Origis Energy

San Luis West Solar and Storage Project



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San Luis West Solar and Storage Project

BURROWING OWL SURVEY REVISED REPORT

Fresno County, California
July 2025

EXECUTIVE SUMMARY

Burrowing owl (BUOW, *Athene cunicularia*) surveys were conducted at the San Luis West Solar and Storage Project (Project) site. The Project site contains original parcels that were surveyed for biological resources in spring 2023. Three additional parcels, known as the Califland Corp parcels, that were originally part of a separate project were added to the Project site in November 2023; a due diligence survey of these parcels had already been performed in July 2023, and additional surveys of these areas were performed in the spring of 2024 as part of this Project. A gen-tie line was added to the Project site in January 2024. A general biological survey and BUOW habitat assessment was performed in the gen-tie line route in January 2024. A reduced footprint alternative was selected to be the Project site after January 2024; therefore, some areas have been removed from the original Project site and an additional area within the Woolf Parcel South parcel that was not previously part of the Project site was added to the Project. A general biological survey was performed in this additional area in July 2025.

A protocol burrowing owl habitat assessment, burrow survey, breeding season surveys, and winter season survey were performed in the original parcels within the Project site and a 150-meter buffer, also known as the Biological Study Area (BSA), in 2023. A due diligence survey mapping burrowing owl burrows and winter season survey were performed in 2023 within the additional Califland Corp parcels. A burrow survey and breeding season surveys were performed in the Califland Corp parcels and a 150-meter buffer in 2024. A burrowing owl habitat assessment and burrow survey was conducted within the Woolf Parcel South Addition in 2025. These surveys were performed to assess the potential presence of BUOW, a California Department of Fish and Wildlife candidate species under the California Endangered Species Act and Species of Special Concern (SSC). During field surveys, a total of four small mammal burrows that would be considered suitable for BUOW use and 39 suitable burrow surrogates in the form of culverts and pipes were mapped within the entire Project site, gen-tie, and 150-meter buffer. Potential BUOW sign (whitewash) was observed at two burrow surrogates, but the sign could not be specifically attributed to BUOW. No BUOW individuals were observed. This report includes avoidance and minimization measures recommended to reduce potential Project impacts to BUOW.

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ACRONYMS/ABBREVIATIONS

APN	Assessor's Parcel Number
B	burrow
BSA	biological study area
BUOW	burrowing owl
C	culvert
California Aqueduct	Governor Edmund G. Brown California Aqueduct
CDFW	California Department of Fish and Wildlife
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
cm	centimeters
CNDDB	California Natural Diversity Database
CNPS	California Native Plant Society
LLC	Limited Liability Company
MCV	Manual of California Vegetation
MW	megawatt
NRCS	National Resources Conservation Service
P	pipe
PG&E	Pacific Gas & Electric
Project	San Luis West Solar and Storage Project
Project proponent	Origis Development, LLC
SSC	Species of Special Concern
USDA	United States Department of Agriculture
USGS	United States Geological Survey

1 INTRODUCTION

Tetra Tech has prepared this Burrowing Owl Survey Revised Report for the proposed San Luis West Solar and Storage Project (Project). Origis Development, LLC (Project proponent) proposes to develop approximately 1,265 acres of land (Project site) located in unincorporated Fresno County, California, as a solar energy and storage facility. This report has been prepared to document burrowing owl (BUOW, *Athene cunicularia*) survey methods, results, impact assessment, and recommendations, in accordance with the guidelines in the *Burrowing Owl Survey Protocol and Mitigation Guidelines* (The California Burrowing Owl Consortium 1993) and the *Staff Report on Burrowing Owl Mitigation* (California Department of Fish and Game 2012).

BUOW use a variety of habitat types characterized by low-growing vegetation and the presence of burrows or burrow-like structures (i.e., burrow surrogates). BUOW may utilize a site for breeding, foraging, overwintering, or transient/migration stops; therefore, a site that is utilized by BUOW may only be occupied for a short duration. Agricultural land can be considered suitable habitat for BUOW, dependent upon the presence of burrowing mammals or suitable burrow surrogates (California Department of Fish and Game 2012; The California Burrowing Owl Consortium 1993). BUOW are a California Department of Fish and Wildlife (CDFW) Species of Special Concern (SSC).

The BUOW is also a California Endangered Species Act (CESA) candidate species, meaning that take of the species is prohibited unless authorized pursuant to an incidental take permit issued by the CDFW. It is possible that BUOW may be listed as threatened or endangered under CESA during the Project's lifespan.

The methods and results of the general biological survey, including vegetation community mapping, plant and wildlife surveys, and raptor surveys, and the jurisdictional wetlands and waters delineation are provided in separate reports. This report describes the methods and results of the BUOW surveys.

1.1 Project Site Location

The Project site, which encompasses all parcels within the Project, is located on approximately 1,265 acres of privately-owned agricultural land within the Great Valley, also called the Central Valley. The Project Footprint, the area where ground disturbance is anticipated to occur, is located on approximately 770 acres of land within the Project site. The proposed Project is in rural unincorporated southwestern Fresno County, California, immediately adjacent to the Governor Edmund G. Brown California Aqueduct (California Aqueduct) (Figures 1 and 2). The Project site is about 3 miles southeast of the City of Huron, 8 miles northeast of Interstate 5, 10 miles northwest of Kettleman City, and about 38 miles south-southwest of the City of Fresno. The Project site is in the United States Geological Survey (USGS) Huron 7.5-Minute Topographic Quadrangle Map (Figure 3). The Project site is within the following Townships (T), Ranges I, and Sections (S), Mount Diablo Principal Meridian:

- Township 21S, Range 17E, Sections 02 and 03,
- Township 21S, Range 18E, Section 06,
- Township 20S, Range 18E, Section 31, and
- Township 20S, Range 17E, Section 35.

The Project site is comprised of multiple parcels grouped into six Project areas. Three additional parcels that were previously included in a separate project were added to the Project site in November 2023 and the gen-tie line was added in January 2024. An additional area within Woolf Parcel South that was not

previously part of the Project site was added when the revised footprint alternative was selected as the new Project site. The original and additional parcels include the following:

- Original parcels:
    - Woolf Parcel North (Assessor's Parcel Numbers [APN]: 07507054S)
    - Woolf Parcel South (APN: 08505001S)
    - Sageberry parcel (APN: 07808055)
    - Parcel 5 (APNs: 07806085S)
- Additional parcels:
    - Califland Corp parcels (APNs: 08505047S, 085055048S, 08505084S)
    - Gen-tie line
    - Woolf Parcel South Addition: (APN: 08505001S)

The Project site also contains three Subareas, which are made up of the following parcels:

- Subarea A: Woolf Parcel South (including Woolf Parcel South Addition), Califland Corp Parcels
- Subarea B: Woolf Parcel North
- Subarea C: Sageberry Parcel, Parcel 5

Each parcel shares one boundary with West Jayne Avenue (Figure 2). Woolf Parcel North and Parcel 5 are located on the north side of West Jayne Avenue. Sageberry, Woolf Parcel South, and Califland Corp parcels are located on the south side. The proposed Project site spans across about 4.3 miles from the southwest corner of the Woolf Parcel South and the northern edge of Parcel 5.

Each parcel boundary is bordered by unnamed, dirt roads on each side, except for Woolf Parcel North, Woolf Parcel South, and the Califland Corp parcels. Woolf Parcel North is bound by a paved road, Lassen Avenue, on its west side. Woolf Parcel South is bound by West Jayne Avenue on its north side. The Califland Corp parcels are bound by Lassen Avenue on their east side. Woolf Parcel South is directly across the street from Pacific Gas & Electric's (PG&E) Gates Substation, which is located at the intersection of South Trinity Avenue and West Jayne Avenue.

The proposed gen-tie line is split into three sections. The western section of the gen-tie line runs along Lassen Avenue adjacent to Woolf Parcel North and spans two unnamed dirt roads, connecting Woolf Parcel North and Woolf Parcel South. The southeastern section of the gen-tie line runs along the southern half of West Jayne Avenue, connecting Woolf Parcel North to Sageberry parcel. The northeastern section of the gen-tie is located along an unnamed dirt road in between Woolf Parcel North and the southern portion of Parcel 5 (Figure 1). These areas are the potential routes that the gen-tie line route may follow; the final route will likely be shorter than what is depicted in Figure 1.

