APPENDIX HYD-1

1. WATER SUPPLY ASSESSMENT
   NOVEMBER 2024

2. GROUNDWATER RESOURCE IMPACT ANALYSIS
   NOVEMBER 2024

Water Supply Assessment

Coyote Creek Agrivoltaic Ranch Environmentally Preferred Project Design Sacramento County, California

JULY 2024/REVISED NOVEMBER 2024

Prepared for:

SACRAMENTO VALLEY ENERGY CENTER, LLC
1166 Avenue of the Americas, 9th Floor
New York, New York 10036

Prepared by:

DUDEK

1102 R Street
Sacramento, California 95811
Contact: Matt Naftaly, PG No. 9839, PH No. 13-H-5003

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Table of Contents

TABLES

FIGURES

APPENDIX

Acronyms and Abbreviations

Acronym or Abbreviation	Definition
AF	acre-feet
AFY	acre-feet per year
CCAR	Coyote Creek Agrivoltaic Ranch
CEQA	California Environmental Quality Act
County	County of Sacramento
CWC	California Water Code
DWR	California Department of Water Resources
ESA	Environmental Site Assessment
GDE	groundwater-dependent ecosystem
GET	Groundwater Extraction and Treatment
GSA	Groundwater Sustainability Agency
GSP	Groundwater Sustainability Plan
MW	megawatt
NSA	North Service Area
Project	Coyote Creek Agrivoltaic Ranch
PWS	public water system
SASb	South American Subbasin
SB	Senate Bill
SCGA	Sacramento Central Groundwater Authority
SCWA	Sacramento County Water Agency
SGMA	Sustainable Groundwater Management Act
SRCD	Sloughouse Resource Conservation District
SVRA	State Vehicle Recreation Area
UWMP	Urban Water Management Plan
WSA	Water Supply Assessment

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1 Introduction

1.1 Purpose of Document

Senate Bill (SB) 610 was passed on January 1, 2002, amending the California Water Code (CWC) to require detailed analysis of water supply availability for certain types of development projects. The primary purpose of SB 610 is to improve the linkage between water and land use planning by ensuring greater communication between water providers and local planning agencies, and ensuring that land use decisions for certain large development projects are fully informed as to whether a sufficient water supply is available to meet project demands. SB 610 requires preparation of a Water Supply Assessment (WSA) for a project that is subject to the California Environmental Quality Act (CEQA) and meets certain requirements. SB 610 is codified in CWC Division 6, Part 2.10 (Sections 10910–10915).

Coyote Creek Agrivoltaic Ranch (CCAR or project) has been determined to be subject to CEQA by the County of Sacramento (County), acting as lead agency. The CCAR satisfies the statutory definition of a "project" for the purpose of determining SB 610 applicability because it is considered an industrial facility in excess of 40 acres, per CWC Section 10912(a)(5). Furthermore, because the CCAR is not proposing to connect to a public water system (PWS), as defined in CWC Section 10912(c), the County, as the CEQA lead agency, is responsible for the preparation of a WSA, which will be included in the CEQA documentation for consideration. The lead agency will make an independent determination as to whether there is adequate water supply for the proposed CCAR, having considered the entire administrative record. In compliance with SB 610, this WSA examines the availability of the identified water supply under normal-year, single-dry-year, and multiple-dry-year conditions over a 20-year projection, accounting for the projected water demand of the CCAR plus other existing and planned future uses of the identified water supply. Besides the SB 610 requirement, this WSA also evaluates water sufficiency over the project's operational period, estimated for planning purposes to be 35 years.

Because the project is expected to use groundwater, either directly via on-site wells, from wells at the Sloughhouse Solar Project, or as supplied by Site the SCWA, this WSA is accompanied by a Groundwater Resource Impact Analysis (Appendix A), which forms the technical basis for evaluation of groundwater sufficiency and sustainability.

1.2 Project Location and Description

The applicant proposes to construct and operate the project on approximately 2,555 acres in Sacramento County. The project would be an up to 200-megawatt (MW) alternating-current photovoltaic solar energy facility with associated on-site substation, inverters, fencing, roads, and supervisory control and data acquisition (SCADA) system. The proposed energy storage components would include an up to 100 MW alternating-current maximum capacity energy storage (battery) system. The project site is on the Barton Ranch adjacent to 3830 Scott Road, Sacramento County, California (Figure 1, Project Location). The site is approximately 2.5 miles south of White Rock Road in the Cosumnes community. The project site is approximately 4.5 miles south of U.S. Route 50, southeast of the Prairie City State Vehicle Recreation Area (SVRA) and is bisected by Scott Road (Figure 2, Site Aerial Map). The geographic center of the project roughly corresponds with 38.576278° North and -121.132944° West, at an elevation of 196 feet above sea level. A generation tie (gen-tie) line would extend approximately 1.5 miles to reach the nearest Sacramento Municipal Utility District 230-kilovolt powerline that runs through the Prairie City SVRA. The project would include the grazing of sheep as is currently conducted on the property.

The project would consist of the following components:

- Solar photovoltaic modules mounted on single-axis tracking systems
- One on-site substation
- One on-site restroom in the control building of the substation
- Energy storage system with capacity to store 100 MW alternating current/400 megawatt hours of energy
- Two meteorological towers up to 15 feet in height
- Diesel-, propane-, or battery-powered backup generators
- Water storage with maximum capacity of 15,000 gallons
- Private access roads, perimeter roads, and fencing
- Gen-tie line

The planned operational life of the facility is approximately 35 years.

1.3 Water Supply Assessment Applicability

Because the CCAR is a “project” per CWC Section 10912(a)(5), it is subject to SB 610, and therefore requires the preparation of a WSA. SB 610 requires that a WSA address the following questions:

- Is there a public water system that will service the project?
- Is there a current Urban Water Management Plan that accounts for the project demand?
- Is groundwater a component of the supplies for the project?
- Are there sufficient supplies to serve the project over the next 20 years?

The WSA is required to answer the following primary question:

> Will the total projected water supplies available during normal, single-dry, and multiple-dry water years during a 20-year projection meet the projected water demand of the proposed project, in addition to existing and planned future uses of the identified water supplies, including agricultural and manufacturing uses?

The following sections address the SB 610 WSA questions as they relate to the CCAR. Besides the SB 610 requirement, this WSA also evaluates water sufficiency over the project’s operational period for CEQA purposes, estimated to be 35 years.

1.3.1 Is There a Public Water System That Will Service the Project?

CWC Section 10912 defines a PWS as a system that has 3,000 or more service connections and provides piped water to the public for human consumption. The CCAR site is not connected to a PWS as defined by CWC Section 10912, and there are no plans to do so as part of project construction, operation and maintenance, or decommissioning.

The site partially overlaps both the Sloughouse Resource Conservation District (SRCD) planning area and the Sacramento County Water Agency (SCWA) service area. Although the SRCD has important roles in water management, it does not operate a PWS that serves the project site or its surroundings. The SCWA service area overlaps the western edge of the project site (Figure 3, Water Service Areas). Although partially within its service area, the SCWA does not have facilities within the project boundary, and connection to the SCWA system is not proposed as part of the project. While no direct service connection is proposed for the Project, because SCWA's service area extends into the project site, the amounts shown in Table 4a would potentially be available to supply the project's short-term water demands (via water trucks filled at a hydrant or other location). These amounts are considered available to the project for the purpose of this WSA. Refer to Section 4.3 for additional details.

1.3.2 Is There a Current Urban Water Management Plan That Accounts for the Project Demand?

There is no Urban Water Management Plan (UWMP) that accounts for the water demand of the project. Although SCWA's service area partially overlaps with the western edge of the project site, its UWMP identifies that portion of the project site as being under agricultural land use in its buildout scenario (SCWA 2021 [Figure 7-1]). Because the SCWA is an urban water supplier, its 2020 UWMP assumes that the area would use no water for the purpose of accounting for municipal water supply (SCWA 2021 [Table 7-5]).

1.3.3 Is Groundwater a Component of the Supplies for the Project?

Groundwater is likely to supply some or all of the water demand for construction and decommissioning, and the full water demand for operations and maintenance of the CCAR. For construction and decommissioning, water may potentially be derived from on-site groundwater wells, or it may need to be imported from off-site sources. that may draw from both surface water sources (e.g., the American River) and groundwater from the South American Subbasin (SASb) or from the San Joaquin Groundwater Basin (Sloughhouse Solar Project wells) (Section 4.2 and Appendix A). For operation and maintenance, on-site groundwater wells would be used. If on-site or off-site groundwater is a potential water source, SB 610 requires additional analyses, which is provided in Appendix A.

1.3.4 Are There Sufficient Supplies to Serve the Project Over the Next 20 Years?

Based on the assessment discussed in Chapter 2, Project Water Demand, and Chapter 5, Water Supply and Demand Comparison, of this WSA, the estimated water demand of the construction and operational phases of the CCAR is insubstantial compared to the proposed groundwater source and the surplus water anticipated by the SCWA. Groundwater supply is buffered from short-term impacts of wet and dry climate cycles, and therefore the CCAR groundwater supply would remain largely unaffected by CCAR normal-year, single-dry-year, and multiple-dry-year conditions over the 20-year projection. To further evaluate and quantify the potential groundwater-related impacts of the CCAR, a project impact analysis was prepared, the results of which are provided in Chapter 5 and Appendix A of this WSA. The analysis indicates that there is sufficient groundwater supply to serve the CCAR over the 20-year period required by the legislation and the 35-year project life. In addition, CCAR implementation would not significantly impact groundwater resources, groundwater-dependent ecosystems (GDEs), or land subsidence in the vicinity of the CCAR. Project water demand would have a negligible effect on the occurrence of the undesirable results defined by the Sustainable Groundwater Management Act (SGMA), including significant and unreasonable loss of groundwater in storage and decline of groundwater levels, and virtually no impact on the minimum thresholds and measurable objectives established in the Groundwater Sustainability Plan (see Section 4.2, Groundwater).

2 Project Water Demand

Water demand for the construction phase of the CCAR is estimated to be approximately 253 acre-feet (AF) during the 18-month construction period. Subsequent operation and maintenance of the CCAR during the anticipated 35-year CCAR operational life would require approximately 10.3 acre-feet per year (AFY) of water, primarily for solar module washing but also including water for landscaping and sheep. An additional 0.2 AFY is estimated for restroom water demand during the operation and maintenance phase of the project.[1] Plans for decommissioning and potential revegetation of the site at the end of the 35-year project life are not yet complete, but for the purpose of this WSA, it is estimated to be the same as the construction water demand (i.e., 253 AF). Therefore, water demand equal to that required for CCAR construction is used as a conservative estimate (Table 1).

Table 1. CCAR Water Demand Estimates

CCAR Phase	Estimated Water Demand
Construction	253 AF
Operation and Maintenance	10.5 AFY
Decommissioning and Removal	253 AF

CCAR = Coyote Creek Agrivoltaic Ranch; AF = acre-feet; AFY = acre-feet per year

Table 2 is an amortization of CCAR water demand over the 20-year timeframe specified by SB 610, and the 35-year CCAR operational life consisting of construction, operation, and decommissioning.

Table 2. CCAR Amortized Construction, Operations and Maintenance, and Decommissioning Water Demand

WSA 20-Year Amortization*	Project Life 35-Year Amortization
22.4 AFY	24.5 AFY

CCAR = Coyote Creek Agrivoltaic Ranch; WSA = Water Supply Assessment; AFY = acre-feet per year
* Decommissioning water demand was not included in the 20-year amortization because the CCAR would still be operational at the end of that time.

2.1 Construction Water Demand

As a high-level check on the reasonableness of the estimated construction water demand, Dudek gathered metered water use data associated with construction of six solar projects in Southern California and Nevada. The average construction water demand for these projects was 1.33 AF per MW, ranging from a minimum of 0.39 AF per MW to a maximum of 3.15 AF per MW. The projects selected for comparison are located primarily in dry, hot, and dusty environments, and therefore represent a conservative approach to preparing a demand estimate for the CCAR. Water consumption during construction is estimated to be approximately 253 acre-feet for dust suppression and earthwork over an approximately 18-month period. Construction-phase water demand would be greatest during site

1 One to three workers would visit the site about five times per year. Water demand is conservatively estimated as the indoor residential per-capita daily use of 55 gallons per day, continuously throughout the year (DWR 2011) (3 people x 55 gallons x 365 days)/325,851 gallons per acre-foot = 0.2 acre-feet per year (rounded).

grading, which would consist of disc and roll compaction over the site. The 253 acre-feet estimate for construction and decommissioning is consistent with the range of water use observed for the solar projects reviewed.

2.2 Operation and Maintenance Water Demand

The operational phase water demand is anticipated to include panel washing, sheep grazing, landscape irrigation, and staff use of a single restroom. Water demand for the operation and maintenance phase was estimated to be 3,376 gallons of water per MW for panel washing. Based on the CCAR's estimated production of 200 MW, the water demand for a single panel-washing event would be approximately 2 AF. Conservatively assuming washings would be required four times a year, the annual operation and maintenance water demand is estimated to be 8 AFY (note that panel washing is typically not required in average or wet water years).[2] Short season sheep grazing demand is equal to about 0.52 AFY (Dudek 2023). Although landscape irrigation requirements are not yet definitive, based on the project area as related to similar projects, landscape demand is estimated to be 1.75 AFY. A restroom inside of the control building within the substation would accommodate occasional worker use with one toilet and one sink and have an estimated demand of 0.2 AFY. The total annual water demand for all water uses of the operation and maintenance phase of the project would be about 10.5 AF. Water trucks would be used to deliver water for panel washing operations from onsite groundwater wells or the SCWA. The water used for panel washing would be clean, with no chemicals added.

2.3 Decommissioning Water Demand

The CCAR operational life is anticipated to be 35 years. The site would be disked and revegetated as needed for reclamation. Water use during decommissioning would be primarily for dust control and reseeding. Reseeding requirements will be unknown until the end of the project life. Even though grading for decommissioning would be less intense and extensive, water demand for decommissioning is conservatively assumed to be equivalent to that for the construction phase (253 AF).

2 3,376 gallons/MW x 200 MW x 4 washings/year x (1 gallon/325,851 AF) = 8 AF (rounded)

3 Water Resources Plans and Programs

Because the CCAR is not proposing to connect to a PWS or urban water supplier (i.e., subject to urban water management plans/programs), the scope of applicable water resource plans and programs is limited to groundwater management and the UWMPs that serve adjacent areas. Because hydrogeological conditions may limit the availability of on-site groundwater, most water needed for construction and decommissioning may be obtained from the SCWA or Sloughhouse Solar Project wells and trucked in and/or stored in tanks.

3.1 Sustainable Groundwater Management Act

The SGMA is a package of three bills (Assembly Bill 1739, SB 1168, and SB 1319) and provides local agencies with a framework for managing groundwater basins in a sustainable manner. The SGMA establishes minimum standards for sustainable groundwater management, roles and responsibilities for local agencies that manage groundwater resources, and priorities and timelines to achieve sustainable groundwater management within 20 years of adoption of a Groundwater Sustainability Plan (GSP). Central to the SGMA are the identification of critically overdrafted basins; prioritization of groundwater basins; establishment of Groundwater Sustainability Agencies (GSAs); and preparation and implementation of GSPs for medium-priority, high-priority, and critically over-drafted basins. The SGMA required GSAs to be formed by June 30, 2017. GSPs must consider all beneficial uses and users of groundwater in a basin, and include measurable objectives and interim milestones that ensure basin sustainability. A basin may be managed by a single GSP or multiple coordinated GSPs. At the state level, the California Department of Water Resources (DWR) has the primary role in the implementation, administration, and oversight of the SGMA, with the State Water Resources Control Board stepping in should a local agency be found to be managing groundwater in an unsustainable manner. DWR approved regulations and guidelines for implementation of the SGMA.

The SASb is designated as "high priority" by DWR based on the multiple criteria included in the prioritization process (DWR 2019). This designation requires the preparation of a GSP under the SGMA. Basin priority is based on a combination of existing population and anticipated population growth; groundwater well density; agricultural demands; and the historical and current documented impacts to water levels and storage, groundwater quality, subsidence, and the presence of GDEs. DWR determined the ranking for the SASb with consideration of the following (DWR 2019):

- Groundwater levels are showing decline over time, and groundwater is a significant component of the SASb water supply. Approximately 147,000 AFY of groundwater is extracted comprising approximately 50% of water supplies within the SASb.
- There is approximately 44,515 acres of irrigated agriculture within the SASb, resulting in an irrigated agriculture density of approximately 115 acres per square mile.
- There are 265 public water supply wells within the SASb, equaling a density of approximately 0.70 public supply wells per square mile.
- There are approximately 4,171 production wells within the SASb, equaling a density of approximately 11 groundwater wells per square mile.

The GSAs formed for coordination of SGMA implementation within the SASb are the County of Sacramento, Northern Delta, Omochumne-Hartnell Water District, Sacramento Central Groundwater Authority, and

Sloughhouse Resource Conservation District. The GSA for the part of the project site within the SASb is the Sloughhouse Resource Conservation District GSA. The GSAs prepared the Final Report GSP which has been approved by DWR. Groundwater conditions discussed in the GSP include the presence of point-source contamination resulting from industrial and defense industries within the SASb. Contamination plumes documented within the GSP are mainly north and west of the CCAR and are currently undergoing remediation (SASb GSAs 2021). Apart from point-source contamination, groundwater quality within the SASb is generally adequate for existing beneficial uses (SASb GSAs 2021). Groundwater levels in the SASb have historically increased in the west and declined in the east (SASb GSAs 2021). Modelling of groundwater storage conditions within the SASb indicate the absence of overdraft under historical and current conditions (SASb GSAs 2021). Project water demand, if all supply was from the SASb, would be a negligible percentage of the sustainable yield estimated for the SASb. Thus, the project would not substantially contribute to the undesirable results defined in the GSP, nor would the project contribute materially to the exceedance of the minimum thresholds established to evaluate groundwater in storage or declining groundwater levels (Section 4.2). Therefore, the project would not interfere with achievement or maintenance of the measurable objectives developed for the GSP.

As a high priority groundwater basin, the SASb is subject to the California Governor's Executive Order (EO) No. N-3-23 (modifying EO N-7-23) to establish circumstances under which regulating agencies must obtain approval from a Groundwater Sustainability Agency (GSA) prior to issuing well permits within SGMA regulated Basins. New or replacement wells constructed as part of the CCAR would require review by Sloughhouse Resource Conservation District GSA in addition to Sacramento County.

3.2 Groundwater Well Permitting and Construction Standards

The Sacramento County Environmental Management Wells Program regulates the construction, modification, repair, inactivation, and destruction of wells in Sacramento County in accordance with Chapter 6.28 of the County Code and CWC Section 13801. Chapter 6.28 of the County Code requires the issuance of a well permit prior to construction of groundwater and other types of wells unless exempted by the code. DWR has developed well standards for the state per CWC Sections 13700 to 13806. These standards have been adopted by the State Water Resources Control Board into a statewide model well ordinance (Resolution No. 89-98) for use by the Regional Water Quality Control Boards for enforcing well construction standards where no local well design ordinance exists that meets or exceeds the DWR standards. DWR's Well Standards are presented in Bulletin 74-81 and Bulletin 74-90 and are incorporated into the County Groundwater Ordinance by reference (Section 6.28.040, Water Well Standards). In addition to the permit requirement, the construction of most groundwater wells requires the payment of a fee and an inspection to verify correct seal preparation and placement. A well completion report is required in accordance with DWR requirements after construction, repair, modification, or destruction of a well.

Section 6.28(G) of the County Code establishes that, "Any application for a well permit within two thousand (2,000) feet of a known groundwater contaminant plume is subject to special review by appropriate regulatory agencies, including, but not limited to, the Sacramento County Environmental Management Department and the California Regional Water Quality Control Board, Central Valley Region, to evaluate potential impacts to public health and groundwater quality. The proposed on-site area for project groundwater extraction is located outside of the 2,000-foot consultation zone (Section 6.28(G) of the County Code). Refer to Figure 5 showing a map of the estimated extent of the groundwater plume and consultation zone. Refer to section 3.5 for additional information regarding the Aerojet site and its management.

3.3 Sacramento Central Groundwater Authority

The Sacramento Central Groundwater Authority (SCGA) is a Joint Powers Agreement with the City of Elk Grove, the City of Rancho Cordova, the City of Sacramento, and the County of Sacramento intended to facilitate a collaborative and inclusive approach to sustainable groundwater management. Formation of the SCGA in 2006 preceded California's 2014 SGMA. The SCGA is a joint powers authority created to collectively manage groundwater resources in the SASb, which includes Sacramento County south of the American River. In 2006, the SCGA adopted a Groundwater Management Plan that identifies management objectives for the SCGA boundary in the SASb. Currently, the SCGA, along with the other GSAs in the SASb, have completed a the GSP that creates a plan to manage the SASb within the state-mandated requirements of the SGMA. Now approved by DWR, this GSP replaces the Groundwater Management Plan as the primary document governing groundwater management within the SASb.

3.4 Sloughhouse Resource Conservation District

The Sloughhouse Resource Conservation District (SRCD) was formed in 1956 by local farmers and ranchers to address local soil conservation issues (SRDC 2021). More specifically, the SRCD manages natural resources through collaboration with stakeholders and partners in their district to successfully balance the wide range of programs that protect groundwater for long-term sustainability; soil for agricultural productivity and environmental values; surface water for multiple uses, including agriculture, fish, and wildlife; and natural areas for their habitat value. Additionally, the SRCD participates as one of the five GSAs within the SASb SGMA Working Group. The project site is completely contained within the SRCD boundaries. Landowners within SRCD boundaries are represented by a five-member Board of Directors. The SRCD is a resource conservation district operating under the provisions of Division 9 of the California Public Resources Code, Section 9000 et seq., with the authority to control runoff, prevent or control soil erosion, develop and distribute water, and improve land capabilities. The SRCD is also authorized to form improvement districts to fund and construct flood prevention facilities and facilities for the conservation, development, utilization, drainage disposal, and distribution of water for agricultural purposes (SRCD 2021).

3.5 United States Environmental Protection Agency

On July 20, 2001, the United States Environmental Protection Agency reached a Record of Decision (ROD) for the Western Groundwater Operable Unit OU-3 at the Aerojet General Corps Sacramento Site. An ROD signifies a formal public approval by the EPA documenting the remedy for a superfund site. The proposed remedy extends over the contaminated groundwater noted beneath portions of the Solar Development Area (USEPA 2001).

