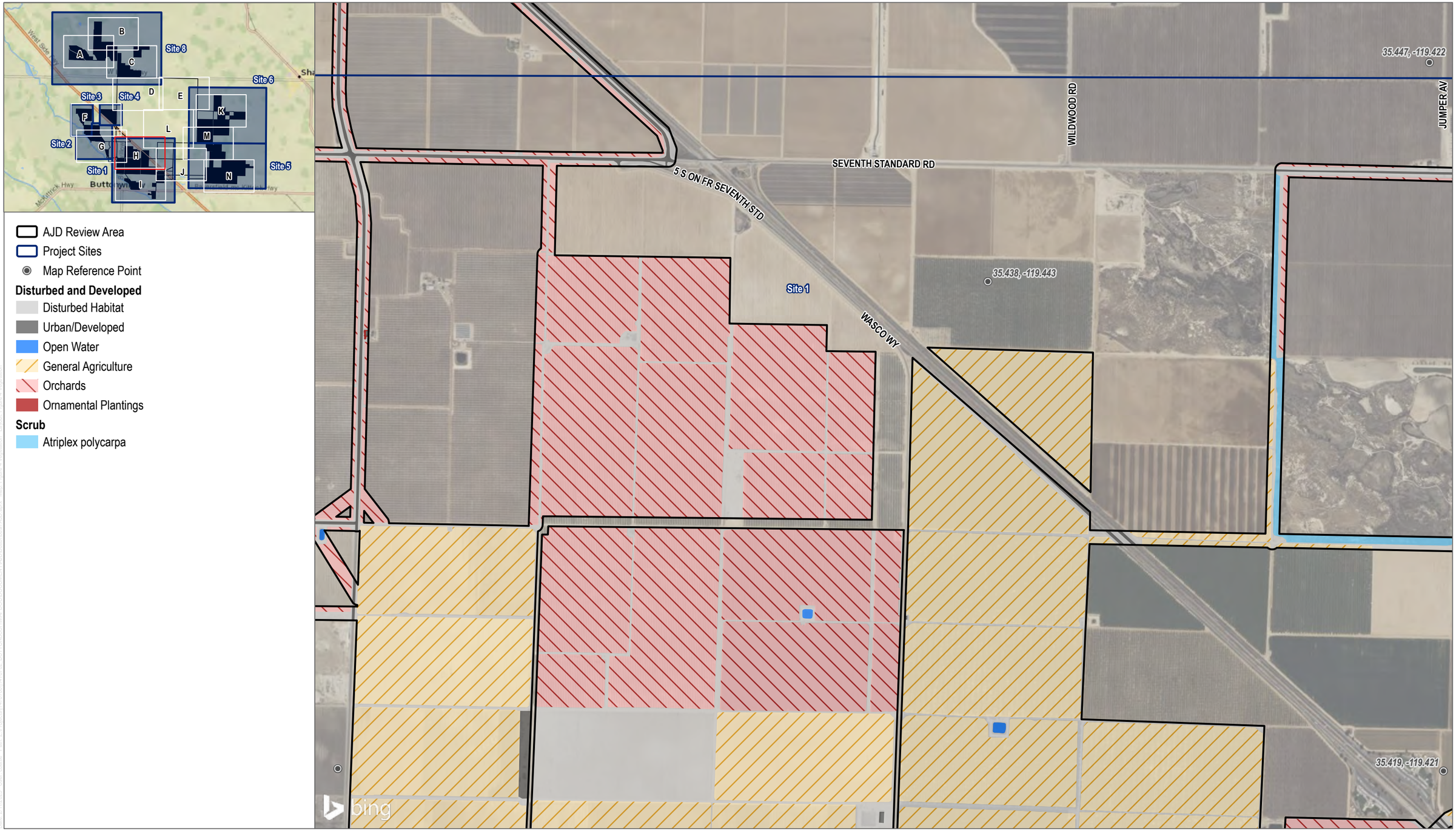
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FIGURE 4G

Vegetation Communities and Land Cover Types

Buttonbush Solar Energy Project Approved Jurisdictional Determination Request

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SOURCE: Avantus LLC. 2024; Bing Maps 2022; Kern County 2022

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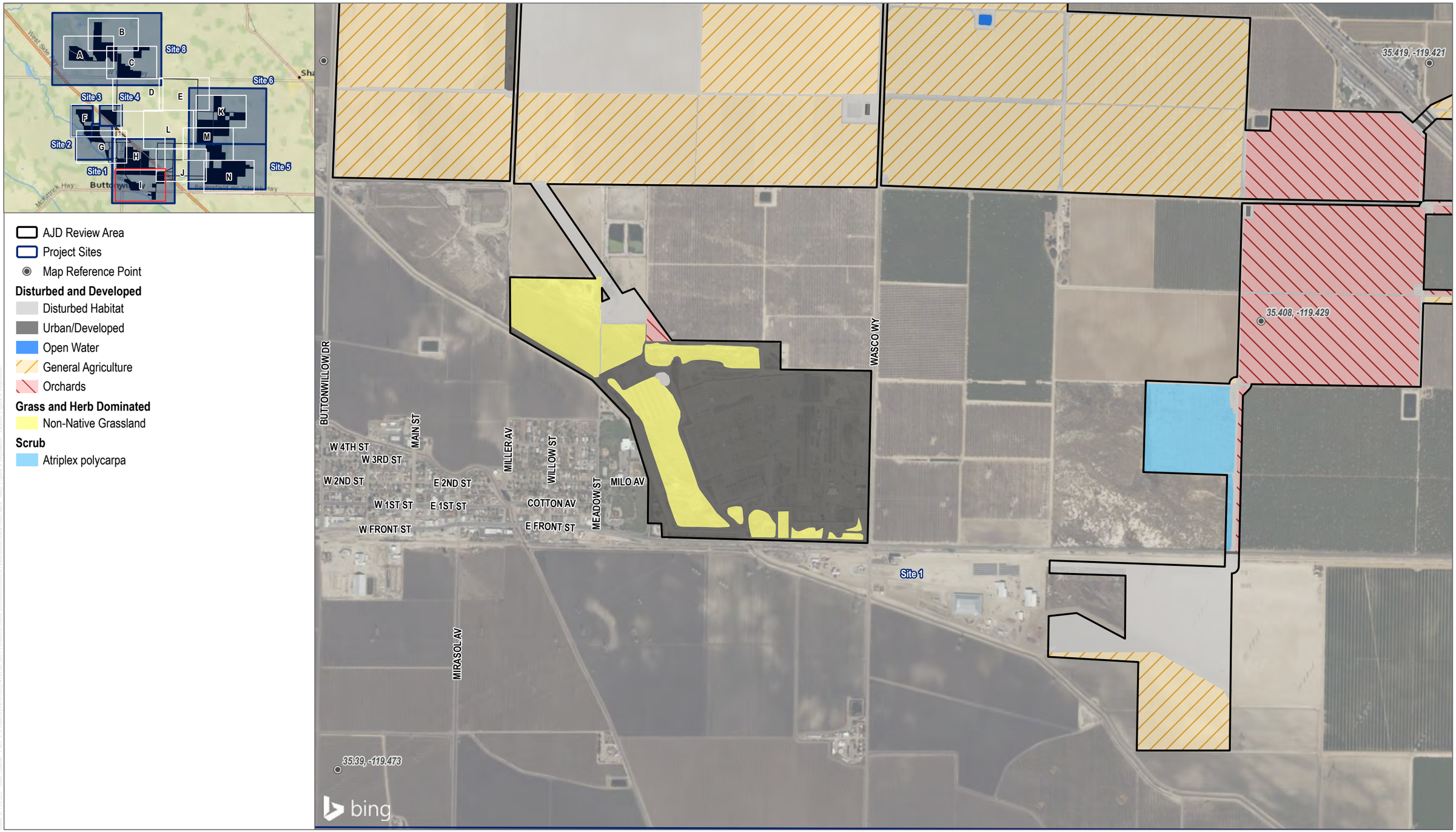
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FIGURE 4H

Vegetation Communities and Land Cover Types

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SOURCE: Avantus LLC. 2024; Bing Maps 2022; Kern County 2022

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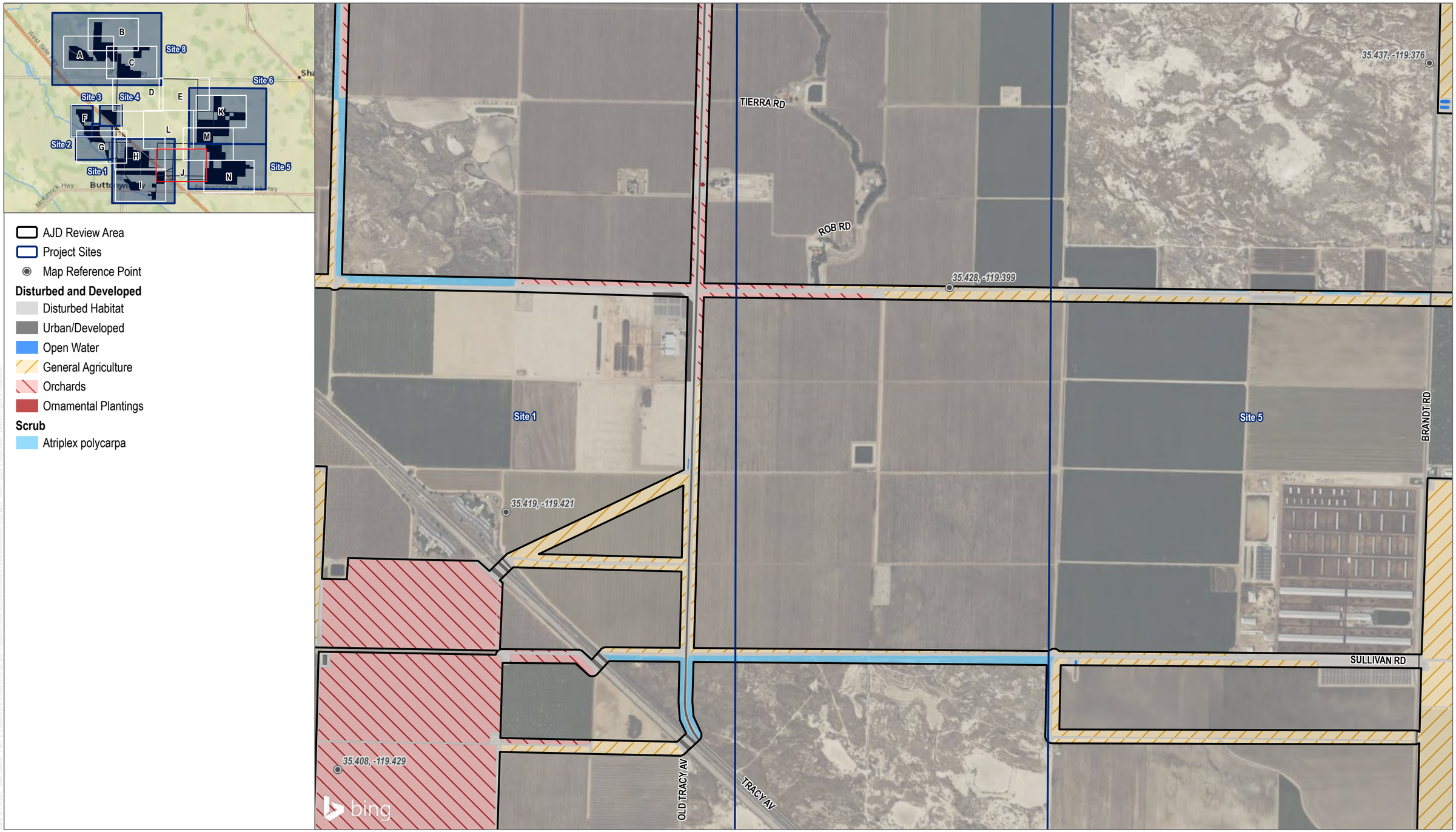
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FIGURE 4I

Vegetation Communities and Land Cover Types

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SOURCE: Avantus LLC. 2024; Bing Maps 2022; Kern County 2022

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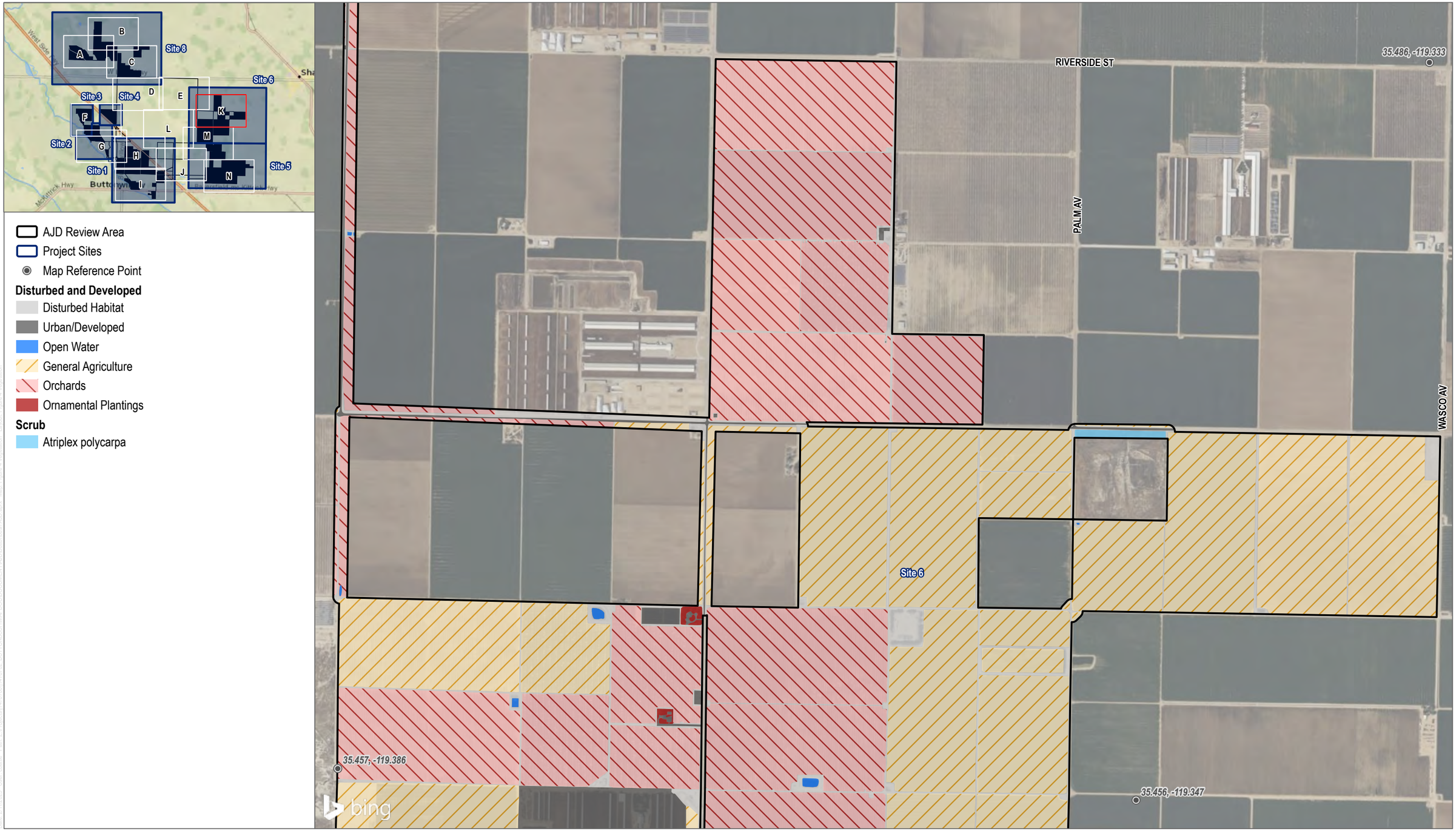
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FIGURE 4J

Vegetation Communities and Land Cover Types

Buttonbush Solar Energy Project Approved Jurisdictional Determination Request

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SOURCE: Avantus LLC. 2024; Bing Maps 2022; Kern County 2022

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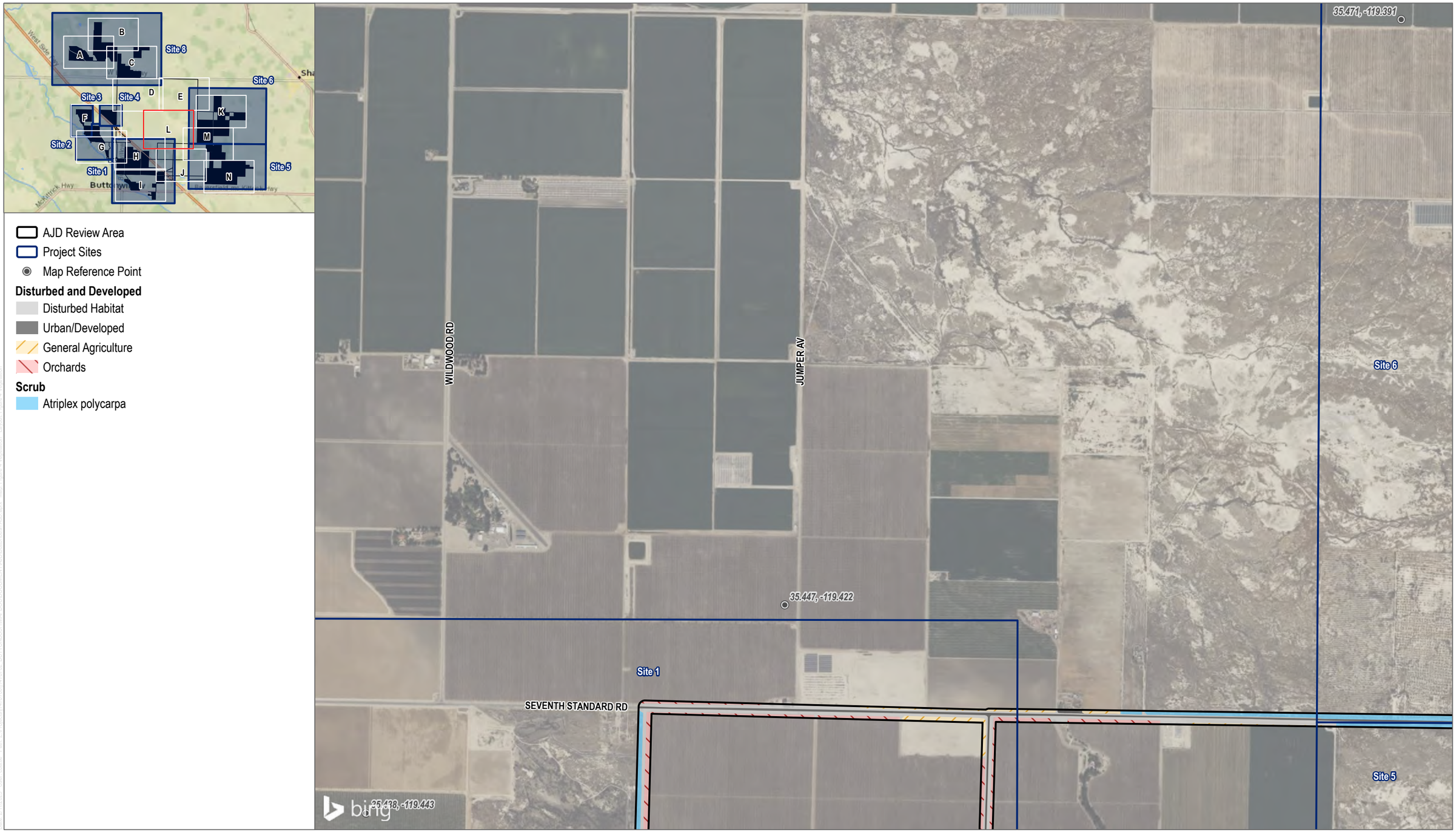
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FIGURE 4K

Vegetation Communities and Land Cover Types

Buttonbush Solar Energy Project Approved Jurisdictional Determination Request

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SOURCE: Avantus LLC. 2024; Bing Maps 2022; Kern County 2022

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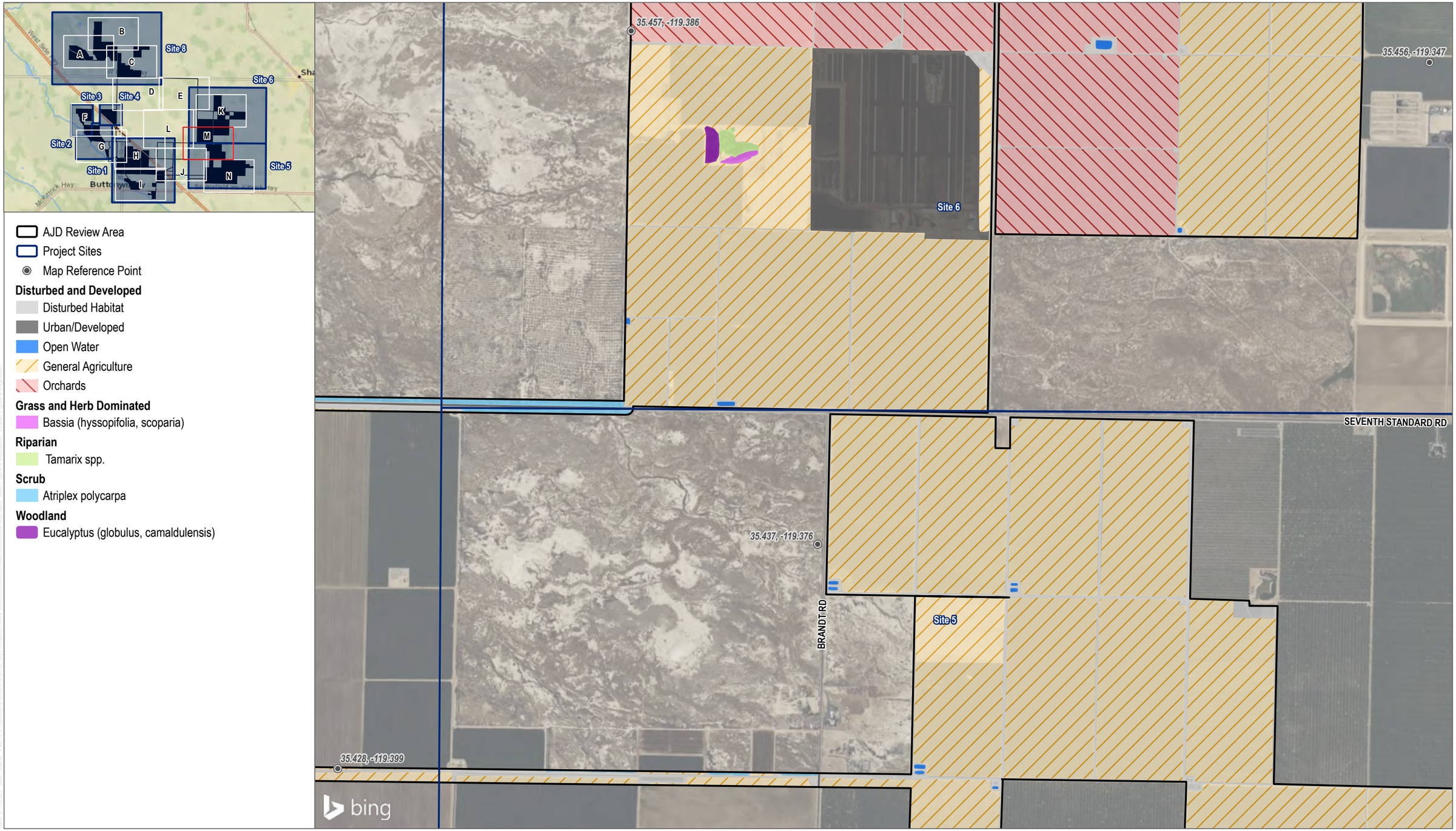
0 500 1,000 Feet

FIGURE 4L

Vegetation Communities and Land Cover Types

Buttonbush Solar Energy Project Approved Jurisdictional Determination Request

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AJD Review Area
Project Sites
Map Reference Point

Disturbed and Developed
Disturbed Habitat
Urban/Developed
Open Water
General Agriculture
Orchards

Grass and Herb Dominated
Bassia (hyssopifolia, scoparia)

Riparian
Tamarix spp.

Scrub
Atriplex polycarpa

Woodland
Eucalyptus (globulus, camaldulensis)

SOURCE: Avantus LLC. 2024; Bing Maps 2022; Kern County 2022

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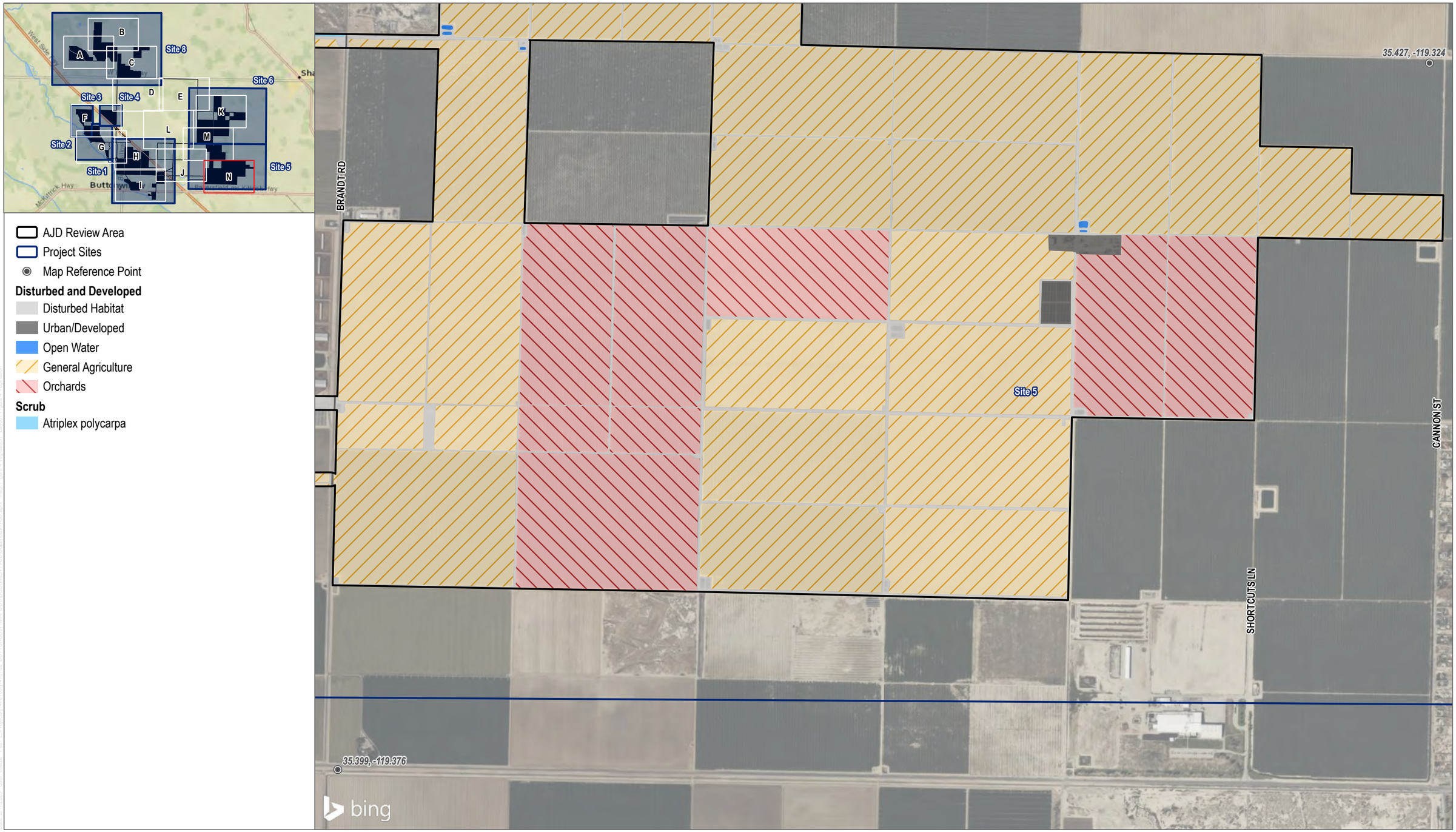
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FIGURE 4M

Vegetation Communities and Land Cover Types

Buttonbush Solar Energy Project Approved Jurisdictional Determination Request

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SOURCE: Avantus LLC. 2024; Bing Maps 2022; Kern County 2022

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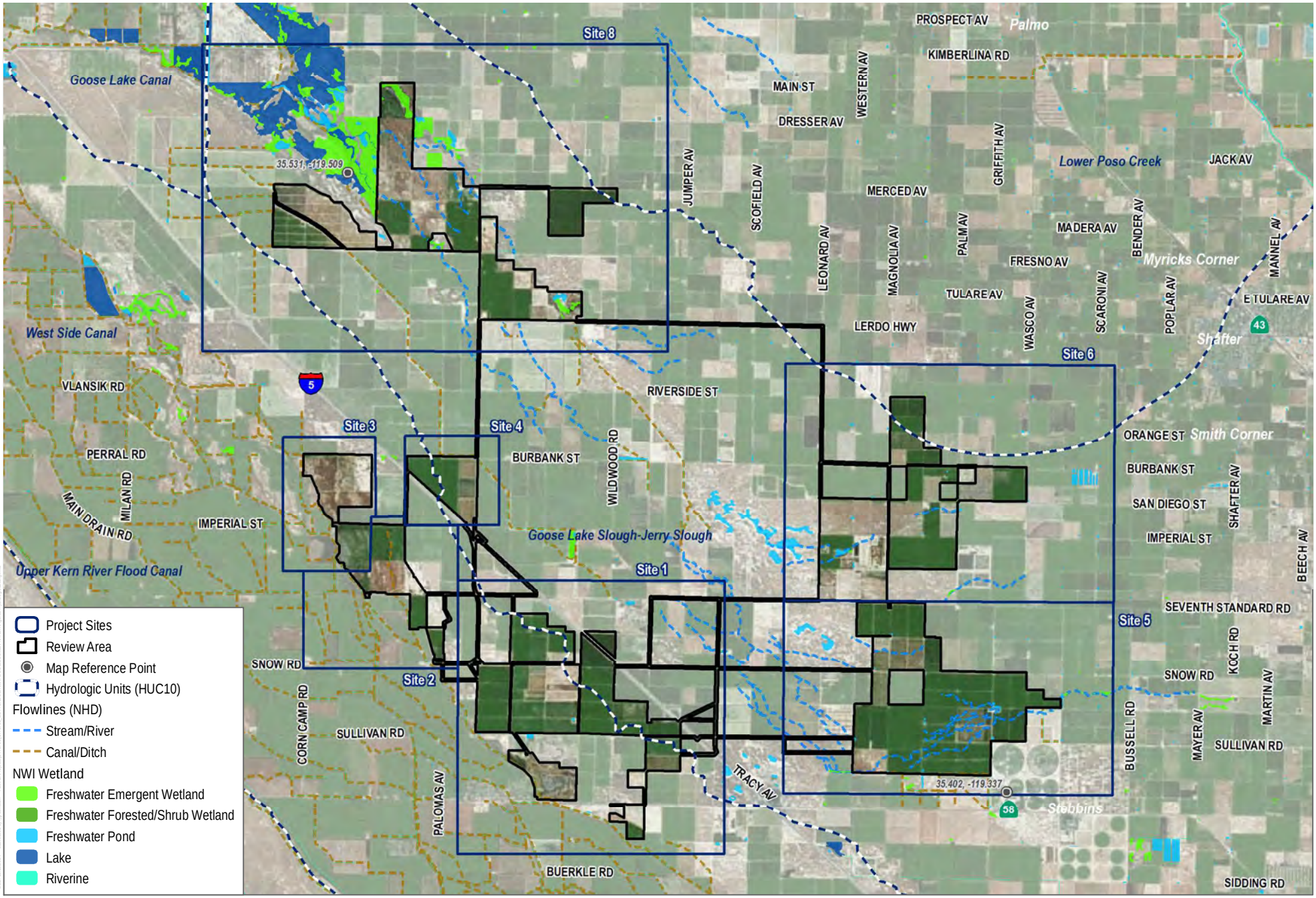
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FIGURE 4N

Vegetation Communities and Land Cover Types

Buttonbush Solar Energy Project Approved Jurisdictional Determination Request

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SOURCE: Avantus LLC., 2024; USGS NHD; USFWS NWI; Kern County; Bing Maps

Coordinate System: NAD 1983 StatePlane California V FIPS 0405 Feet
Projection: Lambert Conformal Conic
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Vertical Datum: NAVD88
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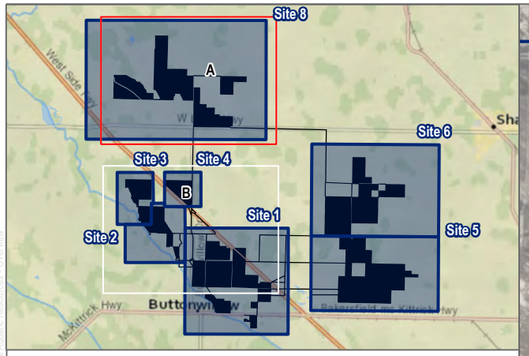
0 1 2 Miles

FIGURE 5

Hydrologic Setting

Buttonbush Solar Energy Project Aquatic Resources Delineation Report

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Project Sites
Review Area
Map Reference Point

Potential Aquatic Resources*

Non-Wetland Water (USACE/RWQCB/CDFW)**

Canal/ditch (6.6 acres)
Pond (6.1 acres)

Wetland Waters (USACE/RWQCB/CDFW)**

Shrub-scrub wetland (91.3 acres)

* Acreage noted represents total acreage for the Review Area.
** Features are not anticipated to be USACE-jurisdictional via the AJD process.

SOURCE: Avantus LLC. 2024; Bing Maps 2022; Kern County 2022

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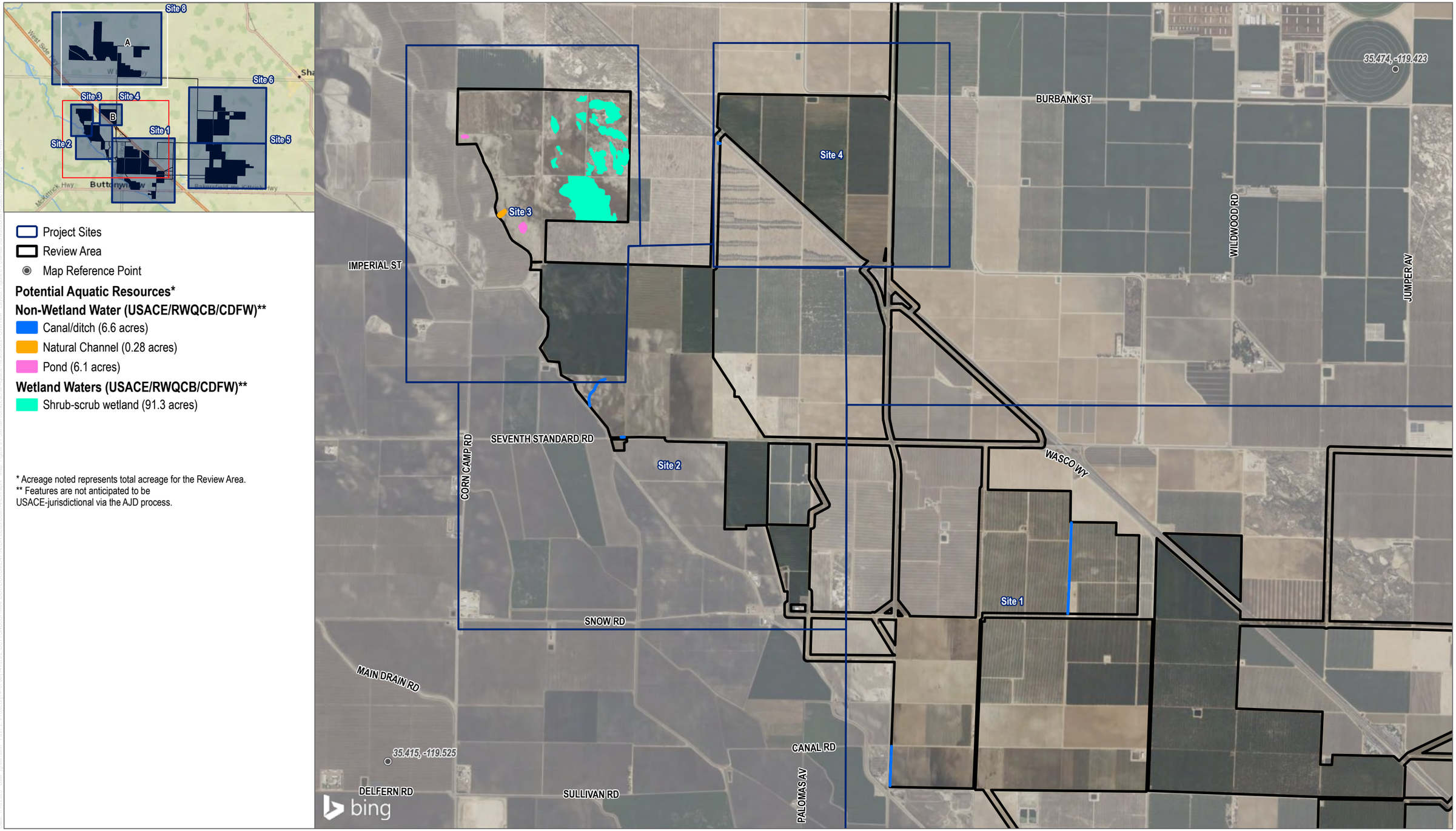
0 1,250 2,500 Feet

FIGURE 6

Potential Jurisdictional Aquatic Resources - Overview

Buttonbush Solar Energy Project Aquatic Resources Delineation Report

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SOURCE: Avantus LLC. 2024; Bing Maps 2022; Kern County 2022

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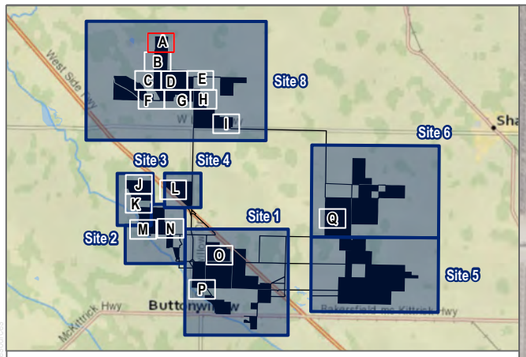
0 1,250 2,500 Feet

FIGURE 6

Potential Jurisdictional Aquatic Resources - Overview

Buttonbush Solar Energy Project Aquatic Resources Delineation Report

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- Project Sites
- Review Area
- Photo Point
- Wetland Sampling Point
- Map Reference Point

Potential Aquatic Resources*

Non-Wetland Water (USACE/RWQCB/CDFW)**

- Canal/ditch (6.6 acres)
- Pond (6.1 acres)

Wetland Waters (USACE/RWQCB/CDFW)**

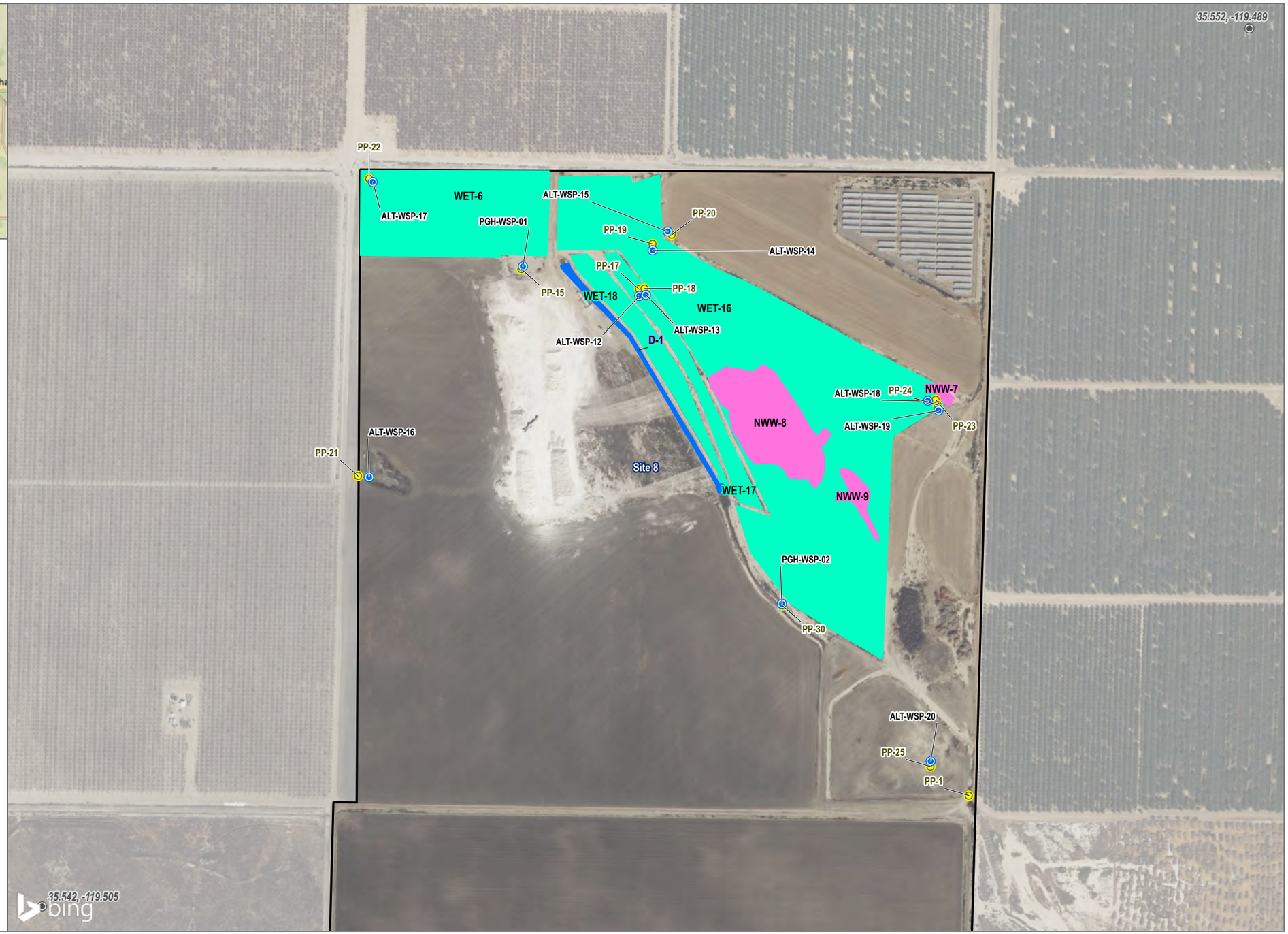
- Shrub-scrub wetland (91.3 acres)

* Acreage noted represents total acreage for the Review Area.
** Features are not anticipated to be USACE-jurisdictional via the AJD process.

Coordinate System: NAD 1983 StatePlane California V FIPS 0405 Feet
Projection: Lambert Conformal Conic
Datum: North American 1983
Vertical Datum: NAVD88
U.S. Feet

Created on January 9, 2025

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Jason Greenstein, GIS Analyst, Dudek,
605 Third Street, Encinitas, CA 92024



SOURCE: Avantus LLC. 2024; Bing Maps 2022; Kern County 2022

DUDEK

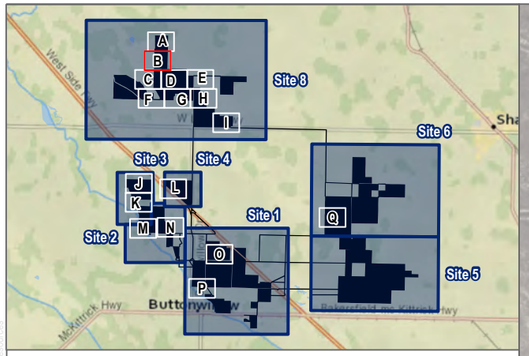
0 200 400 Feet

FIGURE 7A

Potential Jurisdictional Aquatic Resources

Buttonbush Solar Energy Project Aquatic Resources Delineation Report

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Project Sites
Review Area
Photo Point
OHWM Transect
Map Reference Point

Potential Aquatic Resources*

Non-Wetland Water (USACE/RWQCB/CDFW)**

Canal/ditch (6.6 acres)

* Acreage noted represents total acreage for the Review Area.
** Features are not anticipated to be USACE-jurisdictional via the AJD process.

Coordinate System: NAD 1983 StatePlane California V FIPS 0405 Feet
Projection: Lambert Conformal Conic
Datum: North American 1983
Vertical Datum: NAVD88
U.S. Feet

Created on January 9, 2025

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SOURCE: Avantus LLC. 2024; Bing Maps 2022; Kern County 2022

DUDEK

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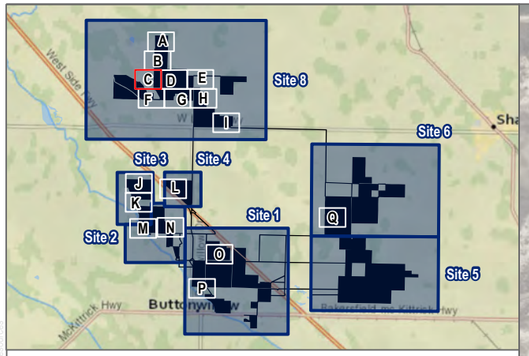
0 200 400 Feet

FIGURE 7B

Potential Jurisdictional Aquatic Resources

Buttonbush Solar Energy Project Aquatic Resources Delineation Report

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Project Sites
Review Area
Map Reference Point

Potential Aquatic Resources*

Non-Wetland Water (USACE/RWQCB/CDFW)**

Canal/ditch (6.6 acres)

* Acreage noted represents total acreage for the Review Area.
** Features are not anticipated to be USACE-jurisdictional via the AJD process.

Coordinate System: NAD 1983 StatePlane California V FIPS 0405 Feet
Projection: Lambert Conformal Conic
Datum: North American 1983
Vertical Datum: NAVD88
U.S. Feet

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SOURCE: Avantus LLC. 2024; Bing Maps 2022; Kern County 2022

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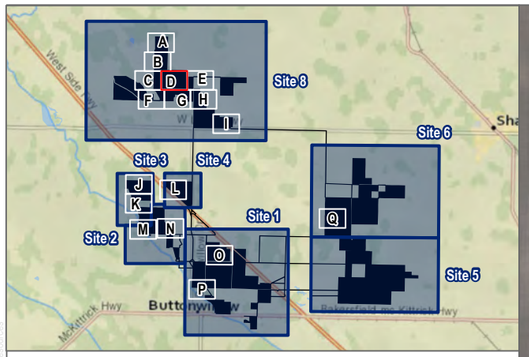
0 200 400 Feet

FIGURE 7C

Potential Jurisdictional Aquatic Resources

Buttonbush Solar Energy Project Aquatic Resources Delineation Report

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Project Sites
Review Area
Map Reference Point

Potential Aquatic Resources*

Non-Wetland Water (USACE/RWQCB/CDFW)**

Canal/ditch (6.6 acres)

* Acreage noted represents total acreage for the Review Area.
** Features are not anticipated to be USACE-jurisdictional via the AJD process.

Coordinate System: NAD 1983 StatePlane California V FIPS 0405 Feet
Projection: Lambert Conformal Conic
Datum: North American 1983
Vertical Datum: NAVD88
U.S. Feet

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605 Third Street, Encinitas, CA 92024



SOURCE: Avantus LLC. 2024; Bing Maps 2022; Kern County 2022

DUDEK

0 200 400 Feet

FIGURE 7D

Potential Jurisdictional Aquatic Resources

Buttonbush Solar Energy Project Aquatic Resources Delineation Report

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Project Sites
Review Area
Photo Point
Wetland Sampling Point
Map Reference Point

* Acreage noted represents total acreage for the Review Area.
** Features are not anticipated to be USACE-jurisdictional via the AJD process.

Coordinate System: NAD 1983 StatePlane California V FIPS 0405 Feet
Projection: Lambert Conformal Conic
Datum: North American 1983
Vertical Datum: NAVD88
U.S. Feet

Created on January 9, 2025

Made in accordance with the Updated Map and Drawing Standards for the South Pacific Division Regulatory Program, as amended on February 10, 2016, by:
Jason Greenstein, GIS Analyst, Dudek,
605 Third Street, Encinitas, CA 92024

SOURCE: Avantus LLC. 2024; Bing Maps 2022; Kern County 2022

DUDEK

0 200 400 Feet

FIGURE 7E

Potential Jurisdictional Aquatic Resources

Buttonbush Solar Energy Project Aquatic Resources Delineation Report

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Project Sites
Review Area
Map Reference Point

Potential Aquatic Resources*

Non-Wetland Water (USACE/RWQCB/CDFW)**

Canal/ditch (6.6 acres)

* Acreage noted represents total acreage for the Review Area.
** Features are not anticipated to be USACE-jurisdictional via the AJD process.

Coordinate System: NAD 1983 StatePlane California V FIPS 0405 Feet
Projection: Lambert Conformal Conic
Datum: North American 1983
Vertical Datum: NAVD88
U.S. Feet

Created on January 9, 2025

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605 Third Street, Encinitas, CA 92024

SOURCE: Avantus LLC. 2024; Bing Maps 2022; Kern County 2022

DUDEK

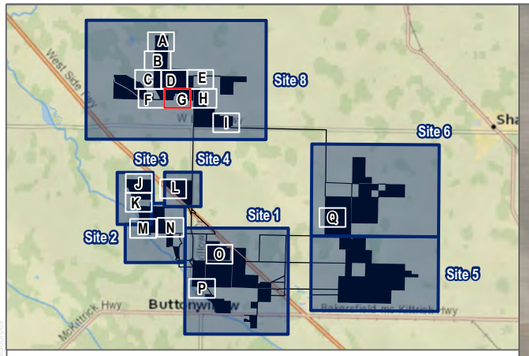
0 200 400 Feet

FIGURE 7F

Potential Jurisdictional Aquatic Resources

Buttonbush Solar Energy Project Aquatic Resources Delineation Report

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Project Sites
Review Area
Map Reference Point

Potential Aquatic Resources*

Non-Wetland Water (USACE/RWQCB/CDFW)**

Canal/ditch (6.6 acres)

* Acreage noted represents total acreage for the Review Area.
** Features are not anticipated to be USACE-jurisdictional via the AJD process.

Coordinate System: NAD 1983 StatePlane California V FIPS 0405 Feet
Projection: Lambert Conformal Conic
Datum: North American 1983
Vertical Datum: NAVD88
U.S. Feet

Created on January 9, 2025

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Jason Greenstein, GIS Analyst, Dudek,
605 Third Street, Encinitas, CA 92024



SOURCE: Avantus LLC. 2024; Bing Maps 2022; Kern County 2022

DUDEK

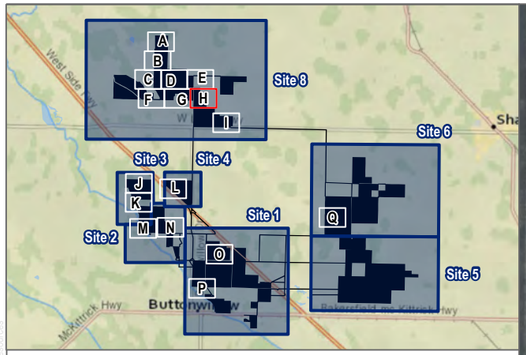
0 200 400 Feet

FIGURE 7G

Potential Jurisdictional Aquatic Resources

Buttonbush Solar Energy Project Aquatic Resources Delineation Report

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Project Sites
Review Area
Map Reference Point

Potential Aquatic Resources*

Non-Wetland Water (USACE/RWQCB/CDFW)**

Canal/ditch (6.6 acres)

* Acreage noted represents total acreage for the Review Area.
** Features are not anticipated to be USACE-jurisdictional via the AJD process.

Coordinate System: NAD 1983 StatePlane California V FIPS 0405 Feet
Projection: Lambert Conformal Conic
Datum: North American 1983
Vertical Datum: NAVD88
U.S. Feet

Created on January 9, 2025

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605 Third Street, Encinitas, CA 92024



SOURCE: Avantus LLC. 2024; Bing Maps 2022; Kern County 2022

DUDEK

N

0 200 400 Feet

FIGURE 7H

Potential Jurisdictional Aquatic Resources

Buttonbush Solar Energy Project Aquatic Resources Delineation Report

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Project Sites
Review Area
Photo Point
Wetland Sampling Point
OHWM Transect
Map Reference Point

Potential Aquatic Resources*
Non-Wetland Water (USACE/RWQCB/CDFW)**
Canal/ditch (6.6 acres)
Pond (6.1 acres)

* Acreage noted represents total acreage for the Review Area.
** Features are not anticipated to be USACE-jurisdictional via the AJD process.

Coordinate System: NAD 1983 StatePlane California V FIPS 0405 Feet
Projection: Lambert Conformal Conic
Datum: North American 1983
Vertical Datum: NAVD88
U.S. Feet

Created on January 9, 2025

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SOURCE: Avantus LLC. 2024; Bing Maps 2022; Kern County 2022

DUDEK

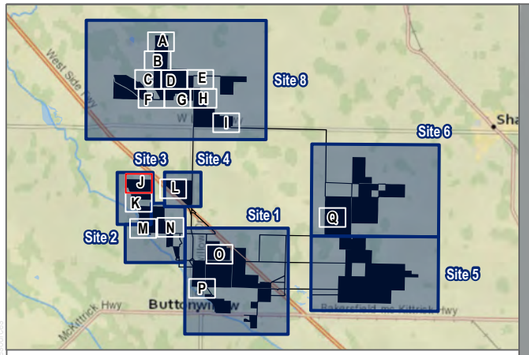
0 200 400 Feet

FIGURE 7I

Potential Jurisdictional Aquatic Resources

Buttonbush Solar Energy Project Aquatic Resources Delineation Report

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Project Sites
Review Area
Photo Point
Wetland Sampling Point
Map Reference Point

Potential Aquatic Resources*

Non-Wetland Water (USACE/RWQCB/CDFW)**

Pond (6.1 acres)

Wetland Waters (USACE/RWQCB/CDFW)**

Shrub-scrub wetland (91.3 acres)

* Acreage noted represents total acreage for the Review Area.
** Features are not anticipated to be USACE-jurisdictional via the AJD process.

Coordinate System: NAD 1983 StatePlane California V FIPS 0405 Feet
Projection: Lambert Conformal Conic
Datum: North American 1983
Vertical Datum: NAVD88
U.S. Feet

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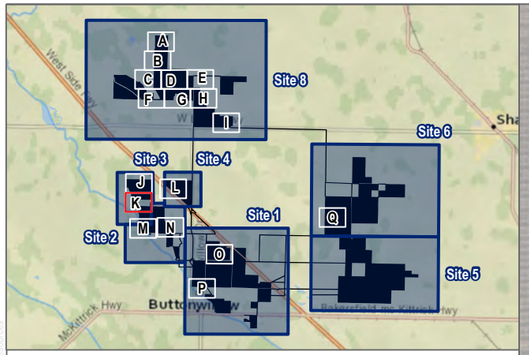
0 200 400 Feet

FIGURE 7J

Potential Jurisdictional Aquatic Resources

Buttonbush Solar Energy Project Aquatic Resources Delineation Report

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- Project Sites
- Review Area
- Photo Point
- Wetland Sampling Point
- OHWM Transect
- Map Reference Point

Potential Aquatic Resources*

Non-Wetland Water (USACE/RWQCB/CDFW)**

- Natural Channel (0.28 acres)
- Pond (6.1 acres)

Wetland Waters (USACE/RWQCB/CDFW)**

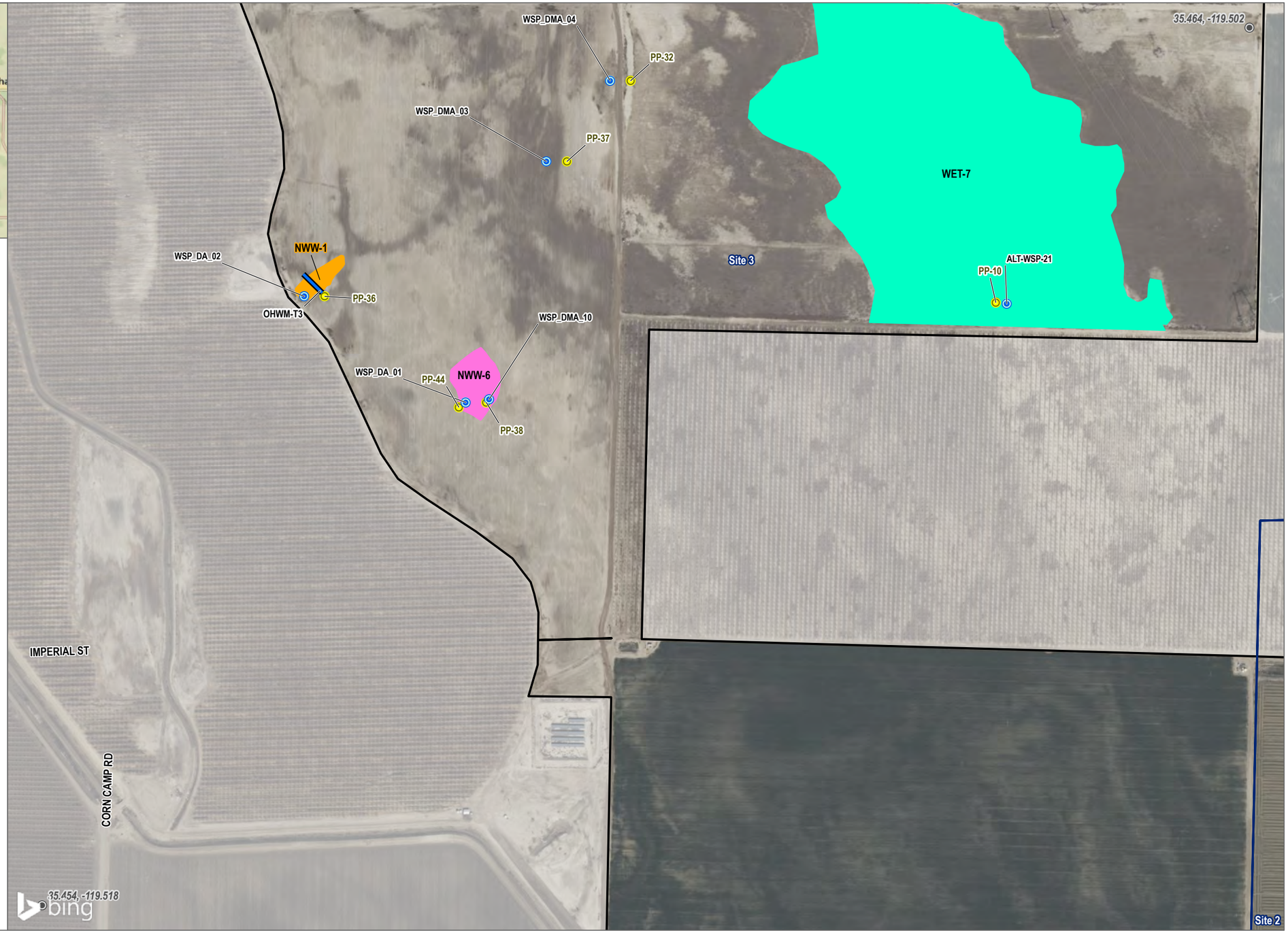
- Shrub-scrub wetland (91.3 acres)

* Acreage noted represents total acreage for the Review Area.
** Features are not anticipated to be USACE-jurisdictional via the AJD process.

Coordinate System: NAD 1983 StatePlane California V FIPS 0405 Feet
Projection: Lambert Conformal Conic
Datum: North American 1983
Vertical Datum: NAVD88
U.S. Feet

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605 Third Street, Encinitas, CA 92024



SOURCE: Avantus LLC. 2024; Bing Maps 2022; Kern County 2022

DUDEK

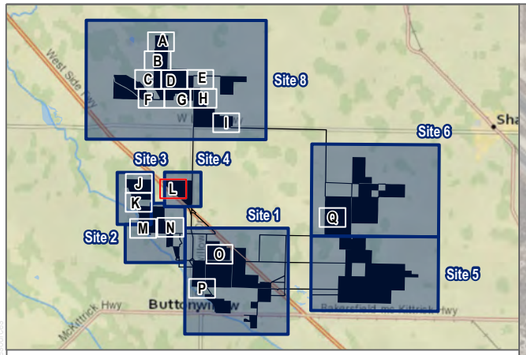
0 200 400 Feet

FIGURE 7K

Potential Jurisdictional Aquatic Resources

Buttonbush Solar Energy Project Aquatic Resources Delineation Report

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Project Sites
Review Area
Map Reference Point

Potential Aquatic Resources*

Non-Wetland Water (USACE/RWQCB/CDFW)**

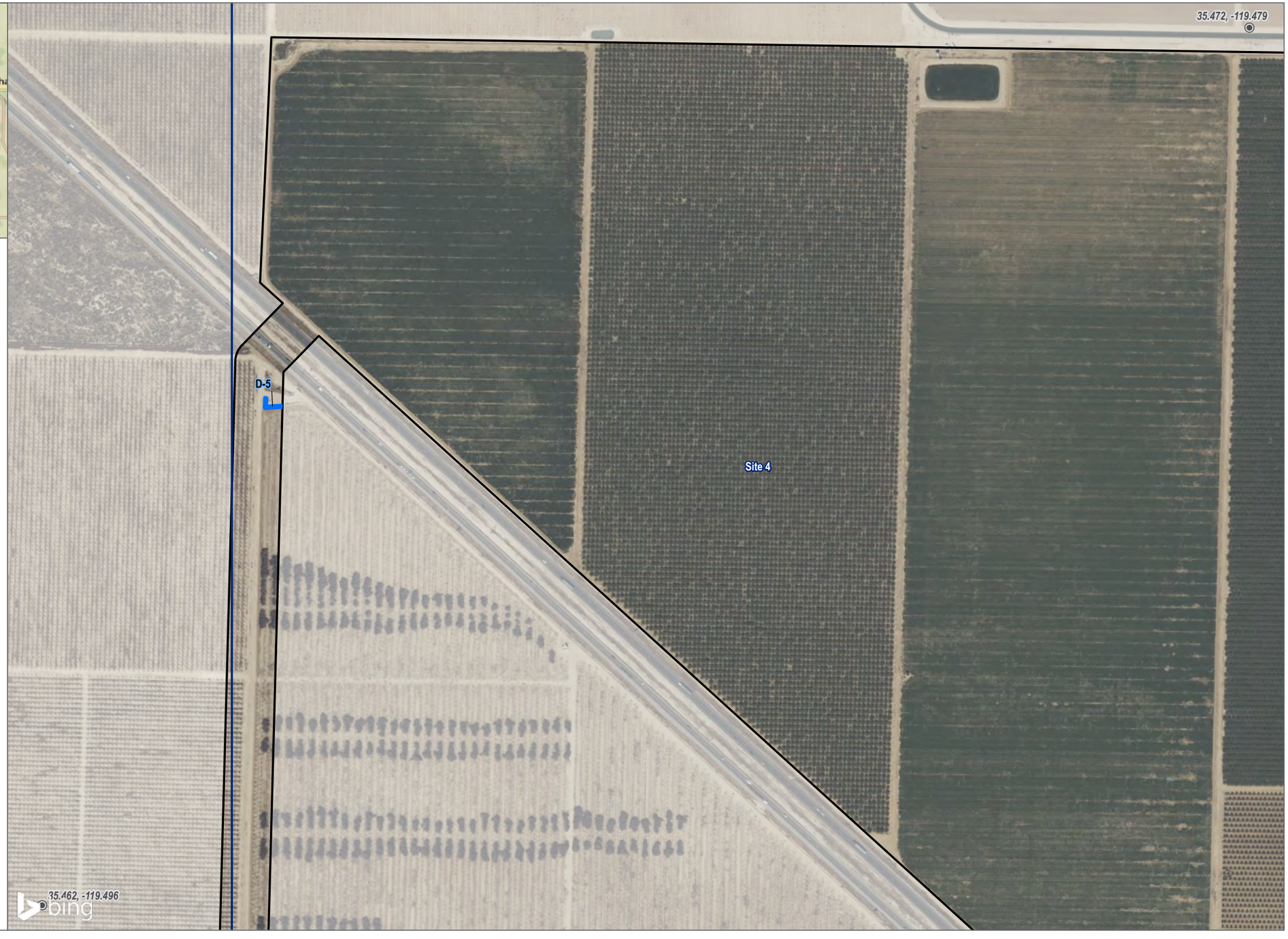
Canal/ditch (6.6 acres)

* Acreage noted represents total acreage for the Review Area.
** Features are not anticipated to be USACE-jurisdictional via the AJD process.

Coordinate System: NAD 1983 StatePlane California V FIPS 0405 Feet
Projection: Lambert Conformal Conic
Datum: North American 1983
Vertical Datum: NAVD88
U.S. Feet

Created on January 9, 2025

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SOURCE: Avantus LLC. 2024; Bing Maps 2022; Kern County 2022

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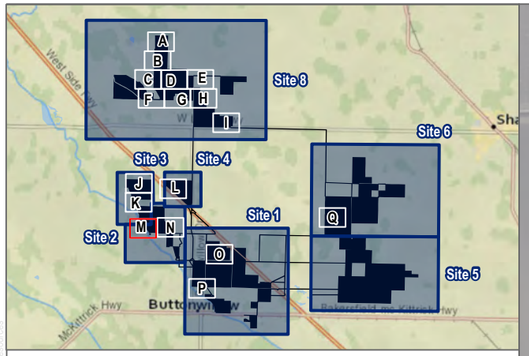
0 200 400 Feet

FIGURE 7L

Potential Jurisdictional Aquatic Resources

Buttonbush Solar Energy Project Aquatic Resources Delineation Report

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- Project Sites
- Review Area
- Photo Point
- Wetland Sampling Point
- OHWM Transect
- Map Reference Point

Potential Aquatic Resources*

Non-Wetland Water (USACE/RWQCB/CDFW)**

- Canal/ditch (6.6 acres)

* Acreage noted represents total acreage for the Review Area.
** Features are not anticipated to be USACE-jurisdictional via the AJD process.

Coordinate System: NAD 1983 StatePlane California V FIPS 0405 Feet
Projection: Lambert Conformal Conic
Datum: North American 1983
Vertical Datum: NAVD88
U.S. Feet

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DUDEK

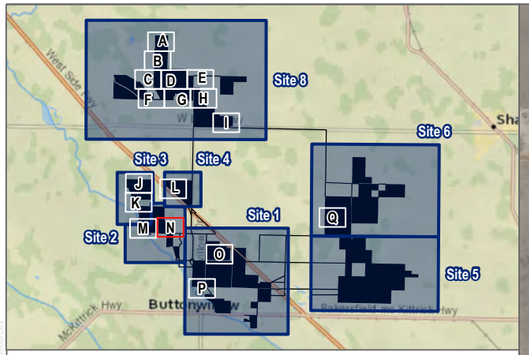
0 200 400 Feet

FIGURE 7M

Potential Jurisdictional Aquatic Resources

Buttonbush Solar Energy Project Aquatic Resources Delineation Report

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- Project Sites
- Review Area
- Photo Point
- Wetland Sampling Point
- Map Reference Point

* Acreage noted represents total acreage for the Review Area.
** Features are not anticipated to be USACE-jurisdictional via the AJD process.

Coordinate System: NAD 1983 StatePlane California V FIPS 0405 Feet
Projection: Lambert Conformal Conic
Datum: North American 1983
Vertical Datum: NAVD88
U.S. Feet

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SOURCE: Avantus LLC. 2024; Bing Maps 2022; Kern County 2022

DUDEK

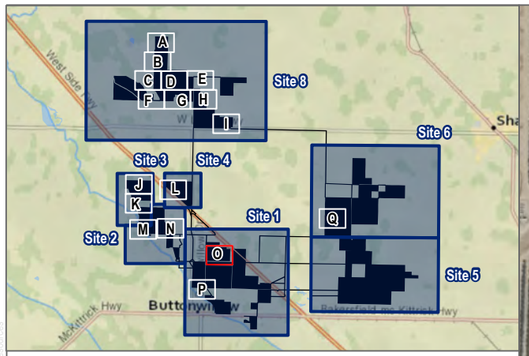
0 200 400 Feet

FIGURE 7N

Potential Jurisdictional Aquatic Resources

Buttonbush Solar Energy Project Aquatic Resources Delineation Report

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Project Sites
Review Area
Map Reference Point

Potential Aquatic Resources*

Non-Wetland Water (USACE/RWQCB/CDFW)**

Canal/ditch (6.6 acres)

* Acreage noted represents total acreage for the Review Area.
** Features are not anticipated to be USACE-jurisdictional via the AJD process.

Coordinate System: NAD 1983 StatePlane California V FIPS 0405 Feet
Projection: Lambert Conformal Conic
Datum: North American 1983
Vertical Datum: NAVD88
U.S. Feet

Created on January 9, 2025

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SOURCE: Avantus LLC. 2024; Bing Maps 2022; Kern County 2022

DUDEK

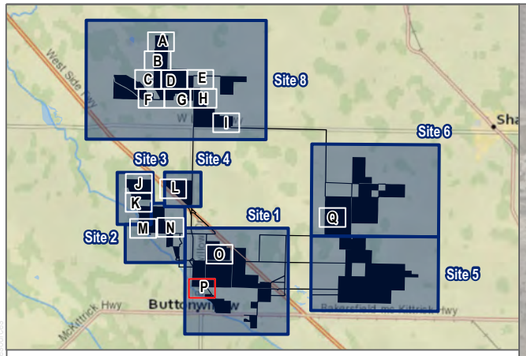
0 200 400 Feet

FIGURE 7O

Potential Jurisdictional Aquatic Resources

Buttonbush Solar Energy Project Aquatic Resources Delineation Report

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- Project Sites
- Review Area
- Photo Point
- Wetland Sampling Point
- OHWM Transect
- Map Reference Point

Potential Aquatic Resources*

Non-Wetland Water (USACE/RWQCB/CDFW)**

- Canal/ditch (6.6 acres)

* Acreage noted represents total acreage for the Review Area.
** Features are not anticipated to be USACE-jurisdictional via the AJD process.

Coordinate System: NAD 1983 StatePlane California V FIPS 0405 Feet
Projection: Lambert Conformal Conic
Datum: North American 1983
Vertical Datum: NAVD88
U.S. Feet

Created on January 9, 2025

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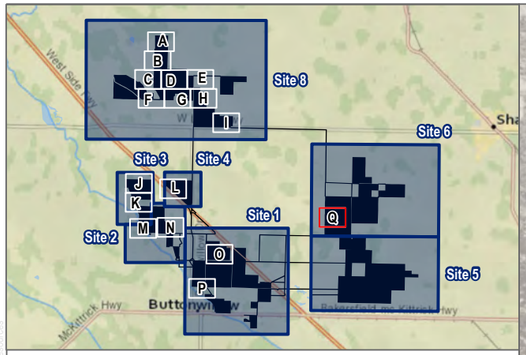
0 200 400 Feet

FIGURE 7P

Potential Jurisdictional Aquatic Resources

Buttonbush Solar Energy Project Aquatic Resources Delineation Report

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- Project Sites
- Review Area
- Photo Point
- Wetland Sampling Point
- Map Reference Point

* Acreage noted represents total acreage for the Review Area.
** Features are not anticipated to be USACE-jurisdictional via the AJD process.

Coordinate System: NAD 1983 StatePlane California V FIPS 0405 Feet
Projection: Lambert Conformal Conic
Datum: North American 1983
Vertical Datum: NAVD88
U.S. Feet

Created on January 9, 2025

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605 Third Street, Encinitas, CA 92024



SOURCE: Avantus LLC. 2024; Bing Maps 2022; Kern County 2022

DUDEK

0 200 400 Feet

FIGURE 7Q

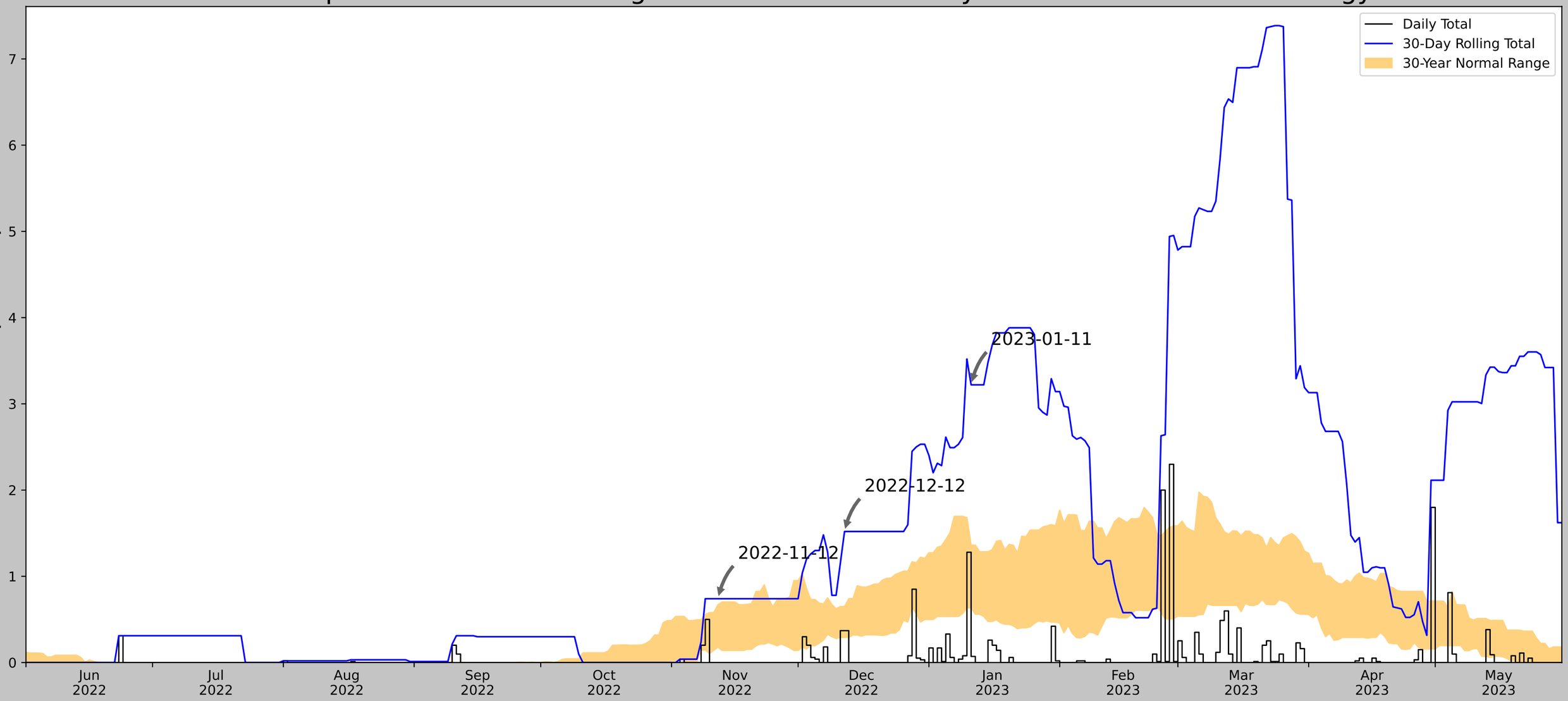
Potential Jurisdictional Aquatic Resources

Buttonbush Solar Energy Project Aquatic Resources Delineation Report

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Appendix A

Antecedent Precipitation Tool Output



Coordinates	35.508202, -119.478555
Observation Date	2023-01-11
Elevation (ft)	258.58
Drought Index (PDSI)	Severe wetness
WebWIMP H_2O Balance	Wet Season

30 Days Ending	30th %ile (in)	70th %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2023-01-11	0.63622	1.361024	3.220473	Wet	3	3	9
2022-12-12	0.290945	0.649606	1.519685	Wet	3	2	6
2022-11-12	0.17874	0.670472	0.740158	Wet	3	1	3
Result							Wetter than Normal - 18

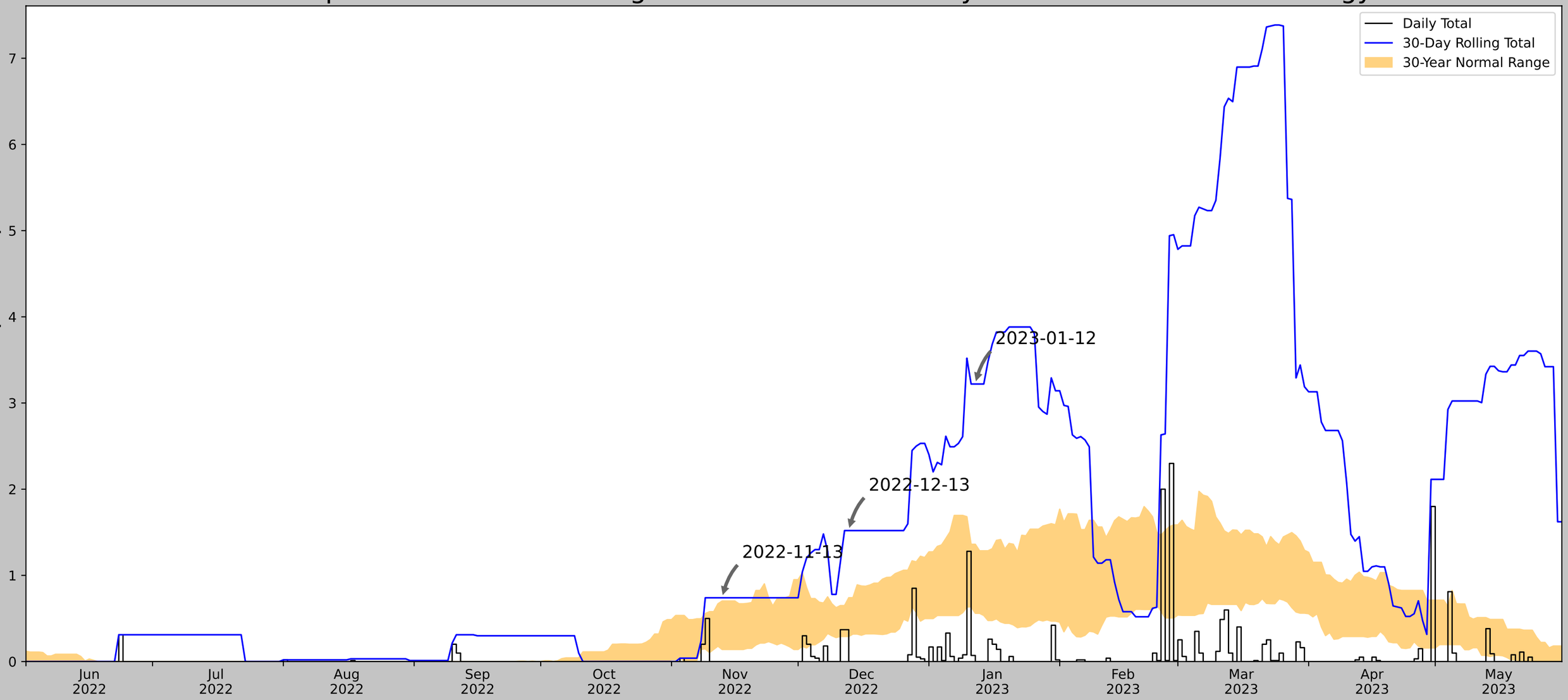
US Army Corps of Engineers

ERDC

Figures and tables made by the Antecedent Precipitation Tool Version 2.0

Developed by: U.S. Army Corps of Engineers and U.S. Army Engineer Research and Development Center

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
WASCO	35.5892, -119.3519	291.011	9.056	32.431	4.369	10250	74
WASCO 0.8 SSW	35.5832, -119.3483	325.131	0.461	34.12	0.223	537	16
DELANO	35.7683, -119.26	301.837	13.407	10.826	6.178	479	0
BUTTONWILLOW	35.4028, -119.47	225.066	14.492	65.945	7.477	82	0
SHAFTER 6E	35.4867, -119.1458	403.871	13.58	112.86	7.644	2	0
BAKERSFIELD 6.1 WSW	35.3311, -119.1078	370.079	22.511	79.068	11.91	3	0



Coordinates	35.508202, -119.478555
Observation Date	2023-01-12
Elevation (ft)	258.58
Drought Index (PDSI)	Severe wetness
WebWIMP H_2O Balance	Wet Season

30 Days Ending	30th %ile (in)	70th %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2023-01-12	0.559843	1.361024	3.220473	Wet	3	3	9
2022-12-13	0.290945	0.740945	1.519685	Wet	3	2	6
2022-11-13	0.140157	0.702756	0.740158	Wet	3	1	3
Result							Wetter than Normal - 18

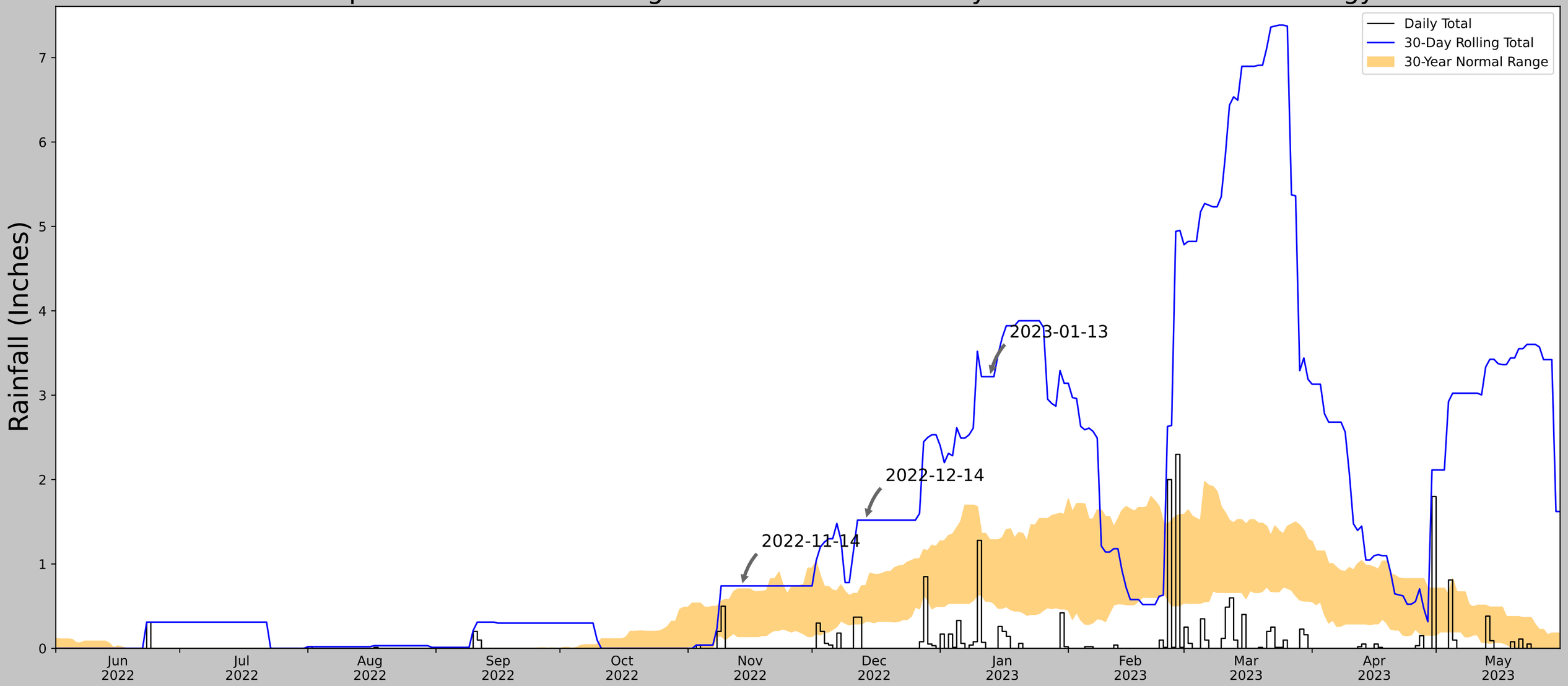
US Army Corps of Engineers

ERDC

Figures and tables made by the Antecedent Precipitation Tool Version 2.0

Developed by: U.S. Army Corps of Engineers and U.S. Army Engineer Research and Development Center

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
WASCO	35.5892, -119.3519	291.011	9.056	32.431	4.369	10250	74
WASCO 0.8 SSW	35.5832, -119.3483	325.131	0.461	34.12	0.223	537	16
DELANO	35.7683, -119.26	301.837	13.407	10.826	6.178	479	0
BUTTONWILLOW	35.4028, -119.47	225.066	14.492	65.945	7.477	82	0
SHAFTER 6E	35.4867, -119.1458	403.871	13.58	112.86	7.644	2	0
BAKERSFIELD 6.1 WSW	35.3311, -119.1078	370.079	22.511	79.068	11.91	3	0



Coordinates	35.508202, -119.478555
Observation Date	2023-01-13
Elevation (ft)	258.58
Drought Index (PDSI)	Severe wetness
WebWIMP H_2O Balance	Wet Season

30 Days Ending	30th %ile (in)	70th %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2023-01-13	0.559843	1.285433	3.220473	Wet	3	3	9
2022-12-14	0.318898	0.740945	1.519685	Wet	3	2	6
2022-11-14	0.140157	0.702756	0.740158	Wet	3	1	3
Result							Wetter than Normal - 18

US Army Corps of Engineers

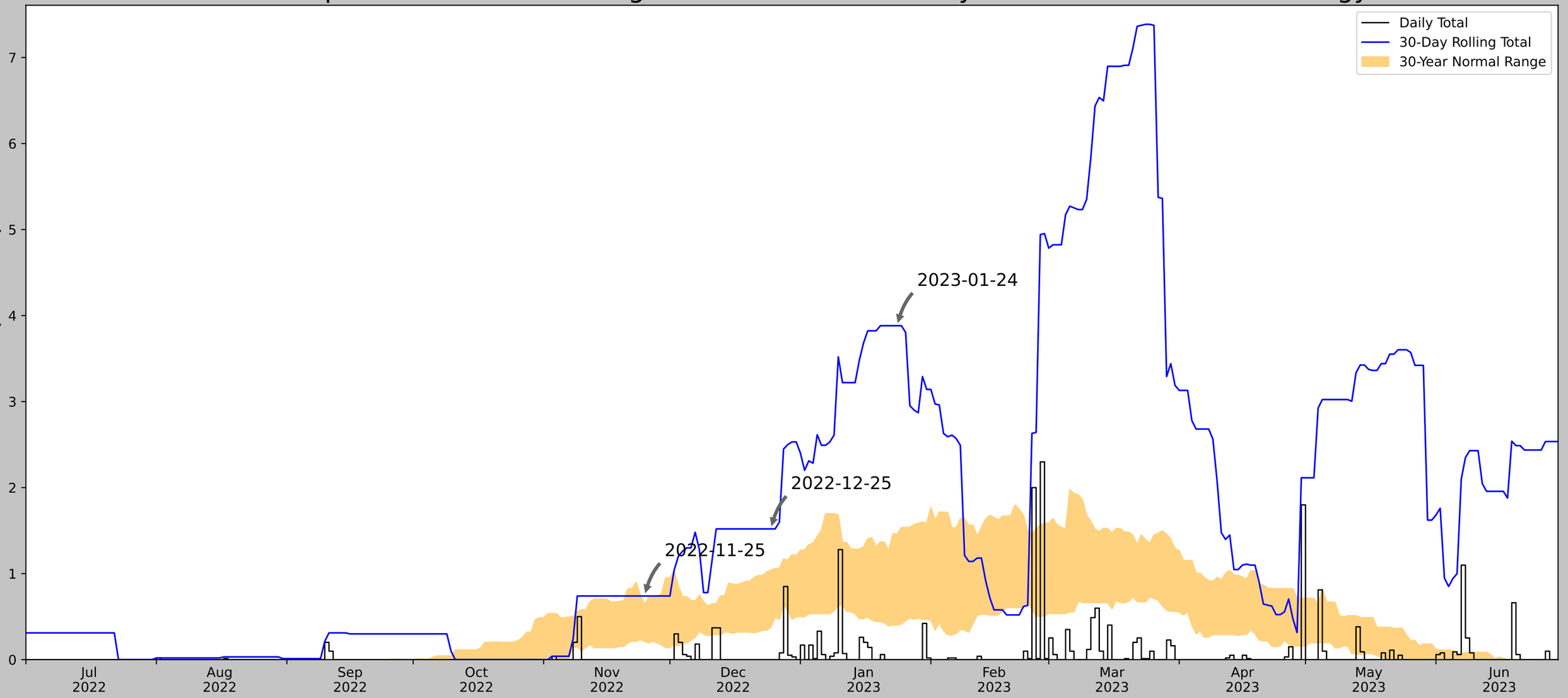
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Figures and tables made by the Antecedent Precipitation Tool Version 2.0

Developed by: U.S. Army Corps of Engineers and U.S. Army Engineer Research and Development Center

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
WASCO	35.5892, -119.3519	291.011	9.056	32.431	4.369	10250	75
WASCO 0.8 SSW	35.5832, -119.3483	325.131	0.461	34.12	0.223	537	15
DELANO	35.7683, -119.26	301.837	13.407	10.826	6.178	479	0
BUTTONWILLOW	35.4028, -119.47	225.066	14.492	65.945	7.477	82	0
SHAFTER 6E	35.4867, -119.1458	403.871	13.58	112.86	7.644	2	0
BAKERSFIELD 6.1 WSW	35.3311, -119.1078	370.079	22.511	79.068	11.91	3	0

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network



Coordinates	35.508202, -119.478555
Observation Date	2023-01-24
Elevation (ft)	258.58
Drought Index (PDSI)	Severe wetness
WebWIMP H_2O Balance	Wet Season

30 Days Ending	30th %ile (in)	70th %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2023-01-24	0.402362	1.459449	3.88189	Wet	3	3	9
2022-12-25	0.380709	1.039764	1.519685	Wet	3	2	6
2022-11-25	0.214567	0.645276	0.740158	Wet	3	1	3
Result							Wetter than Normal - 18

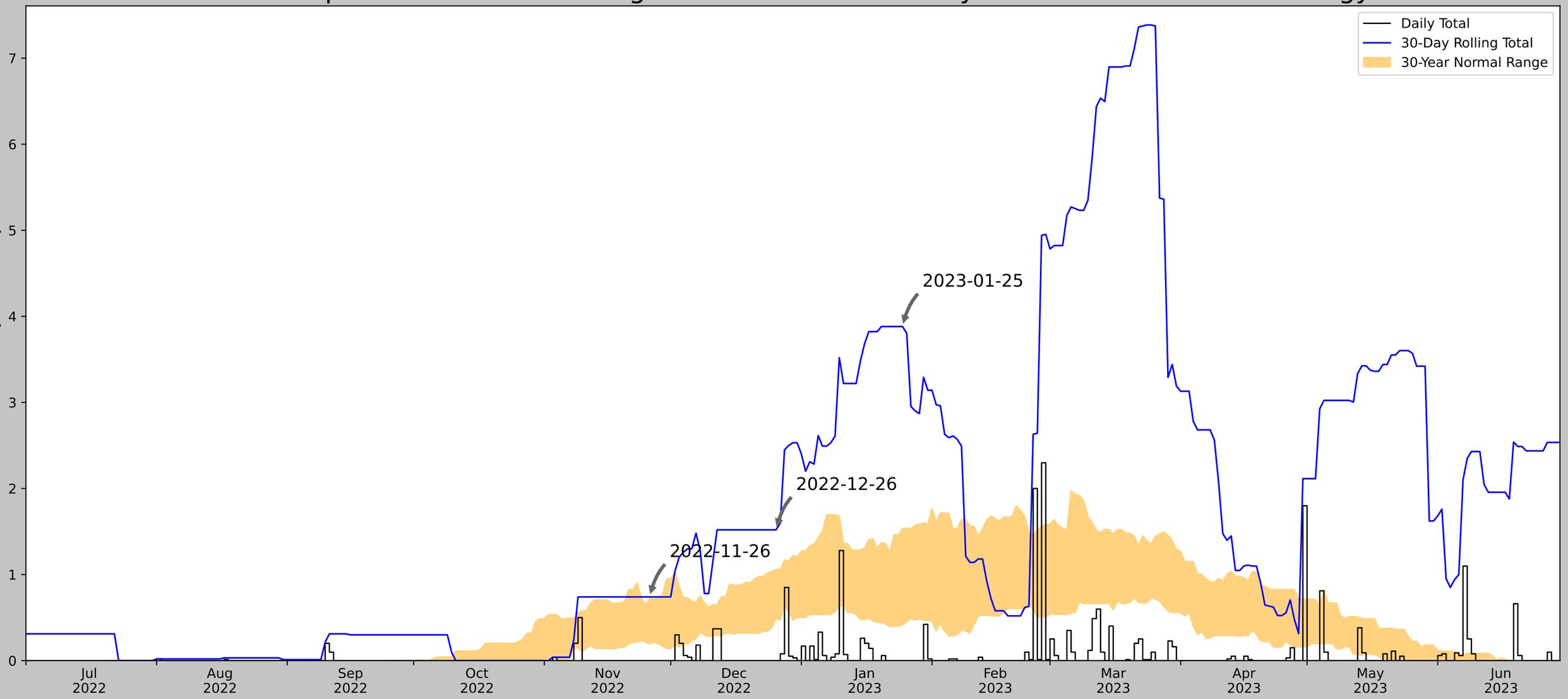
US Army Corps of Engineers

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Figures and tables made by the Antecedent Precipitation Tool Version 2.0

Developed by: U.S. Army Corps of Engineers and U.S. Army Engineer Research and Development Center

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
WASCO	35.5892, -119.3519	291.011	9.056	32.431	4.369	10250	75
WASCO 0.8 SSW	35.5832, -119.3483	325.131	0.461	34.12	0.223	537	15
DELANO	35.7683, -119.26	301.837	13.407	10.826	6.178	479	0
BUTTONWILLOW	35.4028, -119.47	225.066	14.492	65.945	7.477	82	0
SHAFTER 6E	35.4867, -119.1458	403.871	13.58	112.86	7.644	2	0
BAKERSFIELD 6.1 WSW	35.3311, -119.1078	370.079	22.511	79.068	11.91	3	0



Coordinates	35.508202, -119.478555
Observation Date	2023-01-25
Elevation (ft)	258.58
Drought Index (PDSI)	Severe wetness
WebWIMP H_2O Balance	Wet Season

30 Days Ending	30th %ile (in)	70th %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2023-01-25	0.414961	1.536221	3.88189	Wet	3	3	9
2022-12-26	0.491732	1.059843	1.519685	Wet	3	2	6
2022-11-26	0.194882	0.725984	0.740158	Wet	3	1	3
Result							Wetter than Normal - 18

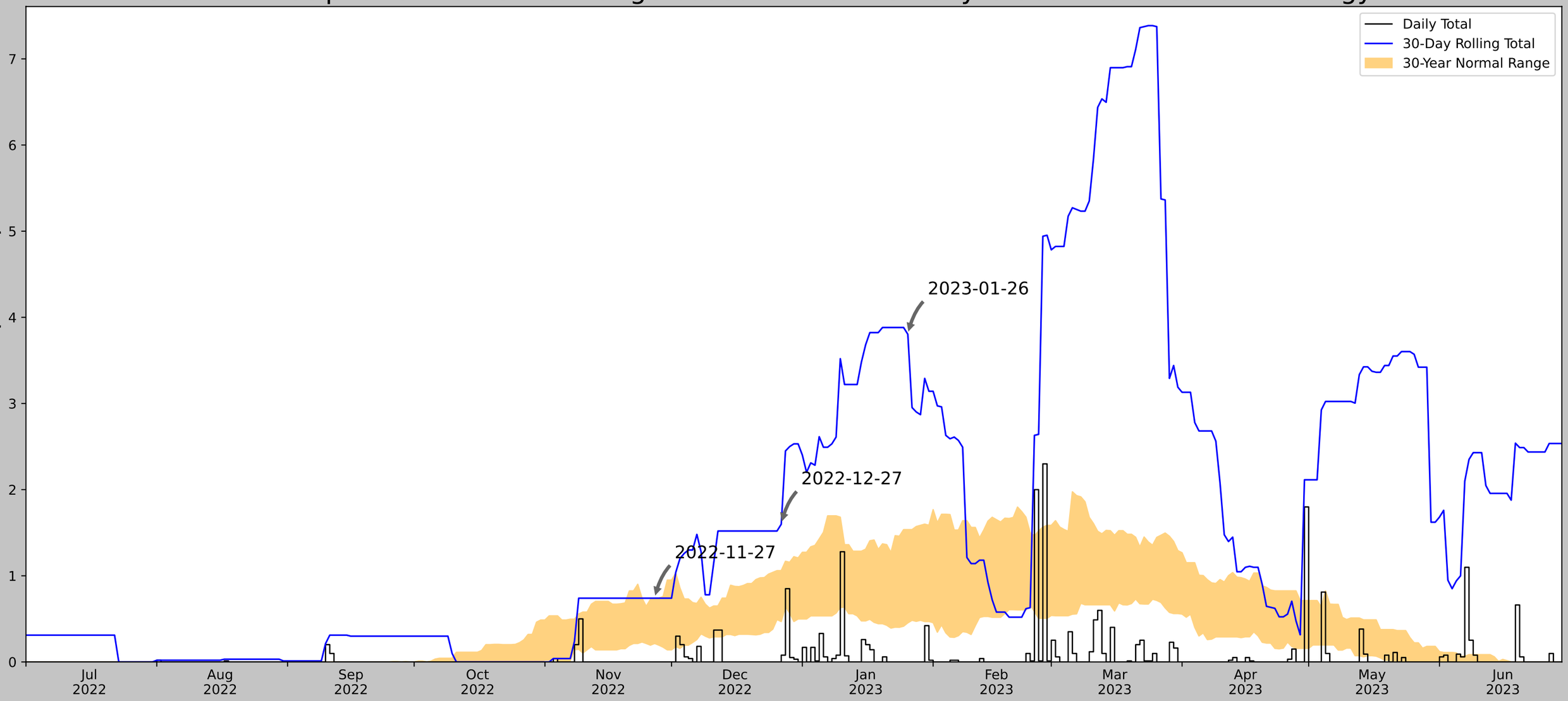
US Army Corps of Engineers

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Figures and tables made by the Antecedent Precipitation Tool Version 2.0

Developed by: U.S. Army Corps of Engineers and U.S. Army Engineer Research and Development Center

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
WASCO	35.5892, -119.3519	291.011	9.056	32.431	4.369	10250	75
WASCO 0.8 SSW	35.5832, -119.3483	325.131	0.461	34.12	0.223	537	15
DELANO	35.7683, -119.26	301.837	13.407	10.826	6.178	479	0
BUTTONWILLOW	35.4028, -119.47	225.066	14.492	65.945	7.477	82	0
SHAFTER 6E	35.4867, -119.1458	403.871	13.58	112.86	7.644	2	0
BAKERSFIELD 6.1 WSW	35.3311, -119.1078	370.079	22.511	79.068	11.91	3	0



Coordinates	35.508202, -119.478555
Observation Date	2023-01-26
Elevation (ft)	258.58
Drought Index (PDSI)	Severe wetness
WebWIMP H_2O Balance	Wet Season

30 Days Ending	30th %ile (in)	70th %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2023-01-26	0.453543	1.536221	3.80315	Wet	3	3	9
2022-12-27	0.468898	1.059843	1.598425	Wet	3	2	6
2022-11-27	0.214567	0.741339	0.740158	Normal	2	1	2
Result							Wetter than Normal - 17

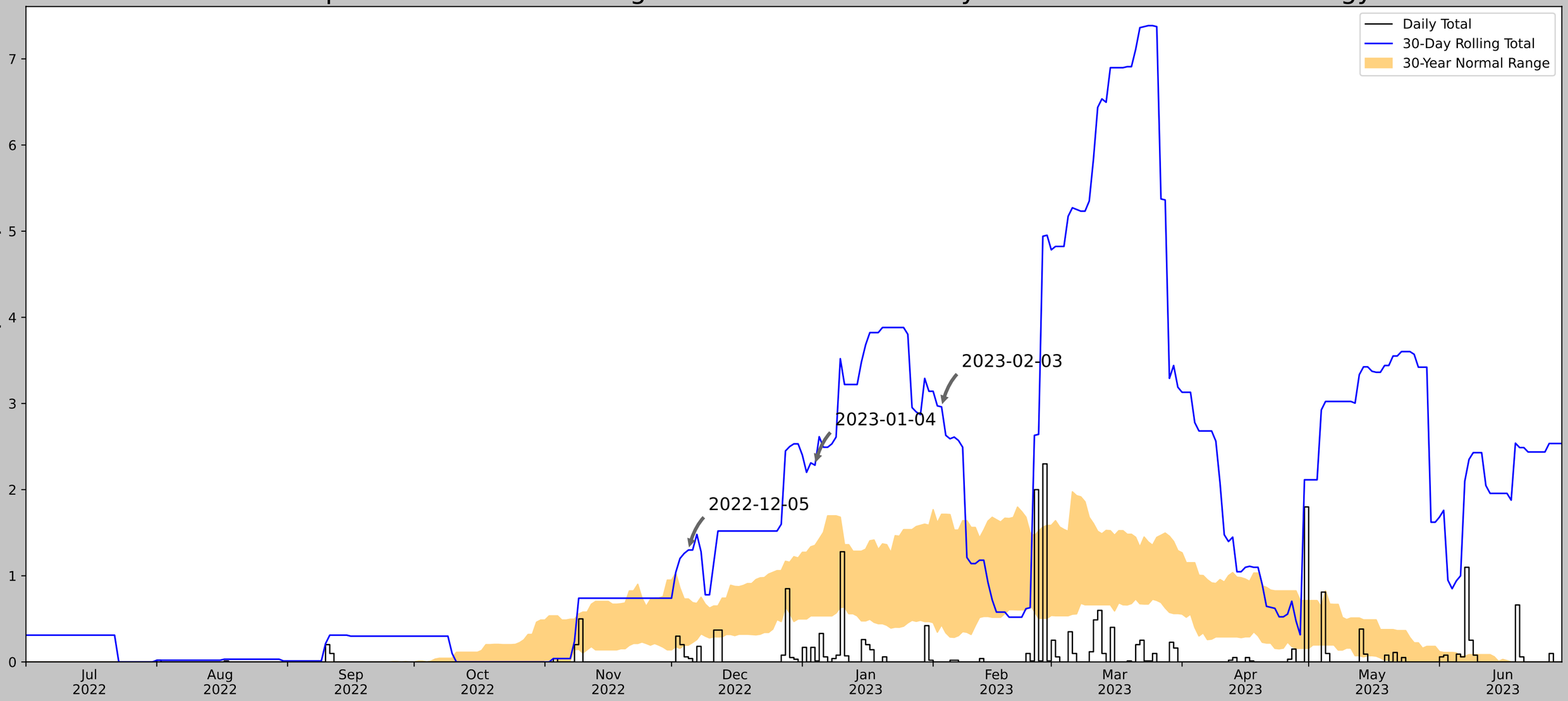
US Army Corps of Engineers

ERDC

Figures and tables made by the Antecedent Precipitation Tool Version 2.0

Developed by: U.S. Army Corps of Engineers and U.S. Army Engineer Research and Development Center

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
WASCO	35.5892, -119.3519	291.011	9.056	32.431	4.369	10250	75
WASCO 0.8 SSW	35.5832, -119.3483	325.131	0.461	34.12	0.223	537	15
DELANO	35.7683, -119.26	301.837	13.407	10.826	6.178	479	0
BUTTONWILLOW	35.4028, -119.47	225.066	14.492	65.945	7.477	82	0
SHAFTER 6E	35.4867, -119.1458	403.871	13.58	112.86	7.644	2	0
BAKERSFIELD 6.1 WSW	35.3311, -119.1078	370.079	22.511	79.068	11.91	3	0



Coordinates	35.508202, -119.478555
Observation Date	2023-02-03
Elevation (ft)	258.58
Drought Index (PDSI)	Severe wetness
WebWIMP H_2O Balance	Wet Season

30 Days Ending	30th %ile (in)	70th %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2023-02-03	0.429921	1.714173	2.96063	Wet	3	3	9
2023-01-04	0.534646	1.35315	2.283465	Wet	3	2	6
2022-12-05	0.194882	0.731102	1.299213	Wet	3	1	3
Result							Wetter than Normal - 18

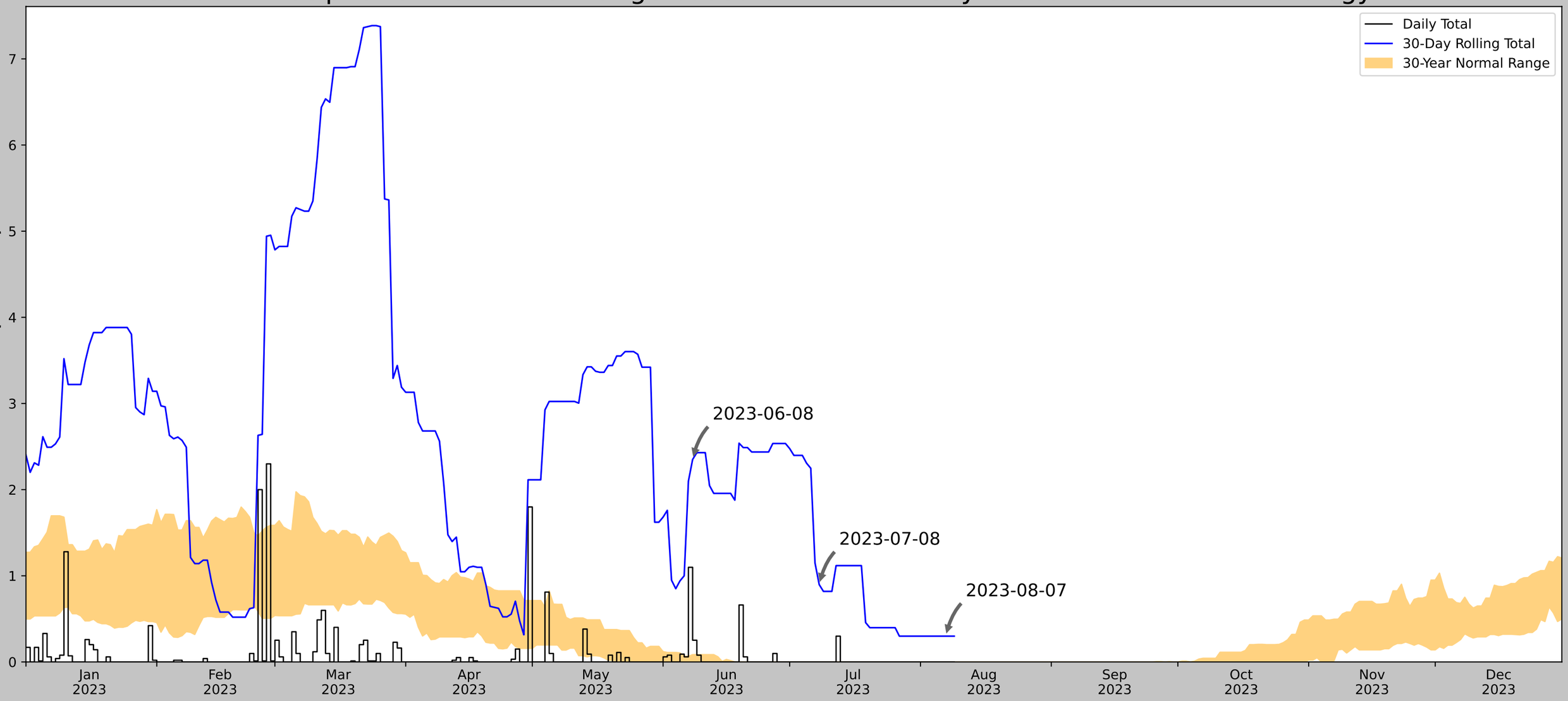
US Army Corps of Engineers

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Figures and tables made by the Antecedent Precipitation Tool Version 2.0

Developed by: U.S. Army Corps of Engineers and U.S. Army Engineer Research and Development Center

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
WASCO	35.5892, -119.3519	291.011	9.056	32.431	4.369	10250	71
WASCO 0.8 SSW	35.5832, -119.3483	325.131	0.461	34.12	0.223	537	19
DELANO	35.7683, -119.26	301.837	13.407	10.826	6.178	479	0
BUTTONWILLOW	35.4028, -119.47	225.066	14.492	65.945	7.477	82	0
SHAFTER 6E	35.4867, -119.1458	403.871	13.58	112.86	7.644	2	0
BAKERSFIELD 6.1 WSW	35.3311, -119.1078	370.079	22.511	79.068	11.91	3	0



Coordinates	35.508202, -119.478555
Observation Date	2023-08-07
Elevation (ft)	258.58
Drought Index (PDSI)	Moderate wetness (2023-07)
WebWIMP H_2O Balance	Dry Season

30 Days Ending	30th %ile (in)	70th %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2023-08-07	0.0	0.0	0.299213	Wet	3	3	9
2023-07-08	0.0	0.0	0.897638	Wet	3	2	6
2023-06-08	0.0	0.084646	2.350394	Wet	3	1	3
Result							Wetter than Normal - 18

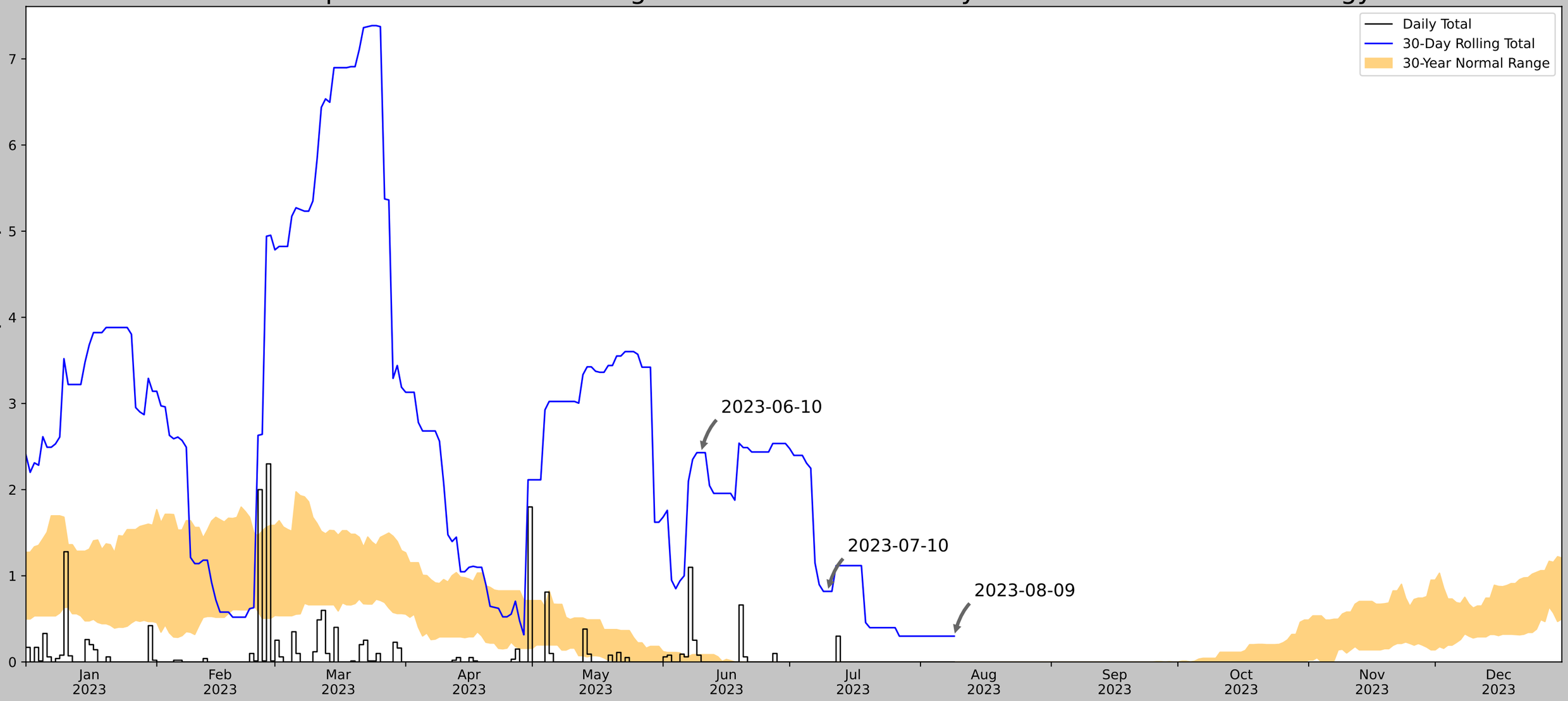
US Army Corps of Engineers

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Figures and tables made by the Antecedent Precipitation Tool Version 2.0

Developed by: U.S. Army Corps of Engineers and U.S. Army Engineer Research and Development Center

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
WASCO	35.5892, -119.3519	291.011	9.056	32.431	4.369	10250	84
WASCO 0.8 SSW	35.5832, -119.3483	325.131	0.461	34.12	0.223	537	6
DELANO	35.7683, -119.26	301.837	13.407	10.826	6.178	479	0
BUTTONWILLOW	35.4028, -119.47	225.066	14.492	65.945	7.477	82	0
SHAFTER 6E	35.4867, -119.1458	403.871	13.58	112.86	7.644	2	0
BAKERSFIELD 6.1 WSW	35.3311, -119.1078	370.079	22.511	79.068	11.91	3	0



Coordinates	35.508202, -119.478555
Observation Date	2023-08-09
Elevation (ft)	258.58
Drought Index (PDSI)	Moderate wetness (2023-07)
WebWIMP H_2O Balance	Dry Season

30 Days Ending	30th %ile (in)	70th %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2023-08-09	0.0	0.0	0.299213	Wet	3	3	9
2023-07-10	0.0	0.0	0.818898	Wet	3	2	6
2023-06-10	0.0	0.084646	2.429134	Wet	3	1	3
Result							Wetter than Normal - 18

US Army Corps of Engineers

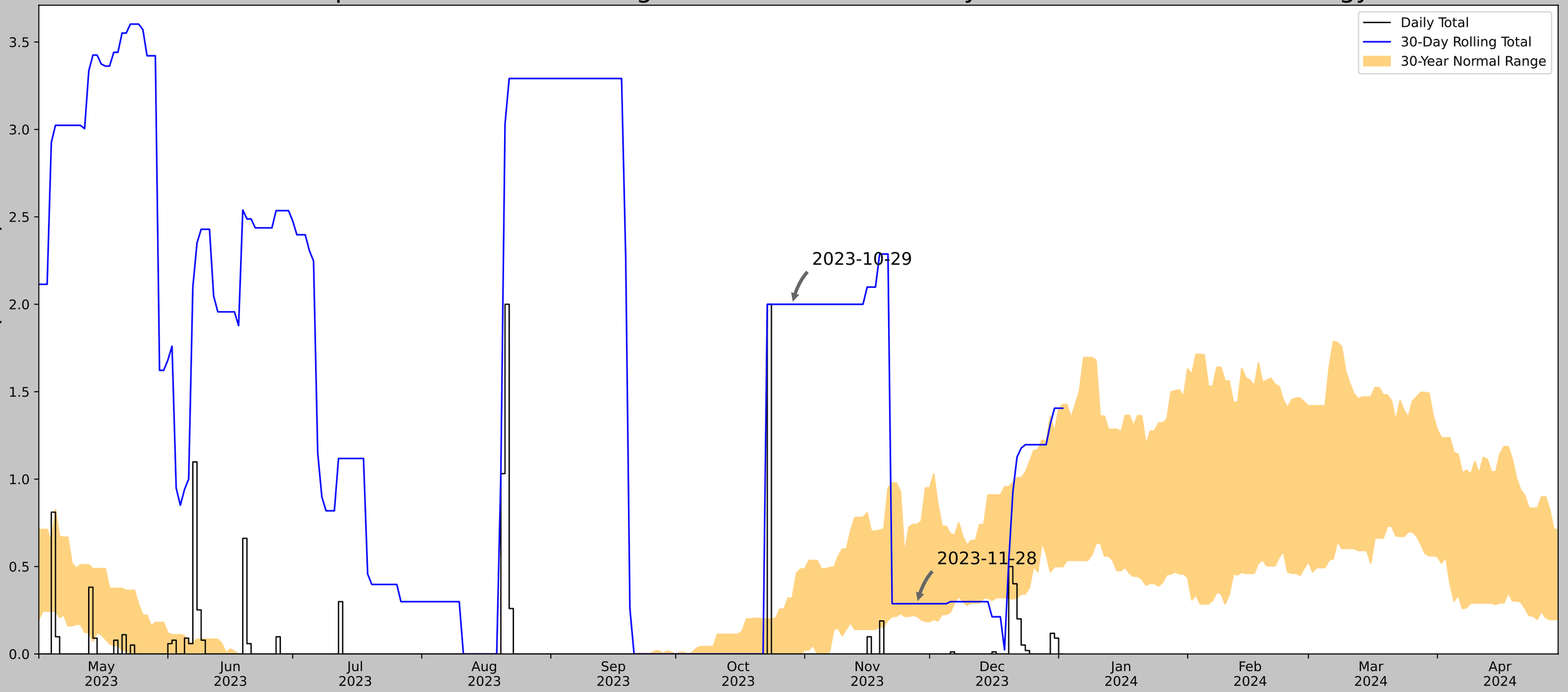
ERDC

Figures and tables made by the Antecedent Precipitation Tool Version 2.0

Developed by: U.S. Army Corps of Engineers and U.S. Army Engineer Research and Development Center

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
WASCO	35.5892, -119.3519	291.011	9.056	32.431	4.369	10250	84
WASCO 0.8 SSW	35.5832, -119.3483	325.131	0.461	34.12	0.223	537	6
DELANO	35.7683, -119.26	301.837	13.407	10.826	6.178	479	0
BUTTONWILLOW	35.4028, -119.47	225.066	14.492	65.945	7.477	82	0
SHAFTER 6E	35.4867, -119.1458	403.871	13.58	112.86	7.644	2	0
BAKERSFIELD 6.1 WSW	35.3311, -119.1078	370.079	22.511	79.068	11.91	3	0

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network



Coordinates	35.458078, -119.443869
Observation Date	2023-11-28
Elevation (ft)	268.198
Drought Index (PDSI)	Incipient wetness
WebWIMP H_2O Balance	Dry Season

30 Days Ending	30th %ile (in)	70th %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2023-11-28	0.214567	0.741339	0.287402	Normal	2	3	6
2023-10-29	0.0	0.319685	2.0	Wet	3	2	6
2023-09-29	0.0	0.017717	0.0	Normal	2	1	2
Result							Normal Conditions - 14

US Army Corps of Engineers

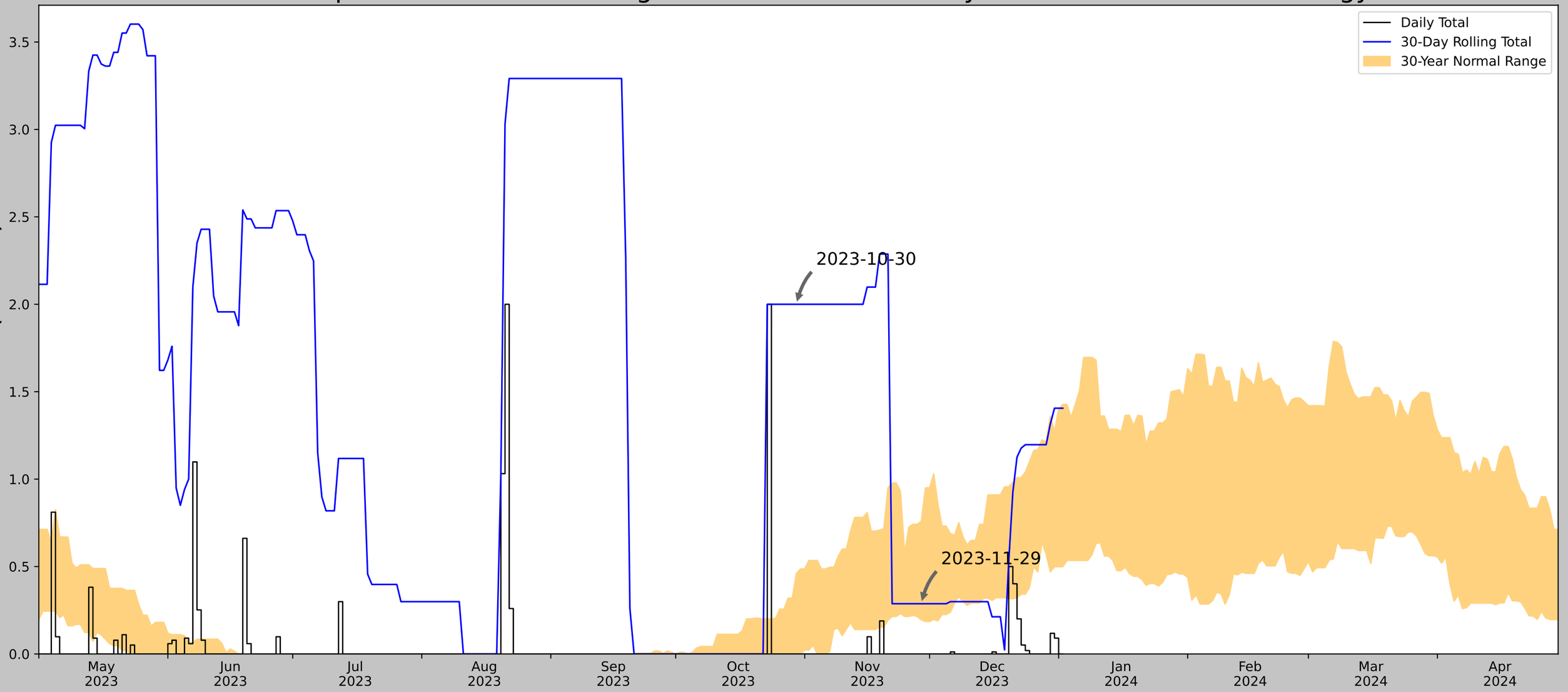
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Figures and tables made by the Antecedent Precipitation Tool Version 2.0

Developed by: U.S. Army Corps of Engineers and U.S. Army Engineer Research and Development Center

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
WASCO	35.5892, -119.3519	291.011	10.432	22.813	4.932	10186	90
WASCO 0.8 SSW	35.5832, -119.3483	325.131	0.461	34.12	0.223	601	0
DELANO	35.7683, -119.26	301.837	13.407	10.826	6.178	479	0
BUTTONWILLOW	35.4028, -119.47	225.066	14.492	65.945	7.477	81	0
SHAFTER 6E	35.4867, -119.1458	403.871	13.58	112.86	7.644	2	0
BAKERSFIELD 6.1 WSW	35.3311, -119.1078	370.079	22.511	79.068	11.91	3	0

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network



Coordinates	35.458078, -119.443869
Observation Date	2023-11-29
Elevation (ft)	268.198
Drought Index (PDSI)	Incipient wetness
WebWIMP H_2O Balance	Dry Season

30 Days Ending	30th %ile (in)	70th %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2023-11-29	0.194882	0.759055	0.287402	Normal	2	3	6
2023-10-30	0.0	0.461417	2.0	Wet	3	2	6
2023-09-30	0.0	0.009449	0.0	Normal	2	1	2
Result							Normal Conditions - 14

US Army Corps of Engineers

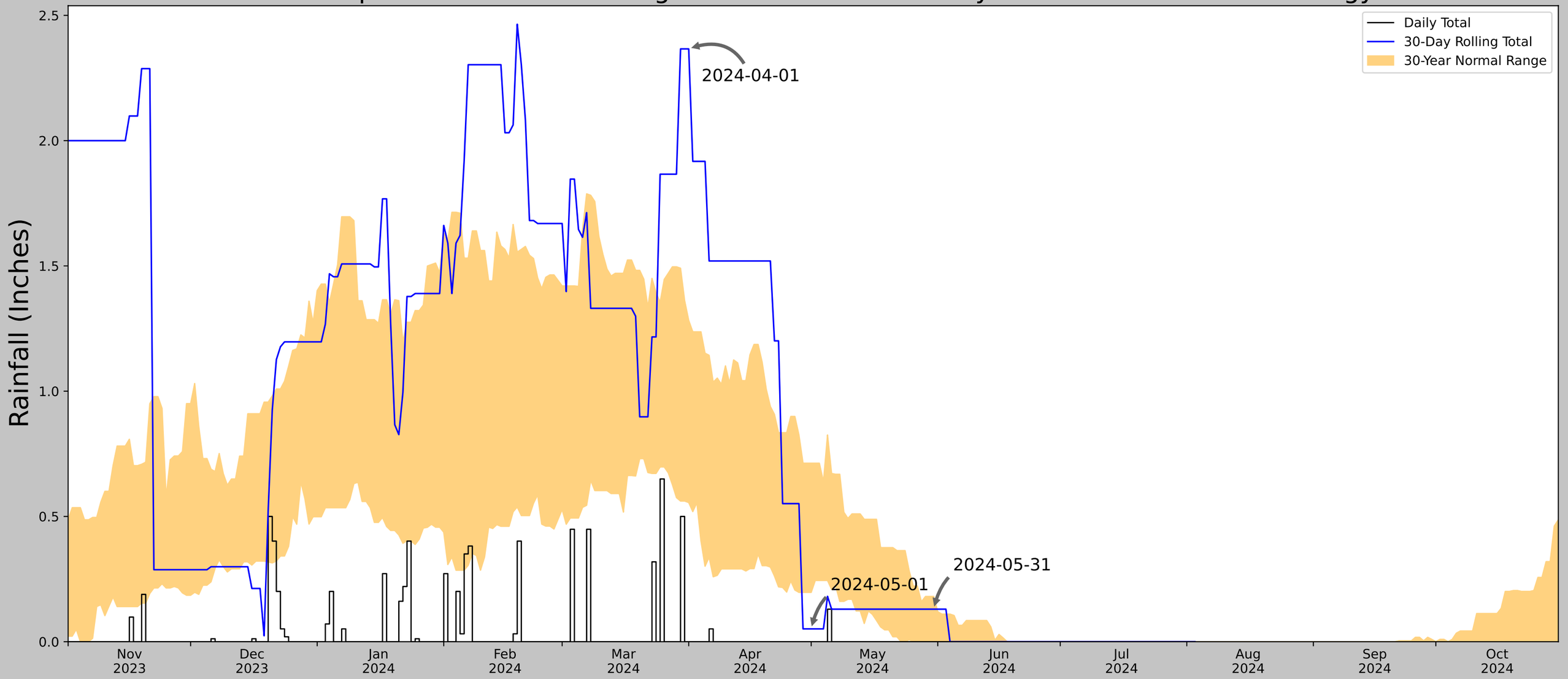
ERDC

Figures and tables made by the Antecedent Precipitation Tool Version 2.0

Developed by: U.S. Army Corps of Engineers and U.S. Army Engineer Research and Development Center

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
WASCO	35.5892, -119.3519	291.011	10.432	22.813	4.932	10186	90
WASCO 0.8 SSW	35.5832, -119.3483	325.131	0.461	34.12	0.223	601	0
DELANO	35.7683, -119.26	301.837	13.407	10.826	6.178	479	0
BUTTONWILLOW	35.4028, -119.47	225.066	14.492	65.945	7.477	81	0
SHAFTER 6E	35.4867, -119.1458	403.871	13.58	112.86	7.644	2	0
BAKERSFIELD 6.1 WSW	35.3311, -119.1078	370.079	22.511	79.068	11.91	3	0

Antecedent Precipitation vs Normal Range based on NOAA's Daily Global Historical Climatology Network



Coordinates	35.4083216745797 9, -119.4612620776151
Observation Date	2024-05-31
Elevation (ft)	271.32
Drought Index (PDSI)	Incipient drought
WebWIMP H_2O Balance	Dry Season

30 Days Ending	30th %ile (in)	70th %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2024-05-31	0.0	0.180709	0.129921	Normal	2	3	6
2024-05-01	0.19685	0.712598	0.051181	Dry	1	2	2
2024-04-01	0.555512	1.282677	2.366142	Wet	3	1	3
Result							Normal Conditions - 11

US Army Corps of Engineers

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Figures and tables made by the Antecedent Precipitation Tool Version 2.0

Developed by: U.S. Army Corps of Engineers and U.S. Army Engineer Research and Development Center

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
WASCO	35.5892, -119.3519	291.011	13.93	19.691	6.543	10186	80
WASCO 0.8 SSW	35.5832, -119.3483	325.131	0.461	34.12	0.223	601	10
DELANO	35.7683, -119.26	301.837	13.407	10.826	6.178	479	0
BUTTONWILLOW	35.4028, -119.47	225.066	14.492	65.945	7.477	81	0
SHAFTER 6E	35.4867, -119.1458	403.871	13.58	112.86	7.644	2	0
BAKERSFIELD 6.1 WSW	35.3311, -119.1078	370.079	22.511	79.068	11.91	3	0

Appendix B
Data Forms

Arid West Ephemeral and Intermittent Streams OHWM Datasheet

Project: Buttonbush Solar Energy Project
Project Number: N/A (Dudek Project No. 14787.02)
Stream: N/A (Ditch-20)
Investigator(s): C. Amoaku

Date: 1/25/23 **Time:** 1118
Town: Kern County **State:** CA
Photo begin file#: 2 **Photo end file#:** 2

Y ☑ / N ☐ Do normal circumstances exist on the site?