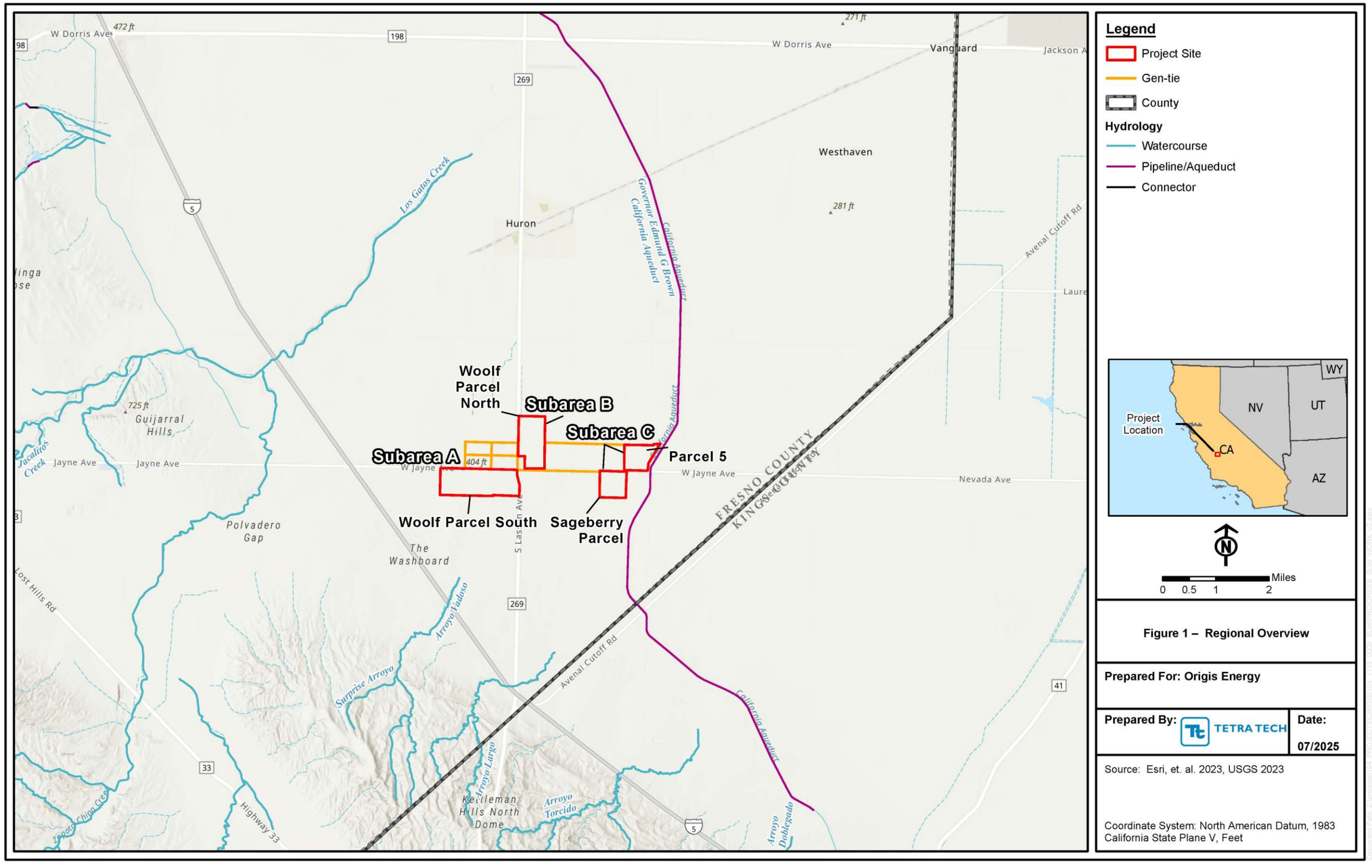


Figure 1 – Regional Overview

Prepared For: Origis Energy

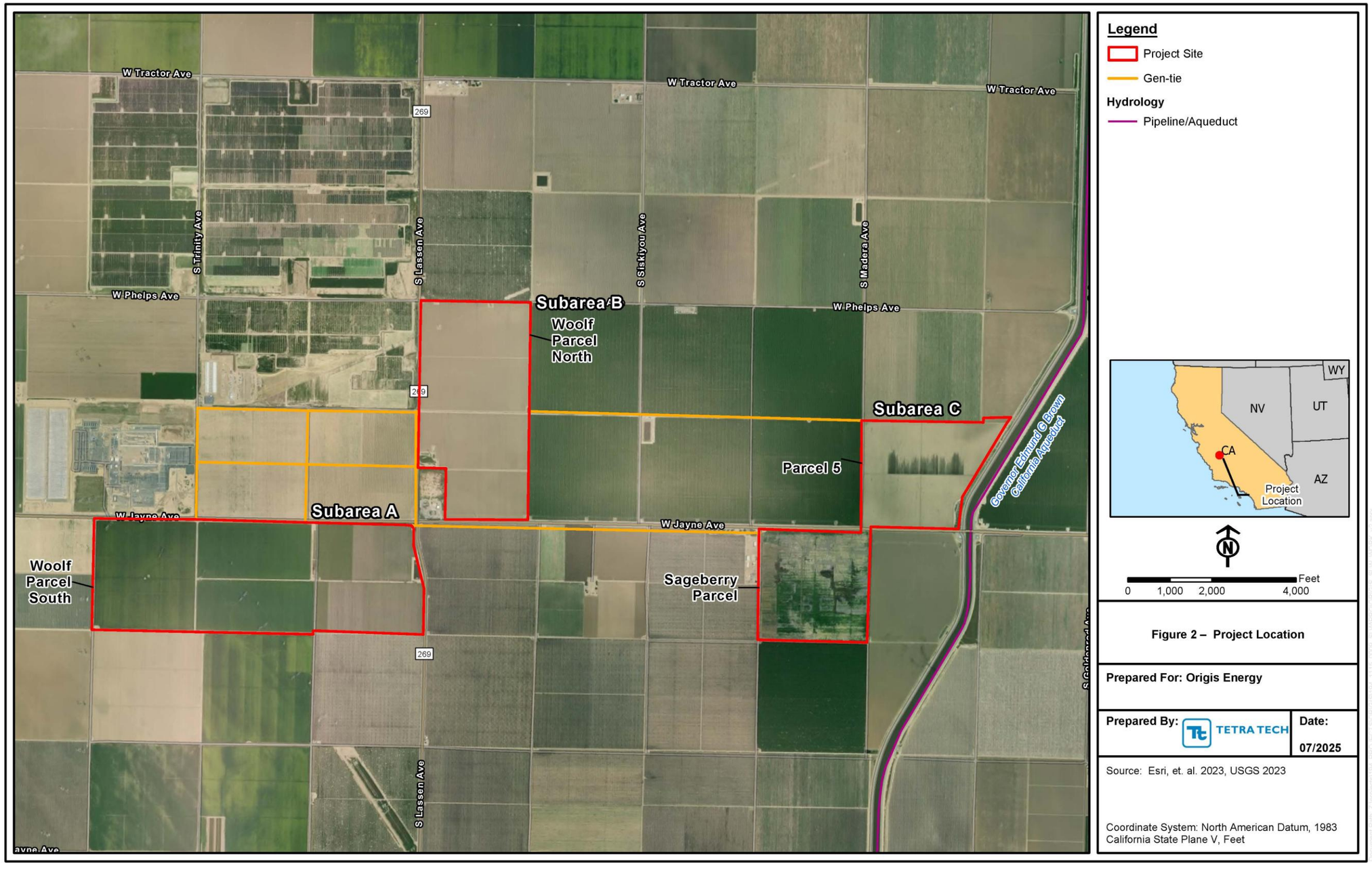
Prepared By: TETRA TECH

Date: 07/2025

Source: Esri, et. al. 2023, USGS 2023

Coordinate System: North American Datum, 1983 California State Plane V, Feet

Not for Construction



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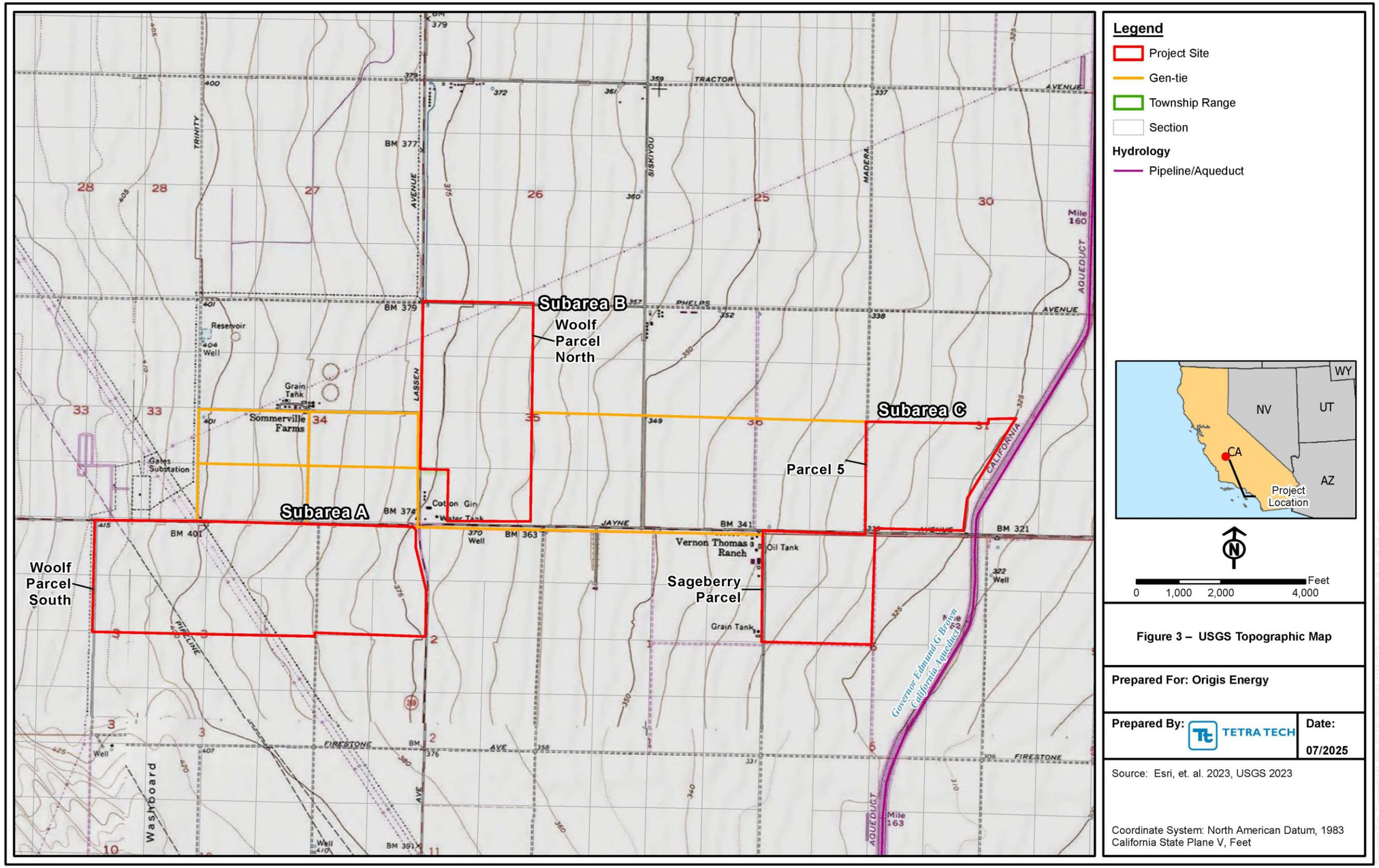


Figure 3 – USGS Topographic Map

Prepared For: Origis Energy

Prepared By: TETRA TECH

Date: 07/2025

Source: Esri, et. al. 2023, USGS 2023

Coordinate System: North American Datum, 1983 California State Plane V, Feet

Not for Construction

1.2 Project Description

The proposed Project consists of constructing and operating a 125-megawatt (MW) alternating current photovoltaic solar electricity generating facility, a 30-MW energy storage system, and associated infrastructure. The photovoltaic portion of the facility will produce electricity for injection into the electrical grid operated by PG&E, while the battery energy storage system will store electricity either generated by the facility or absorbed from the PG&E grid. The energy storage system will make the stored electricity available for discharge during peak periods of electrical load. The Project would include the construction of:

- Photovoltaic solar panels on rotating metal racks.
- Electrical inverters (convert direct current to alternating current).
- Electrical transformers.
- Medium-voltage (34.5 kilovolt) collection system, either overhead or underground.
- A new electric substation.
- 230-kilovolt gen-tie line.
- Operations and maintenance building.
- Perimeter security fencing.
- Access road improvements.
- Lighting.
- Lithium-ion cell batteries for the battery energy storage system.

The Project site plans are provided in Appendix A.

2 METHODS

This section describes the literature search and field methods used for the protocol BUOW habitat assessment, burrow survey, and breeding season surveys, in accordance with the *Burrowing Owl Survey Protocol and Mitigation Guidelines* (The California Burrowing Owl Consortium 1993) and the *Staff Report on Burrowing Owl Mitigation* (California Department of Fish and Game 2012). Surveys at the original parcels were conducted separately from the Califland Corp parcels and the Woolf Parcel South Addition.

2.1 Habitat Assessment and Burrow Survey

A literature review of pertinent background information for the Project site was completed prior to fieldwork. The literature review included querying the CDFW California Natural Diversity Database (CNDDB, CDFW 2025), the USGS 7.5-Minute Topographic Map *Huron* Quadrangle, and aerial and historical imagery (Google Earth©). Topography describes the physical features of an area of land. The topographic features looked at include natural landforms, aquatic features, developed lands, agricultural lands, undeveloped lands, and terrain. Soil types mapped on the Project site in the existing datasets were also reviewed.

2.1.1 Original Parcels

The habitat assessment and burrow survey for all parcels except the Califland Corp parcels as well as the Woolf Parcel South Addition were conducted from March 19-20, 2023, by biologists Daniel Berg and Victoria Prado. During these surveys, biologists ascertained existing site conditions, mapped vegetation communities in accordance with the California Native Plant Society (CNPS) Manual of California Vegetation, Second Edition (MCV; CNPS 2025), and surveyed all potential habitat in the original parcels for potential burrows and burrow surrogates by walking 20-meter (66-foot) interval transects. In addition, a 150-meter (approximately 500-foot) buffer around the original parcels was surveyed for potential burrows and burrow surrogates. Some areas within the 150-meter buffer were surveyed using binoculars due to access limitations. The original parcels and 150-meter buffer are known as the Biological Study Area (BSA). Transects were walked during optimal weather conditions (i.e., no heavy rain or fog) to allow for the greatest visibility possible. In areas of potential habitat, 100 percent visual coverage of the BSA ground surface was achieved. A burrow/burrow surrogate was considered suitable for BUOW if it was equal or greater than 11 centimeters (cm, 4.3 inches) in diameter (height and width) and 150 cm (59 inches) in depth (Johnson et al. 2010). Examples of potential burrow surrogates include man-made structures such as pipes, culverts, debris piles, or other openings that meet the size criteria stated above. All potentially suitable burrows and burrow surrogates were mapped using Esri ArcGIS Field Maps on a tablet paired with a sub-meter accuracy Arrow 100 Global Positioning System device and documented on a burrow survey datasheet. All BUOW survey datasheets are included in Appendix B. Any signs of use, including the presence of pellets, feathers, tracks, whitewash, burrow decoration materials, eggshell fragments, etc. were also documented.

2.1.2 Califland Corp Parcels and Gen-tie

A due diligence survey was conducted at the Califland Corp parcels and a 150-meter buffer on July 12, 2023 by Victoria Prado. The biologist surveyed for plants and wildlife and for the presence of special-status wildlife species and their habitats. Any signs of burrowing owl, including burrows, burrow surrogates, pellets, and whitewash, were also recorded.

A habitat assessment was completed within the gen-tie on January 10, 2024, consisting of a windshield survey along the gen-tie route. The purpose of the general biological survey and BUOW habitat assessment

was to identify potential biological resources that may be impacted by installation of the gen-tie line. The exact route of the gen-tie line is currently in development and is likely going to be shorter than what is shown in Figure 1.

