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Soda Mountain Solar Project

Water Supply Report for the Soda Mountain Subbasin of the Soda Lake Valley Groundwater Basin

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Acronyms

AF	acre-feet
AFY	acre-feet per year
BLM	U.S. Bureau of Land Management
CEC	California Energy Commission
CEQA	California Environmental Quality Act
County	San Bernardino County
DGMO	Desert Groundwater Management Ordinance
DWR	Department of Water Resources
GPD	gallons per day
gpm	gallons per minute
GSA	Groundwater Sustainability Agency
GSP	Groundwater Sustainability Plan
kV	kilovolt
PV	photovoltaic
RWQCB	Regional Water Quality Control Board
SGMA	Sustainable Groundwater Management Act
Silver LVGB	Silver Lake Valley Groundwater Basin
Soda LVGB	Soda Lake Valley Groundwater Basin
USEPA	U.S. Environmental Protection Agency
WCR	Well Completion Report

Report Authors

This *Water Supply Report for the Soda Mountain Subbasin of the Soda Lake Valley Groundwater Basin* was authored by Rincon Consultants, Inc. water resources planners Aubrey Mescher and Rosalyn Prickett, with support from project managers Evelyn Langsdale and Marlyng Gama.

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Executive Summary

The Soda Mountain Solar Project (project) proposes to construct, operate, and maintain a utility-scale solar photovoltaic electrical generating and battery energy storage facility and associated infrastructure to generate, store, and deliver renewable electricity to the statewide electricity transmission grid.

The project is located on approximately 2,670 acres of land administered by the U.S. Department of Interior, Bureau of Land Management, in San Bernardino County. Project construction would occur over an approximately 18-month period. After approximately 40 years of operation, the facility would be decommissioned over approximately 18 months. The project may use water sourced from up to five new on-site groundwater wells within the Soda Lake Valley Groundwater Basin in San Bernardino County, California. As an alternative, or in addition, to up to five new on-site groundwater wells, the project may use water from an existing water supply well in the Silver Lake Valley Groundwater Basin identified by Well Completion Report Number 2020-016662; this water supply source was previously analyzed in the *Silver Lake Valley Groundwater Basin Water Supply Report*, which was submitted to the California Energy Commission (CEC) as Appendix J, *Water Supply Report*, TN #261605 of Docket Number 24-OPT-03 (SMS 2025).

Implementation of MM BIO-3, as described in the project's CEC application materials, seeks to minimize construction impacts by reducing grading under the solar field, which in turn reduces the dust control water requirements (Resolution 2025a, Resolution 2025b, Rincon 2025). Because implementation of MM BIO-3 would reduce the area of temporary ground disturbance from 2,670 acres to 1,770 acres, it was assumed that the amount of water required for dust control would be reduced proportionally (i.e, water use at 66% of prior estimate). This report presents pre-mitigation groundwater demands, followed by water demands with implementation of MM BIO-3.

During the construction process, the project's groundwater demand is estimated to be a maximum of 319 acre-feet (AF) (223 AF with implementation of MM BIO-3) for a period of 18 months (with daily usage within the construction period varying depending on construction phase). Operational water demand for the 40-year lifespan of the project would be approximately 5.6 acre-feet per year (AFY) (224 AF total) and would begin following construction. During the decommissioning process, it is assumed that water demand would be the same as construction. Total groundwater demand for the project would be up to 862 AF (670 AF with implementation of MM BIO-3), including water used during construction, operations, and decommissioning. Potable demand for personnel use would total 94 AF across all project phases. Potable water is assumed to be supplied by the groundwater well(s) and treated as necessary for potable use via a Point-of-Use (located at sink or shower) treatment system.

The projected groundwater pumping for construction, operation and maintenance, and decommissioning water demands for the project falls within the safe yield of the Soda Mountain Subbasin, which is calculated as 357 AFY. Project water supply needs could be sustainably met through the up to five potential on-site production wells. Anticipated groundwater use for the project is a small fraction of the groundwater in storage within the Soda Mountain Subbasin.

This water supply report concludes that, based on an analysis of regional hydrogeology, an evaluation of pumping impacts, and water quality data, sufficient water resources are available to meet the projected water demands of the project.

1 Introduction

The Soda Mountain Solar Project (project or proposed project), developed by Soda Mountain Solar, LLC (applicant) is a utility-scale solar photovoltaic (PV) electric generating and battery energy storage facility in San Bernardino County; see Figure 1, *Regional Location,* below. The project would generate up to 300 megawatts (MW) of renewable energy and include up to 300 MW/1,200 MW-hours of battery storage. The power produced and stored by the project would be conveyed to the regional electrical grid through an interconnection with the existing Mead-Adelanto 500-kilovolt (kV) transmission line operated by the Los Angeles Department of Water and Power.

This report has been prepared to assess the Soda Mountain Subbasin (Subbasin) of the Soda Lake Valley Groundwater Basin (Soda LVGB) as a potential water supply source for the project. This report outlines the regulatory framework governing groundwater use in the project area, approximates water supply availability within the Subbasin, and assesses the project's potential impacts on groundwater resources including as related to groundwater levels, drawdown, and total amount of groundwater in storage.

This report, the *Soda LVGB Water Supply Report*, is informed by data from existing studies, reports, and publicly available sources including but not limited to the *Soda Mountain Solar Project Proposed Plan Amendment/Final Environmental Impact Statement/Environmental Impact Report* (PPA/FEIS/EIR; BLM 2015), which analyzed an earlier proposed version of the project, and a water supply report that assessed the Silver Lake Valley Groundwater Basin (Silver LVGB) as a potential water supply source for the project.

1.1 Previous Analysis

1.1.1 Soda LVGB

The *Soda Mountain Solar Project Proposed Plan Amendment/Final Environmental Impact Statement/Environmental Impact Report* (PPA/FEIS/EIR; BLM 2015) and its technical studies contains an extensive evaluation of groundwater supply and quality in the Soda Mountain Subbasin.

The *Soda Mountain Solar Project Water Supply Assessment* (Panorama 2013) evaluated the adequacy of groundwater supply from the Soda Mountain Subbasin for project use. Total construction, operation, and maintenance water demands were estimated at 786 AF over 33 years, and the study concluded that there is adequate groundwater supply in the Subbasin to meet projected demands.

The *Soda Mountain Solar Project Hydrogeological Conditions and Groundwater Modeling Report Addendum* (TRC Solutions 2013) updated groundwater modeling used to evaluate whether the hydrogeologic conditions at the project site could sustain groundwater use for construction, operation, and maintenance of the project without causing impacts to nearby water users or environmental resources located within the Mojave National Preserve. Adjustments were made to the model's recharge rates and hydraulic conductivity values, and water demands were updated to be consistent with the *Soda Mountain Solar Project Water Supply Assessment* (Panorama 2013). The groundwater modeling shows that that there is adequate groundwater in the Subbasin to support construction, operation, and maintenance of the project without adversely affecting nearby wells or sensitive resources. The report did recommend completing a well test to confirm the modeling.

The *Soda Mountain Solar Project Groundwater Modeling Sensitivity Analysis* (Burns & McDonnell and Panorama 2014) was prepared to address National Park Service (NPS) and U.S. Geological Survey (USGS) comments on the groundwater flow model. The sensitivity analysis results demonstrate that the proposed groundwater well test results will not change the analysis of impacts at a nearby spring.

1.1.2 Silver LVGB

The *Silver LVGB Water Supply Report* (SMS 2025) assessed an existing water supply well in the Silver LVGB identified by Well Completion Report (WCR) Number 2020-016662. An aquifer test and water quality monitoring were conducted at the supply well (WRC No. 2020-016662) to inform the *Silver LVGB Water Supply Report*. The Silver LVGB supply well is located approximately 12 miles northeast of the proposed project site and approximately three miles north of the town of Baker, a census-designated place in San Bernardino County that overlies the Soda LVGB. Aerial imagery shows that the areas around the Silver LVGB supply well and the greater Silver LVGB are almost entirely undeveloped desert land, with no developed agricultural fields, and no other groundwater wells within a 0.5-mile radius of the well (see Figure 2, *Groundwater Basins,* and Figure 3, *Existing Groundwater Wells*, below). This suggests a lack of substantial ongoing groundwater production for land uses in the project area.

The *Silver LVGB Water Supply Report* assessed availability of water supply in the Silver LVGB based on consideration of drawdown, average depth to groundwater, total volume of water in the aquifer, and percentage used of total available storage, and concluded that the Silver LVGB may be used to meet all water demands of the proposed project without resulting in adverse impacts or regulatory conflicts. Potential drawdown would be negligible and temporary; the basin would recover from the initial drawdown of pumping activities during constant-state pumping, as well as following the cessation of project-related pumping. No water quality treatment would be necessary.