Y ☑ / N ☐ Is the site significantly disturbed?

Location Details:
Buttonbush Solar Energy Project ARDR (Dudek 2025)

Projection: NAD 83 **Datum:** WGS 84
Coordinates: 35.531944, -119.496666

Potential anthropogenic influences on the channel system:
The review area has been extensively disturbed over the years by anthropogenic influences, chiefly past/present agricultural activities. The feature assessed is part of an array of irrigation ditches onsite used for conveying water to orchards & agricultural fields, as well as human-made basins draining the orchards and fields.

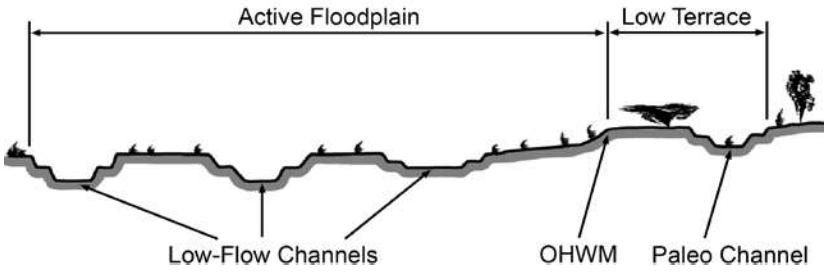
Brief site description:
The review area is approx.13,000 acres, spanning privately owned agricultural, developed, and undeveloped land northwest of Bakersfield between Buttonwillow and Lost Hills.

Checklist of resources (if available):

- ☑ Aerial photography
  Dates:
- ☑ Topographic maps
- ☐ Geologic maps
- ☑ Vegetation maps
- ☑ Soils maps
- ☑ Rainfall/precipitation maps
- ☐ Existing delineation(s) for site
- ☑ Global positioning system (GPS)
- ☐ Other studies

- ☐ Stream gage data
  Gage number:
  Period of record:
- ☐ History of recent effective discharges
- ☐ Results of flood frequency analysis
- ☐ Most recent shift-adjusted rating
- ☐ Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event

Hydrogeomorphic Floodplain Units

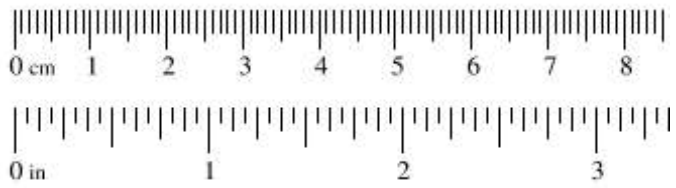


Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:

1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site.
2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units.
3. Determine a point on the cross section that is characteristic of one of the hydrogeomorphic floodplain units.
   a) Record the floodplain unit and GPS position.
   b) Describe the sediment texture (using the Wentworth class size) and the vegetation characteristics of the floodplain unit.
   c) Identify any indicators present at the location.
4. Repeat for other points in different hydrogeomorphic floodplain units across the cross section.
5. Identify the OHWM and record the indicators. Record the OHWM position via:
   - ☐ Mapping on aerial photograph
   - ☐ Digitized on computer
   - ☑ GPS
   - ☐ Other:

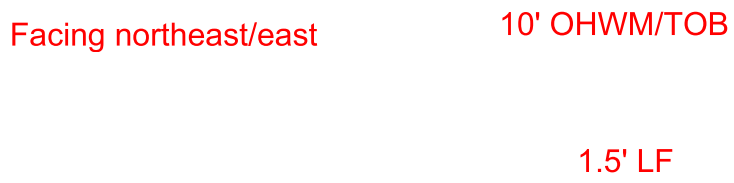
Wentworth Size Classes

Inches (in)	Millimeters (mm)	Wentworth size class	
10.08	256	Boulder	
		Cobble	Gravel
2.56	64		
0.157	4	Pebble	
		Granule	
0.079	2.00		
0.039	1.00	Very coarse sand	
0.020	0.50	Coarse sand	
0.0098 (1/2)	0.25	Medium sand	Sand
0.005 (1/4)	0.125	Fine sand	
0.0025 (1/8)	0.0625	Very fine sand	
0.0012 (1/16)	0.031	Coarse silt	
0.00061 (1/32)	0.0156	Medium silt	Silt
0.00031 (1/64)	0.0078	Fine silt	
0.00015 (1/128)	0.0039	Very fine silt	
		Clay	Mud



Project ID: Buttonbush Solar Energy Project **Cross section ID:** OHWM-T1 **Date:** 1/25/23 **Time:** 1118

Cross section drawing:



OHWM

GPS point: 35.531944, -119.496666

Indicators:

- ☐ Change in average sediment texture
- ☐ Change in vegetation species
- ☐ Change in vegetation cover
- ☐ Break in bank slope
- ☑ Other: Artificial break in bank slope
- ☐ Other: _____

Comments:

Feature is a ditch that only displayed an artificial/constructed break in bank slope; however, did not exhibit any other OHWM indicators (i.e., did not display an observable bed and bank, change in average sediment texture, vegetation species or cover). The ditch was created in upland areas as a result of agricultural practices in the area.

Floodplain unit: ☑ Low-Flow Channel ☐ Active Floodplain ☐ Low Terrace

GPS point: Within AF/OHWM

Characteristics of the floodplain unit:

Average sediment texture: N/A - Standing water

Total veg cover: 0 % Tree: 0 % Shrub: 0 % Herb: 0 %

Community successional stage:

- ☑ NA
- ☐ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☑ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☐ Surface relief
- ☑ Other: Standing water
- ☐ Other: _____
- ☐ Other: _____

Comments:

LF channel defined by standing water and some drift and debris present as accumulated sediment.

Project ID: IE North Logistics Center **Cross section ID:** T-01 **Date:** 1/25/23 **Time:** 1118

Floodplain unit: ☐ Low-Flow Channel ☑ Active Floodplain ☐ Low Terrace

GPS point: At OHWM

Characteristics of the floodplain unit:

Average sediment texture: Clay loam

Total veg cover: 0 % Tree: 0 % Shrub: 0 % Herb: 0 %

Community successional stage:

- ☑ NA
- ☐ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☐ Surface relief
- ☑ Other: Artificial break in bank slope
- ☐ Other: _____
- ☐ Other: _____

Comments:

Approx. 10' OHWM only defined by artificial/constructed break in bank slope

Floodplain unit: ☐ Low-Flow Channel ☐ Active Floodplain ☑ Low Terrace

GPS point: Above AF - Upland Habitat

Characteristics of the floodplain unit:

Average sediment texture: Clay loam

Total veg cover: 0 % Tree: 0 % Shrub: 0 % Herb: 0 %

Community successional stage:

- ☑ NA
- ☐ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☑ Surface relief
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

Comments:

Abrupt shift to uplands from artificially constructed banks. Feature located between a road and adjacent agricultural fields.

Arid West Ephemeral and Intermittent Streams OHWM Datasheet

Project: Buttonbush Solar Energy Project
Project Number: N/A (Dudek Project No. 14787.02)
Stream: NWW-5
Investigator(s): C. Amoaku

Date: 1/24/23 **Time:** 0910
Town: Kern County **State:** CA
Photo begin file#: 6 **Photo end file#:** 7

Y ☑ / N ☐ Do normal circumstances exist on the site?

Y ☑ / N ☐ Is the site significantly disturbed?

Location Details:
Buttonbush Solar Energy Project ARDR (Dudek 2025)

Projection: NAD 83 **Datum:** WGS 84
Coordinates: 35.501343, -119.449549

Potential anthropogenic influences on the channel system:
The review area has been extensively disturbed over the years by anthropogenic influences, chiefly past/present agricultural activities. The feature assessed is located between orchards & agricultural fields.

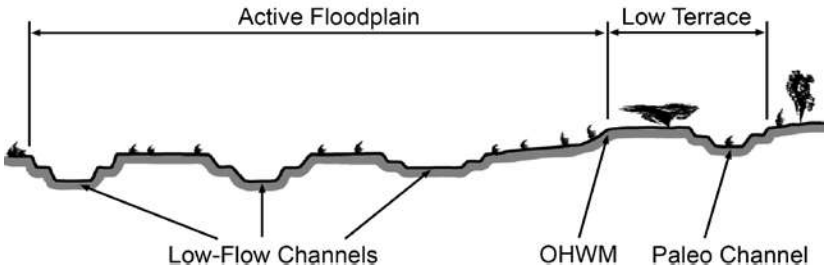
Brief site description:
The review area is approx.13,000 acres, spanning privately owned agricultural, developed, and undeveloped land northwest of Bakersfield between Buttonwillow and Lost Hills.

Checklist of resources (if available):

- ☑ Aerial photography
  Dates:
- ☑ Topographic maps
- ☐ Geologic maps
- ☑ Vegetation maps
- ☑ Soils maps
- ☑ Rainfall/precipitation maps
- ☐ Existing delineation(s) for site
- ☑ Global positioning system (GPS)
- ☐ Other studies

- ☐ Stream gage data
  Gage number:
  Period of record:
- ☐ History of recent effective discharges
- ☐ Results of flood frequency analysis
- ☐ Most recent shift-adjusted rating
- ☐ Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event

Hydrogeomorphic Floodplain Units

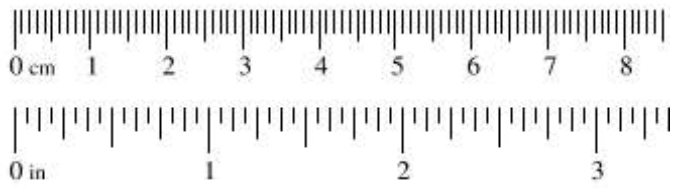


Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:

1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site.
2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units.
3. Determine a point on the cross section that is characteristic of one of the hydrogeomorphic floodplain units.
   a) Record the floodplain unit and GPS position.
   b) Describe the sediment texture (using the Wentworth class size) and the vegetation characteristics of the floodplain unit.
   c) Identify any indicators present at the location.
4. Repeat for other points in different hydrogeomorphic floodplain units across the cross section.
5. Identify the OHWM and record the indicators. Record the OHWM position via:
   - ☐ Mapping on aerial photograph
   - ☐ Digitized on computer
   - ☑ GPS
   - ☐ Other:

Wentworth Size Classes

Inches (in)	Millimeters (mm)	Wentworth size class	
10.08	256	Boulder	
		Cobble	Gravel
2.56	64		
0.157	4	Pebble	
		Granule	
0.079	2.00		
0.039	1.00	Very coarse sand	
0.020	0.50	Coarse sand	
0.0098 (1/2)	0.25	Medium sand	Sand
0.005 (1/4)	0.125	Fine sand	
0.0025 (1/8)	0.0625	Very fine sand	
0.0012 (1/16)	0.031	Coarse silt	
0.00061 (1/32)	0.0156	Medium silt	Silt
0.00031 (1/64)	0.0078	Fine silt	
0.00015 (1/128)	0.0039	Very fine silt	
		Clay	Mud



Project ID: Buttonbush Solar Energy Project **Cross section ID:** OHWM-T2 **Date:** 1/24/23 **Time:** 0910

Cross section drawing:



OHWM

GPS point: 35.501343, -119.449549

Indicators:

- ☐ Change in average sediment texture
- ☑ Change in vegetation species
- ☑ Change in vegetation cover
- ☑ Break in bank slope
- ☐ Other: _____
- ☐ Other: _____

Comments:

Feature is a seasonal/intermittent pond within alkali sink containing standing water at the time of the site assessment, primarily OHWM indicator denoting extent of feature is a gradual break in bank slope to upland areas dominated by Atriplex polycarpa shrubs

Floodplain unit:

☑ Low-Flow Channel ☑ Active Floodplain ☐ Low Terrace

GPS point: Within AF/OHWM

Characteristics of the floodplain unit:

Average sediment texture: N/A - Standing water

Total veg cover: 0 % Tree: 0 % Shrub: 0 % Herb: 0 %

Community successional stage:

- ☑ NA
- ☐ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☐ Surface relief
- ☑ Other: Standing water
- ☐ Other: _____
- ☐ Other: _____

Comments:

LF channel is indistinguishable from active floodplain/OHWM; standing water denotes extent of pond feature (AF/OHWM)

Project ID: IE North Logistics Center **Cross section ID:** T-02 **Date:** 1/24/23 **Time:** 0910

Floodplain unit: ☐ Low-Flow Channel ☐ Active Floodplain ☑ Low Terrace

GPS point: Above AF - Upland Habitat

Characteristics of the floodplain unit:

Average sediment texture: Clay loam

Total veg cover: 50 % Tree: 0 % Shrub: 50 % Herb: 0 %

Community successional stage:

- ☑ NA
- ☐ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☑ Surface relief
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

Comments:

Gradual slope transition between the pond feature and adjacent uplands; Atriplex polycarpa shrubs surrounding feature in upland area

Floodplain unit: ☐ Low-Flow Channel ☐ Active Floodplain ☐ Low Terrace

GPS point: N/A

Characteristics of the floodplain unit:

Average sediment texture: _____

Total veg cover: _____ % Tree: _____ % Shrub: _____ % Herb: _____ %

Community successional stage:

- ☐ NA
- ☐ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☑ Surface relief
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

Comments:

N/A

Arid West Ephemeral and Intermittent Streams OHWM Datasheet

Project: Buttonbush Solar Energy Project
Project Number: N/A (Dudek Project No. 14787.02)
Stream: NWW-1
Investigator(s): C. Amoaku

Date: 1/28/23 **Time:** 0957
Town: Kern County **State:** CA
Photo begin file#: 36 **Photo end file#:** 36

Y ☑ / N ☐ Do normal circumstances exist on the site?

Y ☑ / N ☐ Is the site significantly disturbed?

Location Details:
Buttonbush Solar Energy Project ARDR (Dudek 2025)

Projection: NAD 83 **Datum:** WGS 84
Coordinates: 35.460912, -119.514873

Potential anthropogenic influences on the channel system:
The review area has been extensively disturbed over the years by anthropogenic influences, chiefly past/present agricultural activities. The feature assessed is located between orchards & agricultural fields.

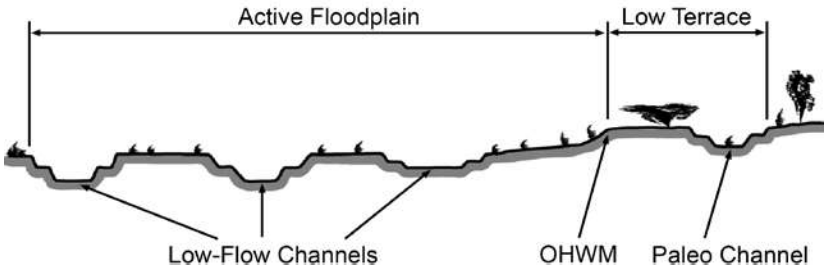
Brief site description:
The review area is approx.13,000 acres, spanning privately owned agricultural, developed, and undeveloped land northwest of Bakersfield between Buttonwillow and Lost Hills.

Checklist of resources (if available):

- ☑ Aerial photography
  Dates:
- ☑ Topographic maps
- ☐ Geologic maps
- ☑ Vegetation maps
- ☑ Soils maps
- ☑ Rainfall/precipitation maps
- ☐ Existing delineation(s) for site
- ☑ Global positioning system (GPS)
- ☐ Other studies

- ☐ Stream gage data
  Gage number:
  Period of record:
- ☐ History of recent effective discharges
- ☐ Results of flood frequency analysis
- ☐ Most recent shift-adjusted rating
- ☐ Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event

Hydrogeomorphic Floodplain Units

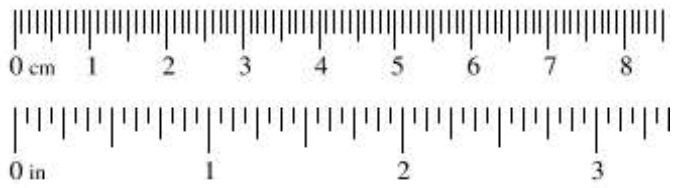


Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:

1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site.
2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units.
3. Determine a point on the cross section that is characteristic of one of the hydrogeomorphic floodplain units.
   a) Record the floodplain unit and GPS position.
   b) Describe the sediment texture (using the Wentworth class size) and the vegetation characteristics of the floodplain unit.
   c) Identify any indicators present at the location.
4. Repeat for other points in different hydrogeomorphic floodplain units across the cross section.
5. Identify the OHWM and record the indicators. Record the OHWM position via:
   - ☐ Mapping on aerial photograph
   - ☐ Digitized on computer
   - ☑ GPS
   - ☐ Other:

Wentworth Size Classes

Inches (in)	Millimeters (mm)	Wentworth size class	
10.08	256	Boulder	
		Cobble	Gravel
2.56	64		
0.157	4	Pebble	
		Granule	
0.079	2.00		
0.039	1.00	Very coarse sand	
0.020	0.50	Coarse sand	
0.0098 (1/2)	0.25	Medium sand	Sand
0.005 (1/4)	0.125	Fine sand	
0.0025 (1/8)	0.0625	Very fine sand	
0.0012 (1/16)	0.031	Coarse silt	
0.00061 (1/32)	0.0156	Medium silt	Silt
0.00031 (1/64)	0.0078	Fine silt	
0.00015 (1/128)	0.0039	Very fine silt	
		Clay	Mud



Project ID: Buttonbush Solar Energy Project **Cross section ID:** OHWM-T3 **Date:** 1/28/23 **Time:** 0957

Cross section drawing:



OHWM

GPS point: 35.460912, -119.514873

Indicators:

- ☐ Change in average sediment texture
- ☐ Change in vegetation species
- ☐ Change in vegetation cover
- ☑ Break in bank slope
- ☐ Other: _____
- ☐ Other: _____

Comments:

Feature is a depression-like feature containing mudcracks at the time of the site assessment, primary OHWM indicator denoting extent of feature is a gradual break in bank slope to upland areas

Floodplain unit:

☑ Low-Flow Channel ☑ Active Floodplain ☐ Low Terrace

GPS point: Within AF/OHWM

Characteristics of the floodplain unit:

Average sediment texture: Medium sand

Total veg cover: 21 % Tree: 0 % Shrub: 0 % Herb: 21 %

Community successional stage:

- ☐ NA
- ☑ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☑ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☐ Surface relief
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

Comments:

LF channel is indistinguishable from active floodplain/OHWM; mudcracks denotes extent of depression-like feature

Project ID: IE North Logistics Center **Cross section ID:** T-03 **Date:** 1/28/23 **Time:** 0957

Floodplain unit: ☐ Low-Flow Channel ☐ Active Floodplain ☑ Low Terrace

GPS point: Above AF - Upland Habitat

Characteristics of the floodplain unit:

Average sediment texture: Medium sand

Total veg cover: 21 % Tree: 0 % Shrub: 0 % Herb: 21 %

Community successional stage:

- ☐ NA
- ☑ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☑ Surface relief
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

Comments:

Gradual slope transition between the depression-like feature and adjacent uplands

Floodplain unit: ☐ Low-Flow Channel ☐ Active Floodplain ☐ Low Terrace

GPS point: N/A

Characteristics of the floodplain unit:

Average sediment texture: _____

Total veg cover: _____ % Tree: _____ % Shrub: _____ % Herb: _____ %

Community successional stage:

- ☐ NA
- ☐ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☑ Surface relief
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

Comments:

N/A

Arid West Ephemeral and Intermittent Streams OHWM Datasheet

Project: Buttonbush Solar Energy Project
Project Number: N/A (Dudek Project No. 14787.02)
Stream: N/A (Ditch-24)
Investigator(s): C. Amoaku

Date: 1/12/23 **Time:** 1403
Town: Kern County **State:** CA
Photo begin file#: 12 **Photo end file#:** 12

Y ☑ / N ☐ Do normal circumstances exist on the site?

Y ☑ / N ☐ Is the site significantly disturbed?

Location Details:
Buttonbush Solar Energy Project ARDR (Dudek 2025)

Projection: NAD 83 **Datum:** WGS 84
Coordinates: 35.445833, -119.505277

Potential anthropogenic influences on the channel system:
The review area has been extensively disturbed over the years by anthropogenic influences, chiefly past/present agricultural activities. The feature assessed is part of an array of irrigation ditches onsite used for conveying water to orchards & agricultural fields, as well as human-made basins draining the orchards and fields.

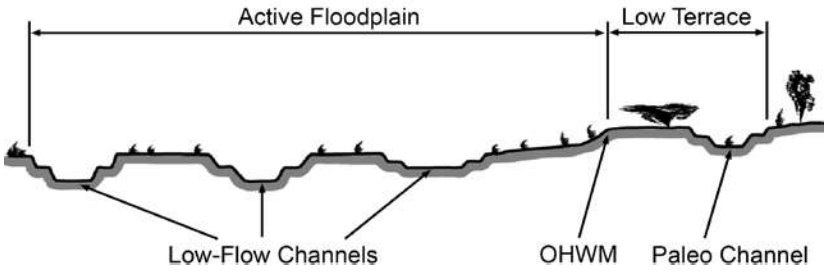
Brief site description:
The review area is approx.13,000 acres, spanning privately owned agricultural, developed, and undeveloped land northwest of Bakersfield between Buttonwillow and Lost Hills.

Checklist of resources (if available):

- ☑ Aerial photography
  Dates:
- ☑ Topographic maps
- ☐ Geologic maps
- ☑ Vegetation maps
- ☑ Soils maps
- ☑ Rainfall/precipitation maps
- ☐ Existing delineation(s) for site
- ☑ Global positioning system (GPS)
- ☐ Other studies

- ☐ Stream gage data
  Gage number:
  Period of record:
- ☐ History of recent effective discharges
- ☐ Results of flood frequency analysis
- ☐ Most recent shift-adjusted rating
- ☐ Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event

Hydrogeomorphic Floodplain Units

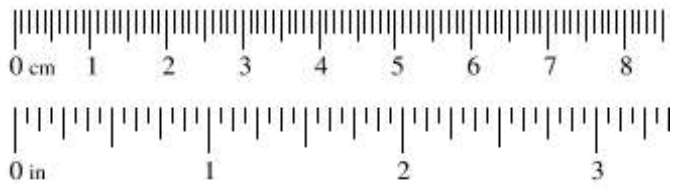


Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:

1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site.
2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units.
3. Determine a point on the cross section that is characteristic of one of the hydrogeomorphic floodplain units.
   a) Record the floodplain unit and GPS position.
   b) Describe the sediment texture (using the Wentworth class size) and the vegetation characteristics of the floodplain unit.
   c) Identify any indicators present at the location.
4. Repeat for other points in different hydrogeomorphic floodplain units across the cross section.
5. Identify the OHWM and record the indicators. Record the OHWM position via:
   - ☐ Mapping on aerial photograph
   - ☐ Digitized on computer
   - ☑ GPS
   - ☐ Other:

Wentworth Size Classes

Inches (in)	Millimeters (mm)	Wentworth size class	
10.08	256	Boulder	
		Cobble	Gravel
2.56	64		
0.157	4	Pebble	
		Granule	
0.079	2.00		
0.039	1.00	Very coarse sand	
0.020	0.50	Coarse sand	
0.0098 (1/2)	0.25	Medium sand	Sand
0.005 (1/4)	0.125	Fine sand	
0.0025 (1/8)	0.0625	Very fine sand	
0.0012 (1/16)	0.031	Coarse silt	
0.00061 (1/32)	0.0156	Medium silt	Silt
0.00031 (1/64)	0.0078	Fine silt	
0.00015 (1/128)	0.0039	Very fine silt	
		Clay	Mud



Project ID: Buttonbush Solar Energy Project **Cross section ID:** OHWM-T4 **Date:** 1/12/23 **Time:** 1403

Cross section drawing:



OHWM

GPS point: 35.445833, -119.505277

Indicators:

- ☐ Change in average sediment texture
- ☑ Change in vegetation species
- ☑ Change in vegetation cover
- ☐ Break in bank slope
- ☑ Other: Artificial break in bank slope
- ☐ Other: _____

Comments:

Feature is a ditch that primarily displayed an OHWM indicator of an artificial/constructed break in bank slope; however, there was a change in change in vegetation species/cover as the ditch contained dried vegetation compared to the bare adjacent agricultural fields. The ditch was created in upland areas as a result of agricultural practices in the area.

Floodplain unit:

☑ Low-Flow Channel ☐ Active Floodplain ☐ Low Terrace

GPS point: Within AF/OHWM

Characteristics of the floodplain unit:

Average sediment texture: Clay loam

Total veg cover: 30 % Tree: 0 % Shrub: 0 % Herb: 30 %

Community successional stage:

- ☐ NA
- ☑ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☑ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☐ Surface relief
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

Comments:

LF channel defined by drift and debris present as dried vegetation

Project ID: IE North Logistics Center **Cross section ID:** T-04 **Date:** 1/12/23 **Time:** 1403

Floodplain unit: ☐ Low-Flow Channel ☑ Active Floodplain ☐ Low Terrace

GPS point: At OHWM

Characteristics of the floodplain unit:

Average sediment texture: Clay loam

Total veg cover: 0 % Tree: 0 % Shrub: 0 % Herb: 0 %

Community successional stage:

- ☑ NA
- ☐ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☐ Surface relief
- ☑ Other: Artificial break in bank slope
- ☐ Other: _____
- ☐ Other: _____

Comments:

Approx. 10' OHWM only defined by artificial break in bank slope

Floodplain unit: ☐ Low-Flow Channel ☐ Active Floodplain ☑ Low Terrace

GPS point: Above AF - Upland Habitat

Characteristics of the floodplain unit:

Average sediment texture: Clay loam

Total veg cover: 0 % Tree: 0 % Shrub: 0 % Herb: 0 %

Community successional stage:

- ☑ NA
- ☐ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☑ Surface relief
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

Comments:

Abrupt shift to uplands from artificially constructed banks. Feature located between a road and adjacent agricultural fields.

Arid West Ephemeral and Intermittent Streams OHWM Datasheet

Project: Buttonbush Solar Energy Project
Project Number: N/A (Dudek Project No. 14787.02)
Stream: N/A (Ditch-10)
Investigator(s): C. Amoaku

Date: 1/11/23 **Time:** 1432
Town: Kern County **State:** CA
Photo begin file#: 14 **Photo end file#:** 14

Y ☑ / N ☐ Do normal circumstances exist on the site?

Y ☑ / N ☐ Is the site significantly disturbed?

Location Details:
Buttonbush Solar Energy Project ARDR (Dudek 2025)

Projection: NAD 83 **Datum:** WGS 84
Coordinates: 35.413333, -119.473611

Potential anthropogenic influences on the channel system:
The review area has been extensively disturbed over the years by anthropogenic influences, chiefly past/present agricultural activities. The feature assessed is part of an array of irrigation ditches onsite used for conveying water to orchards & agricultural fields, as well as human-made basins draining the orchards and fields.

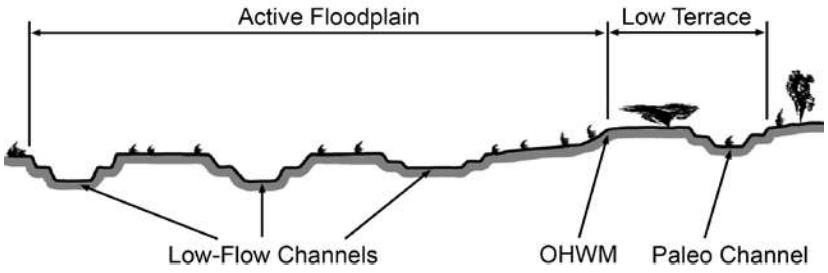
Brief site description:
The review area is approx.13,000 acres, spanning privately owned agricultural, developed, and undeveloped land northwest of Bakersfield between Buttonwillow and Lost Hills.

Checklist of resources (if available):

- ☑ Aerial photography
  Dates:
- ☑ Topographic maps
- ☐ Geologic maps
- ☑ Vegetation maps
- ☑ Soils maps
- ☑ Rainfall/precipitation maps
- ☐ Existing delineation(s) for site
- ☑ Global positioning system (GPS)
- ☐ Other studies

- ☐ Stream gage data
  Gage number:
  Period of record:
- ☐ History of recent effective discharges
- ☐ Results of flood frequency analysis
- ☐ Most recent shift-adjusted rating
- ☐ Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event

Hydrogeomorphic Floodplain Units

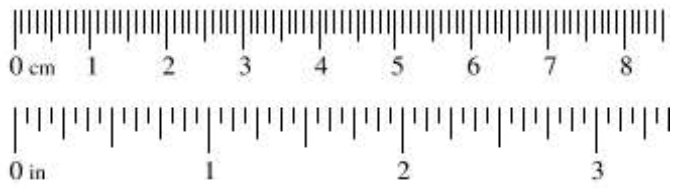


Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:

1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site.
2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units.
3. Determine a point on the cross section that is characteristic of one of the hydrogeomorphic floodplain units.
   a) Record the floodplain unit and GPS position.
   b) Describe the sediment texture (using the Wentworth class size) and the vegetation characteristics of the floodplain unit.
   c) Identify any indicators present at the location.
4. Repeat for other points in different hydrogeomorphic floodplain units across the cross section.
5. Identify the OHWM and record the indicators. Record the OHWM position via:
   - ☐ Mapping on aerial photograph
   - ☐ Digitized on computer
   - ☑ GPS
   - ☐ Other:

Wentworth Size Classes

Inches (in)	Millimeters (mm)	Wentworth size class	
10.08	256	Boulder	
		Cobble	Gravel
2.56	64		
0.157	4	Pebble	
		Granule	
0.079	2.00		
0.039	1.00	Very coarse sand	
0.020	0.50	Coarse sand	
0.0098 (1/2)	0.25	Medium sand	Sand
0.005 (1/4)	0.125	Fine sand	
0.0025 (1/8)	0.0625	Very fine sand	
0.0012 (1/16)	0.031	Coarse silt	
0.00061 (1/32)	0.0156	Medium silt	Silt
0.00031 (1/64)	0.0078	Fine silt	
0.00015 (1/128)	0.0039	Very fine silt	
		Clay	Mud



Project ID: Buttonbush Solar Energy Project **Cross section ID:** OHWM-T5 **Date:** 1/11/23 **Time:** 1432

Cross section drawing:



OHWM

GPS point: 35.413333, -119.473611

Indicators:

- ☐ Change in average sediment texture
- ☑ Change in vegetation species
- ☑ Change in vegetation cover
- ☐ Break in bank slope
- ☑ Other: Artificial break in bank slope
- ☐ Other: _____

Comments:

Feature is a ditch that primarily displayed an OHWM indicator of an artificial/constructed break in bank slope; however, there was a change in vegetation species/cover as the ditch contained dried vegetation compared to the bare adjacent agricultural fields. The ditch was created in upland areas as a result of agricultural practices in the area.

Floodplain unit:

☑ Low-Flow Channel ☐ Active Floodplain ☐ Low Terrace

GPS point: Within AF/OHWM

Characteristics of the floodplain unit:

Average sediment texture: Clay loam

Total veg cover: 30 % Tree: 0 % Shrub: 0 % Herb: 30 %

Community successional stage:

- ☐ NA
- ☑ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☑ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☐ Surface relief
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

Comments:

LF channel defined by drift and debris present as dried vegetation

Project ID: IE North Logistics Center **Cross section ID:** T-05 **Date:** 1/11/23 **Time:** 1432

Floodplain unit: ☐ Low-Flow Channel ☑ Active Floodplain ☐ Low Terrace

GPS point: At OHWM

Characteristics of the floodplain unit:

Average sediment texture: Clay loam

Total veg cover: 0 % Tree: 0 % Shrub: 0 % Herb: 0 %

Community successional stage:

- ☑ NA
- ☐ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☐ Surface relief
- ☑ Other: Artificial break in bank slope
- ☐ Other: _____
- ☐ Other: _____

Comments:

Approx. 10' OHWM only defined by artificial break in bank slope

Floodplain unit: ☐ Low-Flow Channel ☐ Active Floodplain ☑ Low Terrace

GPS point: Above AF - Upland Habitat

Characteristics of the floodplain unit:

Average sediment texture: Clay loam

Total veg cover: 0 % Tree: 0 % Shrub: 0 % Herb: 0 %

Community successional stage:

- ☑ NA
- ☐ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☑ Surface relief
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

Comments:

Abrupt shift to uplands from artificially constructed banks. Feature located between a road and adjacent agricultural fields.

Appendix C
Review Area Photos



Photo 1. A view of an area investigated southeast of Wetland Sampling Point (WSP) ALT-WSP-20.



Photo 2. View of Ordinary High Water Mark (OHWM) Transect OHWM-T1 located near a culvert and depicting the typical ditch between fields onsite.



Photo 3. View of WSP ALT-WSP-07. Point lies within Non-Wetland Water (NWW)-4, a seasonal pond.

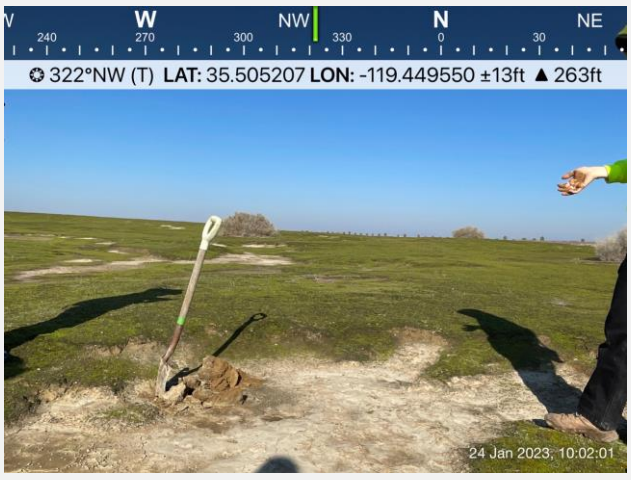


Photo 4. View of WSP ALT-WSP-06. Point taken within micro-wetland/upland complex. The WSP did not meet all three wetland parameters.



Photo 5. View of WSP ALT-WSP-05. WSP lies in upland tamarisk vegetation. The WSP did not meet all three wetland parameters.



Photo 6. View of WSP ALT-WSP-04. WSP lies outside of NWW-5, an intermittent pond.



Photo 7. View of WSP ALT-WSP-03 and OHWM-T2. Data points are representative of NWW-5, an intermittent pond.



Photo 8. View of WSP DMA-WSP-01. This is an individual upland data point.

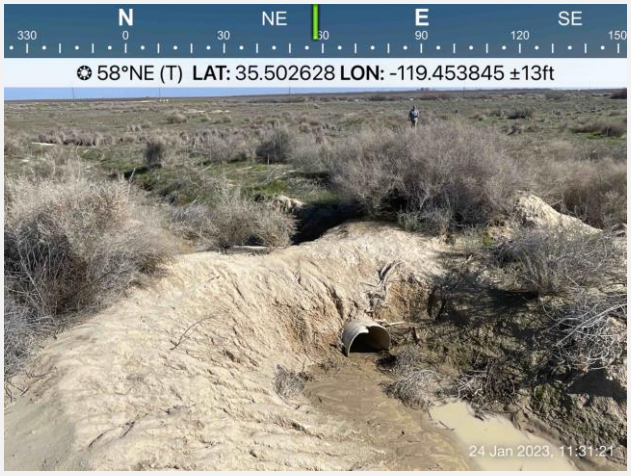


Photo 9. View of culvert passing through constructed berm, north of WSP DMA-WSP-01.

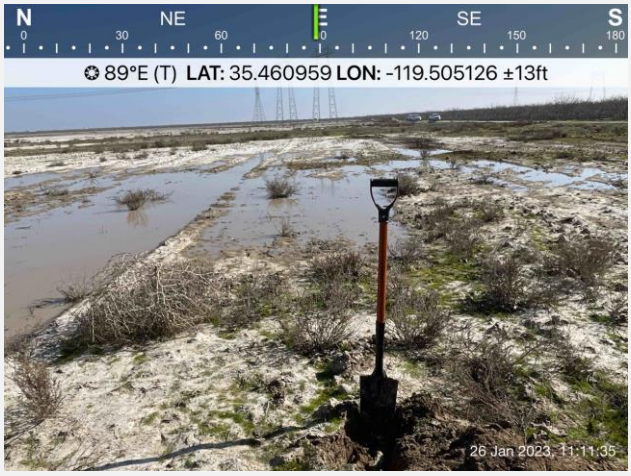


Photo 10. View of WSP ALT-WSP-21. Data point is representative of Wetland (WET)-7, a disturbed (tilled) depressional palustrine scrub-shrub (PSS) wetland in an alkali sink.



Photo 11. View of WSP ALT-WSP-02. Data point contains darker soil in a slight depression but did not meet any of the three wetland parameters. As such, it remains representative of upland habitat.



Photo 12. View of Ditch (D)-24 and OHWM-T4.



Photo 13. View of WSP ALT-WSP-01. This is an isolated data point that did not meet all three wetland parameters. As such, it is representative of upland habitat within the review area.



Photo 14. View of OHWM-T5, facing north. This photograph depicts D-10, an isolated canal/ditch within the review area.

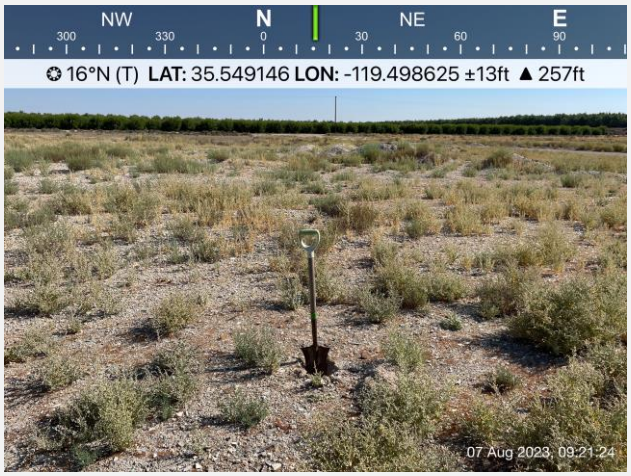


Photo 15. View of WSP PGH-WSP-01.



Photo 16. View of WSP PGH-WSP-07.

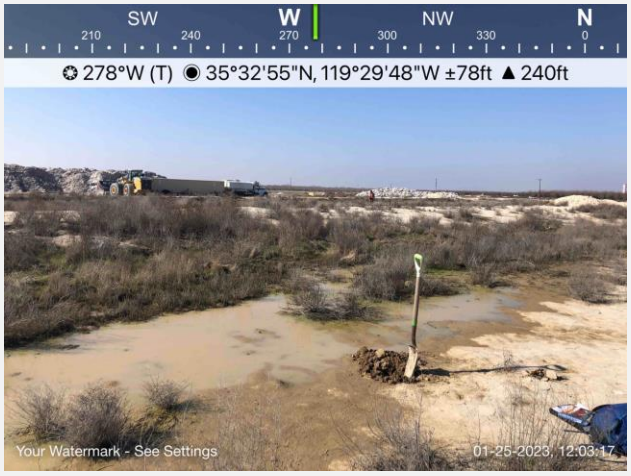


Photo 17. View of WSP ALT-WSP-12. Data point is taken within WET-17, a PSS depressional wetland. This is a typical "three-parameter wetland" alkaline sink basin with constructed berms.



Photo 18. View of WSP ALT-WSP-13. This is also within WET-17.



Photo 19. View of WSP ALT-WSP-14.



Photo 20. View of WSP ALT-WSP-15. Data point lies outside of WET-16.



Photo 21. View of WSP ALT-WSP-16.



Photo 22. View of WSP ALT-WSP-17 within WET-6, which is a depressional PSS wetland.



Photo 23. View of WSP ALT-WSP-18. Data point lies within WET-16, a depressional PSS wetland.



Photo 24. View of WSP ALT-WSP-19, lying outside of the WET-16 boundary.



Photo 25. View of WSP ALT-WSP-20. This data point lies in upland habitat in the southeast corner of the parcel.



Photo 26. View of ALT-WSP-11. Data point meet the wetland hydrology parameter; however, did not meet the hydric soils or hydrophytic vegetation parameters.



Photo 27. View of ALT-WSP-10. This data point also only met the wetland hydrology parameter.



Photo 28. View of WSP ALT-WSP-09.

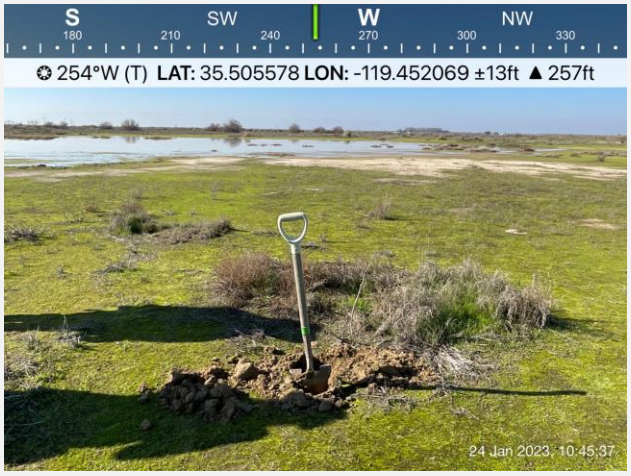


Photo 29. View of ALT-WSP-08. Data point lies outside of NWW-4, a seasonal pond.



Photo 30. View of WSP PGH-WSP-02.



Photo 31. View of WSP PGH-WSP-03.



Photo 32. View of WSP WSP_DMA_04.

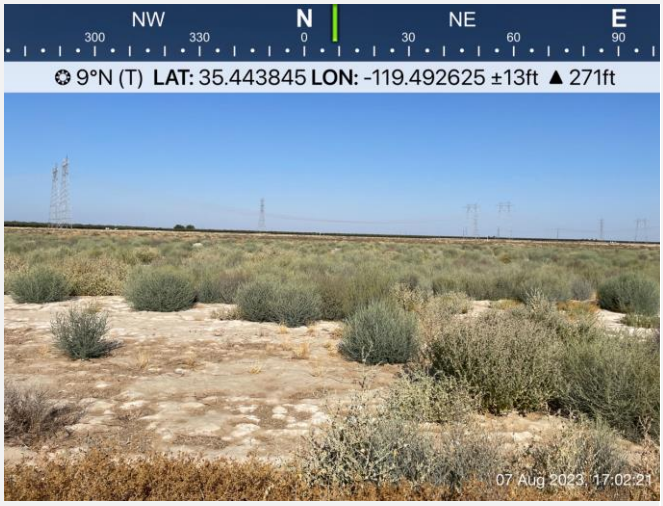


Photo 33. View of data point with the same indicators as PGH-WSP-07.



Photo 34. View of data point with the same indicators as PGH-WSP-07.

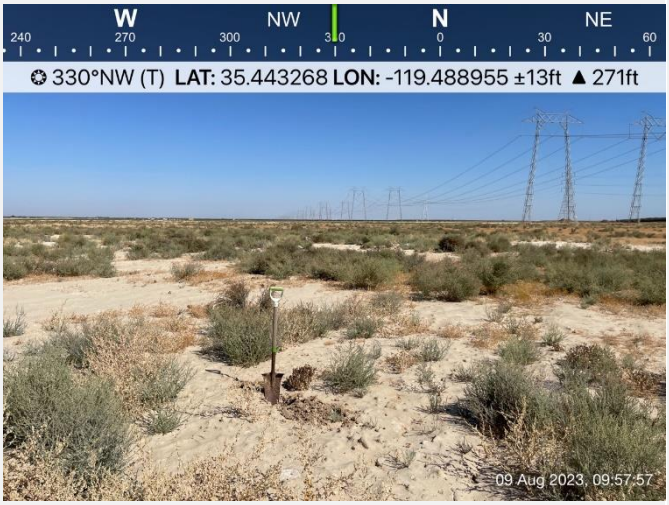


Photo 35. View of data point with the same indicators as PGH-WSP-07.



Photo 36. View of WSP WSP_DA_02 and OHWM-T3.

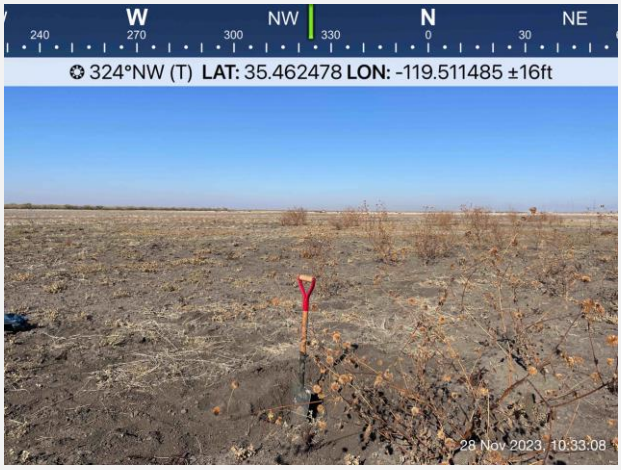


Photo 37. View of WSP WSP_DMA_03.



Photo 38. View of WSP WSP_DMA_10.



Photo 39. View of WSP WSP_DMA_05.



Photo 40. View of WSP WSP_DMA_06.



Photo 41. View of WSP WSP_DMA_07.



Photo 42. View of WSP WSP_DMA_08.



Photo 43. View of WSP WSP_DMA_09.



Photo 44. View of WSP WSP_DMA_10.



Photo 45. View of WSP PGH-WSP-11.



Photo 46. View of WSP PGH-WSP-12.



Photo 47. View of WSP PGH-WSP-13.



Photo 48. View of WSP PGH-WSP-14.

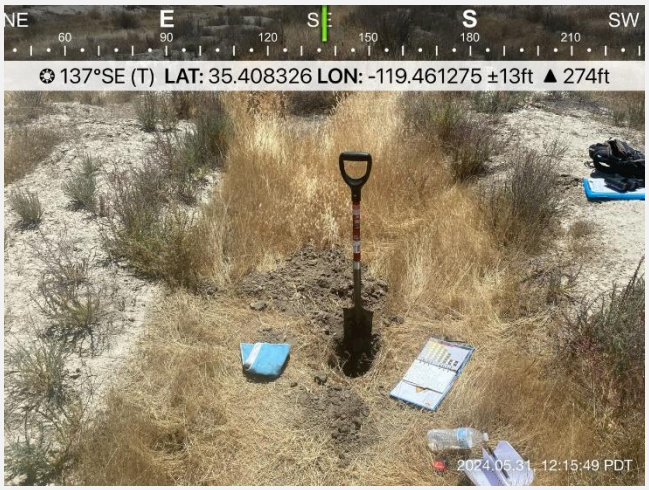


Photo 49. View of WSP RES-WSP-1.



Photo 50. View of RES-WSP-2.

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Appendix D.5

Biological Resources Habitat Assessment

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Biological Resources Habitat Assessment

Buttonbush Solar and Storage Project – Midway Substation

SEPTEMBER 2024

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C Special-Status Plant Species with Low or No Potential to Occur
D Special-Status Wildlife Species Not Expected to Occur on the Project Site

Acronyms and Abbreviations

Acronym	Definition
BCC	Bird of Conservation Concern
BMP	best management practice
CDFW	California Department of Fish and Wildlife
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CFR	Code of Federal Regulations
CNPS	California Native Plant Society
CRPR	California Rare Plant Rank
CWA	Clean Water Act
EPA	U.S. Environmental Protection Agency
ESA	federal Endangered Species Act
FP	fully protected
gen-tie	generation tie
GIS	geographic information system
HCP	habitat conservation plan
ITP	Incidental Take Permit
KCVFHCP	Kern County Valley Floor Habitat Conservation Plan
kV	kilovolt
MM	Mitigation Measure
O&M	operations and maintenance
OHWM	ordinary high water mark
PG&E	Pacific Gas & Electric Company
SJVAPCD	San Joaquin Valley Air Pollution Control District
SSC	Species of Special Concern
SWPPP	stormwater pollution prevention plan
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service

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1 Introduction

This biological resources habitat assessment (report) documents the results of surveys conducted to identify potential biological resources for the Buttonbush Solar and Storage Project—Midway Substation (project) in Kern County, California. Figure 1, Project Location, shows the regional location and vicinity of the project site.

1.1 Purpose of Report

The purpose of this report is to describe the conditions of biological resources within the project site in terms of vegetation communities, plants, wildlife, wildlife habitats, and wetlands.

1.2 Project Description

1.2.1 Project Location

The project site is located within unincorporated Kern County directly northeast of the community of Buttonwillow, approximately 11 miles west of the City of Shafter, and approximately 13 miles southwest of the City of Wasco. The project site boundaries are illustrated on Figure 1. The project site is located west of Interstate 5, directly north of Highway 58 (East Front Street), directly west of Wasco Way, and east of the East Side Canal. Several single-family homes and agriculture-related structures are near the project boundary.

According to the U.S. Geological Survey, the project site is within the Buttonwillow U.S. Geological Survey 1:24,000 topographic map (7.5-minute quadrangle). More specifically, the project is primarily located in Township 29 S, Range 23 E, Section 13.

The project site comprises 255 acres.

1.2.2 Project Description

The Buttonbush Solar and Storage project proponent (29SC 8me LLC) proposes to develop a photovoltaic solar facility and associated infrastructure necessary to generate up to 2 gigawatts of AC power with an up to 2-gigawatt energy storage system on approximately 12,091 acres located on 128 privately owned parcels in the valley region of Kern County. The project would be supported by a 500-kilovolt (kV) overhead generation tie (gen-tie) and/or underground electrical transmission line(s) originating from one or more on-site substations and terminating at the Pacific Gas & Electric Company (PG&E) Midway Substation.

PG&E will modify the Midway Substation's 500 kV yard, within PG&E's Midway Substation property boundary, to accommodate the proposed project's interconnection along with other upgrades. The project's permanent facilities would include solar panels, solar racking, inverters, service roads, a power collection system, communication cables, overhead and underground transmission lines, electrical switchyards, microwave towers, project substations, energy storage system(s), and operations and maintenance (O&M) facilities.

As part of the proposed Buttonbush Solar and Storage Project, interconnection requests have been submitted to the California Independent System Operator Corporation (CAISO) for the project that would interconnect to PG&E's

Midway Substation. To accommodate the request, PG&E proposes to enlarge Midway Substation's 500 kV yard within the Midway Substation property boundaries. Specifically, PG&E proposes to remove the existing precast security wall at the northwestern side of Midway Substation and replace it with a new 12-foot-tall wall, approximately 510 feet north and 140 feet west of the existing walls of the 500 kV yard in Midway Substation. Grading of the expansion area would be required, but all expansion would be within the parcel. Within the newly graded area of Midway Substation, PG&E would install approximately one 550 kV, 3,000 ampere, 63 kiloampere high-voltage circuit breaker. This would include installing equipment foundations and concrete trenches, equipment cabinets, bus structures, communication lines, conduits, pull boxes, and concrete-encased conduit duct banks inside the substation as required. In addition to substation modifications, PG&E anticipates installing up to 2,000 feet of new 500 kV single -circuit transmission line, creating a new, direct tie from Midway Substation to the point of interconnection for the proposed project. The new transmission line would be supported by up to four approximately 175-foot-tall lattice steel towers (LSTs) or tubular steel poles (TSPs). The towers would be supported by concrete foundations. The foundations would be designed to support the design loads based on local conditions.

2 Regulatory Setting

2.1 Federal

Federal Endangered Species Act

The federal Endangered Species Act (ESA) of 1973 (16 USC 1531 et seq.), as amended, is administered by the U.S. Fish and Wildlife Service (USFWS) for most plant and animal species, and by the National Oceanic and Atmospheric Administration's National Marine Fisheries Service for certain marine species. This legislation is intended to provide a means to conserve the ecosystems upon which endangered and threatened species depend and provide programs for the conservation of those species, thus preventing the extinction of plants and wildlife. ESA defines an endangered species as "any species that is in danger of extinction throughout all or a significant portion of its range." A threatened species is defined as "any species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range." Under ESA, it is unlawful to "take" any listed species; "take" is defined as "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct."

The ESA allows for the issuance of Incidental Take Permits (ITPs) for listed species under Section 7, which is generally available for projects that also require other federal agency permits or other approvals, and under Section 10, which provides for the approval of habitat conservation plans (HCPs) on private property.

Migratory Bird Treaty Act

The Migratory Bird Treaty Act prohibits the intentional and unintentional take of any migratory bird or any part, nest, or eggs of any such bird. Under the Migratory Bird Treaty Act, "take" is defined as pursuing, hunting, shooting, capturing, collecting, or killing, or attempting to do so (16 USC 703 et seq.). Currently, the Migratory Birds Office considers nests that support eggs, nestlings, or juveniles to be active. Additionally, Executive Order 13186, Responsibilities of Federal Agencies to Protect Migratory Birds, requires that any project with federal involvement address impacts of federal actions on migratory birds, with the purpose of promoting conservation of migratory bird populations (66 FR 3853–3856). Executive Order 13186 requires federal agencies to work with USFWS to develop a memorandum of understanding. USFWS reviews actions that might affect these species.

Clean Water Act

The Clean Water Act (CWA) is the major federal legislation governing water quality, providing guidance for the restoration and maintenance of the chemical, physical, and biological integrity of the nation's waters. Section 401 of the CWA requires an applicant for a federal license or permit that may result in a discharge of pollutants into waters of the United States to obtain state certification, thereby ensuring that the discharge will comply with the provisions of the CWA. The State Water Resources Control Board and Regional Water Quality Control Boards administer the Section 401 certification program in California. Section 402 of the CWA establishes a permitting system for the discharge of any pollutant (except dredged or fill material) into waters of the United States. Section 404 establishes a permit program administered by the U.S. Army Corps of Engineers (USACE) that regulates the discharge of dredged or fill material into waters of the United States, including wetlands. USACE implementing regulations are found in Title 33 of the Code of Federal Regulations (CFR), Parts 320 to 332. Guidelines for implementation are referred to as the Section 404(b)(1) Guidelines, which were developed by the

U.S. Environmental Protection Agency (EPA) in conjunction with USACE (40 CFR 230). The guidelines allow the discharge of dredged or fill material into the aquatic ecosystem only if there is no practicable alternative that would have less adverse impacts.

Wetlands and Other Waters of the United States

The definition of "waters of the United States" establishes the geographic scope for authority under Section 404 of the CWA; however, the CWA does not specifically define waters of the United States, leaving the definition open to statutory interpretation and agency rulemaking. The definition of what constitutes waters of the United States (provided in 33 CFR 328.3[a]) has changed multiple times over the past few decades, starting with the *United States v. Riverside Bayview Homes Inc.* court ruling in 1985. Subsequent court proceedings, rule makings, and congressional acts in 2001 (*Solid Waste Agency of Northern Cook County v. United States Army Corps of Engineers*), 2006 (*Rapanos v. United States*), 2015 (Clean Water Rule), 2018 (suspension of the Clean Water Rule), 2019 (formal repeal of the Clean Water Rule), 2020 (Navigable Waters Protection Rule), and 2021 (*Pasqua Tribe et al. v. United States Environmental Protection Agency*, resulting in remand and vacatur of the Navigable Waters Protection Rule and a return to "the pre-2015 regulatory regime") have attempted to provide greater clarity to the term and its regulatory implementation. On December 30, 2022, the agencies announced the final Revised Definition of "Waters of the United States" rule (Rule) (88 CFR 3004–3144). The Rule was published in the Federal Register on January 18, 2023, and became effective on March 20, 2023, restoring federal jurisdiction over waters that were protected prior to 2015 under the CWA for traditional navigable waters, territorial seas, interstate waters, and upstream water resources that significantly affect those waters. The Rule represents a re-expansion of federal jurisdiction over certain water bodies and wetlands previously exempt pursuant to the 2020 Navigable Waters Protection Rule. The Rule also considers various subsequent court decisions, including two notable Supreme Court decisions.

There are two key changes that the Rule incorporates. First, the Rule reinstates the Significant Nexus test. The Significant Nexus test refers to waters that either alone, or in combination with similarly situated waters in the region, significantly affect the chemical, physical, or biological integrity of traditional navigable waters, interstate waters, or territorial seas (86 FR 69372–69450). The Significant Nexus test attempts to establish a scientific connection between smaller water bodies, such as ephemeral or intermittent tributaries, and larger, more traditional navigable waters, such as rivers. Significant Nexus evaluations take into consideration hydrologic and ecologic factors including, but not limited to, volume, duration, and frequency of surface water flow in the resource; the resource's proximity to a traditional navigable water; and the functions performed by the resource on adjacent wetlands. Second, the Rule adopts the Relatively Permanent Standard test. To meet the Relatively Permanent Standard, water bodies must be relatively permanent, standing, or continuously flowing and must have a continuous surface connection to such waters.

On May 25, 2023, the Supreme Court issued its long-anticipated decision in *Sackett v. EPA*, in which it rejected EPA's claim that waters of the United States, as defined in the CWA, include wetlands with an ecologically significant nexus to traditional navigable waters. The Supreme Court held that only those wetlands with a continuous surface water connection to traditional navigable waterways would be afforded federal protection under the CWA. Specifically, to assert jurisdiction over an adjacent wetland under the CWA, a party must establish that (1) "the adjacent [body of water constitutes]… 'water[s] of the United States,' (i.e., a relatively permanent body of water connected to traditional interstate navigable waters)" and (2) "the wetland has a continuous surface connection with that water, making it difficult to determine where the 'water' ends and the 'wetland' begins." The Rule will need to be modified by the Biden administration in light of this decision.

The term "wetlands" (a subset of waters of the United States) is defined in 33 CFR 328.3(c)(16) as "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." In the absence of wetlands, the limits of USACE jurisdiction in non-tidal waters, such as intermittent streams, extend to the "ordinary high water mark" (OHWM), which is defined in 33 CFR 328.3(c)(7) as "that line on the shore 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."

2.2 State

California Endangered Species Act

The California Endangered Species Act (CESA) (California Fish and Game Code, Chapter 1.5) provides protection and prohibits the take of plant, fish, and wildlife species listed by the State of California. Unlike ESA, under CESA, state-listed plants have the same degree of protection as wildlife, but insects and other invertebrates may not be listed. Take is defined similarly to ESA and is prohibited for both listed and candidate species. Take authorization may be obtained by a project applicant from CDFW under CESA Section 2081, which allows take of a listed species for educational, scientific, or management purposes. In this case, private developers consult with CDFW to develop a set of measures and standards for managing the listed species, including full mitigation for impacts, funding of mitigation implementation, and monitoring of mitigation measures.

On October 21, 2019, the California Fish and Game Commission received a petition from the Center for Biological Diversity to list western Joshua tree (*Yucca brevifolia*) (Center for Biological Diversity 2019).[1] On November 1, 2019, the California Fish and Game Commission referred the petition to CDFW for evaluation. CDFW evaluated the scientific information presented in the petition and other relevant information possessed by CDFW at the time of review and prepared a report for submittal to the California Fish and Game Commission. The report states that CDFW recommended that the California Fish and Game Commission accept the petition for further consideration of western Joshua tree under CESA. On September 22, 2020, the California Fish and Game Commission approved the petition to accept the candidacy proposal for western Joshua tree, effective October 9, 2020 (CDFW 2020). When a plant or wildlife species is granted candidacy under CESA, the species is given the same protection as a threatened or endangered species while the California Fish and Game Commission evaluates whether formal listing as threatened or endangered is warranted. For this project, take or removal of western Joshua trees would require a 2081 ITP from CDFW. In July 2023, the Western Joshua Tree Conservation Act (WJTCA), was enacted in California. The WJTCA protects the western Joshua tree by prohibiting its importation, export, take, possession, purchase, or sale without authorization from CDFW. CDFW can issue permits for incidental take, removal of dead trees, or trimming of live trees under specific conditions, with permittees having the option to pay fees instead of conducting mitigation activities

[1] On October 21, 2019, the California Fish and Game Commission received a petition to list the following as threatened under the CESA: (1) western Joshua tree (*Yucca brevifolia*) throughout its California range, or, in the event the Commission determines that listing of *Yucca brevifolia* throughout its California range is not warranted, then (2) the western Joshua tree population within the northern part of western Joshua tree's California range, or (3) the western Joshua tree population within the southern part of western Joshua tree's California range.

California Fish and Game Code

Fully Protected Species

Sections 3511, 4700, 5050, and 5515 of the California Fish and Game Code outline protection for fully protected species of mammals, birds, reptiles, amphibians, and fish. Species that are fully protected by these sections may not be taken or possessed at any time. CDFW cannot issue permits or licenses that authorize the take of any fully protected species, except under certain circumstances, such as for scientific research and live capture and relocation of such species pursuant to a permit for the protection of livestock. On July 10, 2023, Senate Bill 147, which amends the California Fish and Game Code to allow a 10-year permitting mechanism for a defined set of projects within the renewable energy, transportation, and water infrastructure sectors, was signed into law.

It is the responsibility of CDFW to maintain viable populations of all native species. Toward that end, CDFW has designated certain vertebrate species as Species of Special Concern (SSC) because declining population levels, limited ranges, and/or continuing threats have made them vulnerable to extinction.

Sections 1600–1616

CDFW jurisdiction includes ephemeral, intermittent, and perennial watercourses (including dry washes) and lakes characterized by the presence of definable bed and banks and existing fish or wildlife resources. CDFW takes jurisdiction to the top of bank of the stream or the limit of the adjacent riparian vegetation, which may include oak woodlands in canyon bottoms. Historical court cases have further extended CDFW jurisdiction to include watercourses that seemingly disappear but reemerge elsewhere. Under the CDFW definition, a watercourse need not exhibit evidence of an OHWM to be claimed as jurisdictional. CDFW does not have jurisdiction over ocean or shoreline resources.

Under California Fish and Game Code Sections 1600–1616, CDFW has the authority to regulate work that will substantially divert or obstruct the natural flow of, or substantially change or use any material from, the bed, channel, or bank of any river, stream, or lake. CDFW also has the authority to regulate work that will deposit or dispose of debris, waste, or other material containing crumbled, flaked, or ground pavement where it may pass into any river, stream, or lake. This regulation takes the form of a requirement of a Lake or Streambed Alteration Agreement and is applicable to all projects. Applications to CDFW must include a complete, certified California Environmental Quality Act (CEQA) document.

California Native Plant Protection Act

The California Native Plant Protection Act of 1977 (Section 1900 et seq. of the California Fish and Game Code) directed CDFW to carry out the legislature's intent to "preserve, protect and enhance rare and endangered plants in this State." The California Native Plant Protection Act gave the California Fish and Game Commission the power to designate native plants as endangered or rare and to protect endangered and rare plants from take. CESA expanded on the original California Native Plant Protection Act and enhanced legal protection for plants, but the California Native Plant Protection Act remains part of the California Fish and Game Code. To align with federal regulations, the categories of "threatened" and "endangered" species were added to CESA. All "rare" animals in CESA were converted to "threatened," but this did not occur for rare plants. Thus, there are three listing categories for plants in California: rare, threatened, and endangered. Because rare plants are not included in CESA, mitigation measures for impacts to rare plants are specified in a formal agreement between CDFW and project proponents.

Nesting Birds

Section 3503 of the California Fish and Game Code states that "it is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird, except as otherwise provided by this code or any regulation made pursuant thereto." Section 3503.5 protects all birds of prey (raptors) and their eggs and nests. Section 3511 states that fully protected birds or parts thereof "may not be taken or possessed at any time." Section 3513 states that it is unlawful to take or possess any migratory non-game bird as designated in the Migratory Bird Treaty Act.

California Environmental Quality Act

CEQA requires identification of a project's potentially significant impacts on biological resources, and ways that such impacts can be avoided, minimized, or mitigated. CEQA also provides guidelines and thresholds for use by lead agencies for evaluating the significance of proposed impacts.

The Guidelines for Implementation of the California Environmental Quality Act (CEQA Guidelines) Section 15380(b)(1) defines endangered animals or plants as species or subspecies whose "survival and reproduction in the wild are in immediate jeopardy from one or more causes, including loss of habitat, change in habitat, overexploitation, predation, competition, disease, or other factors." A rare animal or plant is defined in CEQA Guidelines Section 15380(b)(2) as a species that, although not presently threatened with extinction, exists "in such small numbers throughout all or a significant portion of its range that it may become endangered if its environment worsens; or … [t]he species is likely to become endangered within the foreseeable future throughout all or a significant portion of its range and may be considered 'threatened' as that term is used in the federal Endangered Species Act." Additionally, an animal or plant may be presumed to be endangered, rare, or threatened if it meets the criteria for listing, as defined further in CEQA Guidelines Section 15380(c).

CDFW has developed a list of "Special Species" as "a broad term used to refer to all the animal taxa tracked by the CDFW California Natural Diversity Database, regardless of their legal or protection status" (CDFW 2024a). This is a broader list than those species that are protected under ESA, CESA, and other California Fish and Game Code provisions, and includes lists developed by other organizations, including, for example, the Audubon Watch List. Guidance documents prepared by other agencies, including the Bureau of Land Management Sensitive Species and USFWS Birds of Special Concern, are also included on this CDFW Special Species list. Additionally, CDFW has concluded that plant species listed as California Rare Plant Rank (CRPR) 1 and 2 by the California Native Plant Society (CNPS), and potentially some CRPR 3 plants, are covered by CEQA Guidelines Section 15380.

Section IV, Appendix G, Environmental Checklist Form, of the CEQA Guidelines requires an evaluation of impacts to "any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Wildlife or the U.S. Fish and Wildlife Service."

Porter–Cologne Water Quality Control Act

Pursuant to provisions of the Porter–Cologne Water Quality Control Act, the Regional Water Quality Control Boards regulate discharging waste, or proposing to discharge waste, within any region that could affect a water of the state (California Water Code Section 13260[a]). The State Water Resources Control Board defines a water of the state as "any surface water or groundwater, including saline waters, within the boundaries of the state" (California Water Code Section 13050[e]). All waters of the United States are waters of the state. Waters of the

state include wetlands, and the State Water Resources Control Board definition of wetlands includes the following (SWRCB 2019):

1. Natural wetlands,
2. Wetlands created by modification of a surface water of the state, and
3. Artificial wetlands that meet any of the following criteria:
    a. Approved by an agency as compensatory mitigation for impacts to other waters of the state, except where the approving agency explicitly identifies the mitigation as being of limited duration;
    b. Specifically identified in a water quality control plan as a wetland or other water of the state;
    c. Resulted from historic human activity, is not subject to ongoing operation and maintenance, and has become a relatively permanent part of the natural landscape; or
    d. Greater than or equal to one acre in size, unless the artificial wetland was constructed, and is currently used and maintained, primarily for one or more of the following purposes…:
        i. Industrial or municipal wastewater treatment or disposal,
        ii. Settling of sediment,
        iii. Detention, retention, infiltration, or treatment of stormwater runoff and other pollutants or runoff subject to regulation under a municipal, construction, or industrial permitting program,
        iv. Treatment of surface waters,
        v. Agricultural crop irrigation or stock watering,
        vi. Fire suppression,
        vii. Industrial processing or cooling,
        viii. Active surface mining – even if the site is managed for interim wetlands functions and values,
        ix. Log storage,
        x. Treatment, storage, or distribution of recycled water, or
        xi. Maximizing groundwater recharge (this does not include wetlands that have incidental groundwater recharge benefits); or
        xii. Fields flooded for rice growing.

Wetlands that may not meet all of USACE's wetland delineation criteria are considered wetland waters of the state 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" (SWRCB 2019). Additionally, aquatic resources that USACE determines to not be waters of the United States because they lack a significant nexus to a traditional navigable water or are above the OHWM limit of federal jurisdiction may also be considered waters of the state. If a CWA Section 404 permit is not required for a project, the Regional Water Quality Control Board may still require a permit (waste discharge requirements) for impacts to waters of the state under the Porter–Cologne Water Quality Control Act.

2.3 Regional

Draft Kern County Valley Floor Habitat Conservation Plan

The project site is within the management area of the Draft Kern County Valley Floor Habitat Conservation Plan (KCVFHCP). The Draft KCVFHCP area occurs in the western portion of Kern County, excluding areas at the base of the Tehachapi Mountains. The Draft KCVFHCP area is limited to the southern San Joaquin Valley floor of Kern County, including the project site.

The KCVFHCP is a pending HCP pursuant to ESA. The Draft KCVFHCP area covers more than 3,110 square miles in Kern County, with a purpose of creating a comprehensive strategy to conserve and protect the San Joaquin kit fox (*Vulpes macrotis mutica*), blunt-nosed leopard lizard (*Gambelia sila*), and 23 other sensitive species. In addition, this HCP provides a streamlined program for complying with the requirements of CESA and ESA. The HCP has not yet been approved by USFWS, CDFW, or the Kern County Board of Supervisors.

2.4 Local

Kern County General Plan

The Kern County General Plan identifies the federal, state, and local statutes, ordinances, and policies that govern the conservation of biological resources that must be considered by Kern County during the decision-making process for any project that could affect biological resources.

The following goals, policies, and measures from the Land Use, Open Space, and Conservation Element and the Energy Element of the Kern County General Plan are applicable to the natural resources occurring or potentially occurring on the project site or along the proposed gen-tie line routes (County of Kern 2009).

Chapter 1: Land Use, Open Space, and Conservation Element

1.10: General Provisions

Goal 1: Ensure that the County can accommodate anticipated future growth and development while a safe and healthful environment and a prosperous economy by preserving valuable natural resources, guiding development away from hazardous areas, and assuring the provision of adequate public services.

1.10.5: Threatened and Endangered Species

Policy 27: Threatened or endangered plant and wildlife species should be protected in accordance with State and Federal laws.

Policy 28: County should work closely with State and federal agencies to assure that discretionary projects avoid or minimize impacts on fish, wildlife, and botanical resources.

Policy 29: The County will seek cooperative efforts with local, State, and federal agencies to protect listed threatened and endangered plant and wildlife species through the use of conservation plans and other methods promoting management and conservation of habitat lands.

Policy 31: Under the provisions of the California Environmental Quality Act (CEQA), the County, as lead agency, will solicit comments from the California Department of Fish and Game [now CDFW] and the U.S. Fish and Wildlife Service when an environmental document (Negative Declaration, Mitigated Negative Declaration, or Environmental Impact Report) is prepared.

Policy 32: Riparian areas will be managed in accordance with the United States Army Corps of Engineers, and the California Department of Fish and Game [now CDFW] rules and regulations to enhance the drainage, flood control, biological, recreational, and other beneficial uses while acknowledging existing land use patterns.

Implementation Measures

Measure Q: Discretionary projects shall consider effects to biological resources as required by the California Environmental Quality Act.

Measure R: Consult and consider the comments from responsible and trustee wildlife agencies when reviewing a discretionary project subject to the California Environmental Quality Act.

Measure S: Pursue the development and implementation of conservation programs with State and federal wildlife agencies for property owners desiring streamlined endangered species mitigation programs.

Chapter 5: Energy Element

5.2: Importance of Energy to Kern County

Policy 8: The County should work closely with local, state, and federal agencies to assure that energy projects (both discretionary and ministerial) avoid or minimize direct impacts to fish, wildlife, and botanical resources, wherever practical.

Policy 9: The County should develop and implement measures which result in long-term compensation for wildlife habitat, which is unavoidably damaged by energy exploration and development activities.

5.4.5: Solar Energy Development

Policy 4: The County should encourage solar development in the desert and valley regions previously disturbed, and discourage development of energy projects on undisturbed land supporting State or federally protected plant and wildlife species.

Kern County Code of Ordinances

Section 19.81, Dark Skies Ordinance (Outdoor Lighting)

In November 2011, Kern County approved a Dark Skies Ordinance. The purpose of this ordinance is as follows (Kern County Code of Ordinances 19.81.010):

> In order to maintain the existing character of Kern County, a minimal approach shall be taken to outdoor lighting, as excessive illumination can create a glow that may obscure the night sky and

excessive illumination or glare may constitute a nuisance. The purpose of this chapter is to provide requirements for outdoor lighting within specified unincorporated areas of Kern County in order to accomplish the following objectives:

1. Encourage a safe, secure, and less light-oriented night-time environment for residents, businesses and visitors.
2. Promote a reduction in unnecessary light intensity and glare, and to reduce light spillover onto adjacent properties.
3. Protect the ability to view the night sky by restricting unnecessary upward projections of light.
4. Promote a reduction in the generation of greenhouse gases by reducing wasted electricity that can result from excessive or unwanted outdoor lighting.

Buttonwillow Specific Plan

The Buttonwillow Specific Plan guides development within and surrounding the Buttonwillow community. The Buttonwillow Specific Plan addresses issues of importance in the area by stating goals, policies, and implementation measures to accommodate growth while protecting the community's unique business, agricultural, industrial, and environmental issues. The Buttonwillow Specific Plan works in tandem with the Kern County General Plan and Zoning Ordinance to direct land use and development decisions, establishing a single set of community-wide policies and implementation strategies. It contains Land Use, Housing Standards, Circulation, Conservation, and Open Space Elements. None of these elements identify any goals, policies, or objectives pertaining to the conservation or protection of biological resources.

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3 Methods

Data regarding biological resources present within the project site was obtained through review of pertinent literature, field reconnaissance, habitat assessments, and protocol/focused surveys, which are described in detail in this chapter. For purposes of this report, special-status resources are defined as follows:

- Special-status plant species include the following:
  - Species that are designated as either rare, threatened, or endangered by CDFW or USFWS and are protected under either CESA (California Fish and Game Code, Section 2050 et seq.) or ESA (16 USC 1531 et seq.)
  - Species that are candidate species being considered or proposed for listing under ESA or CESA
  - Species with a CRPR of 1 or 2 in the Special Vascular Plants, Bryophytes, and Lichens List (CDFW 2024b)
  - Species protected under the California Desert Native Plants Act
- Special-status wildlife species include the following:
  - Species that are designated as either rare, threatened, or endangered by CDFW or USFWS and are protected under either CESA (California Fish and Game Code, Section 2050 et seq.) or ESA (16 USC 1531 et seq.)
  - Species that are candidate species being considered or proposed for listing under ESA or CESA
  - California Species of Special Concern (SSC), as designated by CDFW, and Birds of Conservation Concern (BCC), as designated by USFWS (CDFW 2024a)
  - Mammals and birds that are fully protected (FP) species, as described in California Fish and Game Code, Sections 4700 and 3511 (CDFW 2024a)
- Special-status vegetation communities are those designated as sensitive by CDFW (i.e., S1, S2, and S3)

3.1 Literature Review

Prior to conducting a field assessment, a literature search and database review were conducted by Dudek biologists to evaluate the natural resources found or potentially occurring on the project site. The database review included the most recent versions of the California Natural Diversity Database, special-status species lists (CDFW 2024a, 2024b), the CNPS Inventory of Rare and Endangered Plants of California (CNPS 2024a), and USFWS's Information for Planning and Consultation (IPaC) occurrence data (USFWS 2024a). The CNPS Inventory of Rare and Endangered Plants of California was reviewed to identify sensitive biological resources present or potentially present for the U.S. Geological Survey 7.5-minute quadrangle on which the project site is located (Buttonwillow) and the 9 surrounding quadrangles. The CDFW occurrence data were queried using geographic information system (GIS) software based on a 5-mile buffer around the project site. Once the critical habitat was identified in the IPaC database, GIS data of the critical habitat were reviewed in ArcGIS. Potential and/or historical drainages and aquatic features were investigated based on a review of U.S. Geological Survey topographic maps (1:24,000 scale), aerial photographs, the USFWS National Wetland Inventory database (USFWS 2024b), and the Natural Resource Conservation Service's Web Soil Survey (USDA 2024a).

3.2 Field Surveys

Dudek biologist Russell Sweet conducted a reconnaissance-level survey on the undeveloped portions of the project site on May 31, 2024, to identify existing biological resources on the site and confirm potential biological constraints. The biologist created a vegetation map and conducted an aquatic resources jurisdictional delineation. Following the reconnaissance-level survey, Russell Sweet and Nicole Plotkin conducted a focused survey for special-status plants on June 19, 2024.

Table 1 lists the dates, focus, scope, conditions, and personnel for the survey.

Table 1. Survey Conditions

Date	Biologists	Type of Survey	Time	Weather Conditions
05/31/2024	R. Sweet	Aquatic resources delineation/vegetation mapping	6:40 a.m.–1:22 p.m.	64°F–94°F; 0% cloud cover; 2–3 mph wind
6/19/2024	R. Sweet and N. Plotkin	Focused special-status plant survey	6:40 a.m.–12:09 p.m.	67–88°F; 0% cloud cover; 2–3 mph wind

Note: mph = miles per hour.

3.2.1 Vegetation Community and Land Cover Mapping

The Dudek biologist used CDFW's Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities (CDFW 2018) and the California Natural Communities List (CDFW 2023; based on A Manual of California Vegetation, Online Edition [CNPS 2024b]), to map the entire project site. These classification systems focus on a quantified, hierarchical approach that includes both floristic (plant species) and physiognomic (community structure and form) factors as currently observed (as opposed to predicting climax or successional stages). Vegetation communities and land covers were delineated to the vegetation alliance level and, where appropriate, the association level. Some modifications, such as the Preliminary Descriptions of the Terrestrial Natural Communities of California (Holland 1986; Oberbauer et al. 2008), were incorporated to accommodate the lack of conformity of the observed communities to those included in these references.

Vegetation mapping was conducted on foot to visually cover 100% of the undeveloped portions of the project site. The majority of the site is developed and disturbed and includes an existing sub-station and associated infrastructure. Vegetation communities and land cover types were mapped in the field using an Esri ArcGIS mobile application. Vegetation communities were classified based on the site factors, descriptions, distribution, and characteristic species present in the area. Information was recorded including dominant species and associated cover classes, aspect, canopy height, and visible disturbance factors.

Minimum mapping units were established to standardize the scale and appropriate evaluation of stands, as recommended by CDFW (2022a). Mapping standards call for a minimum mapping unit of not greater than 10 acres for upland natural communities not considered sensitive, but usually 1 or 2 acres, and 0.25 acres for sensitive vegetation communities and wetland or riparian vegetation communities. Visible disturbance factors were also noted during vegetation mapping.

Following completion of the fieldwork, Dudek GIS analysts digitized the vegetation boundaries as delineated by the field biologist and created a GIS coverage for vegetation communities.

3.2.2 Flora

Latin and common names for plant species with a CRPR follow the CNPS Inventory of Rare, Threatened, and Endangered Plants of California (CNPS 2024a). For plant species without a CRPR, Latin names follow the Jepson Interchange List of Currently Accepted Names of Native and Naturalized Plants of California (Jepson Flora Project 2024), and common names follow the California Natural Communities List (CDFW 2022b) or the U.S. Department of Agriculture's Natural Resources Conservation Service PLANTS Database (USDA 2024b). A list of the plant species observed on the project site are provided in Appendix A, Plant Compendium, to this report.

3.2.3 Fauna

All wildlife species detected during the field surveys by sight, vocalizations, burrows, tracks, scat, or other signs were recorded. The site was visually scanned with and without binoculars to identify wildlife. Latin and common names of animals follow Crother (2017) for reptiles and amphibians, American Ornithological Society (AOS 2021) for birds, Mammal Diversity Database (2024) for mammals, North American Butterfly Association (NABA 2016) or San Diego Natural History Museum (SDNHM 2002) for butterflies, and Moyle (2002) for fish. Wildlife species observed on the project site are provided in Appendix B, Wildlife Compendium, to this report.

3.2.4 Special-Status and Regulated Resources

Aquatic Resources Delineation

Potential and/or historical drainages and aquatic features were investigated based on a review of U.S. Geological Survey topographic maps (1:24,000 scale), aerial photographs, the USFWS National Wetland Inventory database (USFWS 2024b), the USGS National Hydrology Dataset, and the Natural Resource Conservation Service's Web Soil Survey (USDA 2024a). An aquatics resources delineation report is being prepared. Dudek conducted a delineation of state and federal jurisdictional waters and wetlands on the undeveloped portions of project site in accordance with current policies. Federal wetlands were mapped based on the procedures in USACE's 1987 Corps of Engineers Wetlands Delineation Manual (USACE 1987) and its 2008 Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0) (USACE 2008a). Non-wetland waters were mapped at the OHWM based on the procedures defined in USACE's 2008 A Field Guide to Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States (OHWM Manual; USACE 2008b). Waters of the state were mapped in accordance with the State Wetland Definition and Procedures for Discharges of Dredged or Fill Material to Waters of the State (SWRCB 2019). CDFW jurisdictional areas were mapped to include the bank of the stream/channel and extent of ponds, as set forth under California Fish and Game Code Section 1602.

Wetland Determination Forms were taken at certain points within drainages or vegetation communities where a predominance of hydrophytic vegetation was present; hydrology, vegetation, and soils were assessed to determine whether USACE three-parameter wetlands were present. USACE OHWM Forms were completed at representative cross sections of non-wetland waters to capture their characteristics and widths.

No federal or state-jurisdictional waters were observed on site; therefore, no waters were mapped.

Focused Survey for Special-Status Plants

Field survey methods and mapping of rare plants conformed to CNPS's Botanical Survey Guidelines (CNPS 2001), Protocols for Surveying and Evaluating Impacts to Special-Status Native Populations and Natural Communities (CDFW 2018), and General Rare Plant Survey Guidelines (Cypher 2002). The surveys consisted of one survey pass in June 2024 that provided 100% coverage of the undeveloped lands within the project site.

3.2.5 Survey Limitations

Limitations of the surveys include a diurnal bias and the absence of focused surveys for special-status species or trapping for reptiles, amphibians, and small mammals at night. The surveys were conducted during the daytime to maximize the detection of most wildlife. Most birds are active in the daytime, so diurnal surveys maximize the number of bird observations. Conversely, diurnal surveys usually result in few observations of mammals, many of which may only be active at night. In addition, many species of reptiles and amphibians are secretive in their habits and are difficult to observe using standard meandering transects.

4 Environmental Setting

The purpose of this chapter is to describe the general existing conditions within and adjacent to the project site to document the baseline conditions for this report and subsequent analysis.

4.1 Climate

The climate of the in the project region is typical of the Central Valley of California, with hot dry summers and cool, mild winters. Daytime temperatures in the summer are often in the upper 90s (°F), and some highs extend into the low 100s (°F). Nighttime lows are typically in the 60s (°F). In winter, daytime temperatures are usually in the low 40s (°F). Yearly precipitation averages approximately 12 inches, and rainfall occurs mostly in the months of December and January.

4.2 Topography

The project site is relatively flat throughout, with elevations ranging from approximately 272 feet above mean sea level in the northwest to approximately 285 feet above mean sea level in the southeast.

4.3 Soils

According to the U.S. Department of Agriculture Natural Resources Conservation Service (USDA 2024a), the following soil series occur within the boundaries of the project site: (1) Kimberlina fine sandy loam, 0% to 2% slopes; (2) Milham sandy loam, 0% to 2% slopes; (3) Buttonwillow clay, drained; and (4) Lokern clay, saline-alkali, drained. The soil series are described in more detail below and are presented in Figure 2, Soils.

- Buttonwillow Series consists of deep, somewhat poorly drained soils formed in alluvium weathered mainly from granite. Buttonwillow soils are in basins and have slopes of 0% to 2%. The mean annual precipitation is approximately 5 inches, and the mean annual temperature is 63°F (USDA 2024c).
- Kimberlina Series consists of very deep, well-drained soils on floodplains and recent alluvial fans. These soils formed in mixed alluvium derived predominantly from igneous and/or sedimentary rock sources. The slope is 0% to 9%. The mean annual precipitation is approximately 6 inches, and the mean annual temperature is approximately 64°F (USDA 2024c).
- Lokern Series consists of deep, somewhat poorly drained, clayey soils formed from mixed but predominantly granitic alluvium. Lokern soils are on basins and have slopes of 0% to 2%. The mean annual precipitation is approximately 5 inches, and the mean annual temperature is approximately 63°F (USDA 2024c).
- Milham Series consists of very deep, well-drained soils on alluvial fans, plains, low terraces, and fan remnants. These soils formed in mixed calcareous alluvium weathered from granitic and sedimentary rock. The slopes are 0% to 9%. The mean annual precipitation is approximately 7 inches, and the mean annual temperature is approximately 64°F (USDA 2024c).

4.4 Watersheds and Hydrology

The project site is in the South Valley Hydrologic Unit within the Semitropic Hydrologic Area (558.70) (Figure 3, Watershed).

5 Results

This chapter describes the results of the literature review, field surveys, and habitat assessments within the project site.

5.1 Vegetation Communities and Land Covers

One vegetation community and three land cover types were mapped on the project site (Table 2). The spatial distribution of the vegetation communities and land covers are presented on Figure 4, Vegetation.

State rankings of 1, 2, or 3 are considered high priority for inventory or special status, and impacts to these communities typically require mitigation. There are no vegetation communities or covers considered sensitive biological resources by CDFW under CEQA (CDFW 2023).

Approximately 169.0 acres or 66% of the project site are disturbed/developed, including the following land cover types: orchards; disturbed habitat; and urban/developed lands.

Table 2. Existing Land Covers and Vegetation Communities in the Biological Study Area

General Category of Vegetation	Common Name of Vegetation	Scientific Name of Vegetation	Classification of Vegetation	Acreages on Project Site	Percentage Of Vegetation Comments/ Land Covers
Disturbed and Developed	Orchards	Orchards (ORC)	NA/General Habitat/Group	0.6	0%
	Disturbed habitat	Disturbed Habitat (DH)	NA/General Habitat/Group	1.2	0%
	Urban/developed	Urban/Developed (DEV)	NA/General Habitat/Group	167.2	66%
			Disturbed and Developed Total	*169.0*	*66%*
Grass and Herb Dominated Community	Non-native grassland	Non-Native Grassland General Habitat (NNG)	NA/General Habitat/Group	86.0	34%
			Grass and Herb Dominated Total	*86.0*	*34%*
			Total	**255.0**	**100%**

Note: NA = not applicable.

5.1.1 Disturbed and Developed

Disturbed Habitat

Disturbed habitat refers to areas where soils have been recently or repeatedly disturbed by grading, compaction, or clearing of vegetation. Structures are typically not present within disturbed habitats, and these areas provide relatively low value for most plant and wildlife species. When vegetated, disturbed habitat supports predominantly non-native plant species, such as ornamentals or ruderal exotic species that take advantage of disturbance.

Disturbed habitat is not a listed vegetation community under the California Natural Community List (CDFW 2023), but it has been used in this report because it best describes what was observed in the field. As such, this land cover is not globally or state ranked and is not considered a sensitive natural community under CEQA (CDFW 2023).

Within the project site, disturbed habitat consists of soil stockpiles, grading, and vegetation clearance for fuel modification and totals 1.2 acres (0%).

Urban/Developed

Urban/developed land covers refer to areas that have been constructed on or otherwise physically altered to the point where vegetation is no longer present. Developed areas are characterized by permanent or semi-permanent structures, hardscapes, and landscaped areas that require irrigation.

Urban/developed land is not a listed vegetation community under the California Natural Community List (CDFW 2023), but it has been used in this report because it best describes what was observed in the field. As such, this community is not globally or state ranked and is not considered a sensitive natural community under CEQA (CDFW 2023).

Within the project site, approximately 167.2 acres (66%) are urban/developed areas and include the existing substation, roads, and parking.

Orchards

Orchards refer to areas where trees, shrubs, or crop plants such as grapevines have been intentionally planted (i.e., to produce food or for other commercial purposes). Orchards and vineyards are typically artificially irrigated, and plants may be supported with structures such as trellises. Orchards and vineyards typically support a limited understory of grasses or herbs (Oberbauer et al. 2008).

Within the project site there are 0.6 acres (0%) of orchards within the project site.

5.1.2 Grass and Herb Dominated

Non-Native Grassland

Non-native grasslands are grasslands that are dominated by non-native species. These grasslands typically occur in areas with a history of disturbance. Some associated species include common oat (*Avena sativa*), bromes (*Bromus* spp.), and barleys (*Hordeum* spp.) (CNPS 2024b). On the project site, this general habitat occurs in upland habitat in the non-agricultural portions of the project site.

Common non-native grasses that dominant these areas include compact brome (*Bromus madritensis*), mouse barley (*Hordeum murinum*), and common Mediterranean grass (*Schismus barbatus*).

Non-native grasslands were not mapped to the alliance or association level because no alliances or associations are considered sensitive under CEQA, as they are dominated by non-native species.

Within the project site, there are 86.0 (34%) non-native grasslands on site.

5.2 Plants and Wildlife Observed

5.2.1 Plants

A total of 25 species of native or naturalized plants, 10 native (40%) and 15 non-native (60%), were recorded on the site (see Appendix A).

5.2.2 Wildlife

A total of 11 wildlife species, consisting of 10 native species (91%) and 1 non-native species (9%), were recorded on the project site during surveys (Appendix B).

5.3 Special-Status and Regulated Resources

5.3.1 Special-Status Plants

Special-status plants include species that are listed, or candidates for listing, as threatened or endangered by USFWS and CDFW, and species identified as rare by CNPS (particularly CRPR 1A, presumed extinct in California; CRPR 1B, rare, threatened, or endangered throughout its range; and CRPR 2, rare or endangered in California, more common elsewhere).

Dudek biologists performed an extensive desktop review of literature, existing documentation, and GIS data to evaluate the potential for special-status plant species to occur on the project site. Each special-status plant species was assigned a rating of "not expected," "low," "moderate," or "high" potential[2] to occur based on relative location to known occurrences, vegetation community, soil, and elevation. Based on the results of the literature review and database searches, as well as the June 2024 focused rare plant surveys, one special-status plant species is present on the project site. Table 3 lists the special-status plant species present on the project site. Plant species with a low potential to occur or plant species that are not expected to occur are listed in Appendix C; these species are not discussed further in this report because no significant direct, indirect, or cumulative impacts to these species are expected to result from the proposed project.

[2] Not Expected: Habitat within the project site is unsuitable or project site is outside of species historical range (i.e., over 20 years old) or surveys have been conducted during the appropriate blooming period; Low: Habitat with the project site is marginal and/or documented occurrences of species are historical (i.e., over 20 years old); Moderate: Habitat within the project site is suitable and species has been document within 5 miles of the project site in recent records (i.e., within 20 years); High: Habitat within the project site is suitable and species has been documented either within the project site or immediately adjacent to project boundary in recent records (i.e., within 20 years).

Table 3. Special-Status Plants Present on the Project Site

Scientific Name	Common Name	Status (Federal/State/CRPR)	Primary Habitat Associations/ Life Form/ Blooming Period/ Elevation Range (feet amsl)	Potential to Occur on the Project Site
Atriplex cordulata var. *cordulata*	heartscale	None/None/1B.2	Chenopod scrub, meadows and seeps, valley and foothill grassland (sandy); alkaline (sometimes)/annual herb/ Apr–Oct/0–1,835	***Present.*** This species was observed during focused surveys conducted in June 2024[3]. One CNDDB record from 1999 has been recorded of this species approximately 3.5 miles southwest of the project site (CDFW 2024c).

Notes: CRPR = California Rare Plant Rank; amsl = above mean sea level; CNDDB = California Natural Diversity Database.
California Rare Plant Ranks
1B: Plants rare, threatened, or endangered in California and elsewhere
.1 Seriously threatened in California (over 80% of occurrences threatened / high degree and immediacy of threat)
.2 Moderately threatened in California (20%–80% occurrences threatened / moderate degree and immediacy of threat)

5.3.2 Special-Status Wildlife

Special-status wildlife species include those listed, or candidates for listing, as threatened or endangered by USFWS and CDFW; those designated as Species of Special Concern by CDFW; and those designated as Birds of Conservation Concern by USFWS.

As they did for special-status plants, Dudek biologists performed an extensive desktop review of literature, existing documentation, and GIS data to evaluate the potential for special-status wildlife species to occur on the project site. Each special-status wildlife species was assigned a rating of "not expected," "low," "moderate," or "high"[4] potential to occur based on relative location to known occurrences and vegetation community/habitat association. Listed species with any potential to occur and non-listed special-status species with a moderate or higher potential to occur are discussed in Table 4. The occurrence data provided in Table 4 represents the closest occurrences to the project site and the most recent records. Those special-status wildlife species that are not expected or that have low potential to occur on the project site are included in Appendix D; however, these species are not discussed further in this report because no significant direct or indirect impacts to these species are expected as result of the proposed project.

Based on the results of the literature review, database searches, and biological reconnaissance survey, one special-status reptile, three special-status birds, and two special-status mammals have a moderate to high potential to occur within the project site (Table 4).

[4] Not Expected: Habitat within the project site is unsuitable or project site is outside of species historical range (i.e., over 20 years old); Low: Habitat with the project site is marginal and/or documented occurrences of species are historical (i.e., over 20 years old); Moderate: Habitat within the project site is suitable and species has been document within 5 miles of the project site in recent records (i.e., within 20 years); High: Habitat within the project site is suitable and species has been documented either within the project site or immediately adjacent to project boundary in recent records (i.e., within 20 years).

Table 4. Special-Status Wildlife Species Present or with Potential to Occur on the Project Site

Species Name	Common Name	Status (Federal/State)	Habitat	Potential to Occur on the Project Site[1]
Reptiles				
Gambelia sila	blunt-nosed leopard lizard	FE/FP, SE	Sparsely vegetated alkali and desert scrubs, including semi-arid grasslands, alkali flats, and washes	***Moderate potential to occur.*** The project site contains suitable sparse vegetative areas and grasslands. Several CNDDB records have been recorded within 5 miles of the project site. The closest observation occurs 1.8 miles north of the project, however this is a historical record from 1974. Another observation recorded in 2023 occurs 3.5 miles southwest of the project site. However, this and other recent records occur either on the southwest side of the California Aqueduct, or on the northeast side of Highway 5. Both man-made structures may reduce the likelihood of blunt-nosed leopard lizard occurring on site (CDFW 2024c).
Birds				
Athene cunicularia (burrow sites and some wintering sites)	burrowing owl	BCC/SSC	Nests and forages in grassland, open scrub, and agriculture, particularly with ground squirrel burrows	***Moderate potential to nest.*** Moderate potential to forage. No California ground squirrel burrows were observed on the project site. No burrows suitable for nesting burrowing owl were observed. The grassland on site could be used by foraging burrowing owls. Several CNDDB records have been recorded of burrowing owls within 5 miles of the project site, and one record recorded in 2007 occurs within the project site (CDFW 2024c).
Buteo swainsoni (nesting)	Swainson's hawk	None/ST	Nests in open woodland and savanna, riparian, and in isolated large trees; forages in nearby grasslands and agricultural areas such as wheat and alfalfa fields and pasture	***Moderate potential to nest.*** Moderate potential to forage. The site contains one large tamarisk tree with potential for nesting. No nests were observed within the tree at the time of surveys. The grassland on site could be used by foraging Swainson's hawk. Several CNDDB records have been recorded of Swainson's hawk nests within 5 miles of the project site. The closest record occurs 1.5 miles northeast of the project site, recorded in 2018, where a nesting pair with two downy chicks were observed (CDFW 2024c).

Table 4. Special-Status Wildlife Species Present or with Potential to Occur on the Project Site

Species Name	Common Name	Status (Federal/State)	Habitat	Potential to Occur on the Project Site[1]
Lanius ludovicianus (nesting)	loggerhead shrike	None/SSC	Nests and forages in open habitats with scattered shrubs, trees, or other perches	***Present.*** Species observed hunting. The tamarisk on site could be used for nesting. The open grassland can be used for foraging. No CNDDB records have been recorded of this species within 5 miles of the project site (CDFW 2024c). However, this species is known to occur throughout the area.
Mammals				
Dipodomys nitratoides nitratoides	Tipton kangaroo rat	FE/SE	Alluvial fan and floodplain soils; habitat with one or two species of sparsely scattered shrubs and a ground cover of introduced and native annual grasses and forbs	***Moderate potential to occur.*** The project site does contain suitable habitat of annual grassland. A few small mammal burrows were observed of potential size for Tipton kangaroo rat. The closest record is 1.6 miles northeast of the project site, recorded in 1992. A more recent record recorded in 2011 occurs 3.2 miles west of the project site (CDFW 2024c). This record occurs on the northeast side of the California Aqueduct, as does the project site. Therefore, Tipton kangaroo rat may occupy areas immediately surrounding the project site.
Vulpes macrotis mutica	San Joaquin kit fox	FE/ST	Grasslands and scrublands, including those that have been modified; oak woodland, alkali sink scrubland, vernal pool, and alkali meadow	***Moderate potential to occur.*** The project site provides suitable habitat where this species may forage. No California ground squirrel burrows were observed on the project site. However, San Joaquin kit fox has the potential to use the site to move through the area. Additionally, this species has been recorded in the CNDDB in several locations within 5 miles of the project site, and there are two records that overlap with project site boundaries, however both records are historical, from 1975 and 1992. Another record from 2007 occurs 3.8 miles southwest of the project site (CDFW 2024c).

[1] CNDDB data is processed data only.
Notes: CNDDB = California Natural Diversity Database.
Status Legend
Federal
BCC: U.S. Fish and Wildlife Service Bird of Conservation Concern

FE: Federally listed as endangered
FT: Federally listed as threatened
State
FP: California Department of Fish and Wildlife Fully Protected species
SC: State candidate for listing as endangered
SE: State listed as endangered
SSC: California Department of Fish and Wildlife Species of Special Concern
ST: State listed as threatened

5.3.3 Potential Aquatic Resources

The jurisdictional delineation methods are described in Section 3.2.4. The jurisdictional aquatic resources delineation determined that there are no jurisdictional aquatic resources present on the project site. There were no streambeds, stream banks, channels or riparian vegetation. Additionally, there were no drainages with an ordinary high waters mark.

5.4 Wildlife Corridors and Habitat Linkages

Wildlife corridors are linear features that connect large patches of natural open space and provide avenues for the migration of animals. Wildlife corridors contribute to population viability by ensuring continual exchange of genes between populations, providing access to adjacent habitat areas for foraging and mating, and providing routes for recolonization of habitat after local extirpation or ecological catastrophes (e.g., fires). Habitat linkages are small patches that join larger blocks of habitat and help reduce the adverse effects of habitat fragmentation. Habitat linkages provide a potential route for gene flow and long-term dispersal of plants and animals and may also serve as primary habitat for smaller animals, such as reptiles and amphibians. Habitat linkages may be continuous habitat or discrete habitat islands that function as steppingstones for dispersal.

The project site is not mapped as an Essential Connectivity Area (ds620) or a natural landscape block (ds823). The site is mapped as an Area of Conservation Emphasis (ACE; ds2734) Rank 1 (Limited Connectivity Opportunity). (Figure 5, Wildlife Movement). CDFW (2019a) defines ACE Rank 1 as follows:

> ACE Rank 1: Limited Connectivity Opportunity. Areas where land use may limit options for providing connectivity (e.g., agriculture, urban) or no connectivity importance has been identified in models. Includes lakes. Some DOD [U.S. Department of Defense] lands are also in this category because they have been excluded from models due to lack of conservation opportunity, although they may provide important connectivity habitat.

Overall, the CDFW databases described above support the observation that the project site is situated across in a patchy landscape of natural areas that support wildlife diversity. It's important to note that Highway 58 runs along the southern border the project site, which is a major barrier to wildlife movement and breaks the connectivity between the site and potential habitat to the south. I-5 is also a major barrier to wildlife moving east to west. The topography across the project site is flat, with the vast majority of the site consisting of nonnative grassland, developed and disturbed habitats (Table 2). Wildlife moving across the landscape generally can move freely through the open landscape. The relatively low traffic volume, along with light human presence, likely does not preclude wildlife from utilizing the project site or surrounding areas.

However, the project site does not currently function as a corridor or linkage between two larger habitat blocks. In addition, the proposed project would continue to provide open spaces across the region for movement. Although the project site may function as local dispersal habitat for wildlife movement and/or foraging/hunting, the proposed project would not create a significant impediment to wildlife movement that would warrant a wildlife corridor study.

