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Docket Number:	26-OPT-01
Project Title:	Vaca Dixon Power Center Project
TN #:	268159
Document Title:	Section 5-13_Water Resources_VDPC
Description:	This section discusses the existing water resources near the Project, and potential impacts that the Project may have on these resources.
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Submission Date:	1/6/2026 1:17:11 PM
Docketed Date:	1/16/2026

5.13 Water Resources

This section discusses the existing water resources relevant to the Vaca Dixon Power Center Project (Project), as well as potential impacts related to water resources that may result from construction and operation of the Project. Section 5.13-1 describes the existing environmental setting. Section 5.13.2 provides an overview of the regulatory setting related to water resources. Section 5.13.3 identifies potential environmental impacts that may result from Project construction and operation (including maintenance), as well as mitigation measures that should be considered during Project construction and operation. Section 5.13.4 discusses cumulative impacts. Section 5.13.5 presents laws, ordinances, regulations, and standards (LORS) applicable to water resources and the Project. Section 5.13.6 identifies regulatory agency contacts and Section 5.13.7 includes a description of the necessary water resources permits required to construct and operate the Project. Section 5.13.8 provides a list of references used in the preparation of this section.

5.13.1 Environmental Setting

The following subsections provide an overview of the existing environmental setting for water resources in the Project vicinity. This includes the following topics required in California Energy Commission (CEC) Appendix B:

- Groundwater resources and geologic structures (Appendix B Requirement (B)(i)) – see Section 5.13.1.1, *Groundwater*;
- Surface water bodies (Appendix B Requirement (B)(ii)) – see Section 5.13.1.2, *Surface Water*;
- Flood control facilities, existing and proposed (Appendix B Requirement (B)(iii)) – see Section 5.13.1.3, *Stormwater*;
- Water inundation zones, such as the 100-year flood plain and tsunami zones (Appendix B Requirement (B)(iv)) – see Section 5.13.1.4, *Flooding and Inundation*;
- Wastewater – see Section 5.13.1.5, *Wastewater*; and
- Water Supply – see Section 5.13.1.6, *Water Supply*.

As shown in Figure 5.13-1, the BESS components of the Project are located on the south side of Interstate 80 (I-80) in the City of Vacaville, while the transmission intertie (gen-tie) lines that would connect the BESS components to the existing CalPeak Power - Vaca Dixon Peaker Plant (VDPP) on the Pacific Gas & Electric (PG&E) parcel on the north side of I-80 are located on Solano County land; these jurisdictions are discussed further in Section 5.13.1.1 *Groundwater*, under "Sustainable Groundwater Management Act."

5.13.1.1 Groundwater

Solano Subbasin

The Project Site is located within the Solano Subbasin of the Sacramento Valley Groundwater Basin (DWR Basin No. 5-021.66). As shown in Figure 5.13-2, the Project Site is located in the north-northwestern portion of the subbasin.

Figure 5.13-1 Regional Location

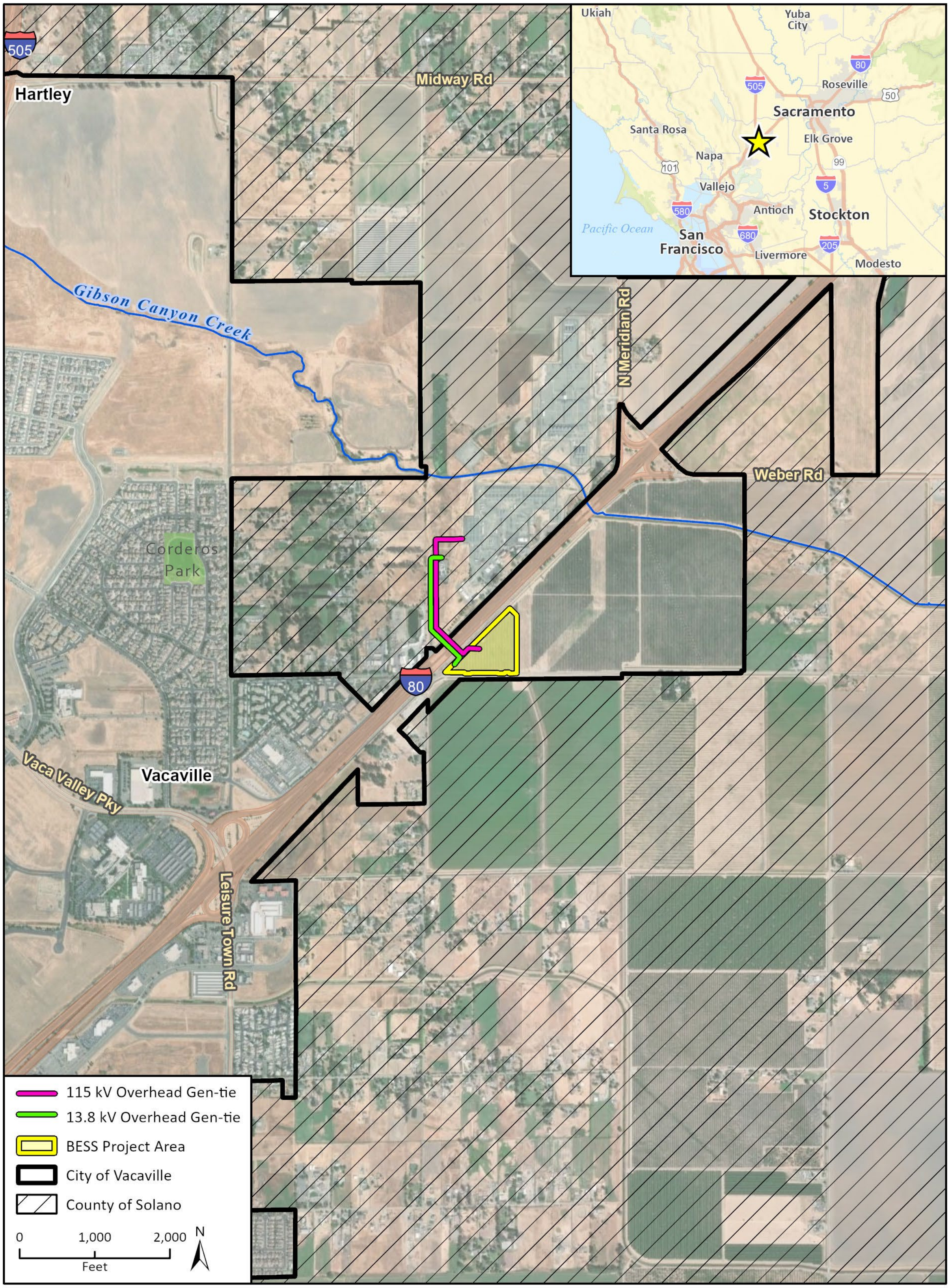

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Fig 2-1 Regional Location_Portrait

Figure 5.13-2 Groundwater

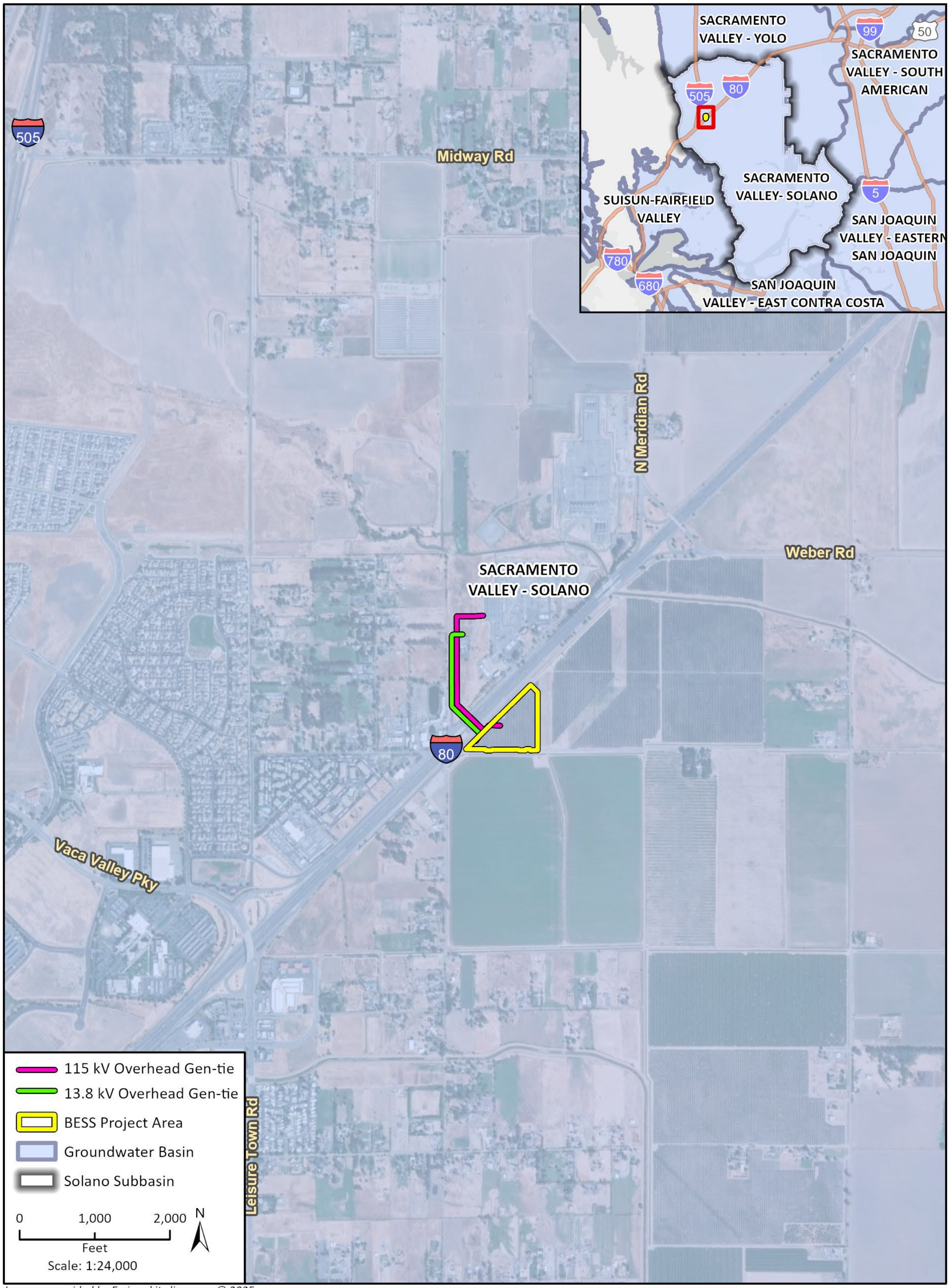

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Fig X Groundwater Subbasin - Portrait - 24K

Topography throughout the subbasin is relatively flat, with elevations reaching up to approximately 700 feet above mean sea level (amsl) in the northern and western areas of the subbasin, where the Coast Range influences elevation (City of Vacaville GSA et al. 2021). Freshwater-bearing sedimentary deposits in the subbasin extend to approximately 3,000 feet below the ground surface (bgs). The main water-bearing units in the Solano Subbasin are Late Tertiary (Pliocene) to Quaternary (Recent) in age and consist of sedimentary continental deposits. Three units contain most of the freshwater in the subbasin, including younger alluvium, older alluvium, and the Tehama Formation. The Tehama Formation, which is representative of Cenozoic nonmarine sediments, and the overlying quaternary sands and gravels are the aquifers that provide much of the fresh groundwater available. These deposits are thinner to the west toward the Coast Range, where the proposed Project Site is located, and increase in thickness towards the eastern boundary of the subbasin, up to several thousand feet (City of Vacaville GSA et al. 2021).

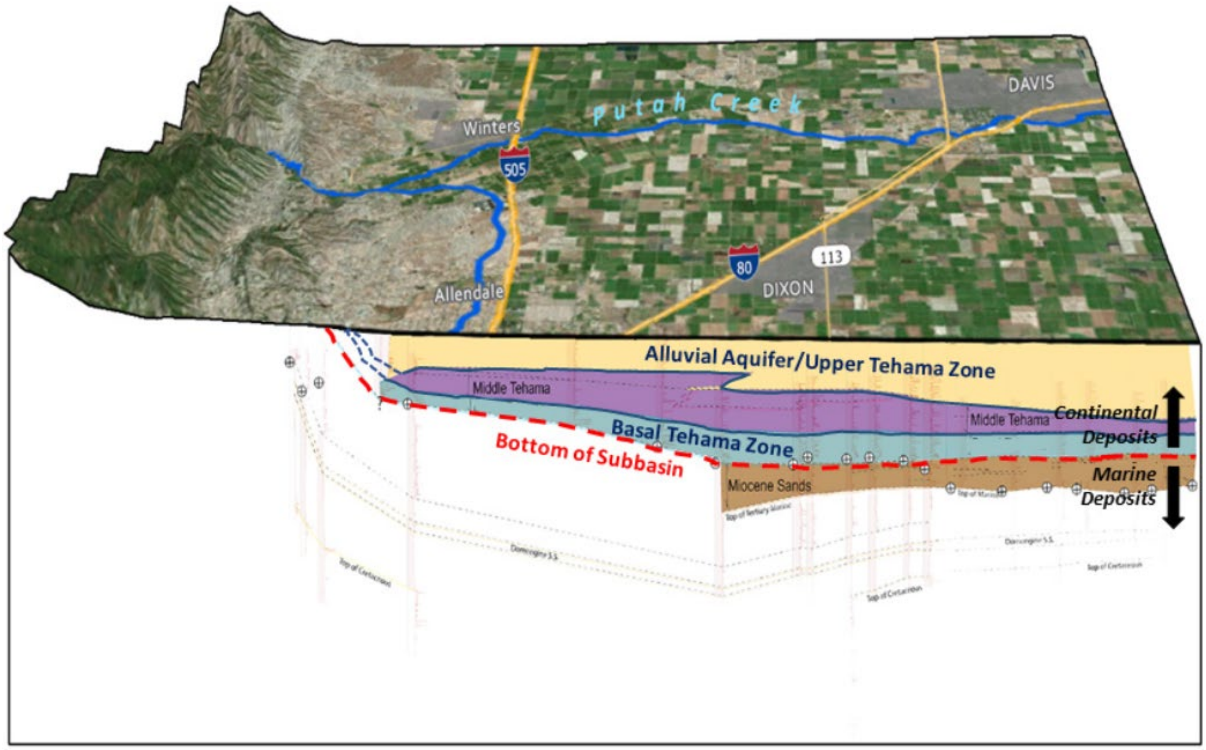
Aquifer System Overview

There are two primary aquifer zones in the Solano Subbasin, including the shallow aquifer which consists of the Alluvial Aquifer and Upper Tehama Zone, and the underlying deep aquifer which consists of the Basal Tehama Zone. The primary aquifer zones are separated by the Middle Tehama zone, which consists of fine-grained material that is generally non-water bearing and creates an aquitard through much of the subbasin, limiting vertical movement of water between the shallower Alluvial Aquifer/Upper Tehama Zone and the deeper Basal Tehama Zone (Solano Collaborative and SCWA 2025). Most groundwater pumping occurs in the shallower Alluvial Aquifer and Upper Tehama Zone. Figure 5.13-3 provides an overview of the aquifer zones in the Solano Subbasin.

Long-term groundwater level data indicate stable conditions throughout the Subbasin with some declining levels in localized areas, most notably in the northwestern part of the Subbasin, which is also where the most urbanized development is located. Groundwater levels typically decline during drought periods and recover during and after wet periods. Seasonal fluctuations in depth to groundwater occur throughout the Subbasin due to cyclic trends in groundwater pumping for urban and agricultural uses during the irrigation season (City of Vacaville GSA et al. 2021).

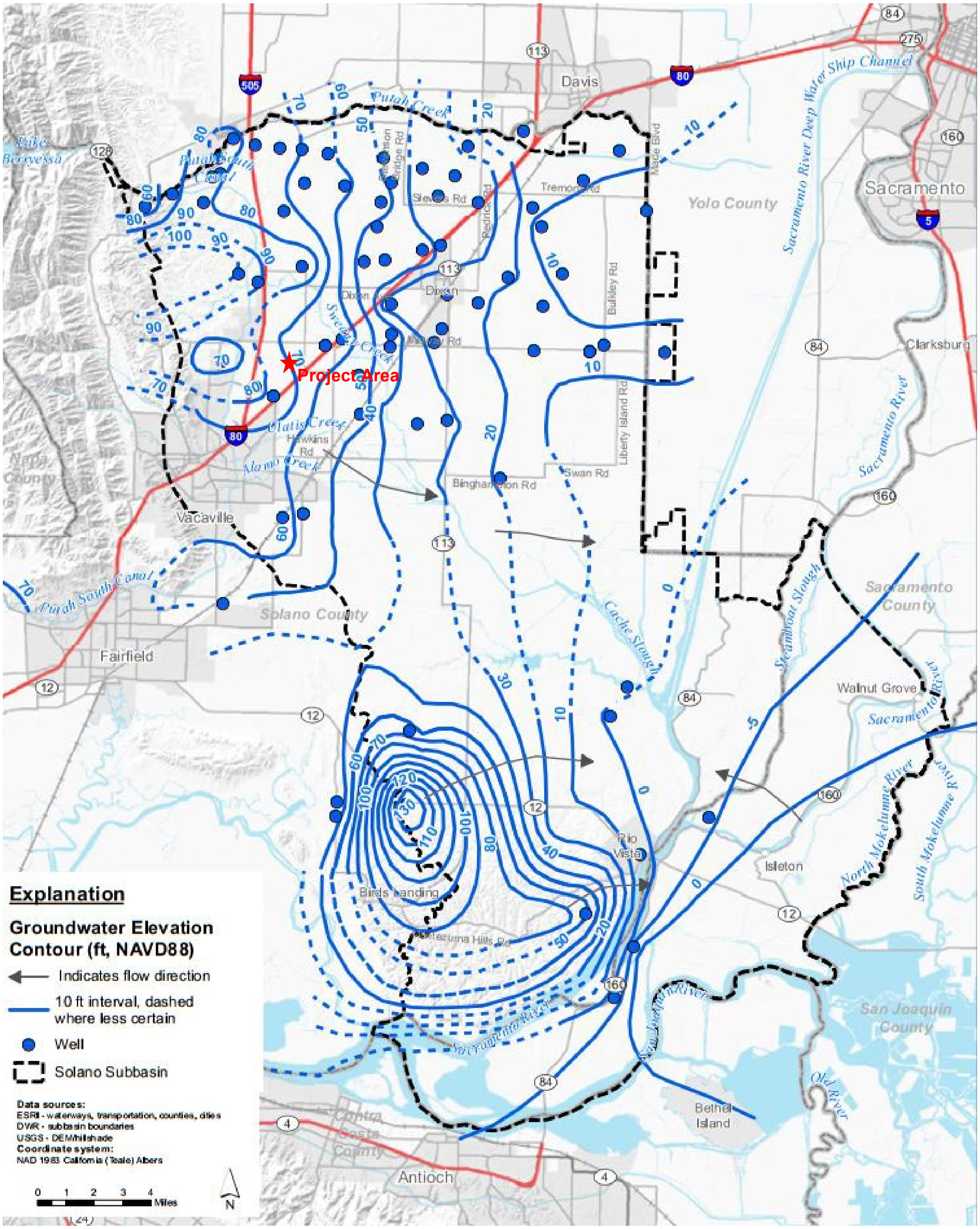
Groundwater flow direction in the Alluvial Aquifer and Upper Tehama zone is generally from west/northwest towards the east/southeast (SID GSA et el. 2021). In the deeper Basal Tehama zone, which is a confined aquifer, groundwater flow is generally towards the southwest and the City of Vacaville, where historical groundwater pumping in the Basal Tehama zone has occurred (SID GSA et el. 2021). Figure 5.13-4 and Figure 5.13-5 show the direction of groundwater flow and approximate depth to groundwater in each aquifer zone.