Figure 1 Regional Location

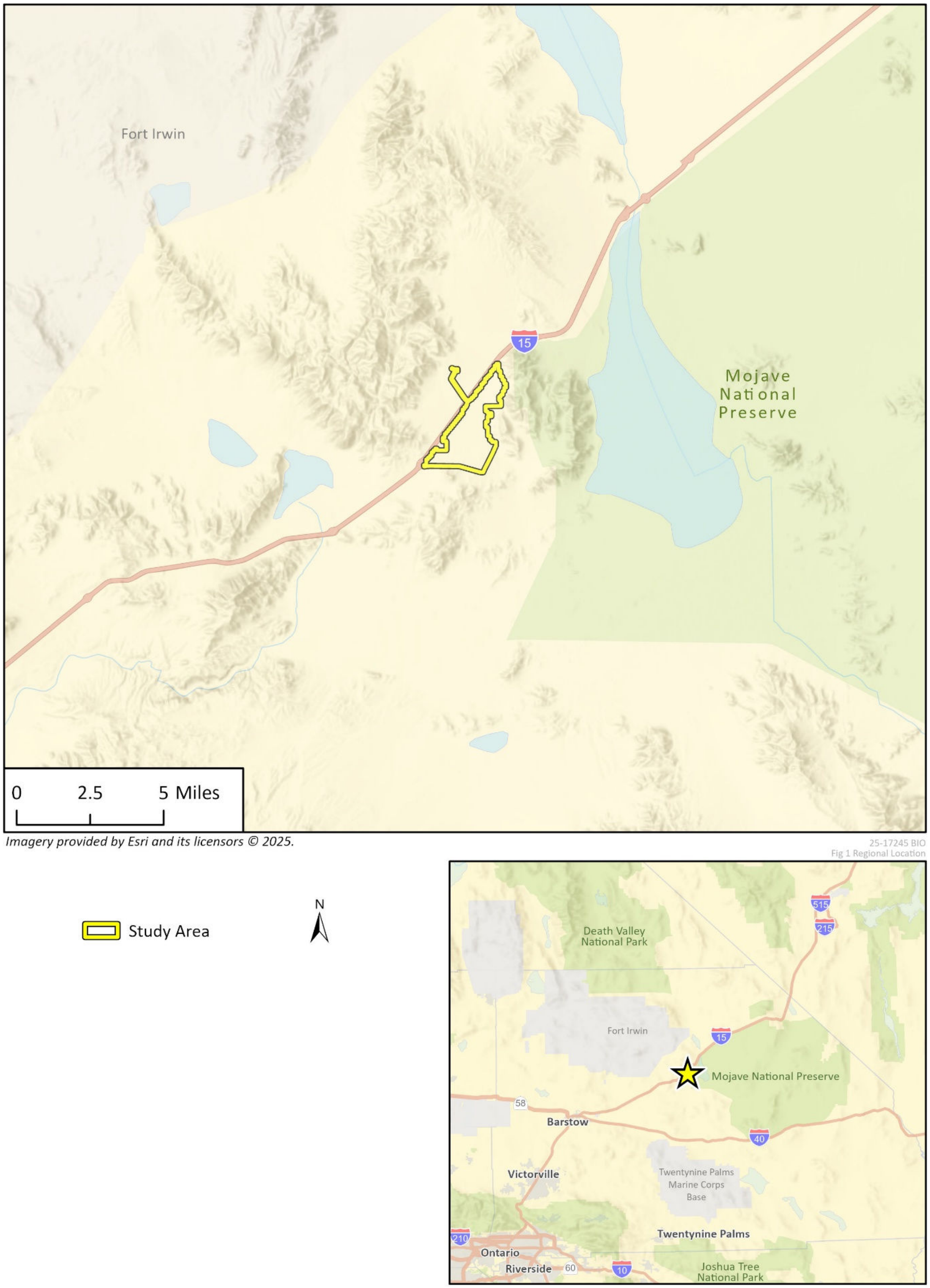

Figure 2 Groundwater Basins

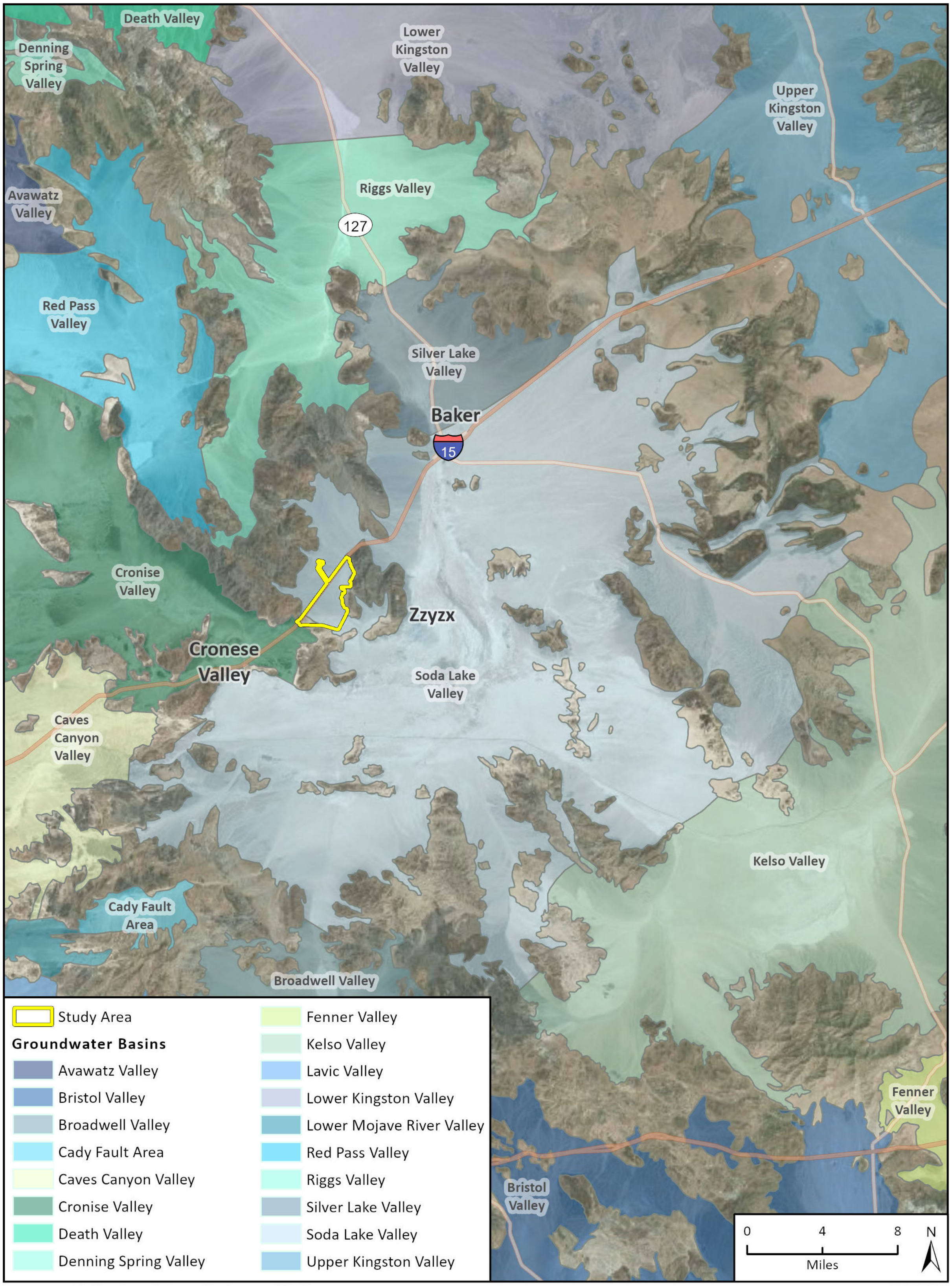

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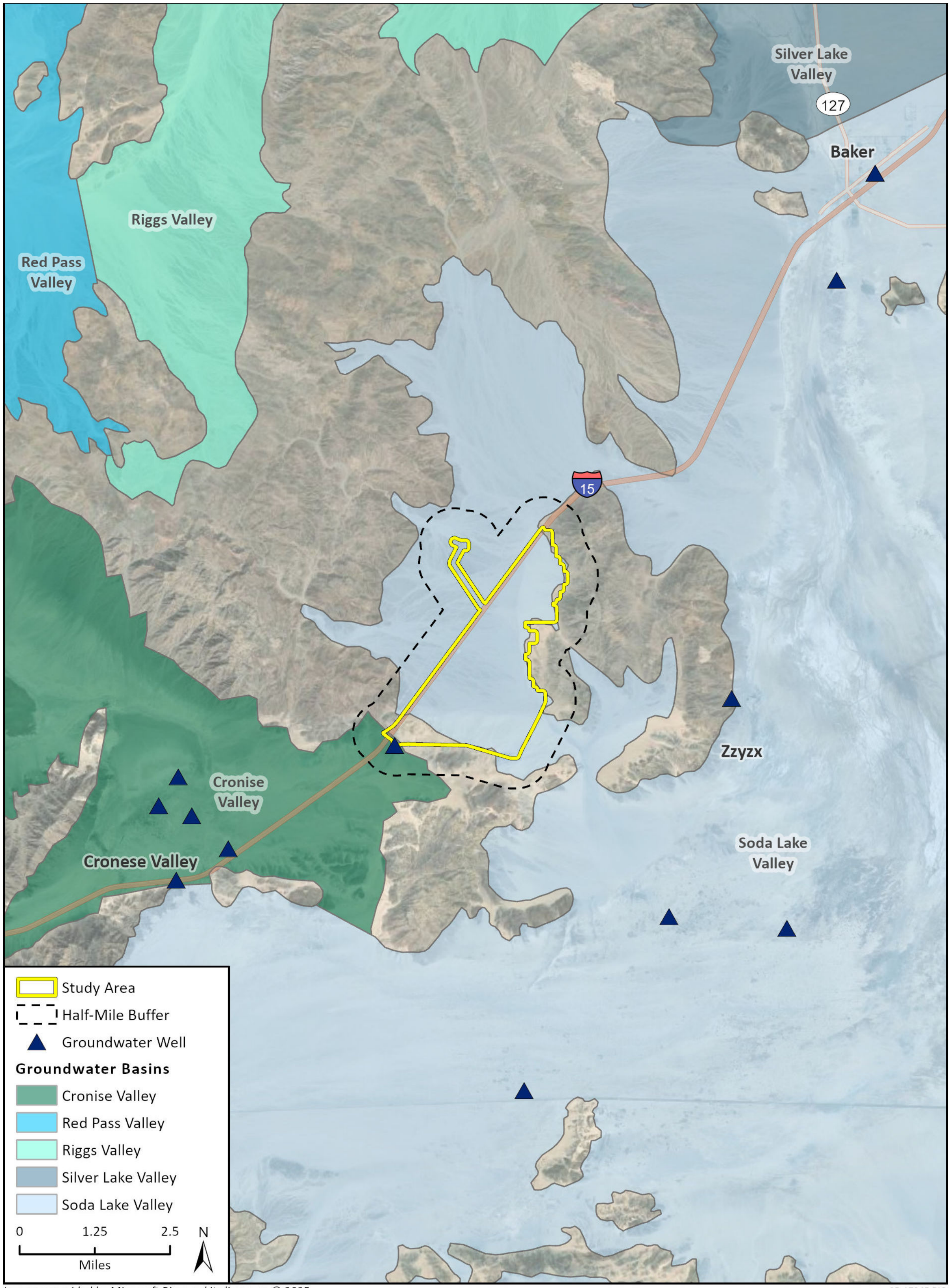
Fig X Groundwater Resources