A burrow survey was conducted at the Califland Corp parcels and a 150-meter buffer on April 1, 2024. For the burrow survey in the Califland Corp parcels, meandering transects were walked within suitable BUOW habitat and a windshield survey was conducted on all roads located along the edges of unsuitable BUOW habitat. New potential burrows and burrow surrogates in these parcels were mapped and investigated for signs of owl use.

2.1.2 Woolf Parcel South Addition

A general biological survey, BUOW habitat assessment, and BUOW burrow survey were conducted at the Woolf Parcel South Addition and a 150-meter buffer on July 10, 2025 by Lauren Jennings and Ari Naiman. The biologists surveyed for plants and wildlife and for the presence of special-status wildlife species and their habitats. Meandering transects were walked within suitable BUOW habitat. New potential burrows and burrow surrogates in these parcels were mapped and investigated for signs of owl use. Any signs of burrowing owl, including pellets and whitewash, were recorded.

2.2 Protocol Breeding Season Surveys

2.2.1 Original Parcels

Four protocol-level BUOW breeding season surveys were conducted from March 19 through 20, April 19, May 15, and July 11, 2023, in accordance with survey protocol recommendations and dates stated in the *Burrowing Owl Survey Protocol and Mitigation Guidelines* (The California Burrowing Owl Consortium 1993) and the *Staff Report on Burrowing Owl Mitigation* (CDFW 2012). One survey was completed between February 15 and April 15, 2023, and three surveys were completed between April 15 and July 15, 2023, with at least one visit after June 15. During these surveys, all potential burrows and burrow surrogates mapped during the burrow survey/habitat assessment within the BSA were visited during the timeframe of two hours before sunset until evening civil twilight or from morning civil twilight to 10:00 AM. Additionally, any new suitable burrows or burrow surrogates incidentally observed were mapped and visited during the appropriate survey window. Burrows and burrow surrogates were observed using binoculars as to maintain a minimum distance of 50 meters (164 feet) to minimize disturbance, should occupied burrows or BUOW individuals be present. Surveys were not conducted during heavy rain, high winds greater than 20 miles per hour, or dense fog. Any possible BUOW predators present and any evidence of predation of owls were noted.

2.2.2 Califland Corp Parcels

Four protocol-level BUOW breeding season surveys were conducted on April 1, April 24, May 30, and June 26, 2024 within the Califland Corp parcels, in accordance with survey protocol recommendations and dates stated in the *Burrowing Owl Survey Protocol and Mitigation Guidelines* (The California Burrowing Owl Consortium 1993) and the *Staff Report on Burrowing Owl Mitigation* (CDFW 2012), as described in Section 2.2.1.

2.3 Protocol Winter Season Survey

A protocol winter season BUOW survey was conducted within the original parcels, Califland Corp parcels, and 150-meter buffer on January 10, 2024, in accordance with survey protocol recommendations stated in the *Burrowing Owl Survey Protocol and Mitigation Guidelines* (The California Burrowing Owl Consortium 1993) and the *Staff Report on Burrowing Owl Mitigation* (CDFW 2012). Potential burrows and

burrow surrogates mapped during the burrow survey/habitat assessment in the original parcels, Califland Corp parcels, and 150-meter buffer were visited during the timeframe of morning civil twilight to 10:00 AM. Additionally, any new suitable burrows or burrow surrogates incidentally observed were mapped and visited. Burrows and burrow surrogates were observed using binoculars as to maintain a minimum distance of 50 meters (164 feet) to minimize disturbance, should occupied burrows or BUOW individuals be present. Surveys were not conducted during heavy rain, high winds greater than 20 miles per hour, or dense fog. Any possible BUOW predators present and any evidence of predation of owls were noted. Non-breeding season (1 September to 31 January) surveys may provide information on burrowing owl occupancy, but do not substitute for breeding season surveys because results are typically inconclusive.

3 RESULTS

This section describes the results of the protocol BUOW habitat assessments, burrow surveys, breeding season surveys, and winter season survey.

3.1 Habitat Assessment and Burrow Survey

The Project site is in the known distributional range of the BUOW. According to the CNDDB, the nearest recorded observation of BUOW is approximately 1 mile south of the Project site in 2004 (CDFW 2025). There are no records of BUOW on the Project site; however, there are six occurrences of BUOW between 2001 and 2005 documented within 5 miles of the Project site. Additionally, BUOW pellets were found by Tetra Tech biologists in adjacent parcels during previous surveys for nearby projects (Tetra Tech 2022). Due to these findings, it was determined that the Project site contains suitable habitat to potentially support BUOWs due to its current agricultural use and low-growing vegetation. However, areas that are actively being disced and disturbed by agricultural practices are not considered suitable habitat for BUOW. The site has historically been used for agriculture and has been used for this purpose since at least 1950, based on available historical imagery (California State University, Fresno 2014).

According to the United States Department of Agriculture (USDA) National Resources Conservation Service (NRCS) Web Soil Survey (USDA NRCS 2025), the Project site includes three types of soil: Westhaven loam (approximately 70 percent of the site), Kimberlina sandy loam (approximately 14 percent of the site), and Excelsior sandy loam (approximately 16 percent of the site). The elevational range of the Project site is approximately 315 to 405 feet above mean sea level.

Vegetation communities within the Project site and 150-meter buffer surrounding the Project site (BSA) were mapped in accordance with the CNPS MCV (CNPS 2025). Given the disturbed nature of the Project site and dominance of non-native plant species, a best attempt to categorize vegetation communities according to the CNPS MCV was made. However, in the case that membership rules/community definitions were not met, vegetation communities were named according to a best fit for the dominant species observed, aligned to the CNPS MCV structure. Table 1 lists the vegetation communities found and their acreage within either the Project site or 150-meter buffer. Results of the vegetation mapping are shown in Figure 4.

Table 1. Vegetation Communities

Vegetation Communities	Acres within Project Site	Acres within 150-meter buffer
Disturbed	883.4	205.3
Tamarix spp. Shrubland Semi-Natural Alliance	0.1	0.7
Retention Basin	3.6	0.7
Developed	104.8	78.5
Cultivated Row Crop	0.0	58.0
Cultivated Tree Orchard	124.1	551.2
Cultivated Vineyard	148.7	3.2
Oleander Hedgerow	0.0	0.4
Total	**1,264.7**	**898.0**

All Project parcels are used for active agricultural production. Throughout the season, the fallow fields in the original parcels were mowed of weeds, topsoil was disced, crops were planted, and then the crops were harvested. Areas used for agricultural production are labeled in Figure 4 and Table 2 as disturbed. Only one small natural vegetation community, *Tamarix* spp. Shrubland Semi-Natural Alliance, was found within

the BSA. Retention basins and drainage ditches were also found bordering most agricultural fields. Transmission towers and poles were present within the Project site.

A majority of the 150-meter buffer was comprised of agricultural fields with disced topsoil, cultivated trees, and cultivated row crops. Retention basins and drainage ditches also occurred. A portion of the 150-meter buffer included developed areas of commercial and residential use. Transmission towers, transmission poles, and ornamental trees over 10 feet were also present in the 150-meter buffer.

The text below describes the vegetation communities observed in more detail.

Disturbed. Areas of recent or consistent topsoil disturbance were mapped as disturbed. The following text summarizes the disturbed areas within the BSA.

Woolf Parcel North: In March 2023, the disturbed area was a bare and disced field. In July 2023, this area had been planted with rows of cultivated tomatoes (*Solanum lycopersicum*) lined with ditches. Each ditch had irrigation pipes installed. The tomato fields surround a graded dirt pad with a radio tower.

Woolf Parcel South: In March 2023, this area had over 100-percent cover of non-native species, with California mustard (*Callanthus lasiophilus*) and charlock (*Sinapis arvensis*) present as dominants. In July 2023, cultivated wheat (*Triticum* sp.) was being harvested from the same area. The wheat fields are surrounded by agricultural ditches with irrigation pipes and connected by culverts. These ditches routinely sprout weeds after harvest and have been treated with glyphosate.

Sageberry Parcel: In March 2023, this area was a bare, disced field with sparse coverage of cheeseweed (*Malva parviflora*). During the May 2023 survey, this parcel had been planted with row crops that were being irrigated.

Parcel 5: In March 2023, this parcel was overgrown with non-native species such as London rocket (*Sysimbrium irio*) and common groundsel (*Senecio vulgaris*) while others in the surrounding area were completely bare. In July 2023, the field had disced topsoil and was left devoid of vegetation.

Califland Corp Parcels: Disturbed areas included a 4 to 5-foot-tall berm and a graded pad with stored equipment and groundwater pumps surrounding a retention basin. The walls of the berm were compact; two burrows were found in the berm.

Woolf Parcel South Addition: In July 2025, this disturbed area consisted of a bare and disced field.

Gen-Tie: One area was mapped as disturbed along the proposed gen-tie line. This area was located directly next to a dirt road and consisted of a fenced solar field.

150-meter buffer: Within the 150-meter buffer, disturbed areas consisted of recently plowed fields, dirt access roads, graded pads, and ruderal roadside areas. Plowed fields were primarily bare, with some presence of early-colonizing non-natives such as London rocket and common groundsel. Wall barley (*Hordeum murinum*) and other annual non-native species were also growing along road margins and on graded pads. Along Jayne Avenue (north of Califland Corp parcels and Woolf Parcel South Addition) there are bare areas and non-native weeds sprouting, and along Lassen Avenue (east of Califland Corp parcels) there is compacted topsoil with no vegetation cover.

***Tamarix* spp. Shrubland Semi-Natural Alliance.** This alliance was observed within the southwest corner of Woolf Parcel North and the gen-tie line and consisted of an approximately 600-foot-long stand of athel tamarisk (*Tamarisk aphylla*) with sparse eucalyptus (*Eucalyptus* sp.). The ground beneath the athel tamarisk canopy was covered by non-native, annual grasses and debris. In July 2025, no tamarisk trees were observed within this area.

Retention Basin. Two retention basins were located within the Woolf Parcel North: one in the southeast corner and one centered along the eastern boundary. Each basin was mostly unvegetated and held at least 1 inch of water during the surveys.

There were two retention basins in the northeast corner of the Woolf Parcel South. These two retention basins were connected by a pipe and cover a combined total length of about 0.2 miles. There was a single 10-foot tree of heaven (*Ailanthus altissima*) in the southern basin. Both basins had low vegetation cover (approximately 10 percent) and standing water. Plant species observed in the basins included cheeseweed, wall barley, London rocket, and shepard's purse (*Capsella bursa-pastoris*). The sloped walls of the northern retention basin had active and collapsed small-mammal burrows.

In addition, Woolf Parcel North and South each had one retention basin within the 150-meter buffer. Each basin was approximately 0.1 acres in size and had varying levels of standing water and vegetation cover. Ruderal vegetation such as Russian thistle (S*alsola tragus*) and cheeseweed was present in the basins.