Figure 5.13-3 Solano Subbasin Aquifer Zones



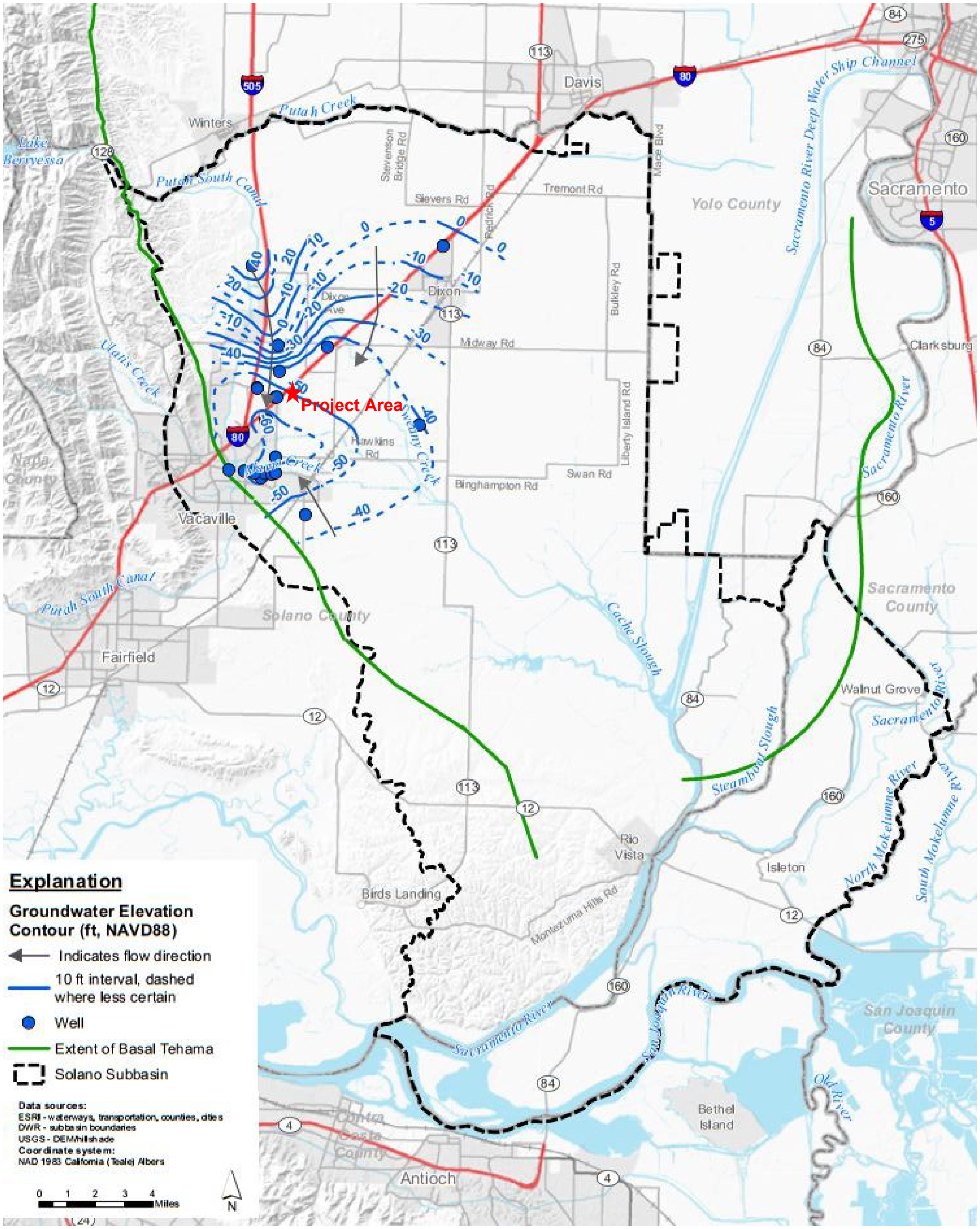
Source: City of Vacaville GSA et al. 2021

Figure 5.13-4 Groundwater Direction and Depth, Alluvial Aquifer and Upper Tehama Zone



Source: City of Vacaville GSA et al. 2021, pg. ES-7

Figure 5.13-5 Groundwater Direction and Depth, Confined Basal Tehama Zone



Source: City of Vacaville GSA et al. 2021, pg. ES-7

Groundwater Budget

Groundwater recharge within the Solano Subbasin occurs primarily through infiltration and deep percolation of precipitation, as well as through percolation of water applied as irrigation, seepage from natural surface waterways, seepage from water conveyance systems including leaking pipes and canals, and deeper subsurface recharge from adjacent and upland areas outside the subbasin (City of Vacaville GSA et al. 2021). Groundwater discharge occurs primarily through pumping for agricultural, municipal, domestic, and industrial purposes. Some of the pumped groundwater returns to the subbasin through deep percolation of applied water, as well as through septic and other wastewater percolation (City of Vacaville GSA et al. 2021).

Table 5.13-1, below, presents projected groundwater budget scenarios for the Solano Subbasin based upon current land uses, including with comparison to historic inflow and outflow conditions.

Table 5.13-1 Solano Subbasin Budget – Current Land Uses (AFY)

Budget Component	Historical	Current, No Climate Change	2030, Climate Change	2070, Climate Change
Alluvial Aquifer/Upper Tehama Zone				
Net seepage	14,000	27,000	38,000	51,000
Deep percolation	210,000	210,000	210,000	200,000
Net subsurface flows	-45,000	-80,000	-78,000	-74,000
Groundwater pumping	-170,000	-160,000	-170,000	-180,000
Annual storage change	-110	1,200	1,300	1,100
Basal Tehama Zone				
Net seepage	0	0	0	0
Deep percolation	0	0	0	0
Net subsurface flows[1]	9,300	6,200	6,300	6,300
Groundwater pumping	-6,400	-6,100	-6,200	-6,200
Annual storage change	3,000	150	130	81
Entire Groundwater System				
Net seepage	14,000	27,000	38,000	51,000
Deep percolation	210,000	210,000	210,000	200,000
Net subsurface flows	-35,000	-74,000	-72,000	-68,000
Groundwater pumping	-180,000	-170,000	-170,000	-180,000
Annual storage change	2,900	1,400	1,400	1,200

AFY = acre-feet per year

[1] Net subsurface flows in the Basal Tehama Zone include downward vertical flow from the Alluvial Aquifer/Upper Tehama Zone.

Source: City of Vacaville GSA et al. 2021, pg. 5-63

The table above shows that net seepage increases in the projected scenarios compared to the historical scenario, with increased stream seepage greatest in the climate change scenarios; this correlates with higher surface water flows resulting from climate change. Deep percolation from surface water to groundwater decreases slightly under the climate change scenarios, while net subsurface flows become more negative, indicating with Subbasin outflows increasing compared to historical rates but decreasing slightly under climate change scenarios. As shown, groundwater storage is projected to increase under both the current and projected scenarios, including with consideration to climate change.

Table 5.13-2, below, presents projected groundwater budget scenarios based upon future land uses. In comparison to the table above, which reflects current land uses in the Solano Subbasin, the table below reflects future land uses that were developed through coordination between the GSAs and local stakeholders, and are primarily characterized by expanding urban uses around the cities of Dixon and Vacaville, and decreasing agricultural uses throughout the subbasin (City of Vacaville GSA et al. 2021).

Table 5.13-2 Solano Subbasin Budget – Future Land Uses (AFY)

GWS Budget Component	Historical	Current, No Climate Change	2030, Climate Change	2070, Climate Change
Alluvial Aquifer/Upper Tehama Zone				
Net seepage	14,000	31,000	42,000	55,000
Deep percolation	210,000	210,000	200,000	190,000
Net subsurface flows	-45,000	-77,000	-75,000	-70,000
Groundwater pumping	-170,000	-160,000	-170,000	-180,000
Annual storage change	-110	1,100	1,100	960
Basal Tehama Zone				
Net seepage	0	0	0	0
Deep percolation	0	0	0	0
Net subsurface flows[1]	9,300	8,000	8,100	8,200
Groundwater pumping	-6,400	-8,100	-8,200	-8,300
Annual storage change	3,000	-79	-100	-160
Entire Groundwater System				
Net seepage	14,000	32,000	42,000	55,000
Deep percolation	210,000	210,000	200,000	190,000
Net subsurface flows	-35,000	-69,000	-67,000	-62,000
Groundwater pumping	-180,000	-170,000	-180,000	-190,000
Annual storage change	2,900	990	1,000	800

AFY = acre-feet per year

[1] Net subsurface flows in the Basal Tehama Zone include downward vertical flow from the Alluvial Aquifer/Upper Tehama Zone.

Source: City of Vacaville GSA et al. 2021, pg. 5-63

Compared to the current land uses reflected in Table 5.13-1, the table above shows that future land uses shift the quantities of annual storage change in both the shallow zone (Alluvial Aquifer and Tehama Zone) and the deeper zone (Basal Tehama Zone), as well as the overall aquifer system. The annual change in storage in the confined Basal Tehama Zone is negative, indicating more outflow than inflow each year; this is likely due to increased urban pumping. However, the overall groundwater system still shows a positive change to groundwater in storage.

Groundwater Quality

Groundwater quality in the Solano Subbasin is characterized by key constituents of concern related to beneficial uses, including Total Dissolved Solids (TDS), chloride, nitrate, arsenic, hexavalent chromium (chromium-6), and boron. These constituents are naturally occurring in the environment; their occurrence and concentrations in groundwater can also be affected by anthropogenic activities. Water quality concentrations are compared to maximum contaminant levels (MCLs) which reflect State drinking water standards. For constituents that do not have MCLs, such as TDS and chloride, secondary MCLs addressing aesthetics such as taste and odor are considered. Below is an overview of groundwater quality characteristics for the Solano Subbasin (City of Vacaville GSA et al. 2021):

- TDS concentrations in parts of the subbasin are above the recommended secondary MCL of 500 milligrams per liter (mg/L) with most areas having TDS concentrations below the upper secondary MCL of 750 mg/L. Elevated TDS in this area is typically from marine geologic deposits.
- Chloride concentrations in groundwater in the Subbasin are generally less than 50 mg/L, which is well below the secondary MCL of 250 mg/L.
- Nitrate as nitrogen concentrations exceeding the MCL of 10 mg/L occur regionally in and around the cities of Dixon and Vacaville, and several regulated contamination sites. Nitrate is associated with fertilizer application and leaching from septic and wastewater systems.
- Arsenic exceedances of the MCL of 10 micrograms per liter (µg/L) are most common in the more southern parts of the subbasin. High arsenic levels are from naturally occurring arsenic in the local geologic materials.
- Chromium-6 concentrations are elevated in some areas in the northern subbasin, although most concentrations are below the total chromium MCL of 50 µg/L. Elevated chromium-6 levels are from natural rock sources and geochemical processes.
- Boron levels typically range from 0.35 to 0.7 mg/L throughout the subbasin with some local areas of concentrations greater than 0.7 mg/L in the southern subbasin. No drinking water MCL exists for boron, although some crop and vegetation types are sensitive to boron levels.

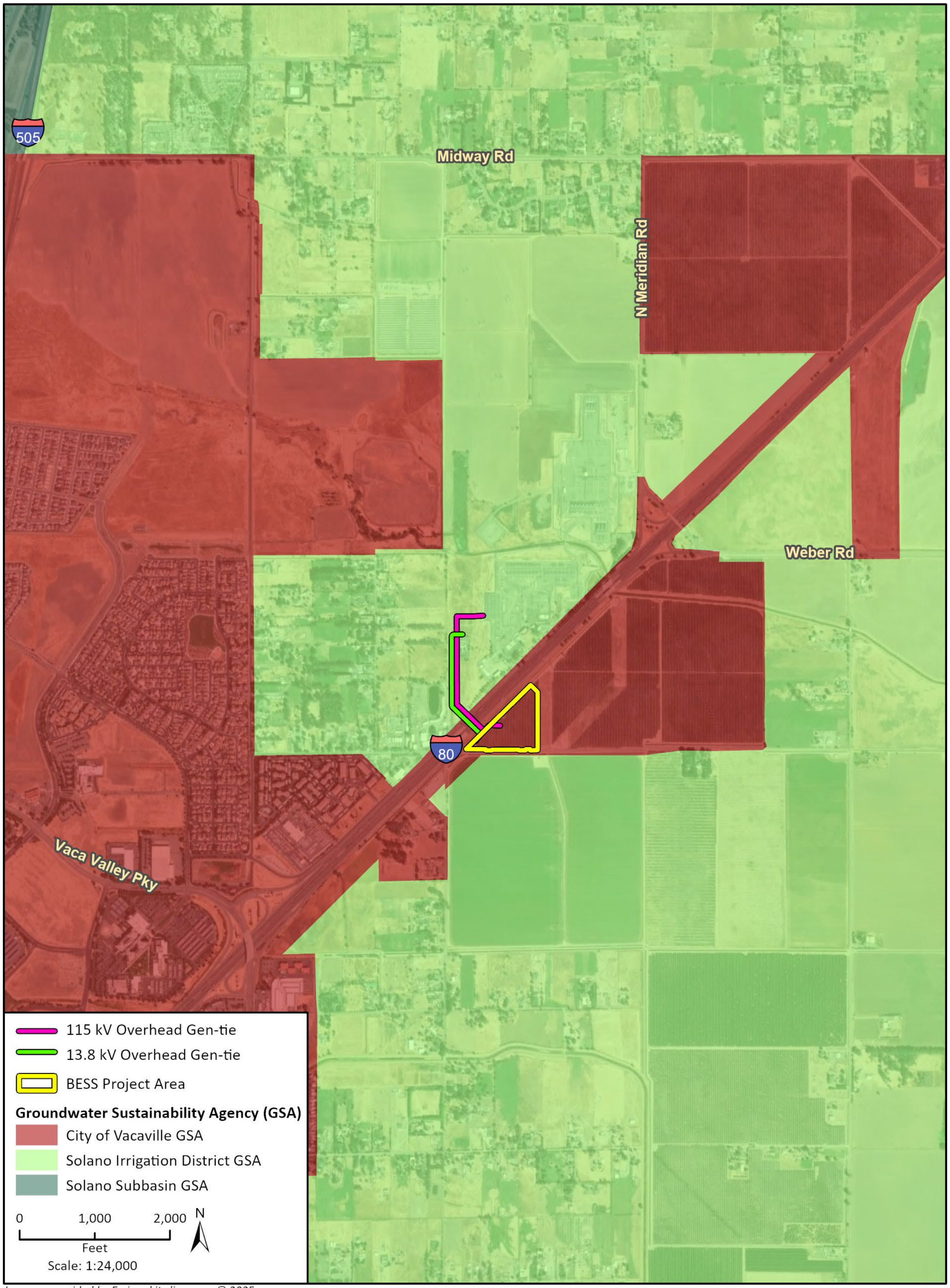
In addition, a portion of the Solano Subbasin is located within the Sacramento River-San Joaquin Delta (Delta), where brackish surface water conditions exist as a result of tidal influences from the San Francisco Bay; therefore, portions of the subbasin are influenced by characteristics of the Delta (City of Vacaville GSA et al. 2021). Water quality data in the subbasin do not indicate historical intrusion of higher salinity water from Delta surface waterways.

Sustainable Groundwater Management Act

In 2014, the Sustainable Groundwater Management Act (SGMA) established a framework for local groundwater management under which the California Department of Water Resources (DWR) assigns priority levels to all basins based on existing water balance conditions. The purpose of SGMA is to bring overdrafted basins into sustainable conditions by 2040, and to maintain sustainable conditions in the future. To accomplish this, SGMA requires that all Medium and High Priority basins, as designated by the DWR, are managed by DWR-approved Groundwater Sustainability Agencies (GSAs) through the implementation of Groundwater Sustainability Plans (GSPs).

The Solano Subbasin is characterized by sustainable conditions absent of long-term overdraft, as discussed in the preceding section under “Groundwater Budget.” The Solano Subbasin is also designated as Medium Priority and is therefore subject to SGMA. There are multiple DWR-approved GSAs in the Solano Subbasin; as discussed in the following subsections and shown in Figure 5.13-6, below, the Project Site is located within the management areas of two GSAs, including the City of Vacaville GSA and the Solano Irrigation District (SID) GSA.

Figure 5.13-6 Solano Subbasin Groundwater Sustainability Agencies



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Additional data provided by the California Department of Water Resources, 2025.

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Fig X Groundwater Sustainability Agencies - Portrait -24K

Groundwater Sustainability Agencies

One basin may have multiple GSAs that each prepare a GSP for their respective jurisdiction, in which case the GSPs must be implemented in coordination between the GSAs through a legally binding agreement to ensure the entire basin is accounted for. Alternatively, multiple GSAs may coordinate to prepare and implement one GSP that covers the entire basin. The Solano Subbasin is managed jointly by multiple GSAs, listed below.