Figure 3 Existing Groundwater Wells



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Additional data provided by CA DWR, 2025 and Bureau of Land Management, 2015.

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Fig X Existing Wells

2 Project Location and Description

2.1 Location and Setting

The project would be located on an approximately 2,670-acre site in the alluvial valley dividing the northern and southern portions of the Soda Mountains in the Mojave Desert. See Figure 1, *Regional Location.* The site is approximately seven miles southwest of the community of Baker in unincorporated San Bernardino County. The site is approximately 50 miles northeast of Barstow, and 0.5 mile from the western boundary of the Mojave National Preserve. The site is bounded to the east by the Mojave National Preserve and U.S. Bureau of Land Management (BLM) lands, including the Rasor Off-Highway Vehicle recreation area to the southeast. Interstate 15 (I-15) traverses the east side of the project site. The proposed Brightline West High-Speed Passenger Train Project (formerly the DesertXpress and XpressWest Project) also has been permitted for construction within the I-15 corridor.

Aerial imagery reveals that the vicinity of the project site and the Soda LVGB is almost entirely undeveloped desert habitat, with no developed agricultural fields on or near the project site. There are also no existing groundwater wells within the project site or a 0.5-mile radius of the site; see Figure 3, *Existing Groundwater Wells*. As noted above, the project site is located approximately seven miles southwest of Baker, which also overlies the Soda LVGB. U.S. Census Bureau data show that the population of Baker decreased from a total of 504 individuals in 2000 to 442 in 2020 (USCB 2025); as such, the population decreased by approximately 12.3 percent over 20 years. According to the San Bernardino County well inventory, there are 54 wells within Baker (SMS 2025); based on the decreasing population size, it is assumed that the current wells were not installed recently and are not present to accommodate increased municipal uses.

2.2 Project Description

The project proposes to construct, operate and maintain, and decommission an up to 300-MW solar PV and battery energy storage facility located within an approximately 2,670-acre site. Construction would include approximately 1,770 acres of temporary disturbance (rounded up from 1,769.88 acres) and 289 acres of permanent disturbance. The project would include the following components:

1. The solar plant site (i.e., all facilities that create a footprint in and around the field of solar panels, including the solar field consisting of solar power arrays identified as the East Array and South Arrays 1, 2, and 3), operation and maintenance (O&M) buildings and structures, stormwater infrastructure, and related infrastructure and improvements.
2. A substation and switchyard for interconnection to the existing transmission system.
3. Gen-tie line connecting project substation, switchyard, and 500-kV Mead-Adelanto line.
4. Approximately 300 MW/1,200 MW-hour of battery energy storage system across 18 acres.

The project would operate 24 hours per day year-round and would generate, store, and deliver solar-generated power to the regional electrical grid through an interconnection with the existing Mead-Adelanto 500-kV transmission line.

The project may include up to five new on-site groundwater supply wells to produce water supply for the project from the Soda Mountain Subbasin of the Soda LVGB. This analysis assumes that during all project phases, potable water would be supplied by the groundwater well(s) and treated as necessary for potable use via a Point-of-Use treatment system. As an alternative, or in addition, to up to five on-site wells, water may be obtained from the existing Silver LVGB supply well (WCR No. 2020-016662) and transported by water truck to the project site; this Silver LVGB supply well is analyzed in the *Silver LVGB Water Supply Report*. It is anticipated that water would be stored in tanks on-site for use as needed throughout operations, including for non-potable uses, emergency fire suppression, and solar panel washing. Water would be distributed throughout the site as needed using water trucks. Water demands are presented in Section 5, *Project Water Demands*.

3 Groundwater Management Considerations and California Energy Commission Guidelines

This section presents groundwater management regulations and California Energy Commission (CEC) guidelines relevant to the potential use of groundwater to produce water supply for the proposed project from the underlying Soda LVGB.

3.1 Sustainable Groundwater Management Act

The Sustainable Groundwater Management Act of 2014 (SGMA) created a framework for the sustainable management of groundwater resources by local agencies. In accordance with SGMA, basins designated by the California Department of Water Resources (DWR) as High Priority or Medium Priority (California Water Code Section 10933) are required to be managed by a DWR-approved Groundwater Sustainability Agency (GSA) through implementation of a Groundwater Sustainability Plan (GSP), also subject to review and approval by the DWR. GSPs outline strategies to achieve sustainable groundwater conditions within 20 years, such as replenishment and demand management, guided by set goals and criteria.

Basin prioritization is based on the best available socioeconomic and hydrogeological data, such as population, number of wells, and irrigated acres. The majority of subbasins within the Mojave Desert are designated as Low Priority or Very Low Priority due to factors such as the extent of urban development, existing groundwater wells, and reliance on groundwater for supply (SMS 2025). The availability of groundwater data in this area is also generally limited, and basin priority designations may not provide a comprehensive depiction of hydrologic conditions or groundwater resources.

The Soda LVGB, which underlies the proposed project site and is assessed herein as a potential water supply source for the project, is designated by DWR as Very Low Priority; therefore, the Soda LVGB is not managed by a GSA and is not subject to a GSP. The Silver LVGB, which was assessed in the *Silver LVGB Water Supply Report* (SMS 2025) for the proposed project, is designated by DWR as Low Priority and therefore is also not managed by a GSA or subject to a GSP. Thus, there is no GSP with groundwater data characterizing existing conditions in the project area for the Soda LVGB or the Silver LVGB. Therefore, the analysis presented herein is informed by site-specific data collected for the *Soda Mountain Solar Project PPA/FEIS/EIR* (BLM 2015), and other published resources including but not limited to DWR's Bulletin 118 reports, San Bernardino County publications, and regional studies in the Mojave Desert with relevant groundwater information.

3.2 Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act (Porter-Cologne Act) (Division 7 of the California Water Code) provides the basis for water quality regulation within California and defines water quality objectives as the limits or levels of water constituents that are established for reasonable protection of beneficial uses. The California State Water Resources Control Board administers water rights, water pollution control, and water quality functions throughout the state, while each of the nine Regional Water Quality Control Boards (RWQCBs) conduct planning, permitting, and enforcement activities. The proposed project is located within the jurisdiction of the Lahontan RWQCB (Region 6) and is subject to the management direction of the *Water Quality Control Plan for the Lahontan Region* (Basin Plan).

The Basin Plan outlines water quality objectives for beneficial uses, and forms the regulatory references for meeting state and federal requirements for water quality control. Changes in water quality are allowed if the change is consistent with the maximum beneficial use of the state and does not unreasonably affect the present or anticipated beneficial uses. Beneficial water uses include consumptive uses, or those normally associated with human activities (primarily municipal, industrial, and irrigation uses), and non-consumptive uses, or those that do not significantly deplete water supply (such as swimming, boating, waterskiing, fishing, and hydropower generation).

The proposed project site is located in the Soda Lake Hydrologic Subarea. Beneficial uses in this area include: municipal and domestic supply (MUN); agricultural supply (AGR); groundwater recharge (GWR); water contact recreation (REC-1); non-contact water recreation (REC-2); cold freshwater habitat (COLD); wildlife habitat (WILD); and water quality enhancement (WQE) (Lahontan RWQCB 2017). Water quality standards and objectives in the vicinity of the project site are designed to support the beneficial uses for respective waters.