The ROD notes that "This remedial action for Western Groundwater Operable Unit (OU-3), addresses contaminated groundwater by containing and remediating the contaminated groundwater on the western side of the Aerojet Superfund Site with a groundwater Pump and Treat System (P&T) to mitigate the loss of additional drinking water supplies in a populated area." (Section 1.4.1)

The document makes specific recommendations related to installation of new wells in the area of the remedy. Section 2.12.2.8 of the Western Groundwater Operable Unit (OU-3) Record of Decision created a "Groundwater

Management Zone" to "maintain water levels and to prevent adverse impact on the remedy." The drilling of new wells within the GMZ, which is contained within OU-3, is prohibited.

The Second Five-Year Review Report for the Superfund site notes that groundwater outside of the Western Groundwater Operable Unit is regulated by the Sacramento County Ordinance. A consultation zone has been established prior to drilling a well within 2,000 feet of chemicals in groundwater around the Aerojet Site (USACE 2021).

The Five-Year Review Report for the Western Groundwater Operable Unit includes a protectiveness statement by the EPA that note that "The Remedy for the Western Groundwater Operable Unit is protective of human health and the environment and exposure pathways that could result in unacceptable risks are being controlled through the implementation of institutional controls, general containment of contamination in groundwater, and contingency plans to protect public drinking water wells." (USACE 2021)

3.6 Urban Water Management Plans

The UWMPs most relevant to the project area, due to proximity, are described below. These descriptions focus on each UWMP's conclusions regarding water sufficiency over the next 25 years, considering growth assumptions and existing and planned sources of supply. Surplus water, as described in each UWMP, is considered potentially available to support the project's construction and decommissioning water demands, as it is common practice for water agencies to sell municipal water for construction purposes as long as the project is within their service area. If the water supplier has recycled or reclaimed water available, it can make such water available for construction projects even if they are outside of its service area. Of the agencies described below, only water from the SCWA is a potential water source for the Project. Information for the City of Folsom and California American Water Company is included for water supply information for the region of the Project.

3.6.1 City of Folsom

The City of Folsom is a public agency that provides potable water directly to its residential and business customers. The City of Folsom's boundaries are not coterminous with the City of Folsom's water service area. The City of Folsom's water system is divided into five water service areas. The closest service areas to the project site are the southern parts of the City of Folsom's water service area, namely the "Folsom Plan Area Service Area" and the "Nimbus Service Area" (City of Folsom 2021). The Folsom Dam and Folsom Lake Reservoir, both of which are part of the Central Valley Project, share part of the City of Folsom's boundary. The reservoir is the primary diversion point for all surface water supplies delivered throughout the City of Folsom's water service area. As of 2020, the City of Folsom serves approximately 20,000 AFY to a water service area population of approximately 69,500 through nearly 22,000 metered connections (City of Folsom 2021).

The City of Folsom previously delivered raw water supplies to Aerojet at its industrial facilities; however, remediated water derived from the Groundwater Extraction and Treatment (GET) A and B facilities is now directly plumbed into Aerojet facilities. Even though the City of Folsom does not deliver remediated water to Aerojet, the City of Folsom does have rights to the remediated water, which it can use for non-potable use within the City of Folsom's water service area (City of Folsom 2021). GET A's 17 wells produce treated water of approximately 537 gallons per minute. The GET B Facility, also currently consisting of extraction wells and a treatment facility, extracts approximately 2,077 gallons per minute, of which approximately 1,477 gallons per minute is made available to the City of Folsom. In total, these facilities provide the City of Folsom with an additional water supply of approximately

3,250 AFY. In February 2020, the City of Folsom began an analysis to develop a Non-Potable Water Master Plan, which includes the potential use of GET A/B water within the City of Folsom's overall water service area. In addition to GET A/B, the City of Folsom developed and installed the Humbug Well near the Empire Ranch Golf Course. Based on aquifer test results, initial pump recommendations were developed for eventual outfitting of the Humbug Well for use. The aquifer test results indicate that the well can be equipped with a pump capable of producing 150 gallons per minute, which is equivalent to 0.66 AF per day, or approximately 20 AF per month.

The analysis of service area, general plan, and demographics buildout projections versus existing and projected supplies through 2045 in the UWMP indicate sufficient water supplies would exist even after multiple dry years (City of Folsom 2021). Under the worst-case scenario (i.e., the fifth year of a 5-year drought), the City of Folsom projects it will have a surplus of approximately 7,201 AFY in 2045 (City of Folsom 2021 [Table 7-6]). The fifth-year drought water demand and supply comparison for the City of Folsom is provided in Table 3. In an average water year, the surplus at the end of 2045 increases to 12,831 AFY (City of Folsom 2021 [Table 7-4]). Because this surplus is potable water, and because the project site is currently outside the service area boundaries, the surplus amounts in Table 3 are not considered available to the project for the purposes of this WSA.

Table 3. City of Folsom Water Surplus in 5-Year Consecutive Dry-Year Scenario (acre-feet)

	2025	2030	2035	2040	2045
Supply Total	32,720	32,720	32,720	32,720	32,720
Demand Total	20,517	22,746	24,214	25,145	25,519
Surplus	12,203	9,974	8,506	7,575	7,201

Source: City of Folsom 2021 (Table 7-6).

3.6.2 Sacramento County Water Agency

The Sacramento County Water Agency's fundamental purpose is to provide safe and reliable drinking water to its wholesale and retail customers throughout Sacramento County. As shown in Figure 3, the northwestern edge of the project site is within the eastern edge of the SCWA's North Service Area (NSA), which is a subset of the larger "Zone 40" service area. SCWA's Zone 40 delivery system supplies a combination of groundwater and surface water into an interconnected system with multiple pressure zones, which together supplies more than 40,000 AFY of potable water to an estimated population of 169,000 (SCWA 2021). The UWMP describes the NSA as follows (SCWA 2021):

> The NSA is located south of the American River and includes part of the City of Rancho Cordova. Historically, the NSA was supplied exclusively by groundwater. In recent years, SCWA has supplied surface water supply to the NSA from the Vineyard Water Treatment Plant (WTP), as part of the agency's conjunctive use program. The NSA is the least developed of the three service areas, with currently less than 10% of the projected build out population. This service area includes the old Mather and Sunrise Corridor systems. SCWA assumed ownership of the Mather System shortly after the County of Sacramento took over Mather Air Force Base after it was decommissioned by the United States Air Force in the mid-1990s. In the case of the Sunrise Corridor System, SCWA was asked to take ownership and provide water service after the system was constructed through

an assessment district in the late 1980's. Most of the land within the NSA boundary is rural and undeveloped but significant growth is anticipated over the next 30 years.

According to current customer account information, the NSA has nearly 6,800 connections of the 28,800 anticipated at build-out (SCWA 2021). Thus, significant growth in urban water demand within this area over the next 30 years can be reasonably anticipated.

The SCWA does not have any facilities within or immediately adjacent to the project site. According to the Draft Zone 40 Water Supply Master Plan Amendment, the closest water facilities (i.e., storage tank and pipes) are approximately 2 miles west of the project boundary at Sunridge Park Village, immediately west of Grant Line Road at Douglas Road in the City of Rancho Cordova (SCWA 2020). The closest active well owned by the SCWA is at Mather Airport. Active groundwater wells in the NSA produced approximately 1,553 AF in 2019, a minor portion of the total groundwater production in Zone 40 for that year, which was 31,330 AF (SCWA 2020). Regarding surface water, Zone 40 supplies generally consist of Central Valley Project water, appropriative water, American River Place of Use water, and other surface water sources (SCWA 2021). Through use of the Vineyard Water Treatment Plant, water demand within the NSA is primarily served by surface water.

The analysis of service area, general plan, and demographics buildout projections versus existing and projected supplies through 2052 in the UWMP indicate sufficient water supplies would exist even after multiple dry years (SCWA 2021). According to the updated analysis (to include the Multi-Sport Complex and Grant Line Industrial Annexation Area), projected water supplies exceed water demand at buildout by 10,500 AFY, even in the third year of a multi-year drought (SCWA 2020). In a typical year, this exceedance is estimated to be 83,300 AFY at buildout (2052). The fifth-year drought potable water demand and supply comparison for the SCWA is provided in Table 4a. Because SCWA's service area extends into the project site, the amounts shown in Table 4a would potentially be available to supply the project's short-term water demands (via water trucks filled at a hydrant or other location). The fifth-year drought non-potable water demand and supply comparison for the SCWA is provided in Table 4b. These amounts are considered available to the project for the purpose of this WSA.

Table 4a. SCWA Potable Water Surplus in Fifth Consecutive Dry-Year Scenario for Zone 40 (acre-feet)

	2025	2030	2035	2040	2045
Supply Total	107,431	113,386	125,886	128,386	133,386
Demand Total	48,547	57,219	65,106	71,551	78,107
Surplus	58,884	56,167	60,780	56,835	55,279

Source: SCWA 2021 (Table 5-4).
SCWA = Sacramento County Water Agency

Table 4b. SCWA Non-Potable Water Surplus in Fifth Consecutive Dry-Year Scenario for Zone 40 (acre-feet)

	2025	2030	2035	2040	2045
Supply Total	3,921	3,921	3,921	3,921	3,921
Demand Total	1,420	1,890	2,360	2,830	3,300
Surplus	2,501	2,031	1,561	1,091	621

Source: SCWA 2021 (Table 5-8).
SCWA = Sacramento County Water Agency

3.6.3 California American Water Company

The CalAm Security Park PWS service area is approximately 3 miles west of the project boundary and is one of the smaller PWSs in CalAm's Sacramento District service area. It has 50 connections serving approximately 10 million gallons per year. The CalAm 2020 UWMP describes the Security Park PWS as follows (CalAm 2021):

> The Security Park service area is the easternmost PWS in the Sacramento Main District and spans approximately 3,000 acres in Sacramento County. It is bounded on the north by White Rock Road and in the south by Douglas Road. The service area extends to Americanos Boulevard in the east and extend approximately 1.5 miles to the west of Security Park Drive.
>
> The Security Park water system currently serves a commercial area. In 2020, the Rio Del Oro development broke ground. It is anticipated that this project will be developed within the Security Park service area over the next 25 to 30 years and will consist of approximately 12,000 residential dwelling units along with commercial, industrial, and institutional development.

Historical water use for the PWS has ranged from approximately 6 AFY most recently to 638 AFY in 2010 (CalAm 2021 [Table 7-6]). The Security Park PWS obtains its water from groundwater wells in the SASb and has the capability to purchase water from the SCWA (CalAm 2021 [Table 6-5]). The analysis of service area, general plan, and demographics buildout projections versus existing and projected supplies through 2045 in the UWMP indicate sufficient water supplies would exist even after multiple dry years (CalAm 2021 [Tables 7-2 and 7-4]). The fifth-year drought potable water demand and supply comparison for CalAM is provided in Table 5. Water from CalAm is not being considered as a potential source for the CCAR Project.

Table 5. CalAm (Security Park) Water Surplus in Fifth Consecutive Dry-Year Scenario (acre-feet)

	2025	2030	2035	2040
Supply Total	41,355	41,355	41,931	42,799
Demand Total	10,280	11,263	12,040	12,998
Surplus	31,075	30,092	29,891	29,802

Source: CalAm 2021 (Table 7-4).

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4 Water Resources Inventory

4.1 Local Surface Water

Local surface water is not considered as a potential source of CCAR Project water. As shown in Figure 4, Hydrologic Areas, the CCAR site is intersected by three U.S. Geological Survey sub-watersheds (USGS 2021). The majority of the site is within the Carson Creek Subwatershed (Hydrologic Unit Code [HUC] 1080400130501]), the southeastern edge of the site is within the Upper Deer Creek Subwatershed (HUC 180400130502), and the northwestern portion of the site is in the Upper Morrison Creek Subwatershed (HUC 180201630402) (Figure 4). Each of these watersheds, including runoff from the project site, eventually drains to the American River and the Sacramento–San Joaquin Delta.

Local surface water resources were inspected as part of the Phase I Environmental Site Assessment (ESA) completed for the project (Dudek 2021). The findings of the Phase I ESA are as follows (Dudek 2021):

> Numerous wetlands are scattered throughout the subject property, and two seasonal creeks intersect the subject property (from north to south). Carson Creek is the larger of the two systems, with headwaters extending north into the community of El Dorado Hills. The majority of the Carson Creek within the subject property is located east of Scott Road, where the channel is confined to steep hills and some exposed bedrock. Per communication with the ranch manager, sections of Carson Creek in this area can retain water year-round (Skjerpe, pers. comm. 2021). Approximately 0.6 miles north of the southern boundary of the subject property, Carson Creek crosses under Scott Road where it enters a lower-gradient alluvial filled channel before exiting the subject property at the southwest corner, approximately 0.3 miles upstream from its confluence with Coyote Creek.
>
> Coyote Creek is located entirely west of Scott Road, and runs nearly parallel to Scott Road before discharging at the southwest corner of the subject property (also 0.3 miles upstream from the confluence with Carson Creek). The small Coyote Creek watershed is primarily comprised of rangeland, although sections of the Prairie City SVRA do contribute flow to this creek. The majority of the Coyote Creek reach is in a shallow alluvial valley, although there is one reach in the southern section that enters a bedrock confined section where remnants of an old dam were encountered. There is more evidence of channel degradation (downcutting, bank erosion) in the Coyote Creek basin than in the Carson Creek basin, including within the smaller contributing ephemeral channels.
>
> One perennial spring was identified near the upper reach of Coyote Creek within the subject property. A groundwater extraction and treatment system was installed at this spring and is assumed associated with the Aerojet Superfund Site. Four cattle ponds were identified through review of aerial imagery, and one was visited in the field. These features are resultant from earthen dam impoundments placed within smaller contributing drainages.
>
> All surface flow generated within the subject property is conveyed through natural channels or earthen ditches (roadside). Excess rainfall (or irrigation/wash water) initially travels as sheet flow across the subject property before coalescing in rills that feed the smaller ephemeral drainages or depressions (sinks) within the subject property. Surface flows that leave the subject property are

most likely conveyed through Carson Creek or Coyote Creek in the southwest, or Morrison Creek to the west which captures a small portion of runoff from the Prairie City SVRA, all of which ultimately discharge to the Cosumnes River.

A search of the Electronic Water Rights Information Management System (eWRIMS) database reveals three points of diversion within the project site (Table 6). Surface water is not being considered as a potential project source.

Table 6. Active Water Rights Records within the Project Boundary

POD ID	Latitude	Longitude	Watershed	Diversion Type	Diversion Storage Amount (AFY)	Water Right Type (Status)	Holder
18393	38.5676962	-121.1186346	Carson Creek	Diversion to Storage	42.5	Appropriative (Licensed)	Milgate Associates Limited Partnership
7818	38.56102056	-121.1075255	Upper Deer Creek	Direct Diversion	9	Stockpond (Certified)	Fay Fay Ledbetter
7819	38.56453718	-121.136686	Carson Creek	Direct Diversion	10	Stockpond (Certified)	Fay Fay Ledbetter

Source: SWRCB 2021
POD = Point of Diversion; AFY = acre-feet per year

4.2 Groundwater

The project site is located along the Cenozoic/Mesozoic contact on the eastern side of the San Joaquin Valley. Appendix A (Section 2.2) describes the geological setting of the project in greater detail, which is composed predominately of the Jurassic Salt Springs Slate and Gopher Ridge Volcanics on the east side of the project site, and the Eocene Ione Formation and Miocene undivided Mehrten Formation on the west side of the project site. Groundwater on the project site occurs under two hydrogeologic conditions: in Mesozoic bedrock in fractures or poorly permeable units, and in Cenozoic units in the western part of the project, which are roughly encompassed by the outer boundary of the SASb (see Figure 4). Because the younger Cenozoic units are part of the SASb, groundwater in this area of the project site would be managed along with the rest of the SASb by the GSA under the adopted GSP, which is described in greater detail in Section 3.1 (SASb GSAs 2021).

The project site is roughly bisected by the eastern boundary of the SASb (DWR Basin No. 5-021.65) (Figure 4), the whole of which is within California's Great Valley. The Great Valley is a broad structural trough bounded by the tilted block of the Sierra Nevada on the east and the complexly folded and faulted Coast Ranges on the west. The CCAR site is at the southeast end of the Sacramento Valley, approximately 5 miles north of the Cosumnes River, which is the boundary between the San Joaquin Valley Groundwater Basin (DWR Basin No. 5-022) and the Sacramento Valley Groundwater Basin (DWR Basin No. 5-021) to the north.

As part of the Phase I ESA completed for the project (Dudek 2021), on-site wells were identified and are shown in Figure 5, Wells Map. A description of the well reconnaissance is provided in the Phase I ESA as follows (Dudek 2021):

Numerous wells, including municipal production wells, groundwater monitoring wells, and extraction wells associated with the Aerojet Superfund Site occur on site. The oldest of the identified wells are assumed to be the five abandoned open (hand dug) wells located throughout the subject property. The hand dug wells consist of shallow rock lined holes approximately 4 to 5 feet in diameter partially filled with debris (wood) and with shallow standing water in two of them (between 10 and 15 feet below ground surface—the bottom of the third well was not observed due to the presence of debris) (Dudek 2021).

Three production wells with standard casings, pumps, and wellheads were identified within close proximity to the ranch house. These wells extended directly west from the main ranch house out into, and across, Coyote Creek. The wells closest to, and furthest from, the ranch house are currently not operational. The well located within the floodplain of Coyote Creek is the current active well for the ranch house. It was noted as having a well casing diameter of 36 inches, and a total depth of 35 feet. Mr. Skjerpe noted that this well provides water for just himself at the ranch house, and that it has gone dry in the past despite the limited demand [Skjerpe pers comm. 2021]. An additional production well associated with a former homestead was identified across Scott Road from the ranch house. The wellhead for the well located at the previous homestead was accidently removed by a bulldozer during a recent fire response. All that is left is the open casing flush with the ground surface. The casing was measured at approximately 10 inches across in diameter. A total depth of 120 feet was tagged during the site reconnaissance, and the depth to water was measured at 43 feet below ground surface. The last production well identified was within the Prairie City SVRA; details regarding the well depth, production rate, and treatment requirements were not determined during the site reconnaissance.

Monitoring and extraction wells, assumed to be associated with the Aerojet Superfund Site, were identified in the northern and northwestern section of the subject property (see discussion of perennial spring above). Multiple extraction wells are located within and just outside the northwestern corner of the subject property.

The feasibility and potential impacts of using on-site groundwater wells to satisfy the water demands of the project were reviewed, and the following primary findings were made (Appendix A):

- There is insufficient data and information with which to evaluate the feasibility of obtaining all project water from on site or near-site groundwater sources. Additional testing and evaluation would be necessary to determine the feasibility of obtaining all water from on-site groundwater resources. Thus, this report analyzes multiple scenarios including the potential for sourcing all water needs for the project from on-site groundwater sources.
- The temporary lowering of groundwater levels due to project on-site or off-site well production of 253 AF during a 18-month period for construction and decommissioning would likely only be a local effect, but additional studies may be required to evaluate potential interference to near-by wells. These studies may include aquifer testing and groundwater modeling.
- The project is unlikely to have any significant impact to the SASb groundwater in storage because of the short period of pumping (253 AF over 18 months) and the large volume of recharge (298,900 AFY) and outflow (305,100 AFY) estimated for future climate conditions in the SASb. Currently, there is a surplus of 2,200 AF annually in the SASb based on need. The amortized per-acre groundwater use for the project

would be approximately 0.01 AFY per acre, which is significantly less than the 1.21 AFY per acre under sustainable conditions.

- Areas of the Project Study Area to the east of Scott Road, which are the general locations being considered for onsite groundwater extraction, are not at risk of being impacted by the Aerojet plumes located to the west and southwest for the following reasons: 1) the area is hydraulically upgradient of the nearest Aerojet plume and wells operating in this area will capture water originating from the northeast, 2) the area is located east and southeast of the Aerojet plumes, which is perpendicular to the direction of plume migration to the southwest, and 3) the proposed groundwater extraction area(s) for the Project are outside the 2,000-foot consultation zone for the Aerojet plumes, which neglects the requirement for a special review by the Sacramento County Environmental Management Department and the Central Valley RWQCB to evaluate potential impacts to public health and groundwater quality (Section 6.28(G) of the County Code). Figure 5 shows the estimated extent of a 2,000-foot buffer centered on the proposed groundwater extraction area in relation to the nearest detected contamination affiliated with the Aerojet plumes. The nearest detected contamination is approximately 6,600 feet from the proposed groundwater extraction area.
- Land subsidence is not considered to be a significant impact in the SASb (SASb GSAs 2021). Significant land subsidence is unlikely to cause a problem in the Cenozoic deposits in the project area because of the limited infrastructure in the area. The Mesozoic bedrock units are not susceptible to land subsidence.
- There are no potential GDEs mapped within the project area. Therefore, groundwater extractions would not affect GDEs or potential GDEs.

Figure 5 summarizes these findings and shows the southerly and easterly extent of the elevated concentrations of the contaminants NDMA, perchlorate, and TCE. Raw water pumped from this location is likely to require expensive treatment and could result in migration of pre-existing contaminant plumes, and thus is not considered as a source of groundwater (the extent of this area is shown in Figure 5).

Given the findings above, this WSA assumes that on-site groundwater is sufficient to supply the 10.5 AFY for the operation and maintenance phase of the project in all water year types. Water from SCWA and/or groundwater from the Sloughhouse Solar Project may be used to supply the construction and decommissioning phases of the project.

4.3 Imported Water

There is currently no imported water available at the project site. Neighboring water districts use imported water to varying degrees as part of their water supply portfolios (described in greater detail in Section 3.5). For the construction and decommissioning phases, the project may supplement on-site groundwater supplies with water imported via water truck from the SCWA or Sloughhouse Solar Project wells. SCWA (Section 3.5).

4.4 Reclaimed/Remediated Water

There is no significant source of reclaimed water available on site. There is a groundwater extraction and treatment system installed at a spring near the upper reach of Coyote Creek that is assumed to be associated with the Aerojet Superfund Site. However, discharge from this system is low and it supports ecological beneficial uses, and thus is not considered available to the project.

In its UWMP, the SCWA provides a description of the reclaimed water it uses from the Aerojet cleanup site, as follows (SCWA 2021):

> In 2010, Aerojet General Corporation (Aerojet) and Sacramento County Water Agency entered a formal settlement agreement related to groundwater contamination issues caused by Aerojet in the SCWA service area. As part of this agreement, Aerojet agreed to deliver and SCWA agreed to receive up to 8,900 acre-feet of Aerojet Groundwater Extraction and Treatment (GET) water. Aerojet extracts and treats contaminated groundwater at its GET facilities from the American River watershed region and discharges the treated water to the American River. SCWA diverts this water at the Freeport Regional Water Project facility for use throughout its service area. Article 2.3 of the settlement agreement states that SCWA "assumes all risks concerning Aerojet's right, title, and interest in GET Transferred Water." Nevertheless, the supply availability has not diminished and SCWA uses the water in its service area. The delivery pattern available for the water may allow SCWA to take larger portions of the supply, if not all the supply, as needed and made available by Aerojet. The water supply is 100% reliable in all year types because the groundwater extraction and treatment are part of a federally mandated remediation program. Aerojet's remediation program will continue beyond the planning horizon of this SCWA's UWMP.