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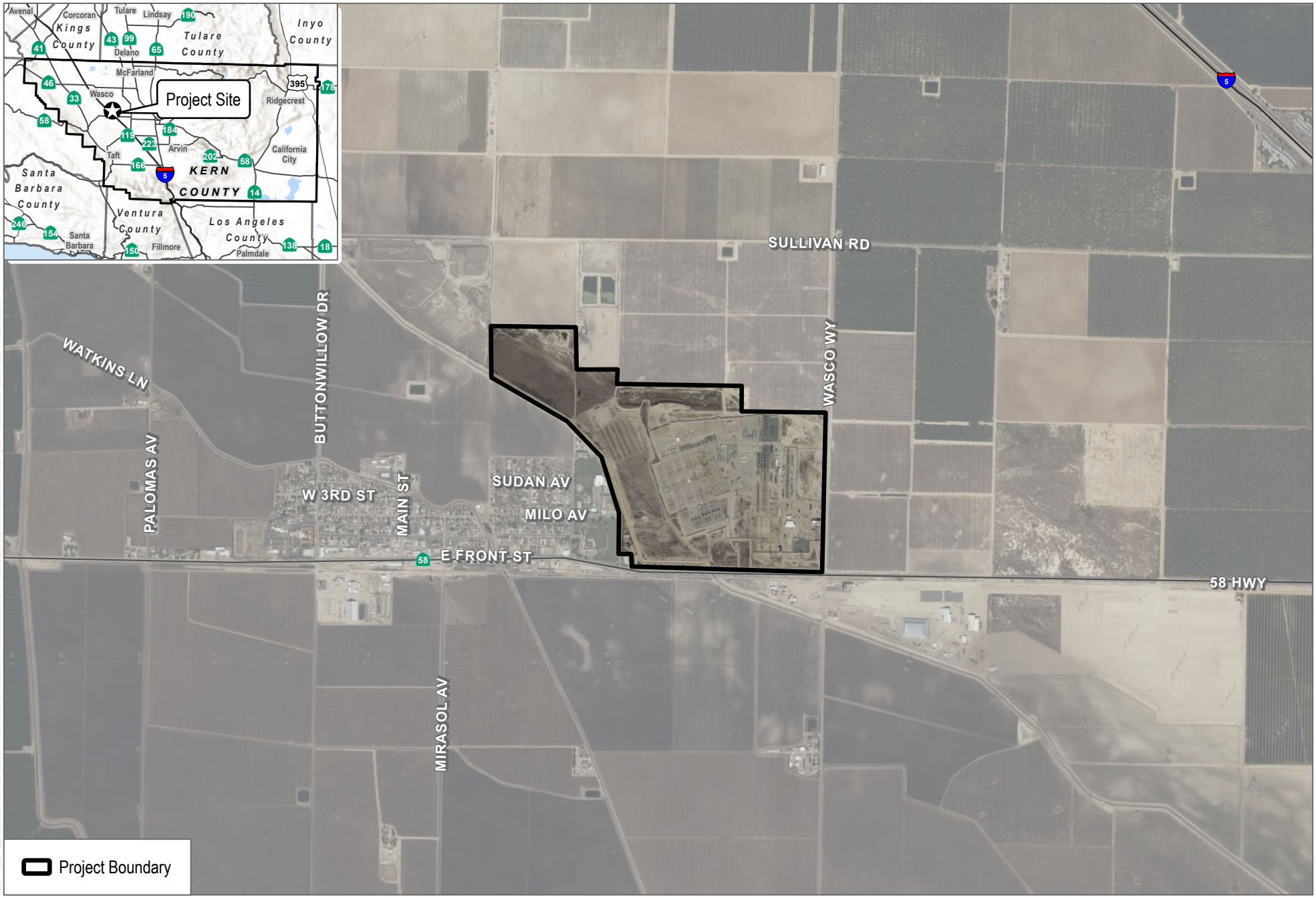
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SOURCE: USGS National Map 2023; Bing Maps 2023; Open Street Map 2023

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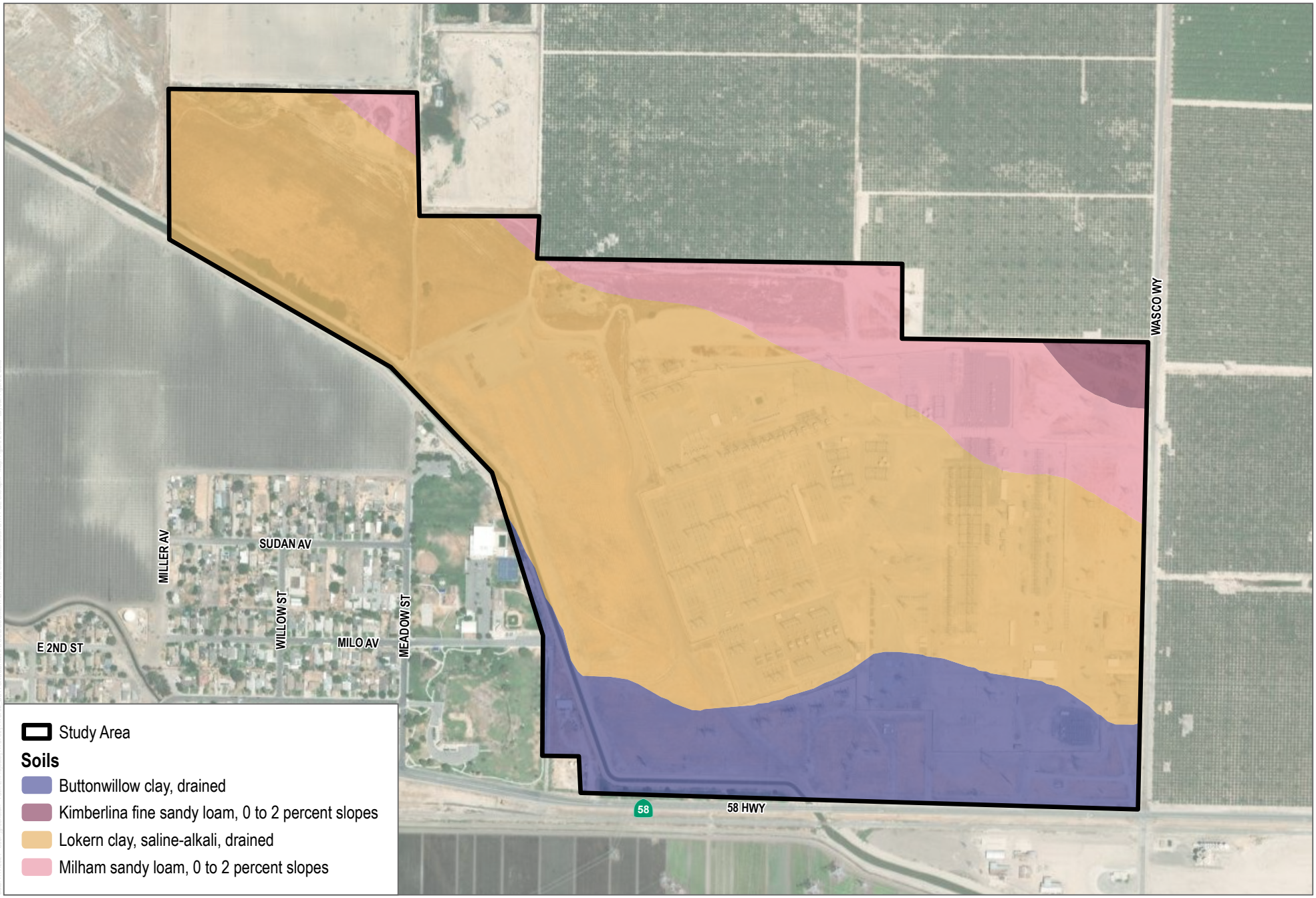
0 1,000 2,000 Feet

FIGURE 1

Project Location

Buttonbush Solar and Storage Project - Midway Substation

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SOURCE: Maxar 2023; Open Street Map 2023; USDA SSURGO

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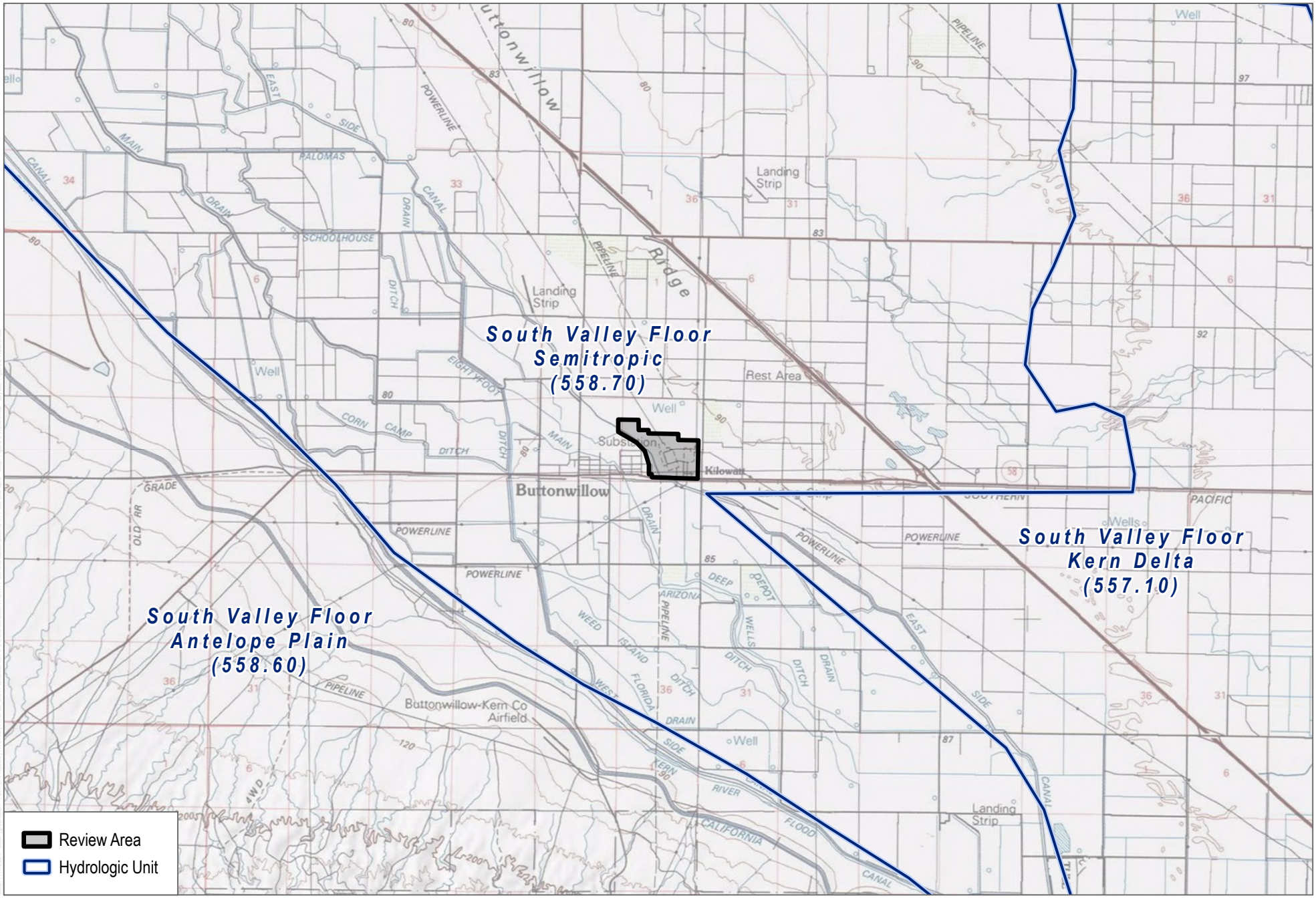
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FIGURE 2

Soils

Buttonbush Solar and Storage Project - Midway Substation

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SOURCE: USGS Topo Map Series; DWR 2023

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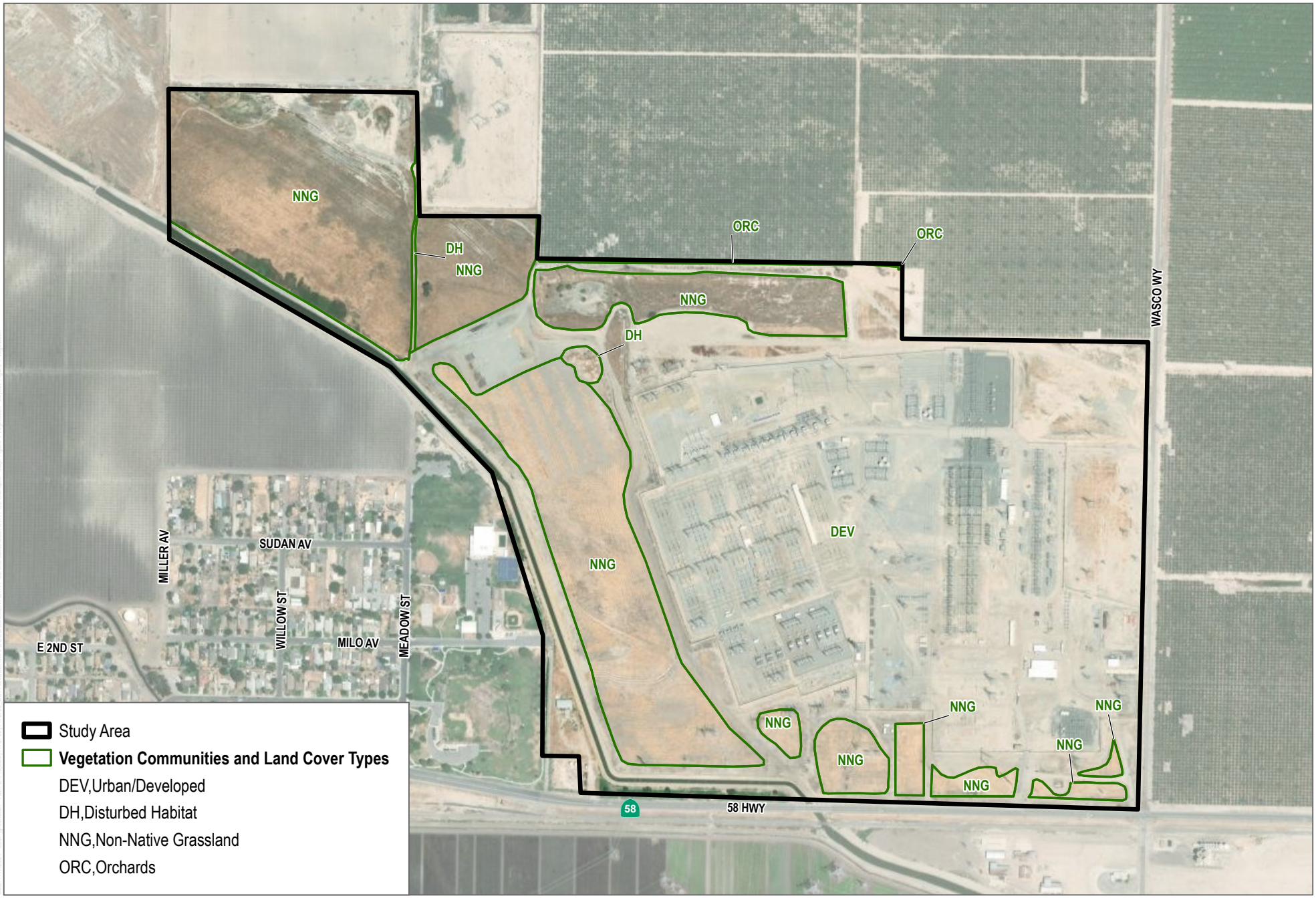
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FIGURE 3

Watershed

Buttonbush Solar and Storage Project - Midway Substation

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SOURCE: Maxar 2023; Open Street Map 2023

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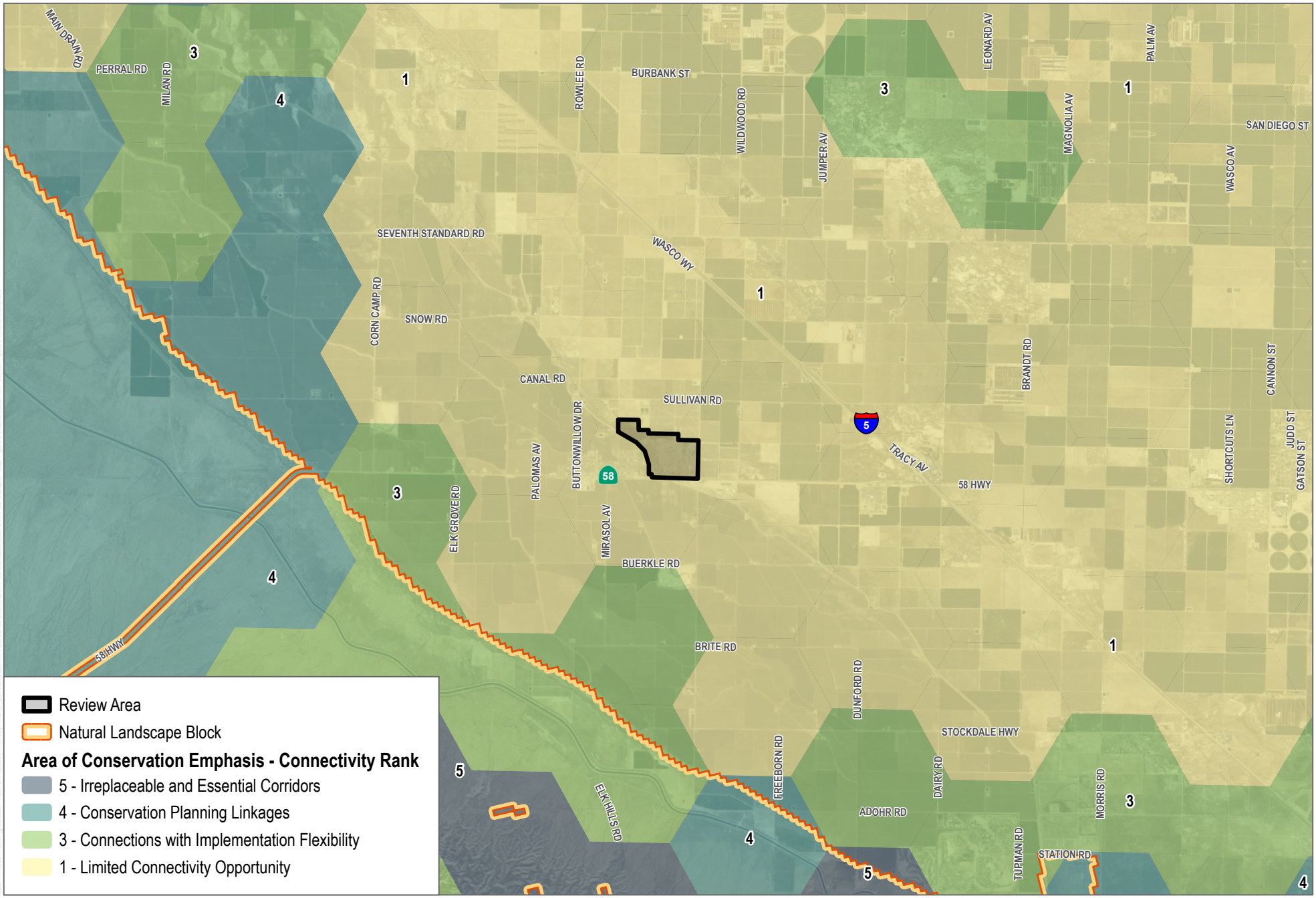
0 250 500 Feet

FIGURE 4

Vegetation

Buttonbush Solar and Storage Project - Midway Substation

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SOURCE: Bing Maps 2023; CDFW

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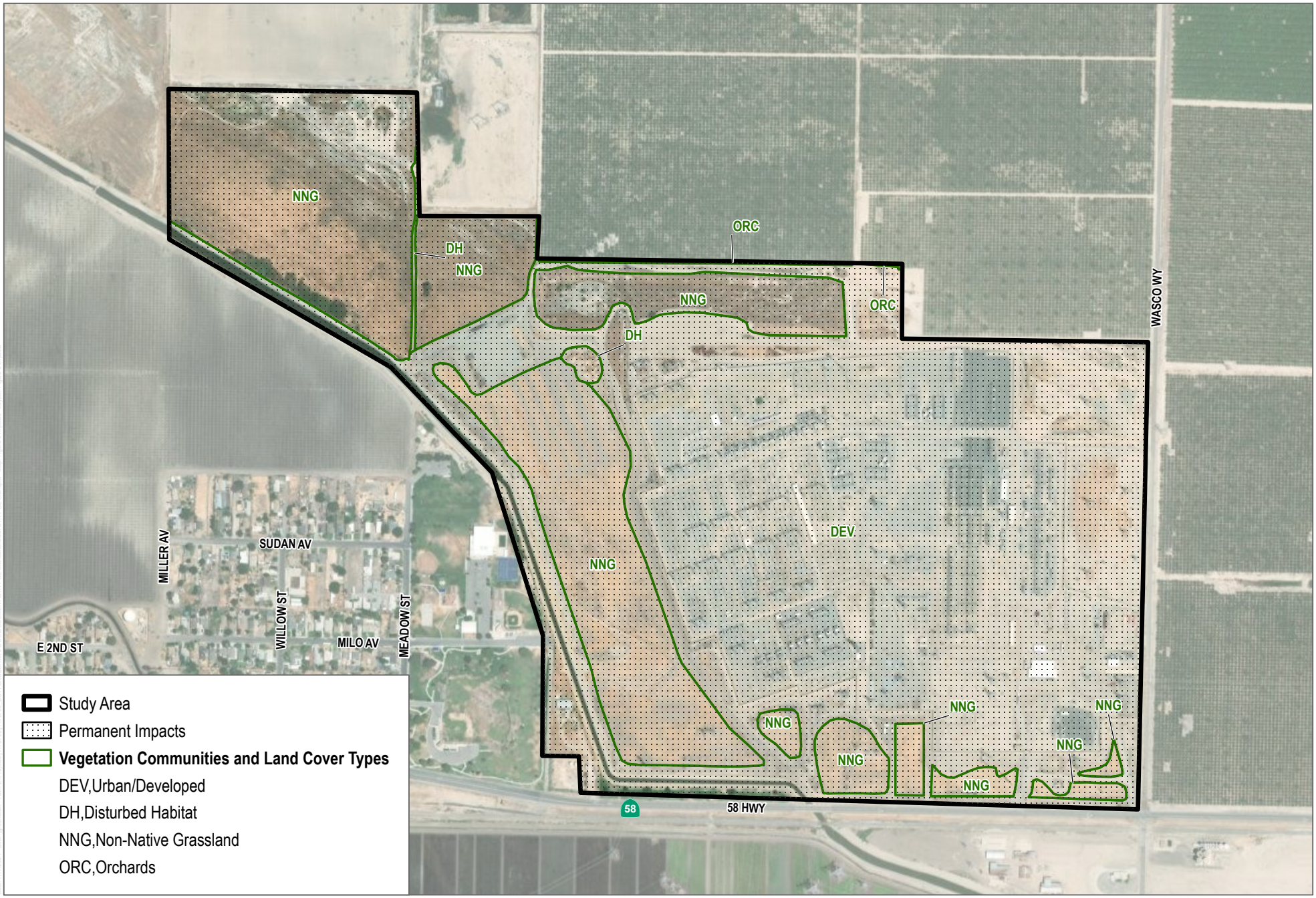
0 5,000 10,000 Feet

FIGURE 5

Wildlife Movement

Buttonbush Solar and Storage Project - Midway Substation

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SOURCE: Maxar 2023; Open Street Map 2023

DUDEK

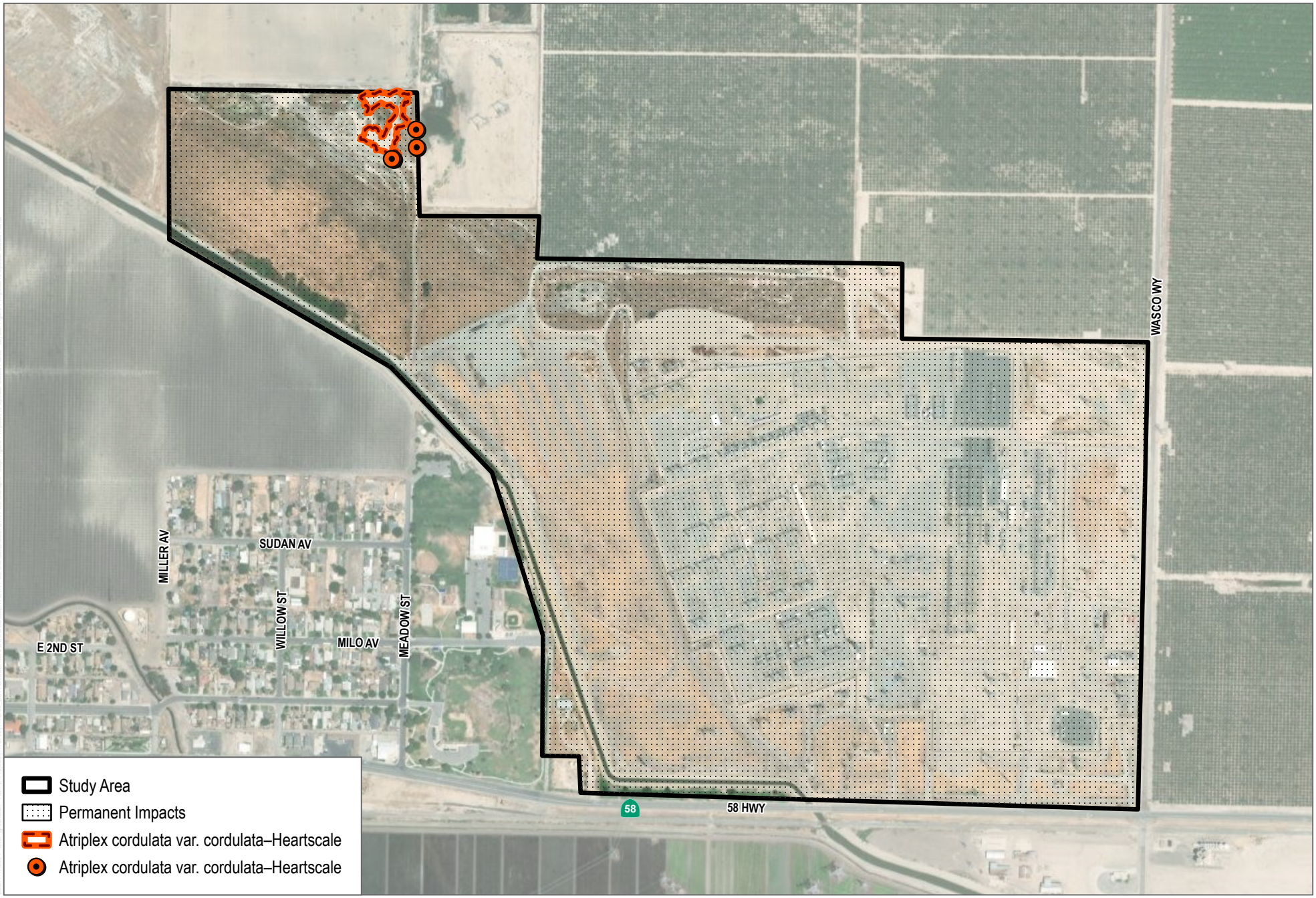
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FIGURE 6

Impacts

Buttonbush Solar and Storage Project - Midway Substation

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SOURCE: Maxar 2023; Open Street Map 2023

DUDEK

0 250 500 Feet

FIGURE 7

Impacts to Special-Status Plants

Buttonbush Solar and Storage Project - Midway Substation

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Appendix A
Plant Compendium

Vascular Plant Species

Eudicots

AMARANTHACEAE—AMARANTH FAMILY

* *Amaranthus albus*—prostrate pigweed

ASTERACEAE—SUNFLOWER FAMILY

* *Centaurea melitensis*—Maltese star-thistle
  Deinandra fasciculata—clustered tarweed
  Erigeron canadensis—Canadian horseweed
  Isocoma acradenia—alkali goldenbush
* *Lactuca serriola*—prickly lettuce
* *Rhaponticum repens*—hardheads
* *Sonchus asper*—spiny sowthistle

BORAGINACEAE—BORAGE FAMILY

Amsinckia menziesii—Menzies' fiddleneck
Heliotropium curassavicum—salt heliotrope

BRASSICACEAE—MUSTARD FAMILY

* *Lepidium latifolium*—perennial pepper weed

CHENOPODIACEAE—GOOSEFOOT FAMILY

Atriplex argentea—silverscale saltbush
Atriplex polycarpa—allscale
* *Atriplex rosea*—tumbling saltweed
* *Salsola tragus*—prickly Russian thistle
Suaeda nigra—bush seepweed

MALVACEAE—MALLOW FAMILY

* *Malva parviflora*—cheeseweed mallow
Malvella leprosa—alkali mallow

POLYGONACEAE—BUCKWHEAT FAMILY

Eriogonum maculatum—spotted buckwheat

SOLANACEAE—NIGHTSHADE FAMILY

* *Nicotiana glauca*—tree tobacco
* *Solanum elaeagnifolium*—silverleaf nightshade

TAMARICACEAE—TAMARISK FAMILY

* *Tamarix ramosissima*—tamarisk

Monocots

POACEAE—GRASS FAMILY

* *Bromus madritensis*—compact brome
* *Hordeum murinum*—mouse barley
* *Schismus barbatus*—common Mediterranean grass

* signifies introduced (non-native) species

Appendix B
Wildlife Compendium

Birds

Blackbirds, Orioles, and Allies

ICTERIDAE—BLACKBIRDS

Agelaius phoeniceus—red-winged blackbird

Finches

FRINGILLIDAE—FRINGILLINE AND CARDUELINE FINCHES AND ALLIES

Haemorhous mexicanus—house finch

Goatsuckers

CAPRIMULGIDAE—GOATSUCKERS

Chordeiles acutipennis—lesser nighthawk

Owls

TYTONIDAE—BARN OWLS

Tyto alba—barn owl

Pigeons and Doves

COLUMBIDAE—PIGEONS AND DOVES

Zenaida macroura—mourning dove

* *Streptopelia decaocto*—Eurasian collared-dove

Shorebirds

CHARADRIIDAE—LAPWINGS AND PLOVERS

Charadrius vociferus—killdeer

Shrikes

LANIIDAE—SHRIKES

Lanius ludovicianus—loggerhead shrike

Mammals

Canids

CANIDAE—WOLVES AND FOXES

Canis latrans—coyote

Reptiles

Lizards

PHRYNOSOMATIDAE—IGUANID LIZARDS

Uta stansburiana—common side-blotched lizard

TEIIDAE—WHIPTAIL LIZARDS

Aspidoscelis tigris—tiger whiptail

* signifies introduced (non-native) species

Appendix C

Special-Status Plant Species with Low or No Potential to Occur

Scientific Name	Common Name	Status (Federal/State/ CRPR)	Primary Habitat Associations/ Life Form/Blooming Period/ Elevation Range (feet amsl)	Potential to Occur on the Project Site
Astragalus hornii var. *hornii*	Horn's milk-vetch	None/None/1B.1	Meadows and seeps, playas; alkaline, lake margins/annual herb/May–Oct/195–2,790	***Not expected to occur.*** The project site does not contain suitable habitat for this species. No CNDDB records have been recorded of this species within 5 miles of the project site (CDFW 2024).
Atriplex cordulata var. *cordulata*	heartscale	None/None/1B.2	Chenopod scrub, meadows and seeps, valley and foothill grassland (sandy); alkaline (sometimes)/annual herb/Apr–Oct/0–1,835	***Not expected to occur.*** This species was not observed during focused surveys conducted in June 2024. Three CNDDB records have been recorded of this species approximately 3.5 miles southwest of the project site (CDFW 2024).
Atriplex cordulata var. *erecticaulis*	Earlimart orache	None/None/1B.2	Valley and foothill grassland/annual herb/Aug–Sep (Nov)/130–330	***Not expected to occur.*** This species was not observed during focused surveys conducted in June 2024. No CNDDB records have been recorded of this species within 5 miles of the project site (CDFW 2024).
Atriplex coronata var. *vallicola*	Lost Hills crownscale	None/None/1B.2	Chenopod scrub, valley and foothill grassland, vernal pools; alkaline/annual herb/Apr–Sep/165–2,085	***Not expected to occur.*** This species was not observed during focused surveys conducted in June 2024. Three CNDDB records have been recorded of this species approximately 3.5 miles southwest of the project site (CDFW 2024).
Atriplex minuscula	lesser saltscale	None/None/1B.1	Chenopod scrub, playas, valley and foothill grassland; alkaline, sandy/annual herb/May–Oct/50–655	***Not expected to occur.*** This species was not observed during focused surveys conducted in June 2024. No CNDDB records have been recorded of this species within 5 miles of the project site (CDFW 2024).
Atriplex subtilis	subtle orache	None/None/1B.2	Valley and foothill grassland; alkaline/annual herb/(Apr)June–Sep (Oct)/130–330	***Not expected to occur.*** This species was not observed during focused surveys conducted in June 2024. No CNDDB records have been recorded of this species within 5 miles of the project site (CDFW 2024).
Caulanthus californicus	California jewelflower	FE/SE/1B.1	Chenopod scrub, pinyon and juniper woodland, valley and foothill grassland; sandy/annual herb/Feb–May/200–3,280	***Low potential to occur.*** No CNDDB records have been recorded of this species within 5 miles of the project site (CDFW 2024).

Scientific Name	Common Name	Status (Federal/State/ CRPR)	Primary Habitat Associations/ Life Form/Blooming Period/ Elevation Range (feet amsl)	Potential to Occur on the Project Site
Cirsium crassicaule	slough thistle	None/None/1B.1	Chenopod scrub, marshes and swamps (sloughs), riparian scrub/ annual/perennial herb/May–Aug/10–330	***Not expected to occur.*** This species was not observed during focused surveys conducted in June 2024. No CNDDB records have been recorded of this species within 5 miles of the project site (CDFW 2024).
Delphinium recurvatum	recurved larkspur	None/None/1B.2	Chenopod scrub, cismontane woodland, valley and foothill grassland; alkaline/perennial herb/Mar–June/10–2,590	***Not expected to occur.*** This species was not observed during focused surveys conducted in June 2024. No CNDDB records have been recorded of this species within 5 miles of the project site (CDFW 2024).
Eremalche parryi ssp. *kernensis*	Kern mallow	FE/None/1B.2	Chenopod scrub, pinyon and juniper woodland, valley and foothill grassland; clay (sometimes), dry, openings, sandy (sometimes)/annual herb/Jan(Feb)Mar–May/230–4,230	***Low potential to occur.*** Numerous CNDDB records have been recorded of this species within 5 miles west and southwest of the project site (CDFW 2024).
Eriogonum temblorense	Temblor buckwheat	None/None/1B.2	Valley and foothill grassland (clay, sandstone)/annual herb/(Apr)May–Sep/985–3,280	***Not expected to occur.*** The project site is outside the known elevation for this species. This species was not observed during focused surveys conducted in June 2024. No CNDDB records have been recorded of this species within 5 miles of the project site (CDFW 2024).
Eschscholzia lemmonii ssp. *kernensis*	Tejon poppy	None/None/1B.1	Chenopod scrub, valley and foothill grassland/annual herb/(Feb)Mar–May/525–3,280	***Not expected to occur.*** The project site is outside the known elevation for this species. No CNDDB records have been recorded of this species within 5 miles of the project site (CDFW 2024).
Lasthenia chrysantha	alkali-sink goldfields	None/None/1B.1	Vernal pools; alkaline/annual herb/Feb–Apr/0–655	***Not expected to occur.*** The project site does not contain suitable habitat for this species. No CNDDB records have been recorded of this species within 5 miles of the project site (CDFW 2024).

Scientific Name	Common Name	Status (Federal/State/ CRPR)	Primary Habitat Associations/ Life Form/Blooming Period/ Elevation Range (feet amsl)	Potential to Occur on the Project Site
Lasthenia glabrata ssp. *coulteri*	Coulter's goldfields	None/None/1B.1	Marshes and swamps (coastal salt), playas, vernal pools/annual herb/Feb–June/5–4,005	***Low Potential to Occur.*** This species was not observed during focused surveys conducted in June 2024. No CNDDB records have been recorded of this species within 5 miles of the project site (CDFW 2024c). There are no suitable vegetation communities present.
Madia radiata	showy golden madia	None/None/1B.1	Cismontane woodland, valley and foothill grassland/annual herb/Mar–May/80–3,985	***Low potential to occur.*** Suitable habitat present with grassland. No CNDDB records have been recorded of this species within 5 miles of the project site (CDFW 2024).
Monolopia congdonii	San Joaquin woollythreads	FE/None/1B.2	Chenopod scrub, valley and foothill grassland (sandy)/annual herb/Feb–May/195–2,625	***Low potential to occur.*** project site does have sandy soils suitable for this species. No CNDDB records have been recorded of this species within 5 miles of the project site (CDFW 2024).
Puccinellia simplex	California alkali grass	None/None/1B.2	Chenopod scrub, meadows and seeps, valley and foothill grassland, vernal pools; alkaline, flats, lake margins, vernally mesic/annual herb/Mar–May/5–3,050	***Not expected to occur.*** The project site does not contain suitable habitat for this species. One CNDDB record from 1983 has been recorded of this species approximately 4.6 miles west of the project site and is presumed extant (CDFW 2024).
Stylocline citroleum	oil neststraw	None/None/1B.1	Chenopod scrub, coastal scrub, valley and foothill grassland; clay/annual herb/Mar–Apr/165–1,310	***Low potential to occur.*** Suitable soil and grassland habitat present. No CNDDB records have been recorded of this species within 5 miles of the project site (CDFW 2024).

Notes: CRPR = California Rare Plant Rank; amsl = above mean sea level; CNDDB = California Natural Diversity Database.
Status Legend:
FE: Federally listed as endangered
SE: State listed as endangered
California Rare Plant Rank
1B: Plants rare, threatened, or endangered in California and elsewhere
.1 Seriously threatened in California (over 80% of occurrences threatened / high degree and immediacy of threat)
.2 Moderately threatened in California (20%–80% occurrences threatened / moderate degree and immediacy of threat)

References

CDFW (California Department of Fish and Wildlife. 2024. RareFind 5, Version 5.2.14. California Natural Diversity Database. Sacramento: CDFW, Biogeographic Data Branch. Accessed July 2024. https://map.dfg.ca.gov/rarefind/view/RareFind.aspx.

Appendix D

Special-Status Wildlife Species Not Expected to Occur on the Project Site

Species Name	Common Name	Status (Federal/State)	Habitat	Potential to Occur on the Project Site
Amphibians				
Spea hammondii	western spadefoot	None/SSC	Primarily grassland and vernal pools, but also in ephemeral wetlands that persist at least 3 weeks in chaparral, coastal scrub, valley–foothill woodlands, pastures, and other agriculture.	***Not expected to occur.*** No suitable habitat is present. No pools or wetlands with water persisting are present. One CNDDB record has been approximately 3.13 miles west of the project site and was located in association with a stormwater retention basin (CDFW 2024).
Reptiles				
Anniella alexanderae	Temblor legless lizard	None/SSC, SCE	Sandy soil at the southeast base of the Temblor Ranges, southwestern San Joaquin Valley, Kern County. Often found underneath leaf litter, rocks, and logs.	***Not expected to occur.*** The project site is outside the known range for this species. It is not known to occur east of the California Aqueduct. No CNDDB records have been recorded of this species within 5 miles of the project site (CDFW 2024).
Anniella grinnelli	Bakersfield legless lizard	None/SSC	Southern San Joaquin Valley. Known from two disjunct areas: the east side of the Carrizo Plain and portions of the city limits of Bakersfield. Often found underneath leaf litter, rocks, and logs.	***Not expected to occur.*** The project site is outside the known range for this species. No CNDDB records have been recorded of this species within 5 miles of the project site (CDFW 2024).
Arizona elegans occidentalis	California glossy snake	None/SSC	Arid scrub, rocky washes, grasslands, chaparral, open areas with loose soil.	***Low potential to occur.*** The project site does contain suitable grassland and open area habitats for this species. No CNDDB records have been recorded of this species within 5 miles of the project site (CDFW 2024).
Coluber flagellum ruddocki	San Joaquin coachwhip	None/SSC	Open, dry, treeless areas including grassland and saltbush scrub	***Low potential to occur.*** The project site contains suitable sparse vegetative areas and grasslands. However, no CNDDB records have been recorded within 5 miles of the project site. The nearest record occurs 9.2 miles southwest of the project site, recorded in 2017(CDFW 2024). Additionally, all four

Species Name	Common Name	Status (Federal/State)	Habitat	Potential to Occur on the Project Site
				local records of the species occur either on the southwest side of the California Aqueduct, or on the northeast side of Highway 5. Both man-made structures may reduce the likelihood of San Joaquin coachwhip occurring on site.
Phrynosoma blainvillii	Blainville's horned lizard	None/SSC	Open areas of sandy soil in valleys, foothills, and semi-arid mountains including coastal scrub, chaparral, valley–foothill hardwood, conifer, riparian, pine–cypress, juniper, and annual grassland habitats.	***Low potential to occur.*** The project site does contain suitable grassland and open area habitats for this species. No CNDDB records have been recorded of this species within 5 miles of the project site (CDFW 2024).
Thamnophis gigas	giant garter snake	FT/ST	Freshwater marsh habitat and low-gradient streams; also uses canals and irrigation ditches.	***Not expected to occur.*** The project site is outside the known range for this species. No CNDDB records have been recorded of this species within 5 miles of the project site (CDFW 2024).
Actinemys marmorata	northwestern pond turtle	FPT/SSC	Slow-moving permanent or intermittent streams, ponds, small lakes, and reservoirs with emergent basking sites; adjacent uplands used for nesting and during winter.	***Not expected to occur.*** The project site does not contain suitable habitat. No CNDDB records have been recorded of this species within 5 miles of the project site (CDFW 2024).
Birds				
Agelaius tricolor (nesting colony)	tricolored blackbird	BCC/SSC, ST	Nests near freshwater, emergent wetland with cattails or tules, but also in Himalayan blackberry; forages in grasslands, woodland, and agriculture.	***Not expected to nest.*** Suitable foraging habitat is present on the project site. No suitable nesting habitat is present on site; however, the grassland does provide suitable foraging. No CNDDB records have been recorded of this species within 5 miles of the project site (CDFW 2024).
Charadrius montanus (wintering)	mountain plover	BCC/SSC	Winters in shortgrass prairies, plowed fields, open sagebrush, and sandy deserts.	***Not expected to nest.*** Suitable foraging habitat is present on the project site. No nesting habitat is present; however, the open grassland could be used for foraging. No CNDDB records have been recorded

Species Name	Common Name	Status (Federal/State)	Habitat	Potential to Occur on the Project Site
				of this species within 5 miles of the project site (CDFW 2024).
Charadrius nivosus nivosus (nesting)	western snowy plover	FT, BCC/SSC	On coasts nests on sandy marine and estuarine shores; in the interior nests on sandy, barren or sparsely vegetated flats near saline or alkaline lakes, reservoirs, and ponds.	***Not expected to occur.*** The project site is outside the known range for this species. No CNDDB records have been recorded of this species within 5 miles of the project site (CDFW 2024).
Toxostoma lecontei	LeConte's thrasher	BCC/SSC	Nests and forages in desert wash, desert scrub, alkali desert scrub, desert succulent, and Joshua tree habitats; nests in spiny shrubs or cactus.	***Not expected to nest.*** Suitable foraging habitat is present on the project site. No nesting habitat is present; however, the open grassland could be used for foraging. No CNDDB records have been recorded of this species within 5 miles of the project site (CDFW 2024).
Vireo bellii pusillus (nesting)	least Bell's vireo	FE/SE	Nests and forages in low, dense riparian thickets along water or along dry parts of intermittent streams; forages in riparian and adjacent shrubland late in nesting season.	***Not expected to occur.*** The project site is outside the known range for this species. No CNDDB records have been recorded of this species within 5 miles of the project site (CDFW 2024).
Mammals				
Ammospermophilus nelsoni	Nelson's antelope squirrel	None/ST	Arid annual grassland and shrubland with saltbushes (*Atriplex* spp.), California jointfir (*Ephedra californica*), bladderpod (*Physaria* spp.), goldenbushes (Astereae), and snakeweed (*Gutierrezia* spp.).	***Low potential to occur.*** The project site does contain suitable habitat of annual grassland. However, no Nelson's antelope suirrels were observed during botanical surveys conducted in June 2024 during appropriate survey conditions. Numerous CNDDB records have been recorded within 5 miles of the project site (CDFW 2024).
Dipodomys ingens	giant kangaroo rat	FE/SE	On fine sandy loam soils with sparse forb vegetation and low-density alkali desert scrub.	***Low potential to occur.*** The project site does contain suitable habitat of annual grassland. A few small mammal burrows were observed of potential size for giant kangaroo rat. The closest CNDDB records have

Species Name	Common Name	Status (Federal/State)	Habitat	Potential to Occur on the Project Site
				been recorded approximately 3.6 to 4 miles south and southwest of the project site (CDFW 2024).
Dipodomys nitratoides brevinasus	short-nosed kangaroo rat	None/SSC	Friable soils on flat or gently rolling terrain in grassland and desert-shrub vegetation.	***Not expected to occur.*** The project site is outside the known range for this species. No CNDDB records have been recorded of this species within 5 miles of the project site (CDFW 2024).
Eumops perotis californicus	western mastiff bat	None/SSC	Chaparral, coastal and desert scrub, coniferous and deciduous forest and woodland; roosts in crevices in rocky canyons and cliffs where the canyon or cliff is vertical or nearly vertical, trees, and tunnels.	***Not expected to occur.*** The project site does not contain suitable habitat for this species. One CNDDB record has been recorded of this species and it has been presumed extant (CDFW 2024).
Onychomys torridus tularensis	Tulare grasshopper mouse	None/SSC	Low, open scrub, and semi-scrub habitats in arid Lower Sonoran associations.	***Not expected to occur.*** The project site does not contain suitable habitat for this species. No CNDDB records have been recorded of this species within 5 miles of the project site (CDFW 2024).
Sorex ornatus relictus	Buena Vista Lake ornate shrew	FE/SSC	Marshes, wetlands, streams, and sloughs along lake basins in southern San Joaquin Valley; historical occurrences include Buena Vista, Tulare, and Kern Lakes; distribution poorly known.	***Not expected to occur.*** The project site does not contain suitable habitat for this species. One CNDDB record has been recorded of this species from 1909 and it has been presumed extant (CDFW 2024).
Taxidea taxus	American badger	None/SSC	Dry, open, treeless areas; grasslands, coastal scrub, agriculture, and pastures, especially with friable soils.	***Low potential to occur.*** The project site provides suitable habitat where this species may forage. No burrows suitable for denning were observed on site. However, this species has potential to use the site to move through the area. Additionally, this species has been recorded in CNDDB several locations within 5 miles of the project site (CDFW 2024).

Species Name	Common Name	Status (Federal/State)	Habitat	Potential to Occur on the Project Site
Invertebrates				
Bombus crotchii	Crotch's bumble bee	None/SC	Open grassland and scrub communities supporting suitable floral resources	***Low potential to occur.*** Open grassland habitat is present, some potential floral resources, such as host plants, are present. A few small mammal burrows were observed, which could be used as a nest site. No CNDDB records have been recorded of this species within 5 miles of the project site. The nearest record occurs 7.3 miles south of the project site, recorded in 1957 (CDFW 2024).
Branchinecta lynchi	vernal pool fairy shrimp	FT/None	Vernal pools, seasonally ponded areas within vernal swales, and ephemeral freshwater habitats.	***Not expected to occur.*** The project site does not contain suitable habitat for this species. No CNDDB records have been recorded of this species within 5 miles of the project site (CDFW 2024).
Danaus plexippus plexippus pop. 1	monarch – California overwintering population	FC/None	Wind-protected tree groves with nectar sources and nearby water sources.	***Not expected to occur.*** The project site does not contain suitable habitat for this species. No wind-protected tree groves with nectar sources were present and no milkweed plants were observed during the botanical surveys conducted in June 2024. No CNDDB records have been recorded of this species within 5 miles of the project site (CDFW 2024).

Status Abbreviations
Federal
BCC: U.S. Fish and Wildlife Service Bird of Conservation Concern
FC: Federal candidate
FE: Federally endangered
FPT: Federally proposed for listing as threatened
FT: Federally threatened
State
SCE: State candidate endangered species
SE: State endangered
SSC: California Species of Special Concern
ST: State threatened

References

CDFW. 2024. RareFind 5, Version 5.2.14. California Natural Diversity Database. Sacramento: CDFW, Biogeographic Data Branch. Accessed July 2024. https://map.dfg.ca.gov/rarefind/view/RareFind.aspx.

Appendix E

Cultural Resources Materials

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Appendix E.1

Archaeological Resources Inventory and Evaluation Report

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Archaeological Resources Inventory and Evaluation Report

Buttonbush Solar and Storage Project Kern County, California

MAY 2025

Prepared for:

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Printed on 30% post-consumer recycled material.

National Archaeological Database (NADB) Information

Authors:	Adam Giacinto, MA, RPA; Ross Owen, MA, RPA; William Burns, MSc, RPA; Nicholas Hanten, MA; Julie Royer, MA
Firm:	Dudek
Project Proponent:	29SC 8me LLC
Report Date:	May 2025
Report Title:	Archaeological Resources Inventory and Evaluation Report for the Buttonbush Solar and Storage Project, Kern County, California
Type of Study:	Archaeological Inventory
Resources:	BB-JR-S-001, BB-JR-S-002, BB-JR-S-003, BB-JR-S-004, BB-JR-S-005, BB-JR-S-006, BB-RO-S-001, BB-ES-S-001, BB-ES-S-002, BB-ES-S-003, BB-ES-S-004, BB-ES-S-005, BB-ES-S-006, BB-ES-S-007, BB-ES-S-008, BB-ES-S-009, BB-KT-S-001, P-15-000324, P-15-000325, P-15-009737, P-15-009738, P-15-013725, P-15-016999, P-15-020558, P-15-021388
USGS Quads:	Buttonwillow, Lokern, Rio Bravo, Semitropic, Wasco SW, California 1:24,000 Township 27 S, Range 23 E, portions of Sections 28, 33, and 34; Township 28S, Range 23E, portions of Sections 1, 2, 3, 4, 5 , 11, 12, 27, 28, 29, 33, and 34; Township 28S, Range 24E, all or portions of Sections 23, 25, 26, 27, 35 and 34; Township 29S, Range 23E, all or portions of Sections 1, 3, 4, 11, and 12; Township 29S, Range 24E, all or portions of Sections 1, 2, 6, 7, 8, 11, 12, 13, 14, 17, 18, and 19; and Township 29S, Range 25E, portions of Section 7
Acreage:	**Project Site:** Approximately 11,983 **Gen-Tie corridor options: 950.7** **Study Area:** Approximately 14,355
Keywords:	Buttonwillow, Lokern, Rio Bravo, Semitropic and Wasco SW, USGS 7.5-Minute Quadrangles, Intensive Pedestrian Survey, Evaluation

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C NAHC Sacred Lands File Search
D Newly Recorded Resources (Confidential)
E Resumes for Key Personnel

Acronyms and Abbreviations

Acronym/Abbreviation	Definition
APE	area of potential effect
CCS	cryptocrystalline silicate
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
cm	centimeter
cmbs	centimeters below ground surface
CRHR	California Register of Historical Resources
DPR	California Department of Parks and Recreation
FGV	Fine-grained volcanic
Historic	Also referred to as “historic-era”, meaning a cultural resources that is more than 45 years in age
M	Meter
NAHC	Native American Heritage Commission
NHPA	National Historic Preservation Act
NRHP	National Register of Historic Places
Prehistoric	Also referred to as “Precontact”, meaning period before Euro-American contact
PRC	California Public Resources Code
Project	Buttonbush Solar and Storage Project
Study Area	Area subject to archaeological pedestrian survey
USGS	U.S. Geological Survey

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Executive Summary

29SC 8me LLC (Project proponent or Applicant) is proposing construction of the Buttonbush Solar and Storage Project (Project), a solar photovoltaic energy generation and storage facility and associated ancillary facilities located in unincorporated northern Kern County (County) in the San Joaquin Valley in central California. The applicant contracted Dudek to perform a Phase I cultural resources inventory for the Project. This archaeological resources inventory and evaluation report was conducted in compliance with the California Environmental Quality Act (CEQA). The lead agency for compliance with CEQA is the County. While work has been completed to typical federal agency standards, specific federal agency review has not been determined at this time.

The proposed Project is located within unincorporated Kern County directly north of Buttonwillow, approximately 2 miles west of the City of Shafter, and approximately 7 miles southwest of the City of Wasco. A larger Study Area encompassing the entire Project site was evaluated for the proposed development to ensure that potential impacts were fully captured in analysis. The Project Study Area evaluated consists of an area approximately 14,355 acres in size. The Project site, as identified by the area planned for use or which may otherwise be affected by Project activities, is approximately 11,983 acres within a gross parcel boundary of 13,868 acres. This is exclusive of the Gen-Tie corridor options of 950.7 acres, including 255 acres of land that is owned and managed by Pacific Gas and Electric (PG&E), of which 38.6 acres will be impacted by the proposed Project. For the purposes of future federal agency review, should this occur, this Project site should also be considered the direct area of potential effect (APE). The vertical APE is assumed to be up to 20 feet below the existing grade, although Project design is still underway, and the exact maximum depth of ground disturbance may be subject to change. The project site acreage is based on a compilation of land parcel acres reported by the County Assessor for each Assessor's Parcel Number (APN) within the project area, as listed in Appendix B. In some cases, these parcel acreages were refined based on land surveys conducted for the project. However, the geometry of parcel polygons in geographic information system (GIS) mapping tools may not exactly match the County Assessor-reported acreage. As a result, the GIS-calculated Project Study Area acreage may slightly differ from the APN-derived project site total.

The Project site is undeveloped, privately owned, and being used for primarily agriculture. Specifically, the Project is located within the Wasco SW, Semitropic, Rio Bravo, Buttonwillow, and Lokern USGS 1:24,000 topographic maps (7.5-minute quadrangle). More specifically, the Project is located as follows: Township 27 S, Range 23 E, portions of Sections 28, 33, and 34; Township 28S, Range 23E, portions of Sections 1, 2, 3, 4, 5 , 11, 12, 27, 28, 29, 33, and 34; Township 28S, Range 24E, all or portions of Sections 23, 25, 26, 27, 35 and 34; Township 29S, Range 23E, all or portions of Sections 1, 3, 4, 11, and 12; Township 29S, Range 24E, all or portions of Sections 1, 2, 6, 7, 8, 11, 12, 13, 14, 17, 18, and 19; and Township 29S, Range 25E, portions of Section 7.

A Southern San Joaquin Valley Information Center (SSJVIC) records search identified 12 previously recorded cultural resources within the Project site and 47 cultural resources within 1-mile of the Project site. These resources report the presence of human remains, habitation debris, and lithic material, along with a historic-era trash scatters, among other resources. Dudek requested a Native American Heritage Commission Sacred Lands File search, the results of which were provided on December 2, 2022. Results of this search were negative. Dudek has not directly contacted Native American tribes with the intent of avoiding disruptions to ongoing government-to-government notifications and consultation pursuant to Assembly Bill 52 and Senate Bill 18; a record of outreach to date is included as an appendix to this report and a full record of this outreach will be on file with the County of Kern.

Between January 17, 2023 and June 18, 2024, Dudek archaeologists conducted an intensive-level pedestrian survey and implemented an archaeological testing program. Survey included the Study Area and associated access roads. Ground surface visibility was high (approximately 80%–99% in most areas) over much of the Project site due to sparse vegetation within fallow agricultural fields. Soils have been disturbed historically and in modern times from water conveyance infrastructure, agriculture, and ranching. It should be noted that a small portion of the Project site (approximately 605 acres) was not accessible due to active agricultural activities, hazardous materials including aerosolized pesticides and liquid waste, and flooding. Visual inspection of these inaccessible areas observed similar terrain and conditions to adjacent agriculturally-active parcels, but did not provide full survey coverage. These unsurveyed areas were included in the record searches, visually assessed from the perimeter of the parcel boundary and included in the geomorphological review but will require survey prior to construction. The recorded locations of all previously recorded cultural resources intersecting the Project site were revisited during archaeological survey. Two of these archaeological sites were relocated or otherwise expanded (P-15-000324 and P-15-020012); the remaining four (4) previously recorded sites and three (3) isolates appear to have been destroyed or are otherwise mismapped. The remaining 4 extant historic built environment structures/ features are addressed in a separate technical report (Jones, Ahmanson and Kim 2025). Sixteen newly recorded cultural resources were identified as a result of Dudek surveys, which included thirteen (13) prehistoric and three historic-era sites.

Given their limited complexity and highly disturbed context, all historic-era resources within the Project site were evaluated for National Register of Historic Places (NRHP) and California Register of Historical Resources (CRHR) eligibility based on surface information. The 13 newly recorded prehistoric sites intersecting the Project site were subject to subsurface testing, both within and surrounding the recorded distribution of surface artifacts. While a small number of incidental artifacts were observed below the surface within the plow zone, no intact subsurface deposits were documented within these sites. Subsurface testing was also completed near (outside of) P-15-000324 and P-15-000325 to provide an understanding of the extent of each site and the potential for intact buried cultural deposits in areas surrounding these resources. No subsurface deposits were documented in areas surrounding these sites; the areas within the recorded resource boundaries themselves were not subject to subsurface investigations. P-15-000325 is fenced off, outside of but adjacent to, the Project site.

The he site falls immediately east of the historic route of the Buena Vista Slough that channeled water variably throughout time northward from Buena Vista Lake towards Tulare Lake. During periods of increased moisture the slough would have flowed freely between the two lakes. Drier time periods would have seen a recession of lake shorelines and the slough transformed into a series of saline marshes. These features represented a resource-rich prehistoric environment. The area has been subject to substantial alluvial soil deposition through reoccurring events; these conditions, left undisturbed, have potential to result in capping of underlying ground surfaces and the development/preservation of subsurface archaeological deposits.

As presently designed, the Project would intersect or fall adjacent to 19 archaeological sites. Previously recorded sites include P-15-000324, a prehistoric resource with reported human remains; P-15-000325 which is recorded just outside of the Project site; and P-15-020012, a highly disturbed multi-component site which falls on PG&E lands. A total of 16 newly recorded resources (13 prehistoric and 3 historic-era) were identified within the Project site. P-15-000324 and P-15-000325 should be assumed eligible for NRHP/CRHR listing, as they remain unevaluated. It is presently the plan of the Applicant to avoid these resources and, as such, they would be subject to no impact. The 16 newly recorded resources and P-15-020012 appear to lack artifacts, features, or associations that could make them eligible for the NRHP under Criteria A/1, B/2, or C/3. Criterion D/4 is most appropriately

applied to an assessment of the sites' eligibility. Surface and subsurface investigations conducted within and surrounding these resources indicate that these sites have limited potential to contribute additional data relating to use, chronology, ethnicity, historic trends, and other important research themes. These resources have limited artifact frequency and variability, and no intact subsurface deposits. Historical uses for agriculture have largely plowed through or otherwise disturbed subsurface soils likely to contain buried resources within the vicinity of these sites. As such, these sites are not recommended eligible for listing on the NRHP/CRHR under Criterion D/4, for their potential to yield information important in prehistory or history. Recommended management strategies include development of a cultural resources management plan, which should include inadvertent discovery protocols and the requirement for periodic archaeological monitoring during construction and decommissioning activities.

1 Introduction

1.1 Project Description and Location

The Buttonbush Solar & Storage Project (Project) as proposed by 29SC 8me LLC (project proponent) would be located on 128 parcels across a leased area of approximately 11,983 acres within a 13,868-acre gross parcel boundary of privately owned land in unincorporated Kern County, California. The majority of the 11,983-acre Project area is currently under agricultural use or developed in the valley region of the County. This is exclusive of the Gen-Tie corridor options of 950.7 acres, including 255 acres of land that is owned and managed by Pacific Gas and Electric (PG&E), of which 38.6 acres will be impacted by the proposed Project. For the purposes of future federal agency review, should this occur, this Project site should also be considered the direct area of potential effect (APE). The vertical APE is assumed to be up to 20 feet below the existing grade, although Project design is still underway, and the exact maximum depth of ground disturbance may be subject to change. The project site acreage is based on a compilation of land parcel acres reported by the County Assessor for each Assessor's Parcel Number (APN) within the project area, as listed in Appendix B. In some cases, these parcel acreages were refined based on land surveys conducted for the project. However, the geometry of parcel polygons in geographic information system (GIS) mapping tools may not exactly match the County Assessor-reported acreage. As a result, the GIS-calculated Project Study Area acreage may differ from the APN-derived project site total.

The Project includes the construction and operation of a photovoltaic (PV) solar facility and associated infrastructure necessary to generate up to 2 gigawatts of alternating current (AC) power with an up to 2-gigawatt battery energy storage system (BESS). Additional components of the Project include solar modules and racking, inverters, transformers, service roads, a power collection system, communication cables, microwave/ radio towers, meteorological stations, a generation-transmission (gen-tie) line with optical ground wire and overhead and underground transmission lines, electrical switchyards, Project substations, security fencing, use of onsite water wells, and operations and maintenance (O&M) facilities.

The Project would be supported by one or more 500 kilovolt (kV) gen-tie electrical transmission lines originating from one or more on-site substations and terminating at the existing PG&E Midway Substation. The Project study area includes the development footprint and gen-tie/collector line, which includes a 200-foot corridor. PG&E will modify the Midway Substation's 500 kV yard within their property boundary to accommodate the proposed Project's interconnection. The PG&E Midway Substation parcels comprise approximately 255 acres; however, only a small portion, up to 38.6 acres, will be impacted by the proposed Project. PG&E will install and trench underground several fiber-optic lines to the west of the gen-tie route to facilitate communication between the Midway Substation and the Point of Change of Ownership, approximately 0.25-mile northwest. Up to four 175-foot-tall lattice steel towers (LST) or tubular steel poles (TSPs) would support the proposed transmission line and the Project's interconnection.

The proposed facilities are expected to be operational for up to 35 years. The full Project description is provided in the Project's California Environmental Quality Act (CEQA) environmental impact report and should be referenced for additional details regarding the Project description.

The Project site is in unincorporated Kern County directly north of the community of Buttonwillow, approximately 2 miles west of the City of Shafter and approximately 7 miles southwest of the City of Wasco. The Project site straddles Interstate 5 (I-5) east of Buttonwillow Raceway Park, just north of State Route (SR) 58, and south of SR-

46. Several single-family homes and agriculture-related structures are near the Project boundary. Properties within the Project include a dairy, a few single-family homes, and some varied structures for agricultural use, all of which would be removed during Project construction. Vehicular access to the site would likely be from Wasco Way, Merced Avenue, Lerdo Highway, Rowlee Road, Wildwood Road, Riverside Street, Burbank Street, Buttonwillow Drive, 7th Standard Road, Snow Road, State Route (SR) 58, and Sullivan Road. Many dirt roads crisscross the Project site.

According to the U.S. Geological Survey (USGS), the Project site is within the Wasco SW, Semitropic, Rio Bravo, Buttonwillow, and Lokern USGS 1:24,000 topographic maps (7.5-minute quadrangle). More specifically, the Project is located as follows:

- Township 27 S, Range 23 E, portions of Sections 28,33, and 34
- Township 28S, Range 23E, portions of Sections 1, 2, 3, 4, 5 , 11, 12, 27, 28, 29, 33, and 34
- Township 28S, Range 24E, all or portions of Sections,, 23, 25, 26, 27, and 35 (portions) and 34 (all)
- Township 29S, Range 23E, all or portions of Sections 1, 3, 4, and 11, (portions) and 12 (all)
- Township 29S, Range 24E, all or portions of Sections 12 (all) and 1, 2, 6, 7, 8, 11, 13, 14, 17, 18, and 19 (portions)
- Township 29S, Range 25E, portions of Section 7

While the Project site encompasses 11,983 acres, a larger 14,355-acre Study Area was evaluated for the proposed development to ensure that potential impacts were fully captured in analysis.

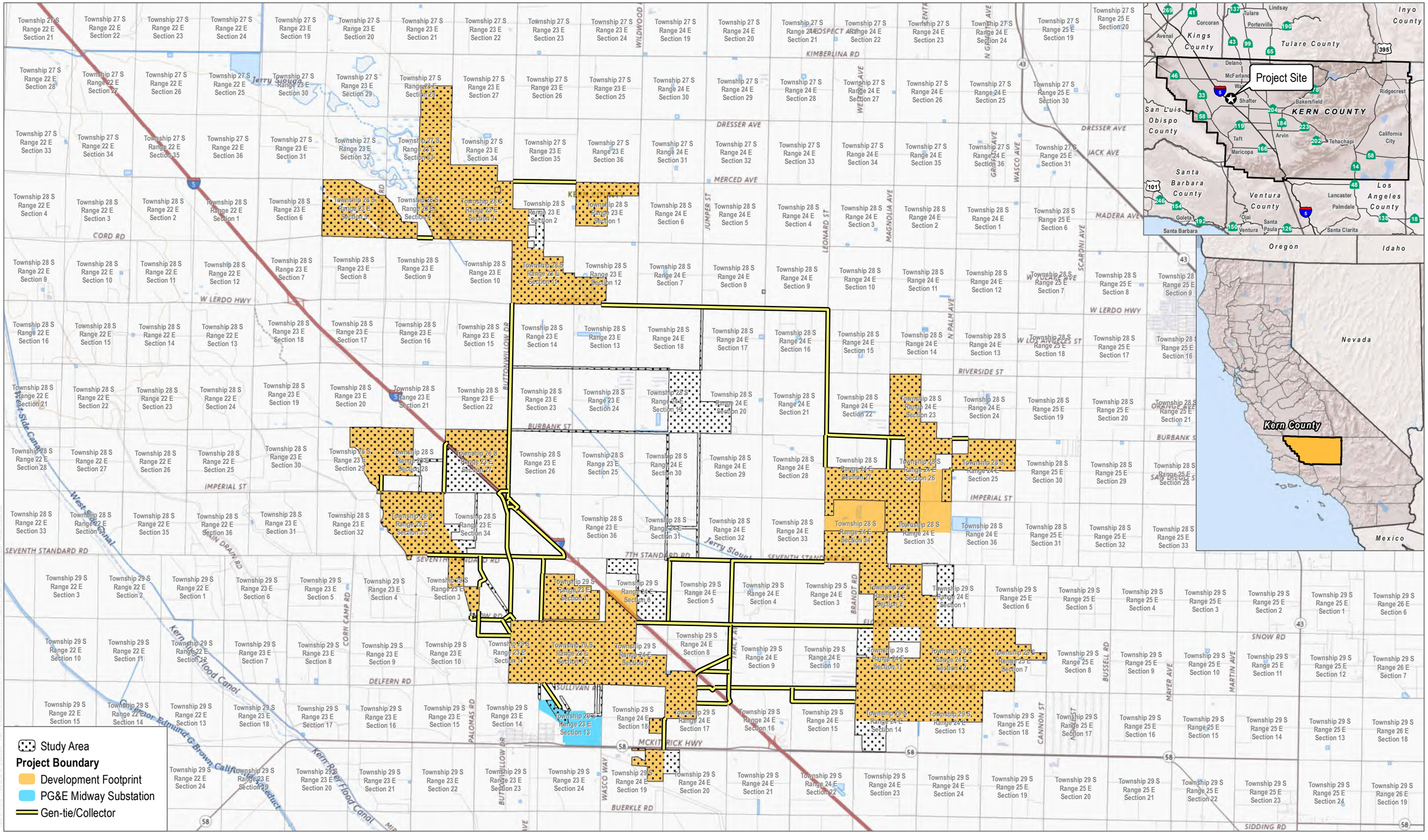
For the purposes of providing management recommendations, the vertical area of direct impact (ADI) or vertical area of potential effect (APE), as represented by the maximum depth of disturbance, is assumed to be 20 feet below the existing ground surface. However, the proposed solar development area would likely have a shallower actual ground disturbance.

In preparation for the Project, Dudek was contracted to perform a Phase I cultural resource inventory. This inventory was conducted in compliance with the California Environmental Quality Act (CEQA) but meets standards and requirements in compliance with Section 106 of the National Historic Preservation Act (NHPA) should federal review be necessary at a future time.

1.2 Report Structure and Key Personnel

This report is divided into six chapters. Following this introduction, Chapter 2 reviews the natural environment and the cultural context and Chapter 3 provides the methods used to complete the current inventory. The records search, survey results, and tribal correspondence are discussed in Chapter 4. Chapter 5 provides a cultural resources effects analysis. Chapter 5 also summarizes the cultural resources work completed for this Project to date and provides recommendations for further management of cultural resources, consistent with CEQA and Section 106 of the NHPA. Chapter 6 provides a list of references cited throughout this report. Several appendices are attached to this report. Appendix A contains confidential maps showing cultural resources overlaid on the Project boundary, Appendix B includes confidential records search results, Appendix C includes confidential Native American Heritage Commission (NAHC) Sacred Lands File search results, Appendix D contains confidential documentation of newly recorded cultural resources, and Appendix E contains the resumes of key personnel.

Ross Owen, MA, RPA, drafted the major portion of the present report and, acting as field director, conducted the intensive pedestrian survey with additional Dudek archaeologists. Ross Owen, Nicholas Hanten, William Burns, and Julie Royer drafted the technical report. Adam Giacinto, MA, RPA acted as principal investigator, prepared management recommendations, and finalized the technical report. All archaeologists meet the Secretary of the Interior's standards for archaeology and have extensive experience working within local, state, and federal regulatory contexts.



SOURCE: Avantus LLC., 2024; USGS National Map 2023; Kern County 2023

DUDEK

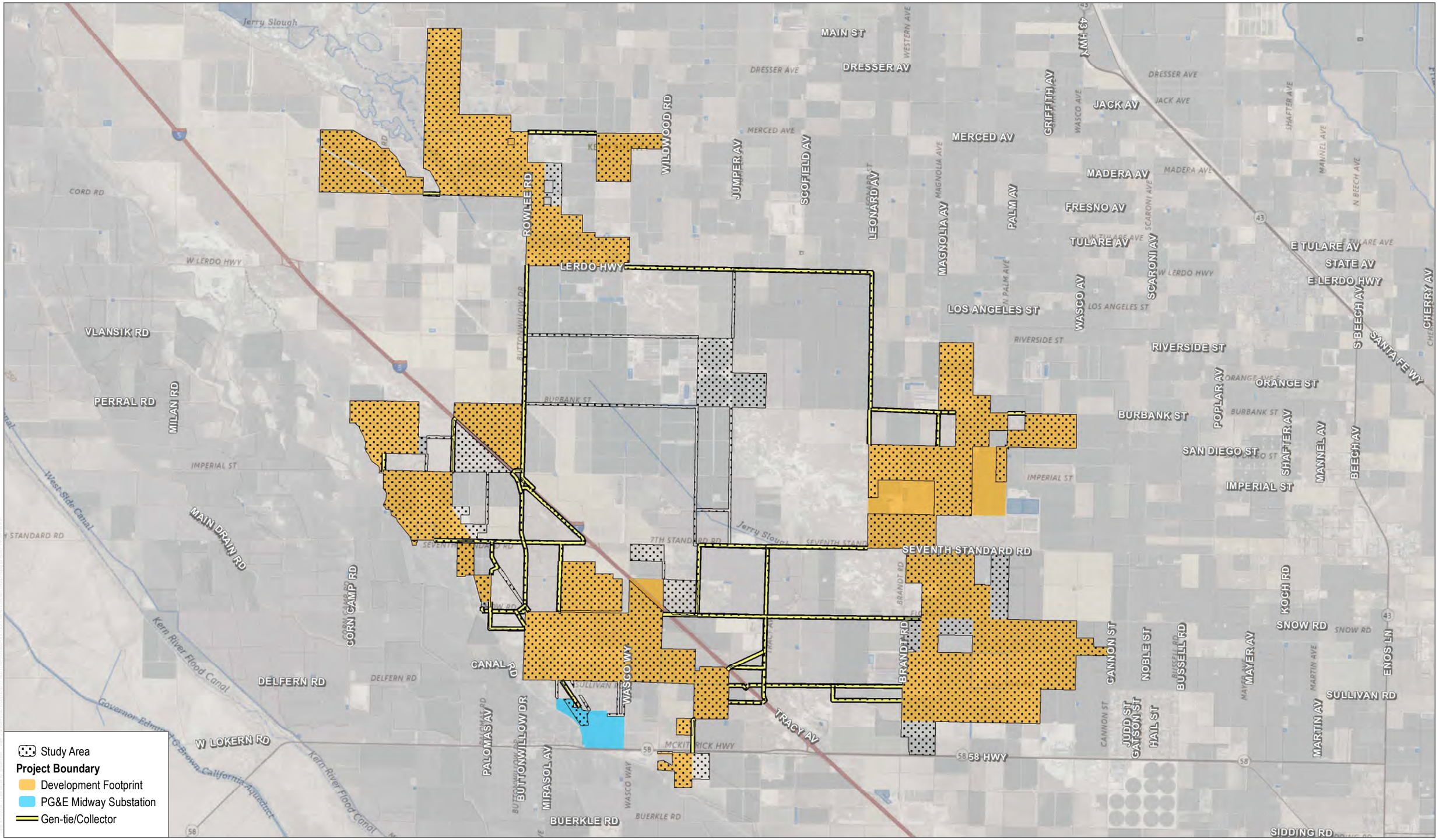
0 1 2 Miles

FIGURE 1

Project Location

Buttonbush Solar and Storage

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SOURCE: Bing Maps 2023; Kern County 2023

DUDEK

0 1 2 Miles

FIGURE 2

Project Site

Buttonbush Solar and Storage

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1.3 Regulatory Context

The current cultural resources investigation was completed to satisfy CEQA, though Section 106 of the NHPA regulations is summarized here if needed.

1.3.1 Federal Requirements

National Historic Preservation Act

The National Register of Historic Places (NRHP) is the United States' official list of districts, sites, buildings, structures, and objects worthy of preservation. Overseen by the National Park Service under the U.S. Department of the Interior, the NRHP was authorized under the NHPA, as amended. Its listings encompass all National Historic Landmarks and historic areas administered by the National Park Service.

NRHP guidelines for the evaluation of historic significance were developed to be flexible and to recognize the accomplishments of all who have made significant contributions to the nation's history and heritage. Its criteria are designed to guide state and local governments, federal agencies, and others in evaluating potential entries in the NRHP. For a property to be listed in or determined eligible for listing, it must be demonstrated to possess integrity and to meet at least one of the following criteria:

The quality of significance in American history, architecture, archaeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and:

A. That are associated with events that have made a significant contribution to the broad patterns of our history; or
B. That are associated with the lives of persons significant in our past; or
C. That embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
D. That have yielded, or may be likely to yield, information important in prehistory or history.

Integrity is defined in NRHP guidance as "the ability of a property to convey its significance. To be listed in the NRHP, a property must not only be shown to be significant under the NRHP criteria, but it also must have integrity" (NPS 2009). NRHP guidance further asserts that properties must have been completed at least 50 years before evaluation to be considered for eligibility. Properties completed fewer than 50 years before evaluation must be proven to be "exceptionally important" (criteria consideration G) to be considered for listing.

A historic property is defined as "any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the NRHP maintained by the Secretary of the Interior. This term includes artifacts, records, and remains that are related to and located within such properties. The term includes properties of traditional religious and cultural importance to an Indian tribe or Native Hawaiian organization and that meet the NRHP criteria" (36 Code of Federal Regulations [CFR] Sections 800.16[i][1]).

Effects on historic properties under Section 106 of the NHPA are defined in the assessment of adverse effects in 36 CFR Sections 800.5(a)(1):

> An adverse effect is found when an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association. Consideration shall be given to all qualifying characteristics of a historic property, including those that may have been identified subsequent to the original evaluation of the property's eligibility for the National Register. Adverse effects may include reasonably foreseeable effects caused by the undertaking that may occur later in time, be farther removed in distance or be cumulative.

Adverse effects on historic properties are clearly defined and include the following (36 CFR 800.5 [2]):

(i) Physical destruction of or damage to all or part of the property;

(ii) Alteration of a property, including restoration, rehabilitation, repair, maintenance, stabilization, hazardous material remediation and provision of handicapped access, that is not consistent with the Secretary's Standards for the Treatment of Historic Properties (36 CFR Part 68) and applicable guidelines;

(iii) Removal of the property from its historic location;

(iv) Change of the character of the property's use or of physical features within the property's setting that contributes to its historic significance;

(v) Introduction of visual, atmospheric or audible elements that diminish the integrity of the property's significant historic features;

(vi) Neglect of a property which causes its deterioration, except where such neglect and deterioration are recognized qualities of a property of religious and cultural significance to an Indian tribe or Native Hawaiian organization; and

(vii) Transfer, lease, or sale of property out of Federal ownership or control without adequate and legally enforceable restrictions or conditions to ensure long-term preservation of the property's historic significance.

To comply with Section 106, the criteria of adverse effects are applied to historic properties, if any exist in the Project site, pursuant to 36 CFR Sections 800.5(a)(1). If no historic properties are identified in the Project site, a finding of "no historic properties affected" is made. If there are historic properties in the Project site, application of the criteria of adverse effect will result in Project-related findings of either "no adverse effect" or "adverse effect." A finding of no adverse effect may be appropriate when the undertaking's effects do not meet the thresholds in criteria of adverse effect found in 36 CFR Sections 800.5(a)(1), in certain cases when the undertaking is modified to avoid or lessen effects, or if conditions were imposed to ensure review of rehabilitation plans for conformance with the Secretary of the Interior's Standards for the Treatment of Historic Properties (codified in 36 CFR Part 68).

If adverse effects findings are expected to result from a project, mitigation would be required, as feasible, and resolution of those adverse effects by consultation may occur to avoid, minimize, or mitigate adverse effects on historic properties pursuant to 36 CFR Part 800.6(a).

1.3.2 State Requirements

In California, the term "historical resource" includes "any object, building, structure, site, area, place, record, or manuscript which is historically or archaeologically significant, or is significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California" (California Public Resources Code [PRC] Section 5020.1[j]). In 1992, the California legislature established the California Register of Historical Resources (CRHR) "to be used by state and local agencies, private groups, and citizens to identify the state's historical resources and to indicate what properties are to be protected, to the extent prudent and feasible, from substantial adverse change" (PRC Section 5024.1[a]). The criteria for listing resources in the CRHR were expressly developed to be in accordance with previously established criteria developed for listing in the NRHP. According to PRC Section 5024.1(c)(1–4), a resource is considered historically significant if it (i) retains "substantial integrity," and (ii) meets at least one of the following criteria:

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

To understand the historic importance of a resource, sufficient time must have passed to obtain a scholarly perspective on the events or individuals associated with the resource. A resource less than 50 years old may be considered for listing in the CRHR if it can be demonstrated that sufficient time has passed to understand its historical importance (see 14 CCR 4852[d][2]).

The CRHR protects cultural resources by requiring evaluations of the significance of prehistoric and historic-era resources. The criteria for the CRHR are nearly identical to those for the NRHP, and properties listed or formally designated as eligible for listing in the NRHP are automatically listed in the CRHR, as are State Landmarks and Points of Interest. The CRHR also includes properties designated under local ordinances or identified through local historical resource survey.

California Environmental Quality Act

Under CEQA, public agencies must consider the effects of their actions on "historical resources," "unique archaeological resources," and "tribal cultural resources." Pursuant to PRC Section 21084.1, a "project that may cause a substantial adverse change in the significance of a historical resource is a project that may have a significant effect on the environment." Section 21083.2 requires agencies to determine whether proposed projects would have effects on "unique archaeological resources."

As described further in subsequent text, the following CEQA statutory provisions and CEQA Guidelines are of relevance to the analysis of archaeological, historic, and tribal cultural resources:

- PRC Section 21083.2(g) defines "unique archaeological resource."
- PRC Section 21084.1 and CEQA Guidelines Section 15064.5(a) define "historical resources." In addition, CEQA Guidelines Section 15064.5(b) defines the phrase "substantial adverse change in the significance of

an historical resource." It also defines the circumstances when a project would materially impair the significance of an historical resource.

- PRC Section 21074(a) defines "tribal cultural resources."
- PRC Section 5097.98 and CEQA Guidelines Section 15064.5(e) set forth standards and steps to be employed following the accidental discovery of human remains in any location other than a dedicated cemetery.
- PRC Sections 21083.2(b)-(c) and CEQA Guidelines section 15126.4 include statutes and regulations providing information regarding the mitigation framework for archaeological and historic resources, including options of preservation-in-place mitigation measures; identifies preservation-in-place as the preferred manner of mitigating impacts to significant archaeological sites.

PRC Sections 21083.2(b)-(c) and CEQA Guidelines Section 15126.4 provide information regarding the mitigation framework for archaeological and historic resources, including examples of preservation-in-place mitigation measures. Preservation-in-place is the preferred manner of mitigating impacts to significant archaeological sites because it maintains the relationship between artifacts and the archaeological context, and may also help avoid conflict with religious or cultural values of groups associated with the archaeological site. Under CEQA, a project may have a significant effect on the environment if it may cause "a substantial adverse change in the significance of an historical resource" (PRC Section 21084.1; CEQA Guidelines Section 15064.5[b]). If a site is either listed or eligible for listing in the CRHR, or if it is included in a local register of historic resources, or identified as significant in a historical resources survey (meeting the requirements of PRC Section 5024.1[q]), it is a "historical resource" and is presumed to be historically or culturally significant for purposes of CEQA (PRC Section 21084.1; CEQA Guidelines Section 15064.5[a]). The lead agency is not precluded from determining that a resource is a historical resource even if it does not fall within this presumption (PRC Section 21084.1; CEQA Guidelines Section 15064.5[a]).

A "substantial adverse change in the significance of an historical resource" reflecting a significant effect under CEQA means "physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of an historical resource would be materially impaired" (CEQA Guidelines Section 15064.5[b][1]; PRC Section 5020.1[q]). In turn, the significance of a historical resource is materially impaired when a project does any of the following (CEQA Guidelines Section 15064.5[b][2]):

- Demolishes or materially alters in an adverse manner those physical characteristics of an historical resource that convey its historical significance and that justify its inclusion in, or eligibility for, inclusion in the California Register; or
- Demolishes or materially alters in an adverse manner those physical characteristics that account for its inclusion in a local register of historical resources pursuant to Section 5020.1(k) of the PRC or its identification in an historical resources survey meeting the requirements of Section 5024.1(g) of the PRC, unless the public agency reviewing the effects of the project establishes by a preponderance of evidence that the resource is not historically or culturally significant; or
- Demolishes or materially alters in an adverse manner those physical characteristics of a historical resource that convey its historical significance and that justify its eligibility for inclusion in the California Register as determined by a lead agency for purposes of CEQA.

If an archaeological site does not meet the criteria defining a historic resource, it still may qualify as a unique historic resource. PRC Section 21083.2(g) defines a unique archaeological resource as an archaeological artifact,

object, or site about which it can be clearly demonstrated that without merely adding to the current body of knowledge, there is a high probability that it meets any of the following criteria:

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

CEQA Guidelines Section 15126.4(b)(3) provides that provides that preservation in place is the preferred manner of mitigating impacts to historic resources of an archaeological nature, and may be accomplished by, but is not limited to, methods such as planning construction to avoid archaeological sites, incorporation of sites within parks, greenspace, or other open space; covering archaeological sites with a layer of chemically stable soil before building tennis courts, parking lots, or similar facilities on the site; or deeding the site into a permanent conservation easement. However, if data recovery through excavation is the only feasible mitigation, then a data recovery plan making provision for adequately recovering scientifically consequential information from and about the historical resource must be prepared and adopted prior to commencing excavation. Curation generally must be employed for any artifact that must be removed from during project excavation.

Similarly, if it can be demonstrated that a project will cause damage to a historic or unique archaeological resource, the lead agency may require reasonable efforts be made to permit any or all of these resources to be preserved in place or left in an undisturbed state under methods similar to those listed for historic resources of an archaeological manner, except that Subdivisions (c) and (e) of Section 21083.2 sets forth limits on the amount and costs of mitigation than can be imposed on projects. Under Section 21083.2(d), excavation as mitigation must be restricted to those parts of the unique archaeological resource that would be damaged or destroyed by the project.

Excavation as mitigation shall not be required for a historic or unique archaeological resources if the lead agency determines that testing or studies already completed have adequately recovered the scientifically consequential information from and about the resource, if this determination is documented in the EIR. PRC Section 21083.2(d); CEQA Guidelines Section 15126.4(b)(D).

Impacts to non-unique archaeological resources are generally not considered a significant environmental impact (PRC Section 21083.2[a]; CEQA Guidelines Section 15064.5[c][4]). However, if a non-unique archaeological resource qualifies as a tribal cultural resource (PRC 21074[c]; 21083.2[h]), further consideration of significant impacts is required.

AB 52 of 2014 established that tribal cultural resources must be considered under CEQA and also provided for additional Native American consultation requirements for the lead agency.

CEQA Guidelines Section 21074(a) defines a “tribal cultural resource” as either of the following:

- Sites, features, places, cultural landscapes, sacred places, and objects with cultural value to a California Native American tribe that are either of the following:
  - Included or determined to be eligible for inclusion in the California Register of Historical Resources.
  - Included in a local register of historical resources as defined in subdivision (k) of Section 5020.1

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

AB 52 formalizes the lead agency–tribal consultation process, requiring the lead agency to initiate consultation with California Native American groups that are traditionally and culturally affiliated with the project site, including tribes that may not be federally recognized. Lead agencies are required to begin consultation prior to the release of a negative declaration, mitigated negative declaration, or environmental impact report.

Section 1 (a)(9) of AB 52 establishes that "a substantial adverse change to a tribal cultural resource has a significant effect on the environment." Effects on tribal cultural resources should be considered under CEQA. Section 6 of AB 52 adds Section 21080.3.2 to the PRC, which states that parties may propose mitigation measures "capable of avoiding or substantially lessening potential significant impacts to a tribal cultural resource or alternatives that would avoid significant impacts to a tribal cultural resource." Further, if a California Native American tribe requests consultation regarding project alternatives, mitigation measures, or significant effects to tribal cultural resources, the consultation shall include those topics (PRC Section 21080.3.2[a]). The environmental document and the mitigation monitoring and reporting program (where applicable) shall include any mitigation measures that are adopted (PRC Section 21082.3[a]).

If it can be demonstrated that a project will cause damage to a tribal cultural resource, the lead agency may require reasonable efforts be made to permit any or all of these resources to be preserved in place or left in an undisturbed state. To the extent that they cannot be left undisturbed, data recovery is an acceptable form of mitigation following the standards for historic resources if the tribal cultural resource qualifies as one, and following the standards for unique archaeological resources if it does not. (PRC Section 21074(c)).

Native American Historic Cultural Sites (California Public Resources Code section 5097 et seq.)

The Native American Historic Resources Protection Act (Public Resources Code section 5097, et seq.) addresses the disposition of Native American burials in archaeological sites and protects such remains from disturbance, vandalism, or inadvertent destruction; establishes procedures to be implemented if Native American skeletal remains are discovered during construction of a project; and establishes the NRHC to resolve disputes regarding the disposition of such remains. In addition, the Native American Historic Resource Protection Act makes it a misdemeanor punishable by up to 1 year in jail to deface or destroy an Indian historic or cultural site that is listed or may be eligible for listing in the CRHR.

California Native American Graves Protection and Repatriation Act

The California Native American Graves Protection and Repatriation Act (California Repatriation Act), enacted in 2001, requires all state agencies and museums that receive state funding and that have possession or control over collections of human remains or cultural items, as defined, to complete an inventory and summary of these remains and items on or before January 1, 2003, with certain exceptions. The California Repatriation Act also provides a process for the identification and repatriation of these items to the appropriate tribes.

California Health and Safety Code

CEQA Guidelines Section 15064.5 assigns special importance to human remains and specifies procedures to be used when Native American remains are discovered. These procedures are detailed in PRC Section 5097.98.

California law protects Native American burials, skeletal remains, and associated grave goods, regardless of their antiquity, and provides for the sensitive treatment and disposition of those remains. California Health and Safety Code Section 7050.5 requires that if human remains are discovered in any place other than a dedicated cemetery, no further disturbance or excavation of the site or nearby area reasonably suspected to contain human remains can occur until the county coroner has examined the remains (Section 7050.5b). PRC Section 5097.98 also outlines the process to be followed in the event that remains are discovered. If the coroner determines or has reason to believe the remains are those of a Native American, the coroner must contact the California NAHC within 24 hours (Section 7050.5c). The NAHC will notify the most likely descendant. With the permission of the landowner, the most likely descendant may inspect the site of discovery. Recommendations must be provided within 48 hours of notification of the most likely descendant by the NAHC and being provided access to the project boundary. The most likely descendant may recommend means of treating or disposing of, with appropriate dignity, the human remains and items associated with Native Americans.

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2 Project Context

2.1 Environmental Context

The Project site is located in a rural setting and is surrounded primarily by agricultural parcels. A majority of the Project site consists of irrigated and active agricultural land. No major waterways traverse the Project site, though Jerry Slough runs through the northern portion of the Project. The Kern River Channel is immediately east of the Project site and Lost Hills, separating the main valley from the Antelope Plain, begin approximately 3.5 kilometers to the west. Historically, the Project site was situated in the vicinity of Buena Vista Slough which flowed into Tulare Lake from Buena Vista Lake to the south. The flow of Buena Vista Slough (dependent upon overflow from Buena Vista Lake to the south) was highly variable and dynamic throughout the Holocene. The alluvial fans and stream-born alluvial formations that dominate the Project site have been formed throughout the Pleistocene and into the Holocene, and have the potential to yield stratified deposits with cultural material.

The Project site is broadly within the southern San Joaquin Valley, near the western edge of the Central Valley and within the Tulare Basin. The Project site is approximately 40 kilometers south of the dry Tulare lake bed and 15 kilometers east of the Temblor Range. The region receives approximately 5.6 inches of precipitation annually, with average monthly high temperatures ranging from approximately 56°F to 98°F (U.S. Climate Data 2023). Topography is generally flat. Annual wet and dry periods would have caused the Project site to oscillate between arid-steppe similar to the Antelope Plain and marsh-like areas with lacustrine resources and migrating birds. Periods of increased rainfall would have contributed to the ecological richness of the area, while possibly inundating activity areas and habitation sites in low-lying areas and forcing occupation onto higher ground.

2.2 Cultural Context

Various attempts to parse out information provided through recorded archaeological assemblages throughout California for the past 12,000 years have led to the development of numerous cultural chronologies. Some of these are based on geologic time, most are interpreted through temporal trends derived from archaeological assemblages, and others are interpretive reconstructions. The spatial extent and detail of these chronologies is also highly variable, with detail chronologies developed in some areas based on substantial numbers of radiocarbon dates, while other areas rely on cross-dating of stylistically distinct artifact styles or cultural patterns. However, each of these chronologies describes essentially similar trends in assemblage composition and cultural succession, with varying degrees of detail. California's archaeological assemblage composition is generally accepted as falling within the following overarching patterns: Paleoindian period (11,550–8550 cal BC), Archaic period (8550 cal BC–cal AD 1100), Emergent/Prehistoric period (cal AD 1100–1750), and Ethnohistoric Period (post-AD 1769). The most broadly applicable chronology for the Central Valley follows a similar framework, further subdividing the Archaic period into Upper, Middle, and Lower phases based on climatic and cultural variations (Bennyhoff and Fredrickson 1994; Groza 2002; Rosenthal et al. 2007).

2.2.1 Prehistoric Era

Paleoindian Period (11,550–8550 cal BC)

Occupation of the Central Valley is likely to have occurred at least 10,000 years ago, but only a handful of Paleoindian period sites with lithic bifacial points have been recorded in the region. Fluted points and other Paleoindian period sites are generally rare and found in isolated contexts in the Central Valley due to the dearth of Late Pleistocene–age deposits in the region resulting from periodic episodes of erosion and deposition during the Holocene that have removed or deeply buried large segments of the Late Pleistocene landscape that would contain Paleoindian sites. The largest and most continuous areas of Late Pleistocene surface deposits in the San Joaquin Valley are found north of the Project site, in and around Tulare Lake (Meyer et al. 2010). Along the southwestern periphery of Tulare Lake, the Witt Site represents the largest collection of early concave-base projectile points in the region, with hundreds of early concave-base and other Paleoindian points recovered from primarily surface contexts along the remnant shoreline (Fenenga 1993; Rondeau and Hopkins 2008). While some of these fluted points are likely from the Late Pleistocene, very few can truly be assigned as "Clovis-like," with other concave base point types such as the Great Basin Concave Point, and other point types similar to the Western Pluvial Lakes Tradition identified in the assemblage (Hopkins 2008; Rondeau and Hopkins 2008).

Archaic Period (8550 cal BC–cal AD 1100)

The Archaic period in the Central Valley is subdivided into three phases: the Lower Archaic (8550–5550 cal BC), the Middle Archaic (5550–550 cal BC), and the Upper Archaic (550 cal BC–cal AD 1100). As with the Paleoindian period, Lower Archaic deposits in the Central Valley tend to be isolated finds lacking stratigraphic context. Stemmed projectile points, flaked stone crescents, and other distinctive flaked stone artifact types are associated with this period, several of which have been found in the vicinity of Tulare Lake (Fenenga 1992).

Despite the paucity of Lower Archaic assemblages in the region as a whole, a small collection of sites in the vicinity of the Project site may represent a distinct Western Stemmed Tradition variant local to the southern San Joaquin valley and dating to the Lower Archaic (Sutton 2019). This variant of the Western Stemmed Tradition, the Buttonwillow Complex, is represented at three sites: the aforementioned Witt Site, CA-KER-166 on Buena Vista Lake, and CA-KER-2720 adjacent to the Buena Vista Slough. While only two artifact types can be firmly associated with the Buttonwillow Complex, stemmed dart points and crescents, numerous other flaked stone artifacts were recovered from the site assemblages, although ground stone artifacts were notably absent. The location, artifact assemblages, and feature from the Buttonwillow Complex sites indicate a subsistence system targeting lacustrine resources, primarily freshwater shellfish and fish, although waterfowl and large mammals also probably contributed to the diet as did marshland plants such as tule, cattail, and sedge (Sutton 2019).

The onset of the Middle Archaic in Central California marked a substantial change in the climate, with warmer, dryer conditions resulting in the shrinking and eventual drying out of Tulare Lake, a phenomenon common among other Pleistocene lakes throughout the western United States during this time. This also coincided with the formation of new wetland habitats as rising sea levels pushed inland, forming the Sacramento and San Joaquin Deltas. These climatic processes resulted in substantially more stable landforms as fans and floodplains stabilized within the delta, making buried Middle Archaic deposits much more common than those from the Early Archaic. Middle Archaic sites are typified by the distinct adaptive pattern of logistically organized subsistence practices and residential stability along river corridors (Rosenthal et al. 2007). The prevalence of ground stone tools, including early examples

of mortars and pestles, suggests an increased reliance on vegetal resources, likely the result of greater residential stability driving resource intensification (e.g., Basgall 1987). Fishing was also an important component of subsistence, as new fishing technologies (including gorge hooks, composite bone hooks, and spears) along with abundant ichthyofaunal remains have been identified at Middle Archaic sites in Contra Costa, Sacramento, and San Joaquin Counties (Heizer 1949; Rosenthal et al. 2007; Schulz 1981). Regional variations of the Middle Archaic pattern include the Windmiller Pattern, which are characterized by a distinctive burial pattern of extended burials oriented to the west. While the Windmiller Pattern was first identified on old levee ridges at the confluence of the Mokelumne and Cosumnes Rivers, Windmiller sites are widespread in the San Joaquin Valley, as well as the Sacramento and San Joaquin Delta region.

The transition to the Upper Archaic period coincides with the onset of late Holocene environmental conditions, during which time the climate was markedly cooler, wetter, and more stable. The archaeological record from the Upper Archaic is better understood and represented throughout the Central Valley, and is marked by an increase in cultural diversity, with numerous regional distinctions in burial posture, artifact styles, and other elements of material culture (Bennyhoff and Fredrickson 1994; Rosenthal et al. 2007). The Upper Archaic record is marked by the development and proliferation of numerous bone tools and implements, as well as widespread production and trade of manufactured goods, including *Olivella* shell beads, *Haliotis* ornaments, and obsidian bifacial roughouts and ceremonial blades (Bennyhoff and Fredrickson 1994; Moratto 1984). Subsistence economies during the Upper Archaic focused on seasonally structured resources that could be harvested and processed in bulk, including acorns, salmon, shellfish, deer, and rabbits. The proliferation of mortars and pestles and archaeobotanical remains indicate that the first widespread reliance on acorns occurred during this period (Wohlgemuth 1996, 2004). Large mounded village sites also first occurred in the delta region during this period (Bennyhoff and Fredrickson 1994; Rosenthal et al. 2007). Less is known about the Upper Archaic in the southern San Joaquin Valley; however, the presence of what appear to be year-round villages on Buena Vista Lake, with a variety of residential features and extensive accumulation of midden deposits indicating exploitation of aquatic and terrestrial food sources, appears consistent with the Upper Archaic pattern in general (Hartzell 1992; Rosenthal et al. 2007).

On the whole, the Archaic period in the Central Valley is characterized by increasing residential stability, cultural diversity, and subsistence intensification though time.

Emergent Period (cal AD 1100–Historic Contact)

The archaeological record for the Emergent period is the most substantial and well-documented of any period in the Central Valley, and the assemblages and adaptations represented therein are the most diverse. The Emergent period also marks the onset of cultural traditions consistent with those documented at European contact and the disappearance of several previous archaeological traditions. Large villages developed in areas of the Sacramento Valley, and the number of mound villages and smaller hamlets increased across the region, with villages and smaller residential communities developing along many of the foothill sidestreams, river channels, and sloughs in the San Joaquin Valley. Subsistence economies during the Emergent period were increasingly reliant on fishing and plant gathering, with increased subsistence intensification evident in the increased reliance on small seeds and a more diverse assortment of mammals and birds (Broughton 1994; Rosenthal et al. 2007; Wohlgemuth 2004). Perhaps the most notable technological change during the Emergent period is the introduction of the bow and arrow, which replaced atlatl technology as the favored hunting implement sometime between AD 1100 and AD 1300 (Bennyhoff and Fredrickson 1994). The material record during the Emergent period is also marked by the introduction of new *Olivella* bead and *Haliotis* ornament types, and eventually the introduction of clamshell disc beads (Groza 2002;

Moratto 1984; Rosenthal et al. 2007). The Emergent period in general is marked by an increase in population size and the number of residential sites and villages throughout the region, with increasing regional variability and resource intensification.

2.2.2 Ethnohistoric Period (post-AD 1750)

The history of Native American communities prior to the mid-1700s has largely been reconstructed through later mission-period and early ethnographic accounts. The first records of the Native American inhabitants of the region come predominantly from European merchants, missionaries, military personnel, and explorers. These brief, and generally peripheral, accounts were prepared with the intent of furthering respective colonial and economic aims and were combined with observations of the landscape. They were not intended to be unbiased accounts regarding the cultural structures and community practices of the newly encountered cultural groups. The establishment of the missions in the region brought more extensive documentation of Native American communities, though these groups did not become the focus of formal and in-depth ethnographic study until the early twentieth century. The principal intent of these ethnographic researchers was to record the pre-contact, culturally specific practices, ideologies, and languages that had survived the destabilizing effects of missionization and colonialism. This research, often understood as "salvage ethnography," was driven by the understanding that traditional knowledge was being lost due to the impacts of modernization and cultural assimilation. Alfred Kroeber applied his "memory culture" approach (Lightfoot 2005: 32) by recording languages and oral histories within the region.

Based on ethnographic information, it is believed that at least 78 mutually unintelligible languages were spoken from Baja California Sur to the southern Oregon state border at the time of Spanish contact. The distribution of recorded Native American languages can be grouped as a geographic mosaic across California through seven primary language families (Golla 2007, 2011).

During the ethnohistoric period, people living in the immediate vicinity of the Project site would have likely spoken Wowol, a dialect of the Southern Valley Yokuts spoken in the areas southeast of Tulare Lake. More generally, the territory of the Southern Valley Yokuts included most of the southern end of the San Joaquin Valley including Tulare Lake and its surrounding sloughs, as well as the lower portions of the Kings, Kaweah, Tule, and Kern Rivers (Gayton 1948; Kroeber 1925; Latta 1977; Wallace 1978). Many ethnographers also group Yokuts speakers in the area surrounding Buena Vista and Kern Lakes with the Southern Valley Yokuts due to similarities in lifeways; however, Golla (2011) distinguishes between Southern Valley and Buena Vista Yokuts based on linguistic differences between the groups.

The Southern Valley Yokuts followed a mixed subsistence economy emphasizing fishing, hunting waterfowl, and collecting shellfish and aquatic plants (Gayton 1948; Wallace 1978). Terrestrial large game made up a small proportion of the diet, although vegetable resources were seasonally gathered (Gayton 1948). Although acorns were collected and sometimes traded for, there were no acorn granaries like those seen among foothill groups (Kroeber 1925). Fish were caught in myriad ways including nets of varying sizes and complexity, spears, basket traps, and sometimes the bow and arrow, while waterfowl were taken by snare or with the bow and arrow and mussels were gathered in large quantities and steamed on tule mats (Wallace 1978). Mortars, for the processing of plant foods, were most commonly constructed from hard woods such as oak, although occasional imported stone specimens were used (Kroeber 1925). Boats, constructed by lashing bundles of tules into a canoe-shaped balsa, were important for hunting, transport of goods and people, and numerous other tasks.

Southern Valley Yokuts habitation areas were most commonly situated in proximity to aquatic resources, particularly along lakeshores, marshes, or at the confluence of two waterways, as these areas were particularly productive for their primary food sources. Because of the abundance and reliability of subsistence resources, Southern Valley Yokuts generally occupied permanent settlements year round. Notable among Wowol and the groups living in the vicinity of Buena Vista lake was the construction of large steep-roofed communal residences shared by 10 or more families (Wallace 1978). These dwellings were constructed of tule reed–woven mats placed over a pole-frame structure, some of which were at least 100 feet long (Gayton 1948). Other structures included earth-covered sweat lodges and granaries for the storage of fish, roots, seeds, and other foods.

2.2.3 The Historic Period

Spanish Period (1769–1822)

Although Spanish, Russian, and British explorers visited parts of California for brief periods between 1529 and 1769, the Spanish period in California begins with the establishment in 1769 of a settlement at San Diego and the founding of Mission San Diego de Alcalá, the first of 21 missions constructed between 1769 and 1823. Missions in the region included San Francisco de Asís (1776), Santa Clara de Asís (1776), San José de Guadalupe (1797 in Alameda County), San Rafael Arcángel (1817 in Marin County), and San Francisco Solano (1823 in Sonoma County) (Grunsky 1989).

The first Spaniards arrived in the San Joaquin Valley in 1772, led by don Pedro Fages who traveled through the Tejon Pass down into the southernmost part of the valley and visited a village in the vicinity of Buena Vista Lake before traveling west to San Luis Obispo (Wallace 1978). Active exploration of the region by the Spanish began in 1805, when several expeditions entered San Joaquin Valley including the expedition by Gabriel Moraga in 1806, which reached the San Joaquin and King Rivers and Buena Vista Lake, and the Palomares expedition to the Tulares in 1808, among others (Cook 1960).

Mexican Period (1822–1848)

Mexico's separation from the Spanish empire in 1821 and the secularization of the California missions in the 1830s caused further disruptions to Native American populations. Following the establishment of the Mexican Republic, the government seized many of the lands belonging to Native Americans, providing them as parts of larger land grants to affluent Mexican citizens and rancheros. The 1833 Secularization Act passed by the Mexican Congress ordered half of all mission lands to be transferred to Native Americans and the other half to remain in trust and managed by an appointed administrator. These orders were never implemented due to several factors that conspired to prevent Native Americans from regaining their patrimony.

American Period (Post-1848)

California was officially ceded to the United States in 1848, which led to the continued appropriation of Native American territory by ranchers, prospectors, and an increasing number of settlers. The economic drive to promote successful ranching activities within the Central Valley was of particular importance to the continued development, regional stabilization, and western growth of the United States government's authority. While mining had limited direct impact on the San Joaquin Valley, by the mid-nineteenth century, Euro-American miners, failed in the lodes to the east, began to move into the area to try their luck at agriculture, ranching, and as farm/ranch hands (Rolle 1998). From 1850, with the passage of California's Indian Act, until legislative reforms in the late 1880s, state laws

provided little actual protections to Native American populations throughout California who often worked on these local ranches and farms. This large influx of people into central California resulted in a large demand for meat and animal byproducts. In the early 1850s, entrepreneurs brought large herds of cattle, sheep, and hogs into the large grazing areas of the Central Valley and the Sierra Foothills (Caltrans 2007).

A report was commissioned by the United States military based in Monterey to examine the Tulare Valley (present-day San Joaquin Valley) and the areas around Tulare Lake, "for the purpose of selecting a suitable position for the establishment of a military post in the neighborhood of the Tulare lake" (Derby and Farquhar 1932: 247). In the report, Lt. Derby describes the landscape as the group approached the western edge of Tulare Lake (Derby and Farquhar 1932: 252): "The country passed over was a perfect desert, and I found here no forage for the animals but wire grass, the water standing in the tule marshes brackish, and no wood at all."

The following excerpt is a description following the group's traverse across a "ridge of sand about one hundred yards in width, and twelve feet above the level of the lake, which divides the water of the northern or Taché from the bed (now nearly dry) of the southern or Ton Taché" (Derby and Farquhar 1932). The ridge sounds similar to the Sand Ridge depicted on topographic maps for the region (Appendix E) (Derby and Farquhar 1932: 252–253):

> This last is little more than a very extensive swamp, covering the plain for fifteen miles in a southerly direction, and is about ten in width. It is filled with sloughs and small tule lakes, and is of course impassable except with the assistance of boats or rafts. The gradual receding of the water is distinctly marked by the ridges of decayed tule upon its shore, and I was informed, and see no reason to disbelieve, that ten years ago it was nearly as extensive a sheet of water as the northern lake, having been gradually drained by the connecting soughs, and its bed filled by the encroachments of the tule.

The Project site is located along the margins of the two landscapes described above. Climate variability resulted in fluctuations in annual precipitation that likely would have caused the conditions within Project site to oscillate between the two prior to the onset of industrial agriculture and irrigation within the San Joaquin Valley.

With the construction of the Southern Pacific Railroad in the late nineteenth century, agricultural activities in the region continued to intensify. Wheat and other cash crops became an important part of the economy and with them came development of large-scale irrigation systems beginning in the late nineteenth century (Preston 1981; Wallace and Riddell 1993). As more water was diverted from rivers to irrigate farmland, lake levels in Tulare, Buena Vista, and Kern Lakes began to drop. Continued irrigation, as well as large water infrastructure projects on the rivers supplying the lake, resulted in the lakes effectively drying out except during especially rainy seasons by the mid-twentieth century.



SOURCE:

DUDEK

0 4 8 Miles

FIGURE 3

1873 Map with Project Site

Buttonbush Solar and Storage

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3 Research Methods

The Secretary of the Interior has issued Standards and Guidelines for Archeology and Historic Preservation (48 FR 44720–44726), which are used for the identification and evaluation of historic properties and to ensure that the procedures are adequate and appropriate. The identification and evaluation of historic properties are dependent upon the relationship of individual properties to other similar properties (NPS and ACHP 1998: 18–20). Information about properties regarding their prehistory, history, architecture, and other aspects of culture must be collected and organized to define these relationships (NPS 2009), which is the intent of the current inventory.

This investigation consisted of a records search, historic background research, and a pedestrian survey of the Project site. The record search, conducted at the Southern San Joaquin Valley Information Center at California State University, Bakersfield, included a search of the Project site and a 1-mile radius around the Project boundary. In addition to the record search, historic research was also conducted to inform the history of land use within the Project site. This research included review of historic topographic maps and aerial photographs (NETR 2023a, 2023b, GLO 1855, 1868).

Following Bureau of Land Management precedents, which are appropriate for federal projects, survey techniques are loosely grouped into two categories: reconnaissance and intensive (BLM 2004; NPS 2009). The choice of survey category depends on the level of effort required for a particular project, which can vary depending on the nature of the properties or property types, the possible adverse effects on such properties, and agency requirements (NPS and ACHP 1998). The selection of field survey techniques and level of effort must be responsive to the management needs and preservation goals that direct the survey effort. For any survey, it is important to consider the full range of historic properties that may be affected, either directly or indirectly, and consider strategies that will minimize any adverse effects and maximize beneficial effects on those properties (BLM 2004; NPS 2009; NPS and ACHP 1998).

The current pedestrian survey methods can be classified as intensive because close-interval transect spacing and full documentation of cultural resources were completed. Survey staff exceed the applicable Secretary of Interior's Professional Qualifications Standards for archaeological survey. Dudek archaeologists surveyed the entire Project site except for a small area that was inaccessible at the time of survey. This area was included in the record search and visually surveyed from the parcel perimeter. The pedestrian survey was conducted with transects spaced no more than 20 meters (m) apart and oriented along the Project alignment. A GPS receiver with sub-meter accuracy and loaded with a shapefile of the Project boundary was used to verify the accuracy of the survey coverage. Evidence for buried cultural deposits was opportunistically sought through inspection of natural or artificial erosion/excavation exposures and the spoils from rodent burrows. Field recording and photo documentation of resources were completed as appropriate.

Methods used to complete testing to evaluate of archaeological sites relied on a combination of hand-excavated units - Shovel Test Pits (STP), and collection of surface artifacts.

In general, STPs consisted of small (0.25-x-0.5-m) subsurface probes providing a presence-absence measure of subsurface archaeological deposits. STPs were also used to test subsurface site boundaries. Auger borings (4-in. diameter) were placed in the base of a sample of STPs and excavated to a depth of 2-m below the surface (mbs) to obtain a deeper understanding of stratigraphy within the culturally-sensitive areas.

Upon completion of fieldwork, all recovered artifacts and cultural material were transported back to Dudek's laboratory for cleaning, sorting, cataloging, and analysis. All materials were processed using standard archaeological methods, and will be returned to the locations from where they were collected. This will be documented in DPR forms related to the pertinent resource, as to avoid any confusion in the future relating to the archaeological record.

Documentation of cultural resources complied with the Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation (48 FR 44716–44740) and the California Office of Historic Preservation Planning Bulletin Number 4(a), December 1989, Archaeological Resource Management Reports: Recommended Contents and Format for the Preparation and Review of Archaeological Reports. All cultural resources identified during this inventory and testing were recorded on California Department of Parks and Recreation (DPR) Form 523 (Series 1/95), using the Instructions for Recording Historical Resources (OHP 1995).

4 Results

This section presents the results of the records search and the field survey of the current study.

4.1 Records Search Results

A records search was completed for the Project site and a 1-mile buffer by staff at the SSJVIC at California State University, Bakersfield, on November 8, 2022. A supplemental records search was conducted to incorporate revisions to the Study Area on April 11, 2023. The records searches identified 72 previous studies performed within the records search area. Of these, 40 studies have covered a portion of the Study Area (Table 1).

Table 1. Previous Cultural Resource Studies Within 1 Mile of the Study Area

Report ID	Year	Author	Title
Reports Intersecting the Study Area			
KE-00866	1992	Parr, Robert E. and Osborne, Richard	Archaeological Survey Report for the Proposed Route Adoption Study on Highway 58, Bakersfield, Kern County, California
KE-01266	1987	Schiffman, Robert A.	Archaeological Investigation for 60 Acre Parcel by Rowlee Road and Merced Ave, Kern County, California
KE-01485	1982	Schiffman, Robert A. and Monday, Nyle C.	Archaeological Evaluation for the Proposed Belridge Field Cogeneration Plant, Kern County, California
KE-01733	1991	Valdez, Sharynn-Marie	An Archaeological Assessment of 40 Acres of Land Northeast of Buttonwillow, Kern County, California
KE-02391	1999	Jackson, Thomas L. and Shapiro, William A.	Cultural Resources Inventory for the Proposed Texaco Sunrise Cogeneration and Power Project: Addendum for Route B and Valley Acres Substation Surveys
KE-02452	2000	Unknown	Construct and Operate Western MSCC Project (See KE-2931)
KE-02527	2001	Foster, John M.	Archaeological Survey for the CalPeak #3 Project, Midway Kern County, California
KE-02584	2001	Christy, Juliet	Archaeological Investigation of the Energy Works Buttonwillow Project, Kern County, CA
KE-02717	2002	Culleton, Brendan and Jackson, Thomas L.	Cultural Resources Inventory, Evaluation, and Mitigation Plan for the Transmission Line (Route 1B), Elk Hills Power Project (99-AFC- 1): Addendum to the Elk Hills Power Project Cultural Resources Monitoring and Mitigation Plan
KE-02740	2002	Casdorph, Cheryl	Draft Environmental Impact Report for Vanderham Dairy
KE-02873	2001	Unknown	Los Banos-Gates 500 kV Transmission Project: Draft Supplemental Environmental Impact Report [Cultural Resources Section]
KE-03027	2004	Clark, Jorie	Tulare Lake Basin Segment: Goose Lake Perimeter Slough Water
KE-03045	2003	Jackson, Thomas	Final Cultural Resources Report for the Sunrise Power Project Phase I

Table 1. Previous Cultural Resource Studies Within 1 Mile of the Study Area

Report ID	Year	Author	Title
KE-03691	2008	Gorden, Mary A.	Archaeological Reconnaissance Survey of the Perimeter at the Buttonwillow Ecological Reserve
KE-03777	2010	Palm-Leach, Laura, Brandy, Paul, King, Jay, Mikkelsen, Pat, Seil, Libby, Hartman, Lindsay, Bradeen, Jill, Larson, Bryan, Freeman, Joseph, Costello, Julia, Rosenthal, Jeffrey, and Jones, Deborah	Cultural Resources Inventory of Caltrans District 6 Rural Conventional Highways in Fresno, Western Kern, Kings, Madera, and Tulare Counties Summary of Methods and Findings
KE-03838	2009	Romani, John F.	Improvements to Lerdo Highway from Interstate 5 East to Poplar Avenue and the Shafter City Limits (Approximately 13 Miles), Kern County, California
KE-04512	2013	Romani, Gwen R.	Archaeological Survey Report Improvements to Elk Hills Road, Skyline Road to State Route 58, Kern County, California
KE-04736	2015	Laurie, Leroy and Gibson, Heather	Archaeological Survey Report for the Improvements to Rowlee Road from Lerdo Highway to State Route 46, Kern County, California
KE-04883	2017	Roper, C. Kristina	Historic Resources Compliance Report Interstate 5 Vehicle Detection Systems at 18 Locations in Kern, Kings, and Fresno Counties, California
KE-04883A	2017	Roper, C. Kristina	Archaeological Survey Report Interstate 5 Vehicle Detection Systems at 18 Locations in Kern, Kings, and Fresno Counties, California
KE-04883B	2017	Young, Craig D	Geoarchaeological Investigation for Interstate 5 VDS in Kern, Kings, and Fresno Counties
KE-04884	2017	Roper, C. Kristina	Historic Resources Compliance Report Interstate 5 Vehicle Detection Systems at 21 Locations in Kern County, California
KE-04884A	2017	Roper, C. Kristina	Archaeological Survey Report Interstate 5 Vehicle Detection Systems at 21 Locations in Kern County, California
Reports Within 1 Mile of the Study Area			
KE-00039	1997	Hudlow, Scott M.	A Phase I Cultural Resource Survey for Martin Outdoor Advertising, Kern County, California
KE-00064	1994	Osborne, Richard and Comeyne, Dominique	Negative Archaeological Survey Report. Highway project description: District 06, Kern County, Route 5, Post Mile 62.60, Charge Unit 169, Expenditure Authorization 37630K
KE-00066	1994	Osborne, Richard and Comeyne, Dominique	Negative Archaeological Survey Report. Highway project description: District 06, Kern County, Route 5, Post Mile 56.64, Charge Unit 169, Expenditure Authorization 37630K

Table 1. Previous Cultural Resource Studies Within 1 Mile of the Study Area

Report ID	Year	Author	Title
KE-00067	1994	Osborne, Richard and Comeyne, Dominique	Negative Archaeological Survey Report. Highway project description: District 06, Kern County, Route 5, Post Mile 58.01, Charge Unit 169, Expenditure Authorization 37630K
KE-00294	1981	Biorn, Margaret and Clayton, A.B.	Archaeological survey report DOT-06-KER- 58, PM 26.4 & 28.4, Charge Unit 06351, EA 218000
KE-00403	1985	Fredrickson, David A.	West Coast Cogeneration Project: Belridge
KE-00694	1995	Murphy, Peggy B.	An Archaeological Assessment of a Proposed Kern County Waste Management Transfer Station Site In Buttonwillow, Kern County, California
KE-00714	1987	Noble, Daryl and Schuster, Terry	Negative Archaeological Survey Report for DOT-06-KER-58, PM 27.3/32.5, EA 270500
KE-00950	1994	Pruett, Catherine Lewis	RE: EA SD 7-94; General Plan Amendment No. 20/ Zone Variance No. 6, Map No. 77 (Valley West Farms by Porter-Robertson Engineering and Surveying)
KE-01098	1984	Schiffman, Robert A.	Archaeological Investigation of Proposed Project Site APN 103-080-6 and 07, Kern County, California
KE-01169	1991	Unknown	Ongoing Fieldwork for the Buena Vista Slough Near Lokern
KE-01434	1992	Schiffman, Robert A.	Archaeological Investigation of Cameron Pointe Commercial Development Sections 17, T.28S., R.23E., Kern County, California
KE-01522	1994	Siefkin, Nelson	An Archaeological Assessment of Parcels APN 103-05-03 and APN 103-05-04, Near Buttonwillow, Kern County, CA
KE-01632	1980	Swenson, Laurie and Clayton, Al	Archaeological Survey Report for Expansion of Buttonwillow Roadside Rest PM 54.1
KE-01688	1984	Uli, Jim	Archaeological Investigation of Leland Freeborn Salinity Management Study Proposed 1921 Acre Evaporation Basin Study Goose Lake Bed Area, Wasco, Kern County, California
KE-02162	1998	Hatoff, Brian	Cultural Resources Technical Report for the La Paloma Generating Project
KE-02323	1999	Demos-Petropoulous, Francine, McGowan, Dana, Scott, Barry, O'Brien, Teresa, Norton, Bill, and Rause, Wendy	Cultural Resources Inventory Report for the AT&T Corp. Cable Upgrade Project, Los Angeles, Kern, and San Luis Obispo Counties, California
KE-02394	1999	Laylander, Don, Marine, Mandy, Chick, Phil, and Wallace, Sarah	Negative Archaeological Survey Report to Install Traffic Surveillance Stations at 21 Locations in Kern, Kings, and Tulare Counties
KE-02741	2002	Washington, Daphne and Murphy, Peggy	Buttonwillow Sanitary Landfill: Draft Negative Declaration SCH #1982121004
KE-03083	2005	Fleagle, Dorothy	Addendum: Additional 38.86 Acres to a Cultural Resources Assessment for 32.6 Acres Near the Intersection of Lerdo Highway and Interstate 5, Kern County, California

Table 1. Previous Cultural Resource Studies Within 1 Mile of the Study Area

Report ID	Year	Author	Title
KE-03153	2005	Billat, Lorna	New Tower ("NT") Submission Packet FCC Form 620 for Rowlee Road, CA-3238D
KE-04054	2010	Romani, John F.	Archaeological Survey Report Improvements to Buttonwillow Drive from Interstate 5 South to State Route 58 (approximately 3.5 miles), Kern County, California
KE-04273	2011	Hudlow, Scott	A Phase I Cultural Resource Survey for Tentative Parcel Map 12011, Kern County, California
KE-04455	2014	Hudlow, Scott	A Phase I Cultural Resource Survey Sullivan Road Industrial Project, Kern County, California
KE-04552	2013	Laurie, Leroy	Cultural Resources Constraints Report for the Midway-Kern #1 230kV (Structures 3/26, 4/28, and 5/33)
KE-04616	2014	Hudlow, Scott M.	A Phase I Cultural Resource Survey for Rosalie Morales, 6010 Buerkle Road, Buttonwillow, Kern County, California
KE-04625	2014	Wills, Carrie D.	Cultural Resources Records Search and Site Visit Results for Verizon Wireless Candidate Leonard St, 28703 Riverside Street, Shafter, Kern County, California
KE-04636	2015	Romani, Gwen	Archaeological Survey Report for the Cannon Street Improvement Project from State Route 58 to Sullivan Road
KE-04637	2015	Romani, Gwen	Archaeological Survey Report for the Sullivan Road Improvement Project from Cannon Street to Bussell Road
KE-04756	2015	Clifton, Virginia and Travers, Aniela	Cultural Resources Survey Frito Lay/Ensite #26194 (285330) Highway 58, Bakersfield, Kern County, California
KE-04948	2017	Baloian, Mary	Cultural Resource Survey for the Semitropic-Midway 115 kV Reconductoring Project, Kern County, California

The records searches identified 12 previously recorded cultural resources within the Study Area and 47 cultural resources within 1 mile of the Study Area (Table 2). Previously recorded resources intersecting the Study Area limits include three prehistoric sites, one historic-era refuse scatter, one razed historic-era ranch, three prehistoric isolates, and four existing historic-era structures/ features/ facilities. These resources are summarized in greater detail below.

Table 2. Previously Recorded Cultural Resources Within 1 Mile of the Study Area

Primary Number	Trinomial	Name	Type	Age	Attributes
Previously Recorded Sites Intersecting the Study Area					
P-15-000324	CA-KER-000324	—	Site	Prehistoric	Lithic scatter; Burials; Habitation debris

Table 2. Previously Recorded Cultural Resources Within 1 Mile of the Study Area

Primary Number	Trinomial	Name	Type	Age	Attributes
P-15-000325	CA-KER-000325	—	Site	Prehistoric	Lithic Scatter; Habitation debris; Freshwater shell
P-15-004347	CA-KER-00416H	GD-1	Site	Historic	Privies/dumps/trash scatters
P-15-009737	—	PL-6	Substation	Historic	Foundations/structure pads; Privies/dumps/trash scatters; Standing structures; Public utility building
P-15-009738	—	PL-7	Ranch / Site	Historic	Privies/dumps/trash scatters; Machinery; Standing structures; Farm/ranch
P-15-013725	CA-KER-007701H	JKE-001; East Side Canal	Canal	Historic	Canal/aqueduct
P-15-020012	CA-KER-010921	CRM TECH 3475-1	Site	Prehistoric	Lithic scatter; Ground stone
P-15-020558	—	Interstate 5; Golden State Freeway	Road	Historic	Roads/trails/railroad grades; Highway/trail
P-15-021385	—	CRM TECH 3856-1	Isolate	Prehistoric	Isolated CCS debitage
P-15-021386	—	CRM TECH 3856-2	Isolate	Prehistoric	Isolated CCS debitage
P-15-021387	—	CRM TECH 3856-3	Isolate	Prehistoric	Isolated CCS debitage
P-15-021388	—	Buttonwillow Wastewater Treatment Plant (WWTP)	Structure	Historic	Public utility building
Previously Recorded Sites Within 1 Mile of the Study Area					
P-15-000052	CA-KER-000052	#17 Gifford and Schenck	Site	Prehistoric	Steatite sherds
P-15-000053	CA-KER-000053	#18 Gifford and Schenck	Site	Prehistoric	Burials
P-15-000056	CA-KER-000056	#29 Gifford and Schenck	Other	Prehistoric, Unknown	No description provided
P-15-000057	CA-KER-000057	#30 Gifford and Schenck	Site, Element of district	Prehistoric	Burials

Table 2. Previously Recorded Cultural Resources Within 1 Mile of the Study Area

Primary Number	Trinomial	Name	Type	Age	Attributes
P-15-000611	CA-KER-000611	B-1	Site	Prehistoric	Lithic scatter; Bone and shell fragments
P-15-001847	CA-KER-001847	Leland Freeborn #2	Site	Prehistoric	Lithic scatter; Habitation debris
P-15-002050	CA-KER-002050H	Southern Pacific Railroad, McKittrick Branch; Midway-Sunset 2; KS-1; FCG-27; Old Southern Pacific Railroad Grade; Asphalto Line of the South Pacific Railroad	Structure, Site	Historic	Foundations/structure pads; Privies/dumps/trash scatters; Road/trail/railroad bed; Engineering structure; Railroad depot; Highway/trail; Standing structures; Wooden structural remains; Bridge; Culvert
P-15-002694	CA-KER-002694	Site #1	Site	Prehistoric	Lithic scatter
P-15-002707	CA-KER-002707	Site #2	Site	Prehistoric	Lithic scatter
P-15-003058	CA-KER-003058	Site #4	Site	Prehistoric	Lithic scatter
P-15-003093	CA-KER-003093	GDE-912	Site	Prehistoric	Lithic scatter
P-15-003102	CA-KER-003102	GDE-914	Site	Prehistoric	Lithic scatter
P-15-003103	CA-KER-003103	GDE-914	Site	Prehistoric	Lithic scatter
P-15-003104	CA-KER-003104	GDE-915	Site	Prehistoric	Lithic scatter
P-15-003107	CA-KER-003107	GDE-918	Site	Prehistoric	Lithic scatter
P-15-003108	CA-KER-003108	GDE-919	Site	Prehistoric	Lithic scatter; Habitation debris
P-15-003109	CA-KER-003109H	GDE-920H	Site	Historic	Foundations/structure pads; Roads/trails/railroad grades; Privies/dumps/trash scatters
P-15-003110	CA-KER-003110	GDE-921	Site	Prehistoric	Lithic scatter

Table 2. Previously Recorded Cultural Resources Within 1 Mile of the Study Area

Primary Number	Trinomial	Name	Type	Age	Attributes
P-15-003114	CA-KER-003114	GDE-927	Site	Prehistoric	Lithic scatter
P-15-003115	CA-KER-003115	GDE-928	Site	Prehistoric	Lithic scatter
P-15-003355	CA-KER-003355H	J.G. – 1	Site	Prehistoric; Historic	Lithic scatter; Shell button
P-15-003356	CA-KER-003356H	Sharynn's Site	Site	Historic	Privies/dumps/trash scatters
P-15-003913	CA-KER-003913	—	Site	Historic	Fill deposit
P-15-004014	CA-KER-004013	FCG-1; ISO-SD1	Site	Prehistoric	Lithic scatter; Burials; Habitation debris
P-15-004621	—	PMI-1	Other	Prehistoric	Lithic scatter
P-15-005702	—	IF-KER-1760H	Other	Historic	Isolate green glass sherds
P-15-008251	—	OHP Property Number – 068783; OTIS Resource Number – 470742	Building	Historic	Single family property
P-15-008252	—	OHP Property Number – 067526; OTIS Resource Number – 469648	Building	Historic	Single family property
P-15-009736	—	PL-5	Site	Prehistoric	Lithic scatter; Habitation debris
P-15-009861	—	Caltrans-7; IF-KER-678	Other	Prehistoric	Lithic scatter
P-15-009862	—	Caltrans-11; IF-KER-689	Other	Prehistoric	Lithic scatter
P-15-009863	—	Caltrans-12; IF-KER-690	Other	Prehistoric	Lithic scatter
P-15-010690	CA-KER-006231	PL-EHPP-6	Site	Prehistoric	Lithic scatter
P-15-013726	CA-KER-007702H	JKE-002; Main Drain Canal	Structure	Historic	Water conveyance system; Canal/aqueduct

Table 2. Previously Recorded Cultural Resources Within 1 Mile of the Study Area

Primary Number	Trinomial	Name	Type	Age	Attributes
P-15-016999	—	Segment of Eastside Cutoff	Structure	Historic	Canal/aqueduct
P-15-017682	—	Arizona Ditch	Structure	Historic	Water conveyance system; Canal/aqueduct
P-15-017683	—	Deep Wells Ditch	Structure	Historic	Water conveyance system; Canal/aqueduct
P-15-017684	—	Eighty Foot Ditch; OTIS Resource Number – 684947	Structure	Historic	Water conveyance system
P-15-017685	—	Florida Drain	Structure	Historic	Water conveyance system
P-15-020558	—	Interstate 5	Site	Historic	Road; highway

P-15-000324 (CA-KER-000324)

CA-KER-000324 was first and last recorded in June 1970 by WJW/ETW. The resource covers a 100' × 50' area, and is located 10 yards east of the East Side Canal Levee and 0.7 miles northwest of Seventh Standard Rd. The site falls along the western border of the project boundary within APN 087-210-04, and is described as a cemetery on a low knoll. At least two adult skeletons were exposed prior to archaeological investigation, and Olivella shell beads and stone chips (chert, chalcedony, obsidian) are also associated with the site. It is noted that levee-building may have removed a portion of the site, and there was expected to be a greater level of destruction due to land cultivation. Excavation was recommended for this resource, the results of which are detailed below in 4.3 Fieldwork Results. Soils within the site and surrounding area are a dark silty loam, and landscape consists of grasslands. It is unknown if the site has been evaluated for either the NRHP or CRHR at this time.