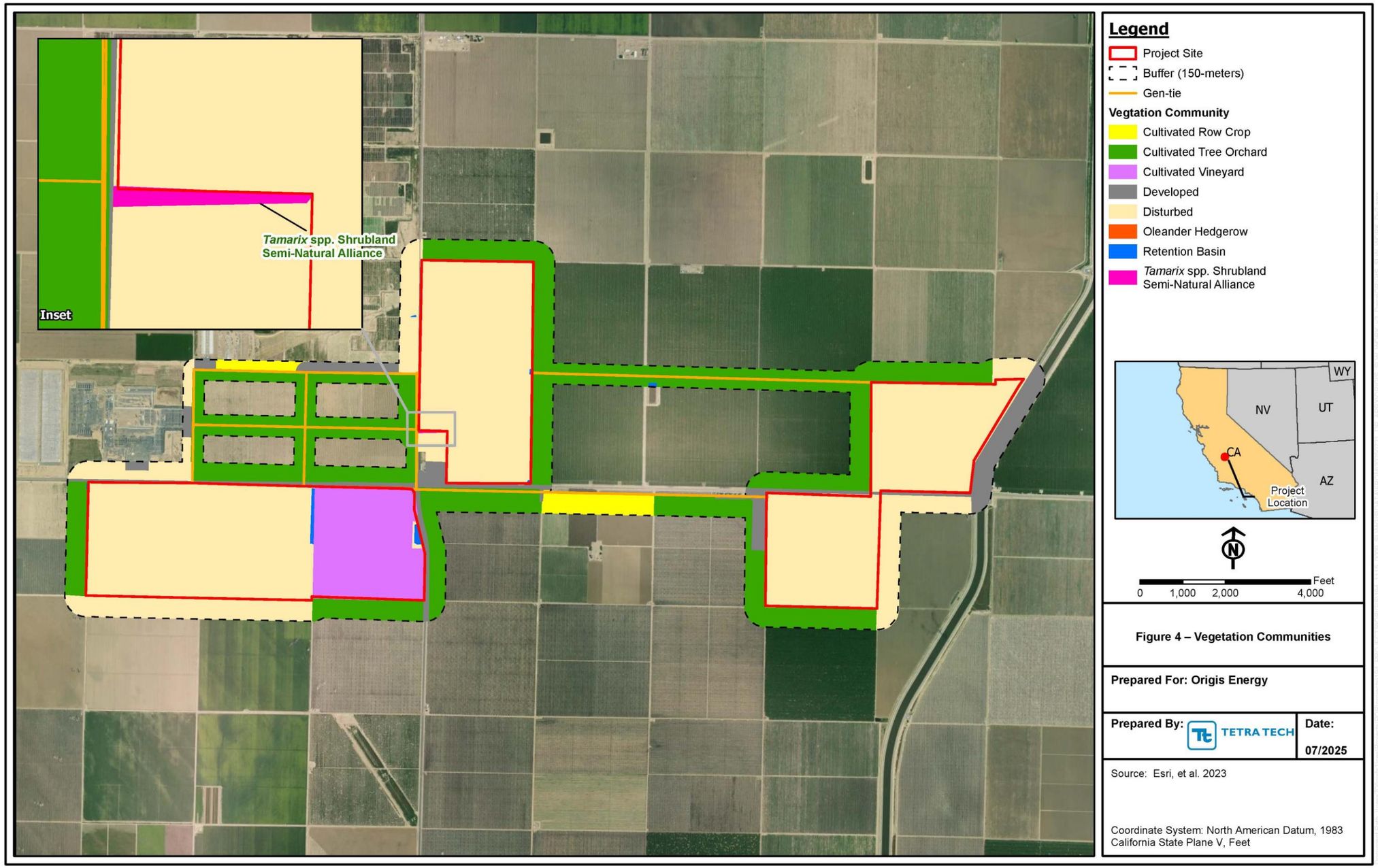
One retention basin was observed in the Califland Corp parcels, centered on the eastern boundary (on the west side of Lassen Avenue). The retention basin was surrounded by a 4- to 5-foot-tall berm and a graded pad with stored equipment and groundwater pumps; these areas were mapped as disturbed. At the northern and southern ends of the retention basin were sparse clusters of bulrush (*Typha latifolia*) and sorghum grass (*Sorghum* sp.). A pump was adding water to the retention basin during the survey in July 2023. In January 2024, the pump had been turned off and the retention basin had no standing water.

Developed. Developed areas consisted of buildings, hardened dirt or paved roads, and other infrastructure. Bordering the southwest corner of Woolf Parcel North was fenced-off private property. This area was covered by concrete and gravel pads. No burrows or burrow surrogates were observed in this area. Within the 150-meter buffer of Woolf Parcel South and the Woolf Parcel South Addition are Jayne Avenue and the PG&E Gates substation that were also mapped as developed. Outside of the western border of the Sageberry Parcel along the gen-tie line was a residential area and vehicle staging area with 10- to 15-foot-tall ornamental trees. In the northeastern corner of the 150-meter buffer of the Califland Corp parcels was private property that was fenced off. This area was covered by concrete and gravel pads and did not provide plant or wildlife habitat.

Cultivated Row Crops. Cultivated row crops occurred to the southeast of Woolf Parcel North. Underneath the row crops were several species of non-native weeds covering the ground, including prickly lettuce (*Lactuca serriola*) and wall barley. In the Califland Corp parcels, this community was comprised of fields of cultivated wheat that were being harvested into hay bales at the time of survey in July 2023. These fields in the Califland Corp parcels had agricultural ditches connected by culverts and pipes. One section of the gen-tie line between the Woolf Parcel North and Sageberry parcel consisted of allium row crops. These fields were treated with glyphosate to control weeds.

Cultivated Tree Orchards. Cultivated tree orchards occurred around each Project parcel and along each section of the gen-tie. This community consisted of rows of tangerine (*Citrus deliciosa*), carob (*Ceratonia siliqua*), almond (*Prunus dulcis*), and pistachio (*Pistacia vera*) trees under current agricultural production. These orchards used drip or sprinkler irrigation and were not surrounded by irrigation pipes or agricultural ditches.

Cultivated Vineyard. Cultivated vineyards bordered Woolf Parcel South to the east and were under current agricultural production. Cultivated vineyards also covered the majority of the Califland Corp parcels and consisted of wine grape row crops. The vineyards in the Woolf Parcel South and the Califland Corp parcels used drip-line irrigation and did not have irrigation ditches.



Not for Construction

Oleander Hedgerow. In the Califland Corp parcels, oleander hedgerows bordered the northern and western portions of the site. This area provided suitable habitat for shrub-nesting bird species.

A total of four small mammal burrows (B) that would be considered suitable for BUOW use were mapped within the Project site and 150-meter buffer. These small mammal burrows were observed within the Project site. A total of 39 suitable potential burrow surrogates in the form of culverts and pipes were mapped within the Project site, gen-tie, and 150-meter buffer. Suitable potential burrow surrogates included 12 culverts (C) and 27 pipes (P). Out of these burrow surrogates, 14 were located within the 150-meter buffer, including five culverts and nine pipes. Two of these burrow surrogates were within the 150-meter buffer of the gen-tie, while 12 were in the 150-meter buffer of the Project site. Potential BUOW sign (whitewash) was observed at P14 and P19 (Table 2, Figure 5). However, whitewash could be from any bird species utilizing the site. No BUOW-specific sign was observed during the surveys. No ground squirrels were observed during the habitat assessments and burrow surveys.

BUOW or their sign were not detected within the Woolf Parcel South Addition during the July 2025 habitat assessment and burrow survey. In total, two burrow surrogates were mapped within the 150-meter buffer. No new burrows or burrow surrogates were observed within the Project site. Due to the lack of BUOW sign at these burrow surrogates, the proximity to extensively surveyed areas of the Project site, and the proximity to disturbed areas like West Jayne Avenue and the PG&E Gates Substation, protocol BUOW surveys are not planned within this area. The measures developed for the Project to avoid impacts to burrowing owl will apply to this area as well.

Details on these potential burrows and burrow surrogates are included in Table 2 and locations are shown in Figure 5; most suitable features occurred along the borders of the Project site, or in and adjacent to the disturbed drainage ditches and small retention basins. Photos of all potential burrows and burrow surrogates are in Appendix C.

Table 2. Potential Burrows and Burrow Surrogates

Burrow ID	Dimensions (inches)	Potential BUOW Sign Observed*	Photo Number (Appendix C)	Notes (Date)
B01	5" x 59"	No	1	Three burrows along the inner banks of a retention basin. Most burrows have collapsed due to water erosion (May 15, 2023). There is at least 2 inches of standing water in the basin (July 12, 2023).
B02	5" x 59"	No	2	Burrow located under cement and gravel (March 20, 2023).
B03[2]	5" x 59"	No	3	Two additional burrows meet the size requirement for BUOW inside of a retention basin. There is standing water in the retention basin (July 12, 2023). No standing water was present during the winter season BUOW survey (January 10, 2024). Most burrows in the basin are less than 3-inches and are collapsed (January 10, 2024). Water was present in the retention basin but one burrow was visible (April 1, 2024; April 24, 2024; May 30, 2024). Burrow appears to have collapsed (June 26, 2024).
B04[2]	5" x 59"	No	4	One burrow that meets the size requirement for BUOW inside a retention basin (July 12, 2023). A very small

Burrow ID	Dimensions (inches)	Potential BUOW Sign Observed*	Photo Number (Appendix C)	Notes (Date)
				amount of standing water was present during the winter season BUOW survey (January 10, 2024). Water was present in the retention basin but burrow was visible (April 1, 2024; April 24, 2024; May 30, 2024; June 26, 2024).
C01	10" x 59"	No	5	Culvert was submerged in water (March 20, 2023). Culvert was exposed from water (May 15, 2023). Some standing water and mud filled the bottom of the basin (July 12, 2023).
C02[1]	20” x 59”	No	6	None.
C03[1]	20” x 59”	No	7	None.
C04	22” x 59”	No	8	Water was flowing through the ditch (July 12, 2023). No water was flowing during the winter season BUOW survey (January 10, 2024).
C05[1]	22" x 59"	No	9	Partially buried with sand (March 20, 2024).
C06[1]	22" x 59"	No	10	Buried about halfway through with sand (March 19, 2023). Completely filled in with dirt (April 1, 2024).
C07	22" x 59"	No	11	Standing water present (April 17, 2023). Water was running through this culvert. There is at least 6 inches of standing water in the basin (July 12, 2023 and January 10, 2024).
C08	22" x 59"	No	12	Pipes lead into a retention basin. Standing water observed (April 17, 2023). Pipe was half-filled with eroded dirt (May 15, 2023). Water was running through the culvert (July 12, 2023). Small pool of water in the culvert opening (January 10, 2024).
C09	22" x 59"	No	13	Partially buried with eroded soil (March 20, 2023). Standing water observed (April 17, 2023). Ditch and culvert were filled with flowing water (July 12, 2023). No water observed within culvert (January 10, 2024).
C10	22" x 59"	No	14	Partially buried with eroded soil (March 20, 2023). Standing water observed (April 17, 2023). Irrigated water was running through pipe (July 12, 2023). No water running through culvert (January 10, 2024).
C11[1,2]	22" x 59"	No	15	Culvert runs through a ditch filled with standing water. Over half of the culvert is buried (July 12, 2023).
C12[2]	22" x 59"	No	16	Culvert runs through a ditch filled with standing water. Over half of the culvert is buried (July 12, 2023). Culvert blocked by debris (April 1, 2024). Water flowing through culvert (April 24, 2024). Culvert is completely buried, water may be flowing through underground (May 30, 2024). Water flowing through culvert (June 26, 2024).

Burrow ID	Dimensions (inches)	Potential BUOW Sign Observed*	Photo Number (Appendix C)	Notes (Date)
P01[1]	4.5" x 59"	No	17	Three pipes total. Canid scat at pipe entrance (January 9, 2024).
P02[1]	10" x 59"	No	18	None.
P03[1]	10" x 59"	No	19	Two pipes total.
P04	10" x 59"	No	20	Four pipes total.
P05	16" x 59"	No	21	None.
P06	14" x 59"	No	22	Two pipes total.
P07	10" x 59"	No	23	Four pipes total.
P08	5" to 10" x 59"	No	24	Seven pipes total. Water was flowing out of a pipe (July 12, 2023 and January 10, 2024).
P09[1]	20" x 59" 10" x 59"	No	25	Five pipes total.
P10[1]	10" to 22" x 59"	No	26	Five pipes total.
P11	4" x 59"	No	27	Active irrigation at several pipes (January 10, 2024).
P12	10" x 59"	No	28	Dozens of stored irrigation pipes (March 20, 2023). The stack of pipes was removed (May 15, 2023). Location of pipes moved to several hundred feet away (January 10, 2024).
P13	22" x 59"	No	29	Two pipes lead into a retention basin. Water was flowing out of the pipe and there was at least 2 inches of standing water in the basin (July 12, 2023).
P14	10 to 12" x 59"	Yes	30	Six pipes total. Whitewash was present on and at pipe entrance. No other BUOW-specific sign present (May 15, 2023; July 12, 2023; January 10, 2024).
P15[1]	20" x 59"	No	31	Pipe entrance closed (July 12, 2023). Water dripping from pipe. Dead mouse in front of pipe opening (January 10, 2024).
P16/17	10" x 59"	No	32	Long, abandoned irrigation pipe in a dry ditch (July 12, 2023). Two more pipes observed close to P18/19 (January 10, 2024).
P18[2]	5” x 59”	No	33	Two pipes are sticking out from a berm. The pipes are 3 to 5 feet deep and only open at one end.
P19[2]	10” x >59”	Yes	34	A stack of several pipes with whitewash at both ends of the pipes. Pipes are 8 to 10 feet long (July 12, 2023). No whitewash observed during the winter season BUOW survey (January 10, 2024). More pipes have been added to the stack, now is about 40 pipes total (June 26, 2024).
P20[3]	18” x >59”	No	35	One pipe, open at both ends. Located along the gen-tie line (January 10, 2024).
P21[3]	12” x >59”	No	36	Long pipe, open at one end (January 10, 2024).
P22[3]	12” x >59”	No	37	Pipe runs through dirt road and is open at both ends (January 10, 2024). Pipe is gone and could not be located (April 1, 2024).
P23[1,4]	12” x >59”	No	38	Approximately 25 pipes in a bare agricultural field (January 10, 2024).