The SASb GSP provides an accounting of remediated water produced by cleanup sites within the subbasin, estimating up to 34,322 acre-feet of water was produced during the 2018 water year (SASb GSAs 2021). Besides the Aerojet facility described above, other sources of reclaimed water are available from the Beoing Inactive Rancho Cordova Test Site (5,067 AF), Mather Air Force Base (2,232 AF), the Keifer Landfill (621 AF), the Sacramento Army Depot (24 AF), the Union Pacific Downtown site (240 AF), and the Union Pacific Curtis Park site (192 AF) (SASb GSAs 2021 [Table 2.1-13]). These amounts are assumed to be provided to local water suppliers in the accounting of potential water supply sources available to the project in this WSA.

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5 Water Supply and Demand Comparison

A comparison of the available water supplies discussed in Chapter 4, Water Resources Inventory, and the proposed water demand determined in Chapter 2, Project Water Demand, is provided in Table 7. The project proponent may rely on SCWA and/or groundwater imported from the Sloughhouse Solar Project as well as groundwater from onsite for construction and decommissioning of the project. The Sloughhouse Solar Project water is to be considered for the operation and maintenance phase only, if necessary, but on-site groundwater will should be sufficient for this purpose. Therefore, Table 7 does not include the Sloughhouse Solar Project Water for operation and maintenance.

This analysis is sufficient to demonstrate water availability over the proposed lifetime of the project, as well as the SB 610 mandated 20-year projection (in a multiple-dry-year scenario). Table 7 provides the multiple-dry-year scenario because if water is sufficient in the worst-case scenario, it is also sufficient in wet and average water years. For operation and maintenance, Appendix A concludes that on-site wells, existing or planned, would be sufficient to provide 10.5 AFY.

The per-acre groundwater use within the SASb is approximately 1.23 AFY per acre (305,100 AFY under future climate conditions over a surface area of 248,000 acres) (DWR 2016). Under the sustainable conditions developed for the SASb GSP, the per-acre groundwater use within the SASb would be approximately 1.21 AFY per acre (298,900 AFY/ 248,000 acres) (SASb GSAs 2021). The SASb GSA has identified more than 170 projects and management actions in the SASb that could be used to counter the 0.02 AFY per-acre projected overdraft in the SASb and has modeled several projects to offset the possible future overdrafts (SASb GSAs 2021). Based on the total project water demand estimate amortized over the project life of 35 years, and assuming that all project water is from groundwater, the Project water use would be 0.01 AFY per acre, well below the sustainable condition of 1.21 AFY/acre[3]. This indicates that the project would not deter sustainable management of the SASb, contribute substantially to exceedances of minimum thresholds in the GSP, or interfere with achievement or maintenance of the measurable objectives developed for the GSP.

[3] 26.5 AFY/2,555 acres = 0.01 AFY/acre

Table 7. Water Supply/PWS Surplus by Source and Project Phase Under Conservative Scenario (Fifth Consecutive Year Drought)

	Construction (AFY)	Operation and Maintenance (AFY)	Decommissioning (AFY)
On-Site Sources			
On-Site Groundwater	10.5	10.5	10.5
Off-Site Sources			
Sacramento County Water Agency[a]	2,501[b]	0[c]	621
Sloughhouse Wells	253	0[d]	253
Water Demand			
Water Demand	253	10.5	253
Surplus			
Surplus	2,512	0[d]	632

Sources: Appendix A; SCWA 2021 (Table 5-4).

PWS = public water system; AFY = acre-feet per year

a Amounts are derived from Table 5-4 of the Sacramento County Water Agency's Urban Water Management Plan according to the closest year corresponding to construction and decommissioning.

b Construction and decommissioning water demand may be provided by on-site groundwater if it is determined that such water is available.

c Because the project does not propose a permanent connection to any off-site PWS, off-site water is not counted as available to the project during its operation and maintenance phase.

d Water from the Sloughhouse Wells is not anticipated for use during the Operation and Maintenance Phase of the CCAR Project but could be sourced as an alternative if necessary.

6 Conclusion

In compliance with SB 610, this WSA concludes that sufficient water is available to supply the project's water demand under normal-year, single-dry-year, and multiple-dry-year conditions over a 20-year projection, and over the estimated 35-year life of the project, accounting for the projected water demand of the CCAR plus other existing and planned future uses of the identified water supply. The analyses included in the WSA evaluates the use of water resources from CCAR onsite wells, the SCWA, or the Sloughhouse Solar Project wells. The conclusions of the WSA remain valid regarding groundwater impacts whether all project water was supplied from on-site wells, all water was supplied from the SCWA, or all water was sourced from Sloughhouse. All three sources are viable to source all construction water needs and all O&M water needs.

The accounting of off-site water sources (SCWA), described in Section 3.5, incorporates the planned future uses of water in its 20-year projections. Based on the analysis above, the project would have no significant effect on the identified water sources over the project's 35-year life. In addition, the project is consistent with the SGMA and the Basin GSP because the project's water demand, if supplied entirely from groundwater from within the Project site or alternatively from the Sloughhouse well, would not materially impact the sustainability goals, undesirable results, minimum thresholds, or measurable objectives of the GSP.

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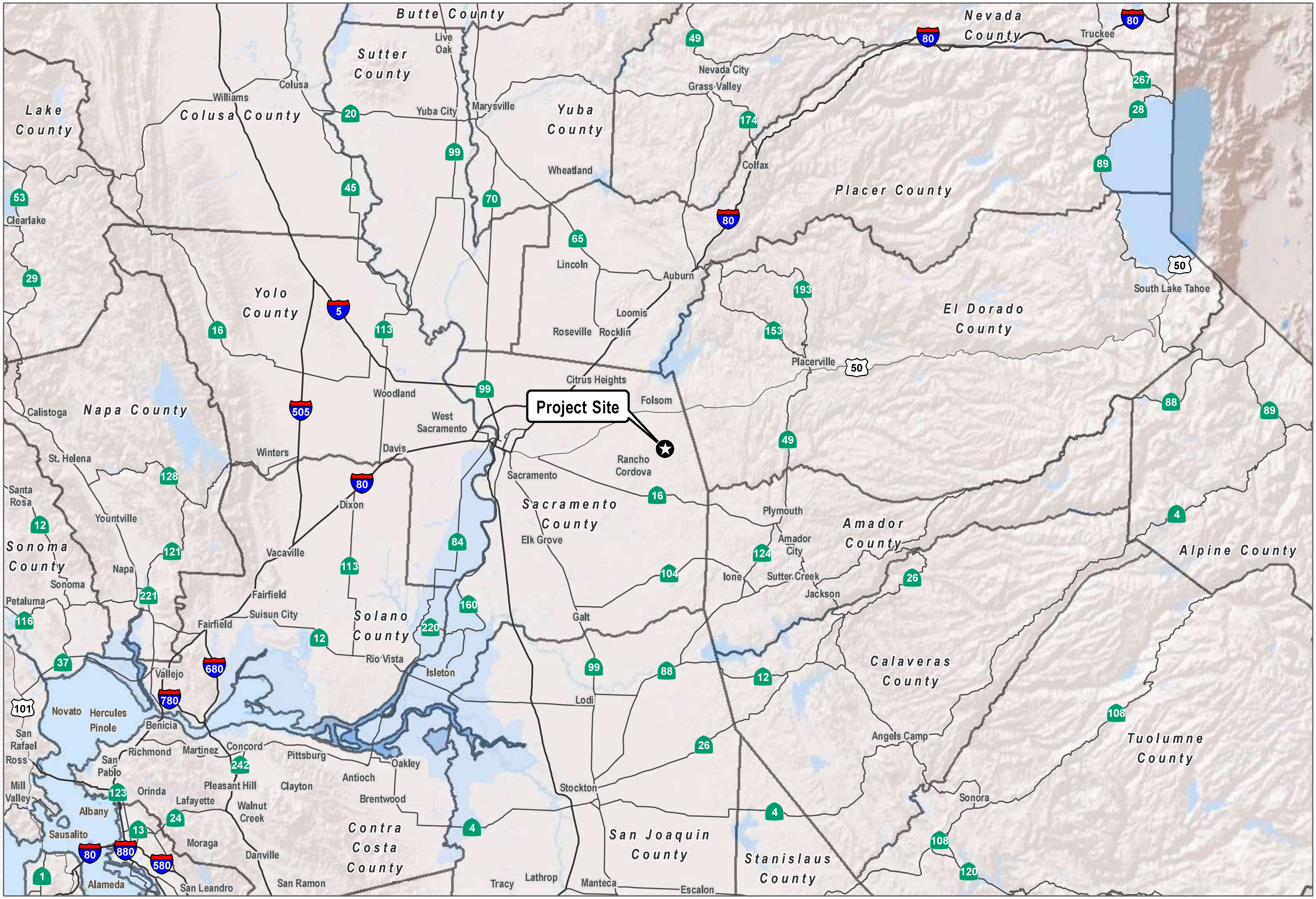

SOURCE: ESRI

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0 5 10 Miles

FIGURE 1

Project Location

Coyote Creek Agrivoltaic Ranch Environmentally Preferred ProjectDesign Water Supply Assessment

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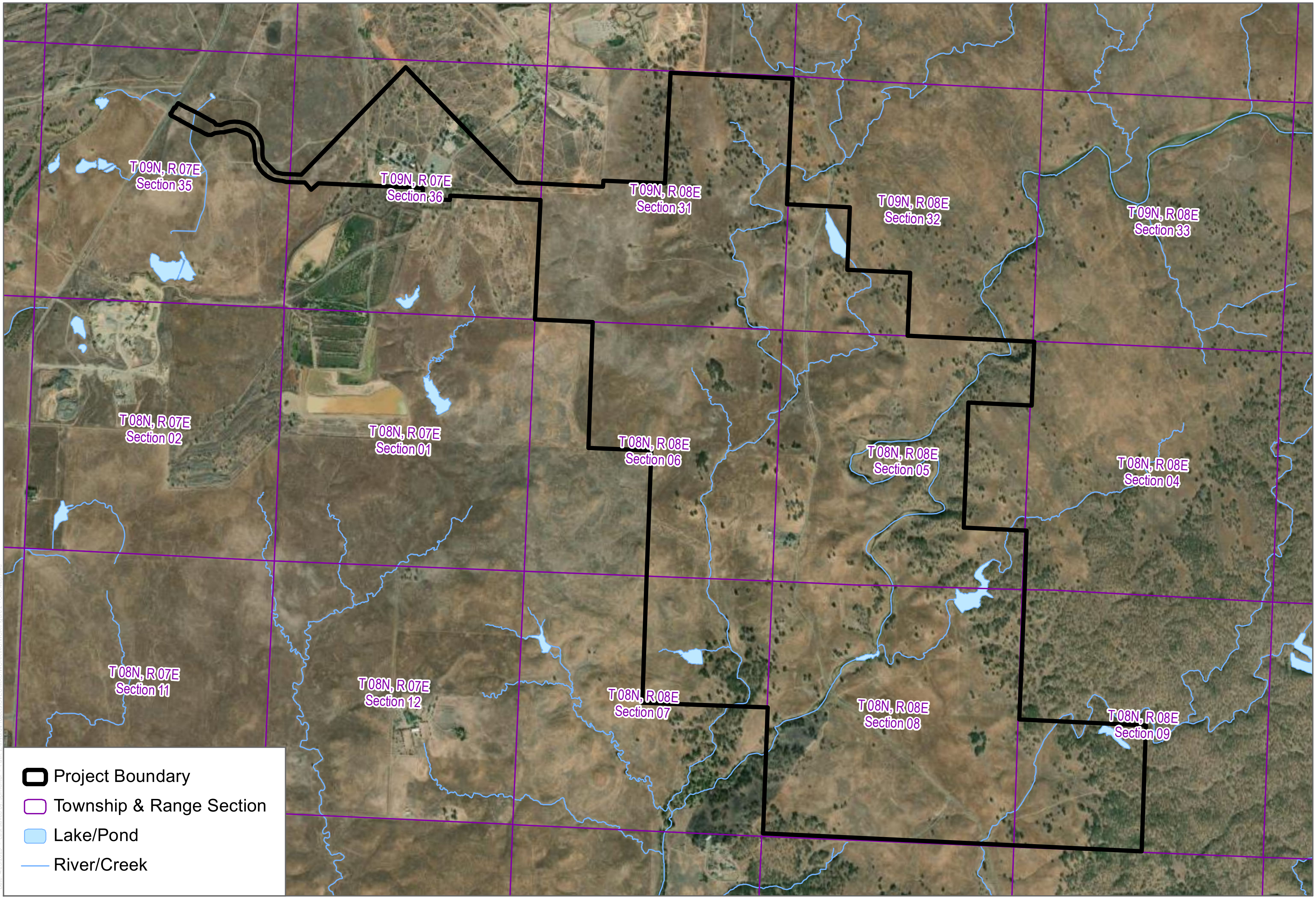

SOURCE: ESRI, USGS

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FIGURE 2

Site Aerial Map

Coyote Creek Agrivoltaic Ranch Environmentally Preferred Project Design Water Supply Assessment

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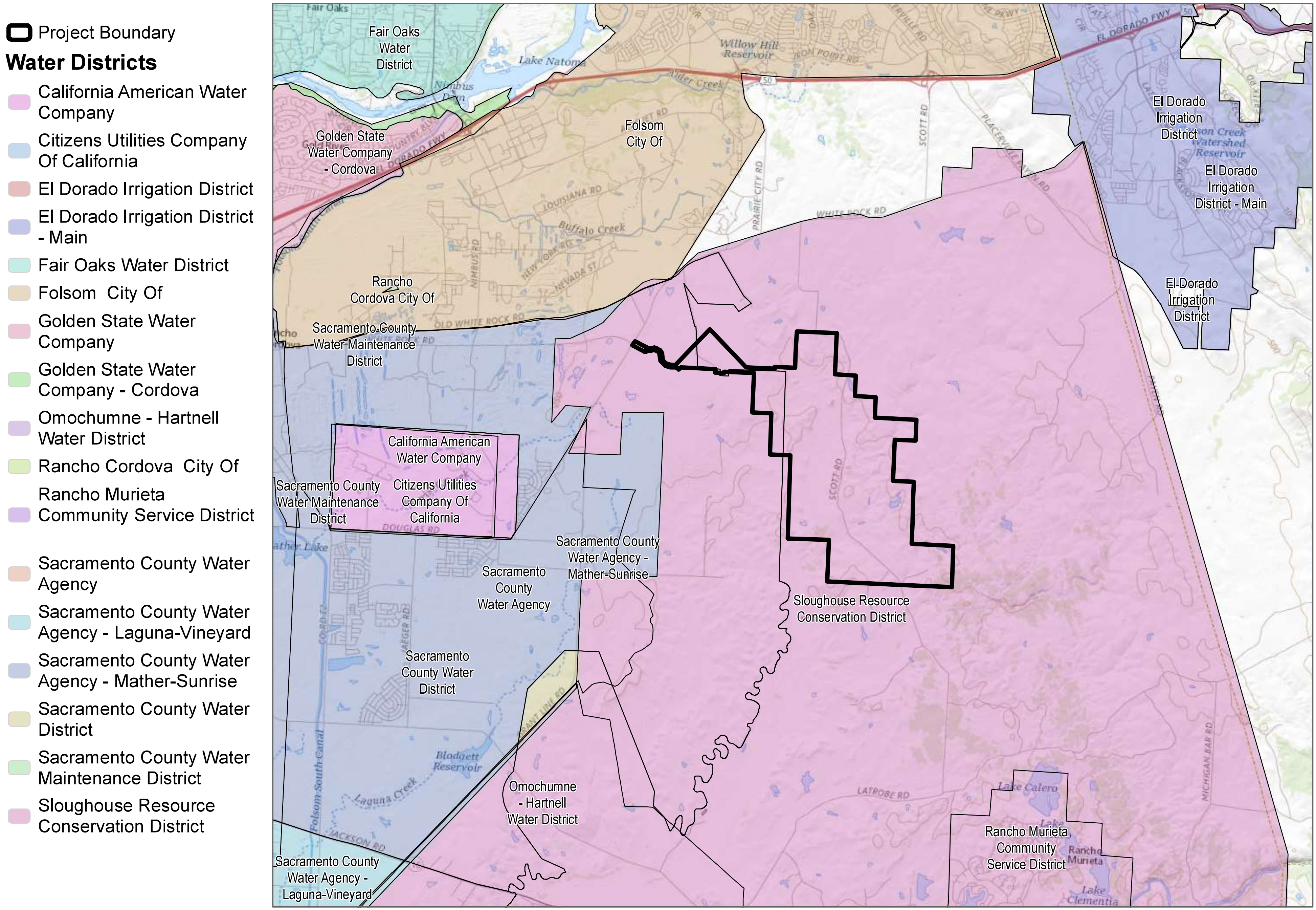

SOURCE: ESRI, USGS

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0 1.5 3 Miles

FIGURE 3

Water Service Areas

Coyote Creek Agrivoltaic Ranch Environmentally Preferred Project Design Water Supply Assessment

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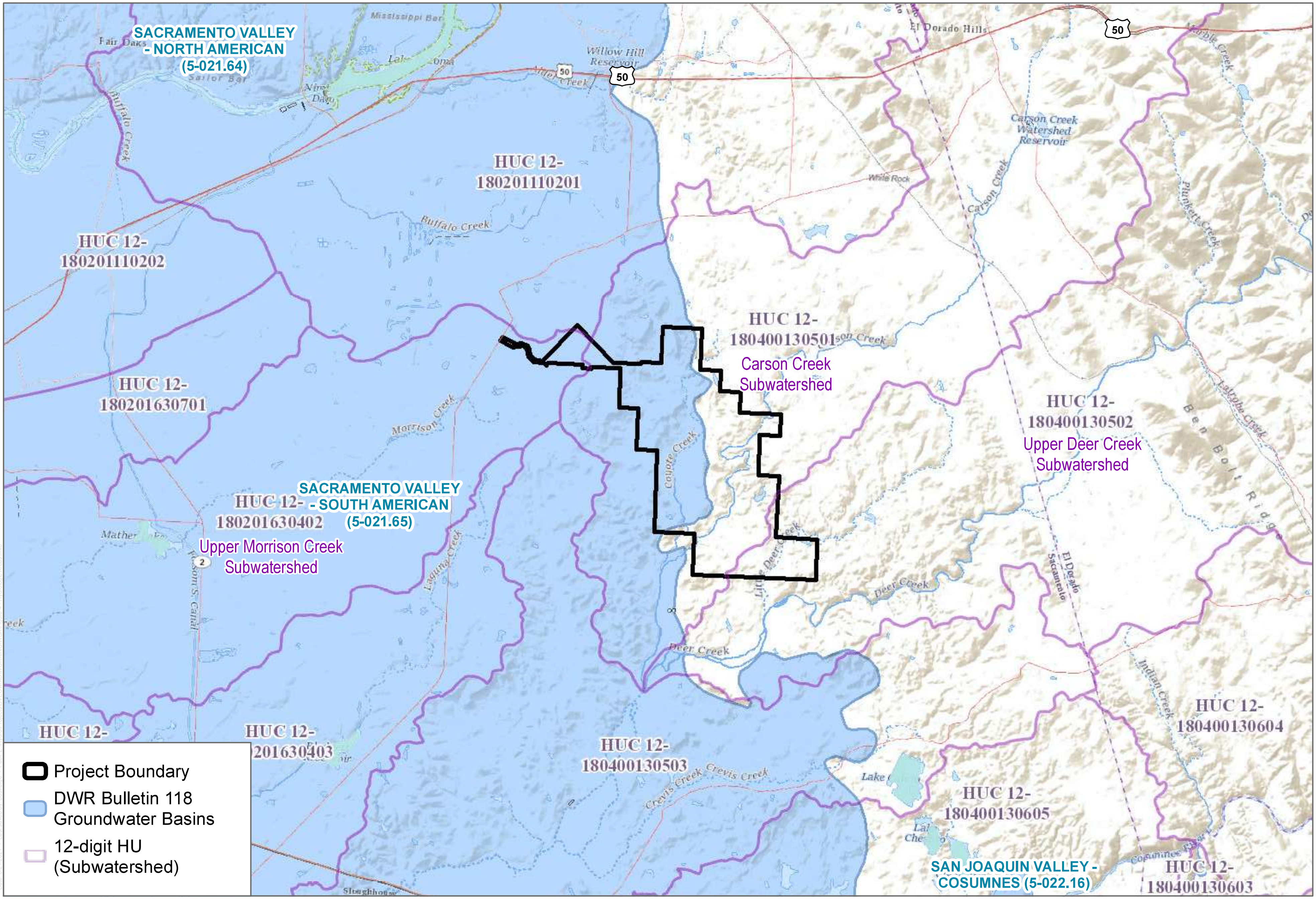

SOURCE: ESRI; USGS; DWR

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FIGURE 4

Hydrologic Areas

Coyote Creek Agrivoltaic Ranch Environmentally Preferred Project Design Water Supply Assessment

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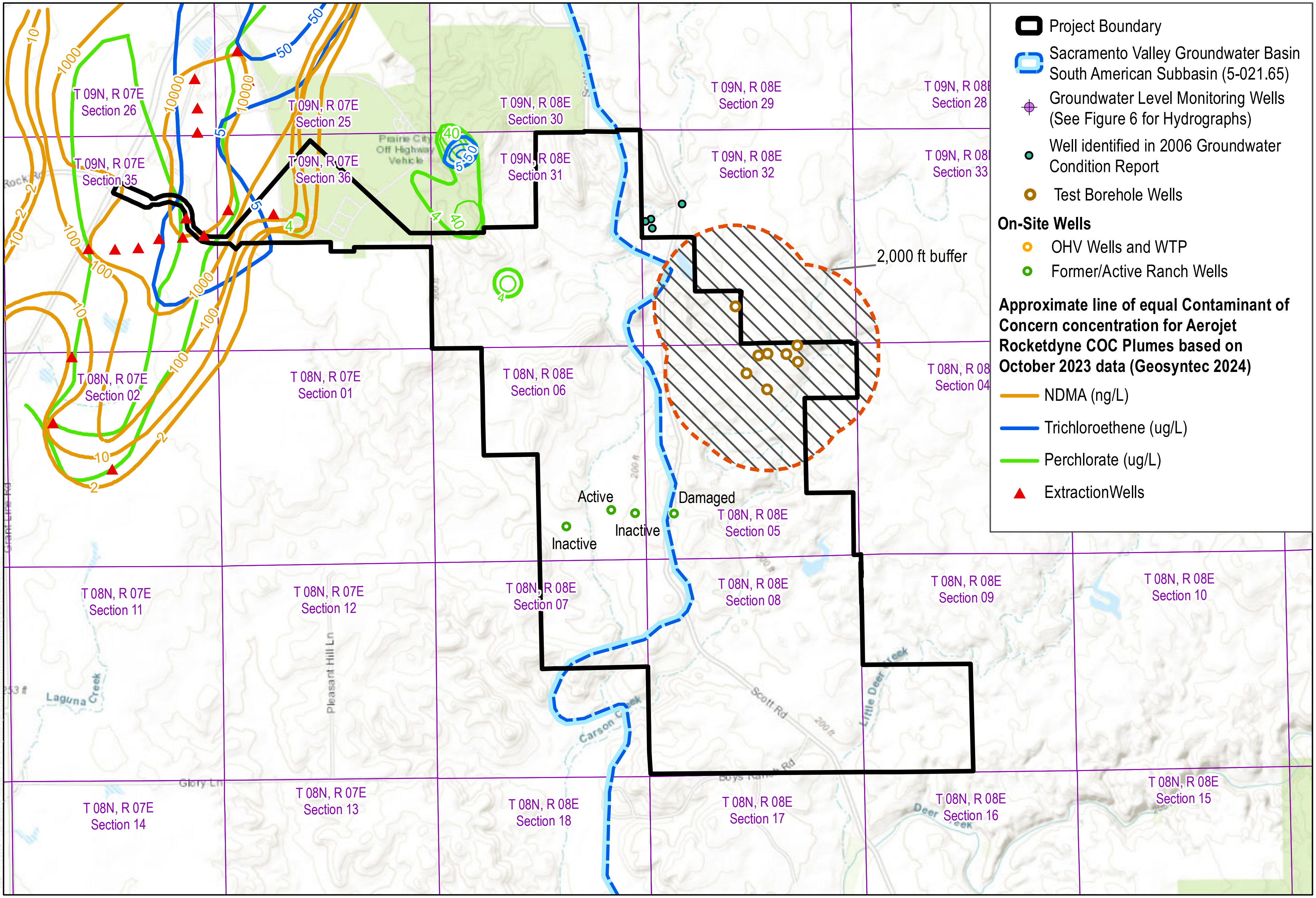

SOURCE: ESRI, DWR, USGS, Geosyntec 2024(Isoconcentration Contour Maps)

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0 0.5 1 Miles

FIGURE 5

Wells Map

Coyote Creek Agrivoltaic Ranch Environmentally Preferred Project Design Water Supply Assessment

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Appendix A

Groundwater Resource Impact Analysis

Groundwater Resource Impact Analysis

Coyote Creek Agrivoltaic Ranch Environmentally Preferred Project Design Sacramento County, California

JULY 2024/REVISED NOVEMBER 2024

Prepared for:

SACRAMENTO VALLEY ENERGY CENTER, LLC
1166 Avenue of the Americas, 9th Floor
New York, New York 10036

Prepared by:

DUDEK

605 Third Street
Encinitas, California 92024

Printed on 30% post-consumer recycled material.

