Appendix A. Notice of Preparation and Comment Letters

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Notice of Preparation

County of San Bernardino

NOTICE OF PREPARATION OF A DRAFT EIR AND SCOPING MEETING

Date: August 23, 2022

To: Responsible Agencies and Interested Parties

Subject: Notice of Preparation of a Draft Environmental Impact Report and Scoping Meeting

Pursuant to the California Environmental Quality Act (CEQA), the County of San Bernardino (County) must conduct a review of the environmental impacts of the proposed Sienna Solar and Storage Project (Project). Implementation of the Project will require discretionary approvals from state and local agencies, and therefore, the Project is subject to the environmental review requirements of CEQA. As the lead agency under CEQA, and due to the involvement of potentially significant impacts to the environment, the County is therefore issuing this Notice of Preparation (NOP) of an Environmental Impact Report (EIR) for the Project.

Project Title: Sienna Solar and Storage Project

Project Applicant: 99MT 8ME, LLC

Assessor's Parcel Number(s): 0452-071-10, 11, 19, 20 and 25; 0452-062-21, 22, 23 and 24; 0452-112-17, 18, 19, 20, 24, and 25; 0452-113-17; 0452-121-12, 38, 39, 42, 48, and 52; 0452-361-46 and 47; 0452-371-01, and; 0452-391-08 and 09.

Project Description

99MT 8ME, LLC (Applicant) plans to construct and operate the Sienna Solar and Storage Project (Project), a utility scale, solar photovoltaic (PV) electricity generation facility that would produce up to 525 megawatts (MW) of solar power and include up to 525 MW of energy storage capacity rate in a battery energy storage system (BESS) within an approximately 1,854-acre Project site. The Project will be processed under one Conditional Use Permit (CUP). The Project consists of the installation of a PV solar facility, BESS, Project substation, operations and maintenance building(s), underground collection system, 230 kV gen-tie line (on- and off-site), and other ancillary facilities. The Project will interconnect at the Southern California Edison (SCE) Calcite Substation (currently pending final permits and construction) via a proposed overhead and/or underground 230-kV gen-tie line in addition to other ancillary facilities utilizing private and potentially public rights-of-way (ROW). The proposed Calcite Substation is located northwest of the Project area, within a 77-acre parcel (Assessor Parcel Number 0453-041-07) that occupies land both east and west of State Route (SR) 247 (Barstow Road). Approximately 39 miles of collector lines and gen-tie alternatives will be analyzed in the EIR, although not all routes will be developed.

Project Objectives

The following are the Project objectives:

- Use proven and established PV and energy storage technology that is efficient and requires low maintenance

- Assist California in meeting greenhouse gas emission reduction goals by 2030 as required by the California Global Warming Solutions Act (Assembly Bill 32), as amended by Senate Bill 32
- Support California's Renewables Portfolio Standard (RPS) Program consistent with the timeline established by Senate Bill 100, which requires that by December 31, 2030, 60 percent of all electricity sold in the State shall be generated from renewable energy sources
- To provide energy to the electric grid to meet increasing demand for in-state generation
- Interconnect directly to the SCE electrical transmission system
- Promote the County's role as the State's leading producer of renewable energy
- Utilize a location that is in close proximity to an existing SCE substation and powerlines

Project Site

The proposed Project is located on approximately 1,854-acres in the southwestern portion of the Mojave Desert and includes the Lucerne Dry Lake, in unincorporated San Bernardino County, California. The Project is predominately located east of SR 247 (Barstow Road), north of the unincorporated community of Lucerne Valley, with portions of the gen-tie alternative corridors that include possible connections along Haynes Road, Huff Road, and Northside Road to the east of Barstow Road. The site is generally located approximately 35 miles south of Barstow, 45 miles northwest of the town of Yucca Valley, 15 miles southeast of the town of Apple Valley, and 20 miles north of the City of Big Bear Lake.

Project Overview and Design

The Project involves the construction and operation of a utility scale, solar PV electricity generation facility that would produce up to 525 MW of solar power with an integrated 525 MW BESS. The Project would be fenced to prevent access by the public. Gates would be installed at the roads entering the Project site. Limiting access to the Project site would be necessary both to ensure the safety of the public and to protect the equipment from potential theft and vandalism. The Project consists of the following components:

Photovoltaic Panels/Solar Arrays**.** The proposed Project will use PV panels or modules (including but not limited to bi-facial or concentrated PV technology) on mounting frameworks to convert sunlight directly into electricity. Individual panels will be installed on either fixed-tilt or tracker mount systems (single- or dual-axis, using galvanized steel or aluminum). If the panels are configured for fixed tilt, they will be oriented toward the south. For tracking configurations, the panels will rotate to follow the sun over the course of the day. The solar panels will be consistent with panel dimensions that are widely used in commercial solar installations in California and will conform to County building code requirements.

Battery Energy Storage System**.** The Project may include one or more BESS', located at or near a substation/switchyard (onsite or shared) and/or at the inverter stations, or elsewhere onsite. Such large-scale BESSs would be up to 525 megawatt alternating current (MWac) in capacity and up to 45 acres in total area. BESS' consist of modular and scalable battery packs and battery control systems that conform to U.S. national safety standards. The BESS modules, which could include commercially available lithium, flow, or other batteries, typically consist of standard containers housed in pad- or post-mounted, stackable metal structures, but may also be housed in a dedicated building(s), in compliance with applicable regulations. The maximum height of a dedicated structure is not expected to exceed 45 feet. The actual dimensions and number of

energy storage modules and structures vary depending on the application, supplier, and configuration chosen, as well as on offtaker/power purchase agreement requirements and on County building standards. The Project may share a BESS with one or more nearby or future solar projects or may operate one or more standalone BESS facilities within the Project site.

Inverters**.** Direct current energy would be delivered from the panels via cable to inverter stations, generally located near the center of each block. Inverter stations convert the DC energy to AC energy which can be dispatched to the transmission system. Inverter stations are typically comprised of one or more inverter modules with a rated power of up to approximately 5-MW each, a unit transformer, and voltage switch gear. The unit transformer and voltage switch gear are housed in steel enclosures, while the inverter module(s) are housed in cabinets. Depending on the model ultimately selected, the inverter station may lie within an enclosed or canopied metal structure, typically on a skid or concrete mounted pad. The final location(s) of each component would be determined before the issuance of building permits.

Substations**.** Output from inverter stations would be transferred via electrical conduits and electrical conductor wires to one or more Project substations or switchyards (collectively referred to as "substations" herein), and then onward via "gen-tie line(s)." The Project would have its own dedicated substation equipment located within the Project area. Dedicated equipment may incorporate several components, including auxiliary power transformers, distribution cabinets, revenue metering systems, a microwave transmission tower, and voltage switch gear. Each substation would occupy an area of up to approximately five (5) acres, secured separately by a chain-link fence. The final location(s) of each component would be determined before the issuance of building permits.

Substations typically include a small control building (roughly 500 square feet) standing approximately 10 feet in height. The building is typically either prefabricated concrete or steel housing with rooms for the voltage switch gear and the metering equipment, a room for the station supply transformer, and a separate control technology room in which the main computer, the intrusion detection system, and the main distribution equipment are housed.

Gen-Tie Line. The Project will interconnect at the SCE Calcite Substation (currently pending final permits and construction) via a proposed overhead and/or underground 230-kV gen-tie line in addition to other ancillary facilities utilizing private and potentially public rights-of-way. The proposed Calcite Substation is located northwest of the Project area, within a 77-acre parcel (Assessor Parcel Number 045-304-107) that occupies land both east and west of SR 247 (Barstow Road). The substation would be designed, constructed, owned, operated, and maintained by SCE and subject to California Public Utilities Commission (CPUC) regulations. Approximately 39 miles of collector lines and gen-tie alternatives will be analyzed in the EIR, although not all routes will be developed.

Operations and Maintenance Building. The Project may include an operations and maintenance (O&M) building, typically 40 feet x 80 feet in size, with designated parking. If constructed, the O&M building would likely be steel framed, with metal siding and roof panels. An O&M building may include the following: office, repair building/parts storage, control room, restroom, and septic tank and leach field.

Site Security and Fencing. The Project area would be enclosed within a chain link fence measuring up to eight feet in height from finished grade. An intrusion alarm system comprised of sensor cables integrated into the perimeter fence, intrusion detection cabinets placed approximately every 1,500 feet along the perimeter fence, and an intrusions control unit, located

either in the substation control room or at the O&M building, or similar technology, may be installed. Additionally, the Project may include additional security measures including, but not limited to, warning reflective signage, controlled access points, security camera systems, and security guard vehicle patrols to deter trespassing and/or unauthorized activities that could interfere with operation of the Project.

Controlled access gates would be maintained at the main entrances to the Project Site. Project area access would be provided to offsite emergency response teams that respond in the event of an after-hours emergency. Enclosure gates would be manually operated with a code or key provided in an identified key box location.

Construction

The construction period for the Project is anticipated to occur over 12 to 24 months, utilizing an estimated (up to) 500 workers per day (during peak construction periods). Heavy construction is expected to occur between 6:00 AM and 5:00 PM, Monday through Saturday. Additional hours may be necessary to make up schedule deficiencies or to complete critical construction activities. Some activities may continue 24 hours per day, seven days per week. Any construction work performed outside of the normal work schedule would be coordinated with the appropriate agencies and would conform to the County Noise Ordinance.

Operations

Once constructed, maintenance of the solar facility would generally be limited to the following: Cleaning of PV panels, monitoring electricity generation, providing site security, facility maintenance - replacing or repairing inverters, wiring, electrical components, and PV modules. It is expected that the Project would require an operational staff of up to 15 full-time employees. The solar farm would operate seven days a week, 24 hours a day. Maintenance activities may occur seven days a week, 24 hours a day to ensure PV panel output when solar energy is available.

Decommissioning

At the end of the Project's operational term (anticipated to be approximately 40 years), the Project Applicant may choose to update site technology and recommission, or decommission the site and remove the systems and components. All decommissioning and restoration activities would adhere to the requirements of the appropriate governing authorities and be in accordance with all applicable federal, State, and County regulations. The Applicant will work with the County to ensure decommissioning of the Project after its productive lifetime complies with all applicable local, state, and federal requirements best management practices (BMPs).

EIR SCOPE

As set forth in the California Public Resources Code Section et seq., and the CEQA Guidelines, codified in the California Code of Regulations, Title 14, Section 15000 et seq, the County has determined, based on substantial evidence and in light of the whole record before the lead agency, that the Project may have a significant effect on the environment and that an Environmental Impact Report shall be prepared for the Project. (PRC Sections 21080(d) and (e); 21802.2(d); 21083(b); and CEQA Guidelines Sections 15060(d) and 15081).

The lead agency has initially identified the following environmental considerations as potentially significant effects of the Project:

- Aesthetics
- Agriculture and Forestry Resources
- Air Quality
- Biological Resources
- Cultural Resources
- Geology and Soils
- Greenhouse Gas Emissions
- Hazards and Hazardous Materials
- Hydrology and Water Quality
- Land Use and Planning
- Noise and Vibration
- Transportation/Circulation
- Tribal Cultural Resources
- Utilities and Service Systems

The EIR will assess the effects of the Project on the environment, identify potentially significant impacts, identify feasible mitigation measures to reduce or eliminate potentially significant environmental impacts, and discuss potentially feasible alternatives to the Project that may accomplish basic Project objectives while lessening or eliminating any potentially significant Project impacts.

RESPONSIBLE AGENCIES

A responsible agency means a public agency other than the lead agency, which has permitting authority or approval power over some aspect of the overall Project. This Notice provides a description of the Project and solicits comments from responsible agencies, trustee agencies, federal, State and local agencies, and other interested parties on the scope and content of the environmental document to be prepared to analyze the environmental impacts of the Project.

Comments received in response to this Notice will be reviewed and considered by the lead agency in determining the scope of the EIR. Due to time limits, as defined by CEQA, your response should be sent at the earliest possible date, but no later than thirty (30) days after publication of this notice. We need to know the views of your agency as to the scope and content of the environmental information that is germane to you or to your agency's statutory responsibilities in connection with the Project. Your agency may need to use the EIR prepared by our agency when considering your permit or other approval for the Project.

OPPORTUNITY FOR PUBLIC REVIEW AND COMMENT

The NOP is available for public review on the County's website at:
https://lus.sbcounty.gov/planning-home/environmental/desert-region/

Additionally, a copy of the NOP is available for public review at the following locations:

San Bernardino County High Desert Government Center
15900 Smoke Tree Street, Suite 1331
Hesperia, CA 92345

San Bernardino County Government Center
385 North Arrowhead Avenue, Second Floor
San Bernardino, CA 92415

San Bernardino County Library Barstow Branch
304 E. Buena Vista Street
Barstow, CA 92311

We would like to hear what you think. Comments and/or questions should be directed to Jim Morrissey, Planner, via U.S. mail or email **by no later than 5:00 p.m. on September 22, 2022**.

County of San Bernardino, Land Use Services Department
Attn: Jim Morrissey, Planner
385 North Arrowhead Avenue, First Floor
San Bernardino, CA 92415
Email: Jim.Morrissey@lus.sbcounty.gov

Please include name, phone number, and address of your agency's contact person in your response.

PUBLIC SCOPING MEETING

The CEQA process encourages comments and questions from the public throughout the planning process. Consistent with Section 21083.9 of the CEQA Statute, a Public Scoping Meeting will be held to solicit public comments on the scope and content of the EIR. A virtual scoping meeting will be held for this Project. The date and meeting details are as follows:

Date and Time: September 14, 2022 at 6:00 P.M.
Place: Via Zoom:
https://hdrinc.zoom.us/j/99875981798?pwd=VHJtU2J4MFBzVjR4TUR2RVI2VTV3Zz09

The zoom meeting may also be accessed through the zoom website by using the following: **Webinar ID: 998 7598 1798**

If you require additional information please contact Jim Morrissey, Planner, at (909) 387- 4234.

Figure 1. Regional Vicinity Map

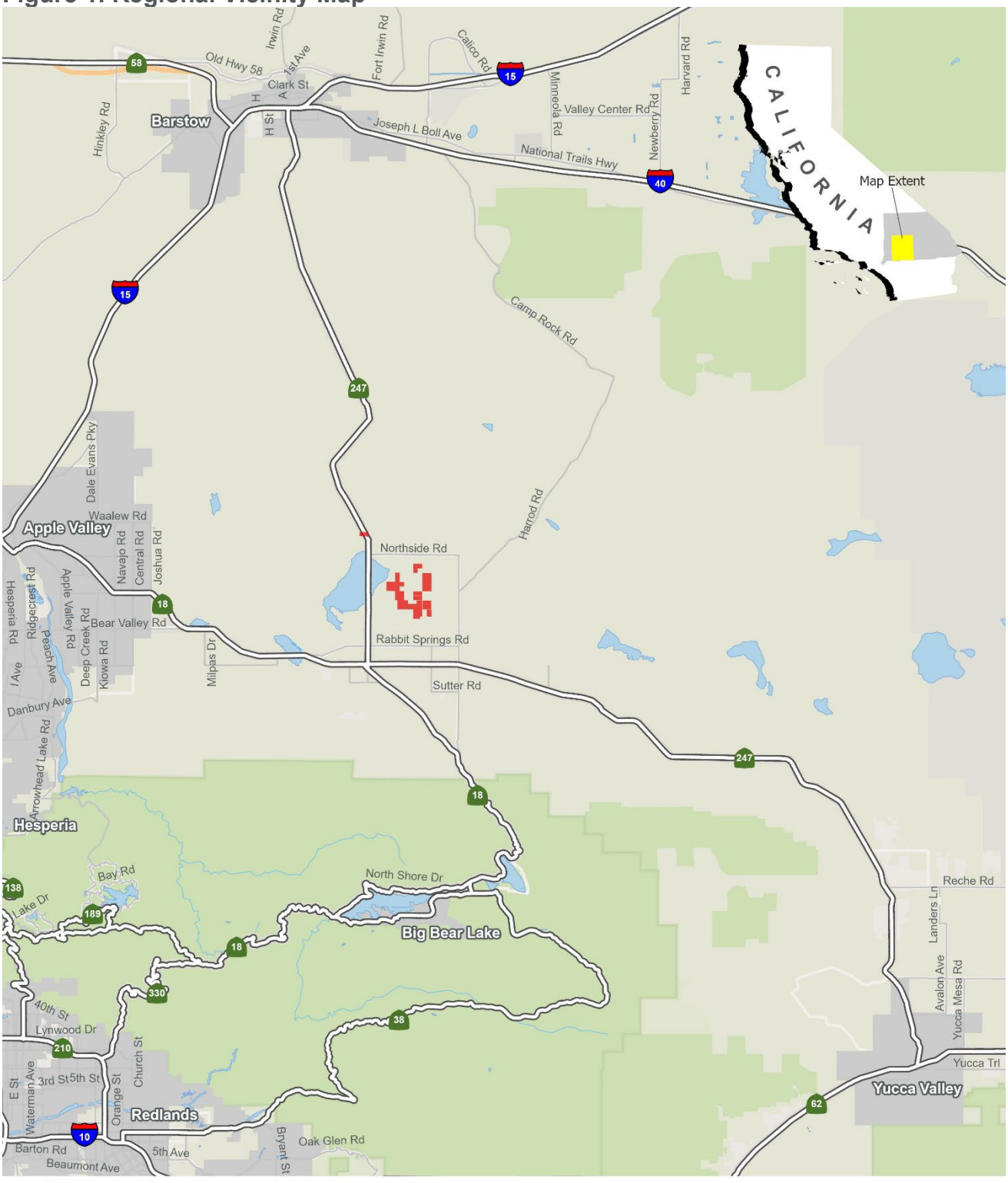
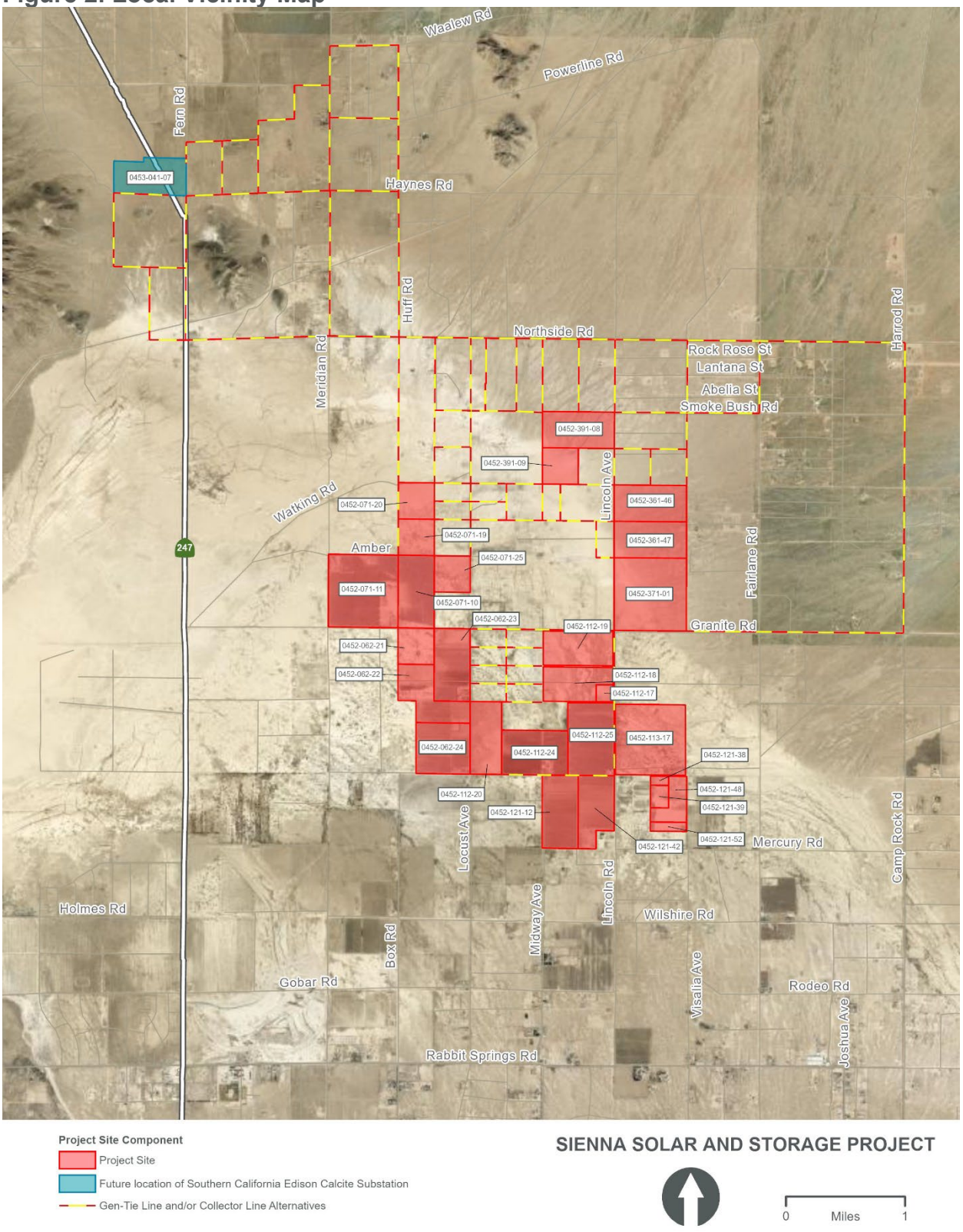


Figure 2. Local Vicinity Map



Comment Letters Received on Notice of Preparation

DESERT TORTOISE COUNCIL
4654 East Avenue S #257B
Palmdale, California 93552
www.deserttortoise.org
eac@deserttortoise.org

Via email only

14 September 2022

Attn: Mr. Jim Morrissey
County of San Bernardino, Land Use Services Department
Attn: Jim Morrissey, Planner
385 North Arrowhead Avenue, First Floor
San Bernardino, CA 92415
Email: Jim.Morrissey@lus.sbcounty.gov

RE: Notice of Preparation of a Draft Environmental Impact Report for Sienna Solar and Storage Project

Dear Mr. Morrissey,

The Desert Tortoise Council (Council) is a non-profit organization comprised of hundreds of professionals and laypersons who share a common concern for wild desert tortoises and a commitment to advancing the public's understanding of desert tortoise species. Established in 1975 to promote conservation of tortoises in the deserts of the southwestern United States and Mexico, the Council routinely provides information and other forms of assistance to individuals, organizations, and regulatory agencies on matters potentially affecting desert tortoises within their geographic ranges.

As of June 2022, our mailing address has changed to:

> Desert Tortoise Council
> 3807 Sierra Highway #6-4514
> Acton, CA 93510

Our email address has not changed. Both addresses are provided above in our letterhead for your use when providing future correspondence to us.

We appreciate this opportunity to provide comments on the above-referenced project. Given the location of the proposed project in habitats likely occupied by Mojave desert tortoise (*Gopherus agassizii*) (synonymous with Agassiz's desert tortoise), our comments pertain to enhancing protection of this species during activities authorized by San Bernardino Land Use Services Department (herein "County"). Please accept, carefully review, and include in the relevant project file the Council's following comments and attachments for the proposed project.

The Mojave desert tortoise is among the top 50 species on the list of the world's most endangered tortoises and freshwater turtles. The International Union for Conservation of Nature's (IUCN) Species Survival Commission, Tortoise and Freshwater Turtle Specialist Group, now considers the Mojave desert tortoise to be Critically Endangered (Berry et al. 2021), as it is a "species that possess an extremely high risk of extinction as a result of rapid population declines of 80 to more than 90 percent over the previous 10 years (or three generations), population size fewer than 50 individuals, other factors." It is one of three turtle and tortoise species in the United States to be critically endangered. This status, in part, prompted the Council to join Defenders of Wildlife and Desert Tortoise Preserve Committee (Desert Tortoise Council 2020) to petition the California Fish and Game Commission in March 2020 to elevate the listing of the Mojave desert tortoise from threatened to endangered in California.

Project Description

The following project description is taken from the Notice of Preparation (NoP) dated 23 August 2022: "99MT 8ME, LLC (Applicant) plans to construct and operate the Sienna Solar and Storage Project (Project), a utility scale, solar photovoltaic (PV) electricity generation facility that would produce up to 525 megawatts (MW) of solar power and include up to 525 MW of energy storage capacity rate in a battery energy storage system (BESS) within an approximately 1,854-acre Project site. The Project will be processed under one Conditional Use Permit (CUP). The Project consists of the installation of a PV solar facility, BESS, Project substation, operations and maintenance building(s), underground collection system, 230 kV gen-tie line (on- and off-site), and other ancillary facilities. The Project will interconnect at the Southern California Edison (SCE) Calcite Substation (currently pending final permits and construction) via a proposed overhead and/or underground 230-kV gen-tie line in addition to other ancillary facilities utilizing private and potentially public rights-of-way (ROW). The proposed Calcite Substation is located northwest of the Project area, within a 77-acre parcel (Assessor Parcel Number 0453-041-07) that occupies land both east and west of State Route (SR) 247 (Barstow Road). Approximately 39 miles of collector lines and gen-tie alternatives will be analyzed in the EIR, although not all routes will be developed."

"The proposed Project is located on approximately 1,854 acres in the southwestern portion of the Mojave Desert and includes the Lucerne Dry Lake, in unincorporated San Bernardino County, California. The Project is predominately located east of SR 247 (Barstow Road), north of the unincorporated community of Lucerne Valley, with portions of the gen-tie alternative corridors that include possible connections along Haynes Road, Huff Road, and Northside Road to the east of Barstow Road. The site is generally located approximately 35 miles south of Barstow, 45 miles northwest of the town of Yucca Valley, 15 miles southeast of the town of Apple Valley, and 20 miles north of the City of Big Bear Lake."

Scoping Comments

The purpose of scoping is to allow the public to participate in an "early and open process for determining the scope of issues to be addressed, and for identifying the significant issues related to a proposed action" [40 Code of Federal Regulations (CFR) 1501.7]. The Draft Environmental Impact Report (DEIR) should discuss how this proposed project fits within the management structure of current land management plans for the area [e.g., California Desert Conservation Area Plan (CDCA Plan) (BLM 1980 as amended), Desert Renewable Energy Conservation Plan (DRECP) (BLM 2015, 2016)]. Even though these are management plans that directly affect public lands managed by the Bureau of Land Management (BLM), they are still applicable to development on private lands relative to indirect and cumulative effects. It should provide maps of critical habitat for the Mojave desert tortoise (USFWS 1994a), Areas of Critical Environmental Concern (ACECs), and other areas identified for special management by BLM [e.g., National Conservation Lands (NCLs)]; U.S. Fish and Wildlife Service (USFWS) (e.g., linkage habitats between desert tortoise populations); other federal, state, and local agencies; and tribal lands.

Proposed Action and Alternatives Considered

We fully expect that the County will comply with all applicable statutes, regulations, and other requirements as they pertain to this project. The County should demonstrate in the DEIR that the proposed project meets all these requirements with respect to the tortoise, that:

- The proposed project will be in conformance with decisions in current land use plan(s) with respect to sustained yield;
- the proposed project will be consistent with priority conservation, restoration, and/or adaptation objectives in the best available landscape-scale information (e.g., for tortoise population connectivity, etc.);
- the applicant has coordinated with governments and agencies, including consideration of consistency with officially adopted plans and policies (e.g., recovery plans);
- the proposed project is in an area with low or comparatively low resource conflicts and where conflicts can be resolved;
- the proposed project will be located in, or adjacent to, previously contaminated or disturbed lands;
- the proposed project will minimize adverse impacts on important fish and wildlife habitats and migration/movement corridors including the desert tortoise;
- the proposed project will minimize impacts on lands with wilderness characteristics and the values associated with these lands;
- the proposed project will not adversely affect lands donated or acquired for conservation purposes, or mitigation lands identified in previously approved projects such as translocation areas for desert tortoise;
- significant cumulative impacts on resources of concern should not occur as a result of the proposed project (i.e., exceedance of an established threshold such population viability for the tortoise and connectivity of tortoise populations among recovery units); and,
- the County's analysis will use current data on the tortoise for the project area, population, Western Mojave Recovery Unit, and range wide, as population numbers and densities have substantially declined in most recovery units.

Please be sure the following two standards are met:

- Mitigation should improve conditions within the connectivity areas, and if these options do not exist, mitigation may be applied toward the nearest tortoise conservation area (e.g., an ACEC for which tortoise had been identified in the Relevant and Important Criteria or critical habitat); and
- a plan included in the DEIR that would effectively monitor desert tortoise impacts, including verification that desert tortoise connectivity corridors are functional. If required, Federal Endangered Species Act (FESA) consultation should further define this monitoring plan.

Regarding the first concern, we believe that a multiagency approach is best to ensure the County is meeting its obligations, soliciting review and input from pertinent federal and state resource agencies, Tribal governments/agencies, and non-governmental organizations (NGOs). Mitigation of impacts should include, in priority order, avoidance, minimization and compensation for unavoidable impacts. Mitigation should at a minimum offset all direct, indirect, and cumulative impacts, especially given the status and trend of the tortoise (please see *Affected Environment - Status of the Populations of the Mojave Desert Tortoise* below). The County should ensure that neither FESA nor the California Endangered Species Act (CESA) are violated by development of this project.

Mitigation should be applied only in areas where the lands are effectively managed for the benefit of the tortoise for both the short-term and long-term. As currently managed, BLM ACECs in the California Desert Conservation Area are not meeting this criterion. Consequently, mitigation should be implemented on lands with a durable conservation designation, or on privately owned lands with a conservation easement or other legal instrument that ensures conservation in perpetuity. Please see *Mitigation Plans* below for additional concerns and requested requirements.

Regarding the second concern, a monitoring plan should (1) be scientifically and statistically credible; (2) be implementable; and (3) require the project proponent to implement adaptive management to correct land management practices if the mitigation is not accomplishing its intended purposes.

The Council supports alternatives to reduce the need for additional solar energy projects in relatively undisturbed habitats in the Mojave Desert. For example, the City of Los Angeles has implemented a rooftop solar Feed-in Tariff (FiT) program, the largest of its kind in America. The FiT program enables the owners of large buildings to install solar panels on their roofs, and sell the power they generate back to utilities for distribution into the power grid.

We request that the County include an urban solar alternative in the DEIR. Under this alternative, owners of large buildings or parking areas would grant the project proponent permission to install solar panels on their roofs and cover parking areas, and sell the power they generate back to utilities for distribution into the power grid.

This approach puts the generation of electricity where the demand is greatest, in populated areas. It may also reduce transmission costs, greenhouse gas emissions from constructing energy projects far from the sources of power demand and materials for construction, the number of affected resources in the desert that must be analyzed under the California Environmental Quality Act (CEQA), and mitigation costs for direct, indirect, and cumulative impacts; monitoring and adaptive management costs; and habitat restoration costs following decommissioning. The DEIR should include an analysis of where the energy generated by this project would be sent and the needs for energy in those targeted areas that may be satisfied by urban solar. We request that at least one viable alternative be analyzed in the DEIR where electricity generation via solar energy is located much closer to the areas where the energy will be used, including generation in urban/suburban areas.

In addition, the County should include another viable alternative of locating solar projects on bladed or highly degraded tracts of land (e.g., abandoned agricultural fields). Such an alternative would not result in the destruction of desert habitats and mitigation for the lost functions and values of these habitats. These losses and mitigation are costly from an economic, environmental, and social perspective. We cannot tell from the Figure 1 and particularly Figure 2 in the NoP how much of the land may be agricultural versus dry lake bed, so these areas and native desert scrub communities should be mapped in the DEIR.

The latter two alternatives are important to consider to minimize or avoid the loss of vegetation that sequesters carbon. Studies around the world have shown that desert ecosystems can act as important carbon sinks. For example, the California deserts account for nearly 10 percent of the state's carbon sequestration; below ground in soil and root systems, and above ground in biomass. Protecting this biome can contribute to securing carbon stores in the state (MDLT 2021). Given the current climate change conditions, there is an increasing need for carbon sequestration. Because vascular plants are a primary user of carbon and the proposed Project would result in the loss/degradation of thousands of acres of plants and their ability to sequester carbon for decades or longer unless successful measures are implemented to restore the same biomass of native vegetation as it is being destroyed, it is imperative that proposed project not result in the loss of vegetation.

The DEIR should consider the monitoring results of recently developed solar projects where soils have been bladed versus those facilities where the vegetation has been mowed or crushed and allowed to revegetate the area. In the latter case, it may be appropriate to allow tortoises to enter the facilities and re-establish residency (i.e., repatriate) under the solar panels as vegetation recolonizes the area. This could be an *option* for the currently described project alternative. It should be designed/implemented as a scientific experiment to add to the limited data on this approach to determine the extent of effects on Mojave desert tortoise populations and movements/connectivity between populations, which is an important issue for this species, particularly over the long-term (see *Desert Tortoise Habitat Linkages/Connectivity among Populations and Recovery Units* below). Long-term monitoring for the life of the project would need to be included to accurately evaluate the effectiveness of this strategy.

Affected Environment

Status of the Population of the Mojave Desert Tortoise: The Council provides the following information for the County so that these or similar data may be included in the DEIR. The Council believes that BLM's failure to implement recovery actions for the Mojave desert tortoise as given in the recovery plan (both USFWS 1994b and 2011) has contributed to tortoise declines between 2004 to 2014 (Table 1; USFWS 2015). There are 17 populations of Mojave desert tortoise described below that occur in Critical Habitat Units (CHUs) and Tortoise Conservation Areas (TCAs); 14 are on lands managed by the BLM; 8 of these are in the CDCA. Again, although this is a project on private lands, it has the potential to directly and indirectly affect public lands managed by the BLM, which should be addressed in the DEIR.

Table 1. Summary of 10-year trend data for 5 Recovery Units and 17 CHUs/TCAs for Mojave desert tortoise. The table includes the area of each Recovery Unit and CHU/TCA, percent of total habitat for each Recovery Unit and CHU/TCA, density (number of breeding adults/km^2 and standard errors = SE), and the percent change in population density between 2004 and 2014. Populations below the viable level of 3.9 breeding individuals/km^2 (10 breeding individuals per mi^2) (assumes a 1:1 sex ratio) and showing a decline from 2004 to 2014 are in red.

Recovery Unit: Designated Critical Habitat Unit/Tortoise Conservation Area	Surveyed area (km^2)	% of total habitat area in Recovery Unit & CHU/TCA	2014 density/km^2 (SE)	% 10-year change (2004–2014)
Western Mojave, CA	**6,294**	**24.51**	**2.8 (1.0)**	**–50.7 decline**
Fremont-Kramer	2,347	9.14	2.6 (1.0)	–50.6 decline
Ord-Rodman	852	3.32	3.6 (1.4)	–56.5 decline
Superior-Cronese	3,094	12.05	2.4 (0.9)	–61.5 decline
Colorado Desert, CA	**11,663**	**45.42**	**4.0 (1.4)**	**–36.25 decline**
Chocolate Mtn AGR, CA	713	2.78	7.2 (2.8)	–29.77 decline
Chuckwalla, CA	2,818	10.97	3.3 (1.3)	–37.43 decline
Chemehuevi, CA	3,763	14.65	2.8 (1.1)	–64.70 decline
Fenner, CA	1,782	6.94	4.8 (1.9)	–52.86 decline
Joshua Tree, CA	1,152	4.49	3.7 (1.5)	+178.62 increase
Pinto Mtn, CA	508	1.98	2.4 (1.0)	–60.30 decline
Piute Valley, NV	927	3.61	5.3 (2.1)	+162.36 increase
Northeastern Mojave	**4,160**	**16.2**	**4.5 (1.9)**	**+325.62 increase**
Beaver Dam Slope, NV, UT, AZ	750	2.92	6.2 (2.4)	+370.33 increase
Coyote Spring, NV	960	3.74	4.0 (1.6)	+ 265.06 increase
Gold Butte, NV & AZ	1,607	6.26	2.7 (1.0)	+ 384.37 increase
Mormon Mesa, NV	844	3.29	6.4 (2.5)	+ 217.80 increase
Eastern Mojave, NV & CA	**3,446**	**13.42**	**1.9 (0.7)**	**–67.26 decline**
El Dorado Valley, NV	999	3.89	1.5 (0.6)	–61.14 decline
Ivanpah Valley, CA	2,447	9.53	2.3 (0.9)	–56.05 decline
Upper Virgin River	**115**	**0.45**	**15.3 (6.0)**	**–26.57 decline**
Red Cliffs Desert	115	0.45	15.3 (6.0)	–26.57 decline
Range-wide Area of CHUs - TCAs/Range-wide Change in Population Status	**25,678**	**100.00**		**–32.18 decline**

Table 2. Estimated change in abundance of adult Mojave desert tortoises in each recovery unit between 2004 and 2014 (Allison and McLuckie 2018). Decreases in abundance are in red.

Recovery Unit	Modeled Habitat (km^2)	2004 Abundance	2014 Abundance	Change in Abundance	Percent Change in Abundance
Western Mojave	23,139	131,540	64,871	-66,668	-51%
Colorado Desert	18,024	103,675	66,097	-37,578	-36%
Northeastern Mojave	10,664	12,610	46,701	34,091	270%
Eastern Mojave	16,061	75,342	24,664	-50,679	-67%
Upper Virgin River	613	13,226	10,010	-3,216	-24%
Total	**68,501**	**336,393**	**212,343**	**-124,050**	**-37%**

Important points from these tables include the following:

Change in Status for the Mojave Desert Tortoise Range-wide
● Ten of 17 populations of the Mojave desert tortoise declined from 2004 to 2014.

● Eleven of 17 populations of the Mojave desert tortoise are no longer viable. These 11 populations represent 89.7 percent of the range-wide habitat in CHUs/TCAs.

Change is Status for the Eastern Mojave Recovery Unit – Nevada and California
● This recovery unit had a 67 percent decline in tortoise density from 2004 to 2014, the largest decline of the five recovery units for the tortoise.

● Tortoises in this recovery unit have densities that are below viability.

Change in Status for the El Dorado Valley and Ivanpah Valley Tortoise Populations in the Eastern Mojave Recovery Unit.
● Both populations in this recovery unit experienced declines in densities of 61 percent and 56 percent, respectively from 2004 to 2014. In addition, there was a 67 percent decline in tortoise abundance.

● Both populations have densities less than needed for population viability.

Change in Status for the Mojave Desert Tortoise in California
● Eight of 10 populations of the Mojave desert tortoise in California declined from 29 to 64 percent from 2004 to 2014 with implementation of tortoise conservation measures in the Northern and Eastern Colorado Desert (NECO), Northern and Eastern Mojave Desert (NEMO), and Western Mojave Desert (WEMO) Plans.

● Eight of 10 populations of the Mojave desert tortoise in California are no longer viable. These eight populations represent 87.45 percent of the habitat in California that is in CHU/TCAs.

● The two viable populations of the Mojave desert tortoise in California are declining. If their rates of decline from 2004 to 2014 continue, these two populations will no longer be viable in about 2020 and 2031.

Change in Status for the Mojave Desert Tortoise on BLM Land in California
● Eight of eight populations of Mojave desert tortoise on lands managed by the BLM in California declined from 2004 to 2014.

● Seven of eight populations of Mojave desert tortoise on lands managed by the BLM in California are no longer viable.

Change in Status for Mojave Desert Tortoise Populations in California that Are Moving toward Meeting Recovery Criteria
● The only population of Mojave desert tortoise in California that is not declining is on land managed by the National Park Service, which has increased 178 percent in 10 years.

The Endangered Mojave Desert Tortoise: The Council believes that the Mojave desert tortoise meets the definition of an endangered species. In the FESA, Congress defined an "endangered species" as "any species which is in danger of extinction throughout all or a significant portion of its range…" In the CESA, the California legislature defined an "endangered species" as a native species or subspecies of a bird, mammal, fish, amphibian, reptile, or plant, which is in serious danger of becoming extinct throughout all, or a significant portion, of its range due to one or more causes (California Fish and Game Code § 2062). Because most of the populations of the Mojave desert tortoise were non-viable in 2014, most are declining, and the threats to the Mojave desert tortoise are numerous and have not been substantially reduced throughout the species' range, the Council believes the Mojave desert tortoise should be designated as an endangered species by the USFWS and California Department of Fish and Wildlife (CDFW).

Standardized Surveys – Desert Tortoise and Other Species

For the DEIR to fully analyze the effects and identify potentially significant impacts, the following surveys must be performed to determine the extent of rare plant and animal populations occurring within areas to be directly and indirectly impacted.

Prior to conducting surveys, a knowledgeable biologist should perform a records search of the California Natural Diversity Data Base (CNDDB; CDFW 2022) for rare plant and animal species reported from the region. The results of the CNDDB review would be reported in the DEIR with an indication of suitable and occupied habitats for all rare species reported from the region based on performing the species-specific surveys described below.

CDFG (2010) lists hundreds of plant communities occurring in California, including those that are considered Communities of Highest Inventory Priority, or "CHIPs." Biologists completing surveys on behalf of the project proponent should document such communities where they occur. and indicate how impacts to them will be minimized.

The project proponent should fund focused surveys for all rare plant and animal species reported from the vicinity of the proposed project. Results of the surveys will determine appropriate permits from CDFW and USFWS and associated avoidance, minimization, and mitigation measures. Focused plant and animal surveys should be conducted by knowledgeable biologists for respective taxa (e.g., rare plant surveys should be performed by botanists), and to assess the likelihood of occurrence for each rare species or resource (e.g., plant community) that has been reported from

the immediate region. Focused plant surveys should occur only if there has been sufficient winter rainfall to promote germination of annual plants in the spring. Alternatively, the environmental documents may assess the likelihood of occurrence with a commitment by the proponents to perform subsequent focused plant surveys prior to ground disturbance, assuming conditions are favorable for germination.

Special Status Plants: There may be special status plant species found in/near the project area. Species or their habitats known to occur in/near the project area should be sought during field surveys and their presence/absence discussed in the DEIR. Surveys should be completed at the appropriate time of year by qualified botanists using the latest acceptable methodologies, which are identified in CDFG (2009). The methods used to survey for special status plant species, the results, and the mitigation/monitoring/adaptive management that will be implemented to avoid or otherwise mitigate adverse effects to these species and their habitats should be included in the DEIR.

At the County level, the San Bernardino County Development Code was revised and adopted on 12 April 2007. Chapter 88.01 Plant Protection and Management, Section 88.01.020 states, "The provisions of this Chapter apply to the removal and relocation of regulated trees or plants and to any encroachment (for example, grading) within the protected zone of a regulated tree or plant on all private land within the unincorporated areas of the County and on public lands owned by the County, unless otherwise specified..."

Section 88.01.060 Desert Native Plant Protection states, "This Section provides regulations for the removal or harvesting of specified desert native plants in order to preserve and protect the plants and to provide for the conservation and wise use of desert resources…"

Section 88.01.060(c) Regulated Desert Native Plants states, "The following desert native plants or any part of them, except the fruit, shall not be removed except under a Tree or Plant Removal Permit in compliance within Section 88.01.050 (Tree or Plant Removal Permits):

(1) The following desert native plants with stems two inches or greater in diameter or six feet or greater in height:
    (A) *Dalea spinosa* (smoke tree).
    (B) All species of the genus *Prosopis* (mesquites).
(2) All species of the family *Agavaceae* (century plants, nolinas, yuccas).
(3) Creosote Rings, 10 feet or greater in diameter.
(4) All Joshua trees.
(5) Any part of the following species, whether living or dead:
    (A) *Olneya tesota* (desert ironwood).
    (B) All species of the genus *Prosopis* (mesquites).
    (C) All species of the genus *Cercidium* (palo verdes)."

At the State level, the 1998 Food and Agricultural Code, Division 23: California Desert Native Plants, Chapter 3: Regulated Native Plants Act, Section 80073 states: The following native plants, or any parts thereof, may not be harvested except under a permit issued by the commissioner or the sheriff of the county in which the native plants are growing:

(a) All species of the family Agavaceae (century plants, nolinas, yuccas).

(b) All species of the family Cactaceae (cacti), except for the plants listed in subdivisions (b) and (c) of Section 80072 (i.e., saguaro and barrel cacti), which may be harvested under a permit obtained pursuant to that section.

(c) All species of the family Fouquieriaceae (ocotillo, candlewood).

(d) All species of the genus *Prosopis* (mesquites).

(e) All species of the genus *Cercidium* (palo verdes).

(f) *Senegalia (Acacia) greggii* (catclaw acacia).

(g) *Atriplex hymenelytra* (desert holly).

(h) *Dalea (Psorothamnus) spinosa* (smoke tree).

(i) *Olneya tesota* (desert ironwood), including both dead and live desert ironwood.

As such, the plant species listed above should be sought and mapped as baseline information to inform the County of pertinent protection measures.

Specialized Reptile Surveys: If there are any loose, shifting sands within/near the impact areas of the panels, along the gen-tie lines, or access routes, focused surveys for Mojave fringe-toed lizards (*Uma scoparia*) should be performed (University of California, Riverside 2005, 2007).

Migratory Birds/Eagles: The County should ensure that all actions it authorizes are implemented in compliance with the Migratory Bird Treaty Act, Bald and Golden Eagle Protection Act, and associated regulations, executive orders, and policies (e.g., Driscoll 2010, Pagel et al. 2010) to avoid mortality or injury to migratory birds and harassment of eagles.

Burrowing owl: Surveys for western burrowing owl (*Athene cunicularia*) should be performed implementing available methods (CDFG 2012). In addition to the project footprint, the protocol requires that peripheral transects be surveyed at 30-, 60-, 90-, 120-, and 150-meter intervals in all suitable habitats adjacent to the subject property to determine the potential indirect impacts of the project on this species. If burrowing owl sign is found, CDFG (2012) describes appropriate minimization and mitigation measures that would be required. If burrowing owl sign is found, the County and the project proponent should develop a science-based mitigation/monitoring/adaptive management plan with the USFWS and CDFW and ensure that this plan is implemented. CDFG (2012) describes appropriate minimization and mitigation measures that would be required if burrowing owl sign is found.

Mojave Desert Tortoise Surveys: Formal protocol surveys for Mojave desert tortoise (USFWS 2019) must be conducted at the proper times of year. Because USFWS (2009) and CDFW require only experienced biologists to perform protocol surveys, USFWS and CDFW biologists should review surveyors' credentials prior to initiating the surveys. Per this protocol, since the impact area is larger than 500 acres, the surveys must be performed in the time periods of April-May or September-October so that a statistical estimate of tortoise densities can be determined for the "action area" (please see below). If any tortoise sign is found, the project proponent should coordinate with USFWS and CDFW to determine whether "take" under FESA or CESA is likely to occur from implementation of the proposed project. If tortoises are present, the project proponent must obtain a Section 10(a)(1)(B) incidental take permit from the USFWS and a section 2081 incidental take permit from the CDFW prior to conducting any ground disturbance.

We request that protocol-level surveys be performed at the area of the proposed project *and the alternative sites that are being considered* in the DEIR. The results of these surveys should be published in the DEIR and should include density estimates for each alternative assessed.

To determine the full extent of impacts to tortoises and to facilitate compliance with the FESA and CESA, authorized biologist(s) must consult with the USFWS to determine the action area for this project. The USFWS defines "action area" the Code of Federal Regulations and their Desert Tortoise Field Manual (USFWS 2009) as "all areas to be affected directly or indirectly by proposed development and not merely the immediate area involved in the action (50 CFR §402.02)." Since the NoP indicates that part of the proposed project occurs on dry lakebed surfaces, we believe that it is prudent to survey native scrub areas *a minimum of a mile east of the project footprint*. Disturbance of the lakebed will predictably result in excessive wind-blown dust, which will result in impaired habitats downwind, east of the lakebed.

The Council's persisting concern is that proponents of solar projects continue to identify a single site for development without any attempt to identify alternative sites. As such, when focused studies reveal significant accumulations of tortoises on the proponent's selected site, because there is only one site identified for the project, there is no opportunity to select an alternative site where impacts would be minimized.

Too often, a single impact footprint is identified, all surveys are restricted to that site, and no alternative sites are assessed. We are concerned that this project may have already pre-determined the project footprint. As such, there may be other areas of lower tortoise densities where impacts could be minimized. However, those areas would not be considered if the project footprint is predetermined before survey data are available. As such, we request that more than one site, preferably three, be identified and analyzed in the DEIR and that the alternative with the fewest impacts to tortoises be adopted for development.

If that is not feasible, we ask that the "action area" of the proposed project be several times larger than the project footprint so that those portions of the site with fewer tortoises could be selected particularly to the east where windblown dust will accumulate. Proponents of the Gemini Solar Site in southern Nevada, for example, ignored these recommendations, and displaced more than 100 tortoises, when based on their presence-absence tortoise surveys, a shift of the site to the east would have avoided many of those animals.

It is current management to require desert tortoise protocol surveys (USFWS 2019) on a given site, but all too often translocation sites are ignored. We feel strongly that protocol surveys should occur on multiple or enlarged sites as given above *and* on all proposed translocation sites, assuming tortoises will be translocated.

<u>Mojave Desert Tortoise Impacts Analysis</u>:

Analysis of Direct and Indirect Impacts: The alternatives analysis should include an economic analysis that provides the total cost of constructing the proposed project versus other alternatives, so the public can see how much the total cost of each alternative is. This would include an analysis of the costs of replacing all public resources that would be lost from granting the proposed project including direct, indirect, and cumulative impacts. Please note, this analysis would include habitat replacement or restoration costs including the time needed to achieve full replacement, not just acquisition, management, monitoring, and adaptive management costs.

The DEIR should include a thorough analysis of the status and trend of the tortoise in the action area, tortoise conservation area(s), recovery unit(s), and range wide. Tied to this analysis should be a discussion of all likely sources of mortality for the tortoise and degradation and loss of habitat from implementation of solar development including construction, operation and maintenance, decommissioning, and restoration of the public lands. The DEIR should use the data from focused plant and wildlife surveys in their analysis of the direct, indirect, and cumulative impacts of the proposed project on the Mojave desert tortoise and its habitat, other listed species, and species of concern/special status species.

We expect that the DEIR will document how many acres would be impacted directly by solar arrays, access roads to the site, administration/maintenance buildings, parking areas, transmission towers, switchyards, laydown areas, internal access roads, access roads along gen-tie lines, a perimeter road, perimeter fencing, substations, battery storage (e.g., the project footprint). We also request that separate calculations document how many acres of desert tortoise habitats would be temporarily and permanently impacted both directly and indirectly (e.g., "road effect zone," etc.) by the proposed Project. As given below, these acreages should be based on field surveys for tortoises not just available models.

Road Effect Zone: We request that the DEIR include information on the locations, sizes, and arrangements of roads to the proposed project and within it, who will have access to them, whether the access roads will be secured to prevent human access or vandalism, and if so, what methods would be used. The presence/use of roads even with low vehicle use has numerous adverse effects on the desert tortoise and its habitats that have been reported in the scientific literature. These include the deterioration/loss of wildlife habitat, hydrology, geomorphology, and air quality; increased competition and predation (including by humans); and the loss of naturalness or pristine qualities.

Vehicle use on new roads and increased vehicle use on existing roads equates to increased direct mortality and an increased road effect zone for desert tortoises. Road construction, use, and maintenance adversely affect wildlife through numerous mechanisms that can include mortality from vehicle collisions, and loss, fragmentation, and alteration of habitat (Nafus et al. 2013; von Seckendorff Hoff and Marlow 2002).

In von Seckendorff Hoff and Marlow (2002), they reported reductions in Mojave desert tortoise numbers and sign from infrequent use of roadways to major highways with heavy use (see also LaRue 1992). There was a linear relationship between traffic level and tortoise reduction. For two graded, unpaved roads, the reduction in tortoises and sign was evident 1.1 to 1.4 km (3,620 to 4,608 feet) from the road. Nafus et al. (2013) reported that roads may decrease tortoise populations via several possible mechanisms, including cumulative mortality from vehicle collisions and reduced population growth rates from the loss of larger reproductive animals. Other documented impacts from road construction, use, and maintenance include increases in roadkill of wildlife species as well as tortoises, creating or increasing food subsidies for common ravens, and contributing to increases in raven numbers and predation pressure on the desert tortoise.

Please include in the DEIR analyses, the five major categories of primary road effects to the tortoise and special status species: (1) wildlife mortality from collisions with vehicles; (2) hindrance/barrier to animal movements thereby reducing access to resources and mates; (3) degradation of habitat quality; (4) habitat loss caused by disturbance effects in the wider environment and from the physical occupation of land by the road; and (5) subdividing animal populations into smaller and more vulnerable fractions (Jaeger et al. 2005a, 2005b, Roedenbeck et al. 2007). These analyses should be at the population, recovery unit, and rangewide levels.

In summary, road establishment/increased use is often followed by various indirect impacts such as increased human access causing disturbance of species' behavior, increased predation, spread of invasive species that alters/degrades habitat, and vandalism and/or collection. The analysis of the impacts from road establishment and use should include cumulative effects to the tortoise with respect to nearby critical habitat and other Tortoise Conservation Areas (TCAs), areas identified as important linkage habitat for connectivity between nearby critical habitat units/TCAs as these linkage areas serve as corridors for maintaining genetic and demographic connectivity between populations, recovery units, and rangewide (see *Desert Tortoise Habitat Linkages/Connectivity among Populations and Recovery Units* below). These and other indirect impacts to the Mojave desert tortoise should be analyzed in the DEIR from project construction, operations and maintenance, decommissioning, and habitat restoration.

Desert Tortoise Habitat Linkages/Connectivity among Populations and Recovery Units: The DEIR should analyze how this proposed project will impact the movement of tortoises relative to linkage habitats/corridors. The DEIR should include an analysis of the minimum linkage design necessary for conservation and recovery of the desert tortoise (e.g., USFWS 2011, Averill-Murray et al. 2013, Hromada et al. 2020), and how the project, along with other existing projects, would impact the linkages between tortoise populations and all recovery units that are needed for survival and recovery. We strongly request that the environmental consequences section of the DEIR include a thorough analysis of this indirect effect (40 Code of Federal Regulations 1502.16) and appropriate mitigation to maintain the function of population connectivity for the Mojave desert tortoise and other wildlife species be identified. Similarly, please document how this project may impact proximate conservation areas, such as BLM-designated ACECs, particularly the nearby Ord-Rodman Critical Habitat Unit, which may be downwind from the northern portions of the proposed project.

Jurisdictional Waters in California: A jurisdictional waters analysis should be performed for all potential impacts to washes, streams, and drainages. It may be that the dry lakebed, itself, may be construed as jurisdictional waters, which should be determined by a knowledgeable consultant in conjunction with CDFW biologists. This analysis should be reviewed by the CDFW as part of the permitting process and a section 1600 Streambed Alteration Agreement acquired, if deemed necessary by CDFW.

Mitigation Plans

The DEIR should include effective mitigation for all direct, indirect, and cumulative effects to the tortoise and its habitats. The mitigation should use the best available science with a commitment to implement the mitigation commensurate to impacts to the tortoise and its habitats. Mitigation should include a fully-developed desert tortoise translocation plan, including protection of tortoise

translocation area(s) from future development and human disturbance in perpetuity; raven management plan; non-native plant species management plan; fire prevention plan; compensation plan for the degradation and loss of tortoise habitat that includes protection of the acquired, improved, and restored habitat in perpetuity for the tortoise from future development and human use; and habitat restoration plan if/when the proposed project is decommissioned.

All plans should be provided in the DEIR so the public and the decisionmaker can determine their adequacy (i.e., whether they are scientifically rigorous and would be effective in mitigating for the displacement and loss of tortoises and degradation and loss of tortoise habitat from project implementation). Too often, such plans are alluded to in the draft environmental document and promised later, which does not allow the reviewers to assess their adequacy, which is unacceptable. If not available as appendices in draft documents, all indicated plans must be published in the final environmental documents. Their inclusion is necessary to determine their adequacy for mitigating direct, indirect, and cumulative impacts, and monitoring for effectiveness and adaptive management regarding the desert tortoise. If these plans are not provided, it is not possible for the County, other decisionmakers, and the interested public to determine the environmental consequences of the project to the tortoise.

These mitigation plans should include an implementation schedule that is tied to key actions of the construction, operation, maintenance, decommissioning, and restoration phases of the project so that mitigation occurs concurrently with or in advance of the impacts. The plans should specify success criteria, include an effectiveness monitoring plan to collect data to determine whether success criteria have been met, and identify/implement actions that would be required if the mitigation measures do not meet the success criteria.

Translocation Plan - Translocated Tortoises & Translocation Sites: How many tortoises will be displaced by the proposed project? How long will translocated tortoises be monitored? Will the monitoring report show how many of those tortoises lived and died after translocation and over time? Are there any degraded habitats or barren areas that may impair success of the translocation? Are there incompatible human uses in the new translocation area that need to be eliminated or managed to protect newly-translocated tortoises? Were those translocation areas sufficiently isolated that displaced tortoises were protected by existing or enhanced land management? How will the proponent minimize predation of translocated tortoises and avoid adverse climatic conditions, such as low winter rainfall conditions that may exacerbate translocation success? Were tortoises translocated to a site where they would be protected from threats (e.g., off-highway vehicles, future development, etc.)? These questions should be answered in pertinent parts of the DEIR and be based on protocol surveys (USFWS 2019).

The project proponent should implement the USFWS' Translocation Guidance (USFWS 2020a) and coordinate translocation with CDFW. Although the best available, proximate habitats are likely to be on public lands managed by the BLM (e.g., Ord-Rodman ACEC), the proponent does not have the latitude to move tortoises there, which would constitute a federal nexus and require that a joint EIR/EIS (environmental impact statement) be developed. Even so, the proponent's project-specific translocation plan should be based on current data and be developed using lessons learned from earlier translocation efforts (e.g., increased predation, drought). (see *Desert Tortoise Translocation Bibliography Of Peer-Reviewed Publications*[1] in the footnote).

[1] https://www.fws.gov/nevada/desert_tortoise/documents/reports/2017/peer-reviewed_translocation_bibliography.pdf

The Translocation Plan should include implementation of a science-based monitoring plan approved by the Desert Tortoise Recovery Office that will accurately access these and other issues to minimize losses of translocated tortoises and impacts to their habitat. For example, the health of tortoises may be jeopardized if they are translocated during drought conditions, which is known to undermine translocation successes (Esque et al. 2010). If drought conditions are present at the time of project development, we request that the proponent confer with the USFWS and CDFW immediately prior to translocating tortoises and seek input on ways to avoid loss of tortoises due to stressors associated with drought. One viable alternative if such adverse conditions exist is to postpone site development until which time conditions are favorable to enhance translocation success.

Moving tortoises from harm's way, the focus of the Translocation Guidance, does not guarantee their survival and persistence at the translocation site, especially if it will be subject to increased human use or development. In addition to the Translocation Guidance and because translocation sites are mitigation for the displacement of tortoises and loss of habitat, these sites should be managed for the benefit of the tortoise in perpetuity. Consequently, a conservation easement or other durable legal designation should be placed on the translocation sites. The project proponent should fully fund management of the site to enhance it for the benefit of the tortoise in perpetuity.

Tortoise Predators and a Predator Management Plan: Common ravens are known predators of the Mojave desert tortoise and their numbers have increased substantially because of human subsidies of food, water, and sites for nesting, roosting, and perching to hunt (Boarman 2002). Coyotes and badgers are also predators of tortoises. Because ravens can fly at least 30 miles in search of food and water daily (Boarman et al. 2006) and coyotes can travel an average of 7.5 miles or more daily (Servin et al. 2003), this analysis should extend out at least 30 miles from the proposed project site, which encompasses critical habitats in the Ord-Rodman ACEC.

The DEIR should analyze if this new use would result in an increase in common ravens and other predators of the desert tortoise in the action area. During construction, operations and maintenance, decommissioning, and restoration phases of the proposed project, the County should require science-based management of common raven, coyote, and badger predation on tortoises in the action area. This would include the translocation sites.

For local impacts, the Predator Management Plan should include reducing/eliminating human subsidies of food and water, and for the common raven, sites for nesting, roosting, and perching to address local impacts (footprint of the proposed project). This includes buildings, fences, and other vertical structures associated with the project site. In addition, the Predator Management Plan should include provisions that eliminate the pooling of water on the ground or on roofs.

The Predator Management Plan should include science-based monitoring and adaptive management throughout all phases of the project to collect data on the effectiveness of the Plan's implementation and implement changes to reduce/eliminate predation on the tortoise if existing measures are not effective.

For regional and cumulative impacts, the County should require the project proponent to participate in efforts to address regional and cumulative impacts. For example, in California, the project proponent should be required to contribute to the National Fish and Wildlife Foundation's Raven Management Fund to help mitigation for regional and cumulative impacts. Unfortunately, this Fund that was established in 2010 has not revised its per acre payment fees to reflect increased labor and supply costs during the past decade to provide for effective implementation. The National Fish and Wildlife Foundation should revise the per acre fee.

We request that for any of the transmission options, the project use infrastructure (particularly towers) that prevent raven nesting and perching for hunting. For example, for gen-ties/transmission lines the tubular design pole with a steep-pointed apex and insulators on down-sloping cross arms is preferable to lattice towers, which should not be used. New fencing should not provide resources for ravens, like new perching and nesting sites.