- Solano Irrigation District (SID) GSA
- Solano Subbasin GSA
- Sacramento County GSA-Solano
- City of Vacaville GSA
- Reclamation District No. 3 GSA
- Reclamation District No. 317 GSA
- Reclamation District No. 349 GSA
- North Delta GSA (Reclamation District No. 501 GSA)
- Reclamation District No. 554 GSA
- Reclamation District No. 556 GSA
- Reclamation District No. 2111 GSA

Five of the GSAs listed above organized to form the Solano Subbasin GSA Collaborative (“Solano Collaborative”), including the SID GSA, City of Vacaville GSA, Solano Subbasin GSA, North Delta GSA, and Sacramento County GSA-Solano (Solano Collaborative and SCWA 2025). As mentioned above, the Project is located within the management areas of both the City of Vacaville GSA and the SID GSA, shown in Figure 5.13-6; the City of Vacaville GSA is responsible for areas within the City of Vacaville, including the BESS Project Area, and the SID GSA is responsible for the portion of Solano County within SID’s jurisdiction, including the Project’s gen-tie lines. All GSAs in the Solano Subbasin collaborated to develop and adopt the Solano Subbasin GSP (City of Vacaville GSA et al. 2021), discussed below.

Groundwater Sustainability Plan

The Solano Collaborative (including the City of Vacaville GSA and SID GSA) and other GSAs in the Solano Subbasin (listed above) entered into a Memorandum of Understanding (MOU) to collaboratively develop and implement one GSP for the subbasin, with each GSA responsible for management of the portion of the subbasin within their respective jurisdiction**.** The Solano Subbasin GSP was developed in collaboration between all GSAs in the Solano Subbasin, discussed above. The GSAs mutually adopted the GSP in 2021 and submitted to the DWR on January 31, 2022, with DWR approval provided on January 18, 2024.

The Solano Subbasin GSP includes all required components of a GSP for compliance with SGMA. As such, the GSP addresses the avoidance of “significant and unreasonable adverse effects,” also referred to as “undesirable results,” for six sustainability indicators, including:

- Chronic lowering of groundwater levels
- Reduction of groundwater storage
- Seawater intrusion
- Water quality degradation
- Land subsidence
- Depletion of interconnected surface water

The GSP identifies projects and management actions (PMAs) designed to achieve sustainability goals for the subbasin and avoid undesirable results for the sustainability indicators listed above. The GSAs determined that based on historical, current, and future budgets developed for the GSP, sustainable conditions can be maintained in the Solano Subbasin with minimal to no additional intervention by the GSAs (City of Vacaville GSA et al. 2021). However, localized areas in the northwestern portion of the subbasin were also determined to be vulnerable to declining groundwater levels; therefore, while PMAs may not be necessary to maintain sustainable conditions throughout the overall Solano Subbasin, they are available for implementation by GSAs should they be determined necessary based upon local conditions (City of Vacaville GSA et al. 2021).

Table 5.13-3 below, presents PMAs available to the Solano Subbasin GSAs, as identified in the GSP.

Table 5.13-3 Solano Subbasin – Projects and Management Actions

PMA	Overview
Ongoing PMAs	
Municipal & Industrial Water Use Efficiency Outreach & Implementation	Develop outreach materials and incentives for municipal and industrial water users to increase water use efficiency.
PMAs Development for Implementation	
City of Vacaville Recycled Water	Develop City's Recycled Water Program as recommended in the 2020 Recycled Water Master Plan Feasibility Study, including construction and installation of recycled water treatment, storage, and conveyance facilities; development of a recycled water use ordinance; updating permits; and identifying customers and executing supply contracts.
Westside Streams Stormwater Capture Project	Develop an implementation schedule for potential projects in the Northwest Focus Area to enhance groundwater recharge and support local groundwater sustainability.
Rainfall Managed Aquifer Recharge Demonstration Project	Evaluate the use of specific managed aquifer recharge activities on local farms to generate multiple benefits for groundwater sustainability and stormwater management.
Potential PMAs	
Other Groundwater Recharge Opportunities	Several conceptual recharge projects have been identified along Ulatis Creek to support ongoing groundwater sustainability in the Solano Subbasin. The Nature Conservancy has provided GSAs with guidelines to implement on-farm, multi-benefit groundwater recharge efforts that would also be applicable in the Solano Subbasin.
Grower Education Related to On-Farm Practices for Sustainable Groundwater Management	Use of Solano Agricultural Scenario Planning System (SASPS), a web-based application that GSAs and other local agencies can use to design voluntary programs to engage agricultural producers in on-farm sustainable groundwater management projects.
Demand Management	Develop a program that would incentivize voluntary participants to reduce water consumption.
Groundwater Trading Institution	Monitor Solano Subbasin conditions and consider a groundwater trading market to increase flexibility (options)to respond to potential demand management programs.
Education and Collaboration	The Solano Resource Conservation District (SRCD), The Freshwater Trust (TFT), Local Government Commission (LGC), and RD 2068 all provide groundwater and water conservation education to classrooms and growers within the Solano Subbasin.
Well Owner Outreach and Education	Develop and implement education and outreach about private domestic well monitoring.

PMA	Overview
Participation in Other Water Resources Management Programs	Implement other groundwater management strategies including further use of recycled water, expanded conjunctive water management, inventory of active pumping wells, changes to well regulations, and other actions.
Source: City of Vacaville GSA et al. 2021, pg. 8-5	

Changes or progress made towards PMA implementation are documented in Annual Reports, which are required by SGMA to be submitted to DWR for review and approval. Although the DWR's approval of the Solano Subbasin GSP occurred in 2024, the Solano Subbasin GSAs have been producing Annual Reports since 2022. The Annual Report for Water Year 2024 details that based on monitoring conducted throughout the Solano Subbasin, there is no evidence that groundwater levels are chronically declining, and such conditions are not expected to occur in the future; water levels are generally stable with seasonal fluctuations, exhibit temporary downward trends during drought periods, and recover during wet periods (Solano Collaborative and SCWA 2025).

Subsidence

Subsidence is a gradual lowering of the ground surface elevation. In the Project Site and throughout the Central Valley, subsidence occurs primarily as a result of over-pumping the groundwater, and persistent groundwater overdraft conditions. Within the Solano Subbasin, continuous global positioning system stations (CGPS stations) were used to collect remote sensing data with Interferometric Synthetic Aperture Radar (InSAR). The data indicates that the Subbasin has elasticity with generally negative vertical displacement (i.e., ground surface elevations lowering) occurring during drier years and positive displacement (i.e., ground surface elevations rising) occurring during wetter years (SID GSA et el. 2021, pg. 3-35). Subsidence has been measured in small quantities, with vertical displacement ranging between approximately -0.1 feet to -0.005 feet, with few areas being less than -0.2 feet or greater than 0.1 feet (SID GSA et el. 2021, pg. 3-35).

In addition, groundwater monitoring conducted at a City of Vacaville well indicate an average subsidence rate of 0.0578 inches per year from 2012 through October 2016, at which time the land surface elevation began increasing at a rate of approximately 0.131 inches per year (City of Vacaville 2021, pg. 6-6). The SCWA has two subsidence monitoring stations, one of which is located adjacent to the west of the Project Site in Vacaville, where a Continuous Global Positioning System (CGPS) Station is paired with a groundwater level monitoring well; this station is identified as SCWA's CGPS Station VCVL and City of Vacaville's Municipal Well 16 (MW-16) (LSCE 2020). The reversal in land surface change measured at the Vacaville well indicates that subsidence in the Solano Subbasin is elastic, responding to depletion and recharge of the groundwater system. No adverse impacts to infrastructure or conditions at the land surface have been reported in the Solano Subbasin as a result of subsidence (City of Vacaville GSA et al. 2021, pg. 3-35).

Nearby Wells

Existing groundwater wells are located throughout the Solano Subbasin and used by private landowners as well as water purveyors including the Solano County Water Agency (SCWA), SID, City of Vacaville, City of Dixon, California Water Service (CalWater), City of Rio Vista, Rural North Vacaville Water District (RNVWD), Maine Prairie Water District (MPWD), and Reclamation District 2068 (RD 2068). Higher densities of domestic wells occur in portions of the Subbasin farther to the north than the Project Site, especially in areas north of the City of Vacaville (City of Vacaville GSA et al. 2021). Agricultural irrigation wells also occur throughout the Subbasin but are more heavily concentrated in the north, most notably in the northeastern areas of the Subbasin (City of Vacaville GSA et al. 2021). Agricultural wells are less dense in the southern portions of the Subbasin where irrigation water is largely provided via surface water supplies (City of Vacaville GSA et al. 2021). There are State records for two SID wells within the Project Site (DWR 2025); however, the status of these wells is not known. The National Hydrography Dataset contains no data for existing groundwater wells on or within one-half mile of the Project Site (USGS 2024).

5.13.1.2 Surface Water

Watersheds

The Project Site is located within the southern-most portion of the Sacramento Hydrologic Basin Planning Area, within the management area of the Central Valley Regional Water Quality Control Board (RWQCB) and subject to the management direction of the Water Quality Control Plan ("Basin Plan") for the Sacramento and San Joaquin River Basins (Central Valley RWQCB 1986, 2019).

The Project Site is located within the Ulatis Creek Watershed (Hydrologic Unit Code [HUC]-10 1802016305), on the boundary between the Gibson Canyon Creek-Sweany Creek Subwatershed (HUC-12 180201630502) to the north and the Upper Ulatis Creek Subwatershed (HUC-12 180201630503) to the south; see Figure 5.13-7. The Ulatis Creek Watershed includes approximately 150 square miles, and surface drainages are largely characterized by flood protection improvements built in the 1960's by the Soil Conservation Service (SCWA 2023). The major creeks within Ulatis Creek Watershed include Ulatis Creek Flood Control Channel, New Alamo Creek Flood Control Channel, Horse Creek, Gibson Canyon Creek, Sweany Creek, and McCune Creek (SCWA 2023). Gibson Canyon Creek occurs to the north of the Project and flows from north to south until it converges with Sweany Creek and eventually meets the Sacramento River.

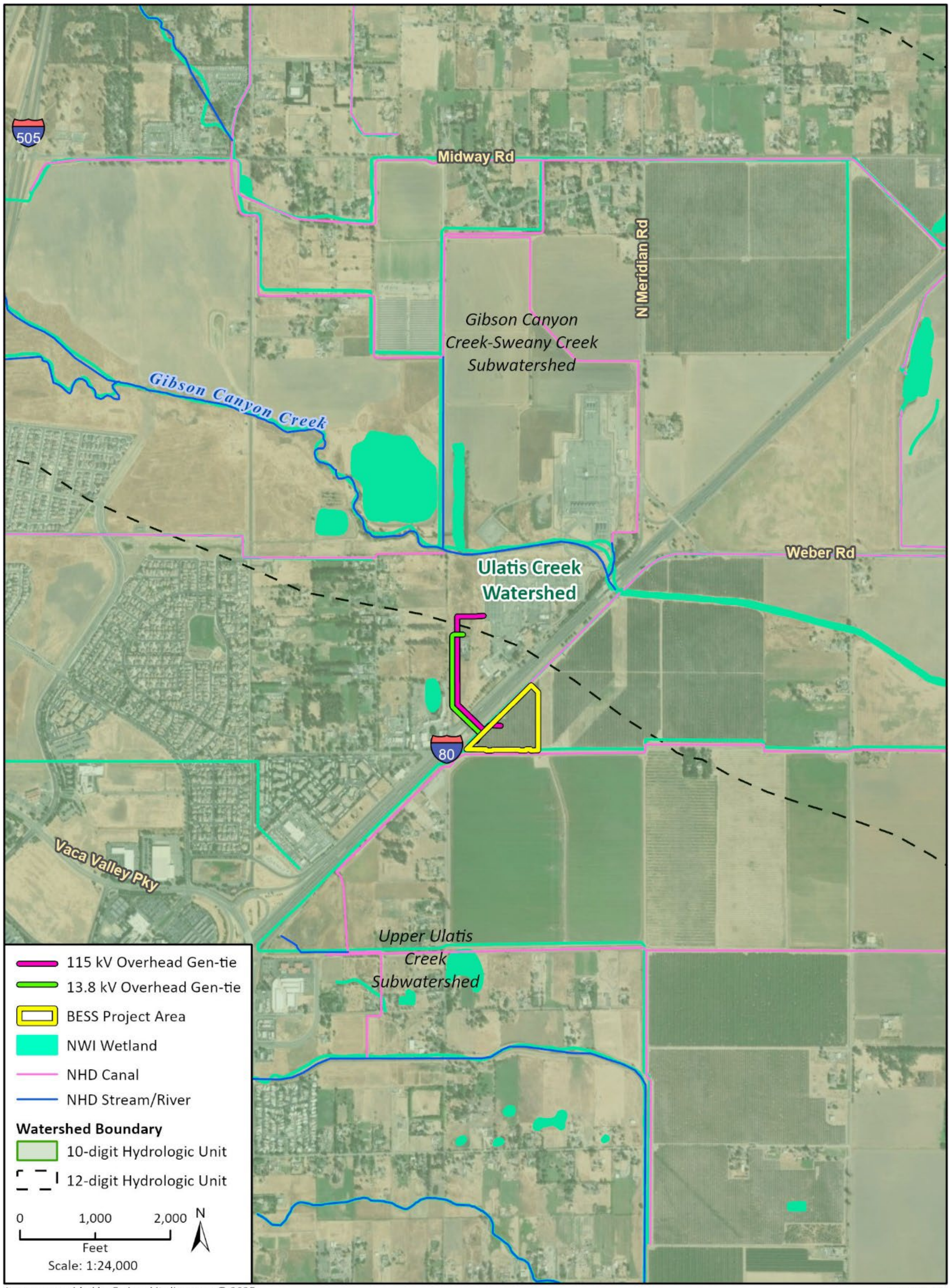
Hydrologic Setting

Major surface water features in the Solano Subbasin, which underlies the Project Site (see Section 5.13.1.1, *Groundwater*), include Putah Creek, Sweeney Creek, Ulatis Creek, Cache Slough, Steamboat Slough, Sacramento River, Mokelumne River, and the San Joaquin River. Putah Creek forms the boundary between Yolo and Solano counties and is impounded by the Monticello Dam to form Lake Berryessa, north-northwest of the Project Site; see which captures streamflow from a catchment of 576 square miles as part of the development of the Solano Project by the United States Bureau of Reclamation (USBR).

The Putah Diversion Dam and the Putah South Canal, located downstream of Lake Berryessa, were also constructed as part of the Solano Project. Lake Solano is located directly upstream of the Putah Diversion Dam and serves as a downstream diversion structure for the Putah South Canal. Releases from the Putah Diversion Dam into lower Putah Creek are managed in accordance with a legal settlement agreement (Putah Creek Accord) and sustain multiple downstream beneficial uses, including environmental, agricultural, and recreational (City of Vacaville GSA et al. 2021). Please see Section 5.13.1.6, *Water Supply*, for further discussion of the Solano Project.

Many smaller waterways also exist in the Solano Subbasin. Ulatis Creek, Alamo Creek, and Sweeny Creek are smaller creeks that drain catchments within the Coast Range to the west of the Solano Subbasin and flow into the Subbasin, merging together and ultimately discharging into the Sacramento River-San Joaquin Delta (Delta) at Cache Slough. The Sacramento River defines the boundary between Solano and Sacramento counties (City of Vacaville GSA et al. 2021). As noted above and shown in Figure 5.13-7, the Project Site is within the Ulatis Creek Watershed.

Figure 5.13-7 Surface Water



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Additional data National Hydrology Dataset and National Wetlant Inventory data provided by USGS, 2024.

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Fig Surface Waters - 24K

Project Site

The BESS Project Area is largely characterized by open space and generally level topography, with elevation ranging between approximately 79 and 84 feet above mean sea level. As described in the *Hydrology and Stormwater Management Report* for the Project (POWER Engineers, Inc. 2025), surface drainage primarily occurs as sheet flow that initiates from a high point near the southern BESS Project Area boundary and flows in a northeastern direction, discharging onto adjoining properties. Some drainage also occurs towards the southern BESS Project Area boundary, similarly, characterized as sheet flow initiating at the aforementioned high point.

As detailed in the *Aquatic Resources Delineation Report* for the Project, three hydrological features are mapped within 250 feet of the Project Site, all of which are characterized as man-made drainage features. Two of these features are well-developed agricultural ditches in the southern portion of the Project Site, one of which conveys flows into Gibson Canyon Creek to the east. The third feature is a pond in the northern portion of the Project Site that is permanently flooded and likely used for agricultural or stormwater management purposes. There are multiple drainage ditches and culverts throughout the Project Site that have not been formally mapped by resource agencies including the USGS and USFWS; however, all aquatic resources present in the Project Site were mapped during field survey efforts conducted for the Project, as documented in the *Aquatic Resources Delineation Report*, included as Appendix J of the Biological Resources Technical Report (Appendix Y).

Low-Impact Development (LID) features incorporated into the Project design are designed for compliance with the State Water Resources Control Board (SWRCB)'s Water Quality Order No. 2013-0001-DWQ National Pollutant Discharge Elimination System (NPDES) General Permit No. CAS000004 and the City of Vacaville's Post Construction Standards Plan. Stormwater is discussed further in Section 5.13.1.3, *Stormwater,* with analysis of potential impacts associated with drainage and stormwater provided in Section 5.13.3 (see Impacts WAT-1, WAT-3, and WAT-4).

Surface Water Quality

As noted above, the Project Site is located within the Sacramento Hydrologic Basin Planning Area of the Central Valley RWQCB, and subject to the management direction of the Basin Plan for the Sacramento and San Joaquin River Basins (Central Valley RWQCB 1986, 2019). The Basin Plan defines water quality objectives for surface waters based upon their designated or potential beneficial uses, and issues water quality permits under the federal Clean Water Act (CWA) with pollutant discharge limitations according to the respective water quality objectives.

Table 5.13-4, below, presents beneficial uses for surface waters in the Solano Subbasin, which underlies the Project Site as discussed above in "Hydrologic Setting." As discussed above in "Project Site," mapped surface water features on the Project Site are manmade for agricultural and stormwater management purposes; there are no named surface water features on the Project Site.

Table 5.13-4 Beneficial Uses of Key Surface Water Features in the Solano Subbasin

Surface Water Feature	Beneficial Uses[1]									
	MUN	AGR	PROC	POW	REC I	REC II	WARM	COLD	SPWN	WILD
Putah Creek – Lake Berryessa	E	E	-	P	E	E	E	E	E	E
Other lakes and reservoirs in Sacramento River Basin[2]	E	E	E	E	E	E	E	E	E	E

MUN = Municipal; AGR = Agricultural Supply; PROC = Industrial Process; POW = Industry Power; REC I = Water Contact Recreation; REC II = Non-contact Water Recreation; WARM = Warm Freshwater Habitat; COLD = Cold Freshwater Habitat; SPWM = Spawning; WILD = Wildlife Habitat

[1] Beneficial Uses are indicated by "E" for existing and "P" for potential. Beneficial Uses not applicable to these surface water features and therefore not presented in this table include IND (Industrial Service Supply), MIGR (Migratory Habitat), and NAV (Navigation).