3.3 Desert Groundwater Management Ordinance

The County adopted the Desert Groundwater Management Ordinance (DGMO) in 2002 with Ordinance No. 3872, to help protect non-adjudicated portions of the Mojave Desert while not precluding the use of groundwater in these areas. The DGMO applies to certain new groundwater wells, and requires a permit to locate, construct, operate, or maintain new wells within the unincorporated, non-adjudicated desert region of San Bernardino County. This permit is discretionary under the California Environmental Quality Act (CEQA) (Public Resources Code 21000 et seq.); therefore, CEQA compliance must be complete prior to permit issuance. Permit conditions may include requirements for groundwater management, monitoring, and mitigation for potentially adverse effects associated with the construction, operation, or maintenance of the new well.

The DGMO applies to new wells proposed within San Bernardino County but outside the jurisdictional boundaries of the Mojave Water Agency and Public Water Districts of the Morongo Basin, as well as new wells proposed in unincorporated desert areas of San Bernardino County (generally including areas west of the Colorado River, north of the San Bernardino-Riverside County line, south of the San Bernardino-Inyo County line, and east of Fort Irwin Military Reservation, the Mojave Water Agency, the Marine Air Ground Task Force Command Center, Twentynine Palms Water District, and the City of Twentynine Palms) (San Bernardino County 2022). The DGMO does not apply to groundwater wells located on federal lands within San Bernardino County, "unless otherwise specified by interagency agreement." The BLM and San Bernardino County have a memorandum of understanding (MOU) under which the BLM requires conformance with the DGMO for all projects proposing to use groundwater from beneath public lands in San Bernardino County.

New groundwater wells proposed in the Soda LVGB and the Silver LVGB are subject to the DGMO due the location of these basins being within the unadjudicated desert region of San Bernardino County and the Mojave Desert. Use of the existing Silver LVGB supply well assessed in the *Silver LVGB Water Supply Report* (SMS 2025) would not be subject to the DGMO because the DGMO applies to new wells. However, there is no existing groundwater well on the proposed project site; if a new groundwater well is installed in the Soda LVGB (or the Silver LVGB), it would be subject to the DGMO, and CEQA review of potential impacts associated with the construction, operation, and maintenance of the proposed well(s) would need to be complete prior to issuance of a DGMO permit (by San Bernardino County).

3.4 California Desert Conservation Area Plan

The California Desert Conservation Area (CDCA) Plan describes multiple-use classes applicable to water resources on the project site. Specifically, the CDCA Plan (BLM 1999) requires that areas designated Multiple-Use Class L be managed to provide for the protection and enhancement of surface and groundwater resources, except for instances of short-term degradation caused by water development projects. For areas designated Class M or I, the CDCA Plan requires management to minimize the degradation of water resources. For all areas, best management practices (BMPs) developed by the BLM shall be used to avoid degradation and to comply with Executive Order 12088, which requires all federal agencies be in compliance with environmental laws and fully cooperate with the Environmental Protection Agency (EPA) and with state, interstate, and local agencies to prevent, control, and abate environmental pollution (SMS 2025b). BLM has approved a CDCA Plan Amendment to identify the project site as suitable for solar energy development (BLM 2016).

3.5 California Energy Commission Requirements

The CEC is the CEQA lead agency for the proposed project. The CEC's Information Requirements for an Application for Certification or Small Power Plant Exemption (California Code of Regulations, title 20, division 2, chapter 5, appendix B; "CEC Application Information Requirements") requires analysis of specific issues related to groundwater resources. The CEC Application Information Requirements were addressed in the *Silver LVGB Water Supply Report* (SMS 2025) for the proposed project's potential use of water from an existing water supply well in the Silver LVGB identified by WCR Number 2020-016662. This *Soda LVGB Water Supply Report* presents new or revised information where necessary to address CEC Application Information Requirements for the potential on-site groundwater wells in the Soda LVGB assessed herein.

Table 1, below, provides an overview of CEC Application Information requirements and how they are addressed herein.

Table 1 CEC Application Information Requirements

CEC Appendix B Requirements	Proposed Project
A detailed description of the hydrologic setting of the project, including groundwater bodies, surface water bodies, surface inundations zones, and any groundwater wells within 0.5 mile of the proposed project and its water supply well.	See Section 4, *Groundwater Basin and Climate* for discussion of the Soda Mountain Subbasin of the Soda Lake Valley Groundwater Basin (Soda LVGB) and hydrologic setting. Figure 3 shows that no groundwater wells are located within 0.5 mile of the proposed project site.
A detailed description of the water to be used and discharged by the project, including:	

CEC Appendix B Requirements	Proposed Project
▪ The source(s) of the primary and back-up water supplies and the rationale for their selection;	The water supply source assessed herein is the Soda LVGB; this source was selected for the proposed project due to location of the groundwater basin underlying the project site, and ability of the basin to support the proposed project as assessed herein. An alternative or additional water supply source is the Silver Lake Valley Groundwater Basin (Silver LVGB), which is assessed in the *Silver LVGB Water Supply Report* (SMS 2025).
▪ The expected physical and chemical characteristics of the source and discharge water(s) including identification of both organic and inorganic constituents before and after any project-related treatment;	Physical and chemical characteristics of the Soda Mountain Subbasin of the Soda LVGB are presented in Section 4, *Groundwater Basin and Climate*. The project does not include any discharge waters.
▪ An average and maximum daily and annual water demand and wastewater discharge for the construction, operation, and decommissioning phases of the project;	Average and maximum water demands are presented in Section 5, *Project Water Demand*. The project does not include any wastewater discharge.
▪ A detailed description of all facilities to be used in water conveyance (from primary source to the power plant site), water treatment, and wastewater discharge;	Water facilities may include up to five new supply wells installed on the project site in the Soda LVGB. Storage tanks would be used to store water on-site for use as needed. Water would be distributed throughout the site as needed using water trucks. See Section 2.2, *Project Description*. No water quality treatment is needed. No wastewater discharge would occur.
▪ For all water supplies intended for industrial uses to be provided from public or private water purveyors, a letter of intent or will-serve letter indicating that the purveyor is willing to serve the project, has adequate supplies available for the life of the project, and any conditions or restrictions under which water will be provided;	Any water supply wells located on the project site in the Soda LVGB would be owned by the project applicant.
▪ Water mass balance and heat balance diagrams for both average and maximum flows that include all process and/or ancillary water supplies and wastewater streams. Highlight any water conservation measures on the diagram and the amount that they reduce water demand.	The project would use groundwater without any significant thermal energy transformation. See Section 2.2, *Project Description*, under "Water Mass and Heat Balance."
▪ For all water supplied which necessitates transfers and/or exchanges at any point, to identify all parties and contracts/agreements involved, including the primary source for the transfer and/or exchange water (e.g., surface water, groundwater), the status of all appropriate agencies' approvals for the proposed use, environmental impact analysis on the specific transfers and/or exchanges required to obtain the proposed supplies, a copy of any agency regulations that govern the use of the water, and an explanation of how the project complies with the agency regulation(s)	The project does not include any water supply that necessitates transfers and/or exchanges at any point.

CEC Appendix B Requirements	Proposed Project
An impact analysis of the proposed project on water resources and a discussion of conformance with water-related laws, ordinances, regulations, and standards and policy. This discussion shall include:	Analysis of potential impacts to water supply is provided in Section 6.1, *Water Availability*. Laws and regulations are assessed in Section 3, and conclusions are presented in Section 7, *Conclusions*.
▪ The effects of project demand on the water supply and other users of this source, including, but not limited to, water availability for other uses during construction or after the power plant begins operation, consistency of the water use with applicable RWQCB basin plans or other applicable resource management plans, and any changes in the physical or chemical conditions of existing water supplies as a result of water use by the power plant;	Section 3.2, *Porter-Cologne Water Quality Control Act*, states that the project is within the Lahontan RWQCB and subject to the Lahontan Basin Plan. Section 4.3, *Soda Mountain Subbasin*, presents information regarding inflow and outflow for the Soda Mountain Subbasin. Section 7, *Conclusions*, describes that the project would not result in impacts to groundwater supply; other users would not be affected.
▪ If the project will pump groundwater, an estimation of aquifer drawdown based on a computer modeling study shall be conducted by a professional geologist and include the estimated drawdown on neighboring wells within 0.5 mile of the proposed well(s), any effects on the migration of groundwater contaminants, and the likelihood of any changes in existing physical or chemical conditions of groundwater resources shall be provided.	Groundwater drawdown is discussed in Section 6.1, *Water Availability*. Figure 3, *Existing Groundwater Wells,* shows that no wells are located within 0.5 mile of the project site, where the new supply well would be located. Section 7 presents conclusions. The project would not result in changes to existing physical or chemical conditions in the Soda Mountain Subbasin of the Soda LVGB.

4 Groundwater Basin and Climate

From its headwaters in the San Bernardino Mountains, the Mojave River travels north and east to generally end its surface flow at Soda Lake south of the town of Baker. Most of the Mojave River is characterized by a dry riverbed that only on occasion reveals surface flow forced upward by less permeable underlying rock formations. Soda Lake and Silver Lake are desert basins with no outlet that periodically fill with water after a storm event to form temporary lakes. The project site is located in the Soda Lake watershed, which is composed of both gently sloping valleys surrounded by steeper mountainous areas (BLM 2015). Water draining from the surrounding mountains during rain events is conveyed through the project area through a series of unnamed braided desert washes.