Burrow ID	Dimensions (inches)	Potential BUOW Sign Observed*	Photo Number (Appendix C)	Notes (Date)
P24[5]	10” x >59”	No	39	Stack of about 20 pipes, with one pipe fallen into the retention basin (April 1, 2024). Retention basin is filled with water, it is likely that the fallen pipe is submerged (April 24, 2024; May 30, 2024; June 26, 2024).
P25[3]	12” x >59”	No	40	One pipe suitable for BUOW consisting of a downed transmission pole or piece of substation infrastructure, adjacent to the substation (January 10, 2024).
P26[6]	12” x >59”	No	41	One long pipe adjacent to PG&E Gates Substation (July 10, 2025).
P27[6]	12” x >59”	No	42	Two long pipes adjacent to PG&E Gates Substation (July 10, 2025).

[1] Potential burrow/burrow surrogates located within the 150-meter buffer.

[2] Mapped during the due diligence survey of the Califland Corp parcels.

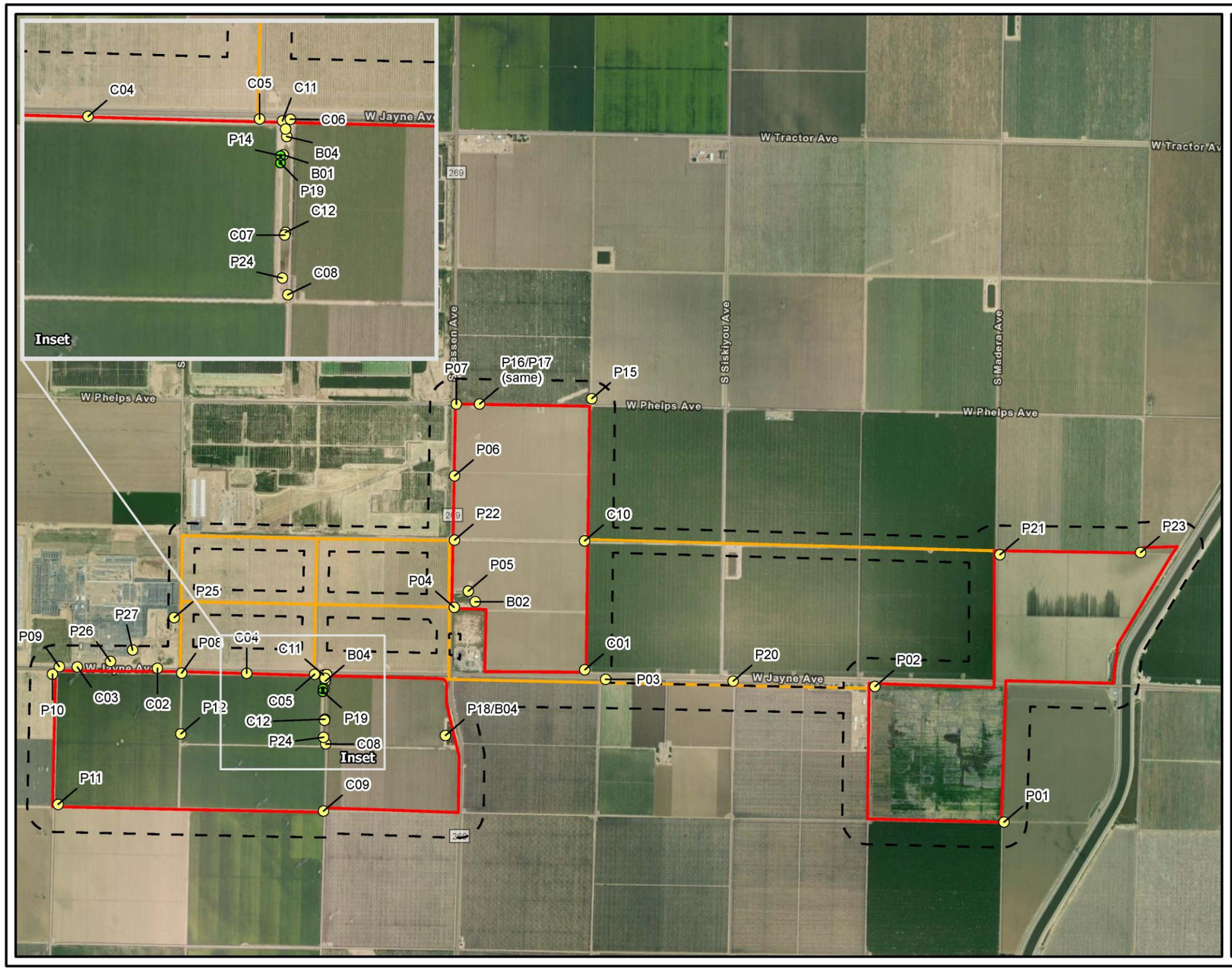
[3] Mapped along the gen-tie route (January 10, 2024). More information on the gen-tie survey is available in the Biological Resources Evaluation Report (Tetra Tech 2024).

[4] Mapped during the protocol winter season BUOW survey.

[5] Mapped during the 2024 burrow survey within the Califland Corp parcels (April 1, 2024).

[6] Mapped during the 2025 BUOW habitat assessment within Woolf Parcel South (July 10, 2025).

* Unless date otherwise noted, sign was first observed during the 2023 habitat assessment/burrow survey in the original parcels and consistently seen throughout 2023 breeding season surveys.



Legend

- Project Site
- Buffer (150-meters)
- Gen-tie

Potential Burrows/Burrow Surrogates

- Potential Sign Observed
- No Sign Observed

*The sign observed at these burrow surrogates was whitewash. Whitewash can be attributed to any bird species utilizing the site.

Note: C = culvert, P = pipe, and B = burrow



Feet
0 1,000 2,000 4,000

Figure 5 – Potential Burrows and Burrow Surrogates

Prepared For: Origis Energy

Prepared By: TETRA TECH

Date: 07/2025

Source: Esri, et al. 2023, USGS 2023

Coordinate System: North American Datum, 1983 California State Plane V, Feet

Not for Construction

Table 3 lists wildlife species observed within the Project site and 150-meter buffer during the general biological survey of the original parcels, due diligence survey in the Califland Corp parcels, general biological survey in the Woolf Parcel South Addition, BUOW surveys, and within a 2-mile buffer around the site during raptor surveys. Observed species that could potentially predate on BUOW include great horned owl (*Bubo virginianus*), red-tailed hawk (*Buteo jamaicensis*), Swainson's hawk (*Buteo swainsoni*), northern harrier (*Circus hudsonius*), coyote (*Canis latrans*), and common raven (*Corvus corax*); however, no evidence of predation of BUOW was observed.

Table 3. Wildlife Species Observed Within BSA

Scientific Name	Common Name	Federal/ State Status	Location Observed
Invertebrates			
Aedes sp.	Mosquito	None	Project site
Apis mellifera	Domestic honeybee	None	Project site
Eleodes sp.	Darkling beetle	None	Project site
Enallagma sp.	American bluet	None	Project site
Libellula sp.	Skimmer	None	Project site
Myrmecocystus sp.	Honeypot ant	None	Project site
Pogonomyrmex sp.	Harvester ant	None	Project site
Sympetrum sp.	Meadowhawk	None	Project site
Amphibian			
Pseudacris sierra	Sierran treefrog	None	Project site
Reptiles			
Sceloporus occidentalis biseriatus	San Joaquin fence lizard	None	Project site
Birds			
Agelaius phoeniceus	Red-winged blackbird	None	Project site
Anas platyrhynchos	Mallard	None	Project site
Aphelocoma californica	California scrub jay	None	Project site
Bombycilla cedrorum	Cedar waxwing	None	Project site
Bubo virginianus	Great-horned owl	None	2-mile buffer
Buteo jamaicensis	Red-tailed hawk	None	Project site
Buteo swainsoni	**Swainson's hawk**	**Threatened**	**Project site (non-nesting)**
Catharus guttatus	Hermit thrush	None	Project site
Charadrius vociferus	Killdeer	None	Project site
Chondestes grammacus	Lark sparrow	None	Project site
Circus hudsonius	**Northern harrier**	**SSC**	**2-mile buffer (non-nesting)**
Corvus corax	Common raven	None	Project site
Eremophila alpestris actia	**California horned lark**	**SSC**	**Project site (foraging)**
Euphagus cyanocephalus	Brewer's blackbird	None	Project site
Falco columbarius	**Merlin**	**SSC**	**Project site (non-nesting)**
Falco sparverius	American kestrel	None	2-mile buffer
Haemorhous mexicanus	House finch	None	Project site
Himantopus mexicanus	Black-necked stilts	None	2-mile buffer
Lanius ludovicianus	**Loggerhead shrike**	**SSC**	**2-mile buffer (non-nesting)**
Mimus polyglottos	Northern mockingbird	None	Project site
Passer domesticus	House sparrow	None	Project site
Petrochelidon pyrrhonota	Cliff swallow	None	2-mile buffer
Quiscalus mexicanus	Great-tailed grackle	None	Project site
Sayornis nigricans	Black phoebe	None	Project site
Sialia mexicana	Western Bluebird	None	Project site
Streptopelia decaocto	Eurasian collared dove	None	Project site
Sturnella neglecta	Western meadowlark	None	Project site
Sturnus vulgaris	European starling	None	Project site
Turdus migratorius	American robin	None	Project site
Tyrannus verticalis	Western kingbird	None	Project site
Tyto alba	Barn owl	None	Project site

Scientific Name	Common Name	Federal/ State Status	Location Observed
Zenaida macroura	Mourning dove	None	Project site
Zonotrichia leucophrys	White-crowned sparrow	None	Project site
Mammals			
Canis latrans *	Coyote *	None	Project site
Didelphis virginiana *	Opossum *	None	Project site

* Only sign of this species was observed.

Species in bold have a federal or State status designation.

3.2 Protocol Breeding Season Surveys

3.2.1 Original Parcels

BUOW were not detected during any of the four protocol breeding season surveys in 2023. Potential BUOW sign (whitewash) was observed at P14 during the burrow survey in the original parcels and 150-meter buffer. This sign remained present and was observed throughout the breeding season surveys. However, whitewash could be from any bird species utilizing the Project site and no sign specific to BUOW was observed. Pellets, fresh or old, were not observed. Burrow B01 was collapsed due to a change in Project site conditions prior to the July 2023 breeding season survey. Some pipes were affected during the survey period by either closing irrigation lines, removing stored pipes, or running irrigation water through the pipes (i.e., C04, C08, C09, C10, P08, P12, P15). Table 4 presents the results of the breeding season surveys. Most suitable features and potential sign occurred along the boundary of each Project parcel or in the 150-meter buffer. No ground squirrels were observed during surveys of the original parcels.

3.2.2 Califland Corp Parcels

BUOW were not detected during any of the four protocol breeding season surveys in 2024. BUOW sign was not observed at any burrow or burrow surrogates. Some pipes were affected during the survey period by either removing stored pipes or running irrigation water through the pipes (i.e., C12 and P22). Table 4 presents the results of the breeding season surveys. Most suitable features and potential sign occurred along the boundary of each Project parcel or in the 150-meter buffer. No ground squirrels were observed during surveys of the Califland Corp Parcels and gen-tie route.

3.3 Protocol Winter Season Survey

BUOW or their sign were not observed in any parcels during the protocol winter season survey. Whitewash was not observed at P14, or P19 during this survey. Several pipes that were previously affected by running irrigation water were no longer affected (C04, C09, C10). Two pipes were still affected by running irrigation water (C08 and P08). One stack of pipes that had been documented as removed during the 2023 protocol breeding season surveys had been relocated to several hundred feet away from its previous location (P12). The entrance to P15 was still closed. Four new locations of pipes were mapped, three of which were mapped along the gen-tie route (P20, P21, P22). One new stack of pipes was mapped during the protocol winter BUOW survey (P23). No sign of BUOW was observed at any newly mapped burrow surrogates. Table 5 displays the results of the winter season survey.