[2] The indicated beneficial uses are to be protected for all waters except in specific cases where evidence indicates the appropriateness of additional or alternative beneficial use designations.

Source: Central Valley RWQCB 2019 (Table 2-1)

For those waters not attaining water quality standards, the RWQCB establishes total maximum daily loads (TMDLs) for water quality constituents, and a program of implementation to meet each TMDL. Under the Porter-Cologne Water Quality Control Act and Section 303(d) of the federal CWA, each State maintains a "303(d) List of Water Quality Limited Segments" identifying waters that are not attaining water quality standards. TMDLs are required for all waters on the 303(d) list.

Putah Creek is listed on the 2024 303(d) List for a 21.39-mile segment between Solano Lake and the Delta boundary for mercury (SWRCB 2024). No surface waters on the 303(d) List are located within or adjacent to the Project Site.

5.13.1.3 Stormwater

Climate and Precipitation

The Project Site is characterized by dry, warm to hot summers and wet, cool winters. Climate for the City of Vacaville is considered representative of the Project Site, which is located within City limits. Table 5.13-5, below, provides an overview of average climate data.

Table 5.13-5 Average Climate Data

Month	Precipitation (in)	ETo (in)	Avg Temp (°F)	Max Temp (°F)	Min Temp (°F)
January	5.3	1.6	47.6	55.9	39.3
February	5.2	2.2	52.0	62.9	42.0
March	3.5	3.7	56.2	67.7	44.6
April	1.3	5.1	60.7	74.1	47.3
May	0.7	6.8	67.3	82.2	52.4
June	0.1	7.8	73.4	89.9	57.0
July	0.0	8.7	77.8	95.9	59.6
August	0.1	7.8	76.6	94.8	58.5
September	0.3	5.7	73.5	90.5	56.6
October	1.2	4.0	65.9	80.3	51.5
November	3.1	2.1	55.0	65.6	44.4
December	5.2	1.6	47.8	56.2	39.3
Total Annual	**26.1**	**57.0**	**62.9**	**76.3**	**49.4**

in = inches; ETo = evapotranspiration; avg = average; max = maximum; min = minimum

Source: City of Vacaville 2021

As shown above, average monthly temperatures in the City of Vacaville, which is considered representative of conditions at the Project Site, range from lows around 40°F to highs above 95°F, and average annual precipitation is approximately 26 inches, 86 percent of which occurs between November and March (City of Vacaville 2021).

Table 5.13-6, below, presents precipitation frequency estimates for the Project Site, based upon National Oceanic and Atmospheric Administration (NOAA) data from its weather station in Vacaville, identified as station number 04-9200 (NOAA 2025a). This station is located at latitude 38.39° longitude -121.96°, at an elevation of approximately 110 feet amsl (NOAA 2025a); the Project Site is located approximately two miles to the east, with elevations of approximately 79 to 84 feet amsl. Due to the close proximity and comparable elevation, data from this station and estimates based on this data are considered representative of the Project Site.

Table 5.13-6 Precipitation Frequency Estimates (inches) for the Project Area[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**0.140** (0.125-0.159)	**0.168** (0.150-0.191)	**0.205** (0.182-0.233)	**0.234** (0.206-0.269)	**0.274** (0.231-0.327)	**0.304** (0.251-0.372)	**0.334** (0.268-0.421)	**0.365** (0.284-0.475)	**0.407** (0.302-0.555)	**0.440** (0.313-0.623)
10-min	**0.201** (0.179-0.228)	**0.241** (0.215-0.274)	**0.293** (0.260-0.334)	**0.335** (0.295-0.385)	**0.392** (0.332-0.468)	**0.435** (0.360-0.533)	**0.479** (0.385-0.603)	**0.524** (0.407-0.681)	**0.584** (0.433-0.796)	**0.630** (0.449-0.893)
15-min	**0.243** (0.217-0.276)	**0.292** (0.260-0.331)	**0.355** (0.315-0.403)	**0.406** (0.357-0.466)	**0.474** (0.401-0.566)	**0.527** (0.435-0.644)	**0.580** (0.465-0.729)	**0.634** (0.493-0.823)	**0.706** (0.524-0.962)	**0.762** (0.543-1.08)
30-min	**0.341** (0.304-0.386)	**0.409** (0.364-0.464)	**0.497** (0.441-0.566)	**0.569** (0.500-0.653)	**0.665** (0.563-0.794)	**0.738** (0.610-0.903)	**0.812** (0.652-1.02)	**0.888** (0.691-1.15)	**0.990** (0.734-1.35)	**1.07** (0.762-1.51)
60-min	**0.480** (0.428-0.543)	**0.575** (0.513-0.652)	**0.700** (0.621-0.796)	**0.800** (0.704-0.919)	**0.935** (0.791-1.12)	**1.04** (0.858-1.27)	**1.14** (0.918-1.44)	**1.25** (0.972-1.62)	**1.39** (1.03-1.90)	**1.50** (1.07-2.13)
2-hr	**0.711** (0.634-0.805)	**0.863** (0.768-0.978)	**1.05** (0.935-1.20)	**1.20** (1.06-1.38)	**1.39** (1.18-1.66)	**1.54** (1.27-1.88)	**1.68** (1.34-2.11)	**1.81** (1.41-2.36)	**1.99** (1.48-2.71)	**2.12** (1.51-3.01)
3-hr	**0.911** (0.813-1.03)	**1.11** (0.991-1.26)	**1.36** (1.21-1.55)	**1.56** (1.37-1.79)	**1.80** (1.53-2.16)	**1.99** (1.64-2.43)	**2.16** (1.74-2.72)	**2.34** (1.82-3.03)	**2.56** (1.90-3.48)	**2.72** (1.94-3.85)
6-hr	**1.32** (1.18-1.50)	**1.64** (1.46-1.86)	**2.02** (1.80-2.30)	**2.32** (2.04-2.66)	**2.70** (2.28-3.22)	**2.97** (2.46-3.64)	**3.24** (2.60-4.08)	**3.50** (2.72-4.54)	**3.83** (2.84-5.22)	**4.07** (2.90-5.77)
12-hr	**1.77** (1.58-2.00)	**2.23** (1.99-2.53)	**2.81** (2.50-3.20)	**3.28** (2.88-3.76)	**3.88** (3.28-4.63)	**4.33** (3.58-5.30)	**4.78** (3.84-6.01)	**5.22** (4.06-6.79)	**5.81** (4.31-7.91)	**6.25** (4.45-8.85)
24-hr	**2.41** (2.17-2.72)	**3.08** (2.77-3.48)	**3.95** (3.55-4.48)	**4.65** (4.15-5.32)	**5.61** (4.87-6.59)	**6.34** (5.41-7.58)	**7.08** (5.92-8.64)	**7.84** (6.41-9.79)	**8.86** (7.00-11.5)	**9.65** (7.40-12.8)
2-day	**3.11** (2.80-3.52)	**3.95** (3.56-4.47)	**5.03** (4.52-5.72)	**5.91** (5.27-6.75)	**7.08** (6.15-8.32)	**7.97** (6.80-9.53)	**8.87** (7.42-10.8)	**9.78** (7.99-12.2)	**11.0** (8.68-14.2)	**11.9** (9.15-15.9)
3-day	**3.59** (3.24-4.06)	**4.54** (4.09-5.14)	**5.75** (5.17-6.53)	**6.72** (6.00-7.68)	**8.02** (6.96-9.42)	**8.99** (7.68-10.7)	**9.96** (8.33-12.2)	**10.9** (8.95-13.7)	**12.3** (9.67-15.8)	**13.2** (10.2-17.6)
4-day	**3.99** (3.60-4.52)	**5.04** (4.54-5.71)	**6.38** (5.73-7.24)	**7.44** (6.64-8.50)	**8.84** (7.68-10.4)	**9.89** (8.44-11.8)	**10.9** (9.14-13.3)	**12.0** (9.78-14.9)	**13.3** (10.5-17.2)	**14.4** (11.0-19.1)
7-day	**4.93** (4.44-5.58)	**6.26** (5.64-7.09)	**7.92** (7.11-8.99)	**9.20** (8.22-10.5)	**10.9** (9.44-12.8)	**12.1** (10.3-14.4)	**13.3** (11.1-16.2)	**14.4** (11.8-18.0)	**15.9** (12.6-20.6)	**17.0** (13.0-22.6)
10-day	**5.56** (5.01-6.29)	**7.11** (6.40-8.05)	**9.00** (8.09-10.2)	**10.5** (9.33-11.9)	**12.3** (10.7-14.4)	**13.6** (11.6-16.3)	**14.9** (12.5-18.2)	**16.1** (13.2-20.1)	**17.7** (14.0-22.9)	**18.8** (14.4-25.0)
20-day	**7.08** (6.38-8.01)	**9.16** (8.25-10.4)	**11.6** (10.5-13.2)	**13.5** (12.0-15.4)	**15.8** (13.7-18.5)	**17.4** (14.8-20.7)	**18.8** (15.8-23.0)	**20.2** (16.5-25.3)	**22.0** (17.3-28.4)	**23.2** (17.8-30.9)
30-day	**8.37** (7.55-9.48)	**10.9** (9.82-12.3)	**13.8** (12.4-15.7)	**16.0** (14.3-18.3)	**18.6** (16.2-21.9)	**20.4** (17.4-24.4)	**22.1** (18.5-26.9)	**23.6** (19.3-29.5)	**25.5** (20.1-33.0)	**26.8** (20.6-35.7)
45-day	**10.1** (9.14-11.5)	**13.2** (11.9-15.0)	**16.7** (15.0-19.0)	**19.3** (17.2-22.0)	**22.3** (19.4-26.2)	**24.4** (20.8-29.1)	**26.2** (21.9-32.0)	**28.0** (22.8-34.9)	**30.0** (23.7-38.8)	**31.4** (24.1-41.8)
60-day	**12.1** (10.9-13.7)	**15.7** (14.1-17.8)	**19.8** (17.8-22.5)	**22.7** (20.3-26.0)	**26.2** (22.7-30.8)	**28.5** (24.3-34.0)	**30.6** (25.6-37.3)	**32.5** (26.5-40.5)	**34.7** (27.4-44.8)	**36.2** (27.8-48.2)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

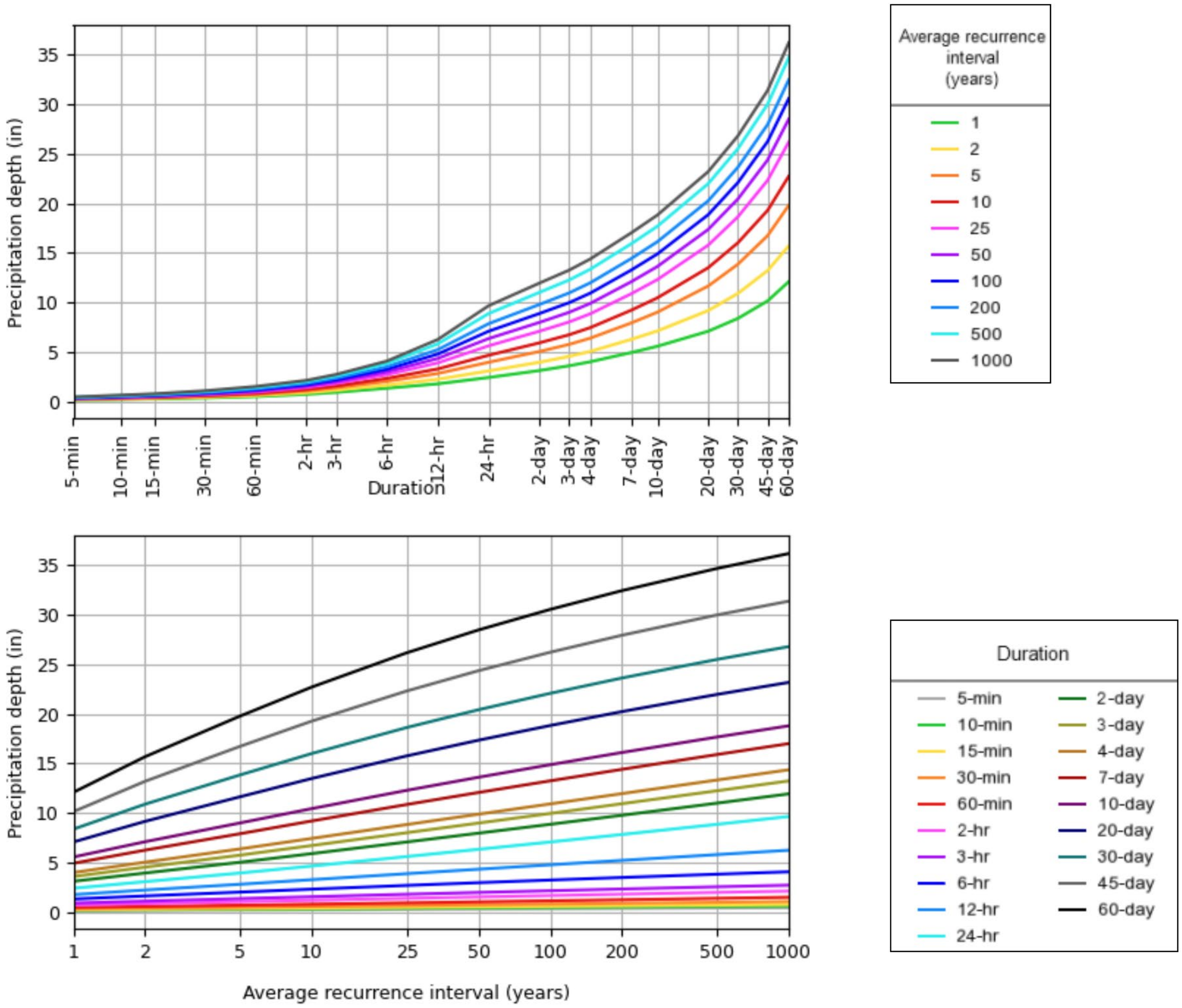
Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Source: NOAA 2025a

Table 5.13-6 presents detailed estimates of rainfall amount in inches over a range of durations between five minutes and 60 days, accounting for rainfall intensity associated with storm sizes ranging from the one-year storm (anticipated to occur every year) through the 100-year storm (anticipated to occur every 100 years), and up to the 1,000-year storm event. As shown above, over 24 hours of a one-year storm event, estimates based on 2025 data indicate that an average of 2.41 inches of precipitation would occur in the Project area. Over the same period during a 100-year storm event, an average of 7.08 inches of precipitation would occur.

Figure 5.13-8, below, provides a graphical presentation of the data shown above.

Figure 5.13-8 Depth-Duration-Frequency Curves for Precipitation for the Project Site Area

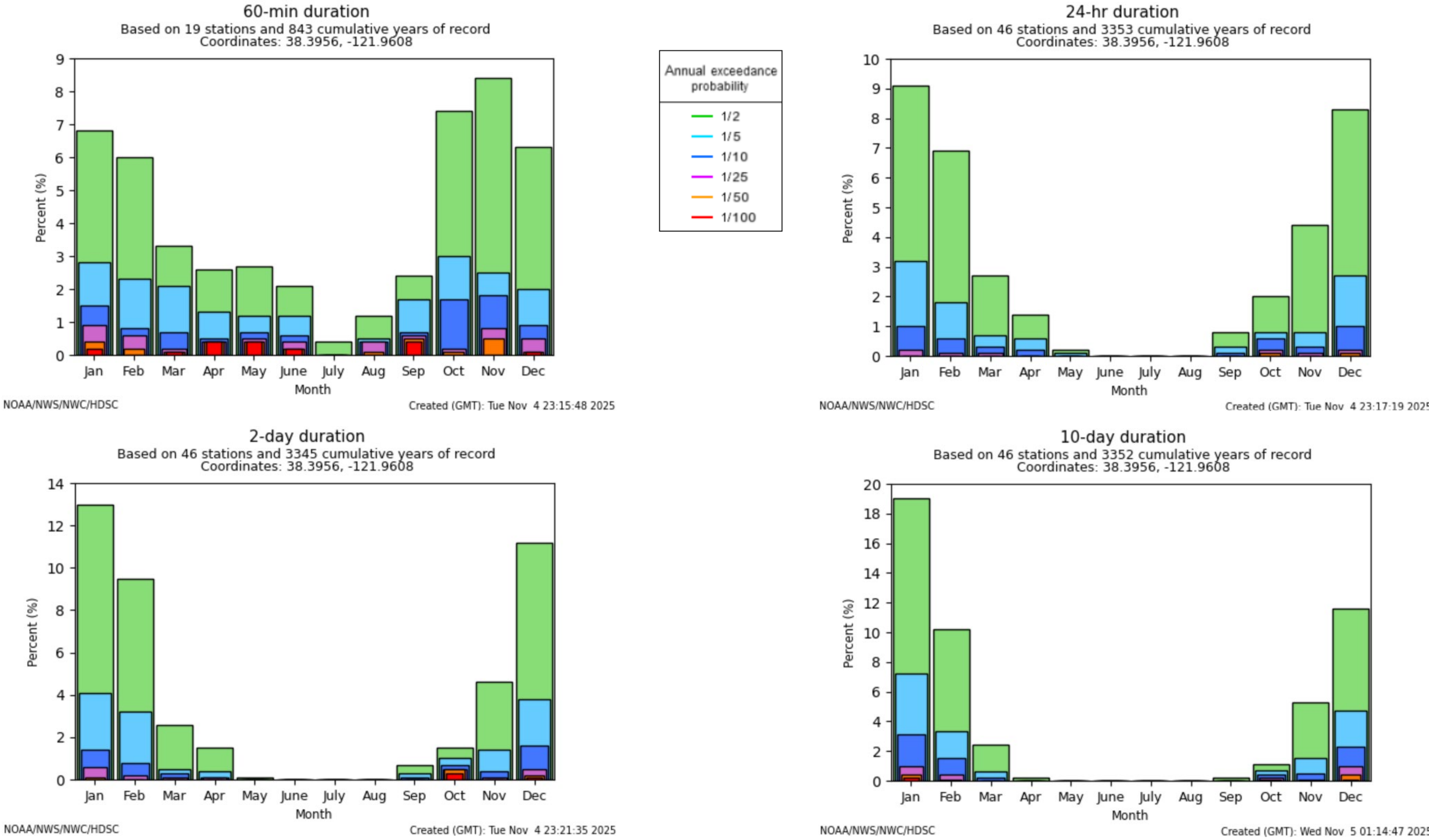


Source: NOAA 2025b

The graphs above show that the amount of precipitation occurring in the Project area is directly correlated with the size of the storm event ("average recurrence interval") and the duration of precipitation. Average annual precipitation in the Project area is approximately 26 inches total, most of which occurs between November and March.