P-15-000325 (CA-KER-000325)

CA-KER-000325 was first and last recorded in June 1970 by WJW/ETW. The resource covers a 200' × 400' area located one mile east of the intersection of Wasco Ave and State Hwy. 58, within APN 103-120-30. The site falls within the southern portion of the project boundary, although the primary parcel it is located within is not within the Project Site. A small sliver of the mapped site boundary intersects the Project site in an area where extensive grading has occurred during the development and maintenance of an agricultural staging area. The resource is described as a series of small campsites on low knolls containing 32 *Olivella* shell beads, three projectile point fragments, a steatite bead, steatite reel fragment, utilized flake, and stone chips (chert, chalcedony, obsidian). It is noted that there are heavy concentrations of freshwater clam shell located at several of the camping places. The surrounding

landscape consists of sagebrush and grasslands. The site has not been evaluated for either the NRHP or CRHR at this time.

P-15-004347

This resource is the location of a former dairy with a diffuse scatter of historic artifacts. The dairy operated from the late 1930s into the 1980s. No structural remains are present. Artifacts include heavily patinated glass sherds, decorated and undecorated stoneware ceramics, concrete and brick fragments, and scrap iron. The site was recorded in 1994 by the CSU Bakersfield Cultural Resource Facility (Siefkin and Woods 1994).

P-15-009737

P-15-009737 was first recorded in May 1999 by Shapiro, Morgan, and Daldorf. The resource covers an area of 51.2 acres and is located in the southeast and east portion of the project boundary within APN 101-010-02. This site encompasses the Midway Switching Center – PG&E substation on the east side of the town of Buttonwillow located at the northwest corner of Hwy 58 and Wasco Ave. Features of the site include three standing structures (two control room buildings and residential complex), a foundation, the remains of a recreational park, and an artifact scatter associated with the San Joaquin Power Company's Midway Steam Plan which was constructed between 1921-1922 and dismantled in 1954 (Shapiro, Morgan, Daldorf 1999). The site has not been evaluated for either the NRHP or CRHR at this time.

P-15-009738

P-15-009738 was first recorded in May 1999 by Shapiro, Morgan, and Daldorf. A portion of this 29.6-acre resource is located within a proposed Gen-Tie alignment in the southeastern portion of the Project site, within APN 101-010-19. The site stretches outside the project boundary to the north, northwest, east, and southeast. The site is located on both sides of Wasco Ave., approximately ½ mile north of its intersection with Hwy 58. The site consists of the remains of a feed mill and cattle ranch complex. Features include several standing and partially collapsed structures thought to be dating between 1928-1954, a feed mill with related tanks and trough system, corrals, concrete slabs related to hay storage, an occupied trailer, miscellaneous farming and ranching equipment, and trash scatter extending across Wasco Road containing glass and ceramic fragments dating to the 1920s-1960s (Shapiro, Morgan, Daldorf 1999). It is also noted that to the north of the artifact scatter on the east side of Wasco Road there is a wide scatter of isolate chert flakes and freshwater mussel shell fragments. The surrounding landscape is described as sagebrush and grasslands with the exception of the area on the east side of Wasco Ave being used for cotton cultivation. The site has not been evaluated for either the NRHP or CRHR at this time.

P-15-013725 (CA-KER-007701H)

CA-KER-007701H, also referred to as the East Side Canal, is a northwest southeast running canal which runs adjacent to and intersects a portion of the western and southwestern border of the project boundary. The historic canal was first recorded in 2009 by Melvin and Flores of JRP Historical Consulting and described as being originally constructed ca. 1870 by the Miller and Lux Company as the primary irrigation canal for their Buttonwillow Ranch. The entire length of the canal is approximately 26.7 miles, where approximately 8 miles of which runs along or near the project boundary. The site has not been evaluated for either the NRHP or CRHR at this time.

P-15-020012

This site consists of a large, sparse artifact scatter with lithic and ground stone. The site measures 340 m × 110 m, and is located within an active agricultural field. Artifacts include a granitic pestle and a granitic mano fragment, along with an obsidian biface midsection, a crypto-crystalline silicate (CCS) core fragment, and multiple obsidian and CCS flakes. No collection of artifacts occurred, and the site was recommended not eligible for listing on the NRHP or CRHR (Ballester 2019).

The site is located in the southwestern portion of the Project site, intersecting one of the proposed Gen-Tie alignments.

P-15-020558

Resource P-15-020558, also referred to as Interstate 5 or the Golden State Freeway, is a major eight-lane paved freeway spanning a total of 1,381 miles from the Mexican border in San Diego County, California, to the Canadian border in Washington State, with 800 miles located within the State of California (Urbana Preservation and Planning 2019). The route has its origins as early as 1910 and the section through the San Joaquin Valley from Sacramento to Los Angeles (Route 4) was paved circa 1930 and became US-99 in 1926. Following the passage of the Federal Aid Highway Act of 1956, the path of Interstate 5 followed the general route of US-99 and replaced portions of the original highway. The segment of Interstate 5 near Bakersfield was completed circa 1972 and was delineated on the 1974 Grapevine USGS Topographic Quadrangle Map as a four-lane highway in either direction (Urbana Preservation and Planning 2020).

The resource stretches northwest–southeast intersecting a portion of the southwestern parcels of the Project boundary. Interstate 5 appears ineligible under NRHP/CRHP Criterion A, B, C and D.

P-15-021385

This resource consists of an isolated CCS flake recorded south of Sullivan Road, near an unpaved extension of Meadow Street (O'Donnell 2022).

P-15-021386

This resource consists of an isolated CCS flake recorded south of Sullivan Road, near an unpaved extension of Meadow Street (O'Donnell 2022).

P-15-021387

This resource consists of an isolated CCS flake recorded south of Sullivan Road, near an unpaved extension of Meadow Street (O'Donnell 2022).

P-15-021388

This resource is the Buttonwillow Wastewater Treatment Plant (WWTP). The WWTP is actively maintained, with both historical and modern elements. Historical components include an Imhoff tank, a corrugated metal shed, a storage pond, a sludge-drying bed, and a cluster of standpipes – all built between 1956 and 1967. Active use and

maintenance of the facility has led to an overall modern appearance (O'Donnell 2022). The site was recommended not eligible for listing on the NRHP or CRHR.

4.1.1 Notable Cultural Resources within Records Search Buffer

P-15-000053 (CA-KER-000053)

CA-KER-000053 was originally recorded by Gifford-Schenck in 1926. The site is approximately 1240 ft east of the intersection of Canal Rd. and Snow Rd. and is located approximately 0.6 miles southwest of the Project site. The resource is described as a group of mounds used temporarily as a camp site and burial mound.

P-15-000057 (CA-KER-000057)

CA-KER-000057 was originally recorded by Gifford-Schenck in 1926. Located approximately 1000ft west of the northern segment of Gun Club Rd. and 0.67 miles north of the Project site. The resource is described as containing cedar posts marking burials.

P-15-000611 (CA-KER-000611)

CA-KER-000611 was first and last recorded by Weisbrod and Bove in May 1977. The site is located on a slight bank approximately 10-20 meters west of Rowlee Road and 200-300 meters south of Lerdo Road, and just east of Jerry Slough. The northern most edge of the resource is located approximately 450ft southwest of the southernmost boundary of the Project site and coverers an area of 900 square meters. It is described as containing a light lithic scatter of chert and chalcedony flakes, with some bone of various species and shell fragments. The site location and surrounding area contains a sandy clay and vegetation is made up of grasslands and scrub.

P-15-001847 (CA-KER-001847)

CA-KER-0001847 was originally recorded in in 1084 by Jim Uli and is located east to adjacent to Basin D, on a ridge system that connects to Semitropic Ridge with Button Willow Ridge. It is approximately 0.97 miles west of the northwestern border, and approximately 1 mile north of the norther border of the Project site. The resource is described as being on elevated land and a major habitation site, consisting of a shell midden with associated freshwater shell and midden soil. It is also noted that charcoal is represented on both the surface and subsurface levels of the site. Though no evidence of human remains were found on the surface there is a potential for burials as other site containing burials are noted within the general vicinity. Soils are described as being sandy, while surrounding soils are described as a sandy loam, vegetation is described as saltbush and grasslands.

P-15-004014 (CA-KER-004013)

CA-KER-0004013 was originally recorded by Morgan and Talman in 1994 and is located adjacent and east of the main drain under existing PG&E 500 kV line and 230 kV transmission lines. The site is located approximately 0.36 miles southwest of the southwestern border, and 0.5 miles southwest of the western tip of the Project site. This resource consists of a lithic scatter containing chert, chalcedony, and obsidian flakes and tools. Two probable human skull fragments, one with possible burning, are also present. Based on the 1932 Buttonwillow USGS Quadrangle map a distinctive mound was located in the vicinity of the site and may have represented the original

midden mound prior to leveling due to agricultural activity (Jackson, Shapiro 1999). Soils are described as a medium to dark brown silty loam, with a large oval area of lighter brown-grey soil to the northeast.

P-15-009736

P-15-0009736 was first recorded by Shapiro, Morgan, Dalldorf, and Angleoff in May 1999. The site is located on either side of a paved access road, east of Mirasol Road, leading to a ranch complex (2910 Mirasol Road), and north of the Sudan/Arizona Ditch and southwest of the Main Drian. PG&E transmission lines 500 kV Line and the Midway Sunset 230 kV #1 Line cross over the site. It is approximately 0.57 miles southwest of the southwestern border, and 0.7 miles southwest of the western tip of the Project site. The resource is described as containing 6 pieces of chert debitage and granitic mano. On the north side of the access road a roughly circular area of lighter colored tan to white-ish soil is distinct relative to the surrounding dark grey-brown silty loam. This may represent a former mound in the area which would have been leveled due to agricultural activity. It is possible this site also connects with the aforementioned P-15-004014.

P-15-016999

P-15-016999, also known as a segment of the Eastside Cutoff, is a canal segment extending from the Eastside Canal to the north where it connects with farmer-created ditches. It is presumed to be associate with the Buena Vista Water Storage District's development of the northern portion of Buttonwillow Ranch post-1924. An approximately 1282 ft segment of this resource is located along the western edge of the Project site. It is not eligible for NRHP or CRHP under Criterion 1, 2, 3, and 4.

P-15-020012

This site, located immediately north of the Dudek survey limits, is reported to consist of a large, sparse artifact scatter with lithic and ground stone (Ballester and Morales 2019). At the time of recording, the site measured 340 m × 110 m, located within an active agricultural field. Artifacts included a granitic pestle and a granitic mano fragment, along with an obsidian biface midsection, a crypto-crystalline silicate (CCS) core fragment, and multiple obsidian and CCS flakes. No collection of artifacts occurred, and the site was recommended not eligible for listing on the NRHP/CRHR.

4.1.2 Historical Map Review

Aerial photographs of the Project site were available for the years 1952, 1956, 1968, 1984, 1994, 2005, 2009, 2010, 2012, 2014, 2016, 2018, and 2020 (NETR 2023a). Topographic maps including the Project site were available for the years 1855, 1868, 1931, 1932, 1934, 1942, 1943, 1950, 1956, 1957, 1974, 1976, 2012, 2015, 2018, and 2021 (GLO 1855, 1868; NETR 2023b).

These documents indicate that the Project site once fell along a series of marshes, sloughs and wetlands between Lake Tulare and Buena Vista Lake called the Buena Vista Slough. A minor offshoot, Jerry Slough intersects the Project site within the northern and central portions. Arid plains were located in elevated areas away from the sloughs. Topographic maps from 1931 onward depicted this area as crisscrossed with a system of canals and levees, although the community of Buttonwillow is already present. By 1942, a series of more established roads had made their way into the Project site and surrounding vicinity. The earliest aerial images of the 1950s display sparse agricultural fields spread about around the project site, surrounded by seemingly arid land. The community

of Buttonwillow also appears to have achieved its current size by 1956. Both maps and aerial images show very little change in the region for the next decades. By 1984, aerial images indicate a larger spread of agricultural fields with more arid regions being turned to farmland. By the 1980s, the region had seemed to take its present form as very little change is seen in aerial images.

4.2 Review of Geomorphological Context

The ground surface of the Project site has been highly disturbed by previous agricultural and ranching activities. The USGS characterized deposits in the region as Quaternary alluvium and marine deposits (USDA 2023). No major rivers, streams, or drainages flow through the Project site, although the southwestern edge of the Project site is in the location of the slough that flowed between Lake Tulare and the Buena Vista Lake and the north portion of the Project site intersects the Jerry Slough. Although portions of the Project site would have likely been dry grassland, other portions and its general proximity to the important Buena Vista Slough would have made this spot an attractive place to reside while exploiting these resources. The low elevation and level ground at the Project site indicate the area could have been subject to seasonal flooding from the slough, inundating and shifting alluvial sedimentation since the Holocene during wetter years. These patterns are generally confirmed through Dudek's subsurface testing, see Section 4.3.3 for additional details.

The potential for buried prehistoric archaeological deposits in the Project site has been characterized as ranging from "Moderately low" to "Very High" by the 2010 California Department of Transportation Districts 6 and 9 Geoarchaeological Overview and Assessment (Meyer et al. 2010). However, such broad analyses must be tempered by local conditions. The Project site is in an area that has a sparse record of prehistoric occupation indicated by the records search for the large size of the study area. However, this appears to be a result of the lack of previous intensive pedestrian survey within the Project site rather than the absence of archaeological resources, as indicated by the results from the current pedestrian survey. While agricultural fields extensively disturb archaeological deposits, they do not erase them; to the contrary, such activities often bring buried deposits to the surface. Portions of the Project site were observed to contain concentrations of artifacts consistent with prehistoric and historic-era resource formation.

According to the U.S. Department of Agriculture Natural Resources Conservation Service (USDA 2022), twelve different soil types are mapped in the Project boundary with the two most dominantly by far being Garces silt loam (28%) and Milham sandy loam (27%). Both soil types follow the western portion of the Project site, the area that would have been the floodplain for the Buena Vista Slough. In general, the soils present in the Project site are consistent with alluvium derived from sedimentary rock and other parent material in stream terraces, brought to the vicinity from the foothills of the Temblor Range and even as far as the Sierra Nevada by the nearby rivers and drainages, and deposited on the Project site during times of seasonal flooding when rivers would overflow. Smaller portions of the Project site consist of lakebed clays, mapped as drained saline-alkali Lokern clay, indicating areas that would have been inundated most of the year.

The historic GLO map from 1855 displays the southwestern portion of the Project site within the Buena Vista Slough, a large system of wetlands stretching from Buena Vista Lake, approximately 11 miles to the south, to Lake Tulare, approximately 20 miles to the north. These massive freshwater lakes and wetlands have dried up in more recent historic times due to tributaries being channelized for agricultural use. Surrounding the lakes would have been an extensive network of streams and sloughs (Osborne 1992). Lake Tulare and Buena Vista Lake were very shallow bodies of water and the shoreline would increase and decrease dramatically with the rainfall and snowpack in the

Sierra Nevada each year. As Latta (1977) stated, “the rise and fall of one foot in the level of water in the lake (Tulare) might move the shoreline forward or backward often a distance as great at two miles.” Shorelines tend to be places of high biomass productivity and would be areas where the local native populations would find numerous attractive resources to exploit such as tule reeds, birds, fish, and freshwater clams. As the edges of the Buena Vista Slough in the southwestern portion of the Project site would have been ever-shifting, it can be inferred that far more of the Project could have been inundated by the slough during wetter times. As such, the entire area at particular times could be productive shoreline. This indicates the portions of the Project site mapped as alluvial slough deposits should be considered at a heightened sensitivity for buried prehistoric resources.

In consideration of the above factors, the sensitivity of the Project site for buried prehistoric resources in regard to geoarchaeology can be divided into “Moderate” and “High.” Soils within the majority of the Project site fall into the broader classification of Quaternary alluvial deposits. Absent historical modifications, the area would have been subject to recurring flooding, often on a seasonal basis. Related soils would have been in a constant state of formation and deposition up to present. Areas along the western edge of the Project site are essentially at the edge, and within, the historical Buena Vista Slough. Prior to this, and occupation by humans, the entire Project site would have been within the Buena Vista Lake. The more recent, Late Pleistocene -historical deposition that corresponds with the region’s people of prehistoric habitation, appears to have resulted in a relatively shallow alluvial horizon, below which are largely culturally sterile clays and sands. As such they are well suited to the formation of cultural deposits, and are considered to have a “High” sensitivity. These areas would have been locations dry enough to inhabit or areas with high productivity for natural resources. Portions of the project site mapped as lakebed clays and clay loams, are considered to have a “Moderately-” sensitivity. These areas would have been underwater most of the year, so would likely not be areas considered for habitation, but could still be used as areas of resource collection. All sensitivity mapping will require confirmation through direct observation during cultural monitoring. All areas of the Project site should be assumed to have the potential to contain buried cultural deposits. During cultural monitoring, sensitivity mapping can be modified or refined as a direct observation of the local conditions is ascertained.



SOURCE:

DUDEK

0 4 8 Miles

FIGURE 3

1873 Map with Project Site

Buttonbush Solar and Storage

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4.3 Fieldwork Results

Dudek Archaeologists Ross Owen, Kolin Taylor, Julie Royer, Jerry Pariseau, Michael Mendiola, Elizabeth Sivell, Victoria Martin, Nicholas Hanten, Walter Saldana, Thomas Miller-Donnelly, Daniel Davis, Adriano Odello, Katie Ahmanson, Russell Silberberger, and Curtis Alcantar conducted an intensive-level pedestrian survey of the entire Project site, as well as archaeological subsurface testing of the area within and/or surrounding 15 resources between January 17, 2023, and June 18, 2024. The survey and resource evaluations were conducted using standard archaeological procedures and techniques, as outlined in Chapter 3, Research Methods.

It is noted that a small portion of the Project site (approximately 605 acres) was not accessible due to active agricultural activities. This includes all of APNs 088-220-20, 088-220-21, 088-220-22, 088-220-23 and 103-030-45; and portions of APNs 088-180-02, 088-180-06, 088-180-07, 088-210-01, 088-220-15 and 088-220-16. APNs 088-220-20, 088-220-21, 088-220-22, 088-220-23, 088-220-15 and 088-220-16 were inaccessible due to an active cattle feed lot, and adjacent retention basins and staging areas for the processing of manure and liquid waste. APN 103-030-45 was inaccessible due to planted crops and pesticide spraying at the time of survey. APNs 088-180-01, 088-220-02, 088-180-06 and 088-180-07 were inaccessible due to flooding. Visual inspection of these inaccessible areas observed similar terrain and conditions to adjacent agriculturally-active parcels, but did not provide full survey coverage. These areas will require survey prior to construction.

Field efforts documented 16 new sites and updated or otherwise expanded the documentation for two previously-recorded sites. The two updated resources included P-15-000324, a prehistoric resource with previously identified human burials (not relocated during the pedestrian survey) and P-15-020012, a highly disturbed mixed prehistoric scatter and historic-era refuse scatter located on PG&E lands. Sixteen previously unrecorded prehistoric and historic era resources were identified and recorded. These resources included thirteen prehistoric lithic scatters and three historic-era refuse scatters. Water conveyance features and other built environment resources are discussed in the *Built Environment Inventory and Evaluation Report for the Buttonbush Solar Project, Kern County, California* (Jones, Ahmanson and Kim 2025).

Ground surface visibility was high (approximately 80%–99% in most areas) over much of the Project site due to sparse vegetation within fallow agricultural fields. Subsurface exposures along drainages and animal burrows were opportunistically inspected for evidence of subsurface archaeological deposits. Photos 1 and 2 show representative conditions within the Project site at the time of survey. Soils have been disturbed historically and in modern times from water conveyance infrastructure, agriculture, and ranching.

All historic-era archaeological sites that were documented to be present within the Project site during survey were observed to be low complexity refuse scatters, often mixed with modern debris. These were evaluated for NRHP/CRHR eligibility based on surface information. The 13 newly recorded prehistoric sites intersecting the Project site were subject to subsurface testing, both within and surrounding the recorded distribution of surface artifacts. While a small number of incidental artifacts were observed below the surface within the plow zone, no intact subsurface deposits were documented within these sites. Subsurface testing was completed near (outside of) P-15-000324 and P-15-000325 to provide an understanding of the extent of each site and the potential for intact buried cultural deposits in areas surrounding these resources. No subsurface deposits were documented in areas surrounding these sites; the areas within the actual resource boundaries themselves were not subject to subsurface investigations. P-15-000325 is fenced off, outside of but adjacent to, the Project site.

Table 3. Field Results

Site ID	Trinomial	Temp ID	Period	Survey Results
P-15-000324	CA-KER-000324	—	Prehistoric	Relocated, updated mapping and site description. Previously reported human remains; not identified during Inventory or testing in area surrounding area.
P-15-000325	CA-KER-000325	—	Prehistoric	No cultural materials encountered within Project site. Fence present around most of the resource, outside of the Project site. Testing completed around perimeter, in Projects site; no subsurface deposits observed.
P-15-004347	CA-KER-00416H	GD-1	Historic	Small overlap with proposed Gen-Tie, no cultural materials encountered during survey
P-15-009737	—	PL-6	Historic	Appears to be destroyed by modern substation; entirely within existing substation footprint
P-15-009738	—	PL-7	Historic	Appears to be destroyed by modern orchards and roads, no cultural materials encountered within mapped site location
P-15-013725	CA-KER-007701H	JKE-001; East Side Canal	Historic	Adjacent Project site, not within survey area - discussed in Built Environment report (Jones, Ahmanson and Kim 2025)
P-15-020012	CA-KER-010921	CRM TECH 3475-1; BB-KT-S-001	Multi-component	Intersects proposed Gen-Tie in southwestern portion of Project site. Observed prehistoric and material on PG&E lands, substantially disturbed (destroyed)
P-15-020558	—	Interstate 5; Golden State Freeway	Historic	Adjacent Project site, not within survey area - discussed in Built Environment report (Jones, Ahmanson and Kim 2025)
P-15-021385	—	CRM TECH 3856-1	Prehistoric	Intersects proposed Gen-Tie in southwestern portion of Project site, no cultural materials encountered during survey
P-15-021386	—	CRM TECH 3856-2	Prehistoric	Intersects proposed Gen-Tie in southwestern portion of Project site, no cultural materials encountered during survey
P-15-021387	—	CRM TECH 3856-3	Prehistoric	Intersects proposed Gen-Tie in southwestern portion of Project site, no cultural materials encountered during survey
P-15-021388	—	Buttonwillow Wastewater Treatment Plant (WWTP)	Historic	Site appears to match existing site record (O'Donnell 2022)
pending	pending	BB-RO-S-001	Prehistoric	Intersects Project site; subsurface testing completed - no subsurface deposits observed
pending	pending	BB-JR-S-001	Prehistoric	Intersects Project site; subsurface testing completed - no subsurface deposits observed
pending	pending	BB-JR-S-002	Prehistoric	Intersects Project site; subsurface testing completed - no subsurface deposits observed

Table 3. Field Results

Site ID	Trinomial	Temp ID	Period	Survey Results
pending	pending	BB-JR-S-003	Prehistoric	Intersects Project site; subsurface testing completed - no subsurface deposits observed
Pending	pending	BB-JR-S-004	Prehistoric	Intersects Project site; subsurface testing completed - no subsurface deposits observed
Pending	pending	BB-JR-S-005	Prehistoric	Intersects Project site; subsurface testing completed - no subsurface deposits observed
Pending	pending	BB-JR-S-006	Prehistoric	Intersects Project site; subsurface testing completed - no subsurface deposits observed
Pending	pending	BB-ES-S-001	Historic	Intersects Project site; subsurface testing completed - no subsurface deposits observed
Pending	pending	BB-ES-S-002	Historic	Intersects Project site; subsurface testing completed - no subsurface deposits observed
Pending	pending	BB-ES-S-003	Prehistoric	Intersects Project site; subsurface testing completed - no subsurface deposits observed
Pending	pending	BB-ES-S-004	Historic	Intersects Project site; subsurface testing completed - no subsurface deposits observed
Pending	pending	BB-ES-S-005	Prehistoric	Intersects Project site; subsurface testing completed - no subsurface deposits observed
Pending	pending	BB-ES-S-006	Prehistoric	Intersects Project site; subsurface testing completed - no subsurface deposits observed
Pending	pending	BB-ES-S-007	Prehistoric	Intersects Project site; subsurface testing completed - no subsurface deposits observed
Pending	pending	BB-ES-S-008	Prehistoric	Intersects Project site; subsurface testing completed - no subsurface deposits observed
pending	pending	BB-ES-S-009	Prehistoric	Intersects Project site; subsurface testing completed - no subsurface deposits observed



Photo 1. Survey Conditions, Southwestern portion of Project site, facing NE



Photo 2. Survey Conditions, Northwestern Portion of Project Site, Facing East



Photo 3. Olivella Bead



Photo 4. Indeterminate ground stone vessel fragment



Photo 5. Hand stone

4.3.1 Updates to Previously Recorded Resources

Twelve previously recorded resources were located within the Project site (Table 3). A brief summary of the survey (and resource evaluation results when applicable), and the relationship between the resources and the Project site is presented in the following section. The recorded locations of all previously recorded cultural resources intersecting the Project site were revisited during archaeological survey. The only two archaeological sites that were relocated or otherwise expanded included P-15-000324 and P-15-020012; the remaining four (4) previously recorded sites and three (3) isolates appear to have been destroyed or are otherwise mismapped. The remaining 4 extant historic built environment structures/ features are addressed in a separate technical report. Subsurface testing was completed near (outside of) P-15-000324 and P-15-000325 to inform on the current extent of each site, and the potential for intact buried cultural deposits within and adjacent to the mapped location of each resource.

P-15-000324

Dudek archaeologists revisited the mapped site location on January 23, 2023. The site location was marked by a point feature included in the records search results provided by the SSJVIC. This point feature, which identified the location of reported human remains, fell within the eastern sidewall of the East Side Canal. Artifacts were located in the agricultural field to the east of the mapped site location, in an area that more-closely matches the sketch map provided on the Bakersfield College Archaeological Site Survey Record. However, no knolls or similar landforms were observed. Decades of agricultural practices have flattened the landscape in the surrounding area. Additionally, no midden-like soils were observed. Communication with the landowner has indicated that they are aware of the presence of an archaeological resource in the vicinity of this recorded location, notably within 250 ft to the southwest.

As observed by Dudek through fieldwork, the site consists of a sparse lithic scatter with one Olivella shell bead located on a level agricultural field adjacent to the East Side Canal. The site measures 85m N/S by 30m E/W. Soils are composed of very compact light greyish brown sandy loam, with very low rock content (<1%), and freshwater shell fragments throughout. A total of 7 pieces of CCS debitage were observed along with one Olivella shell bead (A1). The shell bead (17mm x 11mm x 1mm) consisted of a half-shell with full shelf, a punctured hole, and possible

polishing was observed on the outer shell. This aligns with Class D1a with a CalBP date range of 940-740 BP (Milliken and Schwitalla 2012). This resource is at the edge of the Project site, and the testing strategy was developed with the intent of helping ensure avoidance.

On June 18, 2024, Dudek archaeologists Ross Owen, Kolin Taylor, and Michael Mendiola resurveyed the site location using transects at 5 m intervals, and excavated ten (10) STPS adjacent to (outside of) the site boundaries. South of the artifact scatter located during survey is an unplowed portion of the parcel about 20-40 cm higher than the surrounding landform. This is the area that was flagged as sensitive by the landowner. The STPs were placed at a 40 m buffer off this unplowed feature and the mapped site boundary. The STPs measured 25 cm by 50 cm. Soil from the STPs was sieved using a 1/8" dry screen. Two STPs were augured up to 200 cm below surface (cmbs). All STPs were terminated after two 20 cm sterile levels. All STPs were sterile.

Surface soil varied from moderately compacted 10YR 4/1 dark grey silty clay loam with minimal rocks to loose 10YR 4/2 light greyish brown silt with less than 5% subrounded pebbles. In STP 075, surface soil was 10YR 4/2 light greyish brown silt up to 30 cmbs, where the soil changed to moderately compacted light greyish brown silty loam with white sandy streaks. Auguring in this STP revealed the same soil up to 60 cmbs, followed by highly compacted dark brown clay with white streaks from 60 to 150 cmbs, and finally moderately compacted brownish tan sandy clay from 150 to 200 cmbs at the base of the augur hole. Soil in STP 078 changed from loose 10YR 4/1 dark grey silty clay loam to compacted dark grey clay at 20 cmbs. Auguring in this STP revealed the same dark grey clay up to 80 cmbs, and below that was light olive brown sand extending to the base of the augur hole at 220 cmbs.

In general, surface soil was loose and friable, and compaction and clay content increased with depth. Soils appeared to be disturbed from plowing to a depth of 15-30 cmbs. No artifacts were identified on the surface within the unplowed feature flagged as sensitive by the landowner. Variability in the soil profiles observed in the auger core with compacted clay to a depth of 150 cmbs in STP 075, and only to a depth of 80 cmbs in STP 078 may be related to relict sloughs that would have meandered throughout the alkaline marshes that would have been in the vicinity of the site prior to the 20th century. No artifacts were able to be relocated for collection.

The area has sustained high levels of ground disturbance due to agricultural activities and artifacts have likely been displaced. Subsurface testing revealed soil profiles consistent with disturbed and deflated topsoil from agricultural practices. Soils to a depth of 15-30 cmbs showed evidence of plowing. No artifacts were encountered. Because the STPs were placed off a 40 m buffer of the site boundary, there may still be the possibility of encountering intact buried cultural deposits within or nearer to this resource.

P-15-000325

No cultural materials were encountered within the portion of the mapped resource which intersects the Project site. The majority of P-15-000325 is located outside of the Project site and is encompassed by a chain-link fence. It is possible that the resource boundary has been generalized through mapping. The area on the exterior of the chain-link fence is currently a graded staging area for freight trucks, with a thin layer of gravel and sand on the surface that appears to be maintained in order to keep the area level.

Dudek archaeologists completed a series of six 25 x 50 cm STPs along the exterior of the chain-link fence surrounding the mapped resource boundary on June 2, 2024. All STPs were culturally sterile, with the exception of a modern fill deposit with plastic, asphalt and concrete to a depth of 15-25 cmbs. Native soils consisted of 10YR

2/1 black clay loam with minimal inclusions and a higher moisture content than the overlying fill deposits. The resource does not appear to extend beyond the existing chain-link fence.

P-15-004347

A small portion of this historic trash scatter intersects a proposed Gen-Tie alignment in the southeastern portion of the Project site. No cultural materials were encountered during the intensive pedestrian survey.

P-15-009737

This historic-period substation appears to be entirely subsumed by the modern substation which was not included in the area covered by the intensive pedestrian survey.

P-15-009738

This historic-period feed mill and cattle ranch complex appears to have been destroyed by the development of orchards and maintenance of Wasco Way. No cultural materials were encountered within the mapped site location during the intensive pedestrian survey.

P-15-013725

This canal is located just outside of western edge of the Project site, and was not included within the survey area discussed in this report. The resource is discussed in greater detail in the Built Environment report (Jones, Ahmanson and Kim 2025).

P-15-020012 (BB-KT-S-001)

This site is a diffuse multi-component site expansion, measuring 265 x 160 m in size, consists of a large, diffuse scatter of lithic debitage and historic-aged 20th century refuse located on PG&E owned and managed lands. It should be considered an extension of the previously recorded precontact site to the north, P-15-020012. Lithics include 67 pieces of debitage (66 of CCS and 1 obsidian), and 1 CCS retouched flake tool. Historic artifacts include whiteware, broken bottle glass (including some fragments of amethyst-colored), scrap ferrous metal, nails and modern debris. The artifacts are within a heavily disturbed area with evidence of mechanical grading resulting in cuts and push piles. All of the artifacts were documented within these piles, adjacent to a shallow depression that runs through the center of the site.

As previously noted, the artifact scatter is directly south of P-15-020012, a previously recorded sparse lithic and ground stone scatter. This previous site was recommended as not eligible for NRHP/CRHP eligibility (Ballester and Morales 2019). Dudek agrees that this resource has limited data potential, given the substantial degree of disturbance, the limited artifact frequency, and the low potential for buried deposits. The full extent of this site is not within the Project site and was not fully surveyed by Dudek.

P-15-020558

This resource consists of Interstate 5, which runs between large blocks of the Project site. It is outside of the survey area discussed in this report, and is covered in greater detail in the Built Environment report (Jones, Ahmanson and Kim 2025).

P-15-021385

This resource consists of an isolated CCS flake. It was not relocated during the intensive pedestrian survey.

P-15-021386

This resource consists of an isolated CCS flake. It was not relocated during the intensive pedestrian survey.

P-15-021387

This resource consists of an isolated CCS flake. It was not relocated during the intensive pedestrian survey.

P-15-021388

This resource consists of a historic-era wastewater treatment plant (WWTP) with modern elements. The WWTP is still in use and actively maintained. It was observed to reflect the conditions described on the existing DPR record.

4.3.2 Newly Recorded Resources

Sixteen newly recorded cultural resources were identified as a result of Dudek surveys, which included thirteen (13) prehistoric and three historic-era resources (Figures A-1 through A-3 in Confidential Appendix A). In addition, survey resulted in the identification of 54 prehistoric and one (1)historic-era isolates. Resource evaluation through the excavation of STPs and close interval pedestrian survey with collection of diagnostic artifacts was completed at all thirteen of the prehistoric resources.

4.3.2.1 Prehistoric-Era Resources

The thirteen newly recorded prehistoric resources identified within the Project site represent relatively sparse surface scatters of debitage and formal artifacts that are distributed in increased relative frequency, variety, and density compared to the surrounding area. All sites, while subjected to an extended history of agricultural disturbance, have potential for buried archaeological deposits. Subsurface testing completed within and adjacent to each of these sites to identify buried archaeological deposits was largely negative, confirming the substantial degree of previous disturbance and failing to identify any intact archaeological deposits.

BB-JR-S-001

This prehistoric site consists of a lithic scatter with four formed tools and 33 pieces of debitage. The site measures 47 meters N-S by 25 meters E-W. Debitage density is moderate throughout the site and formed tools are located within the central portion of the site. Lithic tools include one CCS uniface fragment (A1), one CCS projectile point fragment (A2), one obsidian early-stage biface mid-section (A3) and one CCS late-stage biface distal fragment (A4). Soils observed on the surface within the site are moderately compact grayish brown silty clay. Site is located on active agricultural land, and it was devoid of vegetation at the time of the recording, providing 99% ground visibility across the site. The site is located along the eastern edge of a raised landform culminating at approximately 3 feet above surrounding fields.

A total of 37 artifacts were identified during surface survey including 1 CCS projectile point fragment, 2 bifaces fragments (1 CCS, 1 obsidian), 1 CCS unifacial tool fragment, and 33 pieces of debitage. Debitage included 12 CCS interior and 21 CCS secondary flakes. CCS exhibited a variety of colors, including grey/brown, dark brown, milky white, and butterscotch. Some of the CCS was identified as Monterey chert.

The site is located along the eastern edge of a relatively intact raised landform running northwest-southeast and culminating at about 3 feet above the surrounding fields. Vegetation is absent within the site. The setting has been ploughed and disked for agricultural production.

The site likely sustained high levels of disturbance, including topsoil erosion due to plowing and disking. Three other prehistoric lithic scatters were recorded 72 m east (BB-JR-S-002), 110 m northwest (BB-JR-S-003), and 230 m northwest (BB-JR-S-004). Additionally, four isolated artifacts were recorded between BB-JR-S-001 and the other sites. Isolates included one CCS simple flake tool located 28 m east of BB-JR-S-001, two CCS secondary flakes located 98 m north of the site, and one CCS tertiary flake located 120 m north of the site.

It is possible the four scatters may have originated from one site 'stretched' over the landscape by intensive agricultural activities.

On May 29, 2024, Dudek archaeologists resurveyed the site location with transects spaced at 5 m intervals, and excavated four (4) STPs. The STPs measured 25 cm by 50 cm. Soil from the STPs was sieved using a 1/8" dry screen. An additional artifact (A5 – granitic percussing tool) was identified in the western portion of the site. One STP was augured up to 210 cm below surface cmbs. All STPs were terminated after two 20 cmbs sterile levels. One STP was positive, yielding a single piece of debitage in the 0-20 cmbs level. All other STPs were sterile. Surface soil was a 10YR 4/2 grey-brown or 10YR 5/3 brown silt with some gravels. Soils were mottled due to plowing to a depth ranging from 15-22 cmbs. Increased compaction was encountered between 22-30 cmbs, extending to the 40 cmbs base of the STPs. Auguring at the base of an STP at the northern end of the site revealed pale brown silty clay sand to a depth of 115 cmbs, followed by pale brown loose, medium-fine grained sands to a depth of 190 cmbs. This was followed by a gradual transition to a mottled brown and pale brown clay layer at 200-210 cmbs. Artifacts A1-A5 were temporarily collected for additional analysis, and will be reburied on site.

Subsurface testing revealed soil profiles consistent with disturbed and deflated topsoil from agricultural practices. Soils to a depth of 15-22 cmbs showed evidence of plowing. One artifact was observed in this disturbed plowzone. No artifacts were encountered below the plowed surface layer, and there is limited potential to encounter intact buried cultural deposits based on the results of the subsurface testing.

BB-JR-S-002

This prehistoric site consists of a scatter of three pieces of debitage within an area measuring 18 meters NW-SE by 8 meters NE-SW. Debitage included 2 CCS secondary and 1 CCS tertiary flake. Soils observed on the surface within the site are moderately compact dark grayish brown silty clay loam. The site is located on a flat alluvial basin used intensively for agricultural purposes. The area is vegetated with very sparse grasses (fallow field) allowing high ground visibility (90-100%). The site is located in a field which has been recently prepared for agricultural production. The artifacts observed on the ground surface are likely not in their original place of deposition. They could have originated from prehistoric lithic scatter BB-JR-S-001 located 73 meters west along a raised landform.

The area has sustained high levels of ground disturbance due to agricultural activities and artifacts have likely been displaced. The site may have been associated with prehistoric lithic scatter BB-JR-S-001 located 73 meters west, on a relatively intact raised landform. A second lithic scatter was recorded 187 m northwest (BB-JR-S-003) along the same raised landform running northwest-southeast. Additionally, four isolated artifacts were recorded between BB-JR-S-002 and the two other sites. Isolates included one CCS simple flake tool located 45 m west of BB-JR-S-002, two CCS secondary flakes located 150 m northwest of the site, and one CCS tertiary flake located 165 m northwest of the site.

It is possible that these resources may have originated from one site scattered across the landscape by intensive agricultural activities.

On June 1, 2024, Dudek archaeologists resurveyed the site location with transects spaced at 5 m intervals, and excavated three (3) STPs within and adjacent to the site. The STPs measured 25 cm by 50 cm. Soil from the STPs was sieved using a 1/8" dry screen. All STPs were terminated after two 20 cm sterile levels. All STPs were sterile. Surface soil was a 10YR 2/1 loose dark grey-brown silt and 10YR 3/2 dark brown loose silt. A disturbed plowzone layer was consistently encountered at a depth ranging from 15-20 cmbs across the tested area. Soil compaction increased with depth. Site delineation was hampered by low surface visibility (<10%) due to dense grasses.

Subsurface testing revealed soil profiles consistent with disturbed and deflated topsoil from agricultural practices. Soils to a depth of 15-20 cmbs showed evidence of plowing. No artifacts were encountered below the plowed surface layer, and there is limited potential to encounter intact buried cultural deposits based on the results of the subsurface testing.

BB-JR-S-003

This prehistoric site consists of a scatter of seven pieces of debitage within an area measuring 36 meters N-S by 18 meters E-W. Debitage included 2 CCS secondary and 5 CCS interior flakes. Soils observed on the surface within the site are moderately compact light yellowish brown silty clay loam. The site is located on the western edge of a raised landform approximately 2.5 feet high. The area is used intensively for agricultural purposes. Vegetation within the site consists of sparse low grasses (fallow field) allowing high ground visibility (80-99%). Located in a field regularly plowed and disked, the site most likely sustained high levels of disturbance.

The site is located on the western edge of a raised landform running northwest-southeast and culminating at about 2.5 feet above the surrounding fields. The landform appears to have sustained significant erosion due to plowing and disking for agricultural production. Vegetation consists of low non-native grasses.

The site likely sustained high levels of disturbance, including topsoil erosion due to plowing and disking. Three other prehistoric lithic scatters were recorded 106 m north (BB-JR-S-004), 110 m southeast (BB-JR-S-001), and 190 m east-southeast (BB-JR-S-002). Additionally, 14 isolated artifacts were recorded within 265 meters of BB-JR-S-003. Isolates included one CCS simple flake tool, one indeterminate ground stone fragment and 12 pieces of debitage (7 CCS secondary, 4 CCS interior, and 1 fine-grained volcanic (FGV) interior). It is possible the four scatters may have originated from one site 'stretched' over the landscape by intensive agricultural activities.

On May 31, 2024, Dudek archaeologists Ross Owen, Michael Mendiola, and Kolin Taylor resurveyed the site with transects spaced at 5 m intervals, and excavated five (5) STPs within and adjacent to the site. The STPs measured 25 cm by 50 cm. Soil from the STPs was sieved using a 1/8" dry screen. All STPs were terminated after two 20 cm

sterile levels. All STPs were sterile. At the surface, soil was a 2.5YR 4/3 or 2.5Y 5/3 moderately compacted silty clay loam with a disturbed plowzone layer encountered to a depth of 20 cmbs. From 20-40 cmbs soils became increasingly compact, with an increase in sand and clay with depth and increased moisture from 30-40 cmbs. No color change was observed. Site delineation and relocation of previously identified artifacts was hampered by low surface visibility (<10%) due to dense grasses.

Subsurface testing revealed soil profiles consistent with disturbed and deflated topsoil from agricultural practices. Soils to a depth of 20 cmbs showed evidence of plowing. No artifacts were encountered, and there is limited potential to encounter intact buried cultural deposits based on the results of the subsurface testing.

BB-JR-S-004

This prehistoric site consists of a lithic scatter with 1 biface and 3 pieces of debitage. The site measures 27 meters N-S by 9.2 meters E-W. Debitage density is low throughout the site and formed tools with the biface located at the northern end of the site. This biface (A1) is a red-brown CCS mid-stage biface. Debitage consisted of 2 CCS and 1 FGV flake. Soils observed on the surface within the site are moderately compact grayish brown silty clay. Site is located on active agricultural land, and it was devoid of vegetation at the time of the recording, providing 99% ground visibility across the site. The site is located along the eastern edge of a slightly depressed landform that appears to be a drainage sink for surrounding fields. The topography has been altered by decades of agricultural use.

The site is located along the eastern edge of a slightly sunken landform which drains from surrounding fields. Vegetation is absent within the site. The setting has been ploughed and disked for agricultural production.

On May 31, 2024, Dudek archaeologists resurveyed the site location with transects spaced at 5 m intervals, and excavated four (4) STPs within and adjacent to the site. The STPs measured 25 cm by 50 cm. Soil from the STPs was sieved using a 1/8” dry screen. All STPs were terminated after two 20 cm sterile levels. All STPs were sterile. Surface soil varied between a loose 10YR 2/2 and a 2.5YR 3/2 very dark grey-brown loose silty clay loam with no gravels. Soil compaction increased with depth. Pockets of clay were encountered between 35-40 cmbs. No additional changes were observed, and it appears as though the plowzone continues to 40 cmbs throughout the site area. The team was unable to relocate A1 for collection.

Subsurface testing revealed soil profiles consistent with disturbed and deflated topsoil from agricultural practices. Soils to a depth of 30-40 cmbs showed evidence of plowing. No artifacts were encountered, and there is limited potential to encounter intact buried cultural deposits based on the results of the subsurface testing.

BB-JR-S-005

This prehistoric site consists of a lithic scatter with 1 biface, 1 simple flake tool, and 2 pieces of debitage. The site measures 33 meters N-S by 22 meters E-W. Debitage density is low throughout the site. Lithic tools include one CCS mid-stage biface (A1, possible scraper) and 1 CCS simple flake tool (A2). Soils observed on the surface within the site are moderately compact grayish brown silty clay. The site is located on active agricultural land, and sparse vegetation at the time of the recording provided 99% ground visibility across the site. The site is located along the eastern edge of a sunken landform which drains surrounding fields.

The site is located along the eastern edge of a slightly sunken landform which drains from surrounding fields. Vegetation consists of sparse bunch grasses within the site. The setting has been ploughed and disked for agricultural production.

On June 1, 2024, Dudek archaeologists resurveyed the site location with transects spaced at 5 m intervals, and excavated five (5) STPs within and adjacent to the site. The STPs measured 25 cm by 50 cm. Soil from the STPs was sieved using a 1/8" dry screen. All STPs were terminated after two 20 cm sterile levels. All STPs were sterile. Surface soil varied between a loosely compacted 10YR 4/2 light brownish grey silty loam and a 10YR 3/2 very dark greyish brown silty loam. Soils were mottled due to plowing to a depth ranging from 30 to 40 cmbs at the base of the STPs. In STP 053 at 25 m west of the site, soil beneath the plowzone layer was a moderately compacted 10YR 2/1 dark brown silty loam with pockets of clay and streaks of sand throughout from 30 cmbs to the base of the STP at 40 cmbs. Soil compaction increased with depth throughout the site. Site delineation and artifact identification was hampered by low surface visibility (<10%) due to dense grasses. No artifacts were able to be relocated for collection.

Subsurface testing revealed soil profiles consistent with disturbed and deflated topsoil from agricultural practices. Soils to a depth of 30-40 cmbs showed evidence of plowing. No artifacts were encountered, and there is limited potential to encounter intact buried cultural deposits based on the results of the subsurface testing.

BB-JR-S-006

This prehistoric site consists of a sparse lithic scatter of six (6) CCS flakes, including four (4) heat treated interior flakes, one (1) secondary flake, and one (1) CCS retouched flake tool (A1). The site measures 29 meters N-S by 16 meters E-W. The site is located on a salt marsh flood plain with previously tilled agricultural land, and it was devoid of vegetation at the time of the recording, providing 99% ground visibility across the site. Soils observed on the surface within the site are moderately compact sandy clay.

On June 18, 2024, Dudek archaeologists resurveyed the site location with transects spaced at 5 m intervals, and excavated five (5) shovel test pits (STPs) within and adjacent to the site. The STPs measured 25 cm by 50 cm. Soil from the STPs was sieved using a 1/8" dry screen. One STP was augured up to 200 cm below surface (cmbs). All STPs were terminated after two 20 cm sterile levels. All STPs were sterile. Soil had no gravels and varied between moderately compacted 10YR 6/3 pale brown silty sand and loose or highly compacted 10YR 5/4 light tan silt to the base of the units at 40 cmbs. Auguring in STP 084 in the center of the site revealed pale brown silty sand continuing to 180 cmbs, followed by pale brown sandy silty clay down to 220 cmbs. Site delineation and artifact identification was hampered by moderate visibility (30%) due to low shrubs. The team was unable to relocate artifact A1.

Subsurface testing revealed soil profiles consistent with disturbed and deflated topsoil from agricultural practices. No artifacts were encountered, and there is limited potential to encounter intact buried cultural deposits based on the results of the subsurface testing.

BB-RO-S-001

This prehistoric site measures 133 m × 68 m, and consists of a lithic scatter with 5 formal artifacts and 113 pieces of debitage, predominantly of CCS, but 2 fragments of obsidian and 1 piece of FGV. Possible fire-affected rock (FAR), and unidentifiable bone fragments were also observed within the site boundary. The site measures 133 meters N-S by 68 meters E-W. Debitage density is moderate throughout the site and formed tools are located within the western half of the site, the majority being along the margin of the raised landform and sunken salt marsh. Formal

artifacts include one grey CCS retouched flake (A1), one opaque reddish-brown CCS retouched flake with white cortex (A2), one orangish brown CCS core (A3), one coarse-grained volcanic (CGV) ground stone vessel rim fragment with perforations (A4), and one light grey CCS mid-stage biface (A5). The ground stone fragment was likely part of a stone bowl. Its characteristics, notably the drilled holes, are consistent with attempts to repair the item or, more likely, repurposing the item for use as aa shaft straightener / abrader. Soils observed on the surface within the site are brown silty loam with low (<5%) rock content. Site is located on active agricultural land, and it was largely devoid of vegetation at the time of the recording aside from sparse bunch grasses, providing 99% ground visibility across the site. The site is located along shallow rises in the landscape above salt marshes. Despite active agriculture, and the development of nearby irrigation infrastructure (East Side Canal), the raised landforms appear to be relatively intact, and may represent relict landforms from sloughs that pre-date intensive agriculture in the area. These raised landforms are approximately 3 feet above surrounding fields, and contained the greatest density of artifacts observed within the site.

On May 29-30, 2024, Dudek archaeologists resurveyed the site location with transects spaced a 5 m intervals, and excavated nineteen (19) STPs within and adjacent to the site. The STPs measured 25 cm by 50 cm. Soil from the STPs was sieved using a 1/8" dry screen. All STPs were terminated after two 20 cm sterile levels. Two STPs were augured up to 200 cmbs. One STP was positive with one piece of lithic debitage in the layer stretching from 0-20 cmbs. All other STPs were sterile.

Topsoil was moderately compact 10YR 5/2 greyish brown fine sandy silt in the southwestern corner of the site or 10YR 3/2 very dark greyish brown silt, clay loam, or silty clay loam varying from loose to highly compacted throughout the rest of the site and the surrounding area. This layer consistently continued to 15-20 cmbs before transitioning to increasingly compact 10YR 3/2 very dark greyish brown silty clay and clay loam which continued to the base of the STPs at a depth of 40 cmbs. Augers placed at the base of STP 023 and 024 revealed a moderately compacted mottled grey, white-grey and green-grey silty clay layer to a depth ranging from 80 to 160 cmbs. At this point soils were increasingly sandy with tan and greyish brown silty sand to a depth of 195 cmbs, followed by loose light grey sands to a depth of 205 cmbs at which point the auger was terminated.

Site delineation and artifact collection was hampered by moderate visibility (<40%) due to grasses. Artifacts A1, A3, and A6-A11 were temporarily collected for additional analysis, and will be reburied on site. The team was unable to relocate artifacts A2, A4, and A5.

Subsurface testing revealed soil profiles consistent with disturbed and deflated topsoil from agricultural practices. Soils to a depth of 15-20 cmbs showed evidence of plowing. One piece of debitage was encountered within the disturbed surface level; no artifacts were encountered beneath this layer. There is limited potential to encounter a low frequency of additional archaeological material based on the results of the subsurface testing, however, no intact cultural deposit is present.

BB-ES-S-003

BB-ES-S-003 is a sparse lithic scatter of five (5) CCS flakes and one (1) potential fine-grain volcanic (FGV) hammer stone (A1). The site is located in light grey loamy soil in a heavily tilled agricultural field next to pistachio orchards. At least four sets of tire tracks cross the site, and modern shotgun shells and plastic fragments are scattered across

the site. The CCS material is caramel and grey-white. One grey-white CCS flake appears heavily damaged by plowing, making it difficult to determine if it is the product of cultural or natural modifications.

The area has sustained high levels of ground disturbance due to agricultural activities and artifacts have likely been displaced. The site may have been associated with prehistoric lithic scatter BB-ES-S-004 located 115 meters north. Additionally, one isolated artifact was recorded between BB-ES-S-003 and BB-ES-S-004, a fine-grained volcanic (FGV) flake located 65 m north of BB-ES-S-003 (11S 272075 mE/ 3926720 mN). It is possible that these resources may have originated from one site scattered across the landscape by intensive agricultural activities.

Furthermore, the presence of historic refuse scatter BB-ES-S-002 only 3 meters northeast of the site provides further evidence of a heavily disturbed landscape. A historic isolate consisting of one ceramic sherd was also identified on the surface 30 meters east of BB-ES-S-003.

On June 2, 2024, Dudek archaeologists excavated five (5) shovel test pits (STPs) within and adjacent to the site. The STPs measured 25 cm by 50 cm. Soil from the STPs was sieved using a 1/8" dry screen. One STP was augured up to 200 cmbs. All STPs were terminated after two 20 cm sterile levels. Two STPs were positive; STP 059 had two pieces of lithic debitage between 20 and 60 cmbs, and STP 063 had one piece of debitage between 0 and 20 cmbs. One positive STP was west of the recorded boundary, so the site was expanded to incorporate it. All other STPs were sterile.

Surface soil was loosely compacted and mottled from intensive agricultural activity. Soils varied between 2.5Y 6/2 light brownish grey clay loam, 2.5 YR 4/2 light greyish brown silty loam, 2.5YR 5/2 light brownish grey silty loam, 2.5Y 3/2 dark greyish brown clay loam, and 10YR 4/2 light brownish grey silty loam. Subsurface soil was similar to the surface soil with compaction increasing with depth, with a dramatic increase in compaction between 15-20 cmbs. All soils had little to no gravels. Auguring at the base of STP 059 in the center of the site revealed lightly compacted 2.5Y 6/2 brownish grey sandy loam from 80 to 180 cmbs, and loose sand of the same color from 180 to 200 cmbs. Artifact A1 was temporarily collected for analysis and will be reburied on site.

Subsurface testing revealed soil profiles consistent with disturbed and deflated topsoil from agricultural practices. Soils to a depth of 0-60 cmbs showed evidence of plowing. Based on compaction, it appears the modern plowzone extends roughly 15-20 cmbs. One piece of lithic debitage was identified within the plowed layer between 0 and 20 cmbs. Two pieces of lithic debitage were identified between 20 and 60 cmbs. Due to the depth of the plowzone it appears there is limited potential to encounter intact buried cultural deposits.

BB-ES-S-005

This resource consists of a sparse lithic scatter. The site is located in a heavily tilled agricultural field with light grey loamy soil, and it appears a denser cluster of lithics has been distributed linearly via plow. The site includes one (1) early-stage CCS core (A1), one (1) CCS potential hand tool fragment (A2), and one (1) CCS interior flake. A clear glass fragment was found approximately one meter south of A2.

The area has sustained high levels of ground disturbance due to agricultural activities and artifacts have likely been displaced. An isolated CCS flake was identified 87 meters northeast of the site (11S 271875.79 mE / 3927179.62 mN). It is possible that the site and this isolate may have originated from one site scattered across the landscape by intensive agricultural activities.

On June 2, 2024, Dudek archaeologists resurveyed the site location with transects spaced at 5 m intervals, and excavated four (4) STPs within and adjacent to the site. The STPs measured 25 cm by 50 cm. Soil from the STPs was sieved using a 1/8" dry screen. All STPs were terminated after two 20 cm sterile levels. All STPs were sterile. Soils were mottled due to disking and plowing to a depth ranging from 15-20 cmbs. Surface soil varied between 2.5YR 4/2 and 10YR 3/2 very dark greyish brown silty clay loam with no gravels and pockets of clay. In STP 066, 30 m southwest of the site boundary, the soil changed to a moderately compacted 2.5YR 4/3 greyish brown silty loam from 15 to 38 cmbs, and then moderately compacted 2.5YR 5/3 greenish grey-brown sandy silt from 38 to 40 cmbs. No artifacts were able to be relocated for collection due to disturbances; the field had been disked since the 2023 survey.

Subsurface testing revealed soil profiles consistent with disturbed and deflated topsoil from agricultural practices. Soils to a depth of 15-20 cmbs showed evidence of plowing. No artifacts were encountered, and there is limited potential to encounter intact buried cultural deposits based on the results of the subsurface testing.

BB-ES-S-006

BB-ES-S-006 is a sparse lithic scatter. The site is located in a now fallow agricultural field with cattle bones scattered throughout. The site includes five (5) CCS flakes, one (1) portable ground stone mortar (A1), two (2) fine-grained volcanic (FGV) hand stone fragments (A2, A4), and one (1) CCS mid-stage biface fragment (A3).

The area has sustained high levels of ground disturbance due to agricultural activities and artifacts have likely been displaced. Two other prehistoric lithic scatters were recorded 50 m west (BB-ES-S-007) and 140 m west (BB-ES-S-008) of the site, and one isolated grey CCS interior flake was recorded 27 m north of the site. It is possible that these resources may have originated from one site scattered across the landscape by intensive agricultural activities.

On May 31, 2024, Dudek archaeologists resurveyed the site location with transects spaced at 5 m intervals, and excavated five (5) STPs within and adjacent to the site. The STPs measured 25 cm by 50 cm. Soil from the STPs was sieved using a 1/8" dry screen. All STPs were terminated after two 20 cm sterile levels. All STPs were sterile. One STP was augured up to 200 cmbs. Surface soil was varied between very friable 2.5Y 5/3 light olive brown silty loam, moderately compacted 2.5 YR 6/2 light brownish grey sandy silt, and highly compacted 2.5 YR 5/3 greyish brown silty loam. Even, loosely compacted areas of soil were hard-baked and compact at the surface. Soils were mottled due to plowing to a depth ranging from 15-22 cmbs. Auguring at the base of STP 032 at the western edge of the site, near the location of A4, revealed light olive brown silty clay loam from 40 to 75 cmbs, then light yellow-brown silty sand up to 110 cmbs, then light grey-brown sandy clay up to 170 cmbs, finally followed by 2.5Y 7/2 light white-grey sandy clay with compacted chunks of white soil or concretion up to the base of the augur hole at 200 cmbs. Artifact A1 was temporarily collected for analysis, and will be reburied on site. The other artifacts could not be relocated for collection.

Subsurface testing revealed soil profiles consistent with disturbed and deflated topsoil from agricultural practices. No artifacts were encountered below the surface layer, and there is limited potential to encounter intact buried cultural deposits based on the results of the subsurface testing.

BB-ES-S-007

BB-ES-S-007 is a sparse lithic scatter of four (4) CCS flakes and one (1) quartzite utilized flake (A1). The site is located in a previously used agricultural field that is now fallow.

The area has sustained high levels of ground disturbance due to agricultural activities and artifacts have likely been displaced. Two other prehistoric lithic scatters were recorded 50 m east (BB-ES-S-006) and 61 m northwest (BB-ES-S-008) of the site. Additionally, the site is 240 m north of another prehistoric site (BB-JR-S-004) that is located within another cluster of lithic scatters. Two isolated flakes were recorded in between these clusters of lithic scatters 118 m southeast and 180 m south of the site. It is possible that these resources may have originated from one site scattered across the landscape by intensive agricultural activities.

On May 31, 2024, Dudek archaeologists resurveyed the site location with transects spaced at 5 m intervals, and excavated four (4) STPs within and adjacent to the site. The STPs measured 25 cm by 50 cm. Soil from the STPs was sieved using a 1/8" dry screen. All STPs were terminated after two 20 cm sterile levels. All STPs were sterile. Surface soil was moderately compact 10YR 3/2 very dark greyish brown clay loam, moderately compacted 10YR 4/2 greyish brown silty loam, or highly compacted 10YR 7/2 light grey silty clay loam with no gravels. Soils were mottled due to plowing to a depth ranging from 30-35 cmbs. Surface soil was hard-baked and very compacted. Soil compaction lessened from 5-30 cmbs and became moderately compacted with small pocket of clay starting at 30 cmbs, extending to the 40 cmbs base of the STPs. Artifact A1 was temporarily collected for analysis and will be reburied on site.

Subsurface testing revealed soil profiles consistent with disturbed and deflated topsoil from agricultural practices. No artifacts were encountered, and there is limited potential to encounter intact buried cultural deposits based on the results of the subsurface testing.

BB-ES-S-008

BB-ES-S-008 is a sparse lithic scatter of three (3) CCS flakes and one (1) fine-grained volcanic (FGV) side-notched biface (A1). The site is located in a previously used agricultural field that is now fallow.

The area has sustained high levels of ground disturbance due to agricultural activities and artifacts have likely been displaced. Two other prehistoric lithic scatters were recorded 61 m southeast (BB-ES-S-007) and 140 m east (BB-ES-S-006) of the site. Additionally, the site is 307 m northwest of another prehistoric site (BB-JR-S-004) that is located within another cluster of lithic scatters. One isolated fine-grained volcanic flake was recorded 250 m southeast of the site, in between it and BB-JR-S-004. It is possible that these resources may have originated from one site scattered across the landscape by intensive agricultural activities.

On May 30, 2024, Dudek archaeologists resurveyed the site location with transects spaced at 5 m intervals, and excavated three (3) within and adjacent to the site. The STPs measured 25 cm by 50 cm. Soil from the STPs was sieved using a 1/8" dry screen. All STPs were terminated after two 20 cmbs sterile levels. All STPs were sterile. Soil consisted of 10YR 3/2 dark greyish brown silty clay loam with no gravels from 0-40 cmbs. Soil compaction varied from high to light, with a hardened, compact surface. Artifact A1 was temporarily collected, and will be reburied on site.

Subsurface testing revealed soil profiles consistent with disturbed and deflated topsoil from agricultural practices. No artifacts were encountered, and there is limited potential to encounter intact buried cultural deposits based on the results of the subsurface testing.

BB-ES-S-009

BB-ES-S-009 is a sparse lithic scatter of three (3) CCS flakes and one (1) grey CCS stemmed biface (A1). The site is located in a previously used agricultural field that is now fallow. The area has sustained high levels of ground disturbance due to agricultural activities and artifacts have likely been displaced.

On June 1, 2024, Dudek archaeologists resurveyed the site using transects spaced at 5 m intervals, and excavated five (5) shovel test pits (STPs) within and adjacent to the site. The STPs measured 25 cm by 50 cm. Soil from the STPs was sieved using a 1/8" dry screen. One STP was augured up to 200 cmbs. All STPs were terminated after two 20 cm sterile levels. All STPs were sterile.

Surface soil was loosely compacted 2.5YR 3/2 light greyish brown silty loam, 2.5Y 3/2 very dark greyish brown silty clay loam, 10YR 3/2 very dark greyish brown silty loam, or 10YR 2/1 dark greyish brown silt with no gravels. Soil compaction increased to moderately compacted from 10 to 30 cmbs, and to highly compacted from 30 to 40 cmbs at the base of the STPs. Soil between 30 to 40 cmbs also included streaks of sand throughout.

Beneath the surface, soil in STP 055 changed to 2.5YR 5/2 light greyish red-brown silty sand with no gravels from 20 cmbs to 40 cmbs at the base of the STP. Soil in STP 056 changed to 2.5Y 3/2 very dark greyish brown clay from 25 cmbs to 40 cmbs at the base of the STP. Soil in STP 054 changed to 2.5Y 3/1 very dark grey clay with no gravels from 10 to 40 cmbs. Auguring in the base STP 054 showed this layer to continue down to 130 cmbs, then 2.5Y 5/3 light olive brown sandy clay down to 170 cmbs, and finally light olive brown sand down to the base of the augur hole at 200 cmbs.

Soil was mottled from plowing to a depth of 40 cmbs. Site delineation was hampered by low visibility (<5%) due to dense grasses. A1 was collected temporarily for additional analysis, and will be reburied on site.

Subsurface testing revealed soil profiles consistent with disturbed and deflated topsoil from agricultural practices. No artifacts were encountered, and there is limited potential to encounter intact buried cultural deposits based on the results of the subsurface testing.

4.3.2.2 Historic-Era Resources

Three newly recorded historic-era trash scatter was documented within the Project site.

BB-ES-S-001

This resource is a historic refuse scatter made up of 60+ glass and porcelain fragments. The site measures 595 ft × 235 ft. The datum point of the site is centered around the highest concentration of refuse, however similar artifacts can be viewed throughout the surrounding area at a much lower density. The approximate number of glass color types within site boundary include 25 clear, 5 amber, 5 blue, 3 green, 1 amethyst, and 4 milk glass. Porcelain fragment number and color types include 27 white, 3 white with blue stripe, 3 blue, and 3 green.

The site has been heavily disturbed by regular seasonal ploughing and planting activities. The heaviest concentration of artifacts has been recorded as the area making up the site boundary, however a lower density of similar artifacts were identified within the surrounding area and are presumed to be associated with the site. These isolate artifacts are thought to have been pulled into the surrounding area by previously mentioned farming activities.

BB-ES-S-002

BB-ES-S-002 consists of a historic and modern-era trash scatter composed of approximately seven (7) metal aerosol cans, one (1) gas can, and one (1) piece of cylindrical perforated metal. Modern plastic bottles, soda cans, shotgun shells/casings, paper coffee cups, and black/blue plastic fragments are scattered throughout. The site is in an area with light grey loamy soil, within a heavily tilled agricultural field next to pistachio orchards. There are felled tree limbs in the middle of the field, directly east of the site. Several sets of tire tracks cross the site and have crushed two of the aerosol cans.

The site has been repeatedly impacted by agricultural practices and appears to be an isolated refuse deposit that has been dispersed through multiple episodes of plowing and disking.

BB-ES-S-004

BB-ES-S-004 is a historic trash scatter of milk, amber, and clear glass. Artifacts include one (1) amber bottle glass base fragment with diagnostic features (A1) and one (1) clear bottle glass top with a metal screw cap (A2). The site is in an area with light grey loamy soil in a heavily tilled agricultural field next to pistachio orchards. There is a denser concentration of artifacts towards the southern end of the site.

The site has been repeatedly impacted by agricultural practices, and appears to be an isolated refuse deposit that has been dispersed through multiple episodes of plowing and disking.

4.3.2.3 Isolated Resources

A total of 55 isolated resources were identified within the Project site. This includes 54 prehistoric and 1 historic-period isolates. The assemblage of isolated resources included 43 debitage, 10 biface fragments, 6 retouched flake tools, 2 Olivella shell beads, 1 core fragment, 1 hand stone, 1 indeterminant ground stone, and 1 amethyst-tinted bottle glass fragment. A summary of isolated resources is included in Confidential Appendix A.

4.3.3 Summary of Subsurface Conditions

Subsurface testing revealed profiles consistent with the intensive agricultural use of the landscape throughout the historic and modern-era. A clear, and possibly just the most recent, plowzone was consistently identified ranging from a depth of 10-40 cmbs or deeper, fluctuations that may be due to varying agricultural usage (i.e. row crops vs. orchards), deflation of topsoil through repeated plowing, and other natural erosional and depositional factors. Beneath the clayey topsoil/plowzone layer, a moderately-deep (80-160 cmbs) layer of compacted clay was encountered prior to an increase in sand content, at times becoming a light grey/brown loose fine-grained sand stratum. This sandy layer continued at times to the 200 cmbs termination point of the auger borings, and occasionally transitioned back to a clay rich deposit around 195 cmbs.

The soil profiles observed during subsurface testing are largely consistent with the mapped soil types within the Web Soil Survey maintained by USDA. Two soil types, ‘Lokern clay, saline-alkali, drained’ and ‘Buttonwillow clay, drained,’ intersect the entirety of the prehistoric resources discussed in this chapter. They are both basin floor deposits consisting of alluvium derived from granite. Additionally, they are clay-rich lakebed deposits that would have been inundated periodically prior to large-scale agricultural development and associated water conveyance infrastructure in the 20th century.

Increased silt and loam contents were observed in the subsurface testing compared to the soil unit descriptions provided by USDA. This could be an artifact of agricultural usage of the landscape with imported soil utilized to improved drainage and aeration within a predominantly clayey environment.

Despite the largely negative findings of the subsurface testing, the stratified nature of the Lokern and Buttonwillow clay soils indicates that there is potential for intact cultural deposits to exist beneath the plowzone.

4.4 Tribal Coordination

The Project is subject to compliance with AB 52 and SB 18, which require consultation with California Native American Tribal representatives requesting consultation in response to notifications sent by local governments as well as the proper treatment of any tribal cultural resources potentially affected by activities triggering such consultation. On February 5, 2024, the County sent AB 52 consultation letters to individuals from the Twenty-Nine Palms Band of Mission Indians, the Yuhaaviatam of San Manuel Nation, Tejon Indian Tribe, and the Torres Martinez Desert Cahuilla Indians. On February 12, 2024, the County sent SB 18 consultation letters to individuals from Kern Valley Indian Community, Northern Chumash Tribal Council, Santa Rosa Racheria Tachi Yokut Tribe, Tubatulabals of Kern Valley, Tule River Indian Tribe, Kitanemuk and Yowlumne Tejon Indians, and Tejon Indian Tribe. One response was received on February 27, 2024 from Samantha McCarty of the Santa Rosa Racheria Tachi Yokut Tribe indicating that the Tribe was deferring to the Tejon Indian Tribe due to the location of the Project, but indicating that the Project vicinity was considered highly sensitive and recommending tribal monitoring from Tejon. To date, no other responses or correspondence regarding the project have been received. Determination regarding the need for and any further correspondence regarding tribal monitoring will be the responsibility of Kern County as the lead agency responsible for this consultation under CEQA. Copies of tribal consultation letters and responses are included in Appendix C.

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5 Summary and Recommendations

This study consisted of a SSJVIC records search, NAHC Sacred Lands File Search, intensive-level pedestrian survey, and recordation and evaluation of cultural resources. The SSJVIC records search identified 12 previously recorded cultural resources within the Project site and 47 cultural resources within the 1-mile buffer surrounding the larger Study Area. Resource records document the presence of human remains, habitation debris, and lithic material, along with historic trash scatters. Previously recorded archaeological resources intersecting the Project site limits include three prehistoric sites, one historic-era refuse scatter associated with a razed dairy, one razed historic-era ranch, and three prehistoric isolates.

Between January 17, 2023 and June 18, 2024, Dudek archaeologists conducted an intensive-level pedestrian survey and implemented an archaeological testing program. Survey included the Study Area and associated access roads. Ground surface visibility was high (approximately 80%–99% in most areas) over much of the Project site due to sparse vegetation within fallow agricultural fields. Soils have been disturbed historically and in modern times from water conveyance infrastructure, agriculture, and ranching. It should be noted that a small portion of the Project site (approximately 605 acres) was not accessible due to active agricultural activities, hazardous materials, and flooding. While these areas were addressed by the record searches, visual perimeter surveys and geomorphological review, they will require survey prior to construction. The recorded locations of all previously recorded cultural resources intersecting the Project site were revisited during archaeological survey. Two of these archaeological sites were relocated or otherwise expanded (P-15-000324 and P-15-020012); the remaining four (4) previously recorded sites and three (3) isolates appear to have been destroyed or are otherwise mismapped. The remaining 4 extant historic built environment structures/ features are addressed in a separate technical report (Jones, Ahmanson and Kim 2025). Sixteen newly recorded cultural resources were identified as a result of Dudek surveys, which included thirteen (13) prehistoric and three historic-era sites.

An additional 55 isolated resources were identified within the Project. Isolated artifacts lack artifacts, features, or associations that could make them eligible for the NRHP under Criteria A, B, or C or CRHR under Criteria 1, 2, or 3. In addition, they do not provide sufficient data potential to be considered for eligibility under Criterion D/4. None of the recorded isolates meet the definition of "unique" archaeological resource or tribal cultural resource under CEQA. While not significant under CEQA, management recommendations provided below do include collection of diagnostic isolates prior to construction since they may contribute additional analytical potential.

Table 4 below provides a summary of cultural resources that may be affected by the Project as presently designed, as well as recommended management strategies.

Table 4. Archaeological Resource Recommendations

Site ID	Trinomial	Age	Overview of Site	Recommended Eligibility	Management Recommendations
P-15-000324	CA-KER-000324	Prehistoric	Potentially highly sensitive. Reported human remains. Planned avoidance by Project design	Unevaluated - potentially eligible	Avoid with 100 ft buffer. Monitoring in surrounding area

Table 4. Archaeological Resource Recommendations

Site ID	Trinomial	Age	Overview of Site	Recommended Eligibility	Management Recommendations
P-15-000325	CA-KER-000325	Prehistoric	Site not accessible due to fence. Outside / adjacent to Project site	Unevaluated - potentially eligible	Avoid site
P-15-004347	CA-KER-00416H	Historic	Historic era scatter; no resources observed, possibly mipmapped and outside Project site.	Recorded portion in Project site not eligible for NRHP/CRHR listing (not present)	No additional action beyond general measures
P-15-009737	—	Historic	Historic era scatter in substation. Destroyed	Likely not eligible for NRHP/CRHR listing (no longer present)	No additional action beyond general measures
P-15-009738	—	Historic	Historic era scatter / razed ranch. Destroyed.	Not eligible for NRHP/CRHR listing (no longer present)	No additional action beyond general measures
P-15-020012	CA-KER-010921	Prehistoric	Lithic scatter; heavily disturbed. Updated boundary extends into Project site on PG&E lands	Not eligible for NRHP/CRHR listing	No additional action beyond general measures
BB-RO-S-001	—	Prehistoric	Artifact scatter with tools and multiple materials. Moderate buried site potential.	Not eligible for NRHP/CRHR listing	No additional action beyond general measures
BB-JR-S-001	—	Prehistoric	Artifact scatter with tools and multiple materials. Moderate buried site potential.	Not eligible for NRHP/CRHR listing	No additional action beyond general measures
BB-JR-S-002	—	Prehistoric	Very small lithic scatter. Moderate buried site potential	Not eligible for NRHP/CRHR listing	No additional action beyond general measures
BB-JR-S-003	—	Prehistoric	Very small lithic scatter with biface. Moderate buried site potential	Not eligible for NRHP/CRHR listing	No additional action beyond general measures
BB-JR-S-004	—	Prehistoric	Very small lithic scatter with tool. Moderate buried site potential	Not eligible for NRHP/CRHR listing	No additional action beyond general measures
BB-JR-S-005	—	Prehistoric	Very small lithic scatter with one projectile point. Moderate buried site potential	Not eligible for NRHP/CRHR listing	No additional action beyond general measures

Table 4. Archaeological Resource Recommendations

Site ID	Trinomial	Age	Overview of Site	Recommended Eligibility	Management Recommendations
BB-JR-S-006	—	Prehistoric	Very small lithic scatter with tool. Moderate buried site potential	Not eligible for NRHP/CRHR listing	No additional action beyond general measures
BB-ES-S-001	—	Historic	General sparse refuse scatter	Not eligible for NRHP/CRHR listing	No additional action beyond general measures
BB-ES-S-003	—	Prehistoric	Very small lithic scatter with tool. Moderate buried site potential	Not eligible for NRHP/CRHR listing	No additional action beyond general measures
BB-ES-S-005	—	Prehistoric	Very small lithic scatter. Moderate buried site potential	Not eligible for NRHP/CRHR listing	No additional action beyond general measures
BB-ES-S-006	—	Prehistoric	Very small lithic scatter with 4 flaked stone tools. Moderate buried site potential	Not eligible for NRHP/CRHR listing	No additional action beyond general measures
BB-ES-S-007	—	Prehistoric	Very small lithic scatter with 1 flaked stone tool. Moderate buried site potential	Not eligible for NRHP/CRHR listing	No additional action beyond general measures
BB-ES-S-008	—	Prehistoric	Very small lithic scatter with 1 flaked stone tool. Moderate buried site potential	Not eligible for NRHP/CRHR listing	No additional action beyond general measures
BB-ES-S-009	—	Prehistoric	Very small lithic scatter with 1 flaked stone tool. Moderate buried site potential	Not eligible for NRHP/CRHR listing	No additional action beyond general measures

5.1 Resource Significance

According to CEQA and the National Environmental Policy Act, a project with an effect that may cause a substantial adverse change in the significance of a historical resource (historic property) is a project that may have a significant effect (adverse effect) on the environment and the cultural resource itself. A substantial adverse change in the significance of a historical resource/historic property would be constituted by physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of the resource would be materially impaired. Significance, under these conditions, is to be interpreted in terms of the resource's eligibility for listing in the NRHP and/or CRHR. To best mitigate the effects of a project on cultural resources, a reasonable, good faith effort must be applied to determining those resources' archaeological character and eligibility for CRHR/NRHP listing.

The significance criteria used to evaluate a project's impacts to cultural resources under CEQA are based on Appendix G of the CEQA Guidelines. According to Appendix G of the CEQA Guidelines, a significant impact related to cultural resources would occur if the project would:

a. Cause a substantial adverse change in the significance of a historical resource pursuant to §15064.5.
b. Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5.
c. Disturb any human remains, including those interred outside of dedicated cemeteries.

The significance and CRHR/NRHP eligibility for individual resources discussed herein should be considered recommendations based on the significance criteria outlined in CEQA and the NHPA. Ultimately, significance determinations for the individual resources will be the responsibility of the lead agency.

BB-ES-S-001

This resource is a historic refuse scatter made up of 60+ glass and porcelain fragments. The site measures 595 ft × 235 ft. The site has been heavily disturbed by regular seasonal ploughing and planting activities. Based on available information, the site lacks artifacts, features, or associations that could make it eligible for the NRHP under Criteria A, B, or C. Criterion D is most appropriately applied to an assessment of the site's NRHP/CRHR eligibility; the site has potential *to yield, information important in prehistory or history*. All surface artifacts were recorded and, based on observed conditions, there is no buried deposit likely to be present. No additional research potential beyond that documented by Dudek appears to be provided. It is recommended that the archaeological site be considered not eligible for NRHP/CRHR listing under Criterion D/4.

BB-ES-S-002

This site consists of a historic and modern-era trash scatter composed of approximately seven (7) metal aerosol cans, one (1) gas can, and one (1) piece of cylindrical perforated metal. Modern plastic bottles, soda cans, shotgun shells/casings, paper coffee cups, and black/blue plastic fragments are scattered throughout. The site has been repeatedly impacted by agricultural practices and appears to be an isolated refuse deposit that has been dispersed through multiple episodes of plowing and disking. The site has been heavily disturbed by regular seasonal ploughing and planting activities. Based on available information, the site lacks artifacts, features, or associations that could make it eligible for the NRHP under Criteria A, B, or C. Criterion D is most appropriately applied to an assessment of the site's NRHP/CRHR eligibility; the site has potential *to yield, information important in prehistory or history*. All surface artifacts were recorded and, based on observed conditions, there is no buried deposit likely to be present. No additional research potential beyond that documented by Dudek appears to be provided. It is recommended that the archaeological site be considered not eligible for NRHP/CRHR listing under Criterion D/4.

BB-ES-S-003

This resource is a sparse lithic scatter with 5 pieces of debitage and one percussing tool. The site measures 102 ft × 43 ft. The site has been disturbed through decades of agricultural activities. Based on available information, the site lacks artifacts, features, or associations that could make it eligible for the NRHP under Criteria A, B, or C. Criterion D is most appropriately applied to an assessment of the site's NRHP/CRHR eligibility; the site has potential *to yield, information important in prehistory or history*. All surface artifacts were documented in place. A subsurface testing program was completed with the intent of systematically assessing the presence and distribution of subsurface archaeological deposits. No intact subsurface cultural deposits were observed. Review of soils indicated

that subsurface contexts within this site with the highest potential to support the presence of buried archaeological deposits have been subject to substantial previous mixing through agricultural activities. As such, yet-identified scientifically significant archaeological deposits are unlikely to be encountered. No additional research potential beyond that documented by Dudek appears to be provided. It is recommended that the archaeological site be considered not eligible for NRHP/CRHR listing under Criterion D/4.

BB-ES-S-004

BB-ES-S-004 is a historic trash scatter of milk, amber, and clear glass. The site has been repeatedly impacted by agricultural practices, and appears to be an isolated refuse deposit that has been dispersed through multiple episodes of plowing and disking. The site has been heavily disturbed by regular seasonal ploughing and planting activities. Based on available information, the site lacks artifacts, features, or associations that could make it eligible for the NRHP under Criteria A, B, or C. Criterion D is most appropriately applied to an assessment of the site's NRHP/CRHR eligibility; the site has potential *to yield, information important in prehistory or history*. All surface artifacts were recorded and, based on observed conditions, there is no buried deposit likely to be present. No additional research potential beyond that documented by Dudek appears to be provided. It is recommended that the archaeological site be considered not eligible for NRHP/CRHR listing under Criterion D/4.

BB-ES-S-005

This resource is a sparse lithic scatter with a single piece of debitage, a core tool, and a flaked stone tool. The site measures 64 ft × 47 ft. The site is located in an agricultural field adjacent pistachio orchards, and has been heavily disturbed by repeated agricultural practices. Based on available information, the site lacks artifacts, features, or associations that could make it eligible for the NRHP under Criteria A, B, or C. Criterion D is most appropriately applied to an assessment of the site's NRHP/CRHR eligibility; the site has potential *to yield, information important in prehistory or history*. All surface artifacts were documented in place. A subsurface testing program was completed with the intent of systematically assessing the presence and distribution of subsurface archaeological deposits. No intact subsurface cultural deposits were observed. Review of soils indicated that subsurface contexts within this site with the highest potential to support the presence of buried archaeological deposits have been subject to substantial previous mixing through agricultural activities. As such, yet-identified scientifically significant archaeological deposits are unlikely to be encountered. No additional research potential beyond that documented by Dudek appears to be provided. It is recommended that the archaeological site be considered not eligible for NRHP/CRHR listing under Criterion D/4

BB-ES-S-006

This resource is a sparse lithic scatter with 5 pieces of debitage, two hand stone fragments, one portable ground stone mortar, and one bifacial tool. The site measures 199 ft × 167 ft. The site is heavily disturbed by repeated agricultural activities, and currently lies within a fallow field. Based on available information, the site lacks artifacts, features, or associations that could make it eligible for the NRHP under Criteria A, B, or C. Criterion D is most appropriately applied to an assessment of the site's NRHP/CRHR eligibility; the site has potential *to yield, information important in prehistory or history*. All surface artifacts were documented in place. A subsurface testing program was completed with the intent of systematically assessing the presence and distribution of subsurface archaeological deposits. No intact subsurface cultural deposits were observed. Review of soils indicated that subsurface contexts within this site with the highest potential to support the presence of buried archaeological deposits have been subject to substantial previous mixing through agricultural activities. As such, yet-identified

scientifically significant archaeological deposits are unlikely to be encountered. No additional research potential beyond that documented by Dudek appears to be provided. It is recommended that the archaeological site be considered not eligible for NRHP/CRHR listing under Criterion D/4

BB-ES-S-007

This resource is a sparse lithic scatter with 4 pieces of debitage and one expedient flaked stone tool. The site measures 200 ft × 97 ft. The site is heavily disturbed by repeated agricultural practices, and currently lies within a fallow field. Based on available information, the site lacks artifacts, features, or associations that could make it eligible for the NRHP under Criteria A, B, or C. Criterion D is most appropriately applied to an assessment of the site's NRHP/CRHR eligibility; the site has potential *to yield, information important in prehistory or history*. All surface artifacts were documented in place. A subsurface testing program was completed with the intent of systematically assessing the presence and distribution of subsurface archaeological deposits. No intact subsurface cultural deposits were observed. Review of soils indicated that subsurface contexts within this site with the highest potential to support the presence of buried archaeological deposits have been subject to substantial previous mixing through agricultural activities. As such, yet-identified scientifically significant archaeological deposits are unlikely to be encountered. No additional research potential beyond that documented by Dudek appears to be provided. It is recommended that the archaeological site be considered not eligible for NRHP/CRHR listing under Criterion D/4

BB-ES-S-008

This resource is a sparse lithic scatter with 3 pieces of debitage and one projectile point. The site measures 83 ft × 62 ft, and is located within a fallow agricultural field. The site has been heavily disturbed by repeated agricultural practices. Based on available information, the site lacks artifacts, features, or associations that could make it eligible for the NRHP under Criteria A, B, or C. Criterion D is most appropriately applied to an assessment of the site's NRHP/CRHR eligibility; the site has potential *to yield, information important in prehistory or history*. All surface artifacts were documented in place. A subsurface testing program was completed with the intent of systematically assessing the presence and distribution of subsurface archaeological deposits. No intact subsurface cultural deposits were observed. Review of soils indicated that subsurface contexts within this site with the highest potential to support the presence of buried archaeological deposits have been subject to substantial previous mixing through agricultural activities. As such, yet-identified scientifically significant archaeological deposits are unlikely to be encountered. No additional research potential beyond that documented by Dudek appears to be provided. It is recommended that the archaeological site be considered not eligible for NRHP/CRHR listing under Criterion D/4

BB-ES-S-009

This resource is a sparse lithic scatter with 3 pieces of debitage and one bifacial tool. The site measures 219 ft × 80 ft, and is located within a fallow agricultural field. The site has been heavily disturbed by repeated agricultural practices. Based on available information, the site lacks artifacts, features, or associations that could make it eligible for the NRHP under Criteria A, B, or C. Criterion D is most appropriately applied to an assessment of the site's NRHP/CRHR eligibility; the site has potential *to yield, information important in prehistory or history*. All surface artifacts were documented in place. A subsurface testing program was completed with the intent of systematically assessing the presence and distribution of subsurface archaeological deposits. No intact subsurface cultural deposits were observed. Review of soils indicated that subsurface contexts within this site with the highest potential to support the presence of buried archaeological deposits have been subject to substantial previous mixing through agricultural activities. As such, yet-identified scientifically significant archaeological deposits are unlikely to be

encountered. No additional research potential beyond that documented by Dudek appears to be provided. It is recommended that the archaeological site be considered not eligible for NRHP/CRHR listing under Criterion D/4

BB-JR-S-001

This prehistoric site consists of a lithic scatter with four formed tools and 33 pieces of debitage. The site measures 47 meters N-S by 25 meters E-W. Debitage density is moderate throughout the site and formed tools are located within the central portion of the site. Lithic tools include CCS tools, a CCS biface, and an obsidian biface. Soils observed on the surface within the site are moderately compact grayish brown silty clay. Site is located on active agricultural land. The site is located along the eastern edge of a raised landform culminating at approximately 3 feet above surrounding fields.

Based on available information, the site lacks artifacts, features, or associations that could make it eligible for the NRHP under Criteria A, B, or C. Criterion D is most appropriately applied to an assessment of the site's NRHP/CRHR eligibility; the site has potential *to yield, information important in prehistory or history*. All surface artifacts were documented in place. A subsurface testing program was completed with the intent of systematically assessing the presence and distribution of subsurface archaeological deposits. No intact subsurface cultural deposits were observed. Review of soils indicated that subsurface contexts within this site with the highest potential to support the presence of buried archaeological deposits have been subject to substantial previous mixing through agricultural activities. As such, yet-identified scientifically significant archaeological deposits are unlikely to be encountered. No additional research potential beyond that documented by Dudek appears to be provided. It is recommended that the archaeological site be considered not eligible for NRHP/CRHR listing under Criterion D/4.

BB-JR-S-002

This prehistoric site consists of a scatter of three pieces of CCS debitage within an area measuring 18 meters NW-SE by 8 meters NE-SW. Soils observed on the surface within the site are moderately compact dark grayish brown silty clay loam. The site is located on a flat alluvial basin used intensively for agricultural purposes. The site is located in a field which has been recently prepared for agricultural production.

Based on available information, the site lacks artifacts, features, or associations that could make it eligible for the NRHP under Criteria A, B, or C. Criterion D is most appropriately applied to an assessment of the site's NRHP/CRHR eligibility; the site has potential *to yield, information important in prehistory or history*. All surface artifacts were documented in place. A subsurface testing program was completed with the intent of systematically assessing the presence and distribution of subsurface archaeological deposits. No intact subsurface cultural deposits were observed. Review of soils indicated that subsurface contexts within this site with the highest potential to support the presence of buried archaeological deposits have been subject to substantial previous mixing through agricultural activities. As such, yet-identified scientifically significant archaeological deposits are unlikely to be encountered. No additional research potential beyond that documented by Dudek appears to be provided. It is recommended that the archaeological site be considered not eligible for NRHP/CRHR listing under Criterion D/4

BB-JR-S-003

This prehistoric site consists of a scatter of seven pieces of CCS debitage within an area measuring 36 meters N-S by 18 meters E-W. Soils observed on the surface within the site are moderately compact light yellowish brown silty

clay loam. The site is located on the western edge of a raised landform approximately 2.5 feet high. The area is used intensively for agricultural purposes.

Based on available information, the site lacks artifacts, features, or associations that could make it eligible for the NRHP under Criteria A, B, or C. Criterion D is most appropriately applied to an assessment of the site's NRHP/CRHR eligibility; the site has potential *to yield, information important in prehistory or history*. All surface artifacts were documented in place. A subsurface testing program was completed with the intent of systematically assessing the presence and distribution of subsurface archaeological deposits. No intact subsurface cultural deposits were observed. Review of soils indicated that subsurface contexts within this site with the highest potential to support the presence of buried archaeological deposits have been subject to substantial previous mixing through agricultural activities. As such, yet-identified scientifically significant archaeological deposits are unlikely to be encountered. No additional research potential beyond that documented by Dudek appears to be provided. It is recommended that the archaeological site be considered not eligible for NRHP/CRHR listing under Criterion D/4.

BB-JR-S-004

This prehistoric site consists of a lithic scatter with 1 CCS biface and 3 pieces of debitage (CCS and volcanic). The site measures 27 meters N-S by 9.2 meters E-W. Debitage density is low throughout the site and formed tools with the biface located at the northern end of the site. Soils observed on the surface within the site are moderately compact grayish brown silty clay. The site is located along the eastern edge of a slightly depressed landform that appears to be a drainage sink for surrounding fields. The topography has been altered by decades of agricultural use.

Based on available information, the site lacks artifacts, features, or associations that could make it eligible for the NRHP under Criteria A, B, or C. Criterion D is most appropriately applied to an assessment of the site's NRHP/CRHR eligibility; the site has potential *to yield, information important in prehistory or history*. All surface artifacts were documented in place. A subsurface testing program was completed with the intent of systematically assessing the presence and distribution of subsurface archaeological deposits. No intact subsurface cultural deposits were observed. Review of soils indicated that subsurface contexts within this site with the highest potential to support the presence of buried archaeological deposits have been subject to substantial previous mixing through agricultural activities. As such, yet-identified scientifically significant archaeological deposits are unlikely to be encountered. No additional research potential beyond that documented by Dudek appears to be provided. It is recommended that the archaeological site be considered not eligible for NRHP/CRHR listing under Criterion D/4

BB-JR-S-005

This prehistoric site consists of a lithic scatter with 1 CCS biface, 1 CCS simple flake tool, and 2 pieces of debitage. The site measures 33 meters N-S by 22 meters E-W. Debitage density is low throughout the site. Soils observed on the surface within the site are moderately compact grayish brown silty clay. The site is located along the eastern edge of a sunken landform which drains surrounding fields. Additional archaeological resources are present in the surrounding area on the same landform.

Based on available information, the site lacks artifacts, features, or associations that could make it eligible for the NRHP under Criteria A, B, or C. Criterion D is most appropriately applied to an assessment of the site's NRHP/CRHR eligibility; the site has potential *to yield, information important in prehistory or history*. All surface artifacts were documented in place. A subsurface testing program was completed with the intent of systematically assessing the presence and distribution of subsurface archaeological deposits. No intact subsurface cultural deposits were

observed. Review of soils indicated that subsurface contexts within this site with the highest potential to support the presence of buried archaeological deposits have been subject to substantial previous mixing through agricultural activities. As such, yet-identified scientifically significant archaeological deposits are unlikely to be encountered. No additional research potential beyond that documented by Dudek appears to be provided. It is recommended that the archaeological site be considered not eligible for NRHP/CRHR listing under Criterion D/4

BB-JR-S-006

This prehistoric site consists of a sparse lithic scatter measuring 29 meters N-S by 16 meters E-W. Artifacts include 5 pieces of CCS debitage, and one retouched flake tool. The site is located on a salt marsh flood plain with previously tilled agricultural land, and it was devoid of vegetation at the time of the recording. Soils observed on the surface within the site are moderately compact sandy clay.

Based on available information, the site lacks artifacts, features, or associations that could make it eligible for the NRHP under Criteria A, B, or C. Criterion D is most appropriately applied to an assessment of the site's NRHP/CRHR eligibility; the site has potential *to yield, information important in prehistory or history*. All surface artifacts were documented in place. A subsurface testing program was completed with the intent of systematically assessing the presence and distribution of subsurface archaeological deposits. No intact subsurface cultural deposits were observed. Review of soils indicated that subsurface contexts within this site with the highest potential to support the presence of buried archaeological deposits have been subject to substantial previous mixing through agricultural activities. As such, yet-identified scientifically significant archaeological deposits are unlikely to be encountered. No additional research potential beyond that documented by Dudek appears to be provided. It is recommended that the archaeological site be considered not eligible for NRHP/CRHR listing under Criterion D/4

BB-RO-S-001

This prehistoric site measures 133 m × 68 m, and consists of a lithic scatter with 5 formal artifacts and 113 pieces of debitage, including two fragments of obsidian. Possible fire-affected rock and unidentifiable bone fragments were also observed within the site boundary. Formal artifacts include two CCS retouched flakes, one CCS core, one ground stone vessel rim fragment with perforations, and one light grey CCS mid-stage biface. The majority of artifacts are distributed along the margin of the raised landform and sunken salt marsh.

Based on available information, the site lacks artifacts, features, or associations that could make it eligible for the NRHP under Criteria A, B, or C. Criterion D is most appropriately applied to an assessment of the site's NRHP/CRHR eligibility; the site has potential *to yield, information important in prehistory or history*. All surface artifacts were documented in place. A subsurface testing program was completed with the intent of systematically assessing the presence and distribution of subsurface archaeological deposits. No intact subsurface cultural deposits were observed. Review of soils indicated that subsurface contexts within this site with the highest potential to support the presence of buried archaeological deposits have been subject to substantial previous mixing through agricultural activities. As such, yet-identified scientifically significant archaeological deposits are unlikely to be encountered. No additional research potential beyond that documented by Dudek appears to be provided. It is recommended that the archaeological site be considered not eligible for NRHP/CRHR listing under Criterion D/4.

P-15-000324

This site was first and last recorded in June 1970 as a cemetery on a low knoll with at least two adult skeletons, olivella shell beads, lithic flakes (chert, chalcedony, obsidian). It is understood that this site may have been partially destroyed by levee construction and previous agricultural activities. While the initially recorded components of this resource were largely not relocated by Dudek's survey, a total of seven pieces of CCS debitage and one Olivella shell bead were identified generally in the vicinity of the reported site location. Decades of agricultural practices have flattened the landscape in the surrounding area. Additionally, no midden-like soils were observed, although freshwater shell was observable in soils throughout the area.

Based on available information, the site lacks artifacts, features, or associations that could make it eligible for the NRHP under Criteria A, B, or C. Criterion D is most appropriately applied to an assessment of the site's NRHP/CRHR eligibility; the site has potential *to yield, information important in prehistory or history*. Research potential is provided by the presence of a diversity of formal artifacts. The artifact assemblage indicates regional trade, providing potential information relating to broader archaeological patterns. Given the geomorphic context, intact cultural deposits may occur below the soils disturbed by agricultural activities. Of central importance is the potential presence of human remains. Exploratory subsurface investigation of the site and surrounding area would be appropriate to better identify its boundaries and extent. Absent this option, avoidance of the recorded site boundary should be completed by a minimum distance of 100 ft. Pending further investigation, it is recommended that the archaeological site be considered eligible for NRHP/CRHR listing under Criterion D/4.

P-15-000325 (CA-KER-000325)

The site was first and last recorded in June 1970 by WJW/ETW. The site falls primarily within a fenced parcel that is not within the Project site. A small sliver of the mapped site boundary intersects the Project site in an area where extensive grading has occurred during the development and maintenance of an agricultural staging area. The resource is described as a series of small prehistoric campsites on low knolls containing 32 *Olivella* shell beads, three projectile point fragments, a steatite bead, steatite reel fragment, utilized flake, and debitage (chert, chalcedony, obsidian noted). Dudek was unable to access the recorded resource location and, given the substantial disturbances within the adjacent portions of the Project site, it is relatively unlikely to extend to this area.

Based on available information, the site lacks artifacts, features, or associations that could make it eligible for the NRHP under Criteria A, B, or C. Criterion D is most appropriately applied to an assessment of the site's NRHP/CRHR eligibility; the site has potential *to yield, information important in prehistory or history*. Research potential is provided by the presence of a diversity of formal artifacts. The artifact assemblage indicates regional trade, providing potential information relating to broader archaeological patterns. Tool manufacture, habitation activity, and temporally diagnostic artifacts are also reported at this location. Intact cultural deposits may occur below the soils disturbed by agricultural and grading activities. Exploratory subsurface investigation of adjacent portions of the Project site near the resource would be appropriate prior to construction. Absent this option, avoidance of the recorded site boundary buffer by a minimum distance of 100 ft should occur.

P-15-020012 (BB-KT-S-001)

This site is a diffuse multi-component site expansion, measuring 265 x 160 m in size, consisting of a large, diffuse scatter of lithic debitage and historic-aged 20th century refuse located on PG&E owned and managed lands. It should be considered an extension of the previously recorded precontact site to the north, P-15-020012. Lithics

include 67 pieces of debitage (66 of CCS and 1 obsidian), and 1 CCS retouched flake tool. Historic artifacts include whiteware, broken bottle glass (including some fragments of amethyst-colored), scrap ferrous metal, nails and modern debris. The artifacts are within a heavily disturbed area with evidence of mechanical grading resulting in cuts and push piles. All of the artifacts were documented within these piles, adjacent to a shallow depression that runs through the center of the site. This previous site was recommended as not eligible for NRHP/CRHP eligibility (Ballester and Morales 2019). Dudek agrees that this resource has limited data potential, given the substantial degree of disturbance, the limited artifact frequency, and the low potential for buried deposits. The full extent of this site is not within the Project Site and was not fully surveyed by Dudek.

Based on available information, the site lacks artifacts, features, or associations that could make it eligible for the NRHP under Criteria A, B, or C. Criterion D is most appropriately applied to an assessment of the site's NRHP/CRHR eligibility; the site has potential *to yield, information important in prehistory or history*. All surface artifacts were recorded and, based on observed conditions, there is no buried deposit likely to be present. No additional research potential beyond that documented by Dudek appears to be provided. It is recommended that the archaeological site be considered not eligible for NRHP/CRHR listing under Criterion D/4.

5.2 Effects/Impacts Analysis

5.2 Cultural Resources

Threshold a. Would the project cause a substantial adverse change in the significance of a historical resource pursuant to §15064.5?

The term "historical resource" is being applied here as a reference to historic built environment buildings, features, or structures that are over 45 years in age. A separate technical study focused on recordation and evaluation of historic built environment resources that may be affected by the Project has been completed (Jones, Ahmanson and Kim 2025). Please refer to this document in reference to related impacts.

Threshold b. Would the project cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?

As presently designed, the Project would intersect or fall adjacent to 19 archaeological sites. Previously recorded sites include P-15-000324, a prehistoric resource with reported human remains; P-15-000325 which is recorded just outside of the Project site; and P-15-020012, a highly disturbed multi-component site which falls on PG&E lands. A total of 16 newly recorded resources (13 prehistoric and 3historic-era) were identified within the Project site. P-15-000324 and P-15-000325 remain unevaluated and should be assumed eligible for NRHP/CRHR listing. It is presently the plan of the Applicant to avoid these resources and, as such, they would be subject to no impact. The 16 newly recorded resources and P-15-020012 appear to lack artifacts, features, or associations that could make them eligible for the NRHP under Criteria A/1, B/2, or C/3. Criterion D/4 is most appropriately applied to an assessment of the sites' eligibility. Surface and subsurface investigations conducted within and surrounding these resources indicate that these sites have limited potential to contribute additional data relating to use, chronology, ethnicity, historic trends, and other important research themes. These resources have limited artifact frequency and variability, and no intact subsurface deposits. It appears that historical uses for agriculture have largely plowed though subsurface soils likely to contain buried resources within the vicinity of these sites. As such, these sites are

not recommended eligible for listing on the NRHP/CRHR under Criterion D/4, for their potential to yield information important in prehistory or history.

While a formal Project design has yet to be developed, it is anticipated that avoidance of significant archaeological sites is feasible. As such, the Project would not impact resources considered eligible for NRHP/CRHR listing; impacts to known cultural resources would be less than significant, provided P-15-000324 and P-15-000325 remain avoided.

Given the nature and distribution of known resources, as well as the geomorphic context of the broader area, the Project site has potential for yet-identified buried archaeological resources. Surface cultural material and potential subsurface deposits have potential to contribute additional data relating to prehistoric use, chronology, and other important research themes. Impacts to Criterion D/4 can be mitigated through archaeological processes meeting best practice standards. Where feasible, the preferred mitigation strategy should include avoidance or other methods of preservation in place. Where preservation in place is determined to be infeasible, mitigation required to manage impacts to these potentially significant resources must require archaeological data recovery prior to disturbance by construction activities. In addition, a cultural resources monitoring program is recommended to occur during initial subsurface disturbing activities throughout the Project site.

Affects to Tribal Cultural Resources, as a separate category of resources under CEQA, will be assessed through the government-to-government consultation process and implementation of the mitigation measures described here.

Implementation of **Mitigation Measure (MM) CUL-1**, requiring developing and implementing a Worker Environmental awareness Program (WEAP) to ensure workers are sensitive to and properly respond to the unanticipated discovery of cultural resources; **MM-CUL-2,** requiring pre-construction survey of areas inaccessible during the present Dudek survey and best practice standards applied to the management of any additional archaeological resources; **MM-CUL-3** requiring preparation of a Cultural Resources Management plan (CRMP) to address monitoring strategies, Native American monitoring (should this be required by the County), and the proper handling and recovery of unanticipated cultural resources identified at the Project site; **MM-CUL-4**, specifying the proper treatment of any human remains discovered during construction; and, **MM-CUL-5**, requiring periodic monitoring of initial ground-disturbing activities by cultural resources specialists to ensure detection of cultural resources encountered during construction would be required.

Threshold c. Would the project disturb any human remains, including those interred outside of dedicated cemeteries?

Human remains and associated grave goods are protected under California law. No human remains were observed during archaeological survey. One archaeological site with reported human remains intersects the Project site (P-15-000324). It is recommended that this site be avoided by a 100 ft buffer and/or additional pre-construction archaeological testing be completed in order to attempt to further refine this boundary in order to help ensure that associated human remains may be avoided. Three sites with reported human burials have been documented within 1 mile of the Project site (P-15-000053, P-15-000057, P-15-004014). While these sites will not be affected, the presence of documented prehistoric burials within 1 mile of the Project site does indicate that the Project site has an elevated potential for human remains to be present. Further, survey work has documented an assemblage of observed formal artifacts, as well as a moderate-high potential for buried archaeological deposits within the Project site. Methods for management of any possible human remains that may be encountered will be outlined in a WEAP required by **MM-CUL-1** and must occur in compliance with appropriate regulatory requirements, per **MM-CUL-4**. Archaeological monitoring is recommended for all initial ground disturbing activities within the Project site. Specific strategies for implementation of this program will be included in the cultural resources management plan, which is

to be reviewed by the lead agency and consulting tribes and finalized prior to construction. This plan will provide specific requirements for the treatment of human remains, should they be encountered. Applicable Mitigation measures for sites intersecting or directly adjacent to the Project site are presented in Table 5. Implementation **MM-CUL-1, MM-CUL-2, MM-CUL-3, MM-CUL-4**, and **MM-CUL-5** would be required to reduce impacts related to the discovery of archaeological resources containing human remains.

Table 5. Archaeological Resource and Applicable Mitigation Measures

Site ID	Trinomial	Recommended Eligibility	Applicable Mitigation
P-15-000324	CA-KER-000324	Unevaluated - potentially eligible	MM-CUL-1 MM-CUL-3 MM-CUL-4 MM-CUL-5
P-15-000325	CA-KER-000325	Unevaluated - potentially eligible	MM-CUL-1 MM-CUL-3 MM-CUL-4 MM-CUL-5
P-15-004347	CA-KER-00416H	Component in Project site not eligible for NRHP/CRHR listing	MM-CUL-1 MM-CUL-3
P-15-009737	—	Component in Project site not eligible for NRHP/CRHR listing	MM-CUL-1 MM-CUL-3
P-15-009738	—	Component in Project site not eligible for NRHP/CRHR listing	MM-CUL-1 MM-CUL-3
P-15-020012	CA-KER-010921	Component in Project site not eligible for NRHP/CRHR listing	MM-CUL-1 MM-CUL-3 MM-CUL-5
BB-RO-S-001	—	Not eligible for NRHP/CRHR listing	MM-CUL-1 MM-CUL-3 MM-CUL-5
BB-JR-S-001	—	Not eligible for NRHP/CRHR listing	MM-CUL-1 MM-CUL-3 MM-CUL-5
BB-JR-S-002	—	Not eligible for NRHP/CRHR listing	MM-CUL-1 MM-CUL-3 MM-CUL-5
BB-JR-S-003	—	Not eligible for NRHP/CRHR listing	MM-CUL-1 MM-CUL-3 MM-CUL-5
BB-JR-S-004	—	Not eligible for NRHP/CRHR listing	MM-CUL-1 MM-CUL-3 MM-CUL-5
BB-JR-S-005	—	Not eligible for NRHP/CRHR listing	MM-CUL-1 MM-CUL-3 MM-CUL-5
BB-JR-S-006	—	Not eligible for NRHP/CRHR listing	MM-CUL-1 MM-CUL-3

Table 5. Archaeological Resource and Applicable Mitigation Measures

Site ID	Trinomial	Recommended Eligibility	Applicable Mitigation
			MM-CUL-5
BB-ES-S-001	—	Not eligible for NRHP/CRHR listing	MM-CUL-1 MM-CUL-3 MM-CUL-5
BB-ES-S-003	—	Not eligible for NRHP/CRHR listing	MM-CUL-1 MM-CUL-3 MM-CUL-5
BB-ES-S-005	—	Not eligible for NRHP/CRHR listing	MM-CUL-1 MM-CUL-3 MM-CUL-5
BB-ES-S-006	—	Not eligible for NRHP/CRHR listing	MM-CUL-1 MM-CUL-3 MM-CUL-5
BB-ES-S-007	—	Not eligible for NRHP/CRHR listing	MM-CUL-1 MM-CUL-3 MM-CUL-5
BB-ES-S-008	—	Not eligible for NRHP/CRHR listing	MM-CUL-1 MM-CUL-3 MM-CUL-5
BB-ES-S-009	—	Not eligible for NRHP/CRHR listing	MM-CUL-1 MM-CUL-3 MM-CUL-5

5.3 Tribal Cultural Resources

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

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

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

The Project is subject to compliance with AB 52 and possibly SB 18, which require consultation with California Native American Tribal representatives requesting consultation in response to notifications sent by local governments as well as the proper treatment of any tribal cultural resources potentially affected by activities

triggering such consultation. Consultation is presently ongoing – the management strategies should be updated based on the results of this government-to-government process and information provided.

A project with an effect that may cause a substantial adverse change in the significance of tribal cultural resource is a project that may have a significant effect on the environment (Pub. Resources Code, § 21084.2.). An appropriate approach to potential impacts to tribal cultural resources or other resources of traditional Native American cultural value is developed based on the processes outlined by AB 52 and SB 18 based on the identification of a tribal cultural resource (as defined by PRC Section 21074) within or near the Project site.

Nonetheless, archaeological investigations have identified cultural resources of Native American origin and/or association at the Project site. The distribution of archaeological material demonstrates a potential pattern of intensive and/or extended indigenous use relative to the natural prehistoric landscape, most specifically, Tulare Lake and Buena Vista Slough. Additional, yet-identified, buried cultural resources do have potential to be encountered through project-related earth-disturbing activities. Known and unanticipated cultural resources, if present, have the potential to meet definitions of tribal cultural resources.

To address potential impacts to tribal cultural resources caused by the Project, **Mitigation Measure (MM) CUL-1**, requiring developing and implementing a Worker Environmental awareness Program (WEAP), would include appropriate strategies for management of tribal cultural resources; **MM-CUL-2,** requiring pre-construction survey of areas inaccessible during the present Dudek survey and best practice standards applied to the management of any additional archaeological resources; **MM-CUL-3,** requiring preparation of a Cultural Resources Management plan (CRMP), would include provisions for tribal notification in the event of discovery of a potential tribal cultural resource; **MM-CUL-4**, summarizing existing regulations and codes pertaining to required treatment of human remains already specifies contact and coordination with a Native American Most Likely Descendant (MLD) in the event remains are of Native American origin; and, **MM-CUL-5**, requiring periodic monitoring of initial ground-disturbing activities by cultural resources specialists to ensure detection of cultural resources encountered during construction, impacts to archaeological resources would be implemented along with implementation of existing regulations governing the treatment of human remains.

5.3 Recommendations

With the following mitigation implemented, impacts to archaeological resources and human remains would be less than significant.

MM-CUL-1 Workers Environmental Awareness Program (WEAP) Training: All construction personnel and monitors who are not trained archaeologists shall be briefed regarding unanticipated cultural resource discoveries prior to the start of construction activities. The purpose of the WEAP training is to provide specific details on the kinds of archaeological materials that may be identified during construction of the proposed Project and explain the importance of and legal basis for the protection of significant archaeological resources. Each worker shall also learn the proper procedures to follow in the event that cultural resources or human remains are uncovered during ground-disturbing activities. These procedures include work curtailment or redirection, and the immediate contact of the site supervisor and archaeological monitor. The appropriate management requirements relating to inadvertent discovery of a potential tribal cultural resources will also be

addressed as part of the WEAP training. These procedures shall be summarized in a handout to be provided to all personnel working on the proposed Project after completing their WEAP training.

MM-CUL-2 Pre-Construction Archaeological survey: Archaeological survey completed by qualified archaeologists must be conducted of the inaccessible areas must be completed prior to construction. Any identified archaeological resources must be subject to recordation, evaluation, and, where feasible, consideration of avoidance. Work shall meet best practice standards. Where avoidance is infeasible, resources shall be subject to Data Recovery procedures stipulated in mitigation to follow below.

MM-CUL-3 Cultural Resource Management Plan (CRMP): The applicant shall prepare a CRMP for the mitigation of impacts to known and inadvertently encountered historical, unique archaeological, and tribal cultural resources. The CRMP shall be reviewed and approved by Kern County prior to finalization prior to the issuance of building and grading permits. Consistent with the requirements of AB 52 and SB 18, the County, based on information and/or requests received through the process of consultation, shall determine if review and input from the consulting tribes shall occur. The CRMP shall, at a minimum, include and expand upon the following components:

- The CRMP shall define the requirements for addressing inadvertent discoveries, for communication and notification to the lead agency and consulting parties in the event of such discoveries, for the preparation of daily monitoring logs, and for the preparation of a final culutral resources construction monitoring report after completion of construction.
- The CRMP shall include methods for preservation in place to the extent feasible of known, and/or future inadvertant discoveries of historical or unique archaeological or tribal cultural resources, such as through avoidance, incorporation within undisturbed areas of the Project site, covering with a layer of chemically stable soil before building parking lots, staging areas, or other similar improvements on the Project site, or deeding the site into a permanent conservation easement as part of project decommissioning. Avoidance areas shall be delineated as environmentally sensitive areas (ESAs) around avoidable sites to the extent feasible. The ESAs shall be clearly delineated and marked using methods that do not conflict with other resource or construction styles. The ESAs shall not detail the cultural nature of that avoidance area on signage or plans. The ESAs shall be maintained through the duration of construction.
- When artifacts are collected or otherwise recovered, the CRMP shall outline specific methods required to assess, document, and manage the archaeological assemblage. This data is directly tied to the “data potential” and, as such, efforts require that artifacts be subject to archaeological collection, laboratory analyses, and typically, curation. Plans for alternative post-analysis handling, such as reburial on site, or elswhere, may additionally be developed with the individual landowners in coordination with consulting tribes, as applicable based on significance, age and origin of cultural material. The CRMP shall address historic-era material considered unsuitible for curation and/or reburial, including considerations for deaccession.
- To the extent construction activities uncover previously unknown or unanticipated cultural resources, all such activities will stop in the vicinity of the resource until the significance of the resources is determined. An appropriate ESA buffer for avoidance during construction is typically 100 feet, which may be adjusted at the recommendation of a qualified archaeologist meeting Secretary of the Interior Qualifications, so that the exclusion buffer allows key areas

of construction to proceed while ensuring that no ongoing project activities will affect the find during assessment of the resources significance. The CRMP shall provide for archaeological evaluation to occur, as approved by the lead agency. Where approved, resources shall be evaluated by a qualified archaeologist through an archaeological testing phase that consists of systematic excavations of a sample of areas within the area to be disturbed by the Project to determine the integrity of the archaeological deposits, the horizontal and vertical extent of the deposits, the quantity and diversity of artifacts contained within the deposits, and the potential for human remains. The Applicant may use the information from the testing phase as described in the resulting report to refine or revise the project impact area for purposes of avoidance where feasible. The goal is to avoid or minimize impacts to significant deposits based on the results of the test excavations. The qualified archaeologist shall assess if the archaeological site qualifies as a historical resource or unique archaeological or tribal cultural resource under the criteria of California Environmental Quality Act, in consultation with the lead agency, who may request review by consulting tribes. The feasibility of avoidance of any cultural resources shall be reviewed by the project proponent based on project needs and communicated to the lead agency for review. Preservation in place shall be the preferred manner of mitigating impacts to historical and unique archaeological and tribal cultural resources. However, data recovery through excavation may be the only feasible mitigation for such resources at times; therefore, this contingency should be provided for as well in the CRMP, consistent with the terms of MM-CUL-4.

- The final construction monitoring report shall be submitted to the lead agency and Southern San Joaquin Valley Information Center. Distribution to consulting tribes will be determined by the lead agency, as informed through the process of government-to-government consultation. The intent of this report should be to document compliance with approved mitigation and regulations, as well as to provide a full documentation of cultural resources identified. The results of data recovery efforts may be documented in a separate report or included as a component of this construction monitoring report, subject to confidentiality limitations.

MM-CUL-4 Treatment of Human Remains: If human remains are found during evaluations, data recovery, construction monitoring, or any project-related ground-disturbing activity, the remains shall be treated with appropriate dignity pursuant to the requirements of California Public Resources Code Section 5097.98 and the CEQA Guidelines Section 15064.5(e). Project-specific requirements will be included in the CRMP.

MM-CUL-5 Construction Monitoring: A qualified archaeologist shall monitor initial “first-pass” grading, subsurface disturbances, or other ground-disturbing activities at and near recorded archaeological site locations. If unanticipated cultural resources are encountered during construction, the procedures required by MM-CUL-3 for unanticipated discoveries shall be applied. General responsibilities of the archaeologist monitor shall include monitoring construction, preparation of daily monitoring logs, reporting and assessing inadvertent discoveries, communication with tribal representatives, guiding installation and tracking maintenance of environmentally sensitive area marking, and generally ensuring implementation of the CRMP and approved mitigation. The final construction monitoring report shall act as a record of compliance with guiding documents and mitigation.

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Appendix A (Confidential)

Project Site and Resource Location Maps

Appendix B (Confidential)

Records Search Maps and Information

Appendix C

NAHC Sacred Lands File Search and Tribal Coordination

NATIVE AMERICAN HERITAGE COMMISSION

CHAIRPERSON
Laura Miranda
Luiseño

VICE CHAIRPERSON
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SECRETARY
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Miwok

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Buffy McQuillen
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COMMISSIONER
Stanley Rodriguez
Kumeyaay

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NAHC HEADQUARTERS
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nahc@nahc.ca.gov
NAHC.ca.gov

December 2, 2022

Nicholas Hanten
DUDEK

Via Email to: nhanten@dudek.com

Re: Native American Tribal Consultation, Pursuant to the Assembly Bill 52 (AB 52), Amendments to the California Environmental Quality Act (CEQA) (Chapter 532, Statutes of 2014), Public Resources Code Sections 5097.94 (m), 21073, 21074, 21080.3.1, 21080.3.2, 21082.3, 21083.09, 21084.2 and 21084.3, Buttonbush Solar Project, Kern County

Dear Mr. Hanten:

Pursuant to Public Resources Code section 21080.3.1 (c), attached is a consultation list of tribes that are traditionally and culturally affiliated with the geographic area of the above-listed project. Please note that the intent of the AB 52 amendments to CEQA is to avoid and/or mitigate impacts to tribal cultural resources, (Pub. Resources Code §21084.3 (a)) ("Public agencies shall, when feasible, avoid damaging effects to any tribal cultural resource.")