Table of Contents

SECTION **PAGE NO.**

TABLES

FIGURES

Acronyms and Abbreviations

Acronym/Abbreviation	Definition
AF	acre-feet
AFY	acre-feet per year
bgs	below ground surface
CASGEM	California Statewide Groundwater Elevation Monitoring
CCAR	Coyote Creek Agrivoltaic Ranch
CEQA	California Environmental Quality Act
County	County of Sacramento
DWR	California Department of Water Resources
GDE	groundwater-dependent ecosystem
GRIA	Groundwater Resource Impact Analysis
GSA	Groundwater Sustainability Agency
GSP	Groundwater Sustainability Plan
msl	mean sea level
project	Coyote Creek Agrivoltaic Ranch
SASb	South American Subbasin
SB	Senate Bill
SGMA	Sustainable Groundwater Management Act
WSA	Water Supply Assessment

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1 Introduction

1.1 Project Description and Purpose

The Coyote Creek Agrivoltaic Ranch (CCAR or project) would be an up to 200-megawatt alternating-current photovoltaic solar energy facility with associated on-site substation, inverters, fencing, roads, and supervisory control and data acquisition system. The proposed energy storage components would include an up to 100-megawatt alternating-current maximum capacity energy storage (battery) system. A generation tie (gen-tie) line would extend approximately 1.5 miles to reach the nearest Sacramento Municipal Utility District 230-kilovolt powerline, which runs through the Prairie City State Vehicle Recreation Area. The CCAR may also interconnect to an on-site 138-kilovolt powerline owned by Pacific Gas & Electric or the 69-kilovolt Sacramento Municipal Utility District powerline, both of which are along the same gen-tie line easement as the path to the Sacramento Municipal Utility District's 230-kilovolt powerline. The CCAR would maintain current ranching practices of sheep and cattle grazing on the property.

The purpose of this Groundwater Resource Impact Analysis (GRIA) is to evaluate the CCAR's groundwater uses in relation to each of the six sustainability indicators defined under the 2014 Sustainable Groundwater Management Act (SGMA), and if the groundwater impacts of the project could produce, or add to, any undesirable results within the underlying aquifers.

1.2 Project Location

The CCAR site is on approximately 2,555 acres of the Barton Ranch adjacent to 3830 Scott Road, Sacramento County, California (Figure 1, Project Location). The project site is approximately 2.5 miles south of White Rock Road in the Cosumnes community, and approximately 4.5 miles south of U.S. Route 50, southeast of the Prairie City State Vehicle Recreation Area. It is bisected by Scott Road and has a geographic center that roughly corresponds with 38.576278° North and -121.132944° West, at an elevation of 196 feet above sea level. The property includes parts of Sections 35 and 36, Township 9 North, Range 7 East, Sections 31 and 32, Township 9 North, Range 8 East, and Sections 5, 6, 7, 8, and 9, Township 8 North, Range 8 East, Mount Diablo Meridian, California (Figure 2, Site Aerial Map).

1.3 Project Area Climate

The project area's climate is semi-arid with hot, dry summers and cool, wet winters. The mean annual temperature in Sacramento County is 61.5°F, with average annual temperatures near the project site ranging from approximately 53°F to 92°F (WRCC 2021). Average annual rainfall is approximately 18 inches, with only approximately 8 inches occurring during the most recent year available (June 1, 2020 to May 31, 2021) (CDEC 2021). On average, the highest temperature occurs in July and the most precipitation falls in January and February (SCWA 2021).

1.4 Applicable Groundwater Regulations

The project has been determined to be subject to the California Environmental Quality Act (CEQA) by the County of Sacramento (County), the lead agency. Senate Bill (SB) 610, passed on January 1, 2002, amended the California

Water Code to require detailed analysis of water supply availability for certain types of development projects. The primary purpose of SB 610 is to improve the linkage between water and land use planning by ensuring greater communication between water providers and local planning agencies and ensuring that land use decisions for certain large development projects are fully informed as to whether a sufficient water supply is available to meet project demands. SB 610 requires preparation of a Water Supply Assessment (WSA) for a project that is subject to CEQA and meets certain requirements. SB 610 is codified in California Water Code Division 6, Part 2.10 (Sections 10910–10915).

The County, as the CEQA lead agency, is responsible for preparation of a WSA, which will be included in the CEQA documentation for consideration. The lead agency will make an independent determination as to whether there is adequate water supply for the proposed CCAR, having considered the entire administrative record. If on-site or off-site groundwater is a potential water source, SB 610 requires additional analyses.

Part of the project site is in the South American Subbasin (SASb), which is subject to the 2014 SGMA, codified in California Water Code Part 2.75 (Sustainable Groundwater Management) Section 10720 et seq. The SGMA requires preparation of a Groundwater Sustainability Plan (GSP) for the SASb, which is designated as "high priority" by the California Department of Water Resources (DWR). The GSP was approved by DWR in July of 2023 and is being implemented by the Groundwater Sustainability Agencies (GSAs) representing the entire SASb, which include the Sacramento Central Groundwater Authority, Northern Delta GSA, Omochumne-Hartnell Water District, Sloughhouse Resources Conservation District, and County of Sacramento (SASb GSAs 2021).

Under the SGMA, the GSP is required to evaluate significant and unreasonable impacts in medium- and high-priority basins and ensure that these basins achieve and maintain long-term groundwater sustainability. Under the SGMA, any undesirable results that occur throughout the basin, when caused by groundwater withdrawals, indicate that the basin is not sustainable relative to groundwater withdrawals. Significant and unreasonable impacts to any of six sustainability indicators is determined by the GSA using the processes and criteria described in the GSP. The GSA is required to characterize undesirable results for each indicator unless "undesirable results to one or more sustainability indicators are not present and are not likely to occur in the basin" (23 CCR 354.26[d]). The SASb GSP is required to evaluate undesirable results for any of six sustainability indicators resulting from groundwater production. Undesirable results are defined by DWR as follows:

- Chronic lowering of groundwater levels
- Significant and unreasonable reduction of groundwater in storage
- Significant and unreasonable seawater intrusion resulting from groundwater withdrawal (given that the closest possible source of seawater, the Pacific Ocean, is more than 30 miles west of the SASb, this indicator was presumed inapplicable and was not evaluated)
- Significant and unreasonable degradation of water quality resulting from groundwater withdrawal
- Significant and unreasonable land subsidence resulting from groundwater withdrawal
- Significant and unreasonable reduction of interconnected surface water and groundwater resulting from groundwater withdrawal

The purpose of this GRIA is to evaluate the project's groundwater uses in relation to each of the six sustainability indicators listed above, and if groundwater impacts by the project could produce, or add to, any undesirable results within the SASb. The SASb GSP (SASb GSAs 2021) was consulted for data and information regarding the status of the SASb.

1.5 Project Water Demands and Potential Groundwater Requirements

Water for the construction phase of the project is estimated to be approximately 253 acre-feet (AF) during the 18-month construction period (Dudek 2023). Subsequent operation and maintenance of the CCAR during its anticipated 35-year operational life would require approximately 10.5 acre-feet per year (AFY) of water, primarily for solar module washing, sheep grazing, landscape irrigation and restroom use. Plans for decommissioning and potential revegetation of the project site at the end of the 35-year project life are not yet complete, but for the purpose of the WSA (Dudek 2023), decommissioning water demand was conservatively estimated to be the same as that for project construction (i.e., 253 AF). Project water demand estimates are included in Table 1. Additional information about the project's water demand are presented in the WSA (Dudek 2024).

Table 1. Project Water Demand Estimates

Project Phase	Estimated Water Demand
Construction	253 AF
Operation and Maintenance	10.5 AFY
Decommissioning and Removal	253 AF

AF = acre-feet; AFY = acre-feet per year

For purposes of this GRIA, all project water demands are assumed to be from groundwater obtained from on-site wells, Sloughhouse Solar Project Wells, or the SCWA. Due to data gaps regarding on-site hydrogeology and the potential lack of on-site groundwater availability, water demands for construction and decommissioning (253 AF each) are assumed to be derived from the Sloughhouse Solar Project in the San Joaquin Groundwater Basin or the SCWA. Additional data and analysis are required to accurately assess the availability of on-site groundwater for construction and decommissioning. The anticipated 35-year project operational life water demand (10.5 AFY) is assumed to be from groundwater obtained from on-site wells.

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2 Existing Conditions

2.1 Topography and Drainage

Regionally, the project site is on the eastern side of the San Joaquin Valley at the western edge of the Sierra Nevada foothills in the east-central part of Sacramento County, California (Figure 1). Elevations of the project site range from approximately 150 feet to 300 feet mean sea level (msl) (Figure 2). The topography consists of rolling hills intersected by the generally north to south flowing Carson and Coyote Creeks, bisected by Scott Road.

In addition to Carson and Coyote Creeks, Little Deer Creek flows through the project site in Section 9, Township 8 North, Range 8 East, Mount Diablo Meridian, California (Figure 2). Little Deer Creek and three seasonal ponds in the eastern part of the project site are shown in Figure 3, Regional Geologic Map. The CCAR site is intersected by three U.S. Geological Survey sub-watersheds (USGS 2021). The majority of the site is within the Carson Creek Subwatershed (Hydrologic Unit Code [HUC] 1080400130501); the southeastern edge of the site is within the Upper Deer Creek Subwatershed (HUC 180400130502) and the northwestern portion of the site is in the Upper Morrison Creek Subwatershed (HUC 180201630402). Each of these watersheds, including runoff from the project site, eventually drains to the American River and the Sacramento–San Joaquin Delta. One spring was identified on the west side of the project site on maps by Brown and Caldwell (2006). The location of this spring is indicated as the “Spring and Active Aerojet Remediation Well” in Figure 4, Wells Map.

2.2 Geology

The project site is along the Cenozoic/Mesozoic contact on the eastern side of the San Joaquin Valley. Figure 3 shows the geological setting of the project, which is composed predominantly of Jurassic Salt Springs Slate and Gopher Ridge Volcanics on the east side of the project site, and the Eocene Ione Formation and Miocene undivided Mehrten Formation on the west side of the project site. Quaternary undivided alluvial deposits occur in the very western part of the project site, which have been dredged in historic time. Jurassic gabbro and metagabbro of the Foothill Melange occur along the northeastern edge of the project site. Through the center of the project site, Coyote Creek has some Quaternary undivided alluvial deposits. A small area of Cretaceous Chico Formation occurs near the center of the project site (SASb GSAs 2021) (Figure 3).

The Quaternary undivided alluvial deposits and their associated dredge deposits overlie the older Miocene to middle Pliocene-age Mehrten Formation and dip to the west from 1.5 to 2 degrees. The Mehrten Formation overlies the Eocene-age Ione Formation, which the SASb GSP (SASb GSAs 2021) identifies as a significant source of water on the east side of the SASb (the project site). The Ione Formation overlies the older Mesozoic basement rocks, which are considered relatively impermeable and are the boundary of the SASb. The Mehrten Formation has two units; the first unit which is composed of well-sorted black sands formed as fluvial deposits derived from the Sierra Nevada, and the second unit, which is a very dense tuff-breccia, is derived from volcanic ash. The first unit is part of the lower SASb aquifer, and the second unit is considered non-water bearing and may separate the lower SASb aquifer from upper aquifer units. In the project area, the Mehrten Formation is shown to extend to depths of up to 300 feet below ground surface (bgs) (Figure 2.2-34 in SASb GSAs 2021).

2.3 Existing Groundwater Wells

2.3.1 On-Site Groundwater Wells

There are six on-site wells on the CCAR site, not including shallow, hand-dug wells (Figure 4). A summary of the known characteristics of each of the on-site wells is presented in Table 2.

The OHV (off-highway-vehicle) and WTP (water treatment plant) well is state well number 09N07E36F001M and California Statewide Groundwater Elevation Monitoring (CASGEM) well 9661. This well has a total depth of 285 feet bgs and is screened from 197 feet to 269 feet bgs. Groundwater levels in this well have been recorded since 1979 (see Section 2.5.3). This well is currently being used for Aerojet contaminant plume remediation (see Section 2.5.4, Groundwater Quality) (Dudek 2021).

The well designated as "Damaged" was associated with an old homestead across the street from the current ranch house. The depth to groundwater was 43 feet bgs when measured on June 20, 2021, and the total well depth was measured to be approximately 120 feet bgs. The well head was recently accidently removed by a fire bulldozer, so currently, the casing is open with some defunct electrical lines running into it (Dudek 2021).

The site's only active well is the ranch's current production well located near Coyote Creek (Figure 4). The well is reported to have a total depth of approximately 35 feet, with the last groundwater depth reported to be approximately 10 feet bgs. The well is potentially screened in the valley alluvium and is reported to have run dry in the past (Dudek 2021).

There are several shallow hand-dug wells on the project site, as shown in Figure 4. These are dry; their history and purpose are unknown (Dudek 2021).

There is no additional information available about the on-site wells.

2.3.2 Nearby Off-Site Groundwater Wells

The following information is provided for context, but groundwater from off-site SASb wells is not being considered for project use. Off-site wells from DWR's well completion report database, the DWR/U.S. Geological Survey monitoring network, and the Proposed DeSilva Gates Quarry Groundwater Conditions Assessment from 2006 are shown in Figure 4, of which only three have any available information. CASGEM Wells 9659, 30672, and 9296 data is presented in Table 2. With the exception of Well 30672, which has a groundwater level measurement from April 15, 2021, the wells have very little groundwater level data and appear to have been measured irregularly.

Table 2. On-Site and Off-Site Groundwater Wells

Local Well Name	State Well Number	Groundwater Level Monitoring Well Number	Screen Interval (feet below ground surface)	Depth to Water (feet below ground surface)	Date Measured	Well Depth (feet)
On-Site Wells						
OHV Wells and WTP	09N07E36F001M	9661	197 to 269	194.6	April 8, 2021	285
Active	NA	NA	NA	NA	NA	35
Inactive	NA	NA	NA	NA	NA	NA
Inactive	NA	NA	NA	NA	NA	NA
Damaged	NA	NA	NA	43	June 20, 2021[a]	120[a]
Aeroject Remediation Well	NA	NA	NA	NA	NA	NA
Off-Site Monitoring Wells						
NA	09N07E27Q001M	9659	NA	45	May 7, 1990	100
NA	08N07E02N001M	30672	180 to 675	187.5	April 15, 2021	675
NA	08N07E14C001M	9296	NA	139.4	April 19, 2012	208

Sources: Groundwater Level Monitoring Wells from DWR
OHV = off-highway-vehicle; WTP = water treatment plant; NA = not available
Notes: Shallow on-site hand dug wells are not included in Table 2.
[a] Estimated by Dudek staff during field visit

2.4 Surface Water

As noted in Section 2.1, Topography and Drainage, Carson, Coyote, and Little Deer Creeks flow through the project site (Figures 2 and 3), and there is one spring on the west side of the project site (Figure 4). The WSA (Dudek 2023) identified three surface water diversion rights on the project site. Surface water is not a potential source of water for the project. (SWRCB 2021).

2.5 Groundwater

Groundwater on the project site occurs under two hydrogeologic conditions: in Mesozoic bedrock in fractures or poorly permeable units, and in Cenozoic units in the western part of the project site (Section 2.2, Geology; Figure 3). Each of these occurrences are discussed below.

2.5.1 Bedrock Area

Sespe Consulting (2021) prepared a review of relevant technical information pertaining to groundwater conditions underneath the project site, with the objective of providing a preliminarily assessment of groundwater as a possible water source for proposed solar projects. Their work relied on previous technical studies prepared for the previously proposed Milgate Quarry project by ENGEO (2006), which included an addendum by Brown and Caldwell (2006). The Sespe Consulting (2021) investigation only addressed groundwater within the bedrock area of the project site.

For the ENGEO (2006) studies, aquifer characterization and testing were performed in the older Mesozoic units on the project site using select boreholes prepared for the previously proposed Milgate Quarry project. The borehole locations are shown in Figure 5. These boreholes were completed on the project site as part of a geologic study conducted in 2005 (ENGEO 2006). Twelve boreholes were used for aquifer testing, and for each borehole, the initial groundwater levels were measured before pumping. The boreholes were pumped at various rates for varying amounts of time, which are shown in Table 3. Pumping discharges and drawdowns were recorded at each borehole to evaluate the potential for using groundwater as a water source.

Table 3. ENGEO (2006) Borehole Testing to Assess Groundwater as a Possible Water Source

Exploratory Borehole	Reported Total Borehole Depth (feet below ground surface)	Initial Water Level Measured (feet, depth below ground surface)	Discharge (gallons per minute)	Total Drawdown (feet, depth below ground surface)	Pumping Duration (minutes)
AR 05-50	145	40.60	5.5	3.6	180
AR 05-51	145	24.80	4	1.7	180
AR 05-52	145	12.10	4	21.5	210
AR 05-53	270	21.80	25	252	21
AR 05-57	145	15.49	NT	NT	NT
AR 05-58	270	29.20	NT	NT	NT
AR 05-59	145	30.55	4.5	115	35
AR 05-60	145	11.09	4	11	12
RC 05-01	355	38.10	10	213	25
RC 05-02	385	14.60	2.2	60	35
RC 05-07	UNK	37.00	10, 30, 50, 100	147	190
RC 05-08	UNK	47.00	10, 30	275	103

Sources: From Sespe Consulting (2021), based on data from Brown and Caldwell (2006).
UNK = Unknown. NT = Not Tested.

Based on the results presented in Table 3, Sespe Consulting (2021) concluded that, although initial groundwater level depths were generally shallow, the drawdowns for the given pumping rates indicate relatively low specific capacities[1]; consequently, without more detailed study, groundwater serving as the principal water source for project construction and decommissioning appears infeasible.

Based on previous studies and information available for this GRIA, it is likely that on-site groundwater from the older Mesozoic bedrock units are not a feasible source for construction and decommissioning water requirements (253 AF over 18 months). In addition, alluvial aquifers appear to be limited within the project boundaries and an insufficient supply for the construction and decommissioning phases of the project. However, groundwater from on-site wells is a feasible source for the project's 35-year operational period (10.5 AFY), as

1 The specific capacity of a well is the pumping rate (gallons per minute) divided by the drawdown in feet. Specific capacity provides a rate or maximum yield for a well.

suggested by boreholes AR 05-50, AR 05-51, AR 05-52, AR 05-60, RC 05-02, RC 05-07, and RC 05-08, and possibly AR 05-53 and AR 05-59 (for lower pumping rates). A demand of 10.5 AFY is approximately 6.6 gallons per minute (continuous), and one or more of these boreholes are likely able to support this demand.

2.5.2 South American Subbasin

According to the SASb GSP (SASb GSAs 2021), groundwater occurs in the younger Cenozoic units on the western side of the CCAR site. Groundwater may occur in the Ione Formation, in the first unit of the Mehrten Formation, and in Quaternary undivided alluvial deposits. Figure 3 shows the location of these units within the project site. Figure 4 shows that, with the possible exception of the Damaged well, all of the on-site wells were constructed within the younger Cenozoic units. The limited groundwater now in use on the project stie is currently being supplied from younger Cenozoic units. The production rate from these on-site wells is unknown. However, based on their current use, it is unlikely that these wells have sufficient production capability for the 253 AF needed over 18 months for project construction and decommissioning. The current on-site wells only supply the ranch house needs and have a history of going dry (Dudek 2021). Additional aquifer testing would be required to evaluate the younger Cenozoic units on the project site as potential groundwater supply sources for project construction and decommissioning. The current wells are likely adequate for the project's estimated 10.5 AFY, 35-year operational needs.

Because the younger Cenozoic units are part of the SASb, groundwater in this area would be managed, along with the rest of the SASb, by the GSA under the adopted GSP (SASb GSAs 2021). Figure 4 shows the SASb boundary through the project site. Additionally, the groundwater quality in this area would need to be studied because of possible groundwater quality concerns related to historical point-source contamination (see Section 2.5.4, Groundwater Quality).