Figure 5.13-9, below, provides a series of seasonality graphs which demonstrate the monthly distribution of rainfall throughout the year, including one graph each for the 60-minute duration, 24-hour duration, 2-day duration, and 10-day duration storm events, as labeled respectively above each graph. The graphs below also portray how actual precipitation occurs compared to estimated precipitation, for each combination of duration and storm magnitude. Data informing Figure 5.13-9 was collected from up to 46 stations in the region (of Vacaville Station Number 04-9200) and represents up to 3,353 cumulative years of record (NOAA 205c).

Figure 5.13-9 Seasonal Precipitation – Probability of Exceeding Estimates



Source: NOAA 2025c

The graphs presented above demonstrate that rainfall in the Project area is concentrated over winter and spring months, particularly between November and March. Estimates of precipitation are more likely to be exceeded by actual rates of precipitation during shorter-duration storm events. Summer precipitation is unlikely to exceed estimates under all durations, particularly between June and August which are typically the driest months.

Infiltration and Stormwater Runoff

Infiltration Rates

Soil data are classified by the Soil Survey Geographic Database (SSURGO), which defines soil groups A through D, from highest to lowest rates of infiltration. The Project Site is located in the northern-northwestern portion of the Solano Subbasin, where the Coast Range mountains to the west influence soil characteristics, resulting in the presence of soils characterized as Group B; soils in this classification have a larger presence of coarse materials and higher infiltration rates compared to other portions of the subbasin (City of Vacaville GSA et al. 2021, pg. 3-2).

In addition to SSURGO's hydrologic soil groups, soil data also include texture groups identified according to the U.S. Department of Agriculture's Soil Survey Manual. Approximately 74 percent of soils in the Solano Subbasin are classified as either fine-textured, which consists of clay and sandy clay, or moderately fine-textured, which consists of clay loam, sandy clay loam, and silty clay loam (City of Vacaville GSA et al. 2021, pg. 3-2). Table 5.13-7, below, details characteristics of the USDA Natural Resources Conservation Service (NRCS) soil classifications for the Project Site.

Table 5.13-7 Soil Types and Infiltration

Soil Unit Symbol	Soil Name	Slope	Infiltration Rate
CeA	Clear Lake clay	0 - 2%	0.04 - 0.2 inch/hour
SeA	San Ysidro sandy loam	0 - 2%	0.4 - 0.8 inch/hour
SfA	San Ysidro sandy loam, thick surface	0 - 2%	0.4 - 0.8 inch/hour

Source: NRCS 2024, 2022

Runoff Coefficient

A runoff coefficient is a dimensionless number representing the ratio of surface water runoff to precipitation. Larger runoff coefficients indicate low infiltration and high runoff, such as paved surfaces and steep gradients, and lower runoff coefficients indicate permeable and well-vegetated areas, such as forested areas and flat land. The Project Site is relatively flat and currently vegetated, with relatively low infiltration rates due to clay-based soil types. Based upon definitions provided by the SWRCB, the runoff coefficient for the Project Site is estimated to be between approximately 0.3 and 0.5 (SWRCB 2011).

Stormwater Runoff

As discussed in Section 5.13.1.2, *Surface Water*, and detailed in the Project's *Aquatic Resources Delineation Report*, there are several hydrological features in the Project vicinity, which are characterized as manmade and used for agricultural and stormwater management purposes. Surface water generally flows across the BESS Project Area as sheet flow, discharging primarily to the northeast, with some discharge across the site's southern boundary. Existing stormwater outfalls and drainage channels in the area provide flow conveyance during storm events.

As detailed below in Section 5.13.1.4, *Flooding and Inundation*, under "Flood Hazard Areas," the Project Site is not located within a flood hazard area associated with the 100-year storm event, as designated by the Federal Emergency Management Agency (FEMA). The proposed gen-tie alignment and existing VDPP at the PG&E Substation north of I-80 are within a 500-year floodplain; however, FEMA does not regulate the 500-year floodplain as a special flood hazard area.

Stormwater modeling of the Project BESS Area was conducted for the Project's *Hydrology and Stormwater Management Report* (POWER Engineers, Inc. 2025), which quantified runoff volumes associated with the two-year storm event, or the magnitude storm with a 50 percent chance of occurring each year (statistically likely to occur once every two years). This is a more common storm event than those modeled by FEMA, which include the 100-year storm event (one percent likelihood of annual occurrence) and the 500-year storm event (0.2 percent likelihood of annual occurrence). As detailed in the *Hydrology and Stormwater Management Report*, the two-year peak runoff rate is approximately 13.48 cubic feet per second (cfs) in the northern portion of the BESS Project Area and approximately 1.76 cfs in the southern portion of the BESS Project Area (POWER Engineers, Inc. 2025). This data was used to develop site-specific stormwater management features incorporated into the Project design, as further discussed in the analysis of potential impacts provided in Section 5.13.3 (see Impacts WAT-3 and WAT-4).

5.13.1.4 Flooding and Inundation

This section addresses inundation areas, which refer to the area of land that would be inundated by surface water flows resulting from a tsunami or seiche, or in the event of a dam failure, as well as flood hazard areas, which refer to the area of land that would be inundated by surface water flows from precipitation associated with large (100-year and 500-year) storm events.

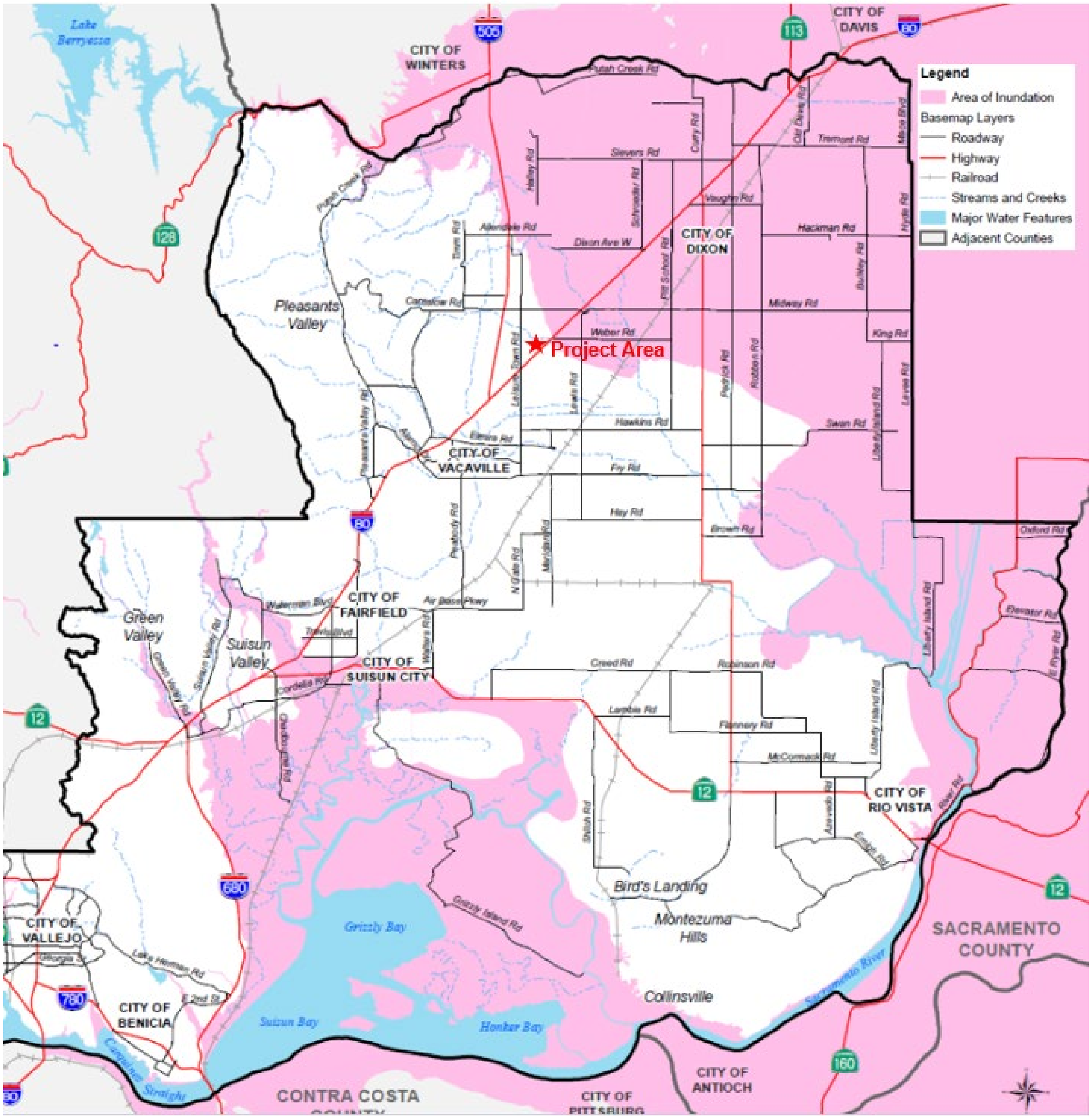
Inundation Areas

Below is an overview of natural hazards including tsunami and seiche events, as well as dam failure with potential to cause inundation.

- **Tsunami.** A tsunami is a powerful wave surge caused by earthquakes that has the potential to flood lowland areas. Should a tsunami occur in Solano County, the only areas of the county that may be inundated are the southwestern part of Mare Island and Island No. 1 southwest of SR 37 (Solano County 2015). The Project Site is not subject to inundation by tsunami.
- **Seiche.** A seiche is a standing wave within an enclosed body of water that occurs in response to seismic activity. The Project Site is not located near an enclosed body of water that could result in a seiche such that water would be released and inundate downstream areas.
- **Dam Failure.** Dam inundation occurs when a dam is not structurally sound or is unable to withstand damage resulting from seismic activity. The degree and rapidity of dam failure depend on the dam's structural characteristics. Figure 5.13-10, below, provides an overview of dam inundation areas in Solano County, including those associated with Lake Berryessa, northwest of the Project Site. As shown, the Project Site is not within a dam inundation area.

As discussed above, the Project Area is not located in an area subject to inundation by tsunami, seiche, or dam failure.

Figure 5.13-10 Dam Inundation Areas

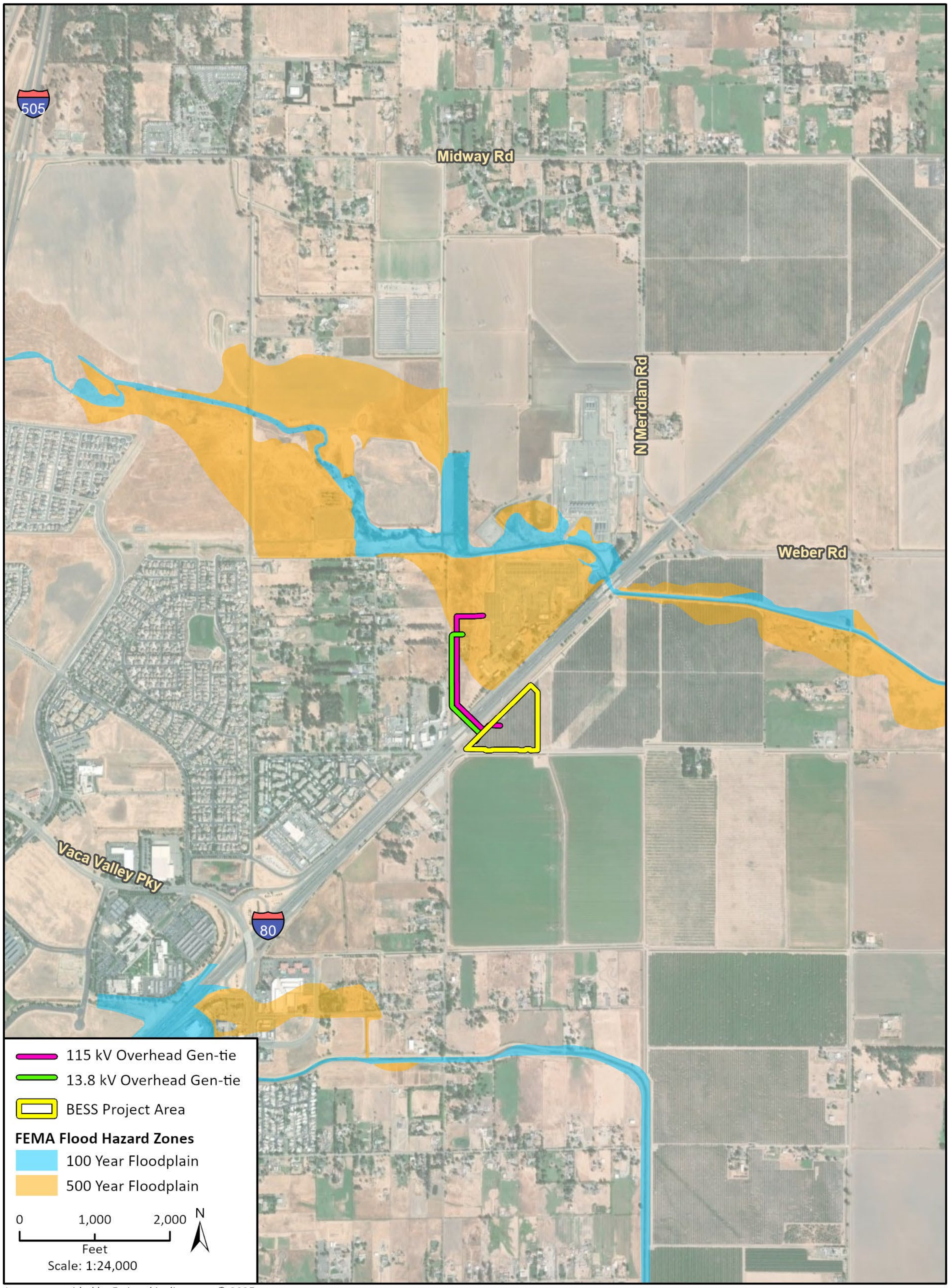


Source: Solano County 2015, pg. HS-13

Flood Hazard Areas

As mentioned in the previous section under "Stormwater Runoff," FEMA defines the limits of floodplains associated with the 100-year and 500-year storm events, which respectively have a one percent and 0.2 percent chance of occurring each year. Flood hazard areas defining the areas of land that would be inundated by a respective storm event are shown on FEMA's Flood Insurance Rate Maps (FIRMs), which are prepared under FEMA's National Flood Insurance Program (NFIP). Under the NFIP, the 100-year floodplain is considered a special flood hazard area. The Project Site is located within the area addressed by FIRM Panel Number 06095C0166F (FEMA 2024).
Figure 5.13-11, below, shows the portion of FIRM Panel Number 06095C0166F that encompasses the Project Site, including the BESS Project Area and gen-tie routes.

Figure 5.13-11 Flood Hazard Areas



Imagery provided by Esri and its licensors © 2025.
Additional data provided by FEMA, 2021.

25-17851 EPS
Fig 5.10-4 Flood Hazard Areas in the Study Area - 24K

As shown in the figure above, the BESS Project Area on the south side of I-80 is not within a FEMA-defined 100-year floodplain or special flood hazard area. The existing VDPP at the PG&E Vaca-Dixon Substation north of I-80 is within a 500-year floodplain, indicating an area that would be inundated by surface runoff during a storm event of the magnitude likely to occur once every 500 years, or the storm with an approximately 0.2 percent statistical likelihood of occurring during any given year; however, the 500-year floodplain is not regulated by FEMA as a special flood hazard area. See Impact WAT-1 in Section 5.13.3, *Impact Analysis*, for further discussion.

5.13.1.5 Wastewater

The Project Site is not located within the service area of an existing sewer system, and there is no existing septic system or other sewage management system within the Project Site.

5.13.1.6 Water Supply

This section characterizes the environmental setting for water supply, under subheadings for each topic required in CEC Appendix B Requirement (C), including water sources, water demands, wastewater discharge, water purveyors, facilities and infrastructure, and water balance.

Water Sources

The City of Vacaville would be the water supply provider for the Project. The City's water supply portfolio is comprised of imported surface water and local groundwater, as listed below and described under respective headings below:

- Surface water from the federal (USBR) Solano Project – the City obtains its USBR-authorized entitlements to Solano Project water through SCWA, and also receives a portion of SID's entitlements through a Master Water Agreement with SID;
- Imported surface water from the State Water Project (SWP) – the City obtains SWP water through SWCA via the North Bay Aqueduct, as well as through DWR as Settlement Water, which is SWP water authorized under settlement of area-of-origin water right applications filed by the City of Vacaville and others, to provide that certain areas are not deprived of the prior right to water reasonably required to adequately supply the beneficial needs of the area; and
- Local groundwater produced from the Solano Subbasin, which the City obtains from local wells.

Each of the City's supply sources are characterized under respective headings below. In addition to these existing sources, as described below, the City is also developing recycled water as a future source for its supply portfolio.

Solano Project

The Solano Project is a federal water storage project originally designed to reduce reliance on groundwater by capturing and storing surface water runoff for use by agricultural users, municipalities, and military facilities in Solano County. The Solano Project includes Lake Berryessa, formed by Monticello Dam, which was authorized by the U.S. Congress for construction and operation by the U.S. Bureau of Reclamation (USBR) and began operation in 1959. Most of the Solano Project water users are located in Solano County, while Lake Berryessa is located in Napa County, and Monticello Dam is located in Yolo County. Napa and Yolo counties declined to participate in the Solano Project during its design phase, and Lake Berryessa was therefore sized to only meet the needs of Solano County (SCWA 2024).

Water in Lake Berryessa comes from the Putah Creek Watershed and its four main tributaries, including Putah Creek, Capell Creek, Pope Creek, and Eticuera Creek. The City of Vacaville receives Solano Project water through two mechanisms, including an annual entitlement authorized by the USBR and obtained by the City through SCWA, and an additional entitlement from SID under a Master Water Agreement providing increasing annual quantities to the City through year 2039 and a constant annual supply thereafter until year 2050.

Table 5.13-8, below, provides an overview of all Solano Project water entitlements including estimated operating losses; as shown below, the total size of the Solano Project is approximately 207,350 AFY, of which the City of Vacaville's entitlement is 5,750 AFY.