Public Resources Code sections 21080.3.1 and 21084.3(c) require CEQA lead agencies to consult with California Native American tribes that have requested notice from such agencies of proposed projects in the geographic area that are traditionally and culturally affiliated with the tribes on projects for which a Notice of Preparation or Notice of Negative Declaration or Mitigated Negative Declaration has been filed on or after July 1, 2015. Specifically, Public Resources Code section 21080.3.1 (d) provides:

Within 14 days of determining that an application for a project is complete or a decision by a public agency to undertake a project, the lead agency shall provide formal notification to the designated contact of, or a tribal representative of, traditionally and culturally affiliated California Native American tribes that have requested notice, which shall be accomplished by means of at least one written notification that includes a brief description of the proposed project and its location, the lead agency contact information, and a notification that the California Native American tribe has 30 days to request consultation pursuant to this section.

The AB 52 amendments to CEQA law does not preclude initiating consultation with the tribes that are culturally and traditionally affiliated within your jurisdiction prior to receiving requests for notification of projects in the tribe's areas of traditional and cultural affiliation. The Native American Heritage Commission (NAHC) recommends, but does not require, early consultation as a best practice to ensure that lead agencies receive sufficient information about cultural resources in a project area to avoid damaging effects to tribal cultural resources.

The NAHC also recommends, but does not require that agencies should also include with their notification letters, information regarding any cultural resources assessment that has been completed on the area of potential effect (APE), such as:

1. The results of any record search that may have been conducted at an Information Center of the California Historical Resources Information System (CHRIS), including, but not limited to:

- A listing of any and all known cultural resources that have already been recorded on or adjacent to the APE, such as known archaeological sites;
- Copies of any and all cultural resource records and study reports that may have been provided by the Information Center as part of the records search response;
- Whether the records search indicates a low, moderate, or high probability that unrecorded cultural resources are located in the APE; and
- If a survey is recommended by the Information Center to determine whether previously unrecorded cultural resources are present.

2. The results of any archaeological inventory survey that was conducted, including:

- Any report that may contain site forms, site significance, and suggested mitigation measures.

  All information regarding site locations, Native American human remains, and associated funerary objects should be in a separate confidential addendum, and not be made available for public disclosure in accordance with Government Code section 6254.10.

3. The result of any Sacred Lands File (SLF) check conducted through the Native American Heritage Commission was negative.

4. Any ethnographic studies conducted for any area including all or part of the APE; and

5. Any geotechnical reports regarding all or part of the APE.

Lead agencies should be aware that records maintained by the NAHC and CHRIS are not exhaustive and a negative response to these searches does not preclude the existence of a tribal cultural resource. A tribe may be the only source of information regarding the existence of a tribal cultural resource.

This information will aid tribes in determining whether to request formal consultation. In the event that they do, having the information beforehand will help to facilitate the consultation process.

If you receive notification of change of addresses and phone numbers from tribes, please notify the NAHC. With your assistance, we can assure that our consultation list remains current.

If you have any questions, please contact me at my email address: Cameron.vela@nahc.ca.gov.

Sincerely,

Cameron Vela

Cameron Vela
Cultural Resources Analyst

Attachment

Native American Heritage Commission
Tribal Consultation List
Kern County
12/2/2022

Big Pine Paiute Tribe of the Owens Valley
James Rambeau, Chairperson
P. O. Box 700
Big Pine, CA, 93513
Phone: (760) 938 - 2003
Fax: (760) 938-2942
j.rambeau@bigpinepaiute.org
Paiute-Shoshone

Big Pine Paiute Tribe of Owens Valley
Sally Manning, Environmental Director
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Phone: (760) 938 - 2003
s.manning@bigpinepaiute.org
Paiute-Shoshone

Big Pine Paiute Tribe of the Owens Valley
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Big Pine, CA, 93513
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Fax: (760) 938-2942
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Paiute-Shoshone

Chumash Council of Bakersfield
Julio Quair, Chairperson
729 Texas Street
Bakersfield, CA, 93307
Phone: (661) 322 - 0121
chumashtribe@sbcglobal.net
Chumash

Coastal Band of the Chumash Nation
Mia Lopez, Chairperson
P. O. Box 4464
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Phone: (805) 324 - 0135
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Chumash

Coastal Band of the Chumash Nation
Gabe Frausto, Vice Chair
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cbcn22vicechair@gmail.com
Chumash

Kitanemuk & Yowlumne Tejon Indians
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115 Radio Street
Bakersfield, CA, 93305
Phone: (626) 339 - 6785
2deedominguez@gmail.com
Kitanemuk
Southern Valley Yokut

Santa Rosa Rancheria Tachi Yokut Tribe
Leo Sisco, Chairperson
P.O. Box 8
Lemoore, CA, 93245
Phone: (559) 924 - 1278
Fax: (559) 924-3583
Southern Valley Yokut

Tejon Indian Tribe
Octavio Escobedo, Chairperson
P.O. Box 640
Arvin, CA, 93203
Phone: (661) 834 - 8566
oescobedo@tejonindiantribe-nsn.gov
Kitanemuk

Tejon Indian Tribe
Colin Rambo,
P.O. Box 640
Arvin, CA, 93203
Phone: (661) 834 - 8566
colin.rambo@tejonindiantribe-nsn.gov
Kitanemuk

Tule River Indian Tribe
Neil Peyron, Chairperson
P.O. Box 589
Porterville, CA, 93258
Phone: (559) 781 - 4271
Fax: (559) 781-4610
neil.peyron@tulerivertribe-nsn.gov
Yokut

yak tityu tityu yak tiłhini – Northern Chumash Tribe
Mona Tucker, Chairperson
660 Camino Del Rey
Arroyo Grande, CA, 93420
Phone: (805) 748 - 2121
olivas.mona@gmail.com
Chumash

This list is current only as of the date of this document. Distribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resources Code and section 5097.98 of the Public Resources Code.

This list is only applicable for consultation with Native American tribes under Public Resources Code Sections 21080.3.1 for the proposed Buttonbush Solar Project, Kern County.

Lorelei H. Oviatt, AICP, Director
2700 "M" Street, Suite 100
Bakersfield, CA 93301-2323
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PLANNING AND NATURAL RESOURCES DEPARTMENT

Planning
Community Development
Administrative Operations

Certified Mail <9598 0710 5270 0689 1649 15>

February 12, 2024

FILE: GPA 1, CUP 12, Map 54; GPA 10, CUP 14, Map 77; GPA 10, GPA 11, CUP 17, ZCC 4, CUP 18, MAP 78; GPA 4, SPA 5, CUP 17, MAP 98; GPA 8, SPA 9, CUP 25, MAP 99; GPA 31, CUP 61, MAP 100.

FILE COPY

Kern Valley Indian Community
Attn: Bandy Kendricks, Tribal Member Monitor
30741 Foxridge Court
Tehachapi, CA, 93561

RE: SB 18 Tribal Consultation - Application for a General Plan Amendment – Specific Plan Amendment - Conditional Use Permit - Zone Change Classification for the Buttonbush Solar Photovoltaic and Hydrogen Facility - (PP24407)

Dear Mr. Kendricks,

The Kern County Planning and Natural Resources Department is in receipt of a request to process an application for a proposed Photovoltaic and Hydrogen facility. The proposed project, Buttonbush Solar, would allow for the development and operation of a Photovoltaic facility on approximately 14,903 acers and a proposed hydrogen facility on approximately 100 acres of privately-owned land.

The proposed project is generally located northwest of the City of Bakersfield, straddling I-5 highway and approximately seven (7) and a half miles southwest of the City of Wasco, five (5) miles west of the City of Shafter, directly north of the community of Buttonwillow, and approximately 18 miles from the western border of Kern County. Proposed project is in the central portion of unincorporated Kern County. The project site is located in the Mount Diablo Base and Meridian (MDB&M).

In compliance with California Senate Bill 18 (SB 18), this Department is requesting your review and comments on the potential impacts on cultural places associated with your tribe by this proposal. Your participation is important at this early stage of processing to ensure that cultural places important to your tribe are identified, and the potential impacts associated with implementation of the project are mitigated.

If you have not responded by **Monday, May 13, 2024**, this Department will assume your tribe has declined consultation as per Public Resources Code (PRC) 21080.3.1. Notification of the availability of public hearing notices will continue to be provided, even if consultation is declined. If you have any questions, comments or wish to request a consultation regarding this proposal, you can contact me at (661) 862-5017 or by email at Fergusonj@kerncounty.com.

Sincerely,

Jamal Ferguson
Planner I, Advanced Planning
Planning and Natural Resources Department

Enclosure: Vicinity Maps

Lorelei H. Oviatt, AICP, Director
2700 "M" Street, Suite 100
Bakersfield, CA 93301-2323
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Fax: (661) 862-8601 TTY Relay 1-800-735-2929
Email: planning@kerncounty.com
Web Address: http://kernplanning.com/

PLANNING AND NATURAL RESOURCES DEPARTMENT

Planning
Community Development
Administrative Operations

February 12, 2024

FILE COPY

FILE: GPA 1, CUP 12, Map 54; GPA 10, CUP 14, Map 77; GPA 10, GPA 11, CUP 17, ZCC 4, CUP 18, MAP 78; GPA 4, SPA 5, CUP 17, MAP 98; GPA 8, SPA 9, CUP 25, MAP 99; GPA 31, CUP 61, MAP 100.

Kern Valley Indian Community
Attn: Robert Robinson, Chairperson
P.O. Box 1010
Lake Isabella, CA, 93240

RE: SB 18 Tribal Consultation - Application for a General Plan Amendment – Specific Plan Amendment - Conditional Use Permit - Zone Change Classification for the Buttonbush Solar Photovoltaic and Hydrogen Facility - (PP24407)

Dear Mr. Robinson,

The Kern County Planning and Natural Resources Department is in receipt of a request to process an application for a proposed Photovoltaic and Hydrogen facility. The proposed project, Buttonbush Solar, would allow for the development and operation of a Photovoltaic facility on approximately 14,903 acers and a proposed hydrogen facility on approximately 100 acres of privately-owned land.

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In compliance with California Senate Bill 18 (SB 18), this Department is requesting your review and comments on the potential impacts on cultural places associated with your tribe by this proposal. Your participation is important at this early stage of processing to ensure that cultural places important to your tribe are identified, and the potential impacts associated with implementation of the project are mitigated.

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Sincerely,

Jamal Ferguson
Planner I, Advanced Planning
Planning and Natural Resources Department

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Northern Chumash Tribal Council
Attn: Violet Walker, Chairperson
P.O. Box 6533
Los Osos, CA, 93412

RE: SB 18 Tribal Consultation - Application for a General Plan Amendment – Specific Plan Amendment - Conditional Use Permit - Zone Change Classification for the Buttonbush Solar Photovoltaic and Hydrogen Facility - (PP24407)

Dear Ms. Walker,

The Kern County Planning and Natural Resources Department is in receipt of a request to process an application for a proposed Photovoltaic and Hydrogen facility. The proposed project, Buttonbush Solar, would allow for the development and operation of a Photovoltaic facility on approximately 14,903 acers and a proposed hydrogen facility on approximately 100 acres of privately-owned land.

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In compliance with California Senate Bill 18 (SB 18), this Department is requesting your review and comments on the potential impacts on cultural places associated with your tribe by this proposal. Your participation is important at this early stage of processing to ensure that cultural places important to your tribe are identified, and the potential impacts associated with implementation of the project are mitigated.

If you have not responded by **Monday, May 13, 2024**, this Department will assume your tribe has declined consultation as per Public Resources Code (PRC) 21080.3.1. Notification of the availability of public hearing notices will continue to be provided, even if consultation is declined. If you have any questions, comments or wish to request a consultation regarding this proposal, you can contact me at (661) 862-5017 or by email at Fergusonj@kerncounty.com.

Sincerely,

Jamal Ferguson
Planner I, Advanced Planning
Planning and Natural Resources Department

Enclosure: Vicinity Map

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Santa Rosa Rancheria Tachi Yokut Tribe
Attn: Shana Powers, THPO
P.O. Box 8
Lemoore, CA, 93245

RE: SB 18 Tribal Consultation - Application for a General Plan Amendment – Specific Plan Amendment - Conditional Use Permit - Zone Change Classification for the Buttonbush Solar Photovoltaic and Hydrogen Facility - (PP24407)

Dear Ms. Powers,

The Kern County Planning and Natural Resources Department is in receipt of a request to process an application for a proposed Photovoltaic and Hydrogen facility. The proposed project, Buttonbush Solar, would allow for the development and operation of a Photovoltaic facility on approximately 14,903 acers and a proposed hydrogen facility on approximately 100 acres of privately-owned land.

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In compliance with California Senate Bill 18 (SB 18), this Department is requesting your review and comments on the potential impacts on cultural places associated with your tribe by this proposal. Your participation is important at this early stage of processing to ensure that cultural places important to your tribe are identified, and the potential impacts associated with implementation of the project are mitigated.

If you have not responded by **Monday, May 13, 2024**, this Department will assume your tribe has declined consultation as per Public Resources Code (PRC) 21080.3.1. Notification of the availability of public hearing notices will continue to be provided, even if consultation is declined. If you have any questions, comments or wish to request a consultation regarding this proposal, you can contact me at (661) 862-5017 or by email at Fergusonj@kerncounty.com.

Sincerely,

Jamal Ferguson
Planner I, Advanced Planning
Planning and Natural Resources Department

Enclosure: Vicinity Map

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Santa Rosa Rancheria Tachi Yokut Tribe
Attn: Samantha McCarty, Cultural Specialist ll
P.O. Box 8
Lemoore, CA, 93245

RE: SB 18 Tribal Consultation - Application for a General Plan Amendment – Specific Plan Amendment - Conditional Use Permit - Zone Change Classification for the Buttonbush Solar Photovoltaic and Hydrogen Facility - (PP24407)

Dear Ms. McCarty,

The Kern County Planning and Natural Resources Department is in receipt of a request to process an application for a proposed Photovoltaic and Hydrogen facility. The proposed project, Buttonbush Solar, would allow for the development and operation of a Photovoltaic facility on approximately 14,903 acers and a proposed hydrogen facility on approximately 100 acres of privately-owned land.

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In compliance with California Senate Bill 18 (SB 18), this Department is requesting your review and comments on the potential impacts on cultural places associated with your tribe by this proposal. Your participation is important at this early stage of processing to ensure that cultural places important to your tribe are identified, and the potential impacts associated with implementation of the project are mitigated.

If you have not responded by **Monday, May 13, 2024**, this Department will assume your tribe has declined consultation as per Public Resources Code (PRC) 21080.3.1. Notification of the availability of public hearing notices will continue to be provided, even if consultation is declined. If you have any questions, comments or wish to request a consultation regarding this proposal, you can contact me at (661) 862-5017 or by email at Fergusonj@kerncounty.com.

Sincerely,

Jamal Ferguson
Planner I, Advanced Planning
Planning and Natural Resources Department

Enclosure: Vicinity Map

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Santa Rosa Rancheria Tachi Yokut Tribe
Attn: Nichole Escalon, Cultural Specialist I
P.O. Box 8
Lemoore, CA, 93245

RE: SB 18 Tribal Consultation - Application for a General Plan Amendment – Specific Plan Amendment - Conditional Use Permit - Zone Change Classification for the Buttonbush Solar Photovoltaic and Hydrogen Facility - (PP24407)

Dear Ms. Escalon,

The Kern County Planning and Natural Resources Department is in receipt of a request to process an application for a proposed Photovoltaic and Hydrogen facility. The proposed project, Buttonbush Solar, would allow for the development and operation of a Photovoltaic facility on approximately 14,903 acers and a proposed hydrogen facility on approximately 100 acres of privately-owned land.

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Sincerely,

Jamal Ferguson
Planner I, Advanced Planning
Planning and Natural Resources Department

Enclosure: Vicinity Map

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Tubatulabals of Kern Valley
Attn: Robert Gomez, Chairperson
P.O. Box 226
Lake Isabella, CA, 93240

RE: SB 18 Tribal Consultation - Application for a General Plan Amendment – Specific Plan Amendment - Conditional Use Permit - Zone Change Classification for the Buttonbush Solar Photovoltaic and Hydrogen Facility - (PP24407)

Dear Mr. Gomez,

The Kern County Planning and Natural Resources Department is in receipt of a request to process an application for a proposed Photovoltaic and Hydrogen facility. The proposed project, Buttonbush Solar, would allow for the development and operation of a Photovoltaic facility on approximately 14,903 acers and a proposed hydrogen facility on approximately 100 acres of privately-owned land.

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Sincerely,

Jamal Ferguson
Planner I, Advanced Planning
Planning and Natural Resources Department

Enclosure: Vicinity Map

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2700 "M" Street, Suite 100
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PLANNING AND NATURAL RESOURCES DEPARTMENT

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Tule River Indian Tribe
Attn: Neil Peyron, Chairperson
P.O. Box 589
Porterville, CA, 93258

RE: SB 18 Tribal Consultation - Application for a General Plan Amendment – Specific Plan Amendment - Conditional Use Permit - Zone Change Classification for the Buttonbush Solar Photovoltaic and Hydrogen Facility - (PP24407)

Dear Mr. Payron,

The Kern County Planning and Natural Resources Department is in receipt of a request to process an application for a proposed Photovoltaic and Hydrogen facility. The proposed project, Buttonbush Solar, would allow for the development and operation of a Photovoltaic facility on approximately 14,903 acers and a proposed hydrogen facility on approximately 100 acres of privately-owned land.

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In compliance with California Senate Bill 18 (SB 18), this Department is requesting your review and comments on the potential impacts on cultural places associated with your tribe by this proposal. Your participation is important at this early stage of processing to ensure that cultural places important to your tribe are identified, and the potential impacts associated with implementation of the project are mitigated.

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Sincerely,

Jamal Ferguson
Planner I, Advanced Planning
Planning and Natural Resources Department

Enclosure: Vicinity Map

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PLANNING AND NATURAL RESOURCES DEPARTMENT

Planning
Community Development
Administrative Operations

Certified Mail <9589 0710 5270 0689 1648 92>

February 12, 2024

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FILE COPY

Kitanemuk & Yowlumne Tejon Indians
Attn: Delia Dominguez, Chairperson
115 Radio Street
Bakersfield, CA, 93305

RE: SB 18 Tribal Consultation - Application for a General Plan Amendment – Specific Plan Amendment - Conditional Use Permit - Zone Change Classification for the Buttonbush Solar Photovoltaic and Hydrogen Facility - (PP24407)

Dear Ms. Dominguez,

The Kern County Planning and Natural Resources Department is in receipt of a request to process an application for a proposed Photovoltaic and Hydrogen facility. The proposed project, Buttonbush Solar, would allow for the development and operation of a Photovoltaic facility on approximately 14,903 acers and a proposed hydrogen facility on approximately 100 acres of privately-owned land.

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Sincerely,

Jamal Ferguson
Planner I, Advanced Planning
Planning and Natural Resources Department

Enclosure: Vicinity Maps

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Tejon Indian Tribe
Attn: Candice Garza, CRM Scheduler
4941 David Road
Bakersfield, CA, 93307

RE: SB 18 Tribal Consultation - Application for a General Plan Amendment – Specific Plan Amendment - Conditional Use Permit - Zone Change Classification for the Buttonbush Solar Photovoltaic and Hydrogen Facility - (PP24407)

Dear Mr. Kendricks,

The Kern County Planning and Natural Resources Department is in receipt of a request to process an application for a proposed Photovoltaic and Hydrogen facility. The proposed project, Buttonbush Solar, would allow for the development and operation of a Photovoltaic facility on approximately 14,903 acers and a proposed hydrogen facility on approximately 100 acres of privately-owned land.

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In compliance with California Senate Bill 18 (SB 18), this Department is requesting your review and comments on the potential impacts on cultural places associated with your tribe by this proposal. Your participation is important at this early stage of processing to ensure that cultural places important to your tribe are identified, and the potential impacts associated with implementation of the project are mitigated.

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Sincerely,

Jamal Ferguson
Planner I, Advanced Planning
Planning and Natural Resources Department

Enclosure: Vicinity Map

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PLANNING AND NATURAL RESOURCES DEPARTMENT

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Administrative Operations

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February 5, 2024

FILE: GPA 1, CUP 12, Map 54; GPA 10, CUP 14, Map 77; GPA 10, GPA 11, CUP 17, ZCC 4, CUP 18, MAP 78; GPA 4, SPA 5, CUP 17, MAP 98; GPA 8, SPA 9, CUP 25, MAP 99; GPA 31, CUP 61, MAP 100.

FILE COPY

Twenty-Nine Palms Band
of Mission Indians
Attn: Darrell Mike, Tribal Chairman
46-200 Harrison Place
Coachella, CA 92236

RE: AB 52 Tribal Consultation - Application for a General Plan Amendment – Specific Plan Amendment - Conditional Use Permit - Zone Change Classification for the Buttonbush Solar Photovoltaic and Hydrogen Facility - (PP24407)

Dear Mr. Mike,

The Kern County Planning and Natural Resources Department is in receipt of a request to process an application for a proposed Photovoltaic and Hydrogen facility. The proposed project, Buttonbush Solar, would allow for the development and operation of a Photovoltaic facility on approximately 14,903 acers and a proposed hydrogen facility on approximately 100 acres of privately-owned land.

The proposed project is generally located northwest of the City of Bakersfield, straddling I-5 highway and approximately seven (7) and a half miles southwest of the City of Wasco, five (5) miles west of the City of Shafter, directly north of the community of Buttonwillow, and approximately 18 miles from the western border of Kern County. Proposed project is in the central portion of unincorporated Kern County. The project site is located in the Mount Diablo Base and Meridian (MDB&M).

In compliance with California Assembly Bill No. 52 (AB 52), this Department is requesting your review and comments on the potential impacts on cultural places associated with your tribe by this proposal. Your participation is important at this early stage of processing to ensure that cultural places important to your tribe are identified, and the potential impacts associated with implementation of the project are mitigated.

If you have not responded by **Wednesday, March 6, 2024**, this Department will assume your tribe has declined consultation as per Public Resources Code (PRC) 21080.3.1.

If you have any questions, comments or wish to request a consultation regarding this proposal please contact me at (661) 862-5017 or by email at Fergusonj@kerncounty.com.

Sincerely,

Jamal Ferguson
Planner I, Advanced Planning
Planning and Natural Resources Department

Enclosure: Vicinity Maps

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PLANNING AND NATURAL RESOURCES DEPARTMENT

Planning
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February 5, 2024

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FILE COPY

Yuhaaviatam of San Manuel Nation
Attn: Alexandra McCleary, Ph.D.
26569 Community Center Drive
Highland, CA 92346

RE: AB 52 Tribal Consultation - Application for a General Plan Amendment – Specific Plan Amendment - Conditional Use Permit - Zone Change Classification for the Buttonbush Solar Photovoltaic and Hydrogen Facility - (PP24407)

Dear Mr. McCleary,

The Kern County Planning and Natural Resources Department is in receipt of a request to process an application for a proposed Photovoltaic and Hydrogen facility. The proposed project, Buttonbush Solar, would allow for the development and operation of a Photovoltaic facility on approximately 14,903 acers and a proposed hydrogen facility on approximately 100 acres of privately-owned land.

The proposed project is generally located northwest of the City of Bakersfield, straddling I-5 highway and approximately seven (7) and a half miles southwest of the City of Wasco, five (5) miles west of the City of Shafter, directly north of the community of Buttonwillow, and approximately 18 miles from the western border of Kern County. Proposed project is in the central portion of unincorporated Kern County. The project site is located in the Mount Diablo Base and Meridian (MDB&M).

In compliance with California Assembly Bill No. 52 (AB 52), this Department is requesting your review and comments on the potential impacts on cultural places associated with your tribe by this proposal. Your participation is important at this early stage of processing to ensure that cultural places important to your tribe are identified, and the potential impacts associated with implementation of the project are mitigated.

If you have not responded by **Wednesday, March 7, 2024**, this Department will assume your tribe has declined consultation as per Public Resources Code (PRC) 21080.3.1.

If you have any questions, comments or wish to request a consultation regarding this proposal please contact me at (661) 862-5017 or by email at Fergusonj@kerncounty.com.

Sincerely,

Jamal Ferguson
Planner I, Advanced Planning
Planning and Natural Resources Department

Enclosure: Vicinity Maps

Lorelei H. Oviatt, AICP, Director
2700 "M" Street, Suite 100
Bakersfield, CA 93301-2323
Phone: (661) 862-8600
Fax: (661) 862-8601 TTY Relay 1-800-735-2929
Email: planning@kerncounty.com
Web Address: http://kernplanning.com/

PLANNING AND NATURAL RESOURCES DEPARTMENT

Planning
Community Development
Administrative Operations

Certified Mail <9589 0710 5270 0689 1699 65>

February 5, 2024

FILE: GPA 1, CUP 12, Map 54; GPA 10, CUP 14, Map 77; GPA 10, GPA 11, CUP 17, ZCC 4, CUP 18, MAP 78; GPA 4, SPA 5, CUP 17, MAP 98; GPA 8, SPA 9, CUP 25, MAP 99; GPA 31, CUP 61, MAP 100.

FILE COPY

Twenty-Nine Palms Band
of Mission Indians
Attn: Anthony Madrigal Jr., Tribal Grants Administrator
46-200 Harrison Place
Coachella, CA 92236

RE: AB 52 Tribal Consultation - Application for a General Plan Amendment – Specific Plan Amendment - Conditional Use Permit - Zone Change Classification for the Buttonbush Solar Photovoltaic and Hydrogen Facility - (PP24407)

Dear Mr. Madrigal,

The Kern County Planning and Natural Resources Department is in receipt of a request to process an application for a proposed Photovoltaic and Hydrogen facility. The proposed project, Buttonbush Solar, would allow for the development and operation of a Photovoltaic facility on approximately 14,903 acers and a proposed hydrogen facility on approximately 100 acres of privately-owned land.

The proposed project is generally located northwest of the City of Bakersfield, straddling I-5 highway and approximately seven (7) and a half miles southwest of the City of Wasco, five (5) miles west of the City of Shafter, directly north of the community of Buttonwillow, and approximately 18 miles from the western border of Kern County. Proposed project is in the central portion of unincorporated Kern County. The project site is located in the Mount Diablo Base and Meridian (MDB&M).

In compliance with California Assembly Bill No. 52 (AB 52), this Department is requesting your review and comments on the potential impacts on cultural places associated with your tribe by this proposal. Your participation is important at this early stage of processing to ensure that cultural places important to your tribe are identified, and the potential impacts associated with implementation of the project are mitigated.

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Sincerely,

Jamal Ferguson
Planner I, Advanced Planning
Planning and Natural Resources Department

Enclosure: Vicinity Map

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February 5, 2024

FILE: GPA 1, CUP 12, Map 54; GPA 10, CUP 14, Map 77; GPA 10, GPA 11, CUP 17, ZCC 4, CUP 18, MAP 78; GPA 4, SPA 5, CUP 17, MAP 98; GPA 8, SPA 9, CUP 25, MAP 99; GPA 31, CUP 61, MAP 100.

FILE COPY

Tejon Indian Tribe
Attn: Candice Garza
4941 David Road
Bakersfield, CA 93307

RE: AB 52 Tribal Consultation - Application for a General Plan Amendment – Specific Plan Amendment - Conditional Use Permit - Zone Change Classification for the Buttonbush Solar Photovoltaic and Hydrogen Facility - (PP24407)

Dear Ms. Garza,

The Kern County Planning and Natural Resources Department is in receipt of a request to process an application for a proposed Photovoltaic and Hydrogen facility. The proposed project, Buttonbush Solar, would allow for the development and operation of a Photovoltaic facility on approximately 14,903 acers and a proposed hydrogen facility on approximately 100 acres of privately-owned land.

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In compliance with California Assembly Bill No. 52 (AB 52), this Department is requesting your review and comments on the potential impacts on cultural places associated with your tribe by this proposal. Your participation is important at this early stage of processing to ensure that cultural places important to your tribe are identified, and the potential impacts associated with implementation of the project are mitigated.

If you have not responded by **Wednesday, March 7, 2024**, this Department will assume your tribe has declined consultation as per Public Resources Code (PRC) 21080.3.1.

If you have any questions, comments or wish to request a consultation regarding this proposal please contact me at (661) 862-5017 or by email at Fergusonj@kerncounty.com.

Sincerely,

Jamal Ferguson
Planner I, Advanced Planning
Planning and Natural Resources Department

Enclosure: Vicinity Maps

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Planning
Community Development
Administrative Operations

February 5, 2024

FILE COPY

FILE: GPA 1, CUP 12, Map 54; GPA 10, CUP 14, Map 77; GPA 10, GPA 11, CUP 17, ZCC 4, CUP 18, MAP 78; GPA 4, SPA 5, CUP 17, MAP 98; GPA 8, SPA 9, CUP 25, MAP 99; GPA 31, CUP 61, MAP 100.

Torres Martinez Desert Cahuilla Indians
Attn: Michael Mirelez, Cultural Resources Coordinator
P.O. Box 1160
Thermal, CA 92274

RE: AB 52 Tribal Consultation - Application for a General Plan Amendment – Specific Plan Amendment - Conditional Use Permit - Zone Change Classification for the Buttonbush Solar Photovoltaic and Hydrogen Facility - (PP24407)

Dear Mr. Mirelez,

The Kern County Planning and Natural Resources Department is in receipt of a request to process an application for a proposed Photovoltaic and Hydrogen facility. The proposed project, Buttonbush Solar, would allow for the development and operation of a Photovoltaic facility on approximately 14,903 acers and a proposed hydrogen facility on approximately 100 acres of privately-owned land.

The proposed project is generally located northwest of the City of Bakersfield, straddling I-5 highway and approximately seven (7) and a half miles southwest of the City of Wasco, five (5) miles west of the City of Shafter, directly north of the community of Buttonwillow, and approximately 18 miles from the western border of Kern County. Proposed project is in the central portion of unincorporated Kern County. The project site is located in the Mount Diablo Base and Meridian (MDB&M).

In compliance with California Assembly Bill No. 52 (AB 52), this Department is requesting your review and comments on the potential impacts on cultural places associated with your tribe by this proposal. Your participation is important at this early stage of processing to ensure that cultural places important to your tribe are identified, and the potential impacts associated with implementation of the project are mitigated.

If you have not responded by **Wednesday, March 7, 2024**, this Department will assume your tribe has declined consultation as per Public Resources Code (PRC) 21080.3.1.

If you have any questions, comments or wish to request a consultation regarding this proposal please contact me at (661) 862-5017 or by email at Fergusonj@kerncounty.com.

Sincerely,

Jamal Ferguson
Planner I, Advanced Planning
Planning and Natural Resources Department

Enclosure: Vicinity Map

SB 18 Application for GPA - SPA - CUP - Zone Change for the Buttonbush Solar Photovoltaic and Hydrogen Facility - (PP24407)

Samantha McCarty <SMcCarty@tachi-yokut-nsn.gov>

Tue 2/27/2024 12:06 PM

To:Jamal Ferguson <Fergusonj@kerncounty.com>
Cc:Shana Powers <SPowers@tachi-yokut-nsn.gov>;Nichole Escalon <nescalon@tachi-yokut-nsn.gov>;Candice Garza (CGarza@TEJONINDIANTRIBE-NSN.GOV) <CGarza@TEJONINDIANTRIBE-NSN.GOV>

CAUTION: This email originated from outside of the organization. Do not click links, open attachments, or provide information unless you recognize the sender and know the content is safe.

Dear Jamal,

Thank you for contacting the Santa Rosa Rancheria Tachi-Yokut Tribe regarding: SB 18 Application for GPA- SPA- CUP - Zone Change for the Buttonbush Solar Photovoltaic and Hydrogen Facility- (PP24407). Due to the location of this project the Tribe will be deferring to the Tejon Indian Tribe. The Tribe has major concerns regarding this project as the area is highly sensitive and is recommending tribal monitoring from Tejon.

If you have any questions, comments, and or concerns please contact myself or the SRR Cultural Department. Thank you.

Sincerely,

Samantha McCarty

Santa Rosa Rancheria Tachi-Yokut Tribe
Cultural Specialist II
SMcCarty@tachi-yokut-nsn.gov
Cell: (559) 633-6640
Direct Line: (559) 925-2591
Office: (559) 924-1278 x 4091

***PLEASE KEEP ALL CULTURAL STAFF IN EMAILS UNLESS STATED OTHERWISE**

Appendix D (Confidential)

Newly Recorded Resources

Appendix E

Resumes for Key Personnel

Adam Giacinto, MA, RPA

Archaeologist

Adam Giacinto is an archaeologist with more than 17 years' experience preparing cultural resource studies and environmental documents, and managing archaeological survey, evaluation, and data recovery-level investigations. His research interests include prehistoric hunter-gatherer cultures and contemporary conceptions of heritage. His current research focuses on the social, historical, archaeological, and political mechanisms surrounding heritage values.



Adam Giacinto

Professional Affiliations

Register of Professional Archaeologists

Society for California Archaeology American Anthropological Association Institute of Archaeomythology

American Anthropological Association

Selected Project Experience

Gonzaga Wind and Transmission Line Project, Pacheco State Park, California. As principal archaeological investigator, Mr. Giacinto coordinated more cultural resources inventory of more than 1,500 acres. This included a CHRIS records search, NAHC Sacred Lands file search, archaeological survey with 5 crew for a month, and preparation of two technical report s for CEQA (State Parks) and Section 106 (Bureau of Reclamation). Included evaluation of Pacheco Ranch Historical District components and recordation of multiple prehistoric and historic-era archaeological resources.

California High Speed Rail, Fresno-Bakersfield, California. As principal investigator, oversees, implements, and reports upon cultural inventory, evaluation, data recovery and compliance efforts under Section 106 of the NHPA, Federal Rail Authority, CEQA, and local Guidelines for Fresno to Bakersfield section. Oversight of Native American monitors, built environment specialists and archaeologists, management of cultural monitoring implementation and site treatment, client reporting, meetings and report preparation. Implementation of mitigation included exploratory archaeological investigations at multiple NAHC-eligible resources.

Tres Amigos Solar, Los Banos, California. As principal archaeological investigator, Mr. Giacinto oversaw cultural resources inventory of more than 1,500 acres. This included a CHRIS records search, NAHC Sacred Lands file search, archaeological survey with 4 crew for a month, and preparation of a technical report for CEQA (State Parks) and Section 106 (USACE).

South Lake Solar Project, Fresno County, California. As principal investigator, Mr. Giacinto coordinated a San Joaquin Valley Information Center (SJVIC) records search, Native American Heritage Commission (NAHC), review of existing information, and preparation of a Critical Issues Analysis.

Proxima Solar Project, Fresno County, California. As principal investigator, Mr. Giacinto coordinated a SJVIC records search, paleontological investigations, a NAHC search, review of existing information, coordination of over 1,000 acres of survey, and preparation of a Critical Issues Analysis, technical report, and MND update.

UC Merced Student Housing Project, Merced County, California. As principal investigator, Mr. Giacinto coordinated a CHRIS records search, NAHC and Native American correspondence (AB 52 and SB 18), archaeological and historic architectural survey, and preparation of a technical report. Mr. Giacinto prepared and reviewed management recommendations for CEQA considerations and Section 106 compliance.

Yokohl Ranch Development Project, The Yokohl Ranch Company, LLC, Tulare County, California. As co-principal investigator and field director, managed 15 archaeologists in conducting significance evaluation of 118 historical and prehistoric cultural resources throughout the 12,000 acre Yokohl Valley area. Operated as tribal interface, and facilitated the respectful handling and reburial of sensitive cultural material with the tribes, applicant, and NAHC.

Operations and Maintenance On-Call, Department of Water Resources. As primary Dudek archaeological and tribal resources consultatant, Mr Giacinto manages cultural resources projects for DWR. These inlude the Cultural Resources Inventory for the B.F. Sisk Dam Safety of Dams Modification Project, Delta Dams Raise Project (three reservoirs), MP 230 Project, and Upper Feather River Projects (three dam locations), preperation of a Programattic Agreement for Cultural resources for DWR, and a number of other Central Valley projects.

McCoy Solar Energy Project and Blythe Solar Power Project, Blythe, California. As principal investigator, Mr. Giacinto supervised, implemented, and reported upon compliance efforts for construction of more than 4000 acres of solar work under Section 106 of the NHPA, BLM Guidelines, CEQA, California Energy Commission, and County of Riverside Guidelines. Mr. Giacinto was the lead multiple formal trainings with monitors and council members from the Colorado River Indian Tribes regarding federal and state regulations relating to human remains, County and BLM guiding documents, identification of cultural material, and the multiple understandings of "cultural resources".

Wildlife Services Program EIR-EIS, CDFA/USDA. Dudek has developed template letters to be used for tribal notification, follow up, and consultation for this project. Dudek drafted, and mailed letters on behalf of CDFA, letters to all 216 NAHC-listed contacts in the state of California. Responses received are tracked, reviewed with the agency, and responded to. In addition, outreach letters prepared by the USDA were reviewed and modified for the purposes of Section 106 consultation.

AB 52 Support. Since helping to establish the present process of AB 52 consultation with City of Los Angeles in 2015, Mr Giacinto has been contracted to prepare dozens of TCR reports. The goal of these investigations is to review the archaeological, historical, academic, and ethnographic record for potential TCR information, then gound contemporary AB 52 consultation information in this context while providing recommendations related to reasonable approaches for Management. In addition, Mr. Giacinto provides on-call suppport for helping a number of agencies work through challenginf AB 52 issues. The most reocurring include the Cities of Danville, Rohnert Park, Auburn, and Novato.

North 16th Street Improvement Project, Sacramento, California. As Principal archaeological investigator, Mr. Giacinto coordinated a NCIC records search, NAHC and Native American information outreach, archaeological and historic architectural survey, DPR 523 building forms, and preparation of a technical report under CEQA regulatory context. An appropriate mitigation strategy was developed for this cultural inventory.

Pacific Gas& Electric Vegetation Management, Central Valley and Western Central Sierras, California. As Co-Principal archaeological investigator, Mr. Giacinto collaboratively coordinates a team in completing survey, monitoring , cultural reviews, tribal coordination, and other related documentation required for PG&E vegetation management projects throughout the Central Valley and western Sierra Nevada's. To date, 350 task orders for individual projects have been completed.

Ross Owen, MA, RPA

Archaeologist

Ross Owen is an Archaeologist with 6 years' experience conducting Phase I and II archaeological surveys. Working on identification-level surveys Mr. Owen has acclimated to working on a diverse range of site types and landforms which has contributed to his knowledge of material culture, site formation processes, and soil development, primarily in the mid-Atlantic region, California, and Nevada.

Education

Indiana University of Pennsylvania
MA, Applied Archaeology

Boston University
BA, Archaeology

Certifications

Register of Professional Archaeologists (RPA), No. 18014

Professional Affiliations

Society for American Archaeology

In his role as a field/lab technician and as a field director, Mr. Owen has been involved in all stages of completing Phase I and II surveys and evaluation for compliance with Section 106 of the NHPA as well as CEQA. He also carries experience in records searches and archival work, tribal consultation, data management, field excavation, and laboratory processing. Outside of work he has sought out opportunities to present research in academic settings, speak with the public about archaeology to better communicate archaeological significance to the public.

Project Experience

Martis Wildlife Area Restoration Project, Placer County, California. Performed demarcation of Environmentally Sensitive Areas (ESAs) in advance of construction association with wetland restoration efforts for the U.S. Army Corps of Engineers, Sacramento District and Truckee River Watershed Council. Archaeological monitoring during construction. Fieldwork to prepare a Performance Work Statement (PWS) for the Army Corps of Engineers to assess impacts to CA-PLA-5. Preparation of reports documenting monitoring and PWS efforts and results.

Martis Valley Trail Segment 3F, Placer County, California. Conducted in-person records search and review at the North Central Information Center and compiled results in report. Pedestrian archaeological survey of project area. Preparation of report documenting negative findings. Tribal correspondence soliciting information on known resources within project area and project-related concerns.

Robinson Mine Conditional Use Permit Modification, Placer County, California. Conducted in-person records search and review at the North Central Information Center and compiled results in report. Pedestrian archaeological survey of project area.

El Dorado Irrigation District Pacific Tunnel Rehabilitation, El Dorado County, California. Conducted in-person records search and review at the North Central Information Center and compiled results in report. Pedestrian archaeological survey of project area. Preparation of report documenting negative findings, and DPR update to portion of the Mormon-Carson Emigrant Trail re-located but not impacted by project design. Tribal correspondence soliciting information on known resources within project area and project-related concerns.

Fish Springs Ranch Solar Energy Center Project, Washoe County, Nevada. Performed 4 months of monitoring. Completed survey and recordation of archaeological sites. Attribute analysis in field of prehistoric and historic resources. Conducted records search review and compilation for report. Reporting of field survey results for Nevada Bureau of Land Management, and preparation of Intermountain Antiquities Computer System (IMACS)

forms documenting new sites and updates to previously recorded sites. Guided field view of resources recorded on private lands with Next Era and Pyramid Lake Paiute Tribal Historic Preservation Officer.

Nevada Street Phase II, City of Auburn, Placer County, California. Performed archaeological monitoring of intersection realignment and utility work along Nevada Street in Auburn, California. Reported monitoring actions and results to City of Auburn and NexGen.

Round Mountain Area Project – Table Mountain Site, Butte County, California. Conducted archaeological survey and reporting for a proposed power generation facility in Butte County.

Heartland Solar Development Project, Fresno County, California. Led crew for survey of 2,000+ acre archaeological survey of a proposed solar energy project.

Gonzaga Wind Repowering Project, Merced County, California. Performed archaeological survey for California Department of Parks and Recreation Four Rivers District proposed wind farm, associated access roads and transmission lines.

Dodge Flat Solar Energy Center, Washoe County, Nevada. Prepared and reviewed BLM submission packet containing final drafts of report and BLM-required digital data. Submitted to Nevada BLM Sierra Front Field Office.

Blythe Solar Power Project, Riverside County, California. Compiled monitoring logs and weekly monitoring summaries to submit to client.

J. Chen Stone Ave Tech Studies 4050 Grange Road, Sonoma County, California. Conducted in-person records search and review at the Northwest Information Center and compiled results in report. Pedestrian archaeological survey of project area. Preparation of report documenting negative findings. Tribal correspondence soliciting information on known resources within project area and project-related concerns.

Cloverdale Unified School District Project, Sonoma County, California. Conducted archaeological survey and reporting for proposed athletic facilities for the Cloverdale Unified School District. Tribal correspondence soliciting information on known resources within project area and project-related concerns.

California State University – Chico Master Plan EIR, Butte County, California. Conducted archaeological survey and reporting of survey results. Assisted in compilation of archaeological report for Master Plan EIR document.

Woodland Community College Performing Arts and Culinary Services Facility Project, Yolo County, California. Conducted archaeological survey and reporting for a proposed university facilities expansion in Yolo County.

Arlington Solar Energy Project, Riverside County, California. Assisted in relocating, sketching and sub-meter accuracy GPS recording of WWII-era military training features as required by a Historic Preservation Treatment Plan drafted to mitigate adverse effects on National Register-eligible archaeological resources.

Dowdell Industrial Park, City of Rohnert Park, Sonoma County, California. Conducted records search review and integrated results into report meeting United States Army Corps of Engineers standards for Section 106 and CEQA compliance.

Ebbetts Pass Reach 1 Water Transmission Pipeline Capital Improvement Project, Calaveras County, California. Performed archaeological monitoring during construction of waterline by Calaveras County Water District. Conducted an evaluation for eligibility for the National Register of Historic Places for an unanticipated discovery found during construction. Prepared DPR site form and report documenting the site and site evaluation efforts. Consultation with the Calaveras Band of Mi-Wuk Indians and Caltrans District 10 throughout monitoring and site evaluation efforts.

William Burns, RPA

PROJECT ARCHAEOLOGIST

William Burns (*WILL-ee-em BURNS; he/him*) is an archaeologist with 18 years' experience in cultural resource management. Mr. Burns is highly knowledgeable about the California Environmental Quality Act, the National Environmental Policy Act, the Native American Graves Protection and Repatriation Act, and the National Historic Preservation Act, particularly the Section 106 process. He evaluates buildings and districts for archaeological sensitivity and possible inclusion on the National Register of Historic Places. Mr. Burns assesses project and building plans for archaeological sensitivity and reviews archaeological reports on the state government regulatory end of the process.

Mr. Burns possesses expertise about pre-contact archaeological sites, paleocoastline reconstruction, and artifact identification and analysis. He applies this expertise to archaeological report writing and editing for Section 106 projects. He also serves on field crews and as a supervisor on archaeological projects, overseeing surveys, site examinations, data recoveries, and artifact database creation and maintenance. For precise site mapping, Mr. Burns uses GPS devices, primarily Trimble GEO XH, ArcGIS, and Maptitude.

Education

University of York
MS, Coastal and Marine Archaeology, 2010,

University of Massachusetts at Amherst
BA, Anthropology (Mathematics minor), 2004

Certifications

Register of Professional Archaeologists (RPA)

Divemaster (National Association of Underwater Instructors)

Occupational Safety and Health Administration (OSHA) HAZWOPER (40-hour)

Basic First Aid/BBP (American Heart Association)

Adult CPR/AED (American Heart Association)

Dudek Project Experience

Alameda County Advanced Meter Infrastructure Project, Alameda County, California. The project proposed to upgrade existing traditional water meter reading systems within its service area with an Advanced Metering Infrastructure system across 84,200 existing meters. As project archaeologist, performed the records search and reviewed and summarized the data of the approximately 41,000-acre project area. Reviewed geomorphological data for the project site and developed a sensitivity model and monitoring plan for the project.

Solar Panel Installation Project, Santa Clara County, California. The project consisted of the installation of solar facilities at 14 sites across the County of Santa Clara. Conducted surveys and site visits to all 14 work sites, documenting existing conditions on several historic structures. Prepared the cultural resources report.

Advanced Meter Infrastructure Project, Santa Clara County, California. Served as project archaeologist on this countywide project to upgrade metering systems for the San Jose Water Company at 16 locations. Tasks included conducting the records search, performing a survey at each of the 16 sites, and preparing the cultural resources report. Two historic structures were identified during the study.

Delta Dams Burrow Remediation Project, California Department of Water Resources, Alameda and Contra Costa Counties, California. Project consisted of maintenance conducted at three separate reservoirs to repair damage cause by rodent burrowing. As project archaeologist, performed the cultural survey at each location, conducted records searches, and prepared the cultural resources report.

B.F. Sisk Dam Safety of Dams Project, California Department of Water Resources, Merced County, California. The B.F. Sisk Dam Safety of Dams Project consisted of repairs and maintenance of the historic dam. The vicinity around the dam contained many historic features of the dam's construction, as well as prehistoric sites including reported burials. Performed the cultural survey documenting these resources, conducted records search, and prepared cultural resources report.

San Geronimo Treatment Plant Emergency Generator Project, Woodacre, California. Performed the cultural survey of local municipal water treatment plant in anticipation of the installation of plant-wide upgrades. Additionally conducted records search and prepared cultural resources report.

Rohnert Park Water Tank Project, City of Rohnert Park, California. As project archaeologist and field director, led crew for an extended phase I field survey, including subsurface testing around a newly discovered prehistoric resource. Prepared the cultural resources report for the extended phase I.

El Dorado Irrigation District Flume Replacements, El Dorado Irrigation District, El Dorado County, California. Conducted field survey of system of flumes, historic and recent, for a series of repairs and upgrades. Resources located included mining camps and features, historic logging roads and retaining walls, and Native American milling sites. Prepared the proper Department of Parks and Recreation (DPR) site forms and the cultural resources report.

Las Gallinas Valley Sanitary District Secondary Treatment Upgrade Project, Las Gallinas Valley Sanitary District, Marin County, California. Conducted field survey and prepared the cultural resources report for water treatment plant improvements.

Mission College Plaza Completion Project, Santa Clara, California. Conducted the records search, performed pedestrian survey, and prepared cultural resources report for university redevelopment project.

San Carlos Fuel Management Project, California Department of Forestry and Fire Protection, San Carlos, California. Project consisted of the California Department of Forestry and Fire Protection's controlled burn of vegetation to control potential wildfires in the San Carlos area. As project archaeologist, performed the cultural survey, conducted records search, and prepared cultural resources report.

Selected Publications

Burns, W., K. Haley, and A. Giacinto. 2021. *Cultural Resources Assessment Report, County of Santa Clara Solar Panel Installation Project.* Dudek No. 12853, County of Santa Clara, California.

Burns, W., R. Owen, and A. Giacinto. 2020. *Cultural Resources Inventory for the Advanced Meter Infrastructure Project, Santa Clara County, California.* Dudek No. 11567, Santa Clara County, California.

Giacinto, A., W. Burns, N. Hanten, F. Steffen, and K. Haley. 2019. *Cultural Resources Inventory and Monitoring Plan for the Alameda County Water District Advanced Metering Infrastructure Project.* Dudek No. 11567, Alameda County, California.

Nicholas Hanten, MA

Archaeologist

Nicholas Hanten is an archaeologist with 12 years' experience conducting and leading archaeological projects including archaeological survey, evaluation, and data recovery investigations, construction monitoring in addition to laboratory procedures including artifact cataloging, analysis, and curation preparation. He also has experience with technical report writing for compliance with local, state, and federal regulations. Mr. Hanten's research interests include prehistoric hunter-gatherer subsistence and settlement systems, prehistoric land use, and human behavioral ecology.

Education

University of California, Davis
BS, Anthropology, 2011
University of California, Davis
MA, Anthropology, 2011
University of California, Davis
PhD, Anthropology, in progress

Selected Project Experience

Sacramento International Airport Cargo Facility Project, Sacramento County, California. As field lead, coordinated and performed archaeological survey; co-author of technical report

Carson Creek Environmental Impact Report. El Dorado County, CA As archaeologist conducted pedestrian survey.

Cultural Resources Inventory, Extended Phase I and Phase II for the Hunter Subdivision Project. As archaeologist, assisted with field excavations; coauthor of technical report

Rancho Seco Solar II Project, Herald CA, As archaeological monitor, monitored the installation of solar energy facility in collaboration with Native American monitors

Martis Wildlife Area Resoration Project, Truckee, CA. As archaeologist, duties included construction monitoring, assisting with field excavations, laboratory analysis. Co-author of technical report/site impacts assessment

Phase II Archaeological Significance Evaluations for the Strauss Wind Energy . As lab director and artifact analyst, supervised cataloging of and performed analysis on large archaeological assemblage. Also assisted with field excavation and was coauthor of technical report

El Dorado Hills Wastewater Collection Facility Relocation Project, El Dorado County, California As archaeologist, conducted pedestrian survey and resource documentation for the project

Cultural Resources Study for Kings Beach Elementary School Modernization, Kings Beach, Placer County, California As field archaeologist, conducted pedestrian survey and resource documentation for archaeological and built environment studies for the project

Cultural Resources Inventory for the City of Woodland Recycled Water Project, Yolo County, California As archaeologist, conducted pedestrian survey and resource documentation for project. Co-author of technical letter report

Truckee High School Track and Field Improvements Project, Truckee, Placer County, CA As archaeologist, conducted pedestrian survey and resource documentation for project. Co-author of technical report

Camp 5 Notice of Emergency Timber Operations Project, El Dorado County, CA As archaeologist, conducted pedestrian survey of the project area. Co-author of technical report

Yokohl Ranch Cultural Resources, The Yokohl Ranch Company, LLC, Tulare County, California. As field director, managed and conducted surface mapping, surface collection, and excavation of 95 prehistoric and historical period sites throughout the Yokohl Valley. As lab director, managed and conducted the cataloging and analysis of all material recovered during excavation and authored laboratory portions of the technical report.

Phase II Evaluation of 85 Archaeological Sites on Edwards Air Force Base, CH2M HILL/JT3, Kern and Los Angeles Counties, California. As crew chief, assisted in test excavations, pedestrian survey, and GPS data collection with a Trimble GPS unit. Also assisted with laboratory analysis and curation preparation.

Phase I Cultural Resources Inventory of 7650 acres on Edwards Air Force Base, CH2M HILL/JT3, Kern County, California. As crew chief, assisted in pedestrian survey and GPS data collection with a Trimble GPS unit, and wrote portions of report.

Winchester 1800 – Saba Property, French Valley Acres LLC, Riverside, California. As field director, conducted pedestrian survey of 40 acres for a proposed housing development; prepared a letter report of findings.

Poseidon Wetland Mitigation Area, Poseidon Water LLC, San Diego, California. As lab director, managed the cataloging and analysis of artifacts recovered from excavations; assisted in authoring final report of findings.

Alessandro Business Park, Western Realco, Riverside, California. As archaeological monitor and crew chief, monitored the excavation of potholes and trenches in collaboration with Native American monitors; recorded and excavated five prehistoric archaeological sites

Evaluation of SDI-13,077H and Data Recovery at SDI-13,078 for the Rhodes Crossing Project, San Diego County, California. As part of crew, assisted in test excavation and pedestrian survey.

St. John Garabed Church Environmental Services, St. John Garabed Apostolic Church Trust, San Diego, California. As crew chief and lab director, assisted in conducting test excavations for one prehistoric site; managed the cataloging and analysis of recovered artifacts; assisted in preparing a report of findings.

Lady of Peace Academy Parking Structure Cultural Monitoring, T.B. Penick & Sons Inc., San Diego, California. As crew chief and lab director, assisted in conducting test excavations for one historic site for during project monitoring. Managed the cataloging and analysis of recovered artifacts.

Cultural Resource Study for the Kearny High School Athletic Field Redevelopment, BRG Consulting, San Diego, California. As crew chief, conducted pedestrian survey and wrote report.

Significance Evaluation of SDI-20363 for the San Marcos High School Expansion Project, San Marcos Unified School District, San Diego County, California. As crew chief, assisted in test excavations and GPS data collection for a buried prehistoric site.

Ocotillo Wind Energy Project, Bureau of Land Management (BLM), Imperial County, California. As third-party monitor, monitored construction activities and archaeological monitors to ensure that all activities were in compliance with BLM regulations.

Block 12 Development, Aera Energy, LLC., Bakersfield, California. As field director, conducted a pedestrian survey of 32 acres for a proposed oil field expansion; prepared a letter report of findings

Solar Site Development Environmental Services, Soitec Solar, San Diego, California. As field director, conducted pedestrian survey of 12 acres for a proposed solar generation facility.

Archaeological Evaluation for the Rugged Solar Project, County of San Diego, California. As crew member, assisted in test excavation, pedestrian survey, and GPS data collection with Trimble GPS unit.

Silurian Valley Wind Project, Iberdrola Renewables, San Bernardino County, California. As monitor, conducted pedestrian survey of access routes and monitored construction activities.

Gold Basin Project Meteorological Mast Construction, LH Renewables, San Diego County, California. As monitor, conducted pedestrian survey of the project area and monitored construction activities.

Significance Evaluation of Four Prehistoric Archaeological Sites for the GCL/Rosendin Sol Focus Project, RBF Consulting, Borrego Springs, California. As crew chief, assisted in test excavations at prehistoric temporary camps.

Phase I Cultural Resources Pedestrian Survey of Various Parcels for the Sol Orchard Solar Project, RBF Consulting, San Diego County, California. Serving as crew chief, conducted intensive pedestrian survey of multiple parcels for solar development.

Class II and Class III Cultural Resources Inventory for the Tule Wind Alternative Energy Project, HDR Engineering for Iberdrola Renewables, San Diego County, California. Serving as field technician, assisted in pedestrian survey and site recordation.

Sunrise-Powerlink Project, San Diego Gas and Electric, San Diego County, California. As crew chief, conducted small pedestrian surveys and monitoring for utility pole replacement.

Cultural Resource Monitoring for the Red Beach Mobile Mount Project, Marine Corps Base (MCB) Camp Pendleton, San Diego County, California. Serving as monitor, conducted small pedestrian survey and monitored construction activities.

Archaeological Investigations at SDI-9824, MCB Camp Pendleton, San Diego County, California. Serving as crew chief, assisted in archaeological excavation, ground-penetrating radar, and X-ray fluorescence study of a late prehistoric archaeological site.

Section 106 Evaluations of Two Prehistoric Sites for Firebreak Maintenance, Vandenberg Air Force Base, Santa Barbara County, California. As student assistant, assisted in test excavations at complex prehistoric habitation sites for the University of California, Davis, Field School.

Carlsbad Desalination Plant Cultural and Biological Monitoring, Poseidon Resources, Carlsbad, California. As archaeological monitor, monitored trenching, grading, and the installation of water lines.

Cultural Resources Testing for the Silver Strand State Beach Project, California State Parks, San Diego County, California. As crew chief, conducted pedestrian survey and test excavations, and assisted in report production.

Archaeological Survey and Evaluations for the Star Ranch Project, County of San Diego Department of Planning and Land Use, San Diego County, California. As lab technician, cataloged and analyzed the assemblage recovered from a previous testing of the project area.

Julie Royer, MA

ARCHAEOLOGIST

Julie Royer is an archaeologist with 6 years' experience conducting archaeological projects throughout California and more recently in Nevada, Virginia, and Wyoming. Her involvement includes archaeological survey, evaluation, and data recovery-level investigations; construction monitoring; and laboratory procedures including artifact cataloging and analysis.

In her role as a crew lead and field director, Ms. Royer has been managing large-scale data recovery investigations and monitoring efforts. She also carries experience in records searches, tribal consultation, data management, and technical report writing for compliance with local, state, and federal regulations. Additionally, Ms. Royer creates digital content for reports, including unit profile drawings and various sketches.

Ms. Royer's background is in European archaeology, and she has been involved with Medieval and Gallo-Roman projects in France.

Education

University of Nantes
MA, Archaeology, 2013

Cardiff University
MA, Anthropology, 2012

University of Nantes
BA, History of Art and Archaeology, 2011

Certifications

CPR/First Aid

Hazardous Waste Operations and Emergency Response 24-hour Course

Incident Command System 100

Roadway Worker Protection (RWP)

Professional Affiliations

GRAF'O – Society for River Archaeology in Western France

Society for California Archaeology

Relevant Project Experience

Energy

Confidential Solar Project, Nevada. Participated in the archaeological investigation of a 8,800-acre project by performing pedestrian survey and recording dozens of archaeological resources.

Confidential Wind Energy Project, Santa Barbara County, California. As a field director, managed field crews for data recovery-level investigations at three large prehistoric sites. Tasks included field logistics, crew coordination and management, and the creation and implementation of a field research plan. Also conducted a cultural resource assessment of the proposed wind turbine farm installation. Tasks included a Phase I survey, using Trimble Geo 7X, ESRI Collector, and a compass.

Confidential Solar Project, Wyoming. Led crew to perform a 1,550-acre pedestrian survey and participated in the preparation of a cultural resources report.

Confidential Solar Project, Virginia. Participated in the archaeological investigation of a 2,980-acre project by performing pedestrian survey and excavation of shovel test probes. Recorded archaeological sites and participated in the reporting effort.

Archaeological Site Monitoring Program for the Pit 3, 4, and 5 (FERC No. 233), Hat Creek (FERC No. 2661), and Pit 1 (FERC No. 2687) Hydroelectric Projects, Pacific Gas & Electric, Shasta County, California. Since 2018, participated in the Section 106 reporting for the results of the yearly monitoring program of over 140 archaeological sites related to the Pit 1 (FERC No. 2687), Hat Creek (FERC No. 2661), and Pit 3, 4 and 5 (FERC No. 233) Hydroelectric Projects. Tasks also included conducting archaeological monitoring for road maintenance and gate installation work for the Pit 1 Project.

Infrastructure

Cultural Resources Inventory for the Spectrum Charter Fiber Optic Lines, California Department of Transportation, Monterey County, California. Conducted an archaeological survey along 6 miles of State Route (SR) 1, 14 miles of SR-68, and 3.1 miles of SR-183; recorded 3 sites and 2 isolates; updated 16 previously recorded resources; tested excavations at 2 sites along SR-183.

Resource Management

Highway 17 Shaded Fuel Break Project, Santa Clara County FireSafe Council and California Department of Forestry and Fire Protection, Santa Clara County, California. Participated a 494-acre archaeological survey; recorded 38 sites and 11 isolates; updated two previously recorded site records; met with representatives from California Department of Forestry and Fire Protection, California Department of Transportation, and Santa Clara FireSafe Council to help the principal investigator organize and facilitate project activities; monitored work areas within archaeological sites; and participated in the reporting effort.

McArthur Swamp Stock Tank and Cross Fencing Improvement Project, Fall River Resource Conservation District, Shasta County, California. Conducted a 66-acre Phase I survey and participated in the site record documentation and report writing.

Vegetation Management Cultural Reviews, Pacific Gas & Electric, Santa Cruz, Monterey, Mariposa, Fresno, and Madera Counties, California. Conducted cultural reviews, survey, and monitoring for various Pacific Gas & Electric vegetation management projects.

Transportation

Caltrain Peninsula Corridor Electrification Project, Peninsula Corridor Joint Powers Board, San Francisco, San Mateo, and Santa Clara Counties, California. As field director, managed archaeological monitoring needs, provided monitor trainings, and coordinated with Native American monitors and construction crews. Conducted archaeological testing and post-field processing of archaeological excavations along the Caltrain corridor. Post-field tasks included analyzing historic glass, completing site record forms for 30 sites, and participating in the reporting effort.

Spectrum Charter Line Hwy 1 and Hwy 68 Project, Charter Communications, Monterey County, California. Conducted a Phase I survey and completed primary site records for newly identified resources.

High Speed Rail Geotechnical Project, Dragados-Flatiron Joint Venture, Corcoran, California. Participated in the Phase III data recovery of a disturbed human burial at Whitley Avenue in Corcoran.

Water/Wastewater

Purissima Hills Water Main Project, Purissima Hills Water District, Los Altos Hills, California. Provided WEAP training for construction workers and conducted archaeological monitoring.

San Felipe Creek Restoration Project, Habitat Restoration Sciences, Santa Clara County, California. Conducted archaeological survey, monitoring, and reporting of historic ranching features and prehistoric isolates for a wetland restoration project.

ERC Stormwater Upgrades Area Project, University of California, Santa Cruz, California. Provided WEAP training for construction workers and conducted archaeological monitoring.

Appendix E.2

Assembly Bill 52 Response

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Mark Tolentino

From: Jamal Ferguson
Sent: Tuesday, October 7, 2025 11:24 AM
To: Mark Tolentino
Subject: Fw: Response to AB52 : CUP - ZCC for the Buttonbush Solar Photovoltaic and Hydrogen Facility (PP24407), Kern County, California, [COU-KERN-2024-4]

From: Raylene Borrego <Raylene.Borrego@sanmanuel-nsn.gov>
Sent: Thursday, February 8, 2024 2:54 PM
To: Jamal Ferguson <Fergusonj@kerncounty.com>
Subject: Response to AB52 : CUP - ZCC for the Buttonbush Solar Photovoltaic and Hydrogen Facility (PP24407), Kern County, California, [COU-KERN-2024-4]

CAUTION: This email originated from outside of the organization. Do not click links, open attachments, or provide information unless you recognize the sender and know the content is safe.

Dear Jamal,

Thank you for contacting the Yuhaaviatam of San Manuel Nation (formerly the San Manuel Band of Mission Indians) regarding the above-referenced project. YSMN appreciates the opportunity to review the project documentation, which was received by the Cultural Resources Management Department on February 8th, 2024. The proposed project is located outside of Serrano ancestral territory and, as such, YSMN will not be requesting to receive consulting party status with the lead agency or to participate in the scoping, development, or review of documents created pursuant to legal and regulatory mandates.

Respectfully,

Raylene Borrego
Cultural Resources Technician
Raylene.Borrego@sanmanuel-nsn.gov
O:(909) 864-8933 x 50-2035
M:(909) 737-3349
26569 Community Center Dr Highland, California 92346



Appendix E.3

Built Environment Inventory and Evaluation Report

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Final Built Environment Inventory and Evaluation Report

Buttonbush Solar and Storage Project, Kern County, California

MAY 2025

Prepared for:

29SC 8me LLC4370 Town Center Blvd, Suite 110,
El Dorado Hills, CA 95762

Prepared by:
EJ Jones, MA
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Printed on 30% post-consumer recycled material.

Acknowledgments

Primary Report Authors: This report was primarily prepared by the Secretary of the Interior qualified Architectural Historians EJ Jones, MA. Lead Architectural Historian Monte Kim, Ph.D., provided a senior-level review of the report.

Report Contributions: The report was also prepared with contributions from Architectural Historians Evan Brisentine, MSHP, and Katie Ahmanson, MHC.

Team Support: Jason Greenstein, GIS Analyst, managed the geographic information system data and created the figures in the report. Amy Seals, Senior Technical Editor, provided editing.

Intended Use: This report is intended for the Client's and its representatives' exclusive use. Based on the results of Dudek's investigation, it contains professional conclusions and recommendations concerning the potential for project-related impacts to cultural resources. It should not be considered to constitute project clearance with regard to the treatment of cultural resources or permission to proceed with the Project described in lieu of review by the appropriate reviewing or permitting agency. This report should be submitted to the appropriate federal, state, and local review agencies for their comments prior to the commencement of the Project.

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Executive Summary

29SC 8me LLC retained Dudek to prepare a Built Environment Inventory and Evaluation Report for the proposed Buttonbush Solar and Storage Project (Project) in Kern County, California. The Project is located northwest of Bakersfield in a rural area of Kern County (Figure 1, Project Location).

The project would be located on 128 parcels across a leased area of approximately 11,983 acres within a 13,868-acre gross parcel boundary of privately owned land currently under agricultural use in the valley region of Kern County. The project involves development of a photovoltaic (PV) solar facility and associated infrastructure necessary to generate up to 2 gigawatts (GW) of alternating current (AC) power with a 2 GW energy storage system, within unincorporated Kern County. The project would be supported by a 500-kilovolt (kV) overhead gen-tie and/or underground electrical transmission line(s) originating from one or more on-site substations and terminating at the Pacific Gas & Electric (PG&E) Midway Substation. PG&E will enlarge the Midway Switching Center 500 kV yard, within PG&E's Midway Substation property boundary, to accommodate the proposed Project's interconnection. The proposed project may also interconnect to the PG&E Ganso Substation via overhead and/or underground gen-tie lines. The project's permanent facilities would include solar panels, solar racking, inverters, service roads, a power collection system, communication cables, microwave/ communication towers, overhead and underground transmission lines, electrical switchyards, project substations, energy storage system(s), and operations and maintenance facilities.

This report documents Dudek's efforts to identify and evaluate built environment resources consistent with the requirements of the California Environmental Quality Act (CEQA). These efforts included a records search of the California Historical Resources Information System (CHRIS), the development of a study area or Area of Potential Impacts (API), an intensive-level survey of the API for built resources of historic age (45 years of age or older); building development and archival research, the creation of an appropriate historic context, and recordation and evaluation of historic-era properties located in the API under National Register of Historic Places (NRHP) and California Register of Historical Resources (CRHR) designation criteria.

Dudek's archival research and field survey identified six historic-age resources within the API. Of the six, two resources—Midway Switching Center (a PG&E substation) and the East Side Canal—were previously recorded and were found ineligible for listing in the CRHR. The remaining four are newly identified residential and agricultural properties that Dudek inventoried and evaluated as ineligible for listing in the CRHR and the NRHP. These four resources include a residence and farm at 39301 Sullivan Road, a residence at 25950 Frey Avenue, a residence and farm at APN 087-010-22, and a residence and farm at 33540 Highway 58.

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Acronyms and Abbreviations

Acronym/Abbreviation	Definition
AC	alternating current
API	Area of Potential Impacts
APN	Assessor's Parcel Number
ca.	circa
CCR	California Code of Regulations
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CHRIS	California Historical Resources Information System
County	Kern County
CRHR	California Register of Historical Resources
DPR	Department of Parks and Recreation
GW	gigawatt
HEIMP	Historic-era Electrical Infrastructure Management Plan
KCAR	Kern County Assessor-Recorder Office
kV	kilovolt
NHPA	National Historic Preservation Act
NRHP	National Register of Historic Places
OHP	Office of Historic Preservation
PG&E	Pacific Gas & Electric
PRC	Public Resources Code
Project	Buttonbush Solar Project
PV	photovoltaic
SHPO	State Historic Preservation Officer
SJPC	San Joaquin Power Company

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1 Introduction

This Built Environment Inventory and Evaluation Report documents the identification and evaluation of built environment cultural resources within or adjacent to the proposed Buttonbush Solar and Storage Project (project) that may require additional analysis for compliance under the California Environmental Quality Act (CEQA). This report includes the following components: (1) an introduction including project location, description, the Area of Potential Impacts (API), and the regulatory context; (2) background research, which includes a focused records search review of previously recorded built environment resources included in the California Historical Resources Information System (CHRIS), a review of historical maps and aerial photographs; and the field methodology and the intensive-level survey of the API; (3) the development of an applicable historic context for the project area; (4) an evaluation of significance for all resources within the API; and (5) recommendations.

1.1 Project Location

The project site is in unincorporated Kern County directly north of the community of Buttonwillow, approximately 2 miles west of the City of Shafter and approximately 7 miles southwest of the City of Wasco. The project site straddles Interstate 5 (I-5) east of Buttonwillow Raceway Park, just north of State Route (SR) 58, and south of SR-46. Several single-family homes and agriculture-related structures are near the project boundary. Properties within the project include a dairy, a few single-family homes, and some varied structures for agricultural use, all of which would be removed during project construction. Vehicular access to the site would likely be from Wasco Way, Merced Avenue, Lerdo Highway, Rowlee Road, Wildwood Road, Riverside Street, Burbank Street, Buttonwillow Drive, 7th Standard Road, Snow Road, Blue Star Memorial Highway, and Sullivan Road. Many dirt roads crisscross the project site.

1.2 Project Description

The Buttonbush Solar & Storage Project (project) as proposed by 29SC 8me LLC (project proponent) would be located on 128 parcels across a leased area of approximately 11,983 acres within a 13,868-acre gross parcel boundary of privately owned land in unincorporated Kern County, California. The majority of the 11,983-acre project area is currently under agricultural use or developed in the valley region of the County.

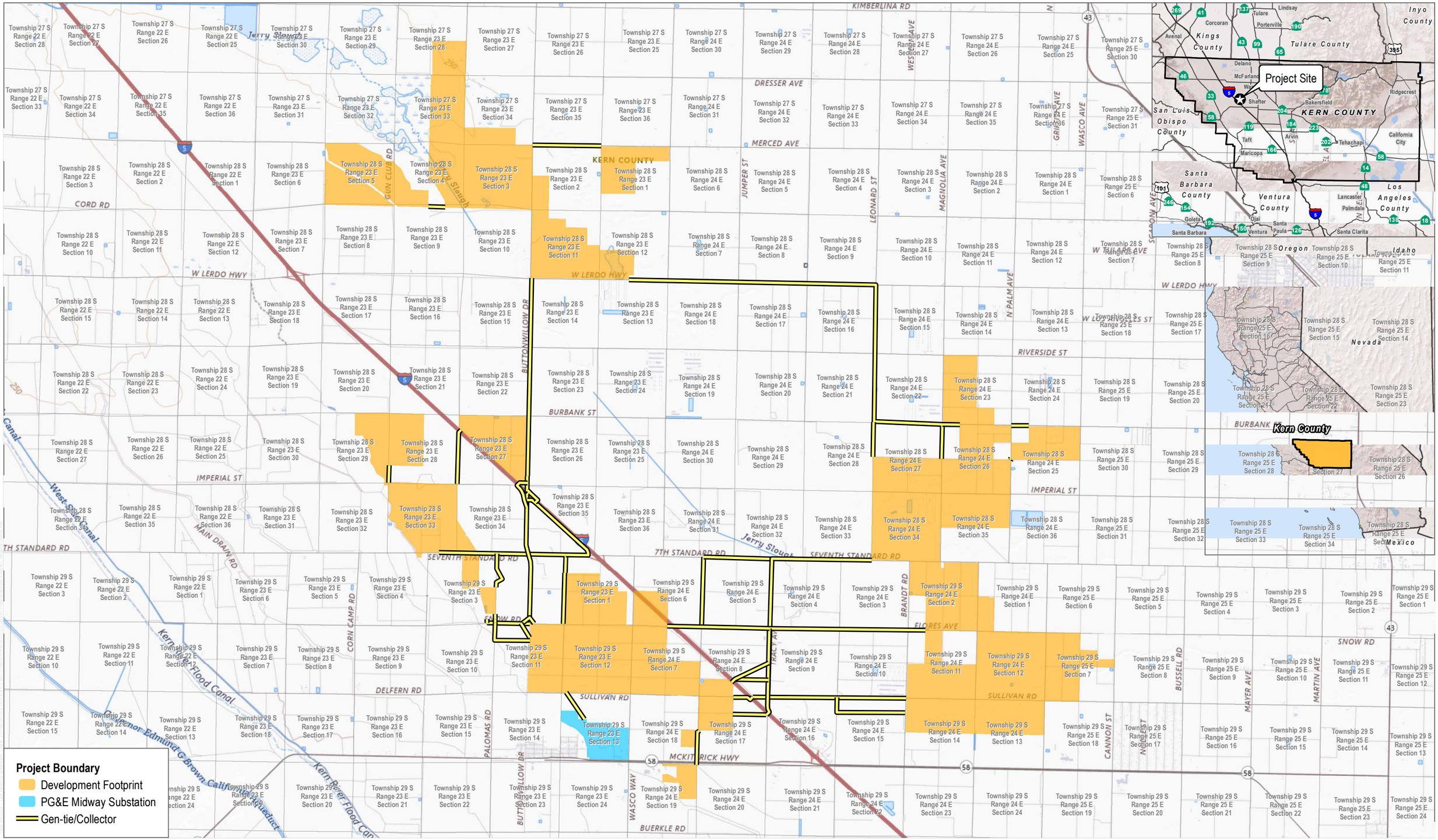
The project includes the construction and operation of a photovoltaic (PV) solar facility and associated infrastructure necessary to generate up to 2 gigawatts of alternating current (AC) power with an up to 2-gigawatt battery energy storage system (BESS). Additional components of the project include solar modules and racking, inverters, transformers, service roads, a power collection system, communication cables, microwave/ radio towers, meteorological stations, a generation-transmission (gen-tie) line with optical ground wire and overhead and underground transmission lines, electrical switchyards, project substations, security fencing, use of onsite water wells, and operations and maintenance (O&M) facilities.

The project would be supported by one or more 500 kilovolt (kV) gen-tie electrical transmission lines originating from one or more on-site substations and terminating at the existing PG&E Midway Substation. The project study area includes the development footprint and gen-tie/collector line, which includes a 200-foot corridor. PG&E will modify the Midway Substation's 500 kV yard within their property boundary to accommodate the proposed project's interconnection. The PG&E Midway Substation parcels comprise approximately 255 acres; however, only a small portion, up to 38.6 acres, will be impacted by the proposed project. PG&E will install and trench underground several fiber-optic lines to the west of the gen-tie route to facilitate communication between the Midway Substation and the Point of Change of Ownership, approximately 0.25-mile northwest. Up to four 175-foot-tall lattice steel towers (LST) or tubular steel poles (TSPs) would support the proposed transmission line and the project's interconnection.

The proposed facilities are expected to be operational for up to 35 years. The full project description is provided in the project's California Environmental Quality Act (CEQA) environmental impact report and should be referenced for additional details regarding the project description.

1.3 Project Personnel

This report, associated fieldwork, and property significance evaluation were prepared by Dudek Architectural Historians EJ Jones, MA, and Katie Ahmanson, MHC. The report was reviewed by Senior Architectural Historian Monte Kim, PhD. The preparers' qualifications are provided in Appendix A of this report.



SOURCE: USGS National Map 2022; Kern County 2022

DUDEK

0 1 2 Miles

FIGURE 1

Regional Vicinity

Buttonbush Solar and Storage Project

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1.4 Regulatory Setting

While the Project as currently planned is subject only to state and local regulatory conditions, federal regulations are also provided here for reference should they be relevant in the future. The following sections provide a brief overview of the federal and state regulatory frameworks that are used to identify significant cultural resources.

1.4.1 Federal

National Historic Preservation Act (54 USC Section 300101 et seq., including Section 106 of the NHPA, 54 USC Section 306108)

The National Historic Preservation Act (NHPA) established the National Register of Historic Places (NRHP) and the Advisory Council on Historic Preservation (ACHP). Under the NHPA, significant cultural resources are referred to as historic properties, which include any prehistoric or historic district, site, building, structure, or object included in, or determined eligible for inclusion in, the NRHP. Historic properties that are designated by the Secretary of the Interior to be National Historic Landmarks are nationally significant historic places that possess exceptional value or quality in illustrating or interpreting the heritage of the United States. A property is considered historically significant if it meets one of the NRHP criteria and retains sufficient historic integrity to convey its significance.

Implementing Regulations for Section 106 of the National Historic Preservation Act (36 CFR Part 800)

Section 106 of the National Historic Preservation Act (NHPA) requires that federal agencies to take into account the effects of their undertakings on historic properties. The Section 106 process consists of four principal steps: 1) initiation of the Section 106 process, which includes identifying and initiating consultation with Native American tribes, local governments, and other interested parties; 2) identification of historic properties; 3) assessment of adverse effects; and 4) delineation of stipulations to resolve adverse effects in an agreement document.

Section 106 affords the ACHP and the State Historic Preservation Officer (SHPO), as well as other consulting parties, a reasonable opportunity to comment on any project that would adversely affect historic properties. The ACHP is an independent administering agency that develops procedures at the federal level to protect cultural resources included in, or eligible for inclusion in, the NRHP. The SHPOs administer the national historic preservation program at the state level, in addition to reviewing NRHP nominations, maintaining data on historic properties, and consulting with federal agencies during the Section 106 review.

The NRHP eligibility criteria (36 CFR Section 60.4) provide the basis for evaluating the historic significance of resources within the undertaking's area of potential effects. The NRHP criteria consider the quality of significance in American history, architecture, archaeology, engineering, and culture that is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and that:

A. are associated with events that have made a significant contribution to the broad patterns of our history; or
B. are associated with the lives of persons significant in our past; or

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

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

To be listed in the NRHP, a property must not only be shown to be significant under the NRHP criteria, but it also must have integrity. Integrity is the ability of a property to convey its significance and is evaluated through consideration of characteristics that existed during the property's period of significance. The NRHP criteria recognizes seven aspects or qualities that, in various combinations, define integrity. These aspects include the following: location, design, setting, materials, workmanship, feeling, and association (NPS 1995).

1.4.2 State

California Environmental Quality Act (PRC Section 21083.2) and CEQA Guidelines (14 CCR Section 15064.5)

CEQA requires that the lead agency consider the impacts of a project on historical resources. The CEQA Guidelines provide specific guidance for determining the significance of impacts on historical resources (CEQA Guidelines Section 15064.5[b]). PRC Section 21084.1 defines historical resources as those listed, or eligible for listing, in the CRHR, or those officially designated or recognized as being historically significant by a local government pursuant to a local ordinance or jurisdiction such as a county or city, unless the preponderance of the evidence demonstrates that the resource is not historically significant. Resources in California that are listed in, or determined eligible for listing in, the NRHP are considered historical resources for the purposes of CEQA and are also listed in the CRHR.

California Register of Historical Resources (PRC Section 5024.1 and CCR Section 4850)

PRC Section 5024.1 establishes the CRHR, which lists all significant resources in California that are considered to be historical resources. The term "historical resource" includes but is not limited to "any object, building, structure, site, area, place, record, or manuscript which is historically or archaeologically significant, or is significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California" (PRC Section 5020.1[j]). In 1992, the California legislature established the CRHR "to be used by state and local agencies, private groups, and citizens to identify the state's historical resources and to indicate what properties are to be protected, to the extent prudent and feasible, from substantial adverse change" (PRC Section 5024.1[a]). The criteria for listing resources in the CRHR were expressly developed to be in accordance with previously established criteria developed for listing in the NRHP. As such, a resource is considered historically significant if it meets at least one of the following criteria outlined under PRC Section 5024.1(c):

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

In addition to meeting at least one of the significance criteria described in PRC Section 5024.1(c), a resource must also possess sufficient integrity to qualify for listing in the CRHR. Integrity as defined in 14 CCR Section 4852(c) as "the authenticity of an historical resource's physical identity evidenced by the survival of characteristics that existed during the resource's period of significance" as evaluated with regard to the resource's retention of location, design, setting, materials, workmanship, feeling, and association. Historical resources that lack sufficient integrity to meet the criteria for listing in the NRHP may still be eligible for listing in the CRHR if they have the potential to yield significant scientific, historical information, specific data, or meet one of the following special considerations for resources described under 14 CCR Section 4852(d):

1 Moved buildings, structures, or objects. The State Historical Resources Commission (Commission) encourages the retention of historical resources on site and discourages the non-historic grouping of historic buildings into parks or districts. However, it is recognized that moving an historic building, structure, or object is sometimes necessary to prevent its destruction. Therefore, a moved building, structure, or object that is otherwise eligible may be listed in the California Register if it was moved to prevent its demolition at its former location and if the new location is compatible with the original character and use of the historical resource. An historical resource should retain its historic features and compatibility in orientation, setting, and general environment.

2. Historical resources achieving significance within the past 50 years. In order to understand the historic importance of a resource, sufficient time must have passed to obtain a scholarly perspective on the events or individuals associated with the resource. A resource less than 50 years may be considered for listing in the California Register if it can be demonstrated that sufficient time has passed to understand its historical importance.

3. Reconstructed buildings. Reconstructed buildings are those buildings not listed in the California Register under the criteria in 14 CCR Section 4852(b) or PRC Section 5024.1(c)(1-4). A reconstructed building less than 50 years old may be eligible if it embodies traditional building methods and techniques that play an important role in a community's historically rooted beliefs, customs, and practices, e.g., a Native American roundhouse.

The CRHR includes not only listed prehistoric and historic cultural resources but also resources that are designated under local ordinances or identified through local historical resource surveys.

1.5 Area of Potential Impacts

The API is the study area delineated to assess potential impacts from the construction and operation of a project on both archaeological and historic built environment resources. The API for built environment resources encompasses the geographic area or areas within which a project may directly or indirectly cause a substantial adverse change in the significance of a known or unknown historical resource. A substantial adverse change in the significance of a historical resource means physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of the resource is materially impaired (14 CCR Section

15064.5[b][1]). Under CEQA, material impairment of a historical resource is considered a significant impact (or effect), which can be direct, indirect, or cumulative.[1]

A direct or primary effect on a historical resource is caused by a project and occurs at the same time and place (14 CCR Section 15358[a][1]). Examples of direct effects that are caused by, and immediately related to, a project include, but are not limited to, demolition, destruction, relocation, and alteration of a historical resource as a result of ground disturbance and other construction activities. Direct effects, however, are not limited to physical effects and, in certain circumstances, can be visual, vibratory, auditory, or atmospheric in nature if the effect is immediate and it results in the material impairment of the significance of a historical resource. Visual intrusions within the viewshed of a historical resource, for example, could result in the material impairment of the resource's integrity of setting if an unencumbered view of the surrounding area or a specific area is a characteristic that contributes to the significance of the resource. Similarly, operational noise that exceeds the ambient level of a sensitive noise receptor can cause material impairment to a historical resource that derives part or all its significance from an inherently quiet auditory setting.[2] Finally, atmospheric intrusions, such as those caused by the introduction of high levels of fugitive dust emissions or chemical pollutants, can result in adverse effects that directly and physically affect biological landscape features that have been identified as historical resources for the purposes of CEQA. Overall, while direct effects clearly include physical effects, they may also include other types of effects that are visual, vibratory, auditory, or atmospheric in nature if the effect is caused by and occurs at the same time and place as a project and there is no other intervening cause between the activities or components of the project and the historical resource.

By contrast, an indirect or secondary effect is a reasonably foreseeable effect caused by a project that occurs later in time or is farther removed in distance. Indirect effects may include growth-inducing effects and other effects related to induced changes in the pattern of land use, population density, or growth rate, and related effects on air and water and other natural systems, including ecosystems (14 CCR Section 15358[a][2]). Because these types of effects are not immediately related to a project, they are considered secondary effects.

Cumulative impacts refer to two or more individual effects that, when considered together, are considerable or compound or increase other environmental impacts. The individual effects may be changes resulting from a single project or a number of separate projects. The cumulative impact from several projects is the change in the environment that results from the incremental impact of a project when added to other closely related past, present, and reasonably foreseeable probable future projects. Cumulative impacts can result from individually minor but collectively significant projects taking place over a period of time (14 CCR Section 15355[a]-[b]). The API for cumulative impacts, if any exist, would include the API for direct effects, indirect effects, or both because in order for a cumulative impact to exist, a historical resource must first be directly or indirectly affected by a project.

1.5.1 Area of Potential Impacts for Built Environment Resources

Delineation of the API considered the proposed project's activities in conjunction with historic-era built resources that are 45 years of age or older (those built in or before 1978) that may sustain impacts due to the construction

[1] As used in the CEQA Guidelines and 14 CCR Section 15358, the terms "effects" and "impacts" are synonymous in this report.

[2] Construction noise that exceeds the ambient level of a sensitive noise receptor is not analyzed because it is considered a temporary impact that would not have an adverse effect on historical resources because it would not cause physical damage and would not permanently alter or diminish the integrity of such resources. Temporary construction noise would not result in a substantial adverse change in the significance of a historical resource and, therefore, would not cause a significant impact under CEQA.

or operation of the project.[3] The project API consists of discontiguous areas where construction activities are proposed (Figure 3). The API for built environment resources includes an area of direct effect, which encompasses the geographic extent of each of the 13 discontiguous project areas. The API for built environment resources does not include any geographic areas under consideration for indirect effects because no historical resources were identified within or adjacent to any of the discontiguous areas that comprise the API and because there are no reasonably foreseeable effects that are not immediately related to the project and that are anticipated to occur at a later time or be farther removed in distance.

The delineation of the API for visual effects considered not only the types of properties surrounding the project and its associated features, such as the overhead electrical transmission lines, but the visibility of project components from these properties within a distance of a half mile. The delineation of the API also took into consideration the numerous, already existing overhead transmission lines and supporting infrastructure with heights reaching 30 to 40 feet within the visual setting of all historic era built environment resources, While the new overhead electrical infrastructure would be similar in form and height to the existing infrastructure, it would nevertheless be a new visual intrusion into the setting of adjacent properties. As such, any historic built environment resource within a half mile of project components was included in the API. Research subsequently confirmed that none of the six, historic era built environment resources identified within the API possess setting characteristics that could be diminished by the introduction of new project components. Research also confirmed that none of the six, historic era built environment resources possessed characteristics that would make them sensitive to any potential vibratory, auditory, or atmospheric effects caused by the Project.

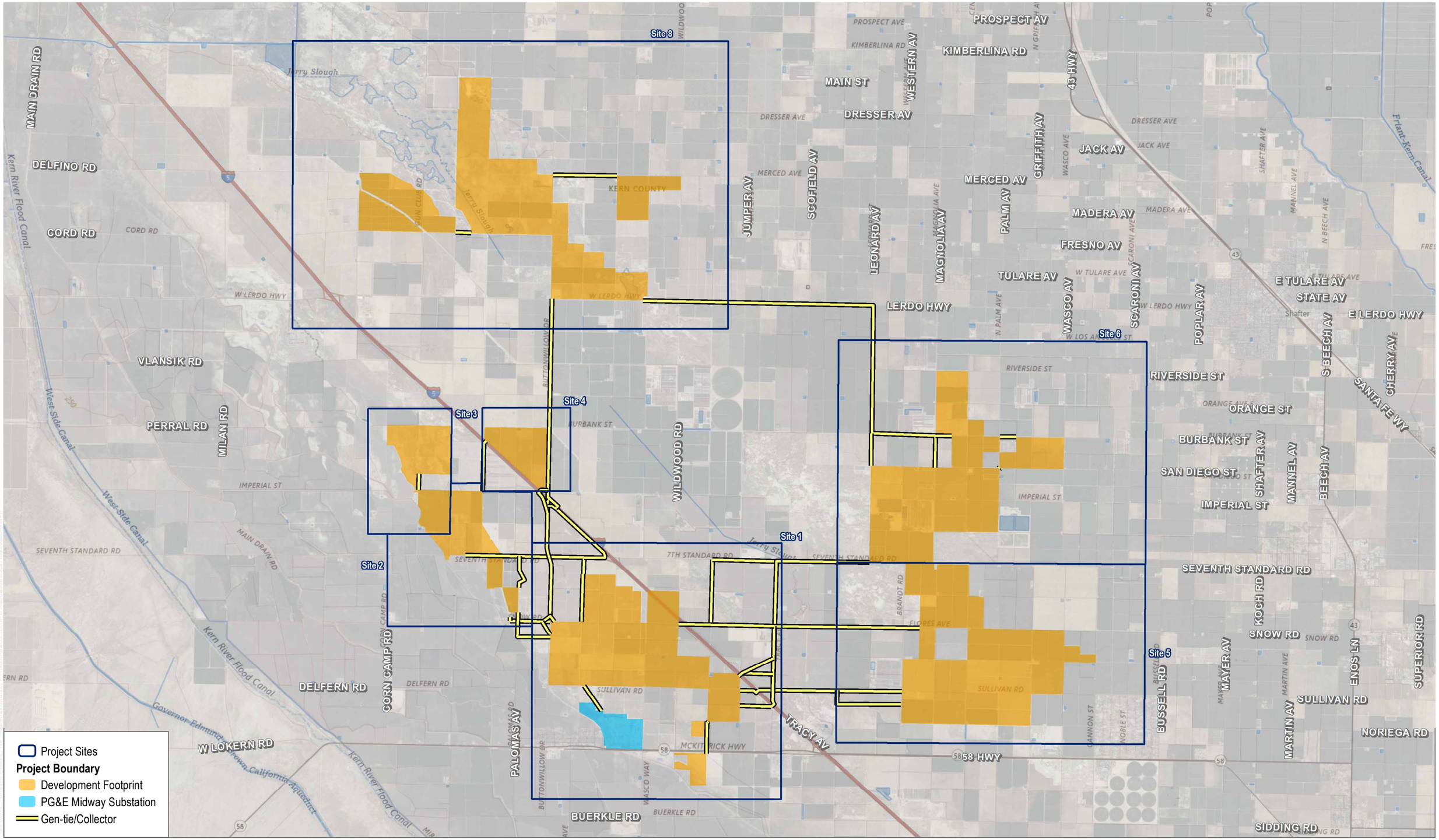
Six properties with built environment resources (over 45 years of age), including two previously identified resources, are located within the API (Table 1). The DPR 523 Forms for the recorded resources are located in Appendix B of this report.

[3] While the 50-year threshold is generally used for listing resources in the NRHP and the CRHR, the Office of Historic Preservation's (OHP) Instructions for Recording Historical Resources recommends recording "any physical evidence of human activities over 45 years . . . for the purposes of inclusion in the OHP's filing system." It also allows for the "documentation of resources less than 45 years . . . if those resources have been formally evaluated, regardless of the outcome of the evaluation." Further, the guidance notes that the 45-year threshold recognizes that there is commonly a 5-year lag between resource identification and the date that planning decisions are made, and thus it explicitly encourages the collection of data about resources that may become eligible for the NRHP or CRHR within that planning period. More restrictive criteria must be met before the resources included in OHP's filing system are listed, found eligible for listing, or otherwise determined to be important in connection with federal, state, and local legal statuses and registration programs (OHP 1995: 2).

Table 1. Historic Era Properties Identified Within the API

Figure 3 Map ID	Property Type	Address/APN	Year Built	Primary Numbers (if previously Evaluated)
A	Residential / Agricultural	39301 Sullivan Road, 103-100-19-01-4	ca. 1964	N/A
B	Residential / Agricultural	25950 Frey Avenue, 087-040-04-00-7 087-040-07-00-6	1978	N/A
C	Residential / Agricultural	No Legal Situs, APN 087-010-22	ca. 1970	N/A
D	Residential / Agricultural	33540 Highway 58, 103-070-35-00-3	1931	N/A
E	Utilitarian / Electrical Infrastructure	APNs 101-010-02-00-5, 101-010-15-00-3; 101-010-05-00-4; 101-010-04-00-1; 101-020-31-00-2; 101-020-35-00-4; 101-010-10-00-8; 101020-23-00-9; 101-020-27-00-1; 101-020-33-00-8; 101-020-30-00-9; 101-020-28-00-4; 101-010-14-00-0	1968	P-15-009737
F	Utilitarian / Water Infrastructure	No Legal Situs	ca. 1900	P-15-013725

Notes: APN = Assessor's Parcel Number; API = Area of Potential Impacts; ca. = circa.



SOURCE: Bing Maps 2022; Kern County 2022

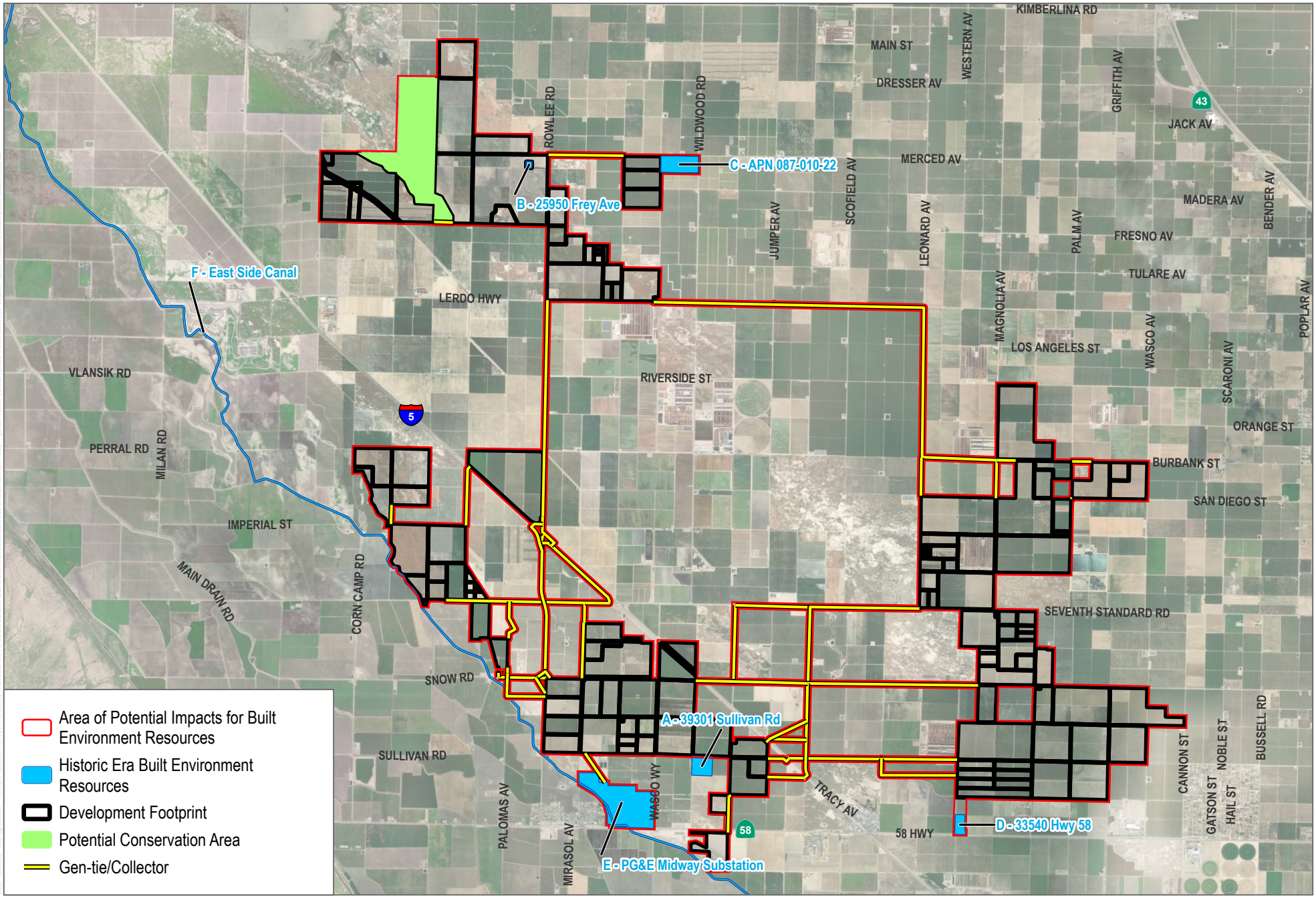
DUDEK

0 1 2 Miles

FIGURE 2

Project Site Boundaries

Buttonbush Solar and Storage Project



SOURCE: Avantus LLC., 2024; Kern County; Bing Maps

DUDEK

FIGURE 3

Area of Potential Impacts for Built Environment Resources

Buttonbush Solar and Storage Project

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2 Literature Review and Background Research

2.1 CHRIS Records Search

To identify cultural resources potentially affected by the Project, staff at the South San Joaquin Valley Information Center at California State University, Bakersfield completed a CHRIS records search of the project site and a 1-mile buffer on April 25, 2023. The search included their collection of mapped prehistoric, historical, and built-environment resources, Department of Parks and Recreation (DPR) Site Records, technical reports, archival resources, and ethnographic references. Additional consulted sources included the NRHP, California Inventory of Historical Resources/CRHR, California Points of Historical Interest, California Historical Landmarks, and Caltrans Bridge Survey information.

2.1.1 Previously Conducted Cultural Resource Studies

The records search identified 54 previous studies (including their addendums/supplemental reports) that have been performed within the records search area. Of these previous studies, 20 document built environment resources that intersect, or are located within a 1-mile radius of the API. Eight of these studies, discussed in Table 2, intersect the API (Table 2).

Table 2. Previous Cultural Resources Studies within the API

IC Report ID	Year	Author	Report Title
Reports Intersecting the Project Site			
KE-02162	1998	Hatoff, Brian	Cultural Resources Technical Report for the La Paloma Generating Project
KE-02391	1999	Jackson, Thomas L. and Shapiro, William A.	Cultural Resources Inventory for the Proposed Texaco Sunrise Cogeneration and Power Project: Addendum for Route B and Valley Acres Substation Surveys
KE-02527	2001	Foster, John M.	Archaeological Survey for the CalPeak #3 Project, Midway Kern County, California
KE-02584	2001	Christy, Juliet	Archaeological Investigation of the Energy Works Buttonwillow Project, Kern County, CA
KE-02873	2001	N/A	Los Banos-Gates 500 kV Transmission Project: Draft Supplemental Environmental Impact Report [Cultural Resources Section]
KE-04637	2015	Romani, Gwen	Archaeological Survey Report for the Sullivan Road Improvement Project from Cannon Street to Bussell Road
KE-04736	2015	Laurie, Leroy and Gibson, Heather	Archaeological Survey Report for the Improvements to Rowlee Road from Lerdo Highway to State Route 46, Kern County, California
KE-04948	2017	Baloian, Mary	Cultural Resource Survey for the Semitropic-Midway 115 kV Reconductoring Project, Kern County, California

Table 2. Previous Cultural Resources Studies within the API

IC Report ID	Year	Author	Report Title
Reports Within 1 Mile of the Project Site			
KE-02323	1999	Demos-Petropoulous, Francine, McGowan, Dana, Scott, Barry, O'Brien, Teresa, Norton, Bill, and Rause, Wendy	Cultural Resources Inventory Report for the AT&T Corp. Cable Upgrade Project, Los Angeles, Kern, and San Luis Obispo Counties, California
KE-02740	2002	Casdorph, Cheryl	Draft Environmental Impact Report for Vanderham Dairy
KE-03045	2003	Jackson, Thomas	Final Cultural Resources Report for the Sunrise Power Project Phase I
KE-03153	2005	Billat, Lorna	New Tower ("NT") Submission Packet FCC Form 620 for Rowlee Road, CA-3238D
KE-04512	2013	Romani, Gwen R.	Archaeological Survey Report Improvements to Elk Hills Road, Skyline Road to State Route 58, Kern County, California
KE-04616	2014	Hudlow, Scott M.	A Phase I Cultural Resource Survey for Rosalie Morales, 6010 Buerkle Road, Buttonwillow, Kern County, California
KE-04636	2015	Romani, Gwen	Archaeological Survey Report for the Cannon Street Improvement Project from State Route 58 to Sullivan Road
KE-04756	2015	Clifton, Virginia and Travers, Aniela	Cultural Resources Survey Frito Lay/Ensuite #26194 (285330) Highway 58, Bakersfield, Kern County, California
KE-04883	2017	Roper, C. Kristina	Historic Resources Compliance Report Interstate 5 Vehicle Detection Systems at 18 Locations in Kern, Kings, and Fresno Counties, California
KE-04883	2017	Roper, C. Kristina	Archaeological Survey Report Interstate 5 Vehicle Detection Systems at 18 Locations in Kern, Kings, and Fresno Counties, California
KE-04883	2017	Young, Craig D	Geoarchaeological Investigation for Interstate 5 VDS in Kern, Kings, and Fresno Counties
KE-04884	2017	Roper, C. Kristina	Historic Resources Compliance Report Interstate 5 Vehicle Detection Systems at 21 Locations in Kern County, California

Note: API = Area of Potential Impacts.

2.1.2 Previously Recorded Built Environment Cultural Resources in the API

The records search indicated 46 previously-recorded resources are located within the 1-mile record search buffer, including 12 historic built environment components. Five of these resources, which are summarized in Table 3, intersect the project site.

Table 3. Previously Recorded Built Environment Cultural Resources within the API

Primary Number	Trinomial	Name	Age	NRHP/CRHR Status Code	Attributes
Resources Within the Area of Potential Impacts					
P-15-009737	N/A	PL-6	1920-1930	N/A	HP9. Public Utility Buildings; AH15 Standing Structures
P-15-009738	N/A	PL-7	1928-1954	N/A	HP9. Public Utility Buildings; AH15 Standing Structures
P-15-013725	CA-KER-07701H	JKE-001; East Side Canal	ca. 1870	7R; 6Z*	HP20. Canal/Aqueduct
P-15-016999	N/A	Segment of Eastside Cutoff	1920s-1950s	6Z	HP20. Canal/Aqueduct
P-15-020558	N/A	Interstate 5	1956-1974	6Z	AH7: Roads/Trails/Grades; HP37: Highways/Trails
Resources Within 1 Mile of the Area of Potential Impacts					
P-15-002050	CA-KER-002050H	Southern Pacific Railroad, McKittrick Branch	ca. 1948 - 1967	6Z	AH7: Roads/Trails/Grades.
P-15-08251	N/A	127 2nd Street	N/A	N/A	HP2. Single Family Residence
P-15-08252	N/A	334 Front Street	N/A	N/A	HP2. Single Family Residence
P-15-013726	CA-KER-07702H	Main Drain Canal	1916	7R*	AH06. Water Conveyance System HP20. Canal/Aqueduct
P-15-17682	N/A	Arizona Ditch	N/A	N/A	AH06. Water Conveyance System
P-15-17683	None	Deep Wells Ditch	N/A	N/A	AH06. Water Conveyance System
P-15-17684	None	Eighty-Foot Ditch	N/A	N/A	AH06. Water Conveyance System

Notes: API = Area of Potential Impacts; NRHP = National Register of Historic Places; CRHR = California Register of Historical Resources; ca = circa.

* 6Z: Found Ineligible for NR, CR, or Local designation through survey evaluation

* 7R: Identified in Reconnaissance Level Survey; Not Evaluated.

2.1.3 Description of Previously Recorded Built Environment Resources in the API Identified in the Records Search

The following previously recorded resources were located in the API and are described in detail below. These are described in detail in Chapter 3, Historic Context, and Chapter 4, Results of Identification and Evaluation. This information was compiled as part of background research and to inform the field survey.

P-15-009737

The Midway Switching Station (P-15-009737) was first documented in 1999 by Cultural Resources Inventory (CRI) on behalf of Radian International, Inc. CRI identified three historic-age built environment resources comprised of two control buildings and a residential complex that dated to circa (ca.) 1921. Although CRI completed a brief description and historical context of the property, they did not evaluate the resource.

P-15-013725

P-15-013725, a segment of the Eastside Canal (the subject segment, Map ID F) was first documented by JRP Historical Consulting LLC, in April 2009. In July 2009, ESA conducted a subsequent survey of the subject segment. Although the segment was documented, it was not evaluated. In 2013, ArchaeoPaleo Resources rerecorded the subject segment and drafted a full historic context but did not fully evaluate the resource's significance due to a perceived lack of integrity. Historian Linda Akyuz also documented the property in 2013 and completed a full significance evaluation. Akyuz determined that the East Side Canal has played an important role within California's agricultural history but that the subject segment, based on archival evidence, is a contemporary realignment of the canal. The realigned concrete-lined canal was constructed wider and deeper than the original earthen East Side Canal. As such, Akyuz recommended that the subject segment of the East Side Canal be found ineligible for recordation in the NRHP and CRHR (6Z: recommended ineligible for survey evaluation).

2.2 Additional Records Reviewed

The following sources provide additional information regarding potential historic era built environment resources within the API. This information was used to understand the history of the area and how the landscape has changed and developed over time.

P-15-009737

In 2020, PG&E published a Historic-era Electrical Infrastructure Management Plan (HEIMP) that documented the history and a framework for evaluating the significance of its historic-era resources. The document discusses the Midway Switching Center and references a 2014 report completed by Cardno (not returned in the 2023 Records Search) that recommended that the substation be found ineligible for the NRHP. While PG&E cited Cardno's report, it also noted that the finding had not received the SHPO's concurrence (Cardno 2014).

In Kern County's inventory of Archeological Determinations of Eligibility, the Midway Switching Center was assigned an NRHP status code of 6Y (determined ineligible for the NR by consensus through Section 106 process- not evaluated for the CR or local listing).

2.3 Review of Historical Aerial Photographs

Dudek consulted historical topographic maps and aerial photographs to understand the development of the API and its surrounding area. Important to note is that while topographic maps are informative, they do not show the minute changes to a landscape over time and, at times, are inconsistent with what is depicted year to year. Nevertheless, the information gathered contributes to the understanding of the chronological development of the API.

2.3.1 Historical Aerial Photographs

On October 2, 2023, Dudek Architectural Historian EJ Jones conducted a review of historical aerial photographs via the National Environmental Title Agency Research (NETR) from the following years: 1952, 1956, 1964, 1968, 1984, 1994, 2005, 2009, 2010, 2012, 2014, 2016, 2018, and 2020. Table 4 discusses observations and findings from these available aerials (NETR 2023).

Table 4. Historical Aerial Photograph Review

Photograph Year (Source)	Observations and Findings
1952	**Buttonwillow:** The area is primarily rural with some agricultural properties, irrigation features, and scattered residential development. Highway 58 is visible traveling east to west through the area, and Buttonwillow Drive, Wasco Way, and Sullivan Road have been developed. Residential and commercial development is concentrated along the intersection of Buttonwillow Drive and the 58. **Map ID A:** The subject property is rural with unpaved roads. It is situated on the southside of Sullivan Road adjacent to an agricultural property to the west. **Map ID B** and **Map ID C:** are not included in the 1952 aerial image. **Map ID D:** An irregular plan, single-family residence is visible on the southwest portion of the subject property. North of the residence is a rectangular plan building. An unpaved driveway leads south from a rural road, around either side of the residence, and leads to two entrances along Highway 58 to the south. The rest of the property appears to be planted with grass. Landscaping includes a lawn surrounding the residence and scattered mature trees along the driveway. **Map ID E:** The western portion of the property is undeveloped and contains grids of unpaved roads along the north side of Highway 58 and the east side of the East Side Canal. The eastern portion of the property had been developed with multiple buildings, industrial facilities, and unpaved roads. **Map ID F:** The East Side Canal is visible traveling diagonally from the northwest to the southeast across Buttonwillow. The potion within the API appears relatively straight.
1956	**Buttonwillow:** More infill with residential and commercial development is visible along the intersection of Buttonwillow Drive and Highway 58. Additionally, the surrounding area includes more gridded agricultural properties to the northeast and southeast. **Map ID A:** No discernable changes to the subject property. **Map ID B:** The subject property is rural and undeveloped. **Map ID C:** A single-family residence has been constructed on the northern portion of the property, on the south side of Merced Avenue. An unpaved driveway from Wildwood Road leads west to along the southern border of the property before turning north at the center to lead to the residence. Rows of trees surround the residence and fill the rest of the property to the west, east, and south. **Map ID D:** An addition to the north elevation of the residence is visible, and two ancillary sheds have been added northwest of the residence. **Map ID E:** The western portion of the property appears to contain rows of crops. There are no discernable changes to the eastern portion of the property. **Map ID F:** No discernable changes to the canal.
1968	**Buttonwillow:** The area northwest of Highway 58 and Tracy Lane is not visible in the 1968 aerial image. Interstate 5 has been developed to the east and travels diagonally through the

Table 4. Historical Aerial Photograph Review

Photograph Year (Source)	Observations and Findings
	area from the northwest to the southeast. The area appears to remain primarily rural and agricultural. **Map ID D:** An addition to the west elevation and portions of the north elevation of the residence are visible. The driveway west of the residence has been filled in with trees. Map ID A, Map ID B, Map ID C, Map ID E, and Map ID F are not included in the 1969 aerial image.
1984	**Buttonwillow:** There area is primarily developed with gridded agricultural plots and scattered residential properties. Commercial development remains concentrated along Buttonwillow Drive and Highway 58. **Map ID A:** Buildings A1, A2, A3, and A4 have been constructed on the property along its western boundary. The rest of the property to the east remains undeveloped. **Map ID B:** Frey Avenue has been developed. An irregular in-plan single-family residence with a pool to the rear has been constructed on the subject property. Two driveways from Frey Avenue lead to the residence. Landscaping includes front and rear lawns and immature trees surrounding the residence and pool. **Map ID C:** The residence has been demolished and the driveway from Wildwood Road is no longer visible. A new single-family residence has been constructed at the center of the northern boundary of the property. The orchard has expanded west, and rows of young trees continue to fill the rest of the property, surrounding the residence to the west, east, and south. **Map ID D:** A pool has been constructed north of the residence. The two ancillary sheds added in 1956 have been removed from the property. **Map ID E:** Industrial equipment and facilities have been constructed on the southwest portion of the property and more industrial development is visible on the eastern portion. The northwest portion remains undeveloped. **Map ID F:** The canal has been realigned in the Study area to create an L-shape. It travels southeast before turning east along Highway 58 and Leslie Street. South of Highway 58 it continues southeast.
1994	**Buttonwillow:** There are no discernible changes to the surrounding area. **Map ID A:** Landscaping such as trees and shrubs are visible on the western portion of the property. There are no discernable changes to the buildings or the rest of the property. **Map ID E:** More industrial development is visible on the property. The northwest portion remains undeveloped. There are no discernable changes to Map ID B, Map ID C, Map ID D, and Map ID F in the 1994 aerial image.
2005	**Buttonwillow:** There are no discernible changes to the surrounding area. **Map ID A:** There are no discernable changes to the buildings on the property. Rows of trees are visible on the eastern portion of the property. **Map ID B:** A gazebo has been constructed north of the pool. **Map ID C:** No discernable changes to the residence. The trees are no longer visible on the property. **Map ID E:** More industrial development is visible on the property. The northwest portion remains undeveloped. There are no discernable changes to Map ID D, and Map ID F in the 1994 aerial image.

Table 4. Historical Aerial Photograph Review

Photograph Year (Source)	Observations and Findings
2009	**Buttonwillow:** There are no discernible changes to the surrounding area. **Map ID A:** No discernable changes to the subject property. **Map ID B:** The addition of an attached garage and concrete driveway to the southwest elevation of the residence is visible. **Map ID C:** No discernable changes to the residence. A driveway has been developed creating a U-shape around the residence with access from Merced Avenue. Young trees have been planted on the property and surround the residence to the west, east, and south. **Map ID E:** Two buildings have been construction on the southeast portion of the property. There are no discernable changes to Map ID D, and Map ID F in the 1994 aerial image.
2010	**Map ID B:** A shed has rectangular in-plan shed has been added east of the residence. There are no discernable changes to Buttonwillow, Map ID A, Map ID C, Map ID D, Map ID E, and Map ID F in the 2010 aerial image.
2018	**Map ID A:** There are no discernable changes to the buildings on the property. The rows of trees on the eastern portion of the property have been removed. **Map ID B:** The pool has been filled in and a patio has been constructed to the rear of the property. Additionally, the rear lawn has expanded to cover a portion of the former pool. There are no discernable changes to Buttonwillow, Map ID C, Map ID D, Map ID E, or Map ID F in the 2018 aerial image.
2020	There are no discernable changes to Buttonwillow, Map ID A, Map ID B, Map ID C, Map ID D, Map ID E, or Map ID F in the most recent aerial image.

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3 Historic Context

This context is provided to ascertain relevant significant themes for the project area. Dudek provides this context to better understand the potential significance of built environment resources identified in the API. This context provides an overview of the historic themes and the building types that were documented as part of this study. A summary of post-contact history for the State of California, which spans the Spanish Period (1769–1822), the Mexican Period (1822–1848), and the early American Period (1848–1855) is presented before relevant historical themes pertaining to the API are discussed. The section concludes with a discussion about the development of individual subject properties (see Table 1, Historic Era Properties Identified in the API During Background Research and Field Survey; and Figure 3, Area of Potential Impacts for Built Environment Resources

3.1 Hispanic and Early American Periods (1769-1855)

Although Spanish, Russian, and British explorers visited parts of California for brief periods between 1529 and 1769, the Spanish Period in California began with the establishment in 1769 of a settlement at San Diego. To promote Hispanic settlement, the government granted expansive tracts of land, ranchos, to Spanish settlers. When Mexico gained Independence from Spain in 1821, the new Mexican government expanded the program. Despite the land grant system, inland California and contemporary Kern County remained largely uninhabited until after the start of the American Period and the California Gold Rush (Hoover et al. 2002: pp. 125, 138; Bakersfield Californian 2016).

In 1848, gold was found in Coloma, California, and a rush of speculative miners flooded into the California territory via overland routes from the eastern United States. In 1851, gold was discovered in the Kern River Valley and miners quickly relocated to pan local waterways. When gold yields lessened, miners moved away from the San Joaquin Valley to escape its chronic, cyclical flooding. In 1854, a second large vein was discovered in the Kern River, spurring miners to rework the region's network of rivers, streams, and tributaries. When the gold fields dried up, settlers constructed an expansive canal system to drain the inundated valley and control water distribution for agricultural irrigation. As more water was diverted from rivers to irrigate farmland, lake levels in Tulare, Buena Vista, and Kern Lakes began to drop. The reclaimed, nutrient-rich land was subdivided and developed into residential farmsteads. The influx of people into central California resulted in a large demand for meat and animal byproducts (Hoover et al. 2002: pp. 125; Bakersfield Californian 2016).

3.2 The Rise of Agriculture and Development of Irrigation (1855-1890)

In 1855, Henry Miller (1827-1916), a German immigrant with a butcher shop in San Francisco, arrived in San Joaquin Valley and purchased 300 head of cattle. Miller integrated his businesses and, as demand skyrocketed, purchased grazing land and breeding stock. In 1857, cattlemen Charles Lux (1823-1887) and Miller incorporated the Pacific Livestock Company, an integrated cattle and meatpacking enterprise, purchased 300,000 acres, and heavily invested in the region's irrigation and agricultural infrastructure. The burgeoning industry attracted migrants who settled in the region permanently. In 1866, the State of California created Kern County, home to 300 residents, from parts of Los Angeles and Tulare Counties. The settlers introduced new crops, experimented with growing methods, and cultivated herds of cattle, sheep, and hogs. The Southern Pacific Railroad constructed a railway through Kern County in 1870, facilitating population growth, dictating the placement of major cities, and connecting

ranching and farming operations to distant markets (Hoover et al. 2002: pp. 125; Bakersfield Californian 2016; Morgan 1914).

In 1885, Miller and Lux established Buttonwillow Ranch, a Pacific Livestock Company[4] sub-headquarters, market, and livestock operation. The ranch, located 3 miles west of Buena Vista Slough, was named for the riparian Buttonwillow trees (*Cephalanthus occidentalis, californicus*) that flourished in the Kern River valley. The partners also established Buena Vista Farm (located directly south of contemporary State Route 58), which provided feed for the livestock. Miller and ranch employees constructed a dam at the south end of Buena Vista Lake (north of Buttonwillow) a 26-mile-long, 50-foot-wide canal west of Buttonwillow Ranch. The 'West Side Canal' watered thousands of cattle and irrigated 500,000 acres of experimental alfalfa, wheat, rye, barley, and corn by early 1886 (Waldschmidt-Nelson 2018; Morgan 1914; Zonlight 1979: p. 318; 331).

Exhibit 1. Haying at Buena Vista Farm, a Pacific Livestock Company holding (date unknown) (Huntington Library 2013).



Shortly after the canal became operational, upstream competitors, James Ben Ali Haggin, W. B. Carr, and Lloyd Tevis, diverted the water, cutting off the ranch's supply. *Miller v. Hagan,* heard by the California Supreme Court in 1888, forced the litigants to share water rights. As a result, the two large landowners divided the Kern River's flow

[4] By 1890, the Pacific Livestock Company had amassed 1.3 million acres of land in California, Nevada, Oregon, and Idaho to become the largest integrated cattle and meat packing enterprise in the US (Waldschmidt-Nelson 2018).

into two channels, detrimentally impacting small-scale ranchers downstream that relied on the river's natural course. After the court ruling, Miller constructed the 'East Side Canal,' which further irrigated Buttonwillow Ranch and Buena Vista Farm while depriving his neighbors, and competitors, of water (Waldschmidt-Nelson 2018; Morgan 1914; Zonlight 1979: p. 318; 331).

3.3 The Development of Buttonwillow and Rural Residential Infrastructure

In 1893, Miller donated a large tract of land between Buttonwillow Ranch (north) and Buena Vista Farm (south) for the future townsite of 'Buena Vista.' In 1895, the Southern Pacific Railroad constructed the McKittrick branch through the community and a Post Office, named 'Buttonwillow,' was established. In the early 1900s, as Miller entered his mid-80s, he established the Miller and Lux Land Company (despite Lux being deceased) and subdivided sections of his massive holdings to sell as ranchland. As the community grew, both 'Buena Vista' and 'Buttonwillow' were used by residents, cartographers, and newspapers. After Miller died in 1916, his heirs continued to gradually subdivide plots of land around Buttonwillow Ranch to subdivided and sell. In 1924, the Buena Vista Water Storage District was established to manage the area's extensive irrigation and drainage network and, in 1927, land agent C.E. Houchin platted the townsite of Buttonwillow. Residents adopted Buttonwillow as the community's name although archival sources continue to refer to "Buena Vista" until approximately 1930. Houchin platted a small grid with residential lots at the town's core and agricultural properties on the lattice's outskirts. Buttonwillow's commercial district fronted (north) McKitterick Bakersfield Highway (extant California State Route [SR] 85) and the Southern Pacific McKitterick railway. Outlying residential farmsteads were positioned between a complex series of canals including the West Side Canal, East Side Canal, Eighty Foot Ditch, Deep Wells Ditch, Garden Ditch, Corn Camp Ditch, Poplar Grove Ditch (sometimes referred to as the Arizona Ditch), and Main Drainage Canal (USGS 1932; Waldschmidt-Nelson 2018; Romani 2013: pp. 1-3).