2.5.3 Groundwater Levels

Depth to groundwater in the Damaged on-site well is 43 feet bgs, deeper than water levels in most of the boreholes (Tables 2 and 3). This may be due to its location proximal to the currently producing ranch well as a result of local drawdown and seasonal conditions. Depth to groundwater usually varies in fractured bedrock due to locally different groundwater head conditions and at different times during the years based on local recharge to the bedrock fractures (Dudek 2021)..

Groundwater levels in wells in the Quaternary undivided alluvial deposits were generally unknown. Well 08N07E02N001M (30672 in Figure 4) measured 187.5 feet bgs on April 15, 2021 (Table 2). This well suggests deeper groundwater than does Figure 2.3-28 in the SASb GSP (SASb GSAs 2021), which indicated a depth to groundwater of 80 feet to 100 feet bgs from September 1, 2019 to October 31, 2019. Groundwater levels at well 9661 (09N07E36F001M), an on-site well in the Quaternary undivided alluvial deposits, has been measured almost continuously since 1979. The hydrograph for Well 9661 is presented as Figure 6. The hydrograph shows that groundwater levels increased approximately 10 feet from 170 feet msl to approximately 180 feet msl from 1979 to 1985, but have generally declined to approximately 115 feet msl since 1985.

2.5.4 Groundwater Quality

The SASb GSP (SASb GSAs 2021) used 216 groundwater quality wells from the Groundwater Ambient Monitoring and Assessment (GAMA) Program, 462 wells from the State Water Resources Control Board GeoTracker Database, 131 wells from DWR's California Department of Pesticide Regulations Program, 15 wells from the U.S. Geological Survey's National Water Information System, and a few smaller databases to assess the groundwater quality in the SASb. According to the SASb GSP (SASb GSAs 2021), groundwater quality of the SASb is generally good,

- The Aerojet remediation area has concentrations of N-nitrosodimethylamine, perchlorate, and TCE (trichloroethylene), which occur in some of the younger Cenozoic units on the northwest portion of the project site (Dudek 2021). Groudnwater extraction is not proposed in these locations or within 2,000 feet of these locations. The contact between the younger Cenozoic units on the west with the older bedrock units is approximately the SASb boundary line in Figure 4. The proposed groundwater extraction area, generally the location of the Project site that is east of Scott Road and within the Solar Development Area, is not at risk of being impacted by the Aerojet plumes located to the west and southwest for the following reasons: 1) the area is hydraulically upgradient of the nearest Aerojet plume and wells operating in this area will capture water originating from the northeast, 2) the area is located east and southeast of the Aerojet plumes, which is perpendicular to the direction of plume migration to the southwest, and 3) the area is outside the 2,000-foot consultation zone associated with the Aerojet plumes, which neglects the requirement for a special review by the Sacramento County Environmental Management Department and the Central Valley RWQCB to evaluate potential impacts to public health and groundwater quality (Section 6.28(G) of the County Code). Figure 5 shows the estimated extent of a 2,000-foot buffer centered on the proposed groundwater extraction area in relation to the nearest detected contamination affiliated with the Aerojet plumes. The nearest detected contamination is approximately 6,600 feet from the proposed groundwater extraction area.

2.6 Land Subsidence

The primary causes of land subsidence in California are tectonic forces and aquifer system compaction because of fluid withdrawal. Aquifer system compaction occurs when there is a reduction of fluid (e.g., oil or groundwater) pressure in the pores of unconsolidated sediments. Land subsidence resulting from aquifer deformation may be either elastic or inelastic. Elastic deformation is reversible and temporary, and typically occurs in response to seasonal groundwater recharge or extraction. Inelastic subsidence is irreversible and permanent and occurs as pore spaces within fine-grained sediments collapse in response to lowered groundwater levels and reduced fluid pressure. Inelastic deformation can occur when groundwater elevations drop below the historical low elevations and fine-grained sediments become depressurized. Once this process occurs, the pore space cannot be re-inflated by rising water levels (Borchers et al. 2014).

Based on the geology of the project site (discussed in Section 2.2), the only potential location for fine-grained sediments would be in the Cenozoic deposits that occur on the western side of the project site (Figure 3). Some of this area was historically dredged during gold mining operations, but documented historical evidence of subsidence is not available. The SASb GSP (SASb GSAs 2021) considered historical land subsidence for the SASb and found areas adjacent to the project site of up to −0.05 feet in total vertical displacement using Interferometric Synthetic Aperture Radar satellite data from June 2015 to September 2019 (Figure 2.3-41 of the SASb GSP [SASb GSAs 2021]).

The Cenozoic deposits are currently producing some groundwater through the Aerojet Remediation Project, but production rates are not available. Groundwater pumping from the Cenozoic deposits are unlikely to produce land subsidence, and land subsidence was not identified as an undesirable result in the GSP (SASb GSAs 2021). Any effects to infrastructure, or to beneficial uses, are unlikely due to low historical total vertical displacement (less than 0.05 feet over 4 years) and the limited infrastructure in the area, which is for Aerojet pumping and treatment. The remainder of the project site consists of Mesozoic bedrock units that are not susceptible to land subsidence.

2.7 Surface Water Connectivity and Groundwater Dependent Ecosystems

DWR's Natural Communities Commonly Associated with Groundwater Dataset was reviewed to determine potential wetland features and vegetation that may be groundwater dependent in the vicinity of the CCAR site. Additionally, the SASb GSP (SASb GSAs 2021) reviewed interconnected surface water and groundwater and potential groundwater-dependent ecosystems (GDEs) in the vicinity of the CCAR site. There are no GDEs or potential GDEs mapped in the vicinity of the project site. Streams from the project site flow to Deer Creek and may potentially support GDEs on the lower end of the Cosumnes River. The SASb GSP (SASb GSAs 2021) found that the reach of the Cosumnes River that flows approximately between Deer Creek and Twin Cities Road is disconnected on a seasonal basis, but that some evidence of sub-seasonal connection does exist. For planning purposes, that reach of the Cosumnes River is considered a data gap and more research is needed to understand stream/aquifer interaction. However, the SGMA only addresses the impacts of groundwater pumping on GDEs and not surface water diversions. Surface water rights currently allow for up to 61.5 AFY to be diverted from three points of diversion that could potentially be used for project construction purposes (Section 2.4; SWRCB 2021). Additional studies may be required to assess surface diversion amounts if requested.

2.8 Groundwater Storage Depletion

The SASb GSP (SASb GSAs 2021) indicates that the current annual change in groundwater in storage is a surplus of 2,200 AF, but that SASb projected conditions without climate change are for an average annual deficit in groundwater in storage of 1,100 AF. With projected climate change, the average annual deficit in groundwater in storage is projected to be 6,200 AF. The SASb GSP (SASb GSAs 2021) noted several projects and management actions that could reduce the average annual groundwater in storage deficit under projected climate change conditions to 100 AF. The SASb GSP (SASb GSAs 2021) does not include an estimate of the total groundwater in storage with which to calculate the percentage change of groundwater in storage as a result of project implementation. However, with the estimated recharge to the SASb of 298,900 AFY under future climate conditions, an extraction of 253 AF for 1 year (the estimated project construction and decommissioning demand) would be 0.08% of the total average annual recharge. Estimated pumping under future climate conditions is 305,100 AFY, so the project could increase pumping by 0.08% for 1 year. The project pumping is estimated to be approximately 10.5 AFY, so no significant additional change in storage is expected to result from the project 35-year operational period pumping.

The per-acre groundwater use within the SASb is approximately 1.23 AFY per acre (305,100 AFY under future climate conditions over a surface area of 248,000 acres) (DWR 2016). Under sustainable conditions, assuming the estimated overdraft of 6,200 AFY, the sustainable per-acre groundwater use within the SASb would be approximately 1.21 AFY per acre (298,900 AFY/248,000 acres). The amortized per-acre groundwater use for the project would be approximately 0.01 AFY per acre (506 AF for construction and decommissioning, plus 10.5 AFY for 35 years [10.5 AF over 33 years], divided by a project area of 2,555 acres), which is well below the SASb per-acre sustainable use.

Groundwater storage depletion for the project is not expected to be a significant impact to the SASb because of the small percentage of 1-year pumping (253 AF) relative to the large average annual pumping (305,100 AFY) estimated for the SASb. Currently, the SASb has a surplus of 2,200 AF annually, and 253 AF for 1 year would have no significate impact on the SASb.

3 Summary of Project Groundwater Resources, Impacts, and Mitigation

Potential CCAR groundwater pumping was reviewed for potential impacts to the lowering of groundwater levels, reduction of groundwater in storage, degradation of groundwater quality, land subsidence, and the reduction of interconnected surface water. There is insufficient data and information with which to evaluate the upper end of project demand estimates for the feasibility of obtaining all project water from on-site or near-site groundwater sources. However, empirical evidence suggests that hydrogeologic conditions are suitable for the operation and maintenance water demand of 10.5 AFY. Potential sources for construction and decommissioning water demand include the SWCA, Sloughhouse Solar Project groundwater wells, and onsite groundwater wells. Below is a summary of findings for potential groundwater sustainability impacts that assumes all project water demand is met solely from groundwater:

- The temporary lowering of groundwater levels due to project well production of 253 AF during a 18-month period for construction and decommissioning would likely be only a local effect, but additional studies may be required to evaluate potential interference to nearby wells.
- The project is unlikely to have any significant impact to the SASb groundwater in storage because of the short period of pumping (253 AF over 18 months) and the large volumes of recharge (298,900 AFY) and pumping (305,100 AFY) estimated for future climate conditions in the SASb. Currently, there is a surplus of 2,200 AF annually in the SASb. The amortized per-acre groundwater use for the project would be approximately 0.01 AFY per acre, which is significantly less than the 1.21 AFY per acre limit under sustainable conditions.
- County ordinance has established a consultation zone for any application for a well permit within 2,000 feet of a known groundwater contaminant plume (Section 6.28(G) of the County Code). The proposed area for on-site project groundwater extraction is outside the 2,000-foot consultation zone of the known Aerojet contaminant plume and, therefore, is not subject to a special review by appropriate regulatory agencies to evaluate potential impacts to public health and water quality (Figure 5).
- Land subsidence is not considered to be a significant impact in the SASb (SASb GSAs 2021). Significant land subsidence is unlikely to cause a problem in the Cenozoic deposits in the project area because of the limited infrastructure in the area. The Mesozoic bedrock units are not susceptible to land subsidence.
- There are no potential GDEs mapped within the project area; therefore, groundwater extractions would not affect GDEs or potential GDEs.

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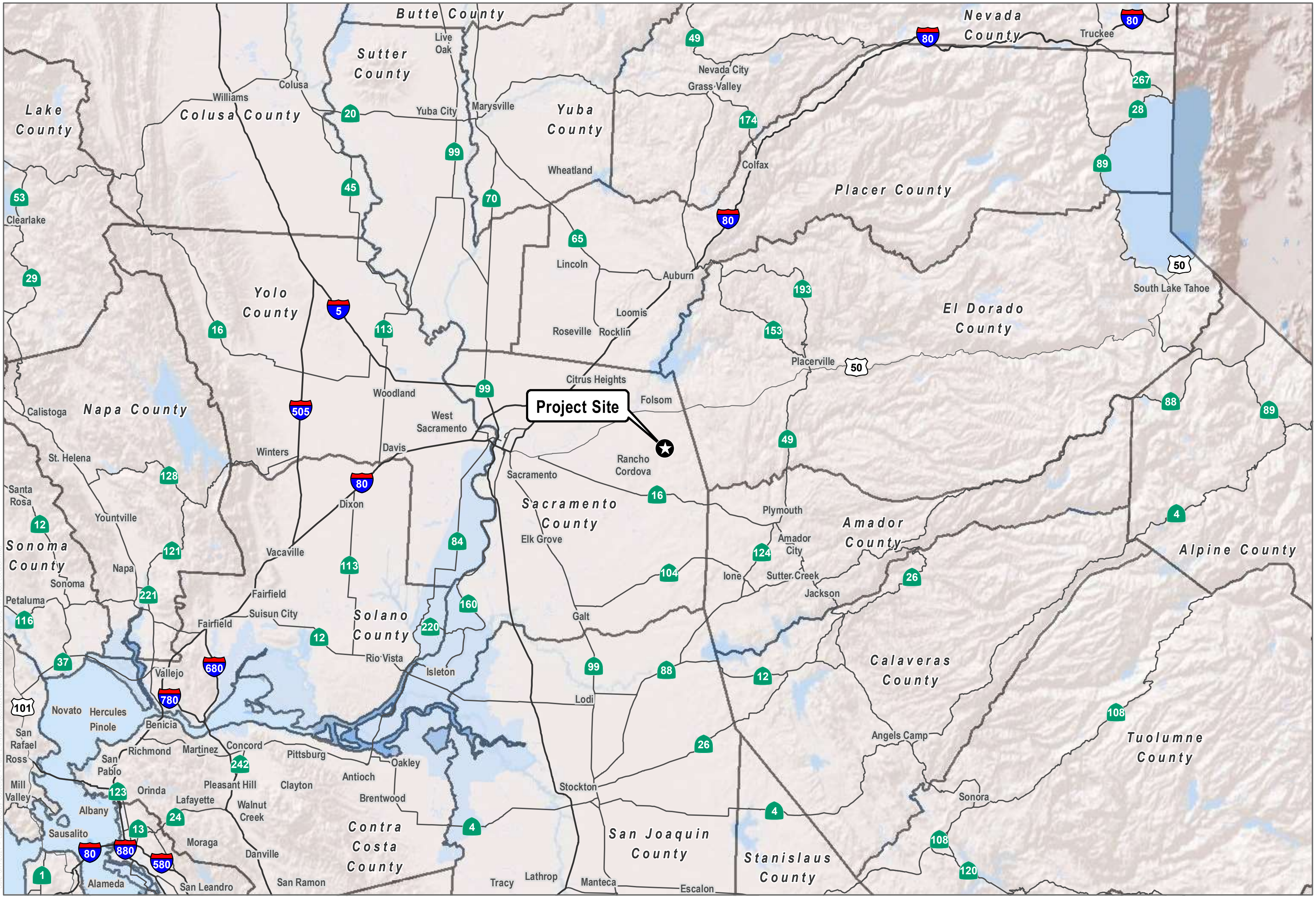

SOURCE: ESRI

DUDEK

0 5 10 Miles

FIGURE 1

Project Location

Coyote Creek Agrivoltaic Ranch Environmentally Preferred Project Design

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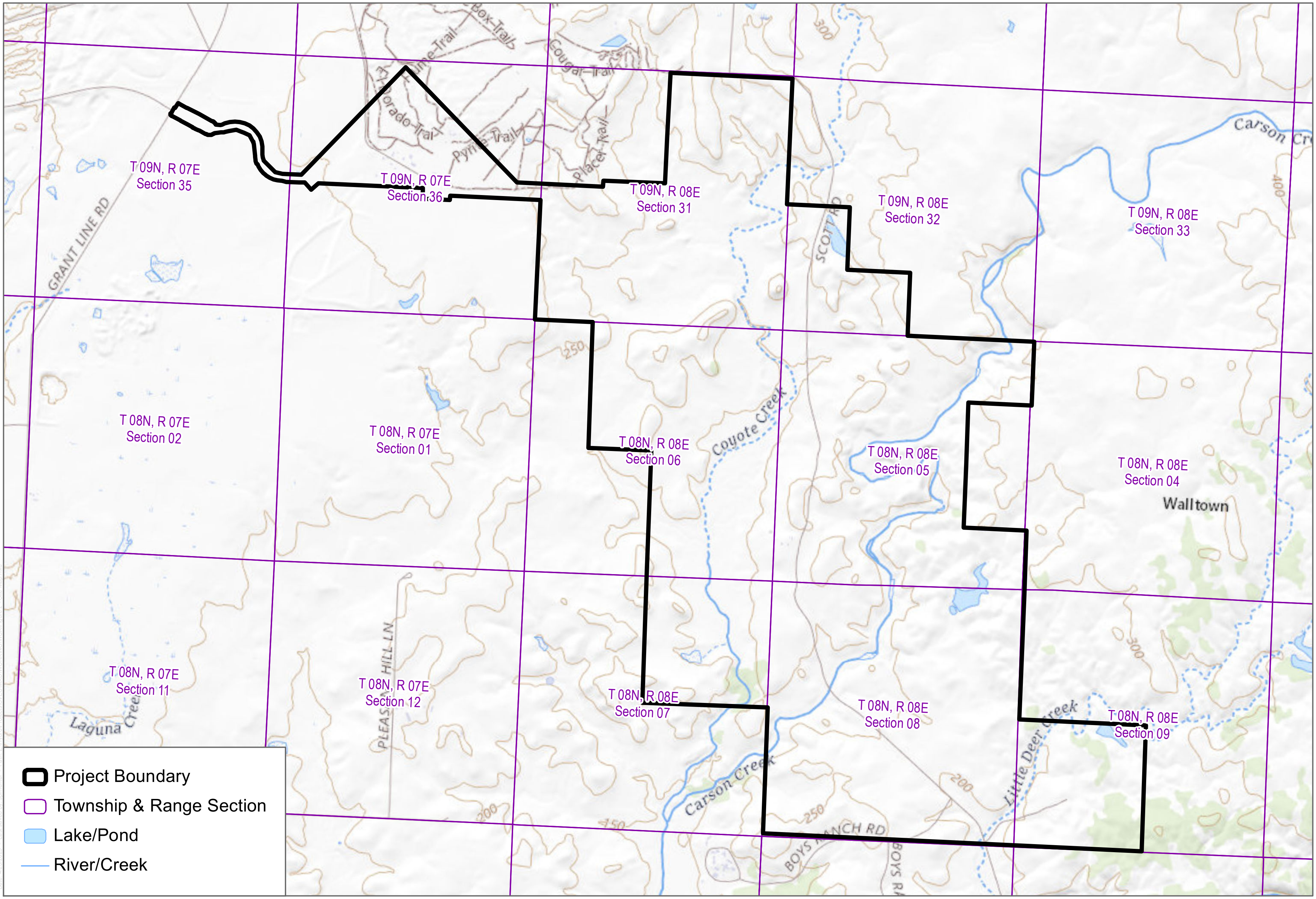

SOURCE: ESRI, USGS

DUDEK

FIGURE 2

Site Aerial Map

Coyote Creek Agrivoltaic Ranch Environmentally Preferred Project Design

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Project Boundary

Structural Features

metamorphic foliation, vertical

metamorphic foliation, inclined

Geologic Contacts

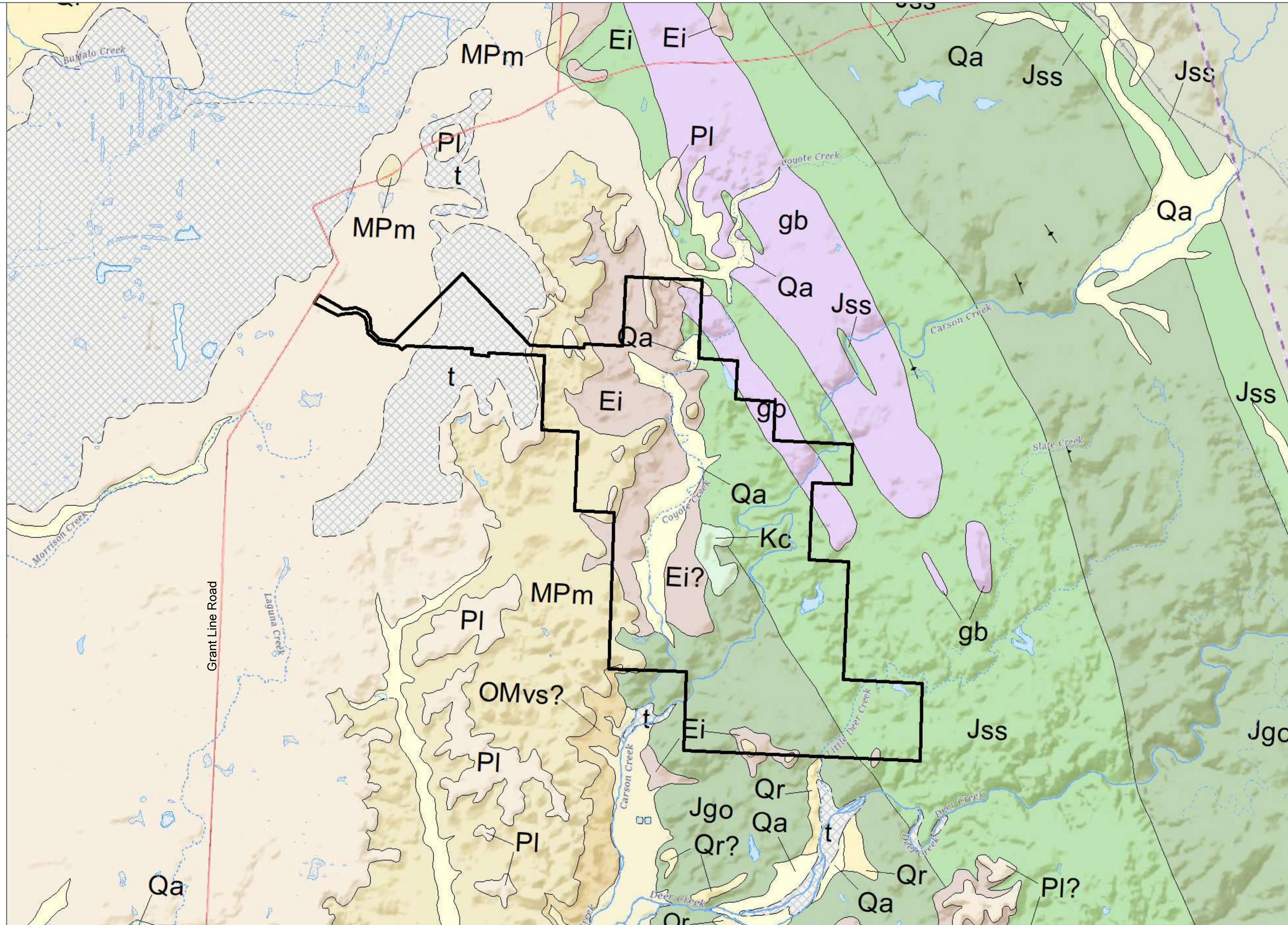
contact, approx. located

contact, certain

water boundary

Geologic Unit (Youngest to Oldest)