According to Appendix A of Common Raven Predation on the Desert Tortoise (USFWS 2010), "The BLM's biological assessments and the USFWS' biological opinions for the California Desert Conservation Area (CDCA) plan amendments reiterate the need to address the common raven and its potential impacts on desert tortoise populations." Please ensure that all standard measures to mitigate the local, regional, and cumulative impacts of raven predation on the tortoise are included in this DEIR, including developing a raven management plan for this specific project. USFWS (2010) provides a template for a project-specific management plan for common ravens. This template includes sections on construction, operation, maintenance, and decommissioning (including restoration) with monitoring and adaptive management during each project phase (USFWS 2010).

Fire Prevention/Management Plans: The proposed project could include numerous infrastructure components that have been known to cause fires. Lithium-ion batteries at the project site have the potential to explode and cause fires and are not compatible with using water for fighting fires. Photovoltaic panel malfunctions have caused vegetation to burn onsite. We request that the DEIR include a Fire Prevention Plan in addition to a Fire Management Plan specifically targeting methods to deal with explosions/fires produced by these batteries/panels as well as other sources of fuel and explosives on the project site.

Habitat Compensation Plan: When the project proponent seeks an incidental take permit from the CDFW, because their project would result in take of a listed species under CESA (e.g., Mojave desert tortoise, Mohave ground squirrel, etc.), compensatory mitigation would be required. The mitigation lands must be occupied by the species and secured and managed in perpetuity for the listed species. Hence, the DEIR should include a Habitat Compensation Plan for the loss/degradation of habitat. This plan should calculate how it will fully mitigate for the impacts of the proposed project including direct, indirect, cumulative, and temporal impacts.]

Climate Change and Non-native Plants

Climate Change: We request that the DEIR address the effects of the proposed action on climate change warming and the effects that climate change may have on the proposed action. For the latter, we recommend including: an analysis of habitats within the project area that may provide

refugia for tortoise populations; an analysis of how the proposed action would contribute to the spread and proliferation of nonnative invasive plant species; how this spread/proliferation would affect the desert tortoise and its habitats (including the frequency and size of human-caused fires); and how the proposed action may affect the likelihood of human-caused fires. We strongly urge the County to require the project proponent to develop and implement a management and monitoring plan using this analysis and other relevant data that would reduce the transport to and spread of nonnative seeds and other plant propagules within the project area and eliminate/reduce the likelihood of human-caused fires. The plan should integrate vegetation management with fire prevention and fire response.

Impacts from Proliferation of Nonnative Plant Species and Management Plan: The DEIR should include an analysis of how the proposed project would contribute to the spread and proliferation of non-native invasive plant species; how this spread/proliferation would affect the desert tortoise and its habitats (including the frequency and size of human-caused fires); and how the proposed project may affect the frequency, intensity , and size of human-caused and naturally occurring fires. For reasons given in the previous paragraph, we strongly urge the County to require the project proponent to develop and implement a management and monitoring plan for nonnative plant species. The plan should integrate management/enhancement of native vegetation with fire prevention and fire response to wildfires.

Hydrology and Water Quality

Regarding water quality of surface and ground water, the DEIR should include an analysis of the impacts of water acquisition, use, and discharge for panel washing, potable uses, and any other uses associated with this proposed project, and cumulative impacts from water use and discharge on native perennial shrubs and annual vegetation used for forage by the Mojave desert tortoise, including downstream and downstream impacts. The DEIR should analyze how much water is proposed to be used during construction and operation; how any grading, placement, and/or use of any project facilities will impact downstream/downslope flows that are reduced, altered, eliminated, or enhanced. This analysis should include impacts to native and non-native vegetation and habitats for wildlife species including the Mojave desert tortoise, for which washes are of particular importance for feeding, shelter, and movements.

Therefore, we request that the DEIR include an analysis of how water use during construction, operations and maintenance, decommissioning, and habitat restoration will impact the levels of ground water in the region. These levels may then impact surface and near-surface flows at springs, seeps, wetlands, pools, and groundwater-dependent vegetation in the basin. The analyses of water quality and quantity of surface and ground water should include appropriate measures to ensure that these impacts are fully mitigated, preferably beginning with avoidance and continuing through other forms of mitigation.

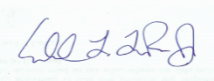
Cumulative Effects

With regards to cumulative effects, the DEIR should list and analyze all project impacts within the region including future state, federal, and private actions affecting listed species on state, federal, and private lands. The Council asks that the relationship between this proposed project and the

DRECP (BLM 2015) be analyzed, as the project area does not appear to be in a designated Development Focused Area (DFA) identified in the final Record of Decision by the BLM for the DRECP (BLM 2016). We also expect that the environmental documents will provide a detailed analysis of the "heat sink" effects of solar development on adjacent desert areas and particularly Mojave desert tortoise in addition to climate change.

We appreciate this opportunity to provide scoping comments on this project and trust they will help protect tortoises during any resulting authorized activities. Herein, we reiterate that the Desert Tortoise Council wants to be identified as an Affected Interest for this and all other projects funded, authorized, or carried out by the BLM that may affect species of desert tortoises, and that any subsequent environmental documentation for this project is provided to us at the contact information listed above. Additionally, we ask that you respond in an email that you have received this comment letter so we can be sure our concerns have been registered with the appropriate personnel and office for this project.

Respectfully,



Edward L. LaRue, Jr., M.S.
Desert Tortoise Council, Ecosystems Advisory Committee, Chairperson

cc. California State Clearinghouse, state.clearinghouse@opr.ca.gov
Jeff Drongeson, Chief, Habitat Conservation Planning Branch, CDFW, HCPB@wildlife.ca.gov

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LUCERNE VALLEY ECONOMIC DEVELOPMENT ASSOCIATION (LVEDA)

To: Jim Morrissey, Planner Jim.Morrissey@lus.sbcounty.gov
Land Use Services
385 N. Arrowhead Ave. First Floor
San Bernardino, CA 92415

From: Chuck Bell, Pres. chuckb193@outlook.com
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Lucerne Valley, CA 92356

Date: 9/19/22

LVEDA's COMMENTS ON THE SIENNA NOP – EIR – AND PROJECT PARAMETERS:

Background:

The County's record re: approving and mitigating solar projects is dismal. Especially the two (previous 'Agincourt and Marathon') on Camprock Rd. in Lucerne Valley and most recently Daggett Solar (Clearway) in Daggett/Newberry Springs. Not just tons of flying dirt/sand/PM10 and 2.5 particles – all significant health impacts - piled sand on residents' driveways/yards/in houses in Newberry Springs, etc. Wrong locations for a

multitude of reasons. And MDAQMD/LUS/Code Enforcement not willing or able to deal with the complaints and violations. Hopefully it did better for projects at Kramer Junction and Harper Lake areas.

This cannot happen again. Time for the County to fully understand and deal with the consequences – and be available when needed for restitution.

Why wasn't the NOP delivered to the Lucerne Valley library? Certainly more locally available there than in Hesperia and San Bernardino. And we expect our library to have a copy of the Draft EIR!

The Bd. of Sups. resolution re: RECE amendment '4.10' allows transfers of grandfathered applications (those filed and accepted prior to the moratorium) to other locations within a community. The obvious intent was to keep moved project acreage/MWs/other parameters, etc. relatively consistent with the original application – not allowing expanded projects that significantly differ from the original. <u>If</u> we read the old and new project descriptions correctly:

Original on Lucerne Dry Lake: 990 acres. 300 MWs.
Proposed to new location: 1,854 acres. 525 MWs.

We asked the County to explain the allowed changes and obviously greater impacts. Response (probably from LUS) follows:

"The applicant worked with landowners in the vicinity of the current project location to relocate the project area based on the feedback and input received from the local stakeholders involved in the previous effort. They also want to be sure to account for various potential constructability constraints and setbacks, e.g. hydrology, drainage, ecological resources, land use, existing infrastructure, visual resources, etc. to achieve the most optimal final design with the fewest impacts possible.

Since there was no action taken on the previous Project, they are able to propose any changes to the Project description provided it is thoroughly disclosed, assessed in the EIR and made available for public comment."

The underlined part of the response doesn't answer the core of the question – nor explain divergence from the BOS' likely intent.

Project Objectives:

"Utilize a location that is in close proximity to an 'existing' SCE substation….." If that refers to SCE's Calcite substation – it doesn't exist (as correctly stated elsewhere in the NOP).

Aesthetics:

Sent separately by others will be aerials/maps showing the tremendous extent of the project's visibility within the community and along proposed "Scenic 247" (Barstow Rd.). Glare can only be partially mitigated and must be mitigated to the max. extent possible.

The Battery Energy Storage structure at 45' height would constitute a major intrusion that doesn't exist in the area other than powerlines. It needs to be lower.

At least viewed from Barstow Rd. - fixed panel tilts to the south would be less intrusive than east/west tracking especially in the afternoon. Nevertheless – still visible. Even with undergrounding power lines from a location on the project site to the proposed Calcite Substation – with towers on both sides – it will negate the intent and value of a State-designated "Scenic Highway".

The miles of powerlines required to link all the project's dispersed sites will significantly add to said impacts. That is an issue we brought up with the developer due to all the non-project parcels in the middle. There would be less poles and lines if said parcels could be incorporated/consolidated.

Definitely a Significant Adverse Environmental Impact that cannot be mitigated.

Agriculture:

The project's incorporation of agricultural fields will exacerbate the end of large-scale alfalfa/grain/etc. farming in Lucerne Valley – a major part of its historical custom, culture and land-use. However with our diminishing usable water rights due to the groundwater adjudication – conversion of ag. to solar will at least provide an economic 'way out' for the involved farmers. It's still a land-use impact.

Air Quality/Soils:

As stated above re: previous projects – the County's poor record in requiring 'real' mitigations for dirt/dust blow-off – plus developers lack of compliance with the few

that were required – cannot happen again. As evidenced with Daggett Solar – sand cannot be stabilized with water or chemical treatments – too unstable. This project's clay-based soils have a better chance of temporary adhesion with water – but still will blow off when disturbed.

The only real and feasible mitigation for dirt/dust/PM10 and 2.5 blowoff – affecting downwind residents – would be NO SOIL DISTURBANCE DURING TYPICAL WINDY MONTHS FROM NOVEMBER TO JUNE. It's just a matter of not scheduling work during those typical wind events. Plus – since that ground is mostly flat – requiring only minimal levelling – not grading – disturb as little as possible at a time. Example: Work on 20 acre segments – stabilize it – then another 20 – etc. Again, water application is only a temporary fix. With clay soils – the only feasible solution to soil erosion and downwind health impacts – and for successful operation of the facility – is to apply at least 4" of gravel on surfaces that would be continuously disturbed. Without a gravel base – wet clay soils from rain or water application and ponding in this low part of the basin will make driving/walking/construction/etc. extremely muddy and difficult – with vehicles mired in muck. Gravel in critical

locations is the solution for both erosion and the plant's operation.

Biological Resources:

While the site itself might not be biological 'rich' – it does provide cover and space for desert species. The analysis needs to factor in the site's value as a wildlife corridor.

The glare from the two solar plants in Lucerne Valley – seen from the entire valley from the north – resembles a vast 'lake'. What mitigations are available to at least reduce migrating waterfowl from seeing it as a "lake"? Both wind and solar power aren't bird friendly – especially the most protected species.

Cultural and Tribal Resources:

The site is at the south end or probably at one time within a Pleistocene lake – therefore a thorough on-the-ground cultural survey needs to be done – not just a literature review of Native American finds. Local tribes obviously have to be contacted.

(See other comments re: the project's impact on Lucerne Valley's custom and "culture").

Greenhouse Gas Emissions:

For the EIR to comply with its CEQA obligations – it must document the GHG emissions required for mining the materials (especially lithium) - manufacturing of the panels and all plant facilities – construction-related emissions – and how many years of plant operation will be required for it to become "GHG neutral". As an example – recent studies indicate that an electric car has to travel 60,000 miles before it becomes 'neutral' – compensating for the impacts of its manufacture, etc.

Hydrology and Water Quality:

Some wells within the project footprint produce high TDS/etc. water. Some better quality. It's all usable in one form or another. Any release of a hazardous substance associated with the project – especially its battery facilities that could percolate to groundwater – even through restrictive clay lenses – would be environmentally significant.

Estimates of the amount of water required for construction of previous solar projects – primarily for soil stabilization – have been a fraction of what was actually

used or needed. The source and amount of water required for this one needs to be accurately documented and realistic. The developer will likely have access to use of water rights from the farms to be vacated by the project – but the EIR needs to be honest about water requirements.

The EIR and the County need to fully understand, acknowledge and factor in the Mojave Basin groundwater adjudication – certainly better than it has in the past.

The EIR needs to cover any impacts on surrounding properties from any water flow diversions proposed by the project or required by County Flood Control.

Land Use and Alternatives:

The EIR needs to assess the impacts/consequences of the project completely transforming a rural farming/residential area into an industrial complex – albeit built-out solar might have different consequences than typical active 'industrial'. The construction will certainly make it fully "industrial' especially for the affected residents.

Alternatives to industrial solar taking up desert ground exist in many forms – ie: solar panels on the thousands of square miles of commercial parking lots in the western states – commercial and residential roof-tops – localized CCA's for communities – etc. And most of these utilizing local electrical grids not requiring thousands of miles of transmission lines that sluff off a high percentage of MWs along the way.

8 Minute reps. seem to want to work with the community. We met with them on site. The project site is large enough to warrant a revised Project Description eliminating panels or any disturbance immediately up-wind (primarily west) of residences – and stabilizing said ground as part of the project and as a courtesy to those that will be significantly affected by it – even with said changes. A 'revised' project would be the best form of 'mitigation' for these residences – of course along with the soil mitigations listed under Air Quality.

The County must require the developer to post a bond to cover the County in case it has to manage future decommissioning.

Cumulative/Growth Inducing Impacts:

We have dealt with project EIRs for many years. Never have we been confronted with the scale of cumulative Impacts associated with this one. Does this project alone warrant SCE's proposed Calcite substation? Does it need State Land's Stagecoach Solar to make the substation viable? Would this project's 'contribution' to the viability of the Calcite substation trigger the proposed (now on hold) Calcite Solar project? Then how does the proposed Ord Mt. Solar project fit in (now also on hold)? If some or all of those projects get approved and built – Lucerne Valley will be 'industrialized' – significant loss of its current rural, land-use integrity. Solar panels about everywhere – numerous powerlines across Barstow Rd. to the Calcite Substation, etc. etc. And of course that part of "Scenic 247"shot to hell.

And to make this situation more troublesome – the State Lands Commission is CEQA Lead Agency and decider on Stagecoach Solar in the northwest part of the valley - and the State's Stagecoach EIR will be the EIR for SCE's Calcite Substation - with the CPUC probably its deciding entity. There may or not be any County Conditional Use Permits required for it to weigh in for all these projects. So with Sienna's 'contribution' to the potential advancement of the Calcite substation – the State has a bigger hold on making decisions in our community. (That's like the fox and chickens deciding what to have for lunch).

And even with the County's "4.10" moratorium prohibiting any new solar applications to be filed – there are many acres of BLM's DRECP's Development Focus Areas (DFAs) in Lucerne Valley where new projects could be filed and with little or no County ability to weigh in.

Another potential growth-inducing impact: Apparently there is recent legislation or an 'Order'(?) allowing an <u>option for developers to bypass local project processing</u> and having the State - likely the Energy Commission - to be the entity deciding on solar/wind/renewables projects on

private lands. This would pre-empt counties from actions on them if the developer option is exercised – just another loss of local land-use control.

THE EIR HAS TO BE HONEST ABOUT ALL OF THIS!

NOTE: Latest info. we received from our State reps. re: Calcite substation and Stagecoach Solar:

Southern California Edison (SCE) has not filed a permitting Application with the CPUC yet for the Calcite Substation project. SCE provided CPUC staff with the below project summary information, including status and milestones, in July:

SCE Calcite Substation Summary

- *Need: To support the Stagecoach Solar Project and subsequent solar projects*
- *Background:*
  - *Aurora Solar (subsidiary of Avangrid) executed an interconnection agreement with SCE and CAISO in 2016 for 200 MW Stagecoach Solar Project + 50 MW for 4 hours battery energy storage on State Lands Commission land in San Bernardino County.*
  - *Aurora Solar issued an Authorization to Proceed requesting SCE to proceed with the Calcite Substation design, as the Stagecoach Solar Project is triggering the need for Calcite Substation.*

    - *State Lands Commission is performing California Environmental Quality Act (CEQA) review of the Calcite Substation as part of the Stagecoach Project.*
    - *SCE's project scope entails the construction of a 220-kV substation, loop in of the Lugo-Pisgah No.1 220-kV Transmission Line.*
- *<u>Status and Current Activities:</u>*
    - *May 2022: Avangrid suspended Stagecoach Solar Project due to the US Department of Commerce's decision to investigate anti-dumping and anti-circumvention duties on solar imports from Cambodia, Malaysia, Thailand, and Vietnam.*
- *<u>Upcoming Milestones:</u>*
    - *February 2023: Suspension by Avangrid of Stagecoach Project ends.*

The CPUC does not have a firm date on when we expect to receive a permitting Application from SCE on this project. We expect that we will not have an update from SCE until sometime after February 2023 when Avangrid's Stagecoach Solar Project suspension ends. In addition, the State Lands Commission is the lead agency for CEQA on the Calcite Substation. Thus, the CPUC will rely on the Environmental Impact Report (EIR) prepared by State Lands to process SCE's permitting Application.

<u>Noise:</u>

Construction noise could at least be partially mitigated for residents with the revision listed above. Noise carries a long way in desert airsheds. It would be bad enough and significant in that currently quiet area even during normal work hours – but the potential for "Some activities continuing 24 hours per day – seven days per week" will definitely constitute a 'significant adverse impact' for adjacent and surrounding residents. (See Transportation below re: traffic).

Transportation/Circulation:

This is critical content for an adequate EIR: Will the construction equipment come from Barstow to the north? Or off Hwy 18 though town from the west. Or through town from Hwy 247 from the east? Same for the workers? Or a mix? And at what percentage? What will be the main access route to the project site? How much and what type of trucks equipment would be expected during a typical day – week – etc.? How much associated noise and vibration? How would it affect regional and local residents? And impacts on local County

roads and normal traffic? How would it affect the town's Hwy 247/247 4 way stop? Number of vehicles/hour/day there? That intersection isn't wide enough for local semitrucks without needing the opposing lane for turning movements – let alone the long/wide rigs that this project will require. Where would right/left turn pockets be required – even if just temporary?

We will expect a detailed Traffic Study and analysis of these project impacts.

Utilities and Service systems:

8 Minute Solar reps. attend our LVEDA meetings and want to be 'part of our community' – very nice people and seem very generous. LVEDA's position is that we don't engage in discussion of any donations or financial help for our community projects until a project has been approved or in operation. Want to avoid any such conflicts.

There is one option for 8 Minute to be a major help and community benefactor – assuming this is even feasible and our local SCE substation can handle it - and the lines to it could be reached from the project site or nearby. If

feasible and practical – major question: 8 Minute donates X MWs diverted from the project directly though our local distribution system to SCE's local substation in town. And would only work if SCE would factor in lower rates for all our customers who get power off the SCE system. And of course if said substation has excess capacity or it could be increased. (This needs to be assessed and would likely be more of a "Project Description" than a direct EIR issue).

All solar reps. say that its power goes to the SCE grid and therefore 'we get it'. We have heard reports that MWs from California often get exported to other states. If true – what % of Sienna's output would be included in that export?

With Calcite Substation in place taking who knows how much power from potential Lucerne Valley solar plants – is there sufficient transmission capacity from Calcite Substation to the Lugo Substation in Hesperia to accommodate it all? What would need to be upgraded in that segment if any? That's a critical part and consideration of all these potential projects aided and abetted by Sienna Solar.

MBCA

morongo basin conservation association

September 22, 2022

County of San Bernardino, Land Use Services Department
Attn: Jim Morrissey, Planner
385 North Arrowhead Avenue, First Floor
San Bernardino, CA 92415
Email: Jim.Morrissey@lus.sbcounty.gov

RE: Scoping Comments for Sienna Solar and Storage Project in Lucerne Valley

Dear Mr. Morrissey:

MBCA takes this opportunity to comment on the proposed Sienna Solar and Storage Project consisting of the installation of a photovoltaic (PV) solar facility, a battery storage system (BESS), Project substation, operations and maintenance building(s), and the underground collection system on approximately 1,932-acres/500MW. The Project would interconnect with the SCE Calcite Substation (currently pending final permits and construction) via a proposed overhead and/or underground 230-kV gen-tie line in addition to other ancillary facilities utilizing private and potentially public right-a-way.

RECE Policy 4.10, 4.10.2, Co Resolution No. 2019-17, Section 3, and Sienna 2

- The Renewable Energy and Conservation Element (RECE) Policy 4.10: Prohibits utility-oriented renewable energy (RE) project development on sites that would create adverse impacts on the quality of life or economic development opportunities in existing unincorporated communities.
- Re 4.10.2 prohibits development of utility-oriented RE projects within the boundaries of existing community plans, which at the time of the RECE adoption included Lucerne Valley. This would seem to protect Lucerne Valley from the larger Sienna 2. However,
- County Resolution No. 2019-17 Section 3 states: *Any application for development of a renewable energy generation project that has been accepted as complete in compliance with CA Gov. Code Sec. 65943 before the effective date of this Resolution shall be processed in compliance with the policies and regulations in effect at the time the application was accepted as complete. These applications may be located to other sites under the same policies and regulations.*

The RECE and the Resolution were adopted in February 2019. The Resolution was not incorporated into the RECE. The original Sienna Application for a CUP was accepted in 2014.

However, eight years earlier the RECE incorporated the Countywide Vision Core Values as fundamental to development of the siting criteria for utility-scale RE projects. The Core Values sited on page 4 of the RECE were adopted on June 30, 2011 as part of the Countywide Vision Statement. The RECE Guiding Principles, based largely on the Core Values, are subject to the General Plan (2007). When complying with the policies and regulations, which comes first? In this case the chickens: General Plan (2007) and Core Values[1] (2011) precede the 2014 Sienna 1 Application. The County Resolution NO. 2019-17, Section 3, and the 2022 Sienna 2 NOP, the eggs, follow.

The proposed Sienna 2 project and its footprint is significantly different than the project described in the original application even though the 645 ac/300 MW (2014) grew over time to 1630 ac/450 MW (2018). The applicant, 99MT 8ME, LLC, remains the same.

The relocated Sienna 2 is larger than the final design of Sienna 1 by 302 acres. It now also includes a towering 45 foot high battery storage structure and a whopping 39 miles of collector and gen-tie lines to connect areas in within its irregular footprint with the substation. A reasonable person could assume these are not the same projects. See Sienna 2 NOP Figure 2-Local Vicinity Map.

CEQA Environmental Factor IX. LAND USE AND PLANNING: a) The large footprint Sienna 2 physically divides the established community as clearly visualized in Appendix A Figure 10.

Comment: Approval of Sienna 2 is questionable under Section 3. However, If Sienna 2 is approved under Section 3 it will bring regionally permanent adverse changes to the character, quality-of-life, and economy of the severely disadvantaged community (SDAC) of Lucerne Valley (https://gis.water.ca.gov/app/dacs/ Figure 9 Appendix A). These changes must be itemized under potentially significant cumulative impacts at all levels off-site and on-site.

Project Objectives

Is the SDAC community of Lucerne Valley included in the proposed Sienna 2 Project Objectives? No. But, it should be. See the RECE Community-Oriented Guiding Principles (page 5).

- Keep large-scale utility projects separate from or sufficiently buffered from existing communities, to avoid adverse impacts on community development and quality of life.

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[1] CORE VALUES Renewable Energy and Conservation Element Page 4.
The Countywide Vision Statement adopted by the Board of Supervisors on June 30, 2011, fosters strategic countywide coordination in a manner that reflects the priorities of local residents, businesses, and stakeholders. The citizens of San Bernardino County share the following core values, as articulated in the Countywide Vision:
 Quality of Life: A high quality of life for residents of the county that provides a broad range of choices to support the county's diverse people, geography, and economy to live, work, and play.
 Vibrant Economy: Ample economic opportunities for current residents and businesses that support countywide prosperity, as well as new investment in economic growth.
 Conservation of Natural and Cultural Resources: Stewardship that conserves and responsibly uses environmental, scenic, recreational, and cultural assets, ensures healthy habitats for sensitive plants and wildlife, enhances air quality and makes the county a great place for residents and visitors alike. Renewable energy, when developed responsibly, is a valuable natural resource.
 Sustainable Systems: High quality built, natural, and social systems that complement, rather than degrade, the county's natural resources, environment, and existing communities.
 Self-Reliance: Communities or individuals meeting their own energy needs.
 Open Governance: Governance guided by open, transparent, and ethical decision-making that values the county's environment, people, heritage, location, economy, and community spirit.

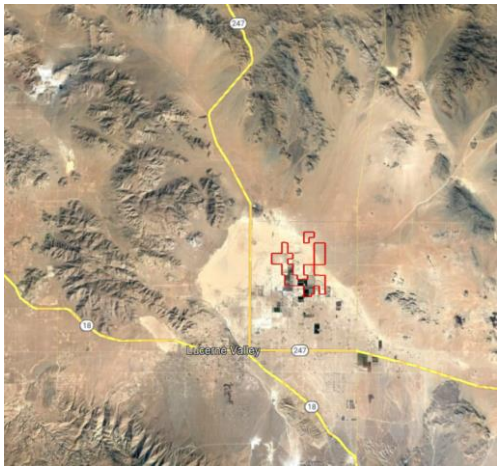
- Provide residents more affordable, reliable, diverse, and safe access to energy, especially renewable energy.

Comment: Should the proposed Sienna 2 be approved, the SDAC of Lucerne Valley will be required to absorb impacts to its development and quality of life. How much of that 500 MW of solar power will be diverted directly to community residents or community buildings? How will 8ME bring affordable, reliable, and safe access to renewable energy to Lucerne Valley residents?

CEQA Environmental Factor

I. AESTHETICS

The project would: a) have a substantial adverse effect on a scenic vista; b) substantially damage scenic resources; c) substantially degrade the existing visual character or quality of public views of the site and its surroundings; d) create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?



The Impacts of this project on scenic vistas and the visual character of the community are significant. The quality-of life for all residents will be changed. No longer will the view out the window or from the front porch be one's neighbor (wave to say hi) and the surrounding mountains.

The Project footprint would industrialize an area of ~5 square miles of land east of SR 247. It will be visible for 322 sq. /mi, and within the viewshed of 2,761 homes,

See Figure 2: Visibility of Proposed Sienna Solar and SCE Substation Projects (page 4) and Figure 10 Appendix A

Figure 1: Landscape view of Proposed Project showing its basin location in relation to the surrounding mountainous viewshed.

The NOP does not provide information on lighting but one assumes for security purposes lighting will be required. In addition, the lighting glow at night could be substantial and affect wildlife as well as the residents. Please consult the SB Co Outdoor Lighting Ordinance https://lus.sbcounty.gov/planning-home/outdoor-lighting-regulations/

The County has designated SR 247 as scenic. Currently, its views are largely unobstructed. SR 247 could be one of the least despoiled series of desert views in California.

As proposed, Sienna 2 will impact SR 247's designation by Caltrans as "eligible" for Scenic Highway status. The State has established it as eligible for scenic designation; therefore it has scenic protection under Chapter 27 of the California Department of Transportation Standard Environmental Reference: *The intent of the State Scenic Highway Program is to protect and enhance California's natural scenic beauty. If a highway is listed as eligible for official designation, it is also part of the Scenic Highway System and care must be taken to preserve its eligible status*. Department of Transportation website:
http://www.dot.ca.gov/ser/vol1/sec3/community/ch27via/chap27via.htm#scenic

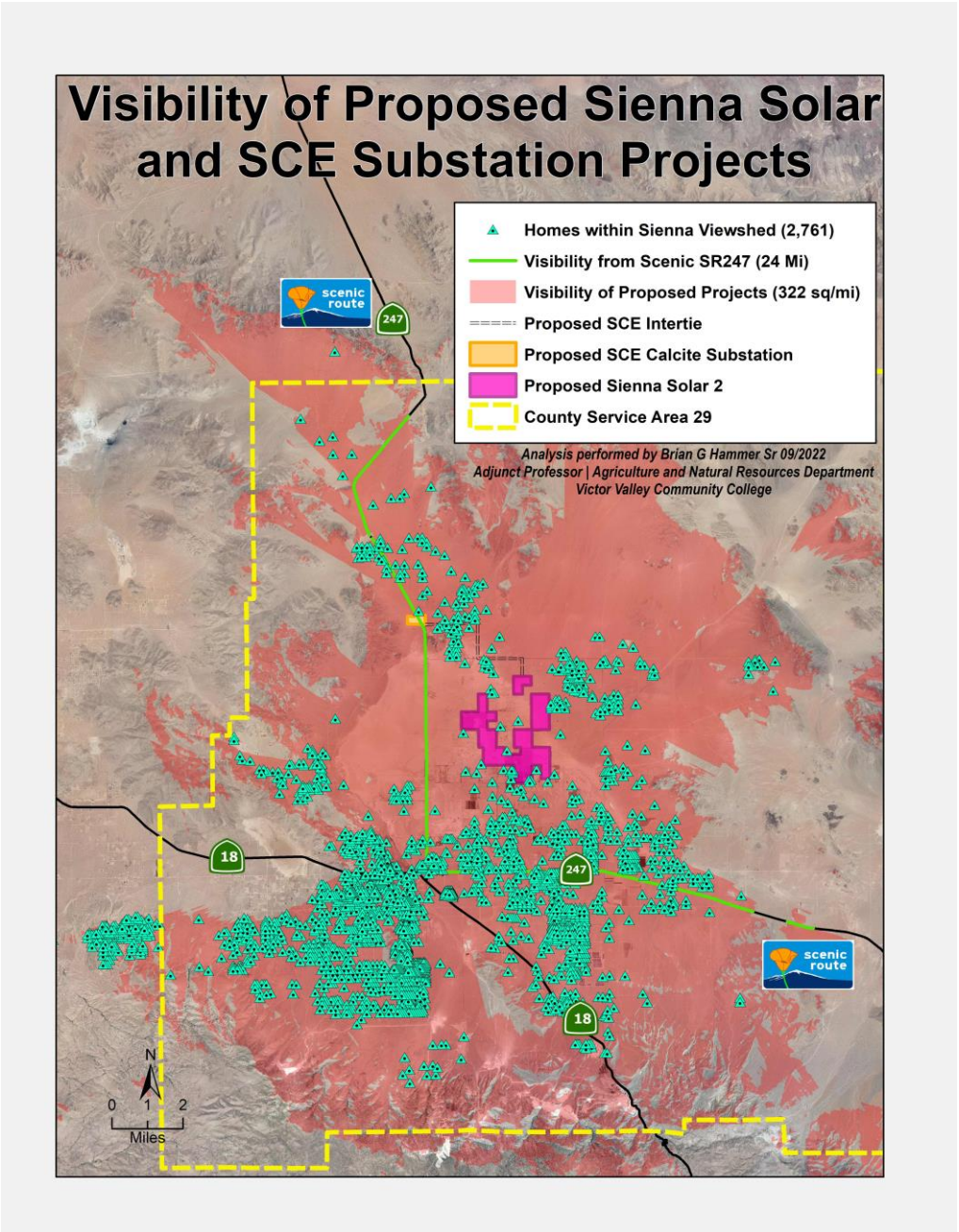


Figure 2: Visibility of proposed Sienna Solar and SCE Substation Projects

Because of the scale the homes look close together but in reality, and factoring in the history of homesteading back to the 1870s and the later Small Tract Act (5 acre Jackrabbit Homesteads 1938-1976) most homes are on 1 to 5 acres and larger. See Figure 10 Appendix A

Comment: The Impact of the proposed Project is potentially significant and all mitigation measures must take into consideration the whole action involved, including off- and on-site.

THIS IS NOT AN ACT OF GOD



Taken 03/17/2014 at 2:04 PM at the top of Camp Rock Road, Lucerne Valley

THIS IS INDUSTRIAL SOLAR IN THE DESERT

CEQA Environmental Factor
III AIR QUALITY:
As we will see (Figure 3, page 6), when disturbed the Sienna 2 project area soils will release considerable PM 10 and PM 2.5 exposing a large number of sensitive receptors (Figure 2) to substantial dust pollution resulting in significant health impacts. See the Newberry Springs blog referenced below.

Unfortunately, the local Mojave Desert Air Quality Management District (MDAQMD) is not able to make accurate PM determinations because it lacks ambient air quality monitors in the affected area. Their monitors are in Hesperia and Victorville approximately 22 miles west, upwind of the proposed project and blocked by the Granite Mountain ridges. The Lucerne Valley ambient air monitor is located at a school on Aliento Road off Route 18 going toward Big Bear. It monitors descending air from the higher up Mitsubishi Cement Mine and would not record PM rising from disturbance 5 miles to the north although the dust clouds will be visible.

As a Best Management Practice 8ME would have baseline monitoring data for at least one year, but 2 is better. Without baseline data you would be advised to rely on local experience including consultation with Chuck Bell and members of LVEDA. When the wind blows, beginning at 15 mph. the dust will rise during the 12 to 24 months of continuous construction and during operation. See photo at the top of this page. The MDAQMD Dust Control Plan which 8ME will have to sign relies on water and chemicals. To see how well this has worked for the folks in Newberry Springs during the current construction of the Daggett Solar Project visit
http://newberryspringsinfo.com/Alliance/Compilation3.html

Figure 3: Soils with potential for dust issues illustrates how wise 8ME was to move Sienna 1 east off the dry lake proper. The beige color in Figure 3 is the shrinking clays found at the upper edges of Pleistocene lakes. Following storms, as the slimy clays dry out, huge fissures form which swell and heave making it difficult to travel across. A thick gravel surface will be required for vehicles traveling across the project area. The agricultural parcels will lose their cover crops along with the moisture and roots which hold the clay surface in place.

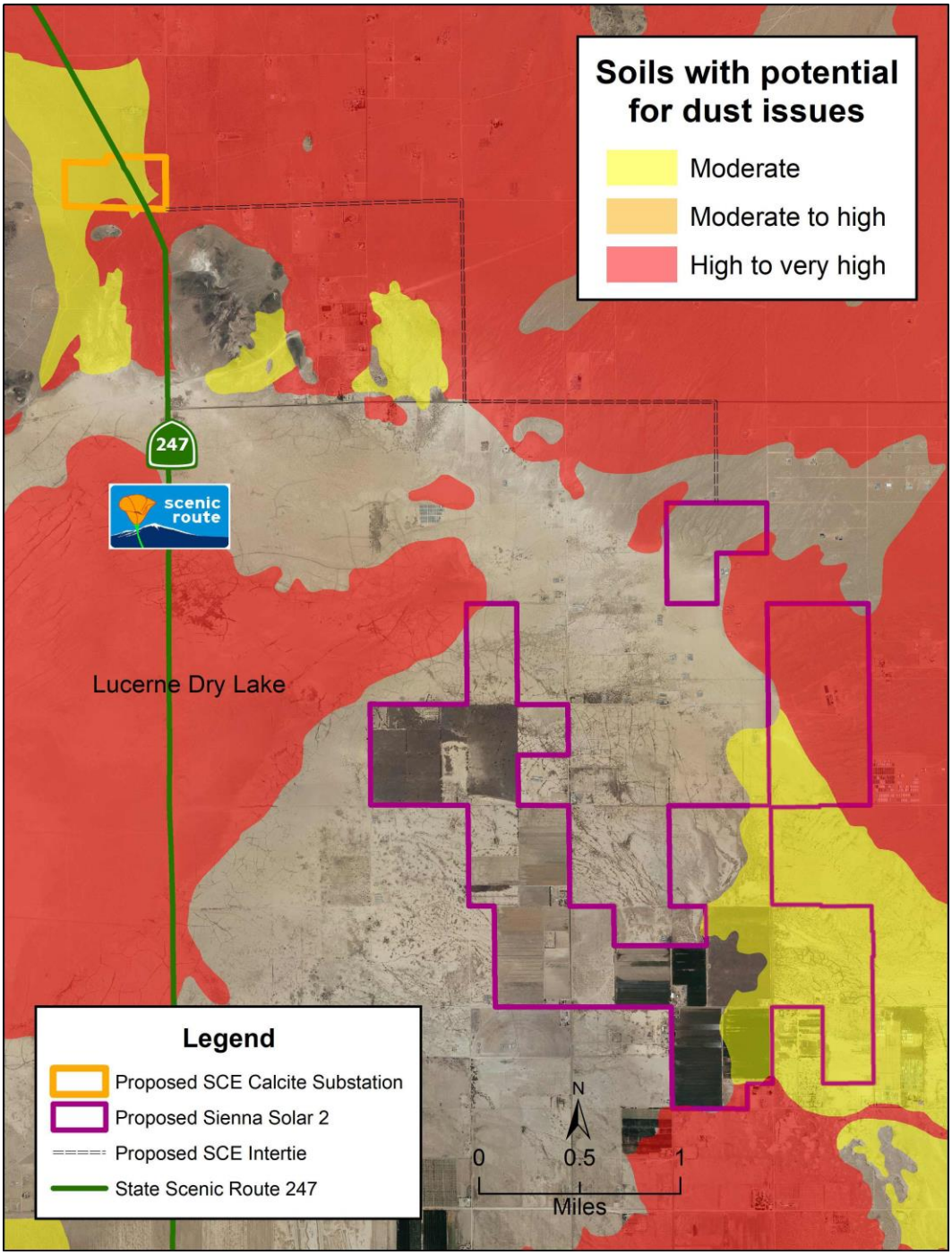


Figure 3: Soils with potential for dust issues

Although CEQA lists the factors to be addressed alphabetically nature doesn't work that way. All discussion of air quality includes the geology and soils and water availability for the life of the project and beyond.

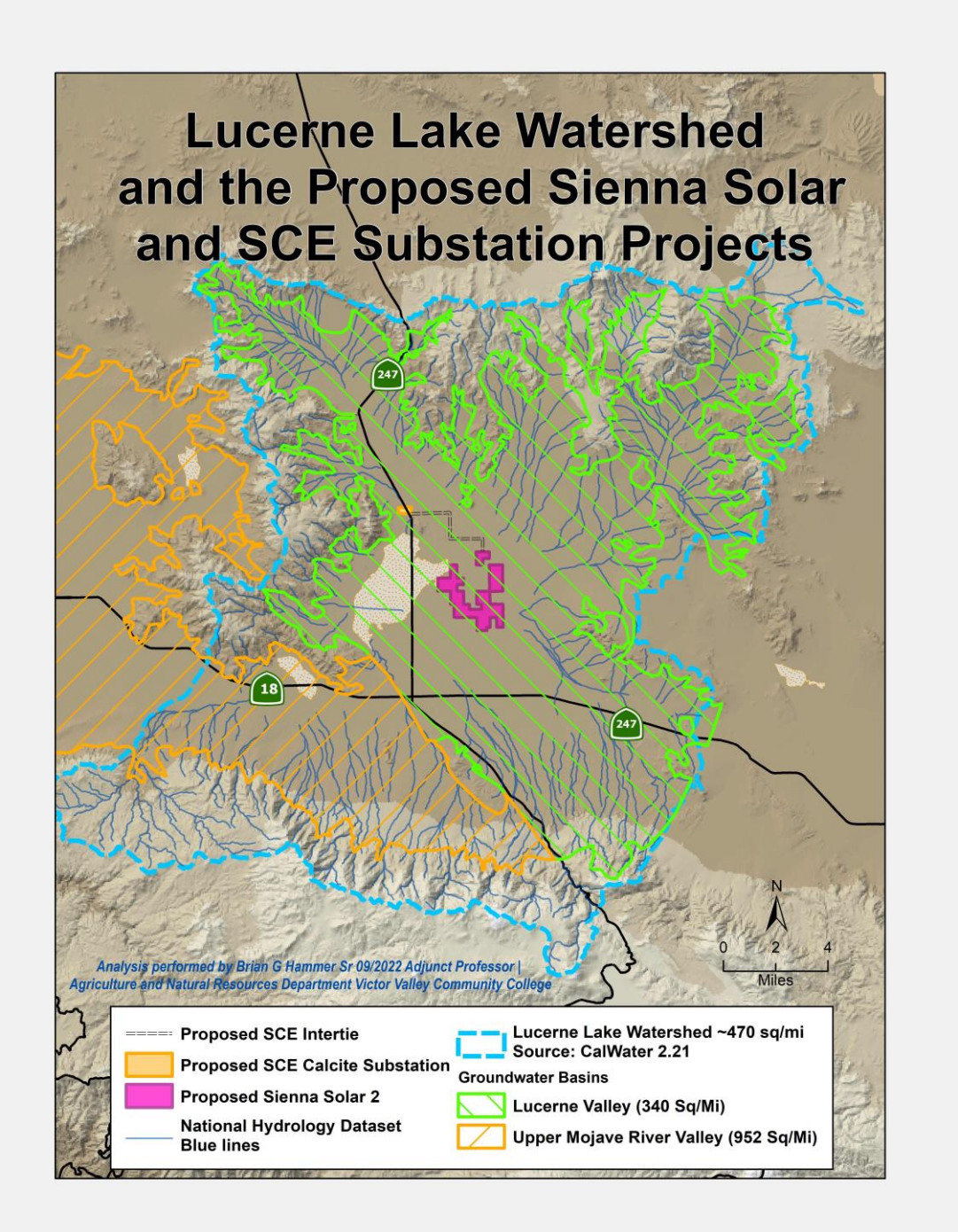


Figure 4: Lucerne Lake Watershed and Groundwater Basins

Comment: Local residents relying on wells must be protected. Water for construction, operation, and decommissioning (unless the project is continued) must be accounted for. Chuck Bell, President of LVEDA, has pointed out that estimates for previous projects primarily for soil stabilization have been a fraction of what was actually used or needed. The EIR needs to be realistic about water and dust control. Locals have the experience to know when soil stabilization and water calculations are based on the best available information.

Dust control and water availability, including recharge have potentially significant impacts from the proposed Sienna 2 project. Before any approval of the CUP 8ME must show they have the water rights and/or will serve letters to provide all the water required for the duration of the project without drying up neighboring wells. This information must be publically disclosed.

For these comments the USGS 2022 study done with the Mojave Water Agency was consulted.
https://www.usgs.gov/publications/hydrogeology-and-simulation-groundwater-flow-lucerne-valley-groundwater-basin

> *Groundwater withdrawal from pumping has exceeded the amount of water recharged to the basin, causing groundwater declines of more than 100 feet between 1917 and 2016 in the center of the basin. The continued withdrawal has resulted in an increase in pumping costs, reduced well efficiency, and land subsidence near Lucerne Lake. Although the volume of pumping has declined in recent years, there is concern that new agricultural growth and limits on imported water will continue to strain the sustainability of the groundwater system*.

Dust Control: Those of us living in areas subject to dust storms during construction and operation of utility-scale solar projects speak from experience. It must be dealt with up front to prevent both the health and property impacts. We suggest again that the Newberry Springs blog visualizing their ongoing experience with the construction of Daggett Solar be viewed.
http://newberryspringsinfo.com/Alliance/Compilation3.html
The Great Basin Unified Air Pollution Control District provides useful guidance on the technology for controlling dust in our basins.
https://gbuapcd.org/OwensLake/DustControls/

CEQA Environmental Factor
IV BIOLOGICAL RESOURCES
d) The project would interfere substantially with the movement of established native resident or migratory wildlife species and their migratory corridors.

The EIR biological report must account for the golden eagles known to fly the area. The 39 miles of connector and gen-tie pole lines will provide a number of perches for eagles and other birds especially ravens. Raven numbers are out of control in the region – poor desert tortoise,
https://www.29palms.marines.mil/Portals/56/Docs/Environmental%20Affairs/RavenManagementFinalPEA_signedFONSI.pdf

Apple Valley is preparing a Multispecies Habitat Conservation Plan And Natural Community Conservation Plan (Apple Valley MSHCP/NCCP).
https://www.applevalley.org/home/showpublisheddocument/31135/637575478074670000

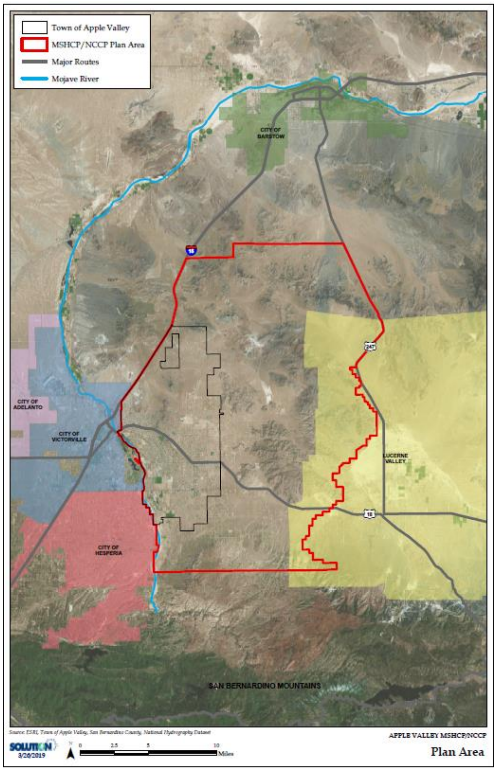


Figure 5: Plan Area for the Apple Valley HCCP

The Plan Area does not overlap with the proposed Sienna 2 site but the covered species are not impressed with artificial boundaries and should be studied for overlap with the Sienna 2 site in the EIR. See Table 1 below for the list of covered species especially those that are threatened, endangered, or candidate species under federal and state laws.

Figure 6: Terrestrial Connectivity (page 10) places the proposed Sienna 2 within both Connectivity Rank 3 and 4 as developed by California Department of Fish and Wildlife. It is also within the DRECP Desert Linkage Network.

The terrestrial connectivity bridges the area between the San Bernardino Mountains and the Newberry and Rodman Mountain Wilderness Areas.

Covered Species

The species proposed for coverage under the MSHCP/NCCP include four State and/or Federally listed species and five special status species and/or state fully protected species in the Plan Area (see Table 1, below). The list of species proposed to be covered in the MSHCP/NCCP may be modified to include additional threatened or endangered species, and species that may become listed as endangered or threatened during the life of the permit that occur within the project area and may be affected by the covered activities.

TABLE 1 – SPECIES PROPOSED FOR INCLUSION IN THE APPLE VALLEY MSHCP/NCCP

Common name	Scientific name	Federal status	State status
Birds			
Burrowing owl	*Athene cunicularia*	None	State Species of Concern (SSC)
Golden eagle	*Aquila chrysaetos*	Protected under BGEPA and MBTA	Fully Protected Watch List
Least Bell's vireo	*Vireo belli pusillus*	Endangered	Endangered
Southwestern willow flycatcher	*Epidonax traillii extimus*	Endangered	Endangered
Western yellow-billed cuckoo	*Coccyzus americanus occidentalis*	Candidate	Endangered
Mammals			
Desert bighorn sheep	*Ovis canadensis*	None	Fully Protected
Desert kit fox	*Vulpes marotis arsipus*		Fully Protected Furbearing Mammal
Reptiles			
Desert tortoise	*Gopherus agassizii*	Threatened	Threatened
Plants			
Joshua tree	*Yucca brevifolia*		Candidate Threatened

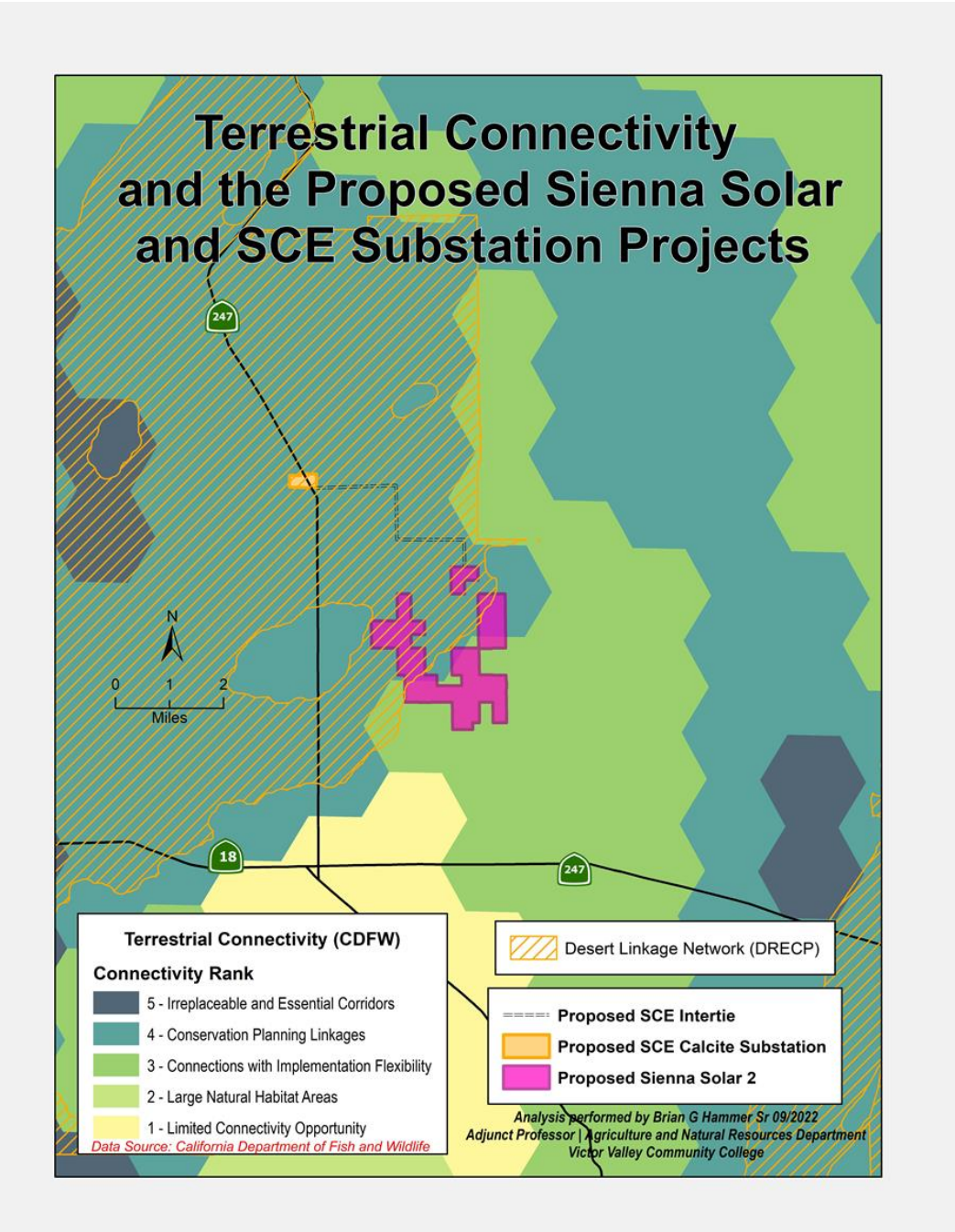


Figure 6: Terrestrial Connectivity

Comment: The EIR must analyze the biological richness of the area and the mitigation measures proposed for Sienna 2 on- and off-site including the larger surrounding area to maintain the integrity of the connectivity between the San Bernardino Mountains and the Newberry and Rodman Mountains Wilderness Areas.

CEQA Environmental Factor
XIII PUBLIC SERVICES
The proposed Project's battery storage system will include up to 525 MW of energy storage capacity. Lithium batteries are known to be highly explosive and flammable under certain conditions. A fire in the battery storage system would have a significant impact on the surrounding community and Fire fighting service..

Comment: The EIR must account for the flammabality of the 45' high storage facility and show if the local San Bernardino Fire Station 8 has the equipment and the trained fighters to extinguish a lithim blaze while protecting the surrounding community members. Mitigation could require 8ME to support expanded equipment, personnel, and training.

CEQA Environmental Factor
XVII. MANDATORY FINDINGS OF SIGNIFICANCE
a) Does the project have the potential to substantilally degrade the quality of the environment?
b) Does the project have impacts that are individually limited but cumulatively considerable?

The answer to both a. and b. is yes. Following we show the degradation of the environment as it relates to migratory bird species. And we will demonstrate the triggering affect of this project and its dependence on additional projects.

Cumulative effects
Please see Figure 7: Cumulative Solar Projects (page 12)
Figure 7 shows the existing and planned solar projects and the SCE Calcite Substation.

Southern Lucerne Valley
- Agincourt (80 acres) and
- Marathon (152 acres) off Camp rock road in

Northern Lucerne Valley
- Sienna 2 (proposed – 1932 acres)
- Ord Mountain (proposed - 483 acres)
- Calcite Solar (proposed - 664 acres)
- Stagecoach Solar (proposed – 1950 acres)

Daggett Solar (in construction – 3500 acres) in Newberry Springs

The four Projects in northern Lucerne Valley depend on the approval and construction of the Calcite Substation for energy distribution. The EIR for Calcite is connected to Stagecoach Solar with approval by the CPUC before construction. Stagecoach is on State Lands and California State Lands is the Lead Agency.

Comment: Figure 7: Cumulative Solar Projects (page 12) is included to assist with the cumulative analysis on the environment and on the SDAC communities of Lucerne Valley and Newberry Springs. From the personal investment of homeowners, health effects from diminished air quality, loss of community tourist revenue, the personal loss of viewshed and dark night skies, and the change in day-today living that the muliple effects will change many lives. Watch again the Newberry Springs blog documenting Daggett Solar construction.

Lake Effect and degradation of the environment

If all the listed projects are built the millions of solar panels when stowed at night under moonlight or just starlight will resemble a series of ponds of varying sizes. Migrating birds, many species flying at night, will see the ponds as places to stop and rest, and feed, before continuing on to the Salton Sea and other points south. Unfortunately, they tend to crashland on the hard panel surface with fatal results. Panel glow will also attract birds during daylight hours.

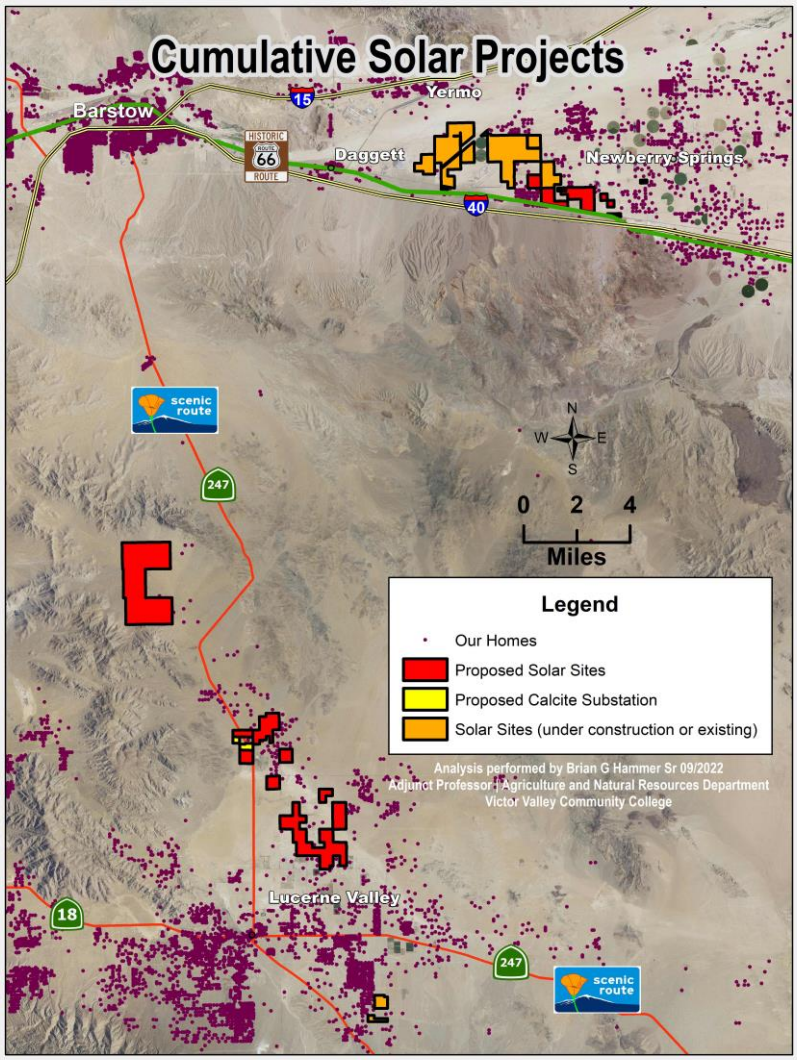


Figure 7: Cumulative Solar Projects

Birds have been migrating the inland route of the Pacific Flyway for millions of years. During the Pleistocene (Ice Ages) they would have been used to seeing the landscape below them dotted with lakes in the basins between the hundreds of mountain ranges. At the end of the Ice Ages the climate warmed and the lakes became ephemiral and then disappeared. Now, human created ponds attract the birds to rest and eat. It can be hard to distinguish the difference between a solar field and a pond at night and certain times during the day. The Lake Effect is a deadly illusion.

The Lake Effect as a bird killer has been known since 1982 with the installation of the experimental Solar One in Daggett. During migration hundreds of migrating birds a day would be observed in the Daggett Evaporation Ponds. Occasionally, disoriented birds flew into a heliostat. This reviewer reports from experience as the biologist on site to observe and record the birds.

In order to understand the magnitude of the bird problem it is necessary to look beyond bird surveys of the solar sites themselves for a regional picture. Fortunately this is easy to do because the Cornell Lab of Ornithology has given us the tool: eBird is a citizen science, peer reviewed site where people record birds at locations around the world. To access this project go to https://ebird.org/hotspots. When the world map comes up type “Daggett Evaporation Ponds” into the Hotspot search window. Shortly you will see the hotpot on a larger map. For a better look at

the area activate the satellite map. Pulling back you will get a view of other hotspots in the area. I am interested in the ones marked by yellow or red balloons. Figure 8 shows the mapped area in Figure 7. Daggett/Newberry Springs is on the east side. Lucerne Valley is at the base of the arc of mountains. The Mojave River defines the mountain arc and includes the red balloon Mojave Narrows Regional Park.

The yellow balloons:
Piute Rd. Dairy, Daggett Evaporation Ponds and Tees & Trees surround the Daggett Solar Project. The rest of the yellow balloons trace ponds along the Mojave River.



Figure 8: eBird Hotspots captured 9/19/2022

eBird Hotspot from east to west	# species	# counts
Camp Cady	109	38
Piute Rd. Dairy	125	135
Daggett Evaporation Ponds	150	291
Tees & Trees – Barstow Ponds	256	218
Barstow WTP	165	186
Barstow Community College	121	310
Helendale WTP	126	141
Silver Lakes (SBE Co.)	187	235
Mojave Narrows Regional Park (red balloon)	267	1222

Table 2: eBird Hotspot data from east to west. The #counts is the number of times that a person has uploaded observations to the site.

The area is rich is species diversity. Most of the species are migratory, heading south to the Salton Sea and beyond.

The proliferation of utility solar sites in this area of the flyway is deadly. Without scientific study and transparent reporting there is no way to know if any mitigation measures work.

Comment: In addition to the CEQA Mandatory Findings the County Development Code Findings must be completely evaluated in the project EIR.

The San Bernardino County Development Code § 85.06.040 Findings Required

(1) The site for the proposed use is adequate in terms of shape and size to accommodate the proposed use and all landscaping, loading areas, open spaces, parking areas, setbacks, walls and fences, yards, and other required features pertaining to the application.

(2) The site for the proposed use has adequate access, which means that the site design incorporates appropriate street and highway characteristics to serve the proposed use.

(3) The proposed use will not have a substantial adverse effect on abutting property or the allowed use of the abutting property, which means that the use will not generate excessive noise, traffic, vibration, or other disturbance. In addition, the use will not substantially interfere with the present or future ability to use solar energy systems.

(4) The proposed use and manner of development are consistent with the goals, maps, policies, and standards of the General Plan and any applicable community or specific plan.

(5) There is supporting infrastructure, existing or available, consistent with the intensity of development, to accommodate the proposed development without significantly lowering service levels.

(6) The lawful conditions stated in the approval are deemed reasonable and necessary to protect the public health, safety, and general welfare.

Thank you for your consideration of these Scoping Comments.

Special thanks to Board Member Brian Hammer for the informative and visually compelling maps without which this analysis could not have been done.