On June 11, 1921, the San Joaquin Power Company (SJPC) opened the Midway Steam Plant in Buttonwillow and established power infrastructure in the rural community. The Midway Steam Plant, which supplied 17,000 horsepower units along high-tension lines to local residents, included a boiler room, turbine room, an electrical operating room, and a large retention and cooling pond. By early 1922, the Midway Steam Plan no longer met the energy demands posed by Kern County's growing population. To increase production, SJPC spent 1,250,000 dollars to increase production to double the plant's size and increase its total output to approximately 40,000 units. The Midway Steam Plant continued producing electricity for the region until the late 1940s and the development of nuclear power plants in the region (San Francisco Chronicle 1921: p. 20; Fresno Republican 1921: p. 13; Tribune 1921: p. 8; Fresno Morning Republican 1922: p. 13).

The Midway Steam Plant was demolished in 1952 and a major employer left the region. However, Kern County was quickly becoming a major oil producer in California. The oil industry flourished in the mid- twentieth century, as did local agricultural projection. Shortly after the industrial boom began, rural, dirt roads between farms and businesses were graded and paved. Local power creation resumed in the late 1960s when PG&E established the Midway Switching Center. Although increased economic opportunity in the region led to a slight increase in Buttonwillow's population in the late twentieth century and early twenty-first century, the region has retained its rural character. (Fresno Morning Republican 1922: p. 13; NETR 2023; PG&E 2020: pp. 3-115; California Demographics 2023).

3.3.1 Property Type: Rural Residential Infrastructure

The four rural residential and agricultural properties documented (Map ID A, 39301 Sullivan Road; Map ID B, 25950 Frey Avenue; Map ID C, Assessor's Parcel Number [APN] 087-010-22; and Map ID D, 33540 Highway 58) are ubiquitous property types in Kern County, the state of California, and the western United States. Rural residential and agricultural properties include buildings, structures, and landscape features that function together and reflect the residents' functional needs. These interrelated resources are important in understanding how rural properties have been used over time.

The characteristics of these rural residential and agricultural properties include the following.

- Land Use and Activities
  - Agricultural and/or Ranching
  - Sustenance and/or Commercial Cultivation
- Patterns of Spatial Organization
  - Building Clusters
  - Demarcated Orchards/Vineyards/Corrals (agriculturally-productive areas)
  - Boundary Demarcations
- Response to the Natural Environment
  - Irrigation and Water Storage Infrastructure
- Circulation Networks
  - Entry Roads, Field Access Roads, and Trails
- Buildings, structures, and features of this rural property type
  - Main Residence
  - Barn(s)
  - Ancillary Outbuildings
  - Chicken Coop
  - Repair Shop/Workshop/Garage
  - Corrals
  - Livestock Shelters
  - Water Storage Tanks, Wells, and Pump Houses
  - Fuel Storage Structures

3.4 Methods

Dudek Architectural Historian Claire Cancilla, MA, conducted an intensive-level survey of the APIs for historic built environment resources on October 19, 2023. The survey also documented the historic built resources using field notes, digital photography, close-scale field maps, and aerial photographs. Specific note was taken of character-defining features, spatial relationships, observed alterations, and any historic landscape features on the property.

All field notes, photographs, and records related to the current study are on file at Dudek's Sacramento, California office.

3.5 Survey Results

Six properties with built environment resources were identified as over 45 years old within the API (Table 5). The resources include four rural residential properties (Map ID A. 39301 Sullivan Road, Map ID B. 25950 Frey Avenue, Map ID C. 087-010-22, and Map ID D. 33540 Highway 58), the Midway Switching Center (Map ID E), and a Segment of the East Side Canal (Map ID F). Section 4, Results of Identification and Evaluation Efforts, provides a detailed physical description of the entire property and the associated significance evaluation under all applicable national, state, and local designation criteria and integrity requirements.

Table 5. Built Environment Properties Recorded and Evaluated in the API

Map ID	Property Type	Address/APN	Year Built	Primary Numbers (if previously Evaluated)
Previously Recorded within the API				
E	Utilitarian (switching center)	APNs 101-010-02-00-5, 101-010-15-00-3; 101-010-05-00-4; 101-010-04-00-1; 101-020-31-00-2; 101-020-35-00-4; 101-010-10-00-8; 101-020-23-00-9; 101-020-27-00-1; 101-020-33-00-8; 101-020-30-00-9; 101-020-28-00-4; 101-010-14-00-0	ca. 1921; 1968	P-15-009737
F	Utilitarian (Canal)	No Legal Situs,	ca. 1900	P-15-013725
Newly Recorded within the API				
A	Residential; Agricultural	39301 Sullivan Road, 103-100-19-01-4	ca. 1964	N/A
B	Residential; Agricultural	25950 Frey Avenue, 087-040-04-00-7 087-040-07-00-6	1978	N/A
C	Residential; Agricultural	No Legal Situs, APN 087-010-22	ca. 1970	N/A
D	Residential; Agricultural	33540 Highway 58, 103-070-35-00-3	1931	N/A

Notes: API = Area of Potential Impacts; APN = Assessor's Parcel Number.

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4 Results of Identification and Evaluation Efforts

This section provides a physical description and an evaluation of each of the resources in the API under NRHP and CRHR listing criteria. To assess the historical significance and integrity of built resources in the API, the subject properties were recorded and evaluated in consideration of NRHP and CRHR criteria. A physical description of each property and its development history are also provided below. The significance evaluations were prepared by Dudek Architectural Historians EJ Jones and Katie Ahmanson, who both meet the Secretary of the Interior's Professional Qualification Standards for architectural history.

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4.1 Newly Recorded Resources

4.1.1 Map ID A: 39301 Sullivan Road

Map ID A, 39301 Sullivan Road (APN 103-100-19-01-4), is a 78-acre single-family residential and agricultural property locally referred to as the "Almond Farm." Map ID A does not appear eligible for listing in the NRHP or CRHR due to a lack of historical associations and architectural merit. As such, the property does not appear to be a historical resource under CEQA and has been assigned a California Historical Resource Status Code of 6Z (found ineligible for the NRHP, CRHR, or local designation through survey evaluation).

4.1.1.1 Resource-Specific Historic Context

Map ID A, legally sited as 39301 Sullivan Road, was developed by an unidentified property owner in ca. 1964. Per the Kern County Assessor-Recorder Office (KCAR, the original property owners maintained the orchards until 2014. After being sold, a series of agricultural companies owned the property, including L & K Ranch, Bakersfield (2014–2018), Wells AGC Holdings LLC (2018–2023), and Willow Avenue Investments. Willow Avenue Investments, which purchased the property in 2023, is the current owner. Archival research at Ancestry.com, Newspaper.com, and the Kern County Accessor and Recorder archives, does not indicate that the original owner and developer, or subsequent owners or occupants, are persons important to our past (NETR 2023; Arivify 2023; KCAR 2023a; Parcel Quest 2023a).

4.1.1.2 Description

Map ID A, 39301 Sullivan Road (APN 103-100-19-01-4), is a 78-acre rectangular property (oriented east to west) that fronts the south boundary of Sullivan Road. The property is occupied by two large, square almond orchards with a small building complex clustered along the western boundary of the parcel. Map ID A1. Building 1 is a utilitarian, premanufactured, industrial-type building located in the northwest corner of the parcel. The one-story building is accessed via oversized sliding doors on an exterior track (west elevation) and has an open-air section on the west elevation. The corrugated-metal-clad building is otherwise featureless (Photograph 1). Map ID A2. Building 2 is a one-story, rectangular building oriented east to west with a side-gable roof. Map ID A2 is clad in horizontal wood boards and has a roof clad in composite shingles. A multilight window in a wood frame is located on the building's north elevation (Photograph 2). Map ID A3, Residence, and Map ID A4, Shelter, were not visible from the public right-of-way during the survey (Photograph 3).

There are no identified alterations to Map ID A.

Photograph 1. Annotated overview of Map ID A. 39301 Sullivan Road showing Map ID A1. Building 1 (yellow arrow) and Map ID A2. Building 2 (red arrow), facing south.



Photograph 2. Overview of Map ID A showing Map ID A1 in relation to the property's orchards, facing southeast.



Photograph 3. Detail view of Map ID A1 and Map ID A2, which obscures the property's additional resources (Map ID A3, Residence, and Map ID A4, Shelter), facing south.



4.1.1.3 Discussion of Significance and Evaluation

National Register of Historic Places and California Register of Historic Resources

Criterion A/1: That are associated with events that have made a significant contribution to the broad patterns of our history.

Map ID A, 39301 Sullivan Road (APN 103-100-19-01-4), a rural residential and agricultural property, is best understood as part of the broad pattern of rural agrarian practices in the Buttonwillow area. Map ID A, which was developed in ca. 1964 with a residence, three agricultural buildings, and orchards, possesses an association with the agricultural development of the area during the mid-1960s, but research did not indicate that it contributed in any significant way to this pattern of development. The property also lacks an important association with the expansion of rural residential development in the Buttonwillow area. As such, Map ID A, 39301 Sullivan Road, is not eligible under NRHP/CRHR Criterion A/1.

Criterion B/2: That are associated with the lives of persons significant in our past.

To be found eligible under B/2, Map ID A. 39301 Sullivan Road must be directly tied to an important person and the place where that individual conducted or produced the work for which they are known. Archival research indicates that Map ID A is not associated with any specific persons known to be historically important figures at the national, state, or local level. While a number of individuals have occupied the property either as owners or renters from the time of its construction to the present day, research did not indicate that any of these individuals made a significant contribution to history. Due to a lack of identified significant associations with important persons in history, Map ID A, 39301 Sullivan Road, is not eligible under NRHP Criterion B or CRHR Criterion 2.

Criterion C/3: That embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction.

Map ID A, 39301 Sullivan Road, is an agricultural property type, constructed in ca. 1964, in a rural area surrounding Buttonwillow. Although Map ID A displays key characteristics of a rural agricultural property-type, including agrarian land use for commercial activities, patterns of spatial organization, irrigation infrastructure, and vehicular and pedestrian circulation networks, the property is not a particularly distinguished example of this property type. Map ID A also does not possess high artistic value, nor is it a significant and distinguishable entity whose components may lack individual distinction. Additionally, archival research did not indicate that Map ID A was the work of a master architect or builder, possesses high artistic value, or has components that rise to the level of individual distinction. Map ID A, 39301 Sullivan Road, is not eligible under NRHP Criterion C or CRHR Criterion 3.

Criterion D/4: That have yielded, or may be likely to yield, information important in prehistory or history.

There is no evidence to suggest that Map ID A, 39301 Sullivan Road, has the potential to yield information important to state or local history. Therefore, the property is not eligible under NRHP/CRHR Criterion D/4.

4.1.1.4 Discussion of Integrity

In conclusion, the property at Map ID A, 39301 Sullivan Road, lacks sufficient significance to meet any of the criteria for listing in the NRHP or CRHR. To be eligible for listing in either register, a resource must first meet one or more of the significance criteria outlined above before a determination can be made as to whether the resource retains its historic character and can convey its significance. In the specific case of the property at 39301 Sullivan Road, an integrity analysis was considered immaterial because the evaluation found that the property lacked the necessary significance to warrant further analysis of its physical and historic integrity. Consequently, the evaluation determined that the subject property is not a historic property based on the NRHP criteria outlined in 36 California Code of Regulations 60.4, either individually or as a contributing element to an existing or potential historic district, nor is it a historical resource for the purposes of CEQA.

4.1.2 Map ID B: 25950 Frey Avenue

Map ID B, 25950 Frey Avenue (APNs 087-040-04-00-7 and 087-040-07-00-6), is located on two distinct parcels. Map ID B1, Residence; Map ID B2, Gazebo; and Map ID B3, Shed, are located on APN 087-040-04-00-7, while 087-040-07-00-6 is occupied by a fallow agricultural field. Map ID B does not appear eligible for listing in the NRHP or CRHR as a historic resource due to a lack of historical associations and architectural merit. As such, the property does not appear to be a historical resource under CEQA and has been assigned a California Historical Resource Status Code of 6Z (found ineligible for the NRHP, CRHR, or local designation through survey evaluation).

4.1.2.1 Resource-Specific Historic Context

Map ID B, legally sited as 25950 Frey Avenue, was developed by an unidentified property owner in 1978. Per the KCAR, the original property owners maintained the orchards until the mid-1990s. In ca. 1995, Robert William Tracy (born 1942) and Elizabeth Ann (Witcher) Tracy (born ca. 1947) purchased the property. In 2002, the Tracy family

placed the property in a revocable trust, which they continue to maintain. In ca. 2000, the Tracy family added Map ID B2, Gazebo, to the property. In 2008, Map ID B1, Residence, was remodeled and a garage unit was added to the building's southwest corner (Permit Number KB805857). Archival research, including from Ancestry.com, Newspaper.com, and the Kern County Accessor and Recorder archives, does not indicate that the original owner and developer, or subsequent owners or occupants, are persons important to our past (NETR 2023; Ancestry 2023a, 2023b; KCAR 2023b; Parcel Quest 2023b).

4.1.2.2 Description

Map ID B, legally sited as 25950 Frey Avenue, is located on two parcels. The building complex, which includes Map ID B1 Residence and two contemporary structures, is confined to a 3.28-acre parcel (APN 087-040-04-00-7). The parcel is heavily landscaped with mature foliage. Map ID B1 is an asymmetrical, one-story ranch-style residence with a complex form and hipped roof. The residence is accessed via a single entrance on the main (south) elevation, four additional single-door entrances on the rear (north) and west elevations, and two garage doors in the southwest corner of the main elevation (Photographs 4 and 5). Additional fenestration includes large, multilight square windows on the main elevation and a variety of fixed and sliding windows in vinyl frames. A metal, square shade has been added to the building's rear (south) elevation to provide shade for a full-length, concrete patio area. Map ID B's roof is sheathed in composite asphalt shingles, while the building is primarily clad in stucco but features full-height brick veneer on the main (north) elevation.

Identified Alterations include:

- Unknown: Addition to the northeast corner of Map ID B1 (Observed Alteration)
- ca. 2000: Property heavily landscaped (NETR 2023)
- ca. 2000: Map ID B2, Gazebo, added to the property (NETR 2023)
- 2008: Garage Constructed (Permit Number KB805857) (KCAR 2023b)
- ca. 2010: Map ID B3, Shed, added to the property (NETR 2023)

Photograph 4. View of Map ID B. showing Map ID B1. Residence and mature landscaping, facing north.



Photograph 5. View of Map ID B1's north (rear) elevation, facing south.



4.1.2.3 Discussion of Significance and Evaluation

National Register of Historic Places and California Register of Historic Resources

Criterion A/1: That are associated with events that have made a significant contribution to the broad patterns of our history.

Map ID B, 25950 Frey Avenue (APNs 087-040-04-00-7 and 087-040-07-00-6), a rural residential and agricultural property, is best understood as part of the broad pattern of rural agrarian practices in the Buttonwillow area. Map ID B, which was developed in 1978 with a single-family residence, possesses an association with the agricultural practices of the area during the late-1970s, but research did not indicate that it contributed in any significant way to this pattern of development. The property also lacks an important association with the expansion of rural residential development in the Buttonwillow area. As such, Map ID B, 25950 Frey Avenue, is not eligible under NRHP/CRHR Criterion A/1.

Criterion B/2: That are associated with the lives of persons significant in our past.

To be found eligible under B/2, Map ID B, 25950 Frey Avenue, must be directly tied to an important person and the place where that individual conducted or produced the work for which they are known. Archival research indicates that Map ID B is not associated with any specific persons known to be historically important figures at the national, state, or local level. While a number of individuals have occupied the property either as owners or renters from the time of its construction to the present day, research did not indicate that any of these individuals made a significant contribution to history. Due to a lack of identified significant associations with important persons in history, Map ID B. 25950 Frey Avenue is not eligible under NRHP Criterion B or CRHR Criterion 2.

Criterion C/3: That embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction.

Map ID B, 25950 Frey Avenue, is an agricultural property type, constructed in ca. 1964, in a rural area surrounding Buttonwillow. Although Map ID A demonstrates key characteristic of a rural agricultural property-type, including agrarian land use for commercial activities, patterns of spatial organization, irrigation infrastructure, and vehicular and pedestrian circulation networks, the property is not a particularly distinguished example of this property type. Map ID B also does not possess high artistic value, nor is it a significant and distinguishable entity whose components may lack individual distinction. Additionally, archival research did not indicate that Map ID B was the work of a master architect or builder, possess high artistic value, or have components that rise to the level of individual distinction. Map ID B. 25950 Frey Avenue is not eligible under NRHP Criterion C or CRHR Criterion 3.

Criterion D/4: That have yielded, or may be likely to yield, information important in prehistory or history.

There is no evidence to suggest that Map ID B, 25950 Frey Avenue, has the potential to yield information important to state or local history. Therefore, the property is not eligible under NRHP/CRHR Criterion D/4.

4.1.2.4 Discussion of Integrity

In conclusion, the property at Map ID B, 25950 Frey Avenue, lacks sufficient significance to meet any of the criteria for listing in the NRHP or CRHR. To be eligible for listing in either register, a resource must first meet one or more of the significance criteria outlined above before a determination can be made as to whether the resource retains its historic character and is able to convey its significance. In the specific case of the property at Map ID B, 25950 Frey Avenue, an integrity analysis was considered immaterial because the evaluation found that the property lacked the necessary significance to warrant further analysis of its physical and historic integrity. Consequently, the evaluation determined that the subject property is not a historic property based on the NRHP criteria outlined in 36 California Code of Regulations 60.4, either individually or as a contributing element to an existing or potential historic district, nor is it a historical resource for the purposes of CEQA.

4.1.3 Map ID C: APN 087-010-22 (No Legal Situs)

Map ID C, APN 087-010-22, is a 66-acre, single-family residential and agricultural property that does not appear eligible for listing in the NRHP or CRHR due to a lack of historical associations and architectural merit. As such, the property does not appear to be a historical resource under CEQA and has been assigned a California Historical Resource Status Code of 6Z (found ineligible for the NRHP, CRHR, or local designation through survey evaluation).

4.1.3.1 Resource Specific Historic Context

Map ID C, APN 087-010-22 (no legal situs), was developed as a residential property and almond orchard in ca. 1970 by an unidentified property owner. Per the KCAR, the original property owners maintained the orchards until the early twenty-first century. The property was sold to unidentified owners in 2010 and 2010. In 2022, Erika and Brian J. Romanini purchased the property. Archival research, including from Ancestry.com, Newspaper.com, and KCAR archives, does not indicate that the original owner and developer, or subsequent owners or occupants, are persons important to our past (KCAR 2023c; Parcel Quest 2023c; NETR 2023).

4.1.3.2 Description

Map ID C, APN 087-010-22, is a 66-acre residential and agricultural property developed with a single-family residence, almond orchard, and irrigation infrastructure. The rectangular parcel, oriented east–west, fronts the south side of Merced Avenue and has an address indicator labeled “26767.” Most of the parcel is developed with a mature almond orchard. Map ID C1, Residence, is a one-story rectangular house (oriented east–west) adjacent to Merced Avenue (Photograph 6). The residence, which has an attached carport (east elevation), has a cascaded side-gable roof. Map ID C1 is accessed via a wood door on the main (south) elevation and has sliding windows in aluminum frames. The residence is clad in stucco and has a roof clad in composite asphalt tiles. A U-shaped, unpaved driveway loops around the residence, separating the building from the surrounding almond orchard. The rear of the residence was not accessible at the time of survey and is not visible from the public right-of-way. Map ID C2, includes a well with a vertical concrete flume and metal piping. The well is located north of the orchard and directly south of Merced Avenue.

Identified Alterations include:

- Unknown: Added detached metal shelter (observed alteration)

- 2006: Demolition (Permit Number AS17922)
- 2007: Miscellaneous site improvements (Permit Number AS17922)
- 2008: Demolition (Permit Number AS18963)
- ca. 2022: Structure/building association with Map ID C3. Well demolished (Google Earth 2023)
- 2021: Carport added to Map ID C1's north elevation (Google Earth 2023)
- 2022: Rear buildings/structures (south of Map ID C1. Residence demolished (Google Earth 2023)
- 2022: Removed mature trees that surrounded Map ID C1. Residence (Google Earth 2023)

Photograph 6. View of Map ID C. APN 087-010-22 including Map ID C1. Residence and Map ID C2. Well (yellow arrow), facing southeast (Google Earth 2023).



4.1.3.3 Discussion of Significance and Evaluation

National Register of Historic Places and California Register of Historic Resources

Criterion A/1: ***That are associated with events that have made a significant contribution to the broad patterns of our history.***

Map ID C, APN 087-010-22, a rural residential and agricultural property, is best understood as part of the broad pattern of rural agrarian practices in the Buttonwillow area. Map ID C, which was developed between 1956 and 1977 with a residence, irrigation infrastructure, and almond orchards, possesses an association with the agricultural development of the area during the mid-twentieth century, but research did not indicate that it contributed in any significant way to this pattern of development. The property also lacks an important association with the expansion of rural residential development in the Buttonwillow area. As such, Map ID C, APN 087-010-22, is not eligible under NRHP/CRHR Criterion A/1.

Criterion B/2: That are associated with the lives of persons significant in our past.

To be found eligible under B/2, Map ID C, APN 087-010-22, must be directly tied to an important person and the place where that individual conducted or produced the work for which they are known. Archival research indicates that Map ID C is not associated with any specific persons known to be historically important figures at the national, state, or local level. While a number of individuals have occupied the property either as owners or renters from the time of its construction to the present day, research did not indicate that any of these individuals made a significant contribution to history. Due to a lack of identified significant associations with important persons in history, Map ID C, APN 087-010-22, is not eligible under NRHP Criterion B or CRHR Criterion 2.

Criterion C/3: That embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction.

Map ID C, APN 087-010-22, is an agricultural property type in the rural arrow surrounding the town of Buttonwillow. Although Map ID C demonstrates key characteristic of a rural agricultural property-type, including agrarian land use for commercial activities, patterns of spatial organization, irrigation infrastructure, and vehicular and pedestrian circulation networks, the property is not a particularly distinguished example of this property type. Map ID C also does not possess high artistic value, nor is it a significant and distinguishable entity whose components may lack individual distinction. Additionally, archival research did not indicate that Map ID C was the work of a master architect or builder, possess high artistic value, or have components that rise to the level of individual distinction. Map ID C, APN 087-010-22, is not eligible under NRHP Criterion C or CRHR Criterion 3.

Criterion D/4: That have yielded, or may be likely to yield, information important in prehistory or history.

There is no evidence to suggest that Map ID C, APN 087-010-22, has the potential to yield information important to state or local history. Therefore, the property is not eligible under NRHP/CRHR Criterion D/4.

4.1.3.4 Discussion of Integrity

In conclusion, the property at Map ID C, lacks sufficient significance to meet any of the criteria for listing in the NRHP or CRHR. To be eligible for listing in either register, a resource must first meet one or more of the significance criteria outlined above before a determination can be made as to whether the resource retains its historic character and is able to convey its significance. In the specific case of the property at Map ID C, an integrity analysis was considered immaterial because the evaluation found that the property lacked the necessary significance to warrant further analysis of its physical and historic integrity. Consequently, the evaluation determined that the subject property is not a historic property based on the NRHP criteria outlined in 36 California Code of Regulations 60.4, either individually or as a contributing element to an existing or potential historic district, nor is it a historical resource for the purposes of CEQA.

4.1.4 Map ID D: 33540 Highway 58

Map ID D, 33540 Highway 58 (APN 103-070-35-00-3), is a 19-acre residential and agricultural property that does not appear eligible for listing in the NRHP or CRHR as a historic resource due to a lack of historical associations

and architectural merit. As such, the property does not appear to be a historical resource under CEQA and has been assigned a California Historical Resource Status Code of 6Z (found ineligible for the NRHP, CRHR, or local designation through survey evaluation).

4.1.4.1 Resource Specific Historic Context

Map ID 4, 33540 Highway 58 (APN 103-070-35-00-3), is a residential and agricultural property constructed in 1931 by an unidentified owner. Archival research, including from Ancestry.com, Newspaper.com, and the KCAR archives, did not yield information in subsequent property owners or indicate that the original owner and developer, or subsequent owners or occupants, are persons important to our past. KCAR indicates that Michael Bushnell purchased the property in 2000 before selling the parcel to Highway 58 LLC in 2020 (KCAR 2023c; Parcel Quest 2023d; NETR 2023).

4.1.4.2 Description

Map ID D, 33540 Highway 58 (APN 103-070-35-00-3), is comprised of a roughly rectangular 19-acre parcel developed with Map ID D1, Residence; Map ID D2, Barn; and a field dedicated to row crops. Map ID D1, Residence, is a one-story building with complex, irregular footprint that has been expanded over time. The building's primary elevation features a U-shaped façade ornamented with a full-length front porch supported by posts obscured by mature foliage and moderately overhanging eaves with faux rectangular rafters. Map ID D1 has a moderately pitched roof clad in composite asphalt shingle and the residence is clad in stucco. The building's secondary elevations were inaccessible during the survey and not visible from the public right-of-way. Aerials indicate that, to the rear of Map ID D1 is a rectangular pool, temporary octagonal shelter, and Map ID D2, Barn. Map ID D2, which was not visible from the public right-of-way, is a one-story rectangular building (oriented east–west) with a corrugated metal-clad roof (Photograph 7).

There are no identified alterations to Map ID D.

Photograph 7. Main (north) elevation of the residence located at [Map ID D, 33540 Highway 58], view looking northeast. Photograph taken on April 11, 2023.



4.1.4.3 Discussion of Significance and Evaluation

National Register of Historic Places and California Register of Historic Resources

Criterion A/1: That are associated with events that have made a significant contribution to the broad patterns of our history.

Map ID D, 33540 Highway 58, a rural residential and agricultural property, is best understood as part of the broad pattern of rural agrarian practices in the Buttonwillow area. Map ID D, which was developed in 1931 with a residence, barn, irrigation infrastructure, and agricultural orchards, possesses an association with the agricultural development of the area during the early- and mid-twentieth century, but research did not indicate that it contributed in any significant way to this pattern of development. The property also lacks an important association with the expansion of rural residential development in the Buttonwillow area. As such, Map ID D, 33540 Highway 58, is not eligible under NRHP/CRHR Criterion A/1.

Criterion B/2: That are associated with the lives of persons significant in our past.

To be found eligible under B/2, Map ID D, 33540 Highway 58, must be directly tied to an important person and the place where that individual conducted or produced the work for which they are known. Archival research indicates that Map ID D is not associated with any specific persons known to be historically important figures at the national, state, or local level. While a number of individuals have occupied the property either as owners or renters from the time of its construction to the present day, research did not indicate that any of these individuals made a significant contribution to history. Due to a lack of identified significant associations with important persons in history, Map ID D, 33540 Highway 58, is not eligible under NRHP Criterion B or CRHR Criterion 2.

Criterion C/3: That embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction.

Map ID D, 33540 Highway 58, is an agricultural property type in the rural area surrounding the town of Buttonwillow. Although Map ID D demonstrates key characteristic of a rural agricultural property-type, including agrarian land use for commercial activities, patterns of spatial organization, irrigation infrastructure, and vehicular and pedestrian circulation networks, the property is not a particularly distinguished example of this property type. Map ID D also does not possess high artistic value, nor is it a significant and distinguishable entity whose components may lack individual distinction. Additionally, archival research did not indicate that Map ID D was the work of a master architect or builder, possess high artistic value, or have components that rise to the level of individual distinction. Map ID D, 33540 Highway 58, is not eligible under NRHP Criterion C or CRHR Criterion 3.

Criterion D/4: That have yielded, or may be likely to yield, information important in prehistory or history.

There is no evidence to suggest that Map ID D, 33540 Highway 58, has the potential to yield information important to state or local history. Therefore, the property is not eligible under NRHP/CRHR Criterion D/4.

4.1.4.4 Discussion of Integrity

In conclusion, the property at Map ID D, 33540 Highway 58, lacks sufficient significance to meet any of the criteria for listing in the NRHP or CRHR. To be eligible for listing in either register, a resource must first meet one or more of the significance criteria outlined above before a determination can be made as to whether the resource retains its historic character and is able to convey its significance. In the specific case of the property at Map ID D, an integrity analysis was considered immaterial because the evaluation found that the property lacked the necessary significance to warrant further analysis of its physical and historic integrity. Consequently, the evaluation determined that the subject property is not a historic property based on the NRHP criteria outlined in 36 California Code of Regulations 60.4, either individually or as a contributing element to an existing or potential historic district, nor is it a historical resource for the purposes of CEQA.

4.2 Previously Recorded Resources

4.2.1 Map ID E: Midway Switching Center (P-15-009737)

Map ID E, Midway Switching Center, which is legally sited at 2205 Wasco Way and 40534 Highway 58 and covers 13 legal APNs (101-010-02-00-5, 101-010-15-00-3, 101-010-05-00-4, 101-010-04-00-1, 101-020-31-00-2, 101-020-35-00-4, 101-010-10-00-8, 101-020-23-00-9, 101-020-27-00-1, 101-020-33-00-8, 101-020-30-00-9, 101-020-28-00-4; and 101-010-14-00-0 is a 280-acre utilitarian property developed with a large, electrical substation. As a result of extensive archival research and an intensive field survey Map ID E, Midway Switching Center, does not appear eligible for listing in the NRHP or CRHR due to a lack of historical associations and architectural merit. The Midway Switching Center does not appear to be a historical resource under CEQA and has been assigned a California Historical Resource Status Code of 6Z (found ineligible for the NRHP, CRHR, or local designation through survey evaluation).

4.2.1.1 Resource Specific Historic Context

On July 15, 1920, SJPC opened their first power plant in Bakersfield, California. Less than a month later, SJPC opened a second plant on the San Joquin River. The company's third power plant, the Midway Steam Plant in Buttonwillow, opened on June 11, 1921, and supplied 17,000 horsepower units along high-tension lines to local rural, largely agricultural communities. The 120-acre power plant consisted of a boiler room, turbine room, an electrical operating room, and a large retention and cooling pond. In October of the same year, a fourth steam power plant opened on the Kern River, further adding to the company's power infrastructure. Within 2 years, SJPC established four power plants that produced over 100,000 units of horsepower (San Francisco Chronicle 1921: p. 20; Fresno Republican 1921: p. 13; Tribune 1921: p. 8).

Within less than a year, the Midway Steam Plan no longer met energy demands posed by Kern County's growing population. To increase production, SJPC spent $1,250,000 to increase production to double the plant's size and increase its total output to approximately 40,000 units. The Midway Steam Plant continued producing electricity for the region until the late 1940s and development of nuclear power plants in the region. The Midway Steam Plant was demolished by 1952, and by 1956, the site of the (extant) Midway Switching Center was largely a grass field dotted with trees and landscaping. (Fresno Morning Republican 1922: p. 13; NETR 2023).

By 1968, PG&E completed the 1,025-mile 500kV Pacific Northwest-Southwest Intertie, a transmission corridor connecting the Columbia River to Midway Switching Center in Kern County, California, where power transfers to Southern California Edison. The project included the construction and placement of transmission infrastructure and substantial upgrades to the company's existing substation network. Seven substations, including Round Mountain, Table Mountain, Vaca-Dixon, Tesla, Metcalf, Los Banos, and Midway, were either rehabilitated or razed and reconstructed as Extra High Voltage stations. The seven substations were equipped with larger circuit breakers, transformers, and switching equipment necessary to relay and convert the 500 kV power to lower voltage. The facilities were also equipped with cutting-edge computer technology that monitored and regulated energy flow (PG&E 2020: pp. 3-115).

In 1999, Pacific Survey Inc., documented four built environment resources, including the original control house (extant Map ID E1), a single-family residence, and two ancillary buildings (non-extant) that were constructed in ca. 1921 as part of the Midway Steam Plant. The residence and associated outbuildings were demolished in the early twenty-first century, and a large wooden security fence was constructed around the entirety of the site for security. PG&E's outdoor equipment and standardized structures are regularly upgraded or replaced as part of ongoing operations and maintenance. No alterations were observed to the tower, but insulators and conductors have likely been replaced as part of routine maintenance (NETR 2023).

4.2.1.2 Property Type: Electrical Infrastructure

Power infrastructure is present throughout the United States in urban and rural areas. Resources include transmission lines (corridors and the individual poles and towers within them), substations (including various structures, elements, and types), control houses, maintenance facilities, office spaces, converter stations, and a wide variety of other site-specific buildings and structures. Power infrastructure is marked by its utilitarian design that values its stability and function and does not include recognizable design features. The power system includes a vast quantity of types of buildings and structures, many of which follow similar forms, repeated throughout the rural landscape. Power transmission structures are designed to work with the topography of the area. Their

structures represent various designs that support their function as power transmission support. Similarly, substations were designed with functionality in mind.

Transmission lines are a series of vertical poles or towers that hold electric conductors to power plants and substations to serve individual customers such as cities, towns, industrial plants, and utility districts. Transmission line structures include three main architectural design components: the tower structure, the conductors, and the insulators. The tower is the structure that holds the insulators, and the insulators hold the conductors, which come in the form of a transmission line. The transmission of electricity includes anything above the electrical voltages of 60 kV or more. 500 kV transmissions are the highest voltage connected to energy grids throughout the western United States. Lines with higher voltages (230 kV and above) are primarily carried on metal towers, while lines below 230 kV are usually on wooden pole structures. With technological advances in insulator and conductor design, components are replaced and repaired regularly. Transmission lines and systems are generally categorized by their conductor positioning, construction materials, and voltage.

Character-defining features are the specific physical characteristics of data requirements that an individual property must possess to retain integrity. Key character-defining features of transmissions lines often include the following:

- Alignment of transmission line from the date of original construction
- Intact primary tower structures
- Connectivity and association to power generating plants and substations

Substations act as a receiver of newly generated power through transmission lines and use transformers to convert energy into high voltages or convert the current to lower desired voltages. Substation design includes structures such as the intake from high-voltage transmission lines, transformers, switchgears, shield wires, and lightning arrestors that divert lightning to the ground through towers. Two types of substations are transmission substations and distribution substations. Transmission substations are known for either increasing voltages for long-distance transmission or decreasing voltages for sub-transmission and distribution to the user. Distribution substations generally serve as the electric system that operates before serving customers.

Character-defining features are the specific physical characteristics of data requirements that an individual property must possess to retain integrity. Key character-defining features of substations often include the following:

- Power capacity generated from the date of original construction
- Connection/association to power generating plants and transmission lines

4.2.1.3 Description

The PG&E Midway Switching Station comprises two legal addresses—2205 Wasco Way and 40534 Highway 58—and covers 13 legal APNs (101-010-02-00-5, 101-010-15-00-3, 101-010-05-00-4, 101-010-04-00-1, 101-020-31-00-2, 101-020-35-00-4, 101-010-10-00-8, 101020-23-00-9, 101-020-27-00-1, 101-020-33-00-8, 101-020-30-00-9, 101-020-28-00-4; 101-010-14-00-0) (Parcel Quest 2023e).

The Midway Switching Center is an electric bulk power transmission and step-down switching facility located directly east of Buttonwillow, a 1,340-resident Census Designated Place, in Kern County, California. The substation is bound by the Buttonwillow Recreation and Park District and East Side Canal to the west, agricultural properties and

orchards to the north, Wasco Way to the east, and Highway 58 (Blue Star Memorial Highway) to the south. The 247.47-acre, sprawling complex has an irregular footprint surrounded by a tall wall constructed from thick, vertical wood beams. The property is accessible via four oversized metal gates on the south and east sides of the complex.

The Midway Switching Center features a control house with a one-story building with a rectangular plan, raised concrete foundation, and a flat roof. Clusters of electrical equipment include a series of circuit breakers, switch arresters, and generator-battery modules that divide incoming energy among multiple outgoing transmission lines. Vertical metal latticework structures support busbars, shield wires, and lightening arrestors that divert lightning strikes away from the substation's electrical infrastructure. Additional infrastructure includes transmission wire, lattice steel towers, lattice steel poles, light duty steel poles, and wood poles. The interior of the Midway Switching Center property was not accessible at the time of survey and not visible from the public right of way. PG&E's 2020 HEIMP describes the facility's buildings as utilitarian (PG&E 2020: pp. 4. 21-22; A2. 17; A2. 20; A3C. 12) (Photograph 8).

Identified Alterations

Electrical infrastructure, including transmission lines and substations, have outdoor equipment and standardized structures that are routinely maintained. There are no observed alterations visible from the right-of-way, and construction/maintenance records could not be obtained.

Photograph 8. Overview of Map ID E, Midway Switching Center, a PG&E substation, facing northwest.



4.2.1.4 Discussion of Significance and Evaluation

4.2.1.4.1 Approach to Historic Era Resources

PG&E uses a comprehensive management plan to assist in the identification, evaluation, and treatment of their historic-era electrical infrastructure, the HEIMP. The HEIMP presents a comprehensive historic context, related property types, a framework for identification and evaluation, and management plan implementation strategies. The historic context outlined in the HEIMP provides an in-depth context of PG&E's history since its establishment in 1905. Within this context, the HEIMP outlines four major significance themes to apply under each of the evaluation criteria of the NRHP and CRHR. These include the following:

- The role of **Corporate Organization** in facility development and expansion.
- The role of **Technological Innovation** in electrical development and consumption.
- The role of **Architectural Treatment** and design in facility development.
- The role of electrical development in California's **Community Development**.

The HEIMP also outlines exempt PG&E property types in Chapter 5, Historic-Era Electrical Identification and Evaluation Standards. The established periods of significance for transmission alignments are 1901–1931 for 60 kV to 230 kV transmission lines, and 1960–1970 for 500 kV transmission lines. The transmission lines that are exempt from review are standardized and ubiquitous and have no potential to convey any of the significant themes as defined by PG&E. Transmission alignments and facilities that fall outside these defined periods are considered standard or iterative in technology, function, and design (PG&E 2020: 5-21).

According to the HEIMP, the substation within the project area—the Midway Switching Center—is one of 948 PG&E substations that facilitate the transmission of electricity from generating facilities to consumers. The oldest substation owned by PG&E was constructed in Solano County by the Bay Counties Power Company in 1901 while the newest dates to 2016 (PG&E 2020: p. 4-21).

4.2.1.5 Discussion of Significance and Evaluation

Map ID E, Midway Switching Center, per PG&E's 2020 HEIMP, was evaluated in 2014 by Cardno environmental consulting and recommended ineligible for the NRHP. Although Cardno's evaluation did not receive SHPO concurrence, Kern County's Inventory of Archeological Determinations of Eligibility lists the property as having an NRHP status code of 6Y (determined ineligible for the NRHP by consensus through Section 106 process and not evaluated for the CRHR or local listing). Architectural Historian Claire Cancilla, MA, resurveyed the property in October 2023 for potential recordation on the CRHP.

Map ID E, Midway Switching Center, does not appear eligible for listing in the NRHP or CRHR as a historic resource due to a lack of historical associations and architectural merit. As such, the property does not appear to be a historical resource under CEQA and has been assigned a California Historical Resource Status Code of 6Z (found ineligible for the NRHP, CRHR, or local designation through survey evaluation).

California Register of Historic Resources

Criterion 1: That are associated with events that have made a significant contribution to the broad patterns of our history.

The Midway Switching Center, which features components constructed in 1921 and 1968, was constructed to provide power to rural residents in Kern County. The Control Building (extant 1921 resource), and the infrastructure associated with the 1968 Midway Switching Center (Map ID E) are representative of a massive investment in the development and transmission of electrical power. Under CRHP Criterion 1, Map ID E must be directly associated with events that have made a significant contribution to the broad patterns of our history. Relevant historical themes for Buttonwillow and rural Kern County, and rural communities within the State of California, include agriculture and/or commerce and industry. Archival research does not indicate that Map ID E initiated or significantly contributed to agricultural development in, or around, Buttonwillow. Although the establishment of Map ID E in 1968 contributed to the region's economy and industry, the Midway Switching Center is not an electrical substation that made a unique or significant contribution to the region's commercial or industrial sectors.

Map ID E does not appear to be associated with any extraordinary events or events occurring within the context of electrical infrastructure development, nor does it have a significant association with the broad patterns of history in Buttonwillow, Kern County, or the State of California. Therefore, the Midway Switching Center does not appear eligible under CRHR Criterion 1.

Criterion 2: That are associated with the lives of persons significant in our past.

To be found eligible under Criterion 2, the Midway Switching Center must be directly tied to an important person and the place where that individual conducted or produced the work for which they are known. Archival research does not indicate that an important individual conducted significant work at the Midway Switching Center (Map ID E) and, therefore, this property does not appear eligible under CRHR Criterion 2.

Criterion 3: That embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction.

Extant Map ID E, Midway Switching Center, is a standard, electrical substation consistent with PG&E's midcentury design. Individual features, including the 1921 Control House are reflective of resource types commonly used for utilitarian purposes. The Midway Switching Center (Map ID E) and its individual components are undistinguished examples of this property type. Map ID E does not possess high artistic value, nor is it a significant and distinguishable entity whose components may lack individual distinction. As such, the property is not eligible under NRHR Criterion 3.

Criterion 4: That have yielded, or may be likely to yield, information important in prehistory or history.

There is no evidence to suggest that the Midway Switching Center has the potential to yield information important to state or local history. Therefore, the property does not appear eligible under CRHR Criterion 4.

4.2.1.6 Discussion of Integrity and Evaluation Summary

National Register Bulletin 15: How to Apply the National Register Criteria for Evaluation (NPS 1997) states that the integrity of a property is based upon the historical significance and character-defining features of that property, and that "only after significance is fully established can you proceed to the issue of integrity."

To be eligible for listing in the NRHP, properties must retain their physical integrity from the period in which they gained significance. In the case of architecturally significant properties, the period of significance is normally the date of construction. For historically significant properties, the length of the historic associations usually measures the period of significance. As the Midway Switching Center is not significant under any NRHP or CRHR criteria, it does not have a period of significance and the integrity of the buildings does not require examination.

Based on the significance evaluation and in consideration of the Midway Switching Center history and requisite integrity, Dudek finds the complex not eligible for listing in the NRHP or CRHR. As a result of Dudek's extensive archival research, field survey, and property significance evaluations, the Midway Switching Center does not appear eligible for listing in the NRHP or CRHR as a historic resource due to a lack of historical associations and architectural merit. As such, the Midway Switching Center does not appear to be a historical resource under CEQA and has been assigned a California Historical Resource Status Code of 6Z (found ineligible for the NRHP, CRHR, or local designation through survey evaluation).

4.2.2 Map ID F: Segment of the East Side Canal (P-15-013725)

Map ID F, Segment of the East Side Canal is a .38-mile linear resource associated with the East Side and All-American Canal systems. As a result of extensive archival research and an intensive field survey the canal segment does not appear eligible for listing in the NRHP or CRHR due to a lack of historical associations and architectural merit. This Segment of the East Side Canal does not appear to be a historical resource under CEQA and has been assigned a California Historical Resource Status Code of 6Z (found ineligible for the NRHP, CRHR, or local designation through survey evaluation).

4.2.2.1 Resource Specific Historic Context

Map ID F has been previously recorded in 2009 by JRP Historical Consulting and in 2013 by Compass Rose Archaeological, JRP Historical Consulting, and ArchaeoPaleo Resource Management. For the most recent, comprehensive historic context statement regarding Map ID F, Segment of the East Side Canal, please refer to the 2013 DPR 523 Form prepared by Linda Akyuz and Denise Ruzicka, ArchaeoPaleo Resource Management. This recordation provides specific context regarding the subject segment of the East Side Canal (Akyuz and Ruzicka 2013: pp. 1-11; Parcel Quest 2023f).

Map ID F, Segment of the East Side Canal, was originally constructed in ca. 1900 to provide water for the Buttonwillow Ranch, owned by Miller and Lux. When the original canal was constructed, it was earthen-lined, 25 feet wide, and 3 to 5 feet deep. In ca. 1920, after both business partners had died and the ranch changed hands, the sections of the East Side Canal, including Map ID F, were realigned and enlarged to triple its water-carrying capacity. In 1924, the Buena Vista Water Storage District was established to manage the region's infrastructure and took ownership of the earthen-lined, 27-mile-long East Side Canal. After an unprecedented amount of rainfall flooded the Buena Vista Water Storage District in 1935, the East Side Canal, including Map ID F, underwent a series

of improvements. Over the length of the entire canal, new culverts, drains, ditches, bridges, weirs, and management systems were constructed. Several segments were excavated and lined in concrete. In 1943, the Buena Vista Water Storage District implemented a canal maintenance program that provided routine maintenance to the system every two years (USGS 1910; Akyuz and Ruzicka 2013: pp. 1-11) (Photograph 9).

4.2.2.1.1 Property Type: Water Infrastructure

Water infrastructure can be traced back more than 2,000 years to the Roman Empire in the form of aqueducts spanning Europe to connect water resources from rural areas to city centers. In the United States, the early Euro-American settlement period developed water infrastructure in areas of the arid west with mining and agriculture along water courses and passes through the Sierra Nevada. Diversion and irrigation ditches were constructed from river and stream waters to support mills and individual farmers. Beginning in 1903, the United States Reclamation Service (later the Bureau of Reclamation) began federal investment in irrigation services throughout the West, and construction of these large-scale irrigation projects allowed for population increases in rural areas. Examples of water infrastructure include main water lines, wells, pumping stations, treatment plants, stormwater drains, sewer drains, dams, and levees. Water infrastructure could contain closed features, such as underground pipes, wells, tanks, and drains, or it could be constructed near ground level, such as canals, laterals, and ditches. Water delivery and irrigation systems could include ancillary features such as bridges, checks, and flumes. Materials used to create water infrastructure systems, for either water transportation or water storage, include wood, metal, steel, and more recently, industrial-use plastics.

Character-defining features are the specific physical characteristics of data requirements that an individual property must possess to retain integrity. Key character-defining features of water infrastructure often include the following:

- Alignment and system connectivity of its original construction
- Primary physical and operational components (laterals, flumes, canals)
- Connectivity/association to power-generating hydroelectric dams and powerhouses

4.2.2.2 Description

The .38-mile segment of the (24-mile) East Side Canal consists of a concrete-lined water conveyance structure with a trapezoidal shape, steep sides, and a flat bottom. The top of the canal is approximately 12 feet deep. The top of the canal is between 10 and 20 feet wide while the bottom is approximately 6 feet wide. The canal right-of-way—the reserved land on either side of the depression—totals approximately 100 feet wide (Photograph 9).

Identified Alterations

This realignment was paved in the early twenty-first century. Water and irrigation infrastructure have outdoor equipment and standardized structures that are routinely maintained. There are no observed alterations visible from the right-of-way, and construction/maintenance records could not be obtained (Akyuz and Ruzicka 2013: p.3).

Photograph 9. Partial view of Map ID F, Segment of the East Side Canal, facing southeast.



4.2.2.3 Discussion of Significance and Evaluation

In 2001, the Bureau of Land Management determined the All-American Canal is eligible for the NRHP as a historic district under Criterion A and Criterion C. According to the report, the All-American Canal was found to be significant on local, state, and national levels due to its association with major federal public works projects. All elements of the canal were evaluated as significant contributing elements of a district even if they are less than 50 years old. The Bureau of Land Management stated that additional research is required to determine if elements are contributory, prior to any NRHP nomination submittals. The All-American Canal is an ongoing and vital element of Kern County's infrastructure that, since its construction, has required regular maintenance and upgrading (Schaefer and O'Neil 2001: 71).

Map ID F, Segment of the Eastside Canal, was originally documented in separate DPR 523 Forms by JRP Historical Consulting LLC, and ESA 2009. Neither firm evaluated the resource. In 2013, ArchaeoPaleo Resources also recorded the subject segment but did not evaluate the resource's significance due to a perceived lack of integrity. In a subsequent 2013 documentation effort, Historian Linda Akyuz evaluated the resource and determined that, although the canal has played an important role within California's agricultural history, the subject segment is a contemporary realignment of the canal. Additionally, the realigned concrete-clad canal was constructed wider and deeper than the original earthen East Side Canal. As such, Akyuz recommended that the subject segment of the East Side Canal be found ineligible for recordation in the NRHP and CRHR (6Z: recommended ineligible through a survey evaluation).

In October 2023, Dudek revisited a portion of the East Side Main Canal adjacent to the Project API and observed minimal, maintenance-based alterations since the last recordation in 2013. Dudek concurs with the previous findings that the canal does not meet the criteria for listing in the NRHP or CRHR due to lack of integrity. Although the .38-mile subject Segment of the East Side Canal has an association with the prominent landowners Henry Miller (1827-1916) and Charles Lux (1823-1887) and contributed to the agricultural development of the area, it no longer

reflects its original construction as it existed during the period from ca 1900 to ca 1920. In ca 1920, ownership of the canal changed hands and the structure was realigned and enlarged to triple its water-carrying capacity. Dudek also finds—as a result of the current study, and in accordance with Section 15064.5(a)(2)-(3) of the CEQA Guidelines and the criteria outlined in PRC Section 5024.1—that the segment of the Westside Main Canal is not a historical resource for the purposes of CEQA. Dudek has assigned the segment of the Westside Main Canal a 6Z California Historical Resource status code.

Consequently, the subject property is not a historic property based on the NRHP criteria outlined in 36 CFR Section 60.4, individually or as a contributing element to an existing or potential historic district. Similarly, the evaluation also concludes that the subject property is not a historical resource for the purposes of CEQA as defined under PRC Section 5024.1 and 14 CCR Section 15064.5(a), either individually or as a contributing element to an existing or potential historic district.

5 Findings and Conclusions

Dudek evaluated the API in accordance with Section 15064.5 (a)(2)-(3) of the State CEQA Guidelines and using the criteria outlined in Section 5024.1 of the PRC. Dudek concludes that the properties evaluated within the API do not appear eligible for listing in the NRHP or CRHR resources due to a lack of significance. As such, no properties within the API are considered to be historical resources under CEQA (Table 6).

Table 6. Summary of Significance Evaluations and Findings

Map ID	Resource/Address	Year Built	Primary Number*	NRHP/ CRHR Eligibility	CHR Status Code
Newly Identified Resources in the API					
A	Residence and farm. 39301 Sullivan Road	ca. 1964	N/A	Not Eligible	6Z
B	Residence. 25950 Frey Avenue	1978	N/A	Not Eligible	6Z
C	Residence and farm. No Legal Situs. APN 087-010-22	ca. 1970	N/A	Not Eligible	6Z
D	Residence and farm. 33540 Highway 58	1931	N/A	Not Eligible	6Z
Previously Recorded Resources in the API					
E	Midway Switching Center (PG&E Substation). 2205 Wasco Way, 40531 Highway 5	ca. 1921; 1968	P-15-009737	Not Eligible	6Z
F	East Side Canal.	ca. 1900	P-15-013725	Not Eligible	6Z

Notes: APN = Assessor's Parcel Number; API = Area of Potential Impacts; ca. = circa; CHR = California Historical Resources [Status Code]; NRHP = National Register of Historic Places; CRHR = California Register of Historical Resources; 6Z = Found ineligible for NR, CR, or local designation through survey evaluation.

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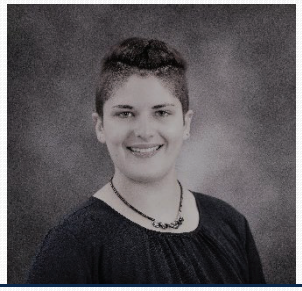
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Appendix A
Preparers' Qualifications

EJ Jones, MA

ARCHITECTURAL HISTORIAN

EJ (Erin) Jones (EE-JAY *JO-nes; they/them*) is a cultural resource manager with 3 years' experience specializing in Washington, Oregon, and California. Jones is an expert researcher and is adept at context writing and the evaluation of historic properties. They have experience authoring California Environmental Quality Act (CEQA) compliance documents, National Historic Preservation Act (NHPA) Section 106 compliance reports, Historic Resource Evaluation Reports (HRERs), Cultural Resources Inventory and Evaluation Reports (CRIERs), Historical Resource Inventories (HRI), Cultural Resource Technical Reports (CRTRs), Historical Resources Inventory and Evaluation Reports (HRIERs), and Historic American Building Survey (HABS)–level documentation. Jones meets the Secretary of the Interior's Professional Qualification Standards for architectural history.



Education

California State University, Sacramento
MA, Public History with Distinguished Honors,

University of Oregon
BA, History and Political Science

Dudek Project Experience

Confidential Energy Project, Confidential Client, Kern County, California. Serving as architectural historian, conducted in-person archival research and authored the Historic Architectural Landscape Survey (HALS) documentation as a mitigation measure for a proposed energy facility and energy storage system in Kern County, California. (2022–2023)

Confidential Solar Project, Confidential Client, Washoe County, Nevada. Serving as architectural historian, coauthored the technical study for the project, which proposed the development of a solar energy facility and energy storage system. The project sites are in unincorporated Washoe County, Nevada. All buildings and structures more than 45 years old were recorded and evaluated for historical significance, which included conducting archival research and building development research for a potential historic vernacular landscape, energy transmission, mined areas, and related histories located on the project sites and completing a historic context. (2022–2023)

Confidential Solar Project, Confidential Client, Sacramento County, California. Serving as architectural historian, authored the technical study for the project, which proposed the development of a solar energy facility, energy storage system, and Gen-Tie Line. The project sites are in unincorporated south Sacramento County, California. The technical study involved a pedestrian survey for the presence of historic built environment resources. All buildings and structures more than 45 years old were recorded and evaluated for historical significance, which included conducting archival research and building development research for a potential historic vernacular landscape located on the project site and completing a historic context. (2023)

Confidential Solar Project, Confidential Client, Sacramento County, California. Serving as architectural historian, coauthored the technical study for the project, which proposed the development of a solar energy facility and energy storage system. The project sites are in unincorporated eastern Sacramento County, California. The technical study involved a pedestrian survey for the presence of historic built environment resources. All buildings

and structures more than 45 years old were recorded and evaluated for historical significance, which included conducting archival research and building development research for a potential historic vernacular landscape, military development, energy transmission, mined areas, ranching, dairy, and related histories located on the project sites and completing a historic context. Contributed to the associated archeology site work and authored a section of the archeological context. (2021–2023)

Confidential Solar Project, Confidential Client, Sacramento County, California. Serving as architectural historian, coauthored the technical study for the project, which proposed the development of a solar energy facility and energy storage system. The project sites are in unincorporated eastern Sacramento County, California. The technical study involved a pedestrian survey for the presence of historic built environment resources. All buildings and structures more than 45 years old were recorded and evaluated for historical significance, which included conducting archival research and building development research for a potential historic vernacular landscape, hop growing, and related histories located on the project sites and completing a historic context. (2021–2023)

Confidential Solar Project, Confidential Client, San Bernardino County, California. Serving as architectural historian, authored the technical study for the project, which proposed the demolition of extant structures and development of a solar energy facility and energy storage system. The project sites are in unincorporated San Bernardino County, California. All buildings and structures more than 45 years old were recorded and evaluated for historical significance. Efforts included conducting archival research and building development research for a potential historic significance. (2022)

BEIER for NSCD Biomass Project, NCSD, Truckee, Placer County, California. Dudek was retained by Northstar Community Services District (NCSD) to prepare a BEIER for the proposed NCSD Biomass Project located in Northstar at Tahoe Ski Resort community, which is located approximately 6 miles south of downtown Truckee in Placer County. The NCSD proposes to build a biomass energy system to meet heating loads that are currently served by natural gas-fired boilers in approximately 14 buildings in the Northstar California ski resort community. The new energy system will consist of two wood chip–fired hot water boilers located on NCSD property at 908 Northstar Drive. Heating loads include a range of residential and commercial space heating, domestic hot water, and swimming pools and spas. As lead architectural historian, authored the technical report as part of supporting documentation for the initial study prepared in accordance with the requirements of CEQA (PRC, Section 21000 et seq.) and the CEQA Guidelines (14 CCR 15000 et seq.) (2022)

Confidential Solar Project, Confidential Client, Santa Clara County, California. Project architectural historian and author of the technical study for the project. The proposed project sites are in unincorporated Santa Clara County, California. Efforts included conducting archival research for a county wide historic context document. (2022)

BEIER for Golden State Natural Resources Gould Site, Golden State Finance Authority, Lassen County, California. Served as the architectural historian and coauthor of the BEIER for the Golden State Natural Resources Gould Site Project. Dudek was retained by the Golden State Finance Authority to complete a BEIER for a proposed project that would redevelop a site in Nubieber, Lassen County, to facilitate the transport of forest material (such as trees or underbrush that have no lumber value). The project parcels comprised approximately 65 acres, a light-industrial site associated with regional logging, and an abandoned 1930s Great Northern and Western Pacific Railroad station. Conducted the CHRIS records search; the pedestrian surface reconnaissance survey of the built environment Area of Potential Effects (APE); extensive archival and building development research; the development of an appropriate historic context for the project area; recordation and evaluation of the buildings over 45 years of age for the NRHP, CRHR, and local historic resource eligibility criteria and integrity requirements in compliance with CEQA; and report and accompanying DPR 523 form set preparation. (2022)

Monte Kim, PhD

SENIOR ARCHITECTURAL HISTORIAN

Monte Kim (*he/him*) is a senior architectural historian and historic built environment resource specialist with over 20 years of professional experience in all phases of regulatory compliance under Section 106 and Section 110 of the National Historic Preservation Act (NHPA), Section 4(f) of the Department of Transportation Act, National Environmental Policy Act (NEPA), and California Environmental Quality Act (CEQA). He has experience in the inventory and evaluation of resources within the historic built environment, as well as the assessment of effects on historic properties and historical resources and has authored or co-authored nominations for the National Register of Historic Places (NRHP) and has overseen the documentation of historic properties in accordance with the standards required for the Historic American Building Survey (HABS), the Historic American Engineering Record (HAER), and the Historic American Landscape Survey (HALS). He has also developed and implemented resource-specific mitigation measures, treatment plans, protection plans, and interpretive plans for large, transportation-related projects, including the California High-Speed Rail Project. Additionally, he has experience consulting with State Historic Preservation Officers and developing programmatic agreements and memorandum of agreement documents for government agencies. Mr. Kim meets the Secretary of the Interior's Professional Qualification Standards for history and architectural history.



Education

University of California, Santa Barbara PhD, History, 2005

California State University, Sacramento MA, Public History, 1999

University of California, Santa Cruz BA, History, 1996

Professional Affiliations

California Preservation Foundation

Vernacular Architecture Forum

Transportation Research Board

Employment History

Dudek (2023-Present)

WSP/CA High-Speed Rail Authority (2015-2023)

ICF International 2015-2022)

Relevant Project Experience

On-Call Services for Department of Water Resources, Operations and Maintenance Division, State of California. Dudek was retained by the State of California's Department of Water Resources (DWR), Operations and Maintenance Division (O&M), to assist in a wide range of on-going environmental compliance efforts. Under this on-call contract, Mr. Kim provides senior level guidance and reviews of the built environment evaluations and technical reports prepared under the current task orders (2023–Ongoing).

California Department of Fish and Wildlife Mission Creek Habitat Restoration Project, Santa Barbara County, California. The California Department of Fish and Wildlife (CDFW) retained Dudek to provide a peer review of a mitigated negative declaration (MND) and the supporting cultural resources technical studies for the Mission Creek Habitat Restoration Project. The reports were prepared for Southern California Edison for a project that involved restoration treatments on a 2.88-acre site and the evaluation of historic built resources within the area of potential impacts in conformance with the regulatory requirements of the California Environmental Quality Act. Mr. Kim reviewed the MND and supporting technical studies and found them to be adequate for compliance under CEQA (2023).

Area of Potential Effects Justification & Preliminary Effects Assessment Memorandum for the San Luis Rey Habitat Management Area Wetland Restoration Project, San Diego County, California. Dudek assisted the San Diego County Water Authority (SDCWA) address comments from the U.S. Army Corps of Engineers (Corps) regarding potential impacts from the San Luis Rey Habitat Management Area Wetlands Restoration Project on a segment of the Second San Diego Aqueduct within the project's area of potential effects (APE). The memorandum recommended that SCDWA consider the aqueduct segment within the APE eligible for the National Register of Historic Places (NRHP) for the purposes of the undertaking only and that a finding of no historic properties affected under 36 CFR § 800.4(d)(1) would be appropriate because the resource would be avoided and protected through measures implemented by the project. Mr. Kim authored the justification for the APE and the Section 106 preliminary effects analysis using the criteria of adverse effect (36 CFR § 800.5) (2023).

Cultural Resources Technical Memorandum for the Scotts Valley Water District Intertie Project, Santa Cruz County, California. Dudek was retained by the Scotts Valley Water District to evaluate the impacts from the extension of a 9,600 linear-foot water pipeline to a new pump station in unincorporated Santa Cruz County. Dudek completed a records search, intensive pedestrian survey, and evaluation of built resources within the pipeline's study area. The memorandum found that none of the built resources in the study area were eligible for the NRHP, CRHR, or local designation. These resources were also evaluated in accordance with 14 CCR § 15064.5(a)(2)-(3) using the criteria outlined in PRC § 5024.1 and determined not to be historical resources for the purposes of CEQA. Mr. Kim provided a senior level review of the evaluations and the technical memorandum for this project (2023).

Previous Project Experience

California High-Speed Rail Project Environmental Impact Report/Environmental Impact Statements. Mr. Kim served as a lead planner for the California High-Speed Rail Authority and was responsible for reviewing the cultural resources, parks and recreation, and Section 4(f) EIR/EIS chapters for six of the eight regional sections of the California High-Speed Rail Project. Additionally, he reviewed the supporting cultural resources technical reports (inventory, evaluation, and finding of effect reports), built environment treatment plans, as well as contributed to the drafting of four memorandum of agreement documents between the California High-Speed Rail Authority, California SHPO, and the Surface Transportation Board, provided technical guidance to the Authority's regional consultants, and consulted with the SHPO to obtain Section 106 and Section 4(f) concurrences (2015-2022)

Feather River CEQA/NEPA Compliance, Sutter Butte Flood Control Agency, Butte and Sutter Counties, California. This report was prepared for the Sutter Butte Flood Control Agency (SBFCA) to support the agency in fulfilling its regulatory obligations under the Section 106 of the NHPA for various construction improvements along a 40-mile segment of the Feather River Levee in Sutter and Butte Counties. Mr. Kim recorded and evaluated historic built environment resources in the project APE in consultation with the Army Corps of Engineers and the SHPO. The survey work resulted in the identification of 99 historic-era resources within the APE, which required evaluation under NRHP Criteria. Of the resources inventoried, 17 resources were found to be eligible for the NRHP, including the Feather River Levee and the Sutter-Butte Canal. Mr. Kim also assisted in preparing the Section 106 effects analysis and developing mitigation measures for properties adversely affected by the project. (2012–2015)

Built Historical Resources Evaluation Report for the Bay Delta Conservation Plan Project, Sacramento, Yolo, Solano, San Joaquin, Contra Costa, and Alameda Counties, California. This report was prepared for the California Department of Water Resources for a project known previously as the Bay Delta Conservation Plan. The report documented and evaluated 25 newly identified properties that were found eligible for listing in the NRHP and CRHR. Mr. Kim conducted intensive field survey and evaluated properties under NRHP and CRHR listing criteria on DPR 523 forms (2012).

Katie Ahmanson, MHC

ARCHITECTURAL HISTORIAN



Katie Ahmanson (*KAY-tee AH-mun-son; she/her*) is an architectural historian with 3 years' experience in the field of architectural history and heritage conservation. She has experience with Historic-Cultural Monument and National Register of Historic Places (NRHP) nominations, historic context statements, building descriptions, and California Department of Parks and Recreation (DPR) 523 forms. Ms. Ahmanson has worked with environmental compliance documentation in support of projects that fall under the California Environmental Quality Act (CEQA)/National Environmental Policy Act, and Sections 106 and 110 of the National Historic Preservation Act.

Education

University of Southern California School of Architecture
MA, Heritage Conservation, 2022

Claremont McKenna College
BA, Art History, 2019

Project Experience

Built Environment Inventory and Evaluation Report for a Confidential Solar Project, Confidential Client, Unincorporated Imperial County, California. Dudek was retained by a confidential client to prepare a BEIER for a confidential solar project located unincorporated Imperial County, California. The project proposes to develop a solar facility on approximately 1,456 acres of agricultural land. The report documents Dudek's efforts to identify and evaluate built environment resources 45 years of age or older (historic era) that may be subject to direct or indirect impacts under CEQA as a result of the construction and operation of the proposed project. As an architectural historian, completed the Historic Context section for the report. (2023)

South Bay Area Plan Project Historic Context Statement, unincorporated Los Angeles County, California. Dudek was retained by the County of Los Angeles Department of Regional Planning to prepare a Historic Context Statement (HCS) for the South Bay Area Plan (SBAP) project. The HCS is one component of the larger SBAP project that addresses the following seven unincorporated communities of the County: Alondra Park/El Camino Village, Del Aire/Wiseburn, Hawthorne Island, La Rambla, Lennox, West Carson, and Westfield/Academy Hills (SBAP communities). Collectively, these SBAP communities reside within the South Bay Planning Area, which is one of the 11 Planning Areas identified in the County General Plan. The purpose of the HCS is to inform and enhance the larger SBAP project as it relates to historical resources within the SBAP communities, including the preparation of goals, policies, and implementation programs. As an architectural historian, surveyed the area and completed archival research for the report. (2023)

Mesa Verde Specific Plan Built Environment Inventory and Evaluation Report, Mesa Verde Owners, LLC, Calimesa, California. Dudek was retained by Mesa Verde Owners, LLC to complete a built environment inventory and evaluation report (BEIER) for the proposed Mesa Verde Specific Plan 2023 Project, which is an Amendment to the Mesa Verde Estates Specific Plan (SPA 13-01) that was previously adopted in 2007 and subsequently amended in 2017. The purpose of the report is to determine if the project would impact any historical resources pursuant to CEQA. As an architectural historian, coauthored the report, wrote significance evaluations and building descriptions, and completed archival research. (2023)

Atascadero Armory Department of Parks and Recreation Form, Department of General Services, Atascadero, California. Dudek was retained by the Department of General Services to evaluate the Atascadero Armory located at 6105 Olmeda Avenue in the City of Atascadero in San Luis Obispo County, California (subject property) for eligibility for the NRHP, the CRHR, and as a California Historical Landmark. As an architectural historian, coauthored a DPR 523 form documenting the history of the subject property and evaluating it for eligibility under all applicable criteria. Completed the property survey, wrote building descriptions and significance evaluations, and completed archival research. (2023)

Simms Park Stormwater Capture and Teen & Senior Center Project Built Environment Inventory and Evaluation Report, City of Bellflower, Bellflower, California. Dudek was retained by the City of Bellflower to prepare a BEIER for the proposed Simms Park Stormwater Capture and Teen & Senior Center Project. The project consists of two major components: (1) stormwater capture infrastructure development and (2) a new Teen and Senior Center. The report documents Dudek's efforts to identify and evaluate built environment resources 45 years of age or older (historic era) that may be subject to direct or indirect impacts under CEQA as a result of the construction and operation of the proposed project. As an architectural historian, coauthored the report, wrote building descriptions and significance evaluations, surveyed the property, and completed archival research. (2023)

Sandpiper Golf Course Built Environment Inventory and Evaluation Report, Price, Postel & Parma LLP, Goleta, California. Dudek was retained by Price, Postel & Parma LLP to prepare a BEIER for the Sandpiper Golf Course (subject property) located at 7925 Hollister Avenue in Goleta, California (APN 079-210-059). Sandpiper Golf Course's current owner is proposing alterations to the golf course, including the demolition of the Sandpiper's clubhouse, maintenance buildings, and comfort station, in addition to associated golf course revisions. As the Sandpiper Golf Course was constructed in 1972, more than 45 years ago, the purpose of the report is to determine if the Project would impact any historical resources pursuant to CEQA. As an architectural historian, surveyed the property and wrote building descriptions for the report. (2023)

Los Angeles County Florence–Firestone Community Plan Area Historic Resources Survey, Los Angeles County Department of Regional Planning, Los Angeles, California. Dudek was retained by the County of Los Angeles Department of Regional Planning to prepare a historic context statement and conduct a historic resources survey for the Community Plan Area of Florence–Firestone. The goal of the project is to document the development history of the community from the rancho period to the present; identify important themes, events, and patterns of development; and describe the different property types, styles, builders, and architects associated with these important periods and themes. The document will also provide registration requirements and recommendations for future study/action by the County of Los Angeles to facilitate and streamline the historic preservation program. As an architectural historian, completed fieldwork and contributed to a historic resources survey report. (2022)

Clara Oaks Environmental Impact Report, City of Claremont, California. Dudek was retained by the City of Claremont to prepare an environmental impact report for The Webb Schools (Assessor's Identification Number: 8669-015-014) as part of the Clara Oaks environmental impact report. The report documents Dudek's efforts to identify and update the previous evaluation for The Webb Schools' campus for eligibility as a historic district at the federal, state, and local level and identify potential direct or indirect impacts under CEQA due to construction and implementation of the proposed project. As an architectural historian, completed an analysis of historic aerial photographs and Sanborn maps. (2022)

Appendix B
DPR Form Sets

State of California ♉ The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

PRIMARY RECORD

Primary #
HRI #
Trinomial
NRHP Status Code 6Z

Other listings
Review Code Reviewer Date

 ***Resource Name or #:** (Assigned by recorder) 39301 Sullivan Road;
P1. Other Identifier: Almond Farm; Map ID A

*P2. **Location:** ☐ **Not for Publication** ■ **Unrestricted**
***a. County** Kern **and** P2b and P2c or P2d. Attach a Location Map as necessary.)
***b. USGS 7.5'** Buttonwillow Quadrangle **Date** 2023 **T** 29S; **R** 23E; **of Sec** 23; Mount Diablo **B.M.**
c. Address 39301 Sullivan Road City Buttonwillow Zip 95062
d. UTM: (Give more than one for large and/or linear resources) Zone: 11S; 278977.63 m E; 3921369.20 m N
e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate)
Assessor's Parcel Number (APN) 103-100-19-01-4

***P3a. Description:** (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries)

The property legally sited as 39301 Sullivan Road is a 78-acre rectangular property (oriented east to west) that fronts the south boundary of Sullivan Road. The property is occupied by two large, square almond orchards with a small building complex clustered along the western boundary of the parcel. Map ID A1. Building 1 is a utilitarian, premanufactured, industrial-type building located in the northwest corner of the parcel. **See Continuation Sheet*

***P3b. Resource Attributes:** (List attributes and codes) HP2. 1-3 Single-family property
***P4. Resources Present:** ■ Building ☐Structure ☐Object ☐Site ☐District ☐Element of District ☐Other (Isolates, etc.)

P5b. Description of Photo: Overview of Map ID A. 39301 Sullivan Road showing Map ID A1. Building 1 (yellow arrow) and Map ID A2. Building 2 (red arrow), facing south.

P5a. Photograph 1.



***P6. Date Constructed/Age and Source:**
■ Historic ☐Prehistoric ☐ Both
ca.1964 (NETR 2023)

***P7. Owner and Address:**
Willow Avenue Investments LLC
5260 N Pam Ave Ste 421A,
Fresno, California 93704

***P8. Recorded by:**
Claire Cancilla, Dudek
725 Front Street, Ste. 400
Sacramento, California, 95060

***P9. Date Recorded:** 9/17/2023.

***P10. Survey Type:** (Describe)
Intensive Pedestrian

***P11. Report Citation:** (Cite survey report and other sources or enter "none.") Jones, E., and K. Ahmanson. 2025. Built Environment Inventory and Evaluation Report. Prepared for a private client. Kern County, California: Dudek. May 2025.

***Attachments:** ☐NONE ■Location Map ■Continuation Sheet ■Building, Structure, and Object Record ☐Archaeological Record ☐District Record ☐Linear Feature Record ☐Milling Station Record ☐Rock Art Record

BUILDING, STRUCTURE, AND OBJECT RECORD

***Resource Name or #** (Assigned by recorder) 39301 Sullivan Road *__NRHP Status Code__ 6Z
Page 2 **of** 11

B1. Historic Name: None
B2. Common Name: None
B3. Original Use: Commercial B4. Present Use: Commercial
***B5. Architectural Style:** Utilitarian/ industrial
B6. Construction History: (Construction date, alterations, and date of alterations)
39301 Sullivan Road was originally constructed in ca. 1964. There are no identified alterations to the property. *See *Continuation Sheet*

***B7. Moved?** ■ **No** ☐**Yes** ☐**Unknown** **Date:** N/A **Original Location:** N/A
***B8. Related Features:** N/A
B9a. Architect Unknown b. Builder: Unknown
***B10. Significance: Theme** N/A **Area** N/A
Period of Significance N/A **Property Type** N/A **Applicable Criteria** N/A
(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)
39301 Sullivan Road (APN 103-100-19-01-4), is a 78-acre single-family residential and agricultural property locally referred to as the "Almond Farm." The property is not eligible for listing in the NRHP or CRHR due to a lack of historical associations and architectural merit. As such, the property does not appear to be a historical resource under CEQA and has been assigned a California Historical Resource Status Code of 6Z (found ineligible for the NRHP, CRHR, or local designation through survey evaluation).

B11. Additional Resource Attributes: None.

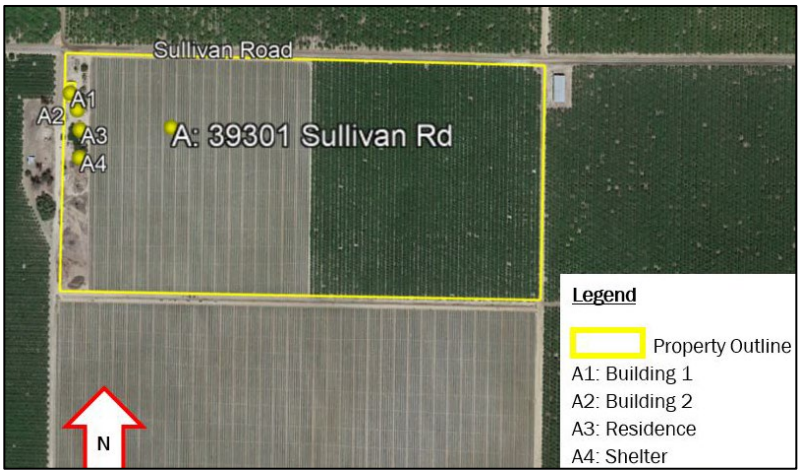
***B12. References:** See Continuation Sheet

B13. Remarks: None

***B14. Evaluator:** EJ Jones, MA, Dudek

***Date of Evaluation:** 7/26/2023

(This space reserved for official comments.)

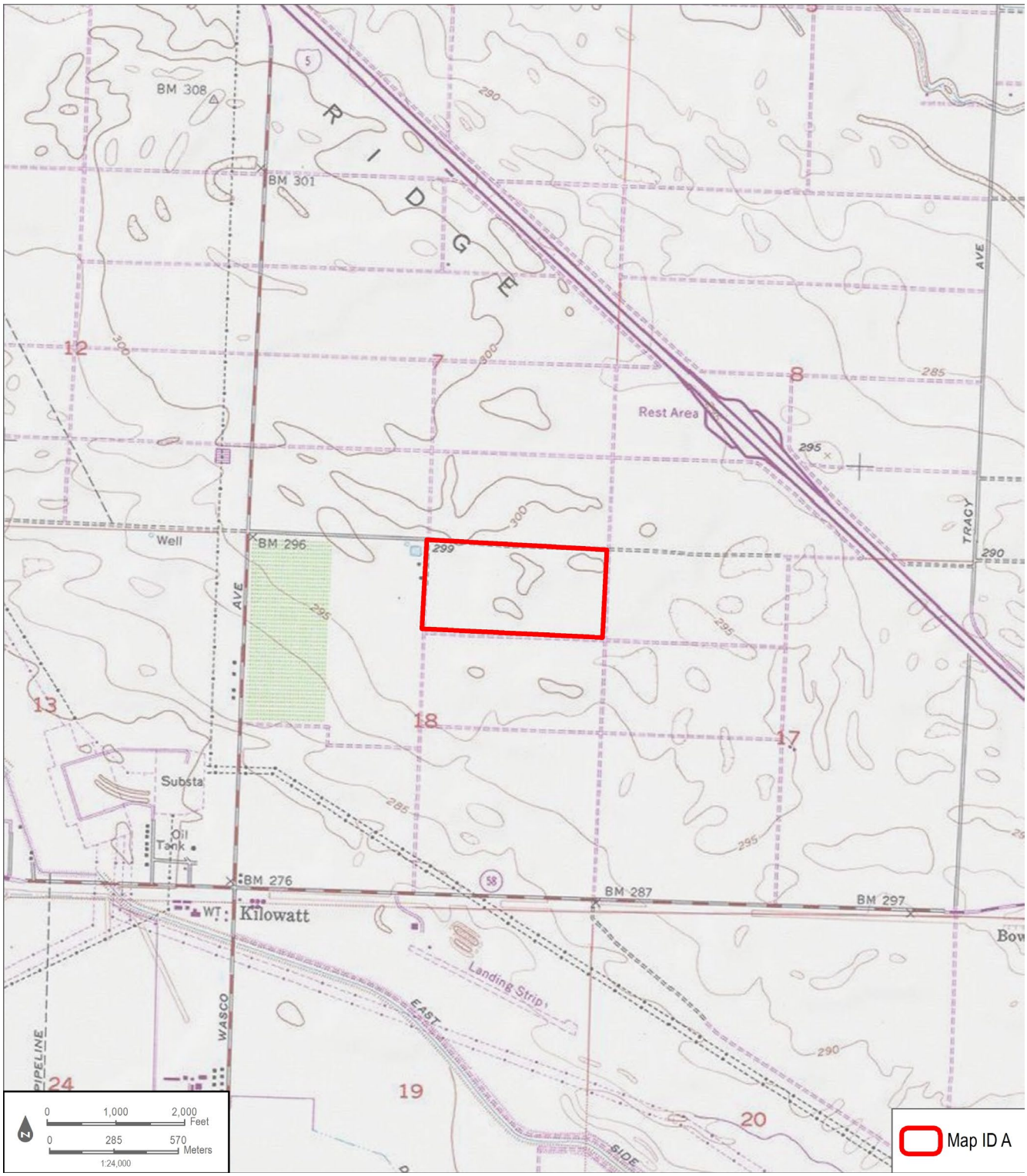


State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

LOCATION MAP

Primary #
HRI #
Trinomial

 ***Resource Name or #** (Assigned by recorder) 39301 Sullivan Road
***Map Name:** Buttonwillow Quadrangle ***Scale:** 1:24,000 ***Date of map:** 2021



***P3a. Description (Continued):**

Building 1 (A1) is accessed via oversized sliding doors on an exterior track (west elevation) and has an open-air section on the west elevation. The corrugated-metal-clad building is otherwise featureless. Building 2 (A2) is a one-story, rectangular building-oriented east to west with a side-gable roof. Map ID A2 is clad in horizontal wood boards and has a roof clad in composite shingles. A multilight window in a wood frame is located on the building's north elevation (Photograph 2). The Residence (A3) and Shelter (A4) were not visible from the public right-of-way during the survey (Photograph 3).

Photograph 2. Overview of the property's building cluster in relation to the property's orchards, facing southeast.



***P3a. Description (Continued):**

Photograph 3. Detail view of the Building 1 (A1) and Building 2 (A2), which obscures the property's additional resources (Residence [A3] and Shelter [A4]), facing south.



***B10. Significance** (Continued):

Historic Context

The following context provides an overview of post-contact history for the State of California, which is generally divided into three periods: the Spanish Period (1769–1822), the Mexican Period (1822–1848), and American Period (1848–present). A summary of these periods is discussed below because, unlike many regions of California, Hispanic-era land grants were absent in this area of Kern County. The section then documents relevant historical themes pertaining to the Project area with a discussion about the development of Kern County, the town of Buttonwillow, and agricultural development after 1850.

Hispanic and Early American Periods (1769-1855)

Although Spanish, Russian, and British explorers visited parts of California for brief periods between 1529 and 1769, the Spanish Period in California began with the establishment in 1769 of a settlement at San Diego. To promote Hispanic settlement, the government granted expansive tracts of land, ranchos, to Spanish settlers. When Mexico gained Independence from Spain in 1821, the new Mexican government expanded the program. Despite the land grant

***B10. Significance** (Continued):

system, inland California and contemporary Kern County remained largely uninhabited until after the start of the American Period and the California Gold Rush (Hoover et al. 2002: pp. 125, 138; Bakersfield Californian 2016).

In 1848, gold was found in Coloma, California, and a rush of speculative miners flooded into the California territory via overland routes from the eastern United States. In 1851, gold was discovered in the Kern River Valley and miners quickly relocated to pan local waterways. When gold yields lessened, miners moved away from the San Joaquin Valley to escape its chronic, cyclical flooding. In 1854, a second large vein was discovered in the Kern River, spurring miners to rework the region's network of rivers, streams, and tributaries. When the gold fields dried up, settlers constructed an expansive canal system to drain the inundated valley and control water distribution for agricultural irrigation. As more water was diverted from rivers to irrigate farmland, lake levels in Tulare, Buena Vista, and Kern Lakes began to drop. The reclaimed, nutrient-rich land was subdivided and developed into residential farmsteads. The influx of people into central California resulted in a large demand for meat and animal byproducts (Hoover et al. 2002: pp. 125; Bakersfield Californian 2016).

The Rise of Agriculture and Development of Irrigation (1855-1890)

In 1855, Henry Miller (1827-1916), a German immigrant with a butcher shop in San Francisco, arrived in San Joaquin Valley and purchased 300 head of cattle. Miller integrated his businesses and, as demand skyrocketed, purchased grazing land and breeding stock. In 1857, cattlemen Charles Lux (1823-1887) and Miller incorporated the Pacific Livestock Company, an integrated cattle and meatpacking enterprise, purchased 300,000 acres, and heavily invested in the region's irrigation and agricultural infrastructure. The burgeoning industry attracted migrants who settled in the region permanently. In 1866, the State of California created Kern County, home to 300 residents, from parts of Los Angeles and Tulare Counties. The settlers introduced new crops, experimented with growing methods, and cultivated herds of cattle, sheep, and hogs. The Southern Pacific Railroad constructed a railway through Kern County in 1870, facilitating population growth, dictating the placement of major cities, and connecting ranching and farming operations to distant markets (Hoover et al. 2002: pp. 125; Bakersfield Californian 2016; Morgan 1914).

In 1885, Miller and Lux established Buttonwillow Ranch, a Pacific Livestock Company[1] sub-headquarters, market, and livestock operation. The ranch, located 3 miles west of Buena Vista Slough, was named for the riparian Buttonwillow trees (*Cephalanthus occidentalis, californicus*) that flourished in the Kern River valley. The partners also established Buena Vista Farm (located directly south of contemporary State Route 58), which provided feed for the livestock. Miller and ranch employees constructed a dam at the south end of Buena Vista Lake (north of Buttonwillow) a 26-mile-long, 50-foot-wide canal west of Buttonwillow Ranch. The 'West Side Canal' watered thousands of cattle and irrigated 500,000 acres of experimental alfalfa, wheat, rye, barley, and corn by early 1886 (Waldschmidt-Nelson 2018; Morgan 1914; Zonlight 1979: p. 318; 331).

[1] By 1890, the Pacific Livestock Company had amassed 1.3 million acres of land in California, Nevada, Oregon, and Idaho to become the largest integrated cattle and meat packing enterprise in the US (Waldschmidt-Nelson 2018).

***B10. Significance** (Continued):

Exhibit 1. Haying at Buena Vista Farm, a Pacific Livestock Company holding (date unknown) (Huntington Library 2013).



Shortly after the canal became operational, upstream competitors, James Ben Ali Haggin, W. B. Carr, and Lloyd Tevis, diverted the water, cutting off the ranch's supply. *Miller v. Hagan,* heard by the California Supreme Court in 1888, forced the litigants to share water rights. As a result, the two large landowners divided the Kern River's flow into two channels, detrimentally impacting small-scale ranchers downstream that relied on the river's natural course. After the court ruling, Miller constructed the 'East Side Canal,' which further irrigated Buttonwillow Ranch and Buena Vista Farm while depriving his neighbors, and competitors, of water (Waldschmidt-Nelson 2018; Morgan 1914; Zonlight 1979: p. 318; 331).

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***B10. Significance** (Continued):

1927, land agent C.E. Houchin platted the townsite of Buttonwillow. Residents adopted Buttonwillow as the community's name although archival sources continue to refer to "Buena Vista" until approximately 1930 . Houchin platted a small grid with residential lots at the town's core and agricultural properties on the lattice's outskirts. Buttonwillow's commercial district fronted (north) McKitterick Bakersfield Highway (extant California State Route [SR] 85) and the Southern Pacific McKitterick railway. Outlying residential farmsteads were positioned between a complex series of canals including the West Side Canal, East Side Canal, Eighty Foot Ditch, Deep Wells Ditch, Garden Ditch, Corn Camp Ditch, Poplar Grove Ditch (sometimes referred to as the Arizona Ditch), and Main Drainage Canal (USGS 1932; Waldschmidt-Nelson 2018; Romani 2013: pp. 1-3).

On June 11, 1921, the San Joaquin Power Company (SJPC) opened the Midway Steam Plant in Buttonwillow and established power infrastructure in the rural community. The Midway Steam Plant, which supplied 17,000 horsepower units along high-tension lines to local residents, included a boiler room, turbine room, an electrical operating room, and a large retention and cooling pond. By early 1922, the Midway Steam Plan no longer met the energy demands posed by Kern County's growing population. To increase production, SJPC spent 1,250,000 dollars to increase production to double the plant's size and increase its total output to approximately 40,000 units. The Midway Steam Plant continued producing electricity for the region until the late 1940s and the development of nuclear power plants in the region (San Francisco Chronicle 1921: p. 20; Fresno Republican 1921: p. 13; Tribune 1921: p. 8; Fresno Morning Republican 1922: p. 13).

The Midway Steam Plant was demolished in 1952 and a major employer left the region. However, Kern County was quickly becoming a major oil producer in California. The oil industry flourished in the mid- twentieth century, as did local agricultural projection. Shortly after the industrial boom began, rural, dirt roads between farms and businesses were graded and paved. Local power creation resumed in the late 1960s when PG&E established the Midway Switching Center. Although increased economic opportunity in the region led to a slight increase in Buttonwillow's population in the late twentieth century and early twenty-first century, the region has retained its rural character. (Fresno Morning Republican 1922: p. 13; NETR 2023; PG&E 2020: pp. 3-115; California Demographics 2023).

<u>Architectural Typology: Rural and Agricultural Properties</u>

The rural residential and agricultural properties documented, such as 39301 Sullivan Road, is ubiquitous in Kern County, State of California, and western United States. Rural residential and agricultural properties include buildings, structures, and landscape features that function together and reflect the residents' functional needs. These interrelated resources are important in understanding how the rural property has been used over time. Typical resources present at a rural residential farming property include the following.

The characteristics of these rural residential and agricultural properties include the following.

- Land Use and Activities
  - Agricultural and/or Ranching
  - Sustenance and/or Commercial Cultivation
- Patterns of Spatial Organization
  - Building Clusters
  - Demarcated Orchards/Vineyards/Corrals (agriculturally-productive areas)

***B10. Significance** (Continued):

  - Boundary Demarcations
- Response to the Natural Environment
  - Irrigation and Water Storage Infrastructure
- Circulation Networks
  - Entry Roads, Field Access Roads, and Trails
- Buildings, structures, and features of this rural property type
  - Main Residence
  - Barn(s)
  - Ancillary Outbuildings
  - Chicken Coop
  - Repair Shop/Workshop/Garage
  - Corrals
  - Livestock Shelters
  - Water Storage Tanks, Wells, and Pump Houses
  - Fuel Storage Structures

Property Specific Historic Context

Map ID A, legally sited as 39301 Sullivan Road, was developed by an unidentified property owner in ca. 1964. Per the Kern County Assessor-Recorder Office (KCAR, the original property owners maintained the orchards until 2014. After being sold, a series of agricultural companies owned the property, including L & K Ranch, Bakersfield (2014–2018), Wells AGC Holdings LLC (2018–2023), and Willow Avenue Investments. Willow Avenue Investments, which purchased the property in 2023, is the current owner. Archival research at Ancestry.com, Newspaper.com, and the Kern County Accessor and Recorder archives, does not indicate that the original owner and developer, or subsequent owners or occupants, are persons important to our past (NETR 2023; Arivify 2023; KCAR 2023; Parcel Quest 2023).

Significance Evaluation: Criteria for the National Register of Historic Places and California Register of Historic Resources

National Register of Historic Places and California Register of Historic Resources

Criterion A/1: That are associated with events that have made a significant contribution to the broad patterns of our history

Map ID A, 39301 Sullivan Road (APN 103-100-19-01-4), a rural residential and agricultural property, is best understood as part of the broad pattern of rural agrarian practices in the Buttonwillow area. Map ID A, which was developed in ca. 1964 with a residence, three agricultural buildings, and orchards, possesses an association with the agricultural development of the area during the mid-1960s, but research did not indicate that it contributed in any significant way to this pattern of development. The property also lacks an important association with the expansion of rural residential development in the Buttonwillow area. As such, Map ID A, 39301 Sullivan Road, is not eligible under NRHP/CRHR Criterion A/1.

***B10. Significance** (Continued):

Criterion B/2: That are associated with the lives of persons significant in our past

To be found eligible under B/2, Map ID A. 39301 Sullivan Road must be directly tied to an important person and the place where that individual conducted or produced the work for which they are known. Archival research indicates that Map ID A is not associated with any specific persons known to be historically important figures at the national, state, or local level. While a number of individuals have occupied the property either as owners or renters from the time of its construction to the present day, collaborative efforts are best evaluated under Criterion A. Due to a lack of identified significant associations with important persons in history, Map ID A, 39301 Sullivan Road, does not appear eligible under NRHP Criterion B or CRHR Criterion 2.

Criterion C/3: That embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction.

Map ID A, 39301 Sullivan Road, is an agricultural property type, constructed in ca. 1964, in a rural area surrounding Buttonwillow. Although Map ID A demonstrates key characteristics of a rural agricultural property-type, including agrarian land use for commercial activities, patterns of spatial organization, irrigation infrastructure, and vehicular and pedestrian circulation networks, the property does not embody distinctive characteristics of a type, period, or method of construction outside of its primary function. Map ID A also does not possess high artistic value, nor is it a significant and distinguishable entity whose components may lack individual distinction. Additionally, archival research did not indicate that Map ID A was the work of a master architect or builder, possesses high artistic value, or has components that rise to the level of individual distinction. Map ID A, 39301 Sullivan Road, does not appear eligible under NRHP Criterion C or CRHR Criterion 3.

Criterion D/4: That have yielded, or may be likely to yield, information important in prehistory or history.

There is no evidence to suggest that Map ID A, 39301 Sullivan Road, has the potential to yield information important to state or local history. Therefore, the property does not appear eligible under NRHP/CRHR Criterion D/4.

Integrity Evaluation

In conclusion, the property at Map ID A, 39301 Sullivan Road, lacks sufficient significance to meet any of the criteria for listing in the NRHP or CRHR. To be eligible for listing in either register, a resource must first meet one or more of the significance criteria outlined above before a determination can be made as to whether the resource retains its historic character and can convey its significance. In the specific case of the property at Map ID A, 39301 Sullivan Road, an integrity analysis was considered immaterial because the evaluation found that the property lacked the necessary significance to warrant further analysis of its physical and historic integrity. Consequently, the evaluation determined that the subject property is not a historic property based on the NRHP criteria outlined in 36 California Code of Regulations 60.4, either individually or as a contributing element to an existing or potential historic district.

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State of California ◆ The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

PRIMARY RECORD

Primary #
HRI #
Trinomial _____
NRHP Status Code 6Z

Other listings
Review Code Reviewer Date

 ***Resource Name or #:** (Assigned by recorder) 25950 Frey Avenue
P1. Other Identifier: Map ID B

***P2. Location:** ☐ **Not for Publication** ■ **Unrestricted**

***a. County** Kern and P2b and P2c or P2d. Attach a Location Map as necessary.)

***b. USGS 7.5'** Buttonwillow Quadrangle **Date** 2023 **T** 28S; **R** 23E; **of Sec** 3; Mount Diablo **B.M.**

c. Address 25950 Frey Avenue City Buttonwillow Zip 93206

d. UTM: (Give more than one for large and/or linear resources) Zone: 11S; 275212.30 m E; 3934269.08 m N

e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate)

Assessor's Parcel Number (APN) 087-040-04-00-7 and 087-040-07-00-6

***P3a. Description:** (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries)

Map ID B, legally sited as 25950 Frey Avenue, is located on two parcels. The building complex, which includes Map ID B1 Residence and two contemporary structures, is confined to a 3.28-acre parcel (APN 087-040-04-00-7). The parcel is heavily landscaped with mature foliage. **See Continuation Sheet*

***P3b. Resource Attributes:** (List attributes and codes) HP2. 1-3 Single-family property

***P4. Resources Present:** ■ Building ☐Structure ☐Object ☐Site ☐District ☐Element of District ☐Other (Isolates, etc.)

P5b. Description of Photo: View of Map ID B. showing Map ID B1. Residence and mature landscaping, facing north.

***P6. Date Constructed/Age and Source:** ■ Historic ☐Prehistoric ☐ Both 1978 (Parcel Quest 2023)

P5a. Photograph 1.



***P7. Owner and Address:**
Tracy Robert & Elizabeth Rev TR
PO Box 505
Buttonwillow CA 93206

***P8. Recorded by:**
Claire Cancilla, Dudek
725 Front Street, Ste. 400
Sacramento, California, 95060

***P9. Date Recorded:** 9/17/2023.

***P10. Survey Type:** (Describe)
Intensive Pedestrian

***P11. Report Citation:** (Cite survey report and other sources or enter "none.") Jones, E., and K. Ahmanson. 2025. Built Environment Inventory and Evaluation Report. Prepared for a private client. Kern County, California: Dudek. May 2025.

***Attachments:** ☐NONE ■Location Map ■Continuation Sheet ■Building, Structure, and Object Record ☐Archaeological Record ☐District Record ☐Linear Feature Record ☐Milling Station Record ☐Rock Art Record

BUILDING, STRUCTURE, AND OBJECT RECORD

***Resource Name or #** (Assigned by recorder) 25950 Frey Avenue ***NRHP Status Code** 6Z
Page 2 **of** 12

B1. Historic Name: None
B2. Common Name: None
B3. Original Use: Commercial B4. Present Use: Commercial
***B5. Architectural Style:** Ranch
***B6. Construction History:** (Construction date, alterations, and date of alterations)
The property sited as 25950 Frey Avenue, was developed by an unidentified property owner in 1978. Per the Kern County Assessors and Recorders Office, the original property owners maintained the orchards until the mid-1990s. In ca. 1995, Robert William Tracy (born 1942) and Elizabeth Ann (Witcher) Tracy (born ca. 1947) purchased the property. In 2002, the Robert family placed the property in a revocable trust which they continue to maintain. In ca. 2000, the Robert family added an addition building. Gazebo to the property. In 2008, the Residence was remodeled, and a garage unit was added to the building's southwest corner (Permit Number KB805857). Archival research does not indicate that the original owner and developer, or subsequent owners or occupants, are persons important to our past (NETR 2023; Ancestry 2023a; Ancestry 2023b; KCAR 2023; Parcel Quest 2023). (See Continuation Sheet)

***B7. Moved?** ■ **No** ☐**Yes** ☐**Unknown** **Date:** N/A **Original Location:** N/A
***B8. Related Features:** N/A
B9a. Architect Unknown b. Builder: Unknown
***B10. Significance: Theme** N/A **Area** N/A
Period of Significance N/A **Property Type** N/A **Applicable Criteria** N/A
(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)
Map ID B. 25950 Frey Avenue (APNs 087-040-04-00-7 and 087-040-07-00-6), is located on two distinct parcels. Map ID B1. Residence, Map ID B2. Gazebo, and Map ID B3. Shed are located on APN 087-040-04-00-7 while 087-040-07-00-6 is occupied by a fallow agricultural field. Map ID B does not appear eligible for listing in the NRHP or CRHR as a historic resource due to a lack of historical associations and architectural merit. As such, the property does not appear to be a historical resource under CEQA and has been assigned a California Historical Resource Status Code of 6Z (found ineligible for the NRHP, CRHR, or local designation through survey evaluation).

B11. Additional Resource Attributes: None.

***B12. References:** See Continuation Sheet

B13. Remarks: None

***B14. Evaluator:** EJ Jones, MA, Dudek

***Date of Evaluation:** 10/25/2023

(This space reserved for official comments.)

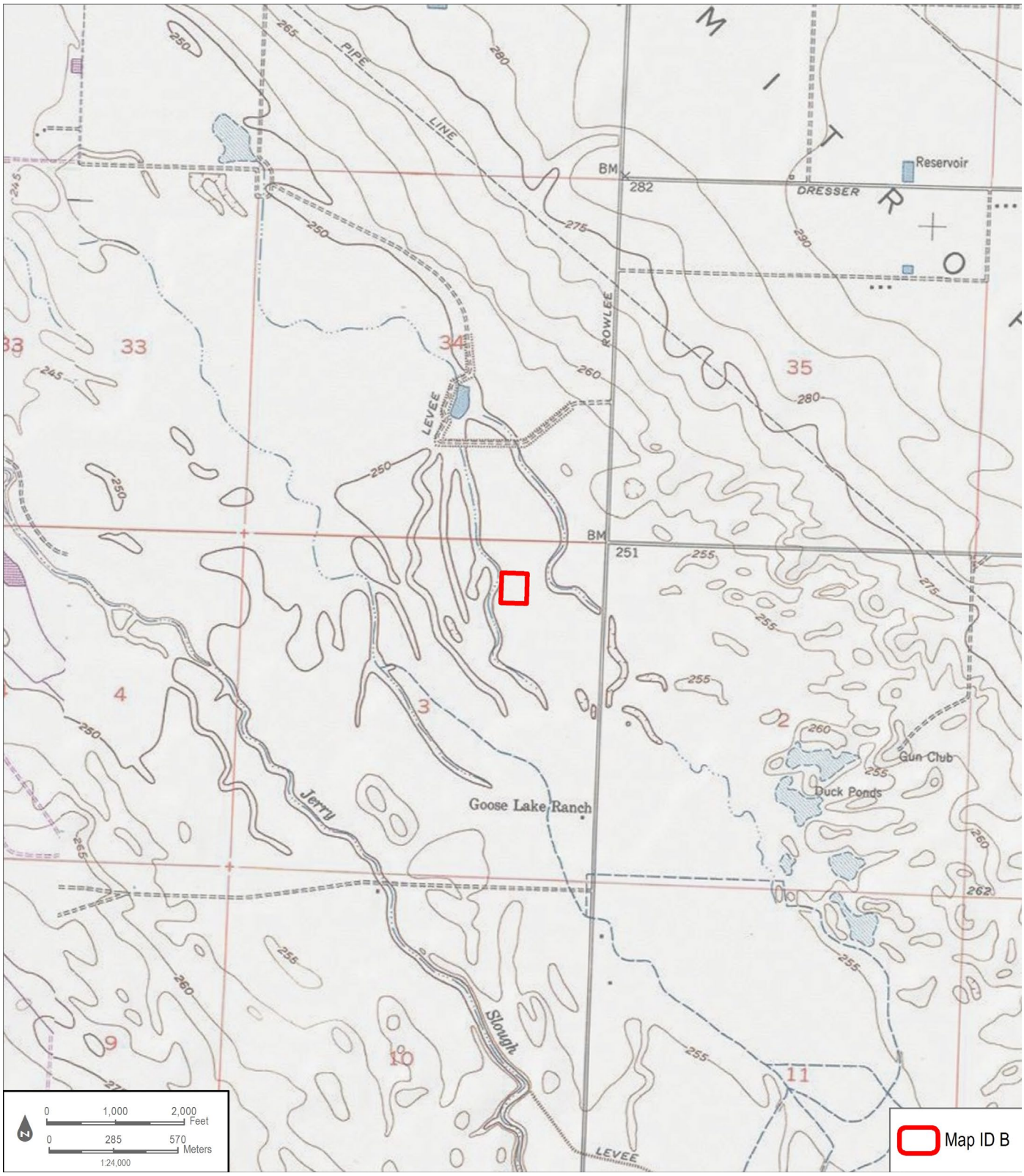


State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

LOCATION MAP

Primary #_____
HRI # _____
Trinomial_____

 ***Resource Name or #** (Assigned by recorder) 25950 Frey Avenue
***Map Name:** Buttonwillow Quadrangle ***Scale:** 1:24,000 ***Date of map:** 2021



***P3a. Description (Continued):**

The Residence (B1) is an asymmetrical, one-story ranch-style residence with a complex form and hipped roof. The residence is accessed via a single entrance on the main (south) elevation, four additional single-door entrances on the rear (north) and west elevations, and two garage doors in the southwest corner of the main elevation (Photographs 1 and 2). Additional fenestration includes large, multilight square windows on the main elevation and a variety of fixed and sliding windows in vinyl frames. A metal, square shade has been added to the building's rear (south) elevation to provide shade for a full-length, concrete patio area. Map ID B's roof is sheathed in composite asphalt shingles, while the building is primarily clad in stucco but features full-height brick veneer on the main (north) elevation.

Photograph 2. View of the rear (north) elevation of Map ID B and mature landscaping, facing south.



***B10. Significance (Continued):**

Historic Context

The following context provides an overview of post-contact history for the State of California, which is generally divided into three periods: the Spanish Period (1769–1822), the Mexican Period (1822–1848), and American Period (1848–present). A summary of these periods is discussed below because, unlike many regions of California, Hispanic-era land grants were absent in this area of Kern County. The section then documents relevant historical themes pertaining to the Project area with a discussion about the development of Kern County, the town of Buttonwillow, and agricultural development after 1850.

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Although Spanish, Russian, and British explorers visited parts of California for brief periods between 1529 and 1769, the Spanish Period in California began with the establishment in 1769 of a settlement at San Diego. To promote Hispanic settlement, the government granted expansive tracts of land, ranchos, to Spanish settlers. When Mexico gained Independence from Spain in 1821, the new Mexican government expanded the program. Despite the land grant

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system, inland California and contemporary Kern County remained largely uninhabited until after the start of the American Period and the California Gold Rush (Hoover et al. 2002: pp. 125, 138; Bakersfield Californian 2016).

In 1848, gold was found in Coloma, California, and a rush of speculative miners flooded into the California territory via overland routes from the eastern United States. In 1851, gold was discovered in the Kern River Valley and miners quickly relocated to pan local waterways. When gold yields lessened, miners moved away from the San Joaquin Valley to escape its chronic, cyclical flooding. In 1854, a second large vein was discovered in the Kern River, spurring miners to rework the region's network of rivers, streams, and tributaries. When the gold fields dried up, settlers constructed an expansive canal system to drain the inundated valley and control water distribution for agricultural irrigation. As more water was diverted from rivers to irrigate farmland, lake levels in Tulare, Buena Vista, and Kern Lakes began to drop. The reclaimed, nutrient-rich land was subdivided and developed into residential farmsteads. The influx of people into central California resulted in a large demand for meat and animal byproducts (Hoover et al. 2002: pp. 125; Bakersfield Californian 2016).

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In 1855, Henry Miller (1827-1916), a German immigrant with a butcher shop in San Francisco, arrived in San Joaquin Valley and purchased 300 head of cattle. Miller integrated his businesses and, as demand skyrocketed, purchased grazing land and breeding stock. In 1857, cattlemen Charles Lux (1823-1887) and Miller incorporated the Pacific Livestock Company, an integrated cattle and meatpacking enterprise, purchased 300,000 acres, and heavily invested in the region's irrigation and agricultural infrastructure. The burgeoning industry attracted migrants who settled in the region permanently. In 1866, the State of California created Kern County, home to 300 residents, from parts of Los Angeles and Tulare Counties. The settlers introduced new crops, experimented with growing methods, and cultivated herds of cattle, sheep, and hogs. The Southern Pacific Railroad constructed a railway through Kern County in 1870, facilitating population growth, dictating the placement of major cities, and connecting ranching and farming operations to distant markets (Hoover et al. 2002: pp. 125; Bakersfield Californian 2016; Morgan 1914).

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***B10. Significance** (Continued):

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Shortly after the canal became operational, upstream competitors, James Ben Ali Haggin, W. B. Carr, and Lloyd Tevis, diverted the water, cutting off the ranch's supply. *Miller v. Hagan,* heard by the California Supreme Court in 1888, forced the litigants to share water rights. As a result, the two large landowners divided the Kern River's flow into two channels, detrimentally impacting small-scale ranchers downstream that relied on the river's natural course. After the court ruling, Miller constructed the 'East Side Canal,' which further irrigated Buttonwillow Ranch and Buena Vista Farm while depriving his neighbors, and competitors, of water (Waldschmidt-Nelson 2018; Morgan 1914; Zonlight 1979: p. 318; 331).

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***B10. Significance** (Continued):

1927, land agent C.E. Houchin platted the townsite of Buttonwillow. Residents adopted Buttonwillow as the community's name although archival sources continue to refer to "Buena Vista" until approximately 1930. Houchin platted a small grid with residential lots at the town's core and agricultural properties on the lattice's outskirts. Buttonwillow's commercial district fronted (north) McKitterick Bakersfield Highway (extant California State Route [SR] 85) and the Southern Pacific McKitterick railway. Outlying residential farmsteads were positioned between a complex series of canals including the West Side Canal, East Side Canal, Eighty Foot Ditch, Deep Wells Ditch, Garden Ditch, Corn Camp Ditch, Poplar Grove Ditch (sometimes referred to as the Arizona Ditch), and Main Drainage Canal (USGS 1932; Waldschmidt-Nelson 2018; Romani 2013: pp. 1-3).

On June 11, 1921, the San Joaquin Power Company (SJPC) opened the Midway Steam Plant in Buttonwillow and established power infrastructure in the rural community. The Midway Steam Plant, which supplied 17,000 horsepower units along high-tension lines to local residents, included a boiler room, turbine room, an electrical operating room, and a large retention and cooling pond. By early 1922, the Midway Steam Plan no longer met the energy demands posed by Kern County's growing population. To increase production, SJPC spent 1,250,000 dollars to increase production to double the plant's size and increase its total output to approximately 40,000 units. The Midway Steam Plant continued producing electricity for the region until the late 1940s and the development of nuclear power plants in the region (San Francisco Chronicle 1921: p. 20; Fresno Republican 1921: p. 13; Tribune 1921: p. 8; Fresno Morning Republican 1922: p. 13).

The Midway Steam Plant was demolished in 1952 and a major employer left the region. However, Kern County was quickly becoming a major oil producer in California. The oil industry flourished in the mid- twentieth century, as did local agricultural projection. Shortly after the industrial boom began, rural, dirt roads between farms and businesses were graded and paved. Local power creation resumed in the late 1960s when PG&E established the Midway Switching Center. Although increased economic opportunity in the region led to a slight increase in Buttonwillow's population in the late twentieth century and early twenty-first century, the region has retained its rural character. (Fresno Morning Republican 1922: p. 13; NETR 2023; PG&E 2020: pp. 3-115; California Demographics 2023).

Architectural Typology: Rural and Agricultural Properties

The rural residential and agricultural properties documented, such as 39301 Sullivan Road, is ubiquitous in Kern County, State of California, and western United States. Rural residential and agricultural properties include buildings, structures, and landscape features that function together and reflect the residents' functional needs. These interrelated resources are important in understanding how the rural property has been used over time. Typical resources present at a rural residential farming property include the following.

The characteristics of these rural residential and agricultural properties include the following.

- Land Use and Activities
  - Agricultural and/or Ranching
  - Sustenance and/or Commercial Cultivation
- Patterns of Spatial Organization
  - Building Clusters
  - Demarcated Orchards/Vineyards/Corrals (agriculturally productive areas)

***B10. Significance** (Continued):

  - Boundary Demarcations
- Response to the Natural Environment
  - Irrigation and Water Storage Infrastructure
- Circulation Networks
  - Entry Roads, Field Access Roads, and Trails
- Buildings, structures, and features of this rural property type
  - Main Residence
  - Barn(s)
  - Ancillary Outbuildings
  - Chicken Coop
  - Repair Shop/Workshop/Garage
  - Corrals
  - Livestock Shelters
  - Water Storage Tanks, Wells, and Pump Houses
  - Fuel Storage Structures

Property Specific Historic Context

The property, legally sited as 25950 Frey Avenue, was developed by an unidentified property owner in 1978. Per the KCAR, the original property owners maintained the orchards until the mid-1990s. In ca. 1995, Robert William Tracy (born 1942) and Elizabeth Ann (Witcher) Tracy (born ca. 1947) purchased the property. In 2002, the Robert family placed the property in a revocable trust, which they continue to maintain. In ca. 2000, the Robert family added Map ID B2, Gazebo, to the property. In 2008, Map ID B1, Residence, was remodeled and a garage unit was added to the building's southwest corner (Permit Number KB805857). Archival research, including from Ancestry.com, Newspaper.com, and the Kern County Accessor and Recorder archives, does not indicate that the original owner and developer, or subsequent owners or occupants, are persons important to our past (NETR 2023; Ancestry 2023a, 2023b; KCAR 2023b; Parcel Quest 2023b).

Significance Evaluation

National Register of Historic Places and California Register for Historic Resources

Criterion A/1: That are associated with events that have made a significant contribution to the broad patterns of our history.

Map ID B, 25950 Frey Avenue (APNs 087-040-04-00-7 and 087-040-07-00-6), a rural residential and agricultural property, is best understood as part of the broad pattern of rural agrarian practices in the Buttonwillow area. Map ID B, which was developed in 1978 with a single-family residence, possesses an association with the agricultural practices of the area during the late-1970s, but research did not indicate that it contributed in any significant way to this pattern of development. The property also lacks an important association with the expansion of rural residential development in the Buttonwillow area. As such, Map ID B, 25950 Frey Avenue, is not eligible under NRHP/CRHR Criterion A/1.

***B10. Significance (Continued):**

Criterion B/2: That are associated with the lives of persons significant in our past.

To be found eligible under B/2, Map ID B. 25950 Frey Avenue must be directly tied to an important person and the place where that individual conducted or produced the work for which they are known. Archival research indicates that Map ID B is not associated with any specific persons known to be historically important figures at the national, state, or local level. While a number of individuals have occupied the property either as owners or renters from the time of its construction to the present day, collaborative efforts are best evaluated under Criterion B. Due to a lack of identified significant associations with important persons in history, Map ID B. 25950 Frey Avenue does not appear eligible under NRHP Criterion B or CRHR Criterion 2.

Criterion C/3: That embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction.

Map ID B, 25950 Frey Avenue, is an agricultural property type, constructed in ca. 1964, in a rural area surrounding Buttonwillow. Although Map ID A demonstrates key characteristic of a rural agricultural property type, including agrarian land use for commercial activities, patterns of spatial organization, irrigation infrastructure, and vehicular and pedestrian circulation networks, the property does not embody distinctive characteristics of a type, period, or method of construction outside of its primary function. Map ID B also does not possess high artistic value, nor is it a significant and distinguishable entity whose components may lack individual distinction. Additionally, archival research did not indicate that Map ID B was the work of a master architect or builder, possess high artistic value, or have components that rise to the level of individual distinction. Map ID B. 25950 Frey Avenue does not appear eligible under NRHP Criterion C or CRHR Criterion 3.

Criterion D/4: That have yielded, or may be likely to yield, information important in prehistory or history.

There is no evidence to suggest that Map ID B. 25950 Frey Avenue has the potential to yield information important to state or local history. Therefore, the property does not appear eligible under NRHP/CRHR Criterion D/4.

***B10. Significance (Continued):**

Integrity Evaluation

In conclusion, the property at Map ID B, 25950 Frey Avenue, lacks sufficient significance to meet any of the criteria for listing in the NRHP or CRHR. To be eligible for listing in either register, a resource must first meet one or more of the significance criteria outlined above before a determination can be made as to whether the resource retains its historic character and is able to convey its significance. In the specific case of the property at Map ID B, 25950 Frey Avenue, an integrity analysis was considered immaterial because the evaluation found that the property lacked the necessary significance to warrant further analysis of its physical and historic integrity. Consequently, the evaluation determined that the subject property is not a historic property based on the NRHP criteria outlined in 36 California Code of Regulations 60.4, either individually or as a contributing element to an existing or potential historic district.

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State of California ◆ The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

PRIMARY RECORD

Primary #
HRI #
Trinomial _____
NRHP Status Code 6Z

Other listings
Review Code Reviewer Date

 ***Resource Name or #:** (Assigned by recorder) APN 087-010-22
P1. Other Identifier: 26767 Merced Avenue; Map ID C

***P2. Location:** ☐ **Not for Publication** ■ **Unrestricted**
***a. County** Kern **and** P2b and P2c or P2d. Attach a Location Map as necessary.)
***b. USGS 7.5'** Buttonwillow Quadrangle **Date** 2023 **T** 28S; **R** 23E; **of Sec** 1; Mount Diablo **B.M.**
c. Address no situs address **City** Buttonwillow **Zip** 93206
d. UTM: (Give more than one for large and/or linear resources) Zone: 11S; 587895.00 m E; 4101701.00 m N
e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate)
Assessor's Parcel Number (APN) 087-010-22-00-0

***P3a. Description:** (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries)

The property developed at the legal APN 087-010-22 is a 66-acre residential and agricultural property with a single-family residence, almond orchard, and irrigation infrastructure. The rectangular parcel, oriented east–west, fronts the south side of Merced Avenue and has an address indicator labeled "26767." Most of the parcel is developed with a mature almond orchard.
**See Continuation Sheet*

***P3b. Resource Attributes:** (List attributes and codes) HP2. 1-3 Single-family property
***P4. Resources Present:** ■ Building ■ Structure ☐Object ☐Site ☐District ☐Element of District ☐Other (Isolates, etc.)

P5a. Photograph 1.



P5b. Description of Photo: View of Map ID C. APN 087-010-22 including Map ID C1. Residence and Map ID C2. Well (yellow arrow), facing southeast (Google Earth 2023).

***P6. Date Constructed/Age and Source:**
■ Historic ☐Prehistoric ☐ Both ca. 1970 (NETR)

***P7. Owner and Address:**
B&E Romanini Investments LP
10401 Claridge Ct
Bakersfield CA 93311,

***P8. Recorded by:**
Claire Cancilla, Dudek
725 Front Street, Ste. 400
Sacramento, California, 95060

***P9. Date Recorded:** 9/17/2023.

***P10. Survey Type:** (Describe)
Intensive Pedestrian

***P11. Report Citation:** (Cite survey report and other sources or enter "none.") Jones, E., and Cancilla, C. 2025. Built Environment Inventory and Evaluation Report. Prepared for a private client. Kern County, California: Dudek. May 2025.

***Attachments:** ☐NONE ■Location Map ■Continuation Sheet ■Building, Structure, and Object Record ☐Archaeological Record ☐District Record ☐Linear Feature Record ☐Milling Station Record ☐Rock Art Record

BUILDING, STRUCTURE, AND OBJECT RECORD

***Resource Name or #** (Assigned by recorder) APN-087-010-22 ***NRHP Status Code** 6Z

B1. Historic Name: None.
B2. Common Name: None.
B3. Original Use: Commercial B4. Present Use: Commercial
***B5. Architectural Style:** Ranch
***B6. Construction History:** (Construction date, alterations, and date of alterations)
Map ID C. APN 087-010-22 (no legal situs) was developed as a residential property and almond orchard in ca. 1970 by an unidentified property owner. Identified Alterations include:

- Unknown: Added detached metal shelter (observed alteration)
- 2006: Demolition (Permit Number AS17922)
- 2007: Miscellaneous site improvements (Permit Number AS17922)
- 2008: Demolition (Permit Number AS18963)
- ca. 2022: Structure/building association with Map ID C3. Well demolished (Google Earth 2023)
- 2021: Carport added to Map ID C1's north elevation (Google Earth 2023)
- 2022: Rear buildings/structures (south of Map ID C1. Residence demolished (Google Earth 2023)
- 2022: Removed mature trees that surrounded Map ID C1. Residence (Google Earth 2023)

***B7. Moved?** ■ **No** ☐**Yes** ☐**Unknown** **Date:** N/A **Original Location:** N/A
***B8. Related Features:** N/A
B9a. Architect Unknown b. Builder: Unknown
***B10. Significance: Theme** N/A **Area** N/A
Period of Significance N/A **Property Type** N/A **Applicable Criteria** N/A
(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)
Map ID C. APN 087-010-22 is a 66-acre single-family residential and agricultural property that does not appear eligible for listing in the NRHP or CRHR as a historic resource due to a lack of historical associations and architectural merit. As such, the property does not appear to be a historical resource under CEQA and has been assigned a California Historical Resource Status Code of 6Z (found ineligible for the NRHP, CRHR, or local designation through survey evaluation).

B11. Additional Resource Attributes: None.