Table 5.13-8 Solano Project Water Contract Entitlements

Agency/Contract Participant	Acre-feet per year (AFY)
City of Fairfield	9,200
Suisun City	1,600
City of Vacaville	5,750
City of Vallejo	14,600
Solano Irrigation District (SID)	141,000
Maine Prairie Water District	15,000
U.C. Davis	4,000
California State Prison, Solano	1,200
Total Entitlements	192,350
Estimated Operating Losses	15,000
Total Solano Project Size	**207,350**

[1] Value approximates a firm yield during the driest hydrologic period of record (1916-1934).

Source: City of Vacaville 2021 (Table 6-1)

Table 5.13-9, below, provides an overview of the reliability of SCWA's contract entitlements for Solano Project water, demonstrating a high level of reliability during average/normal water year conditions as well as dry year conditions (single and multiple).

Table 5.13-9 SCWA Solano Project Reliability[1]

	2025	2030	2035	2040-2045
Average Water Year[2]	205,986	205,986	205,986	205,986
% of Contract Amount[2]	99%	99%	99%	99%
Single Dry Year[3]	204,326	204,326	204,326	204,326
% of Contract Amount[3]	99%	99%	99%	99%
Multi-Dry Year[4]	192,375	192,375	192,375	192,375
% of Contract Amount[4]	93%	93%	93%	93%

SCWA = Solano County Water Agency

[1] SCWA's Total Participating Agency Contract Amounts equal 207,350 acre-feet per year (AFY) and includes 15,000 AFY of canal losses.

[2] Based on average percent allocation, including canal losses, during Average Years over the study's historic hydrologic period of 1906 through 2019, rounded to the nearest whole percent.

[3] Based on average percent allocation, including canal losses, during Single Dry Years over the historic hydrologic period of 1906 through 2019, rounded to the nearest whole percent.

[4] Supplies shown are average percent allocation, including canal losses, over four consecutive dry years, based on a repeat of the historic five-year dry period with low inflow to Lake Berryessa of 1990 through 1994, rounded to the nearest whole percent.

Source: City of Vacaville GSA et al. 2021 (Table 4-11)

As mentioned above, in addition to Solano Project water purchased from SCWA, the City of Vacaville also receives additional Solano Project water through its Master Water Agreement with SID; this is water provided by SID from within its annual entitlements of 141,000 AFY as shown in Table 5.13-8. Table 5.13-10, below, details the annual water allocations to the City of Vacaville from SID through their Master Water Agreement.

Table 5.13-10 Annual Entitlements for the SID Master Water Agreement

Year	Entitlement	Year	Entitlement
2015	3,125	2033	8,025
2016	3,325	2034	8,325
2017	3,525	2035	8,625
2018	3,725	2036	8,925
2019	3,925	2037	9,225
2020	4,125	2038	9,525
2021	4,425	2039	9,825
2022	4,725	2040	10,050
2023	5,025	2041	10,050
2024	5,325	2042	10,050
2025	5,625	2043	10,050
2026	5,925	2044	10,050
2027	6,225	2045	10,050
2028	6,525	2046	10,050
2029	6,825	2047	10,050
2030	7,125	2048	10,050
2031	7,425	2049	10,050
2032	7,725	2050	10,050

SID = Solano Irrigation District

Source: City of Vacaville 2021 (Table 6-2)

The table above shows that in accordance with the City's Master Water Agreement with SID, it will receive increasing portions of SID's Solano Project entitlements through 2050. The Master Water Agreement has been amended multiple times and could be extended beyond its existing term but is currently scheduled to expire in 2050.

State Water Project

The SWP is operated and maintained by the DWR and supplies water to 29 public water agencies across California through a network of canals, pipelines, tunnels, and reservoirs. The headwaters of the SWP occur as Sierra Nevada snowmelt runoff which is entrained by Lake Oroville and released into the Feather River in Sacramento County, Northern California. Flows are released from Lake Oroville into the Feather River as needed to fulfill SWP entitlements held by SWP Contractors, including SCWA.

SWP flows are conveyed through Central California to Southern California via the Sacramento-San Joaquin Bay-Delta (Delta) and the California Aqueduct. In addition to flows from the Feather River, the SWP contains unregulated flows which enter SWP facilities in the Delta. SCWA is a North of Delta SWP Contractor, receiving SWP water via the North Bay Aqueduct (NBA). The NBA conveys wholesale SWP water supply for municipal and industrial uses from the Barker Slough Pumping Plant in the Delta to Napa and Solano counties.

The amount of water in the SWP system depends upon the volume of snowpack, which varies depending upon climatic variations and drought conditions. Each SWP contractor holds a contract with the DWR for Table A, which is the maximum amount of SWP water that a SWP contractor may request each year. SCWA's maximum allocation (Table A) contract is for 47,756 AFY. Table 5.13-11, below, provides an overview of SCWA's supply reliability projections for its maximum allocation under average water year conditions as well as single dry year and multiple dry year conditions.

Table 5.13-11 SCWA SWP Table A Supply Reliability Assumptions

Climate Conditions	Portion of Table A Amount[1]	2020	2025	2030	2035	2040-2045
Average Water Year	83%	39,637	39,637	39,637	39,637	39,637
Single Dry Year	15%	7,163	7,163	7,163	7,163	7,163
Multiple-Dry Year 1	45%	21,490	21,490	21,490	21,490	21,490
Multiple-Dry Year 2	30%	14,327	14,327	14,327	14,327	14,327
Multiple-Dry Year 3	15%	7,163	7,163	7,163	7,163	7,163
Multiple-Dry Year 4	15%	7,163	7,163	7,163	7,163	7,163
Multiple-Dry Year 5	30%	14,327	14,327	14,327	14,327	14,327

[1] This percentage is derived from the Final State Water Project Delivery Capability Report 2019 dated August 26, 2020, and includes 10 percent NOD allocations for additional reliability.

Source: City of Vacaville GSA et al. 2021 (Table 4-10)

The table above indicates that reliability of SWP water is more variable than reliability of Solano Project water (see Table 5.13-9).

Solano Subbasin

The City's water supply sources include groundwater pumped from the underlying Solano Subbasin. Table 5.13-1 and Table 5.13-2, presented in Section 5.13.1.1, provide an overview of the inflows and outflows to the Solano Basin under projected 2030 and 2070 conditions, including with consideration to climate change. As shown, surplus conditions are projected under all scenarios.

Recycled Water

The City of Vacaville adopted a *Recycled Water Master Plan Feasibility Study* in 2021, which outlines a proposed recycled water project to produce approximately 2,830 AFY of tertiary-treated recycled water at the Easterly Wastewater Treatment Plant (EWWTP). This project would begin providing recycled water in 2030, with up to 745 AFY for irrigation of parks and streetscapes, increasing to 1,140 AFY in 2040 and 1,510 AFY in 2045, with an additional 315 AFY available in 2045 for industrial cooling tower and boiler uses (City of Vacaville 2021, Table 6-8). The demand forecast tables presented below under "Water Balance" account for this approved EWWTP recycled water project.

Water Demands

This section presents the estimated water demands associated with construction and operation of the Project.

Construction

Water demand for Project construction would be related to site preparation and dust suppression. Construction would occur over an approximately two-year period. Table 5.13-12, below, provides an overview of Project construction water demands.

Table 5.13-12 Construction Water Demands

Construction Phase / Activity	Water Demand (AFY)
Vaca Dixon 57 MWh BESS	
Site Grading and Leveling	1.5
Dust Suppression	0.9 - 1.3
Subtotal – Vaca Dixon BESS	**2.4 (min) – 2.8 (max)**
Arges 400 MWh BESS	
Site Grading and Leveling	1.5
Dust Suppression	0.9 - 1.3
Subtotal – Arges BESS	**2.4 (min) – 2.8 (max)**
Total	**4.8 (min) – 5.6 (max)**

AFY = acre-feet per year

As shown above, construction of each BESS component would require up to 2.8 AFY, for a total construction water demand of up to 5.6 acre-feet over two years. Construction water is planned to be supplied by connecting to a fire hydrant adjacent to the southwest corner of the BESS Project Area.

No water would be required for concrete manufacturing, as concrete would be manufactured off-site and transported to the site via truck. In addition, no water would be required for sanitary uses, as temporary sanitary facilities would be provided during construction and serviced by a third-party contractor, with no water required on-site.

Operation

Operation and maintenance of the Project facilities would require water for landscaping, which would primarily be met through natural rainfall, as well as water for emergency fire suppression when needed, which would be provided through connection to the City's existing water main that parallels the Project's northern site boundary. The Project design includes a fire water loop around the BESS facilities. A fire water loop is a closed-loop piping system designed to provide reliable water delivery with consistent pressure throughout the facility for efficient fire suppression when needed and would be installed in compliance with California Fire Code.

It is estimated that the Project's total operational water demand would be approximately 1.45 AFY, which accounts for landscaping needs as well as annual flow testing of the fire water loop system. However, sufficient water would be received through natural rainfall to satisfy most landscaping needs during average water year conditions. As such, the total amount of City water anticipated to be needed during Project operation is approximately 0.2 to 0.3 AFY, to satisfy landscaping needs and flow testing of the fire water loop system.

Summary of Demands

Table 5.13-13, below, provides an overview of all water demands for Project construction and operation, as discussed above.

Table 5.13-13 Summary of Project Water Demands

Water Use	Annual Demand (AFY)	Total Demand (AF)
Construction (2 years)	2.4 – 2.8	4.8 – 5.6
Operation & Maintenance (35 years)	0.2 – 0.3	7.0 – 10.5
Total	**n/a**	**11.8 – 16.1**

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

As shown above, over the Project's anticipated two-year construction period and 35-year operational lifetime, total water demand would be approximately 11.8 to 16.1 acre-feet. During future decommissioning of the Project, it is anticipated that water demands would be comparable to construction water demands associated primarily with dust suppression during ground disturbance.

Wastewater Discharge

As stated in Section 5.13.1.5, *Wastewater*, the Project would not introduce a new source of wastewater within the Project Site. No wastewater discharge would occur as a result of the Project.

Facilities and Infrastructure

Water for construction of the Project would be obtained from the City of Vacaville via hookup to a fire hydrant near the southwest corner of the site and trucked to the Project Site. It is expected that water for the fire water loops and landscaping would be obtained from new metered taps/valves to be installed on the existing connection between the City water main to the north and the fire hydrant. The 12-inch diameter City main runs parallel to the northern BESS Project Area. The Project would not introduce new facilities for water conveyance or treatment, or wastewater.

Water Purveyors

Water for the Project would be obtained from the City of Vacaville, which purchases federal and State surface water SCWA, as well as produces local groundwater from the Solano Subbasin. The City of Vacaville is a local water purveyor and SCWA is a wholesale water agency. Coordination with the City of Vacaville regarding water supply for the Project is underway.

Water Balance

Water Supply

As discussed in Section 5.13.1.6, *Water Supply*, the City's water supply portfolio consists of federal surface water from the Solano Project, State surface water from the SWP, and locally produced groundwater from the Solano Subbasin.

Table 5.13-14, below, provides an overview of the City's supply sources, including reasonably available volume compared to total right or safe yield, through 2045.

Table 5.13-14 City of Vacaville Projected Water Supplies (acre-feet)

	2025		2030		2035		2040		2045	
Supply Source	RAV	Total Right	RAV	Total Right	RAV	Total Right	RAV	Total Right	RAV	Total Right
Groundwater	7,300	7,300	7,700	7,700	8,100	8,100	8,100	8,100	8,100	8,100
Solano Project	11,307	11,375	12,798	12,875	14,289	14,375	15,705	15,800	15,705	15,800
SWP	7,451	8,978	7,451	8,978	7,451	8,978	7,451	8,978	7,451	8,978
Settlement	1,454	9,320	1,454	9,320	1,454	9,320	1,454	9,320	1,454	9,320
Recycled	0	0	745	2,830	745	2,830	1,140	2,830	1,825	2,830
Total	**27,512**	**36,973**	**30,148**	**41,703**	**32,039**	**43,603**	**33,850**	**45,028**	**34,535**	**45,028**

RAV = Reasonably Available Volume; Total Right = The total quantity of water held in contract or as safe yield; SWP = State Water Project

Source: City of Vacaville 2021 (Table 6-11)

As discussed previously under "Water Sources," the volume of water that is physically available through the federal Solano Project and State SWP each year varies depending upon climatic conditions and may be less than the total right to that water as defined in contracts. The table above shows that the City of Vacaville accounts for these differences in its water supply projections.

Table 5.13-15, below, presents the City's projected supply and demand balance under normal water year conditions, indicating positive water balance through 2045.

Table 5.13-15 Water Supply Balance (acre-feet) – Normal Year

	2025	2030	2035	2040	2045
Supply Total	27,512	30,148	32,039	33,850	34,535
Demand Total	18,620	19,719	20,886	22,125	23,439
Difference	**8,892**	**10,429**	**11,153**	**11,725**	**11,096**

Source: City of Vacaville 2021 (Table 7-6)

The table above shows the City of Vacaville projects a surplus water supply available under normal water year conditions through 2045. Table 5.13-16, below, presents the City's projected supply and demand balance under single dry water year (drought) conditions.

Table 5.13-16 Water Supply Balance (acre-feet) – Single Dry Year

	2025	2030	2035	2040	2045
Supply Total	19,973	22,196	23,673	25,472	26,157
Demand Total	18,620	19,719	20,886	22,125	23,439
Difference	**1,353**	**2,477**	**2,787**	**3,347**	**2,718**

Source: City of Vacaville 2021 (Table 7-7)

The table above shows the City of Vacaville projects a surplus water supply available under single dry water year conditions through 2045. Table 5.13-17, below, presents the City's projected supply and demand balance under multiple dry water year (extended drought) conditions.

Table 5.13-17 Water Supply Balance (acre-feet) – Multiple Dry Years

		2025	2030	2035	2040	2045
Year 1	Supply Total	23,868	25,948	27,283	28,679	29,364
	Demand Total	18,620	19,719	20,886	22,125	23,439
	Difference	**5,248**	**6,229**	**6,397**	**6,554**	**5,925**
Year 2	Supply Total	21,671	23,751	25,086	26,215	26,900
	Demand Total	18,620	19,719	20,886	22,125	23,439
	Difference	**3,051**	**4,032**	**4,200**	**4,090**	**3,461**
Year 3	Supply Total	20,127	22,207	23,542	24,404	25,089
	Demand Total	18,620	19,719	20,886	22,125	23,439
	Difference	**1,507**	**2,488**	**2,656**	**2,279**	**1,650**
Year 4	Supply Total	20,859	22,939	24,274	24,869	25,554
	Demand Total	18,620	19,719	20,886	22,125	23,439
	Difference	**2,239**	**3,220**	**3,388**	**2,744**	**2,115**
Year 5	Supply Total	23,107	25,187	26,455	26,850	27,535
	Demand Total	18,620	19,719	20,886	22,125	23,439
	Difference	**4,487**	**5,468**	**5,569**	**4,725**	**4,096**

Source: City of Vacaville 2021 (Table 7-8)

The table above shows the City of Vacaville projects a surplus water supply available under multiple dry water year conditions through 2045.

As shown in Table 5.13-13, the Project water demand would be up to 5.6 AFY during construction, and up to 10.5 AFY during operation and maintenance. Under all climate scenarios reflected in the water supply and demand comparisons presented above, the City's surplus water supply availability would be sufficient to meet Project demands. The available water supply balance for the Project Site would be positive in amounts equal to the water demands of the Project.

Wastewater

There are no wastewater management facilities on or connecting to the Project Site, including those related to sewage collection, conveyance, treatment, or discharge, and none are proposed for introduction to the area under the Project. Portable toilet facilities would be provided for temporary use during the construction period and would be regularly serviced by a third-party contractor as needed throughout the construction period. Therefore, the pre- and post-Project wastewater balance on the Project Site would be zero.

Stormwater

The Project would introduce a drainage system to accommodate stormwater flows within the BESS Project Area through implementation of project-specific drainage design plan. The drainage system would collect and convey runoff to separate stormwater management basins for each BESS component. A 27,000 square-foot basin is located north of the Vaca Dixon 57 MWh BESS component, and a 23,825 square-foot basin is located to the north of the Arges 400 MWh BESS component. In addition, the Project would include BMPs for stormwater control and management, as detailed in a Stormwater Pollution Prevention Plan (SWPPP), which is required for compliance with the NPDES program under Section 402 of the federal CWA. Standard construction BMPs include but are not limited to the watering of disturbed areas to control dust, covering all disturbed areas and trucks hauling soil, sand, or other loose material to prevent migration, applying erosion barriers such as straw wattles and detention basins to control runoff from leaving the Project Site, and using designated areas for vehicle and equipment staging and refueling.

In addition, the Project would use pervious surfaces to the extent possible, including gravel on roadways and in parking and laydown areas. In combination with the SWPPP BMPs, these stormwater control features would serve to control the flow of stormwater through the Project Site and divert it into on-site stormwater basins. The gen-tie facilities would occupy minimal space at each pole location and would not alter stormwater flows on the PG&E parcel north of I-80. Therefore, the pre- and post-Project stormwater conditions on the Project Site would be balanced, as the Project would not increase stormwater discharges.

5.13.2 Regulatory Setting

A review of existing relevant LORS was conducted to define the regulatory context for water resources, hydrology, and water quality relevant to the Project. This included review of applicable federal, state, and local policies and regulations including CEQA, CWC, SGMA, Solano County's General Plan and Code of Ordinances, City of Vacaville ordinances, and other applicable LORS which are detailed in Section 5.13.5, *Laws, Ordinances, Regulations, and Standards*.

5.13.3 Impact Analysis

The following subsections discuss the potential direct and indirect impacts related to water resources from construction and operation (including maintenance) of the Project.

5.13.3.1 Methodology

To identify and assess potential impacts related to water resources, Rincon Consultants, Inc. considered the activities of the Project against existing conditions, as characterized in Section 5.13.1, *Environmental Setting*, and based upon review of publicly available information including maps, online databases, articles, reports, and published research papers (see Section 5.13.8, *References*). Section 5.13.3.2, *Impact Evaluation Criteria,* presents detailed impact analyses with each impact characterized for the construction and operational periods for the Vaca Dixon 57 MWh BESS and Arges 400 MWh BESS components, respectively, as well as the overall Project.

5.13.3.2 Impact Evaluation Criteria

The potential for impacts related to water resources and their uses were evaluated using the criteria described in Appendix G of the California Environmental Quality Act (CEQA) Guidelines (Sections 15000-15387, Title 14, California Code of Regulations, Chapter 3). A project would have a significant environmental impact in terms of water resources if it would meet any of the following criteria:

- Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or groundwater quality;
- Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the Project may impede sustainable groundwater management of the basin;

- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:
  - Result in substantial erosion or siltation on- or off-site;
  - Substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site;
  - Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; and/or
  - Impede or redirect flood flows;
- In flood hazard, tsunami, or seiche zones, risk release of pollutants due to Project inundation; and/or
- Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan.