Sincerely,

Pat Flanagan, MBCA Board Member and Project Reviewer

Steve Bardwell, MBCA Board President

Cc:

Supervisor Col. Paul Cook	Supervisor.Cook@bos.sbcounty.gov
Supervisor Janice Rutherford	Supervisor.Rutherford@bos.sbcounty.gov
Supervisor Dawn Rowe	Supervisor.Rowe@bos.sbcounty.gov
Supervisor Curt Hagman	Supervisor.Hagman@bos.sbcounty.gov
Supervisor Joe Baca, Jr.	Supervisor.Baca@bos.sbcounty.gov

APPENDIX A

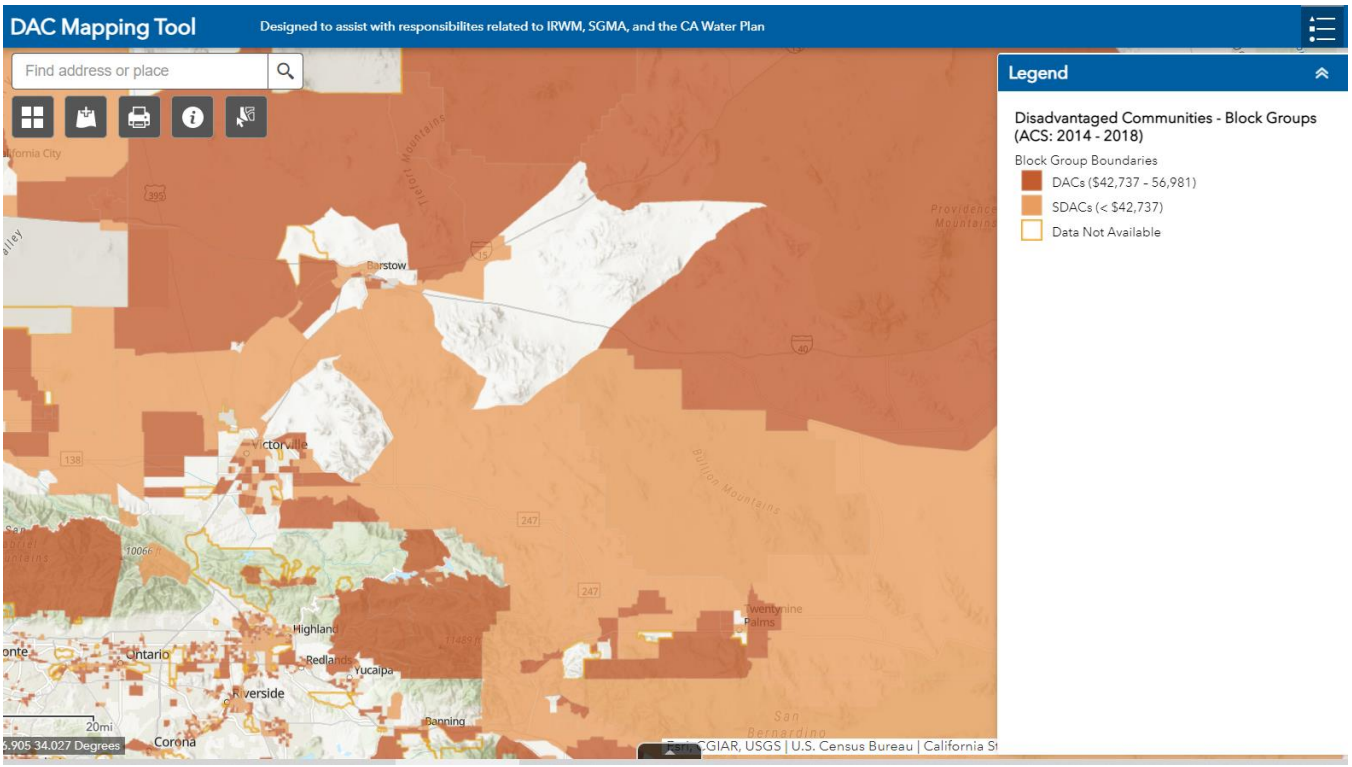


Figure 9: Map showing the Severely Disadvantaged Communities (SDAC) of Lucerne Valley and Newberry Springs.

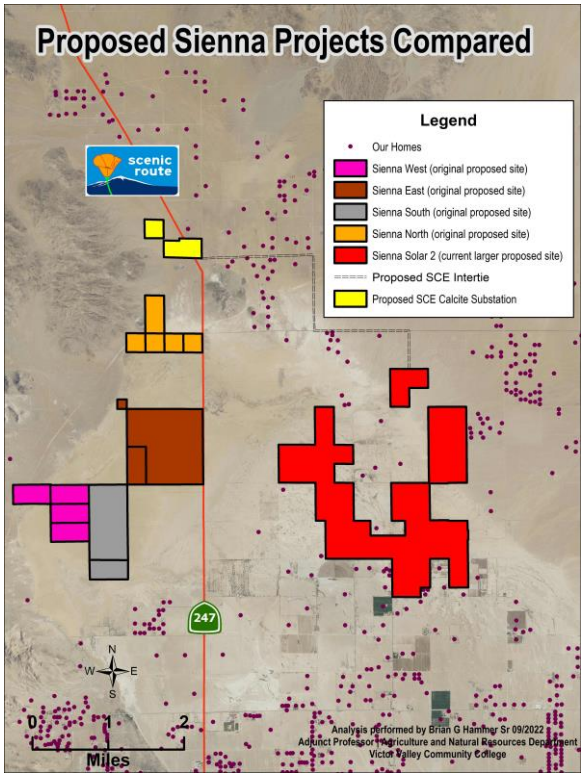


Figure 10: Proposed Sienna Projects Compared

The map demonstrates the degree to which the original Sienna 1 Project, even after the additional acres were added, did not physically divide the community of Lucerne Valley as the proposed Sienna 2 does.

California Program Office
P.O. Box 401 Folsom, California 95763 | 916-313-5800
www.defenders.org

September 22, 2022

Jim Morrissey, Contract Planner
County of San Bernardino, Land Use Services Department
385 North Arrowhead Avenue, First Floor
San Bernardino, CA 92415
Delivered via email to: Jim.Morrissey@lus.sbcounty.gov

RE: Scoping Comments – Sienna Solar and Storage Project Draft Environmental Impact Report (SCH 2022080518)

Dear Mr. Morrissey:

Thank you for the opportunity to provide scoping comments for the Draft Environmental Impact Report (DEIR) for the proposed Sienna Solar and Storage Project (Project). These comments are submitted on behalf of Defenders of Wildlife (Defenders) and our nearly 2.2 million members and supporters in the United States, 323,000 of which reside in California.

Defenders is dedicated to protecting all wild animals and plants in their natural communities. To that end, Defenders employs science, public education and participation, media, legislative advocacy, litigation, and proactive on-the-ground solutions to prevent the extinction of species, associated loss of biological diversity, and habitat alteration and destruction.

Defenders strongly supports responsible energy development that will help meet California's emission reduction goals. A low carbon energy future is critical for California – for our economy, our communities, and the environment. Achieving this future, and *how* we achieve it, is critical for protecting California's internationally treasured wildlife, landscapes, productive farmlands, and diverse habitats.

As we transition toward a clean energy future, it is imperative for our future and the future of our wild places and wildlife that we strike a balance between addressing the near-term impact of solar development with the long-term impacts of climate change on our biological diversity, fish and wildlife habitat, and natural landscapes. To ensure that the proper balance is achieved, we need smart planning for renewable power that avoids and minimizes adverse impacts on wildlife and lands with known high-resource values. We believe energy projects must be sited in a manner that avoids or minimizes impacts to wildlife and wildlife habitat, and where necessary, unavoidable impacts should be offset through mitigation.

The Project is located on 1,854 acres in the southwestern portion of the Mojave Desert within unincorporated San Bernardino County, east of State Route 247 and north of the unincorporated community of Lucerne Valley. The Project is a 525-megawatt (MW) utility scale solar photovoltaic electricity generation facility that will include up to 525 MW of storage and a 230 kV gen-tie line.

We offer the following scoping comments for the DEIR for the Project:

1. **General**: Aerial imagery of the Project area show areas of previous disturbance such as fallow alfalfa fields, dirt roads and trails. The Project is also in a Development Focus Area (DFA) that was identified in the Preferred Alternative of the Draft Desert Renewable Energy Conservation Plan (DRECP). Although the final DRECP did not apply to private lands, those DFAs in the Draft DRECP were determined to be areas where renewable energy projects could be developed due to their low biological and cultural resource values. Thus, the Project is located in an area that was identified by DRECP staff experts as potentially suitable for utility-scale renewable energy projects, including solar PV.

2. **Biological Resources**: The NOP states that the Project has the potential to cause significant impacts on biological resources and that the DEIR will assess those effects, identify feasible mitigation measures to reduce or eliminate potentially significant impacts, and identify potentially feasible alternatives to the Project that may accomplish basic Project objectives while lessening or eliminating any potentially significant impacts.

Defenders is primarily concerned with the impact of the project on special-status species. Numerous special-status species are known to occur or are likely to occur within the Project area and therefore may be adversely impacted by the Project. Defenders recommends coordination with the California Department of Fish and Wildlife and U.S. Fish and Wildlife Service for appropriate protocol level survey methods for special-status species, including the desert tortoise, burrowing owl, loggerhead shrike, desert kit fox and American badger. If the surveys find special-status species occurring on or near the project site, we recommend consultation with the state and federal wildlife agencies for recommended impact avoidance, minimization, compensatory mitigation measures, and requirements for obtaining Incidental Take Permits, if needed.

According to the California Natural Diversity Database (CNDDB), and Data Basin (databasin.org), the project site and adjacent areas may provide habitat for the following special status species (e.g., threatened, endangered, fully protected, species of special concern). Appropriate surveys for these species should be performed and the results included in the DEIR, how the Project would impact them, and appropriate impact avoidance and mitigation measures.

Common Name	**Scientific Name**
Desert tortoise	*Gopherus agassizii*

Burrowing owl	*Athene cunicularia*
Loggerheaded shrike	*Lanius ludovicianus*
Desert kit fox	*Vulpes macrotis arsipus*
American badger	*Taxidea taxus*

The Project is located within a Landscape-level Linkage for wildlife movements identified in the Final DRECP, Figure H-2 (Attachment 1). The DEIR should include an analysis of the effects of the Project on the linkage and mitigation measures designed to minimize adverse effects on wildlife movements and to maintain the function of the linkage.

The American badger is a California Species of Special Concern.[1] According to the map of habitat linkages, the Project is located within a portion of the Desert Linkage Network identified as a Least Cost Corridor for this species.[2]

3. **Cumulative Impacts**: The increasing development of solar energy projects in the Lucerne Valley area and associated fencing and lighting present barriers and deterrents to wildlife. Cumulative impacts to these special-status species accrue over time and increase when impacts from individual projects are not fully mitigated or offset as required under the California Environmental Quality Act. The DEIR should include analysis of cumulative impacts to special status species from renewable energy development and other reasonably foreseeable development in Lucerne Valley.

Per Public Resources Code Section 21001(c), it is the policy of the state to: 1) prevent the elimination of fish or wildlife species due to man's activities, 2) ensure that fish and wildlife populations do not drop below self-perpetuating levels, and 3) preserve for future generations representations of all plant and animal communities. San Bernardino County has a significant number of proposed and completed solar PV projects. As of August 2022, there were eight active renewable energy projects that, if developed, would result in the conversion of an additional 5,380.5 acres[3] of land to utility-scale PV facilities. Past, present and reasonably foreseeable future projects should be accounted for and analyzed in the DEIR to fully understand the impacts to biological resources. The DEIR must include the cumulative analysis of impacts of renewable energy and other projects within the area and provide mitigation measures to avoid, minimize or mitigate for any

[1] https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=109406&inline

[2] Penrod, K., P. Beier, E. Garding, and C. Cabañero. 2012. A Linkage Network for the California Deserts. Produced for the Bureau of Land Management and The Wildlands Conservancy. Produced by Science and Collaboration for Connected Wildlands, Fair Oaks, California.
http://www.scwildlands.org/reports/ALinkageNetworkForTheCaliforniaDeserts.pdf
http://oak.ucc.nau.edu/pb1/.

[3] See https://www.sbcounty.gov/uploads/LUS/Renewable/SolarProjectListAGU_2022.pdf

increase in adverse cumulative impacts associated with the Project.

Conclusion: Thank you again for the opportunity to provide comments on the scope of the DEIR for the Project and for considering our comments. We look forward to reviewing the DEIR and request to be notified when it is available. Please contact us if you would like any additional information or have questions on our comments.

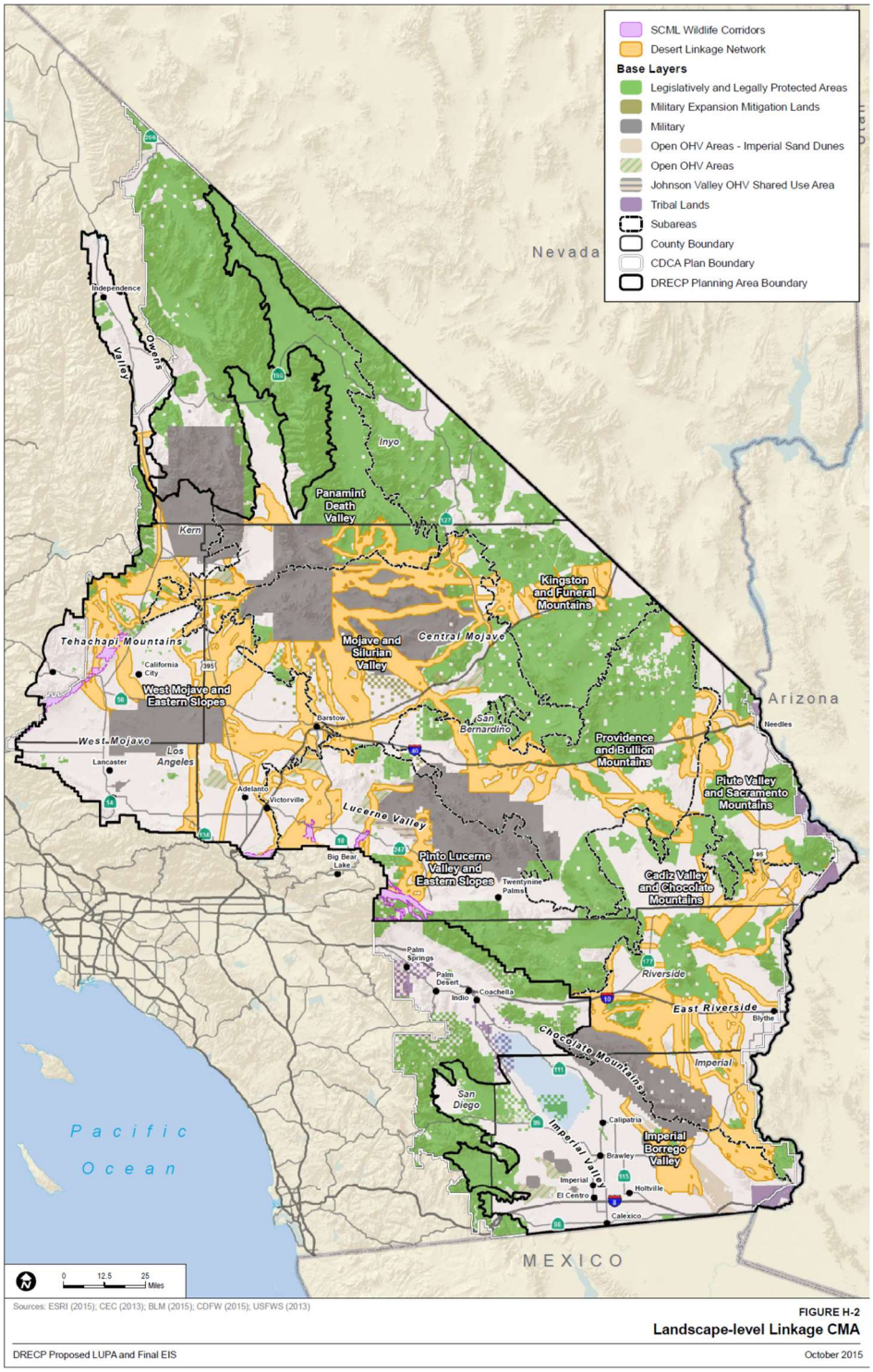
Respectfully submitted,

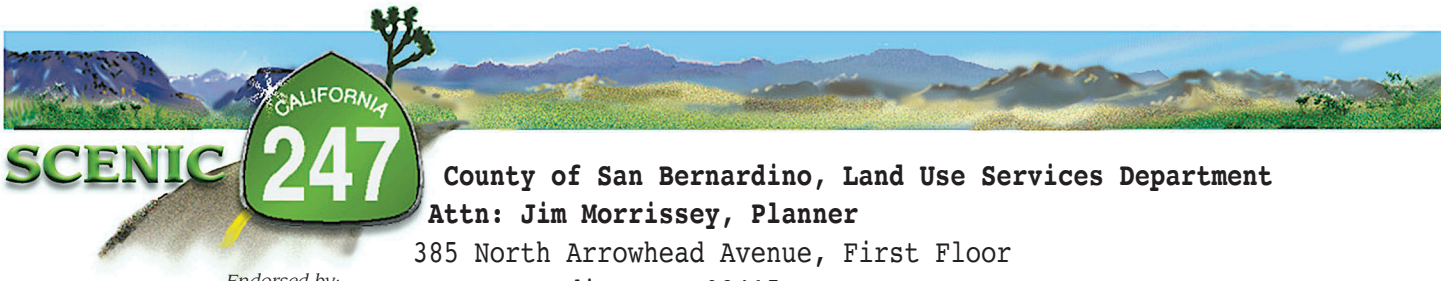
Jeff Aardahl
Senior California Representative
Defenders of Wildlife
jaardahl@defenders.org

Sophia Markowska
Senior California Representative
Defenders of Wildlife
smarkowska@defenders.org

Attachment 1. Final DRECP, Figure H-2, Landscape-level Linkage

Attachment 1. Final DRECP, Figure H-2, Landscape-level Linkage.





Endorsed by:

Homestead Valley Community Council
www.hvccsite.org

Morongo Basin Historical Society
www.mbhs.org

Flamingo Heights
Community Association
www.fhca.com

Johnson Valley
Improvement Association
see www.johnsonvalley.com

Hammerking Productions
dave@kingofthehammers.com

Landers Association

Yucca Mesa
Improvement Association
www.yuccamesa.org

Western American Railroad Museum
www.barstowrailmuseum.org

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Chamber of Commerce

Lucerne Valley
Economic Development Association

Lucerne Valley Market & Hardware

Lucerne Valley Museum

Route 66 Mother Road Museum
www.route66museum.org

Joshua Tree
Gateway Communities
Tourism Committee
www.joshuatreegatewaycommunities.com

Points of Interest Promotions
Lucerne Valley
billlembright@thenewlight.net

Rockhound Field Trip Fanatics!
http://rockhound-field-trips.ning.com

Morongo Basin
Conservation Association
www.mbconservation.org

Lucerne Valley-Johnson Valley
Municipal Advisory Council

Barstow Chamber of Commerce
www.barstowchamber.com

Morongo Basin
Municipal Advisory Council

Julie Hackbarth-McIntyre
Mayor. City of Barstow

County of San Bernardino, Land Use Services Department
Attn: Jim Morrissey, Planner
385 North Arrowhead Avenue, First Floor
San Bernardino, CA 92415
Email: Jim.Morrissey@lus.sbcounty.gov September 22, 2022

RE: Scoping Comments for Draft EIR Sienna Solar and Storage Project (Sienna 2)

Dear Mr. Morrissey:

As you probably know, the Scenic 247 Committee is lead organization on the County's campaign to seek State Scenic Highway designation for S.R. 247.

We have completed the extensive Visual Assessment, vetted and approved by County Land Use Services and Caltrans.

Our December 2021 presentation to the public meeting of the County Planning Commission Planning was very well received.

We have submitted a draft Corridor Protection Plan. Being finalized right now, this is the final step for County obtaining the State Scenic Highway designation.

Sierra 2 is not compatible with the scenic protections outlined in the Corridor Protection Plan. However, even without official State designation, the highway already has protections:

"The intent of the State Scenic Highway Program is to protect and enhance California's natural scenic beauty. If a highway is listed as eligible for official designation, it is also part of the Scenic Highway System and care must be taken to preserve its eligible status."
—Department of Transportation website
http://www.dot.ca.gov/ser/vol1/sec3/community/ch27via/chap27via.htm#scenic

Ray Desselle, Caltrans Landscape Architect, confirmed at the outset of our campaign:

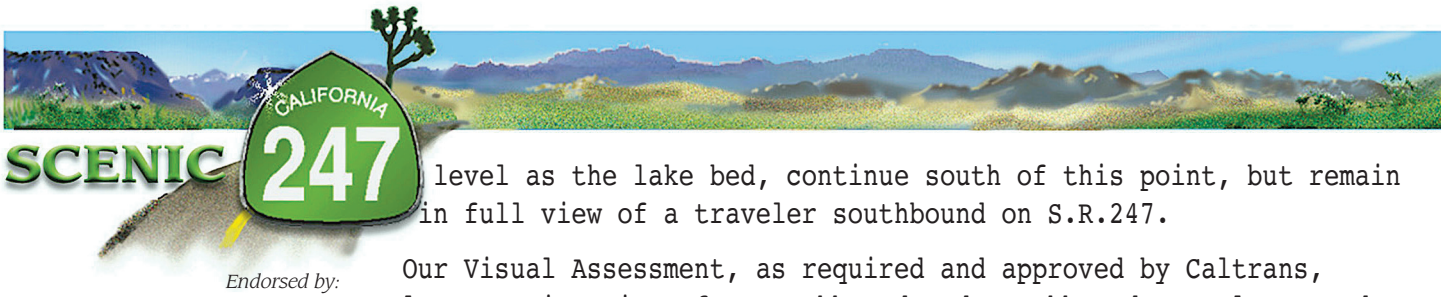
1) The Scenic Corridor includes everything visible from the highway.

2) Official designation changes nothing in already existing codes.

County Land Use Services updated their protections for S.R.247 as a County Scenic Byway to align with Caltrans Scenic Highway guidelines.

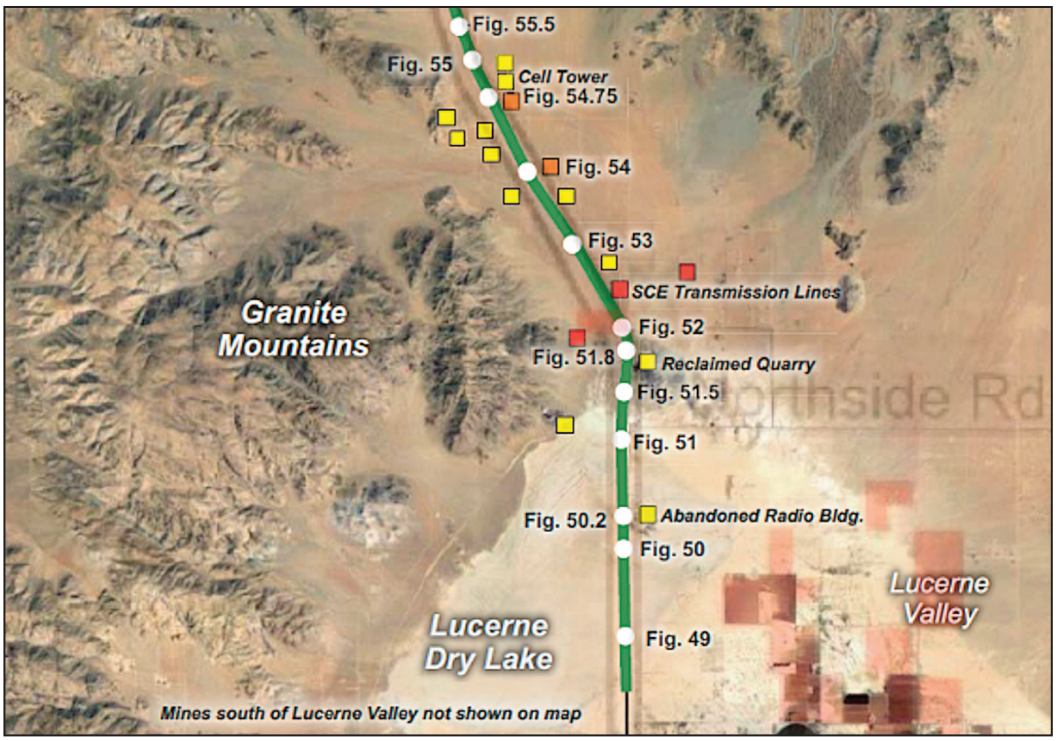
The Sienna project undeniably sits in the 247 scenic corridor.

Section 4 South in our Visual Assessment of segments of S.R. 247 eligible for Scenic Highway status begins with Post Mile 48.5. The vast playa and surroundings of Lake Lucerne, even from the same



level as the lake bed, continue south of this point, but remain in full view of a traveler southbound on S.R.247.

Our Visual Assessment, as required and approved by Caltrans, locates viewpoints for northbound and southbound travelers, and rates scenic resources and intrusions according to percentages by mile. All intrusions are included, whether by the roadside or visible from miles away. The map below shows Section 4 topography, viewpoint locations (Fig. 49, etc.) and intrusions. A quick over-layering of the Sienna 2 site gives you the problem in a nutshell.





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Lucerne Valley
Chamber of Commerce

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Route 66 Mother Road Museum
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Joshua Tree
Gateway Communities
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billlembright@thenewlight.net

Rockhound Field Trip Fanatics!
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Morongo Basin
Municipal Advisory Council

Julie Hackbarth-McIntyre
Mayor. City of Barstow

SCENIC 247 COMMITTEE •
51720 Hacienda Rd.#247, Johnson Valley, CA 92285 • www.scenichighway247.com
A committee of the Homestead Valley Community Council

SCENIC CALIFORNIA 247

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Mayor. City of Barstow



View eastward from Mile 49 – As you can see, Sienna 2 would be assessed as a Major Intrusion.

The relocated Sienna Solar and Storage project location, substation, battery storage, gen-ties with the proposed Calcite substation, as described, have other adverse affects.

Also, We strongly disagree with County Land Use Services position that Sienna 2 is a viable project under Res #2019-17, Sec. 3.

Sienna 2 site lies in full view of most property owners in the unincorporated "disadvantaged" community of Lucerne Valley, a major conflict with the San Bernardino County Renewable Energy and Conservation Element (RECE) Policy 4.10:
"Prohibits utility-oriented renewable energy (RE) project development on sites that would create adverse impacts on the quality of life or economic development opportunities in existing unincorporated communities."

Thank you for your attention,

Betty Munson

Betty Munson,
Chair
760-364-2646

P.S.
Please see Pages 50-59 of the Scenic 247 Visual Assessment, included. Also see the photo on Page 68 (59S) which shows the vista presented to the southbound traveler when descending from Goat Pass. This iconic view across Lucerne Lake also appears on the cover page of all documents we produce.

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A committee of the Homestead Valley Community Council

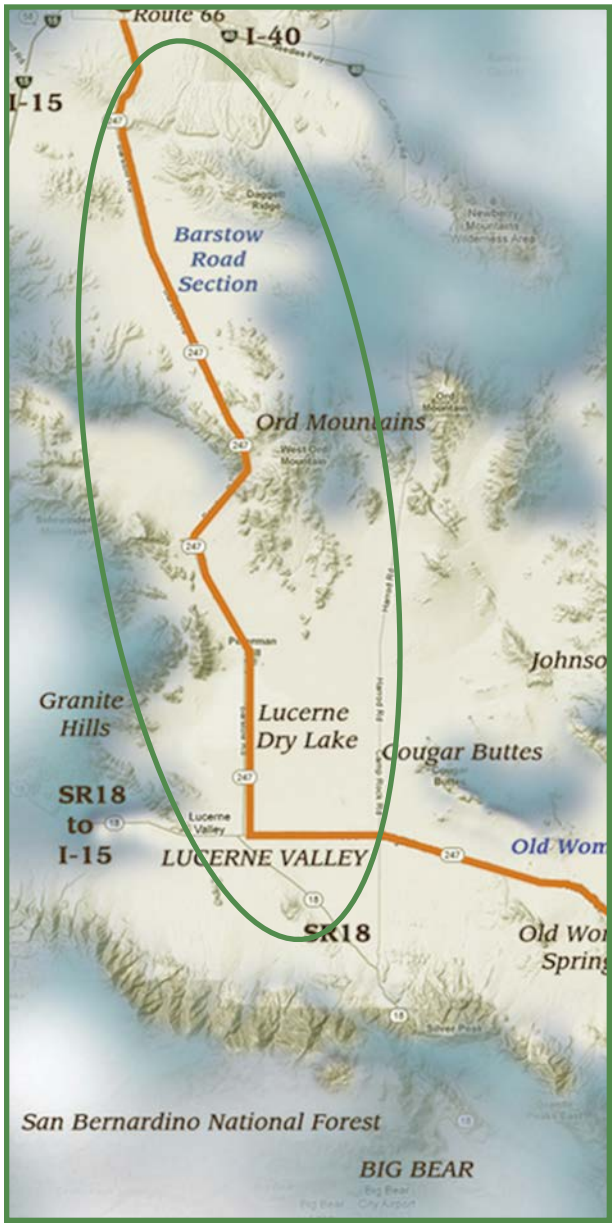
Pages 50-59 and 68
of the
Scenic 247 Visual Assessment

VISUAL ASSESSMENT

Section 4: Barstow Road

PM 48.5 to PM 76 (Length: 27.5 miles)

Percentage of Visual Intrusions within Section: 23.9%



Minor Intrusions: Rural residences and structures, transmission lines at a distance, "water tank" cell tower, Peterman Hill reclaimed quarry, microwave relay station, gas line equipment, signage, distant freeway, distant city and town views.

Moderate Intrusions: Distant mining operations, rural residences and structures close to highway, Slash X Ranch, transmission lines at closer range, landfill.

Major Intrusions: Transmission lines seen at close range.

At approximately PM 48.5 the northbound traveler enters the heart of Lucerne Lake, a dry lake bed occupying the lowest point in the region at 2,851 ft. elevation (Figure 49N). This straight section of highway travels due north.

Lucerne Dry Lake



"PM" = Caltrans numbered Post Mile markers. SR 247 PM 0 stands at the intersection with SR 62 in Yucca Valley. PM 78 intersects Route 66/Interstate15

Lucerne Lake is approximately 3.7 miles by 5 miles in size at its widest point. It is classified as an Endorheic Basin or "closed sea" because it has no outflow to lower elevations. Undrained basins such as these which occur in the desert are also known as "playas."

They are characteristically flat, dry and free of vegetation. Although the dry lake bed may appear to be a featureless plain, playas in general reveal much about climate, past and present. Lucerne Lake last held permanent water at the end of the Pleistocene Epoch, approximately 11,000 years ago. Its beaches show evidence of prehistoric human occupation.

Today, Lucerne Lake may collect a bit of water for brief periods in rainy seasons, before drying out again.

Deep fissures can be observed across the surface of the dry lake bed. They are attributed to the drying out of sediments at depth, due to both ongoing climatic drying of the region and to overdraft of groundwater.

Lucerne Lake is surrounded by the Granite Mountains to the northwest, the Ord Mountains to the northeast, the town of Lucerne Valley and the Bighorn Mountains to the south, and Cougar Buttes and the Fry Mountains in the distance to the east (Figs. 49W, 49E, 49NE, 50NE).



Figure 49N - Scenic View: The northbound traveler passes through the Lucerne Dry Lake bed at PM 49, with the Granite Mountains to the east and the Ord Mountains. ahead and to the west.



Figure 49W - *Scenic View: Looking west across the dry lake bed toward the Granite Mountains, with clay and silt dunes.*



Figure 49E - *Scenic View: Looking east across Lucerne Dry Lake to the craggy Cougar Buttes at a distance of 7 miles, and to the Fry Mountains on the left at a distance of 14 miles. The Bighorn Mountains south of Johnson Valley can be seen on the right.*



Figure 49NE - *Scenic View: Looking northeast across the dry lake bed toward the Ord Mountains, 6 to 15 miles in the distance.*



Figure 50NE - *Scenic View: At PM 50 looking northeast, the traveler is at the edge of the lake bed looking toward the Ord Mountains.*

The unincorporated community of Lucerne Valley might begin to come into distant view for the southbound traveler at about PM 49, with the San Bernardino Mountains beyond. Three active mining operations exist on the north face of the mountain range above Lucerne Valley.

The mines are all regulated under the Surface Mining Control and Reclamation Act (SMCRA) and are slated for restoration to pre-mine conditions when they close. Two of them mine high-quality limestone which is a major component in dozens of everyday products. It is light in color, contrasting with the surrounding mountains. The third mines a material darker in color, and is less visible. The mines are at a distance of 8 to 12 miles from the southbound traveler viewing them from PM 49.

The treeless desert landscape doesn't offer screening of views to the mines. However, because of the great distance, the land use may not be recognizable to travelers from this vantage point. Scenic views in all directions allow the intrusive impact of the mines to recede so they do not dominate the desert panorama. While variation in color on the face of the mountain range may be discernible to the southbound traveler for a driving distance of about seven miles in this section, it isn't until about PM 49 that the land use is classified as an intrusion.

These historic mines are thus classified as a moderate intrusion over a distance of 1/2 mile. The following three images show views of the mines from three different vantage points along the highway (Figs. 49S, 51S, and 56S).



Figure 49S - *Scenic View with Intrusion: The mines on the San Bernardino Mountains above Lucerne Valley become discernible as intrusions at about PM 49 looking south.*



Figure 51S - *Scenic View: The mines on the face of the San Bernardino Mountains above Lucerne Valley, seen at a sufficient distance and with enough other features in the view as to be indiscernible to most visitors looking south from PM 51.*



Figure 56S - *Scenic View: The mines on the north face of the San Bernardino Mountains begin to come into view for the southbound traveler about PM 56, but because of their great distance and the scenic nature of the immediate landscape, they are not yet classified as an intrusion. The foothills of the Granite Mountains are seen near the west side of the highway.*

At PM 50.2, the traveler passes an abandoned radio broadcasting building on the east side of the highway. The single structure is not screened from view, but it is the only structure for miles and the natural landscape dominates. It is classified as a minor intrusion (Fig.50.2E).



Figure 50.2E - *Intrusion: An abandoned radio broadcasting building sits 400' off the highway at PM 50.2 looking east.*

At PM 51, the northbound traveler is at the northern limit of the dry lake. Clumps of Saltbush cover the flat terrain reaching east. Salt Cedar (Tamarisk) grows in spots along the highway.
A collection of rural residences can be seen about a mile from the highway to the east of PM 51. They are not classified as an intrusion (Fig. 51E).

Depending on the light and weather, from approximately PM 50 for the northbound traveler transmission lines may be discernible running along the base of the mountains in the distance two miles to the west. For 1/2 mile traveling in either direction, the lines are classified as a minor intrusion (Figure 51.5W). >>>

At PM 52.2, the three rows of large SCE transmission lines cross the highway. For a stretch of approximately 1/4 mile approaching from either direction, the transmission towers and lines dominate the view and are classified as a major intrusion (Figure 52N). >>>



Figure 51E - *Scenic View: Looking East from PM 51 toward the Fry Mountains 10 to 15 miles in the distance.*



Figure 51.5W - *Scenic View with Intrusion: The scenic Granite Mountains, viewed from PM 51.5 looking west. Creosote bushes begin to populate the landscape. Transmission lines may be discernible running along the base of the mountains at a distance of two miles.*



Figure 52N - *Intrusion: The three parallel SCE transmission lines cross the highway just north of PM 52.*



Figure 53S - *Scenic View with Intrusion: Peterman Hill, viewed as Scenic by the southbound traveler from PM 53. The SCE transmission lines are visible here to the southbound traveler as they cross the highway ahead.*



Figure 51.8SE - *Intrusion: Peterman Hill reclaimed limestone quarry, as seen from PM 51.8 looking southeast.*

Once the traveler passes under the power lines, views are again unobstructed. South of PM 52, the highway bends to the left for the northbound traveler to follow a northwest/southeast direction, splitting from Haynes Rd. which continues north. The lower formation of the Granite Mountains (called White Horse Mountain on the USGS map) comes close to the highway here to the west.

Very close to the east side of the highway at PM 51.5 sits Peterman Hill, a limestone deposit which comes into view for the southbound traveler at PM 59. The scenic peaked shape of the hill appears prominently in the view of the approaching southbound traveler for about 7.5 miles, standing in relief within the vast mostly flat landscape around it. Only upon passing the hill can the traveler see evidence of past mining, with some white scarring which contrasts with the dark color of the rock. This former limestone quarry has been successfully recontoured and reclaimed, and is classified as a minor intrusion for 1/8 mile (Figs. 51.8SE, 53S).

North Lucerne Valley



Figure 53E - *Scenic View: Looking east from PM 53, the traveler views the jagged landforms of the Ord Mountains. Distant rural residences offer a sense of scale to the vast landscape. One home in this area is within a half mile of the highway, not pictured.*

Between PM 52 and PM 56.5, SR 247 travels in a northwest/southeast direction through a landscape gaining in elevation and increasingly dominated by Creosote bushes as one drives north.

At PM 54 the elevation of the highway reaches 3,000 feet and continues to gently climb, bending slightly further northward at PM 55.

The traveler along this stretch of highway is treated to views over the vast Mojave Desert landscape, with its variations in texture, color and light.

Within this remarkably scenic landscape exists a few areas of sparse rural residential development. Some of these residences can be seen in the distance, and are not classified as intrusions. A few of them occur within a half mile of the highway. They are widely dispersed, and the natural landscape dominates. These rural residences are classified as minor intrusions. Some include a number of outbuildings, collections of trailers, vehicles or other reflective objects and are classified as moderate intrusions. Overall, 1.5 miles of this stretch of highway are classified as intruded-upon.



Inset: During mating season the Desert Tortoise migrates toward the water in lakes that are dry for the rest of the year.

The images on pp.59-64, listed below, exemplify the types of built elements that exist along the scenic 4.5 mile stretch between PM 52 and PM 56.5:

Captions for each photo will describe and locate the Scenic View and/or Intrusion.(Figs. 53E, 53W, 53SE, 54E, 54W, 54.75NE, 55N, 55NE, 55SW, 55.5E, 56SE, and 56NW). >>>



Figure 59SW - *Scenic View: Looking southwest toward the Sidewinder and Granite Mountains from PM 59. Wooden power poles approach and cross the highway then travel its flank to the north. The southbound traveler here is descending from a 3,500' elevation.*



Figure 59S - *Scenic View: Looking southeast from PM 59 with the foothills of the Ord Mountains in the foreground to the east, past the Granite Mountains and Peterman Hill in the mid-ground, then over Lucerne Dry Lake to the San Bernardino Mountains beyond.*

JHOLLY RANCH ADULT RESIDENTIAL HOME

35222 SHERMAN WAY

LUCERNE VALLEY, CA. 92356

Date: September 22, 2022

County of San Bernardino, Land Use Services Department

To: Attn: Jim Morrissey, Planner

385 North Arrowhead Avenue, First Floor

San Bernardino, CA. 92415

Email: Jim.Morrissey@lus.sbcounty.gov

Subject: Notice of Preparation of a Draft Environmental Impact Report and Scoping Meeting

Mr. Jim Morrissey

We are located on Sherman Way and Lincoln between Assessor's Parcel Number(s) 0452-121-12 and 42. See highlighted local vicinity map section. We have lived here since 2014. My wife and I are owner operators of a State licensed Home and Vendored by the Inland Regional Center of San Bernardino to house and assist Adults with developmental disabilities from 18-59 years old. We operate and serve our residents at the above address which will be impacted by the Sienna Solar and Storage project if said Parcel Numbers are occupied by Solar Panels.

Our home also will serve as a destination for our other homes soon to open this year. This home will be used to entertain, celebrate major holidays, company meetings, etc.... feed staff, residents, family and friends as we bring everyone together. We have several projects we would like to see realized on this property for the fulfillment of our dream to expand our reach to the disabled persons of our community. Projects like expanding our farm to add more animals, a pound (reservoir to recycle water) for fishing & paddle boating, outdoor kitchen, green house, planting more fruit trees, play-ground area for the disabled families and friends.

However, we feel that the Parcel's stated above if occupied by Solar Panels will inversely impact our property security and health. Examples, our view, the dirt-windstorms which will increase when the dirt is disturbed which will cause road blockage and damage to our vehicles, wear and tear on the home & surrounding structures, people and animals , the glare from the panels to our eyes at certain times of the day, the increased heat from the reflection of the panels, barren vegetation and devoid of wild life, power line location to our proximity which overtime would cause health issues for all living creatures.

We appreciate what this project would accomplish. But we would like you to consider our position and the cost to us if surrounded by these proposed solar panel locations as stated. I

participated in a tour of with Sienna Solar along with other residents of Lucerne Valley which identified parcels of land to be impacted. Camden Rd from Box Rd 0452-062-0452/112-24-0452/112-25-0452/113-17 to Visalia Rd would be excellent parcels to occupy and less exposure to residents, In my opinion.

We desire to continue to be a part of Lucerne Valley for a long time. But if the parcels highlighted in the beginning of this letter our occupied by solar panels, we would have to consider a relocation (moving) and something we thought would never happen.

Please consider our position in this matter.

Sincerely,



Debra Holly (Owner-Co-Owner) and Lee Johnson (Co-Owner)

President / Vice President

Cell # 951-232-8922 / Cell # 951-216-9419

Appendix B. Visual Resources Assessment

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Sienna Solar and Storage Project

Visual Resources Assessment

prepared for

99MT 8me, LLC
211 Sutter Street, 6th Floor
San Francisco, California 94108
Contact: Erec DeVost

prepared with the assistance of

Rincon Consultants, Inc.
180 North Ashwood Avenue
Ventura, California 93003

March 2023

RINCON CONSULTANTS, INC.
Environmental Scientists | Planners | Engineers
rinconconsultants.com

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1 Introduction and Setting

1.1 Project Description Summary

The proposed Sienna Solar and Storage Project (Project) is a 525-megawatt (MW) utility-scale solar farm with 525-MW battery storage located in unincorporated San Bernardino County. The site is located east of Barstow Road/State Route (SR) 247 roughly between Northside Road and Wilshire Road, northeast of the community of Lucerne Valley. The Project consists of the installation of a photovoltaic (PV) solar facility, Battery Energy Storage System (BESS), project substation, Operations and Maintenance building(s), underground collection system, and a 230-kV generation-interconnect (gen-tie) line. The Sienna Project will interconnect at the SCE Calcite Substation (currently pending environmental clearance and construction) via a proposed overhead and/or underground 230-kV gen-tie line in addition to other ancillary facilities utilizing private and potentially public ROWs. The Project area encompasses approximately 1,854 acres with an additional 77-acre substation site. Approximately 39 miles of collector lines and gen-tie alternatives will be analyzed in this Assessment, although not all routes will be developed.

1.2 Project Location and Environmental Setting

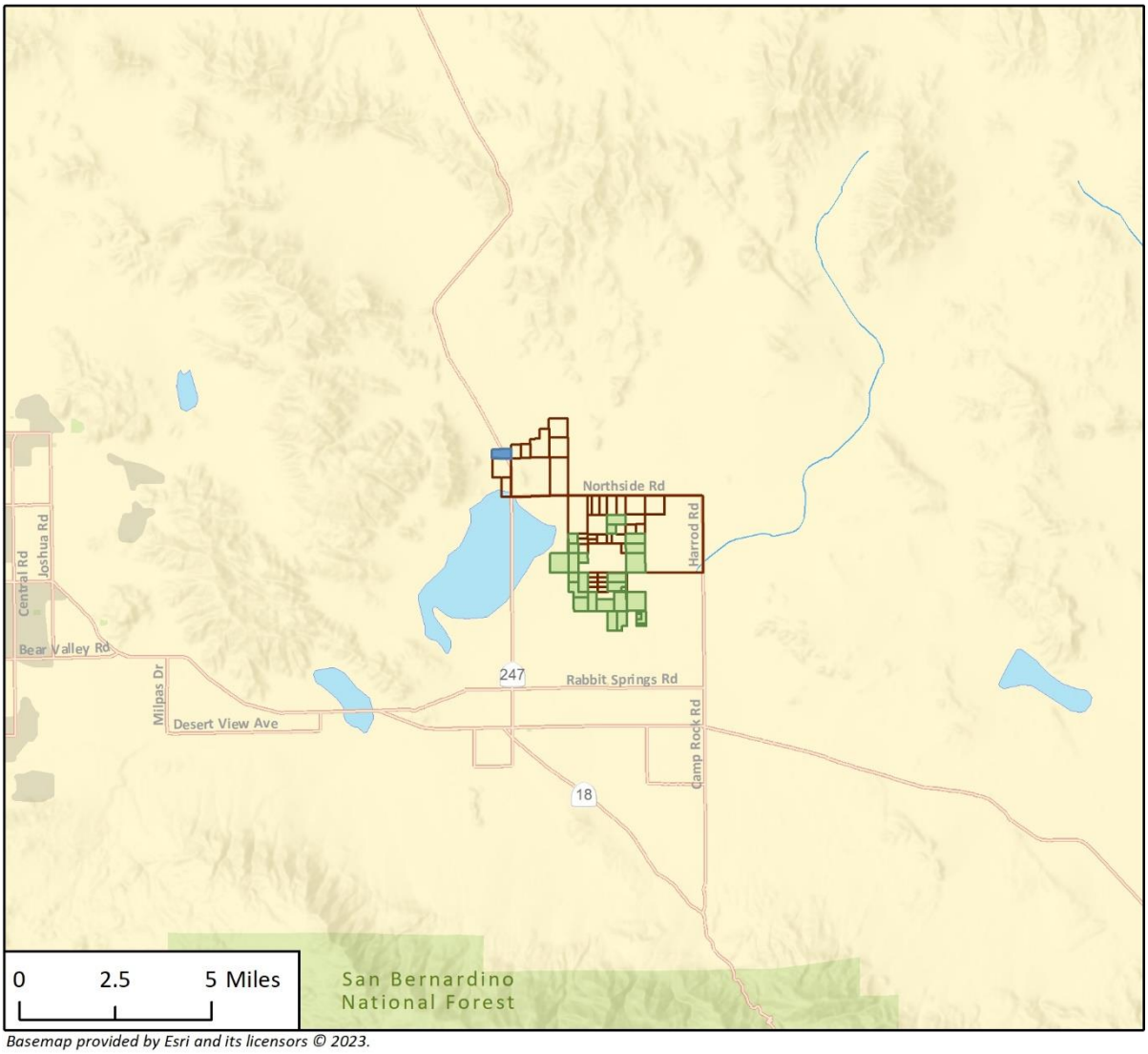
The approximately 1,854-acre Project area is located in the southwestern portion of Mojave Desert in and near Lucerne Dry Lake, in unincorporated San Bernardino County, California. The Project is predominately located east of State Route 247 (Barstow Road), north of the unincorporated community of Lucerne Valley, with portions of the gen-tie alternative corridors that include possible connections along Haynes Road, Huff Road, and Northside Road to the east of Barstow Road. It is generally located approximately 35 miles south of the City of Barstow, 45 miles northwest of the town of Yucca Valley, 15 miles southeast of the town of Apple Valley, and 20 miles north of the City of Big Bear Lake. Barstow Road would provide primary access to the project area. Land uses in the area are primarily rural residential, recreation, farmland, open space, and transportation corridors.

Figure 1 shows the regional location of the Project area, while Figure 2 depicts the regional landscape setting.

1.2.1 Regional Character

San Bernardino County contains three distinct geographic regions: the Mountain Region, the Valley Region, and the Desert Region. The project area and surrounding vicinity are in the Desert Region, which is visually characterized by its arid landscape, consisting of desert plains, sparsely vegetated mountain ranges, and broad valleys with expansive alluvial fans and scattered dry lakes. The Project area is primarily located on the floor of the Lucerne Dry Lake, and along its eastern and northern margins. Topography is mostly flat to gently sloped along the dry lake margins. Elevation of the Project area ranges between 2,850 and 2,910 feet above mean sea level. The Granite Mountains and White Horse Mountain are west of the Project area, and Peterman Hill is within the overall Project footprint, east of Barstow Road. The Ord Mountains, a weathered rugged volcanic range, trending east-west with a peak elevation of 6,309 feet above mean sea level, are approximately 10 miles to the northeast. The mountain ranges surrounding the valley rise approximately 2,300 to 3,400 feet above the valley floor, and the silhouette of ridgelines dominates the viewshed.

Figure 1 Regional Location Map



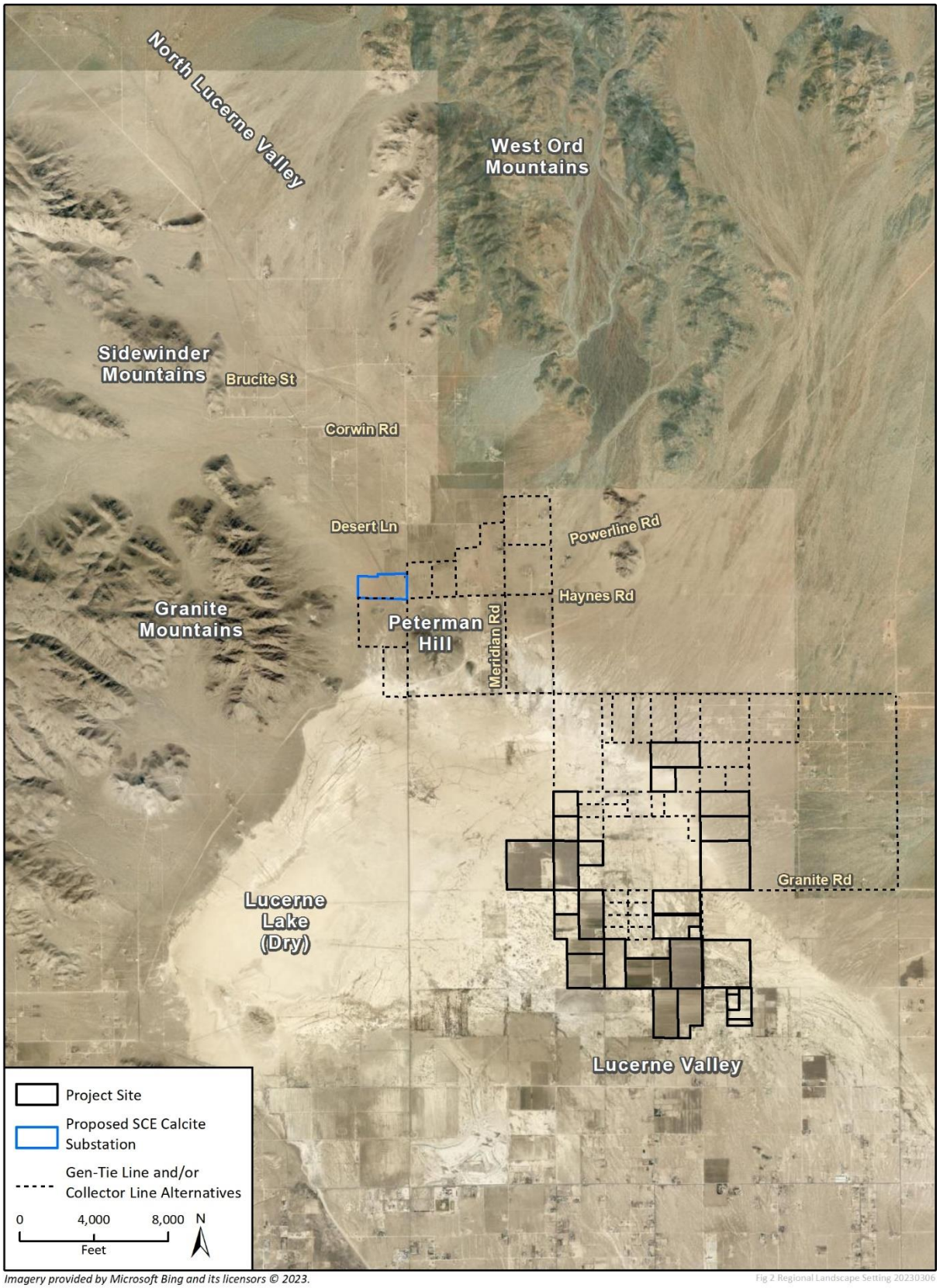
Basemap provided by Esri and its licensors © 2023.

Project Site
Proposed SCE Calcite Substation
Gen-tie Line and/or
Collector Line Alternatives

N



Figure 2 Regional Landscape Setting



The dry lakebed is heavily used for recreational activities, including off highway vehicle (OHV) travel (including racing) and assorted day use and camping activities. The Rocketry Organization of California (ROC) uses the dry lake as one of its designated launch sites, with scheduled launches occurring monthly throughout the year. Additionally, areas outside the dry lake within the Project area are also subject to various ongoing disturbances related to road maintenance, utility activities (electrical transmission towers and lines; underground gas pipeline), recreation, OHV travel, and illegal dumping.

1.2.2 Surrounding Land Uses

The Project area includes areas zoned as Lucerne Valley/Resource Conservation (LV/RC), Lucerne Valley/Rural Living (LV/RL), and Lucerne Valley/Agriculture (LV/AG) (San Bernardino County 2016). Portions of the gen-tie corridor routes are also in areas zoned as Lucerne Valley/Rural Living – 5 Acre Minimum (LV/RL-5) and Lucerne Valley/Agriculture- 40 acre minimum (LV/AG-40). Primary uses in and immediately surrounding the Project area are rural residential, recreation, open space, and transportation corridors.

1.2.3 Project Setting

The natural landscape of the Project area consists of a generally land surface, sloping up to craggy mountains in the distance in all directions, with intervening small rocky hills. The landscape is characterized by bare tan soil or low golden grasses punctuated by low, mounded olive or dark green shrubs.

The built environment of the Project vicinity is dominated by a lattice of paved and dirt roads extending from SR 247, which runs generally north-south to the west of the project area. Several large regional power lines supported by tall steel lattice towers run east-west in the project vicinity. Low wood post and wire fences are present throughout the project vicinity, as are small, single-story residences dotting the landscape, some of which have substantial stands of trees planted, serving as visual screening. Also present and visible are the wood poles of local electrical distribution lines providing service to the residences.

The visual character of the Project area and vicinity is illustrated and described in Figure 3 and Figure 4.

1.2.4 Scenic Routes

SR 247 and SR 28 are eligible for California State Scenic Highway Designation (Caltrans 2018). The County of San Bernardino has also designated SR 247 in the Project vicinity as a Scenic Route (County of San Bernardino 2020).

1.2.5 Vista Points

There are no Department of Transportation (DOT) vista points on state highways within the Project vicinity. The nearest vista point identified by Caltrans is the Bear Valley Dam Vista Point in the San Bernardino Mountains, approximately 20 miles south of the Project area. The Project area is not visible from this vista point (Caltrans 2015).

Figure 3 Photo Point Locations

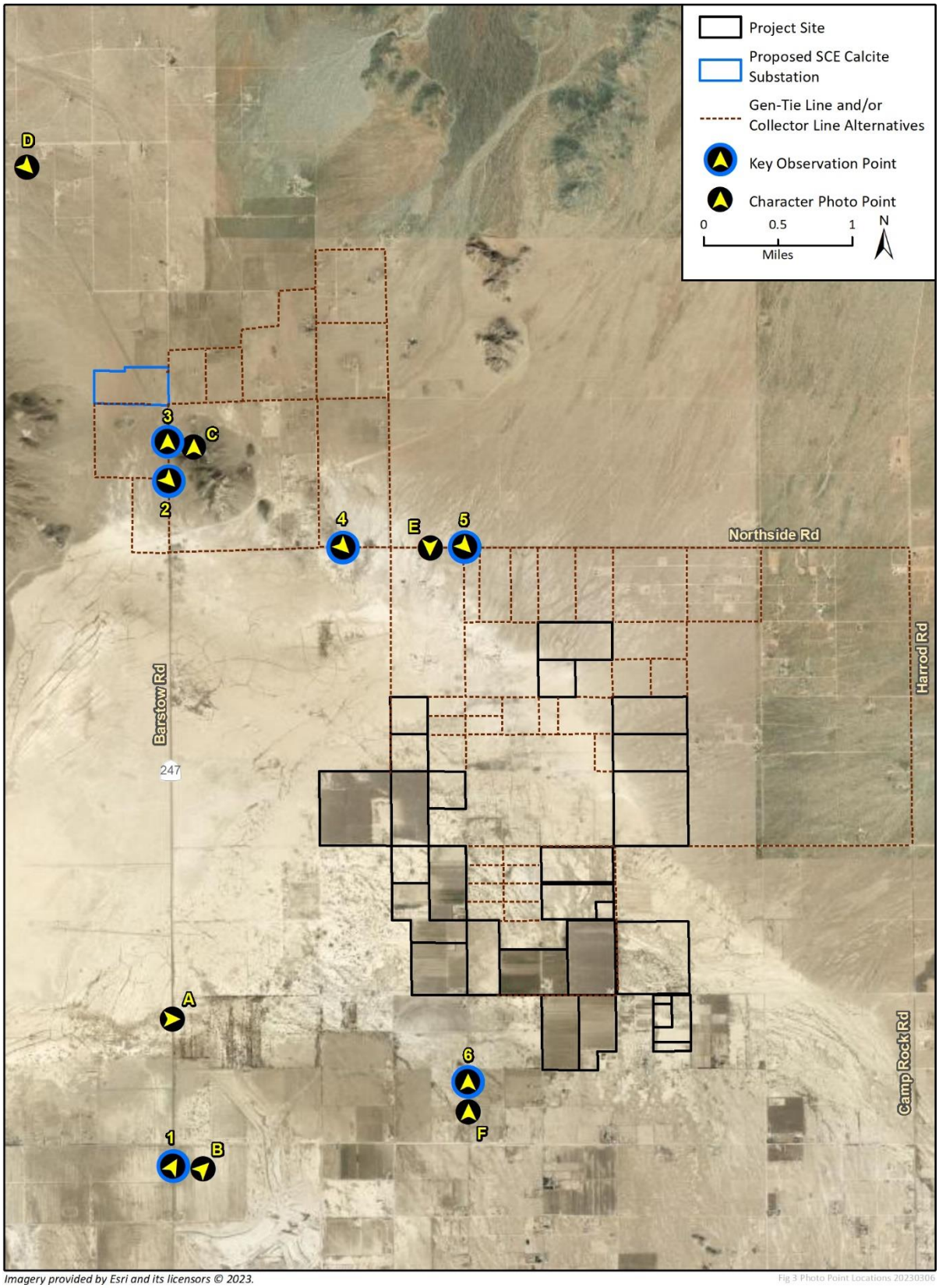


Figure 4 Project Area Character Photographs



Photograph A. View looking east from SR 247 toward the southernmost extent of the Project area, approximately 1.6 miles distant. Photograph A is representative of views for motorists on SR 247. The Project area is generally flat, sloping up to the craggy mountain in the distance. The landscape is characterized by bare tan soil punctuated by low, mounded olive-green shrubs. A large regional power line supported by tall steel lattice towers that run east-west is visible on the right-hand side of the photograph.



Photograph B. View looking northeast from SR 247 toward the center of the Project area. Photograph B is representative of views for motorists traveling north on SR 247. A deteriorated low wood post and wire fence is located adjacent to SR 247 and is characteristic of fences throughout the Project vicinity. Low golden grasses dominate the view, with sparce dark green shrubs in the middleground and mountains in the distance.



Photograph C. View to the north from SR 247 at Fern Road toward the northern extent of the Project area. Photograph C is representative of views for motorists traveling north on SR 247. The near and middleground land surface is generally level, sloping up to the mountain range in the background, approximately 8 miles from the viewing location. Tan soils and low shrubby olive-green vegetation characterize the landscape. A major transmission line corridor with different types of lattice steel structures extends west to east across the view.



Photograph D. View to the southeast from SR 247 toward the northern portion of the Project area. Photograph D is representative of views for motorists traveling south on SR 247. The landscape is dotted with sparse low vegetation and remote single-story rural residences. The wood poles of local electrical distribution lines paralleling dirt roads are visible in the middleground view. Small rocky hills punctuate the center of the view, while the San Bernardino Mountains are distantly visible in the right-hand side of the view.



Photograph E. View to the south from Northside Road toward the Project area. Photograph E is representative of project views for area residents. Exposed tan soils and sparse, low, dusty-green shrubs dominate the landscape. Small, single-story residences dot the landscape, some of which have substantial stands of trees planted, serving as visual screening. Also visible are the wood poles of local electrical distribution lines providing service to the residences. The visible landscape is generally flat, before sloping up into the San Bernardino Mountains, 12 to 15 miles distant.



Photograph F. View to the northeast from Locust Avenue, at the southernmost extent of the Project area. Except for the rocky mountains in the distance, the landscape is generally flat, with exposed tan soils and golden grasses, except where taller green vegetation in the middleground identifies residential areas. The lattice steel towers of a high-voltage powerline are visible in the middleground, as are the wood poles associated with local electrical distribution lines.

2 Methodology

The initial step in the evaluation process was the review of planning documents applicable to the Project area to gain insight into the type of land uses intended for the general area, and the guidelines given for the protection or preservation of visual resources. Consideration was then given to the existing visual setting within the Project viewshed, which is defined as the geographical area in which the Project can be seen. A desktop analysis was conducted to identify the areas from which the proposed Project will have the potential to be visible. Site reconnaissance was conducted to view the Project area and surrounding vicinity, identify potential Key Observation Points (KOPs), and take representative photographs of existing visual conditions. Photographs from the site reconnaissance were selected to represent the "before" conditions from each of the potential KOPs. Within the viewshed area, seven KOPs were selected to be used as the basis for analysis of the proposed Project's visual effects. An effort was made to identify sensitive receptors[1] and viewing areas that would be the most sensitive to the proposed Project's potential visual impacts. Three of the selected KOPs are locations along SR 247, a County-designated scenic highway. These KOPs present representative views for both local residents and local or transient recreationists. The other three KOPs were selected to be representative views for local residents.

To provide a basis for evaluating the visual effect of the proposed Project on these views, visual simulations were produced to illustrate the "after" visual conditions from each of the KOPs. The proposed facilities were modeled based on design information provided by 99MT 8me, LLC and included both the solar array as well as gen-tie lines.

One proposed gen-tie route was selected for the simulations to be representative of the different gen-tie route alternatives. This route extends from the solar array at Watking Road, north along Huff Road to Haynes Road, and then west to the proposed 230-kV substation. Single-circuit tubular steel poles (TSPs) at 1,000-foot spacing were assumed, each 88 feet tall, with a 5-foot base diameter. The collector lines connecting the solar arrays will be buried and are therefore not shown in the simulations.