4.1 Climate

Annual average precipitation within the surface area of the 595-square-mile Soda LVGB ranges between approximately three and five inches (DWR 2004a). The project vicinity has a warm, dry desert climate, with extremely hot, dry summers and temperate winters. Climatic records for Barstow Daggett AP Fire Station (Cooperative Observer Program Station No. 042257) indicate that the project site has an average annual maximum temperature of 81.6 degrees Fahrenheit (°F) and an average annual minimum temperature of 53.4°F (SMS 2025). Average annual rainfall is 3.83 inches, most of which occurs between December and February, whereas the average annual total snowfall, which largely occurs during December and January, is 0.8 inch (WRCC 2025).

4.2 Soda Lake Valley Groundwater Basin

The project site overlies the Soda Mountain Subbasin of the Soda LVGB. The Soda LVGB extends for approximately 594 square miles (381,000 acres) in San Bernardino County, with a surface elevation ranging from approximately 923 feet above mean sea level (amsl) in the lower portions of the basin floor to approximately 5,000 feet amsl in the upper portions of the eastern-mountain basin boundary. The Soda LVGB is bounded by low permeability nonwatery-bearing rocks of the Marl and Kelso Mountains to the east, the Bristol and Cady Mountains to the south, and the Soda and Cave mountains along the western boundary of the basin (DWR 2004a). Quaternary alluvium is the primary water bearing material, existing primarily at or around the basin valley. Quaternary alluvium in the basin consists of unconsolidated younger alluvium underlain by older, poorly consolidated alluvial material (DWR 2004a).

Recharge to the Soda LVGB occurs primarily from discharge to the local alluvial aquifer from the Mojave River, percolation through alluvial fan deposits along the basin margins, and to a lesser extent, subsurface inflows from Cave Canyon, Kelso, and the Broadway Valley groundwater basins (DWR 2004a). Key surface features within this groundwater basin include Soda Lake, a dry lakebed or “playa lake” located east of the project site, approximately in the west-central portion of the groundwater basin, which contains water only in direct response to large storm events resulting in substantial flows in the Mojave River. Soda Lake is a remnant of the ancient Mojave Dry Lake, and experiences temporary flooding roughly once every 10 years (USGS 2009). Groundwater typically follows the natural topography of the area and flows toward Soda Lake where it eventually discharges north into the Silver LVGB (DWR 2004a).

As discussed above in Section 3.1, *Sustainable Groundwater Management Act*, Soda LVGB has been designated by the DWR as Very Low Priority based upon total groundwater use within the basin being less than 2,000 AFY and "no documented impacts" based upon the 2019 Basin Prioritization Project, subcomponent 8(c) (DWR 2025). Basins identified as Very Low Priority are not required to be managed by a GSA(s) through implementation of a GSP(s). Therefore, the extent of available data for groundwater in the project area is generally limited. For the purposes of this Water Supply Report, analysis is presented on the basis of available published data and technical studies contained within the *Soda Mountain Solar Project PPA/FEIS/EIR* (BLM 2015).

4.3 Soda Mountain Subbasin

The Soda Mountain Subbasin is located in the northwestern portion of the Soda LVGB. The Soda Mountain Subbasin area is outlined in blue in Figure 4; note that the project area (shown in red) on this figure reflects a prior proposed footprint (including a solar array northwest of I-15 that is no longer part of the project). The 51 square mile (32,946 acre) Subbasin is topographically higher than most of the Soda LVGB and is generally separated from the rest of Soda LVGB by mountains to the south and east (BLM 2015). Geologic mapping indicates that the alluvium in the subbasin is surrounded by volcanic and granitic geologic units with the presence of some fault bounded carbonate units. The direction of groundwater flow within the Subbasin is expected to generally mimic the slope of the surface topography. Alluvial groundwater likely flows from the Subbasin to the remainder of Soda LVGB through a bedrock gap in the Soda Mountains to the east toward Soda Lake and a bedrock gap to the southeast toward Mojave Wash (Panorama 2013).

Geologic and geophysical logs were developed and evaluated as part of a groundwater well test completed for the project in accordance with Applicant Proposed Measure (APM) 14 and APM 15 in the *Soda Mountain Solar Project PPA/FEIS/EIR* (BLM 2015). The alluvium within the Subbasin covers an area of approximately 19 square miles (12,632 acres) across the lower elevations of the valley. The upper 200 feet of sediment was observed to dominantly consist of alluvium composed of fine- to coarse-grained sands and gravels. A clay layer was encountered, followed by fine- to medium-grained clayey sands, which transition to fine- to coarse-grained, well-graded sands. Weathered bedrock was logged below the sand aquifer with the character of medium to coarse granitic sands, variably consolidated depending on the degree of weathering. The remaining 32 square miles (20,314 acres) within the Subbasin consist of the mountains surrounding the valley (BLM 2015).

4.3.1 Inflow/Outflow

Recharge for the Subbasin primarily occurs as runoff from the surrounding mountains onto alluvial fan deposits of the surrounding valleys. Mountain-front recharge was estimated using precipitation data from the PRISM Climate Group. The mountainous portion of the Subbasin receives approximately 4.855 inches (0.405 foot) of rain annually (based on a weighted average over the elevation ranges represented), which equates to 8,219 AFY of precipitation. Using a recharge rate of 7.8 percent, mountain-front recharge was estimated at 641 AFY (Panorama 2013). BLM staff suggested recharge rates ranging from 3 percent to 10 percent of precipitation (0.12 to 0.4 inches recharge per year) should be used in the revised groundwater model based on their experience elsewhere in arid and semi-arid regions of southern California (Panorama 2013). The low-end (3 percent) and high-end (10 percent) recharge rates used in the groundwater model provide a total input of 376 to 1,330 AFY of recharge (corresponding to 0.12 to 0.4 inches of recharge per year) (Panorama 2013).

The Subbasin is geographically and topographically isolated and does not receive much, if any, inflow from adjacent groundwater basins. Consequently, other sources of inflow to the basin were not included in estimates of groundwater availability or recharge (Panorama 2013).

Groundwater outflow from the eastern outlet of the Soda Mountain Valley is estimated in the groundwater model for existing (steady-state) conditions to be 121 AFY with low-end recharge and 425 AFY with high-end recharge (TRC Solutions 2013).

4.3.2 Groundwater Levels

Groundwater levels within the Subbasin are higher than those measured by the U.S. Geological Survey (USGS) in other portions of Soda LVGB (BLM 2015). As part of the groundwater well test completed under APM 14 and APM 15, a test well (PW-1) and observation well (OW-1) were constructed approximately 187 feet apart on the south side of Blue Bell Mine Road. The well test results determined that groundwater elevation (measured static depth to water) in the project area is approximately 1,009 amsl (or 428 to 435 feet below ground surface (bgs) as measured in wells PW-1 and OW-1 respectively). Groundwater levels outside the Subbasin measured by the USGS at wells located near the eastern end of Rasor Road lower in Soda LVGB range from 945 feet to 958 feet amsl. The groundwater levels at PW-1 and OW-1 are approximately 80 to 90 feet above the elevation of groundwater along the west shore of Soda Lake (BLM 2015).

4.3.3 Subbasin Storage

Based on the groundwater well test, the thickness of the saturated alluvium was estimated at approximately 125 feet based on the observed geology (including a portion of the underlying weathered bedrock) and Subbasin storage was estimated to be approximately 375,000 AF (BLM 2015).

4.3.4 Safe Yield

The only existing producer in the Subbasin is the groundwater well installed at the Rasor Road Service Station near the southwest corner of the project site (shown on Figure 3 above). There are no planned future uses of groundwater within the Subbasin other than the Project (BLM 2015).