- water
- t, Dredge Tailings (Historic)
- Qa, Undivided Alluvium (Quaternary)
- Qm, Modesto Formation (Pleistocene)
- Qr, Riverbank Formation (Pleistocene)
- Pl, Laguna Formation (Pliocene)
- MPm, Undivided Mehrten Formation (Miocene)
- Ei, Ione Formation (Eocene)
- OMvs, Valley Springs Formation (Oligocene)
- Kc, Chico Formation (Cretaceous)
- Jch, Copper Hill Volcanics (Jurassic)
- Jgo, Gopher Ridge Volcanics (Jurassic)
- Jss, Salt Springs Slate (Jurassic)
- gb, Gabbro and Metagabbro of Foothill Melange (Jurassic)



SOURCE: California Department of Conservation (Preliminary Geologic map of the Sacramento 30' x 60' quadrangle, California)

DUDEK

0 1 2 Miles

FIGURE 3

Regional Geologic Map

Coyote Creek Agrivoltaic Ranch Environmentally Preferred Project Design

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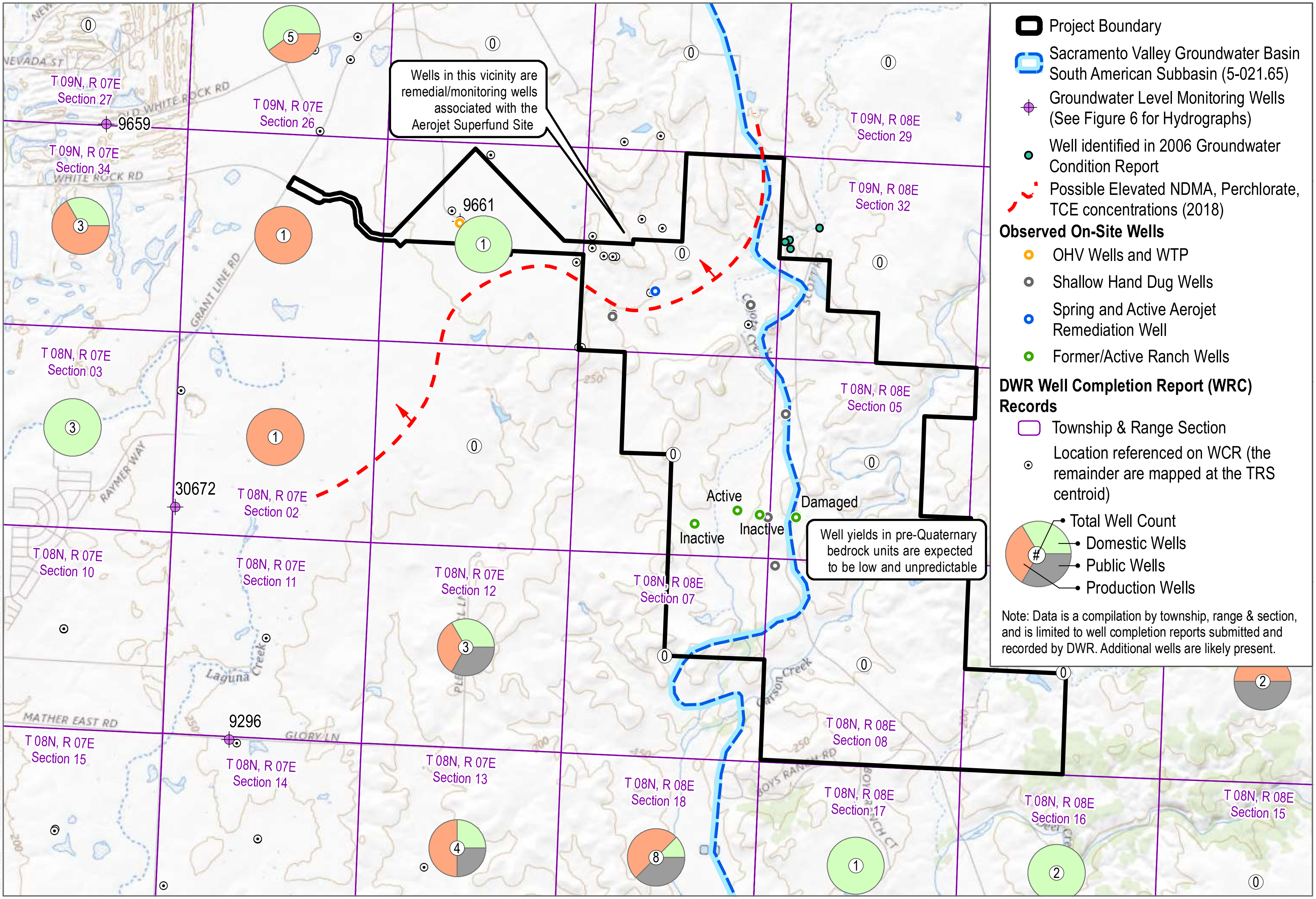

SOURCE: ESRI, DWR, USGS, Geosyntec 2018 (Isoconcentration Contour Maps)

DUDEK

0 0.5 1 Miles

FIGURE 4

Wells Map

Coyote Creek Agrivoltaic Ranch Environmentally Preferred Project Design

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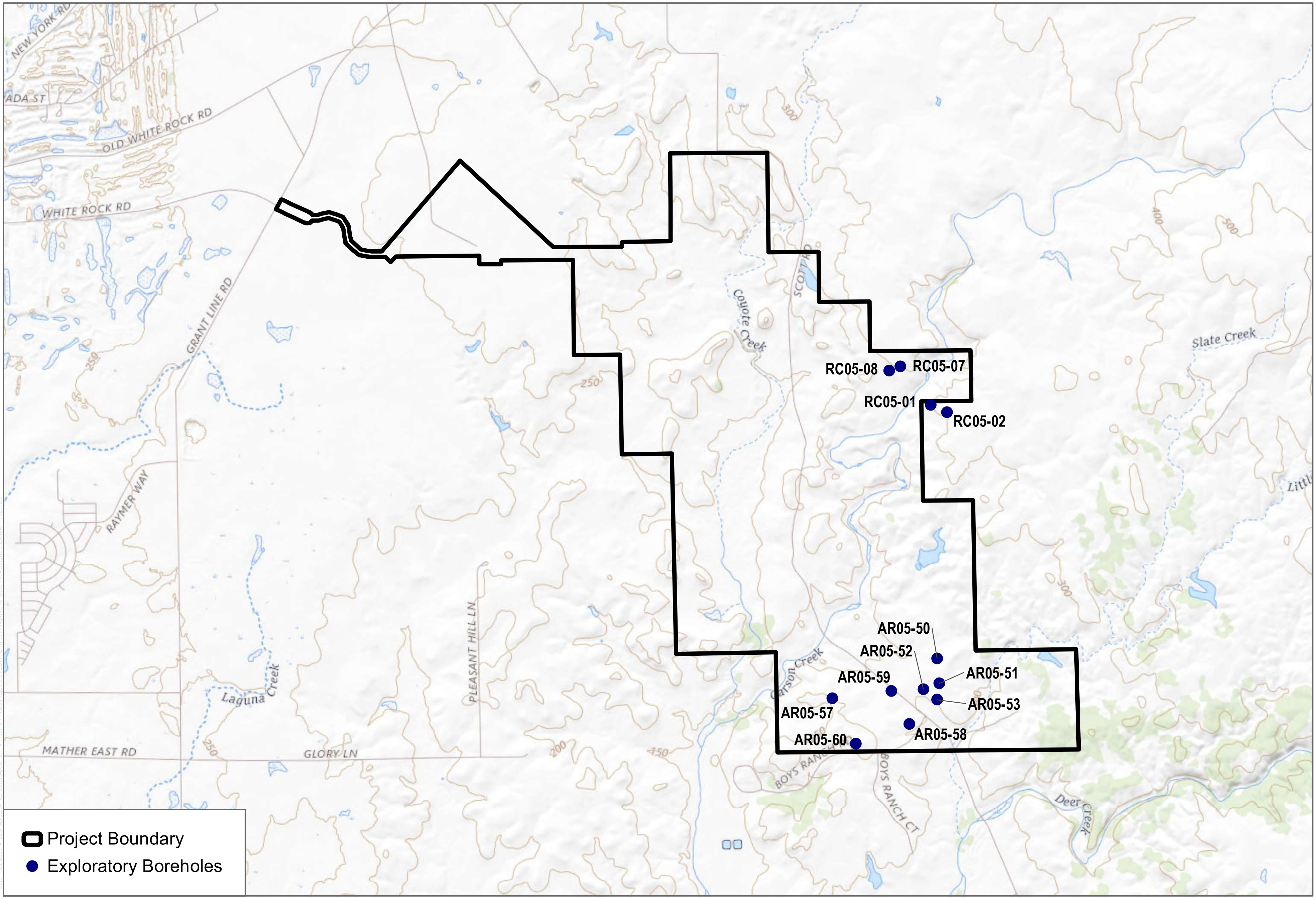

SOURCE: ESRI, DWR, Sespe Consulting Inc. 2020

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0 0.5 1 Miles

FIGURE 5

Borehole Location Map

Coyote Creek Agrivoltaic Ranch Environmentally Preferred Project Deisgn

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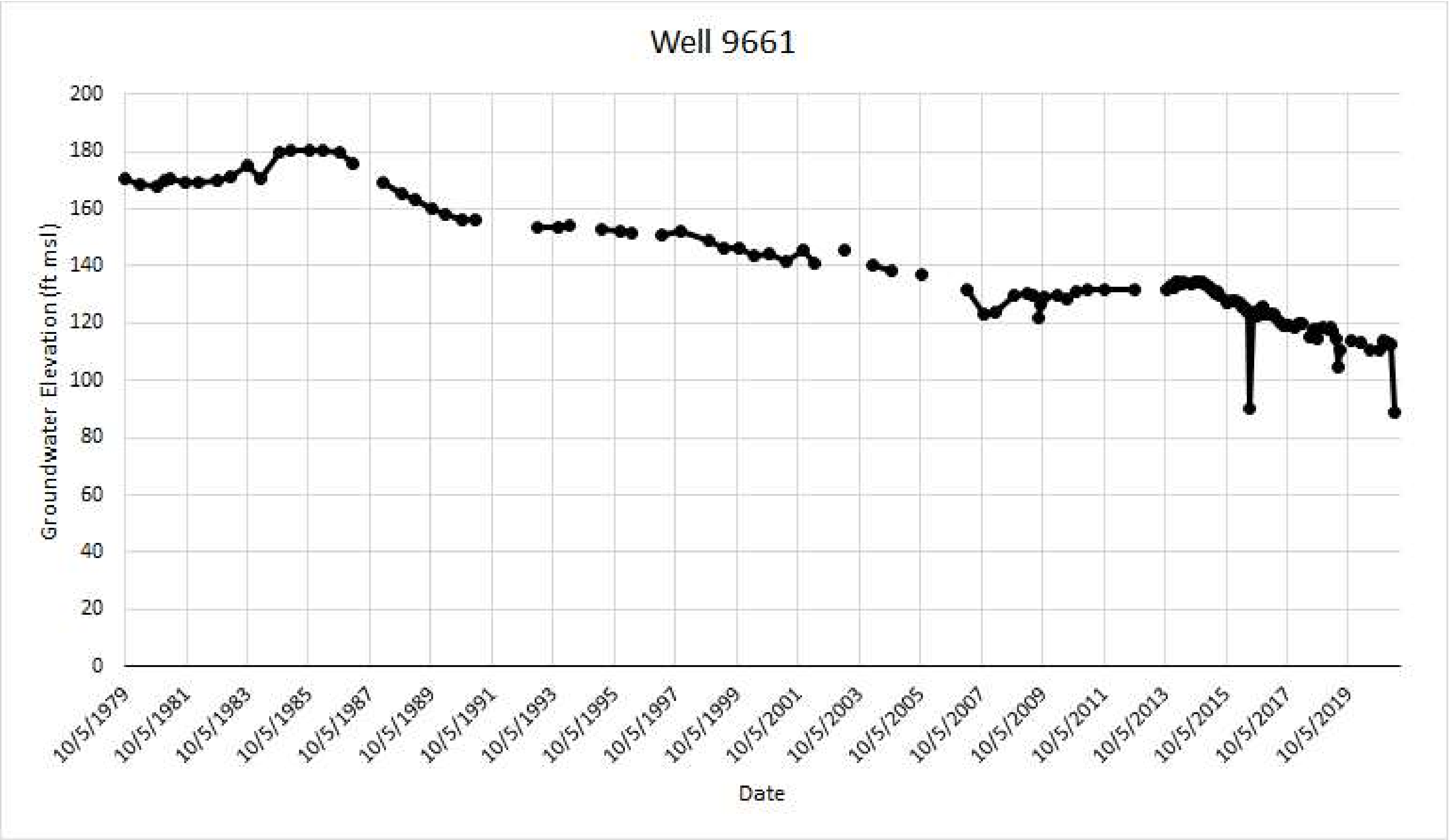

SOURCE: CASGEM DATABASE DWR

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FIGURE 6

Hydrograph for Well 9661

Coyote Creek Agrivoltaic Ranch Environmentally Preferred Project Design

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Groundwater Resource Impact Analysis

Coyote Creek Agrivoltaic Ranch Environmentally Preferred Project Design Sacramento County, California

JULY 2024/REVISED NOVEMBER 2024

Prepared for:

SACRAMENTO VALLEY ENERGY CENTER, LLC
1166 Avenue of the Americas, 9th Floor
New York, New York 10036

Prepared by:

DUDEK
605 Third Street
Encinitas, California 92024

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Table of Contents

SECTION **PAGE NO.**

TABLES

FIGURES

Acronyms and Abbreviations

Acronym/Abbreviation	Definition
AF	acre-feet
AFY	acre-feet per year
bgs	below ground surface
CASGEM	California Statewide Groundwater Elevation Monitoring
CCAR	Coyote Creek Agrivoltaic Ranch
CEQA	California Environmental Quality Act
County	County of Sacramento
DWR	California Department of Water Resources
GDE	groundwater-dependent ecosystem
GRIA	Groundwater Resource Impact Analysis
GSA	Groundwater Sustainability Agency
GSP	Groundwater Sustainability Plan
msl	mean sea level
project	Coyote Creek Agrivoltaic Ranch
SASb	South American Subbasin
SB	Senate Bill
SGMA	Sustainable Groundwater Management Act
WSA	Water Supply Assessment

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1 Introduction

1.1 Project Description and Purpose

The Coyote Creek Agrivoltaic Ranch (CCAR or project) would be an up to 200-megawatt alternating-current photovoltaic solar energy facility with associated on-site substation, inverters, fencing, roads, and supervisory control and data acquisition system. The proposed energy storage components would include an up to 100-megawatt alternating-current maximum capacity energy storage (battery) system. A generation tie (gen-tie) line would extend approximately 1.5 miles to reach the nearest Sacramento Municipal Utility District 230-kilovolt powerline, which runs through the Prairie City State Vehicle Recreation Area. The CCAR may also interconnect to an on-site 138-kilovolt powerline owned by Pacific Gas & Electric or the 69-kilovolt Sacramento Municipal Utility District powerline, both of which are along the same gen-tie line easement as the path to the Sacramento Municipal Utility District's 230-kilovolt powerline. The CCAR would maintain current ranching practices of sheep and cattle grazing on the property.

The purpose of this Groundwater Resource Impact Analysis (GRIA) is to evaluate the CCAR's groundwater uses in relation to each of the six sustainability indicators defined under the 2014 Sustainable Groundwater Management Act (SGMA), and if the groundwater impacts of the project could produce, or add to, any undesirable results within the underlying aquifers.

1.2 Project Location

The CCAR site is on approximately 2,555 acres of the Barton Ranch adjacent to 3830 Scott Road, Sacramento County, California (Figure 1, Project Location). The project site is approximately 2.5 miles south of White Rock Road in the Cosumnes community, and approximately 4.5 miles south of U.S. Route 50, southeast of the Prairie City State Vehicle Recreation Area. It is bisected by Scott Road and has a geographic center that roughly corresponds with 38.576278° North and -121.132944° West, at an elevation of 196 feet above sea level. The property includes parts of Sections 35 and 36, Township 9 North, Range 7 East, Sections 31 and 32, Township 9 North, Range 8 East, and Sections 5, 6, 7, 8, and 9, Township 8 North, Range 8 East, Mount Diablo Meridian, California (Figure 2, Site Aerial Map).

1.3 Project Area Climate

The project area's climate is semi-arid with hot, dry summers and cool, wet winters. The mean annual temperature in Sacramento County is 61.5°F, with average annual temperatures near the project site ranging from approximately 53°F to 92°F (WRCC 2021). Average annual rainfall is approximately 18 inches, with only approximately 8 inches occurring during the most recent year available (June 1, 2020 to May 31, 2021) (CDEC 2021). On average, the highest temperature occurs in July and the most precipitation falls in January and February (SCWA 2021).

1.4 Applicable Groundwater Regulations

The project has been determined to be subject to the California Environmental Quality Act (CEQA) by the County of Sacramento (County), the lead agency. Senate Bill (SB) 610, passed on January 1, 2002, amended the California

Water Code to require detailed analysis of water supply availability for certain types of development projects. The primary purpose of SB 610 is to improve the linkage between water and land use planning by ensuring greater communication between water providers and local planning agencies and ensuring that land use decisions for certain large development projects are fully informed as to whether a sufficient water supply is available to meet project demands. SB 610 requires preparation of a Water Supply Assessment (WSA) for a project that is subject to CEQA and meets certain requirements. SB 610 is codified in California Water Code Division 6, Part 2.10 (Sections 10910–10915).

The County, as the CEQA lead agency, is responsible for preparation of a WSA, which will be included in the CEQA documentation for consideration. The lead agency will make an independent determination as to whether there is adequate water supply for the proposed CCAR, having considered the entire administrative record. If on-site or off-site groundwater is a potential water source, SB 610 requires additional analyses.

Part of the project site is in the South American Subbasin (SASb), which is subject to the 2014 SGMA, codified in California Water Code Part 2.75 (Sustainable Groundwater Management) Section 10720 et seq. The SGMA requires preparation of a Groundwater Sustainability Plan (GSP) for the SASb, which is designated as “high priority” by the California Department of Water Resources (DWR). The GSP was approved by DWR in July of 2023 and is being implemented by the Groundwater Sustainability Agencies (GSAs) representing the entire SASb, which include the Sacramento Central Groundwater Authority, Northern Delta GSA, Omochumne-Hartnell Water District, Sloughhouse Resources Conservation District, and County of Sacramento (SASb GSAs 2021).

Under the SGMA, the GSP is required to evaluate significant and unreasonable impacts in medium- and high-priority basins and ensure that these basins achieve and maintain long-term groundwater sustainability. Under the SGMA, any undesirable results that occur throughout the basin, when caused by groundwater withdrawals, indicate that the basin is not sustainable relative to groundwater withdrawals. Significant and unreasonable impacts to any of six sustainability indicators is determined by the GSA using the processes and criteria described in the GSP. The GSA is required to characterize undesirable results for each indicator unless “undesirable results to one or more sustainability indicators are not present and are not likely to occur in the basin” (23 CCR 354.26[d]). The SASb GSP is required to evaluate undesirable results for any of six sustainability indicators resulting from groundwater production. Undesirable results are defined by DWR as follows:

- Chronic lowering of groundwater levels
- Significant and unreasonable reduction of groundwater in storage
- Significant and unreasonable seawater intrusion resulting from groundwater withdrawal (given that the closest possible source of seawater, the Pacific Ocean, is more than 30 miles west of the SASb, this indicator was presumed inapplicable and was not evaluated)
- Significant and unreasonable degradation of water quality resulting from groundwater withdrawal
- Significant and unreasonable land subsidence resulting from groundwater withdrawal
- Significant and unreasonable reduction of interconnected surface water and groundwater resulting from groundwater withdrawal

The purpose of this GRIA is to evaluate the project's groundwater uses in relation to each of the six sustainability indicators listed above, and if groundwater impacts by the project could produce, or add to, any undesirable results within the SASb. The SASb GSP (SASb GSAs 2021) was consulted for data and information regarding the status of the SASb.

1.5 Project Water Demands and Potential Groundwater Requirements

Water for the construction phase of the project is estimated to be approximately 253 acre-feet (AF) during the 18-month construction period (Dudek 2023). Subsequent operation and maintenance of the CCAR during its anticipated 35-year operational life would require approximately 10.5 acre-feet per year (AFY) of water, primarily for solar module washing, sheep grazing, landscape irrigation and restroom use. Plans for decommissioning and potential revegetation of the project site at the end of the 35-year project life are not yet complete, but for the purpose of the WSA (Dudek 2023), decommissioning water demand was conservatively estimated to be the same as that for project construction (i.e., 253 AF). Project water demand estimates are included in Table 1. Additional information about the project's water demand are presented in the WSA (Dudek 2024).

Table 1. Project Water Demand Estimates

Project Phase	Estimated Water Demand
Construction	253 AF
Operation and Maintenance	10.5 AFY
Decommissioning and Removal	253 AF

AF = acre-feet; AFY = acre-feet per year

For purposes of this GRIA, all project water demands are assumed to be from groundwater obtained from on-site wells, Sloughhouse Solar Project Wells, or the SCWA. Due to data gaps regarding on-site hydrogeology and the potential lack of on-site groundwater availability, water demands for construction and decommissioning (253 AF each) are assumed to be derived from the Sloughhouse Solar Project in the San Joaquin Groundwater Basin or the SCWA. Additional data and analysis are required to accurately assess the availability of on-site groundwater for construction and decommissioning. The anticipated 35-year project operational life water demand (10.5 AFY) is assumed to be from groundwater obtained from on-site wells.

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2 Existing Conditions

2.1 Topography and Drainage

Regionally, the project site is on the eastern side of the San Joaquin Valley at the western edge of the Sierra Nevada foothills in the east-central part of Sacramento County, California (Figure 1). Elevations of the project site range from approximately 150 feet to 300 feet mean sea level (msl) (Figure 2). The topography consists of rolling hills intersected by the generally north to south flowing Carson and Coyote Creeks, bisected by Scott Road.

In addition to Carson and Coyote Creeks, Little Deer Creek flows through the project site in Section 9, Township 8 North, Range 8 East, Mount Diablo Meridian, California (Figure 2). Little Deer Creek and three seasonal ponds in the eastern part of the project site are shown in Figure 3, Regional Geologic Map. The CCAR site is intersected by three U.S. Geological Survey sub-watersheds (USGS 2021). The majority of the site is within the Carson Creek Subwatershed (Hydrologic Unit Code [HUC] 1080400130501); the southeastern edge of the site is within the Upper Deer Creek Subwatershed (HUC 180400130502) and the northwestern portion of the site is in the Upper Morrison Creek Subwatershed (HUC 180201630402). Each of these watersheds, including runoff from the project site, eventually drains to the American River and the Sacramento–San Joaquin Delta. One spring was identified on the west side of the project site on maps by Brown and Caldwell (2006). The location of this spring is indicated as the “Spring and Active Aerojet Remediation Well” in Figure 4, Wells Map.