The simulations were produced from photography of the Project area and 3D modeling of a typical solar array design. For purposes of the simulations, the panel array is assumed to consist of an 8-foot fixed panel on a 20-foot tall post, with a 10-foot access lane between rows of panels. The perspective and lighting of each KOP view was matched to the 3D model and the proposed views were rendered. Foreground elements in the photographs were masked out and the 3D rendering was composited with the background. Atmosphere, noise, and blur was added to the 3D rendering to match the photography.

At each KOP, the existing visual conditions were compared to those under the development of the Project area, based on the visual simulations. The comparison, included in Section 3, considers the existing quality of scenic backdrops, background vistas, and foreground views across the Project area and the Project's alteration of these scenic views.

[1] Typically, residents and recreationists are considered to be sensitive receptors to change in the landscape. This is because of the potential for effects to their long-term views or their enjoyment of a particular landscape or activity.

3 Key Observation Points and Anticipated Visual Effects

3.1 KOP Evaluation

Figure 3 shows the location of the six KOPs that were selected to be used as the basis for analysis of the proposed Project's visual effects. A discussion of the existing view and the anticipated visual effect of the proposed Project at each of these KOPs is provided below. A comparison of the existing view and the simulated with-Project view for each KOP is used as the basis for the evaluation.

3.1.1 KOP 1

Figure 5, Photograph 1 documents the existing north-northeastern view toward the Project area from SR 247 near its intersection with Holmes Road, and Figure 5, Photograph 2 shows a simulation of the view as it will appear after construction. The existing view to motorists on SR 247 includes deteriorated low wood post and wire fencing, as well as wood post distribution lines paralleling the roadway. Low golden grasses dominate the view, with sparce dark green shrubs in the middleground and mountains in the distance.

As shown in the simulated view, the solar array presents as an indistinct horizontal linear feature in the middleground of the view, beyond the dotting of low shrubs. The existing high voltage transmission line remains the most visible man-made structure in the middleground of the view. From KOP 1, the proposed Project is not identifiable as a new feature in the landscape and would not introduce an impact to visual resources.

3.1.2 KOP 2

Figure 6, Photograph 1 documents the existing southeast view toward the Project area from SR 247 near Peterman Hill, and Figure 6, Photograph 2 shows a simulation of the view as it will appear after construction. The existing view for southbound motorists on SR 247 includes a landscape dotted with low vegetation. The distant San Bernardino Mountains dominate the view.

As shown in the simulated view, the solar facility is nearly imperceptible when viewed from the roadway and would likely be go unobserved by motorists traveling on SR 247. From KOP 2, the proposed Project is not identifiable as a new feature in the landscape and would not introduce an impact to visual resources.

3.1.3 KOP 3

Figure 7, Photograph 1 documents the existing northern view toward the Project area from SR 247 near Peterman Hill, and Figure 7, Photograph 2 shows a simulation of the view as it will appear after construction. The existing view to northbound motorists on SR 247 includes generally flat land surfaces in the near and middleground, dipping down then sloping up to the mountain range in the background. Tan soils and low shrubby olive-green vegetation characterize the landscape, and a major transmission line corridor with different types of lattice steel structures extends west to east across the view.

As shown in the simulated view, new tubular steel poles associated with the 230- kV gen-tie line would be visible, along with the new 230-kV substation[2]. From KOP 3, the proposed Project would bring a new industrial character to the view, but the proposed infrastructure is consistent with the existing high-voltage transmission infrastructure and the mountains to the north remain the most prominent visual feature.

3.1.4 KOP 4

Figure , Photograph 1 documents the existing southeast view toward the Project area from Northside Road between Meridian Road and Huff Road, and Figure , Photograph 2 shows a simulation of the view as it will appear after construction. Multiple rural residences are located nearby, and residents would experience similar views. The existing view includes an extremely flat landscape with exposed tan soils and sparse, low, dusty-green shrubs and golden grasses in the middleground. White-tarped hoop houses contrast with the darker, mountain backdrop. Short fencing with wooden post and thin wire mesh line Northside Road, and distribution lines are strung along the roadway.

As shown in the simulated view[3], the solar facility would introduce larger-scale utilities to the landscape. From KOP 4, the proposed Project would introduce a new industrial character to the view. In particular, new 230-kV TSPs associated with the gen-tie line are skylined[4] above the hills and mountains in the distance, emphasizing their introduction to the landscape. As a result, the proposed Project introduces a moderate amount of visual contrast to the view from KOP 4.

3.1.5 KOP 5

Figure , Photograph 1 documents the existing southeast view toward the Project area from Northside Road near the intersection of Logoo Street and Locust Avenue, and Figure , Photograph 2 shows a simulation of the view as it will appear after construction. The existing view includes an extremely flat landscape with exposed tan soils and sparse, low, dusty-green shrubs and golden grasses in the middleground. Distribution lines are strung along Northside Road.

As shown in the simulated view[5], the solar facility would be faintly visible as a linear feature. The new 230-kV TSPs associated with the gen-tie line are not visible in the with-Project view from KOP 5, leaving the hills and mountains in the distance as the most prominent visual features in the landscape.

3.1.6 KOP 6

Figure , Photograph 1 documents the existing northern view toward the Project area from Locust Avenue, between Sunswept Drive and Wilshire Road, and Figure , Photograph 2 shows a simulation of the view as it will appear after construction. The existing view includes a generally flat landscape,

[2] The simulated view shows the solar facility as a linear feature in the middleground. This portion of the solar array has been removed from the proposed Project and will not be present after Project construction.

[3] The visual simulation for KOP 4 includes a portion of the solar array that has been removed from the proposed Project. As such, the proposed Project would be less visible than shown in Figure 8, Photograph 2.

[4] When a transmission tower or conductor is located above background terrain or the horizon and extends into the viewed sky, it is said to be skylined or silhouetted.

[5] The visual simulation for KOP 5 includes a portion of the solar array that has been removed from the proposed Project. As such, the proposed Project would be less visible than shown in Figure 9, Photograph 2.

with exposed tan soils and golden grasses, except where taller green vegetation in the middleground identifies residential areas. The lattice steel towers of a high-voltage powerline are visible in the middleground, as are the wood poles associated with local electrical distribution lines, with prominent rocky mountains in the distance.

As shown in the simulated view, the solar array presents as an indistinct horizontal linear feature in the middleground of the view. The existing high voltage transmission tower and wooden distribution lines remain the most visible man-made structure in the middleground of the view along Locust Avenue, and the distant mountains remain the most prominent visual features in the landscape.

3.2 Summary of Anticipated Visual Effects

As described above and illustrated in Figures 5 through 10, in most views, the proposed Project is minimally discernable in the landscape. When visible, the proposed Project solar array adds an industrial character to the landscape, but the degree of contrast introduced to the view is low. The proposed 230-kV substation and 230-kV gen-tie line also add industrial character, especially in views where the associated transmission structures are skylined, but the structures are similar in form to existing electrical infrastructures in the Project vicinity. Overall, the Project would not substantially degrade the existing visual character or quality of public views of the Project area and its surroundings.

Figure 5 KOP 1



Photograph 1. Existing view looking north-northeast toward the Project area from SR 247 near Holmes Road.



Photograph 2. Simulated view after construction of the proposed Project.

Figure 6 KOP 2



Photograph 1. Existing view looking southeast toward the Project area from SR 247 near Wilderness Road.



Photograph 2. Simulated view after construction of the proposed Project.

Figure 7 KOP 3



Photograph 1. Existing view looking north toward the Project area from SR 247 near Haynes Road.



Photograph 2. Simulated view after construction of the proposed Project.

Figure 8 KOP 4



Photograph 1. Existing view looking southeast toward the Project area from Northside Road between Meridian Road and Huff Road.



Photograph 2. Simulated view after construction of the proposed Project.

Figure 9 KOP 5



Photograph 1. Existing view looking southeast toward the Project area from Northside Road near Locust Avenue.



Photograph 2. Simulated view after construction of the proposed Project.

Figure 10 KOP 6



Photograph 1. Existing view looking north toward the Project area from Locust Avenue between Sunswept Drive and Wilshire Road.



Photograph 2. Simulated view after construction of the proposed Project.

4 References

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_____. 2020. Countywide Plan NR-3 Scenic Routes & Highways Webmap. Available at https://www.arcgis.com/apps/webappviewer/index.html?id=01c32a4480954deba20af965275b81e7. (accessed August 2021).

Sienna Solar Visual Simulation Updates

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KOP 3 - Existing

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KOP 3 - Proposed - 115’ Gen-Tie Poles

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KOP 3 - Proposed - 125’ Gen-Tie Poles

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KOP 4 - Existing

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KOP 4 - Proposed - 115’ Gen-Tie Poles

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KOP 4 - Proposed - 125’ Gen-Tie Poles

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Appendix C1. Air Quality and Greenhouse Gas Study

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Sienna Solar and Storage Project

Air Quality and Greenhouse Gas Study

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Appendix A Bulk Emissions Data

1 Project Description

1.1 Introduction

This study analyzes the air quality and greenhouse gas (GHG) emissions from proposed Sienna Solar and Storage Project (Project) located in unincorporated San Bernardino County, California. Rincon Consultants, Inc. (Rincon) prepared this study under contract to99MT 8me, LLC (applicant). The purpose of this study is to analyze the Project's air quality and GHG impacts related to both temporary construction activity and long-term operation of the Project.

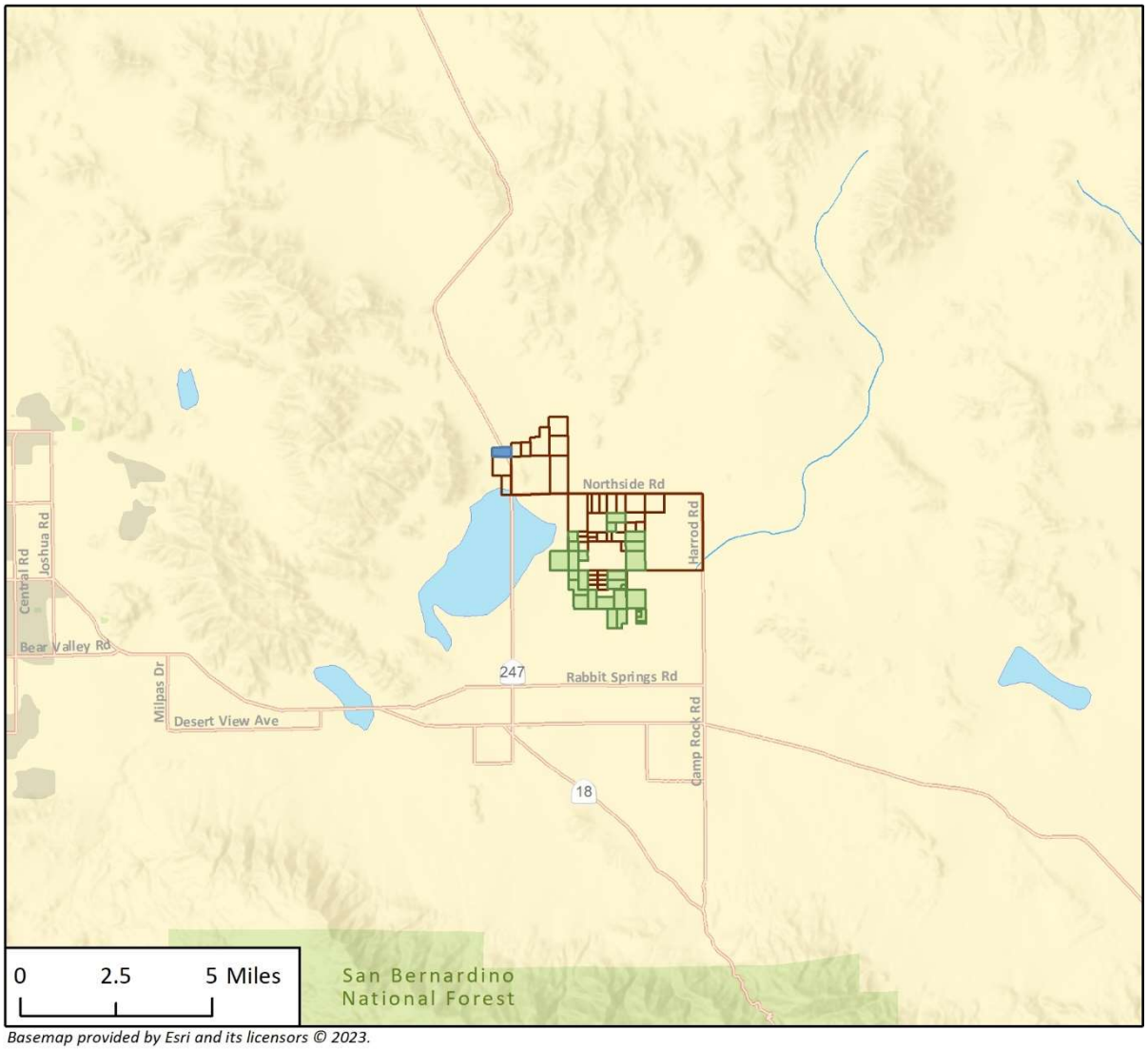
1.2 Project Area and Description

The proposed Sienna Solar and Storage Project is a 525-megawatt (MW) utility-scale solar farm with 525 MW battery storage located in unincorporated San Bernardino County. The site is located east of Barstow Road/State Route (SR) 247 roughly between Northside Road and Wilshire Road, northeast of the community of Lucerne Valley.

The Project consists of the installation of a photovoltaic (PV) solar facility, Battery Energy Storage System (BESS), Project substation, Operations and Maintenance building(s), underground collection system, and a 230-kV generation-interconnect (gen-tie) line. The Sienna Project will interconnect at the SCE Calcite Substation (currently pending environmental clearance and construction) via a proposed overhead and/or underground 230-kV gen-tie line in addition to other ancillary facilities utilizing private and potentially public ROWs. The Project area encompasses 1,854 acres with an additional 77.3-acre SCE Calcite Substation site. Approximately 39 miles of collector lines and gen-tie alternatives will be analyzed in this assessment, although not all routes will be developed.

The Project area is characterized by a mixture of residential properties, undeveloped playa and desert scrub communities, and agricultural land that includes alfalfa and jojoba farms and large-scale hemp growing operations. Small-scale abandoned and operational hemp and/or marijuana growing operations were present throughout the playa region of the Project area.

Figure 1 Regional Location



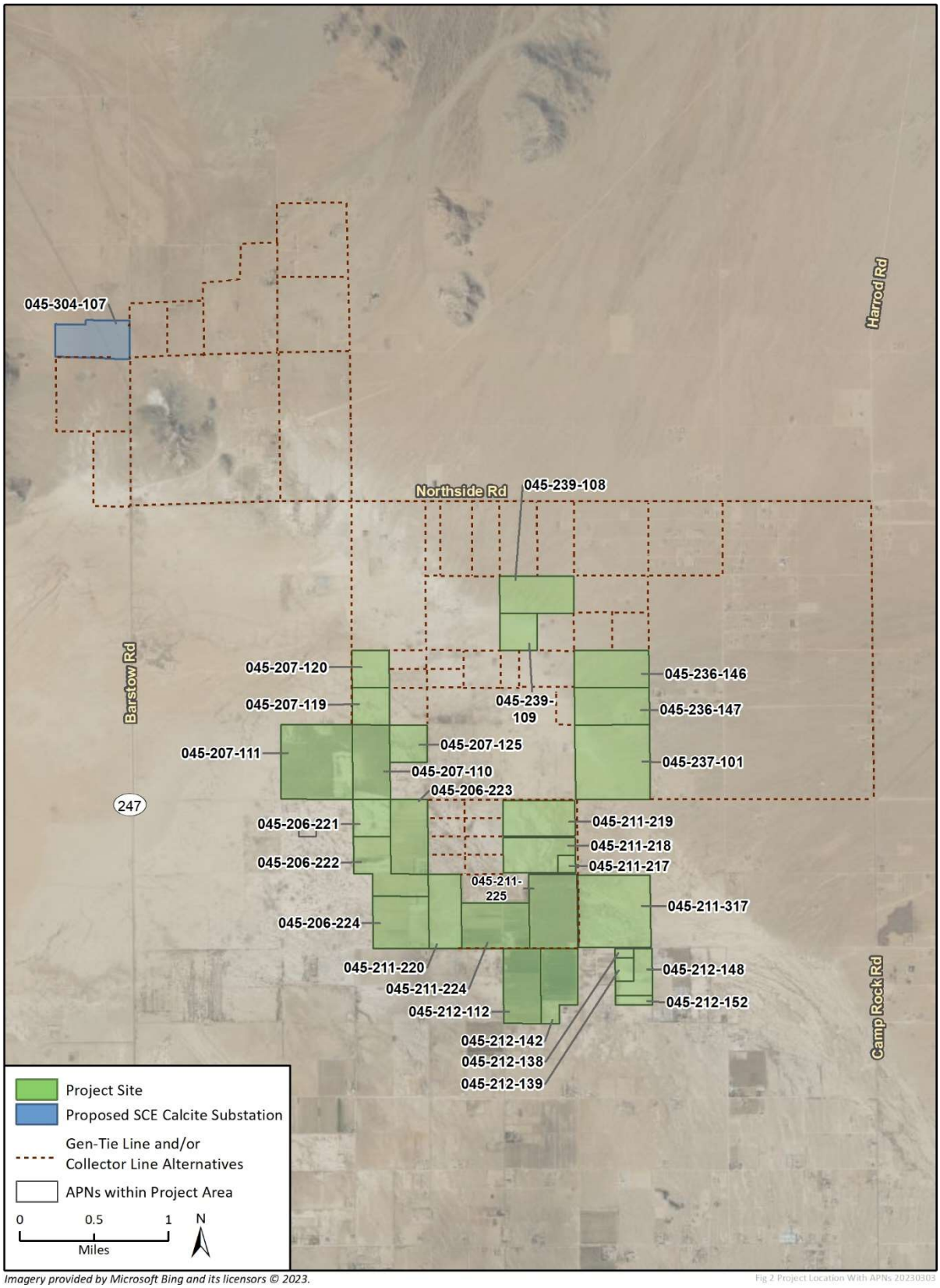
Basemap provided by Esri and its licensors © 2023.

Project Site
Proposed SCE Calcite Substation
Gen-tie Line and/or
Collector Line Alternatives

N



Figure 2 Project Location



1.3 Construction Activities

Construction of all Project components would occur over approximately 12 to 24 months beginning as early as the first quarter of 2023 (i.e., January 1, 2023). Construction would take a maximum of 12 months to complete, however due to weather and other constraints the 12 months of construction activity may require up to 24 months to complete (for example, if March sees excessive precipitation, construction activities would have been postponed and no on-site activity would have occurred in March). Construction of the Project would include the following types of activities:[1]

- Site preparation
- Grading and earthwork
- Concrete foundations
- Structural steel work
- Electrical/instrumentation work
- Collector line installation
- Architecture and landscaping

Each parcel that comprises the Sienna Solar and Storage Project may be constructed simultaneously, and phases of construction would overlap.

Table 1 shows the assumed construction schedule, number of workdays, and overlapping phases that were used in the following analysis.

Table 1 Overall Project Construction Schedule

Construction Phase	Workdays	Months											
		1	2	3	4	5	6	7	8	9	10	11	12
Phase 1: Site preparation & Grading	66												
Phase 2: Tracker Foundations (Piles)	125												
Phase 3: Underground Cabling	125												
Phase 4: Mechanical Installation	146												
Phase 5: Electrical Installation	167												

Note: Construction schedule assumptions are based on Eland 1 Solar Project, where number of days per phase were scaled down based a decrease in acreage. The solar capacity of Eland I and Sienna Solar Storage Project is the same.

[1] This list of types of construction activities is not all inclusive of the various activities that will be conducted during each phase of construction and is provided as an example of some of the work that will be conducted. For example, Phase 1 would include activities such as site preparation, grading, and earth work; Phase 2 would include activities such as concrete foundations; Phase 3 would include activities such as trenching and collector line installation; Phase 4 would include activities such as structural steel work; Phase 5 would include activities such as electrical/instrumentation work. Additional activities not listed above such as material delivery would also occur during various phases of construction. As such, this list of types of construction activities is presented without respect to the construction schedule shown in Table 1. Construction could take up to 24 months, however the analysis assumes a 12-month construction schedule as a conservative analysis.

Construction traffic would access the Project area locally from Barstow Road, Camp Rock Road, and Old Woman Springs Road to parcels located in the southern portion of the development areas. The substation located in the north would gain access from Haynes Road. It is estimated that up to 800 workers per day (during peak construction periods) would be required during construction. On-road traffic would consist of employee and vendor vehicle trips. The number of vehicle trips would vary by month depending on the construction activities.

Heavy construction is expected to occur anytime between 7:00 a.m. and 7:00 p.m., Monday through Friday. Additional hours may be necessary to make-up schedule deficiencies or to complete critical construction activities. Some activities may continue 24 hours per day, seven days per week. Nighttime activities could include, but are not limited to: equipment refueling, staging material for the following day's construction activities, quality assurance/control, and commissioning. Earthmoving activities are expected to be limited to the construction of access roads, operation and maintenance (O&M) buildings, substations, energy storage systems, and storm water protection or storage (detention) facilities. Final grading may include revegetation with low lying grass or applying earth-binding materials to disturbed areas. Materials and supplies would be delivered to the Project area by truck. Truck deliveries would normally occur during daylight hours. However, there could be offloading and/or transporting of materials to the Project area on weekends and during evening hours.

1.4 Operational Activities

Once completed, the Project would generally be limited to the following maintenance activities:

- Cleaning PV panels
- Monitoring electricity generation
- Providing site security
- Maintaining the facility: replacing or repairing inverters, wiring, and PV modules

The Project would operate continuously, 24 hours per day, seven days a week. The Project would require an operational staff of up to 15 full-time employees. The facility would generate electricity during normal daylight hours when solar energy is available. Maintenance activities may occur seven days a week, 24 hours a day to ensure PV panel output when solar energy is available.

1.5 Decommissioning Activities

After 30 to 40 years, the Project would be repowered or decommissioned. If decommissioned, then the site would be reverted to undeveloped land. The decommissioning and restoration process would involve removing aboveground and belowground structures, restoring topsoil, revegetation, and seeding. All debris would be removed from the area.

2 Air Quality

2.1 Environmental Setting

Local Climate and Meteorology

The Project area is within the Mojave Desert Air Basin (MDAB), an inland region in southern California includes the desert portions of northwestern Los Angeles County, eastern Kern County, northeastern Riverside County, and San Bernardino County. The region is closed off from southern coast of California and central California by mountain ranges with the Sierra Nevada Mountains to the north, the Tehachapi Mountains to the northwest, and the San Gabriel and San Bernardino Mountains to the south. The Sonoran Desert borders the eastern and southern portions of the air basin. The regional climate in the MDAB is dry-host desert climate characterized by little cloud formation, daytime solar heating, and infrequent precipitation. During summer, the MDAB is normally influenced by the Pacific subtropical high cell off the coast that prevents cloud formation and encourages daytime solar heating. Cold air masses moving south from Canada and Alaska do not generally influence the MDAB because the frontal systems are weak and diffuse before they reach the desert. Therefore, desert moisture comes in the form of warm, moist, unstable air masses from the south and the MDAB averages three to seven inches of rain annually. The air quality within the MDAB is primarily influenced by meteorology, topography, and a wide range of emission sources, such as dense population centers, substantial vehicular traffic, and industry. The Mojave Desert Air Quality Management District (MDAQMD) monitors and regulates local air quality in Riverside County (MDAQMD 2020a).

Air Pollutants of Concern

The United States Environmental Protection Agency (USEPA) has identified criteria air pollutants that are a threat to public health and welfare. Primary criteria pollutants are emitted directly from a source (e.g., vehicle tailpipe, an exhaust stack of a factory, etc.) into the atmosphere. Primary criteria pollutants include carbon monoxide (CO), nitrogen dioxide (NO_2), fine particulate matter (PM_{10} and $PM_{2.5}$), sulfur dioxide (SO_2), and lead. Ozone (O_3) is considered a secondary criteria pollutant because it is created by atmospheric chemical and photochemical reactions between reactive organic gases (ROG) and nitrogen oxides (NO_X). The Project would generate CO, PM_{10}, $PM_{2.5}$, SO_2, and lead as well as ozone precursors ROG and NO_X (including NO_2) during construction and operation. These pollutants can have adverse impacts on human health at certain levels of exposure. These pollutants are called “criteria” air pollutants because standards have been established for each of them to meet specific public health and welfare standards. The following subsections describe the characteristics, sources, and health and atmospheric effects of air pollutants.

Ozone

Ozone (O_3) is produced by a photochemical reaction (triggered by sunlight) between nitrogen oxides (NO_X) and volatile organic compounds (VOC[2]). NO_X is formed during the combustion of fuels, while ROG

[2] Organic compound precursors of ozone are routinely described by a number of variations of three terms: hydrocarbons (HC), organic gases (OG), and organic compounds (OC). These terms are often modified by adjectives such as total, reactive, or volatile, and result in a rather confusing array of acronyms: HC, THC (total hydrocarbons), RHC (reactive hydrocarbons), TOG (total organic gases), ROG (reactive organic gases), TOC (total organic compounds), ROC (reactive organic compounds), and VOC (volatile organic compounds). While most of these differ in some significant way from a chemical perspective, two groups are important from an air quality perspective: non-photochemically reactive in the lower atmosphere, or photochemically reactive in the lower atmosphere (HC, RHC, ROG, ROC, and VOC).

are formed during combustion and evaporation of organic solvents. Because O_3 requires sunlight to form, it usually occurs in substantial concentrations between the months of April and October. Ozone is a pungent, colorless, toxic gas with direct health effects on humans including respiratory and eye irritation and possible changes in lung functions (USEPA 2021a). Groups most sensitive to O_3 include children, the elderly, people with respiratory disorders, and people who exercise strenuously outdoors.

Nitrogen Dioxide

Nitrogen dioxide is a byproduct of fuel combustion, with the primary source being motor vehicles and industrial boilers and furnaces. The principal form of nitrogen oxide produced by combustion is nitric oxide (NO), but NO reacts rapidly to form NO_2, creating the mixture of NO and NO_2 commonly called NO_X. NO_2 is an acute irritant. A relationship between NO_2 and chronic pulmonary fibrosis may exist, and an increase in bronchitis in young children at concentrations below 0.3 parts per million (ppm) may occur. Elevated levels of NO_2 can also cause respiratory irritation, impaired pulmonary function, and bronchitis (USEPA 2021a). Nitrogen dioxide absorbs blue light, gives a reddish-brown cast to the atmosphere, and reduces visibility. It can also contribute to the formation of ozone/smog and acid rain.

Carbon Monoxide

Carbon monoxide is a local pollutant that is found in high concentrations near fuel combustion equipment and other sources of CO. The primary source of CO, a colorless, odorless, poisonous gas, is automobile traffic. Therefore, elevated concentrations are usually only found near areas of high traffic volumes. The health effects of CO are related to its affinity for hemoglobin in the blood. At high concentrations, CO reduces the amount of oxygen in the blood, causing heart difficulty in people with chronic diseases, nausea, reduced lung capacity, and impaired mental abilities (USEPA 2021a).

Sulfur Dioxide

Sulfur dioxide (SO_2) is a colorless, pungent, irritating gas formed primarily by the combustion of sulfur-containing fossil fuels. When SO_2 oxidizes in the atmosphere, it forms sulfur trioxide (SO_3). Collectively, these pollutants are referred to as sulfur oxides (SO_X). In humid atmospheres, SO_2 can also form sulfuric acid mist, which can eventually react to produce sulfate particulates that can inhibit visibility. Combustion of high sulfur-content fuels is the major source, while chemical plants, sulfur recovery plants, and metal processing are minor contributors. At sufficiently high concentrations, SO_2 irritates the upper respiratory tract. At lower concentrations, when in conjunction with particulates, SO_2 appears to do still greater harm by injuring lung tissues. This compound also constricts the breathing passages, especially in people with asthma and people involved in moderate to heavy exercise. Sulfur dioxide causes respiratory irritation, including wheezing, shortness of breath, and coughing (USEPA 2021a). Long-term SO_2 exposure has been associated with increased risk of mortality from respiratory or cardiovascular disease. Sulfur oxides, in combination with moisture and oxygen, can yellow leaves on plants, dissolve marble, and eat away iron and steel.

Particulate Matter

Atmospheric particulate matter is comprised of finely divided solids and liquids such as dust, soot, aerosols, fumes, and mists. The particulates that are of particular concern are PM_{10} (small particulate matter that measures no more than 10 microns in diameter) and $PM_{2.5}$ (fine particulate that measures no more than 2.5 microns in diameter). The characteristics, sources, and potential health effects associated with the PM_{10} and $PM_{2.5}$ can be different. Major man-made sources of PM_{10} are agricultural

MDAQMD uses the term VOC to denote organic precursors.

operations, industrial processes, combustion of fossil fuels, construction, demolition operations, and entrainment of road dust into the atmosphere. Natural sources include windblown dust, wildfire smoke, and sea spray salt. The finer $PM_{2.5}$ particulates are generally associated with combustion processes as well as formation in the atmosphere as a secondary pollutant through chemical reactions. Elevated levels of PM_{10} can cause respiratory irritation, reduced lung function, aggravation of cardiovascular disease, and cancer (USEPA 2021a). $PM_{2.5}$ is more likely to penetrate deeply into the lungs and poses a serious health threat to all groups, but particularly to the elderly, children, and those with respiratory problems. Elevated levels of $PM_{2.5}$ can cause respiratory stress and decreased lung function and increase the risk of long-term disease (USEPA 2021a). More than half of the small and fine particulate matter that is inhaled into the lungs remains there, which can cause permanent lung damage. These materials can damage health by interfering with the body's mechanisms for clearing the respiratory tract or by acting as carriers of an absorbed toxic substance.

Lead

Lead (Pb) is a metal found naturally in the environment, as well as in manufacturing products. Lead occurs in the atmosphere as particulate matter. The major sources of Pb emissions historically have been mobile and industrial sources. In the early 1970s, the USEPA set national regulations to gradually reduce the lead content in gasoline. In 1975, unleaded gasoline was introduced for motor vehicles equipped with catalytic converters. The USEPA completed the ban prohibiting the use of leaded gasoline in highway vehicles in December 1995. As a result of the USEPA's regulatory efforts to remove lead from gasoline, atmospheric lead concentrations have declined substantially over the past several decades. The most dramatic reductions in lead emissions occurred prior to 1990 due to the removal of lead from gasoline sold for most highway vehicles. Lead emissions were further reduced substantially between 1990 and 2008, with reductions occurring in the metals industries in part due to national emissions standards for hazardous air pollutants (USEPA 2013). As a result of phasing out leaded gasoline, metal processing is currently the primary source of Pb emissions. The highest level of Pb in the air is generally found near lead smelters. Other stationary sources include waste incinerators, utilities, and lead-acid battery manufacturers. Lead may cause a range of health effects, including anemia, kidney disease, and neuromuscular and neurological dysfunction (in severe cases).

Toxic Air Contaminants

In addition to the criteria pollutants discussed above, Toxic Air Contaminants (TAC) are another group of pollutants of concern. Assembly Bill 1807 (AB 1807) sets forth a procedure for the identification and control of TACs in California. CARB defines a TAC as an air pollutant that may cause or contribute to an increase in mortality or an increase in serious illness, or that may pose a present or potential hazard to human health. TACs may result in long-term health effects such as cancer, birth defects, neurological damage, asthma, or genetic damage, or short-term acute effects such as eye watering, respiratory irritation, runny nose, throat pain, and headaches. Because no safe levels of TACs can be determined, there are no ambient air quality standards for TACs. Instead, TAC impacts are evaluated by calculating the health risks associated with a given exposure. TACs are considered either carcinogenic or non-carcinogenic based on the nature of the health effects associated with exposure. For carcinogenic TACs, potential health impacts are evaluated in terms of overall relative risk expressed as excess cancer cases per one million exposed individuals. Non-carcinogenic TACs differ in that there is generally assumed to be a safe level of exposure below which no negative health impact is believed to occur. These levels are determined on a pollutant-by-pollutant basis.

TACs include both organic and inorganic chemical substances. One of the main sources of TACs in California is diesel engines that emit exhaust containing solid material known as diesel particulate

matter (DPM); however, TACs may be emitted from a variety of common sources, including gasoline stations, motor vehicles, dry cleaners, industrial operations, painting operations, and research and teaching facilities.

Diesel Particulate Matter

Diesel engine fuel combustion forms an important fraction of the particulate matter emission inventory, as particulates in diesel emissions are very small and readily respirable. The particles have hundreds of chemicals adsorbed onto their surfaces, including many known or suspected mutagens and carcinogens. The Office of Environmental Health Hazard Assessment (OEHHA) reviewed and evaluated the potential for diesel exhaust to affect human health, and the associated scientific uncertainties. Based on the available scientific evidence, it was determined that a level of DPM exposure has not been identified, below which no carcinogenic effects are anticipated. The Scientific Review Panel that approved the OEHHA report determined that, based on studies to date, 3×10^{-4} micrograms per cubic meter ($\mu g/m^3$) is a reasonable estimate of the unit risk for DPM. This means that a person exposed to a DPM concentration of 1 $\mu g/m^3$ continuously over the course of a lifetime has a 3 per 10,000 chance (or 300 in one million chance) of contracting cancer due to this exposure. In 2000, the statewide estimated average concentration of diesel PM was 1.26 $\mu g/m^3$ for indoor and outdoor ambient air. If DPM concentrations remained the same, about 380 excess cancers per one million population could be expected (CARB 2000). Therefore, these particulate emissions have been determined by CARB to be a TAC.

DPM emissions are estimated to be responsible for about 70 percent of the total ambient Statewide air toxics risk. DPM can also be responsible for elevated localized or near-source exposures ("hot-spots"). Depending on the activity and nearness to receptors, these potential risks are as high as 1,500 per million or more (CARB 2000). CARB staff have conducted risk characterization scenarios to determine the potential excess cancer risks involved when individuals are near various sources of diesel engine emissions, ranging from school buses to high volume freeways. The purpose of the risk characterization was to estimate, through air dispersion modeling, the cancer risk associated with typical diesel-fueled engine or vehicle activities based on modeled PM concentration at the point of maximum impact. The study included various sources of DPM emissions, including idling school buses, truck stops, low- and high-volume freeways, and other sources. High-volume freeways (20,000 or more trucks per day) were estimated to cause 800-1,700 per million potential excess cases of cancers, while low-volume freeways (2,000 or fewer trucks per day) were estimated to cause about 100-200 per million potential excess cases of cancers Statewide (CARB 2000).

Valley Fever

Valley Fever or *coccidioidomycosis* is caused locally by the microscopic fungus *Coccidioides immitis* (C. immitis). The Coccidioides fungus resides in the soil in southwestern United States, northern Mexico, and parts of Central and South America. During drought years, the number of organisms competing with C. immitis decreases, and the C. immitis remains alive but dormant. When rain finally occurs, the fungal spores germinate and multiply more than usual because of fewer other competing organisms. Later, the soil dries out in the summer and fall, and the fungi can become airborne and potentially infectious (Kirkland and Fierey 1996).

Infection occurs when the spores of the fungus become airborne and are inhaled. The fungal spores become airborne when contaminated soil is disturbed by human activities, such as construction and agricultural activities, and natural phenomena, such as windstorms, dust storms, and earthquakes. About 60 percent of infected persons have no symptoms. The remainder develop flu-like symptoms

that can last for a month and tiredness that can sometimes last for longer than a few weeks. Common symptoms include fatigue, couth, chest pain, fever, rashes on upper body or legs, headaches, muscle aches, night sweats, and unexplained weight loss (California Department of Public Health 2021a). A small percentage of infected persons (<1 percent) can develop disseminated disease that spreads outside the lungs to the brain, bone, and skin. Without proper treatment, Valley Fever can lead to severe pneumonia, meningitis, and even death. Symptoms may appear between one to four weeks after exposure (Los Angeles County Health Department 2013). Both humans and animals can become infected with Valley Fever, but the infection is not contagious and cannot spread from one person or animal to another (California Department of Public Health 2021a).

Diagnosis of Valley Fever is conducted through a sample of blood, other body fluid, or biopsy of affected tissue. Valley Fever is treatable with anti-fungal medicines. Once recovered from the disease, the individual is protected against further infection. Persons at highest risk from exposure are those with compromised immune systems, such as those with human immunodeficiency virus (HIV) and those with chronic pulmonary disease. Farmers, construction workers, and others who engage in activities that disturb the soil are at highest risk for Valley Fever. Infants, pregnant women, diabetics, people of African, Asian, Latino, or Filipino descent, and the elderly may be at increased risk for disseminated disease. Historically, people at risk for infection are individuals not already immune to the disease and whose jobs involve extensive contact with soil dust, such as construction or agricultural workers and archeologists (Los Angeles County Health Department 2013). Most cases of Valley Fever (over 65 percent) are diagnosed in people living in the Central Valley and Central Coast regions (California department of Public Health 2021a).

There is no vaccine to prevent Valley Fever. However, the California Department of Public Health recommends the following practical tips to reduce exposure (2021a):

- Stay inside and keep windows and doors closed when it is windy outside and the air is dusty, especially during dust storms.
- Consider avoiding outdoor activities that involve close contact to dirt or dust, including yard work, gardening, and digging, especially if you are in one of the groups at higher risk for severe or disseminated Valley fever.
- Cover open dirt areas around your home with grass, plants, or other ground cover to help reduce dusty, open areas.
- While driving in these areas, keep car windows closed and use recirculating air, if available.
- Try to avoid dusty areas, like construction or excavation sites.
- If you cannot avoid these areas, or if you must be outdoors in dusty air, consider wearing an N95 respirator (a type of face mask) to help protect against breathing in dust that can cause Valley fever.

However, if in situations where digging dirt or stirring up dust will happen, then the following tips are recommended:

- Stay upwind of the area where dirt is being disturbed.
- Wet down soil before digging or disturbing dirt to reduce dust.
- Consider wearing an N95 respirator (mask).
- After returning indoors, change out of clothes if covered with dirt.
    - Be careful not to shake out clothing and breathe in the dust before washing. If someone else is washing your clothes, warn the person before they handle the clothes.

In 2020, approximately 246 cases were reported in San Bernardino County (California Department of Public Health 2021b). This is a decrease of 16 cases compared to 2019 (230 cases). In 2019, the incident rate was 10.4 cases per 100,000 people (California Department of Public Health 2020).[3]

2.2 Regulatory Setting

The federal and state governments have authority under the federal and state Clean Air Acts to regulate emissions of airborne pollutants and have established ambient air quality standards (AAQS) for the protection of public health. An air quality standard is defined as "the maximum amount of a pollutant averaged over a specified period of time that can be present in outdoor air without harming public health" (CARB 2021a). USEPA is the federal agency designated to administer air quality regulation, while CARB is the state equivalent in California. Federal and state AAQS have been established for six criteria pollutants: ozone, carbon monoxide, nitrogen dioxide, sulfur dioxide, $PM_{10,}$ $PM_{2.5}$, and lead. AAQS are designed to protect those segments of the public most susceptible to respiratory distress, such as children under the age of 14, the elderly (over the age of 65), persons engaged in strenuous work or exercise, and people with cardiovascular and chronic respiratory diseases (USEPA 2016). In addition, the State of California has established health-based ambient air quality standards for these and other pollutants, some of which are more stringent than the federal standards (CARB 2021b). The federal and state Clean Air Acts are described in more detail below.

Federal and State Regulations

The Clean Air Act (CAA) was enacted in 1970 and amended in 1977 and 1990 [42 United States Code (USC) 7401] for the purposes of protecting and enhancing the quality of the nation's air resources to benefit public health, welfare, and productivity. In 1971, to achieve the purposes of Section 109 of the CAA [42 USC 7409], USEPA developed primary and secondary National Ambient Air Quality Standards (NAAQS). NAAQS have been designated for the following criteria pollutants of primary concern: O_3, CO, NO_2, SO_2, $PM_{10,}$ $PM_{2.5}$, and Pb.

The primary NAAQS "in the judgment of the Administrator[4], based on such criteria and allowing an adequate margin of safety, are requisite to protect the public health," and the secondary standards are to "protect the public welfare from any known or anticipated adverse effects associated with the presence of such air pollutant in the ambient air" [42 USC 7409(b)(2)]. USEPA classifies specific geographic areas as either "attainment" or "nonattainment" areas for each pollutant based on the comparison of measured data with the NAAQS. States are required to adopt enforceable plans, known as a State Implementation Plan (SIP), to achieve and maintain air quality meeting the NAAQS. State plans also must control emissions that drift across state lines and harm air quality in downwind states.

The California Clean Air Act (CCAA) was enacted in 1988 (California Health & Safety Code (H&SC) Section 39000 et seq.). Under the CCAA, the State has developed the California Ambient Air Quality Standards (CAAQS), which are generally more stringent than the NAAQS. In addition to the federal criteria pollutants, the CAAQS also specify standards for visibility-reducing particles, sulfates, hydrogen sulfide, and vinyl chloride. Similar to the federal CAA, the CCAA classifies specific geographic areas as either "attainment" or "nonattainment" areas for each pollutant, based on the comparison of measured data within the CAAQS. Table 2 lists the current federal and state standards for regulated pollutants.

[3] The 2020 incident rate is not yet published.
[4] The term "Administrator" means the Administrator of the USEPA.

Table 2 Federal and State Ambient Air Quality Standards

Pollutant	Averaging Time	NAAQS	CAAQS
Ozone	1-Hour	–	0.09 ppm
	8-Hour	0.070 ppm	0.070 ppm
Carbon Monoxide	8-Hour	9.0 ppm	9.0 ppm
	1-Hour	35.0 ppm	20.0 ppm
Nitrogen Dioxide	Annual	0.053 ppm	0.030 ppm
	1-Hour	0.100 ppm	0.18 ppm
Sulfur Dioxide	Annual	0.030 ppm	–
	24-Hour	0.14 ppm	0.04 ppm
	1-Hour	0.075 ppm	0.25 ppm
PM_{10}	Annual	–	20 µg/m^3
	24-Hour	150 µg/m^3	50 µg/m^3
PM_{25}	Annual	12 µg/m^3	12 µg/m^3
	24-Hour	35 µg/m^3	–
Lead	30-Day Average	–	1.5 µg/m^3
	3-Month Average	0.15 µg/m^3	–

NAAQS = National Ambient Air Quality Standard; CAAQS = California Ambient Air Quality Standard ppm = parts per million; µg/m^3 = micrograms per cubic meter

Source: CARB 2016

NAAQS and CAAQS Attainment Status

California is divided geographically into 15 air basins for managing the air resources of the state on a regional basis. Areas within each air basin are considered to share the same air masses and, therefore, are expected to have similar ambient air quality. If an air basin is not in either federal or state attainment for a particular pollutant, the basin is classified as a nonattainment area for that pollutant. Under the federal and state Clean Air Acts, once a nonattainment area has achieved the air quality standards for a particular pollutant, it may be redesignated to an attainment area for that pollutant. To be redesignated, the area must meet air quality standards and have a 10-year plan for continuing to meet and maintain air quality standards, as well as satisfy other requirements of the federal CAA. Areas that have been redesignated to attainment are called maintenance areas. As described in Section 2.1 *Environmental Setting,* the Project is within the MDAB.

The portion of the MDAB overseen by the MDAQMD is designated severe nonattainment for the federal eight-hour ozone standard, federal 24-hour PM_{10} standard (San Bernardino County only), state ozone standard, state PM_{10} standard, and state $PM_{2.5}$ standard. The area is classified attainment or unclassified/attainment for all other criteria pollutants (MDAQMD 2020a).

State Implementation Plan

The State Implementation Plan (SIP) is a collection of documents that set forth the state's strategies for achieving the NAAQS. In California, the SIP is a compilation of new and previously submitted plans, programs (such as monitoring, modeling, and permitting), district rules, state regulations, and federal controls. CARB is the lead agency for all purposes related to the SIP under state law. Local air districts and other agencies, such as the Department of Pesticide Regulation and the Bureau of Automotive

Repair, prepare SIP elements and submit them to CARB for review and approval. CARB then forwards SIP revisions to the USEPA for approval and publication in the Federal Register. All of the items included in the California SIP are listed in the Code of Federal Regulations (CFR) at 40 CFR 52.220.

As the regional air quality management district, the MDAQMD is responsible for preparing and implementing the portion of the SIP applicable to the portion of the MDAB within its jurisdiction. The air pollution control district for each county adopts rules, regulations, and programs to attain federal and state air quality standards and appropriates money (including permit fees) to achieve these objectives.

Local Air Quality Regulations

Mojave Desert Air Quality Management District

As the local air quality management agency, MDAQMD is required to monitor air pollutant levels to ensure that state and federal air quality standards are met and, if they are not met, to develop strategies to meet the standards. Depending on whether the standards are met or exceeded, the MDAB is classified as being in "attainment" or "nonattainment." In areas designated as non-attainment for one or more air pollutants, a cumulative air quality impact exists for those air pollutants, and the human health impacts described in Section 2.1, *Environmental Setting,* are already occurring in that area as part of the environmental baseline condition.

Under state law, air districts are required to prepare a plan for air quality improvement for pollutants for which the district is in non-compliance. The SIPs adopted by the MDAQMD that are applicable to the Project are as follows: *Mojave Desert Planning Area Federal Particulate Matter (PM_{10}) Attainment Plan* (1995) and the *MDAQMD 70 ppb Ozone Attainment Plan (Western Mojave Desert Non-Attainment Area)* (2023). The MDAQMD SIP for the PM_{10} NAAQS was adopted on July 31, 1995 and covers San Bernardino County excluding Searles Valley planning area and the South Coast Air Basin. The PM_{10} attainment plan provides specific control measures to reach federal attainment for PM_{10}. Measures to reduce fugitive dust emissions from construction, disturbed areas, travel on unpaved roads, and stationary sources were provided. The plan had the goal of reaching attainment of PM_{10} in 2000. The MDAQMD attainment plan for the 2008 8-hour ozone NAAQS was adopted on January 23, 2023 and covers parts of San Bernardino County and Antelope Valley within the Western Mojave Desert. The plan includes enforceable emission limits, a monitoring program, a permitting program, and contingency measures to attain the federal 2008 8-hour ozone standard. The attainment plan addresses several state and federal planning requirements and incorporates new scientific information, primarily in the form of updated emissions inventories, ambient measurements, and meteorological air quality models. The document also demonstrated conformity with the Southern California Association of Governments' (SCAG) 20202 Regional Transportation Plan/Sustainable Communities Strategy (2020 RTP/SCS) activity data. The document demonstrates that the MDAQMD will meet the 70 ppm 8-hour ozone NAAQS by August 2033.

Project-level significance thresholds established by local air districts set the level at which a project would cause or have a cumulatively considerable contribution to an exceedance of a federal or state ambient air quality standard. Therefore, if a project's air pollutant emissions exceed the significance thresholds, the Project could cause or contribute to the human health impacts.

To minimize potential impacts from Project emissions, MDAQMD implements rules and regulations for emissions that may be generated by various uses and activities. The rules and regulations detail pollution-reduction measures that must be implemented during construction and operation of projects. Rules and regulations relevant to the project include the following:

- **Rule 401 (Visible Emissions).** This rule addresses discharge of visible emissions from any single source into the atmosphere. A violation is a discharge for a period or periods aggregating more than 3 minutes in any one hour which is:
  - As dark or darker in shade designated as No. 1 on the Ringelmann Chart, as published by the United State Bureau of Mines, or
  - Of such opacity as to obscure an observer's view to a degree equal to or greater that does smoke described in Subsection A or 20 percent opacity.
- **Rule 402 (Nuisance).** This rule prohibits the discharge from any source quantities for air containments or other materials which could cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public.
- **Rule 403 (Fugitive Dust).** This rule pertains to any project or facility with a disturbance surface area of at least twenty acres; residential construction/demolition activity with a disturbed surface area of at least 10 acres; non-residential construction/demolition activity with a disturbed surface area of at least five acres; moving, depositing, or relocating more than 2,500 cubic yards per day of bulk materials on at least three consecutive days; solar projects; healthily-traveled unpaved roads; and any other project or facility where fugitive dust is visible (MDAQMD 2020b).

In addition, the following California Code of Regulations (CCR) would be applicable to the project:

- **Engine Idling.** In accordance with Section 2485 of CCR Title 13, the idling of all diesel-fueled commercial vehicles (weighing over 10,000 pounds) during construction shall be limited to five minutes at any location.
- **Emission Standards.** In accordance with Section 93115 of CCR Title 17, operation of any stationary, diesel-fueled, compression-ignition engines shall meet specified fuel and fuel additive requirements and emission standards.

San Bernardino County

The San Bernardino County Countywide Plan was adopted on October 27, 2020 and serves as the County's General Plan (County of San Bernardino 2020). Specific air quality policies are addressed in the Natural Resources Element. Applicable policies are as follows:

- **Policy NR-1.3 Coordination on air pollution.** We collaborate with air quality management districts and other local agencies to monitor and reduce major pollutants affecting the county at the emissions source.
- **Policy NR-1.6 Fugitive dust emissions**. We coordinate with air quality management districts on requirements for dust control plans, revegetation, and soil compaction to prevent fugitive dust emissions.
- **Policy NR-1.8 Construction and operations.** We invest in County facilities and fleet vehicles to improve energy efficiency and reduce emissions. We encourage County contractors and other builders and developers to use low-emission construction vehicles and equipment to improve air quality and reduce emissions.

In addition, San Bernardino County has a Development Code for construction of projects and for commercial solar energy facilities in the County. Under Section 83.01.040 *Air Quality*, the following measures for construction are applicable to the project:

(c) Diesel Exhaust Emissions Control Measures. The following emissions control measures shall apply to all discretionary land use projects approved by the County on or after January 15, 2009:

1) *On-Road Diesel Vehicles.* On-road diesel vehicles are regulated by the State of California Air Resources Board.
2) *Off-Road Diesel Vehicle/Equipment Operations.* All business establishments and contractors that use off-road diesel vehicle/equipment as part of their normal business operations shall adhere to the following measures during their operations in order to reduce diesel particulate matter emissions from diesel-fueled engines:

A. Off-road vehicles/equipment shall not be left idling on site for periods in excess of five minutes. The idling limit does not apply to:

I. Idling when queuing;

II. Idling to verify that the vehicle is in safe operating condition;

III. Idling for testing, servicing, repairing or diagnostic purposes;

IV. Idling necessary to accomplish work for which the vehicle was designed (such as operating a crane);

V. Idling required to bring the machine system to operating temperature; and

VI. Idling necessary to ensure safe operation of the vehicle.

B. Use reformulated ultra low-sulfur diesel fuel in equipment and use equipment certified by the USEPA or that pre-dates EPA regulations.

C. Maintain engines in good working order to reduce emissions.

D. Signs shall be posted requiring vehicle drivers to turn off engines when parked.

E. Any requirements or standards subsequently adopted by the South Coast Air Quality Management District, the Mojave Desert Air Quality Management District or the California Air Resources Board.

F. Provide temporary traffic control during all phases of construction.

G. On-site electrical power connections shall be provided for electric construction tools to eliminate the need for diesel-powered electric generators, where feasible.

H. Maintain construction equipment engines in good working order to reduce emissions. The developer shall have each contractor certify that all construction equipment is properly serviced and maintained in good operating condition.

I. Contractors shall use ultra-low sulfur diesel fuel for stationary construction equipment as required by Air Quality Management District (AQMD) Rules 431.1 and 431.2 to reduce the release of undesirable emissions.

J. Substitute electric and gasoline-powered equipment for diesel-powered equipment, where feasible.

The Project would be subject to all applicable measures from the Development Code Section 84.29.035 *Required Findings for Approval of a Commercial Solar Energy Facility*. The following are the relevant air quality measures for controlling fugitive dust emissions.

(c) The finding of fact shall include the following:

7) The proposed commercial solar energy generation facility will minimize site grading, excavating, and filling activities by being located on land where the existing grade does not exceed an average of five percent across the developed portion of the project site, and by utilizing construction methods that minimize ground disturbance.
20) The proposed commercial solar energy generation facility will be designed, constructed, and operated so as to minimize dust generation, including provision of sufficient watering of excavated or graded soil during construction to prevent excessive dust. Watering will occur at a minimum of three times daily on disturbed soil areas with active operations, unless dust is otherwise controlled by rainfall or use of a dust palliative, or other approved dust control measure.
21) All clearing, grading, earth moving, and excavation activities will cease during period of winds greater than 20 miles per hour (averaged over one hour), or when dust plumes of 20 percent or greater opacity impact public roads, occupied structures, or neighboring property, and in conformance with Air Quality Management District (AQMD) regulations.
22) For sites where the boundary of a new commercial solar energy generation facility will be located within one-quarter mile of a primary residential structure, an adequate wind barrier will be provided to reduce potentially blowing dust in the direction of the residence during construction and ongoing operation of the commercial solar energy generation facility.
23) Any unpaved roads and access ways will be treated and maintained with a dust palliative or graveled or treated by another approved dust control method to prevent excessive dust, and paving requirements will be applied pursuant to Chapter 83.09 of the Development Code.
24) On-site vehicle speed will be limited to 15 miles per hour.

The Project would be subject to all applicable measures from the Development Code Section 84.29.070 *Decommissioning Requirements*. The following are the relevant air quality measures:

a) *Closure Plan*. Following the operational life of the project, the project owner shall perform site closure activities to meet federal, state, and local requirements for the rehabilitation and revegetation of the project site after decommissioning. The project owner shall prepare a Closure, Revegetation, and Rehabilitation Plan and submit it to the Planning Division for review and approval prior to building permit issuance. Under this plan, all aboveground structures and facilities shall be removed to a depth of three feet below grade and removed offsite for recycling or disposal. Concrete, piping, and other materials existing below three feet in depth may be left in place. Areas that had been graded shall be restored to original contours unless it can be shown that there is a community benefit for the grading to remain as altered. Succulent plant species native to the area shall be salvaged prior to construction, transplanted into windrows, and maintained for later transplanting following decommissioning. Shrubs and other plant species shall be revegetated by the collection of seeds and re-seeding following decommissioning.

b) *Compliance with Other Requirements*.

(1) Project decommissioning shall be performed in accordance with all other plans, permits, and mitigation measures that would assure the project conforms to applicable requirements and would avoid significant adverse impacts. These plans include the following as applicable:

(A) Water Quality Management Plan.

(B) Erosion and Sediment Control Plan.

(C) Drainage Report.

(D) Notice of Intent and Stormwater Pollution Prevention Plan.

(E) Air Quality Permits.

(F) Biological Resources Report.

(G) Incidental Take Permit, Section 2081 of the Fish and Game Code.

(H) Cultural Records Report.

(2) The County may require a Phase 1 Environmental Site Assessment be performed at the end of decommissioning to verify site conditions.

2.3 Current Air Quality

Existing Ambient Air Quality

MDAQMD currently operates six active air quality monitoring station in the MDAB (MDAQMD 2020a). The purpose of the monitoring stations is to measure ambient concentrations of pollutants and determine whether ambient air quality meets the California and federal standards. The nearest monitoring station that monitors all the relevant criteria pollutants is the Victorville-14306 Park Avenue monitoring station, which is approximately 31 miles west of the edge of the Project area. This station monitors O_3, $PM_{2.5}$, and NO_2 along with PM_{10}. Table 3 indicates the number of days that each of the standards was exceeded the years 2019, 2020, and 2021. The data collected at the Victorville station indicates that the 8-hour O_3 state and federal standard was exceeded in 2019, 2020, and 2021. In addition the state 1-hour O_3 was exceeded all three years. The PM_{10} federal standard was exceeded in 2019, 2020, and 2021. The federal $PM_{2.5}$ standard was exceeded in 2020 and 2021. No other federal or state standards were exceeded at these monitoring stations.

Table 3 Ambient Air Quality at the Nearest Monitoring Stations

Pollutant	2019	2020	2021
Ozone, O_3			
8 Hour Ozone (ppm), 8-Hr Maximum[1]	0.081	0.094	0.098
Number of Days of State exceedances (>0.070)	34	38	35
Number of days of Federal exceedances (>0.070)	29	35	345
Ozone (ppm), Worst Hour[1]	0.104	0.112	0.112
Number of days above State standard (>0.09 ppm)	3	4	8
Number of days above Federal standard (>0.112 ppm)	0	0	0
Respirable Particulate Matter, PM_{10}			
Particulate Matter 10 microns, μg/m^3, Worst 24 Hours[1]	170.0	261.4	591.6
Number of days above State standard (>50 μg/m^3)	*	*	*
Number of days above Federal standard (>150 μg/m^3)	2	2	1
Fine Particulate Matter, $PM_{2.5}$			
Particulate Matter <2.5 microns, μg/m^3, Worst 24 Hours[1]	20.0	48.7	87.1
Number of days above Federal standard (>35 μg/m^3)	0	4	1
Nitrogen Dioxide, NO_2[3]			
Nitrogen Dioxide (ppb), Worst Hour[1]	0.056	0.059	0.057
Number of days above State standard (>180 ppb)	0	0	0
Number of days above Federal standard (>100 ppb)	0	0	0

[1] Measurements from the Victorville-14306 Park Avenue station at 14306 Park Avenue, Victorville.

*Indicates that insufficient data available to determine the value.

Source: CARB 2023

Sensitive Receptors

CARB and OEHHA have identified the following groups of individuals as the most likely to be affected by air pollution: the elderly over 65, children under 14, infants (including in utero in the third trimester of pregnancy), and persons with cardiovascular and chronic respiratory diseases such as asthma, emphysema, and bronchitis (CARB 2005; OEHHA 2015). Some land uses considered more sensitive to air pollution than others due to the types of population groups or activities involved are referred to as sensitive receptors. Examples of these sensitive receptors are residences, schools, hospitals, religious facilities, and daycare centers. MDAQMD CEQA Guidance defines sensitive receptor land uses as residences, schools, daycare centers, playgrounds, and medical facilities (MDAQMD 2020a). The sensitive receptors with the highest potential to be affected by the Project include residences surrounding the Project area. The closet single-family residence is located at the north corner of the Sherman Way and Lincoln Road intersection, immediately east of the Accessor Parcel Number 045-212-142 in the southern portion of the Project area The nearest residential community is Lucerne Valley, which is approximately six miles southwest of the Project area.

3 Air Quality Impact Analysis

3.1 Methodology

Construction and operational emissions were estimated from several emissions models and associated spreadsheet calculations, depending on the source type and data availability.[5] The primary emissions models used included CARB's on-road vehicle emission factor model (EMFAC2017) and the off-road diesel equipment emissions analysis and inventory (OFFROAD2017). Emission factors were obtained from the USEPA AP-42 *Compilation of Air Pollutant Emissions Factors* (USEPA 2006). Short-term and annual emissions were estimated using appropriate emission factors, the number of pieces of equipment, daily operating hours, and the associated schedules. Refer to Appendix A for details on equipment fleet, hours of operation, Project trips, construction schedule, and other assumptions used. The following construction and operational sources and activities were analyzed for emissions:

- **On-site construction equipment exhaust emissions (all criteria pollutants):** Based on EMFAC2017 and OFFROAD2017 emission factors and estimated equipment schedules.
- **On-site construction equipment fugitive dust emissions (PM_{10} and $PM_{2.5}$)**: Based on USEPA AP-42 emission factors, CARB Entrained Road Travel and Paved Road Dust Miscellaneous Process Methodology, and estimated equipment schedules.
- **On-site and off-site haul truck (includes delivery, freight, and dump/water trucks) exhaust emissions (all criteria pollutants):** Based on EMFAC2017 and estimated Project trips from the Traffic Assessment prepared by GHD (2023).
- **On-site and off-site entrained fugitive dust emissions for paved and unpaved road travel**: Based on AP-42 methodology, CARB methodology, and estimated Project trips.
- **Worker vehicle emissions for trips to and from the site**: Based on EMFAC2017 and estimated Project trips.
- **Worker vehicle entrained fugitive dust emissions for paved roads**: Based on AP-42 methodology, CARB methodology, and estimated Project trips.

As previously mentioned in Section 1.3, *Construction Activities*, construction at some of the Project parcels may occur simultaneously, and phases of construction would overlap. Construction emissions associated with the Project are discussed below with the assumption that construction would occur at all sites simultaneously. The lifetime of the Project was assumed to be 30 years and at the end of the solar facility's lifetime it was assumed to be decommissioned.

Trip generation rates for employees and vendors were provided by in the Traffic Assessment (GHD 2023). It was assumed that one-third of vendor vehicles would be medium-heavy duty trucks and two-thirds would be heavy-heavy duty trucks. Similarly, it was assumed that 76 percent of the worker commute vehicles were light-duty automobiles, and the remaining 24 percent were light-duty trucks. Percentages were derived from the distribution of vehicle miles traveled from EMFAC2017.

[5] The Project description was changed subsequent to the original modeling to reduce area size and increase facility size. As discussed in more detail in the Appendix, the analysis was not changed to reflect the changes in the Project size as the analysis as presented represents a more conservative analysis. The operational workers analyzed in the original analysis was 12, the current workers is estimated at 15. The analysis is scaled to update worker trip emissions accordingly.