Impact WAT-1

Threshold:	Would the Project violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or groundwater quality?
Threshold:	Would the Project conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?

Vaca Dixon 57 MWh BESS

Construction

Less than Significant Impact. The Vaca Dixon 57 MWh BESS component is located on approximately 4.25 acres of the Project's 10-acre site. During construction , up to 5.15 acres would be graded, which includes the Vaca Dixon 57 MWh BESS portion of the Project Site as well as a portion of the Project's Arges 400 MWh BESS site. Due to disturbing more than one acre of land, a SWPPP is required for compliance with the NPDES program under Section 402 of the federal CWA. One SWPPP may be prepared for the construction of the Project and applied during implementation of both the Vaca Dixon 57 MWh and Arges 400 MWh BESS components.

The SWPPP would include BMPs to control the discharge of pollutants including sediment from disturbed areas and would specify the stormwater monitoring and construction BMPs required to protect the quality of surface water and groundwater in the Project Site. As discussed in Section 5.13.1.2, *Surface Water*, Project components are not located within an existing defined drainage channel. Drainage across the Project Site generally occurs as sheet flow that initiates from a high point near the southern Project boundary and flows in a northeastern direction, discharging onto adjoining properties. Some drainage also occurs towards the southern Project boundary, as is similarly characterized as sheet flow initiating at the aforementioned high point. In addition, as detailed in the *Hydrology and Stormwater Management Report* for the Project (POWER Engineers, Inc. 2025), the Project design includes Source Control Measures for chemical spills, leaks, parking and maintenance areas, landscaping, and pesticide use, as well as refuse areas and outdoor material storage. The SWPPP BMPs and Source Control Measures would be implemented as part of the

Project design and would minimize or avoid the potential for Project activities to result in water quality degradation or conflict with water quality standards or waste discharge requirements.

If water is encountered during excavation, dewatering may be conducted, in accordance with the Construction General Permit. The water removed from the work area during dewatering activities may be discharged to the ground surface, or stored and reused on-site, such as for dust suppression. If the removed water is discharged to land, compliance with the Construction General Permit would require testing and treatment to ensure that the discharge meets or exceeds the effluent limitations specified in the permit. Dischargers seeking permit coverage for dewatering activities under the SWRCB General Water Quality Order (Low Threat General Order) 2003-0003 or the Central Valley RWQCB Waiver of Report of Waste Discharge and Waste Discharge Requirements (Low Threat Waiver) R5-2018-0085 must file a Notice of Intent with the Central Valley RWQCB prior to beginning the discharge of dewatered water to the ground.

There are no 303(d) listed waterbodies on the Project Site and construction would not contribute to the degradation of water quality within a 303(d) listed waterbody. Construction activities would not include the discharge of wastewater, as any wastewater generated during the construction period would be contained within portable toilet facilities and disposed of by a licensed contractor. Potential impacts would be less than significant.

Operation

Less than Significant Impact. Operation of the Vaca Dixon 57 MWh BESS would involve continued compliance with the Construction General Permit described above through the implementation of "Post-Construction Requirements" specified in the Construction General Permit. This would involve the implementation of BMPs and LID features to provide post-Project runoff conditions that are comparable or improved compared to existing runoff conditions. Project design features would include a stormwater management basin situated north of the BESS development area to control stormwater and pollutant discharge from the Project Site. Compliance with the requirements of the Construction General Permit and construction of operational BMPs and LID features would control stormwater runoff to prevent degradation of water quality.

A variety of chemicals would be stored and used during operation of the Project. The storage, handling, and use of all chemicals would be conducted in accordance with applicable laws, ordinances, regulations, and standards as well as the Source Control Measures mentioned above. Chemicals would be stored in appropriate chemical storage facilities designed to contain leaks and spills. Workers would be trained to handle hazardous waste generated at the site. Hazardous materials management is further discussed in Section 5.9, *Hazardous Materials Handling*, and Section 5.11, *Waste Management*. Operation of the Project would be conducted in compliance with water quality permits and waste discharge requirements and would not conflict with a water quality control plan or sustainable groundwater management plan. Potential impacts would be less than significant.

Arges 400 MWh BESS

Construction

Less than Significant Impact. During construction of the Arges 400 MWh BESS component, which would occur on an approximately 5.75-acre portion of the 10-acre site, approximately 5.3 acres would be graded, including regrading a portion of the area disturbed during construction of the Vaca Dixon 57 MWh BESS. As discussed above for the Vaca Dixon 57 MWh BESS, a Project-specific

SWPPP would be developed and implemented for both the Vaca Dixon 57 MWh and Arges 400 MWh BESS components of the Project. The SWPPP would include BMPs to control stormwater runoff and erosion, manage drainage pattern alterations, and avoid or minimize the potential for water quality degradation to occur. Construction of the Arges 400 MWh BESS component would be conducted in the same manner as described above for the Vaca Dixon 57 MWh BESS component Construction would not involve the discharge of wastewater. Potential impacts would be less than significant.

Operation

Less than Significant Impact. Operation of the Arges 400 MWh BESS component would be conducted as described above for the Vaca Dixon 57 MWh BESS component. Drainage and runoff conditions would be maintained at comparable or improved conditions compared to the existing area. Project design features would include a stormwater management basin situated north of the BESS development area to control stormwater and pollutant discharge from the Project Site. Hazardous materials would be handled, stored, and disposed of incompliance with applicable laws, ordinances, regulations, and standards. Potential impacts would be less than significant.

Overall Project

Less than Significant Impact. As discussed above, implementation of the Project would include ground-disturbing activities on more than one acre of land, thereby necessitating a site-specific SWPPP for compliance with the federal CWA and the NPDES Program. The SWPPP would include construction and post-construction BMPs for stormwater management. The Project would introduce new impervious area, and would use pervious surfacing such as gravel to the extent feasible, and would implement drainage control features to reduce or avoid site-specific increases in stormwater runoff and erosion. Construction and operation of the Project would not result in significant impacts to water quality and would have minimal potential result in the violation of a water quality standard or waste discharge requirement. Construction and operation of the Project would not conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan. Potential impacts would be less than significant.

Impact WAT-2

Threshold:	Would the Project substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the Project may impede sustainable groundwater management of the basin?

Groundwater resources can be directly affected through production and consumption or indirectly affected through the alteration of recharge rates or patterns that adversely affect groundwater in storage. Impedance of sustainable groundwater management can occur if a project would cause or exacerbate existing overdraft conditions. The proposed Project overlies the Solano Subbasin of the Sacramento Valley Groundwater Basin, which is not characterized by overdraft conditions and is being managed sustainably under a DWR-approved GSP; see Section 5.13.1.1, *Groundwater*.

Table 5.13-13, *Summary of Project Water Demands*, shows that construction and operation of the Project would require up to approximately 16.1 acre-feet of water over 37 years, which accounts for two years of construction requiring up to 5.6 AFY and 35 years of operation requiring up to 0.3 AFY. The tables presented in Section 5.13.1.6, *Water Supply,* under "Water Balance" and "Water Supply" indicate that the City of Vacaville has surplus supply availability in quantities substantially higher than the Project's annual water demands under all projected climate (drought) scenarios. In addition, the groundwater budget presented in Section 5.13.1.1*, Groundwater*, demonstrates that the Solano Subbasin has a positive supply balance that is substantially higher than the Project's water demands under the projected 2030 and 2070 scenarios, including with consideration to climate change. Therefore, the proposed Project would not decrease groundwater supplies or interfere substantially with groundwater recharge such that the Project may impede sustainable groundwater management of the basin, and potential impacts would be less than significant.

The discussions below characterize potential impacts associated with groundwater supply and recharge for construction and operational activities.

Construction

Less than Significant Impact. Construction of both the Vaca Dixon 57 MWh and Arges 400 MWh BESS components would require a water supply for site preparation and dust suppression, as detailed in Section 5.13.1.6, *Water Supply*, under "Water Demands." The construction water supply is planned to be obtained from the City of Vacaville by connecting to a fire hydrant adjacent to the southwest corner of the BESS Project Area. The City's water supply portfolio is comprised of multiple sources including local groundwater from the Solano Subbasin; however, the Solano Subbasin is not overdrafted and, as detailed in Section 5.13.1.6 under "Water Balance," the City has surplus supply availability under all projected climatic scenarios through 2045.

Indirect effects to groundwater could result from changes to infiltration rates and patterns across the Project Site. The site-specific SWPPP discussed under Impact WAT-1 would include BMPs to minimize or avoid drainage pattern alterations, including through use of pervious surfacing materials. These BMPs are in addition to the Project design features listed in Section 5.13.1.6, *Water Supply,* under "Water Balance" and "Stormwater." Construction of the Project would not alter infiltration rates or patterns in a way that would adversely affect groundwater recharge.

If de-watering is required during construction due to encountering shallow or perched groundwater, such activities would be conducted for consistency with the Construction General Permit to avoid adverse impacts to groundwater quality. Construction of both BESS project components would be conducted to minimize or avoid direct and indirect adverse effects to groundwater resources and would not impede sustainable management of the Solano Subbasin. Potential impacts would be less than significant.

Operation

Less than Significant Impact. Operation of the Project would require a water supply to supplement natural rainfall for landscape watering during summer months and dry conditions; water during operation would also be needed for annual flow testing of the fire water loop system. As discussed in the Project Description (see Section 2.1.1, *Project Location*), the Project Site is designated by the City of Vacaville General Plan as Business Park and the BESS Project Area is located within the City's Northeast Growth Area, which is intended for offices, industrial uses, and technology campuses. Municipal fire departments use zoning and land use designations to estimate fire flow requirements for given areas, including the volume and pressure of water needed to provide fire suppression. While the Project would introduce new uses to the site, these uses would not alter potential fire suppression needs associated with existing zoning and designations for the site. Therefore, the existing municipal water distribution system is appropriately designed with facilities and capacity to accommodate fire suppression needs during operation of the Project.

Operational water supply for the Project would be obtained from the City of Vacaville by tapping and installing meters and valves on the pipeline that feeds the fire hydrant near the southwest corner of the BESS Project Area. The tap would be installed upstream of the fire hydrant. Alternately, the Project may tap the existing 12-inch diameter City water main that parallels the northern site boundary. As detailed in Section 5.13.1.6 under "Water Balance," the City has surplus supply availability under all projected climatic scenarios through 2045. This supply source is considered sustainably available and reliable and would not adversely affect groundwater resources.

As described above, the presence of the Vaca Dixon 57 MWh BESS and the Arges 400 MWh BESS would include pervious surfacing and the use of BMPs to minimize or avoid drainage pattern alterations. Operation of the Vaca Dixon 57 MWh and Arges 400 MWh BESS Project components would not alter infiltration rates or patterns in a way that would adversely affect groundwater recharge. Potential impacts would be less than significant.

Impact WAT-3

Threshold:	Would the Project substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would: ▪ Result in substantial erosion or siltation on- or off-site? ▪ Substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?

The existing Project Site is relatively flat and vegetated, with drainage occurring as sheet flow primarily to the northeast and some towards the southern Project boundary (see description in Section 5.13.1.3, *Stormwater*, under "Infiltration and Stormwater Runoff." There are no defined drainage channels on the Project Site, and the Project would not alter the course of any stream or river. The Project would alter existing drainage patterns by introducing facilities and gravel cover, with some paved areas to accommodate access driveways, and would include stormwater design features to provide stormwater management and conveyance of surface flows around the Project components to avoid potentially adverse impacts associated with drainage pattern alterations.

The Project would also introduce new impervious surfaces; potentially adverse effects associated with runoff from impervious surfaces would be minimized or avoided through the implementation of detention basins and LID features, as mentioned under Impact WAT-1. As detailed in the *Hydrology and Stormwater Management Report* for the Project (POWER Engineers, Inc. 2025), LID Design Standards that would be implemented as part of the Project include but are not limited to:

- Define the development envelope and areas deemed unsuitable for development to be left undisturbed (during Project implementation).
- Install water efficient landscaping along all four property lines inside the required setbacks.
- Design site layout consistent with existing access and topography including natural landforms.
- Design the grading and drainage plan to replicate the site's natural drainage patterns.
- Manage surface runoff throughout the site using aboveground stormwater management/infiltration basins and gravel areas.

In addition to the above-ground basins noted above, stormwater would be retained on-site using infiltration trenches set below-grade in the bottom of the proposed stormwater management basins. Retention facilities would be sized to contain flows associated with the 85th percentile storm event during which one inch of rainfall would occur over a 24-hour period; this is the "design storm" that reflects the intensity of storm that is greater than 85 percent of recorded storm events and is used to design LID features and treatment systems with sufficient capacity to capture runoff from 85th percentile storm events. There are currently no stormwater control features on the Project Site such that under current conditions, runoff from the 85th percentile storm occurs as sheet flow across the site. Under the Project, stormwater basins would detain runoff with overflow releasing it at or below pre-construction peak rates. Post-Project runoff would be detained on-site during Project operations so as not to exceed pre-Project flow rates for the two-year, 24-hour storm event (POWER Engineers, Inc. 2025).

Vaca Dixon 57 MWh BESS

Construction

Less than Significant Impact. As discussed under Impact WAT-1, construction of the Vaca Dixon 57 MWh BESS component would involve grading of approximately 5.13 acres, representing 51 percent of the 10-acre Project Site. Drainage pattern alterations associated with Project construction would be conducted with BMPs from the SWPPP to control stormwater runoff and minimize or avoid potential erosion and sedimentation, as well as with the design measures and LID features presented above. Therefore, potentially adverse impacts associated with drainage pattern alterations that could result in erosion or flooding would be minimized or avoided. Potential impacts would be less than significant.

Operation

Less than Significant Impact. The Project would include construction of BESS facilities and related infrastructure within the disturbance area that would be located above grade and would include the addition of impervious surfaces. As shown in the drainage and grading plans presented in Section 2, *Project Description*, the Vaca Dixon 57 MWh BESS site plan includes stormwater management basins and outlets within the Project Site to control surface runoff and discharge. As described above, retention facilities would be sized to contain flows associated with the 85th percentile storm event, and post-Project runoff would be controlled on-site and released at rates equivalent to or less than current conditions. Therefore, the Project would not increase surface runoff or the potential for erosion or flooding associated with drainage pattern alterations. Potential impacts would be less than significant.

Arges 400 MWh BESS

Construction

Less than Significant Impact. As discussed under Impact WAT-1, construction of the Arges 400 MWh BESS facilities would involve grading of 5.3 acres, representing approximately 53 percent of the 10-acre Project Site. As with the Vaca Dixon 57 MWh BESS facilities of the Project, the SWPPP and BMPs that would be implemented during construction would protect and maintain existing drainage patterns and would control erosion and sedimentation to minimize or avoid the potential for adverse impacts from drainage pattern alterations. Potential impacts would be less than significant.

Operation

Less than Significant Impact. Operation of the Arges 400 MWh BESS facilities would occur in the same manner as described above for the Vaca Dixon 57 MWh BESS facilities and would include detention basins and outlets within the Project Site to control surface runoff and discharge. While the operation of the Arges 400 MWh BESS facilities would include the presence of new impervious surfaces, due to LID features and BMPs, the Project would not increase surface runoff or the potential for erosion or flooding associated with drainage pattern alterations. Potential impacts would be less than significant.

Overall Project

Less than Significant Impact. The overall Project would involve grading of approximately 10 acres of land, including re-grading a portion of the Vaca Dixon 57 MWh BESS component area during construction of the Arges 400 MWh BESS component area. The Project would introduce new impervious surfaces primarily in the form of permanent foundations and improved access surfaces. With the implementation of stormwater management features including the use of erosion control BMPs and pervious surfaces where possible, new impervious surfaces introduced by the Project would not alter drainage patterns in a way that would increase runoff or result in increased erosion or flooding. As discussed above, Project design includes stormwater management basins placed on the Project Site to control the rate and amount of stormwater runoff associated with each drainage area. Potential impacts associated with drainage pattern alterations would be less than significant.

Impact WAT-4

Threshold:	Would the Project substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would: ▪ Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff? ▪ Impede or redirect flood flows?
Threshold:	Would the Project in flood hazard, tsunami, or seiche zones, risk release of pollutants due to Project inundation?

The Project Site is not served by an existing or planned stormwater drainage system; therefore, stormwater runoff is addressed below with respect to the potential for the Project to contribute additional sources of polluted runoff. The Project Site is not located within the inundation area for tsunami, seiche, or dam failure. The impact analysis provided below captures potential impacts associated with flood flows by considering whether the Project would substantially alter the existing drainage pattern of the site or surrounding area.

As discussed under respective headings below, construction and operation of the Project would not impede or redirect flood flows such that adverse impacts would occur and would not contribute new sources of polluted runoff. Potential impacts would be less than significant.

Construction

Less than Significant Impact. As discussed under Impact WAT-1, construction of Vaca Dixon 57 MWh and Arges 400 MWh BESS component areas would not result in impacts associated with the violation of a water quality permit or waste discharge requirement. Additionally, as discussed under Impact WAT-3, construction of the Vaca Dixon 57 MWh and Arges 400 MWh BESS components would not alter the course or any existing stream or river. A Project-specific SWPPP and BMPs would be implemented throughout construction and would include measures to minimize or avoid stormwater flows leaving the Project Site, minimize erosion or sedimentation that could affect water quality, and provide proper handling and use of hazardous materials to avoid spills and conduct appropriate clean-up as needed. Construction of the Vaca Dixon 57 MWh and Arges 400 MWh BESS components would not create substantial additional sources of polluted runoff, impede or redirect flood flows, or risk release of pollutants due to inundation. Potential impacts would be less than significant.

Operation

Less than Significant Impact. As discussed in Section 5.13.1.4, Flooding and Inundation, neither the Vaca Dixon 57 MWh nor Arges 400 MWh BESS components of the Project are located within a FEMA-designated flood hazard area, which would be subject to inundation during large storm events. A portion of the Project's proposed gen-tie alignments and the existing VDPP at the PG&E Substation north of I-80 are within a 500-year floodplain. As discussed in Section 5.13.1.4, Flooding and Inundation, under "Flood Hazard Areas," the 100-year floodplain is defined by FEMA as a special flood hazard area; the 500-year floodplain is not defined as a special flood hazard area and is not regulated under FEMA's NFIP.