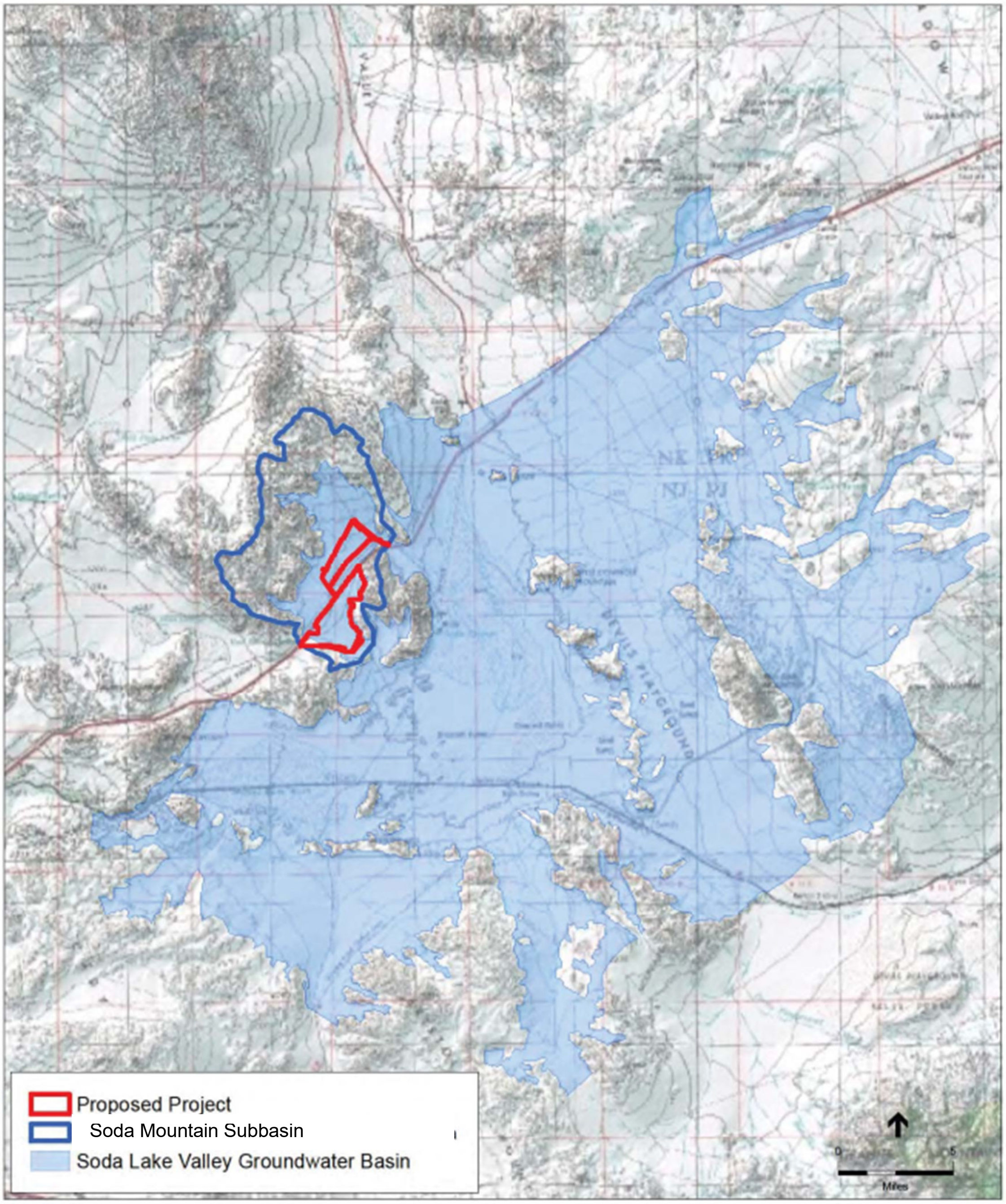
The well at the Rasor Road Service Station is a 760-foot-deep water supply well screened in bedrock that is hydrologically separated from the saturated alluvium in the valley (Panorama 2013). Reports of yields from this well range from just 1,500 gallons per day (gpd) (1.7 AFY) to 10 to 12 gpm (16 to 19 AFY) (BLM 2015). Groundwater use at the Rasor Road Service Station is expected to remain constant due to the limited well productivity.

Using the high end of potential Rasor Road Service Station use and the low end of the estimated recharge rate to be conservative, the safe yield of the Soda Mountain Subbasin is calculated as follows (adapted from Panorama 2013):

Recharge – Rasor Road Service Station Pumping = Safe Yield

376 AFY – 19 AFY = 357 AFY

Figure 4 Soda Mountain Subbasin, Soda Lake Valley Groundwater Basin[1]



[1] The Soda Mountain Subbasin area is outlined in blue in Figure 4; note that the project area (shown in red) on this figure reflects a prior proposed footprint (including a solar array northwest of I-15 that is no longer part of the project).

4.4 Groundwater Quality

Groundwater quality in the Soda LVGB is typically characterized by elevated levels of sodium chloride or sodium bicarbonate (salts), particularly near Soda Lake, with elevated sulfate levels in the eastern portion of the basin. DWR has rated groundwater quality in this basin as "marginal to inferior for both domestic and irrigation purposes," based on elevated concentrations of fluoride, boron, and TDS (DWR 2004a).

Limited groundwater quality data is available for the Soda Mountain Subbasin due to the absence of wells in the valley. There are no known hazardous materials sites in the Subbasin. Water quality at the Rasor Road Service Station well, which is screened in bedrock and hydrogeologically separated from the saturated alluvium of the valley, has TDS concentrations of approximately 3,000 mg/L and requires use of a reverse osmosis system to produce potable water (BLM 2015). In September 2010, a geophysical survey collected subsurface resistivity data that were used to estimate water quality. Based on the study, TDS values for groundwater at the project site were anticipated to be in the range of 800 to 1,200 parts per million (BLM 2015).

4.4.1 Current Water Quality

Groundwater quality samples were collected and evaluated as part of a groundwater well test completed for the project in accordance with APM 16 in the *Soda Mountain Solar Project PPA/FEIS/EIR* (BLM 2015). Given the lack of development in the project area (the Rasor Road Service Station is the only developed parcel in the vicinity), this analysis assumes that groundwater quality remains stable due to the lack of contaminant sources and low human activity which means natural filtration processes stay intact. Groundwater samples were collected for water quality analysis from both the production (PW-1) and observation (OW-1) wells. Samples were collected during well development, at the end of an aquifer step-drawdown test, and approximately every 24 hours during pumping conducted as part of a constant-rate well test (BLM 2015). Select analytical results for general chemistry are presented in Table 2, along with their federal Maximum Contaminant Levels (MCLs) and Secondary Maximum Contaminant Levels (SMCLs).

Table 2 Water Quality Results – Soda Mountain Subbasin

Detected Analyte	OW-1 9/17/14	PW-1 10/5/14	PW-1 10/7/14	PW-1 10/8/14	PW-1 10/9/14	Unit	Title 22 MCL[1] or SMCL[2]	MCL / SMCL Exceeded?
Field Measurements								
pH	8.14	8.61	8.38	8.37	8.36	mg/L	6.5 to 8.5	Yes
Temperature	33.08	33.11	31.73	32.63	32.88	mg/L	N/A	N/A
Laboratory Analysis								
TDS	1140	1260	1250	1250	1250	mg/L	500	Yes
Total Nitrate/Nitrite (as N)	2.6	2.0	2.2	1.9	2.0	mg/L	10,000	No
Carbonate/Bicarbonate	83.6	60.4	50.7	59.3	55.4	mg/L	N/A	N/A
Sulfate	369	446	446	429	429	mg/L	250	Yes
Chloride	292	241	243	236	239	mg/L	250	Yes
Calcium	34.7	46.5	40.3	39.7	39.8	mg/L	N/A	N/A
Magnesium	6.69	6.22	<5	<5	<5	mg/L	N/A	N/A
Sodium	346	347	359	358	346	mg/L	N/A	N/A

MCL = Maximum Contaminant Level; SMCL = Secondary Maximum Contaminant Level; mg/L = milligrams per liter

1 Maximum Contaminant Level (MCLs) from Code of Federal Regulations, Title 40, Chapter I, Part 141, National Primary Drinking Water Regulations.

2 Secondary Maximum Contaminant Level (SMCLs) from Code of Federal Regulations, Title 40, Chapter I, Part 143, National Secondary Drinking Water Regulations.

SOURCE: BLM 2015

The water quality results presented above show that pH, TDS, sulfate, and chloride concentrations in Subbasin groundwater exceeded primary or secondary MCLs established by the California EPA or the USEPA. Title 22 water quality standards are designed to protect drinking water quality, which means that use of underlying groundwater without treatment would be limited to non-potable uses associated with project construction, operation and maintenance, and decommissioning. Water quality at the proposed project site is sufficient to meet the non-potable water needs of the project. Potable water is assumed to be supplied by the groundwater well(s) and treated as necessary for potable use via a Point-of-Use treatment system. The 1996 Amendments to the Safe Drinking Water Act (Section 1412(b)(4)(E)(ii)) allows systems to install Point-of-Use treatment devices to achieve compliance with some of the federal MCLs established in the National Primary Drinking Water Regulations.

5 Project Water Demand

Table , below, presents an overview of water demands associated with each project phase, including construction, operation and maintenance, and decommissioning. The construction and decommissioning phases are assumed to span 18 months each, with a total project lifespan of 40 years. Groundwater would be needed in all three phases of the project, along with limited potable supply for personnel use.

Implementation of MM BIO-3, as described in the project’s CEC application materials, seeks to minimize construction impacts by reducing grading under the solar field, which in turn reduces the dust control water requirements. Implementation of MM BIO-3 is estimated to result in 289 acres of total permanent impacts and 1,770 acres of total temporary impacts. This report presents pre-mitigation groundwater demands, followed by water demands with implementation of MM BIO-3.

During the construction phase, the project’s groundwater demand is estimated to be a maximum of 319 AF for a period of 18 months (with daily usage within the construction period varying depending on construction phase). Operational water demand for the 40-year lifespan of the project would be approximately 5.6 AFY (224 AF total) and would begin following construction. During the decommissioning process, it is assumed that water demand would be the same as construction. Total groundwater demand for the project would be up to 862 AF across all project phases.

Potable demand for personnel use would be greater during the construction and decommissioning phases when more employees are onsite (a maximum of 16.8 AF over 18 months). Long-term potable demands are estimated at 1.5 AFY (1,339 gallons per day for 365 days) or 60 AF over 40 years. Total potable water demand for the project would be up to 94 AF across all project phases. Potable water is assumed to be supplied by the groundwater well(s) and treated as necessary for potable use via a Point-of-Use (located at sink or shower) treatment system. Point-of-use treatment devices are considered a reliable and cost-effective way to address contaminants for small drinking water systems and private wells.