***B12. References:** See Continuation Sheet

B13. Remarks: None

***B14. Evaluator:** EJ Jones, MA, Dudek

***Date of Evaluation:** 10/25/2023



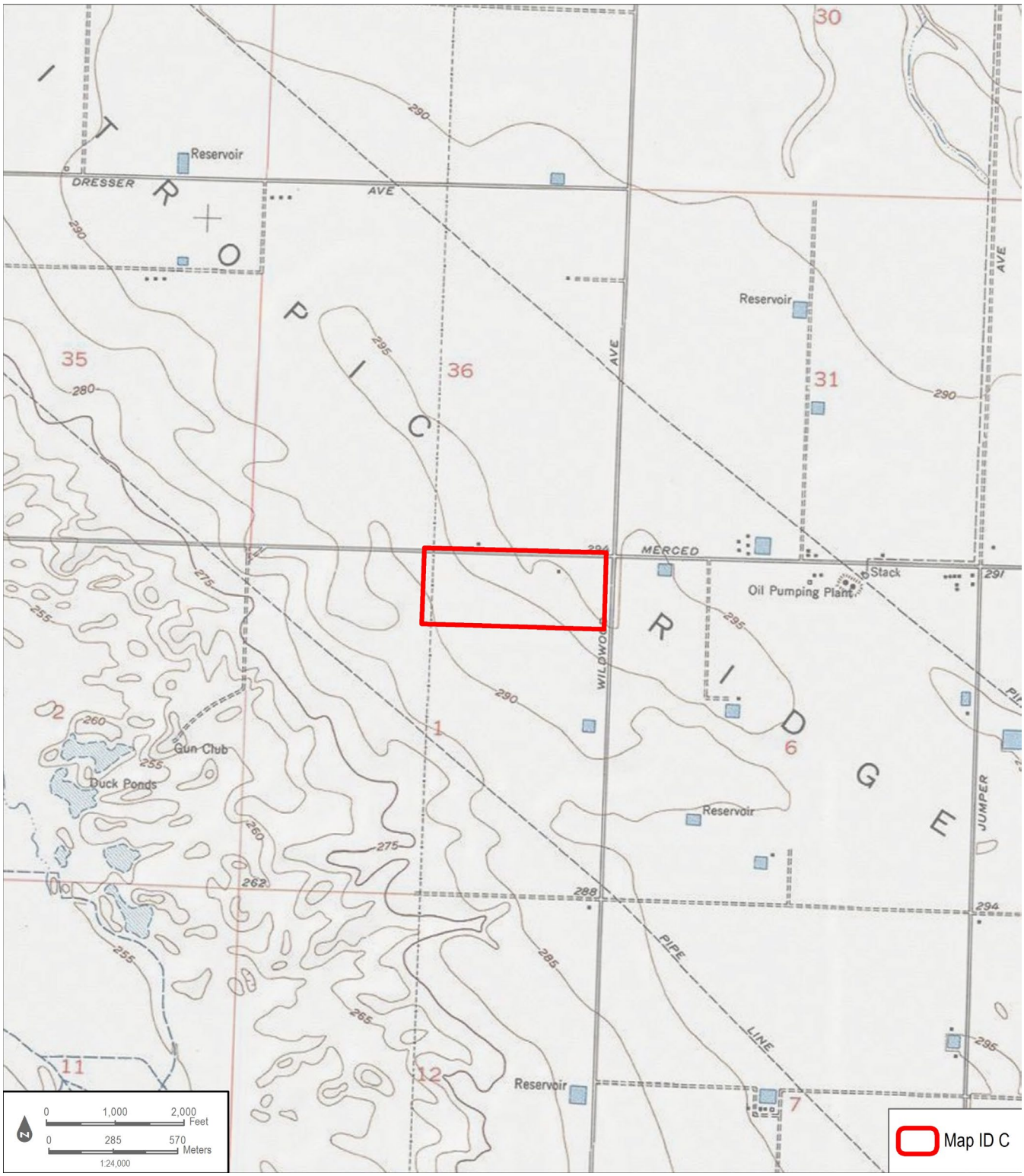
(This space reserved for official comments.)

State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

LOCATION MAP

Primary #_____
HRI # _____
Trinomial_____

 ***Resource Name or #** (Assigned by recorder) APN-087-010-22
***Map Name:** Buttonwillow Quadrangle ***Scale:** 1:24,000 ***Date of map:** 2021



***P3a. Description (Continued):**

The Residence (C1) is a one-story rectangular house (oriented east–west) adjacent to Merced Avenue (Photograph 2). The residence, which has an attached carport (east elevation), has a cascaded side-gable roof. Map ID C1 is accessed via a wood door on the main (south) elevation and has sliding windows in aluminum frames. The residence is clad in stucco and has a roof clad in composite asphalt tiles. A U-shaped, unpaved driveway loops around the residence, separating the building from the surrounding almond orchard. The rear of the residence was not accessible at the time of survey and is not visible from the public right-of-way. Map ID C2, Well, includes a vertical concrete flume and metal piping. The well is located north of the orchard and directly south of Merced Avenue.

Photograph 2. View of Map ID C. APN 087-010-22 including Map ID C1. Residence and Map ID C2. Well (yellow arrow), facing southeast (Google Earth 2023).



***B10. Significance (Continued):**

Historic Context

The following context provides an overview of post-contact history for the State of California, which is generally divided into three periods: the Spanish Period (1769–1822), the Mexican Period (1822–1848), and American Period (1848–present). A summary of these periods is discussed below because, unlike many regions of California, Hispanic-era land grants were absent in this area of Kern County. The section then documents relevant historical themes pertaining to the Project area with a discussion about the development of Kern County, the town of Buttonwillow, and agricultural development after 1850.

Hispanic and Early American Periods (1769-1855)

Although Spanish, Russian, and British explorers visited parts of California for brief periods between 1529 and 1769, the Spanish Period in California began with the establishment in 1769 of a settlement at San Diego. To promote Hispanic settlement, the government granted expansive tracts of land, ranchos, to Spanish settlers. When Mexico gained Independence from Spain in 1821, the new Mexican government expanded the program. Despite the land grant

***B10. Significance** (Continued):

system, inland California and contemporary Kern County remained largely uninhabited until after the start of the American Period and the California Gold Rush (Hoover et al. 2002: pp. 125, 138; Bakersfield Californian 2016).

In 1848, gold was found in Coloma, California, and a rush of speculative miners flooded into the California territory via overland routes from the eastern United States. In 1851, gold was discovered in the Kern River Valley and miners quickly relocated to pan local waterways. When gold yields lessened, miners moved away from the San Joaquin Valley to escape its chronic, cyclical flooding. In 1854, a second large vein was discovered in the Kern River, spurring miners to rework the region's network of rivers, streams, and tributaries. When the gold fields dried up, settlers constructed an expansive canal system to drain the inundated valley and control water distribution for agricultural irrigation. As more water was diverted from rivers to irrigate farmland, lake levels in Tulare, Buena Vista, and Kern Lakes began to drop. The reclaimed, nutrient-rich land was subdivided and developed into residential farmsteads. The influx of people into central California resulted in a large demand for meat and animal byproducts (Hoover et al. 2002: pp. 125; Bakersfield Californian 2016).

The Rise of Agriculture and Development of Irrigation (1855-1890)

In 1855, Henry Miller (1827-1916), a German immigrant with a butcher shop in San Francisco, arrived in San Joaquin Valley and purchased 300 head of cattle. Miller integrated his businesses and, as demand skyrocketed, purchased grazing land and breeding stock. In 1857, cattlemen Charles Lux (1823-1887) and Miller incorporated the Pacific Livestock Company, an integrated cattle and meatpacking enterprise, purchased 300,000 acres, and heavily invested in the region's irrigation and agricultural infrastructure. The burgeoning industry attracted migrants who settled in the region permanently. In 1866, the State of California created Kern County, home to 300 residents, from parts of Los Angeles and Tulare Counties. The settlers introduced new crops, experimented with growing methods, and cultivated herds of cattle, sheep, and hogs. The Southern Pacific Railroad constructed a railway through Kern County in 1870, facilitating population growth, dictating the placement of major cities, and connecting ranching and farming operations to distant markets (Hoover et al. 2002: pp. 125; Bakersfield Californian 2016; Morgan 1914).

In 1885, Miller and Lux established Buttonwillow Ranch, a Pacific Livestock Company[1] sub-headquarters, market, and livestock operation. The ranch, located 3 miles west of Buena Vista Slough, was named for the riparian Buttonwillow trees (*Cephalanthus occidentalis, californicus*) that flourished in the Kern River valley. The partners also established Buena Vista Farm (located directly south of contemporary State Route 58), which provided feed for the livestock. Miller and ranch employees constructed a dam at the south end of Buena Vista Lake (north of Buttonwillow) a 26-mile-long, 50-foot-wide canal west of Buttonwillow Ranch. The 'West Side Canal' watered thousands of cattle and irrigated 500,000 acres of experimental alfalfa, wheat, rye, barley, and corn by early 1886 (Waldschmidt-Nelson 2018; Morgan 1914; Zonlight 1979: p. 318; 331).

[1] By 1890, the Pacific Livestock Company had amassed 1.3 million acres of land in California, Nevada, Oregon, and Idaho to become the largest integrated cattle and meat packing enterprise in the US (Waldschmidt-Nelson 2018).

***B10. Significance** (Continued):

Exhibit 1.Haying at Buena Vista Farm, a Pacific Livestock Company holding (date unknown) (Huntington Library 2013).



Shortly after the canal became operational, upstream competitors, James Ben Ali Haggin, W. B. Carr, and Lloyd Tevis, diverted the water, cutting off the ranch's supply. *Miller v. Hagan,* heard by the California Supreme Court in 1888, forced the litigants to share water rights. As a result, the two large landowners divided the Kern River's flow into two channels, detrimentally impacting small-scale ranchers downstream that relied on the river's natural course. After the court ruling, Miller constructed the 'East Side Canal,' which further irrigated Buttonwillow Ranch and Buena Vista Farm while depriving his neighbors, and competitors, of water (Waldschmidt-Nelson 2018; Morgan 1914; Zonlight 1979: p. 318; 331).

The Development of Buttonwillow and Rural Residential Infrastructure

In 1893, Miller donated a large tract of land between Buttonwillow Ranch (north) and Buena Vista Farm (south) for the future townsite of 'Buena Vista.' In 1895, the Southern Pacific Railroad constructed the McKittrick branch through the community and a Post Office, named 'Buttonwillow,' was established. In the early 1900s, as Miller entered his mid-80s, he established the Miller and Lux Land Company (despite Lux being deceased) and subdivided sections of his massive holdings to sell as ranchland. As the community grew, both 'Buena Vista' and 'Buttonwillow' were used by residents, cartographers, and newspapers. After Miller died in 1916, his heirs continued to gradually subdivide plots of land around Buttonwillow Ranch to subdivided and sell. In 1924, the Buena Vista Water Storage District was established to manage the area's extensive irrigation and drainage network and, in

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The rural residential and agricultural properties documented, such as 39301 Sullivan Road, is ubiquitous in Kern County, State of California, and western United States. Rural residential and agricultural properties include buildings, structures, and landscape features that function together and reflect the residents' functional needs. These interrelated resources are important in understanding how the rural property has been used over time. Typical resources present at a rural residential farming property include the following.

The characteristics of these rural residential and agricultural properties include the following.

- Land Use and Activities
  - Agricultural and/or Ranching
  - Sustenance and/or Commercial Cultivation
- Patterns of Spatial Organization
  - Building Clusters
  - Demarcated Orchards/Vineyards/Corrals (agriculturally-productive areas)

***B10. Significance** (Continued):

- Boundary Demarcations

- Response to the Natural Environment
  - Irrigation and Water Storage Infrastructure
- Circulation Networks
  - Entry Roads, Field Access Roads, and Trails
- Buildings, structures, and features of this rural property type
  - Main Residence
  - Barn(s)
  - Ancillary Outbuildings
  - Chicken Coop
  - Repair Shop/Workshop/Garage
  - Corrals
  - Livestock Shelters
  - Water Storage Tanks, Wells, and Pump Houses
  - Fuel Storage Structures

Property Specific Historic Context

Map ID C, APN 087-010-22 (no legal situs), was developed as a residential property and almond orchard in ca. 1970 by an unidentified property owner. Per the KCAR, the original property owners maintained the orchards until the early twenty-first century. The property was sold to unidentified owners in 2010 and 2010. In 2022, Erika and Brian J. Romanini purchased the property. Archival research, including from Ancestry.com, Newspaper.com, and KCAR archives, does not indicate that the original owner and developer, or subsequent owners or occupants, are persons important to our past (KCAR 2023c; Parcel Quest 2023c; NETR 2023).

***B10. Significance (Continued):**

Significance Evaluation

National Register of Historic Places and California Register of Historic Resources

Criterion A/1: That are associated with events that have made a significant contribution to the broad patterns of our history.

Map ID C, APN 087-010-22, a rural residential and agricultural property, is best understood as part of the broad pattern of rural agrarian practices in the Buttonwillow area. Map ID C, which was developed between 1956 and 1977 with a residence, irrigation infrastructure, and almond orchards, possesses an association with the agricultural development of the area during the mid-twentieth century, but research did not indicate that it contributed in any significant way to this pattern of development. The property also lacks an important association with the expansion of rural residential development in the Buttonwillow area. As such, Map ID C, APN 087-010-22, is not eligible under NRHP/CRHR Criterion A/1.

Criterion B/2: That are associated with the lives of persons significant in our past.

To be found eligible under B/2, Map ID C, APN 087-010-22, must be directly tied to an important person and the place where that individual conducted or produced the work for which they are known. Archival research indicates that Map ID C is not associated with any specific persons known to be historically important figures at the national, state, or local level. While a number of individuals have occupied the property either as owners or renters from the time of its construction to the present day, collaborative efforts are best evaluated under Criterion C. Due to a lack of identified significant associations with important persons in history, Map ID C, APN 087-010-22, does not appear eligible under NRHP Criterion B or CRHR Criterion 2.

Criterion C/3: That embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction.

Map ID C, APN 087-010-22, is an agricultural property type in the rural arrow surrounding the town of Buttonwillow. Although Map ID C demonstrates key characteristic of a rural agricultural property-type, including agrarian land use for commercial activities, patterns of spatial organization, irrigation infrastructure, and vehicular and pedestrian circulation networks, the property does not embody distinctive characteristics of a type, period, or method of construction outside of its primary function. Map ID C also does not possess high artistic value, nor is it a significant and distinguishable entity whose components may lack individual distinction. Additionally, archival research did not indicate that Map ID C was the work of a master architect or builder, possess high artistic value, or have components that rise to the level of individual distinction. Map ID C, APN 087-010-22, does not appear eligible under NRHP Criterion C or CRHR Criterion 3.

Criterion D/4: That have yielded, or may be likely to yield, information important in prehistory or history.

There is no evidence to suggest that Map ID C, APN 087-010-22, has the potential to yield information important to state or local history. Therefore, the property does not appear eligible under NRHP/CRHR Criterion D/4.

***B10. Significance** (Continued):

Integrity Evaluation

In conclusion, Map ID C lacks sufficient significance to meet any of the criteria for listing in the NRHP or CRHR. To be eligible for listing in either register, a resource must first meet one or more of the significance criteria outlined above before a determination can be made as to whether the resource retains its historic character and is able to convey its significance. In the specific case of the property at Map ID C, an integrity analysis was considered immaterial because the evaluation found that the property lacked the necessary significance to warrant further analysis of its physical and historic integrity. Consequently, the evaluation determined that the subject property is not a historic property based on the NRHP criteria outlined in 36 California Code of Regulations 60.4, either individually or as a contributing element to an existing or potential historic district.

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State of California ♉ The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

PRIMARY RECORD

Primary #
HRI #
Trinomial _____
NRHP Status Code 6Z

Other listings
Review Code Reviewer Date

 ***Resource Name or #:** (Assigned by recorder) 33540 Hwy 58
P1. Other Identifier: Map ID D

***P2. Location:** ☐ **Not for Publication** ■ **Unrestricted**
***a. County** Kern **and** P2b and P2c or P2d. Attach a Location Map as necessary.)
***b. USGS 7.5'** Buttonwillow Quadrangle **Date** 2023 **T** 29S; **R** 24E; **of Sec** 14; Mount Diablo **B.M.**
c. Address no situs address City Buttonwillow Zip 93206
d. UTM: (Give more than one for large and/or linear resources) Zone: 11S; 284279.54 m E; 3920074.61 m N
e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate)
Assessor's Parcel Number (APN) 103-070-35-00-3

***P3a. Description:** (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries)

The property located at 33540 Highway 58 (APN 103-070-35-00-3) is comprised of a roughly rectangular 19-acre parcel developed with a Residence (D1) and a Barn (D2); and a field dedicated to row crops. Map ID D1, Residence, is a one-story building with complex, irregular footprint that has been expanded overtime. *See Continuation Sheet

***P3b. Resource Attributes:** (List attributes and codes) HP2. 1-3 Single-family property
***P4. Resources Present:** ■ Building ☐Structure ☐Object ☐Site ☐District ☐Element of District ☐Other (Isolates, etc.)

P5b. Description of Photo: Photograph 1. Main (north) elevation of the residence located at 22540 Highway 58, view looking northeast. Photograph taken on April 11, 2023.

P5a. Photograph 1.



***P6. Date Constructed/Age and Source:**
■ Historic ☐Prehistoric ☐ Both ca. 1931 (Parcel Quest 2023)

***P7. Owner and Address:**
Highway 58 LLC
6608 Brandt Road
Buttonwillow CA 93206

***P8. Recorded by:**
Claire Cancilla, Dudek
725 Front Street, Ste. 400
Sacramento, California, 95060

***P9. Date Recorded:** 9/17/2023.

***P10. Survey Type:** (Describe)
Intensive Pedestrian

***P11. Report Citation:** (Cite survey report and other sources or enter "none.") Jones, E., and Cancilla, C. 2025. Built Environment Inventory and Evaluation Report. Prepared for a private client. Kern County, California: Dudek. May 2025.

***Attachments:** ☐NONE ■Location Map ■Continuation Sheet ■Building, Structure, and Object Record ☐Archaeological Record ☐District Record ☐Linear Feature Record ☐Milling Station Record ☐Rock Art Record

BUILDING, STRUCTURE, AND OBJECT RECORD

***Resource Name or #** (Assigned by recorder) 33540 Highway 58 ***NRHP Status Code** 6Z
Page 2 **of** 11

B1. Historic Name: None
B2. Common Name: None
B3. Original Use: Commercial B4. Present Use: Commercial
***B5. Architectural Style:** Ranch
***B6. Construction History:** (Construction date, alterations, and date of alterations)
33540 Highway 58 (APN 103-070-35-00-3) is a residential and agricultural property constructed in 1931 *See Continuation Sheet.

***B7. Moved?** ■ **No** ☐**Yes** ☐**Unknown** **Date:** N/A **Original Location:** N/A
***B8. Related Features:** N/A
B9a. Architect Unknown b. Builder: Unknown
***B10. Significance: Theme** N/A **Area** N/A
Period of Significance N/A **Property Type** N/A **Applicable Criteria** N/A
(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)
33540 Highway 58 (APN 103-070-35-00-3) is a 19-acre residential and agricultural property that does not appear eligible for listing in the NRHP or CRHR as a historic resource due to a lack of historical associations and architectural merit. As such, the property does not appear to be a historical resource under CEQA and has been assigned a California Historical Resource Status Code of 6Z (found ineligible for the NRHP, CRHR, or local designation through survey evaluation). **See Continuation Sheet*

B11. Additional Resource Attributes: None

***B12. References:** See Continuation Sheet

B13. Remarks: None

***B14. Evaluator:** EJ Jones, MA, Dudek

***Date of Evaluation:** 10/25/2023



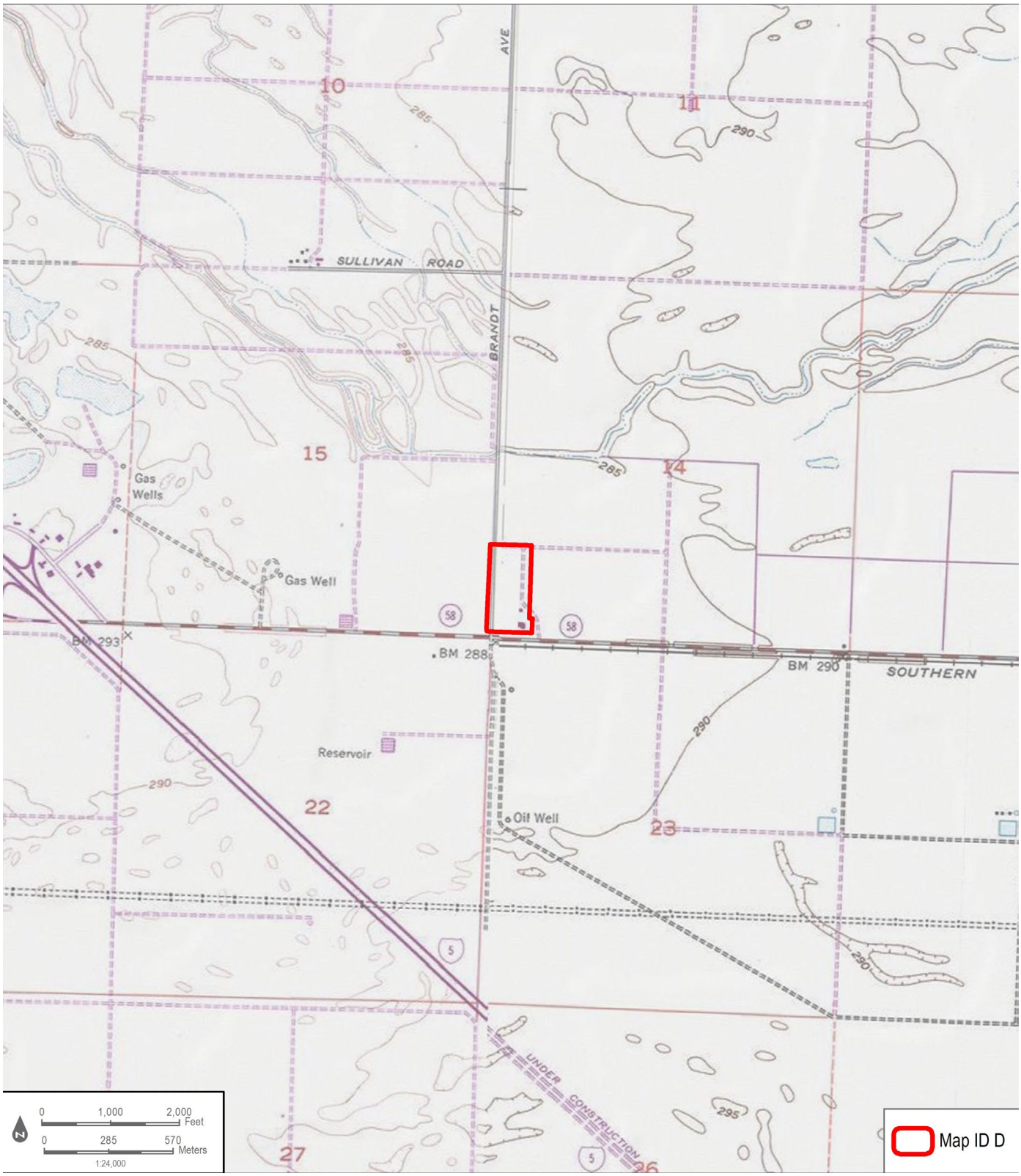
(This space reserved for official comments.)

State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

LOCATION MAP

Primary #_____
HRI # _____
Trinomial_____

 ***Resource Name or #** (Assigned by recorder) 33540 Highway 58
***Map Name:** Buttonwillow Quadrangle ***Scale:** 1:24,000 ***Date of map:** 2021



***P3a. Description (Continued):**

The building's primary elevation features a U-shaped façade ornamented with a full-length front porch supported by posts obscured by mature foliage and moderately overhanging eaves with faux rectangular rafters. Map ID D1 has a moderately pitched roof clad in composite asphalt shingle and the residence is clad in stucco. The building's secondary elevations were inaccessible during the survey and not visible from the public right-of-way. Aerials indicate that, to the rear of Map ID D1 is a rectangular pool, temporary octagonal shelter, and Map ID D2, Barn. Map ID D2, which was not visible from the public right-of-way, is a one-story rectangular building (oriented east–west) with a corrugated metal-clad roof (Photograph 2).

Photograph 2. Main (north) elevation of the residence located at the subject property, view looking northeast. Photograph taken on April 11, 2023.



***B10. Significance** (Continued):

Historic Context

The following context provides an overview of post-contact history for the State of California, which is generally divided into three periods: the Spanish Period (1769–1822), the Mexican Period (1822–1848), and American Period (1848–present). A summary of these periods is discussed below because, unlike many regions of California, Hispanic-era land grants were absent in this area of Kern County. The section then documents relevant historical themes pertaining to the Project area with a discussion about the development of Kern County, the town of Buttonwillow, and agricultural development after 1850.

Hispanic and Early American Periods (1769-1855)

Although Spanish, Russian, and British explorers visited parts of California for brief periods between 1529 and 1769, the Spanish Period in California began with the establishment in 1769 of a settlement at San Diego. To promote Hispanic settlement, the government granted expansive tracts of land, ranchos, to Spanish settlers. When Mexico gained Independence from Spain in 1821, the new Mexican government expanded the program. Despite the land grant system, inland California and contemporary Kern County remained largely uninhabited until after the start of the American Period and the California Gold Rush (Hoover et al. 2002: pp. 125, 138; Bakersfield Californian 2016).

In 1848, gold was found in Coloma, California, and a rush of speculative miners flooded into the California territory via overland routes from the eastern United States. In 1851, gold was discovered in the Kern River Valley and miners quickly relocated to pan local waterways. When gold yields lessened, miners moved away from the San Joaquin Valley to escape its chronic, cyclical flooding. In 1854, a second large vein was discovered in the Kern River, spurring miners to rework the region's network of rivers, streams, and tributaries. When the gold fields dried up, settlers constructed an expansive canal system to drain the inundated valley and control water distribution for agricultural irrigation. As more water was diverted from rivers to irrigate farmland, lake levels in Tulare, Buena Vista, and Kern Lakes began to drop. The reclaimed, nutrient-rich land was subdivided and developed into residential farmsteads. The influx of people into central California resulted in a large demand for meat and animal byproducts (Hoover et al. 2002: pp. 125; Bakersfield Californian 2016).

The Rise of Agriculture and Development of Irrigation (1855-1890)

In 1855, Henry Miller (1827-1916), a German immigrant with a butcher shop in San Francisco, arrived in San Joaquin Valley and purchased 300 head of cattle. Miller integrated his businesses and, as demand skyrocketed, purchased grazing land and breeding stock. In 1857, cattlemen Charles Lux (1823-1887) and Miller incorporated the Pacific Livestock Company, an integrated cattle and meatpacking enterprise, purchased 300,000 acres, and heavily invested in the region's irrigation and agricultural infrastructure. The burgeoning industry attracted migrants who settled in the region permanently. In 1866, the State of California created Kern County, home to 300 residents, from parts of Los Angeles and Tulare Counties. The settlers introduced new crops, experimented with growing methods, and cultivated herds of cattle, sheep, and hogs. The Southern Pacific Railroad constructed a railway through Kern County in 1870, facilitating population growth, dictating the placement of major cities, and connecting ranching and farming operations to distant markets (Hoover et al. 2002: pp. 125; Bakersfield Californian 2016; Morgan 1914).

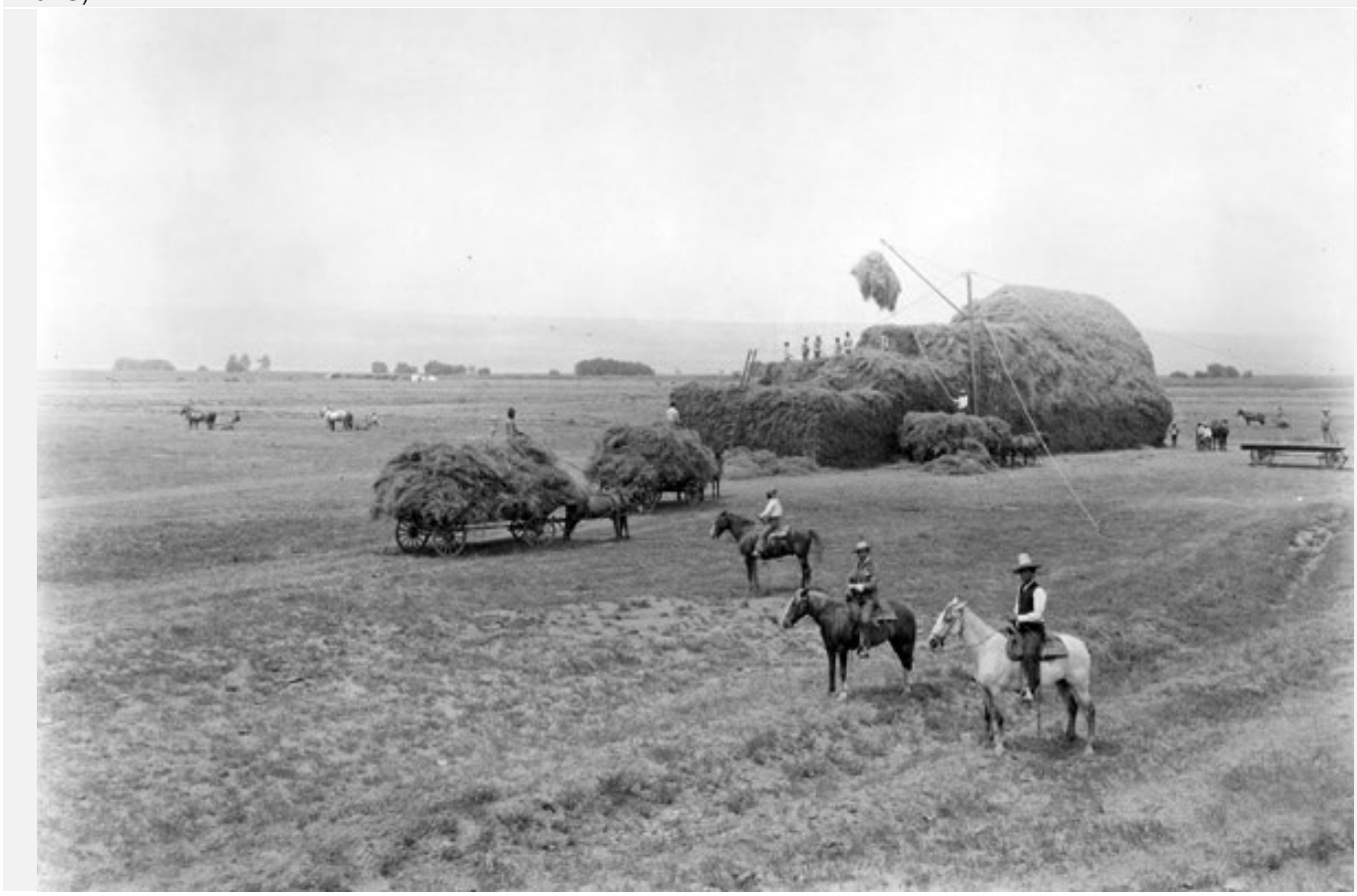
***B10. Significance** (Continued):

In 1885, Miller and Lux established Buttonwillow Ranch, a Pacific Livestock Company[1] sub-headquarters, market, and livestock operation. The ranch, located 3 miles west of Buena Vista Slough, was named for the riparian Buttonwillow trees (*Cephalanthus occidentalis, californicus*) that flourished in the Kern River valley. The partners also established Buena Vista Farm (located directly south of contemporary State Route 58), which provided feed for the livestock. Miller and ranch employees constructed a dam at the south end of Buena Vista Lake (north of Buttonwillow) a 26-mile-long, 50-foot-wide canal west of Buttonwillow Ranch. The 'West Side Canal' watered thousands of cattle and irrigated 500,000 acres of experimental alfalfa, wheat, rye, barley, and corn by early 1886 (Waldschmidt-Nelson 2018; Morgan 1914; Zonlight 1979: p. 318; 331).

[1] By 1890, the Pacific Livestock Company had amassed 1.3 million acres of land in California, Nevada, Oregon, and Idaho to become the largest integrated cattle and meat packing enterprise in the US (Waldschmidt-Nelson 2018).

***B10. Significance** (Continued):

Exhibit 1.Haying at Buena Vista Farm, a Pacific Livestock Company holding (date unknown) (Huntington Library 2013).



Shortly after the canal became operational, upstream competitors, James Ben Ali Haggin, W. B. Carr, and Lloyd Tevis, diverted the water, cutting off the ranch's supply. *Miller v. Hagan,* heard by the California Supreme Court in 1888, forced the litigants to share water rights. As a result, the two large landowners divided the Kern River's flow into two channels, detrimentally impacting small-scale ranchers downstream that relied on the river's natural course. After the court ruling, Miller constructed the 'East Side Canal,' which further irrigated Buttonwillow Ranch and Buena Vista Farm while depriving his neighbors, and competitors, of water (Waldschmidt-Nelson 2018; Morgan 1914; Zonlight 1979: p. 318; 331).

The Development of Buttonwillow and Rural Residential Infrastructure

In 1893, Miller donated a large tract of land between Buttonwillow Ranch (north) and Buena Vista Farm (south) for the future townsite of 'Buena Vista.' In 1895, the Southern Pacific Railroad constructed the McKittrick branch through the community and a Post Office, named 'Buttonwillow,' was established. In the early 1900s, as Miller entered his mid-80s, he established the Miller and Lux Land Company (despite Lux being deceased) and subdivided sections of his massive holdings to sell as ranchland. As the community grew, both 'Buena Vista' and 'Buttonwillow' were used by residents, cartographers, and newspapers. After Miller died in 1916, his heirs continued to gradually subdivide plots of land around Buttonwillow Ranch to subdivided and sell. In 1924, the Buena Vista Water Storage District was established to manage the area's extensive irrigation and drainage network and, in

***B10. Significance** (Continued):

1927, land agent C.E. Houchin platted the townsite of Buttonwillow. Residents adopted Buttonwillow as the community's name although archival sources continue to refer to "Buena Vista" until approximately 1930 . Houchin platted a small grid with residential lots at the town's core and agricultural properties on the lattice's outskirts. Buttonwillow's commercial district fronted (north) McKitterick Bakersfield Highway (extant California State Route [SR] 85) and the Southern Pacific McKitterick railway. Outlying residential farmsteads were positioned between a complex series of canals including the West Side Canal, East Side Canal, Eighty Foot Ditch, Deep Wells Ditch, Garden Ditch, Corn Camp Ditch, Poplar Grove Ditch (sometimes referred to as the Arizona Ditch), and Main Drainage Canal (USGS 1932; Waldschmidt-Nelson 2018; Romani 2013: pp. 1-3).

On June 11, 1921, the San Joaquin Power Company (SJPC) opened the Midway Steam Plant in Buttonwillow and established power infrastructure in the rural community. The Midway Steam Plant, which supplied 17,000 horsepower units along high-tension lines to local residents, included a boiler room, turbine room, an electrical operating room, and a large retention and cooling pond. By early 1922, the Midway Steam Plan no longer met the energy demands posed by Kern County's growing population. To increase production, SJPC spent 1,250,000 dollars to increase production to double the plant's size and increase its total output to approximately 40,000 units. The Midway Steam Plant continued producing electricity for the region until the late 1940s and the development of nuclear power plants in the region (San Francisco Chronicle 1921: p. 20; Fresno Republican 1921: p. 13; Tribune 1921: p. 8; Fresno Morning Republican 1922: p. 13).

The Midway Steam Plant was demolished in 1952 and a major employer left the region. However, Kern County was quickly becoming a major oil producer in California. The oil industry flourished in the mid- twentieth century, as did local agricultural projection. Shortly after the industrial boom began, rural, dirt roads between farms and businesses were graded and paved. Local power creation resumed in the late 1960s when PG&E established the Midway Switching Center. Although increased economic opportunity in the region led to a slight increase in Buttonwillow's population in the late twentieth century and early twenty-first century, the region has retained its rural character. (Fresno Morning Republican 1922: p. 13; NETR 2023; PG&E 2020: pp. 3-115; California Demographics 2023).

Architectural Typology: Rural and Agricultural Properties

The rural residential and agricultural properties documented, such as 39301 Sullivan Road, is ubiquitous in Kern County, State of California, and western United States. Rural residential and agricultural properties include buildings, structures, and landscape features that function together and reflect the residents' functional needs. These interrelated resources are important in understanding how the rural property has been used over time. Typical resources present at a rural residential farming property include the following.

The characteristics of these rural residential and agricultural properties include the following.

- Land Use and Activities
  - Agricultural and/or Ranching
  - Sustenance and/or Commercial Cultivation
- Patterns of Spatial Organization
  - Building Clusters
  - Demarcated Orchards/Vineyards/Corrals (agriculturally-productive areas)

***B10. Significance** (Continued):

  - Boundary Demarcations
- Response to the Natural Environment
  - Irrigation and Water Storage Infrastructure
- Circulation Networks
  - Entry Roads, Field Access Roads, and Trails
- Buildings, structures, and features of this rural property type
  - Main Residence
  - Barn(s)
  - Ancillary Outbuildings
  - Chicken Coop
  - Repair Shop/Workshop/Garage
  - Corrals
  - Livestock Shelters
  - Water Storage Tanks, Wells, and Pump Houses
  - Fuel Storage Structures

Property Specific Historic Context

The property legally addressed as 33540 Highway 58 (APN 103-070-35-00-3) is a residential and agricultural property constructed in 1931 by an unidentified owner. Archival research, including from Ancestry.com, Newspaper.com, and the KCAR archives, did not yield information in subsequent property owners or indicate that the original owner and developer, or subsequent owners or occupants, are persons important to our past. KCAR indicates that Michael Bushnell purchased the property in 2000 before selling the parcel to Highway 58 LLC in 2020 (KCAR 2023c; Parcel Quest 2023d; NETR 2023).

Significance Evaluation: Criteria for the National Register of Historic Places and California Register of Historic Resources

Criterion A/1: That are associated with events that have made a significant contribution to the broad patterns of our history.

Map ID D, 33540 Highway 58, a rural residential and agricultural property, is best understood as part of the broad pattern of rural agrarian practices in the Buttonwillow area. Map ID D, which was developed in 1931 with a residence, barn, irrigation infrastructure, and agricultural orchards, possesses an association with the agricultural development of the area during the early- and mid-twentieth century, but research did not indicate that it contributed in any significant way to this pattern of development. The property also lacks an important association with the expansion of rural residential development in the Buttonwillow area. As such, Map ID D, 33540 Highway 58, is not eligible under NRHP/CRHR Criterion A/1.

***B10. Significance** (Continued):

Criterion B/2: That are associated with the lives of persons significant to our pasts.

To be found eligible under B/2, Map ID D, 33540 Highway 58, must be directly tied to an important person and the place where that individual conducted or produced the work for which they are known. Archival research indicates that Map ID D is not associated with any specific persons known to be historically important figures at the national, state, or local level. While a number of individuals have occupied the property either as owners or renters from the time of its construction to the present day, collaborative efforts are best evaluated under Criterion D. Due to a lack of identified significant associations with important persons in history, Map ID D, 33540 Highway 58, is not eligible under NRHP Criterion B or CRHR Criterion 2.

Criterion C/3: That embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction.

Map ID D, 33540 Highway 58, is an agricultural property type in the rural area surrounding the town of Buttonwillow. Although Map ID D demonstrates key characteristics of a rural agricultural property-type, including agrarian land use for commercial activities, patterns of spatial organization, irrigation infrastructure, and vehicular and pedestrian circulation networks, the property does not embody distinctive characteristics of a type, period, or method of construction outside of its primary function. Map ID D also does not possess high artistic value, nor is it a significant and distinguishable entity whose components may lack individual distinction. Additionally, archival research did not indicate that Map ID D was the work of a master architect or builder, possess high artistic value, or have components that rise to the level of individual distinction. Map ID D, 33540 Highway 58, is not eligible under NRHP Criterion C or CRHR Criterion 3.

Criterion D/4: That have yielded, or may be likely to yield, information important in prehistory or history.

There is no evidence to suggest that Map ID D, 33540 Highway 58, has the potential to yield information important to state or local history. Therefore, the property does not appear eligible under NRHP/CRHR Criterion D/4.

Integrity Evaluation

In conclusion, the property at Map ID D, 33540 Highway 58, lacks sufficient significance to meet any of the criteria for listing in the NRHP or CRHR. To be eligible for listing in either register, a resource must first meet one or more of the significance criteria outlined above before a determination can be made as to whether the resource retains its historic character and is able to convey its significance. In the specific case of the property at Map ID D, an integrity analysis was considered immaterial because the evaluation found that the property lacked the necessary significance to warrant further analysis of its physical and historic integrity. Consequently, the evaluation determined that the subject property is not a historic property based on the NRHP criteria outlined in 36 California Code of Regulations 60.4, either individually or as a contributing element to an existing or potential historic district.

References

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Zonlight, M. 1979. "Land, Water, and Settlement in Kern County, California: 1850-1890." Master's thesis in Economics, University of California (Berkeley, California), 1979.

Map Reference Number: E

P1. Other Identifier: N/A

e. Other Locational Data: Assessor Parcel Numbers (APNs) 101-010-02-00-5, 101-010-15-00-3, 101-010-05-00-4, 101-010-04-00-1, 101-020-31-00-2, 101-020-35-00-4, 101-010-10-00-8, 101020-23-00-9, 101-020-27-00-1, 101-020-33-00-8, 101-020-30-00-9, 101-020-28-00-4, and 101-010-14-00-0 (Parcel Quest 2023e)

***P3a. Description:** The PG&E Midway Switching Station comprises two legal addresses—2205 Wasco Way and 40534 Highway 58.

The Midway Switching Center is an electric bulk power transmission and step-down switching facility located directly east of Buttonwillow, a 1,340-resident Census Designated Place, in Kern County, California. The substation is bound by the Buttonwillow Recreation and Park District and East Side Canal to the west, agricultural properties and orchards to the north, Wasco Way to the east, and Highway 58 (Blue Star Memorial Highway) to the south. The 247.47-acre, sprawling complex has an irregular footprint surrounded by a tall wall constructed from thick, vertical wood beams. The property is accessible via four oversized metal gates on the south and east sides of the complex.

The Midway Switching Center features a control house with a one-story building with a rectangular plan, raised concrete foundation, and a flat roof. Clusters of electrical equipment include a series of circuit breakers, switch arresters, and generator-battery modules that divide incoming energy among multiple outgoing transmission lines. Vertical metal latticework structures support busbars, shield wires, and lightening arrestors that divert lightning strikes away from the substation's electrical infrastructure. Additional infrastructure includes transmission wire, lattice steel towers, lattice steel poles, light duty steel poles, and wood poles. The interior of the Midway Switching Center property was not accessible at the time of survey and not visible from the public right of way. PG&E's 2020 HEIMP describes the facility's buildings as utilitarian (PG&E 2020: pp. 4. 21-22; A2. 17; A2. 20; A3C. 12) (Photograph 1).

Photograph 1. Partial view of Map ID E. Midway Switching Center, facing southwest.



Identified Alterations

Electrical infrastructure, including transmission lines and substations, have outdoor equipment and standardized structures that are routinely maintained. There are no observed alterations visible from the right-of-way, and construction/maintenance records could not be obtained.

***P3b. Resource Attributes:** HP9. Public Utility Building

***P8. Recorded by:** EJ Jones, MA. Dudek. 1810 13th Street, Suite 110, Sacramento, CA, 95811

***P11. Report Citation:** Jones, E., et al. "Confidential Built Environment Inventory and Evaluation Report near Buttonwillow, Kern County, California. Prepared by Dudek 2023.

***B10. Significance:**

Midway Switching Center, which is legally sited at 2205 Wasco Way and 40534 Highway 58 is a 280-acre utilitarian property developed with a large, electrical substation. As a result of extensive archival research and an intensive field survey Map ID E. Midway Switching Center does not appear eligible for listing in the NRHP or CRHR due to a lack of historical associations and architectural merit. The Midway Switching Center does not appear to be a historical resource under CEQA and has been assigned a California Historical Resource Status Code of 6Z (found ineligible for the NRHP, CRHR, or local designation through survey evaluation).) (See Continuation Sheet)

Power infrastructure is present throughout the United States in urban and rural areas. Resources include transmission lines (corridors and the individual poles and towers within them), substations (including various structures, elements, and types), control houses, maintenance facilities, office spaces, converter stations, and a wide variety of other site-specific buildings and structures. Power infrastructure is marked by its utilitarian design that values its stability and function and does not include recognizable design features. The power system includes a vast quantity of types of buildings and structures, many of which follow similar forms, repeated throughout the rural landscape. Power transmission structures are designed to work with the topography of the area. Their structures represent various designs that support their function as power transmission support. Similarly, substations were designed with functionality in mind.

Transmission lines are a series of vertical poles or towers that hold electric conductors to power plants and substations to serve individual customers such as cities, towns, industrial plants, and utility districts. Transmission line structures include three main architectural design components: the tower structure, the conductors, and the insulators. The tower is the structure that holds the insulators, and the insulators hold the conductors, which come in the form of a transmission line. The transmission of electricity includes anything above the electrical voltages of 60 kV or more. 500 kV transmissions are the highest voltage connected to energy grids throughout the western United States. Lines with higher voltages (230 kV and above) are primarily carried on metal towers, while lines below 230 kV are usually on wooden pole structures. With technological advances in insulator and conductor design, components are replaced and repaired regularly. Transmission lines and systems are generally categorized by their conductor positioning, construction materials, and voltage.

Character-defining features are the specific physical characteristics of data requirements that an individual property must possess to retain integrity. Key character-defining features of transmission lines often include the following:

- Alignment of transmission line from the date of original construction
- Intact primary tower structures
- Connectivity and association to power generating plants and substations

***B10. Significance** (continued):

Substations act as a receiver of newly generated power through transmission lines and use transformers to convert energy into high voltages or convert the current to lower desired voltages. Substation design includes structures such as the intake from high-voltage transmission lines, transformers, switchgears, shield wires, and lightning arrestors that divert lightning to the ground through towers. Two types of substations are transmission substations and distribution substations. Transmission substations are known for either increasing voltages for long-distance transmission or decreasing voltages for sub-transmission and distribution to the user. Distribution substations generally serve as the electric system that operates before serving customers.

Character-defining features are the specific physical characteristics of data requirements that an individual property must possess to retain integrity. Key character-defining features of substations often include the following:

- Power capacity generated from the date of original construction
- Connection/association to power generating plants and transmission lines

Approach to Historic Era Resources

PG&E uses a comprehensive management plan to assist in the identification, evaluation, and treatment of their historic-era electrical infrastructure, the HEIMP. The HEIMP presents a comprehensive historic context, related property types, a framework for identification and evaluation, and management plan implementation strategies. The historic context outlined in the HEIMP provides an in-depth context of PG&E's history since its establishment in 1905. Within this context, the HEIMP outlines four major significance themes to apply under each of the evaluation criteria of the NRHP and CRHR. These include the following:

- The role of Corporate Organization in facility development and expansion.
- The role of Technological Innovation in electrical development and consumption.
- The role of Architectural Treatment and design in facility development.
- The role of electrical development in California's Community Development.

The HEIMP also outlines exempt PG&E property types in Chapter 5, Historic-Era Electrical Identification and Evaluation Standards. The established periods of significance for transmission alignments are 1901–1931 for 60 kV to 230 kV transmission lines, and 1960–1970 for 500 kV transmission lines. The transmission lines that are exempt from review are standardized and ubiquitous and have no potential to convey any of the significant themes as defined by PG&E. Transmission alignments and facilities that fall outside these defined periods are considered standard or iterative in technology, function, and design (PG&E 2020: 5-21).

According to the HEIMP, the substation within the project area—the Midway Switching Center—is one of 948 PG&E substations that facilitate the transmission of electricity from generating facilities to consumers. The oldest substation owned by PG&E was constructed in Solano County by the Bay Counties Power Company in 1901 while the newest dates to 2016 (PG&E 2020: p. 4-21).

Discussion of Significance and Evaluation: California Register of Historic Resources

Map ID E, Midway Switching Center, per PG&E's 2020 HEIMP, was evaluated in 2014 by Cardno environmental consulting and recommended ineligible for the NRHP. Although Cardno's evaluation did not receive SHPO concurrence, Kern County's Inventory of Archeological Determinations of Eligibility lists the property as having an NRHP status code of 6Y (determined ineligible for the NRHP by consensus through Section 106 process and not evaluated for the CRHR or local listing). Architectural Historian Claire Cancilla, MA, resurveyed the property in October 2023 for potential recordation on the CRHP.

Map ID E, Midway Switching Center, does not appear eligible for listing in the NRHP or CRHR as a historic resource due to a lack of historical associations and architectural merit. As such, the property does not appear to be a historical resource under CEQA and has been assigned a California Historical Resource Status Code of 6Z (found ineligible for the NRHP, CRHR, or local designation through survey evaluation).

***B10. Significance (**continued):

Criterion 1: That are associated with events that have made a significant contribution to the broad patterns of our history.

The Midway Switching Center, which features components constructed in 1921 and 1968, was constructed to provide power to rural residents in Kern County. The Control Building (extant 1921 resource), and the infrastructure associated with the 1968 Midway Switching Center are representative of a massive investment in the development and transmission of electrical power. Under CRHP Criterion 1, Map ID E must be directly associated with events that have made a significant contribution to the broad patterns of our history. Relevant historical themes for Buttonwillow and rural Kern County, and rural communities within the State of California, include agriculture and/or commerce and industry. Archival research does not indicate that Map ID E initiated or significantly contributed to agricultural development in, or around, Buttonwillow. Although the establishment of Map ID E contributed to the region's economy and industry in 1968, the Midway Switching Center is not an electrical substation that made a unique or significant contribution to the region's commercial or industrial sectors.

Map ID E does not appear to be associated with any extraordinary events or events occurring within the context of electrical infrastructure development, nor does it have a significant association with the broad patterns of history in Buttonwillow, Kern County, or the State of California. Therefore, the Midway Switching Center does not appear eligible under CRHR Criterion 1.

Criterion 2: That are associated with the lives of persons significant in our past.

To be found eligible under Criterion 2, the Midway Switching Center must be directly tied to an important person and the place where that individual conducted or produced the work for which they are known. Archival research does not indicate that an important individual conducted significant work, studied, or researched at the Midway Switching Center and, therefore, this property is not eligible under CRHR Criterion 2.

Criterion 3: That embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction.

Extant Map ID E, Midway Switching Center, is a standard, electrical substation consistent with PG&E's mid-century design. Individual features, including the 1921 Control House are reflective of resource types commonly used for utilitarian purposes. The Midway Switching Center and its individual components do not embody distinctive characteristics of a type, period, or method of construction outside of its primary function as an electrical substation. Map ID E does not possess high artistic value, nor is it a significant and distinguishable entity whose components may lack individual distinction. As such, the property is not eligible under NRHR Criterion 3.

Criterion 4: That have yielded, or may be likely to yield, information important in prehistory or history.

There is no evidence to suggest that the Midway Switching Center has the potential to yield information important to state or local history. Therefore, the property does not appear eligible under CRHR Criterion 4.

Discussion of Integrity and Evaluation Summary

National Register Bulletin 15: How to Apply the National Register Criteria for Evaluation (NPS 1997) states that the integrity of a property is based upon the historical significance and character-defining features of that property, and that "only after significance is fully established can you proceed to the issue of integrity."

To be eligible for listing in the NRHP, properties must retain their physical integrity from the period in which they gained significance. In the case of architecturally significant properties, the period of significance is normally the date of construction. For historically significant properties, the length of the historic associations usually measures the period of significance. As the Midway Switching Center is not significant under any NRHP or CRHR criteria, it does not have a period of significance and the integrity of the buildings does not require examination.

***B10. Significance (**continued):

Based on the significance evaluation and in consideration of the Midway Switching Center history and requisite integrity, Dudek finds the complex not eligible for listing in the NRHP or CRHR. As a result of Dudek's extensive archival research, field survey, and property significance evaluations, the Midway Switching Center does not appear eligible for listing in the NRHP or CRHR as a historic resource due to a lack of historical associations and architectural merit. As such, the Midway Switching Center does not appear to be a historical resource under CEQA and has been assigned a California Historical Resource Status Code of 6Z (found ineligible for the NRHP, CRHR, or local designation through survey evaluation).

Evaluator: EJ Jones, MA, Dudek. 1810 13th Street, Suite 110, Sacramento, CA. 95811.

***Date of Evaluation:** October 23, 2023.

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State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PRIMARY RECORD

P 15 009737

Primary # _____
HRI # _____
Trinomial _____
NRHP Status Code _____
Other Listings _____
Review Code _____ Reviewer _____ Date _____

 Resource Name or # : PL-6

P1. Other Identifier: None

P2. Location: ☒ Not for publication ☐ Unrestricted

P2a. County: Kern (241B)

P2b. USGS 7.5' Quad: Buttonwillow 1954, revised 1973, T. 29 S., R. 23 E., SW ¼ of Sec. 13

P2c. Address: Northwest Corner of Highway 58 and Wasco Ave, Buttonwillow, CA

P2d. UTM: Zone 11; UTM A: 277810 mE, 3920460 mN
UTM B: 277790 mE, 3919870 mN
UTM C: 277360 mE, 3919880 mN
UTM D: 277380 mE, 3920480 mN

P2e. Other Locational Data: The site area encompasses the Midway Switching Center - PG&E substation on the east side of the town of Buttonwillow located at the northwest corner of Highway 58 and Wasco Ave.

P3a. Description: The site consists of three standing structures (two control room buildings and a residential complex), a foundation, the remains of a recreational park and an artifact scatter associated with the San Joaquin Power company's Midway Steam Plant which was constructed between 1921-1922 and dismantled in 1954. PG&E currently operates two substation transfer yards at this location with its existing control room building dating to the late 1920s to early 1930s. The overall site boundaries extend approximately 700 m north-south by 700 m east-west and overlap with the existing PG&E facility.

Cliff Thompson, PG&E Operating Supervisor for the Switching Center Operations at the Midway Switching Center provided much of the following background information. An historic photo in the PG&E control room building shows the original Midway Steam Plant and notes that it was constructed in 1921-1922 and dismantled in 1954. Historic USGS topographic maps of the Buttonwillow Quadrangle illustrate the changes in the buildings associated with the San Joaquin Light and Power Company facility which eventually was incorporated into the existing PG&E substation (see attachments).

There appear to be four features remaining of the original steam plant operation, which are listed and described as follows: (1) a standing structure located just north of Highway 58 at the entrance to the existing substation facility. It is a rectangular building measuring 20'4" north-south by 40'5" east-west and approximately 30' high constructed of poured concrete (the forms for the concrete were 8" milled boards based on impressions still visible in the concrete). This building was apparently the original steam generating power control house and dates to the early 1920s according to Cliff Thompson. On the south side of the building (facing Highway 58) one can still detect the remains of the original "San Joaquin Power" logo which has been painted over. The building has a flat roof, with roll-top steel loading doors on its north and south sides and is built on a raised foundation supported by 16" square concrete piers. This structure is not depicted on either the Buttonwillow 1932 or 1954 USGS maps.; (2) a poured concrete foundation measuring 240' north-south by 164' east-west with a sunken floor approximately 3' deep. The poured concrete forms were of 8" milled boards and a discontinued form of rebar was used to reinforce the concrete. This foundation is fenced off and was the former location of the cooling plant for the steam operation. The foundation is cracked and decomposing in places and the area is currently used as an equipment storage yard. This feature is depicted on both the 1932 and 1954 USGS maps (the large open rectangle parallel to Wasco Ave); (3) a house and associated outbuildings which was one of the residences built for the steam plant operators and maintenance personnel. It was originally built around 1920-1930, but appears to have been remodeled and updated since then with the stucco, wood framed bungalo-style house, garage and outbuildings now appearing to date to the 1950s era. This is the only remaining house of the original seven to thirteen residences built to house the maintenance and operatoring crew of the original San Joaquin Light and Power Company steam plant. The 1932 edition (surveyed in 1928-1929) Buttonwillow 1:31,680 USGS topographic map depicts thirteen structures in a row to the west of the westernmost road entering the facility. The 1954 and 1954 (photorevised 1973) Buttonwillow 1:24,000 USGS topographic maps both show seven structures in a row. No evidence of the other residences were detectable. A PG&E operator currently occupies the residence; (4) the remains of a recreational park which was

apparently built for the families of the operators and maintenance personnel. A grove of palm trees marks the park location with abandoned swing sets and barbeque areas still detectable. The park dates to the same time as the nearby house, around the 1920s to 1930s.

In addition to features associated with the steam plant, there is a standing PG&E control room building within the eastern 130-230 KV Yard. This building still serves as the control room for the eastern substation yard. On the eastern face of the building is inscribed "Pacific Gas and Electric Company - Control Building". The building apparently dates to sometime after the mid to late 1920s when PG&E purchased San Joaquin Power and Light Company and no longer used the steam generating facility. A disturbed light scatter of historic debris (including solarized glass fragments, cobalt blue glass fragments, clear glass fragments, and stoneware ceramic fragments) is located along the northern and eastern substation fence and is probably associated with the substation and residences. The 1932 and 1954 Buttonwillow topographic maps depict a spur of the Southern Pacific Railroad (portions of which have been previously recorded as site P-15-002050) leading to the former steam generation facility, but no evidence of this railroad spur was detected during the current investigation. Both the 1932 and 1954 maps depict structures on the east side of Wasco Way and the north side of Highway 58 (near their intersections), but no evidence of these were detected and it is unsure as to whether they were associated with the steam facility.

P3b. **Resource Attributes:** AH2 (Foundations), AH4 (trash scatter), HP9 (Public Utility Buildings) & AH15 (Standing structures)

P4. **Resources Present:** ☒ Building ☐ Structure ☐ Object ☒ Site ☐ District ☐ Element of District

P5. **Photograph or drawing:** None

P6. **Date Constructed/Age:** ☐ Prehistoric ☒ Historic ☐ Both

P7. **Owner and Address:** Pacific Gas and Electric Company

P8. **Recorded by:** Will Shapiro, Chris Morgan, Graham Dalldorf and Nick Angleoff. Pacific Legacy, Inc., 1525 Seabright Ave., Santa Cruz, CA 95062

P9. **Date Recorded:** 5-5-99

P10. **Survey Type/Description:** Intensive pedestrian survey

P11. **Report Citation:** Jackson, T. and W. Shapiro 1999. Cultural Resources Inventory for the Proposed Texaco Sunrise Cogeneration and Power Project: Addendum for Route B and Valley Acres Substation Surveys. Report submitted to Radian International, Inc.

Attachments: ☐ None ☒ Location Map ☐ Sketch Map ☐ Building, Structure, and Object Record
☐ Archaeological Record ☐ District Record ☐ Linear Feature Record ☐ Milling Station Record
☐ Rock Art Record ☐ Artifact Record ☐ Photograph Record ☒ Other: Historic USGS topographic map copies: Buttonwillow 1932 Edition (surveyed in 1928-1929, scale 1:31,68) note that the xerox is enlarged 132% to a 1:24000 scale; and Buttonwillow 1954 USGS (scale 1:24,000 and xeroxed 1:1).

P 15 009737

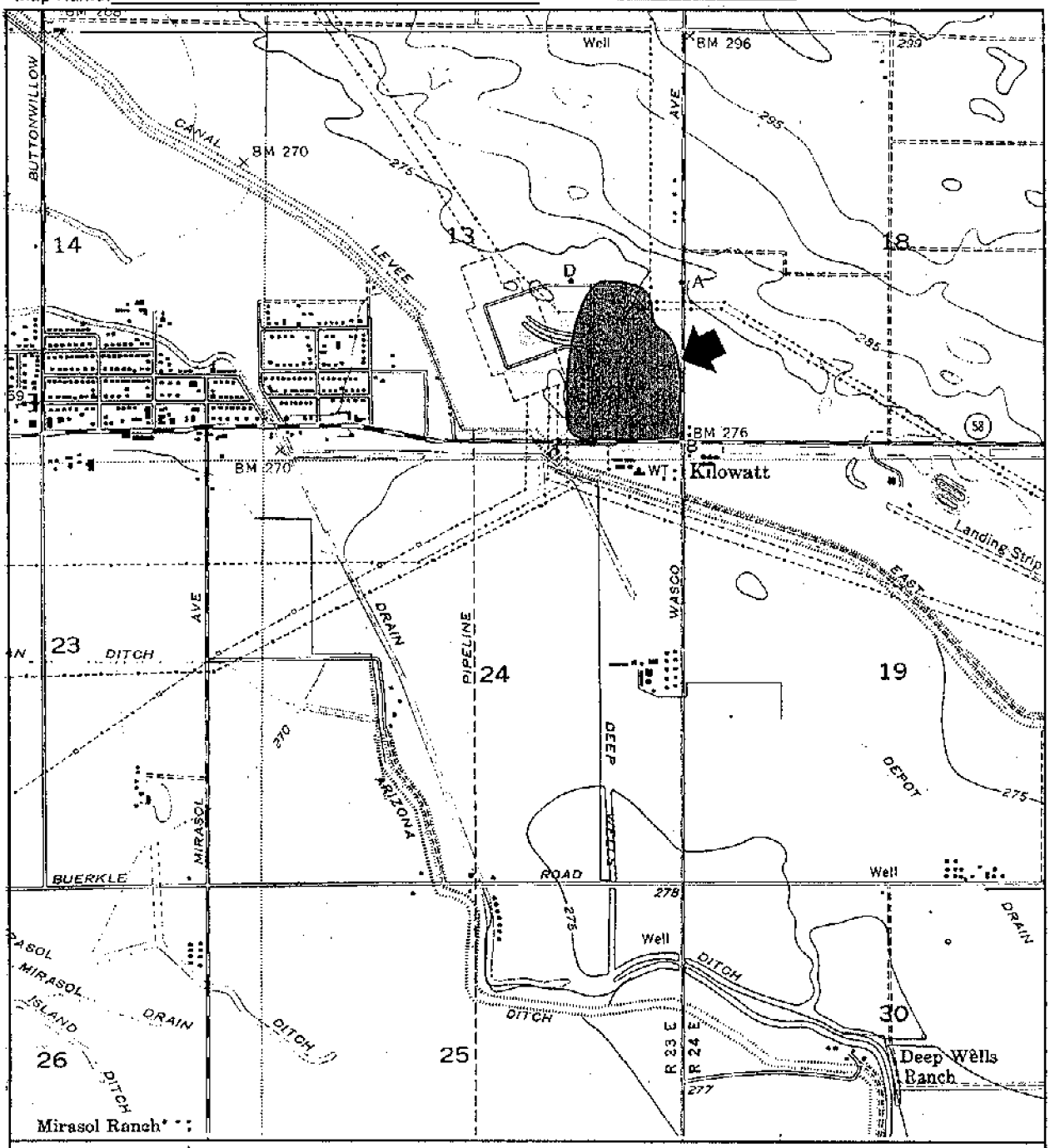
State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
LOCATION MAP

*Primary #:
HRI #:
Trinomial:

Page 3 of 5

*Resource Name or # (Assigned by recorder) PL-6

*Map Name: *Scale: *Date of Map:



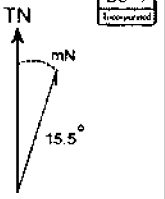
A Portion of
Buttonwillow, Calif., USGS 7.5' Quadrangle
1954; Photorevised 1973;
SCALE: 1:24,000

0 0.5 1 kilometer

0 0.5 1 mile



QUADRANGLE LOCATION



Pacific Legacy Incorporated

DPR 523J (1/95)

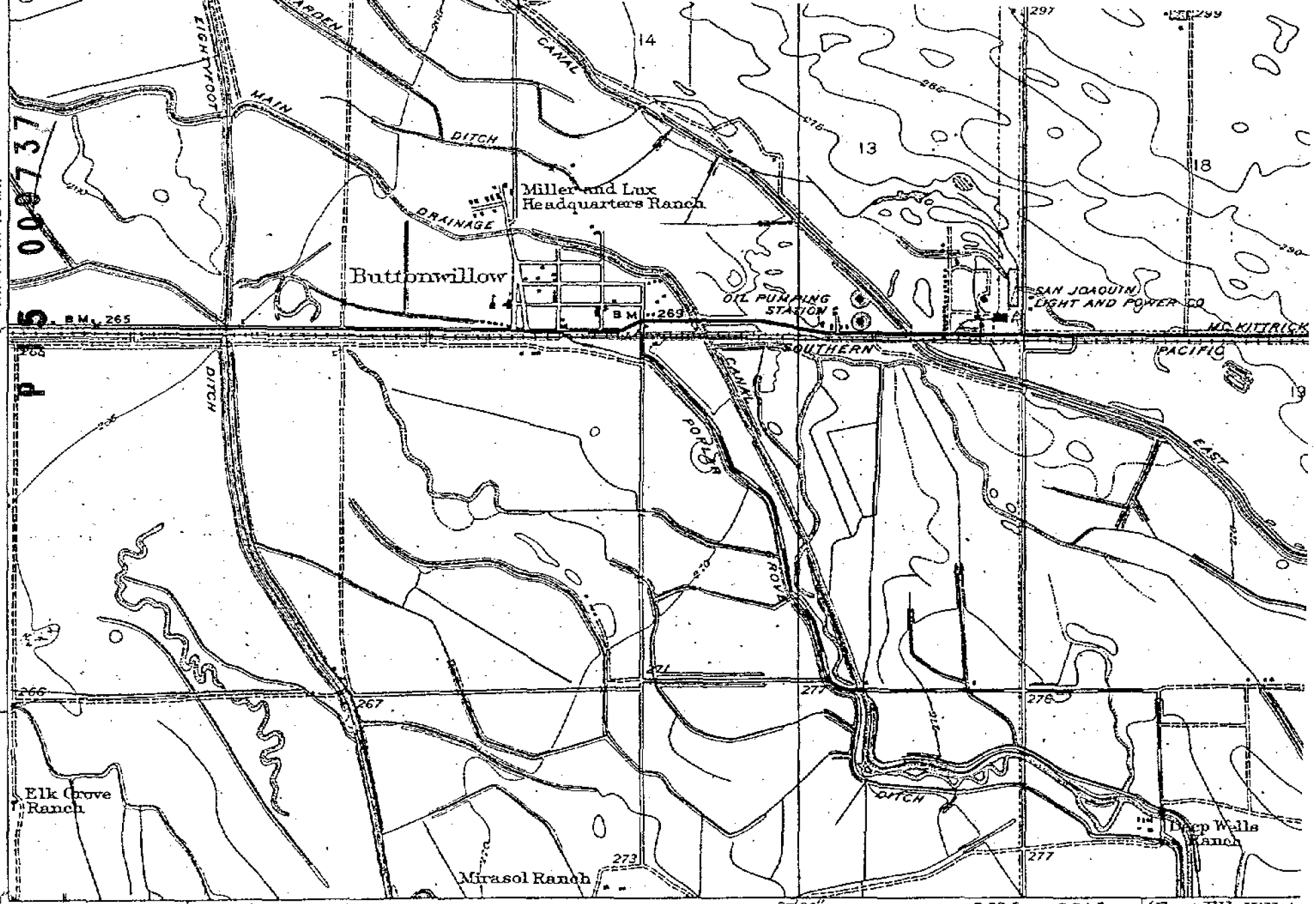
*Required Information

P 5 00737

DIVISION OF OIL AND GAS

LOS ANGELES

SAN LUIS OBISPO 100 MI.
MCKITTRICK 12 MI.



Topography by H.L. McDonald
Control by U.S. Geological Survey and
U.S. Coast and Geodetic Survey
Surveyed in 1928-1929

Scale 1/31680

1 0 1 MILE
5000 2500 0 5000 FEET
1 0 1 KILOMETER

TRUE NORTH
MAGNETIC NORTH
16°

BUTTONWILLOW 1932 EDITION USGS MAP
([illegible] 1932 to 1:24,000 SCALE)

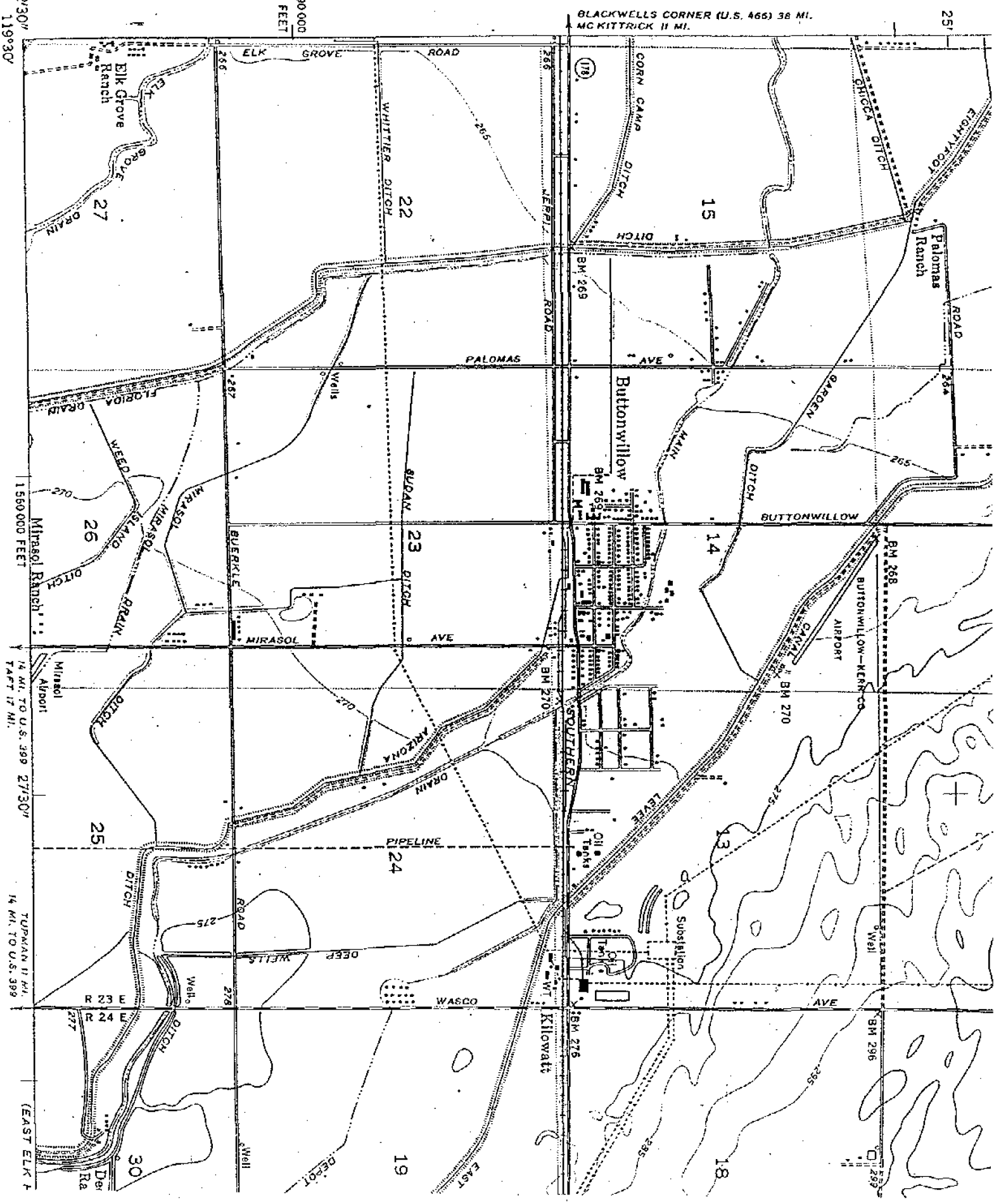
PL-6

PL-6

Buttonwillow 1954 Edition USGS MAP
scale 1: 24,000

PAGE 5/5

P 15



Map Reference Number: F

P1. Other Identifier: N/A

e. Other Locational Data: Assessor Parcel Number

***P3a. Description:** The .38-mile segment of the (24-mile) East Side Canal consists of a concrete-lined water conveyance structure with a trapezoidal shape, steep sides, and a flat bottom. The top of the canal is approximately 12 feet deep. The top of the canal is between 10 and 20 feet wide while the bottom is approximately 6 feet wide. The canal right-of-way—the reserved land on either side of the depression—totals approximately 100 feet wide (Photograph 1).

Identified Alterations

This realignment was paved in the early twenty-first century. Water and irrigation infrastructure have outdoor equipment and standardized structures that are routinely maintained. There are no observed alterations visible from the right-of-way, and construction/maintenance records could not be obtained (Akyuz and Ruzicka 2013: p.3).

***P3b. Resource Attributes:** HP20: Aqueduct/Canal

***P8. Recorded by:** EJ Jones, MA. Dudek. 1810 13th Street, Suite 110, Sacramento, CA, 95811

***P11. Report Citation:** Jones, E., et al. "Confidential Built Environment Inventory and Evaluation Report near Buttonwillow, Kern County, California. Prepared by Dudek 2023.

***B10. Significance:**

Map ID F. Segment of the East Side Canal is a .38-mile linear resource associated with the East Side and All-American Canal systems. As a result of extensive archival research and an intensive field survey, the canal segment is not eligible for listing in the NRHP or CRHR due to a lack of historical associations and architectural merit. This Segment of the East Side Canal does not appear to be a historical resource under CEQA and has been assigned a California Historical Resource Status Code of 6Z (found ineligible for the NRHP, CRHR, or local designation through survey evaluation).

Resource-Specific Historic Context

Map ID F has been previously recorded in 2009 by JRP Historical Consulting and in 2013 by Compass Rose Archaeological, JRP Historical Consulting, and ArchaeoPaleo Resource Management. For the most recent, comprehensive historic context statement regarding Map ID F, Segment of the East Side Canal, please refer to the 2013 DPR 523 Form prepared by Linda Akyuz and Denise Ruzicka, ArchaeoPaleo Resource Management. This recordation provides specific context regarding the subject segment of the East Side Canal (Akyuz and Ruzicka 2013: pp. 1-11; Parcel Quest 2023f).

Map ID F, Segment of the East Side Canal, was originally constructed in ca. 1900 to provide water the Buttonwillow Ranch, owned by Miller and Lux. When the original canal was constructed, it was earthen-lined, 25 feet wide, and 3 to 5 feet deep. In ca. 1920, after both business partners had died and the ranch changed hands, the sections of the East Side Canal, including Map ID 4, were realigned and enlarged to triple its water-carrying capacity. In 1924, the Buena Vista Water Storage District was established to manage the region's infrastructure and took ownership of the earthen-lined, 27-mile-long East Side Canal. After an unprecedented amount of rainfall flooded the Buena Vista Water Storage District in 1935, the East Side Canal, including Map ID 4, underwent a series of improvements. Over the length of the entire canal, new culverts, drains, ditches, bridges, weirs, and management systems were constructed. Several segments were excavated and lined in concrete. In 1943, the Buena Vista Water Storage District implemented a canal maintenance program that provided routine maintenance to the system every two years (USGS 1910; Akyuz and Ruzicka 2013: pp. 1-11) (Photograph 9).

Property Type: Water Infrastructure

Water infrastructure can be traced back more than 2,000 years to the Roman Empire in the form of aqueducts spanning Europe to connect water resources from rural areas to city centers. In the United States, the early Euro-American settlement period developed water infrastructure in areas of the arid west with mining and agriculture along water courses and passes through the Sierra Nevada.

***B10. Significance** (continued)**:**

Diversion and irrigation ditches were constructed from river and stream waters to support mills and individual farmers. Beginning in 1903, the United States Reclamation Service (later the Bureau of Reclamation) began federal investment in irrigation services throughout the West, and construction of these large-scale irrigation projects allowed for population increases in rural areas. Examples of water infrastructure include main water lines, wells, pumping stations, treatment plants, stormwater drains, sewer drains, dams, and levees. Water infrastructure could contain closed features, such as underground pipes, wells, tanks, and drains, or it could be constructed near ground level, such as canals, laterals, and ditches. Water delivery and irrigation systems could include ancillary features such as bridges, checks, and flumes. Materials used to create water infrastructure systems, for either water transportation or water storage, include wood, metal, steel, and more recently, industrial-use plastics.

Character-defining features are the specific physical characteristics of data requirements that an individual property must possess to retain integrity. Key character-defining features of water infrastructure often include the following:

- Alignment and system connectivity of its original construction
- Primary physical and operational components (laterals, flumes, canals)
- Connectivity/association to power-generating hydroelectric dams and powerhouses

Discussion of Significance and Evaluation

In 2001, the Bureau of Land Management determined the All-American Canal is eligible for the NRHP as a historic district under Criterion A and Criterion C. According to the report, the All-American Canal was found to be significant on local, state, and national levels due to its association with major federal public works projects. All elements of the canal were evaluated as significant contributing elements of a district even if they are less than 50 years old. The Bureau of Land Management stated that additional research is required to determine if elements are contributory, prior to any NRHP nomination submittals. The All-American Canal is an ongoing and vital element of Kern County's infrastructure that, since its construction, has required regular maintenance and upgrading (Schaefer and O'Neil 2001: 71).

Map ID F, Segment of the Eastside Canal, was originally documented in separate DPR 523 Forms by JRP Historical Consulting LLC, and ESA 2009. Neither firm evaluated the resource. In 2013, ArchaeoPaleo Resources also recorded the subject segment but did not evaluate the resource's significance due to a perceived lack of integrity. In a subsequent 2013 documentation effort, Historian Linda Akyuz evaluated the resource and determined that, although the canal has played an important role within California's agricultural history, the subject segment is a contemporary realignment of the canal. Additionally, the realigned concrete-clad canal was constructed wider and deeper than the original earthen East Side Canal. As such, Akyuz recommended that the subject segment of the East Side Canal be found ineligible for recordation in the NRHP and CRHR (6Z: recommended ineligible through a survey evaluation).

In October 2023, Dudek revisited a portion of the East Side Main Canal adjacent to the Project API and observed minimal, maintenance-based alterations since the last recordation in 2013. Dudek concurs with the previous findings that the canal does not meet the criteria for listing in the NRHP or CRHR due to lack of integrity. The .38-mile subject Segment of the East Side Canal does not reflect its original construction through the construction of features outside of its period of significance (1908–1941). Dudek also finds—as a result of the current study, and in accordance with Section 15064.5(a)(2)-(3) of the CEQA Guidelines and the criteria outlined in PRC Section 5024.1—that the segment of the Westside Main Canal is not a historical resource for the purposes of CEQA. Dudek has assigned the segment of the Westside Main Canal a 6Z California Historical Resource status code.

Consequently, the subject property is not a historic property based on the NRHP criteria outlined in 36 CFR Section 60.4, individually or as a contributing element to an existing or potential historic district. Similarly, the evaluation also concludes that the subject property is not a historical resource for the purposes of CEQA as defined under PRC Section 5024.1 and 14 CCR Section 15064.5(a), either individually or as a contributing element to an existing or potential historic district.

Evaluator: EJ Jones, MA, Dudek. 1810 13th Street, Suite 110, Sacramento, CA. 95811.

***Date of Evaluation:** October 23, 2023.

Photograph(s):

Photograph 1. Partial view of Map ID F. Segment of the East Side Canal, facing southeast.



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UPDATE

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PRIMARY RECORD

Primary # P15-13725
HRI #
Trinomial CA-KER-07701H
NRHP Status Code

Other Listings
Review Code Reviewer Date

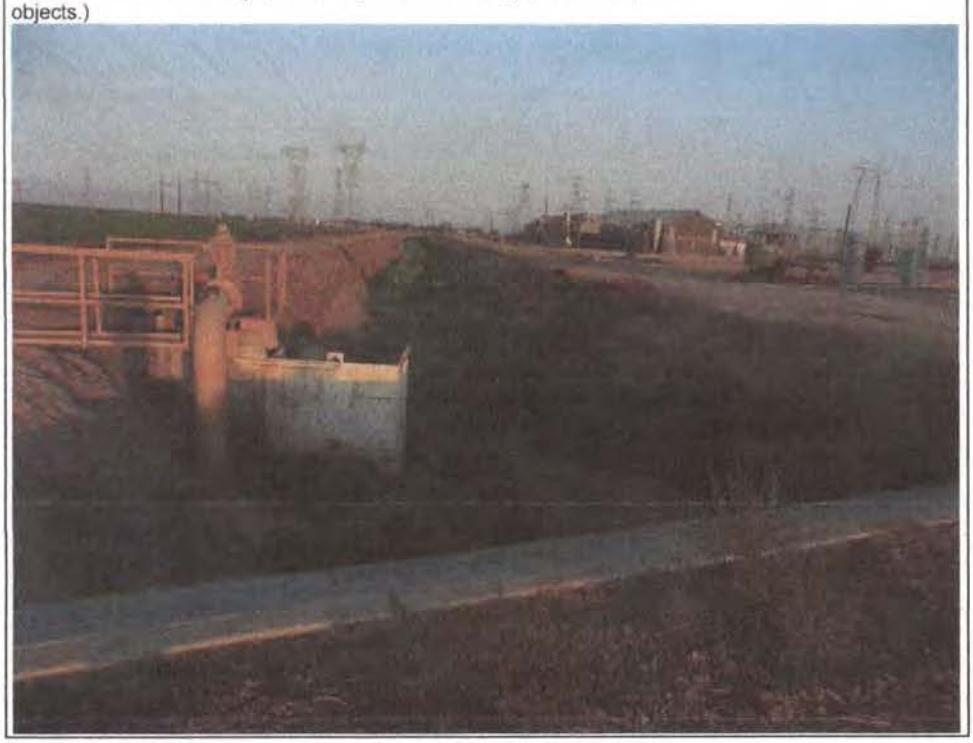
Page 1 of 2 *Resource Name or #: East Side Canal: Update

P1. Other Identifier:
*P2. Location: ☐ Not for Publication ☐ Unrestricted *a. County: Kern
and (P2b and P2c or P2d. Attach a Location Map as necessary.)
*b. USGS 7.5' Quad: Buttonwillow Date: 1954/73 T 29S; R 23E; NE ¼ of NE ¼ of Sec 24; T 29S; R24E; NW ¼ of NW ¼ of Sec 19; MD B.M.
c. Address: City: Zip:
d. UTM: Zone: 11 ; 277800 mE/ 3919630 mN (NAD 27)
e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate) Elevation: 275 ft AMSL
From north bound Interstate 5 follow State Route 58 west approximately three miles to Wasco Avenue and turn left (south). Follow Wasco Avenue south approximately 0.1 mile to the East Side Canal crossing.

*P3a. Description: (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries)
An historical irrigation canal. The East Side Canal was originally recorded by Melvin and Flores (2009) and described as originally constructed ca. 1870 by the Miller and Lux Company as the primary irrigation canal for their Buttonwillow Ranch. The segment of the canal herein recorded consists of an earthen "V" shaped, flat bottomed, ditch measuring approximately 45 feet in width at the top and 12 feet in depth, crossing Wasco Avenue by means of a concrete encased undercrossing consisting of three parallel culverts. The ditch continues to the east and west from this point and is apparent on the Buttonwillow 7.5' topographic depictions of the area dated 1932 and 1954.

*P3b. Resource Attributes: (List attributes and codes) HP 20 Canal/Aqueduct; AH6 Water Conveyance System
*P4. Resources Present: ☐Building ☒ Structure ☐Object ☐Site ☐District ☐Element of District ☐Other (Isolates, etc.)

P5a. Photo or Drawing (Photo required for buildings, structures, and objects.)



P5b. Description of Photo: (View, date, accession #) East Side Canal overview to west

*P6. Date Constructed/Age and Sources: ☒Historic ☐Prehistoric ☐Both

*P7. Owner and Address: Unknown.

*P8. Recorded by: (Name, affiliation, and address)
June A. Schmidt and James J. Schmidt
Compass Rose Archaeological, Inc.
18960 Nordhoff Street, Northridge, CA 91324

*P9. Date Recorded: 09/15/13

*P10. Survey Type: (Describe) Roadside pedestrian

*P11. Report Citation: (Cite survey report and other sources, or enter "none.") Melvin, Steven J., and Rebecca Flores, 2009: Primary Record for P15-13725 (CA-KER-07701H).
Romani, Gwen & James Schmidt *Archaeological Survey Report: Improvements to Elk Hills Road, Skyline Road to State Route 58 (approximately 10.2-miles), Kern County, California.* Submitted to Kern County Roads Department. KE-04512

*Attachments: ☐None ☒Location Map ☐Sketch Map ☐Continuation Sheet ☐Building, Structure, and Object Record ☐Archaeological Record ☐District Record ☐Linear Feature Record ☐Milling Station Record ☐Rock Art Record ☐Artifact Record ☐Photograph Record ☐ Other (List):

DPR 523A (1/95) *Required information

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

PRIMARY RECORD

Primary # P-15-013725
HRI #
Trinomial CA-KER-7701H
NRHP Status Code

Other Listings
Review Code | Reviewer | Date

Page 1 of 11 *Resource Name or #: Segments of the East Side Canal from Semitropic Canal to South of Canal 8, from Lerdo Highway to Milan Road, and from north of Perral Road to Canal 17

P1. Other Identifier: East Side Canal

*P2. Location: ☑ Not for Publication ☐ Unrestricted *a. County: Kern

*b. USGS 7.5' Quad: Lokern; Semitropic Date: 1973 Mount Diablo B.M. Overall (Surveyed underlined):
T 27S; R 22E: Sec 13, 14, 23, 22, 21, 28, 33, 34; T 28S; R 22E ; Sec 2, 3, 11, 14, 13, 24; T 28S; R 23E ; Sec 19, 30, 31, 32

c. Address: City: Zip: 93206

d. UTM: Zone: 11 all NAD 83; UTMs of areas surveyed:
N end of northern segment surveyed: 264210 mE/ 3937918mN; South end of northern segment surveyed: 266692 mE/3932675 mN
N end of northern middle sgmnt. surveyed: 267188 mE/ 3931480mN; South end middle sgmnt surveyed: 267388 mE/3931280 mN
N end of southern middle sgmnt. surveyed: 268896 mE/ 3928468mN; South end sthrn sgmnt surveyed: 269306 mE/3927570 mN
Check dam in Photo 1030010 = 266213 mE/ 3933093mN; Crossing at Semitropic Canal 264216 mE/ 3937918mN;
Lerdo Highway 267188 mE/ 3931480mN
Other Check dams: 268909 mE/3928420 mN; 269027 mE/3928207 mN; 269284 mE/3927590 mN; 264135 mE/3937584 mN; 264308 mE/3935588 mN

e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate)
Off Lerdo Highway, also at I-5, north of Buttonwillow, south of Lost Hills
Elevation: 240-248, 256 feet

*P3a. Description: (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries)
The East Side Canal is an approximately 40-foot-wide dredged canal that forms/marks the eastern boundary of the Buena Vista Water Storage District (BVWSD) in western Kern County. It was originally constructed by the Kern Valley Water Company before the 1890s. The segments surveyed include a portion south of Lerdo Highway that runs from north of Perral Road to Canal 17, a short portion running from Lerdo Highway south to Milan Road, and a long portion that lies north of Lerdo Highway that runs from just south of Cord Road to the East Side Canal's crossing with the Semitropic Canal. On either side of the canal is an approximately 30-foot wide built-up levee that also serves as a road. The canal reaches a depth of 10-15 feet below these levees. Three check dams/"bridges" were present in the canal in the surveyed portions.

*P3b. Resource Attributes: (HP20) Canal/aqueduct

*P4. Resources Present: ☐Building ☑Structure ☑Object ☐Site ☐District ☐Element of District ☐Other (Isolates, etc.)

P5a. Photo or Drawing (Photo required for buildings, structures, and objects.)



P5b. Description of Photo: P1030010, facing Northwest, 1/7/2013
☆ on Sketch map is approx. location of photograph

*P6. Date Constructed/Age and Sources: ☑Historic
☐Prehistoric ☐Both
1876-1950s: alterations and improvements to date

*P7. Owner and Address:
Buena Vista Water Storage District
525 North Main Street
Buttonwillow, CA 93206
Also Various Parcel oweners

*P8. Recorded by:
Denise Ruzicka, Linda Akyüz, Teejay Casado, Paul Shattuck
ArchaeoPaleo Resource Management, Inc.
1531 Pontius Ave, Suite 200
Los Angeles, CA 90025

*P9. Date Recorded: 7-11 January 2013

*P10. Survey Type: Pedestrian

*P11. Report Citation: Akyüz, Linda and Denise Ruzicka. 2013. *Paleontological Resources and Cultural Resources Phase I Assessment for the Buena Vista Water Storage District Northern Area Project, Kern County, California.*

*Attachments: ☐NONE ☑Location Map ☐Sketch Map ☑Continuation Sheet ☑Building, Structure, and Object Record
☐Archaeological Record ☐District Record ☑Linear Feature Record ☐Milling Station Record ☐Rock Art Record
☐Artifact Record ☐Photograph Record ☐ Other (List): DPR 523A (1/95) *Required information

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
Primary # P-15-013725
HRI#
BUILDING, STRUCTURE, AND OBJECT RECORD
CA-KER-7701H

***NRHP Status Code** Some segments not surveyed 7R; segments surveyed 6Z

***Resource Name or #:** Segments of the East Side Canal from Semitropic Canal to South of Canal 8, from Lerdo Highway to Milan Road, and from north of Perral Road to Canal 17

B1. Historic Name: East Side Canal B2. Common Name: East Side Canal B3. Original Use: irrigation

B4. Present Use: irrigation ***B5. Architectural Style:** N/A

***B6. Construction History:** (Construction date, alterations, and date of alterations)

The portions of the canal surveyed are on land originally patented to the State of California by the Swamp Land Act of 1850 (*9 Stat. 519*) or to Benjamin B. Eldred by the Homestead Act of 1862 (*12 Stat. 392*) (United States Congress 2011; BLM 2013). This portion of the East Side Canal may have been constructed after the initial irrigation of the southern portion of Miller and Lux land holdings. Land ownership during period of significance includes Miller and Lux, Cox, and Cornwell. It may appear on an 1886 map (with a disclaimer), does not appear on an 1897 Kern Valley Water Company map, and is not discernible on a 1901 map. Webb (2012:23) states that the canal was "constructed by the Kern Valley Water Company under the direction of S.W. Wible in the late 1870s. Initially, the East Side Canal was to serve as the primary irrigation canal for the Buttonwillow Ranch, while the KVWCC was to drain the slough on the western side. In 1898 the canal was 25 feet wide and three to five feet deep. At its intake from the Buena Vista Slough a regulating gate with vertical flashboards controlled water flow and also functioned as a road bridge." A portion of its southern course appears on the McKittrick 1910 USGS map. All segments south of Lerdo Highway appear to have been altered since that time. Webb (2012) has deemed the portions surveyed by JRP as not eligible (different segments than were surveyed by APRMI).

According to Webb (2012: 23-24), "[s]tarting in 1918 through at least 1920, Miller & Lux had extensive work done on the canal . . . Extensive excavation was performed on the canal to increase the working capacity of the canal from 100 second feet [cubic feet per second] to 300 second feet throughout. When the BVWSD acquired East Side Canal in 1926, the canal was 27 miles long and served as the main artery on the east side of the district, supplying . . . irrigation canals on its west side. At the time, most of the control structures on the entire canal system were of wood construction. There were also a few concrete structures present, at Old Headquarters Weir and a few small concrete drops."

***B7. Moved?** ☑No ☐Yes ☐Unknown ***B8. Related Features:** Check dam, levees/roads, culverts

B9a. Architect: S.W. Wible b. Builder: Kern Valley Water Company

***B10. Significance:** Not significant = 6Z **Theme:** Agricultural Development **Area:** western Kern County

Period of Significance: 1870s – 1927 **Property Type:** Canal **Applicable Criteria:** N/A

(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.)

The historic context of the canal system in western Kern County under Miller & Lux and the Buena Vista Water Storage District is provided on a continuation sheet. Only the surveyed segments that could be found on early (1912 and 1927) twentieth century maps (to compare course) were considered for CRHR eligibility, although other segments outside the survey area may be eligible. Maps from initial portion of period of significance (initial irrigation of the Valley) (1886, 1897, and 1901) do not show the East Side Canal, but it had been constructed by then (Webb 2012). The northern portion (south of Semitropic Canal) may not have been constructed, but even the constructed southern portions are not mapped. The East Side Canal played an integral part of the development of irrigation (Pattern in CA history, Criterion 1; engineered by Wible, Criterion 3), and if portions are intact as far as course and depth/angle, even with modern turnouts, gates, different water supply, etc., they could be considered eligible. This evaluation differs from Webb's, as the present evaluation finds the East Side Canal significant enough to be considered for listing in the CRHR, while Webb's did not. In any case, the current analysis finds the integrity of the canal has not been retained, as changes in course and depth/angle have occurred. Per the segments surveyed by APRMI, they were deemed not eligible, as they have changed course and/or characteristics since initial irrigation. For some segments, their course could only be defined as far back as 1927, but their depth and angle were considered too modified to have retained integrity. Constant realignment, reshaping, and replacement of control structures has compromised the integrity of the segments surveyed. Therefore the segments of the East Side Canal surveyed are not deemed eligible for CRHR or NRHP.

B11. Additional Resource Attributes: (AH6) – Water conveyance system, (AH7) – Roads

***B12. References:** See last continuation sheet .

B13. Remarks: segments surveyed 6Z

***B14. Evaluator:** Linda Akyüz

***Date of Evaluation:** January 7-11, 2013; March 22, 2013; April 2, 2013

DPR 523 B

(Sketch Map with north arrow required.)



Portions Surveyed
= where Photo 1030010 was taken

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
LINEAR FEATURE RECORD

Primary # P-15- 013725
HRI #
Trinomial CA-KER- 7761 H

***Resource Name or #:** Segments of the East Side Canal from Semitropic Canal to South of Canal 8, from Lerdo Highway to Milan Road, and from north of Perral Road to Canal 17

L1. Historic and/or Common Name: East Side Canal

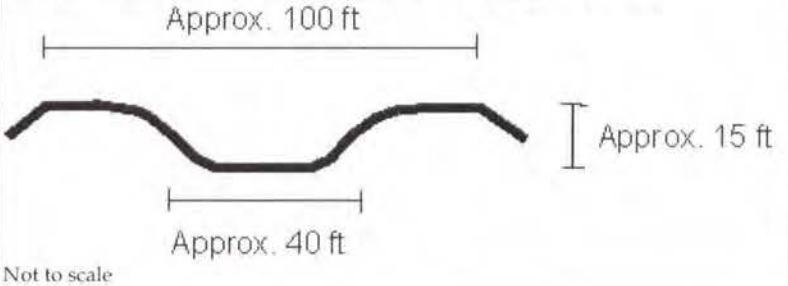
L2a. Portion Described: ☐ Entire Resource ☑ Segment ☐ Point Observation **Designation:** (see below)

b. Location of point or segment: 267296 mE/ 3931452 mN (NAD83) – Lerdo Highway crossing
269301 mE/ 3927602 mN to 268901 mE/ 3928531 mN (NAD83) – Alternate 1
266640 mE/ 3932724 mN to 264213 mE/ 3937911 mN (NAD83) – Primary 3

L3. Description: (Describe construction details, materials, and artifacts found at this segment/point. Provide plans/sections as appropriate.)
The East Side Canal is a trapezoidal, earth-lined canal that forms the eastern boundary of the Buena Vista Water Storage District and supplies subsidiary canals and laterals. It runs from its southern origins at the weir (south of the current Project area) for approximately 24.1 miles and ends at Goose Lake Canal (Webb 2012: 16). The canal itself measures approximately 15 feet deep and 40 feet wide, while the canal with its accompanying roads measures approximately 100 feet across.

L4. Dimensions: (estimated)
- **a. Top Width:** 100 feet
- **b. Bottom Width:** 40 feet
- **c. Height or Depth:** 15 feet
- **d. Length of Segment:** 4.75 miles total

L4e. Sketch of Cross-Section (include scale) **Facing:** Northwest



Not to scale

L5. Associated Resources: road

L6. Setting: Agricultural land located on both sides of canal with portions along the west side being recently tilled/furrowed.

L7. Integrity Considerations: The canal has served the area's agriculture, a major event or theme in California's history, but not all portions of it run its original course. The portions whose route has changed are not eligible for listing in the CRHR. Although some of these occurred over 50 years ago, they occurred after the period of significance (when it was first built) for the canal. Canals and ditches are reshaped twice a year and re-excavated approximately every five years (Webb 2012). This, in and of itself, does not necessarily compromise integrity, unless the original shape and feeling of the water conveyance is lost (dredging actually retains the integrity of the canal if it retains its original shape and course). It appears, although the course of some segments have not changed course since 1927, the reshaping of the canal's channel has compromised its integrity. Course alterations to the East Side Canal route, apparent just south of Lerdo Highway, occurred between 1907 and 1954 (USGS 1912, 1934, 1950, 1954). Alterations to the route north of the Semitropic Canal crossing is apparent (USGS 1931, 1973a). Some segments between Semitropic Canal and Lerdo Highway follow the same course since 1927, but it is not known what that course was before 1927. Earlier maps are needed to make this conclusion. The "Old East Side Canal" is shown on maps from 1912 (surveyed 1907-1908) to between 1950 and 1954 (USGS 1910, 1934, 1950, 1954). Alterations to the East Side Canal route just south of Lerdo Highway occurred between 1910 and 1954. Alterations to the route in the northern end past the Semitropic Canal crossing occurred post-1950. Portions of the segment between Lerdo Highway and the Semitropic Canal might have been eligible for inclusion in the CRHR under Criteria 1, 2, 3, 4 for association with important patterns in California history and with important figures in California irrigation, important engineering, and because of research potential. However, integrity has not been retained, and therefore the segments surveyed are not considered eligible for CRHR or NRHP. 1914 Lost Hills 30'-quadrangle map does not have the area where the (nortyhern part of the) canal is located mapped. Earliest version of that area found is on Semitropic 1927/Goose Lake 1931 (1927).

L8a. Photograph, Map or Drawing



L8b. Description of Photo, Map, or Drawing P1030014, facing North, 1/8/2013

L10. Form Prepared by: Linda Akyüz and Denise Ruzicka, ArchaeoPaleo Resource Management, Inc., 1531 Pontius Ave Suite 200, Los Angeles, CA 90025 **L11. Date:** 25 March 2013 **DPR 523E (1/95)**

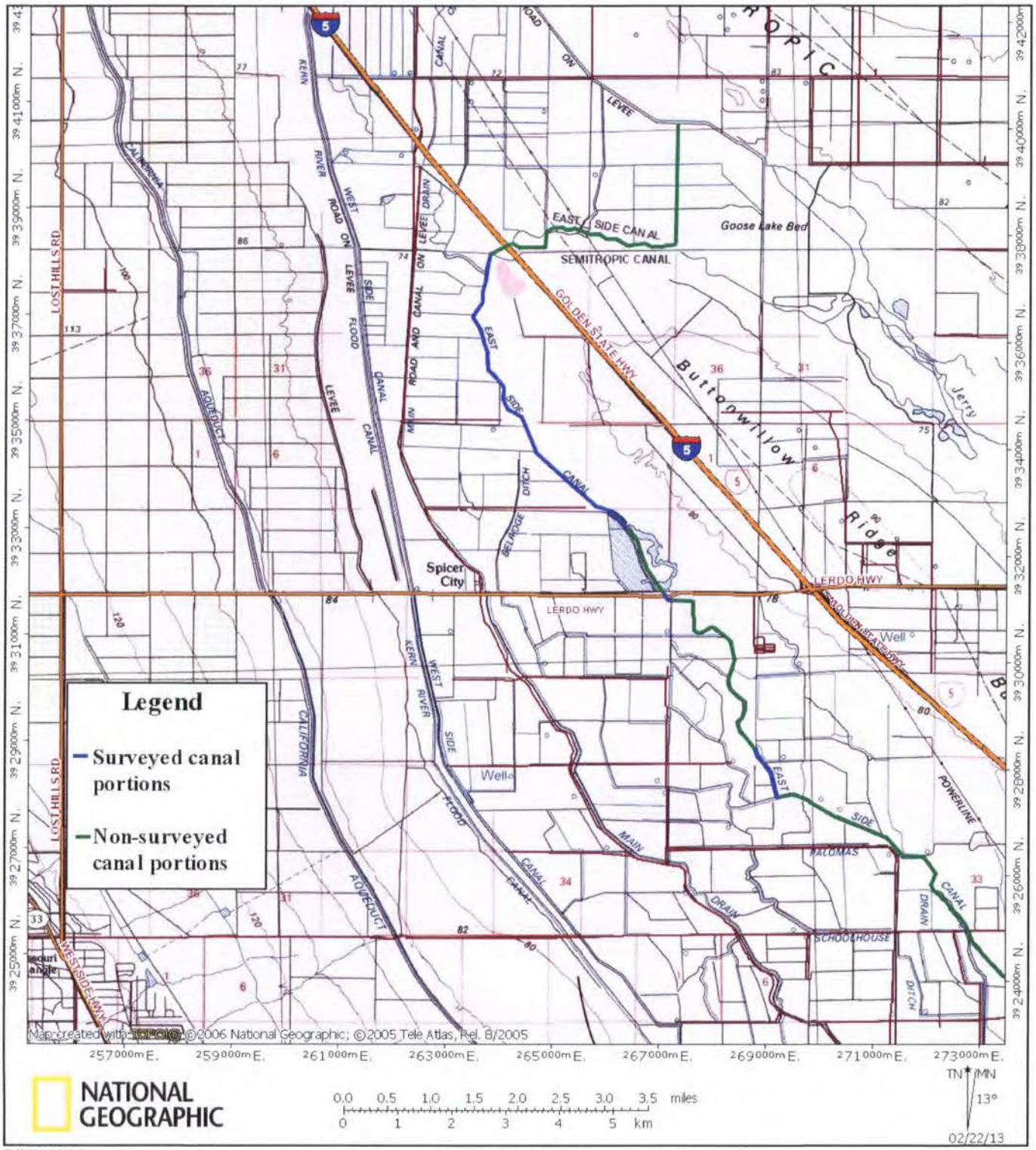
State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

LOCATION MAP

Primary # P-15-013725
HRI#
Trinomial CA-KER-7701 H

*Resource Name or #: Segments of the East Side Canal from Semitropic Canal to South of Canal 8, from Lerdo Highway to Milan Road, and from north of Perral Road to Canal 17

*Map Name: Semitropic and Lokern *Scale: 1:100K *Date of Map: 1954/PR1973



DPR 523J

Summarized or excerpted from Webb (2013: 18-21):

The Buena Vista Slough, the marshy area between Buena Vista Lake and Tulare Lake, was granted to the State of California under the Arkansas Act of September 28, 1850. "In 1851, the federal government removed San Joaquin Valley tribes from the region" in order to open it to settlement." The seasonal nature of the swamp land led to disagreements between state and federal surveyors about boundaries. Some parcels sold as 'dry' by the federal government were "sold by the state as swamp and overflowed" lands. Ultimately, California conducted its own surveys in the area, and "on December 5, 1871, and the Secretary of the Interior accepted the state's proposed boundaries".

By 1868, California required payment of $1.00 per acre, "which was refundable if the land was 'reclaimed'." Henry Miller, Charles Lux, John Redington, Horatio Stebbins, F.A. Tracy, H.L. Bonestell, and Horatio Livermore acquired their acreage on the lower Kern River west of Bakersfield, also acquiring "swampland certificates of purchase from would-be settlers or from local agents like Julius Chester, Duncan Beaumont, Richard Stretch and Thomas Baker, whose earliest claims in the area dated to January 28, 1870. In this manner, Miller & Lux secured their 'Southern Division' surrounding Buttonwillow in Kern and Kings Counties." The area "operated under this single ownership from the 1870s until 1927, when Miller & Lux Incorporated started selling the land."

Miller & Lux principally raised cattle on Buttonwillow Ranch, which did not require large-scale irrigation. However, in order to "reclaim" the lands, drainage and irrigation canals had to be constructed. "In accordance with Assembly Bill 54 of 1861, Swampland District 121 was formed in May 1871, including swamplands along Buena Vista Slough." Afterwards, Miller & Lux and others with cattle ranges in the Slough organized the Kern Valley Water Company in 1876. "The system created during the Miller & Lux period consisted of canals dug and maintained by Miller & Lux, and a system of laterals dug and maintained by individual tenant farmers." In particular, the Kern Valley Water Company dug the "Kern Valley Water Company's Canal" (KVWCC/Kern River Flood Channel/Canal) in 1877 to drain the slough on the west side. The canal was completed in 1878. After constructing the Kern River Flood Canal along the west side of the Slough, Miller & Lux constructed the East Side and West Side canals for distribution prior to the early 1890s. The canals bordered the east and west sides of Buttonwillow Ranch (more or less the Buena Vista Slough). The West Side Canal paralled the KVWCC.

Prior to the construction of many of the canals, Miller & Lux found themselves with no water and 10,000 head of cattle during the drought season of 1876-1877. They pinpointed upstream diversions of water from the Kern River from such landowners as James B. Haggin as the cause of the lack of water. "Miller & Lux's attempts to control the Buena Vista Slough through construction of the KVWC played a role in the events that led to the landmark water rights case, *Lux v. Haggin*." Miller & Lux claimed that they had riparian rights to the Kern River and that Haggin and others did not have the right to divert all the water. Ultimately, in 1888, the Miller-Haggin agreement settled water-rights claims, for the most part, where a portion of the water was allowed to be diverted upstream and the rest was to be available to those downstream.

Miller & Lux later constructed a drainage canal (Main Drain), from the southern end near the old headquarters north to the center of the ranch between 1916 and 1918. "Farmers used the water from Main Drain, collected primarily by seepage, for irrigation. The remainder of the canals and laterals in the area ... were primarily works of individual farmers and Miller & Lux farm divisions in the area, who connected to the main canal system for irrigation of their crops." By 1919, Miller & Lux were farming the entire area south of Buttonwillow between the West Side and East Side canals south to the Old Headquarters. At that time it became apparent that in order to sell the land, it was essential to provide an adequate water supply for the land. Therefore, in 1920, "the California State Engineer released a report on the water resources of the Kern River and recommended that a large district, including the Haggin and Miller & Lux water rights, be formed to manage water distribution. Despite the effective implementation of the Miller-Haggin agreement, the two parties chose to protect their interests by forming separate districts. Miller & Lux's holdings became the nucleus of the Buena Vista Water Storage District. The district submitted a petition for formation to the State Engineer in 1922 and received approval in 1924. As a part of district formation, Miller & Lux linked water rights to the land within the district, making future sales possible."

"The district acquired all the canals in the study area, including flood water canals, irrigation canals, drainage canals, and associated water control features. The Kern Valley Water Company Canal (Miller & Lux owned 86% of the company) was the largest canal the district acquired in the area."

Water levels rose after 1935, which required improvements to the drainage system and thus, 4.8 miles of new drains were constructed in 1943 and 1944. Culverts, bridges, and roads were also added. "Redwood culverts and corrugated metal pipe culverts, some installed by Miller & Lux, began to be replaced."

In 1943, the Buena Vista Water Storage District implemented a canal maintenance program of regular hand maintenance as well as mechanized maintenance every four years. "Today, the canals are reshaped twice a year and re-excavated approximately every five years." Ditches and drains have been relocated to the edges of fields to accommodate mechanized farming.

"Larger changes [have since] occurred to the water supply for the canals . . .The Army Corps of Engineers developed plans for Lake Isabella in the 1930s (as a new source of water: Lake Isabella is a result of the damming of the Kern River), but World War II delayed construction. The earthen Isabella Dam was finally completed in 1953 . . . The system also receives water from the California Aqueduct."

B.12. References (continued):

Bureau of Land Management (BLM). 2013. U.S. Department of Interior Bureau of Land Management General Land Office Records <www.glorecords.blm.gov>

Hammond, William. 1886 Sheet No. 4, Southern Portion, Irrigation Map of the San Joaquin Valley, California. California State Engineering Department, Sacramento.

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United States Geological Survey (USGS). 1910. *McKittrick Quadrangle*. California-Kern Co., 30-Minute Series (Topographic).

1914. *Lost Hills Quadrangle*. California-Kern Co., 30-Minute Series (Topographic). [currently Semitropic Quadrangle]

1931. *Goose Lake Quadrangle*. California-Kern Co., 7.5-Minute Series (Topographic). [currently Semitropic Quadrangle]

1934. *Lokern Quadrangle*. California-Kern Co., 7.5-Minute Series (Topographic).

1950. *Lokern Quadrangle*, California-Kern Co., 7.5-Minute Series (Topographic).

1954. *Lokern Quadrangle*, California-Kern Co., 7.5-Minute Series (Topographic).

1973. *Semitropic Quadrangle*, California-Kern Co., 7.5-Minute Series (Topographic). [photorevised from 1954]

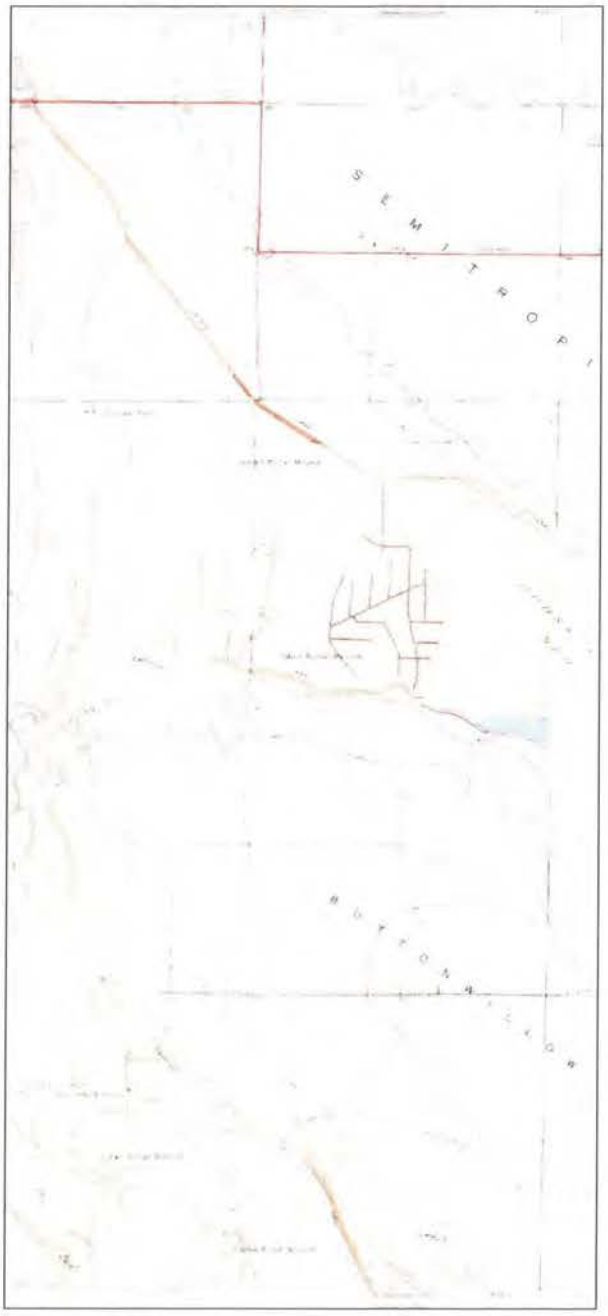
URS. 2012a, 2012b. Responses to CEC Data Requests Set Three (45-Day Extension): Amended Application for Certification for HYDROGEN ENERGY CALIFORNIA (08-AFC-8A), Kern County, California, and Responses to CEC Data Requests –Nos. A181 through A217

Webb, Toni. 2012. Primary Record for "Portions of Buena Vista Water Storage District" (not submitted at time of this evaluation).

*Recorded by: Ruzicka, Akyüz, Casado, Shattuck *Date: Map 1931 ☑ Continuation ☐ Update



↑
Historic Lost Hills Quadrangle (USGS 1914):
portion of land where canal is located had not been not mapped until 1931 (surveyed 1927)



Historic Semitropic (Goose Lake) Quadrangle
(USGS 1931, surveyed 1927) >>>>>>>>>>>>>>>>>>>>>>>>>>>>

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
CONTINUATION SHEET

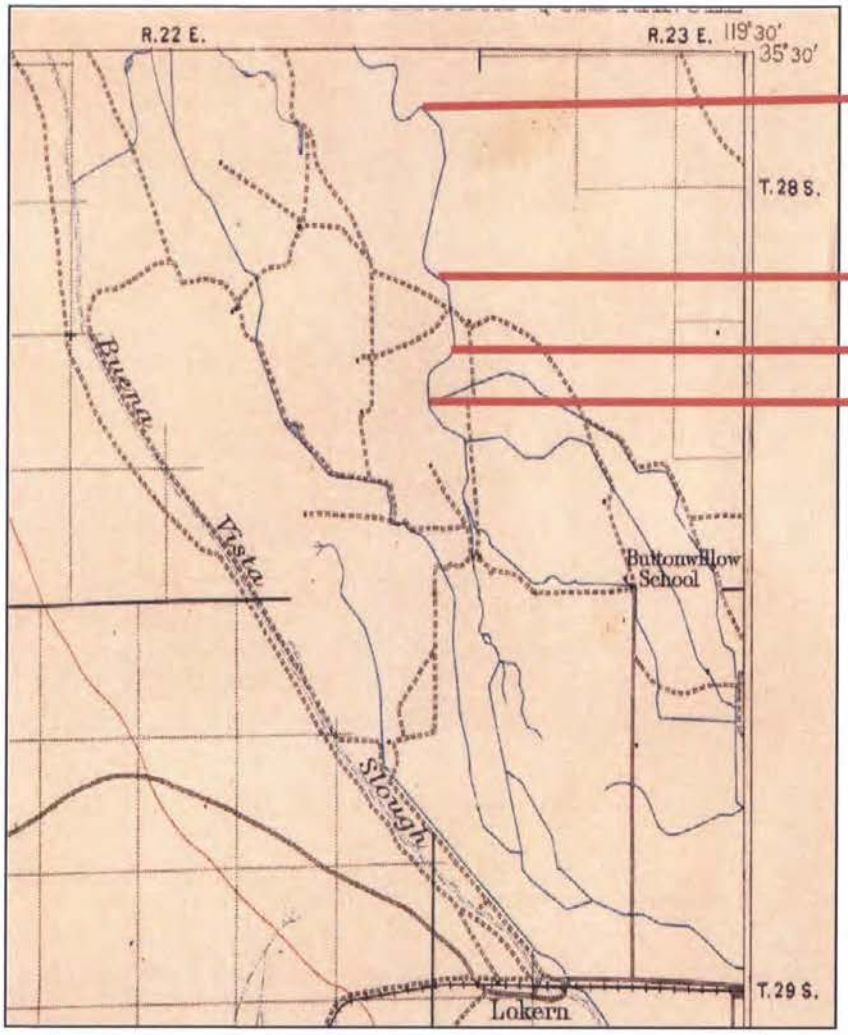
Primary # P-15-013725
HRI#
Trinomial CA-Ker-7701.H

 ***Resource Name or #:** Segments of the East Side Canal from Semitropic Canal to South of Canal 8, from Lerdo Highway to Milan Road, and from north of Perral Road to Canal 17

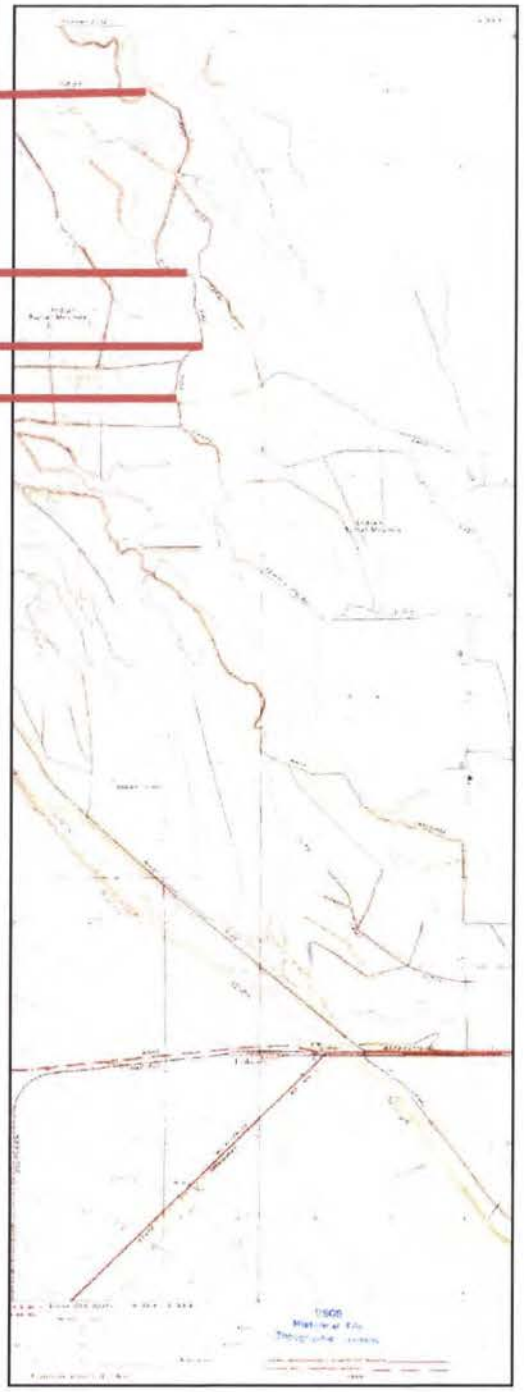
***Recorded by:** Ruzicka, Akyüz, Casado, Shattuck ***Date:** Map 1934 ☑ Continuation ☐ Update

Points along the canal geo-referenced with each other in red.

Historic McKittrick Quadrangle (USGS 1910)



Historic Lokern Quadrangle (USGS 1934)

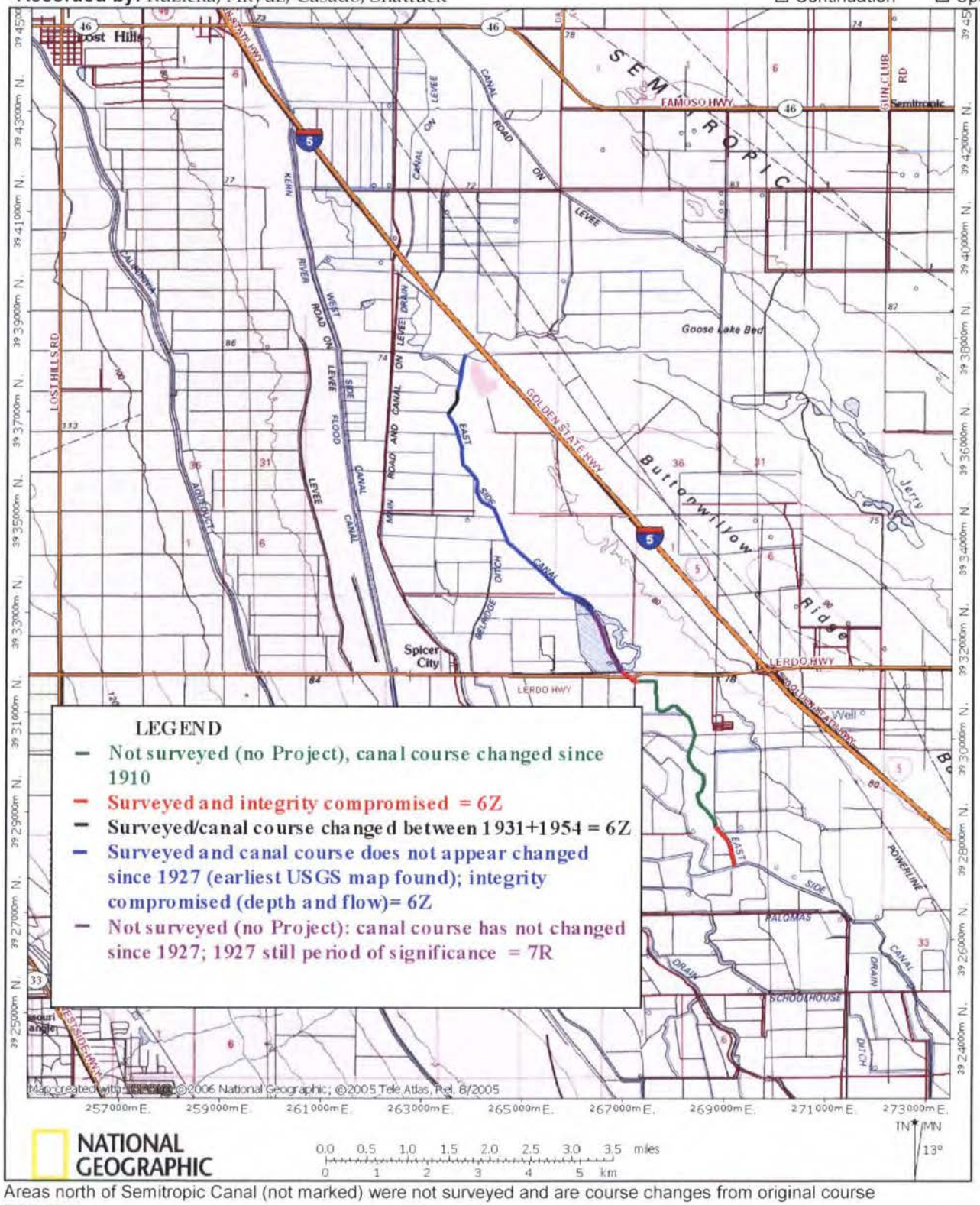


EVALUATION:
See maps. NO part within survey area was deemed eligible for CRHR. Some surveyed portions had changed course or aspect since 1910. Some surveyed portions had changed course between 1927 or 1931 and 1954. Other portions surveyed that did not appear to have changed course since 1927 could only be traced back to 1927, which is after initial irrigation. In any case, the segments that have retained course since 1927 have changed shaped too much to have integrity for eligibility. Map legend gives Status Codes.