3.2 Significance Thresholds

MDAQMD Significance Thresholds

Consistency with Air Quality Management Plan

MDAQMD's guidance states that a Project is considered non-conforming if it "…conflicts with or delays the implementation of an applicable attainment or maintenance plans." To demonstrate compliance, the Project must conform to all applicable MDAQMD rules, comply with proposed control measures that are not yet adopted from the applicable plans, and be consistent with the growth forecast from the applicable plans.

Regional Criteria Pollutant Thresholds

MDAQMD recommends quantitative regional significance thresholds for temporary construction activities and long-term Project operation in the MDAB. Projects that exceed the regional emission threshold would be considered to have a cumulatively significant impact to air quality. MDAQMD suggest the use of annual thresholds for projects exceeding one year. The annual thresholds shown in Table 4 are used to evaluate a project's potential air quality impacts.

Table 4 MDAQMD Air Quality Significance Thresholds

Pollutant	Annual Thresholds (tons per year)
CO	100
NO_x	25
VOC	25
SO_x	25
PM_{10}	15
$PM_{2.5}$	12

CO = carbon monoxide; NO_x = nitrogen oxides; VOC = volatile organic compounds; SO_x = sulfur oxide; PM_{10} = particulate matter with a diameter no more than 10 microns; $PM_{2.5}$ = particulate matter with a diameter no more than 2.5 microns

Source: MDAQMD 2020a

Toxic Air Containments Thresholds

MDAQMD has developed significance thresholds for the emissions of TACs based on health risks associated with elevated exposure to such compounds. For carcinogenic compounds, cancer risk is assessed in terms of incremental excess cancer risk. A project would result in a potentially significant impact if it would generate an incremental excess cancer risk greater or equal to 10 in a million or result in a hazard index (HI) or non-cancerous value greater or equal to 1. MDAQMD has listed in their CEQA guidance criteria for when these thresholds should be used for specific land use types and their distance to sensitive receptors (MDAQMD 2020a). The following project types proposed for sites within the specified distance to an existing or planned (zoned) sensitive receptor land use (e.g., residences, schools, daycare centers, playgrounds, and medical facilities) must evaluate the project using the aforementioned MDAQMD TAC thresholds:

- Any industrial project within 1,000 feet;
- A distribution center (40 or more trucks per day) within 1,000 feet;
- A dry cleaner using perchloroethylene within 500 feet;

- A gasoline dispensing facility within 300 feet.

Since the Project is a solar facility and is not categorized as the listed project types, evaluation of the Project's TAC emissions using the MDAQMD thresholds is not required. Therefore, no quantitative health risk assessment is necessary, and TAC emissions generated by the Project are qualitatively assessed.

3.3 Project Impact Analysis

Construction Impacts

Construction of the Project would require approximately 12 months of continuous activity involving several overlapping phases. Refer to Section 1.3, *Construction Activities*, for phasing specifics related to the Project construction schedule. Construction of the Project would generate air pollutant emissions from entrained dust, off-road equipment uses, and vehicle emissions. Off-site emissions would be generated by construction worker daily commute trips and heavy-duty diesel haul and vendor truck trips. Construction emissions would vary substantially from day to day, depending on the level of activity, the specific type of operation, and, for dust and the prevailing weather conditions. Construction of the gen-tie is incorporated into the Project construction schedule and equipment mix. Therefore, emissions associated with the gen-tie are incorporated directly into the impacts associated with construction of the Project. [6]

As shown in Table 5, all construction emissions with no control measures would be below the MDAQMD annual threshold except for PM_{10} emissions. However, the Project would be required to comply with MDAQMD Rule 403 and San Bernardino County Development Code Section 84.29.035 to control fugitive dust along with the San Bernardino County Development Code Section 83.01.040 to reduce exhaust emissions during construction (see Section 2.2, *Regulatory Setting*, for measures associated with the Development Code) . At this time, the exhaust-related reduction cannot be determined since the reduction is dependent on fleet specific information, but adherence to the dust control measures were quantified and applied to the PM_{10} and $PM_{2.5}$ emissions. Table 6 shows the reduced PM_{10} and $PM_{2.5}$ measures accounting for a water control measure. With the water control measures, the PM_{10} emissions do not exceed MDAQMD's threshold of 15 tons per year. Therefore, all construction-related criteria pollutant emissions would not exceed the applicable MDAQMD thresholds.

[6] As indicated in the introduction, the SCE Calcite Substation is not part of this Project and emissions estimates do not include estimates for construction of the Calcite Substation site.

Table 5 Annual Construction Emissions – No Control Measures

Emission Type	Source	Annual Emissions (tons per year)[2]					
		VOC	NO_X	SO_X	CO	PM_{10}	$PM_{2.5}$
2023							
Exhaust	Off-Road Construction Equipment	1.6	13.5	<0.1	14.9	0.6	0.6
	On-Road Vehicles	0.6	2.0	<0.1	8.8	0.7	0.3
Fugitive Dust[1]	Off-Road Construction Activity	–	–	–	–	5.7	0.6
	On-Road Vehicles (resuspended)	–	–	–	–	8.6	1.7
Total		**2.2**	**15.5**	**<0.1**	**23.7**	**15.6**	**3.2**
Threshold		25	25	25	100	15	12
Exceed Threshold?		No	No	No	No	**Yes**	No

[1] Fugitive dust describes particulate matter that is emitted into the air due to earth moving activities or that has been re-suspended.

[2] Emissions by construction year are based on an estimated construction schedule and construction starting on January 1, 2023.

VOC = volatile organic compounds; NO_x = nitrogen oxides; SO_x = sulfur oxides; CO = carbon monoxide; PM_{10} = particulate matter with a diameter of 10 or less microns; $PM_{2.5}$ = particulate matter with a diameter of 2.5 or less microns

Rounded values shown; columns may not add up correctly. Subtotal equals the sum of all exhaust and fugitive dust emissions from off-road construction equipment and on-road vehicles. See Appendix A for calculations.

Table 6 Annual Construction Emissions – With Water Control Measures

Emission Type	Source	Annual Emissions (tons per year)[2]					
		VOC	NO_X	SO_X	CO	PM_{10} (with water control)	$PM_{2.5}$ (with water control)
2023							
Exhaust	Off-Road Construction Equipment	1.6	13.5	<0.1	14.9	0.6	0.6
	On-Road Vehicles	0.6	2.0	<0.1	8.8	0.7	0.3
Fugitive Dust[1]	Off-Road Construction Activity	–	–	–	–	3.9	0.4
	On-Road Vehicles (resuspended)	–	–	–	–	7.2	1.6
Total		**2.2**	**15.5**	**0.1**	**23.7**	**12.4**	**2.9**
Threshold		25	25	25	100	15	12
Exceed Threshold?		No	No	No	No	No	No

[1] Fugitive dust describes particulate matter that is emitted into the air due to earth moving activities or that has been re-suspended. Water control measures pursuant to MDAQMD Rule 403 and the San Bernardino County Development Code Section 84.29.035 are accounted for in the PM_{10} and $PM_{2.5}$ emissions.

[2] Emissions by construction year are based on an estimated construction schedule and construction starting on January 1, 2023.

VOC = volatile organic compounds; NO_x = nitrogen oxides; SO_x = sulfur oxides; CO = carbon monoxide; PM_{10} = particulate matter with a diameter of 10 or less microns; $PM_{2.5}$ = particulate matter with a diameter of 2.5 or less microns

Rounded values shown; columns may not add up correctly. Subtotal equals the sum of all exhaust and fugitive dust emissions from off-road construction equipment and on-road vehicles. See Appendix A for calculations.

Project Decommissioning

As stated in Section 1.4, *Operational Activities*, at the end of the Project's useful life (anticipated to be 30 to 40 years), the solar facility would be repowered or decommissioned. For this analysis, the lifetime is based on 30 years. The PV arrays and supporting equipment largely sit on the surface of the land, and removal of the arrays would not require extensive ground-disturbing activities. Any other activities required for deconstruction of the on-site facilities would require similar types and levels of equipment as those used during the construction phase. Therefore, based on the emissions shown in Table 6, decommissioning activities would not generate emissions exceeding established MDAQMD thresholds if decommissioning occurred at all Project parcels simultaneously. If the parcels were to be decommissioned in a subsequent order, then emissions would be lower than those reported in Table 6. Additionally, the Project applicant would be required to develop a Decommissioning Closure Plan for review and approval by the San Bernardino County Planning and Community Development Department. All decommissioning and restoration activities would adhere to the requirements of the appropriate governing authorities and be conducted in accordance with all applicable federal, state, and county regulations. Additionally, recommendations related to the decommissioning of utility sized solar facilities are included as a requirement of all proposed solar projects in San Bernardino County pursuant to development code 84.29.070 to establish safeguards to ensure the maintenance of the health, safety, and welfare of the citizens of the County.

Long-term Regional Impacts

Air Quality Management Plan Consistency

Construction, operation, and decommissioning of the Project would result in emissions of criteria pollutants including ozone precursors, such as ROG and NO_X as well as particulate matter. MDAQMD has prepared air quality management plans (AQMP) to achieve federal ozone standards, the most recent of which is the *MDAQMD 70 ppb Ozone Attainment Plan (Western Mojave Desert Non-Attainment Area)* (2023). In addition, the MDAQMD prepared the *Mojave Desert Planning Area Federal Particulate Matter (PM_{10}) Attainment Plan* (1995) since San Bernardino County is designated nonattainment for the federal PM_{10} standards. To be consistent with the MDAQMD air quality plans, projects must conform to all applicable MDAQMD rules, comply with proposed control measures that are not yet adopted from the applicable plans, and be consistent with the growth forecast from the applicable plans.

The Project would adhere to the MDAQMD Rule 403 (Fugitive Dust Control), in addition to complying with any applicable proposed control measures from the *Mojave Desert Planning Area Federal Particulate Matter (PM_{10}) Attainment Plan* (1995) and the *MDAQMD 70 ppb Ozone Attainment Plan (Western Mojave Desert Non-Attainment Area)* (2023).

The Project would be consistent with the growth forecasts used in the applicable MDAQMD AQMP. The MDAQMD 2023 ozone Attainment Plan used VMT provided by the SCAG's 2020 RTP/SCS, thus the projected number of employees generated by the Project were compared to the SCAG's 2020 RTP/SCS socioeconomic forecast projections of regional population, housing, and employment growth (SCAG 2020).[7] The Project would require fifteen on-site, full-time employees once operational. The employment growth forecasts in SCAG's 2020 RTP/SCS for Apple Valley Town, the nearest major town to the Project area, estimate that the total number of jobs would increase from 18,000 jobs in 2016 to

[7] On September 3, 2020, SCAG's Regional Council formally adopted the 2020-2045 RTP/SCS (titled Connect SoCal). However, the SIP was adopted prior to this date and relies on the demographic and growth forecasts of the 2016-2040 RTP/SCS; therefore, these forecasts are utilized in the analysis of the project's consistency with the air quality attainment plans

30,200 jobs in 2045, for an increase of 12,200 jobs (SCAG 2020). The Project would increase employment by fifteen people (assuming that the Project would require new employees to move to Apple Valley Town). The increase anticipated from the proposed Project would be within the SCAG's projected 2045 employment increase of 12,200 from 2016, and the Project would not cause the Town to exceed official regional employment projections.

Furthermore, as shown in Table 6 and Table 7, the Project would not generate criteria pollutant emissions that would exceed MDAQMD's thresholds for ozone precursors (VOC and NO_X), CO, SO_x, PM_{10}, and $PM_{2.5}$. Thus, the Project would not have a cumulatively considerable air quality impact nor contribute to an exceedance of a federal or state ambient air quality standard. The Project would be consistent with the applicable MDAQMD air quality management plans.

Operational Air Pollutant Emissions

Table 7 summarizes estimated emissions associated with operation of the Project as a whole. As discussed in Section 1.4, *Operational Activities*, the Project would require approximately fifteen full-time employees for operations and maintenance activities. As shown in Table 7, unmitigated operations emissions from the Project would not exceed MDAQMD thresholds for any criteria pollutant. Therefore, the Project would not contribute substantially to an existing or projected air quality violation. In addition, because criteria pollutant emissions and regional thresholds are cumulative in nature, the Project would not result in a cumulatively considerable net increase of criteria pollutants.

Table 7 Estimated Operational Emissions- No Control Measures

Emission Type	Source	Emissions					
		VOC	NO_X	SO_X	CO	PM_{10}	$PM_{2.5}$
Exhaust	On Road and On-Site Vehicles	<0.1	0.1	<0.1	0.4	<0.1	<0.1
Fugitive Dust	Maintenance Vehicles	–	–	–	–	1.0	0.1
Total (tons/year)		**<0.1**	**0.1**	**<0.1**	**0.4**	**1.0**	**0.1**
MDAQMD Threshold		25	25	25	100	15	12
Exceed Threshold?		No	No	No	No	No	No

[1] Annualized at 250 working days per year

VOC = volatile organic compounds; NO_x = nitrogen oxides; SO_x = sulfur oxides; CO = carbon monoxide; PM_{10} = particulate matter with a diameter of 10 or less microns; $PM_{2.5}$ = particulate matter with a diameter of 2.5 or less microns

Totals may not add up due to rounding. Subtotal equals the sum of all exhaust and fugitive dust emissions from on-road and on-site vehicles. See Appendix A for calculations.

Emissions Displaced During Operation

The operation of the Project as a renewable energy source could indirectly cause the replacement of fossil fuel energy production facilities and thereby displace criteria pollutants created by existing power generation sources. The Project would generate a maximum of 525 MW of electricity at any given time. Over the 30-year lifespan of the Project, approximately 35,240 gigawatt-hours (GWh) of electricity would be produced, which equates to 1,175 GWh of electricity per year. Table 8 shows the potential criteria pollutant emissions that could be displaced by the Project. It is noted that this estimate only includes emissions generated by the combustion of fossil fuels and does not include operational employee trips or the emissions associated with extracting and transporting those power sources. It is also noted that this estimate only includes the displacement of emissions from the portion of the California electricity market that comes from fossil fuels (approximately 67 percent of the market) and does not include displacement of emissions from the portion of the California electricity market

generated by non-combustion sources (i.e., wind, solar, nuclear, hydro-electric) (CEC 2021). These emissions are for informational purposes only and are not used to determine Project significance as it is unknown if active fossil fuel generators would be taken offline directly as a result of this Project. Refer to Appendix A for detailed calculations related to the Project's annual energy generation.

Table 8 Criteria Pollutant Emissions Displaced by the Project

	Emissions					
	VOC	NO_X	SO_X	CO	PM_{10}	$PM_{2.5}$
Emissions Displaced Annually (tons per year)	0.4	295.9	11.2	36.0	10.8	4.5
Total Emissions Displaced over Lifetime of Project (tons over 30 years)	12.6	8,877.7	337.0	1,080.2	324.4	135.4

Note: Refer to Appendix A for displacement calculations.

Toxic Air Containments

Construction Impacts

Construction-related activities would result in temporary Project-generated emissions of DPM exhaust emissions from off-road, heavy-duty diesel equipment for site preparation, grading, building construction, and other construction activities. DPM was identified as a TAC by CARB in 1998 (CARB 2021c). Generation of DPM from construction projects typically occurs in a single area for a short period. Construction of the proposed project would occur over approximately 12 months. The dose to which the receptors are exposed is the primary factor used to determine health risk. Dose is a function of the concentration of a substance or substances in the environment and the extent of exposure that person has with the substance. Dose is positively correlated with time, meaning that a longer exposure period would result in a higher exposure level for the Maximally Exposed Individual. The risks estimated for a Maximally Exposed Individual are higher if a fixed exposure occurs over a longer period of time. According to the OEHHA, health risk assessments, which determine the exposure of sensitive receptors to toxic emissions, should be based on a 30-year exposure period (assumed to be the approximate time that a person spends in a household). OEHHA recommends this risk be bracketed with 9-year and 70-year exposure periods. Health risk assessments should be limited to the period/duration of activities associated with the Project.

CARB's Air Quality and Land Use Handbook: A Community Health Perspective (April 2005) recommends against siting sensitive receptors within 500 feet of a freeway, urban roads with 100,000 vehicles/day, or rural roads with 50,000 vehicles/day. While these siting distances are not particular to construction activities, the primary source of TAC emissions from both freeways and construction equipment is DPM. Therefore, for projects within 1,000 feet of sensitive receptors a refined health risk should be conducted. Additionally, OEHHA states that health risk should not be done for projects that are less than 2 months (OEHHA 2015). Based on the size of the site and the scattered residences within the vicinity, there are only approximately 40 to 70 acres of the project site that are within 1,000 feet of the any of the nearest sensitive receptors. If we conservatively round that up to 100 acres, and the construction schedule is 12 months, that means that each 100-acre area would take approximately 1.5 months to complete construction activities from start to finish, assuming a 22-day work month.

Therefore, as most of the site is outside the 1,000-foot radius, and since the receptors within 1,000 feet of the residences would be exposed to construction emissions for less than 2 months, impacts to these nearby receptors from construction activities would be less than significant. Therefore, given the short

duration of exposure (less than 2 months) for residences within 1,000 feet of the project site, the low concentration of exhaust PM_{10}, and the fact that the majority of the site is greater than 1,000-feet from the nearest sensitive receptors, DPM generated by Project construction is not expected to create conditions where cancer risk would exceed the 10 in one million threshold or the non-carcinogenic Hazard Index of one for the Maximally Exposed Individual Receptor.

Operation Impacts

Common operational sources of TACs include gasoline stations, dry cleaners, diesel backup generators, truck distribution centers, freeways, and other major roadways (CARB 2005). The Project would not involve construction of gas stations, dry cleaners, highways, or roadways. In addition, the Project would not introduce a new stationary source of emissions. There would be some use of diesel-powered equipment during O&M activities, but the usage would be limited and not a continuous source of DPM. Therefore, the Project would not expose nearby sensitive receivers to substantial pollutant concentrations during operation.

Carbon Monoxide Hot Spots

A carbon monoxide hotspot is a localized concentration of carbon monoxide that is above a carbon monoxide ambient air quality standard. Localized carbon monoxide hotspots can occur at intersections with heavy peak hour traffic. Specifically, hotspots can be created at intersections where traffic levels are sufficiently high such that the local carbon monoxide concentration exceeds the federal one-hour standard of 35.0 ppm or the federal and state eight-hour standard of 9.0 ppm (CARB 2016).

The MDAQMD does not have recommendations to address carbon monoxide hotspots. In lieu of guidance, an analysis completed by the South Coast Air Quality Management District (SCAQMD) was used instead. A detailed carbon monoxide analysis was conducted during the preparation of the SCAQMD's 2003 AQMP. The locations selected for microscale modeling in the 2003 AQMP included high average daily traffic (ADT) intersections in the South Coast Air Basin, those which would be expected to experience the highest CO concentrations. The highest CO concentration observed was at the intersection of Wilshire Boulevard and Veteran Avenue on the west side of Los Angeles near the Interstate-405. The concentration of CO at this intersection was 4.6 ppm, which is well below the state and federal standards. The Wilshire Boulevard/Veteran Avenue intersection has an ADT of approximately 100,000 vehicles per day (SCAQMD 2003).

All the existing roadway segments in proximity to the Project have an ADT of less than 10,000 vehicles. The existing segment with the highest ADT is State Route 18 at the Lucerne Valley and State Route 246 junction with an existing ADT of 8,500 vehicles. With the Project construction traffic, the ADT on the same roadway segment would increase to 9,020 vehicles (GHD 2023). However, this increase would be temporary and cease once construction is complete. During Project operation, the Project would generate approximately 64 total daily trips to account for employee, delivery, and visitor trips (GHD 2023). This quantity of daily vehicle trips could not generate CO hotspot due to the small magnitude of mobile emission sources. Additionally, the Project area is located in a rural flat area where air dispersion is not impeded by buildings or nearby terrain such that exist in metropolitan areas; therefore, CO emissions generated during Project construction and operation would disperse rapidly. Thus, the Project would not cause any nearby intersections to exceed a 100,000 ADT nor result in or substantially contribute to concentrations that exceed the one-hour or eight-hour CO standard.

Valley Fever

Construction activities that include ground disturbance can result in fugitive dust, which can cause fungus *Coccidioides* spores to become airborne if they are present in the soil. These spores can cause Valley Fever. Workers who disturb soil where fungal spores are found, whether by digging, operating earthmoving equipment, driving vehicles, or by working in dusty, wind-blown areas, are more likely to breathe in spores and become infected. It is not a contagious disease and secondary infections are rare. Construction activities associated with the Project would include ground-disturbing activities that could result in an increased potential for exposure of nearby residents and on-site workers to airborne spores, if they are present. Compliance with dust control measured required by MDAQMD Rule 403 and San Bernardino County Development Code Section 84.29.035 would minimize personnel and public exposure to Valley Fever and reduce the potential risk of nearby resident and on-site worker exposure to Valley Fever. However, Recommendation AQ-1 is provided to ensure that personnel and public exposure to Valley Fever is minimized to the greatest extent possible.

Odors

Substantial objectionable odors are normally associated with agriculture, wastewater treatment, industrial uses, or landfills. The Project would involve the construction, operation and maintenance, and decommissioning of a solar energy facility and associated infrastructure that do not produce objectionable odors. For construction activities, odors would be short-term in nature and are subject to MDAQMD Rule 402 *Nuisance* (MDAQMD 1977). Construction activities would be temporary and transitory and associated odors would cease upon construction completion. Accordingly, the proposed Project would not create objectionable odors affecting a substantial number of people during construction. Common sources of operational odor complaints include sewage treatment plants, landfills, recycling facilities, and agricultural uses. Operation of the Project would not emit any odorous compounds.

4 Greenhouse Gases

4.1 Environmental Setting

GHGs and climate change are a cumulative global issue. CARB and USEPA regulate GHG emissions within the State of California and the United States, respectively. While the CARB has the primary regulatory responsibility within California for GHG emissions, local agencies can also adopt policies for GHG emission reduction. CARB has divided California into regional air basins. The Project is in unincorporated San Bernardino County, which is within the MDAB, and under the jurisdiction of the MDAQMD.

Climate Change and Greenhouse Gases

Climate change is the observed increase in the average temperature of the Earth's atmosphere and oceans along with other substantial changes in climate (such as wind patterns, precipitation, and storms) over an extended period. The term "climate change" is often used interchangeably with the term "global warming," but climate change is preferred because it conveys that other changes are happening in addition to rising temperatures. The baseline against which these changes are measured originates in historical records that identify temperature changes that occurred in the past, such as during previous ice ages. The global climate is changing continuously, as evidenced in the geologic record which indicates repeated episodes of substantial warming and cooling. The rate of change has typically been incremental, with warming or cooling trends occurring over the course of thousands of years. The past 10,000 years have been marked by a period of incremental warming, as glaciers have steadily retreated across the globe. However, scientists have observed acceleration in the rate of warming over the past 150 years. The United Nations Intergovernmental Panel on Climate Change (IPCC) expressed that the rise and continued growth of atmospheric CO_2 concentrations is unequivocally due to human activities in the IPCC's Sixth Assessment Report (2021). Human influence has warmed the atmosphere, ocean, and land, which has led the climate to warm at an unprecedented rate in the last 2,000 years. It is estimated that between the period of 1850 through 2019, that a total of 2,390 gigatonnes of anthropogenic CO_2 was emitted. It is likely that anthropogenic activities have increased the global surface temperature by approximately 1.07 degrees Celsius between the years 2010 through 2019 (IPCC 2021).

Gases that absorb and re-emit infrared radiation in the atmosphere are called GHGs. The gases widely seen as the principal contributors to human-induced climate change include carbon dioxide (CO_2), methane (CH_4), nitrous oxides (N_2O), fluorinated gases such as hydrofluorocarbons (HFCs) and perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6). Water vapor is excluded from the list of GHGs because it is short-lived in the atmosphere, and natural processes, such as oceanic evaporation, largely determine its atmospheric concentrations.

GHGs are emitted by natural processes and human activities. Of these gases, CO_2 and CH_4 are emitted in the greatest quantities from human activities. Emissions of CO_2 are usually by-products of fossil fuel combustion, and CH_4 results from off-gassing associated with agricultural practices and landfills. Human-made GHGs, many of which have greater heat-absorption potential than CO_2, include fluorinated gases and SF_6 (USEPA 2021b).

Different types of GHGs have varying global warming potentials (GWP). The GWP of a GHG is the potential of a gas or aerosol to trap heat in the atmosphere over a specified timescale (generally, 100

years). Because GHGs absorb different amounts of heat, a common reference gas (CO_2) is used to relate the amount of heat absorbed to the amount of the gas emitted, referred to as "carbon dioxide equivalent" (CO_2e), which is the amount of GHG emitted multiplied by its GWP. Carbon dioxide has a 100-year GWP of one. By contrast, CH_4 has a GWP of 30, meaning its global warming effect is 30 times greater than CO_2 on a molecule per molecule basis. N_2O has a GWP of 273 (IPCC 2021).

The accumulation of GHGs in the atmosphere regulates the earth's temperature. Without the natural heat-trapping effect of GHGs, the earth's surface would be about 33 degrees Celsius (°C) cooler (World Meteorological Organization 2020). However, since 1750, estimated concentrations of CO_2, CH_4, and N_2O in the atmosphere have increased by 47 percent, 156 percent, and 23 percent, respectively, primarily due to human activity (IPCC 2021). GHG emissions from human activities, particularly the consumption of fossil fuels for electricity production and transportation, are believed to have elevated the concentration of these gases in the atmosphere beyond the level of concentrations that occur naturally.

Greenhouse Gas Emissions Inventory

Global Emissions Inventory

Worldwide anthropogenic emissions of GHGs were approximately 49,000 million metric tons (MMT) of CO_2e in 2010 (IPCC 2014). Carbon dioxide emissions from fossil fuel combustion and industrial processes contributed about 65 percent of total emissions in 2010. Of anthropogenic GHGs, CO_2 was the most abundant, accounting for over 75 percent of total 2010 emissions. Methane emissions accounted for 16 percent of the 2010 total, while N_2O and fluorinated gases accounted for 6 percent and 2 percent respectively (IPCC 2014).[8]

United States Emissions Inventory

Total U.S. GHG emissions were 6,558 MMT of CO_2e in 2019. Emissions decreased by 1.7 percent from 2018 to 2019; since 1990, total U.S. emissions have increased by an average annual rate of 0.06 percent for a total increase of 1.8 percent between 1990 and 2019. The decrease from 2018 to 2019 reflects the combined influences of several long-term trends, including population changes, economic growth, energy market shifts, technological changes such as improvements in energy efficiency, and decrease carbon intensity of energy fuel choices. In 2019, the industrial and transportation end-use sectors accounted for 30 percent and 29 percent, respectively, of nationwide GHG emissions while the commercial and residential end-use sectors accounted for 16 percent and 15 percent of nationwide GHG emissions, respectively, with electricity emissions distributed among the various sectors (USEPA 2021c).

California Emissions Inventory

Based on the CARB California Greenhouse Gas Inventory for 2000-2018, California produced 418.2 MMT of CO_2e in 2019, which is 7.2 MMT of CO_2e lower than 2018 levels. The major source of GHG emissions in California is the transportation sector, which comprises 40 percent of the state's total GHG emissions. The industrial sector is the second largest source, comprising 21 percent of the state's GHG emissions while electric power accounts for approximately 14 percent (CARB 2021b). The magnitude of California's total GHG emissions is due in part to its large size and large population compared to other states. However, a factor that reduces California's per capita fuel use and GHG emissions as compared to other states is its relatively mild climate. In 2016, the State of California

[8] Updated global anthropogenic GHG emissions have not been published yet by the IPCC.

achieved its 2020 GHG emission reduction target of reducing emissions to 1990 levels as emissions fell below 431 MMT of CO_2e (CARB 2021d). The annual 2030 statewide target emissions level is 260 MMT of CO_2e (CARB 2017).

Potential Effects of Climate Change

Globally, climate change has the potential to affect numerous environmental resources though potential impacts related to future air temperatures and precipitation patterns. Scientific modeling predicts that continued GHG emissions at or above current rates would induce more extreme climate changes during the 21st century than were observed during the 20th century. Each of the past three decades has been warmer than all the previous decades in the instrumental record, and the decade from 2000 through 2010 has been the warmest. The observed global mean surface temperature (GMST) from 2015 to 2017 was approximately 1.0°C higher than the average GMST over the period from 1880 to 1900 (National Oceanic and Atmospheric Administration 2020). Furthermore, several independently analyzed data records of global and regional Land-Surface Air Temperature (LSAT) obtained from station observations jointly indicate that LSAT and sea surface temperatures have increased. Due to past and current activities, anthropogenic GHG emissions are increasing global mean surface temperature at a rate of 0.2°C per decade. In addition to these findings, there are identifiable signs that global warming is currently taking place, including substantial ice loss in the Arctic over the past two decades (IPCC 2014 and 2018).

According to *California's Fourth Climate Change Assessment*, statewide temperatures from 1986 to 2016 were approximately 0.6 to 1.1°C higher than those recorded from 1901 to 1960. Potential impacts of climate change in California may include reduced water supply from snowpack, sea level rise, more extreme heat days per year, more large forest fires, and more drought years (State of California 2018). In addition to statewide projections, *California's Fourth Climate Change Assessment* includes regional reports that summarize climate impacts and adaptation solutions for nine regions of the state and regionally specific climate change case studies (State of California 2018). However, while there is growing scientific consensus about the possible effects of climate change at a global and statewide level, current scientific modeling tools are unable to predict what local impacts may occur with a similar degree of accuracy. A summary follows of some of the potential effects that could be experienced in California as a result of climate change.

Air Quality

Scientists project that the annual average maximum daily temperatures in California could rise by 2.4 to 3.2°C in the next 50 years and by 3.1 to 4.9°C in the next century (State of California 2018). Higher temperatures are conducive to air pollution formation, and rising temperatures could therefore result in worsened air quality in California. As a result, climate change may increase the concentration of ground-level ozone, but the magnitude of the effect, and therefore its indirect effects, are uncertain. In addition, as temperatures have increased in recent years, the area burned by wildfires throughout the state has increased, and wildfires have occurred at higher elevations in the Sierra Nevada Mountains (State of California 2018). If higher temperatures continue to be accompanied by an increase in the incidence and extent of large wildfires, air quality could worsen. Severe heat accompanied by drier conditions and poor air quality could increase the number of heat-related deaths, illnesses, and asthma attacks throughout the state. However, if higher temperatures are accompanied by wetter, rather than drier conditions, the rains could tend to temporarily clear the air of particulate pollution, which would effectively reduce the number of large wildfires and thereby ameliorate the pollution associated with them (California Natural Resources Agency 2009).

Water Supply

Analysis of paleoclimatic data (such as tree-ring reconstructions of stream flow and precipitation) indicates a history of naturally and widely varying hydrologic conditions in California and the west, including a pattern of recurring and extended droughts. Uncertainty remains with respect to the overall impact of climate change on future precipitation trends and water supplies in California. Year-to-year variability in statewide precipitation levels has increased since 1980, meaning that wet and dry precipitation extremes have become more common (California Department of Water Resources 2018). This uncertainty regarding future precipitation trends complicates the analysis of future water demand, especially where the relationship between climate change and its potential effect on water demand is not well understood. The average early spring snowpack in the western U.S., including the Sierra Nevada Mountains, decreased by about 10 percent during the last century. During the same period, sea level rose over 0.15 meter along the central and southern California coasts (State of California 2018). The Sierra snowpack provides the majority of California's water supply as snow that accumulates during wet winters is released slowly during the dry months of spring and summer. A warmer climate is predicted to reduce the fraction of precipitation that falls as snow and the amount of snowfall at lower elevations, thereby reducing the total snowpack (State of California 2018). Projections indicate that average spring snowpack in the Sierra Nevada and other mountain catchments in central and northern California will decline by approximately 66 percent from its historical average by 2050 (State of California 2018).

Agriculture

California has an over $50 billion annual agricultural industry that produces over a third of the country's vegetables and two-thirds of the country's fruits and nuts (California Department of Food and Agriculture 2020). Higher CO_2 levels can stimulate plant production and increase plant water-use efficiency. However, if temperatures rise and drier conditions prevail, certain regions of agricultural production could experience water shortages of up to 16 percent, which would increase water demand as hotter conditions lead to the loss of soil moisture. In addition, crop yield could be threatened by water-induced stress and extreme heat waves, and plants may be susceptible to new and changing pest and disease outbreaks (State of California 2018). Temperature increases could also change the time of year certain crops, such as wine grapes, bloom or ripen, and thereby affect their quality (California Climate Change Center 2006).

Ecosystems and Wildlife

Climate change and the potential resultant changes in weather patterns could have ecological effects on the global and local scales. Soil moisture is likely to decline in many regions as a result of higher temperatures, and intense rainstorms are likely to become more frequent. Rising temperatures could have four major impacts on plants and animals: timing of ecological events; geographic distribution and range of species; species composition and the incidence of nonnative species within communities; and ecosystem processes, such as carbon cycling and storage (Parmesan 2006; State of California 2018).

4.2 Regulatory Setting

Federal

USEPA "ENDANGERMENT" AND "CAUSE OR CONTRIBUTE" FINDINGS

The U.S. Supreme Court in *Massachusetts et al. v. Environmental Protection Agency et al*. ([2007] 549 U.S. 05-1120) held that USEPA has the authority to regulate motor-vehicle GHG emissions under the federal CAA. The USEPA issued a Final Rule for mandatory reporting of GHG emissions in October 2009. This Final Rule applies to fossil fuel suppliers, industrial gas suppliers, direct GHG emitters, and manufacturers of heavy-duty and off-road vehicles and vehicle engines and requires annual reporting of emissions. In 2012, the USEPA issued a Final Rule that establishes the GHG permitting thresholds that determine when federal CAA permits under the New Source Review Prevention of Significant Deterioration (PSD) and Title V Operating Permit programs are required for new and existing industrial facilities.

In 2014, the U.S. Supreme Court in *Utility Air Regulatory Group v. EPA* (134 S. Ct. 2427 [2014]) held that USEPA may not treat GHGs as an air pollutant for purposes of determining whether a source is a major source required to obtain a PSD or Title V permit. The Court also held that PSD permits otherwise required (based on emissions of other pollutants) may continue to require limitations on GHG emissions based on the application of Best Available Control Technology.

State

The legal framework for GHG emission reduction in California is built upon executive orders, legislation, and regulations. The major components of California's climate change initiative are summarized below.

CALIFORNIA ADVANCED CLEAN CARS PROGRAM

Assembly Bill (AB) 1493 (2002), California's Advanced Clean Cars program (referred to as "Pavley"), requires CARB to develop and adopt regulations to achieve "the maximum feasible and cost-effective reduction of GHG emissions from motor vehicles." On June 30, 2009, USEPA granted the waiver of CAA preemption to California for its GHG emission standards for motor vehicles beginning with the 2009 model year. Pavley I regulates model years from 2009 to 2016 and Pavley II, which is now referred to as "LEV (Low Emission Vehicle) III GHG" regulates model years from 2017 to 2025. The Advanced Clean Cars program coordinates the goals of the Low Emissions Vehicles (LEV), Zero Emissions Vehicles (ZEV), and Clean Fuels Outlet programs, and would provide major reductions in GHG emissions. By 2025, when the rules will be implemented fully, new automobiles will emit 34 percent fewer GHGs and 75 percent fewer smog-forming emissions from their model year 2016 levels (CARB 2011).

EXECUTIVE ORDER N-79-20

On September 23, 2020, the governor issued Executive Order N-79-20, which sets a new statewide goal of phasing out gasoline powered vehicles and equipment. The executive order includes three main goals that CARB will be required to develop regulations for. The order requires that by 2035, all in-states sales of new passenger cars and trucks be 100 percent zero-emissions. By 2045, 100 percent of medium-and-heavy-duty vehicles operating in the State will be zero-emissions where feasible and by 2035 for drayage trucks. Also, by 2035, all off-road vehicles and equipment will be 100 percent zero emissions.

EXECUTIVE ORDER S-3-05

California's major initiative for reducing GHG emissions is outlined in AB 32, the "California Global

Warming Solutions Act of 2006," which was signed into law in 2006. AB 32 codifies the statewide goal of reducing GHG emissions to 1990 levels by 2020 and requires CARB to prepare a Scoping Plan that outlines the main State strategies for reducing GHGs to meet the 2020 deadline. In addition, AB 32 requires CARB to adopt regulations to require reporting and verification of statewide GHG emissions. Based on this guidance, CARB approved a 1990 statewide GHG level and 2020 limit of 427 MMT CO_2e. The Scoping Plan was approved by CARB on December 11, 2008 and included measures to address GHG emission reduction strategies related to energy efficiency, water use, and recycling and solid waste, among other measures. Many of the GHG reduction measures included in the Scoping Plan (e.g., Low Carbon Fuel Standard, Advanced Clean Car standards, and Cap-and-Trade) have been adopted since approval of the Scoping Plan.

In May 2014, CARB approved the first update to the AB 32 Scoping Plan. The 2013 Scoping Plan update defined CARB's climate change priorities for the next five years and set the groundwork to reach post-2020 statewide goals. The update highlighted California's progress toward meeting the "near-term" 2020 GHG emission reduction goals defined in the original Scoping Plan. It also evaluated how to align the State's longer-term GHG reduction strategies with other State policy priorities, including those for water, waste, natural resources, clean energy, transportation, and land use (CARB 2014).

The 2017 Scoping Plan Update was adopted on December 14, 2017. The Scoping Plan Update addresses the 2030 target established by Senate Bill (SB) 32, discussed below, and establishes a proposed framework of action for California to meet a 40 percent reduction in GHG emissions by 2030 compared to 1990 levels. The key programs that the Scoping Plan Update builds on include increasing the use of renewable energy in the state, the Cap-and-Trade Regulation, the Low Carbon Fuel Standard, and reduction of methane emissions from agricultural and other wastes (CARB 2017).

In response to the passage of AB 1279 and the identification of the 2045 GHG reduction target, CARB published the Final 2022 Climate Change Scoping Plan in November 2022 (CARB 2022a). The 2022 Update builds upon the framework established by the 2008 Climate Change Scoping Plan and previous updates while identifying new, technologically feasible, cost-effective, and equity-focused path to achieve California's climate target. The 2022 Update includes policies to achieve a significant reduction in fossil fuel combustion, further reductions in short-lived climate pollutants, support for sustainable development, increased action no NWL to reduce emissions and sequester carbon, and the capture and storage of carbon.

The 2022 Update assesses the progress California is making toward reducing its GHG emissions by at least 40 percent below 1990 levels by 2030, as called for in SB 32 and laid out in the 2017 Scoping Plan, addresses recent legislation and direction from Governor Newsom, extends and expands upon these earlier plans, and implements a target of reducing anthropogenic emissions to 85 percent below 1990 levels by 2045, as well as taking an additional step of adding carbon neutrality as a science-based guide for California's climate work. As stated in the 2022 Update, "The plan outlines how carbon neutrality can be achieved by taking bold steps to reduce GHGs to meet the anthropogenic emissions target and by expanding actions to capture and store carbon through the state's NWL and using a variety of mechanical approaches" (CARB 2022a).

SENATE BILL 97

SB 97, signed in August 2007, acknowledges that climate change is an environmental issue that requires analysis in CEQA documents. In March 2010, the California Resources Agency (Resources Agency) adopted amendments to the *State CEQA Guidelines* for the feasible mitigation of GHG emissions or the

effects of GHG emissions. The adopted guidelines give lead agencies the discretion to set quantitative or qualitative thresholds for the assessment and mitigation of GHG and climate change impacts.

SENATE BILL 375

SB 375, signed in August 2008, enhances the state's ability to reach AB 32 goals by directing CARB to develop regional GHG emission reduction targets to be achieved from passenger vehicles by 2020 and 2035. In addition, SB 375 directs each of the state's 18 major Metropolitan Planning Organizations (MPO) to prepare a "sustainable communities strategy" (SCS) that contains a growth strategy to meet these emission targets for inclusion in the Regional Transportation Plan (RTP). On March 22, 2018, CARB adopted updated regional targets for reducing GHG emissions from 2005 levels by 2020 and 2035. The updated GHG emission reduction targets took effect October 1, 2018.

SENATE BILL 32

On September 8, 2016, the governor signed SB 32 into law, extending AB 32 by requiring the state to further reduce GHGs to 40 percent below 1990 levels by 2030 (the other provisions of AB 32 remain unchanged). On December 14, 2017, CARB adopted the 2017 Scoping Plan, which provides a framework for achieving the 2030 target. The 2017 Scoping Plan relies on the continuation and expansion of existing policies and regulations, such as the Cap-and-Trade Program, as well as implementation of recently adopted policies and policies, such as SB 350 and SB 1383 (see below). The 2017 Scoping Plan also puts an increased emphasis on innovation, adoption of existing technology, and strategic investment to support its strategies. As with the 2013 Scoping Plan Update, the 2017 Scoping Plan does not provide project-level thresholds for land use development. Instead, it recommends that local governments adopt policies and locally-appropriate quantitative thresholds consistent with a statewide per capita goal of six metric tons (MT) CO_2e by 2030 and two MT CO_2e by 2050 (CARB 2017). As stated in the 2017 Scoping Plan, these goals may be appropriate for plan-level analyses (regional, sub-regional, county, or city level), but not for specific individual projects because they include all emissions sectors in the state.

SENATE BILL 350

Adopted on October 7, 2015, SB 350 supports the reduction of GHG emissions from the electricity sector through a number of measures, including requiring electricity providers to achieve a 50 percent renewables portfolio standard by 2030, a cumulative doubling of statewide energy efficiency savings in electricity and natural gas by retail customers by 2030.

SENATE BILL 1368

SB 1368 (Chapter 598, Statutes of 2006) is the companion bill of AB 32 and was signed by the Governor in September 2006. SB 1368 requires the California Public Utilities Commission (CPUC) to establish a GHG emission performance standard for baseload generation from investor-owned utilities by February 1, 2007. The California Energy Commission (CEC) also was required to establish a similar standard for local publicly owned utilities by June 30, 2007. These standards cannot exceed the GHG emission rate from a baseload combined-cycle natural gas-fired plant. The legislation further requires that all electricity provided to California, including imported electricity, must be generated from plants that meet the standards set by the CPUC and CEC. The Solar Facility meets the criteria of a renewable energy generation facility as defined in Chapter 8.6 of Division 15 of the Public Resources Code and therefore is determined by rule to comply with the GHG Emission Performance Standards requirements of SB 1368.

SENATE BILL 100

Adopted on September 10, 2018, SB 100 supports the reduction of GHG emissions from the electricity sector by accelerating the state's Renewables Portfolio Standard (RPS) Program, which was last updated by SB 350 in 2015. SB 100 requires electricity providers to increase procurement from eligible renewable energy resources to 33 percent of total retail sales by 2020, 60 percent by 2030, and 100 percent by 2045. This further supports the reduction of GHG emissions from the electricity sector.

EXECUTIVE ORDER B-55-18

On September 10, 2018, the governor issued Executive Order B-55-18, which established a new statewide goal of achieving carbon neutrality by 2045 and maintaining net negative emissions thereafter. This goal is in addition to the existing statewide GHG reduction targets established by SB 375, SB 32, SB 1383, and SB 100.

CARB RESOLUTION 07-54

CARB Resolution 07-54 establishes 25,000 metric tons of GHG emissions as the threshold for identifying the largest stationary emission sources in California for purposes of requiring the annual reporting of emissions. This threshold was just over 0.005 percent of California's total inventory of GHG emissions for 2004.

17 CALIFORNIA CODE OF REGULATIONS SECTION 95350 ET SEQ.

The purpose of this regulation is to achieve GHG emission reductions by reducing SF_6 emissions from gas-insulated switchgear. Owners of such switchgear must not exceed maximum allowable annual emissions rates, reduced each year until 2020, after which annual emissions must not exceed 1.0 percent. Owners must regularly inventory gas-insulated switchgear equipment, measure quantities of SF_6, and maintain records of these for at least three years. Additionally, by June 1 each year, owners also must submit an annual report to CARB's Executive Officer for emissions that occurred during the previous calendar year.

In September 2020, CARB adopted Resolution 20-28, to amend the current regulation to phase out acquisition of SF_6 in gas-insulated switchgear in stages between 2025 and 2033. Under this resolution, CARB will be developing a timeline for phasing out SF_6 equipment in California and creating incentives to encourage owners to replace SF_6 equipment. The Resolution has not yet been approved by the California Office of Administrative Law.

CALIFORNIA ADVANCED CLEAN TRUCKS PROGRAM

In June 2020, CARB approved the Advanced Clean Trucks regulation, which requires manufacturers who certify Class 2b-8 chassis or complete vehicles with combustion engines to sell zero-emission trucks as an increasing percentage of their annual California sales from 2024 to 2035. In addition, the regulation requires company and fleet reporting for large employers and fleet owners with 50 or more trucks. CARB estimates that implementation of this regulation will reduce GHG emissions by a total of approximately 29 MMT of CO_2e between 2020 and 2040 relative to the business-as-usual baseline. By 2040, emissions are expected to be reduced by approximately four percent annually compared to the business-as-usual forecast (CARB 2020g). By 2045, all new trucks sold in California must be zero-emission.

CALIFORNIA ENVIRONMENTAL QUALITY ACT

Pursuant to the requirements of SB 97, the Resources Agency adopted amendments to the CEQA Guidelines for the feasible mitigation of GHG emissions or the effects of GHG emissions. The adopted

CEQA Guidelines provide general regulatory guidance on the analysis and mitigation of GHG emissions in CEQA documents, while giving lead agencies the discretion to set quantitative or qualitative thresholds for the assessment and mitigation of GHGs and climate change impacts.

Local Regulations

SAN BERNARDINO COUNTY GENERAL PLAN

The San Bernardino County Countywide Plan was adopted on October 27, 2020 and serves as the County's General Plan (County of San Bernardino 2020). Specific air quality policies are addressed in the Natural Resources Element. The applicable policy is as follows:

- **Policy NR-1.7 Greenhouse gas reduction targets**. We strive to meet the 2040 and 2050 greenhouse gas emission reduction targets in accordance with state law.

5 Greenhouse Gas Impact Analysis

5.1 Methodology and Significance Thresholds

Direct GHG Emissions

Construction of the Project would generate temporary GHG emissions primarily from the use of on-site construction equipment, vehicles transporting construction workers to and from the Project area, and heavy-duty trucks used to export earth materials off-site. Site preparation and grading typically generate the greatest emissions from grading equipment and soil hauling. Operational activities of the Project would generate GHG emissions primarily from operation of maintenance equipment on-site and vehicles transporting employees to and from the Project area. Emissions associated with decommissioning of the Project were conservatively assumed to be equivalent to construction of the Project give the type of equipment required for decommissioning. However, equipment and vehicles used at the decommissioning stage would most likely be cleaner. Operational direct GHG emissions accounted for employee vehicle travel and testing of the emergency generator. The analysis relied on CARB's on-road vehicle emission factor model (EMFAC2017), CARB's 2017 Off-Road Equipment Inventory Model (OFFROAD2017), and emission factors obtained from the USEPA AP-42 *Compilation of Air Pollutant Emissions Factors* (2006). The EMFAC2017 model was used to develop CO_2, CH_4, and N_2O emission estimates. These emissions results were used to calculate CO_2e.

Temporary and annual Project emissions were estimated based on equipment and construction schedule assumptions developed from similar solar projects and using appropriate emission factors. The Association of Environmental Professionals (AEP) recommends that total construction GHG emissions resulting from a project be amortized over the project's estimated lifetime and added to GHG emissions (AEP 2016). The construction and decommissioning GHG emissions were summed together and divided over a 30-year lifetime.

Indirect GHG Emissions Associated with Water Use

The use of water in California can involve substantial energy consumption, depending on the source of the water and the use location relative to the source. Major portions of the state rely on imported water from the State Water Project (California Aqueduct), the Central Valley Project, the Colorado River Aqueduct, the All-American Canal, and similar large-scale water distribution systems. Moving water across the state involves considerable energy consumption for pumping and delivering the water to the use location. The use of groundwater can involve substantial energy consumption to pump water from deep aquifers. In addition to the energy consumption associated with wholesale water supply, energy is consumed during local treatment for potable use and for local delivery. Most of the energy associated with water supply is provided by electricity, which is generated from a variety of sources, including fossil-fueled power plants that produce GHGs. Consequentially, the use of water for dust control and grading compaction during construction and photovoltaic panel washing during operations results in indirect GHG emissions. Based on similar solar projects, approximately 400 acre-feet of water would be required over the Project's construction and 50 acre-feet of water would be needed during operation.

As described in Section 1.3, *Construction Activities*, the Project may require water during construction for dust suppression. During operation the Project would require water for solar PV panel washing and facilities at the O&M buildings. Based on the energy factors in CPUC's *Embedded Energy in Water*

Studies (CPUC 2010a) and assuming minimal treatment and delivery, it was estimated that each acre-foot of water requires 649 kilowatt-hours of electricity for Project area delivery. The amount of GHG emissions associated with the 649 kilowatt-hours was conservatively based on the emissions profile for statewide average provided in the California Emissions Estimator Model (CalEEMod) version 2020.4.0 (CAPCOA 2021).

Displaced Emissions

Operation of the Project would create renewable energy over the planned 30-year Project lifetime. This energy could displace GHG emissions that would otherwise be produced by existing power generation resources, including coal and natural gas/other non-renewables.[9] The Project has the capacity to generate approximately 525 MW of electricity at peak sun exposure. Annual energy generation was estimated based on solar radiation at the Project area and annual operational time.[10] The Project could displace a fraction of existing current annual power generated by fossil-fuels. Displaced GHG emissions were estimated assuming that generated solar energy could displace energy generated from fossil fuels in the California market and does not include the approximate 34 percent of the California electricity generated by non-combustion sources (CEC 2021). Refer to Appendix A for detailed calculations related to the Project's annual energy generation. Displaced emissions are provided for informational purposes and are not included in the significance determination.

5.2 Significance Thresholds

Most individual projects do not generate sufficient GHG emissions to directly influence climate change. However, physical changes caused by a project can contribute incrementally to cumulative effects that are significant, even if individual changes resulting from a project are limited. The issue of climate change typically involves an analysis of whether a project's contribution towards an impact would be cumulatively considerable. "Cumulatively considerable" means that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, other current projects, and probable future projects (CEQA Guidelines, Section 15064[h][1]).

For future projects, the significance of GHG emissions may be evaluated based on locally adopted quantitative thresholds, consistency with a regional GHG reduction plan, or consistency with statewide regulations adopted to reduce GHG emissions. A project may not have an impact related to GHG emissions if it complies with an adopted plan that includes specific measures to sufficiently reduce GHG emissions (14 Cal. Code Regs. Section 15064[h][3]).

Section 15064.4 of the *CEQA Guidelines* recommends that lead agencies quantify GHG emissions of projects and consider several other factors that may be used in the determination of significance of GHG emissions from a project, including the extent to which the project may increase or reduce GHG emissions; whether a project exceeds an applicable significance threshold; and the extent to which the project complies with regulations or requirements adopted to implement a plan for the reduction or mitigation of GHG emissions.

[9] While the intent is to ultimately replace fossil fuel generation of electricity, until fossil fuel generation systems are ultimately taken offline, the project is adding supply to the existing system. As it is unknown if an existing fossil fuel generating facility will be taken offline as a result of this project, the displaced emissions were not counted as Project benefits for determining project significance.

[10] Photovoltaic cell capacity is rated in terms of mega or kilowatts and indicates the amount of instantaneous power produced when operating at peak sun exposure. Total amount of electricity produced in measured in watt-hours and is dependent on operational time. Operational time of a solar panel is defined by the amount of time that the photovoltaic cells are actively converting solar energy into power, which depends on solar radiation. Solar radiation is the measure of energy emitted from the sun and varies daily depending on the time of day, season, local landscape, and geography.

CEQA Guidelines Section 15064.4 does not establish a threshold of significance. Lead agencies have the discretion to establish significance thresholds for their respective jurisdictions, and in establishing those thresholds, a lead agency may appropriately look to thresholds developed by other public agencies, or suggested by other experts, as long as any threshold chosen is supported by substantial evidence (*CEQA Guidelines* Section 15064.7[c]).

According to *CEQA Guidelines* Section 15183.5, projects can tier off of a qualified GHG reduction plan, which allows for project-level evaluation of GHG emissions through the comparison of the project's consistency with the GHG reduction policies included in a qualified GHG reduction plan. This approach is considered by the Association of Environmental Professionals (AEP) in their white paper, *Beyond Newhall and 2020*, to be the most defensible approach presently available under CEQA to determine the significance of a project's GHG emissions (AEP 2016). However, the County of San Bernardino's *Greenhouse Gas Emissions Reduction Plan* (2011) does not address SB 32 or post-2020 GHG emissions. The project would be operational post-2020. Therefore, for CEQA purposes, this Project cannot tier off the *Greenhouse Gas Emissions Reduction Plan*.

The next best approach would be to use a quantitative threshold from the local air district. Thus, for the purposes of this analysis, thresholds developed by the MDAQMD are considered to determine the significance of GHG emissions. The MDAQMD *CEQA and Federal Conformity Guidelines* provides an annual threshold of 100,000 tons CO_2e and a daily threshold of 548,000 pounds CO_2e for short-term phases (less than one year). The annual threshold of 100,000 tons CO_2e is used in this analysis but converted into the MT CO_{2e} the threshold is 90,718 MT CO_2e.[11]

5.3 Project Impacts

Quantified GHG Emissions

The Project would generate GHG emissions directly and indirectly during construction, routine operational and maintenance activities, and decommissioning activities. Most emissions from the Project would be generated during construction and decommissioning activities. Table 9 presents total estimated emissions from construction activities from on-site and off-site emission sources. As shown therein, the estimated total GHG emissions during Project construction would be approximately 7,144 MT CO_2e over the 12-month construction period. It was conservatively assumed that decommissioning of the Project would use the same type and amount of equipment in a similar schedule to construction; therefore, decommissioning of the Project was estimated to generate an equivalent amount of emissions as construction. This is a conservative estimate because on-road vehicles and off-site equipment would continue to improve in fuel efficiency resulting in reduced emissions over time, as such decommissioning emissions in 30 years[12] would likely be substantially lower than construction emissions. Estimated construction and decommissioning emissions related to the Project amortized over 30 years, the anticipated Project lifetime, would be approximately 476 MT CO_2e per year which his added to the annual operational emissions to determine overall project significance as GHG emissions are cumulative in nature. Additional details on calculations can be found in Appendix A.

[11] 100,000 tons CO_2e *0.907185 MT = 90,718 MT CO_2e

[12] Although the Project would be constructed to last up to 40 years, the project construction-generated emissions were amortized over 30 years to provide a conservative estimate.

Table 9 Estimated Construction Emissions of Greenhouse Gases

Year	Emissions Source (MT CO_2e)				Total (MT CO_2e) per Year
	Off-Road	On-site Mobile	Off-site Mobile	Indirect GHG Emissions from Water Use	
Total Construction	2,822	22	4,254	46	7,144
Total Decommissioning	2,822	22	4,254	46	7,144
Total Construction and Decommissioning	5,643	44	8,509	93	14,289
Amortized Emissions (30-year life)	188	1	284	3	476

MT = metric tons; CO_2e = carbon dioxide equivalent; GHG = greenhouse gases; MDAQMD = Mojave Desert Air Quality Management District

Note: Numbers have been rounded to nearest metric tons

Table 10 summarizes operational emissions associated with the Project. Operation and maintenance of the Project would generate GHG emissions largely through motor vehicle trips to and from the Project area; on-site maintenance activities involving portable equipment and maintenance vehicles; and energy use associated with water consumption. As shown in Table 10, the Project would emit an estimated 150 MT CO_2e per year during operation. The total construction and decommissioning GHG emissions, amortized over 30 years, was added to the annual estimated operational emissions to estimate annual GHG emissions generated by the Project. Accounting for the amortized construction and decommissioning GHG emissions, the Project would emit an average of 627 MT CO_2e per year over the operational life of the Project (assumed 30 years). The total Project GHG emissions do not exceed the MDAQMD threshold of 90,718 MT CO_2e per year with Project emissions being 0.69 percent of the threshold.

Additionally, construction and operation of new renewable energy facilities would offset GHG emissions by replacing energy generated by fossil-fueled power plants. The Project would generate approximately 1,175 gigawatt-hours (GWh) of solar-generated electricity each year that would be added to the power grid and be potentially used in place of electricity generated by fossil-fuel sources. Based on the Project's projected annual electricity generation and the GHG emissions generated due to fossil-fuel combustion to generate the same level of electricity, the Project has the potential to displace 253,319 MT CO_2e per year. Assuming existing fossil fuel electric generation station production is reduced consistent with Project generation, the Project would result in an overall lifetime reduction estimated at 7,599,573 MT CO_2e and therefore could be regionally beneficial.[13] Thus, as the Project would not result in GHG emissions that exceed the MDAQMD threshold and, over its 30-year life could result in a net reduction in regional GHG emissions, the Project would be consistent with state GHG reduction laws, such as SB 32.

Additionally, the proposed on-site substation may feature circuit breakers that contain SF_6 gas, used as an insulator and an arc suppressor in the breakers. SF_6 is inert and non-toxic and is encapsulated in the breaker assembly. SF_6 is a GHG with substantial global warming potential because of its chemical nature and long residency time within the atmosphere. However, under normal conditions, it would be completely contained in the equipment and SF_6 would be released only in the unlikely event of a failure, leak, or crack in the circuit breaker housing. In addition, the equipment would comply with CARB's *Reducing Sulfur Hexafluoride Emissions from Gas Insulated Switchgear* regulations. CARB's current regulations require that switchgear not exceed a maximum allowable annual SF_6 emissions rate of 1.0

[13] 253,319 MT CO_2e * 30 years = 7,599,573 MT CO_2e

percent. All circuit breakers used for this Project would have a manufacturer-guaranteed SF_6 leakage rate of 0.5 percent per year or less per International Electro-technical Commission (IEC) standards. In compliance with CARB regulations, the applicant would be required to regularly inventory gas-insulated switchgear equipment, measure quantities of SF_6 and submit an annual report to CARB. With compliance with existing CARB regulations, the amount of SF_6 that could be released by the solar facility equipment would be insubstantial.

Table 10 Estimated Annual Operational Greenhouse Gas Emissions

	Emissions Source (MT CO_2e)				
Location	Off-Road	On-site Mobile	Off-site Mobile	Indirect GHG Emissions from Water Use	Total (MT CO_2e)
Operation	<1	15	130	6	150
Amortized Construction and Decommissioning Emissions	188	1	284	3	476
Annual Total	**188**	**8**	**354**	**9**	**627**
MDAQMD Threshold					90,718
Threshold Exceeded?					No
Annual Displaced GHG Emissions (MT CO_2e/year)					253,319
Net Annual GHG Emissions (MT CO_2e /year)					(252,692)

MT = metric tons; CO_2e = carbon dioxide equivalent; GHG = greenhouse gases; MDAQMD = Mojave Desert Air Quality Management District; parenthetical numbers represent negative values

Note: Numbers have been rounded to nearest metric tons

Consistency with GHG Reduction Plans and Policies

The Project would also be consistent with the renewable energy goals under the 2022 Scoping Plan Update and SB 100. The solar facility is consistent with the following specific electricity goals outlined in the 2022 Scoping Plan Update:

- Sector GHG target of 38 million metric tons of carbon dioxide equivalent (MMT of CO2e) in 2030 and 30 MMT of CO2e in 2035 Retail sales load coverage.
- Meet increased demand for electrification without new fossil gas-fired resources.
- Provide availability to support the increase in residential and commercial appliance conversion from current fuel to electric as products are replaced at end of life.

The Statewide goal to reduce GHG emissions to 40 percent below 1990 levels by 2030 has been established in SB 32. The *2022 Climate Change Scoping Plan Update* includes strategies to achieve SB 32 goals as well as further reduce emissions towards the ultimate goal of net zero (85 percent below 1990 emissions) by 2045. The SB 32 Scoping Plan update have included implementation of the RPS as an individual strategy. As discussed in Section 4.2, *Regulatory Setting*, SB 100 accelerated the state's RPS Program by increasing California's procurement of electricity from renewable sources to 33 percent of total retail sales by 2020, 60 percent by 2030, and 100 percent by 2045. The Project would generate approximately 1,175 GWh of electricity each year or approximately 35,240 GWh over the Project's 30-year lifetime. This additional solar-generated energy would be added to the power grid and, thus would directly support energy goals under SB 100 and would be consistent with the 2022 Scoping Plan. Replacement of fossil-fuel sources by 2045 with renewable solar energy would also displace GHG emissions, ultimately off-setting any GHG emissions produced

by construction, decommissioning, and operation of the Project. Therefore, the Project would be consistent with state and regional plans to reduce GHG emissions and be consistent with the *2022 Climate Change Scoping Plan Update*.

6 Recommendations

As discussed, a construction and operation of the Project would not generate emissions that would exceed applicable MDAQMD thresholds or conflict with applicable regional plans. Regardless, due to the earthmoving activities associated with construction of the Project there is an increased potential for exposure of nearby residents and on-site workers to Valley Fever airborne spores, if they are present. Recommendation AQ-1 would reduce health risks associated with the potential exposure to Valley Fever spores.