Table 4, below, presents an overview of water demands associated with each project phase following implementation of MM BIO-3, including construction, operation and maintenance, and decommissioning. The original demand forecast estimated that groundwater would be used for dust control over approximately 2,670 acres of temporary disturbance during construction and decommissioning. With implementation of MM BIO-3, the area of temporary disturbance is reduced to approximately 1,770 acres, and water demands for dust control have been reduced proportionally (i.e, water use at 66% of prior estimate).

With implementation of MM-3, the project’s groundwater demand during the construction phase is estimated to be a maximum of 223 AF for a period of 18 months (with daily usage within the construction period varying depending on construction phase). Operational water demand for the 40-year lifespan of the project would be approximately 5.6 AFY (224 AF total) and would begin following construction. During the decommissioning process, it is assumed that water demand would be the same as construction. Total groundwater demand for the project with implementation of MM-3 would be up to 670 AF across all project phases.

Implementation of MM-3 would not change the potable water demand for personnel use. Potable water is assumed to be supplied by the groundwater well(s) and treated as necessary for potable use via a Point-of-Use treatment system.

Table 3 Proposed Project Water Demands

Project Phase/Feature	Gallons/year	Avg GPD[1]	Acre-feet/year	Total AF
Non-Potable Water				
Construction (18 months)				
Dust Control	62,042,104	169,978	190.4	285.6
Initial System Demand	7,299,071	19,997	22.4	33.6
Total Construction	*69,341,175 gal/yr*	*189,976 GPD*	*212.8 AFY*	*319.2 AF*
Operation and Maintenance (40 years)				
System Wash Water (panel washing)[1]	912,384	14,482	2.80	112.00
Process Water (solar collector)	91,238	250	0.28	11.20
Facilities (non-potable)	456,192	1,250	1.40	56.00
Irrigation[2]	182,477	500	0.56	22.40
Fire Suppression[2]	182,477	500	0.56	22.40
Total Operations	*1,824,768 gal/yr*	*16,982 GPD*	*5.6 AFY*	*224.0 AF*
Decommissioning (1.5 years)				
Dust Control	62,042,104	169,978	190.4	285.6
Initial System Demand	7,299,071	19,997	22.4	33.6
Total Decommissioning	*69,341,175 gal/yr*	*189,976 GPD*	*212.8 AFY*	*319.2 AF*
Total Non-Potable Water Demand	**140,507,119 gal/yr**	**396,934 GPD**	**431.2 AFY**	**862.4 AF**
Potable Water				
Construction (18 months)				
Personnel	3,649,535	9,999	11.2	16.8
Operation and Maintenance (40 years)				
Personnel	488,735	1,339	1.5	60.0
Decommissioning (1.5 years)				
Personnel	3,649,535	9,999	11.2	16.8
Total Potable Water Demand	**7,787,806 gal/yr**	**21,336 GPD**	**23.9 AFY**	**93.6 AF**
Total Water Demand				**956 AF**

GPD = gallons per day; AF = acre-feet

1. For consistency with the operational water demands presented in this table, construction (and decommissioning) water demands are presented as an annual rate for 12 months (versus total demand for the 18-month duration of construction/decommissioning), which was calculated by dividing the total demand by 18 (months) and multiplying the result by 12 (months per year).
2. During project construction and decommissioning, the average daily use rate was calculated by dividing the annual water demand by 365 (days per year). During project operations, the maximum daily use rate for system wash water (panel washing) was calculated assuming three system wash events per year, each extending for up to three weeks, resulting in a total of 63 days per year when water demands for system washing would occur; the maximum daily use rate was calculated by dividing the total amount of wash water by 63 days, which covers nine weeks and captures all days during which system washing would occur. Average daily use rate for other operational water needs was calculated by dividing the respective water demand by 365 (days per year).
3. The *Silver LVGB Water Supply Report* (SMS 2025) identifies both 182,477 gallons and 182,459 gallons as the water demand for irrigation and fire suppression, respectively; for the purposes of this analysis, the higher amount of 182,477 gallons is used.

Source: Adjusted from SMS 2025 (to separate out potable water demands)

Table 4 Proposed Project Water Demands with MM BIO-3

Project Phase/Feature	Gallons/year	Avg GPD[2]	Acre-feet/year	Total AF
Non-Potable Water				
Construction (18 months)				
Dust Control	41,129,035	112,682	126.22	189.33
Initial System Demand	7,299,071	19,997	22.40	33.60
Total Construction	*48,428,107 gal/yr*	*132,680 GPD*	*148.6 AFY*	*222.9 AF*
Operation and Maintenance (40 years)				
System Wash Water (panel washing)[2]	912,384	14,482	2.80	112.00
Process Water (solar collector)	91,238	250	0.28	11.20
Facilities (non-potable)	456,192	1,250	1.40	56.00
Irrigation[3]	182,477	500	0.56	22.40
Fire Suppression[3]	182,477	500	0.56	22.40
Total Operations	*1,824,768 gal/yr*	*16,982 GPD*	*5.6 AFY*	*224.0 AF*
Decommissioning (1.5 years)				
Dust Control	42,407,056	116,184	130.14	195.21
Initial System Demand	7,299,071	19,997	22.40	33.60
Total Decommissioning	*48,428,107 gal/yr*	*132,680 GPD*	*148.6 AFY*	*222.9 AF*
Total Non-Potable Water Demand	**98,680,981 gal/yr**	**282,341 GPD**	**302.8 AFY**	**669.9 AF**
Potable Water				
Construction (18 months)				
Personnel	3,649,535	9,999	11.2	16.8
Operation and Maintenance (40 years)				
Personnel	488,735	1,339	1.5	60.0
Decommissioning (1.5 years)				
Personnel	3,649,535	9,999	11.2	16.8
Total Potable Water Demand	**7,787,806 gal/yr**	**21,336 GPD**	**23.9 AFY**	**93.6 AF**
Total Water Demand				**763 AF**

GPD = gallons per day; AF = acre-feet

1. Water for dust control was estimated by assuming the same reduction (66.31 percent) as the area of temporary ground disturbance, which reduced from 2,670 acres assessed in the *Silver Lake Valley Groundwater Basin (LVGB) Water Supply Report* (SMS 2025) to 1,770 acres assessed herein based on current project design. No other aspects of construction water demands changed due to the reduced temporary disturbance area.
2. For consistency with the operational water demands presented in this table, construction (and decommissioning) water demands are presented as an annual rate for 12 months (versus total demand for the 18-month duration of construction/decommissioning), which was calculated by dividing the total demand by 18 (months) and multiplying the result by 12 (months/year).
3. During project construction and decommissioning, the average daily use rate was calculated by dividing the annual water demand by 365 (days/year). During project operations, the maximum daily use rate for system wash water (panel washing) was calculated assuming three system wash events per year, each extending for up to three weeks, resulting in a total of 63 days per year when water demands for system washing would occur; the maximum daily use rate was calculated by dividing the total amount of wash water by 63 days, which covers nine weeks and captures all days during which system washing would occur. Average daily use rate for other operational water needs was calculated by dividing the respective water demand by 365 (days/year).
4. The *Silver LVGB Water Supply Report* (SMS 2025) identifies both 182,477 gallons and 182,459 gallons as the water demand for irrigation and fire suppression, respectively; for the purposes of this analysis, the higher amount of 182,477 gallons is used.

Source: Adjusted from SMS 2025 (to separate out potable demands and incorporate MM BIO-3)

5.1 Construction Water Demand

Construction of the proposed project would occur over approximately 18 months (1.5 years) and would require up to approximately 213 AFY or 319 AF total. With implementation of MM BIO-3 (which will reduce the amount of water needed for dust control), construction water demands would be 149 AFY or 223 AF total. The project's average daily water use rate during construction is estimated to be 132,680 GPD. During construction, water would be used primarily for dust control and soil compaction during grading activities. Daily water demand during construction would likely decrease following the initial period of intensive ground disturbance.

5.2 Operation and Maintenance Water Demand

Operational water use would primarily involve the periodic washing of photovoltaic modules, or "panel washing." It is assumed that panel washing would be conducted three times per year, depending on weather conditions and the rate of dust collection on the panels. Each panel-washing cycle would extend for up to three weeks. Water for panel washing would be conveyed throughout the project's solar arrays using a water truck, with panel washing conducted using a truck-mounted pressure washer. No additives, detergents, or water quality treatment would be required to prepare the local groundwater for use in panel washing.

The solar collector would also require approximately 0.27 AFY (91,238 gallons per year), and additional non-potable uses would account for an estimated 1.4 AFY (456,192 gallons per year) during operations. Limited landscape irrigation would be applied, requiring approximately 0.56 AFY (182,459 gallons per year). Fire suppression would also require approximately 0.56 AFY (182,459 gallons per year). During the project's 40-year operational phase, maximum daily water use rates would occur during the panel-washing cycles, which are assumed to extend for up to 63 days per year.

Water Mass and Heat Balance

Water mass balance diagrams are typically used to quantify and manage water input, output, and losses in systems where water is actively circulated, evaporated, or treated, such as in concentrated solar power plants with cooling systems. Similarly, heat balance diagrams are relevant in projects involving significant heat energy transfers, such as those using steam turbines to convert solar energy into electricity. Water usage for the proposed project involves standard construction and operational water use with the biggest driver of long-term water use going toward panel cleaning. The process uses groundwater without any significant thermal energy transformation; therefore, no water mass balance or heat balance diagrams are provided herein.