2.2 Geology

The project site is along the Cenozoic/Mesozoic contact on the eastern side of the San Joaquin Valley. Figure 3 shows the geological setting of the project, which is composed predominantly of Jurassic Salt Springs Slate and Gopher Ridge Volcanics on the east side of the project site, and the Eocene Ione Formation and Miocene undivided Mehrten Formation on the west side of the project site. Quaternary undivided alluvial deposits occur in the very western part of the project site, which have been dredged in historic time. Jurassic gabbro and metagabbro of the Foothill Melange occur along the northeastern edge of the project site. Through the center of the project site, Coyote Creek has some Quaternary undivided alluvial deposits. A small area of Cretaceous Chico Formation occurs near the center of the project site (SASb GSAs 2021) (Figure 3).

The Quaternary undivided alluvial deposits and their associated dredge deposits overlie the older Miocene to middle Pliocene-age Mehrten Formation and dip to the west from 1.5 to 2 degrees. The Mehrten Formation overlies the Eocene-age Ione Formation, which the SASb GSP (SASb GSAs 2021) identifies as a significant source of water on the east side of the SASb (the project site). The Ione Formation overlies the older Mesozoic basement rocks, which are considered relatively impermeable and are the boundary of the SASb. The Mehrten Formation has two units; the first unit which is composed of well-sorted black sands formed as fluvial deposits derived from the Sierra Nevada, and the second unit, which is a very dense tuff-breccia, is derived from volcanic ash. The first unit is part of the lower SASb aquifer, and the second unit is considered non-water bearing and may separate the lower SASb aquifer from upper aquifer units. In the project area, the Mehrten Formation is shown to extend to depths of up to 300 feet below ground surface (bgs) (Figure 2.2-34 in SASb GSAs 2021).

2.3 Existing Groundwater Wells

2.3.1 On-Site Groundwater Wells

There are six on-site wells on the CCAR site, not including shallow, hand-dug wells (Figure 4). A summary of the known characteristics of each of the on-site wells is presented in Table 2.

The OHV (off-highway-vehicle) and WTP (water treatment plant) well is state well number 09N07E36F001M and California Statewide Groundwater Elevation Monitoring (CASGEM) well 9661. This well has a total depth of 285 feet bgs and is screened from 197 feet to 269 feet bgs. Groundwater levels in this well have been recorded since 1979 (see Section 2.5.3). This well is currently being used for Aerojet contaminant plume remediation (see Section 2.5.4, Groundwater Quality) (Dudek 2021).

The well designated as "Damaged" was associated with an old homestead across the street from the current ranch house. The depth to groundwater was 43 feet bgs when measured on June 20, 2021, and the total well depth was measured to be approximately 120 feet bgs. The well head was recently accidently removed by a fire bulldozer, so currently, the casing is open with some defunct electrical lines running into it (Dudek 2021).

The site's only active well is the ranch's current production well located near Coyote Creek (Figure 4). The well is reported to have a total depth of approximately 35 feet, with the last groundwater depth reported to be approximately 10 feet bgs. The well is potentially screened in the valley alluvium and is reported to have run dry in the past (Dudek 2021).

There are several shallow hand-dug wells on the project site, as shown in Figure 4. These are dry; their history and purpose are unknown (Dudek 2021).

There is no additional information available about the on-site wells.

2.3.2 Nearby Off-Site Groundwater Wells

The following information is provided for context, but groundwater from off-site SASb wells is not being considered for project use. Off-site wells from DWR's well completion report database, the DWR/U.S. Geological Survey monitoring network, and the Proposed DeSilva Gates Quarry Groundwater Conditions Assessment from 2006 are shown in Figure 4, of which only three have any available information. CASGEM Wells 9659, 30672, and 9296 data is presented in Table 2. With the exception of Well 30672, which has a groundwater level measurement from April 15, 2021, the wells have very little groundwater level data and appear to have been measured irregularly.

Table 2. On-Site and Off-Site Groundwater Wells

Local Well Name	State Well Number	Groundwater Level Monitoring Well Number	Screen Interval (feet below ground surface)	Depth to Water (feet below ground surface)	Date Measured	Well Depth (feet)
On-Site Wells						
OHV Wells and WTP	09N07E36F001M	9661	197 to 269	194.6	April 8, 2021	285
Active	NA	NA	NA	NA	NA	35
Inactive	NA	NA	NA	NA	NA	NA
Inactive	NA	NA	NA	NA	NA	NA
Damaged	NA	NA	NA	43	June 20, 2021[a]	120[a]
Aeroject Remediation Well	NA	NA	NA	NA	NA	NA
Off-Site Monitoring Wells						
NA	09N07E27Q001M	9659	NA	45	May 7, 1990	100
NA	08N07E02N001M	30672	180 to 675	187.5	April 15, 2021	675
NA	08N07E14C001M	9296	NA	139.4	April 19, 2012	208

Sources: Groundwater Level Monitoring Wells from DWR
OHV = off-highway-vehicle; WTP = water treatment plant; NA = not available
Notes: Shallow on-site hand dug wells are not included in Table 2.
a Estimated by Dudek staff during field visit

2.4 Surface Water

As noted in Section 2.1, Topography and Drainage, Carson, Coyote, and Little Deer Creeks flow through the project site (Figures 2 and 3), and there is one spring on the west side of the project site (Figure 4). The WSA (Dudek 2023) identified three surface water diversion rights on the project site. Surface water is not a potential source of water for the project. (SWRCB 2021).

2.5 Groundwater

Groundwater on the project site occurs under two hydrogeologic conditions: in Mesozoic bedrock in fractures or poorly permeable units, and in Cenozoic units in the western part of the project site (Section 2.2, Geology; Figure 3). Each of these occurrences are discussed below.

2.5.1 Bedrock Area

Sespe Consulting (2021) prepared a review of relevant technical information pertaining to groundwater conditions underneath the project site, with the objective of providing a preliminarily assessment of groundwater as a possible water source for proposed solar projects. Their work relied on previous technical studies prepared for the previously proposed Milgate Quarry project by ENGEO (2006), which included an addendum by Brown and Caldwell (2006). The Sespe Consulting (2021) investigation only addressed groundwater within the bedrock area of the project site.

For the ENGEO (2006) studies, aquifer characterization and testing were performed in the older Mesozoic units on the project site using select boreholes prepared for the previously proposed Milgate Quarry project. The borehole locations are shown in Figure 5. These boreholes were completed on the project site as part of a geologic study conducted in 2005 (ENGEO 2006). Twelve boreholes were used for aquifer testing, and for each borehole, the initial groundwater levels were measured before pumping. The boreholes were pumped at various rates for varying amounts of time, which are shown in Table 3. Pumping discharges and drawdowns were recorded at each borehole to evaluate the potential for using groundwater as a water source.

Table 3. ENGEO (2006) Borehole Testing to Assess Groundwater as a Possible Water Source

Exploratory Borehole	Reported Total Borehole Depth (feet below ground surface)	Initial Water Level Measured (feet, depth below ground surface)	Discharge (gallons per minute)	Total Drawdown (feet, depth below ground surface)	Pumping Duration (minutes)
AR 05-50	145	40.60	5.5	3.6	180
AR 05-51	145	24.80	4	1.7	180
AR 05-52	145	12.10	4	21.5	210
AR 05-53	270	21.80	25	252	21
AR 05-57	145	15.49	NT	NT	NT
AR 05-58	270	29.20	NT	NT	NT
AR 05-59	145	30.55	4.5	115	35
AR 05-60	145	11.09	4	11	12
RC 05-01	355	38.10	10	213	25
RC 05-02	385	14.60	2.2	60	35
RC 05-07	UNK	37.00	10, 30, 50, 100	147	190
RC 05-08	UNK	47.00	10, 30	275	103

Sources: From Sespe Consulting (2021), based on data from Brown and Caldwell (2006).
UNK = Unknown. NT = Not Tested.

Based on the results presented in Table 3, Sespe Consulting (2021) concluded that, although initial groundwater level depths were generally shallow, the drawdowns for the given pumping rates indicate relatively low specific capacities[1]; consequently, without more detailed study, groundwater serving as the principal water source for project construction and decommissioning appears infeasible.

Based on previous studies and information available for this GRIA, it is likely that on-site groundwater from the older Mesozoic bedrock units are not a feasible source for construction and decommissioning water requirements (253 AF over 18 months). In addition, alluvial aquifers appear to be limited within the project boundaries and an insufficient supply for the construction and decommissioning phases of the project. However, groundwater from on-site wells is a feasible source for the project's 35-year operational period (10.5 AFY), as

1 The specific capacity of a well is the pumping rate (gallons per minute) divided by the drawdown in feet. Specific capacity provides a rate or maximum yield for a well.

suggested by boreholes AR 05-50, AR 05-51, AR 05-52, AR 05-60, RC 05-02, RC 05-07, and RC 05-08, and possibly AR 05-53 and AR 05-59 (for lower pumping rates). A demand of 10.5 AFY is approximately 6.6 gallons per minute (continuous), and one or more of these boreholes are likely able to support this demand.

2.5.2 South American Subbasin

According to the SASb GSP (SASb GSAs 2021), groundwater occurs in the younger Cenozoic units on the western side of the CCAR site. Groundwater may occur in the Ione Formation, in the first unit of the Mehrten Formation, and in Quaternary undivided alluvial deposits. Figure 3 shows the location of these units within the project site. Figure 4 shows that, with the possible exception of the Damaged well, all of the on-site wells were constructed within the younger Cenozoic units. The limited groundwater now in use on the project stie is currently being supplied from younger Cenozoic units. The production rate from these on-site wells is unknown. However, based on their current use, it is unlikely that these wells have sufficient production capability for the 253 AF needed over 18 months for project construction and decommissioning. The current on-site wells only supply the ranch house needs and have a history of going dry (Dudek 2021). Additional aquifer testing would be required to evaluate the younger Cenozoic units on the project site as potential groundwater supply sources for project construction and decommissioning. The current wells are likely adequate for the project's estimated 10.5 AFY, 35-year operational needs.

Because the younger Cenozoic units are part of the SASb, groundwater in this area would be managed, along with the rest of the SASb, by the GSA under the adopted GSP (SASb GSAs 2021). Figure 4 shows the SASb boundary through the project site. Additionally, the groundwater quality in this area would need to be studied because of possible groundwater quality concerns related to historical point-source contamination (see Section 2.5.4, Groundwater Quality).

2.5.3 Groundwater Levels

Depth to groundwater in the Damaged on-site well is 43 feet bgs, deeper than water levels in most of the boreholes (Tables 2 and 3). This may be due to its location proximal to the currently producing ranch well as a result of local drawdown and seasonal conditions. Depth to groundwater usually varies in fractured bedrock due to locally different groundwater head conditions and at different times during the years based on local recharge to the bedrock fractures (Dudek 2021)..

Groundwater levels in wells in the Quaternary undivided alluvial deposits were generally unknown. Well 08N07E02N001M (30672 in Figure 4) measured 187.5 feet bgs on April 15, 2021 (Table 2). This well suggests deeper groundwater than does Figure 2.3-28 in the SASb GSP (SASb GSAs 2021), which indicated a depth to groundwater of 80 feet to 100 feet bgs from September 1, 2019 to October 31, 2019. Groundwater levels at well 9661 (09N07E36F001M), an on-site well in the Quaternary undivided alluvial deposits, has been measured almost continuously since 1979. The hydrograph for Well 9661 is presented as Figure 6. The hydrograph shows that groundwater levels increased approximately 10 feet from 170 feet msl to approximately 180 feet msl from 1979 to 1985, but have generally declined to approximately 115 feet msl since 1985.

2.5.4 Groundwater Quality

The SASb GSP (SASb GSAs 2021) used 216 groundwater quality wells from the Groundwater Ambient Monitoring and Assessment (GAMA) Program, 462 wells from the State Water Resources Control Board GeoTracker Database, 131 wells from DWR's California Department of Pesticide Regulations Program, 15 wells from the U.S. Geological Survey's National Water Information System, and a few smaller databases to assess the groundwater quality in the SASb. According to the SASb GSP (SASb GSAs 2021), groundwater quality of the SASb is generally good,

- The Aerojet remediation area has concentrations of N-nitrosodimethylamine, perchlorate, and TCE (trichloroethylene), which occur in some of the younger Cenozoic units on the northwest portion of the project site (Dudek 2021). Groudnwater extraction is not proposed in these locations or within 2,000 feet of these locations. The contact between the younger Cenozoic units on the west with the older bedrock units is approximately the SASb boundary line in Figure 4. The proposed groundwater extraction area, generally the location of the Project site that is east of Scott Road and within the Solar Development Area, is not at risk of being impacted by the Aerojet plumes located to the west and southwest for the following reasons: 1) the area is hydraulically upgradient of the nearest Aerojet plume and wells operating in this area will capture water originating from the northeast, 2) the area is located east and southeast of the Aerojet plumes, which is perpendicular to the direction of plume migration to the southwest, and 3) the area is outside the 2,000-foot consultation zone associated with the Aerojet plumes, which neglects the requirement for a special review by the Sacramento County Environmental Management Department and the Central Valley RWQCB to evaluate potential impacts to public health and groundwater quality (Section 6.28(G) of the County Code). Figure 5 shows the estimated extent of a 2,000-foot buffer centered on the proposed groundwater extraction area in relation to the nearest detected contamination affiliated with the Aerojet plumes. The nearest detected contamination is approximately 6,600 feet from the proposed groundwater extraction area.

2.6 Land Subsidence

The primary causes of land subsidence in California are tectonic forces and aquifer system compaction because of fluid withdrawal. Aquifer system compaction occurs when there is a reduction of fluid (e.g., oil or groundwater) pressure in the pores of unconsolidated sediments. Land subsidence resulting from aquifer deformation may be either elastic or inelastic. Elastic deformation is reversible and temporary, and typically occurs in response to seasonal groundwater recharge or extraction. Inelastic subsidence is irreversible and permanent and occurs as pore spaces within fine-grained sediments collapse in response to lowered groundwater levels and reduced fluid pressure. Inelastic deformation can occur when groundwater elevations drop below the historical low elevations and fine-grained sediments become depressurized. Once this process occurs, the pore space cannot be re-inflated by rising water levels (Borchers et al. 2014).

Based on the geology of the project site (discussed in Section 2.2), the only potential location for fine-grained sediments would be in the Cenozoic deposits that occur on the western side of the project site (Figure 3). Some of this area was historically dredged during gold mining operations, but documented historical evidence of subsidence is not available. The SASb GSP (SASb GSAs 2021) considered historical land subsidence for the SASb and found areas adjacent to the project site of up to −0.05 feet in total vertical displacement using Interferometric Synthetic Aperture Radar satellite data from June 2015 to September 2019 (Figure 2.3-41 of the SASb GSP [SASb GSAs 2021]).

The Cenozoic deposits are currently producing some groundwater through the Aerojet Remediation Project, but production rates are not available. Groundwater pumping from the Cenozoic deposits are unlikely to produce land subsidence, and land subsidence was not identified as an undesirable result in the GSP (SASb GSAs 2021). Any effects to infrastructure, or to beneficial uses, are unlikely due to low historical total vertical displacement (less than 0.05 feet over 4 years) and the limited infrastructure in the area, which is for Aerojet pumping and treatment. The remainder of the project site consists of Mesozoic bedrock units that are not susceptible to land subsidence.

2.7 Surface Water Connectivity and Groundwater Dependent Ecosystems

DWR's Natural Communities Commonly Associated with Groundwater Dataset was reviewed to determine potential wetland features and vegetation that may be groundwater dependent in the vicinity of the CCAR site. Additionally, the SASb GSP (SASb GSAs 2021) reviewed interconnected surface water and groundwater and potential groundwater-dependent ecosystems (GDEs) in the vicinity of the CCAR site. There are no GDEs or potential GDEs mapped in the vicinity of the project site. Streams from the project site flow to Deer Creek and may potentially support GDEs on the lower end of the Cosumnes River. The SASb GSP (SASb GSAs 2021) found that the reach of the Cosumnes River that flows approximately between Deer Creek and Twin Cities Road is disconnected on a seasonal basis, but that some evidence of sub-seasonal connection does exist. For planning purposes, that reach of the Cosumnes River is considered a data gap and more research is needed to understand stream/aquifer interaction. However, the SGMA only addresses the impacts of groundwater pumping on GDEs and not surface water diversions. Surface water rights currently allow for up to 61.5 AFY to be diverted from three points of diversion that could potentially be used for project construction purposes (Section 2.4; SWRCB 2021). Additional studies may be required to assess surface diversion amounts if requested.

2.8 Groundwater Storage Depletion

The SASb GSP (SASb GSAs 2021) indicates that the current annual change in groundwater in storage is a surplus of 2,200 AF, but that SASb projected conditions without climate change are for an average annual deficit in groundwater in storage of 1,100 AF. With projected climate change, the average annual deficit in groundwater in storage is projected to be 6,200 AF. The SASb GSP (SASb GSAs 2021) noted several projects and management actions that could reduce the average annual groundwater in storage deficit under projected climate change conditions to 100 AF. The SASb GSP (SASb GSAs 2021) does not include an estimate of the total groundwater in storage with which to calculate the percentage change of groundwater in storage as a result of project implementation. However, with the estimated recharge to the SASb of 298,900 AFY under future climate conditions, an extraction of 253 AF for 1 year (the estimated project construction and decommissioning demand) would be 0.08% of the total average annual recharge. Estimated pumping under future climate conditions is 305,100 AFY, so the project could increase pumping by 0.08% for 1 year. The project pumping is estimated to be approximately 10.5 AFY, so no significant additional change in storage is expected to result from the project 35-year operational period pumping.

The per-acre groundwater use within the SASb is approximately 1.23 AFY per acre (305,100 AFY under future climate conditions over a surface area of 248,000 acres) (DWR 2016). Under sustainable conditions, assuming the estimated overdraft of 6,200 AFY, the sustainable per-acre groundwater use within the SASb would be approximately 1.21 AFY per acre (298,900 AFY/248,000 acres). The amortized per-acre groundwater use for the project would be approximately 0.01 AFY per acre (506 AF for construction and decommissioning, plus 10.5 AFY for 35 years [10.5 AF over 33 years], divided by a project area of 2,555 acres), which is well below the SASb per-acre sustainable use.

Groundwater storage depletion for the project is not expected to be a significant impact to the SASb because of the small percentage of 1-year pumping (253 AF) relative to the large average annual pumping (305,100 AFY) estimated for the SASb. Currently, the SASb has a surplus of 2,200 AF annually, and 253 AF for 1 year would have no significate impact on the SASb.

3 Summary of Project Groundwater Resources, Impacts, and Mitigation

Potential CCAR groundwater pumping was reviewed for potential impacts to the lowering of groundwater levels, reduction of groundwater in storage, degradation of groundwater quality, land subsidence, and the reduction of interconnected surface water. There is insufficient data and information with which to evaluate the upper end of project demand estimates for the feasibility of obtaining all project water from on-site or near-site groundwater sources. However, empirical evidence suggests that hydrogeologic conditions are suitable for the operation and maintenance water demand of 10.5 AFY. Potential sources for construction and decommissioning water demand include the SWCA, Sloughhouse Solar Project groundwater wells, and onsite groundwater wells. Below is a summary of findings for potential groundwater sustainability impacts that assumes all project water demand is met solely from groundwater:

- The temporary lowering of groundwater levels due to project well production of 253 AF during a 18-month period for construction and decommissioning would likely be only a local effect, but additional studies may be required to evaluate potential interference to nearby wells.
- The project is unlikely to have any significant impact to the SASb groundwater in storage because of the short period of pumping (253 AF over 18 months) and the large volumes of recharge (298,900 AFY) and pumping (305,100 AFY) estimated for future climate conditions in the SASb. Currently, there is a surplus of 2,200 AF annually in the SASb. The amortized per-acre groundwater use for the project would be approximately 0.01 AFY per acre, which is significantly less than the 1.21 AFY per acre limit under sustainable conditions.
- County ordinance has established a consultation zone for any application for a well permit within 2,000 feet of a known groundwater contaminant plume (Section 6.28(G) of the County Code). The proposed area for on-site project groundwater extraction is outside the 2,000-foot consultation zone of the known Aerojet contaminant plume and, therefore, is not subject to a special review by appropriate regulatory agencies to evaluate potential impacts to public health and water quality (Figure 5).
- Land subsidence is not considered to be a significant impact in the SASb (SASb GSAs 2021). Significant land subsidence is unlikely to cause a problem in the Cenozoic deposits in the project area because of the limited infrastructure in the area. The Mesozoic bedrock units are not susceptible to land subsidence.
- There are no potential GDEs mapped within the project area; therefore, groundwater extractions would not affect GDEs or potential GDEs.