AQ-1 Minimize Personnel and Public Exposure to Valley Fever

A Fugitive Dust Control Plan shall be prepared to minimize personnel and public exposure to Valley Fever. The Plan shall include the following requirements:

- All heavy-duty earth-moving vehicles shall be closed-cab and equipped with a High Efficiency Particulate Arrestance (HEPA) filtered air system.
- N95 respirators shall be provided to on-site workers for the duration of the construction period and workers shall wear the respirators during any ground-disturbance activities.
- Workers shall receive training to recognize the symptoms of Valley Fever and shall be instructed to promptly report suspected symptoms of work-related Valley Fever to a supervisor. Evidence of training shall be provided to the San Bernardino County Planning Department within 24 hours of the training session.
- A Valley Fever informational handout shall be provided to all on-site construction personnel. The handout shall provide, at a minimum, information regarding the symptoms, health effects, preventative measures, and treatment.

7 Conclusions

7.1 Air Quality

As discussed in Section 3, *Air Quality Impact Analysis*, simultaneous construction and decommissioning of the Project parcels would not exceed the significance thresholds established by MDAQMD. If construction activities occurred subsequently at Project parcels, the Project would also not generate emissions during construction or decommissioning that would exceed the MDAQMD significance threshold. As previously discussed, construction would be subject to MDAQMD Rule 403 and the San Bernardino County Development Code Section 84.29.035 to control fugitive dust along with the San Bernardino County Development Code Section 83.01.040 to reduce exhaust emissions during construction. Compliance with these existing requirements would further reduce emissions. In addition, the Project construction and decommissioning would not result in health risk impacts that would exceed the MDAQMD carcinogenic and non-carcinogenic risk thresholds. The analyses further documented that Project operation would not result in adverse long-term regional impacts. Lastly, the Project would not result in excessive exposure to CO hotspots. Therefore, since the Project's emissions do not exceed the MDAQMD applicable thresholds, the Project construction and decommissioning, and operations and maintenance, would not result in a cumulatively considerable increase in emissions of nonattainment pollutants. Moreover, the Project would not expose sensitive receptors to excessive concentrations of DPM or generate CO hotspots.

Exposure to Valley Fever and the resulting health impacts to surrounding communities and on-site workers would be reduced with Recommendation AQ-1. Valley Fever spores are naturally occurring in the soil of San Bernardino County and fungal spores can become airborne during ground disturbances, such as construction work. Reduction of dust disturbance or stabilization of dust will reduce the number of fungal spores becoming airborne and thus reduce the incidences of individuals becoming infected.

7.2 Greenhouse Gases

As discussed in Section 5, *Greenhouse Gas Impact Analysis*, the Project would not generate GHG emissions that would exceed local and regional significance thresholds and is consistent with applicable GHG reduction plans. Further, due to being a renewable solar energy project, the Project would reduce the local, regional, and statewide cumulative GHG emissions and offset a portion of the incremental cumulative GHG impacts of other projects. The Project, as a solar development, would reduce dependency on fossil fuels for electricity generation and would be regionally beneficial to air quality. Therefore, the Project would support attainment of the state's GHG reduction goals and the Project-specific incremental impact on GHG emissions would not be cumulatively considerable.

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Appendix A

Bulk Emissions Calculations

Sienna Solar
Assumptions Updates

Apr-23

The project description was updated after the initial analysis was conducted. The analysis was not revised as the analysis provided is more conservative than what the revised project would be. The following changes to the original analysis are made textually in the report but are not revised in the Appendix calculations.

- The system size is increased from a 500-megawatt facility to a 525-megawatt facility. This will not change the construction time or average daily trips to the site. It would increase the potential GHG offset emissions quantified by approximately 342,000 MT over the 30 years of operation.

- The site size was reduced from 2,007 acres to 1,854 acres. This would reduce the number of days needed for site preparation and grading activities or the daily acres graded but would not reduce the equipment needed. No change was made to construction emissions based on reduced acreage.

- The total miles of collector lines to be developed will be up to 39 miles as opposed to the 28.10 as identified in the original report. The number of miles would not increase the daily emissions estimates. And although 39 miles is analyzed, not all routes will be developed.

Employment

	2016	2045	Growth
SCAG	18,000	30,200	12,200

SCAG 2020. Current Context Demographics and Growht Forecast. Technical Report adopted on September 3. 2020. https://scag.ca.gov/sites/main/files/file-attachments/0903fconnectsocal_demographics-and-growth-forecast.pdf?1606001579

Sienna Solar
Analysis Updates

Worker Commute Emissions

			Emissions lbs/day						MT/yr
	Workers	Worker Trips	VOC	NO_X	SO_X	CO	PM_{10}	$PM_{2.5}$	CO_2e
Original (5 worker, 2 visitor)									
Passenger Vehicle (LDA)			0.03554	0.041222	0.00247	0.611563	0.045042	0.01846	0.1141469
Light-duty Truck (LDT2)			0.02272	0.031566	0.00108	0.309462	0.015719	0.00645	0.0497806
Total	5	24	0.05826	0.07279	0.00355	0.92102	0.06076	0.0249	0.163927
Emissions/trip			0.00243	0.00303	0.00015	0.03838	0.00253	0.001	0.00683
2023 Revisions (15 worker, 2 visitor)									
Worker (Updated)	15	64	0.15537	0.1941	0.00947	2.45606	0.16203	0.0664	0.43714
Service Vehicles (LHDT2)			0.00662	0.17793	0.00067	0.05028	0.01234	0.0058	0.032426
Equipment/Material Delivery (T6)			0.00231	0.06902	0.00105	0.03883	0.01648	0.0072	0.050525
Total			0.16429	0.44104	0.01119	2.54517	0.19085	0.0795	0.520091
		Days/year	tons/year						
		250	0.02	0.06	0.00	0.32	0.02	0.01	130

Worker Onsite Emissions

			Emissions lbs/year						MT/yr
	Workers	Worker Trips	VOC	NO_X	SO_X	CO	PM_{10}	$PM_{2.5}$	CO_2e
Original (5 worker, 2 visitor)									
Light-duty Truck (LDT2)	3		0.49028	0.91638	0.04194	11.3348	0.33856	0.1566	1.934171
Emissions/trip		12	0.04086	0.07637	0.0035	0.94457	0.02821	0.013	0.161181
2023 Revisions (15 worker, 2 visitor)									
Worker (Updated)	4	16	2.6148	4.88736	0.22369	60.4524	1.80564	0.8351	10.31558
Utility/Service Vehicle			0.17202	8.55818	0.0468	1.99286	0.32532	0.1407	1.507633
Water Truck			0.18148	23.8963	0.06533	2.96211	0.24131	0.1031	3.271216
Total			2.9683	37.3418	0.33582	65.4074	2.37227	1.0789	15.09443
			tons/year						
			0.001	0.019	0.0002	0.033	0.001	0.001	15

Worker Fugitive Emissions

	Worker Trips	On-Road (lbs/day)		Worker Trips	On-Site (lbs/day)	
		PM_{10}	$PM_{2.5}$		PM_{10}	$PM_{2.5}$
Original (5 worker, 2 visitor)						
Passenger Vehicle (LDA)		108.47	26.62			
Light-duty Truck (LDT2)		37.81	9.28		763.12	76.67
Emissions/trip	24.00	6.09	1.50	12.00	63.59	6.39
2023 Revisions (15 worker, 2 visitor)						
Worker (Updated)	64.00	390.07	95.75	16.00	1,017.49	102.23
Service Vehicles (LHDT2)		12.19	2.99		254.37	25.56
Equipment/Material Delivery (T6)		12.19	2.99			
Water Truck					254.37	25.56
Total		414.45	101.73		1,526.24	153.34
Total (tons/yr)		0.21	0.05		0.76	0.08

Sienna Solar
Analysis Updates

Operational Criteria Emissions By Year

	tons/year					
	VOC	NO_X	SO_X	CO	PM_{10}	$PM_{2.5}$
On Road and On-Site Vehicles (Exhaust)	0.022	0.074	0.002	0.351	0.025	0.010
Vehicles (Fugitive)					0.97	0.13
Total	0.022	0.074	0.002	0.351	0.995	0.138
Total (For Report)	<0.1	0.1	<0.1	0.4	1.0	0.1

Operational GHG Emissions

	MT/yr CO_2e		
	Original	2023	
Off-Road	0.00	0.00	
Onsite-Mobile	6.71	15	
Off-Site Mobile	61.72	130	
Water	5.79	5.79	
Total Operational	**74.22**	**150.90**	
Amortized Con. & Decom.	476	476	
Total Annual	550	627	0.69%

Emissions Displaced During Operations

Original	2023 Analysis	
500	525	MW system
33,562	35,240	gigawatt hours produced
1,119	1,175	gigawatt hour of electricity per year

	Emissions						
	Annual - Tons/yr; 30 year total - Tons						MT/yr; MT
	VOC	NO_X	SO_X	CO	PM_{10}	$PM_{2.5}$	CO_2e
Original							
Emissions Displaced Annually	0.4	281.9	10.7	34.3	10.3	4.3	241,911
Total Emissions Displaced over 30 years	11.5	8,455.80	320.6	1,028.60	308.4	129.7	7,257,330
2023 Revisions							
Emissions Displaced Annually	0.4	295.9	11.2	36.0	10.8	4.5	253,946
Total Emissions Displaced over 30 years	12.6	8,877.7	337.0	1,080.2	324.4	135.4	7,618,381
Net Displaced Annually (Displaced - Project)							253,319
Net Displaced 30 years (Displaced - Project)							7,599,573
Increase from Original							11,408
							252,692

Sienna Solar PV (2,084 Acres, 500 MW)

Emissions Factors Used in Analysis

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Exhaust Emissions Factors for Equipment in		**Mojave Desert Air Basin**													
Equipment [1, 2, 3]	**Fuel Type**	**Consumption (gallons/hr)**	**Actual HP**	**Modeled HP**	**HC lbs/hr**	**ROG lbs/hr**	**TOG lbs/hr**	**CO lbs/hr**	**NOx lbs/hr**	**CO_2 lbs/hr**	**PM_{10} lbs/hr**	**$PM_{2.5}$ lbs/hr**	**otal PM lbs/h**	**SO_X lbs/hr**	**NH_3 lbs/hr**
Air Compressor	diesel	1.02	78	50	2.11E-02	2.51E-02	3.03E-02	1.94E-01	1.56E-01	2.22E+01	6.28E-03	5.77E-03	1.21E-02	2.87E-04	1.87E-04
Crane	diesel	2.73	231	238	3.44E-02	4.16E-02	4.96E-02	2.86E-01	4.37E-01	6.14E+01	2.06E-02	1.89E-02	3.95E-02	5.67E-04	5.01E-04
Crawler Tractor	diesel	3.93	212	238	4.64E-02	5.62E-02	6.68E-02	4.14E-01	5.93E-01	8.84E+01	2.79E-02	2.57E-02	5.36E-02	8.16E-04	7.22E-04
Drum Roller Compactor	diesel	2.24	134	138	1.56E-02	1.88E-02	2.24E-02	2.96E-01	1.93E-01	5.04E+01	9.74E-03	8.96E-03	1.87E-02	4.66E-04	4.12E-04
Excavator	diesel	3.60	212	238	2.01E-02	2.43E-02	2.90E-02	2.91E-01	2.04E-01	8.11E+01	8.15E-03	7.50E-03	1.56E-02	7.49E-04	6.62E-04
Generator Set	diesel	1.23	84	88	1.47E-02	1.78E-02	2.12E-02	2.09E-01	1.51E-01	2.77E+01	8.65E-03	7.95E-03	1.66E-02	2.56E-04	2.26E-04
Grader	diesel	3.16	187	175	4.26E-02	5.16E-02	6.14E-02	4.58E-01	4.70E-01	7.10E+01	2.58E-02	2.38E-02	4.96E-02	6.55E-04	5.79E-04
Off-highway Truck	diesel	5.79	402	450	3.96E-02	4.79E-02	5.71E-02	3.06E-01	3.40E-01	1.30E+02	1.29E-02	1.18E-02	2.47E-02	1.20E-03	1.06E-03
Other Construction Equipment	diesel	3.26	172	175	3.17E-02	3.84E-02	4.57E-02	4.39E-01	3.78E-01	7.33E+01	1.97E-02	1.82E-02	3.79E-02	6.77E-04	5.98E-04
Rough-terrain Forklift	diesel	2.00	100	100	1.64E-02	1.98E-02	2.36E-02	2.47E-01	2.10E-01	3.81E+01	1.14E-02	1.05E-02	2.20E-02	3.52E-04	3.11E-04
Rubber-tired Loader	diesel	3.34	203	238	2.77E-02	3.35E-02	3.99E-02	2.97E-01	3.01E-01	7.52E+01	1.27E-02	1.17E-02	2.45E-02	6.95E-04	6.14E-04
Skid Steer	diesel	1.35	75	75	7.24E-03	8.76E-03	1.04E-02	1.87E-01	1.17E-01	3.03E+01	3.93E-03	3.62E-03	7.55E-03	2.80E-04	2.47E-04
Trencher (big)	diesel	5.87	300	300	6.46E-02	7.82E-02	9.30E-02	3.96E-01	8.83E-01	1.32E+02	3.69E-02	3.40E-02	7.09E-02	1.22E-03	1.08E-03
Trencher (small)	diesel	1.82	78	75	5.73E-02	6.93E-02	8.25E-02	3.43E-01	5.75E-01	4.10E+01	3.98E-02	3.66E-02	7.65E-02	3.77E-04	3.35E-04
Vibratory Post Driver	diesel	3.26	158	175	3.17E-02	3.84E-02	4.57E-02	4.39E-01	3.78E-01	7.33E+01	1.97E-02	1.82E-02	3.79E-02	6.77E-04	5.98E-04

1. Emissions factors for diesel and gasoline equip developed from the CARB 2017 Off-Road Inventory Model for year 2023. Emissions based on the equipment within the model horsepower bin nearest the applicant provided horsepower rating; emissions between bins were averaged if actual horsepower was equally between two model horsepower bins. Note that emission factors from the 2017 Inventory Model are substantially lower than in the previous OFFROAD2011 model because of changed assumptions by CARB regarding load factors, hours of use, fuel consumption, and equipment population.

2. "Other Construction Equipment" used for vibratory post driver.

On-Road Mobile Vehicle Emission Factors Used in Analysis

Source: San Bernardino (MD), EMFAC 2017 Annual Average, Year 2023

Running Emissions, grams/mile

							PM_{10} (g/mile)			$PM_{2.5}$ * (g/mile)					
Vehicle Type	Speed	ROG	TOG	CO	NO_X	SO_X	Exhaust	Tire Wear	Brake	Exhaust	Tire Wear	Brake	CO_2	CH_4	N_2O
LDA	10	0.039073725	0.056571727	1.152663143	0.058929129	0.005085617	0.006141824	0.008000002	0.036750011	0.005654128	0.002	0.015750005	514.105061	0.0101732	0.007546882
LDA	55	0.006612772	0.009616013	0.535324688	0.034691371	0.002500786	0.001088287	0.008000002	0.036750011	0.001002888	0.002	0.015750005	252.79091	0.00174031	0.00432666
LDT2	10	0.072736507	0.105677788	1.702486955	0.137341515	0.006338669	0.006430896	0.008000002	0.036750011	0.005916233	0.002	0.015750005	640.718936	0.01758122	0.011539515
LDT2	55	0.012788296	0.018636738	0.791867681	0.080178156	0.003123955	0.001136121	0.008000002	0.036750011	0.001045764	0.002	0.015750005	315.75953	0.00309599	0.006661599
LHD2	10	0.400150418	0.464248163	1.947081411	1.300912116	0.013027206	0.036893217	0.010644025	0.089180026	0.035237922	0.00266101	0.038220011	1350.30116	0.02366708	0.125972382
LHD2	55	0.049204727	0.057645641	0.438102934	1.608088606	0.006094553	0.012011418	0.010721276	0.089180026	0.011481981	0.00268032	0.038220011	631.679194	0.00319742	0.059525688
MHDT	10	0.077277336	0.103483406	0.899890201	3.875340234	0.021227558	0.005219915	0.012000003	0.130340037	0.004952537	0.003	0.055860016	1445.51141	0.00134365	0.227214264
MHDT	55	0.014141809	0.019221595	0.311630219	0.560320016	0.009484452	0.007141328	0.012000003	0.130340037	0.006824437	0.003	0.055860016	984.096743	0.00227706	0.09399804
MDV	10	0.100792296	0.145741628	2.086892755	0.182873921	0.007933741	0.006740715	0.008000002	0.036750011	0.006212666	0.002	0.015750005	802.550391	0.02352798	0.016820503
MDV	55	0.01790118	0.025998704	0.950179934	0.109256351	0.003909301	0.001249921	0.008000002	0.036750011	0.001154191	0.002	0.015750005	395.412811	0.00419751	0.00953958
HHDT	10	0.082315376	0.093713629	1.343580537	10.83006655	0.029632034	0.011908318	0.035929861	0.061619857	0.011393168	0.00898247	0.02640851	3136.49243	0.00382503	0.493010826
HHDT	55	0.013749524	0.015687578	0.103353466	1.204377318	0.010277922	0.023408701	0.020003274	0.061739993	0.022396039	0.00500082	0.026459997	1087.88032	0.00065289	0.170965238

Start Emissions, grams/trip

Vehicle Type	ROG	TOG	CO	NO_X	SO_X	PM_{10}	$PM_{2.5}$	CO_2	CH_4	N_2O
LDA	0.220096143	0.240976868	2.200773324	0.183143967	0.000529067	0.001814672	0.001668561	53.46373613	0.05026596	0.025681144
LDT2	0.347631167	0.380611802	2.825381348	0.30303508	0.000689389	0.001934108	0.001778396	69.66470718	0.073493451	0.033103701
LHD2	0.033550831	0.036733937	0.447772491	0.141545188	5.54882E-05	9.38615E-05	8.63022E-05	5.607240725	0.006813508	0.010983259
MHDT	0.04626588	0.050655315	1.013325893	1.641031137	8.66587E-05	0.000105159	9.66897E-05	8.757111402	0.009130818	0.007099773
MDV	0.434955479	0.476216291	3.284695342	0.368175784	0.000841869	0.001989053	0.001829132	85.07331067	0.088026639	0.036081623
HHDT	4.00565E-07	4.38568E-07	0.000707851	2.263815753	7.22654E-08	2.36089E-07	2.17075E-07	0.007302625	7.79928E-08	4.41824E-06

	Additional ROG Emissions				**Additional TOG Emissions**			
Vehicle Type	Diurnal (g/vehicle/day)	Hot Soak (g/trip)[1]	Resting Losses (g/vehicle/day)[2]	Running Losses (g/trip)	Diurnal (g/vehicle/day)	Hot Soak (g/trip)[1]	Resting Losses (g/vehicle/day)[2]	Running Losses (g/trip)
LDA	0.277471607	0.101462018	0.215429112	0.214460887	0.277471607	0.101462018	0.215429112	0.214460887
LDT2	0.499803435	0.153513381	0.394967228	0.513175249	0.499803435	0.153513381	0.394967228	0.513175249
LHD2	0.016803541	0.033711009	0.008088999	0.207056003	0.016803541	0.033711009	0.008088999	0.207056003
MHDT	0.01163704	0.019228227	0.005578239	0.104891362	0.01163704	0.019228227	0.005578239	0.104891362
MDV	0.550298038	0.174147873	0.460825203	0.535921832	0.550298038	0.174147873	0.460825203	0.535921832
HHDT	2.22116E-05	3.25924E-05	1.15678E-05	0.000171434	2.22116E-05	3.25924E-05	1.15678E-05	0.000171434

[1]Hotsoak emissions occur during the first hour the vehilce is parked after normal operation

[2] Diurnal/resting losses have to do with the vehicle population on site as it "rests".

Note: Mobile emission factors are weighted averages based on the vehicle population per fuel type, vehicle class and speed obtained from EMFAC2017.

Additional Greenhouse Gas Emissions Factors

GHG Global Warming Potential [1,2]

CO_2:	1	GWP
CH_4:	30	GWP
N_2O:	273	GWP

Note: 1 ton (short, US) = 0.90718474 metric ton.

1. Based on 100 Yr GWP from IPCC Sixth Assessment, 2021

2. No climate-carbon feedbacks (CC fb) included

Indirect Water Supply GHG Emissions

State Water Project/ Central Valley Proj	428	kwh/acre foot [1]
Local Supply (Groundwater)	906-1,990	kwh/million gallons [2]
Local Treatment	44	kwh/millions gallons [3]
Local Delivery	45-956	kwh/million gallons [4]
Factor used:	***1993***	***kwh/MG*** [5]
	649	***kwh/AF***

Note: 1 million gallons (MG) = 3.07 acre feet (AF)

1. Embedded Energy in Water Studies, 2010a: Study 1, Figure 3.4: Dos Amigos Pumping Plant. (p.62-63)

2. Embedded Energy in Water Studies, 2010b:Study 2, Table 4-6: Central Valley energy intensity range for groundwater (main water supply)

3. Embedded Energy in Water Studies, 2010b:Study 2, Table 4-6: Lowest Statewide energy intensity value used because no Central Valley specific values, but minimal treatment of water observed in Central Valley agencies

4. Embedded Energy in Water Studies, 2010b:Study 2, Table 4-6: Statewide energy intensity values assuming booster pump use on moderate terrain

5 Energy intensity (EI) value used for analysis = the average supply EI + minimal water treatment EI + average local delivery EI

Southern California Edison Electricity Generation [1]

CO_2:	391.000	lbs/MWH	
CH_4:	0.033	lbs/MWH	
N_2O:	0.004	lbs/MWH	
	0.0001783	MT/kwh	**Indirect GHG Factor:**
			0.116 MT/Acre Foot

Note: 1 Metric Tons (MT) = 2204.62 lbs

1. California Emissions Estimator Model User Guide, Appendix D, CAPCOA 2021

Paved roads - Emission Factor Derivation Table

$$E_{ext} = [\, k\,(sL)^{0.91} \times (W)^{1.02} \,]\,(1 - P/4N)$$

where:
E=particulate emissions factor (lb/VMT)
k = particle size multiplier
sL = road surface silt loading (g/m^2)
W = average vehicle weight class (tons)
P = # of "wet" days with at least 0.01 inch of precipitation
N = # of days in averaging period (default 365 for annual)

				On-Site Vehicles[6]	
Parameter	**Unit**	**PM10**	**PM2.5**	**PM10**	**PM2.5**
Mean Vehicle Weight[1]	tons	2.4	2.4	10	10
k factor[2]	lb/VMT	0.0022	0.00054	0.0022	0.00054
Silt Loading, sL[3]	g/m^2	0.156	0.156	0.135	0.135
precipitation, P [4]	days	23	23	23	23
Averaging period, N [5]	days	365	365	365	365
Uncontrolled Emission factor, E	**lb/VMT**	**0.00097518**	**0.00024**	**0.00367**	**0.00090**

NOTES

1. Assumption based on the mix of <u>all</u> vehicles (not just project vehicles) driving on paved roads to site. Eland EIR used 2.2 tons versus CA Statewide MVW = 2.4 tons (CARB 7.9, November 2018).
2. AP-42 Table 13.2.1-1 recommends 0.0022 lb/VMT for PM10 and 0.00054 lb/VMT for PM2.5. PM2.5 factor is estimated to be 15% of PM10 per CARB's Miscellanous Process Methodology 7.9 Entrained Road Travel, Paved Road Dust (March 2018).
3. Consistent with the Project Description, a majority of construction vehicles would access the site from State Route 18 and 247 with some use of county roads. Therefore the silt loading factor was weighted assuming 90% travel on SR-18 and SR-247 considered a major road and 10% travel on county roads considered local rural. The San Bernardino County specific silt loading values were used. Source: CARB 7.9, March
4. CARB 7.9, Nov 2018: Table 8. San Bernardino County in the Mojave Desert receives 23 days of percipitation
5. AP-42 13.2 eqn 2 (EPA, January 2011)

6. Assumption based on onsite fleet mix of heavy, medium and light duty trucks (https://www.epa.gov/emission-standards-reference-guide/vehicle-weight-classifications-emission-standards-reference-guide) and silt loading for "Local" roadway category (CARB 7.9, Nov 2016: Table 3)

Unpaved roads - Emission Factor Derivation Table

$$E.F._{\cdot dust,i} = \left(\frac{k(s/12)^1 (S/30)^{0.5}}{(M/0.5)^{0.2}} - C \right) \left(1 - \frac{P}{365}\right)$$

where:
E=particulate emissions factor (lb/VMT)
k = particle size multiplier for particle size range and units of interest
s = surface material silt content (%)
M= surface material mositure content (%)
S = mean vehicle speed (mph)
C = emission factor for 1980s vehicle fleet exhust, brake wear and tire wear
P = # of "wet" days with at least 0.01 inch of precipitation

Parameter	**Unit**	**PM10**	**PM2.5**
Particle size, k [1]	lbs/VMT	1.8	0.18
Silt content, s [2]	%	8.5	8.5
Surface moisture content, M [3]	%	6.515	6.515
Mead vehicle speed, S [4]	mph	15	15
Exhaust emission factor, C [5]	lbs/VMT	0.00047	0.00036
precipitation, P [6]	days	23	23
Uncontrolled Emission factor, E	**lb/VMT**	**0.51**	**0.05**
Control efficiency for watering [7]	%	0.55	0.55
Controlled Emission factor, E	**lb/VMT**	**0.23**	**0.023**
Control efficiency for dust palliative [8]	%	0.84	0.84
Controlled Emission factor, E	**lb/VMT**	**0.08**	**0.01**

NOTES

1. Consistent assumption obtained for Public Roads from AP-42 Table 13.2.2-2 and CARB 7.9, March 2018: Table 7
2. Silt content was obtained from the most recet AP-42 recommendation (Table 13.2.2-1) for "construction sites". The AP-42 guidance provides a range of 0.56-23 with the average as 8.5%.
3. AP-42 recommends range from 0.03-13 % for public roads (Table 13.2.2-3), therefore average mositure content was applied.
4. MDAQMD-recommended measure for dust control is for vehicles not to exceed 15 mph on any unpaved surface on the construction site. Also consistent with San Bernardino County Development Code Section 84.29.035. Note that AP-42 recommends range from 10-55 mph for public roads (Table 13.2.2-3).
5. AP-42 recommended emission factor for 1980's vehicles fleet exhaust, brake wear and tire wear for unpaved roads (Table 13.2.2.-4.)
6. CARB 7.9, Nov 2018: Table 8. San Bernardino County in the Mojave Desert receives 23 days of percipitation
7. MRI, April 2001. Particulate Emission Measurements from Controlled Construction Activities, EPA/600/R-01/031.
8. Per CARB certification for Soil Sement®

CARB Source: https://ww3.arb.ca.gov/ei/areasrc/fullpdf/full7-9_2018.pdf
USEPA Source: https://www.epa.gov/air-emissions-factors-and-quantification/ap-42-fifth-edition-volume-i-chapter-13-miscellaneous-0

Sienna Solar PV (2,084 Acres, 500 MW)

On-Site Equipment Combustion Emissions [1]

Phase 1 - Site Prep and Grading	# of Days in Phase :	66														
Equipment	HP Estimate	Number of Units	Daily Hours	Days in Use	Total Hourly Usage (units*hours per day*days)	HC lbs	ROG lbs	TOG lbs	CO lbs	NO_X lbs	CO_2 lbs	PM_{10} lbs	$PM_{2.5}$ lbs	NH_3 lbs	SO_X lbs	MT of CO_2e
Crawler Tractor	212	1	5	66	330	15.31	18.53	22.05	136.68	195.48	29,178.61	9.21	8.47	0.24	0.27	13.2
Grader	187	3	8	66	1,584	67.49	81.67	97.19	725.50	743.83	112,431.36	40.91	37.63	0.92	1.04	51.0
Off-highway Truck	402	5	4	66	1,320	52.28	63.26	75.29	404.15	449.21	171,897.82	16.98	15.62	1.40	1.59	78.0
Drum Roller Compactor	134	2	8	66	1,056	16.43	19.88	23.66	312.92	203.93	53,231.47	10.28	9.46	0.43	0.49	24.1
Rubber-tired Loader	203	2	8	66	1,056	29.24	35.38	42.10	313.16	317.41	79,434.11	13.46	12.38	0.65	0.73	36.0
Rough-terrain Forklift	130	3	8	66	1,584	25.98	31.43	37.41	391.27	332.67	60,359.66	18.12	16.67	0.49	0.56	27.4
Skid Steer	75	3	8	66	1,584	11.47	13.88	16.51	296.37	184.63	47,986.78	6.23	5.73	0.39	0.44	21.8
					AVG EXHAUST EMISSIONS PER DAY	**3.31**	**4.00**	**4.76**	**39.10**	**36.78**	**8,403.83**	**1.75**	**1.61**	**0.07**	**0.08**	**3.81**
					TOTAL	**218.20**	**264.02**	**314.21**	**2,580.06**	**2,427.16**	**554,519.81**	**115.18**	**105.97**	**4.53**	**5.12**	**251.53**

Phase 2 - Tracker Foundations	# of Days in Phase :	125														
Equipment	HP Estimate	Number of Units	Daily Hours	Days in Use	Total Hourly Usage (units*hours per day*days)	HC lbs	ROG lbs	TOG lbs	CO lbs	NO_X lbs	CO_2 lbs	PM_{10} lbs	$PM_{2.5}$ lbs	NH_3 lbs	SO_X lbs	MT of CO_2e
Air Compressor	78	1	8	125	1,000	21.07	25.07	30.34	193.64	155.92	22,238.61	6.28	5.77	0.19	0.29	10.1
Generator Set	84	3	8	125	3,000	44.12	53.38	63.53	627.98	452.58	83,197.84	25.94	23.86	0.68	0.77	37.7
Off-highway Truck	402	5	4	125	2,500	99.05	119.85	142.63	765.63	850.99	325,642.10	32.16	29.59	2.66	3.01	147.7
Other Construction Equipment	172	1	2	125	250	7.93	9.60	11.43	109.72	94.59	18,324.59	4.94	4.54	0.15	0.17	8.3
Rough-terrain Forklift	100	5	8	125	5,000	82.01	99.24	118.10	1,235.37	1,050.34	190,574.91	57.21	52.63	1.56	1.76	86.4
Rubber-tired Loader	203	1	8	125	1,000	27.70	33.51	39.88	296.63	300.65	75,239.72	12.75	11.73	0.61	0.69	34.1
Vibratory Post Driver	158	7	8	125	7,000	222.16	268.82	319.92	3,072.05	2,648.51	513,088.38	138.20	127.15	4.19	4.74	232.7
Skid Steer	75	7	8	125	7,000	50.69	61.34	73.00	1,310.01	816.12	212,113.63	27.54	25.34	1.73	1.96	96.2
					AVG EXHAUST EMISSIONS PER DAY	**4.44**	**5.37**	**6.39**	**60.89**	**50.96**	**11,523.36**	**2.44**	**2.24**	**0.09**	**0.11**	**5.23**
					TOTAL	**554.74**	**670.81**	**798.82**	**7,611.03**	**6,369.69**	**1,440,419.78**	**305.02**	**280.62**	**11.76**	**13.38**	**653.36**

Phase 3 - Underground Cabling	# of Days in Phase :	125														
Equipment	HP Estimate	Number of Units	Daily Hours	Days in Use	Total Hourly Usage (units*hours per day*days)	HC lbs	ROG lbs	TOG lbs	CO lbs	NO_X lbs	CO_2 lbs	PM_{10} lbs	$PM_{2.5}$ lbs	NH_3 lbs	SO_X lbs	MT of CO_2e
Excavator	212	3	8	125	3,000	60.32	72.98	86.85	874.09	613.13	243,204.60	24.44	22.49	1.99	2.25	110.3
Trencher (big)	300	1	8	125	1,000	64.60	78.16	93.02	395.76	883.00	132,009.95	36.93	33.98	1.08	1.22	59.9
Off-highway Truck	402	5	4	125	2,500	99.05	119.85	142.63	765.63	850.99	325,642.10	32.16	29.59	2.66	3.01	147.7
Drum Roller Compactor	134	2	8	125	2,000	31.12	37.66	44.82	592.79	386.32	100,841.34	19.48	17.92	0.82	0.93	45.7
Rubber-tired Loader	203	1	8	125	1,000	27.70	33.51	39.88	296.63	300.65	75,239.72	12.75	11.73	0.61	0.69	34.1
Skid Steer	75	3	8	125	3,000	21.73	26.29	31.29	561.43	349.76	90,905.84	11.80	10.86	0.74	0.84	41.2
					AVG EXHAUST EMISSIONS PER DAY	**2.44**	**2.95**	**3.51**	**27.89**	**27.07**	**7,742.75**	**1.10**	**1.01**	**0.06**	**0.07**	**3.51**
					TOTAL	**304.51**	**368.45**	**438.49**	**3,486.33**	**3,383.86**	**967,843.54**	**137.57**	**126.56**	**7.90**	**8.94**	**439.01**

Phase 4 -Mechanical Installation	# of Days in Phase :	146														
Equipment	HP Estimate	Number of Units	Daily Hours	Days in Use	Total Hourly Usage (units*hours per day*days)	HC lbs	ROG lbs	TOG lbs	CO lbs	NO_X lbs	CO_2 lbs	PM_{10} lbs	$PM_{2.5}$ lbs	NH_3 lbs	SO_X lbs	MT of CO_2e
Air Compressor	78	15	8	146	17,520	369.10	439.26	531.51	3,392.64	2,731.71	389,620.49	109.96	101.17	3.28	5.04	176.7
Generator Set	84	8	8	146	9,344	137.41	166.27	197.87	1,955.95	1,409.64	259,133.54	80.79	74.32	2.12	2.39	117.5
Off-highway Truck	402	6	4	146	3,504	138.82	167.98	199.91	1,073.10	1,192.75	456,419.96	45.08	41.47	3.73	4.22	207.0
Other Construction Equipment	172	1	2	146	292	9.27	11.21	13.35	128.15	110.48	21,403.12	5.77	5.30	0.17	0.20	9.7
Rough-terrain Forklift	100	7	8	146	8,176	134.11	162.27	193.12	2,020.08	1,717.51	311,628.09	93.55	86.07	2.54	2.88	141.4
Rubber-tired Loader	203	3	8	146	3,504	97.05	117.42	139.75	1,039.38	1,053.48	263,639.99	44.66	41.09	2.15	2.43	119.6
Skid Steer	75	1	8	146	1,168	8.46	10.24	12.18	218.58	136.18	35,392.67	4.60	4.23	0.29	0.33	16.1
					AVG EXHAUST EMISSIONS PER DAY	**6.12**	**7.36**	**8.82**	**67.31**	**57.20**	**11,898.89**	**2.63**	**2.42**	**0.10**	**0.12**	**5.40**
					TOTAL	**894.22**	**1,074.65**	**1,287.68**	**9,827.89**	**8,351.74**	**1,737,237.87**	**384.41**	**353.65**	**14.28**	**17.48**	**788.00**

Phase 5- Electrical Installation	# of Days in Phase :	167														
Equipment	HP Estimate	Number of Units	Daily Hours	Days in Use	Total Hourly Usage (units*hours per day*days)	HC lbs	ROG lbs	TOG lbs	CO lbs	NO_X lbs	CO_2 lbs	PM_{10} lbs	$PM_{2.5}$ lbs	NH_3 lbs	SO_X lbs	MT of CO_2e
Air Compressors	78	2	8	167	2,672	56.29	66.99	81.06	517.42	416.62	59,421.57	16.77	15.43	0.50	0.77	27.0
Off-highway Truck	402	7	4	167	4,676	185.26	224.16	266.77	1,432.03	1,591.69	609,080.98	60.16	55.35	4.97	5.63	276.3
Rubber-tired Loader	203	3	8	167	4,008	111.00	134.31	159.85	1,188.88	1,205.01	301,560.81	51.08	47.00	2.46	2.78	136.8
Rough-terrain Forklift	100	4	8	167	5,344	87.66	106.07	126.23	1,320.37	1,122.60	203,686.46	61.15	56.26	1.66	1.88	92.4
Trencher (small)	78	2	8	167	2,672	153.13	185.29	220.51	917.43	1,536.83	109,581.66	106.44	97.92	0.89	1.01	49.7
Crane	231	1	2	167	334	11.50	13.91	16.56	95.46	146.07	20,507.79	6.87	6.32	0.17	0.19	9.3
Excavator	212	2	8	167	2,672	53.72	65.00	77.36	778.52	546.09	216,614.23	21.77	20.03	1.77	2.00	98.3
					AVG EXHAUST EMISSIONS PER DAY	**3.94**	**4.76**	**5.68**	**37.43**	**39.31**	**9,104.51**	**1.94**	**1.79**	**0.07**	**0.09**	**4.13**
					TOTAL	**658.56**	**795.73**	**948.32**	**6,250.11**	**6,564.91**	**1,520,453.50**	**324.24**	**298.30**	**12.43**	**14.26**	**689.67**

Annual

Year	HC lbs	ROG lbs	TOG lbs	CO lbs	NO_X lbs	CO_2 lbs	PM_{10} lbs	$PM_{2.5}$ lbs	NH_3 lbs	SO_X lbs	MT of CO2e
2023	2,630.22	3,173.68	3,787.52	29,755.42	27,097.36	6,220,474.50	1,266.42	1,165.10	50.89	59.18	2,821.56
Total	2,630.22	3,173.68	3,787.52	29,755.42	27,097.36	6,220,474.50	1,266.42	1,165.10	50.89	59.18	2,821.56

Max Daily

Year	HC lbs	ROG lbs	TOG lbs	CO lbs	NO_X lbs	CO_2 lbs	PM_{10} lbs	$PM_{2.5}$ lbs	NH_3 lbs	SO_X lbs	MT of CO2e
2023	16.94	20.44	24.40	195.19	174.54	40,269.51	8.12	7.47	0.33	0.38	18.27
Total Max Daily	16.94	20.44	24.40	195.19	174.54	40,269.51	8.12	7.47	0.33	0.38	18.27

NOTES

MT = Metric Tons

1. Equipment list assumptions were prepared using Eland 1 Solar EIR as recommended by the Applicant
2. Off-high Truck additional emissions during transit operations calculated with onsite mobile emissions
3. Emissions for 2023 calculated using following asssumptions related to construction days/schedule: 66 days of Phase 1, 125 days of Phase 2, 125 days of Phase 3, 146 days of Phase 4 & 167 days of Phase 5

Sienna Solar PV (2,084 Acres, 500 MW)

Fugitive Dust Emissions During Construction On-site (excludes vehicular traffic from vendor vehicles)

				Natural Soil					
Phase 1 - Site Prep and Grading		**Number of Days**	**66**	**No Additional Control[4]**		**With Water Control [5]**		**With Palliative Control[6]**	
Vehicle Type	**Total Vehicle Miles Traveled**	**PM_{10} lbs/mile factor [4]**	**$PM_{2.5}$ lbs/mile factor [4]**	**PM_{10} lbs**	**$PM_{2.5}$ lbs**	**PM_{10} lbs**	**$PM_{2.5}$ lbs**	**PM_{10} lbs**	**$PM_{2.5}$ lbs**
Mobile Construction Equipment (0.5 mph) [1]	0.74	0.51	0.050	0.37	0.04	0.2	0.0	0.1	0.0
Stationary Construction Equipment (0.25 mpd) [2]	0	0.51	0.050	0.00	0.00	0.0	0.0	0.0	0.0
Off-highway Truck[3]	3,299	0.25	0.026	839.23	84.32	749.9	74.6	266.6	26.5
Total Pounds Per day				**12.72**	**1.28**	**11.37**	**1.13**	**4.04**	**0.40**
Total	**3,300**			**839.60**	**84.36**	**750.03**	**74.57**	**266.68**	**26.51**

				Natural Soil					
Phase 2 - Tracker Foundations		**Number of Days**	**125**	**No Additional Control[4]**		**With Water Control [5]**		**With Palliative Control[6]**	
Vehicle Type	**Total Vehicle Miles Traveled**	**PM_{10} lbs/mile factor [4]**	**$PM_{2.5}$ lbs/mile factor [4]**	**PM_{10} lbs**	**$PM_{2.5}$ lbs**	**PM_{10} lbs**	**$PM_{2.5}$ lbs**	**PM_{10} lbs**	**$PM_{2.5}$ lbs**
Mobile Construction Equipment (0.5 mph) [1]	1.1	0.51	0.050	0.57	0.06	0.3	0.0	0.1	0.0
Stationary Construction Equipment (0.25 mpd) [2]	0	0.51	0.050	0.00	0.00	0.0	0.0	0.0	0.0
Off-highway Truck[3]	6,250	0.25	0.026	1,589.83	159.73	1420.5	141.2	505.1	50.2
Total Pounds Per day				**12.72**	**1.28**	**11.37**	**1.13**	**4.04**	**0.40**
Total	**6,251**			**1,590.40**	**159.79**	**1,420.80**	**141.25**	**505.17**	**50.22**

				Natural Soil					
Phase 3 - Underground Cabling		**Number of Days**	**125**	**No Additional Control[4]**		**With Water Control [5]**		**With Palliative Control[6]**	
Vehicle Type	**Total Vehicle Miles Traveled**	**PM_{10} lbs/mile factor [4]**	**$PM_{2.5}$ lbs/mile factor [4]**	**PM_{10} lbs**	**$PM_{2.5}$ lbs**	**PM_{10} lbs**	**$PM_{2.5}$ lbs**	**PM_{10} lbs**	**$PM_{2.5}$ lbs**
Mobile Construction Equipment (0.5 mph) [1]	0.8	0.51	0.050	0.39	0.04	0.2	0.0	0.1	0.0
Stationary Construction Equipment (0.25 mpd) [2]	0	0.51	0.050	0.00	0.00	0.0	0.0	0.0	0.0
Off-highway Truck[3]	6,250	0.25	0.026	1,589.83	159.73	1420.5	141.2	505.1	50.2
Total Pounds Per day				**12.72**	**1.28**	**11.37**	**1.13**	**4.04**	**0.40**
Total	**6,251**			**1,590.22**	**159.77**	**1,420.71**	**141.25**	**505.14**	**50.22**

				Natural Soil					
Phase 4 -Mechanical Installation		**Number of Days**	**146**	**No Additional Control[4]**		**With Water Control [5]**		**With Palliative Control[6]**	
Vehicle Type	**Total Vehicle Miles Traveled**	**PM_{10} lbs/mile factor [4]**	**$PM_{2.5}$ lbs/mile factor [4]**	**PM_{10} lbs**	**$PM_{2.5}$ lbs**	**PM_{10} lbs**	**$PM_{2.5}$ lbs**	**PM_{10} lbs**	**$PM_{2.5}$ lbs**
Mobile Construction Equipment (0.5 mph) [1]	1.1	0.51	0.050	0.57	0.06	0.3	0.0	0.1	0.0
Stationary Construction Equipment (0.25 mpd) [2]	0	0.51	0.050	0.00	0.00	0.0	0.0	0.0	0.0
Off-highway Truck[3]	8,760	0.25	0.026	2,228.31	223.88	1991.0	197.9	707.9	70.4
Total Pounds Per day				**15.27**	**1.53**	**13.64**	**1.36**	**4.85**	**0.48**
Total	**8,761**			**2,228.88**	**223.94**	**1,991.28**	**197.97**	**708.01**	**70.39**

				Natural Soil					
Phase 5- Electrical Installation		**Number of Days**	**167**	**No Additional Control[4]**		**With Water Control [5]**		**With Palliative Control[6]**	
Vehicle Type	**Total Vehicle Miles Traveled**	**PM_{10} lbs/mile factor [4]**	**$PM_{2.5}$ lbs/mile factor [4]**	**PM_{10} lbs**	**$PM_{2.5}$ lbs**	**PM_{10} lbs**	**$PM_{2.5}$ lbs**	**PM_{10} lbs**	**$PM_{2.5}$ lbs**
Mobile Construction Equipment (0.5 mph) [1]	0.96	0.51	0.050	0.48	0.05	0.2	0.0	0.1	0.0
Stationary Construction Equipment (0.25 mpd) [2]	0	0.51	0.050	0.00	0.00	0.0	0.0	0.0	0.0
Off-highway Truck[3]	11,690	0.25	0.026	2,973.62	298.76	1349.9	137.3	493.8	52.2
Total Pounds Per day				**17.81**	**1.79**	**8.08**	**0.82**	**2.96**	**0.31**
Total	**11,691**			**2,974.11**	**298.81**	**1,350.13**	**137.36**	**493.85**	**52.23**

Annual

	No Additional Control[4]		**With Water Control [5]**		**With Palliative Control[6]**	
Year	**PM_{10} lbs**	**$PM_{2.5}$ lbs**	**PM_{10} lbs**	**$PM_{2.5}$ lbs**	**PM_{10} lbs**	**$PM_{2.5}$ lbs**
2023	9,223.21	926.67	6,932.96	692.40	2,478.86	249.58
Total	**9,223.21**	**926.67**	**6,932.96**	**692.40**	**2,478.86**	**249.58**

Max Daily

	No Additional Control[4]		**With Water Control [5]**		**With Palliative Control[6]**	
Year	**PM_{10} lbs**	**$PM_{2.5}$ lbs**	**PM_{10} lbs**	**$PM_{2.5}$ lbs**	**PM_{10} lbs**	**$PM_{2.5}$ lbs**
2023	58.52	5.88	47.74	4.75	16.97	1.69
Max Daily	**58.52**	**5.88**	**47.74**	**4.75**	**16.97**	**1.69**

Notes:

1. Crawler tractor, loader, skid-steer, drum roller compactor, and forklifts assumed to transit an average of 0.5 acres/8hr day. VMT is estimated based on the hours of operation and conversion of acreage to square miles to miles. Mobile equipment that is considered earth moving (i.e. grader) are accounted for seperately due to a specific operations.
2. Trencher, pile driver, excavator, and crane work primarily in place and are not considered mobile in this analysis.
3. Off-highway trucks are assumed to travel 5 miles per day on site and is consistent with Rexford 1 assumptions.
4. Uncontrolled emission factors based on silt content of local soil, onsite fleet mix, and and typical construction activites frpm AP-42, Table 13.2.2-2
5. Emission factors are reduced via water control by 55% efficiency per MRI, April 2001. Particulate Emission Measurements from Controlled Construction Activities, EPA/600/R-01/031.
6. Emission factors are reduced via palliative control by 84% efficiency per CARB certification for Soil Sement®
7. Emissions based on assumption of % of activity occuring on compacted/scraper road where base uncontrolled emission factors are 2.27 and 0.227 for PM_{10} and $PM_{2.5}$, respectively.
8. Emissions based on assumption of % of activity occuring on gravel road where base uncontrolled emission factors are 1.76 and 0.176 for PM_{10} and $PM_{2.5}$, respectively.

Particulates from Grading[1]

	Grader Parameters	
Travel Speed (S):	7.1	mph
Hours Operating:	8	
Acres/ 8hr-day:	0.5	
Width of Grading Blade (ft)[2]:	12	**Water Controlled**[3]
PM-10 Emissions Factor (lbs/ VMT) E = 0.6 * 0.051 * (S)^(2.0)	*1.54255*	*0.6*
PM-2.5 Emissions Factor (lbs/VMT) E = 0.031*0.04*(S)^(2.5)	*0.2*	*0.1*

Location	Acreage	VMT[4]	Fugitive Dust From Grading		Mitigated Fugitive Dust From Grading[3]	
			PM 10 (lbs)	PM2.5 (lbs)	PM 10 (lbs)	PM2.5 (lbs)
Site	2084	1432.75	2210.082782	238.6371063	861.9322848	93.06847144
TOTAL	2084	1432.75	2210.082782	238.6371063	861.9322848	93.06847144

Year	Fugitive Dust From Grading		Mitigated Fugitive Dust From Grading[3]	
	PM_{10} lbs	**$PM_{2.5}$ lbs**	**PM_{10} lbs**	**$PM_{2.5}$ lbs**
2023	2,210.08	238.64	861.93	93.07
2024	0.00	0.00	0.00	0.00
Total	**2,210.08**	**238.64**	**861.93**	**93.07**

Year	Fugitive Dust From Grading		Mitigated Fugitive Dust From Grading[3]	
	PM_{10} lbs	**$PM_{2.5}$ lbs**	**PM_{10} lbs**	**$PM_{2.5}$ lbs**
2023	17.68	1.91	6.90	0.74
2024	0.00	0.00	0.00	0.00
Max Daily	**17.68**	**1.91**	**6.90**	**0.74**

Notes

1. Fugitive dust emissions from grading the project site were estimated using the methodology described in Section 11., Western Surface Coal Mining of the USEPA AP-42 and used in CalEEMod 2020.4.0 (CAPCOA 2021).
2. Blade width of grading equipment is default width of 12 feet based on Caterpillar's 140 Motor Grader. (CalEEMod Appendix A, 2017)
3. Assumes use of water to control dust reduces dust by 61% based on per 3.2 hour watering interval of general construction; test series 701 reproted in WRAP Fugitive Dust Handbook, September 2006
4. VMT is estimated based on grading area and blade width where VMT = Acres graded/Blade Width * (43560 sqft/acre)/(5280 ft/mile)

Sienna Solar PV (2,084 Acres, 500 MW)

On-Road Mobile Emissions (55 mph)[1]

Activity 1 - Site Preparation

Vehicle Type[2,3]	Daily Trips To Site[4]	Daily Trips from Site	No. of Trips (one-way)	Average Miles per Trip (one-way)[5,6]	Daily Vehicle Miles Traveled	ROG lbs	TOG lbs	CO lbs	NO_X lbs	CO_2 lbs	PM_{10} lbs	$PM_{2.5}$ lbs	SO_X lbs	CH_4 lbs	N_2O lbs	MT of CO_2e
Within MDAQMD																
Vendors (Trucks)	25															
T6 (MHDT)	8	8	16	25	400	0.01	0.02	0.27	0.49	868.02	0.13	0.06	0.01	0.00	0.08	0
T7 (HHDT)	17	17	34	25	850	0.03	0.03	0.19	2.26	2,039.07	0.20	0.10	0.02	0.00	0.32	1
Employee Commute	100															
Passenger Vehicle (LDA)	76	76	153	25	3,815	0.30	0.33	5.24	0.35	2,144.70	0.39	0.16	0.02	0.03	0.05	1
Light-duty Truck (LDT2)	24	24	47	25	1,185	0.18	0.20	2.36	0.24	832.26	0.12	0.05	0.01	0.02	0.02	0
					Daily Emissions[7]	**0.52**	**0.58**	**8.08**	**3.35**	**5,884.05**	**0.84**	**0.37**	**0.06**	**0.05**	**0.47**	**2.73**
	No. of Days:	66			*Total Activity 1 Emissions:*	*34.20*	*38.10*	*532.95*	*220.80*	*388,254.37*	*55.11*	*24.18*	*3.77*	*3.34*	*30.96*	*179.99*
		1650														

Activity 2 - Grading and Earthwork

Vehicle Type[2,3]	Daily Trips To Site[4]	Daily Trips from Site	No. of Trips (one-way)	Average Miles per Trip (one-way)[5,6]	Daily Vehicle Miles Traveled	ROG lbs	TOG lbs	CO lbs	NO_X lbs	CO_2 lbs	PM_{10} lbs	$PM_{2.5}$ lbs	SO_X lbs	CH_4 lbs	N_2O lbs	MT of CO_2e
Within MDAQMD																
Vendors (Trucks)	25															
T6 (MHDT)	8	8	16	25	400	0.01	0.02	0.27	0.49	868.02	0.13	0.06	0.01	0.00	0.08	0
T7 (HHDT)	17	17	34	25	850	0.03	0.03	0.19	2.26	2,039.07	0.20	0.10	0.02	0.00	0.32	1
Employee Commute	400															
Passenger Vehicle (LDA)	305	305	610	25	15,261	1.21	1.34	20.98	1.41	8,578.81	1.54	0.63	0.08	0.13	0.18	4
Light-duty Truck (LDT2)	95	95	190	25	4,739	0.71	0.79	9.46	0.96	3,329.03	0.48	0.20	0.03	0.06	0.08	2
					Daily Emissions[7]	**1.96**	**2.17**	**30.90**	**5.13**	**14,814.93**	**2.35**	**0.99**	**0.15**	**0.19**	**0.67**	**6.81**
	No. of Days:	66			*Total Activity 2 Emissions:*	*129.22*	*143.22*	*2,039.06*	*338.51*	*977,551.29*	*155.34*	*65.28*	*9.60*	*12.70*	*44.01*	*449.03*
		1650														

Activity 3, 4, 5 - Concrete Foundations, Structural Steel Work and Electrical/Instrumentation Work

Vehicle Type[2,3]	Daily Trips To Site[4]	Daily Trips from Site	No. of Trips (one-way)	Average Miles per Trip (one-way)[5,6]	Daily Vehicle Miles Traveled	ROG lbs	TOG lbs	CO lbs	NO_X lbs	CO_2 lbs	PM_{10} lbs	$PM_{2.5}$ lbs	SO_X lbs	CH_4 lbs	N_2O lbs	MT of CO_2e
Within MDAQMD																
Vendors (Trucks)	55															
T6 (MHDT)	18	18	36	35	1,260	0.04	0.05	0.87	1.56	2,734.27	0.42	0.18	0.03	0.01	0.26	1
T7 (HHDT)	37	37	74	35	2,590	0.08	0.09	0.59	6.88	6,213.17	0.60	0.31	0.06	0.00	0.98	3
Employee Commute	800															
Passenger Vehicle (LDA)	610	610	1,221	25	30,521	2.42	2.67	41.95	2.83	17,157.62	3.09	1.27	0.17	0.25	0.36	8
Light-duty Truck (LDT2)	190	190	379	25	9,479	1.43	1.58	18.91	1.93	6,658.07	0.96	0.39	0.07	0.13	0.17	3
					Daily Emissions[7]	**3.96**	**4.39**	**62.32**	**13.19**	**32,763.12**	**5.07**	**2.15**	**0.32**	**0.39**	**1.76**	**15.08**
	No. of Days:	237			*Total Activity 3, 4, 5 Emissions:*	*936.07*	*1,038.55*	*14,739.49*	*3,120.01*	*7,748,477.35*	*1,198.24*	*508.73*	*75.84*	*91.92*	*417.39*	*3,567.59*
		13,008														

Activity 6 - Collector Line Installation

Vehicle Type[2,3]	Daily Trips To Site[4]	Daily Trips from Site	No. of Trips (one-way)	Average Miles per Trip (one-way)[5,6]	Daily Vehicle Miles Traveled	ROG lbs	TOG lbs	CO lbs	NO_X lbs	CO_2 lbs	PM_{10} lbs	$PM_{2.5}$ lbs	SO_X lbs	CH_4 lbs	N_2O lbs	MT of CO_2e
Within MDAQMD																
Vendors (Trucks)	15															
T6 (MHDT)	5	5	10	25	250	0.01	0.01	0.17	0.31	542.51	0.08	0.04	0.01	0.00	0.05	0
T7 (HHDT)	10	10	20	25	500	0.02	0.02	0.11	1.33	1,199.45	0.12	0.06	0.01	0.00	0.19	1
Employee Commute	75															
Passenger Vehicle (LDA)	57	57	114	25	2,861	0.23	0.25	3.93	0.27	1,608.53	0.29	0.12	0.02	0.02	0.03	1
Light-duty Truck (LDT2)	18	18	36	25	889	0.13	0.15	1.77	0.18	624.19	0.09	0.04	0.01	0.01	0.02	0
					Daily Emissions[7]	**0.38**	**0.43**	**5.99**	**2.08**	**3,974.69**	**0.58**	**0.25**	**0.04**	**0.04**	**0.29**	**1.84**
	No. of Days:	31			*Total Activity 6 Emissions:*	*12.03*	*13.39*	*188.28*	*65.44*	*124,888.79*	*18.16*	*7.90*	*1.21*	*1.18*	*9.10*	*57.79*
		471														

Annual

Year	ROG lbs	TOG lbs	CO lbs	NO_X lbs	CO_2 lbs	PM_{10} lbs	$PM_{2.5}$ lbs	SO_X lbs	CH_4 lbs	N_2O lbs	MT of CO_2e
2023	1,111.52	1,233.27	17,499.78	3,744.77	9,239,171.81	1,426.86	606.09	90.41	109.14	501.46	4,254.40
Total	**1,111.52**	**1,233.27**	**17,499.78**	**3,744.77**	**9,239,171.81**	**1,426.86**	**606.09**	**90.41**	**109.14**	**501.46**	**4,254.40**

Daily

Year	ROG lbs	TOG lbs	CO lbs	NO_X lbs	CO_2 lbs	PM_{10} lbs	$PM_{2.5}$ lbs	SO_X lbs	CH_4 lbs	N_2O lbs	MT of CO_2e
2023	6.43	7.14	101.30	21.67	53,462.10	8.26	3.51	0.52	0.63	2.90	24.62
Total Max Daily	**6.43**	**7.14**	**101.30**	**21.67**	**53,462.10**	**8.26**	**3.51**	**0.52**	**0.63**	**2.90**	**24.62**

Operation[8] **No. Work days in Year: 250**

Vehicle Type	Trips to Site (Daily)	Trips from Site (Daily)	No. of Daily Trips (one-way)	Average Miles per Trip (one-way)[3,4,5]	Daily Vehicle Miles Traveled	ROG lbs	TOG lbs	CO lbs	NO_X lbs	CO_2 lbs	PM_{10} lbs	$PM_{2.5}$ lbs	SO_X lbs	CH_4 lbs	N_2O lbs	MT of CO_2e
Employee Commute	12	12														
Passenger Vehicle (LDA)	9	9	18	25	445	0.04	0.04	0.61	0.04	250.11	0.05	0.02	0.00	0.00	0.01	0
Light-duty Truck (LDT2)	3	3	6	25	155	0.02	0.03	0.31	0.03	108.94	0.02	0.01	0.00	0.00	0.00	0
Service Vehicles (LHDT2)	1	1	2	25	50	0.01	0.01	0.05	0.18	69.67	0.01	0.01	0.00	0.00	0.01	0
Equipment/Material Delivery (T6)	1	1	2	25	50	0.00	0.00	0.04	0.07	108.54	0.02	0.01	0.00	0.00	0.01	0
					Daily Operational On-road Emissions	**0.07**	**0.07**	**1.01**	**0.32**	**537.26**	**0.09**	**0.04**	**0.01**	**0.01**	**0.02**	**0.25**
					Annual Operational On-road Emissions	**16.80**	**18.73**	**252.53**	**79.93**	**134,314.69**	**22.40**	**9.48**	**1.32**	**1.60**	**6.25**	**61.72**

NOTES

Note: 1 lb = 453.59 grams; MT = metric tons

1. On-road emissions use mileage to determine running emissions from associated with vendor vehicles coming to the site. Starting and additional emissions for vendor vehicles are not included here, and are included with on-site emissions. Emissions from employee commute vehicles assume only one trip to the site per day occur. On-road emissions for employee commute acount for running and start emissions for all pollutants, as well as hotsoak, running losses, diurnal, and resting loss ROG and TOG emissions.
2. It is assumed that 1/3 of the vendor trips are done by T6 trucks (MHDT) and 2/3 by T7 trucks (HHDT); assumption is the same as used in Eland 1 Solar Project
3. To more accurately represent the type of vehicles used by employees for commuting it is assumed that 76% of the vehicles are light-duty automobiles (LDA) and 24% is light-duty trucks (LDT2). Percentages were derived from the distribution of gasoline powered LDA and LDT2 VMT from EMFAC2017.
4. Trip data is based the GHD Traffic Assessment
5. Assumed that vendors are coming from Victorville, which is approximately 25 miles west of the project site
6. Assumed that employees are coming from Victorville, which is approximatley 25 miles west of the project site
7. On-road emissions are calculated using emission factors that weighted based on the type of fuel used per vehicle class indicated in EMFAC2017 by sub-area.
8. There would be 5 full-time employees and vendor/delivery trips

Sienna Solar PV (2,084 Acres, 500 MW)

On-site Mobile Emissions (max 10 mph)

Activity 1 - Site Preparation				No. Days in Phase: 66												Un-mitigated		Mitigated-Watering		Mitigated-Palliatives	
Vehicle Type	No. Units/Trips per Day	Days Operating	Miles Traveled per Unit per Day [1]	Total Onsite Vehicle Miles Traveled	ROG lbs	TOG lbs	CO lbs	NO_X lbs	CO_2 lbs	PM_{10} lbs	$PM_{2.5}$ lbs	SO_X lbs	CH_4 lbs	N_2O lbs	MT of CO_2e	Fugitive Dust (PM_{10}) lbs	Fugitive Dust ($PM_{2.5}$) lbs	Fugitive Dust (PM_{10}) lbs	Fugitive Dust ($PM_{2.5}$) lbs	Fugitive Dust (PM_{10}) lbs	Fugitive Dust ($PM_{2.5}$) lbs
Worker (Truck)																					
Light-duty Truck (LDT2)	10	66	4	2,639	3.20	3.44	14.02	1.24	3,830	0.30	0.14	0.04	0.21	0.12	1.75	671.38	67.46	304.78	31.01	111.48	11.79
Vendors (Trucks)	25																				
T6 (MHDT)	8	66	0.25	132	0.24	0.25	1.44	3.04	431	0.04	0.02	0.01	0.01	0.07	0.205	33.57	3.37	15.24	1.55	5.57	0.59
T7 (HHDT)	17	66	0.25	280	0.05	0.06	0.83	12.29	1,939	0.07	0.03	0.02	0.00	0.30	0.917	71.33	7.17	32.38	3.29	11.85	1.25
AVG EMISSIONS PER DAY					**0.05**	**0.06**	**0.25**	**0.25**	**94**	**0.01**	**0.00**	**0.00**	**0.00**	**0.01**	**0.04**	**11.76**	**1.18**	**5.34**	**0.54**	**1.95**	**0.21**
TOTAL				**412**	**3.49**	**3.75**	**16.29**	**16.57**	**6,199**	**0.41**	**0.19**	**0.06**	**0.22**	**0.49**	**2.88**	**776.29**	**77.99**	**352.41**	**35.85**	**128.90**	**13.63**