5.3 Decommissioning Water Demand

Upon completion of the functional operating life of the project, the facility would be decommissioned to remove project components and restore the site. For the purposes of this analysis of water supply, it is assumed that water demands during decommissioning would be comparable in duration and scale to water demands during construction (see Section 5.1, *Construction Water Demands*).

6 Impact Analysis

The proposed project may include the installation of up to five new on-site groundwater wells to produce water supply for the project from the Soda Mountain Subbasin of the Soda LVGB, as assessed herein. The project supply well(s) would represent a source of basin outflow in amounts equal to or less than the project's water demands, as detailed in Section 5, *Project Water Demand*. (As an alternative or additional water supply source, the project may obtain some or all of its water demand from an existing water supply well in the Silver Lake Valley Groundwater Basin identified by WCR Number 2020-016662, as analyzed in the *Silver LVGB Water Supply Report* (SMS 2025).) No other uses have been identified for the project's potential on-site water supply well(s); therefore, outflow associated with the project's potential on-site water supply well(s) would be equal to or less than the project's water demands.

6.1 Water Availability

Water availability for the Soda Mountain Subbasin of the Soda LVGB is assessed herein using the technical studies completed for the *Soda Mountain Solar Project PPA/FEIS/EIR* (BLM 2015). This approach involves considering the potential for project-related pumping to result in drawdown of groundwater levels in the groundwater basin. In addition, the amount of water that may be in storage in the Subbasin was calculated to understand project impacts. Conclusions regarding the data and analysis presented below are presented in Section 7, *Conclusions*.

6.1.1 Groundwater Levels

As reported in DWR's Bulletin 118 (2004) for the Soda LVGB, groundwater levels in the basin have been generally stable over the period of record, although declining levels have been observed in some wells. Groundwater level measurements near the town of Baker, in the northern portion of the basin, indicated drawdown (increased depth to groundwater) of one to two feet over the 30 years between 1954 and 1984 (DWR 2004a). This drawdown may have been caused by growth of the town itself following its establishment in 1929. Due to the small population overall, and the lack of other municipalities or developed areas near the project site, groundwater level trends in the project area are assumed to be uninfluenced by municipal uses.

The groundwater modeling simulations completed for an earlier version of the project show that there is adequate groundwater in the Soda Mountain Subbasin to support construction, operation, and maintenance of the project without adversely affecting nearby wells or sensitive water resources (BLM 2015). Groundwater pumping simulations conducted using both low-end and high-end recharge rates and corresponding low-end and high-end hydraulic conductivity values (as recommended by NPS and USGS) indicate a decline in the groundwater table of less than 1 foot to approximately 2 feet at the nearest bedrock interface east of the wells after 3 years of construction and over the operational period of the project (TRC Solutions 2013). Given the current understanding of the hydrogeology, as well as the current understanding of the one existing well in the Subbasin that may be affected by project-induced drawdown, it is unlikely that groundwater pumping for the project would cause any nearby wells to go dry or be severely impaired or rendered unusable by declining groundwater levels (BLM 2015). Moreover, model results indicate the outflow of groundwater from the Subbasin's northeast outlet would be reduced during construction and operation by 4.6 AFY or less due to groundwater use for the project (TRC Solutions 2013).

Groundwater outflow from the Soda Mountain Valley would return to pre-existing conditions after decommissioning of the project. Detailed results for each of the model scenarios are provided in the *Soda Mountain Solar Project Hydrogeological Conditions and Groundwater Modeling Report Addendum* (TRC Solutions 2013).

Estimated project demands for the project have been reduced since the groundwater modeling was completed in 2013 and 2014. The groundwater modeling simulations completed for an earlier version of the project assumed 576 AF for construction and 990 AFY for operations and maintenance (33 AFY over a 30-year operational period), or a total of 1,566 AF. This is substantially greater than the current project estimates of 862 AF (or 670 AF with implementation of MM BIO-3) for project construction, operations and maintenance, and decommissioning. As such, the findings associated with groundwater impacts are still valid.

6.1.2 Safe Yield

The proposed use of water for construction, operation, and maintenance of the project is within the safe yield of the Subbasin. As described in Section 4, *Groundwater Basin and Climate* above, the low-end (3 percent) and high-end (10 percent) recharge rates used in the groundwater model provide a total input of 376 to 1,330 AFY of recharge (corresponding to 0.12 to 0.4 inches of recharge per year) (TRC Solutions 2013). Using the high end of potential Rasor Road Service Station use and the low end of the estimated recharge rate to be conservative, the safe yield of the Soda Mountain Subbasin is calculated as 357 AFY. Estimated annual project groundwater demand of 213 AFY (or 149 AFY with implementation of MM BIO-3) for the 1.5 years of construction and decommissioning will remain within this safe yield. The projected operational pumping of 5.6 AFY falls well within the safe yield. Project water supply needs could be sustainably met through the proposed production wells.

6.1.3 Total Groundwater in Storage

Table 5, *Total Water in Storage*, below, presents the estimated amount of groundwater in storage in the Soda Mountain Subbasin of the Soda LVGB. Based on the groundwater well test completed for the project, the thickness of the saturated alluvium was estimated at approximately 125 feet based on the observed geology (including a portion of the underlying weathered bedrock) and Subbasin storage was estimated to be approximately 375,000 AF (BLM 2015). Anticipated groundwater use for the project is a small fraction of the groundwater in storage within the Subbasin.

Table 5 Total Water in Storage (AF)

Metric	Value
Total volume in storage	375,000 AF
Total groundwater demand over project lifecycle	862 AF (670 AF with MM BIO-3)
% project use of groundwater in storage	0.0023% (0.0018% with MM BIO-3)

The table above shows that the total amount of water estimated to be in storage in the Subbasin is approximately 375,000 AF. The project's maximum total water demand of 862 AF represents approximately 0.002 percent of the estimated total amount of groundwater available in storage in the Subbasin. This is considered negligible compared to the overall size of the Subbasin and the larger Soda LVGB. In addition, this estimate accounts for the project's entire water demand being removed at once; in reality, water would be removed as needed throughout the project's implementation phases, including 1.5 years of construction, 40 years of operation, and 1.5 years of decommissioning.

7 Conclusions

The project may source non-potable water from up to five new on-site wells producing groundwater from the Soda Mountain Subbasin of the Soda LVGB. This analysis assumes that during all project phases, potable water would be supplied by the groundwater well(s) and treated as necessary for potable use via a Point-of-Use treatment system.

Groundwater demands would total 862 AF (670 AF with implementation of MM BIO-3) over the life of the project. Groundwater modeling and well testing completed for an earlier version of the project determined that a decline in the groundwater table of less than 1 foot to approximately 2 feet at the nearest bedrock interface east of the wells after 3 years of construction and over the operational period of the project (TRC Solutions 2013). This modeling assumed higher construction water demands and over a longer timeframe than the current proposed project. Given the current understanding of the hydrogeology, as well as the current understanding of the one existing well in the Subbasin that may be affected by project-induced drawdown, it is unlikely that groundwater pumping for the project would cause any nearby wells to go dry or be severely impaired or rendered unusable by declining groundwater levels (BLM 2015).

The projected annual construction, operation and maintenance, and decommissioning pumping for the project (up to 213 AFY (or 149 AFY with implementation of MM BIO-3) during construction and decommissioning, and 5.6 AFY during operation) falls within the safe yield of the Soda Mountain Subbasin, which is calculated as 357 AFY. Project water supply needs could be sustainably met through the up to five potential on-site production wells.

Table 6, *Comparison of Project Water Demands to the Estimated Storage*, below, presents an overview of the project's annual water demands for each phase of implementation, with comparison of each to the Subbasin's estimated total storage volume of 375,000 AF. Anticipated groundwater use for the project is a small fraction of the groundwater in storage within the Subbasin.

Table 6 Comparison of Project Water Demands to the Estimated Storage in Subbasin

Project Phase / Feature	Duration	Annual Demand (AFY)	Percentage of Storage
Construction	1.5 years	213 (149 with MM BIO-3)	0.00057 (0.0004 with MM BIO-3)
Operation & Maintenance	40 years	5.60	0.00001
Decommissioning	1.5 years	213 (149 with MM BIO-3)	0.00057 (0.0004 with MM BIO-3)

AFY = acre-feet per year

The table above shows that during the project's most intensive water-use phases—construction and decommissioning—annual project water demands would represent approximately 0.00057 percent (0.0004 percent with implementation of MM BIO-3) of the total amount of water estimated to be in storage in the Soda Mountain Subbasin. Over the project's 40-year operational lifespan, annual water demands would represent approximately 0.002 percent of the total amount of water in storage in the Subbasin.

Based on modeled impacts to groundwater levels, calculated safe yield of the aquifer, and percentage used of total available storage, this assessment concludes that the Soda Mountain Subbasin of the Soda LVGB may be used to meet all water demands of the project without resulting in adverse impacts. Potential drawdown would be negligible and temporary; the Subbasin would recover from the initial drawdown of pumping activities during constant-state pumping, as well as following the cessation of project-related pumping. No groundwater quality treatment would be necessary for non-potable use. Potable water is assumed to be supplied by the groundwater well(s) and treated as necessary for potable use via a Point-of-Use treatment system.

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