Table 4. BUOW Breeding Season Survey Results

Survey	Date	Parcels	Start Time (am/pm)	End Time (am/pm)	Temperature (°F)	Wind Speed (mph)	Cloud Cover (%)	Potential BUOW Sign Observed	BUOW Observed	Biologists
1	March 19, 2023	Original	7:06 pm	8:11pm	57-59	0-8	0-10	No	No	Daniel Berg, Victoria Prado
2	March 20, 2023	Original	5:11 pm	6:05 pm	63-65	0-2	50	Whitewash (C01)	No	Daniel Berg, Victoria Prado
3	April 17, 2023	Original	5: 36 pm	7:52 pm	63-70	0-11	5-95	No	No	Daniel Berg, Lauren Jennings
4	May 15, 2023	Original	5:30 pm	6:55 pm	90-95	7-9	0	Whitewash (P16)	No	Victoria Prado
5	July 12, 2023	Original	6:30 am	7:46 am	66-74	1-2	0	Whitewash (P16)	No	Victoria Prado
6	April 1, 2024	Califland Corp	6:34 pm	7:23 pm	63-66	5	20-30	No	No	Lauren Jennings
7	April 24, 2024	Califland Corp	5:40 pm	7:47 pm	63-68	5-10	30-70	No	No	Lauren Jennings
8	May 30, 2024	Califland Corp	6:00 am	6:35 am	57-62	0	0	No	No	Lauren Jennings
9	June 26, 2024	Califland Corp	6:50 am	7:52 am	76-78	0-1	0-1	No	No	Lauren Jennings

Table 5. BUOW Winter Season Survey Results

Survey	Date (2024)	Start Time (am/pm)	End Time (am/pm)	Temperature (°F)	Wind Speed (mph)	Cloud Cover (%)	Potential BUOW Sign Observed	BUOW Observed	Biologists
1	January 10	7:15 am	9:11am	39-45	4-5	0	No	No	Lauren Jennings

4 DISCUSSION AND SUMMARY OF RECOMMENDATIONS

The high level of soil disturbance and impacts of human activity on the Project site from active agricultural practices, paired with the negative species presence results of the BUOW protocol breeding season surveys, suggests that BUOW are not typically present at the site. Relatively few natural burrows are present to support the potential colonization by dispersing individuals, and many burrow surrogates were observed to experience frequent anthropogenic disruptions that would displace any potentially present BUOW. BUOW is reliant on ground squirrels for burrow excavation, and no ground squirrels were incidentally observed during any surveys within the Project site. However, BUOW may attempt to colonize the existing burrows/burrow surrogates, or other suitable burrow habitat that becomes available, prior to the commencement of construction activities. The confirmed presence of 43 suitable potential burrows/burrow surrogates, six CNDDB BUOW occurrences documented within 5 miles of the Project site, and discovery of BUOW pellets in adjacent parcels during previous surveys for nearby projects support the possibility that BUOW could use the Project site (CDFW 2025, Tetra Tech 2022). Therefore, use of heavy machinery, construction noise, and/or significant ground disturbance during construction activities has the potential to impact BUOW, if present.

The results of the BUOW protocol survey have been used to develop recommendations for pre-construction surveys and avoidance and minimization measures. The recommendations within this report are preliminary and will be refined during the California Environmental Quality Act (CEQA) process as more details about the project design and schedule are determined. Although the potential burrows and burrow surrogates within the 150-meter buffer would likely not be impacted by ground disturbance during Project construction, adjacent noise during construction may disturb BUOW, if present. The following measures are recommended for BUOW:

BIO-1: To protect BUOW, the following conditions shall be met prior to construction:

- A focused avoidance (pre-construction) survey for BUOW presence, including existing potential burrows/surrogates and any new potential burrows/surrogates that may have become available, shall be conducted according to CDFW guidelines by a qualified biologist prior to initiating ground disturbance activities. The survey shall be conducted no less than 14 days prior to the commencement of construction activities and shall occur within the Project site and a 150-meter buffer area around the site, access permitting. The pre-construction survey would include visiting all potential burrows/surrogates during the timeframe of two hours before sunset to evening civil twilight or from morning civil twilight to 10:00 AM, and would include protocol-level transects (i.e., 100 percent visual coverage) within the construction area and a 150-meter buffer around the area.
- The BUOW pre-construction survey can be conducted in conjunction with other required pre-construction surveys if timing is appropriate.
- If construction activity as defined above halts for a period of 7 days or more, the survey will be conducted again prior to the continuation of construction activities.
- A qualified biological monitor will be present during initial ground-disturbing Project activities. If BUOW are detected during biological monitoring, all ground disturbing activities shall halt immediately.
- If BUOW are detected within the Project site or within the 150-meter buffer during the pre-construction survey or biological monitoring, buffers where no work would occur, as defined in the 2012 CDFW Staff Report, may be established to protect BUOW. Buffer size is dependent upon time of year and level of disturbance at the Project site. Depending on the level of disturbance, a smaller buffer may be established in consultation with CDFW.

- If occupied burrow avoidance is infeasible, consultation with CDFW will be performed to discuss possible avoidance measures that can be implemented and/or obtain an Incidental Take Permit for take coverage during Project activities.

BIO-2: Any construction materials stored on the Project site that could serve as a burrow surrogate for BUOW, such as sedentary above ground pipes or rip rap, shall be covered when not in use as to not attract BUOW to the site. The construction staff shall check the construction materials regularly when not in use to ensure they are sufficiently covered.

BIO-3: The results of the pre-construction surveys and any additional site visits/checks will be documented in a report and submitted to Fresno County and CDFW.

5 REFERENCES

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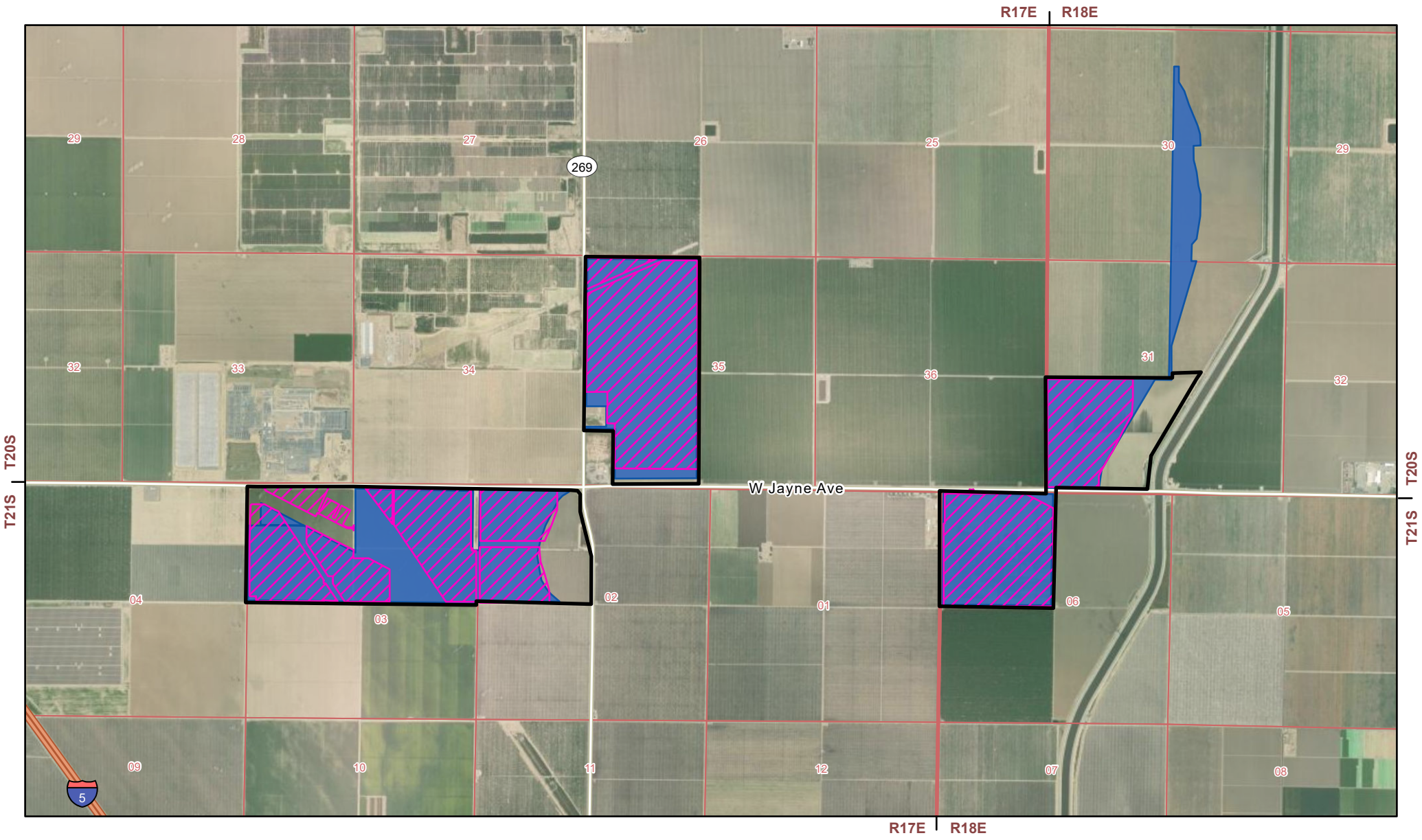
Appendix A: Site Plans





Project Site
Current Project Footprint
Previous Project Footprint
Township/Range
Section

N

0 0.25 0.5
Miles

Source: ESRI (2024)

NOT FOR CONSTRUCTION

TETRA TECH

Appendix A: Project Layout Footprint

San Luis West Solar Project
Fresno County, California

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Appendix B: BUOW Survey Datasheets

Phase II Burrow Survey		
Mapped Burrow ID (take photo)	**Dimensions (height, width, depth)**	**Sign Observed (tracks, feathers, pellets, carcass, white wash, or other items, etc.)**
P1	4.5" x >59"; 3 Pipes total	No sign.
P2	10" x >59"	No sign.
C1	10" x >59"	No sign.Burrow submerged in water.
P3	10" x >59"; 2 pipes total	No sign.
P4	10" x >59"; 4 pipes total	No sign.
P5	16" x >59"	No sign.
P6	14" x >59"; 2 pipes total	No sign.
P7	10" x >59"; 4 pipes total	No sign.
P8	5" to 10" x >59"; 7 pipes total	No sign.
C2	20" x >59"	No sign.
C3	20" x >59"	No sign.
P9	20" x >59"; 3 pipes total	No sign.
P10	10" to 22" x >59"; 5 pipes total	No sign.
P11	4" x >59"	No sign.
P12	10" x >59"	Dozens of stored pipes to be later used for irrigation.
C4	22" x >59"	No sign.
C5	22" x >59"	Partially buried with blow sand.
C6	22" x >59"	Buried about halfway through with blow sand.
P13	22" x >59"; 2 pipes total	Pipes lead into a retention basin.
P14	10 to 12" x >59"; 6 pipes total	No sign.
B1	5"; 3 burrows total	Along the inner banks of a rentention basin.
C7	22" x >59"	No sign.
C8	22" x >59"	Pipes lead into a retention basin.
C9	22" x >59"	Partially buried with eroded soil.
B2	5" x >59"	Under cement and gravel.
C10	22" x >59"	Partially buried with eroded soil.
P15	20" x >59"	No sign.
P16	10" x >59"	Long, abandoned irrigation pipe in a dry ditch.

Burrowing Owl Survey Form

Date:	3/19/2023	Surveyor Names: Daniel Berg, Victoria Prado	
Project Name:	San Luis West		

Phase III Weather Data

	AM		PM	
Time (24 hr)	Start:	End:	Start: 19:06	End: 20:11
Temp (deg F)	Start:	End:	Start: 58.5	End: 57.3
Wind (mph)	Start:	End:	Start: 0-5	End: 5-8
% Cloud Cover	Start:	End:	Start: 10	End: 0
Precip (Yes/No)	Start:	End:	Start: No	End: No
Visibility (Good/Fair/Poor)	Start:	End:	Start: Good	End: Good

Phase III BUOW Survey

1. Surveyors must stay more than 50 meters (approx. 160 ft) away from any owls or occupied burrows.

2. Survey must occur two hours before sunset to evening civil twilight or from morning civil twilight to 10:00 AM.

3. DO NOT survey during heavy rain, high winds greater than 20 miles per hour, or dense fog.

Mapped BUOW ID (take photo)	# of Owls or Nesting Pairs (note nestlings, juveniles, adults, or unknown)	Behavior (feeding, resting, courtship, alarm, territorial defense, copulation)	Time observed (24 hr)	Comments (note associated Burrow ID)
P2	0		1906	No sign.
C1	0		1932	No sign.
P4	0		1937	No sign.
P5	0		1942	No sign.
P7	0		1946	No sign.
P6	0		1950	No sign.
P8	0		1954	No sign.
C2	0		1958	No sign.
C3	0		2003	No sign.
P9	0		2006	No sign.