In Solano County, design standards for structures within flood hazard areas follow State and federal regulations, including California Building Standards Code (Title 24) and NFIP. These requirements are presented in the Solano County Code, Chapter 12.2, *Flood Damage Prevention.* Critical facilities in a special flood hazard area are generally required to be elevated to at least two feet above the Base Flood Elevation. However, as noted above, the 500-year floodplain is not a special flood hazard area; in addition, gen-tie lines such as those associated with the Project are not considered critical facilities. All structures implemented under the Project would be designed and maintained for compliance with applicable standards and regulations, including but not limited to Solano County Code Chapter 12.2.

As discussed under Impact WAT-3, the Project would introduce new impervious surfaces to the area; however, through Project design and BMPs, drainage pattern alterations would be site-specific and would not result in adverse impacts related to runoff or inundation. Potential impacts would be less than significant.

5.13.4 Cumulative Impacts

Impacts of the Project would be considered cumulatively considerable if they would have the potential to combine with other past, present, or reasonably foreseeable projects to become significant.

Overall Project

As discussed in the impact analysis provided in Section 5.13.3, the Project would not result in significant impacts associated with water resources. Potential impacts associated with drainage pattern alterations, potential for flooding, and water quality, would be site-specific and minimized or avoided through

The Project would not substantially degrade surface water quality or groundwater quality and would not violate water quality standards or waste discharge requirements (Impact WAT-1); therefore, no cumulative impacts associated with water quality would occur.

Water for the Project would be provided by the City of Vacaville, which has sufficient surplus water supply available to meet the Project's needs through 2045, including with consideration to climate change and drought. The Project would not affect sustainable groundwater management and no cumulative impacts associated with groundwater supplies would occur (Impact WAT-2).

The Project also would not introduce drainage pattern alterations that would result in erosion, siltation, or flooding on- or off-site (Impact WAT-3), create or contribute runoff water that would exceed the capacity of an existing or planned drainage system, impede or redirect flood flows, or risk release of pollutants due to inundation (Impact WAT-4). Therefore, the Project would not contribute to cumulative impacts associated with ground disturbance and erosion, flooding, water quality, or stormwater drainage.

Alternative Water Supply Sources

Alternative water supply sources that could be considered for the Project include groundwater pumped from the Solano Subbasin from the Project Site, which would likely require installation of new on-site groundwater well(s). As discussed in Section 5.13.1.1, *Groundwater*, under "Groundwater Budget," the Solano Subbasin has a surplus supply balance projected through 2045, including with consideration to varying climate conditions (drought). The Project does not propose to drill or utilize onsite groundwater well water.

5.13.5 Laws, Ordinances, Regulations, and Standards

Table 5.13-18, below, lists the LORS determined to be applicable to water resources, including the topics of surface water, groundwater, flooding, stormwater, and water quality. This table does not present LORS that are not applicable to the Project, such as those related to residential and community development, community water systems or state small water systems, wastewater collection and treatment systems, new groundwater wells, underground injection wells, and other topics not included in Project construction or operation.

Table 5.13-18 LORS Applicable to Water Resources

Jurisdiction	LORS	Applicability	Opt-In Application Reference	Project Conformity
Federal	CWA	Section 303(d), Impaired Water Bodies; Section 404, discharge to federal waters; Section 401, Water Quality Certification; Section 402, NPDES	Impact WAT-1 Impact WAT-4	The Project would comply with all regulatory requirements of the CWA.
State	California Environmental Quality Act (CEQA)	Requires state and local government agencies to inform decision makers and the public about the potential environmental impacts of the Project and to reduce environmental impacts to the extent feasible.	Throughout this Opt-In Application	The Project would comply with CEQA, as required by the California Energy Commission's Opt-In Application process.
State	Porter Cologne Water Quality Control Act	The Water Quality Control Plan for the Central Valley Region sets forth beneficial use objectives and water quality standards for the Project Site.	Impact WAT-1 Impact WAT-4	The Project would comply with water quality standards and would not conflict with beneficial uses set forth in the Central Valley Region Basin Plan.
State	Sustainable Groundwater Management Act	Groundwater is managed by GSAs through implementation of a GSP.	Impact WAT-2	The Project would be implemented in coordination with the GSAs and would not conflict with the Solano Subbasin GSP.
Local	Solano County Code: Chapters 12.2, 31	Chapter 12.2, *Flood Damage Prevention*, presents requirements for structures in areas subject to flooding. Chapter 31, *Grading, Drainage, Land Leveling, and Erosion Control*, includes drainage design standards and erosion control requirements.	Impact WAT-4	The Project would comply with all design standards related to flood hazards and flood damage prevention.
Local	Solano County General Plan: Policies RS.G-9, RS.G-10, RS.P-64 through RS.P-76	These policies aim to protect and enhance the quality of surface and groundwater resources, including through stormwater management, watershed planning, and sustainable management.	Impact WAT-1 Impact WAT-2 Impact WAT-3 Impact WAT-4	The Project would comply with General Plan policies through site design and BMPs during construction and operation.

Jurisdiction	LORS	Applicability	Opt-In Application Reference	Project Conformity
Local	City of Vacaville Municipal Code: Chapters 13.12, 14.27.030, 13.20	Chapter 13.12, *Water*, specifies requirements for use of the City's water supply and facilities. Chapter 14.27.030, *Provisions for New Construction or Rehabilitates Landscapes*, includes water efficient landscape requirements. Chapter 13.20, *Water Conservation*, establishes water conservation requirements and drought response actions. Chapter 15.20.271, *California Fire Code*, presents fire protection water requirements including for supply and flow.	Impact WAT-1 Impact WAT-2	The Project would be designed and implemented in compliance with City Municipal Code requirements for water supply, water quality, water conservation, and water for fire suppression.
Local	City of Vacaville General Plan: Policies LU-P17.5, COS-P13.4, COS-P13.6, COS-P14.1, COS-P14.5, PUB-P1.5, PUB-P12.1	These policies promote sustainable water supply management, protect hydrologic resources, and ensure long-term water reliability to support growth while preserving environmental quality.	Impact WAT-1 Impact WAT-2 Impact WAT-3 Impact WAT-4	The Project would comply with General Plan policies through site design and BMPs during construction and operation.

BMP = best management practice; CWA = Clean Water Act; GSA = Groundwater Sustainability Agency; GSP = Groundwater Sustainability Plan; NPDES = National Pollutant Discharge Elimination System

The LORS presented above are discussed as relevant to the Project in the impact analysis provided above in Section 5.13.3, *Impact Analysis*.

5.13.5.1 Federal LORS

Clean Water Act

The federal CWA (33 United States Code [U.S.C.] § 1251 et seq.) and subsequent amendments outline the protocol for regulating discharges of pollutants to federally jurisdictional waters of the U.S. It is the primary federal law applicable to water quality of the nation's surface waters, including lakes, rivers, and coastal wetlands, and was enacted to "restore and maintain the chemical, physical, and biological integrity of the Nation's waters," implemented by the USEPA. In California, the USEPA has delegated regulatory authority for CWA implementation to the SWRCB and the nine RWQCBs.

Section 303(d), Impaired Waterbodies and Total Maximum Daily Loads

Section 303(d) of the CWA requires states to identify waters where adopted water quality standards and beneficial uses are still unattained. These lists of prioritized impaired waterbodies, known as the "303(d) lists," are submitted to the USEPA every two years. The law requires the development of total maximum daily load (TMDL) criteria to improve water quality of impaired waterbodies. States develop TMDLs for impaired waterbodies to maintain beneficial uses, achieve water quality objectives, and reduce the potential for future water quality degradation. A TMDL must account for point and non-point sources, where point source pollution is any contaminant entering the environment from an easily identified location, and non-point source pollution is a diffuse source of pollution that occurs over a wider area, including stormwater runoff.

Section 404, Placement of Dredge or Fill Material into Waters of the U.S.

The USACE is responsible for issuing permits under CWA Section 404 for placement of dredge or fill material into waters of the U.S., which can include oceans, bays, rivers, streams (including non-perennial streams with a defined bed and bank), lakes, ponds, and seasonal and perennial wetlands. CWA Section 404 requires Project proponents to obtain a permit from the USACE for all discharges of fill or dredged material into waters of the U.S. before proceeding with a proposed activity. The USACE may issue either an individual permit or a general permit.

Section 401, Water Quality Certification

Section 401 of the CWA specifies that the SWRCB or applicable RWQCB must certify that any federal action meets with state water quality standards, (23 California Code of Regulations § 3830, et seq.). California has a policy of no net loss of wetlands, which the SWRCB and RWQCBs address by requiring mitigation for dredge and fill impacts to wetlands and waterways. Dredge and fill activities in wetlands and waterways that impact waters of the U.S. require a CWA Section 404 permit from the USACE. A CWA Section 401 WQC must be obtained from the Central Valley RWQCB prior to issuance of a Section 404 permit.

Section 402, National Pollution Discharge Elimination System

The SWRCB and the RWQCBs implement and enforce the federal NPDES program in California. Established in 1972, the NPDES regulations initially focused on municipal and industrial wastewater discharges, followed by stormwater discharge regulations that became effective in December 1990. NPDES permits provide two levels of control: technology-based limits which are based on the ability of dischargers to treat wastewater, and water quality-based limits, which are required if technology-based limits are not sufficient to protect the waterbody. Additionally, stormwater permitting for construction site discharges is described below under state regulations.

5.13.5.2 State LORS

California Environmental Quality Act

The California Environmental Quality Act (CEQA) requires state and local government agencies to inform decision makers and the public about the potential environmental impacts of the Project and to reduce environmental impacts to the extent feasible. Appendix G of the CEQA Guidelines includes criteria for evaluating potential impacts related to water resources.

Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act ("Porter-Cologne"), established by CWC Division 7, is the state law governing the water quality of all state waters, including surface waters and groundwater. Under Porter-Cologne, the SWRCB has authority over water quality policy on a state-wide level, and the nine RWQCBs establish and implement water quality standards specific to their respective region. The Project is located within the Central Valley and subject to the authority of the Central Valley RWQCB, which jointly implements the federal CWA and the state Porter-Cologne Water Quality Control Act to regulate water quality in the Project area.

Sustainable Groundwater Management Act

In 2014, SGMA established a framework for local groundwater management under which the DWR assigns priority levels to groundwater basins based on existing water balance conditions. The purpose of SGMA is to bring groundwater basins into sustainable conditions by 2040, and to maintain sustainable conditions in the future. To accomplish this, groundwater basins are required to be managed by DWR-approved GSAs, which are then required to develop and implement a GSP for each of their respective basins. See Section 5.13.1.1, *Groundwater*, under "Sustainable Groundwater Management Act" for further discussion of SGMA as relevant to the Project Site.

5.13.5.3 Local LORS

Solano County Code

The Solano County Code is the compilation of laws, regulations, and ordinances governing land use and building standards in Solano County. Key chapters applicable to water resources include but are not limited to the following:

- **Chapter 12.2** – Flood Damage Prevention: Outlines requirements for development in flood-prone areas, including but not limited to the elevation of structures in special flood hazard areas (FEMA-designated 100-year floodplains).
- **Chapter 31** – Grading, Drainage, Land Leveling, and Erosion Control: Regulates development to prevent erosion and manage stormwater runoff.

Solano County General Plan

The Solano County General Plan contains water resources policies applicable to the Project, including, but not limited to those listed below.

- **Policy RS.G-9.** Protect, monitor, restore and enhance the quality of surface and groundwater resources to meet the needs of all beneficial uses.
- **Policy RS.G-10.** Foster sound management of the land and water resources in Solano County's watersheds to minimize erosion and protect water quality using best management practices and protect downstream waterways and wetlands.
- **Policy RS.P-64.** Identify, promote, and seek funding for the evaluation and remediation of water resource or water quality problems through a watershed management approach. Work with the regional water quality control board, watershed focused groups, and stakeholders in the collection, evaluation and use of watershed-specific water resource information.
- **Policy RS.P-65.** Require the protection of natural water courses.
- **Policy RS.P-66.** Together with the Solano County Water Agency, monitor and manage the county's groundwater supplies.
- **Policy RS.P-67.** Encourage new groundwater recharge opportunities.
- **Policy RS.P-68.** Protect existing open spaces, natural habitat, floodplains, and wetland areas that serve as groundwater recharge areas.
- **Policy RS.P-69.** Preserve and maintain watershed areas characterized by slope instability, undevelopable steep slopes, high soil erosion potential, and extreme fire hazards in agricultural use. Watershed areas lacking water and public services should also be kept in agricultural use.

- **Policy RS.P-70.** Protect land surrounding valuable water sources, evaluate watersheds, and preserve open space lands to protect and improve groundwater quality, reduce polluted surface runoff, and minimize erosion.
- **Policy RS.P-71.** Ensure that land use activities and development occur in a manner that minimizes the impact of earth disturbance, erosion, and surface runoff pollutants on water quality.
- **Policy RS.P-72.** Preserve riparian vegetation along county waterways to maintain water quality.
- **Policy RS.P-73.** Use watershed planning approaches to resolve water quality problems. Use a comprehensive stormwater management program to limit the quantity and increase the water quality of runoff flowing to the county's streams and rivers.
- **Policy RS.P-74.** Identify naturally occurring and human-caused contaminants in groundwater in new development projects and develop methods to limit and control contaminants. Work with RWQCB to educate the public on evaluating the quality of groundwater.
- **Policy RS.P-75.** Require and provide incentives for site plan elements (such as permeable pavement, swales, and filter strips) that limit runoff and increase infiltration and groundwater recharge.
- **Policy RS.P-76.** Promote sustainable management and efficient use of agricultural water resources.

City of Vacaville Municipal Code

The City of Vacaville Municipal Code incorporates regulations related to water resources through several chapters within its Land Use and Development Code. These provisions establish standards for water use and landscaping, conservation, fire flow, grading and erosion control, and stormwater management that apply to new development projects, including the Vaca Dixon Power Center Project. Key chapters include:

- **Chapter 13.12** – Water: Specifies requirements for use of the City's water supply and facilities.
- **Chapter 13.20** – Water Conservation: Establishes water conservation requirements and drought response actions.
- **Chapter 14.19** – Grading Regulations: Establishes requirements for grading permits, slope stability, cut-and-fill operations, and dust suppression.
- **Chapter 14.26** – Urban Storm Water Quality Management and Discharge Control: Regulates stormwater runoff from disturbed soils and construction sites.
- **Chapter 14.27** – Water Efficient Landscaping: Includes soil preparation standards for new landscaping to improve water retention and reduce erosion.
- **Chapter 15.20** – California Fire Code: Presents fire protection water requirements including for supply and flow.

City of Vacaville General Plan

The City of Vacaville General Plan contains several policies related to water resources that are applicable to the Project. Key policies include but are not limited to those listed below under headings for respective General Plan Elements.

Land Use Element

- **Policy LU-P17.5.** Require that new industrial development be designed to avoid adverse impacts to adjacent non-industrial uses, particularly residential neighborhoods, with respect to, but not limited to, noise, dust and vibration, water quality, air quality, agricultural resources, and biological resources. Include specific standards in Policy Plans for adequate physical and aesthetic separation of industrial business parks and residential land.

Conservation and Open Space Element

- **Policy COS-P13.4.** Require new development to incorporate Best Management Practices (BMPs) for water use and efficiency and demonstrate specific water conservation measures.
- **Policy COS-P13.6.** Whenever possible, use recycled or non-potable water for irrigation in landscaped areas.
- **Policy COS-P14.1.** Protect the Alamo, Encinosa, Gibson, and Ulatis Creek watersheds by minimizing point and nonpoint source pollutants.
- **Policy COS-P14.5.** Require the implementation of Best Management Practices (BMPs) to minimize erosion, sedimentation, and water quality degradation resulting from construction or from new impervious surfaces.

Public Facilities and Services Element

- **Policy PUB-P1.5.** Require that new development satisfy fire flow and hydrant requirements and other design requirements as established by the Fire Department.
- **Policy PUB-P12.1.** Prohibit any development that will not meet standards of water service. All service standards shall be met prior to project occupancy.

5.13.6 Agencies and Agency Contact

Table 5.13-19, below, provides an overview of regulatory agencies and contacts for water resources.

Table 5.13-19 Agency Contacts for Water Resources

Issue	Agency	Contact
Stormwater discharges in non-federal waters - Order 2009-0009-DWQ, amended by Order 2010-0014-DWQ and 2012-0006-DWQ	Central Valley Regional Water Quality Control Plan (RWQCB) for the Sacramento and San Joaquin River Basins	Sacramento Office: 11020 Sun Center Drive Suite 200 Rancho Cordova, California 95670 916-464-3291
Dredge and fill activities in non-federally jurisdictional wetlands and waterways - CWA Section 401; Porter-Cologne	Central Valley RWQCB	Sacramento Office: 11020 Sun Center Drive Suite 200 Rancho Cordova, California 95670 916-464-3291
Activities within the Solano Subbasin that could affect groundwater – Sustainable Groundwater Management Act	Solano Irrigation District (SID) Groundwater Sustainability Agency (GSA)	SID (Vacaville Office) Paul Fuchslin Director of Engineering 810 Vaca Valley Parkway Suite 201 Vacaville, California 95688: 707-455-4020

5.13.7 Permits and Permit Schedule

Table 5.13-20, below, provides an overview of regulatory permits for water resources and requirements for permit applications.

Table 5.13-20 Permit Application Requirements for Federal and State LORS

Permit, Authority, and Trigger	Requirements for Permit Application/Rationale for Non-Applicability
NPDES Statewide General Permit for Stormwater Discharges Associated with Construction and Land Disturbance Activities: ▪ Central Valley RWQCB - Order 2009-0009-DWQ, amended by Order 2010-0014-DWQ and 2012-0006-DWQ) ▪ Stormwater discharges in non-federal waters	Under the Porter-Cologne Water Quality Control Act ("Porter-Cologne"), the SWRCB via the RWQCBs administers California's stormwater permitting program; construction projects disturbing more than one acre of land require coverage under the General Permit for stormwater with a site-specific Stormwater Pollution Prevention Plan (SWPPP) and BMPs to manage runoff. Requirements for application for coverage under the General Permit include: ▪ Set up an account with Stormwater Multiple Application and Report Tracking System (SMARTS), the State's online project application and reporting system. ▪ Electronically submit all required permit registration documents, including: ▫ Site Risk Assessment ▫ Site-specific SWPPP, documenting all proposed stormwater control measures and BMPs, and describing how each measure will prevent discharge under the project, including maps and runoff calculations ▫ Construction Site Monitoring Plan ▫ Site Map ▪ Send the project-specific acreage-based Permit fee to the SWRCB.

5.13.8 References

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