State of California — The Resources Agency | Primary # P-15-013725
DEPARTMENT OF PARKS AND RECREATION | HRI#
CONTINUATION SHEET | Trinomial CA-KER-7701H

Page 9 of 11 *Resource Name or #: Segments of the East Side Canal from Semitropic Canal to South of Canal 8, from Lerdo Highway to Milan Road, and from north of Perral Road to Canal 17

*Recorded by: Ruzicka, Akyüz, Casado, Shattuck ☑ Continuation ☐ Update



Areas north of Semitropic Canal (not marked) were not surveyed and are course changes from original course

DPR 523L

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

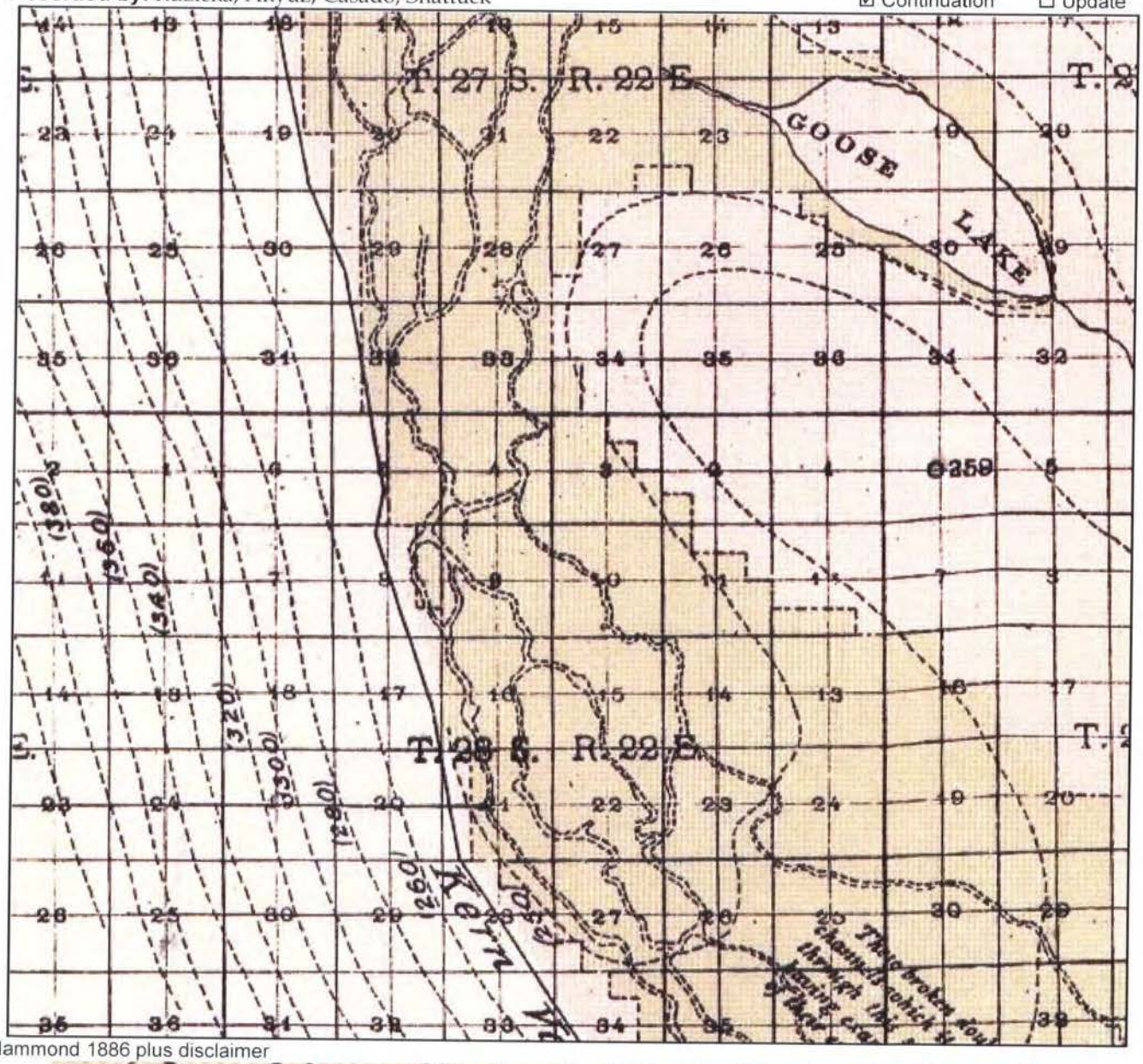
CONTINUATION SHEET

Primary # P-15-013725
HRI#
Trinomial CA-KER-7701H

*Resource Name or #: Segments of the East Side Canal from Semitropic Canal to South of Canal 8, from Lerdo Highway to Milan Road, and from north of Perral Road to Canal 17

*Recorded by: Ruzicka, Akyüz, Casado, Shattuck

☑ Continuation ☐ Update



Hammond 1886 plus disclaimer

State of California — The Resources Agency DEPARTMENT OF PARKS AND RECREATION	Primary # P-15-013725 HRI#
CONTINUATION SHEET	Trinomial CA-Ker-7701H

 ***Resource Name or #:** Segments of the East Side Canal from Semitropic Canal to South of Canal 8, from Lerdo Highway to Milan Road, and from north of Perral Road to Canal 17

***Recorded by:** Ruzicka, Akyüz, Casado, Shattuck ☑ Continuation ☐ Update



Kern County Land Company (1897): T27S at top

DPR 523L

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PRIMARY RECORD

Primary # P-15-013725
HRI #
Trinomial CA-KER-7701H
NRHP Status Code

Other Listings
Review Code | Reviewer | Date

Page 1 of 2 *Resource Name or #: East Side Canal

P1. Other Identifier:
*P2. Location: ☑ Not for Publication ☐ Unrestricted *a. County: Kern
and (P2b and P2c or P2d. Attach a Location Map as necessary.)
*b. USGS 7.5' Quad: Tupman Date: 1977 T30 S; R 24E; SW¼ of SW¼ of Sec 2 ; M.D. B.M.
*b. USGS 7.5' Quad: Tupman Date: 1977 T30 S; R 24E; NW¼ of NW¼ of Sec 11 ; M.D. B.M.
c. Address: City: Zip:
d. UTM: Zone: 11 ; 284300 mE/3914200mN to 284450mE/3912597mN(G.P.S.)
e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate) Elevation: 310 ft.

*P3a. Description: (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries)
A segment of the East Side Canal was recorded during the current survey, running north from Station Road for exactly 1 mile to the center of Section 2 (from 35°, 20', 51" N; 119°, 22', 25" W to 35°, 19', 59" N; 119°, 22', 18" W)

The East Side Canal is earth-lined and trapezoidal in profile, with dirt access roads running along either side. The canal measures approximately 50 feet wide across the top. The canal was constructed in the 1870s; however, it is still in use and appears to receive regular maintenance and scraping.

*P3b. Resource Attributes: (List attributes and codes) HP20. Canal/aqueduct
*P4. Resources Present: ☐Building ☑Structure ☐Object ☐Site ☐District ☐Element of District ☐Other (Isolates, etc.)

P5a. Photo or Drawing (Photo required for buildings, structures, and objects.)



P5b. Description of Photo: (View, date, accession #)
S, 7-13-2009, Digital

*P6. Date Constructed/Age and Sources: ☑Historic
☐Prehistoric ☐Both

*P7. Owner and Address:

*P8. Recorded by: (Name, affiliation, and address)
M. Bray, ESA
707 Wilshire Blvd Suite 1450
Los Angeles, CA 90017

*P9. Date Recorded: 15 July 2009

*P10. Survey Type: (Describe)

Intensive Pedestrian

*P11. Report Citation: (Cite survey report and other sources, or enter "none.") Bray, Madeleine, Ehringer, Candace, and Tietjen, Damien. *Phase I Cultural Resources Assessment for the West Kern Water District Project*, Prepared by ESA, Submitted to the West Kern Water District, February, 2010.

*Attachments: ☐NONE ☑Location Map ☐Sketch Map ☐Continuation Sheet ☐Building, Structure, and Object Record ☐Archaeological Record ☐District Record ☐Linear Feature Record ☐Milling Station Record ☐Rock Art Record ☐Artifact Record ☐Photograph Record ☐ Other (List):

State of Claifornia- The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

LOCATION MAP

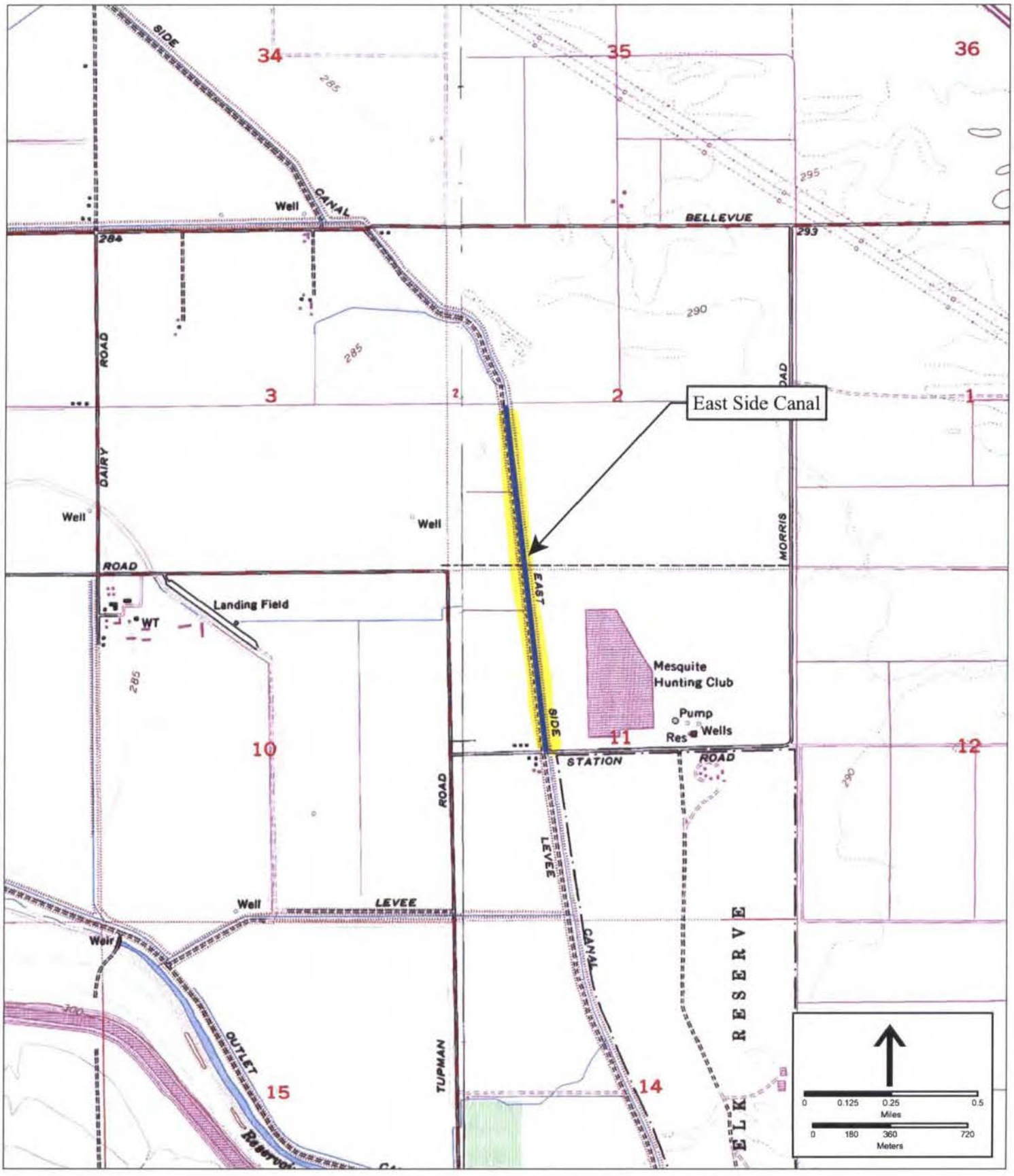
Primary # P-15013725
HRI #
Trinomial CA-KER-7701H

* Resource Name or Number: East Side Canal

*Map name: Tupman, Calif.

*Scale: 1:24000

*Date of Map: 1977



J:\GIS\Projects\209xxx\209033\cultural\209033_DPR_Resource_location_D_7.mxd

* Required Information

P 15 -13725

State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

PRIMARY RECORD

Primary # _____
HRI # _____
Trinomial CA-Ker - 07701H
NRHP Status Code 7
Other Listings _____
Review Code _____ Reviewer _____ Date _____

*Resource Name or #: JKE-001

RECEIVED
FEB 09 2010
By _____

P1. Other Identifier: East Side Canal

*P2. Location: ☐ Not for Publication ☑ Unrestricted *a. County: Kern

*b. USGS Quad: Buttonwillow (1954; photorevised 1973); T29S R23E, Sec. 13; MDBM

c. Address:

d. UTM: Zone 11; 277181 mE/ 3919886 mN NAD27 Datum

e. Other Locational Data:

The resource is located east of the town of Buttonwillow, on both sides of State Route (SR) 58, partially within the highway right-of-way and one meter from the edge-of-pavement. From the intersection of SR 58 and Buttonwillow Drive within Buttonwillow, proceed 1.2 miles east on SR 58 to post mile paddle 28.50 (segment datum). The resource is located 100 feet east of the post mile paddle.

*P3a. Description:

This is a segment of the East Side Canal, recorded at a location where it intersects SR 58 in rural Kern County. The Miller and Lux Company controlled the Kern Valley Water Company and built the East Side Canal in the late 1870s. The cattle barons planned the canal as the primary irrigation ditch for their Buttonwillow Ranch. When constructed it was 25 feet wide, three to five feet deep, and drew water from Buena Vista Slough. From 1918 to 1920, Miller & Lux improved the canal to expand its water capacity, including construction of a levee along its banks north of Buttonwillow (Barnes 1920: 7-8; Miller & Lux, 1916-1919). When the Buena Vista Water Storage District (BVWSD) acquired the East Side Canal in 1926, the canal was 27 miles long and served as the main irrigation canal on the east side of the district. BVWSD replaced the wooden control structures and lined the canal with concrete at certain locations (Hammett 1926; Raznoff 1945). The conduit is currently 24.1 miles long and runs in a northwesterly direction; it remains owned by BVWSD. See Continuation Sheet and Linear Feature Record for a detailed description of the resource.

*P3b. Resource Attributes: HP20 (Canal)

*P4. Resources Present: ☐ Building ☑ Structure ☐ Object ☐ Site ☐ District ☐ Element of District ☐ Other (Isolates, etc.)



*P5b. Description of Photo:
Photograph 1. JKE-001, Seg A, 02, NW -- 9841; facing northwest, SR 58 in the foreground.

*P6. Date Constructed/Age & Sources:
☑ Historic ☐ Prehistoric ☐ Both
Circa 1878 (Barnes 1920)

*P7. Owner and Address:
Buena Vista Water Storage District,
525 North Main
Buttonwillow, CA 93206

*P8. Recorded by:
Steven J. Melvin and Rebecca Flores, JRP Historical Consulting, LLC, 1490 Drew Ave, Suite 110, Davis, CA 95618

*P9. Date Recorded: 4/21/2009

*P10. Survey Type:
Reconnaissance

*P11. Citation: Leach-Palm et al. 2010. Cultural Resources Inventory of Caltrans Districts 9 Rural Conventional Highways in Inyo and Mono Counties. Submitted to Caltrans District 9, Bishop, CA.

*Attachments: ☐ None ☑ Location Map ☑ Sketch Map ☑ Continuation Sheet ☐ Building, Structure, and Object Record
☐ Archaeological Record ☐ District Record ☑ Linear Feature Record ☐ Milling Station Record ☐ Rock Art Record
☐ Artifact Record ☐ Photograph Record ☐ Other:

*Required Information

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State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
LINEAR FEATURE RECORD

Primary # _____
HRI # CA-Ker -07701H
Trinomial _____

 *Resource Name or #: JKE-001

L1. Historic and/or Common Name: East Side Canal

L2a. Portion Described: ☐ Entire Resource ☑ Segment ☐ Point Observation **Designation:**

L2b. Location of Point or Segment:

The resource is located at GIS-based post mile 28.50 on SR 58.

Segment UTMs: 277166mE/ 3920093mN to 277209mE/ 3920037mN

L3. Description:

The canal at this location is unlined south of SR 58 and concrete-lined north of the highway. It has a trapezoidal shape with moderately steep sides and a flat bottom. The top of the canal is level with the surrounding terrain and there are dirt access roads along both sides of the canal. South of the highway, and just out of the right-of-way, a railroad bridge passes over the canal. The short segment of canal between the railroad and the highway is not as neatly maintained as it is further south.

L4. Dimensions:

a. Top Width: 45 feet
b. Bottom Width: 6 feet
c. Height or Depth: 12 feet
d. Length of Segment: 100 feet

L5. Associated Resources:

Bridge No. 50-0017; railroad bridge (out of right-of-way)

L4e. Sketch of Cross-Section: **Facing:** North



Not to scale

L6. Setting:

The canal winds through flat, agricultural land in the southern San Joaquin Valley.

L7. Integrity Considerations:

The canal has been concrete-lined and enlarged.



L8b. Description of Photo, Map, or Drawing

JKE-001, Seg A, 04, SE -- 9843; facing southeast, showing unlined side of the canal.

L9. Remarks:

L10. Form Prepared By:

S. Melvin, JRP Historical Consulting, LLC, 1490 Drew Ave, Suite 110, Davis CA 95618

L11. Date: 4/21/2009

P 15 -13725

State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
CONTINUATION SHEET

Primary # _____
HRI # _____
Trinomial CA-Ker -07701H

 ***Resource Name or #:** JKE-001

***Recorded By:** S. Melvin and R. Flores, JRP Historical Consulting, LLC ***Date:** 4/21/2009 ☑ Continuation ☐ Update

P3a. Description (continued):

References:

Barnes, Harry. "Data on Irrigation of Buttonwillow Ranch and Adjacent Lands," 1920. Unpublished manuscript. Available at Water Resources Center Archives, University of California, Berkeley.

Hammett, W.C. "Report on Re-evaluation of Physical Properties to be Acquired by Buena Vista Water Storage District." San Francisco: n.p., September 4, 1926.

Miller & Lux, CG-163, Buttonwillow Files, Carton 694, East Side Canal, 1916-1919. Available at Bancroft Library, University of California, Berkeley.

Raznoff, William A. Drainage Investigations Buttonwillow Area of Kern County, California. US Dept. of Agriculture, Soil Conservation Service, Water Conservation Division, Pacific Coast, Region 7, 1945.

P 15 -13725

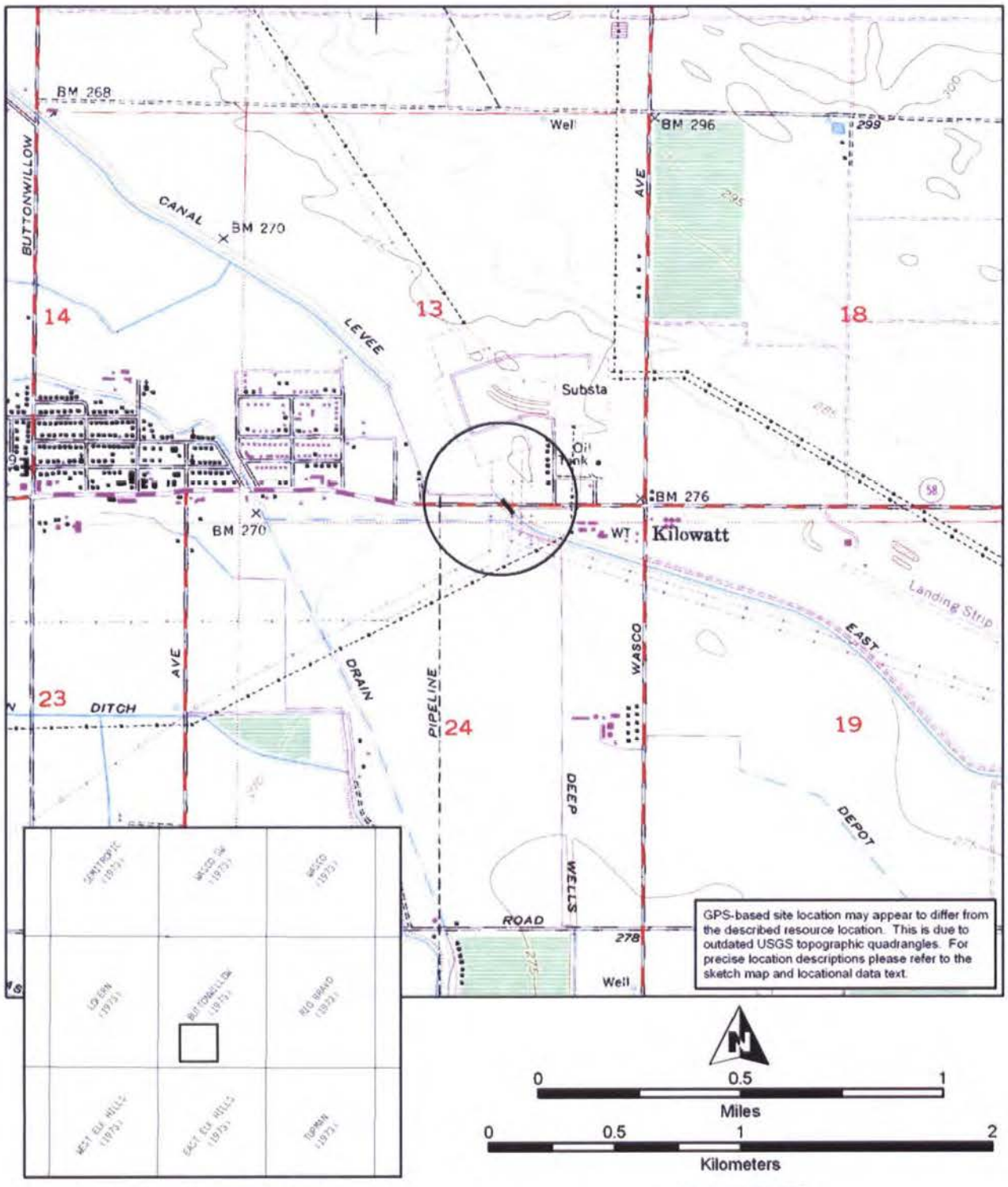
State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
LOCATION MAP

Primary # _____
HRI # _____
Trinomial CA-KER -07701H

*Resource Name or #: JKE-001

*Map Name: Buttonwillow (1973)

*Year: 1973



Key to USGS 7.5' quads depicted

SCALE 1:24,000

*Required Information

P 15 -13725

State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

SKETCH MAP

Primary # _____
HRI # _____
Trinomial CA-KER -07701H

*Resource Name or #: JKE-001

*Drawn By: Far Western and JRP Historical Consulting, LLC

*Date: 04/21/2009



Sketch map is based on 2009 GPS data collected within the highway right-of-way.

*Required Information

Appendix F

Desktop Geotechnical Site Assessment Report

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June 17, 2025
Kleinfelder Project No.: 25002292.001A

Jim Brauer
Manager, Development Engineering
Avantus – 29SC 8me LLC
250 Sutter Street, Suite 600
San Francisco, California 94108

SUBJECT: **Desktop Geotechnical Site Assessment Report**
Buttonbush Solar & Storage Project
Kern County, California

Dear Mr. Brauer:

In accordance with our proposal dated September 20, 2024, and Avantus comments received on October 3, 2024, and May 23, 2025, Kleinfelder presents our Desktop Geotechnical Site Assessment for the Buttonbush Solar & Storage Project. The Buttonbush Solar & Storage Project (the Project) is a proposed photovoltaic (PV) solar electric generation facility and battery energy storage system (BESS). Kleinfelder has prepared this Desktop Geotechnical Site Assessment to identify potential geotechnical concerns and geologic hazards (geohazards) that may adversely impact site development and foundation performance. This study was based on a review of readily available public information, as well as Kleinfelder's previous experience with similar projects with similar geologic and physiographic conditions. This review is intended to aid in prefeasibility-level site geohazard-related risk characterization and may be used for submittal to permit agencies for the purpose of establishing baseline conditions under the California Environmental Quality Act (CEQA). Other geotechnical concerns or geohazards may be identified during later stages of Project development which are not discussed herein.

Kleinfelder's Desktop Geotechnical Site Assessment report is based entirely on information gathered remotely, hence the term "Desktop". No site visit was conducted, no explorations were made, no samples were obtained, and no form of in-situ or laboratory testing was completed. Although the information presented in this report is consistent with the requirements of the California Environmental Quality Act, Appendix G, Part VI Geology and Soils, all CEQA related permits and reporting will be performed by Others.

METHODOLOGY

Kleinfelder performed a review of readily available geotechnical and geologic information relevant to the Project site including websites operated by Federal, State, and County agencies, published reports and maps, aerial imagery, and in-house documents. Our review considered information from numerous sources, including:

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- United States Geological Survey (USGS),
- United States Department of Agriculture (USDA),
- Federal Emergency Management Agency (FEMA),
- California Geologic Survey (CGS),
- California Department of Water Resources (DWR),
- California Geologic Energy Management Division (CalGEM), and
- San Joaquin Valley Air Pollution Control District.

Websites, reports, maps, and other data sources were reviewed for information about the following issues. Other issues not listed here may be discovered during later stages of Project development.

- Present and Recent Past Land Use,
- Faults and Seismicity (nearby active faults),
- Ground Shaking,
- Liquefaction and Lateral Spreading,
- Landslides,
- Erosion,
- Soil Instability (including Subsidence and Collapsible Soils), and
- Expansive Soils.

Kleinfelder also reviewed readily available historic (UCSB, 2020) and recent aerial imagery and street-view images from Google Earth for site features such as topographic relief, general physiography, vegetation, drainage, existing or previous development, and other features which may affect construction activities at the site. A survey to assess the potential impacts of solar development of this site on neighboring properties was beyond the scope of work for this reporting and was not performed.

SUMMARY OF AVAILABLE INFORMATION

The following sections summarize the results of Kleinfelder's Desktop Geotechnical Site Assessment. This information should be considered preliminary and is subject to revision during later stages of Project development.

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KLEINFELDER 707 17th Street, Suite 3000, Denver, CO 80202 p | 303.237.6601

1 SITE DESCRIPTION

The Buttonbush Solar & Storage Project as proposed by 29SC 8me LLC (the Project proponent) would be located on 128 parcels across a leased area of approximately 11,983 acres within a 13,868-acre gross parcel boundary of privately owned land in unincorporated Kern County, California. The majority of the 11,983-acre Project area is currently under agricultural use or developed in the valley region of the County.

The Project includes the construction and operation of a photovoltaic (PV) solar facility and associated infrastructure necessary to generate up to 2 gigawatts of alternating current (AC) power with an up to 2-gigawatt battery energy storage system (BESS). Additional components of the project include solar modules and racking, inverters, transformers, service roads, a power collection system, communication cables, microwave/radio towers, meteorological stations, a generation-transmission (gen-tie) line with optical ground wire and overhead and underground transmission lines, electrical switchyards, Project substations, security fencing, use of onsite water wells, and operations and maintenance (O&M) facilities.

The Project would be supported by one or more 500 kilovolt (kV) gen-tie electrical transmission lines originating from one or more on-site substations and terminating at the existing PG&E Midway Substation. The project study area includes the development footprint and gen-tie/collector line, which includes a 200-foot corridor. PG&E will modify the Midway Substation's 500 kV yard within their property boundary to accommodate the proposed project's interconnection. The PG&E Midway Substation parcels comprise approximately 255 acres; however, only a small portion, up to 38.6 acres, will be impacted by the proposed project. PG&E will install and trench underground several fiber-optic lines to the west of the gen-tie route to facilitate communication between the Midway Substation and the Point of Change of Ownership, approximately 0.25-mile northwest. Up to four 175-foot-tall lattice steel towers (LST) or tubular steel poles (TSPs) would support the proposed transmission line and the project's interconnection.

The proposed facilities are expected to be operational for up to 35 years. The full Project description is provided in the Project's California Environmental Quality Act (CEQA) environmental impact report and should be referenced for additional details regarding the project description.

The Project site is in unincorporated Kern County directly north of the community of Buttonwillow, approximately 2 miles west of the City of Shafter and approximately 7 miles southwest of the City of Wasco. The project site straddles Interstate 5 (I-5) east of Buttonwillow Raceway Park, just north of State Route (SR) 58, and south of SR-46. Several single-family homes and agriculture-related structures are near the project boundary. Properties within the project include a dairy, a few single-family homes, and some varied structures for agricultural use, all of which would be removed during project construction. Vehicular access to the site would likely be from Wasco Way, Merced Avenue, Lerdo Highway, Rowlee Road, Wildwood Road, Riverside Street, Burbank Street, Buttonwillow Drive, 7th Standard Road, Snow Road, State Route 58, and Sullivan Road. Many dirt roads crisscross the Project site.

The various fragmented parcels that comprise the Project extend over a large area and were grouped, for ease of discussion, into three zones: Zone 1 in the north, Zone 2 in the southwest, and Zone 3 in the southeast. The approximate Project boundaries are shown on Figure 1 - Site Vicinity Map.

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Most land use is for agriculture, except for the town of Buttonwillow near the south end of Zone 2. Some undisturbed land is present within the area known locally as the Jerry Slough and vegetation on undisturbed land generally consists of sparse grasses and shrubs (Figure 1). Oil and gas development has taken place in the Project vicinity and several plugged wells are present within the Project boundaries (see Section 7.9).

2 TOPOGRAPHY AND DRAINAGE

The site is located in the southwest San Joaquin Valley, east of the Elk Hills and north of the Kern River. The southwest San Joaquin Valley is a generally flat-lying region but in the vicinity of the Project the valley is crossed by a pair of low, northwest-trending ridges, the Buttonwillow Ridge on the southwest which underlies Zone 2 and the Semitropic Ridge on the northeast which underlies Zone 3, which are separated by the low-lying Jerry Slough which underlies Zone 1 and drains northwest to Goose Dry Lake (Figure 1).

Elevations within the Project area range from approximately 245 feet above mean sea level (msl) in Zone 1 in the low-lying Jerry Slough to approximately 320 feet above msl in Zone 3 at the southeast end of Semitropic Ridge. Overall, the ground surface is relatively flat with a gentle gradient to the northwest.

Surface drainage throughout the study area is mostly via sheet flow runoff over the existing contour of the land toward the northwest as agricultural development now occupies most of the former Jerry Slough. The northwest-flowing East Side Canal borders the west side of Zone 2, and several agricultural canals cross the site and drain towards the west and northwest. The East Side Canal ranges from 15-30 feet wide and up to 30 feet deep.

3 GEOLOGIC SETTING

The Project is in the Great Valley Geomorphic Province of California, one of eleven geomorphic provinces that are recognized based on geology, landscape or landform, topographic relief, and climate. The Great Valley trends parallel to the northwest structural trend of most of California and extends across all of the central and much of the northern parts of the state. The Great Valley Province is characterized as a broad, sediment-filled trough bounded on the east by the Sierra Nevada Mountains and on the west by the mountains and hills of the Coast Ranges (and the San Andreas fault). The southern part of the Great Valley is the San Joaquin Valley. Structurally, the San Joaquin Valley is an asymmetrical syncline with a steeply-dipping western limb and a gently-dipping eastern limb. The San Joaquin Valley is filled with thousands of feet of non-marine deposits that range from late Mesozoic to late Cenozoic age (Smith, 1964).

4 SITE GEOLOGY

The Project is located in the southwest San Joaquin Valley, a generally flat-lying area underlain by recent (Holocene-age) and older (Plio-Pleistocene age) alluvium. Despite the generally low relief, the topography of the Project vicinity includes two subdued, northwest-trending ridges (the Buttonwillow and Semitropic Ridges) separated by an intervening trough (the Jerry Slough) (Figure 2 – Geologic Map). The Buttonwillow Ridge has been uplifted along the northwest-striking Buttonwillow anticline (Dale et al., 1966) exposing older sedimentary deposits along the Buttonwillow Ridge (Smith, 1964) and trapping westward-flowing runoff to form the northwest-draining Jerry Slough. A concealed (buried) fault is

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shown by the California Geologic Survey (CGS, 2015) along parts of the northeast side of Buttonwillow Ridge and this fault is inferred to be a blind thrust-fault related folding of the Buttonwillow anticline.

Older sedimentary deposits are mapped along Semitropic Ridge (Smith, 1964) but evidence for an underlying anticline is unclear. In their geologic cross section, which passes though Project Zones 2 and 3, Dale et al. (1966) do not show anticlinal folding of sedimentary beds based on oil exploration wells. However, the CGS (2015) show a concealed (buried) fault beneath Semitropic Ridge parallel to the concealed fault beneath Buttonwillow Ridge.

Minor folding and possible fold-related blind thrust-faulting in the site vicinity is related to regional shortening which is taking place along a southwest-northeast axis between the San Andreas fault, which lies about 22 miles southwest of the site (USGS, 2019), and the deeply-rooted Sierra Nevada Mountains, which lie northeast of the site.

5 GENERAL SOIL CONDITIONS

Soils in the San Joaquin Valley, including the area of the Project, have been mapped by the U.S. Department of Agriculture (USDA, 2023). The USDA soil mapping was principally for agricultural planning purposes and is generally limited to the upper 60 to 80 inches of the soil profile but includes basic soil engineering properties.

The vicinity of the Project site is crossed by Buttonwillow Ridge where Project Zone 2 is located, and by Semitropic Ridge where Project Zone 3 is located. The Buttonwillow and Semitropic ridges have slightly higher elevations than the surrounding terrain and are underlain by older sediments (Dale et al., 1966). The intervening and slightly lower elevation Jerry Slough where Project Zone 1 is located is underlain by younger sediments (Figure 2).

The topography and geology of the Project vicinity are reflected in the USDA soil maps of the Project site. Figures 3a - 3c are Soil Characteristic Maps (found at the end of this report) which show the distribution of USDA soil types within the three Project zones.

Zone 1 of the site consists of (in decreasing order) primarily clay, clay loam, silt loam, and loam along a northwest-southeast axis corresponding to the axis of Jerry Slough. Sandy areas comprising sandy loam and fine sandy loam are located at the east and west edges of Zone 1 because these locations are away from the axis of the Jerry Slough and are underlain by the older sediments found along Buttonwillow and Semitropic ridges (Figure 2). The calcium carbonate content in Zone 1 is reported to be up to 10 percent, suggesting moderately-cemented soils may be present. Conversely, salts present in these soils may be subject to future dissolution which could create conditions for collapsible soils. Zone 1 soil units are described as poorly to well-drained with rare flooding (USDA, 2023) and include a few areas subject to periodic inundation (Figure 3a).

Zone 2 of the site consists of (in decreasing order) primarily sandy loam, silt loam, and clay (USDA, 2023). The sandy and silty parts of Zone 2 are underlain by the older sediments found along Buttonwillow Ridge and the clayey parts lie southwest of the ridge and are underlain by younger,

fine-grained basin-fill sediments (Figure 2). The calcium carbonate content in Zone 2 is reported to be up to 10 percent, suggesting moderately-cemented soils may be present, and salts present in these soils

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may be subject to future dissolution which could create conditions for collapsible soils in younger sediments. The units are described as moderately well to well drained with rare flooding.

Zone 3 of the site consists of (in decreasing order) primarily silt loam, fine sandy loam, and clay loam (USDA, 2023). Unlike zones 1 and 2, the USDA soil types are not clearly tied to the age and depositional history of the underlying sedimentary deposits. The calcium carbonate content in Zone 3 is reported to be up to 10 percent, suggesting moderately-cemented soils may be present. Conversely, salts present in these soils may be subject to future dissolution which could create conditions for collapsible soils.

6 GROUNDWATER

Kleinfelder reviewed groundwater data collected by the Department of Water Resources (DWR) from production wells and monitoring wells in the Project vicinity. In Zone 1, groundwater was measured at a depth of 7.8 feet below the ground surface (bgs) in 2008 (Well ID: 28S23E03N061M). In Zone 2 groundwater was measured at a depth of 17.1 feet bgs in 2007 (Well ID: 29S23E12R061M). More recent data on shallow water depths are not available for the Project vicinity on the DWR website (DWR, 2024) that reported groundwater at 17.1 feet bgs in 2007. Review of public data indicates that shallow groundwater has not been recorded in the available wells on site since 2009 (DWR, 2024).

Water production wells in the site vicinity show groundwater at depths of approximately 196 to 358 feet bgs (DWR, 2024). In Zone 3 a recent groundwater depth measurement in March 2024 (Well ID: 29S24E13A001M) showed a groundwater depth of 300.3 feet bgs.

Shallow groundwater encountered in the Project vicinity likely represents perched groundwater, meaning it is separated from the deeper groundwater measured at the site by an unsaturated zone. Groundwater levels measured in the vicinity of the Project site may vary due to the presence of multiple aquifers (unconfined and confined), the presence of unlined or leaking canals, local irrigation practices, and seasonal variations in rainfall and runoff.

7 GEOLOGIC HAZARDS

A geologic hazard, or geohazard, is a natural phenomenon or adverse geologic condition capable of inflicting harm to people or property. The risk, or potential, for a particular geologic hazard at a site depends on the site location and geologic setting. Geologic hazards relevant to the subject site are discussed below.

7.1 Faulting and Seismicity

The Project is in seismically active southern California and the Project is within the zone of influence for several faults which are considered active. Active faults may pose both surface fault rupture hazards and ground-shaking hazards. Surface rupture occurs when movement on a fault deep within the earth breaks through to the ground surface. Not all earthquakes result in surface rupture.

7.1.1 Fault Rupture

The California Alquist Priolo (A-P) Earthquake Fault Zoning Act was passed in 1972 to regulate development and construction to avoid the hazard of surface fault rupture (CGS, 2018). The A-P Act established regulatory Earthquake Fault Zones (A-P zones) around recognized active faults which require

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site-specific surface fault rupture hazard investigations. According to the A-P Act, an active fault is a fault that has experienced seismic activity during historic time (since roughly 1800) or exhibits evidence of surface displacement during Holocene time (the last 11,700 years) (Bryant and Hart, 2007; CGS, 2018).

There is no designated A-P Earthquake Fault Zone in the vicinity of the Project site (CGS, 2018) and there are no faults of Quaternary age mapped on or projecting into the Project site (USGS, 2019). We searched the U.S Geological Survey National Geologic Map database (USGS, 2024) for geologic maps covering all or part of the project area and the available maps do not show any faults with surface expression within the Project area (Smith, 1964; Dale et al., 1966).

According to the CGS (2015), a pair of concealed, pre-Quaternary faults are associated with Buttonwillow and Semitropic ridges which cross the Project site. A concealed, pre-Quaternary fault is a fault that is buried below the depth of Holocene- and Pleistocene-age sediments. In the geologic context of Buttonwillow and Semitropic ridges, this pair of faults are inferred to be blind thrust-faults associated with the folding of the Buttonwillow anticline and (possibly) the Semitropic anticline. As such, these faults do not pose a surface fault rupture hazard at the Project site.

7.1.2 Ground Shaking

The Project is within the zone of influence for several faults which are considered active or potentially capable of producing seismic shaking at the site that could be damaging to structures (CGS, 2015; SCEDC, 2013; USGS, 2019). It is anticipated that the Project site will periodically experience ground acceleration as the result of moderate to large magnitude earthquakes on faults outside the immediate Project area.

A number of earthquakes have occurred within the region of the site (approximately a 50-kilometer, or 31-mile, radius) during historic time (since 1800), including the 1857 magnitude 8.25 Fort Tejon earthquake on the San Andreas fault zone approximately 22 miles west of the site. Although the epicenter of the Fort Tejon earthquake was greater than 31 miles from the Project site (Table 1), the earthquake produced a surface rupture over 217 miles long along the fault zone, including the part of the San Andreas fault nearest the site, and was reported to have lasted at least one minute (Sieh, 1978; Agnew and Sieh 1978).

Three other smaller magnitude earthquakes have occurred within 25 miles of the site, two of which occurred roughly 25 miles southeast of the site on a series of unnamed faults. A M5.22 earthquake occurred in August of 2024 while the other, a M5.19, occurred in May of 1993. The third occurred on an unnamed fault roughly 22 miles east of the site in August of 1952 and had a magnitude of 5.52. Minimal data of these three earthquakes were recorded, and no damage was reported (SCEDC, 2013; CGS, 2017).

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Table 1
Historic Earthquakes within 50 km (31 miles) of Project (>Mw 5.0)

Earthquake Name	Distance (miles)	Magnitude (Mw)	Date	Latitude	Longitude
Fort Tejon	46	8.25	1/9/1857	35.716667°	-120.31667
Unnamed	22	5.52	8/22/1952	35.35167	-118.95400
Unnamed	21	5.22	8/7/2024	35.10900	-119.09700
Unnamed	25	5.19	5/28/1993	35.14900	-119.10400

7.2 Liquefaction and Lateral Spreading

The term liquefaction describes a phenomenon in which saturated, cohesionless, or low-plasticity soils temporarily lose shear strength (liquefy) due to increased pore water pressures induced by strong, cyclic ground motions during moderate to large earthquakes. Locations considered most susceptible to liquefaction are those underlain by loose, water saturated sediments within 50-feet of the ground surface. Structures founded on or above potentially liquefiable soils may experience bearing capacity failures due to the temporary loss of foundation support, vertical settlements (both total and differential), and/or undergo lateral spreading. The factors known to influence liquefaction potential include soil type, relative density, grain size, confining pressure, depth to groundwater, and the intensity and duration of the seismic ground shaking.

Based on the site soil properties (USDA, 2023) the potential for shallow groundwater (DWR, 2024), and the proximity to active faults capable of significant ground-shaking (USGS, 2019), there is a significant potential for impact due to liquefaction from a seismic event.

Lateral spreading is a form of horizontal displacement that can occur due to ground-shaking during earthquakes. Lateral spreading occurs when relatively flat-lying soil material moves toward an open or “unconfined” face such as an open body of water, a canal or channel, or an unsupported excavation. In soils, the movement is generally due to failure along a weak plane and is typically associated with liquefaction. Because of the potential for liquefaction in the Project site and the local presence of agricultural canals, there is a potential for lateral spreading at the site as a result of seismic activity.

Secondary seismic hazards, such as tsunami or seiche, are considered negligible because the site is located away from the ocean and confined bodies of water such as lakes or reservoirs.

7.3 Landslides

A landslide is the downgradient movement of earth material along a slope or hillside. Landslides occur on slopes when geologic materials lose strength and the force of gravity causes the material to move down-gradient. Landslides can result from a variety or combination of root causes such as steepness of slope, type of material, water content, amount and type of vegetation, and major natural hazards such as earthquakes, volcanic eruptions, wildfires, and floods. Steeper slopes and weaker rocks are the most vulnerable to landslide events. Landslides can occur as slow but progressive movements of soil over time or from the rapid deterioration of soil on a slope. They are frequently triggered by intense rainfall or seismic shaking. Because the site is relatively flat landslides are not considered a hazard at this site.

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7.4 Erosion

Erosion occurs when loose (or disturbed) earth materials are exposed to wind or flowing water. The risk of erosion at the Project site appears to be limited to seasonal flooding in areas of low relief and blowing dust from strong winds. Erosion and sedimentation are natural processes that occur on slopes, hillsides, and natural drainages. Within the study area erosion is an ongoing process that will continue primarily within existing drainage channels and washes and natural slopes where periodic flooding and sedimentation occur during and following periods of intense rainfall.

A potential wind-blown dust hazard during construction is “valley fever,” a fungal infection in the lungs. Airborne soil may adversely impact permitting and neighboring properties, and uncontrolled airborne soil can result in poor visibility and lead to construction related delays. Dust control will be required throughout construction until a stable post-construction surface is re-established. San Joaquin Valley has specific requirements for dust control.

7.5 Flooding

Flood Hazard Maps available through the Federal Emergency Management Agency (FEMA) were reviewed to assess the flood hazard in the vicinity of the Project (FEMA, 2024). According to FEMA, the Project is in an “area of minimal flood hazard”, meaning the Project lies outside the 0.2 % annual chance floodplain.

Although the proposed development is outside of the FEMA flood risk zone, it should be noted that canals are present in the Project area and may present local flooding hazards during periods of heavy seasonal rains. Also, part of the Project is within the low-lying Jerry Slough which drains internally to Goose Dry Lake northwest of the Project. Areas of internal drainage may be subject to flooding during periods of heavy rain.

7.6 Subsidence

Ground subsidence in the San Joaquin Valley has resulted from over pumping of groundwater causing groundwater level declines and associated aquifer-system compaction (USGS, 2018; 2024). The collapse of the pore spaces due to groundwater withdrawal compacts underlying formations, leading to a drop in ground surface elevation. Structures and improvements located in subsidence-prone areas are at risk for damage if subsidence were to occur. Ground shaking from earthquakes can exacerbate subsidence.

The Project site lies within a zone of generally low subsidence. Between 1926 to 1970 the vicinity of the Project site experienced an estimated 0.3 to 1.2 meters of land subsidence (USGS, 2018). Recent vertical displacement at the Project site (since 2015) is estimated to range from 0 to -0.6 feet (DWR, 2015). The risk of settlement at the site due to continued ground subsidence is considered low to moderate.

7.7 Collapsible Soils

A collapsible soil is an unsaturated soil whose particles undergo a rearrangement and consequent reduction in volume due to wetting, additional loading, or both (Clemence & Finbarr, 1981). Site soils have been subjected to past irrigation and tilling as agricultural land and are known to have a relatively high salt content, factors which may contribute to collapsible soils. As a result, the site is considered to have a low to moderate potential for collapsible soils.

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7.8 Expansive Soils

Swell occurs as clay-rich subsurface materials absorb water in response to changes in the subsurface water content. Changes in the water content are usually the result of construction of concrete slabs or other surface coverings which can act as a relatively impermeable membrane and can change the evaporation rate at the surface, resulting in a net change (increase) in the subgrade water available for absorption.

Clay-rich material is present in the subsurface in all three zones of the Project site (USDA, 2023) (Figure 3). As a result, they may have a low to medium expansion potential. The geotechnical investigation should confirm the swell potential of the subsurface materials across the site and provide guidance on mitigating the hazard, if identified.

Expansive soils are subject to volume change during cycles of wetting and drying. These soils expand when exposed to water, and can result in uplift on foundations, pavements and floor slabs. Shrinkage cracks were observed locally on the site suggesting some of the underlying soils may have expansive properties. Expansion index testing should be performed during a design-level geotechnical investigation to evaluate the potential for expansive soils. Proposed structures may require special design to mitigate the potential for expansive soils.

7.9 Oil and Gas Wells

The site is in an area of past oil development and numerous inactive and abandoned oil and gas wells are present within the property boundaries (DOC, 2024; Figure 4). The Project site is located on or near the Bowerbank and Jerry Slough oil fields and Buttonwillow gas field. Buried oil infrastructure such as pipelines or well-heads may be present, in addition to possible buried oil production waste including spills and mud pits.

8 REGULATORY SETTING

The following sections describe federal, state, and local regulations related to geology and soils and potentially applicable to the implementation of the proposed Project.

8.1 Federal Regulations

There are no federal regulations for geology and soils that are applicable to the proposed Project.

8.2 State Regulations

8.2.1 Alquist-Priolo Earthquake Fault Zoning Act (1972)

The Alquist-Priolo Earthquake Fault Zoning Act of 1972 and updates (California Public Resources Code [PRC], Section 2621, et seq.) is the principal California State guidance to prevent the construction of habitable structures on the surface trace of active earthquake faults. If an active fault is found, a structure for human occupancy must be set back from the fault (generally 50 ft). The Alquist-Priolo Earthquake Fault Zoning Act only addresses the hazard of surface fault rupture; it does not consider other earthquake hazards. There are no known active earthquake fault zones capable of surface fault

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rupture on or in the near vicinity of the Project site; therefore, regulations recommended by the CGS for investigations conducted in such zones do not specifically apply.

8.2.2 Seismic Hazard Mapping Act (1990)

The Seismic Hazard Mapping Act (SHMA) was adopted by the State in 1990 to address the potential hazards posed by secondary effects of seismic activity, including strong ground shaking, soil liquefaction, and associated ground failure and seismically induced landslides. The CGS prepares and provides local governments with seismic hazard zone maps that identify areas susceptible to amplified shaking, liquefaction, earthquake-induced landslides, and other ground failures. The seismic hazard zones are referred to as "zones of required investigation" because site-specific geological investigations are required for construction projects located within these areas. Before a project can be permitted, a geologic investigation, evaluation, and written report must be prepared by a licensed geologist to demonstrate that the potential hazards can be successfully mitigated.

8.2.3 California Building Code

The 2022 California Building Standards Code (Title 24) provide standards for building construction and seismic design parameters and grading requirements (CBC, 2022). These codes contain specific requirements for seismic safety, excavation, foundations, retaining walls, and all demolition and grading activities, including for solar facilities as noted in Section 4.2, *Ground Shaking*.

8.2.4 Construction General Permit

Dischargers whose projects disturb 1 or more acres of soil, or whose projects disturb less than 1 acre, but are part of a larger common plan of development that in total disturbs 1 or more acres, are required to obtain coverage under the General Permit for Discharges of Storm Water Associated with Construction Activity Construction General Permit Order 2009-0009-DWQ. Construction activity subject to this permit includes clearing, grading, and disturbances to the ground, such as stockpiling or excavation.

The Construction General Permit requires the development of a Storm Water Pollution Prevention Plan (SWPPP) by a certified Qualified SWPPP Developer. The SWPPP would identify best management practices the discharger will use to protect storm water runoff and incorporate visual, chemical, and sediment monitoring programs.

8.3 Local Regulations

8.3.1 Kern County Code of Building Regulations

The 2022 Kern County Code of Building Regulations was developed to promote public safety and welfare by adopting minimum building standards required and enforced throughout the unincorporated territory of the County of Kern. Construction in Kern County is required to conform to the Code (Chapter 17.08, Building Code, of the Kern County Code of Ordinances). The 2022 Kern County Code of Building Regulations is partially comprised of the 2022 California Code of Regulations (CCR), Title 24, also referred to as the California Building Standards Code (described under section 5.2.1 California Building Codes above).

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8.3.2 Chapter 17.28 Kern County Grading Code

The purpose of the Kern County Grading Code is to safeguard life, limb, property, and public welfare by regulating grading on private property. Applicable requirements of the Kern County Grading Code would be applied during implementation of the proposed project. All required grading permit(s) would be obtained prior to commencement of construction activities and require the completion of a soils engineering report, engineering geology report, engineering calculations, and drainage computations specific to the proposed project. Sections of the Grading Code that are particularly relevant to geology and soils are provided below.

8.3.3 Kern County Grading Code Section 17.28.140, Erosion Control

A. Slopes. The faces of cut and fill slopes shall be prepared and maintained to control against erosion. This control may consist of effective planting. The protection for the slopes shall be installed as soon as practicable and prior to calling for final approval. Where cut slopes are not subject to erosion due to the erosion-resistant character of the materials, such protection may be omitted.

B. Other Devices. Where necessary, check dams, cribbing, riprap or other devices or methods shall be employed to control erosion and provide safety.

C. Temporary Devices. Temporary drainage and erosion control shall be provided as needed at the end of each workday during grading operations, such that existing drainage channels would not be blocked. Dust control shall be applied to all graded areas and materials and shall consist of applying water or another approved dust palliative for the alleviation or prevention of dust nuisance. Deposition of rocks, earth materials or debris onto adjacent property, public roads or drainage channels shall not be allowed.

8.3.4 Kern County Grading Code Section 17.28.150, Drainage Retention Facilities

All drainage retention/detention facilities and their associated conveyance facilities shall be designed in accordance with the Kern County Development Standards or latest revision thereof.

8.3.5 Kern County Grading Code Section 17.28.160, Maintenance

The owner of any property on which grading has been performed pursuant to a permit issued under the provisions of this chapter, or any other person or agent in control of such property, shall maintain in good condition and repair all drainage structures, sumps and other protective devices shown on the grading plans filed with the application for grading permit and approved as a condition precedent to the issuance of such permit.

8.3.6 Kern County Grading Code Section 17.28.170, Grading Inspection

A. General. All grading operations for which a permit is required shall be subject to inspection by the building official. Professional inspection of grading operations and testing shall be provided by the civil engineer, soils engineer, and the engineering geologist retained to provide such services in accordance with Subsection 17.28.170(E) for engineered grading and as required by the building official for regular grading.

B. Civil Engineer. The civil engineer shall provide professional inspection within such engineer's area of technical specialty, which shall consist of observation and review as to the establishment of line,

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grade and surface drainage of the development area. If revised plans are required during the course of the work they shall be prepared by the civil engineer.

C. Soils Engineer. The soils engineer shall provide professional inspection within such engineer's area of technical specialty, which shall include observation during grading and testing for required compaction. The soils engineer shall provide sufficient observation during the preparation of the natural ground and placement and compaction of the fill to verify that such work is being performed in accordance with the conditions of the approved plan and the appropriate requirements of this chapter. Revised recommendations relating to conditions differing from the approved soils engineering and engineering geology reports shall be submitted to the permittee, the building official and the civil engineer.

D. Engineering Geologist. The engineering geologist shall provide professional inspection within such engineer's area of technical specialty, which shall include professional inspection of the bedrock excavation to determine if conditions encountered are in conformance with the approved report. Revised recommendations relating to conditions differing from the approved engineering geology report shall be submitted to the soils engineer.

E. Permittee. The permittee shall be responsible for the work to be performed in accordance with the approved plans and specifications and in conformance with the provisions of this Ordinance Code, and the permittee shall engage consultants, if required, to provide professional inspections on a timely basis. The permittee shall act as a coordinator between the consultants, the contractor and the building official. In the event of changed conditions, the permittee shall be responsible for informing the building official of such change and shall provide revised plans for approval.

F. Building Official. The building official may inspect the project at the various stages of the work requiring approval to determine that adequate control is being exercised by the professional consultants.

G. Notification of Noncompliance. If, in the course of fulfilling their responsibility under this chapter, the civil engineer, the soils engineer, or the engineering geologist finds that the work is not being done in conformance with this chapter or the approved grading plans, the discrepancies shall be reported immediately in writing to the permittee and to the building official. Recommendations for corrective measures, if necessary, shall also be submitted.

H. Transfer of Responsibility. If the civil engineer, the soils engineer, or the engineering geologist of record is changed during the course of the work, the work shall be stopped until:

The civil engineer, soils engineer, or engineering geologist has notified the building official in writing that they will no longer be responsible for the work and that a qualified replacement has been found who will assume responsibility.

- The replacement civil engineer, soils engineer, or engineering geologist notifies the building official in writing that they have agreed to accept responsibility for the work.

9 SUMMARY OF PROJECT IMPACTS ON GEOLOGY & SOILS CEQA THRESHOLDS

The California Environmental Quality Act (CEQA) requires that California public agencies consider the environmental effects of proposed development projects. Appendix G of the 2025 CEQA Statute and Guidelines defines several Thresholds of Significance for issues related to geology and soils. A project may be deemed to have a significant impact if the project would directly or indirectly cause potential substantial adverse effects related to the CEQA geology and soils issues.

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These issues are discussed below in the context of the Project site.

Threshold A

i) *Would the* project expose people or structures to *potential substantial adverse effects, including the risk of loss, injury, or death involving rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault?*

The proposed Project is not within an Alquist-Priolo Fault Zone and there are no known active faults within the Project area. No adverse impacts are anticipated.

ii) *Would the project expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving strong seismic ground shaking?*

The Project is in seismically active southern California and is subject to strong ground motion resulting from earthquakes on nearby faults. There are several faults in the vicinity of the Project site that are capable of producing strong ground motion.

The proposed Project will include an Operations and Maintenance (O&M) building with offices and bathrooms which may qualify as a structure for human occupancy. According to the California Code of Regulations (Title 14, Division 2, Section 3601(e)), a "structure for human occupancy" is any structure used or intended for supporting or sheltering any use or occupancy, which is expected to have a human occupancy rate of more than 2,000 person-hours per year. Kleinfelder assumes that the design and construction of the proposed O&M building will comply will all applicable State and local building codes which is anticipated to reduce or eliminate potentially adverse effects associated with ground shaking. Therefore, based on information reviewed, the potential for impacts associated with ground shaking in the proposed Project footprint is considered low.

iii) *Would the project expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving seismic-related ground failure, including liquefaction?*

As discussed above, based on available, published soil and groundwater data the Project site is potentially susceptible to liquefaction during earthquake-induced ground-shaking. Kleinfelder assumes that the proposed development will comply will all applicable State and local building codes which is anticipated to reduce or eliminate potentially adverse effects associated with ground shaking. Therefore, based on information reviewed, the potential for impacts associated with liquefaction in the proposed Project footprint is considered low.

iv) *Would the project expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving landslides?*

The proposed Project site has low relief and lacks topographic features. No adverse impacts are anticipated.

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Threshold B

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

As discussed above, the Project area has low relief and existing runoff is by sheet flow over predominantly agricultural land. During construction activities, soil may be exposed, and there may be an increased potential for soil erosion due to soil disturbance. During a storm events (including high winds), soil erosion and loss of topsoil could occur at an accelerated rate. Kleinfelder assumes that the proposed development will comply will all applicable State and local building codes which is anticipated to reduce or eliminate potentially adverse effects associated with construction-related erosion and sediment runoff. Therefore, based on information reviewed, the potential for impacts associated with erosion in the proposed Project footprint is considered low.

Threshold C

Would the project be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?

The potential impacts related to landslides are discussed in Threshold A (iv).

As discussed in Section 7.2, lateral spreading is a liquefaction-related phenomenon, but unlike potential damage to structures resulting from liquefaction, potential damage from lateral spreading may not be mitigated during design and construction if drainage or irrigation canals remain in use near or adjacent to Project infrastructure following site development. Kleinfelder assumes proposed infrastructure associated with the Project will be set-back a minimum of 50 feet from any operating, open water canal which is anticipated to reduce or eliminate potentially adverse effects associated with lateral spreading. Therefore, based on information reviewed, the potential for impacts associated with lateral spreading in the proposed Project footprint is considered low.

Subsidence refers to broad-area changes in the elevation of land. The Project site is located in an area associated with moderate subsidence due to regional groundwater withdrawal but the Project is not anticipated to contribute to regional or local subsidence. Therefore, based on information reviewed, the potential for impacts associated with subsidence in the proposed Project footprint is considered low.

The potential impacts related to liquefaction are discussed in Threshold A (iii).

Collapsible soils are those that undergo settlement upon wetting, even without the application of additional load. The Project site considered to have a low to moderate potential for collapsible soils but the effects of collapsible soils can be mitigated through appropriate design and construction techniques. Kleinfelder assumes that the design and construction of foundation elements of proposed Project infrastructure will comply will all applicable State and local building codes which is anticipated to reduce or eliminate potentially adverse effects associated with collapsible soils. Therefore, based on information reviewed, the potential for impacts associated with collapsible soils in the proposed Project footprint is considered low.

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Threshold D

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

Clayey soils are present in all three Zones at the Project site and consequently the overall site is considered to have a low to medium potential for expansive soils, however, the effects of expansive soils can be mitigated through appropriate design and construction techniques. Kleinfelder assumes that the design and construction of foundation elements of proposed Project infrastructure will comply will all applicable State and local building codes which is anticipated to reduce or eliminate potentially adverse effects associated with expansive soils. Therefore, based on information reviewed, the potential for impacts associated with expansive soils in the proposed Project footprint is considered low.

Threshold E

Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?

Soil mapping by the USDA (2023) indicates that soil conditions vary over the Project site and range from poorly drained, clayey soils to well drained sandy loam soils. Since well drained, sandy loam soils are present in all three zones at the Project site (USDA, 2023), the overall site is considered to have a low potential for soils incapable of adequately supporting the use of septic tanks or alternative waste-water disposal systems provided waste-disposal facilities are located in well-drained soils. Furthermore, the preparation of a soils engineering report including percolation testing and infiltration computations specific to the proposed project, as required by the Kern County Code of Building Regulations, would provide final design and construction recommendations which take into account onsite geologic conditions. No adverse impacts are expected to occur.

Threshold F

Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?

Impacts on paleontological resources are discussed under separate cover in the Paleontological Resources Inventory Memorandum (Dudek, 2024).

10 SUMMARY AND CONCLUSIONS

Kleinfelder conducted a desktop geotechnical site assessment of the Project to identify potential geotechnical concerns and geologic hazards that may adversely impact site development. Our study was based on a review of readily available public information, as well as Kleinfelder's previous experience with similar projects under similar conditions.

In general, the site is expected to be suitable for the construction of the proposed photovoltaic (PV) solar electric generation facility, battery energy storage system (BESS), and related infrastructure. No significant geotechnical or geologic concerns were identified during this desktop (preliminary) geotechnical site assessment. In the event unanticipated issues are identified during later stages of

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Project development, it is expected that these issues will be manageable using engineering design and/or controls.

Criteria for geology and soils listed in the Appendix G of the California Resources Agency CEQA Guidelines (DWR, 2005) were compared to the results of Kleinfelder's desktop geotechnical site assessment. Based on our findings and the nature of the proposed Project, implementation of the Project is not expected to result in potentially significant impacts according to CEQA guidelines.

Kleinfelder recommends that a design-level geotechnical foundation evaluation incorporating an engineering geologic evaluation, subsurface investigation program, laboratory testing, and development and foundation design recommendations will be required to validate these preliminary conclusions.

11 LIMITATIONS

Kleinfelder performed this work in a manner consistent with that level of care and skill ordinarily exercised by other members of Kleinfelder's profession practicing in the same locality, under similar conditions and at the date these services are provided. Our work was preliminary in nature and performed using previous experience and from a review of readily available public information. No building officials were contacted or consulted, no site reconnaissance was performed, no samples obtained, and no form of site or laboratory testing has been completed. Accordingly, the term "Desktop" strictly applies to the level of work performed. Kleinfelder makes no other representation, guaranty, or warranty, express or implied, regarding the services, communication (oral or written), report, opinions, or instrument of service provided.

Kleinfelder offers various levels of investigative and consulting engineering services to suit the varying needs of different clients. While no practical level of investigation or engineering service can eliminate all risk, more comprehensive studies will provide more information, upon which future decisions made and actions taken may be based. As with any geotechnical study which encompasses hundreds or thousands of acres at any level if completeness, the professional opinions presented in the report should be considered provisional and subject to new or additional information. Detailed, design-level investigation will need to be completed if development proceeds.

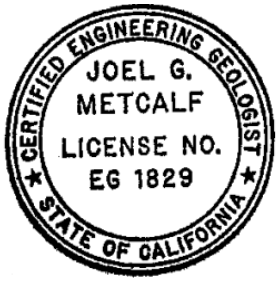
This desktop report may be used only by Avantus and its designated representatives. The report may be used only for the purposes stated for this specific engagement and for the permitting purpose of establishing baseline conditions under the California Environmental Quality Act, and within a reasonable time from its issuance, but in no event later than five (5) years from the date of the report. This preliminary report is not intended for use in design and is intended only for preliminary planning purposes.

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CLOSING

Kleinfelder appreciates the opportunity to provide our services for this Project. If you have questions regarding this letter or if we may be of further assistance, please contact the undersigned.
Sincerely,

KLEINFELDER



Joel G. Metcalf, PG, CEG
Principal Engineering Geologist

Autumn McClendon-Long
Project Manager III

Attachments:

Figure 1 – Site Vicinity Map
Figure 2 – Geologic Map
Figure 3 – Soil Characteristic Map
Figure 4 – Oil and Gas Well Map

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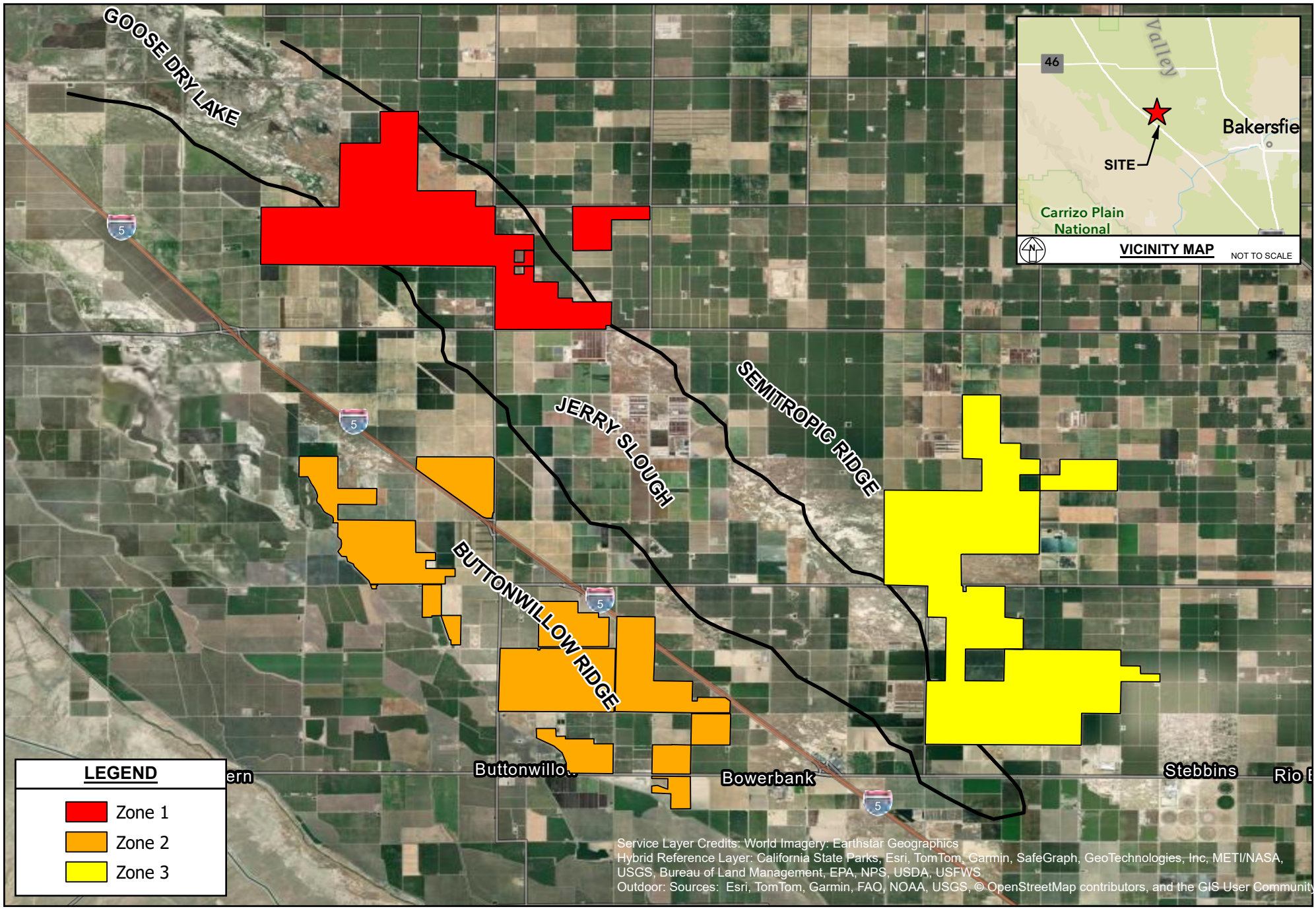
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Figures

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APPROXIMATE SCALE IN MILES

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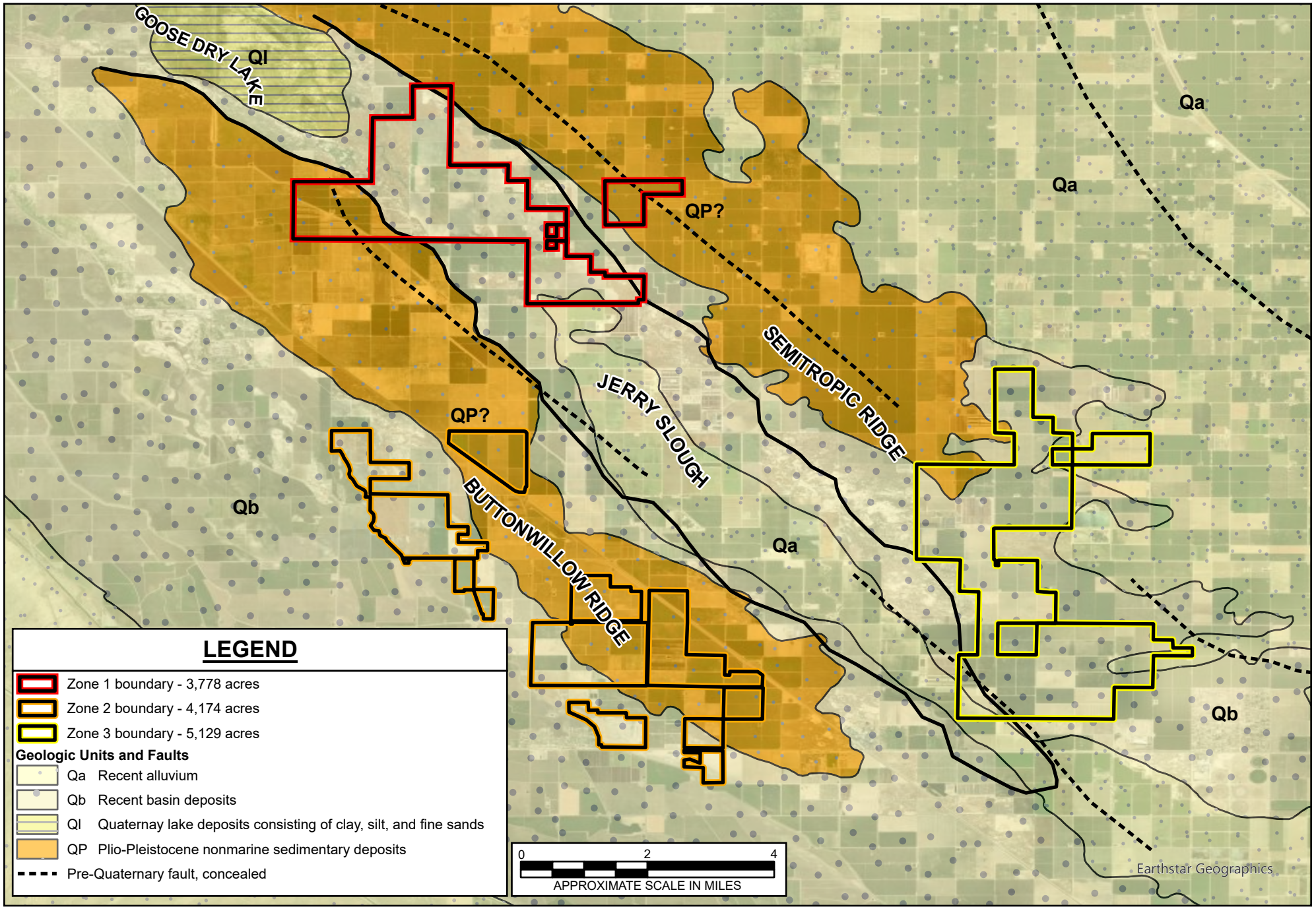
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CHECKED BY:	J. Metcalf
DATE:	09/25/2024

SITE VICINITY MAP

Desktop Geotechnical Site Assessment
Buttonbush Solar Project
Kern County, California

FIGURE
1

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GIS FILE NAME: Buttonbush
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Reference: Smith, A.R., 1964, Geologic Map of California : Bakersfield sheet, California Division of Mines and Geology, Geologic Atlas of California GAM-02, 1:250,000.

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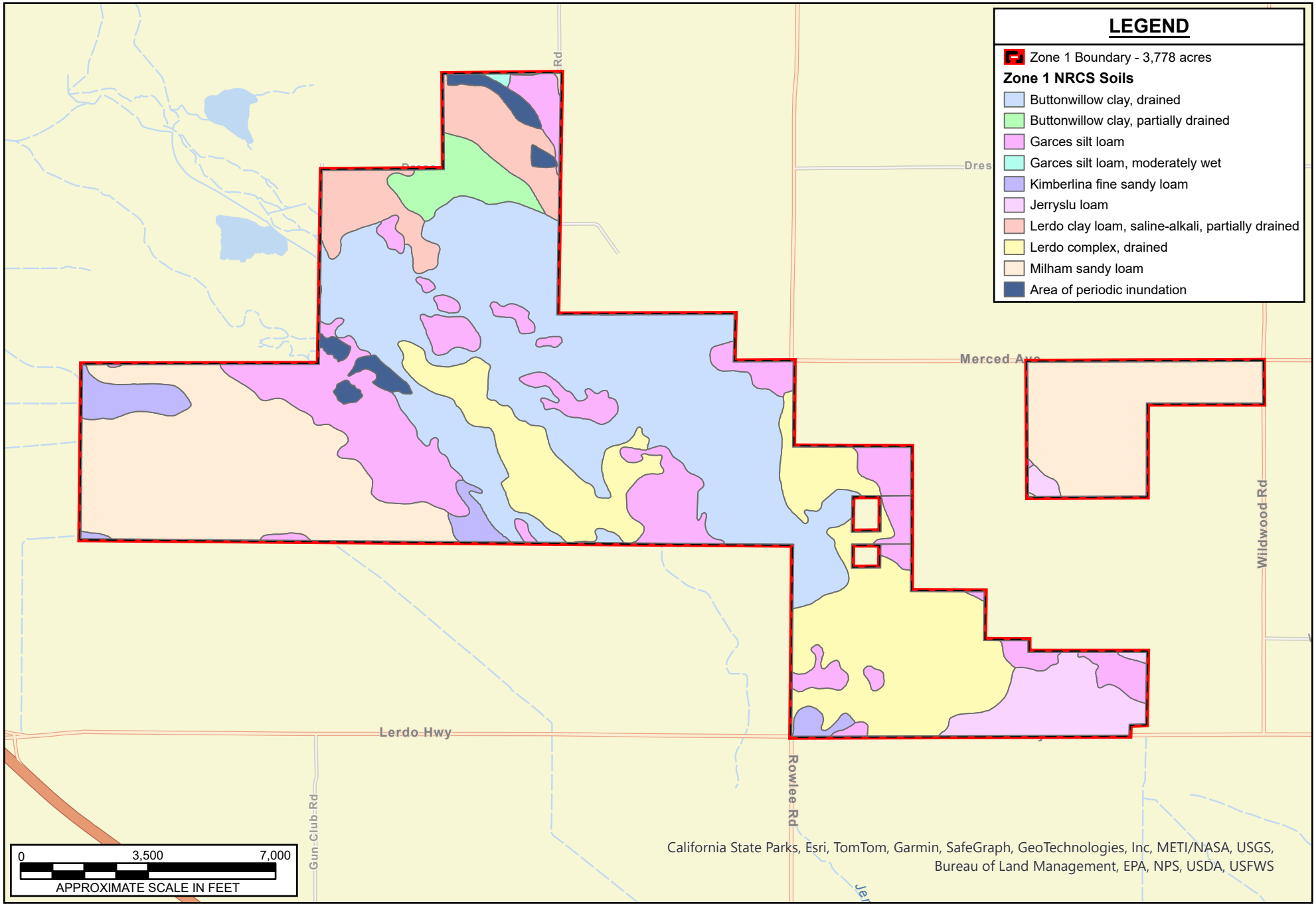
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GEOLOGIC MAP

Desktop Geotechnical Site Assessment
Buttonbush Solar Project
Kern County, California

FIGURE
2

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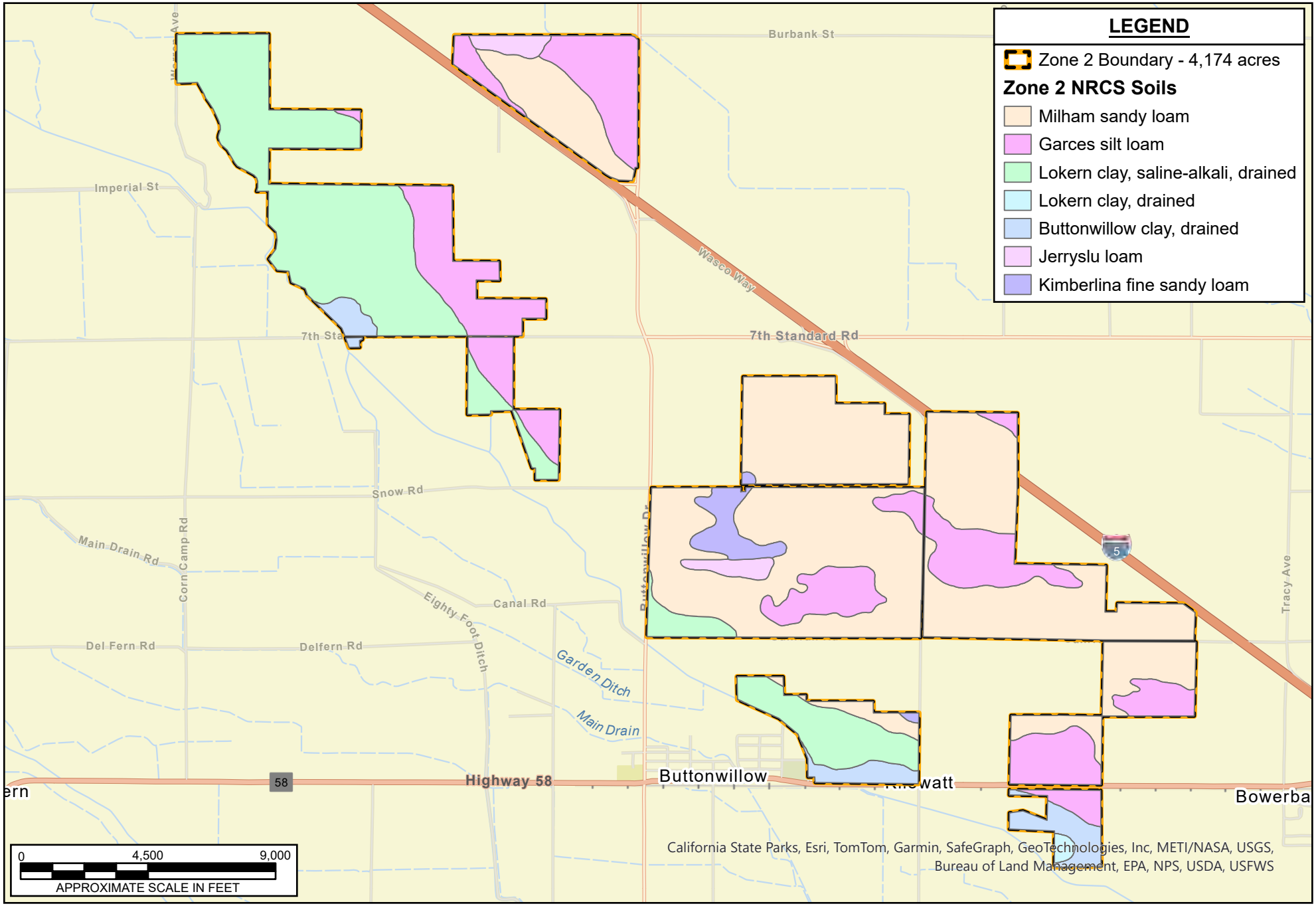
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DATE:	09/25/2024

SOIL CHARACTERISTIC MAP

Desktop Geotechnical Site Assessment
Buttonbush Solar Project
Kern County, California

FIGURE
3a



Modified from: Buttonbush North - NRCS Soils Map
Reference: USDA, 2023, Web Soil Survey, U.S. Department of Agriculture website. Accessed 9-25-2024 at: https://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx

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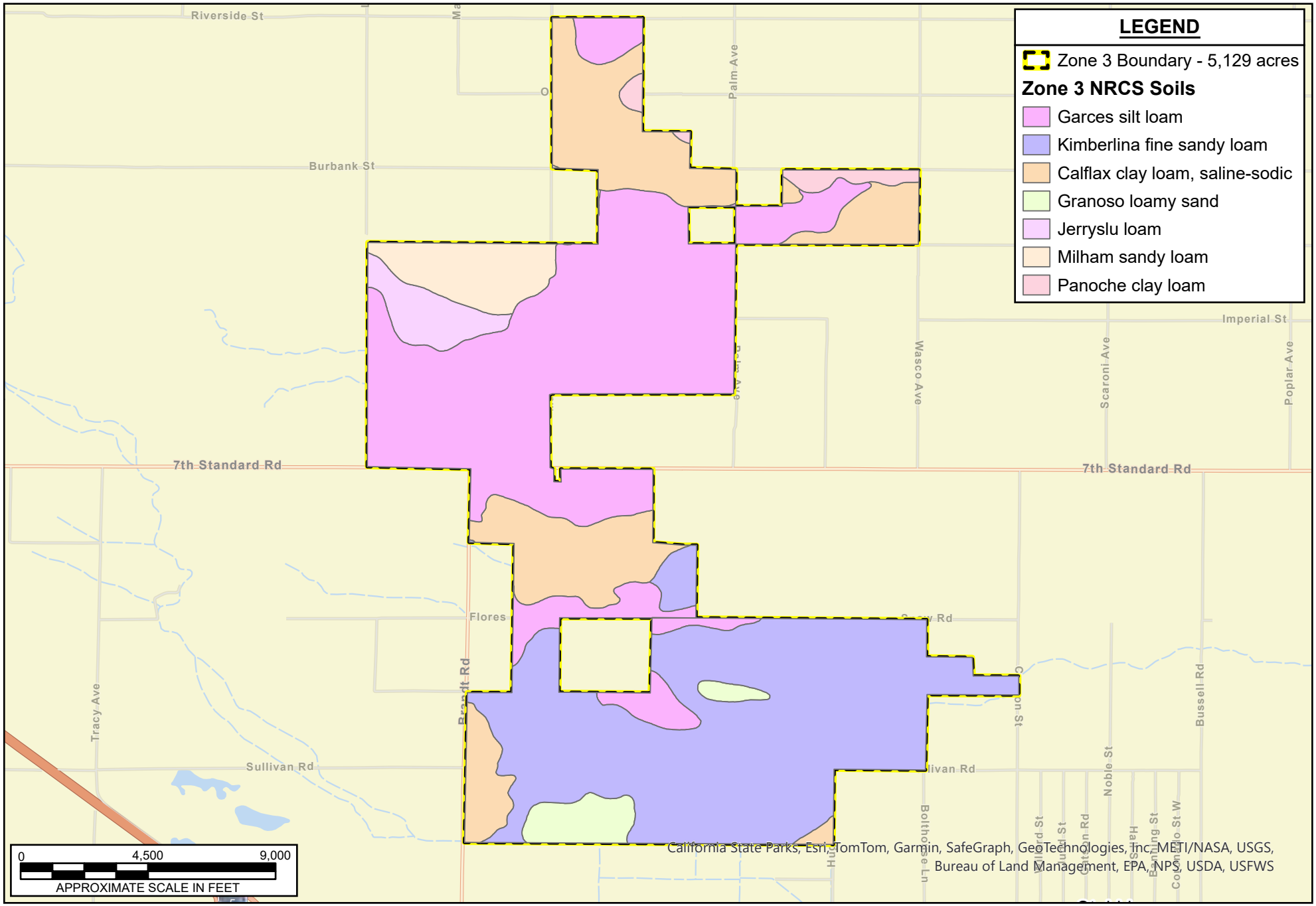
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SOIL CHARACTERISTIC MAP

Desktop Geotechnical Site Assessment
Buttonbush Solar Project
Kern County, California

FIGURE
3b



Modified from: Buttonbush North - NRCS Soils Map
Reference: USDA, 2023, Web Soil Survey, U.S. Department of Agriculture website. Accessed 9-25-2024 at: https://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx

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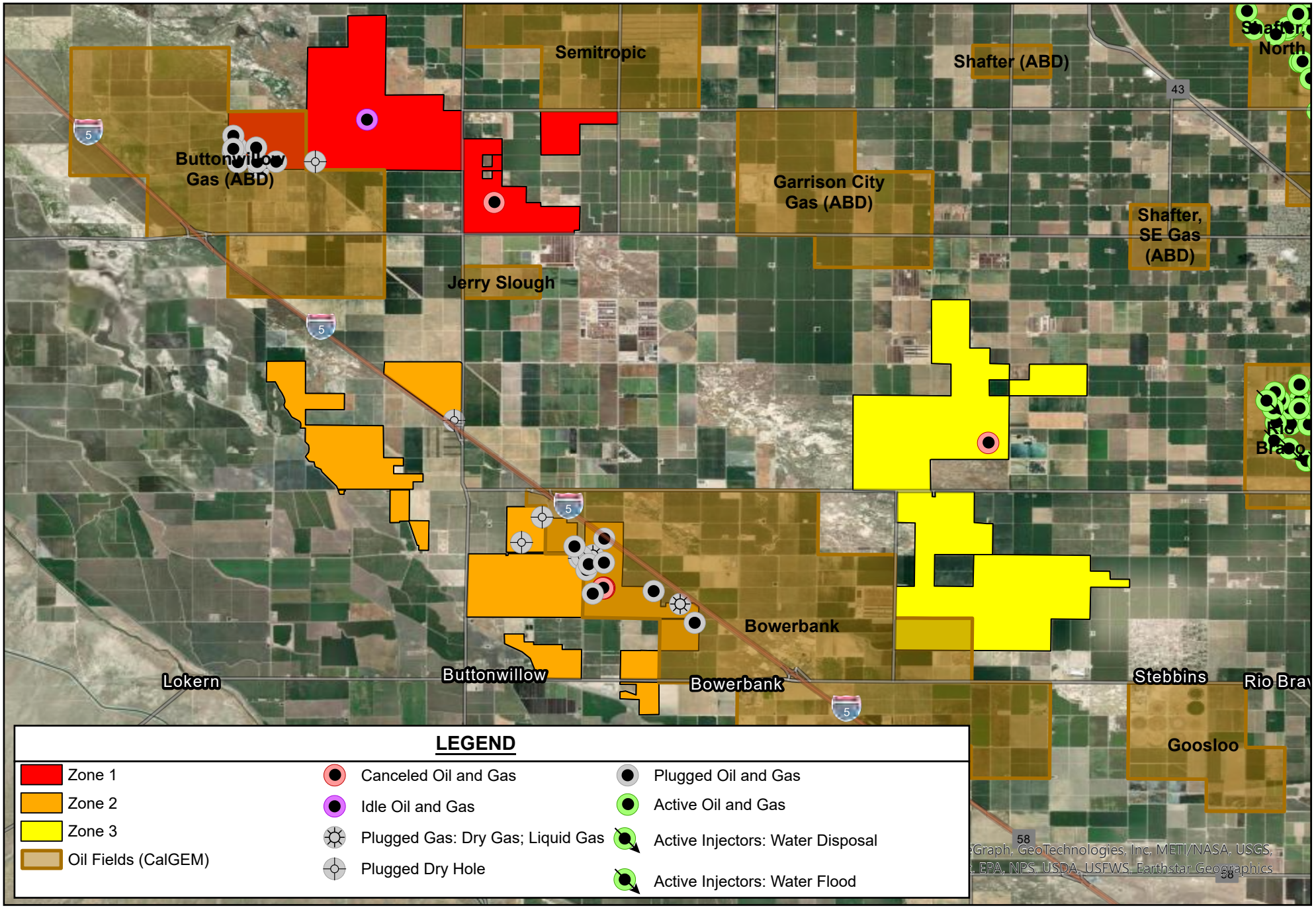
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SOIL CHARACTERISTIC MAP

Desktop Geotechnical Site Assessment
Buttonbush Solar Project
Kern County, California

FIGURE
3c



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APPROXIMATE SCALE IN MILES

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OIL AND GAS WELL MAP

Desktop Geotechnical Site Assessment
Buttonbush Solar Project
Kern County, California

FIGURE
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Appendix G

Paleontological Resources Materials

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Appendix G.1

Paleontological Resources Acreage Memorandum

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MEMORANDUM

To:	Jack Foster, Planner II, Planning & Natural Resources Department
From:	Ronelle Candia, Project Manager, Dudek
Subject:	Clarification on Project Acreage – Buttonbush Solar & Storage Project, Kern County, CA Paleontological Resources Inventory Memorandum
Date:	May 16, 2025
cc:	Pauline Roberts, Director, Permitting, Avantus, Christa Hudson, Permitting Consultant

Introduction

In December 2024 Dudek prepared the Final Paleontological Resources Inventory Memorandum (Memo) for the Buttonbush Solar and Storage Project (Project) in Kern County, California. The Memo assumed the Project would be located on 128 parcels within an approximately 13,888-acre gross parcel boundary.

Project Description Revisions

Subsequent to the final Memo, the Project area has been revised to be located on 128 parcels across a leased area of approximately 11,983 acres within an approximately 13,868-acre gross parcel boundary. This resulted in a reduction of total acres developed as part of the Project. The modification in the Project acres is because the acres listed by Assessor's Parcel Number (APN) were used to comprise the original Project site acreage total while survey data refinements and minor landowner lease exclusions reduced the total area.

Findings on Existing Memo

The minor reduction in project acreage will not necessitate revisions to the Memo, as it does not introduce new significant environmental effects or substantially increase the severity of previously identified impacts. The proposed mitigation measures within the Memo remain applicable and do not require revision, despite the slight reduction in acreage from what was analyzed in the technical study.

Appendix G.2

Paleontological Resources Inventory Memorandum

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DUDEK
MAIN OFFICE
605 THIRD STREET
ENCINITAS, CALIFORNIA 92024
T 800.450.1818 F 760.632.0164

December 2, 2024 14787.01

29SC 8ME LLC
4370 Town Center Boulevard, Suite 110
El Dorado Hills, California 95762
Contact: Kevin Brokish

Subject: **Final Paleontological Resources Inventory Memorandum for the Buttonbush Solar and Storage Project, Unincorporated Kern County, California**

Dear Kevin Brokish:

This letter documents the results of the paleontological resources inventory conducted by Dudek in support of the proposed Buttonbush Solar and Storage Project (project) in unincorporated Kern County, California (Figure 1 – Project Location Map).

To determine the paleontological sensitivity of the project site and make adequate recommendations, Dudek performed a paleontological resources inventory for the project to comply with the California Environmental Quality Act (CEQA) and Society of Vertebrate Paleontology (SVP 2010) guidelines for successful paleontological mitigation. The inventory consisted of a Natural History Museum of Los Angeles County (LACM) paleontological records search, paleontological survey, and review of geological mapping and geological and paleontological literature. The results of the paleontological records search were negative for paleontological resources within the project site; however, the LACM reported six fossil localities near the project site.

Although large portions of the project site have been used for agriculture, and there are a few scattered residential structures, there is a potential to encounter intact subsurface paleontological resources during ground disturbing activities below previously disturbed sediments. As such, a paleontological monitoring program, which includes the preparation and implementation of a Worker Environmental Awareness Training, is necessary to reduce impacts to any potential paleontological resources onsite in those areas underlain by sediments with a high potential to yield significant paleontological resources. This letter report was prepared by Michael Williams, Ph.D. and Sarah Siren, M.Sc., who are qualified Principal Investigators for Paleontology, in accordance with federal and state CEQA guidelines and SVP (2010) standards.

1 Project Location and Description

The project site is located within unincorporated Kern County directly north of the community of Buttonwillow, approximately 2 miles west of the City of Shafter, and approximately 7 miles southwest of the City of Wasco, as shown on Figure 1. The project site straddles Interstate 5 and is east of Buttonwillow Raceway Park, just north of Highway 58, and south of Highway 46. Several single-family homes and agriculture-related structures are near the

project boundary. Several properties within the project boundary contain agriculture structures and single-family homes. One single-family home on Assessor's Parcel Number 087-040-04 would be removed during project construction. Vehicular access to the site would likely be from Wasco Way, Merced Avenue, Lerdo Highway, Rowlee Road, Wildwood Road, Buttonwillow Drive, Seventh Standard Road, Snow Road, Blue Star Memorial Highway, and Sullivan Road. Many dirt roads cross the project site.

According to the U.S. Geological Survey, the project site is within the Wasco SW, Semitropic, Rio Bravo, Buttonwillow, and Lokern U.S. Geological Survey 1:24,000 topographic maps (7.5-minute quadrangle). More specifically, the project is located as follows: Township 27S, Range 23E, portions of Sections 28, 33, and 34; Township 28S, Range 23E, all of Section 3 and portions of Sections 4, 5, 12, 27, 33, 28, 29, 1, 12, 11, 2, and 34; Township 28S, Range 24E, portions of Sections 35, 26, 25, 27, 34, and, 23 and all of Section 34; Township 29S, Range 23E, portions of Sections 1, 3, 11, and 13 and all of Section 12; Township 29S, Range 24E, all of Section 12 and portions of Sections 13, 14, 11, 1, 2, 6, 17, 8, 7, 18, and 19; and Township 29S, Range 25E, portions of Section 7.

The project proponent proposes to develop a PV solar facility and associated infrastructure necessary to generate up to 2 gigawatts of alternating current power with an up to 2 gigawatts energy storage system on privately owned land within Kern County. The project would be supported by a 500-kilovolt, overhead generation tie (gen-tie) and/or underground electrical transmission line(s) originating from one or more on-site substations and terminating at the Pacific Gas & Electric (PG&E) Midway Substation. PG&E will enlarge the Midway Substation's 500-kilovolt yard, within PG&E's Midway Substation property boundary, to accommodate the proposed project's interconnection. The proposed project may also interconnect to the PG&E Ganso Substation via overhead and/or underground gen-tie lines. The project's permanent facilities would include solar panels, solar racking, inverters, service roads, a power collection system, communication cables, overhead and underground transmission lines, electrical switchyards, project substations, energy storage system(s), and operations and maintenance (O&M) facilities.

2 Paleontological Resources

Paleontological resources are the remains or traces of plants and animals that are preserved in earth's crust, and per the Society of Vertebrate Paleontology ([SVP] 2010) guidelines, are older than written history or older than approximately 5,000 years, which approximates the middle Holocene. They are limited, nonrenewable resources of scientific and educational value and are afforded protection under state laws and regulations. This study satisfies requirements in accordance with state guidelines (13 California Public Resources Code [PRC], 21000 et seq.) and PRC Section 5097.5 (Stats 1965, c 1136, p. 2792). This analysis also complies with guidelines and significance criteria specified by SVP (2010). Table 1 provides definitions for high, undetermined, low, and no paleontological resource potential, or sensitivity, as set forth in and by the SVP (2010) Guidelines for Determining Significance: Paleontological Resources.

Table 1. Paleontological Resource Sensitivity Criteria

Resource Sensitivity / Potential	Definition
High	Rock units from which vertebrate or significant invertebrate, plant, or trace fossils have been recovered are considered to have a high potential for containing additional significant paleontological resources. Rocks units classified as having high potential for producing paleontological resources include, but are not limited to, sedimentary formations and some volcaniclastic formations (e. g., ashes or tephras), and some low-grade metamorphic rocks which contain significant paleontological resources anywhere within their geographical extent, and sedimentary rock units temporally or lithologically suitable for the preservation of fossils (e. g., middle Holocene and older, fine-grained fluvial sandstones, argillaceous and carbonate-rich paleosols, cross-bedded point bar sandstones, fine-grained marine sandstones, etc.). Paleontological potential consists of both (a) the potential for yielding abundant or significant vertebrate fossils or for yielding a few significant fossils, large or small, vertebrate, invertebrate, plant, or trace fossils and (b) the importance of recovered evidence for new and significant taxonomic, phylogenetic, paleoecologic, taphonomic, biochronologic, or stratigraphic data. Rock units which contain potentially datable organic remains older than late Holocene, including deposits associated with animal nests or middens, and rock units which may contain new vertebrate deposits, traces, or trackways are also classified as having high potential.
Undetermined Potential	Rock units for which little information is available concerning their paleontological content, geologic age, and depositional environment are considered to have undetermined potential. Further study is necessary to determine if these rock units have high or low potential to contain significant paleontological resources. A field survey by a qualified professional paleontologist (see “definitions” section in this document) to specifically determine the paleontological resource potential of these rock units is required before a paleontological resource impact mitigation program can be developed. In cases where no subsurface data are available, paleontological potential can sometimes be determined by strategically located excavations into subsurface stratigraphy.
Low Potential	Reports in the paleontological literature or field surveys by a qualified professional paleontologist may allow determination that some rock units have low potential for yielding significant fossils. Such rock units will be poorly represented by fossil specimens in institutional collections, or based on general scientific consensus only preserve fossils in rare circumstances and the presence of fossils is the exception not the rule, e. g. basalt flows or Recent colluvium. Rock units with low potential typically will not require impact mitigation measures to protect fossils.
No Potential	Some rock units have no potential to contain significant paleontological resources, for instance high- grade metamorphic rocks (such as gneisses and schists) and plutonic igneous rocks (such as granites and diorites). Rock units with no potential require no protection nor impact mitigation measures relative to paleontological resources.

Source: SVP (2010)

2 Regulatory Framework

2.1 California Environmental Quality Act

The CEQA Guidelines require that all private and public activities not specifically exempted be evaluated against the potential for environmental damage, including effects to paleontological resources. Paleontological resources, which are limited, nonrenewable resources of scientific, cultural, and educational value, are recognized as part of the environment under these state guidelines. This study satisfies project requirements in accordance with CEQA (13 PRC [Public Resources Code], 21000 et seq.).

Paleontological resources are explicitly afforded protection by CEQA, specifically in Section VII(f) of CEQA Guidelines Appendix G, the "Environmental Checklist Form," which addresses the potential for adverse impacts to "unique paleontological resource[s] or site[s] or … unique geological feature[s]." This provision covers fossils of signal importance – remains of species or genera new to science, for example, or fossils exhibiting features not previously recognized for a given animal group – as well as localities that yield fossils significant in their abundance, diversity, preservation, and so forth.

2.2 PRC Section 5097.5

The PRC Section 5097.5 (Stats 1965, c 1136, p. 2792) regulates removal of paleontological resources from state lands, defines unauthorized removal of fossil resources as a misdemeanor, and requires mitigation of disturbed sites.

3 Methods

3.1 Geological Map Review, Literature Review, Survey, and Paleontological Records Search

Published geological maps and published and unpublished reports were reviewed to identify geological units within the project site and determine their paleontological sensitivity.

Dudek conducted a paleontological survey between January 17, 2023 and March 10, 2023. The purpose of the survey was to ascertain if any fossils were present on the surface and confirm geological mapping. The survey was conducted with transects spaced no more than 20 meters (m) apart and oriented along the project alignment. A GPS receiver with sub-meter accuracy and loaded with a shapefile of the project site boundary was used to verify the accuracy of the survey coverage. Evidence for buried paleontological resources was opportunistically sought through inspection of natural or artificial erosion/excavation exposures and the spoils from rodent burrows. Field recording and photo documentation of resources were completed as appropriate.

A paleontological records search request was sent to the LACM on November 17, 2022. The purpose of the records search was to determine whether there are any known fossil localities in or near the project site to aide in determining whether a paleontological mitigation program is warranted to avoid or minimize potential adverse effects of construction on paleontological resources.

4 Results

4.1 Geological Map Review, Literature Review, Survey, and Paleontological Records Search

The project site lies within the southern portion of the Great Valley geomorphic province (California Geological Survey [CGS] 2002). This geomorphic province is characterized by a depositional basin that has received sediments since the Jurassic Period (~ 160 million years ago [mya]; Cohen et al. 2023) and is split into the Sacramento Valley in the north and the San Joaquin Valley in the south where the project is located (CGS 2002). More specifically and according to the published geological mapping at a scale of 1:250,000 by Smith (1964), the project site is underlain by the following geological units: recent alluvial fan deposits (map unit Qf), recent basin deposits (map unit Qb), possible Pleistocene (approximately 11,700 years ago to 2.58 mya) to Pliocene (approximately 2.58 to 5.33 mya; Cohen et al. [2022]) nonmarine deposits (map unit Qp) (Figure 2 – Geologic Map).

While recent alluvial fan and basin deposits are generally too young to yield significant paleontological resources on the surface and at shallow depths, Pleistocene and Pliocene alluvial/nonmarine deposits are known to produce significant fossils in this part of Kern County and potentially underlie the more recent sediments. In his compilation of Holocene and Pleistocene vertebrate fossils from California, Jefferson (1991) reported fossil fish (Osteichthyes), salamander (Urodela), turtle (?*Clemmys* sp.), lizard (lacertilia), snake (Colubridae), bird (Fringillidae), bat (Chiroptera), mole (*Scapanus* sp. cf. *S. latimanus*), rabbit (*Sylvilagus* sp. and *Lepus* sp.), rodent (*Eutamias* sp., *Peromyscus* sp., *Neotoma* sp., *Microtus* sp., *Dipodomys* sp., *Thomomys* sp., and *Ondatra zebethica*), pronghorn (*Capromeryx*), deer (*Odocoileus* sp.), and horse (*Equus occidentalis* and *Equus* sp.) from Bakersfield.

The approximately 13,888-acre Project area in Kern County consists of fallow agricultural fields with high ground surface visibility (approximately 80%–99% in most areas) over much of the project site. Subsurface exposures along drainages and animal burrows were opportunistically inspected for evidence of subsurface paleontological resources and sediments depending on whether the field was recently plowed and what type of produce was being grown (Figure 3 – Survey Photographs). No in situ fossils were observed during the paleontological survey.

The LACM records search results letter was received on November 27, 2022. No records of fossil localities were found within the boundaries of the project site; however, the LACM reported five fossil localities in the vicinity of project site (Confidential Attachment A). The fossil localities are summarized in Table 2 below.

Table 2. LACM Paleontological Records Search Results

Locality Number	Location	Formation or Unit	Taxa	Depth (ft bgs)
LACM VP 7844 and 7845	Polonia Pass, northwest of Antelope Valley	Unnamed Pleistocene unit containing discontinuous light gray, silty sandstone	Deer (Cervidae cf. *Odocoileus*); and microvertebrate assemblage including lizards (Lacertilia), snakes (Serpentes), rodents (Rodentia), and rabbits/hares/pikas (Lagomorpha)	Unknown, found during highway construction
LACM VP CIT117	East of Angiola	Unnamed Pleistocene unit consisting of blue shale	Horse (*Equus*)	425 feet bgs, in well boring
LACM VP 4087	East of Terra Bella	Unnamed Pleistocene unit	Mammoth (*Mammuthus*)	Unknown
LACM VP 6701	Flynn ranch, SE of Ducor, CA	Unnamed Pleistocene unit consisting of green sand	Mammoth (*Mammuthus*)	6 feet bgs

VP, Vertebrate Paleontology; CIT, California Institute of Technology; bgs, below the ground surface

5 Impact Analysis and Management Recommendations

5.1 Thresholds of Significance

The thresholds of significance used to evaluate the impacts of the project related to paleontological resources are based on Appendix G of the California Environmental Quality Act (CEQA) Guidelines. A significant impact under CEQA would occur if the proposed project would:

- Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature.

5.2 Impact Analysis

a) Would the project directly or indirectly destroy a unique paleontological resource or site or unique geologic feature

No paleontological resources were identified within the project site as a result of the paleontological survey, institutional records search, or desktop geological and paleontological review. No unique geological features are present on the surface, and they are not anticipated at depth. The paleontological records search conducted by the LACM revealed five nearby fossil localities. The Pleistocene to Pliocene nonmarine sediments, have high

paleontological sensitivity throughout their geographic and stratigraphic extent; recent alluvial fan and basin deposits have low paleontological sensitivity on the surface, increasing with depth. Based on the records search, survey results, and map and literature review, the project site has high potential to produce paleontological resources during planned construction activities in areas underlain by Pleistocene to Pliocene nonmarine sediments and at an undetermined depth in areas underlain by recent alluvial fan and basin deposits. In the event that intact paleontological resources are discovered on the project site, ground-disturbing activities associated with construction of the project, such as grading and large diameter drilling (two-feet or greater) during site preparation and trenching for utilities, have the potential to destroy a unique paleontological resource or site. Without mitigation, the potential damage to paleontological resources during construction would be a potentially significant impact. With implementation of the following recommended mitigation measure (MM), impacts would be reduced to below a level of significance. Impacts of the project are considered less than significant with mitigation incorporated during construction.

MM GEO-1: The project proponent shall retain a qualified paleontologist, defined as a paleontologist meeting the Society for Vertebrate Paleontology's Professional Standards to carry out all mitigation measures related to paleontological resources.

1. Prior to the start of any ground-disturbing activities, the qualified paleontologist shall prepare a Paleontological Resources Worker Environmental Awareness Training (WEAT) program for all construction personnel working on the project. A Paleontological Resources WEAT Guide approved by the qualified paleontologist shall be provided to all personnel. A copy of the Paleontological Resources WEAT Guide shall be submitted to the Kern County Planning and Natural Resources Department. The training guide may be presented in video form.

2. The Paleontological Resources WEAT may be conducted in conjunction with other awareness training requirements.

3. The training shall include an overview of potential paleontological resources that could be encountered during ground-disturbing activities to facilitate worker recognition, avoidance, and subsequent immediate notification to the qualified paleontologist for further evaluation and action, as appropriate; and penalties for unauthorized artifact collecting or intentional disturbance of paleontological resources.

4. The Paleontological Resources WEAT Guides shall be kept on-site and available for all personnel to review and be familiar with as necessary.

MM GEO-2: A qualified paleontologist or designated monitor shall be on-site initially to spot-check excavations below a depth of 1 foot below the ground surface in areas of the project mapped as being underlain by possible Pleistocene to Pliocene nonmarine deposits and below a depth of 5 feet below the ground surface in areas underlain by recent alluvial fan and basin deposits. If it is determined that sediments are determined to be old enough to produce fossils, then full-time paleontological monitoring shall ensue. If sediments are determined to consist of late Holocene deposits, paleontological monitoring shall be suspended until an excavation depth of 5 feet below the ground surface is reached in the area and monitored at five-foot increments until it is determined that the sediments are old enough to produce fossils.

a. The duration and timing of monitoring shall be determined by the qualified paleontologist in consultation with the Kern County Planning and Natural Resources Department and shall be based on a review of geologic maps and grading plans.

i. During the course of monitoring, if the paleontologist can demonstrate based on observations of subsurface conditions that the level of monitoring should be reduced, the paleontologist, in consultation with the Kern County Planning and Natural Resources Department, may adjust the level of monitoring to circumstances, as warranted.

b. Paleontological monitoring shall include inspection of exposed rock units during active excavations within sensitive geologic sediments. The qualified paleontologist shall have authority to temporarily divert excavation operations away from exposed fossils to collect associated data and recover the fossil specimens if deemed necessary.

c. Following the completion of construction, the paleontologist shall prepare a report documenting the absence or discovery of fossil resources on-site. If fossils are found, the report shall summarize the results of the inspection program, identify those fossils encountered, recovery and curation efforts, and the methods used in these efforts, as well as describe the fossils collected and their significance. A copy of the report shall be provided to the Kern County Planning and Natural Resources Department and to an appropriate repository such as the Natural History Museum of Los Angeles County.

MM GEO-3: If a paleontological resource is discovered, the monitor shall have the authority to temporarily divert the construction equipment within 50 feet of the find until it is assessed for scientific significance and collected. Typically, fossils can be safely salvaged quickly by a single paleontologist and not disrupt construction activity. In some cases, larger fossils (such as complete skeletons or large mammals) require more extensive excavation and longer salvage periods. In this case, the paleontologist should have the authority to temporarily direct, divert, or halt construction activity to ensure that the fossil(s) can be removed in a safe and timely manner.

Once salvaged, significant fossils shall be identified to the lowest possible taxonomic level, prepared to a curation-ready condition and curated in a scientific institution with a permanent paleontological collection (such as the Natural History Museum of Los Angeles County) along with all pertinent field notes, photos, data, and maps. The cost of curation is assessed by the repository and is the responsibility of the project owner.

At the conclusion of laboratory work and museum curation, a final report shall be prepared describing the results of the paleontological mitigation monitoring efforts associated with the project. The report shall include a summary of the field and laboratory methods, an overview of the project geology and paleontology, a list of taxa recovered (if any), an analysis of fossils recovered (if any) and their scientific significance, and recommendations. The final report shall be submitted to the Kern County Planning and Natural Resources Department. If the monitoring efforts produced fossils, then a copy of the report shall also be submitted to the designated museum repository.

Should you have any questions relating to this report and its findings please contact Michael Williams (mwilliams@dudek.com) or Sarah Siren (ssiren@dudek.com).

Respectfully Submitted,

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Att.: *Figure 1, Regional Location Map*
Figure 2, Geological Map
Figure 3, Survey Photos
Attachment A, Confidential LACM Paleontological Records Search Results

cc: *Sarah Siren and Ronelle Candia, Dudek*

6 References

California Geological Survey. 2002. California Geomorphic Provinces: Note 36. 4 pp.

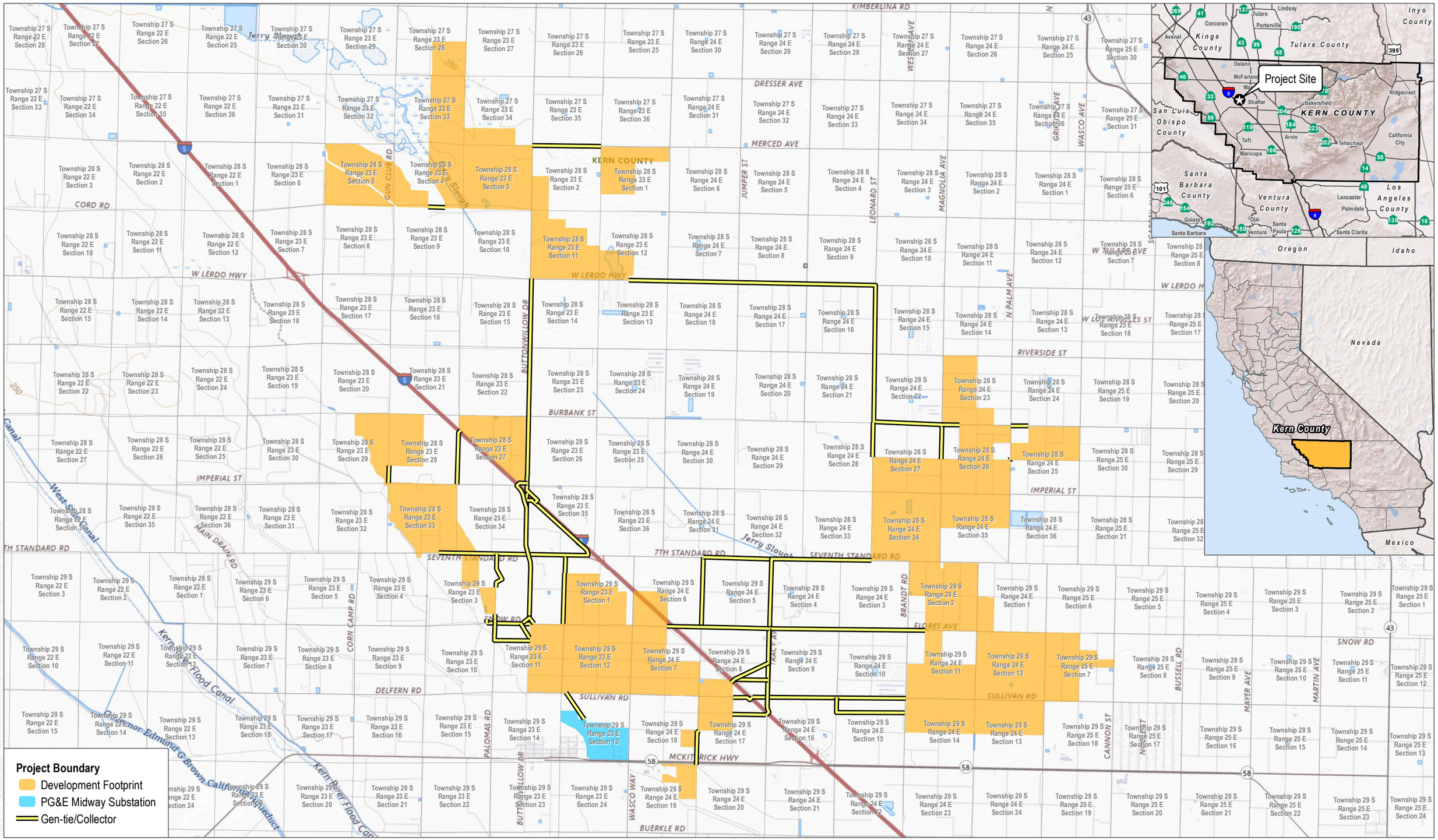
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Figures



SOURCE: USGS National Map 2022; Kern County 2022

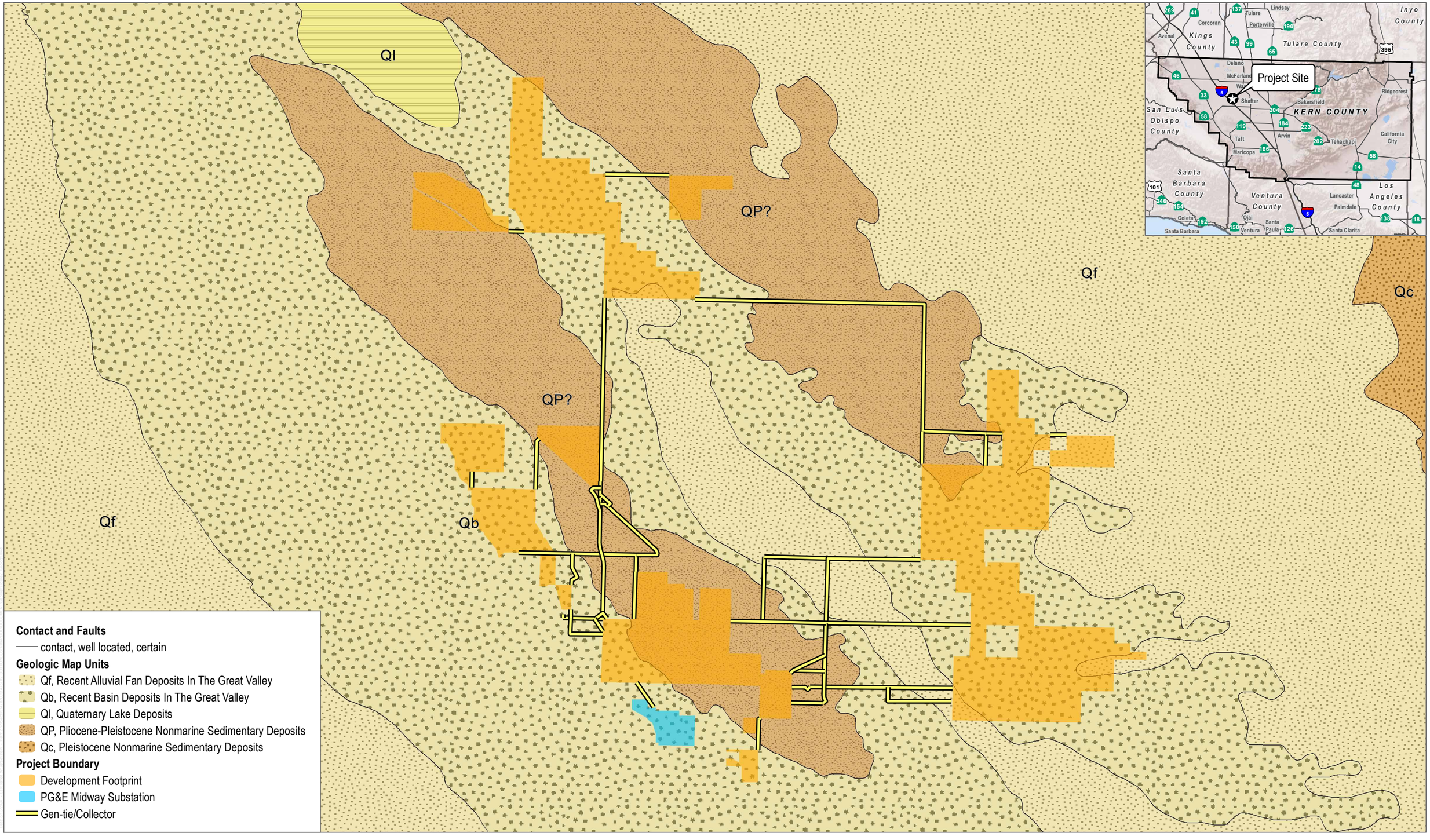
DUDEK

0 1 2 Miles

FIGURE 1

Regional Vicinity

Buttonbush Solar and Storage Project



SOURCE: Geologic map of California, Bakersfield sheet, Smith, A.R., 1964

DUDEK

0 1 2 Miles

FIGURE 2

Geology

Buttonbush Solar Energy Project

Attachment A

LACM Records Search Results (Confidential)