Burrowing Owl Survey Form

Date:	3/20/2023	Surveyor Names: Daniel Berg, Victoria Prado	
Project Name:	San Luis West		

Phase III Weather Data

	AM		PM	
Time (24 hr)	Start:	End:	Start: 17:11	End: 18:05
Temp (deg F)	Start:	End:	Start: 65.3	End: 62.8
Wind (mph)	Start:	End:	Start: 0-2	End: 0-2
% Cloud Cover	Start:	End:	Start: 50	End: 50
Precip (Yes/No)	Start:	End:	Start: No	End: No
Visibility (Good/Fair/Poor)	Start:	End:	Start: Good	End: Good

Phase III BUOW Survey

1. Surveyors must stay more than 50 meters (approx. 160 ft) away from any owls or occupied burrows.

2. Survey must occur two hours before sunset to evening civil twilight or from morning civil twilight to 10:00 AM.

3. DO NOT survey during heavy rain, high winds greater than 20 miles per hour, or dense fog.

Mapped BUOW ID (take photo)	# of Owls or Nesting Pairs (note nestlings, juveniles, adults, or unknown)	Behavior (feeding, resting, courtship, alarm, territorial defense, copulation)	Time observed (24 hr)	Comments (note associated Burrow ID)
C10	0	NA	1712	No sign.
P15	0	NA	1719	No sign.
P17	0	NA	1723	No sign.
P5	0	NA	1727	No sign.
P3	0	NA	1730	No sign.
B2	0	NA	1711	No sign.
C4	0	NA	1734	No sign.
C5	0	NA	1734	No sign.
C6	0	NA	1734	No sign.
P13	0	NA	1737	No sign.
P14	0	NA	1740	No sign.
B1	0	NA	1740	No sign.
C7	0	NA	1742	No sign.
C8	0	NA	1746	No sign.
C9	0	NA	1751	No sign.
P12	0	NA	1754	No sign.
P11	0	NA	1801	No sign.
P10	0	NA	1805	No sign.

Burrowing Owl Survey Form

Date:	4/17/2023	Surveyor Names: Daniel Berg, Lauren Jennings	
Project/Site Name:	San Luis West		

Phase III Weather Data

	AM		PM	
P15 Time (24 hr)	Start: 0	End:	Start: 1736	End: 1952
Temp (deg F)	Start:	End:	Start: 70	End: 63
Wind (mph)	Start:	End:	Start: 8-11	End: 0-5
% Cloud Cover	Start:	End:	Start: 95	End: 5
Precip (Yes/No)	Start:	End:	Start: No	End: No
Visibility (Good/Fair/Poor)	Start:	End:	Start: Good	End: Good

Phase III BUOW Survey

1. Surveyors must stay more than 50 meters (approx. 160 ft) away from any owls or occupied burrows.

2. Survey must occur two hours before sunset to evening civil twilight or from morning civil twilight to 10:00 AM.

3. DO NOT survey during heavy rain, high winds greater than 20 miles per hour, or dense fog.

Mapped BUOW ID (take photo)	# of Owls or Nesting Pairs (note nestlings, juveniles, adults, or unknown)	Behavior (feeding, resting, courtship, alarm, territorial defense, copulation)	Time observed (24 hr)	Comments (note associated Burrow ID)
P1	0		19:29	No sign.
P2	0		19:21	No sign.
C1	0		19:10	No sign.
P4	0		18:28	No sign.
P5	0		18:36	No sign.
P6	0		18:40	No sign.
P7	0		18:46	No sign.
P8	0		17:57	No sign.
C2	0		17:54	No sign.
C3	0		17:48	No sign.
P9	0		17:44	No sign.
C10	0		19:05	Standing water.
P15	0		19:00	No sign.
P17	0		18:50	No sign.
P3	0		18:16	No sign.
B2	0		18:31	No sign.
C4	0		18:21	No sign.
C5	0		18:18	No sign.
B1	0		18:15	No sign.
P13	0		18:15	No sign.
C6				

Mapped BUOW ID (take photo)	# of Owls or Nesting Pairs (note nestlings, juveniles, adults, or unknown)	Behavior (feeding, resting, courtship, alarm, territorial defense, copulation)	Time observed (24 hr)	Comments (note associated Burrow ID)
P14	0		18:15	No sign.
C7	0		18:08	Standing water.
C8	0		18:07	Standing water.
C9	0		18:05	Standing water.
P12	0		18:00	No sign.
P11	0		17:37	No sign.
P10	0		17:42	No sign.
		Comments		

Burrowing Owl Survey Form

Date:	5/15/2023	Surveyor Names: Victoria Prado	
Project Name:	San Luis West		

Phase III Weather Data

	AM		PM	
Time (24 hr)	Start:	End:	Start: 1730	End: 1855
Temp (deg F)	Start:	End:	Start: 95	End: 90
Wind (mph)	Start:	End:	Start: 9	End: 7
% Cloud Cover	Start:	End:	Start: 0	End: 0
Precip (Yes/No)	Start:	End:	Start: No	End: No
Visibility (Good/Fair/Poor)	Start:	End:	Start: Good	End: Good

Phase III BUOW Survey

1. Surveyors must stay more than 50 meters (approx. 160 ft) away from any owls or occupied burrows.

2. Survey must occur two hours before sunset to evening civil twilight or from morning civil twilight to 10:00 AM.

3. DO NOT survey during heavy rain, high winds greater than 20 miles per hour, or dense fog.

Mapped BUOW ID (take photo)	# of Owls or Nesting Pairs (note nestlings, juveniles, adults, or unknown)	Behavior (feeding, resting, courtship, alarm, territorial defense, copulation)	Time observed (24 hr)	Comments (note associated Burrow ID)
P15	0		17:40	
P16/17	0		17:45	
P07	0		17:50	
P06	0		17:50	
P05	0		17:55	
B02	0		17:55	
P04	0		17:55	
C10	0		17:58	
C01	0		18:01	Pipe is exposed.
P03	0		18:06	
P02	0		18:09	
P01	0		18:12	
P10	0		18:17	
P09	0		18:20	
C03	0		18:23	
C02	0		18:28	
P08	0		18:32	
C05	0		18:35	

Mapped BUOW ID (take photo)	# of Owls or Nesting Pairs (note nestlings, juveniles, adults, or unknown)	Behavior (feeding, resting, courtship, alarm, territorial defense, copulation)	Time observed (24 hr)	Comments (note associated Burrow ID)
C06	0		18:35	
P13	0		18:38	
P11	0		18:42	
P14	0		18:45	Whitewash is present on and at pipe entrance.
B01	0		18:45	Most burrows have been collapsed due to water erosion.
C07	0		18:48	
C08	0		18:52	Pipe is half-filled with eroded dirt.
P12	0		18:55	The stack of pipes to check is no longer here.

Comments

Since the previous survey, there was a set of pipes stacked just at the northeast corner of the Parcel 5 buffer boundary. These pipes are not within the survey buffer, however, they are within 10 feet. No burrowing owl or burrowing owl sign were seen in these pipes.

Burrowing Owl Survey Form

Date:	7/12/2023	Surveyor Names: Tori Prado	
Project/Site Name:	San Luis West		

Phase III Weather Data

	AM		PM	
Time (24 hr)	Start: 0630	End: 0746	Start:	End:
Temp (deg F)	Start: 66	End: 74	Start:	End:
Wind (mph)	Start: 1 to 2	End: 1 to 2	Start:	End:
% Cloud Cover	Start: 0	End: 0	Start:	End:
Precip (Yes/No)	Start: No	End: No	Start:	End:
Visibility (Good/Fair/Poor)	Start: Good	End: Good	Start:	End:

Phase III BUOW Survey

1. Surveyors must stay more than 50 meters (approx. 160 ft) away from any owls or occupied burrows.

2. Survey must occur two hours before sunset to evening civil twilight or from morning civil twilight to 10:00 AM.

3. DO NOT survey during heavy rain, high winds greater than 20 miles per hour, or dense fog.

Mapped BUOW ID (take photo)	# of Owls or Nesting Pairs (note nestlings, juveniles, adults, or unknown)	Behavior (feeding, resting, courtship, alarm, territorial defense, copulation)	Time observed (24 hr)	Comments (note associated Burrow ID)
P15			6:38	No sign; pipe closed.
P7	0		6:40	No sign.
P16/P17	0		6:40	No sign. Killdeer and chicks in this area.
P6	0		6:43	Irrigation is being run through the pipe to water a tomato field.
P4	0		6:45	No sign.
P5			6:48	No sign.
C10	0		6:50	Irrigation is being run through the pipe
C1	0		6:53	No sign, some standing water and mud fills the bottom of the basin.
P3	0		6:56	No sign.
C5	0		7:00	Water is running through ditch and culvert.

Mapped BUOW ID (take photo)	# of Owls or Nesting Pairs (note nestlings, juveniles, adults, or unknown)	Behavior (feeding, resting, courtship, alarm, territorial defense, copulation)	Time observed (24 hr)	Comments (note associated Burrow ID)
C6	0		7:00	No sign. Some standing water and mud fills the bottom of the basin.
P13	0		7:03	Water is flowing out of the pipe and there is at least 2 inches of standing water in the basin.
P14	0		7:04	Whitewash is inside, outside, and alongside the pipes. No BUOW-specific sign is present.
B1	0		7:08	No sign. There is at least 2 inches of standing water in the basin.
C7	0		7:11	Water is running through this culvert. There is at least 6 inches of standing water in the basin.
C8	0		7:13	Water is running through this culvert.
C9	0		7:15	Ditch and culvert are filled with flowing water.
P11	0		7:17	No sign.
P10	0		7:20	No sign.
P9	0		7:23	No sign.
C2	0		7:23	No sign.
P8	0		7:26	Water is flowing out of the pipe.
C3	0		7:26	No sign.
C4	0		7:28	Water is flowing through the ditch.
P1	0		7:33	No sign.
P2	0		7:36	No sign.
B2	0		7:42	No sign.
Comments				
Land use has significantly changed since last site visit. Either crops are growing or being harvested. Most ditches are channeling active irrigation. Busy, noisy, and greater than 55 mph traffic runs along Jayne road. This is likely to affect BUOW behavior near the burrows along Jayne road.				

Burrowing Owl Survey Form

Date:	1/10/2024	Surveyor Names:	Lauren Jennings
Project/Site Name:	SLW		

Phase III Weather Data

	AM		PM	
Time (24 hr)	Start: 715	End: 911	Start:	End:
Temp (deg F)	Start: 39	End: 45	Start:	End:
Wind (mph)	Start: 4	End: 5	Start:	End:
% Cloud Cover	Start: 0	End: 0	Start:	End:
Precip (Yes/No)	Start: None	End: None	Start:	End:
Visibility (Good/Fair/Poor)	Start: Good	End: Good	Start:	End:

Phase III BUOW Survey

1. Surveyors must stay more than 50 meters (approx. 160 ft) away from any owls or occupied burrows.

2. Survey must occur two hours before sunset to one hour after sunset or from one hour before to two hours after sunrise.

3. DO NOT survey during heavy rain, high winds greater than 20 miles per hour, or dense fog.

Mapped BUOW ID (take photo)	# of Owls or Nesting Pairs (note nestlings, juveniles, adults, or unknown)	Behavior (feeding, resting, courtship, alarm, territorial defense, copulation)	Time observed (24 hr)	Comments (note associated Burrow ID)
P09	0		718	No sign.
P10	0		718	No sign.
P08	0		724	Water flowing out of pipe.
C04	0		729	No sign, water not currently flowing.
C05	0		733	No sign, no water in culvert.
C11	0		737	No sign.
C06	0		737	No sign.
P13	0		739	No sign.
B03	0		739	No sign.
B01	0		743	No sign.
P14	0		743	No sign.
P19	0		743	No sign.
C07	0		747	No sign, retention basin water level at culvert.
C08	0		750	Small pool of water in culvert opening.
C12	0		752	No sign.
C09	0		756	No sign.