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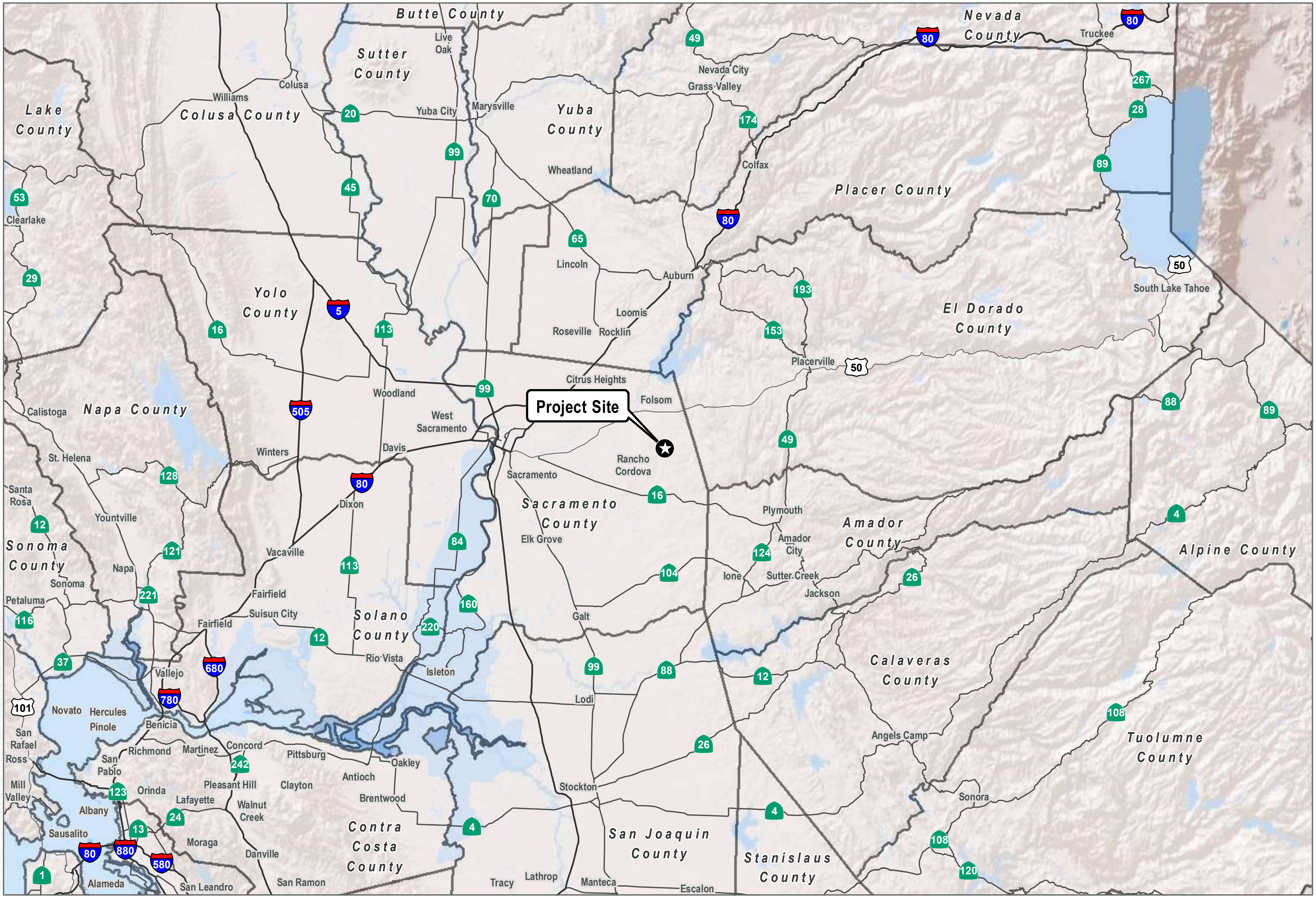

SOURCE: ESRI

DUDEK

0 5 10 Miles

FIGURE 1

Project Location

Coyote Creek Agrivoltaic Ranch Environmentally Preferred Project Design

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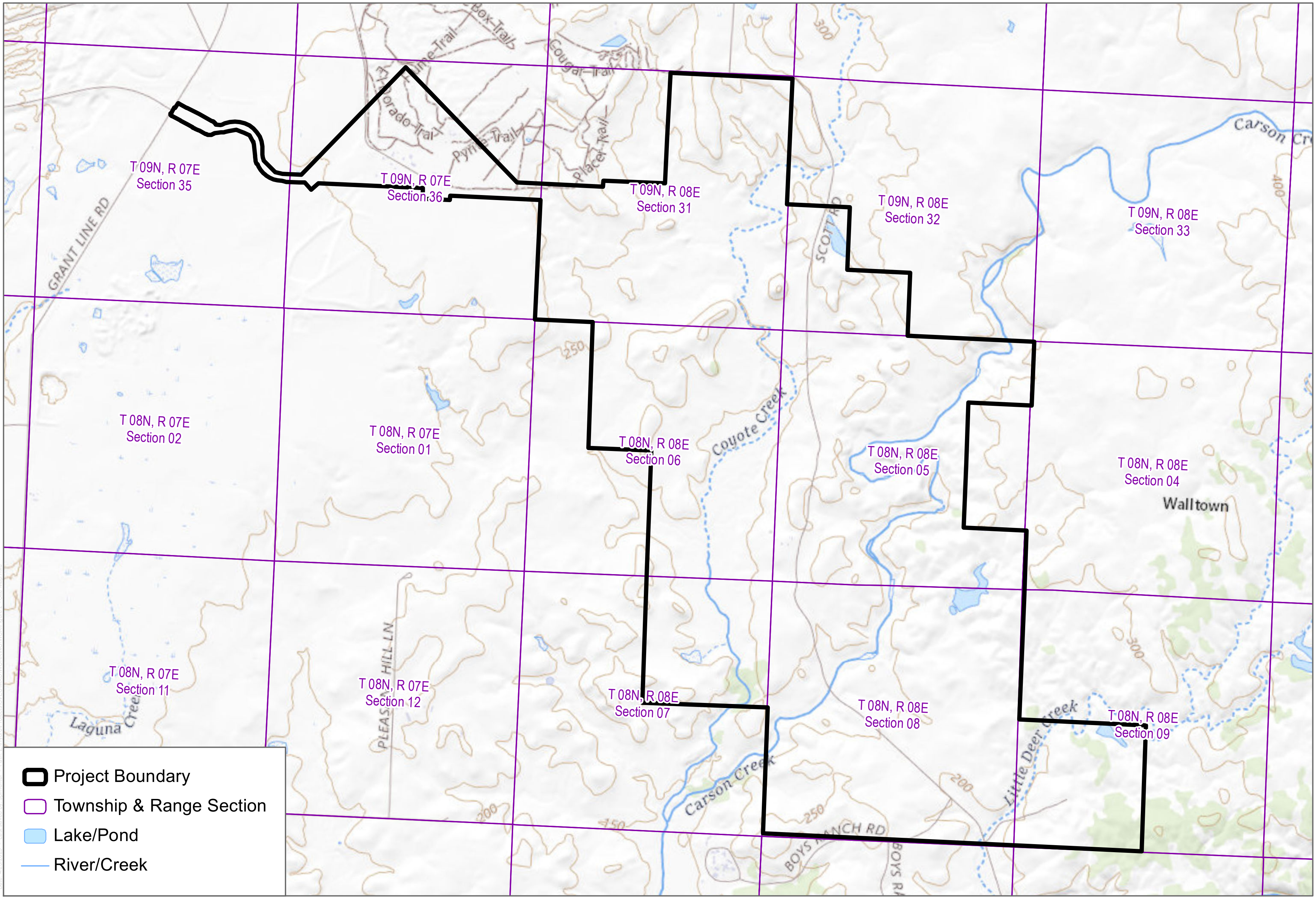

SOURCE: ESRI, USGS

DUDEK

0 0.5 1 Miles

FIGURE 2

Site Aerial Map

Coyote Creek Agrivoltaic Ranch Environmentally Preferred Project Design

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Project Boundary

Structural Features

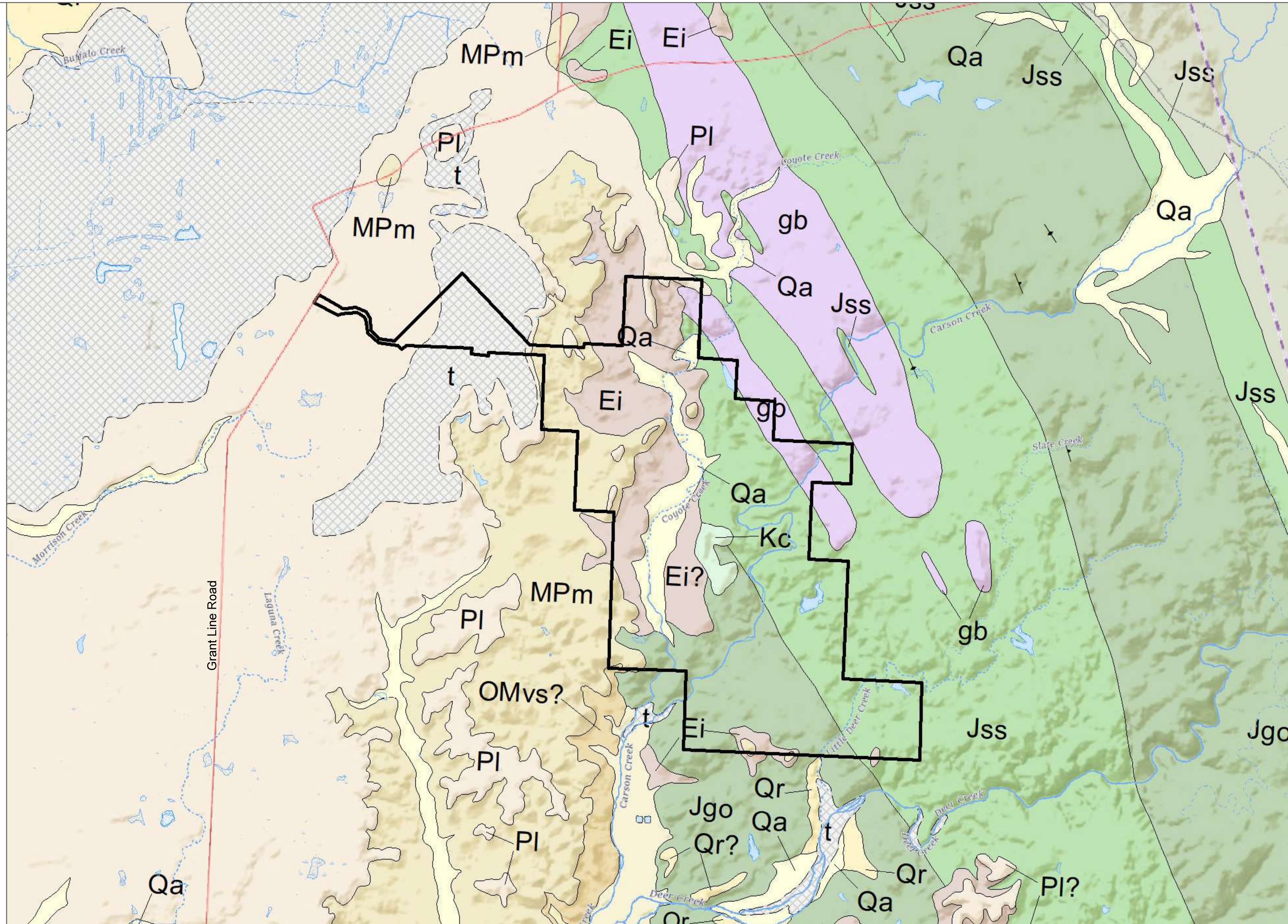
- metamorphic foliation, vertical
- metamorphic foliation, inclined

Geologic Contacts

- contact, approx. located
- contact, certain
- water boundary

Geologic Unit (Youngest to Oldest)

- water
- t, Dredge Tailings (Historic)
- Qa, Undivided Alluvium (Quaternary)
- Qm, Modesto Formation (Pleistocene)
- Qr, Riverbank Formation (Pleistocene)
- Pl, Laguna Formation (Pliocene)
- MPm, Undivided Mehrten Formation (Miocene)
- Ei, Ione Formation (Eocene)
- OMvs, Valley Springs Formation (Oligocene)
- Kc, Chico Formation (Cretaceous)
- Jch, Copper Hill Volcanics (Jurassic)
- Jgo, Gopher Ridge Volcanics (Jurassic)
- Jss, Salt Springs Slate (Jurassic)
- gb, Gabbro and Metagabbro of Foothill Melange (Jurassic)



SOURCE: California Department of Conservation (Preliminary Geologic map of the Sacramento 30' x 60' quadrangle, California)

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0 1 2 Miles

FIGURE 3

Regional Geologic Map

Coyote Creek Agrivoltaic Ranch Environmentally Preferred Project Design

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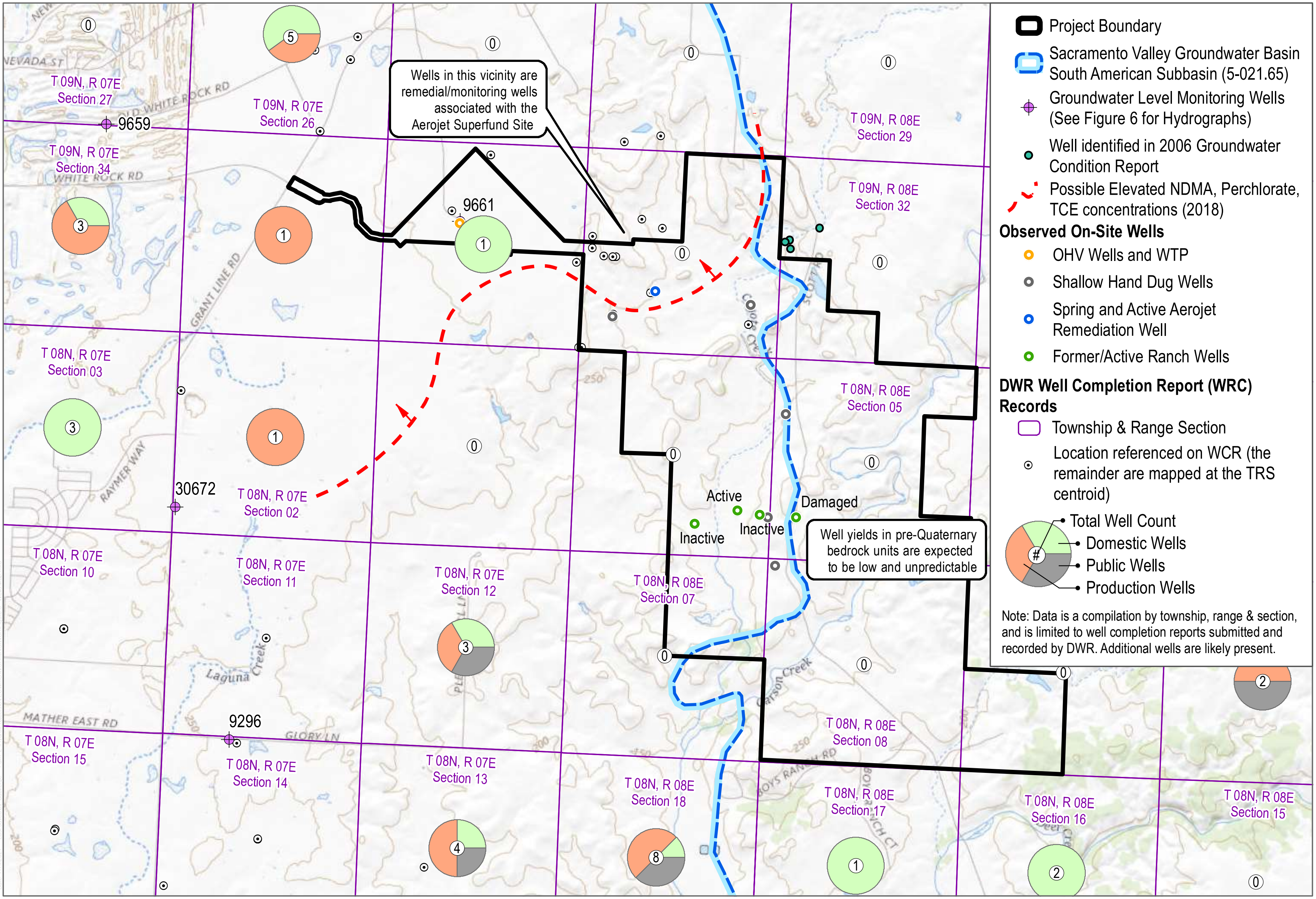

SOURCE: ESRI, DWR, USGS, Geosyntec 2018 (Isoconcentration Contour Maps)

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FIGURE 4

Wells Map

Coyote Creek Agrivoltaic Ranch Environmentally Preferred Project Design

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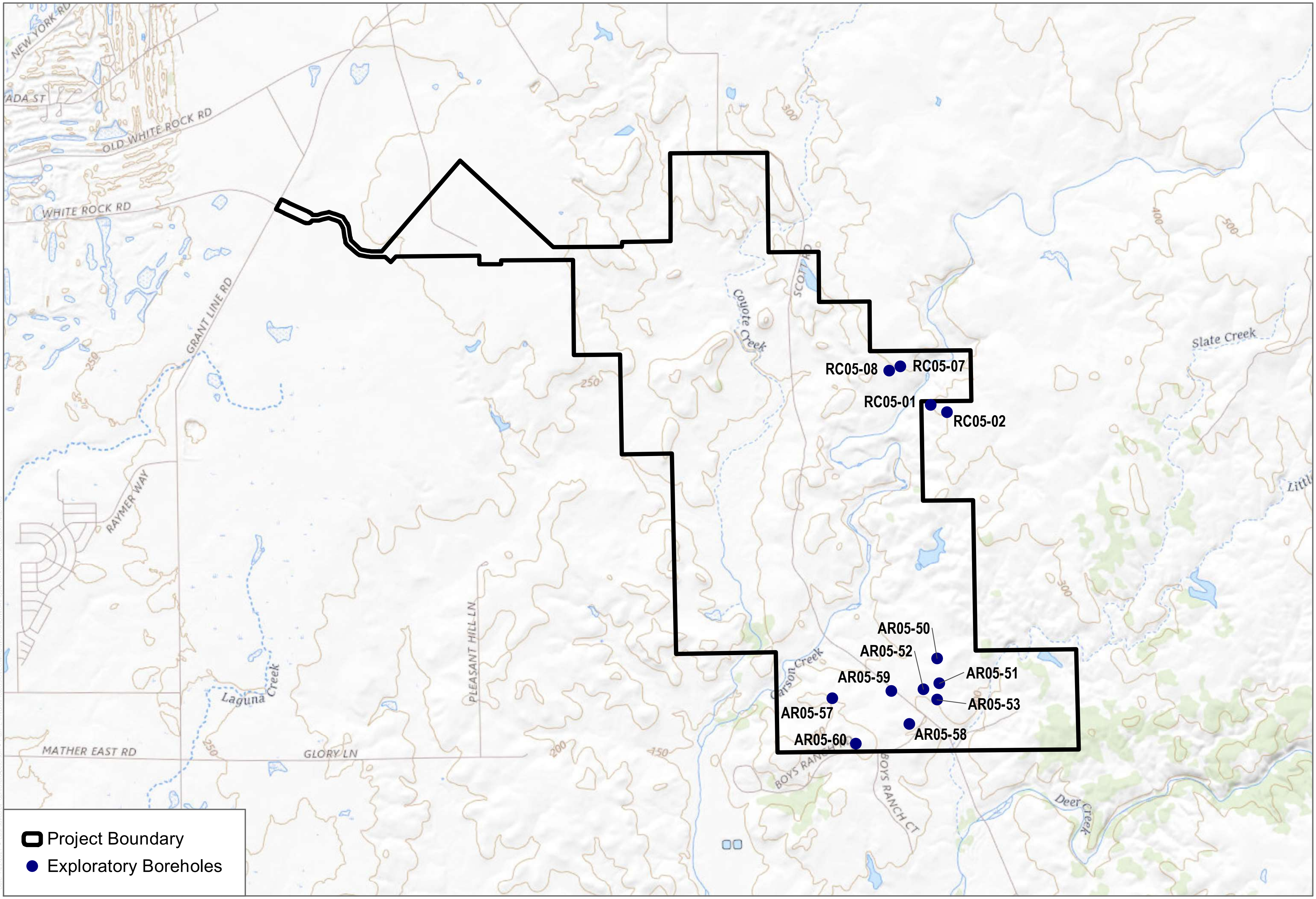

SOURCE: ESRI, DWR, Sespe Consulting Inc. 2020

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FIGURE 5

Borehole Location Map

Coyote Creek Agrivoltaic Ranch Environmentally Preferred Project Deisgn

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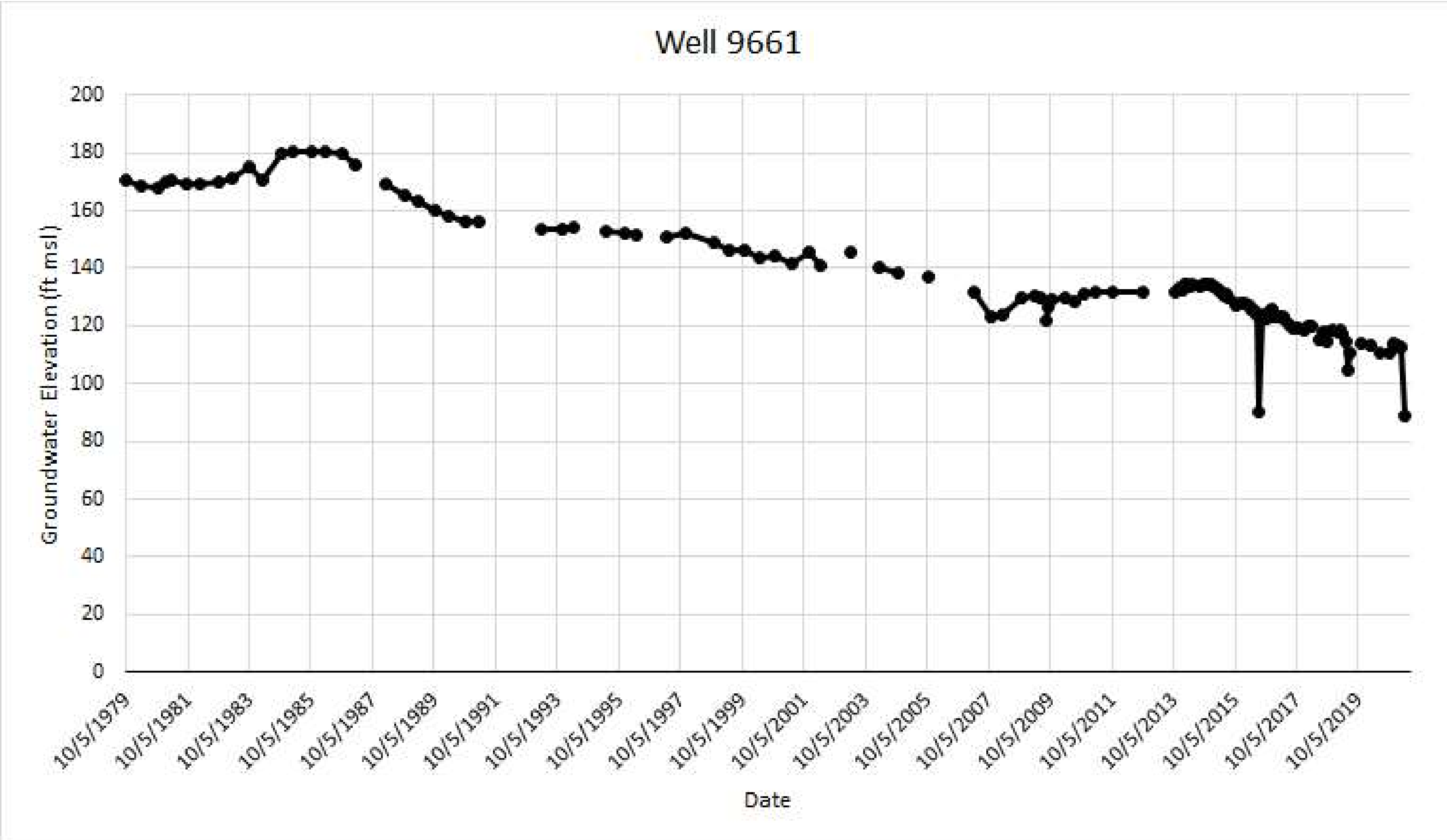

SOURCE: CASGEM DATABASE DWR

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FIGURE 6

Hydrograph for Well 9661

Coyote Creek Agrivoltaic Ranch Environmentally Preferred Project Design

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