Mapped BUOW ID (take photo)	# of Owls or Nesting Pairs (note nestlings, juveniles, adults, or unknown)	Behavior (feeding, resting, courtship, alarm, territorial defense, copulation)	Time observed (24 hr)	Comments (note associated Burrow ID)
C02	0		803	No sign.
C03	0		805	No sign.
P11	0		810	No sign. Active irrigation at several pipes.
P12	0		813	No sign. Location of pipes changed slightly.
P18	0		818	No sign.
P04	0		825	No sign.
P05	0		825	No sign.
B02	0		828	No sign.
P06	0		830	No sign.
P07	0		832	No sign.
P16/17	0		834	No sign. Two unaccounted pipes in between P17 and P18/19.
P15	0		840	No sign. Dead mouse near entrance. Water dripping from one pipe.
C10	0		843	No sign.
C01	0		846	No sign.
P03	0		847	No sign.
P02	0		853	No sign.
P01	0		859	No sign. Canid scat at entrance.

Comments

Burrowing Owl Survey Form

Date:	4/1/2024	Surveyor Names:	Lauren Jennings
Project/Site Name:	SLW		

Phase III Weather Data

	AM		PM	
Time (24 hr)	Start:_____	End:_____	Start: 1834	End: 1923
Temp (deg F)	Start:_____	End:_____	Start: 66	End: 63
Wind (mph)	Start:_____	End:_____	Start: 5	End: 5
% Cloud Cover	Start:_____	End:_____	Start: 30	End: 20
Precip (Yes/No)	Start:_____	End:_____	Start: No	End: No
Visibility (Good/Fair/Poor)	Start:_____	End:_____	Start: Good	End: Good

Phase III BUOW Survey

1. Surveyors must stay more than 50 meters (approx. 160 ft) away from any owls or occupied burrows.

2. Survey must occur two hours before sunset to evening civil twilight or from morning civil twilight to 10:00 AM.

3. DO NOT survey during heavy rain, high winds greater than 20 miles per hour, or dense fog.

Mapped BUOW ID (take photo)	# of Owls or Nesting Pairs (note nestlings, juveniles, adults, or unknown)	Behavior (feeding, resting, courtship, alarm, territorial defense, copulation)	Time observed (24 hr)	Comments (note associated Burrow ID)
B04	0	N/A	1907	No sign.
P18	0	N/A	1907	No sign.
C12	0	N/A	1913	Blocked by debris.
P24	0	N/A	1914	No sign, about 20 pipes.
P19	0	N/A	1917	No sign, about 20 pipes.
B03	0	N/A	1921	No sign.
C11	0	N/A	1923	No sign.

Comments

C06 was completely filled in.

Burrowing Owl Survey Form

Date:	4/24/2024	Surveyor Names: Lauren Jennings	
Project/Site Name:	SLW		

Phase III Weather Data

	AM		PM	
Time (24 hr)	Start:_____	End:_____	Start: 1740	End: 1947
Temp (deg F)	Start:_____	End:_____	Start: 68	End: 63
Wind (mph)	Start:_____	End:_____	Start: 5-10	End: 5-10
% Cloud Cover	Start:_____	End:_____	Start: 70	End: 30
Precip (Yes/No)	Start:_____	End:_____	Start: No	End: No
Visibility (Good/Fair/Poor)	Start:_____	End:_____	Start: Good	End: Good

Phase III BUOW Survey

1. Surveyors must stay more than 50 meters (approx. 160 ft) away from any owls or occupied burrows.

2. Survey must occur two hours before sunset to evening civil twilight or from morning civil twilight to 10:00 AM.

3. DO NOT survey during heavy rain, high winds greater than 20 miles per hour, or dense fog.

Mapped BUOW ID (take photo)	# of Owls or Nesting Pairs (note nestlings, juveniles, adults, or unknown)	Behavior (feeding, resting, courtship, alarm, territorial defense, copulation)	Time observed (24 hr)	Comments (note associated Burrow ID)
C12	0	N/A	1834	No sign, water flowing.
P24	0	N/A	1836	No sign.
P19	0	N/A	1838	No sign.
B03	0	N/A	1845	No sign.
C11	0	N/A	1847	No sign.
B04	0	N/A	1855	No sign.
P18	0	N/A	1855	No sign.

Comments

Burrowing Owl Survey Form

Date:	5/30/2024	Surveyor Names: Lauren Jennings	
Project/Site Name:	SLW		

Phase III Weather Data

	AM		PM	
Time (24 hr)	Start: 600	End: 635	Start:	End:
Temp (deg F)	Start: 57	End: 62	Start:	End:
Wind (mph)	Start: 0	End: 0	Start:	End:
% Cloud Cover	Start: 0	End: 0	Start:	End:
Precip (Yes/No)	Start: No	End: No	Start:	End:
Visibility (Good/Fair/Poor)	Start: Good	End: Good	Start:	End:

Phase III BUOW Survey

1. Surveyors must stay more than 50 meters (approx. 160 ft) away from any owls or occupied burrows.

2. Survey must occur two hours before sunset to evening civil twilight or from morning civil twilight to 10:00 AM.

3. DO NOT survey during heavy rain, high winds greater than 20 miles per hour, or dense fog.

Mapped BUOW ID (take photo)	# of Owls or Nesting Pairs (note nestlings, juveniles, adults, or unknown)	Behavior (feeding, resting, courtship, alarm, territorial defense, copulation)	Time observed (24 hr)	Comments (note associated Burrow ID)
C12	0	N/A	629	Completely buried, water possibly flowing through underground.
P24	0	N/A	627	No sign.
P19	0	N/A	622	No sign.
B03	0	N/A	620	No sign.
C11	0	N/A	618	No sign.
B04	0	N/A	612	No sign.
P18	0	N/A	612	No sign.

Comments

Burrowing Owl Survey Form

Date:	6/26/2024	Surveyor Names: Lauren Jennings	
Project/Site Name:	SLW		

Phase III Weather Data

	AM		PM	
Time (24 hr)	Start: 650	End: 752	Start:	End:
Temp (deg F)	Start: 76	End: 78	Start:	End:
Wind (mph)	Start: 0	End: 1	Start:	End:
% Cloud Cover	Start: 0	End: 1	Start:	End:
Precip (Yes/No)	Start: No	End: No	Start:	End:
Visibility (Good/Fair/Poor)	Start: Good	End: Good	Start:	End:

Phase III BUOW Survey

1. Surveyors must stay more than 50 meters (approx. 160 ft) away from any owls or occupied burrows.

2. Survey must occur two hours before sunset to evening civil twilight or from morning civil twilight to 10:00 AM.

3. DO NOT survey during heavy rain, high winds greater than 20 miles per hour, or dense fog.

Mapped BUOW ID (take photo)	# of Owls or Nesting Pairs (note nestlings, juveniles, adults, or unknown)	Behavior (feeding, resting, courtship, alarm, territorial defense, copulation)	Time observed (24 hr)	Comments (note associated Burrow ID)
C12	0	N/A	743	Water flowing through culvert.
P24	0	N/A	744	No sign.
P19	0	N/A	747	Now ~40 pipes. No sign.
B03	0	N/A	752	Burrow appears to have collapsed.
C11	0	N/A	752	No sign.
B04	0	N/A	700	No sign.
P18	0	N/A	700	No sign.

Comments

Phase II Burrow Survey		
Mapped Burrow ID (take photo)	**Dimensions (height, width, depth)**	**Sign Observed (tracks, feathers, pellets, carcass, white wash, or other items, etc.)**
P26	12" x >59"; 1 pipe total	No sign.
P27	12" x >59"; 2 pipes total	No sign.

Appendix C: Photographs

Photograph 1	
Notes: Burrow 1.	

Photograph 2	
Notes: Burrow 2.	

Photograph 3	
Notes: Burrow 3.	

Photograph 4	
Notes: Burrow 4.	

Photograph 5	
Notes: Culvert 1.	

Photograph 6	
Notes: Culvert 2.	

Photograph 7	
Notes: Culvert 3.	

Photograph 8	
Notes: Culvert 4.	

Photograph 9	
Notes: Culvert 5.	

Photograph 10	
Notes: Culvert 6.	

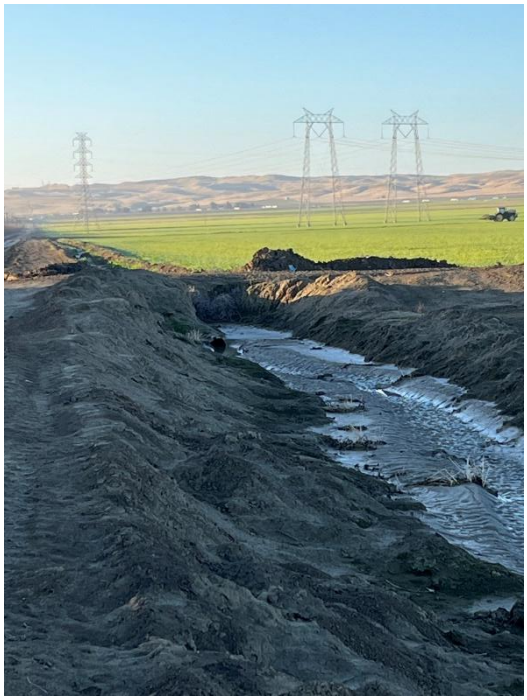
Photograph 11	
Notes: Culvert 7.	

Photograph 12	
Notes: Culvert 8.	

Photograph 13	
Notes: Culvert 9.	

Photograph 14	
Notes: Culvert 10.	

Photograph 15	
Notes: Culvert 11.	

Photograph 16	
Notes: Culvert 12.	

Photograph 17	
Notes: Pipe 1.	

Photograph 18	
Notes: Pipe 2.	

Photograph 19	
Notes: Pipe 3.	

Photograph 20	
Notes: Pipe 4.	

Photograph 21	
Notes: Pipe 5.	

Photograph 22	
Notes: Pipe 6.	

Photograph 23	
Notes: Pipe 7.	

Photograph 24	
Notes: Pipe 8.	

Photograph 25	
Notes: Pipe 9.	

Photograph 26	
Notes: Pipe 10.	

Photograph 27	
Notes: Pipe 11.	

Photograph 28	
Notes: Pipe 12.	

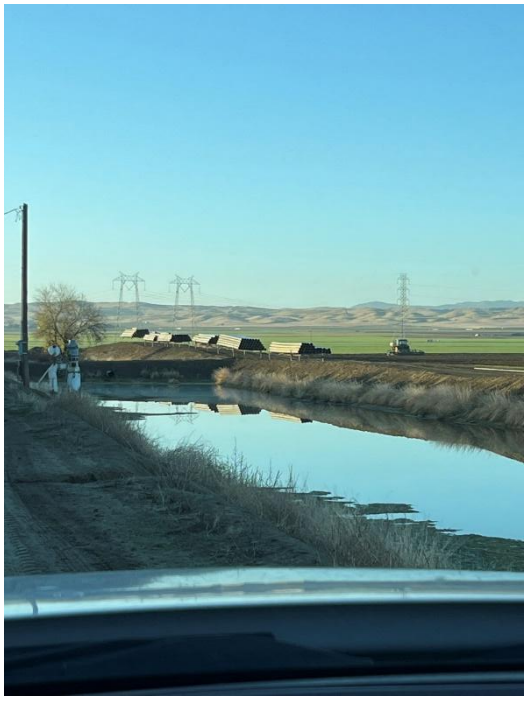
Photograph 29	
Notes: Pipe 13.	

Photograph 30	
Notes: Pipe 14.	

Photograph 31	
Notes: Pipe 15.	

Photograph 32	
Notes: Pipe 16/17.	

Photograph 33	
Notes: Pipe 18.	

Photograph 34	
Notes: Pipe 19.	

Photograph 35	
Notes: Pipe 20.	

Photograph 36	
Notes: Pipe 21.	

Photograph 37	
Notes: Pipe 22.	

Photograph 38	
Notes: Pipe 23.	

Photograph 39	
Notes: Pipe 24.	

Photograph 40	
Notes: Pipe 25.	

Photograph 41	
Notes: Pipe 26.	

Photograph 42	
Notes: Pipe 27.	