Activity 2 - Grading and Earthwork				No. Days in Phase: 66												Un-mitigated		Mitigated-Watering		Mitigated-Palliatives	
Vehicle Type	No. Units/Trips per Day	Days Operating	Miles Traveled per Unit per Day [1]	Total Onsite Vehicle Miles Traveled	ROG lbs	TOG lbs	CO lbs	NO_X lbs	CO_2 lbs	PM_{10} lbs	$PM_{2.5}$ lbs	SO_X lbs	CH_4 lbs	N_2O lbs	MT of CO_2e	Fugitive Dust (PM_{10}) lbs	Fugitive Dust ($PM_{2.5}$) lbs	Fugitive Dust (PM_{10}) lbs	Fugitive Dust ($PM_{2.5}$) lbs	Fugitive Dust (PM_{10}) lbs	Fugitive Dust ($PM_{2.5}$) lbs
Worker (Truck)																					
Light-duty Truck (LDT2)	10	66	4	2,639	3.20	3.44	14.02	1.24	3,830	0.30	0.14	0.04	0.21	0.12	1.75	671.38	67.46	304.78	31.01	111.48	11.79
Vendors (Trucks)	25																				
T6 (MHDT)	8	66	0.25	132	0.24	0.25	1.44	3.04	431	0.04	0.02	0.01	0.01	0.07	0.205	33.57	3.37	15.24	1.55	5.57	0.59
T7 (HHDT)	17	66	0.25	280	0.05	0.06	0.83	12.29	1,939	0.07	0.03	0.02	0.00	0.30	0.917	71.33	7.17	32.38	3.29	11.85	1.25
AVG EMISSIONS PER DAY					**0.05**	**0.06**	**0.25**	**0.25**	**94**	**0.01**	**0.00**	**0.00**	**0.00**	**0.01**	**0.04**	**11.76**	**1.18**	**5.34**	**0.54**	**1.95**	**0.21**
TOTAL				**412**	**3.49**	**3.75**	**16.29**	**16.57**	**6,199**	**0.41**	**0.19**	**0.06**	**0.22**	**0.49**	**2.88**	**776.29**	**77.99**	**352.41**	**35.85**	**128.90**	**13.63**

Activity 3, 4, 5 - Concrete Foundations, Structural Steel Work and Electrical/Instrumentation Work				No. Days in Phase: 237												Un-mitigated		Mitigated-Watering		Mitigated-Palliatives	
Vehicle Type	No. Units/Trips per Day	Days Operating	Miles Traveled per Unit per Day [1]	Total Onsite Vehicle Miles Traveled	ROG lbs	TOG lbs	CO lbs	NO_X lbs	CO_2 lbs	PM_{10} lbs	$PM_{2.5}$ lbs	SO_X lbs	CH_4 lbs	N_2O lbs	MT of CO_2e	Fugitive Dust (PM_{10}) lbs	Fugitive Dust ($PM_{2.5}$) lbs	Fugitive Dust (PM_{10}) lbs	Fugitive Dust ($PM_{2.5}$) lbs	Fugitive Dust (PM_{10}) lbs	Fugitive Dust ($PM_{2.5}$) lbs
Worker (Truck)																					
Light-duty Truck (LDT2)	10	237	4	9,460	11.47	12.33	50.24	4.44	13,726	1.08	0.50	0.14	0.75	0.41	6.29	2406.37	241.77	1092.40	111.14	399.58	42.26
Vendors (Trucks)	55																				
T6 (MHDT)	18	237	0.25	1,064	1.94	2.04	11.62	24.49	3,474	0.35	0.15	0.05	0.09	0.60	1.651	270.72	27.20	122.90	12.50	44.95	4.75
T7 (HHDT)	37	237	0.25	2,188	0.40	0.46	6.49	95.91	15,127	0.53	0.23	0.14	0.02	2.38	7.156	556.47	55.91	252.62	25.70	92.40	9.77
AVG EMISSIONS PER DAY					**0.06**	**0.06**	**0.29**	**0.53**	**137**	**0.01**	**0.00**	**0.00**	**0.00**	**0.01**	**0.06**	**13.67**	**1.37**	**6.21**	**0.63**	**2.27**	**0.24**
TOTAL				**3,252**	**13.81**	**14.83**	**68.35**	**124.84**	**32,327**	**1.95**	**0.88**	**0.33**	**0.86**	**3.39**	**15.09**	**3,233.56**	**324.88**	**1,467.92**	**149.34**	**536.94**	**56.78**

Activity 6 - Collector Line Installation				No. Days in Phase: 31												Un-mitigated		Mitigated-Watering		Mitigated-Palliatives	
Vehicle Type	No. Units/Trips per Day	Days Operating	Miles Traveled per Unit per Day [1]	Total Onsite Vehicle Miles Traveled	ROG lbs	TOG lbs	CO lbs	NO_X lbs	CO_2 lbs	PM_{10} lbs	$PM_{2.5}$ lbs	SO_X lbs	CH_4 lbs	N_2O lbs	MT of CO_2e	Fugitive Dust (PM_{10}) lbs	Fugitive Dust ($PM_{2.5}$) lbs	Fugitive Dust (PM_{10}) lbs	Fugitive Dust ($PM_{2.5}$) lbs	Fugitive Dust (PM_{10}) lbs	Fugitive Dust ($PM_{2.5}$) lbs
Worker (Truck)																					
Light-duty Truck (LDT2)	10	31	4	1,257	1.52	1.64	6.67	0.59	1,824	0.14	0.07	0.02	0.10	0.05	0.84	319.71	32.12	145.13	14.77	53.09	5.61
Vendors (Trucks)	15																				
T6 (MHDT)	5	31	0.25	39	0.07	0.08	0.43	0.90	128	0.01	0.01	0.00	0.00	0.02	0.061	9.99	1.00	4.54	0.46	1.66	0.18
T7 (HHDT)	10	31	0.25	79	0.01	0.02	0.23	3.44	543	0.02	0.01	0.01	0.00	0.09	0.257	19.98	2.01	9.07	0.92	3.32	0.35
AVG EMISSIONS PER DAY					**0.05**	**0.06**	**0.23**	**0.16**	**79**	**0.01**	**0.00**	**0.00**	**0.00**	**0.01**	**0.04**	**11.13**	**1.12**	**5.05**	**0.51**	**1.85**	**0.20**
TOTAL				**118**	**1.61**	**1.73**	**7.34**	**4.94**	**2,495**	**0.17**	**0.08**	**0.03**	**0.10**	**0.16**	**1.15**	**349.68**	**35.13**	**158.74**	**16.15**	**58.07**	**6.14**

Annual

												Un-mitigated		Mitigated-Watering		Mitigated-Palliatives	
Year	ROG lbs	TOG lbs	CO lbs	NO_X lbs	CO_2 lbs	PM_{10} lbs	$PM_{2.5}$ lbs	SO_X lbs	CH_4 lbs	N_2O lbs	MT of CO_2e	Fugitive Dust (PM_{10}) lbs	Fugitive Dust ($PM_{2.5}$) lbs	Fugitive Dust (PM_{10}) lbs	Fugitive Dust ($PM_{2.5}$) lbs	Fugitive Dust (PM_{10}) lbs	Fugitive Dust ($PM_{2.5}$) lbs
2023	22.41	24.07	108.27	162.92	47,220.87	2.95	1.34	0.48	1.41	4.54	22.00	5,135.82	516.00	2,331.47	237.20	852.81	90.19
Total	**22.41**	**24.07**	**108.27**	**162.92**	**47,220.87**	**2.95**	**1.34**	**0.48**	**1.41**	**4.54**	**22.00**	**5,135.82**	**516.00**	**2,331.47**	**237.20**	**852.81**	**90.19**

Max daily

												Un-mitigated		Mitigated-Watering		Mitigated-Palliatives	
Year	ROG lbs	TOG lbs	CO lbs	NO_X lbs	CO_2 lbs	PM_{10} lbs	$PM_{2.5}$ lbs	SO_X lbs	CH_4 lbs	N_2O lbs	MT of CO_2e	Fugitive Dust (PM_{10}) lbs	Fugitive Dust ($PM_{2.5}$) lbs	Fugitive Dust (PM_{10}) lbs	Fugitive Dust ($PM_{2.5}$) lbs	Fugitive Dust (PM_{10}) lbs	Fugitive Dust ($PM_{2.5}$) lbs
2023	0.16	0.18	0.78	1.03	324.60	0.02	0.01	0.00	0.01	0.03	0.15	37.20	3.74	16.89	1.72	6.18	0.65
Total Max Daily	**0.16**	**0.18**	**0.78**	**1.03**	**324.60**	**0.02**	**0.01**	**0.00**	**0.01**	**0.03**	**0.15**	**37.20**	**3.74**	**16.89**	**1.72**	**6.18**	**0.65**

Operational				No. Work days in Year: 250	No. Workers: 5											Un-mitigated		Mitigated-Watering		Mitigated-Palliatives	
Vehicle Type	Trips per Day	Round Trip (miles)	Daily VMT	Annual VMT	ROG lbs	TOG lbs	CO lbs	NO_X lbs	CO_2 lbs	PM_{10} lbs	$PM_{2.5}$ lbs	SO_X lbs	CH_4 lbs	N_2O lbs	MT of CO_2e	Fugitive Dust (PM_{10}) lbs	Fugitive Dust ($PM_{2.5}$) lbs	Fugitive Dust (PM_{10}) lbs	Fugitive Dust ($PM_{2.5}$) lbs	Fugitive Dust (PM_{10}) lbs	Fugitive Dust ($PM_{2.5}$) lbs
Pickup Trucks (LDT2)	3	4	12	3,000	0.49	0.71	11.33	0.92	4,239.50	0.34	0.16	0.04	0.12	0.08	1.934	763.12	76.67	346.43	35.24	126.72	13.40
Utility/Service Vehicle (T6)	1	4	4	1,000	0.17	0.23	1.99	8.56	3,186.90	0.33	0.14	0.05	0.00	0.50	1.508	254.37	25.56	115.48	11.75	42.24	4.47
Water Truck(T7)	1	4	4	1,000	0.18	0.21	2.96	23.90	6,914.82	0.24	0.10	0.07	0.01	1.09	3.271	254.37	25.56	115.48	11.75	42.24	4.47
Avg Daily Emissions					**0.00**	**0.00**	**0.07**	**0.13**	**57.36**	**0.00**	**0.00**	**0.00**	**0.00**	**0.01**	**0.03**	**5.09**	**0.51**	**2.31**	**0.23**	**0.84**	**0.09**
Annual Total Emissions					**0.84**	**1.15**	**16.29**	**33.37**	**14,341.21**	**0.91**	**0.40**	**0.15**	**0.13**	**1.67**	**6.71**	**1,271.87**	**127.79**	**577.38**	**58.74**	**211.20**	**22.34**

NOTES

1 lb = 453.59 grams; MT = metric tons

1. Distance traveled on-site is based on the assumption that vendors vehicles will deliver equipment and materials to staging areas near the access roads and therefore minimal on-site driving would occur. Workers passenger vehicles are assumed to not be driven on the project site accept for accessing the on-site parking lots will be at or near the main access site for the project. For the on-site trucks, it is assumed that the trucks would travel a total of 4 miles per day
2. Emission calculations include running emissions; start emissions, hotsoak, and running losses for a single trip; diurnal, and resting loss emissions per vehicle.
3. Emissions for 2023 calculated using following asssumptions related to construction days/schedule: 79 days from Activity 1, 79 days from Activity 2, 237 days from Activity 3,4,5, 37 days from Activity 6
4. Operational onsite trip information was not available therefore assumptions were made assuming that daily onsite operations would consist of the five workers with 1 trip for the utility/water truck travel and 3 for pickup trucks.

Sienna Solar PV (2,084 Acres, 500 MW)

Fugitive Dust Emissions on Paved Roads in San Bernardino County [1]

Activity 1 - Site Preparation					Number of Days:	66
Vehicle Type	**Daily Vehicle Miles Traveled**	**Total Vehicle Miles Traveled**	**PM_{10} lbs/mile factor**	**$PM_{2.5}$ lbs/mile factor**	**PM_{10} lbs**	**$PM_{2.5}$ lbs**
Vendors (Trucks)						
T6 (MHDT)	400	26,394	0.001	0.0002	25.74	6.32
T7 (HHDT)	850	56,087	0.001	0.0002	54.69	13.43
Employee Commute						
Passenger Vehicle (LDA)	3,815	251,741	0.001	0.0002	245.49	60.26
Light-duty Truck (LDT2)	1,185	78,180	0.001	0.0002	76.24	18.71
Total Pounds Per Day					**6.09**	**1.50**
Total	**6,250**				**402.17**	**98.71**

Activity 2 - Grading and Earthwork					Number of Days:	66
Vehicle Type	**Daily Vehicle Miles Traveled**	**Total Vehicle Miles Traveled**	**PM_{10} lbs/mile factor**	**$PM_{2.5}$ lbs/mile factor**	**PM_{10} lbs**	**$PM_{2.5}$ lbs**
Vendors (Trucks)						
T6 (MHDT)	400	26,394	0.001	0.0002	25.74	6.32
T7 (HHDT)	850	56,087	0.001	0.0002	54.69	13.43
Employee Commute						
Passenger Vehicle (LDA)	15,261	1,006,965	0.001	0.0002	981.97	241.03
Light-duty Truck (LDT2)	4,739	312,718	0.001	0.0002	304.96	74.85
Total Pounds Per Day					**20.72**	**5.09**
Total	**20,000**				**1,367.36**	**335.63**

Activity 3, 4, 5 - Concrete Foundations, Structural Steel Work and Electrical/Instrumentation Work					Number of Days:	237
Vehicle Type	**Daily Vehicle Miles Traveled**	**Total Vehicle Miles Traveled**	**PM_{10} lbs/mile factor**	**$PM_{2.5}$ lbs/mile factor**	**PM_{10} lbs**	**$PM_{2.5}$ lbs**
Vendors (Trucks)						
T6 (MHDT)	1,260	297,990	0.001	0.0002	290.59	71.33
T7 (HHDT)	2,590	612,535	0.001	0.0002	597.33	146.62
Employee Commute						
Passenger Vehicle (LDA)	30,521	7,218,314	0.001	0.0002	7,039.17	1,727.80
Light-duty Truck (LDT2)	9,479	2,241,686	0.001	0.0002	2,186.05	536.58
Total Pounds Per Day					**42.76**	**10.50**
Total	**40,000**				**10,113.14**	**2,482.32**

Activity 6 - Collector Line Installation					Number of Days:	31
Vehicle Type	**Daily Vehicle Miles Traveled**	**Total Vehicle Miles Traveled**	**PM_{10} lbs/mile factor**	**$PM_{2.5}$ lbs/mile factor**	**PM_{10} lbs**	**$PM_{2.5}$ lbs**
Vendors (Trucks)						
T6 (MHDT)	250	7,855	0.001	0.0002	7.66	1.88
T7 (HHDT)	500	15,711	0.001	0.0002	15.32	3.76
Employee Commute						
Passenger Vehicle (LDA)	2,861	89,908	0.001	0.0002	87.68	21.52
Light-duty Truck (LDT2)	889	27,921	0.001	0.0002	27.23	6.68
Total Pounds Per Day					**4.39**	**1.08**
Total	**3,750**				**137.89**	**33.84**

Annual

Year	PM_{10} lbs	$PM_{2.5}$ lbs
2023	12,020.56	2,950.50
Total	**12,020.56**	**2,950.50**

Year	PM_{10} lbs	$PM_{2.5}$ lbs
2023	69.58	17.08
Max Daily	**69.58**	**17.08**

Operational Phase Fugitive Dust Emissions on Paved Roads					Number of Days:	250
Vehicle Type	**Daily Vehicle Miles Traveled**	**Total Vehicle Miles Traveled**	**PM_{10} lbs/mile factor**	**$PM_{2.5}$ lbs/mile factor**	**PM_{10} lbs**	**$PM_{2.5}$ lbs**
Employee Commute						
Passenger Vehicle (LDA)	445	111227.6514	0.001	0.0002	108.47	26.62
Light-duty Truck (LDT2)	155	38772.3486	0.001	0.0002	37.81	9.28
Service Vehicles (LHDT2)	50	12500	0.001	0.0002	12.19	2.99
Equipment/Material Delivery (T6)	50	12500	0.001	0.0002	12.19	2.99
				Total Pounds Per Day	**0.68**	**0.17**
				Annual Pounds	**170.66**	**41.89**

Notes:

1. Emission factor calculation presented in "Emission Factors" tab

3. Emissions for 2023 calculated using following asssumptions related to construction days/schedule: 66 days of Phase 1, 125 days of Phase 2, 125 days of Phase 3, 146 days of Phase 4 & 167 days of Phase 5

Sienna Solar PV (2,084 Acres, 500 MW)

Displaced Energy Production during 30-year Project life

Annual Energy Production		Annual Average Solar Radiation Hours/Day/Year
Grid Size (MW)	500	
Total hrs/year	8,760	
% Operational time [1]	*26%*	6.13
Operational hours/year	2,237	
KWh produced per year	1,118,725,000	
GWh produced per year	1,119	
GWh produced over 30 years	33,562	
Assumed Heat Rate (Btu/KWh)	10,000	
Annual Fuel Equivalent (MMBtu)[2]	11,187,250	

California Power Mix[3]		Annual Fuel Displacement (MMBtu)
Coal[4]	2.74%	306,531
Large Hydro	12.21%	1,365,963
Natural Gas[4]	37.06%	4,145,995
Nuclear	9.33%	1,043,770
Oil	0.01%	1,119
Other (petroleum coke/waste heat)	0.19%	21,256
Renewables	33.09%	3,701,861
Unspecified sources of Power	5.36%	599,637
Total	**100.0%**	**11,186,131**

Annual Pollutant Displacement[4]

Natural Gas Turbine Emissions

Pollutant	AP-42 Emission Factor (lb/MMBtu)[5]	Controlled Emission Factor (lb/MMBtu)	Controlled Emissions (lb)	Controlled Emissions (ton)	AP-42 Emission Factor Source Notes[5]
NO_2	0.099	0.099	410,453	205.23	Table 3.1-1, lean premix; Assume SCR Control Efficiency
CO	0.015	0.015	62,190	31.09	Table 3.1-1, lean premix; Assume Ox. Cat. Control Efficiency
PM_{10}	0.0047	0.0047	19,486	9.74	Table 3.1-2a, PM (condensible)
$PM_{2.5}$	0.0019	0.0019	7,877	3.94	Table 3.1-2a, PM (filterable)
SO_2	0.0034	0.0034	14,096	7.05	Table 3.1-2a
CO_2	110	110	456,059,434	228,029.72	Table 3.1-2a

Coal Combustion Emissions

Pollutant	AP-42 Emission Factor (lb/ton)[6]	Controlled Emission Factor (lb/ton)	Emissions (lb)[7]	Emissions (ton)	AP-42 Emission Factor Source Notes[6]
NOx	12	12	153265	76.63	Table 1.1-3 pulverized coal, wall fired, bituminous coal NSPS
CO	0.5	0.5	6386	3.19	Table 1.1-3 pulverized coal, wall fired, bituminous coal NSPS
PM_{10}[8]	0.46	0.084	1073	0.54	Table 1.1-4, PC-fired dry bottom wall-fired, scrubber control
$PM_{2.5}$[8]	0.12	0.06	766	0.38	Table 1.1-4, PC-fired dry bottom wall-fired, scrubber control
SO_2[9]	2.85	0.57	7280	3.64	Table 1.1-3 pulverized coal, wall fired, bituminous coal NSPS
CO_2	6040	6040	77143547	38,571.77	Table 1.1-20
Total NMHC	0.06	0.06	766	0.38	Table 1.1-19; assumed all hydrocarbons are reactive
CH_4	0.04	0.04	511	0.26	Table 1.1-19
N_2O	0.03	0.03	383	0.19	Table 1.1-19

Total Displaced Emissions Associated With Direct Combustion

Pollutant	tons/year[8]	tons/lifetime (30 years)
ROG (NMHC)	0.4	11.5
NO_X	281.9	8,455.8
CO	34.3	1,028.6
PM_{10}	10.3	308.4
$PM_{2.5}$	4.3	129.7
SO_X	10.7	320.6
CO_2E (Metric Ton)	241,911	7,257,336

Notes:

1. Operational time is based on annual average solar radiation hours per day per year (6.13) for the project area. Source: National Renewable Energy Laboratories, U.S. Department of Energy (https://pvwatts.nrel.gov/pvwatts.php)
2. The Project is assumed to displace existing power generation equivalent to the current power mix(each year of operation.
3. California Power Mix assumptions are based on data from the 2019 Total California Electrical System Power https://www.energy.ca.gov/data-reports/energy-almanac/california-electricity-data/2020-total-system-electric-generation/2019
4. Combustion of natural gas and coal for power are of the greatest concern related to the generation of criteria pollutants and GHG emissions, therefore only fuel displacement of natural gas and coal due to electricty production from the Solar Scarlet facility are considered in this assessment.
5. EPA Air Pollution Emission Factors AP-42 Section 3.1, Stationary Gas Turbines
6. EPA Air Pollution Emission Factors AP-42 Section 1.1, Bituminous and Subbituminous Coal Combustion
7. Coal characteristics used for conversion: Assumed coal heat content = 24 MMBtu/ton
8. Total particulate matter (CPM-TOT) is expressed in terms of coal ash content therefore emission factor is determined by multiplying % ash content of coal (assumed to be 20% herein) by value listed in Table 1.1-4. Organic fraction of particulate matter is 20% of total CPM-TOT (Table 1.1-5) and listed as controlled emission factor.
9. SO_x emission factor calculated by multiplying the weight percent of sulfur (assumed to be 7.5%) by the value listed in Table 1.1-3
10. CO_2E volumes are in metric tons rather than short (US) tons

Sienna Solar PV (2,084 Acres, 500 MW)

Construction Criteria Emissions by Year

Emission Type	Source	Emissions (tons per year)						With Water Control		With Palliative	
		ROG	NO_X	SO_X	CO	PM_{10}	$PM_{2.5}$	PM_{10} (tons)	$PM_{2.5}$ (tons)	PM_{10} (tons)	$PM_{2.5}$ (tons)
2023											
Exhaust	Off Road Construction Equipment	1.6	13.5	0.0	14.9	0.6	0.6	0.6	0.6	0.6	0.6
	On-Road Vehicles	0.6	2.0	0.0	8.8	0.7	0.3	0.7	0.3	0.7	0.3
Fugitive Dust	Off Road Construction Activity	-	-	-	-	5.7	0.6	3.9	0.4	1.7	0.2
	On-Road Vehicles (resuspended)	-	-	-	-	8.6	1.7	7.2	1.6	6.4	1.5
	Subtotal	**2.2**	**15.5**	**0.1**	**23.7**	**15.6**	**3.2**	**12.4**	**2.9**	**9.5**	**2.6**
MDAQMD Tons/Year Threshold		**25**	**25**	**25**	**100**	**15**	**12**	**15**	**12**	**15**	**12**
Exceed Threshold?		No	No	No	No	**Yes**	No	No	No	No	No

Notes:

1. Operational emissions were estimated assuming that operationas for Rexford II would be similar to Eland Solar Project.
2. Assumes maintenance vehicles are traveling on 50% paved roads and 50% unpaved roads/ untreated soil

Operational Criteria Emissions by Year

Emission Type	Source	Emissions (tons per year)					
		ROG	NO_X	SO_X	CO	PM_{10}	$PM_{2.5}$
Operational							
Exhaust	On Road and On-Site Vehicles	0.0	0.1	0.0	0.1	0.0	0.0
Fugitive Dust	Maintenance Vehicles	-	-	-	-	0.6	0.1
	Subtotal	**0.0**	**0.1**	**0.0**	**0.1**	**0.6**	**0.1**
MDAQMD Tons/Year Threshold		**25**	**25**	**25**	**100**	**15**	**12**
Exceed Threshold?		No	No	No	N/A	No	N/A

GHG Emissions from Construction

Year	Emissions Source (MT of CO2e)				Total (MT of CO_2e)
	Off-Road	On-site Mobile	Off-site Mobile	Indirect GHG Emissions from Water Use	
Construction	2,822	22	4,254	46	7,144
Decommissioning	2,822	22	4,254	46	7,144
Construction and Deomminssioning	5,643	44	8,509	93	14,289
Amortized Emissions (30-year life)	*188*	*1*	*284*	*3*	*476*
MDAQMD Threshold					**90,718**
Exceed Threshold?					No

Notes:

1. Numbers have been rounded to the nearest metric ton (MT).
2. The approxiamte volue of water needed during the construction period is unknown. Assuming approximately 400AF of water would be required over the projects construction period based on similar solar projects

GHG Emissions from Operation

Location	Emissions Source (MT of CO2e)				Total (MT of CO_2e)
	Off-Road	On-site Mobile	Off-site Mobile	Indirect GHG Emissions from Water Use	
Total	0	7	62	6	74
Amortized Construction Emissions	188	1	284	3	476
Total	**188**	**8**	**345**	**9**	**551**
MDAQMD Threshold					**90,718**
Exceed Threshold?					No

Notes:

Numbers have been rounded to the nearest metric ton (MT).

1. The approxiamte volue of water needed during the construction period is unknown. Assuming approximately 50AF of water would be required during project operation based on similar solar projects

Appendix C2. CalEEMod Worksheets – Calcite Substation

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Unmitigated Regional Emissions during construction (tons/year)

	ROG	Nox	CO	SO2	Exh PM10	Fug PM10	PM10 Total	Exh PM2.5	Fug PM2.5	PM2.5 Total
Calcite Substation - 2026	7.88	2.19	2.62	0.01	0.07	1.98	2.06	0.07	0.26	0.33
Calcite Substation - 2027	0.03	0.20	0.30	0.00	0.01	0.88	0.89	0.01	0.09	0.10
Calcite Transmission Line Loop-in and Gen-tie - 2026	0.07	0.45	0.54	0.00	0.02	0.58	0.60	0.02	0.06	0.07
Calcite Distribution Line - 2026	0.01	0.08	0.09	0.00	0.00	0.09	0.09	0.00	0.01	0.01
Helicopter	0.06	0.03	0.07				0.00			0.00
Construction Total (if completed on 12 month (1 year) schedule)	8.06	2.94	3.63	0.01	0.10	3.53	3.64	0.09	0.42	0.52
MDAQMD Threshold (tons/year)	25	25	100	25			15			12
Exceedance?	No	No	No	No			No			No

Mitigated Regional Emissions during construction (tons/year)

	ROG	Nox	CO	SO2	Exh PM10	Fug PM10	PM10 Total	Exh PM2.5	Fug PM2.5	PM2.5 Total
Calcite Substation - 2026	7.88	2.19	2.62	0.01	0.07	1.88	1.96	0.07	0.22	0.29
Calcite Substation - 2027	0.03	0.20	0.30	0.00	0.01	0.88	0.89	0.01	0.09	0.10
Calcite Transmission Line Loop-in and Gen-tie - 2026	0.07	0.45	0.54	0.00	0.02	0.58	0.60	0.02	0.06	0.07
Calcite Distribution Line - 2026	0.01	0.08	0.09	0.00	0.00	0.09	0.09	0.00	0.01	0.01
Helicopter	0.06	0.03	0.07				0.00			0.00
Construction Total (if completed on 12 month (1 year) schedule)	8.06	2.94	3.63	0.01	0.10	3.43	3.53	0.09	0.38	0.48
MDAQMD Threshold (tons/year)	25	25	100	25			15			12
Exceedance?	No	No	No	No			No			No

Mitigation: Water 3x daily

GHG Emissions during construction (metric tons/year)

	CO2	CH4	N2O	CO2e
Calcite Substation - 2026	930.96	0.03	0.05	945.95
Calcite Substation - 2027	112.21	0.00	0.01	114.04
Calcite Transmission Line Loop-in and Gen-tie - 2026	188.96	0.01	0.00	190.13
Calcite Distribution Line - 2026	37.21	0.00	0.00	37.44
Helicopter	14.68	0.00	0.00	14.73
Construction Total (if completed on 12 month (1 year) schedule)	1284.01	0.04	0.06	1302.29

Note: GHG emissions are the same for unmitigated and mitigated because the only mitigation is for dust

Helicopter Emissions

Equipment	Engine Mode	Quantity	Hours/day	Number of days	Total Hours	Fuel Flow (Kg/s) [a]	Max Power (HP)	Load Factor [a]	Loaded Power (HP)	Fuel Usage (kg fuel)	Fuel Usage (mmBtu)
Hughes 500 E using Jet A fuel	Ground Idle	1	0.75	7	5.25	0.014	400	0.13	52	270.33	11.04
	Hover and Climb	1	0.75	7	5.25	0.032	400	0.87	348	600.95	24.55
	Approach	1	0.75	7	5.25	0.025	400	0.46	184	464.67	18.98
	Flight	1	4.75	7	33.25	0.030	400	0.8	320	3639.21	148.66
Total			**7**		**49**					**4975.15**	**203.24**

Assumptions:
7 hours per day total (provided by client) - estimated breakdown by engine mode assumed
Single engine turboshaft helicopter, engines up to 600 SHP
Notes:
[a] Source: Guidance on the Determination of Helicopter Emissions Edition 2 - December 2015. https://www.bazl.admin.ch/dam/bazl/de/dokumente/Fachleute/Regulationen_und_Grundlagen/guidance_on_the_determinationofhelicopteremissions.pdf.download.pdf/guidance_on_the_determinationofhelicopteremissions.pdf

[b] GHG Emission factors from Title 40 Subchapter C Part 98 Subpart C, Table C-1 and C-2
[c] CO2e = carbon dioxide equivalent, global warming potentials for CH4=28 and N2O=265 per IPCC AR5
Load factor (GI is ground idle; TO is hover and climb; AP is approach; mean is flight):

Conversions:

MJ	hp-hr
2.68451954	1

mmBtu	MJ
1	1055.06

kg jet fuel	MJ
1	43.1

grams	short tons
907184.74	1

kg	metric tons
1000	1

Helicopter Emissions

		Emission Factors (g/kg fuel) [a]					
Equipment	Engine Mode	VOC	CO	NOX	PM10	PM2.5	SO2
Hughes 500 E using Jet A fuel	Ground Idle	53.52	70.48	1.99	0.12	0.12	-
	Hover and Climb	6.87	8.54	5.86	0.18	0.18	-
	Approach	13.67	17.33	4.08	0.15	0.15	-
	Flight	7.52	9.38	5.59	0.18	0.18	-
Total							

Helicopter Emissions

Criteria Air Pollutant Emissions (short tons)

Equipment	Engine Mode	VOC	CO	NOX	PM10	PM2.5	SO2
Hughes 500 E using Jet A fuel	Ground Idle	0.01594734	0.02100131	0.00059329	3.5095E-05	3.5095E-05	-
	Hover and Climb	0.00454916	0.00565984	0.00388056	0.00012065	0.00012065	-
	Approach	0.00700107	0.00887796	0.00208969	7.5559E-05	7.5559E-05	-
	Flight	0.03016124	0.0376194	0.02240707	0.00070768	0.00070768	-
Total		**0.06**	**0.07**	**0.03**	**0.00**	**0.00**	**-**

Helicopter Emissions

		Emission Factors (kg/mmBtu) [b]			GHG Emissions (metric tons)			
Equipment	Engine Mode	CO2	CH4	N2O	CO2	CH4	N2O	CO2e [c]
Hughes 500 E using Jet A fuel	Ground Idle	72.22	0.003	0.0006	0.79753013	3.3129E-05	6.6258E-06	0.80021359
	Hover and Climb	72.22	0.003	0.0006	1.77294051	7.3647E-05	1.4729E-05	1.77890596
	Approach	72.22	0.003	0.0006	1.37087575	5.6946E-05	1.1389E-05	1.37548836
	Flight	72.22	0.003	0.0006	10.7365633	0.00044599	8.9199E-05	10.7726888
Total					**14.68**	**0.00**	**0.00**	**14.73**

CalEEMod Input Template - Sienna Solar, recalculation for Calcite Substation

Project Name:	Sienna Solar
Project Location:	Mojave Desert AQMD (and Mojave Desert Air Basin)
Land Use Setting:	Rural — Near Lucerne Valley, San Bernardino County (Unincorporated)
Electric Utility:	Southern California Edison
Operational Year:	2028
Project Center Point	34.54707748621878, -116.94960633478249

Land Use

Land Use Type	Land Use Subtype	Unit Amount	Size Metric	Lot Acreage	SF	
Parking	Other Asphalt Surfaces	16	Acre	16		Construct 220 kV Substation and Access Road - see Table SCE-2
Parking	Other Non-Asphalt Surfaces	35	Acre	35		Construct 220kV Transmission Loop-in and SCE Portion of Gen-tie- see Table SCE-4
Parking	Other Non-Asphalt Surfaces	2.132	Acre	2.132		Construct Distribution Line Extension for Station Light & Power to Calcite Station- see Table SCE_6A

Construction Schedule

Notes: 12 month schedule (conservative, could be up to 24 months), use annual emission thresholds

									defaults		
Construction Phase Name	Phase Type	Start Date	End Date	# Days/Week	Total Days	# one-way worker trips/day	# one-way vendor trips/day	# Total One-way haul trips	Worker Trip Length	Vendor Trip Length	Haul Trip Length
Construct 220 kV Substation and Access Road - February 2026 to June 2027											
Survey (1)	Site Preparation	2/9/2026	2/20/2026	6	10	8	8		18.5	10.2	20
Grading (2)	Grading	2/21/2026	4/9/2026	6	40	20	8	181.25	18.5	10.2	20
Fencing (3)	Building Construction	4/10/2026	5/9/2026	6	25	10	8		18.5	10.2	20
Civil (4)	Building Construction	5/10/2026	7/18/2026	6	60	20	11	3	18.5	10.2	20
MEER Install (Drop In) (5)	Building Construction	7/19/2026	8/17/2026	6	25	14	10		18.5	10.2	20
Electrical (6)	Building Construction	8/18/2026	11/6/2026	6	70	20	10		18.5	10.2	20
Wiring (7)	Building Construction	11/7/2026	1/21/2027	6	65	8	6		18.5	10.2	20
Maintenance Crew (8)	Building Construction	1/22/2027	2/25/2027	6	30	4	4		18.5	10.2	20
Testing (9)	Building Construction	2/26/2027	5/6/2027	6	60	8	8		18.5	10.2	20
Asphalt (10)	Paving	5/7/2027	6/22/2027	6	40	12	44		18.5	10.2	20
Construct 220 kV Transmission Line Loop-in and Gen-tie - April 2026 to November 2026											
Survey (1)	Site Preparation	4/6/2026	4/9/2026	6	4	8	8		18.5	10.2	20
Staging/Material Yards (2) (not modeled)		*4/22/2026*	*7/1/2026*	*6*	*61*	*8 per yard*					
Road Work & Structure Pads (3)	Building Construction	4/10/2026	4/21/2026	6	10	10	6		18.5	10.2	20
Guard Structure Installation (4)	Building Construction	4/22/2026	4/23/2026	6	2	12	8		18.5	10.2	20
Conductor & GW Removal (5)	Building Construction	4/24/2026	4/28/2026	6	4	28	12		18.5	10.2	20
LST Removal (6)	Building Construction	4/29/2026	5/2/2026	6	4	12	8		18.5	10.2	20
LST Foundation Removal (7)	Building Construction	5/3/2026	5/5/2026	6	2	8	8		18.5	10.2	20
Steel Pole Structure Foundation Installation (8)	Building Construction	5/6/2026	5/22/2026	6	15	12	8		18.5	10.2	20
Steel Pole Structure Haul (9)	Building Construction	5/23/2026	5/26/2026	6	3	8	6		18.5	10.2	20
Steel Pole Structure Assembly (10)	Building Construction	5/27/2026	6/4/2026	6	8	12	8		18.5	10.2	20
Steel Pole Structure Erection (11)	Building Construction	6/5/2026	6/13/2026	6	8	12	8		18.5	10.2	20
220kV Conductor & GW Installation (12)	Building Construction	6/14/2026	6/22/2026	6	7	56	22		18.5	10.2	20
UG Ground Wire Installation (13)	Building Construction	6/23/2026	6/29/2026	6	6	8	6		18.5	10.2	20
Guard Structure Removal (14)	Building Construction	6/30/2026	7/1/2026	6	2	12	8		18.5	10.2	20
Restoration (15)	Architectural Coating	7/2/2026	7/8/2026	6	6	14	8		18.5	10.2	20
Construct Distribution Line Extension for Station Light & Power to Calcite Station - April 2026 -November 2026											
Install Down Guys (1)	Building Construction	4/6/2026	4/7/2026	6	2	6	6		18.5	10.2	20
Install New Poles (2)	Building Construction	4/8/2026	4/14/2026	6	6	8	8		18.5	10.2	20
Install Overhead Wire (3)	Building Construction	4/15/2026	4/15/2026	6	1	12	6		18.5	10.2	20
Underground Cable Pulling & Transformer Installation (4)	Building Construction	4/16/2026	4/18/2026	6	3	8	6		18.5	10.2	20
Underground Cable Makeup (5)	Building Construction	4/19/2026	4/21/2026	6	2	8	6		18.5	10.2	20
Underground Trenching, Structure Excavation Conduit (6)	Building Construction	4/22/2026	4/28/2026	6	6	8	6		18.5	10.2	20
Underground Boring, Casing and Conduit Installation (7)	Building Construction	4/29/2026	5/1/2026	6	3	12	6		18.5	10.2	20
Restoration (8)	Architectural Coating	5/2/2026	5/2/2026	6	1	8	8		18.5	10.2	20

Notes:

Mitigation - water control measures: MDAQMD Rule 403 and the San Bernardino County Development Code Section 84.29.035 - water 3x day
Construction would occur Monday to Saturday, 6 days a week
There would be potential for nighttime and Sunday work.
Worker, vendor, and haul trip lengths are default.
Assume trips are on paved roads.
Additional 4 vendor trips for misc. added for buffer
Assume on site truck travel equal to vendor one way trips shown on Equipment tab (not including additional misc. trucks) and for 2 mi
Staging/Material Yards phase is only used for locations/phases requiring overhead construction where components would be trucked to staging yard before going to the individual sites

List of Construction Equipment

Equipment Name	CalEEMod Equipment Name	Count	HP	Days	Hrs/day	Load Factor	Fuel type	Notes	Avg # hours across phase duration
Table SCE-3 Calcite Substation - Construct 220 kV Substation and Access Road									
Survey (1)									
1-Ton Truck, 4x4	Off-Highway Trucks	2	300	10	8	0.38	Gas	Vendor	
Grading (2)									
1-Ton Truck, 4x4	Off-Highway Trucks	1	300	40	8	0.38	Gas	Vendor	
Dozer	Rubber Tired Dozers	1	350	40	7	0.4	Diesel		
Loader	Rubber Tired Loaders	2	350	40	7	0.36	Diesel		
Scraper	Scrapers	2	350	40	7	0.48	Diesel		
Grader	Graders	1	350	40	7	0.41	Diesel		
Dump Truck	Off-Highway Trucks	2	350	40	7	0.38	Diesel		
Backhoe	Tractors/Loaders/Backhoes	2	200	40	7	0.37	Diesel		
Tamper	Surfacing Equipment	1	350	35	7	0.3	Diesel		6.13
Tool Truck	Off-Highway Trucks	1	300	40	7	0.38	Gas	Vendor	
Utility Cart	Other General Industrial Equipment	2	50	40	7	0.34	Diesel		
Water Truck	Off-Highway Trucks	3	300	40	8	0.38	Diesel		
Fencing (3)									
1-Ton Truck, 4x4	Off-Highway Trucks	1	300	25	8	0.38	Gas	Vendor	
Bobcat	Tractors/Loaders/Backhoes	1	200	25	8	0.37	Diesel		
Flatbed Truck	Off-Highway Trucks	1	300	15	3	0.38	Gas	Vendor	1.80
Utility Cart	Other General Industrial Equipment	1	50	25	7	0.34	Diesel		
Water Truck	Off-Highway Trucks	1	300	25	8	0.38	Diesel		
Civil (4)									
1-Ton Truck, 4x4	Off-Highway Trucks	1	300	60	8	0.38	Gas	Vendor	
Excavator	Excavators	1	60	45	4	0.38	Diesel		3.00
Lo-Drill/Auger	Bore/Drill Rigs	1	350	30	4	0.5	Diesel		2.00
Backhoe	Tractors/Loaders/Backhoes	2	200	60	7	0.37	Diesel		
Bobcat	Tractors/Loaders/Backhoes	1	200	60	8	0.37	Diesel		
Dump Truck	Off-Highway Trucks	2	350	50	7	0.38	Diesel		5.83
Skip Loader	Tractors/Loaders/Backhoes	1	350	60	8	0.37	Diesel		
Forklift	Forklifts	1	200	45	4	0.2	Diesel		3.00
Concrete Truck	Off-Highway Trucks	2	300	30	4	0.38	Diesel		2.00
Generator	Generator Sets	2	50	60	7	0.74	Diesel	Noted as gas/diesel. Assumed diesel.	
Tool Truck	Off-Highway Trucks	1	300	60	7	0.38	Gas	Vendor	
Utility Cart	Other General Industrial Equipment	2	50	60	7	0.34	Diesel		
Water Truck	Off-Highway Trucks	2	300	60	8	0.38	Diesel		
MEER Install (Drop In)									
1-Ton Truck, 4x4	Off-Highway Trucks	1	300	25	8	0.38	Gas	Vendor	
Manlift/Bucket Truck	Off-Highway Trucks	2	150	20	7	0.38	Diesel		5.60
Stake Truck	Off-Highway Trucks	1	350	20	3	0.38	Gas	Vendor	2.40
Crane	Cranes	1	350	15	4	0.29	Diesel		2.40
Forklift	Forklifts	1	250	25	4	0.2	Diesel		
Tool Truck	Off-Highway Trucks	1	300	25	7	0.38	Gas	Vendor	
Electrical (6)									
1-Ton Truck, 4x4	Off-Highway Trucks	2	300	3	8	0.38	Gas	Vendor	0.34
Scissor Lift	Aerial Lifts	1	60	70	7	0.31	Diesel		
Manlift/Bucket Truck	Off-Highway Trucks	2	150	60	7	0.38	Diesel		6.00
Reach Manlift	Aerial Lifts	1	250	45	7	0.31	Diesel		4.50
Crane	Cranes	1	400	20	4	0.29	Diesel		1.14
Forklift	Forklifts	1	250	70	4	0.2	Diesel		
Generator	Generator Sets	1	50	70	7	0.68	Gas		
Utility Cart	Other General Industrial Equipment	2	50	70	7	0.34	Diesel		
Tool Truck	Off-Highway Trucks	1	300	70	7	0.38	Gas	Vendor	
Wiring (7)									
1-Ton Truck, 4x4	Off-Highway Trucks	1	300	65	8	0.38	Gas	Vendor	
Manlift/Bucket Truck	Off-Highway Trucks	1	150	25	4	0.38	Diesel		1.54
Utility Cart	Other General Industrial Equipment	1	50	65	7	0.34	Diesel		
Maintenance Crew (8)									
1-Ton Truck, 4x4	Off-Highway Trucks	1	300	30	8	0.38	Gas	Vendor	
Testing (9)									
Test Truck	Off-Highway Trucks	2	300	60	8	0.38	Gas	Vendor	
Asphalt (10)									
1-Ton Truck, 4x4	Off-Highway Trucks	2	300	40	4	0.38	Gas	Vendor	
Stake Truck	Off-Highway Trucks	1	350	30	4	0.38	Gas	Vendor	3.00
Dump Truck	Off-Highway Trucks	1	350	35	7	0.38	Diesel		6.13
Asphalt Paver	Pavers	1	350	35	7	0.42	Diesel		6.13
Tractor	Tractors/Loaders/Backhoes	1	350	40	4	0.37	Diesel		
Paving Roller	Rollers	2	150	40	6	0.38	Diesel		
Asphalt Curb Machine	Paving Equipment	1	50	30	4	0.36	Diesel		3.00
Utility Cart	Other General Industrial Equipment	1	50	40	7	0.34	Diesel		
Table SCE-5 Calcite Substation - Construct 220 kV Transmission Line Loop-in and Gen-tie									
Survey (1)									
1-Ton Truck, 4x4	Off-Highway Trucks	2	300	4	8	0.38	Gas	Vendor	
Road Work & Structure Pads (3)									
1-Ton Truck, 4x4	Off-Highway Trucks	1	300	10	8	0.38	Gas	Vendor	
Backhoe/Front Loader	Tractors/Loaders/Backhoes	1	125	10	4	0.37	Diesel		
Tracked Dozer	Rubber Tired Dozers	1	150	10	8	0.4	Diesel		
Motor Grader	Graders	1	250	10	8	0.41	Diesel		
Water Truck	Off-Highway Trucks	2	300	10	8	0.38	Diesel		
Drum Compactor	Surfacing Equipment	1	100	10	4	0.3	Diesel		
Excavator	Excavators	1	250	3	4	0.38	Diesel		1.20
Lowboy Truck/Trailer	Off-Highway Trucks	1	450	10	2	0.38	Diesel		
Guard Structure Installation (4)									
1-Ton Truck, 4x4	Off-Highway Trucks	2	300	2	8	0.38	Gas	Vendor	
Compressor Trailer	Air Compressors	1	60	2	4	0.48	Diesel		
Manlift/Bucket Truck	Off-Highway Trucks	1	250	2	4	0.38	Diesel		
Boom/Crane Truck	Off-Highway Trucks	1	350	2	8	0.38	Diesel		
Auger Truck	Off-Highway Trucks	1	210	2	4	0.38	Diesel		
Flatbed Truck	Off-Highway Trucks	1	400	2	8	0.38	Diesel		

Conductor & GW Removal (5)									
1-Ton Truck, 4x4	Off-Highway Trucks	4	300	4	4	0.38	Gas	Vendor	
Manlift/Bucket Truck	Off-Highway Trucks	2	250	4	8	0.38	Diesel		
Boom/Crane Truck	Off-Highway Trucks	2	350	4	8	0.38	Diesel		
Puller	Other Material Handling Equipment	1	350	4	8	0.4	Diesel		
Static Truck/Tensioner	Off-Highway Trucks	1	350	4	8	0.38	Diesel		
Dump/Stake Bed Truck	Off-Highway Trucks	1	350	4	8	0.38	Diesel		
LST Removal (6)									
1-Ton Truck, 4x4	Off-Highway Trucks	2	300	4	4	0.38	Gas	Vendor	
Compressor Trailer	Air Compressors	1	60	4	8	0.48	Diesel		
R/T Crane (L)	Cranes	1	275	4	8	0.29	Diesel		
Dump Truck	Off-Highway Trucks	1	350	4	8	0.38	Diesel		
Flatbed Truck	Off-Highway Trucks	1	400	4	2	0.38	Diesel		
LST Foundation Removal (7)									
1-Ton Truck, 4x4	Off-Highway Trucks	2	300	2	4	0.38	Gas	Vendor	
Compressor Trailer	Air Compressors	1	60	2	8	0.48	Diesel		
Backhoe/Front Loader	Tractors/Loaders/Backhoes	1	125	2	8	0.37	Diesel		
Dump Truck	Off-Highway Trucks	1	350	2	8	0.38	Diesel		
Excavator	Excavators	1	250	2	2	0.38	Diesel		
Steel Pole Structure Foundation Installation (8)									
1-Ton Truck, 4x4	Off-Highway Trucks	2	300	15	4	0.38	Gas	Vendor	
Boom/Crane Truck	Off-Highway Trucks	1	350	15	4	0.38	Diesel		
Backhoe/Front Loader	Tractors/Loaders/Backhoes	1	125	15	8	0.37	Diesel		
Drill Rig	Bore/Drill Rigs	1	275	10	8	0.5	Diesel		5.33
Water Truck	Off-Highway Trucks	1	300	15	8	0.38	Diesel		
Dump Truck	Off-Highway Trucks	1	350	15	8	0.38	Diesel		
Concrete Truck	Off-Highway Trucks	3	350	8	6	0.38	Diesel		3.20
Steel Pole Structure Haul (9)									
1-Ton Truck, 4x4	Off-Highway Trucks	1	300	3	8	0.38	Gas	Vendor	
Boom/Crane Truck	Off-Highway Trucks	1	350	3	4	0.38	Diesel		
Flatbed Truck	Off-Highway Trucks	1	400	3	8	0.38	Diesel		
Steel Pole Structure Assembly (10)									
1-Ton Truck, 4x4	Off-Highway Trucks	2	300	8	4	0.38	Gas	Vendor	
Compressor Trailer	Air Compressors	1	60	8	8	0.48	Diesel		
Manlift/Bucket Truck	Off-Highway Trucks	1	250	8	8	0.38	Diesel		
R/T Crane (L)	Cranes	1	275	8	8	0.29	Diesel		
Steel Pole Structure Erection (11)									
1-Ton Truck, 4x4	Off-Highway Trucks	2	300	8	4	0.38	Gas	Vendor	
Compressor Trailer	Air Compressors	1	60	8	4	0.48	Diesel		
Manlift/Bucket Truck	Off-Highway Trucks	1	250	8	8	0.38	Diesel		
Crane	Cranes	1	400	8	8	0.29	Diesel		
220kV Conductor & GW Installation (12)									
1-Ton Truck, 4x4	Off-Highway Trucks	8	275	7	4	0.38	Gas	Vendor	
Manlift/Bucket Truck	Off-Highway Trucks	4	250	7	8	0.38	Diesel		
Boom/Crane Truck	Off-Highway Trucks	2	350	7	8	0.38	Diesel		
R/T Crane (L)	Cranes	2	215	7	4	0.29	Diesel		
Dump Truck	Off-Highway Trucks	1	350	7	4	0.38	Diesel		
Wire Truck/Trailer	Off-Highway Trucks	2	350	7	8	0.38	Diesel		
Sock Line Puller	Other Material Handling Equipment	1	300	3	8	0.4	Diesel		3.43
Bullwheel Puller	Other Material Handling Equipment	1	350	5	8	0.4	Diesel		5.71
Static Truck/Tensioner	Off-Highway Trucks	1	350	7	8	0.38	Diesel		
R/T Forklift	Forklifts	1	125	7	8	0.2	Diesel		
Spacing Cart	Other General Industrial Equipment	3	10	2	8	0.34	Diesel		2.29
Backhoe/Front Loader	Tractors/Loaders/Backhoes	1	125	5	4	0.37	Diesel		2.86
Sag Cat w/ Winches	Crawler Tractors	2	350	7	2	0.43	Diesel		
Water Truck	Off-Highway Trucks	1	300	7	8	0.38	Diesel		
Lowboy Truck/Trailer	Off-Highway Trucks	2	450	7	2	0.38	Diesel		
Hughes 500 E		1	400	7	7		Jet A	Calculated separately (outside CalEEMod)	
Fuel, Helicopter Support Truck	Off-Highway Trucks	1	300	7	7	0.38	Diesel		
UG Ground Wire Installation (13)									
1-Ton Truck, 4x4	Off-Highway Trucks	1	275	6	4	0.38	Gas	Vendor	
Backhoe/Front Loader	Tractors/Loaders/Backhoes	1	125	6	8	0.37	Diesel		
Dump Truck	Off-Highway Trucks	1	350	6	8	0.38	Diesel		
Water Truck	Off-Highway Trucks	1	300	6	8	0.38	Diesel		
Guard Structure Removal (14)									
1-Ton Truck, 4x4	Off-Highway Trucks	2	300	2	8	0.38	Gas	Vendor	
Compressor Trailer	Air Compressors	1	60	2	4	0.48	Diesel		
Manlift/Bucket Truck	Off-Highway Trucks	1	250	2	4	0.38	Diesel		
Boom/Crane Truck	Off-Highway Trucks	1	350	2	8	0.38	Diesel		
Flatbed Truck	Off-Highway Trucks	1	400	2	8	0.38	Diesel		
Restoration (15)									
1-Ton Truck, 4x4	Off-Highway Trucks	2	300	6	4	0.38	Gas	Vendor	
Backhoe/Front Loader	Tractors/Loaders/Backhoes	1	125	6	8	0.37	Diesel		
Motor Grader	Graders	1	250	6	4	0.41	Diesel		
Water Truck	Off-Highway Trucks	1	300	6	8	0.38	Diesel		
Drum Compactor	Surfacing Equipment	1	100	6	4	0.3	Diesel		
Lowboy Truck/Trailer	Off-Highway Trucks	1	450	6	2	0.38	Diesel		

Table SCE-6A Calcite Substation - Construct Distribution Line Extension for Station Light & Power to Calcite Station								
Install Down Guys (1)								
1-Ton Crew Cab Flatbed, 4x4	Off-Highway Trucks	1	300	2	8	0.38	Diesel	Vendor
Bucket Truck	Off-Highway Trucks	1	300	2	8	0.38	Diesel	
Install New Poles (2)								
1-Ton Pickup Truck, 4x4	Off-Highway Trucks	2	300	6	8	0.38	Diesel	Vendor
30-Ton Crane Truck	Off-Highway Trucks	1	300	6	8	0.38	Diesel	
Bucket Truck	Off-Highway Trucks	2	300	6	8	0.38	Diesel	
40' Flatbed Truck/Trailer	Off-Highway Trucks	1	350	6	8	0.38	Diesel	
Install Overhead Wire (3)								
1-Ton Crew Cab Pickup Truck, 4x4	Off-Highway Trucks	1	300	1	8	0.38	Diesel	Vendor
55' Double Bucket Truck	Off-Highway Trucks	1	350	1	8	0.38	Diesel	
Underground Cable Pulling & Transformer Installation (4)								
1-Ton Pickup Truck, 4x4	Off-Highway Trucks	1	300	3	8	0.38	Diesel	Vendor
55' Double Bucket Truck	Off-Highway Trucks	1	350	3	8	0.38	Diesel	
Hydraulic Rewind Puller	Other Material Handling Equipment	1	300	3	8	0.4	Diesel	
Underground Cable Makeup (5)								
1-Ton Crew Cab, 4x4	Off-Highway Trucks	1	300	2	8	0.38	Diesel	Vendor
55' Double Bucket Truck	Off-Highway Trucks	1	350	2	8	0.38	Diesel	
Underground Trenching, Structure Excavation Conduit (6)								
1-Ton Pickup Truck, 4x4	Off-Highway Trucks	1	300	6	8	0.38	Diesel	Vendor
Backhoe/Front Loader	Tractors/Loaders/Backhoes	1	200	6	8	0.37	Diesel	
1-Ton Crew Cab Flatbed, 4x4	Off-Highway Trucks	1	300	6	8	0.38	Diesel	
4000 gallon Water Truck	Off-Highway Trucks	1	350	6	8	0.38	Diesel	
Concrete Truck	Off-Highway Trucks	1	350	6	8	0.38	Diesel	
Underground Boring, Casing and Conduit Installation (7)								
1-Ton Pickup Truck, 4x4	Off-Highway Trucks	1	300	3	8	0.38	Diesel	Vendor
Backhoe/Front Loader	Tractors/Loaders/Backhoes	1	200	3	8	0.37	Diesel	
1-Ton Crew Cab Flatbed, 4x4	Off-Highway Trucks	1	300	3	8	0.38	Diesel	
Excavation and Boring Equipment	Other General Industrial Equipment	1	300	3	8	0.34	Diesel	
Restoration (8)								
1-Ton Crew Cab, 4x4	Off-Highway Trucks	2	300	1	2	0.38	Diesel	Vendor
Water Truck	Off-Highway Trucks	1	300	1	8	0.38	Diesel	

Calcite Substation - Construct 220 kV Substation and Access Road

Grading (2) - balanced on site

Hauling

Site Fill, Replacement Fill (import)	55000	CY
Waste removal (export)	3000	CY
Total material movement (assumed not balanced on site)	58000	CY
Size of truck	16	CY/truck
Number of trucks	3625	trucks
Number of one-way haul truck trips	7250	one-way trips
Grading phase	40	days
Number of one-way truck trips per grading phase day	181.25	

Civil (4)

Vendor

Concrete (foundations)	850	CY
Concrete (cable trenches)	25	CY
Size of truck	10	CY/truck
Number of trucks	88	trucks
Number of one-way truck trips	176	trips
Civil phase	60	days
Number of one-way truck trips per civil phase day	3	

Hauling

Trench excavations (export)	1200	CY
Total material movement (assumed not balanced on site)	1200	CY
Size of truck	16	CY/truck
Number of trucks	75	trucks
Number of one-way truck trips	150	one-way trips
Civil phase	61	days
Number of one-way truck trips per civil phase day	3	

Asphalt (10)

Vendor

Asphalt concrete and base (driveway and road)	3500	CY
Rock	3200	CY
Size of truck	10	CY/truck
Number of trucks	670	trucks
Number of one-way truck trips	1340	one-way trips
Asphalt phase	40	days
Number of one-way truck trips per asphalt phase day	34	

Calcite Substation Custom Report

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2.3. Construction Emissions by Year, Mitigated

1. Basic Project Information

1.1. Basic Project Information

Data Field	Value
Project Name	Calcite Substation
Construction Start Date	2/9/2026
Lead Agency	SCE
Land Use Scale	Project/site
Analysis Level for Defaults	County
Windspeed (m/s)	5.00
Precipitation (days)	12.4
Location	34.54707748621878, -116.94960633478249
County	San Bernardino-Mojave Desert
City	Unincorporated
Air District	Mojave Desert AQMD
Air Basin	Mojave Desert
TAZ	5160
EDFZ	10
Electric Utility	Southern California Edison
Gas Utility	Southwest Gas Corp.
App Version	2022.1.1.22

1.2. Land Use Types

Land Use Subtype	Size	Unit	Lot Acreage	Building Area (sq ft)	Landscape Area (sq ft)	Special Landscape Area (sq ft)	Population	Description
Other Asphalt Surfaces	16.0	Acre	16.0	0.00	0.00	0.00	—	—

1.3. User-Selected Emission Reduction Measures by Emissions Sector

Sector	#	Measure Title
Construction	C-10-A	Water Exposed Surfaces

2. Emissions Summary

2.1. Construction Emissions Compared Against Thresholds

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Un/Mit.	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	219	219	55.1	43.8	0.22	1.82	23.6	25.5	1.70	5.32	7.02	—	27,373	27,373	0.62	2.07	26.8	28,033
Mit.	219	219	55.1	43.8	0.22	1.82	18.6	20.4	1.70	3.35	5.05	—	27,373	27,373	0.62	2.07	26.8	28,033
% Reduced	—	—	—	—	—	—	21%	20%	—	37%	28%	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	219	219	55.9	43.4	0.22	1.82	23.6	25.5	1.70	5.32	7.02	—	27,353	27,353	0.61	2.07	0.69	27,986
Mit.	219	219	55.9	43.4	0.22	1.82	18.6	20.4	1.70	3.35	5.05	—	27,353	27,353	0.61	2.07	0.69	27,986
% Reduced	—	—	—	—	—	—	21%	20%	—	37%	28%	—	—	—	—	—	—	—
Average Daily (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	43.5	43.2	12.0	14.4	0.05	0.41	10.9	11.3	0.38	1.44	1.81	—	5,623	5,623	0.16	0.28	1.73	5,714
Mit.	43.5	43.2	12.0	14.4	0.05	0.41	10.3	10.7	0.38	1.22	1.60	—	5,623	5,623	0.16	0.28	1.73	5,714
% Reduced	—	—	—	—	—	—	5%	5%	—	15%	12%	—	—	—	—	—	—	—

Annual (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	7.93	7.88	2.19	2.62	0.01	0.07	1.98	2.06	0.07	0.26	0.33	—	931	931	0.03	0.05	0.29	946
Mit.	7.93	7.88	2.19	2.62	0.01	0.07	1.88	1.96	0.07	0.22	0.29	—	931	931	0.03	0.05	0.29	946
% Reduced	—	—	—	—	—	—	5%	5%	—	15%	12%	—	—	—	—	—	—	—
Exceeds (Annual)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Threshold	—	25.0	25.0	100	25.0	15.0	—	—	12.0	—	—	—	—	—	—	—	—	—
Unmit.	—	No	No	No	No	No	—	—	No	—	—	—	—	—	—	—	—	—
Mit.	—	No	No	No	No	No	—	—	No	—	—	—	—	—	—	—	—	—

2.2. Construction Emissions by Year, Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Year	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily - Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2026	219	219	55.1	43.8	0.22	1.82	23.6	25.5	1.70	5.32	7.02	—	27,373	27,373	0.62	2.07	26.8	28,033
2027	1.32	1.56	8.39	12.8	0.04	0.33	18.2	18.5	0.31	1.90	2.21	—	5,162	5,162	0.15	0.22	3.70	5,235
Daily - Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2026	219	219	55.9	43.4	0.22	1.82	23.6	25.5	1.70	5.32	7.02	—	27,353	27,353	0.61	2.07	0.69	27,986
2027	0.23	0.19	1.32	3.12	0.01	0.05	11.9	12.0	0.04	1.22	1.22	—	704	704	0.02	0.04	0.02	714
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2026	43.5	43.2	12.0	14.4	0.05	0.41	10.9	11.3	0.38	1.44	1.81	—	5,623	5,623	0.16	0.28	1.73	5,714
2027	0.17	0.19	1.07	1.65	0.01	0.04	4.82	4.86	0.04	0.50	0.53	—	678	678	0.02	0.03	0.28	689

Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2026	7.93	7.88	2.19	2.62	0.01	0.07	1.98	2.06	0.07	0.26	0.33	—	931	931	0.03	0.05	0.29	946
2027	0.03	0.03	0.20	0.30	< 0.005	0.01	0.88	0.89	0.01	0.09	0.10	—	112	112	< 0.005	0.01	0.05	114

2.3. Construction Emissions by Year, Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Year	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily - Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2026	219	219	55.1	43.8	0.22	1.82	18.6	20.4	1.70	3.35	5.05	—	27,373	27,373	0.62	2.07	26.8	28,033
2027	1.32	1.56	8.39	12.8	0.04	0.33	18.2	18.5	0.31	1.90	2.21	—	5,162	5,162	0.15	0.22	3.70	5,235
Daily - Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2026	219	219	55.9	43.4	0.22	1.82	18.6	20.4	1.70	3.35	5.05	—	27,353	27,353	0.61	2.07	0.69	27,986
2027	0.23	0.19	1.32	3.12	0.01	0.05	11.9	12.0	0.04	1.22	1.22	—	704	704	0.02	0.04	0.02	714
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2026	43.5	43.2	12.0	14.4	0.05	0.41	10.3	10.7	0.38	1.22	1.60	—	5,623	5,623	0.16	0.28	1.73	5,714
2027	0.17	0.19	1.07	1.65	0.01	0.04	4.82	4.86	0.04	0.50	0.53	—	678	678	0.02	0.03	0.28	689
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2026	7.93	7.88	2.19	2.62	0.01	0.07	1.88	1.96	0.07	0.22	0.29	—	931	931	0.03	0.05	0.29	946
2027	0.03	0.03	0.20	0.30	< 0.005	0.01	0.88	0.89	0.01	0.09	0.10	—	112	112	< 0.005	0.01	0.05	114

Calcite Transmission Line Loop-in and Gen-tie Custom Report

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1. Basic Project Information

1.1. Basic Project Information

Data Field	Value
Project Name	Calcite Transmission Line Loop-in and Gen-tie
Construction Start Date	4/6/2026
Lead Agency	SCE
Land Use Scale	Project/site
Analysis Level for Defaults	County
Windspeed (m/s)	5.00
Precipitation (days)	12.4
Location	34.54707748621878, -116.94960633478249
County	San Bernardino-Mojave Desert
City	—
Air District	Mojave Desert AQMD
Air Basin	Mojave Desert
TAZ	5160
EDFZ	10
Electric Utility	Southern California Edison
Gas Utility	Southwest Gas Corp.
App Version	2022.1.1.22

1.2. Land Use Types

Land Use Subtype	Size	Unit	Lot Acreage	Building Area (sq ft)	Landscape Area (sq ft)	Special Landscape Area (sq ft)	Population	Description
Other Non-Asphalt Surfaces	35.0	Acre	35.0	0.00	0.00	0.00	—	—

1.3. User-Selected Emission Reduction Measures by Emissions Sector

Sector	#	Measure Title
Construction	C-10-A	Water Exposed Surfaces

2. Emissions Summary

2.1. Construction Emissions Compared Against Thresholds

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Un/Mit.	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	6.86	5.79	35.2	43.6	0.16	1.27	53.9	55.2	1.17	5.51	6.68	—	17,843	17,843	0.70	0.27	4.56	17,945
Mit.	6.86	5.79	35.2	43.6	0.16	1.27	53.9	55.2	1.17	5.51	6.68	—	17,843	17,843	0.70	0.27	4.56	17,945
% Reduced	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.45	0.38	2.48	2.95	0.01	0.09	3.18	3.27	0.08	0.33	0.41	—	1,141	1,141	0.04	0.02	0.14	1,148
Mit.	0.45	0.38	2.48	2.95	0.01	0.09	3.18	3.27	0.08	0.33	0.41	—	1,141	1,141	0.04	0.02	0.14	1,148
% Reduced	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.08	0.07	0.45	0.54	< 0.005	0.02	0.58	0.60	0.02	0.06	0.07	—	189	189	0.01	< 0.005	0.02	190
Mit.	0.08	0.07	0.45	0.54	< 0.005	0.02	0.58	0.60	0.02	0.06	0.07	—	189	189	0.01	< 0.005	0.02	190
% Reduced	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Exceeds (Annual)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Threshold	—	25.0	25.0	100	25.0	—	—	15.0	—	—	12.0	—	—	—	—	—	—	—
Unmit.	—	No	No	No	No	—	—	No	—	—	No	—	—	—	—	—	—	—
Mit.	—	No	No	No	No	—	—	No	—	—	No	—	—	—	—	—	—	—

2.2. Construction Emissions by Year, Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Year	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily - Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2026	6.86	5.79	35.2	43.6	0.16	1.27	53.9	55.2	1.17	5.51	6.68	—	17,843	17,843	0.70	0.27	4.56	17,945
Daily - Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2026	0.45	0.38	2.48	2.95	0.01	0.09	3.18	3.27	0.08	0.33	0.41	—	1,141	1,141	0.04	0.02	0.14	1,148
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2026	0.08	0.07	0.45	0.54	< 0.005	0.02	0.58	0.60	0.02	0.06	0.07	—	189	189	0.01	< 0.005	0.02	190

2.3. Construction Emissions by Year, Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Year	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily - Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2026	6.86	5.79	35.2	43.6	0.16	1.27	53.9	55.2	1.17	5.51	6.68	—	17,843	17,843	0.70	0.27	4.56	17,945

Daily - Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2026	0.45	0.38	2.48	2.95	0.01	0.09	3.18	3.27	0.08	0.33	0.41	—	1,141	1,141	0.04	0.02	0.14	1,148
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2026	0.08	0.07	0.45	0.54	< 0.005	0.02	0.58	0.60	0.02	0.06	0.07	—	189	189	0.01	< 0.005	0.02	190

Calcite Distribution Line Extension Custom Report

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2.2. Construction Emissions by Year, Unmitigated

2.3. Construction Emissions by Year, Mitigated

1. Basic Project Information

1.1. Basic Project Information

Data Field	Value
Project Name	Calcite Distribution Line Extension
Construction Start Date	4/6/2026
Lead Agency	SCE
Land Use Scale	Project/site
Analysis Level for Defaults	County
Windspeed (m/s)	5.00
Precipitation (days)	12.4
Location	34.54707748621878, -116.94960633478249
County	San Bernardino-Mojave Desert
City	Unincorporated
Air District	Mojave Desert AQMD
Air Basin	Mojave Desert
TAZ	5160
EDFZ	10
Electric Utility	Southern California Edison
Gas Utility	Southwest Gas Corp.
App Version	2022.1.1.22

1.2. Land Use Types

Land Use Subtype	Size	Unit	Lot Acreage	Building Area (sq ft)	Landscape Area (sq ft)	Special Landscape Area (sq ft)	Population	Description
Other Non-Asphalt Surfaces	2.13	Acre	2.13	0.00	0.00	0.00	—	—

1.3. User-Selected Emission Reduction Measures by Emissions Sector

Sector	#	Measure Title
Construction	C-10-A	Water Exposed Surfaces

2. Emissions Summary

2.1. Construction Emissions Compared Against Thresholds

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Un/Mit.	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	1.81	1.53	8.85	10.7	0.04	0.31	11.9	12.3	0.28	1.22	1.50	—	4,832	4,832	0.19	0.08	1.07	4,861
Mit.	1.81	1.53	8.85	10.7	0.04	0.31	11.9	12.3	0.28	1.22	1.50	—	4,832	4,832	0.19	0.08	1.07	4,861
% Reduced	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.08	0.07	0.41	0.49	< 0.005	0.01	0.49	0.51	0.01	0.05	0.06	—	225	225	0.01	< 0.005	0.03	226
Mit.	0.08	0.07	0.41	0.49	< 0.005	0.01	0.49	0.51	0.01	0.05	0.06	—	225	225	0.01	< 0.005	0.03	226
% Reduced	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.01	0.01	0.08	0.09	< 0.005	< 0.005	0.09	0.09	< 0.005	0.01	0.01	—	37.2	37.2	< 0.005	< 0.005	< 0.005	37.4
Mit.	0.01	0.01	0.08	0.09	< 0.005	< 0.005	0.09	0.09	< 0.005	0.01	0.01	—	37.2	37.2	< 0.005	< 0.005	< 0.005	37.4
% Reduced	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Exceeds (Annual)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Threshold	—	25.0	25.0	100	25.0	—	—	15.0	—	—	12.0	—	—	—	—	—	—	—
Unmit.	—	No	No	No	No	—	—	No	—	—	No	—	—	—	—	—	—	—
Mit.	—	No	No	No	No	—	—	No	—	—	No	—	—	—	—	—	—	—

2.2. Construction Emissions by Year, Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Year	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily - Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2026	1.81	1.53	8.85	10.7	0.04	0.31	11.9	12.3	0.28	1.22	1.50	—	4,832	4,832	0.19	0.08	1.07	4,861
Daily - Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2026	0.08	0.07	0.41	0.49	< 0.005	0.01	0.49	0.51	0.01	0.05	0.06	—	225	225	0.01	< 0.005	0.03	226
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2026	0.01	0.01	0.08	0.09	< 0.005	< 0.005	0.09	0.09	< 0.005	0.01	0.01	—	37.2	37.2	< 0.005	< 0.005	< 0.005	37.4

2.3. Construction Emissions by Year, Mitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Year	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily - Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2026	1.81	1.53	8.85	10.7	0.04	0.31	11.9	12.3	0.28	1.22	1.50	—	4,832	4,832	0.19	0.08	1.07	4,861

Daily - Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2026	0.08	0.07	0.41	0.49	< 0.005	0.01	0.49	0.51	0.01	0.05	0.06	—	225	225	0.01	< 0.005	0.03	226
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2026	0.01	0.01	0.08	0.09	< 0.005	< 0.005	0.09	0.09	< 0.005	0.01	0.01	—	37.2	37.2	< 0.005	< 0.005	< 0.005	37.4

Appendix D1. Biological Resources Assessment

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Sienna Solar and Storage Project

General Biological Resources Assessment

prepared for

99MT 8me, LLC
211 Sutter Street, 6th Floor
San Francisco, California 94108
Contact: Mr. Erec DeVost

Via email: edevost@8minutenergy.com

prepared by

Rincon Consultants, Inc.
180 North Ashwood Avenue
Ventura, California 93003

August 2023

RINCON CONSULTANTS, INC.
Environmental Scientists | Planners | Engineers
rinconconsultants.com

General Biological Resources Assessment for Sienna Solar and Storage Project

Project Area Location

White Horse Mountain, Grand View Mine, and *Lucerne Valley* USGS 7.5-minute topographic quadrangles, Township (T) T06N Range (R) 01W, Section (S) 36; T06N R01E S31; T05N R01W S1-2, 11-14, 24; T05N R01E S06-09, 16-21, 28-30; T05N R01E S10, 15, 22, 27; T05N R01E S28-33.

Assessor's Parcel Number(s)

045207110, 045207111, 045207119, 045207120 and 045207125; 045206221, 045206222, 045206223 and 045206224; 045211217, 045211218, 045211219, 045211220, 045211224, and 045211225; 045211317; 045212112, 045212138, 045212139, 045212142, 045212148, and 045212152; 045236146 and 045236147; 045237101, and; 045239108 and 045239109. **Conditional use permit to construct and operate a 525-megawatt (mw) photovoltaic solar energy facility on 1,854acres in Lucerne Valley; Lucerne Valley/ 3rd Supervisorial District; Project No. P201600569/CUP.**

99MT 8me LLC
211 Sutter Street, 6th Floor
San Francisco, California 94108
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Principal Investigator(s)

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Executive Summary

This document provides the findings of a General Biological Resources Assessment (GBRA) prepared by Rincon Consultants, Inc. (Rincon) for the proposed Sienna Solar and Storage Project. The report documents existing conditions on all parcels proposed for development of solar energy generation facilities and along potential gen-tie corridors (referred to as the Study Area) and assesses potential impacts to sensitive biological resources based upon proposed project plans, consistent with the county's guidelines for GBRAs.

The proposed Sienna Solar and Storage Project (Project) is a 525-megawatt (MW) utility-scale solar farm with 525-MW battery storage located in unincorporated San Bernardino County. The site is located east of Barstow Road/State Route (SR) 247 roughly between Northside Road and Wilshire Road, northeast of the community of Lucerne Valley. There is a northern portion of the site located roughly between Haynes Road and No End Road, east of SR 247.

The Project consists of the installation of a photovoltaic (PV) solar facility, Battery Energy Storage System (BESS), project substation, Operations and Maintenance building(s), underground collection system, and a 230 kV generation-interconnect (gen-tie) line. The Sienna Project will interconnect at the SCE Calcite Substation (currently pending environmental clearance and construction) via a proposed overhead and/or underground 230-kV gen-tie line in addition to other ancillary facilities utilizing private and potentially public ROWs. The Project area encompasses 1,854 acres with an additional 77-acre substation site. Approximately 39 miles of collector lines and gen-tie alternatives will be analyzed in this Assessment, although not all routes will be developed.

The Project area is characterized by a mixture of residential properties, undeveloped playa and desert scrub communities, and agricultural land that includes alfalfa and jojoba farms and large-scale hemp growing operations. Small-scale abandoned and operational hemp and/or marijuana growing operations were present throughout the playa region of the Project area.

Project Setting

The 1,854-acre Project area is located in the southwestern portion of Mojave Desert in and near Lucerne Dry Lake, in unincorporated San Bernardino County, California. The Project is predominately located east of State Route 247 (Barstow Road), north of the unincorporated community of Lucerne Valley, with portions of the gen-tie alternative corridors that include possible connections along Haynes Road, Huff Road, and Northside Road to the east of Barstow Road. It is generally located approximately 35 miles south of the City of Barstow, 45 miles northwest of the town of Yucca Valley, 15 miles southeast of the town of Apple Valley, and 20 miles north of the City of Big Bear Lake. Barstow Road would provide primary access to the Project area. Land uses in the area are primarily rural residential, recreation, farmland, open space, and transportation corridors.

Project Area Special-Status Plants and Wildlife

Rincon identified 18 special status plants and 9 special status species as having some level of potential for occurrence within a portion of the Project area. However, the potential for most special status species to occur is limited to a small portion the project area that occurs within natural scrub communities in the eastern-most parts of the project area.

Rincon determined 17 special-status plant species have a low to moderate potential to occur on the Project area These species include CRPR rankings ranging from 1B.1 to 2B.2; 1 of the 17 species is federally listed. Focused botanical surveys for listed plants are recommended in areas of suitable habitat during the appropriate survey periods to determine if listed or other special status plant species are present.

Rincon evaluated the nine special-status wildlife species as follows: Three special status wildlife species were determined to be present on the Project area: burrowing owl, (*Athene cunicularia*), a species of special concern (SSC), prairie falcon (*Falco mexicanus*), a CDFW Watch List species, and loggerhead shrike (*Lanius ludovicianus*), a SSC. Rincon biologists observed these species within the Project area during the reconnaissance surveys.

Four special-status wildlife species have been assessed as having moderate to high potential to occur in the scrub communities on the Project area based on their known distribution, documented presence in the vicinity of the Project area, and presence of suitable habitat within the Project area: golden eagle (foraging) (*Aquila chrysaetos*, Fully Protected (FP)), desert tortoise (*Gopherus agassizii*, Federally Threatened, State Threatened), Le Conte's thrasher (*Toxostoma lecontei*, SSC), and Bendire's thrasher (*Toxostoma bendirei*, SSC).

Two special-status wildlife species have been assessed as having low potential to occur in the scrub communities on the Project area: western mastiff bat (*Eumops perotis californicus*, SSC) and California condor (*Gymnogyps californianus*, Federally and State Endangered, fully protected).

A variety of common bird species protected by the California Fish and Game Code (CFGC) and the Federal Migratory Bird Treaty Act (MBTA), including most bird species that are not otherwise considered to have any special-status designation, may nest on-site. Nesting opportunities in the Project area include buildings, trees, transmission towers, natural and disturbed scrub habitat and riparian areas.

Special-status species and common nesting birds that may occur on site could be affected directly (loss of individuals) or indirectly (construction noise, dust, and other human disturbances) as a result of construction activity for the proposed Project. These impacts would be potentially significant but are anticipated be reduced to a less than significant level through implementation of proposed mitigation measures.

Jurisdictional Waters

Rincon evaluated the Project area for potentially jurisdictional waters and wetlands that may be subject to regulation by the CDFW and/or Lahontan Regional Water Quality Control Board (LRWQCB). Since the Project area drains to inland areas of California, specifically, Lucerne Lake, for which the U.S. Army Corps of Engineers (USACE) previously issued an approved jurisdictional determination that the dry lake feature and tributaries are not jurisdictional, it is unlikely that the U.S. Army Corps of Engineers (USACE) would assert jurisdiction over these features. Jurisdictional features are described in summary within this GBRA. A full jurisdictional delineation will be presented under a separate cover.

1 Project and Property Description

1.1 Project Description

The proposed Sienna Solar and Storage Project (Project) is a 525-megawatt (MW) utility-scale solar farm with 525-MW battery storage located in unincorporated San Bernardino County. The site is located east of Barstow Road/State Route (SR) 247 roughly between Northside Road and Wilshire Road, northeast of the community of Lucerne Valley.

The Project area is characterized by a mixture of residential properties, undeveloped playa and desert scrub communities, and agricultural land that includes alfalfa and jojoba farms and large-scale hemp growing operations. Small-scale abandoned and operational hemp and/or marijuana growing operations exist throughout the playa region of the Project area.

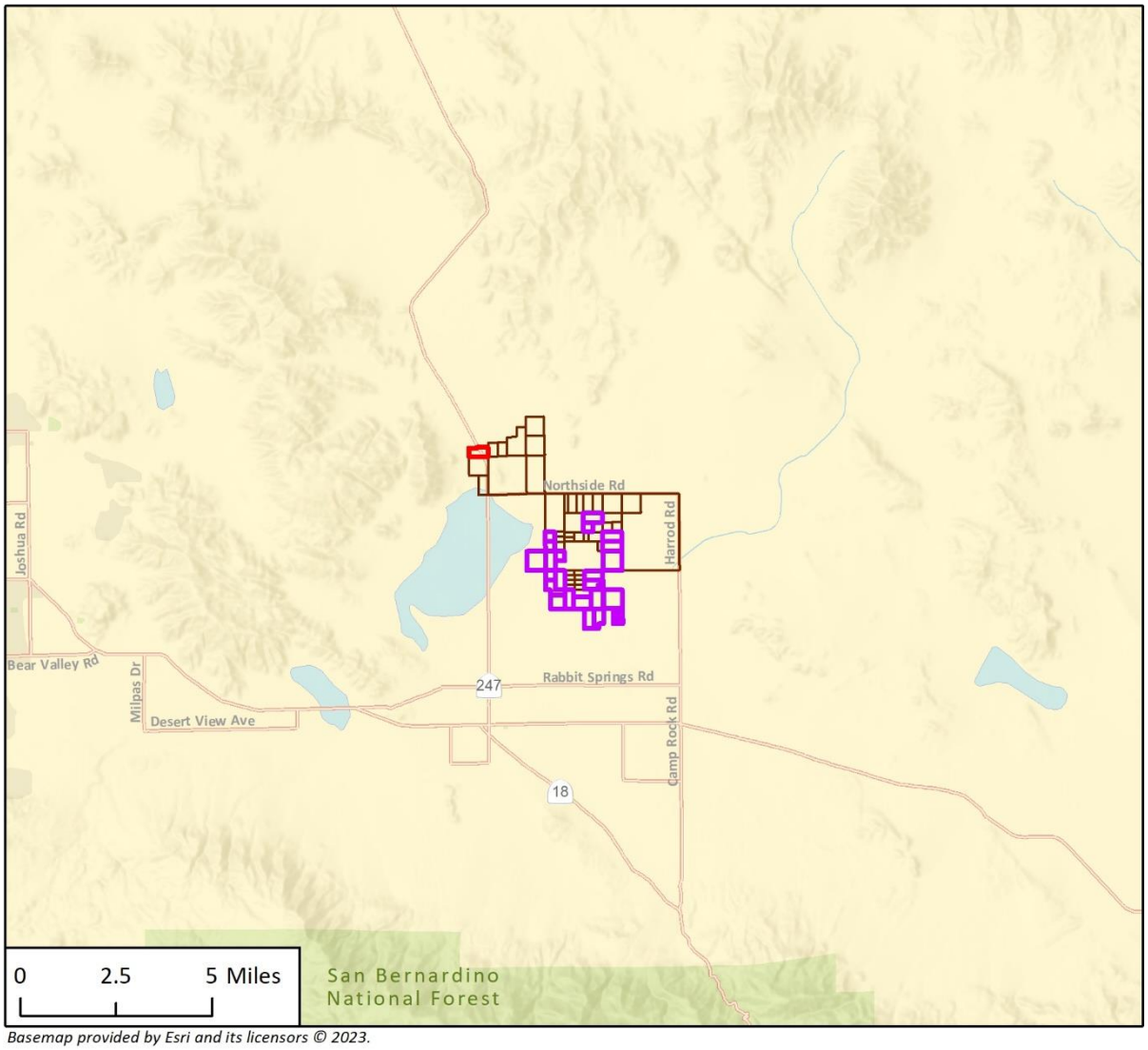
The proposed Project consists of the installation of a photovoltaic (PV) solar facility, Battery Energy Storage System (BESS), Project substation, Operations and Maintenance building(s), underground collection system, a 230 kV generation-interconnect (gen-tie) line, new Southern California Edison 230 kV substation, and other ancillary facilities. The Project area encompasses 1,854 acres with an additional 77-acre substation site. Approximately 39 miles of collector lines and gen-tie alternatives will be analyzed in this Assessment, although not all routes will be developed.

1.2 Project Location and Environmental Setting

The 1,854-acre Project area is located in the southwestern portion of Mojave Desert in and near Lucerne Dry Lake, in unincorporated San Bernardino County, California. The Project is predominately located east of State Route 247 (Barstow Road), north of the unincorporated community of Lucerne Valley, with portions of the gen-tie alternative corridors that include possible connections along Haynes Road, Huff Road, and Northside Road to the east of Barstow Road. It is generally located approximately 35 miles south of the City of Barstow, 45 miles northwest of the town of Yucca Valley, 15 miles southeast of the town of Apple Valley, and 20 miles north of the City of Big Bear Lake. Barstow Road would provide primary access to the Project area. Land uses in the area are primarily rural residential, recreation, farmland, open space, and transportation corridors.

Figure 1 shows the regional location of the Project area. Figure 2 shows the 35 parcels that comprise the site, and Table 1 lists the parcels and the acreage of each. The site is depicted on the *White Horse Mountain, Grand View Mine,* and *Lucerne Valley, California* United States Geological Survey (USGS) 7.5-minute topographic quadrangle maps (Figure 3).

Figure 1 Regional Location Map



Basemap provided by Esri and its licensors © 2023.

Project Site

Proposed SCE Calcite Substation

Gen-Tie Line and/or Collector Line Alternatives

N

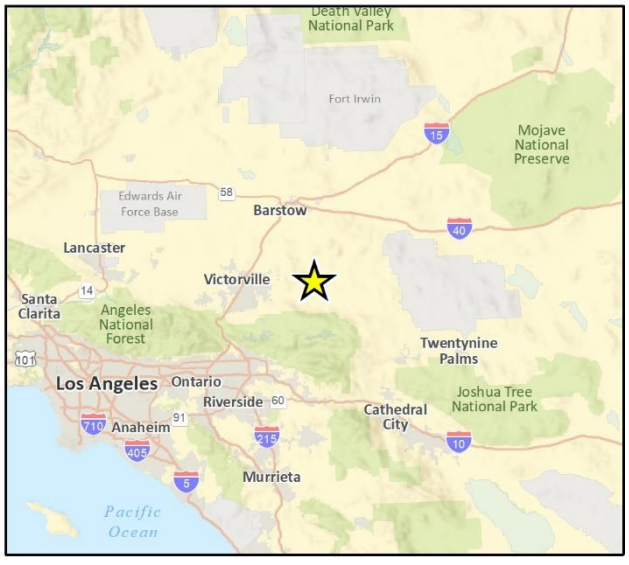


Fig 1 Regional Location Paleo

Figure 2 Project Location with APNs

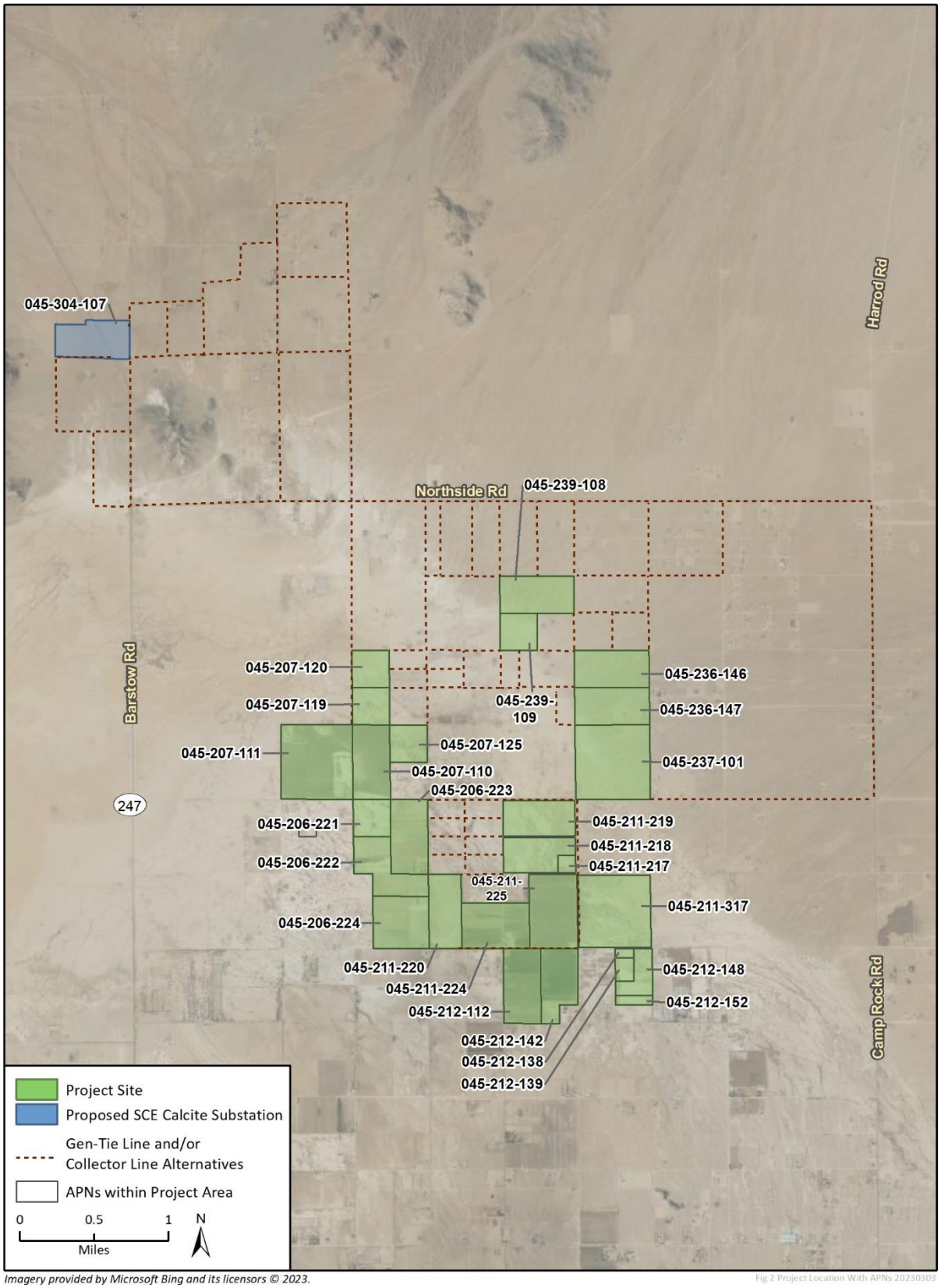
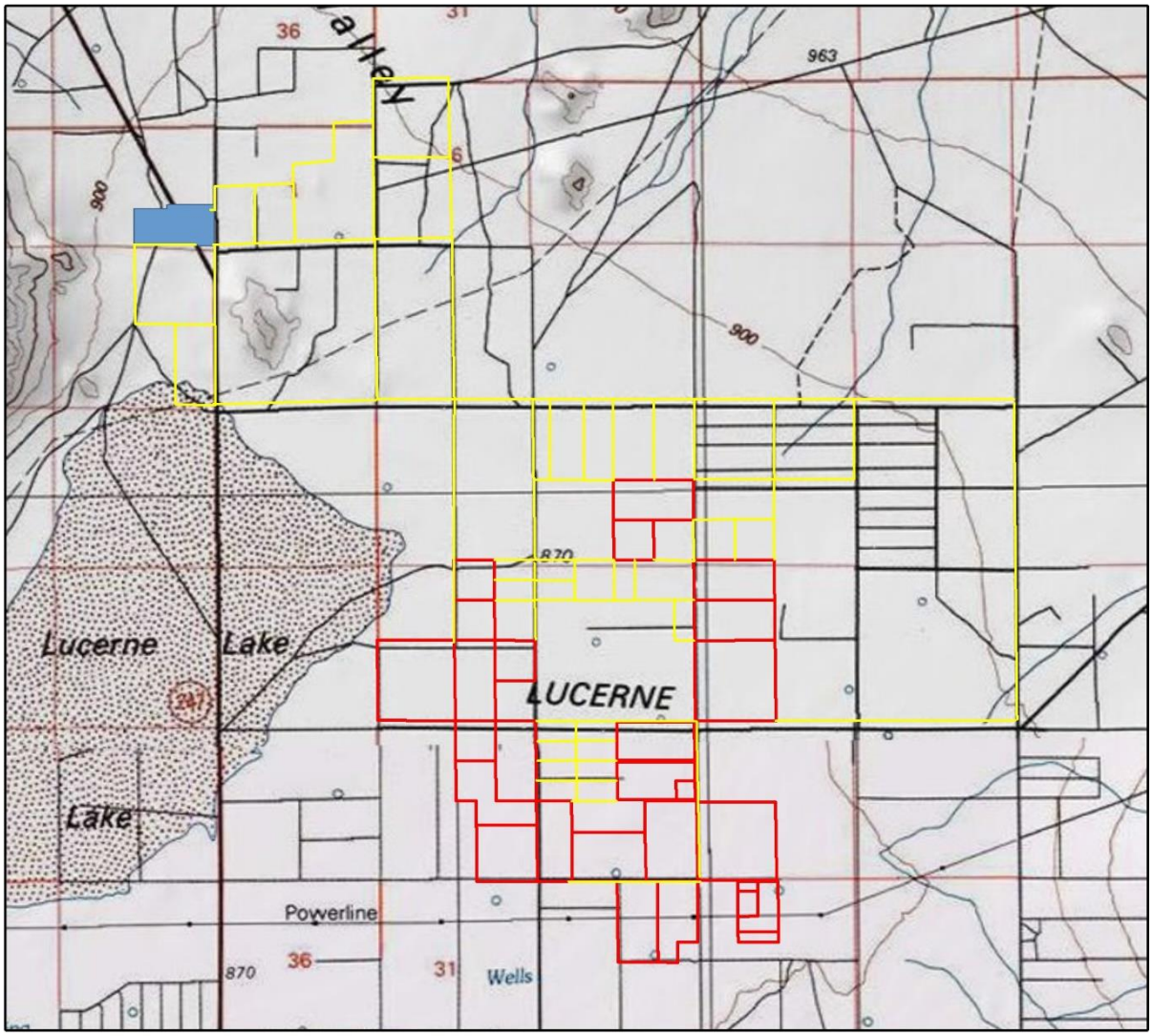
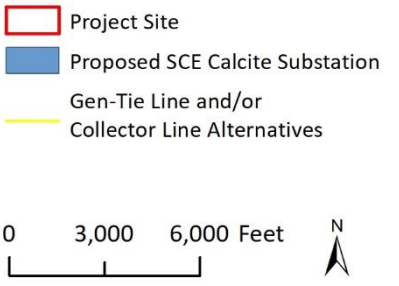


Figure 3 Project Location (Topographic Map)



Basemap provided by National Geographic Society, Esri, and their licensors © 2023.



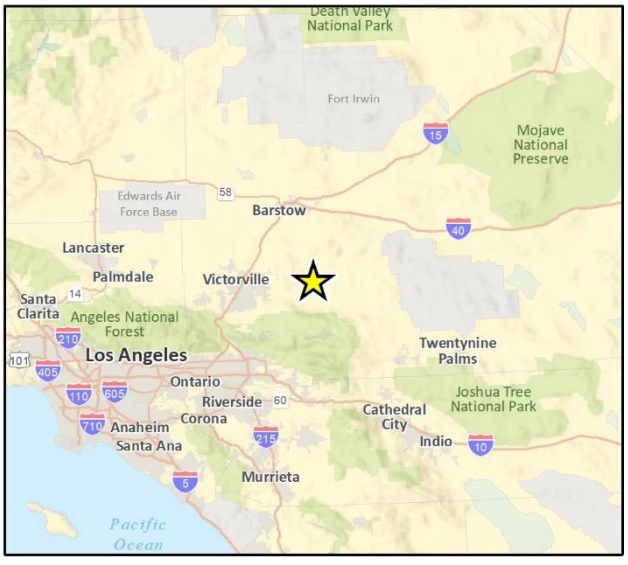


Fig 3 Regional Location Topo

Table 1 Parcels within the Project Area

APN	Acreage (per Assessor's Map)	APN	Acreage (per Assessor's Map)
45207120	40.201988	45211217	8.8374063
45207119	40.21116	45211317	151.40044
45207111	154.92994	45212112	80.724638
45207125	40.206093	45212142	70.847518
45207110	80.411658	45212138	5.0164927
45206223	80.447237	45212139	12.554045
45206221	40.207435	45212148	33.286326
45206222	76.437885	45212152	10.188996
45206224	84.470432	45237101	161.27385
45211220	70.208881	45236147	80.707295
45211224	89.9045	45236146	80.667639
45211225	103.44547	45239109	39.915267
45211219	73.471912	45239108	80.023993
45211218	64.725183		

1.2.1 Topography

The Project area is located in the southwestern portion of Mojave Desert in and near Lucerne Dry Lake. The area is in a rain shadow formed by the adjacent mountains and features alkaline soils. This high desert ecological subregion is characterized by arid scrub, creosote bush scrub, playas, and desert washes. The site is primarily located on the floor of the Lucerne Dry Lake, and along its eastern and northern margins. Topography is mostly flat to gently sloped along the dry lake margins. The Granite Mountains and White Horse Mountain are west of the site, and Peterman Hill is within the gen-tie matrix, east of Barstow Road. Elevation at the site ranges between 2,850 and 2,910 feet above mean sea level.

The dry lakebed is heavily used for recreational activities, including off highway vehicle (OHV) travel (including racing) and assorted day use and camping activities. The Rocketry Organization of California (ROC) uses the dry lake as one of its designated launch sites, with scheduled launches occurring monthly throughout the year. Additionally, areas outside the dry lake within the Project area are also subject to various ongoing disturbances related to road maintenance, utility activities (electrical transmission towers and lines; underground gas pipeline), recreation, OHV travel, and illegal dumping.

1.2.2 Watershed and Drainages

Hydrology of the site and vicinity was evaluated through review of topographic maps, aerial photos, the National Hydrography Dataset (USGS 2021), and the National Wetland Inventory (USFWS 2021c), in conjunction with field survey data.

The site is located within the central portion of the Lucerne Lake watershed, Hydrologic Unit Code [HUC] 181001000404. It is located within the Este hydrologic groundwater sub-basin, a hydrologic subarea of the Mojave Groundwater Basin which contains two primary groundwater basins separated by a fault (Mojave Water Agency [MWA] 2005). The groundwater below the site is stored

in an aquifer within the Lucerne Valley Groundwater Basin (LVGB). The northern portion of the site extends slightly outside of the LVGB. Water is provided to the residents of Lucerne Valley from groundwater pumping (MWA 2005).

The majority of the site is mostly level and slope gradients across the site are extremely low. Thirty-nine small, shallow, ephemeral streams drain generally to the west and southwest in the direction of the dry lakebed. The streams convey water flows only during and immediately after high precipitation events. Hydromodification, primarily from roads, has fragmented stream flow in areas north and west of the dry lakebed. Road maintenance activities include clearing and blading which create large soil berms on each side of the roads, which blocks flow in most of the drainages at the road edge. Additionally, OHV tracks interrupt the flow of small shallow channels.

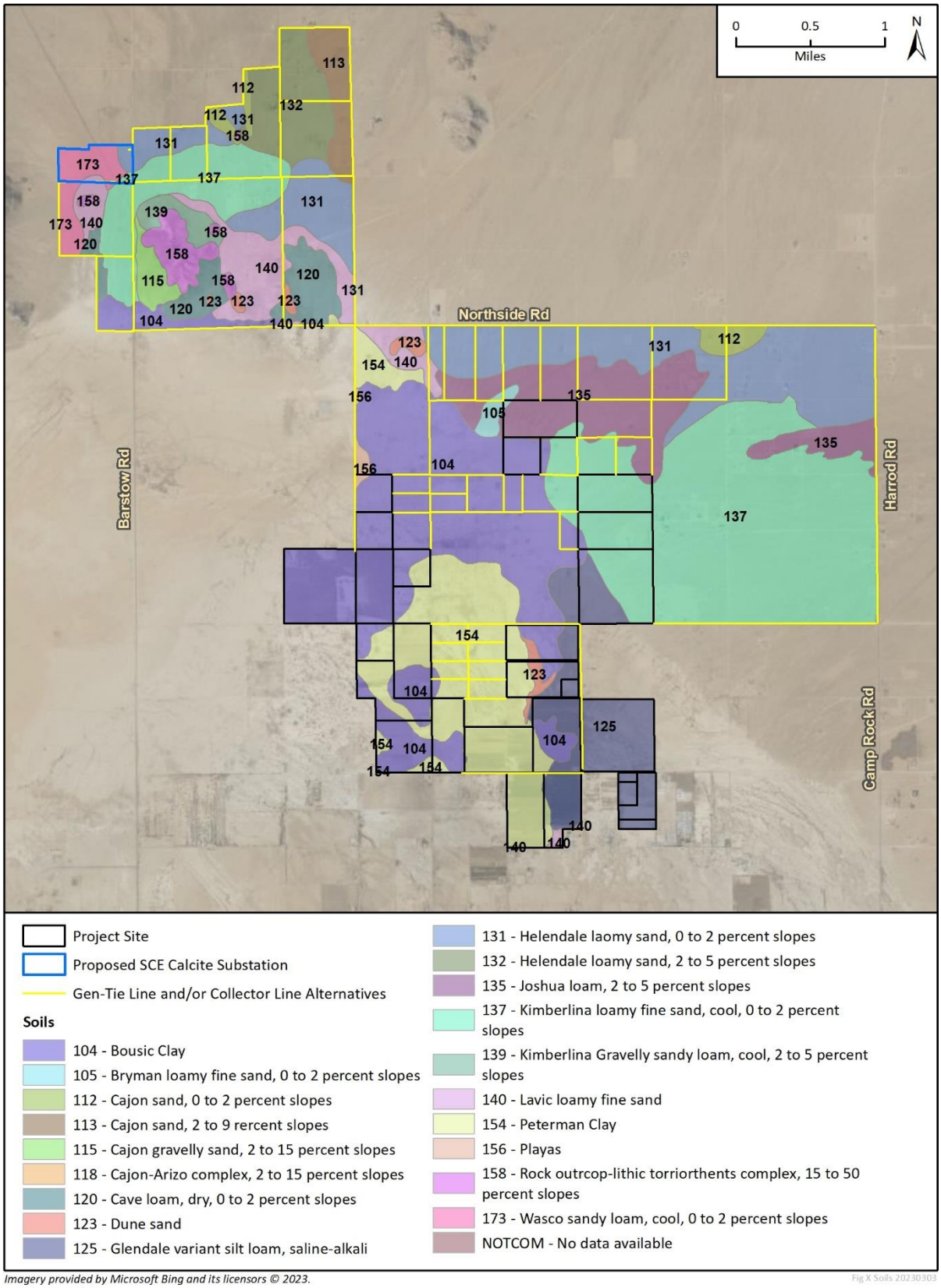
1.2.3 Soils

The U.S. Department of Agriculture (USDA) National Resource Conservation Service (NRCS) has mapped and inventoried soils at both landscape (coarse) scales and detailed (fine) scales. This data are catalogued in previously published soil surveys, the Soil Survey Geographic Database, and the U.S. General Soil Map. These can be accessed through the Web Soil Survey Application (USDA NRCS 2021a). This subsection summarizes soil resources as mapped by the NRCS that overlap the site at the landscape level.

The site is covered by the *Soil Survey of San Bernardino County, California, Mojave River Area*. The soil survey indicates that soils in the Lucerne Valley floor are primarily derived from alluvium parent materials from granitic sources and other mixed sources. Within the Project area, soils are associated with alluvial fans, toe slopes, playas, and other gently sloped landforms. Based on Web Soil Survey data, the site contains 19 soil map units, which are briefly described below. Soil map units across the site are shown on Figure 4.

Hydric soils are defined by the National Technical Committee for Hydric Soils as soils that in their undrained condition, are saturated, flooded, or ponded long enough during a growing season to develop anaerobic conditions that support the growth and regeneration of hydrophytic vegetation (59 Federal Register 16835). Soils that are sufficiently wet to support the growth and regeneration of hydrophytic vegetation due to artificial measures are included in the concept of hydric soils on the list “Hydric Soils of the United States” (National List) (USDA NRCS 2021b). Soils are identified for inclusion on the list based on specific criteria established by law (67 Federal Register 58756). The National List is “a compilation of all map units with either a major or minor component that is at least in part hydric. …Because the list includes both major and minor (small) percentages for map units, in some cases most of the map unit may not be hydric… Some components may be phases of soil series that have a range of characteristics… therefore, only a portion of that component’s concept (or range in characteristics) may in fact be hydric. The list is useful in identifying map units that may contain hydric soils.”

Figure 4 Soils Map



Imagery provided by Microsoft Bing and its licensors © 2023.
Soil data provided by SSURGO, NRCS, USDA, 2021.

Fig X Soils 20230303

At least one minor component of the following soil map units have been identified as hydric when they occur in depressions or playas that are during the growing season:

- Bousic Clay; Cajon Sand
- Cave Loam, Dry, 0 to 2 Percent Slopes
- Lavic Loamy Fine Sand
- Peterman clay
- Playas

The majority of the dry lakebed is mapped as "Playas", which may have hydric components. However, the dry lakebed is not frequently ponded for long or very long durations. During and immediately after infrequent heavy rainfall, low volumes of water appear to collect in the lowest elevations for brief durations. The dry lakebed contains a dense, hardpan layer of clay soil. The soils contain a high alkaline pH, and high levels of salts. Therefore, these soils often do not form hydric soil indicators even when saturated for extended periods.

Bousic Clay

This soil map unit typically occurs on toeslopes of lake plains and talfs (geomorphic components of an essentially flat and broad area dominated by closed depressions) in low areas with very little slope. The dominant soil series, Bousic clay, is formed in alluvium from mixed sources. A typical soil profile consists of clay horizons to at least 60 inches of depth. This soil is well drained, alkaline, and strongly saline. Minor components within this map unit are Peterman soils.

Bryman Loamy Fine Sand, 2 to 5 Percent Slopes

This granitic soil map unit usually occurs on terraces and older alluvial fans, at elevations from 2,800 to 3,800 feet. A typical soil profile consists of a pale topsoil layer that is loamy or sandy. The second horizon is usually pink to reddish brown and is generally sandy clay loam, loam or gravelly sandy loam. The third horizon is pale yellowish brown to strong brown, is usually alkaline, and may be loamy coarse sand to sand.

Cajon Sand, 0 to 2 Percent Slopes

This soil map unit typically occurs on alluvial fans on gentle slopes. The dominant soil series, Cajon sand, is formed in alluvium from granitic sources. A typical soil profile consists of sandy topsoil, underlain by a second sand horizon to approximately 25 inches, with layers of gravelly sand, stratified sand and loamy fine sand below to at least 60 inches of depth. This soil is somewhat excessively drained. Minor components within this map unit are Manet, Kimberlina, and Helendale soils.

Cajon Sand, 2 to 9 Percent Slopes

This soil map unit is similar to the Cajon map unit except it occurs on slightly greater slopes (2 to 9 percent) and may have more layers of stratified gravelly sand in the subsoil.

Cajon Gravelly Sand, 2 to 15 Percent Slopes

This soil map unit is similar to the previous two Cajon map units except it occurs on slightly greater slopes (2 to 15 percent) and the topsoil and subsoil horizons have increased gravel content.

Cajon-Arizo Complex, 2 to 15 Percent Slopes

This soil map unit occurs on alluvial fans in high desert settings. The soil unit is 55 percent Cajon gravelly sand and 30 percent Arizo gravelly loamy sand with Cajon soils in wide margins of alluvial fans and Arizo soils in upper positions of alluvial fans near the mountains or foothills. The surface layer is typically pale brown gravelly loamy sand sitting on top of very gravelly pale brown loamy sand. Minor components within this map unit are Helendale, Bryman, and Joshua soils.

Cave Loam, Dry, 0 to 2 Percent Slopes

This soil map unit typically occurs on alluvial fan remnants on gentle slopes. The dominant soil series, Cave loam, is formed in alluvium from granitic sources. A typical soil profile consists of loam topsoil, underlain by stratified sandy loam to loam subsoil between 21 and at least 66 inches of depth. This soil is well drained, and very slightly to slightly saline. Minor components within this map unit are a Cave soil with clayey subsoil, Kimberlina, and Lavic soils.

Dune Sand

This soil map unit consists of unstable hills and ridges of loose, wind-deposited sand that is excessively drained and barren. Dunes are typically less than 15 feet high, and slopes are between 5 to 15 percent. Minor components within this map unit are Cajon sand, Riverwash and Villa loamy sand along the Mojave River, and Halloran soils.

Glendale Variant Silt Loam, Saline-Alkali

This soil map unit occurs on basin rims and lower margins of narrow alluvial fans with slopes ranging from 0 to 2 percent with vegetation consisting of salt-tolerant shrubs, grasses, and forbs. Soil profiles are very pale brown silt loam down to 11 inches with underlying material consisting of light yellowish brown and pale brown silty clay loam. Surface layer and underlying layers are moderately or strongly alkaline. Minor components within this map unit are small areas of Lavic soils. This soil is suited for irrigated crops in areas where they are reclaimed.

Helendale Loamy Sand, 0 to 2 Percent Slopes

This soil map unit typically occurs on alluvial fan remnants on gentle slopes. The dominant soil series, Helendale loamy sand, is formed in alluvium from granitic sources. A typical soil profile consists of loamy sand topsoil, underlain by sandy loam subsoil between 4 and at least 66 inches of depth. This soil is well drained, and non-saline to very slightly saline. Minor components within this map unit are Bryman, Kimberlina, and Cajon soils.

Helendale Loamy Sand, 2 to 5 Percent Slopes

This soil map unit occurs on alluvial fans and terraces and is derived primarily from granitic material. Slopes are broad and nearly level with many areas dissected by shallow intermittent drainageways. Vegetation is primarily yucca, desert shrubs, grasses, and forbs. The surface layer is very pale brown loamy sand about 4 inches thick with subsoil and the upper part of the substratum are brown, yellowish brown, and light yellowish brown sandy loam about 62 inches thick. Clay content decreases below a depth of 30 inches. Minor components include Bryman, Kimberlina, and Cajon soils.

Joshua Loam, 2 to 5 Percent Slopes

This soil map unit occurs on old stable terraces that have desert pavement. It formed in alluvium derived from mixed sources with broad, slightly convex slopes. Most areas are dissected by moderately deep intermittent drainageways. Typically, 70-90 percent of the surface layer is covered by desert pavement with a light yellowish-brown loam about 3 inches thick. Subsoils are brown and reddish brown gravelly sandy clay loam around 17 inches thick. These soils are often strongly alkali. Minor components within this map unit are Cajon soils.

Kimberlina Loamy Fine Sand, Cool, 0 to 2 Percent Slopes

This soil map unit typically occurs on skirts and aprons of alluvial fans on gentle slopes. The dominant soil series, Kimberlina loamy fine sand, is formed in alluvium from mixed sources. A typical soil profile consists of loamy fine sand topsoil, underlain by sandy loam, fine sandy loam, and loam subsoil between 7 and at least 60 inches of depth. This soil is well drained, and non-saline to very slightly saline. Minor components within this map unit are Helendale and Cajon soils.

Kimberlina Loamy Fine Sand, Cool, 2 to 5 Percent Slopes

This soil map unit is similar to the Kimberlina map unit except it occurs on slightly greater slopes (2 to 5 percent) and may have more layers of stratified gravelly sand in the subsoil.

Lavic Loamy Fine Sand

This soil map unit typically occurs on skirts and aprons of alluvial fans on gentle slopes. The dominant soil series, Lavic loamy fine sand, is formed in alluvium from granitic sources. A typical soil profile consists of loamy fine sand topsoil, underlain by multiple layers of sandy loam, loamy fine sand, loamy sand and loam subsoil between 10 and at least 49 inches of depth. This soil is well drained, and slightly to moderately saline. Minor components within this map unit are unnamed soils.

Peterman Clay

This soil map unit typically occurs on skirts of alluvial fans on gentle slopes. The dominant soil series, Peterman clay, is formed in fine-textured alluvium from mixed sources. A typical soil profile consists of clay topsoil, underlain by clay and gravelly clay subsoil to at least 60 inches of depth. This soil is moderately well drained, alkaline, and strongly saline. Minor components within this map unit are unnamed soils.

Playas

This soil map unit consists of playa areas consisting of lacustrine deposits derived from mixed sources. Minor components within this map unit are Bousic, Norob, and Halloran soils.

Rock Outcrop – Lithic Torriorthents Complex, 15 to 50 Percent Slopes

This soil map unit typically occurs on summits, backslopes and flanks of mountains on moderate to steep slopes. This map unit does not contain named soils. Rock outcrops, typically granitic, are interspersed with minimally developed soil underlain by bedrock within 8 to 20 inches of the soil surface. Minor components within this map unit are Sparkhule, and Trigger soils.

Wasco Sandy Loam, Cool, 0 to 2 Percent Slopes

This soil map unit typically occurs on aprons of alluvial fans on gentle slopes. The dominant soil series, Wasco sandy loam, is formed in alluvium derived from granite. A typical soil profile consists of sandy loam topsoil, underlain by additional sandy loam horizons to at least 60 inches of depth. This soil is well drained, and non-saline to very slightly saline. Minor components within this map unit are Cajon, Lucerne, and Bryman soils.

1.2.4 Climate

The Lucerne Valley has an arid climate characteristic of the California high desert. A nearby weather station in nearby Victorville (National Weather Service Cooperative Weather Station 049325) has recorded weather conditions since at least 1939 (Western Regional Climate Center (WRCC) 2021). Average high temperatures range from 58.86 degrees Fahrenheit (°F) in January to 98.16°F in July, while average low temperatures range from 29.63 °F in December to 61.24°F in July

Climate data for the Lucerne Valley obtained from four sources, including the Western Regional Climate Center (WRCC 2021), WeatherBase (WeatherBase 2021), Climate-Data (Climate-Data 2021), and Intellicast (Intellicast 2021), indicate that average annual rainfall in the vicinity is approximately 6.04 inches and average annual snowfall is approximately 2.03 inches.

1.2.5 Surrounding Land Uses

The Project area includes areas zoned as Lucerne Valley/Resource Conservation (LV/RC), Lucerne Valley/Rural Living (LV/RL), and Lucerne Valley/Agriculture (LV/AG) (San Bernardino County 2016). Portions of the gen-tie corridor routes are also in areas zoned as Lucerne Valley/Rural Living – 5 Acre Minimum (LV/RL-5) and Lucerne Valley/Agriculture- 40 acre minimum (LV/AG-40). Primary uses in and immediately surrounding the Project area are rural residential, recreation, open space, and transportation corridors.

2 Focus Study/Species of Concern

Rincon conducted a literature review including relevant lists from U.S. Fish and Wildlife Service (USFWS) and the California Natural Diversity Database (CNDDB) for baseline information on biological resources potentially occurring on the Project area and in the immediate surrounding area. The review included information available in peer-reviewed journals, standard reference materials, and applicable conservation plans. Details of this review and the resulting list of potentially occurring species are provided in Section 4 and Appendix D.

Rincon conducted informal consultation with the California Department of Fish and Wildlife (CDFW) and USFWS through written notification of the proposed surveys and studies to be conducted for the Project. Rincon provided each agency with a memo submitted on July 16, 2021, outlining the proposed surveys, protocol, and approach to analyses for species relevant to each agency. Neither agencies have responded to the memos as of November 5, 2021. Consultation letters are provided in Appendix E.

3 Methodology

Biological conditions were evaluated by confirming applicable regulations, policies, and standards; reviewing biological literature and querying available databases pertinent to the Project area and vicinity (within 5 miles for CDFW's California Natural Diversity Data Base [CNDDB] and 9 topographic quadrangles for California Native Plant Society's [CNPS] Inventory of Rare and Endangered Plants); and conducting a reconnaissance-level biological survey of the Project area. This assessment provides the existing biological conditions of the Project area at the time of the literature review and reconnaissance surveys. The methods employed are described in detail below. The findings and opinions conveyed in this report are based on this methodology.

3.1 Literature Review

Prior to conducting the biological field survey for this BRA, Rincon reviewed a variety of literature to obtain baseline information about the biological resources with potential to occur at the Project area and in the surrounding areas. Rincon conducted queries of several relevant databases that provide information about occurrences of special status biological resources:

- CDFW's CNDDB (CDFW 2021a)
- CDFW's Biogeographic Information and Observation System (BIOS) (CDFW 2021b)
- U.S. Fish and Wildlife Service's (USFWS) Critical Habitat Mapper (USFWS 2021a)
- USFWS' Information for Planning and Consultation (IpaC) query (USFWS 2021b)
- USFWS' National Wetlands Inventory (NWI) (USFWS 2021c)
- U.S. Department of Agriculture (USDA), Natural Resource Conservation Service's (NRCS) Web Soil Survey (NRCS 2021a)
- Calflora's What Grows Here (Calflora 2021)
- California Native Plant Society's (CNPS) Online Inventory of Rare and Endangered Plants of California (CNPS 2021)

The Project area is located within the boundaries of the Desert Renewable Energy Conservation Plan (DRECP), a joint collaboration between the California Energy Commission, BLM, USFWS, and CDFW. In preparation of the DRECP, habitat models were developed to assess impacts to listed species and inform project planning and project alternatives where there is a lack of adequate data on species distribution. The DRECP is currently only implemented on BLM lands; however, the habitat suitability and range models can provide valuable information on the predicted distribution of listed species within the Project area.

Rincon biologists conducted a search and review of the CNDDB for recorded occurrences of special-status plant taxa (species, varieties, and subspecies) and wildlife species prior to conducting field surveys. The CNDDB is based on recorded occurrences of special-status taxa and does not constitute an exhaustive inventory of biological resources for any given area. The list of potentially occurring special-status plants and animals was developed based on the 5-mile radius CNDDB search area and included regional habitat and vegetation diversity and was supplemented by other data and expert knowledge of Rincon biologists. Other data included database search results from the CNPS online Inventory of Rare and Endangered Plants of California (CNPS 2021) for the *White Horse Mountain,*

Grand View Mine and Lucerne Valley, California USGS 7.5-minute quadrangles (quad), and the ten surrounding quads, and results of a query of the USFWS website (USFWS 2021b) for Federally listed species occurring in San Bernardino County.

Rincon compiled a list of special-status plants species that have the potential to occur on the Project area and adjacent areas using the database searches conducted during the literature review as well as Rincon biologists' knowledge of local ecology, project elevation and regional setting, and botanical conditions. For the purposes of this report, special status plant taxa are those that are: 1) listed, proposed for listing, or candidates for listing as threatened or endangered by the USFWS under the FESA; 2) listed or proposed for listing as rare, threatened, or endangered by the CDFW under the CESA; and/or 3) CNPS California Rare Plant Rank (CRPR) 1B and 2.

The list of special-status plants was cross-referenced with the CDFW Special Vascular Plants, Bryophytes, and Lichens List (CDFW 2021d) to verify rarity status for each special status plant with potential to occur on-site. Habitat requirements and flowering periods for special status plant taxa were obtained from the CNPS online Inventory of Rare and Endangered Plants of California (CNPS 2021), The Jepson Desert Manual (Baldwin et al. 2002), The Jepson Manual, Second edition (Baldwin et al. 2012), and the Calflora Online Species Database (Calflora 2021). Based on the information contained within these databases and inventories, Rincon biologists conducted an evaluation of the potential for occurrence within the Project area based upon each species' local distribution and habitat requirements (e.g., vegetation community type, soil type, elevation above mean sea level, etc.).

3.2 Field Reconnaissance Survey

On July 20, 21, and 22, 2021, Rincon biologists conducted field reconnaissance surveys in the Project area (Table 2). Because the Project area covers a large area, surveys were conducted on three consecutive days. Due to the timeframe for the proposed Project application, surveys could not be conducted within species-specific protocol windows. Therefore, focused protocol surveys were not conducted. Habitats on-site were mapped at a general level of scale. Specifically, the surveys focused on documenting existing conditions and biological resources, evaluating the Project area for potential to support special-status plant and wildlife species, and identifying special-status vegetation communities and potentially jurisdictional resources.

Prior to conducting the reconnaissance survey, Rincon biologists reviewed aerial photographs and database search results for special-status species records in the vicinity of the Project. The reconnaissance surveys consisted of a combination of vehicular surveys and pedestrian transects. Vehicular "windshield" surveys were conducted along gen-tie routes and in areas where vegetation cover and diversity were low. Pedestrian transects were conducted in areas containing higher vegetation diversity and cover, allowing biologists to ground-truth preliminary mapped vegetation communities and identify approximate community boundaries within natural areas. Additionally, biologists evaluated the general health and level of existing disturbances of the vegetation communities and evaluated the various habitats for their ability to support special status species. Biologists documented any sign of the presence of special status species within the proposed Project boundary. Biologists visually evaluated the entire Project area and all alternative gen-tie corridors. Results of the surveys were used to identify suitable habitat for special-status species that may require focused protocol surveys or other more involved analyses, and to develop a research approach for evaluating existing biological resources in the Project area.

Representative photographs were taken to document vegetation communities, species sign, or other notable biological resources observations. Photographs as well as a figure depicting photo point, burrow point, and species point locations are included in Appendix B. Compendia of plants and wildlife observed during surveys are included in Appendix C of this report. Details of the surveys (including dates, staff, and weather conditions) are presented in Table 2 below. Survey methods are described in greater detail below in Section 3.2.1 and Section 3.2.2.

Table 2 Survey Summaries

Survey	Date	Personnel	Time and Weather Conditions	
General Reconnaissance Survey and Vegetation Mapping	7/20/21	A, Trost, J. Hargis, S. Toback, J. Saavedra-Alvarado	Time: Temperature: Skies: Wind:	7:15-14:30 75-100°F Clear 0-6 mph
General Reconnaissance Survey	7/21/21	A, Trost, J. Hargis, S. Toback, J. Saavedra-Alvarado	Time: Temperature: Skies: Wind:	6:45-14:15 77-102°F Clear 2-7 mph
General Reconnaissance Survey	7/22/21	A, Trost, J. Hargis, S. Toback, J. Saavedra-Alvarado	Time: Temperature: Skies: Wind:	6:30-12:00 75-97°F Partly cloudy 0-7 mph

3.2.1 Vegetation

Rincon conducted preliminary vegetation mapping of the Project area during the field reconnaissance surveys. Rincon completed an initial desktop vegetation mapping of the Project area based on aerial imagery. The preliminary desktop mapping was verified and refined during reconnaissance surveys. Field-based vegetation mapping and verification consisted of a combination of windshield surveys of ruderal and developed portions of the Project area, and meandering pedestrian transects of natural habitat areas to generally characterize the distribution of natural vegetation communities, habitats, residential development, and other disturbed areas on the Project area. All mapped boundaries of vegetation communities and land-cover types, and associated acreages presented in this report are approximate. Meandering pedestrian transects were conducted in areas containing natural habitat, which allowed for a more thorough assessment to distinguish vegetation communities and identify approximate community boundaries within natural areas. Natural vegetation communities identified in this report were classified based on the classification system presented in A Manual of California Vegetation, Second Edition (Sawyer et al. 2009).

Initial identification of plant taxa was accomplished in the field through examination of morphological characteristics and reference of regional plant field guides and dichotomous keys. Those specimens that could not be positively identified in the field were identified off-site using regional plant field guides, dichotomous keys, and a dissecting microscope. All species were identified to the level of determining rarity status. Taxonomic nomenclature used in species identification was based on Baldwin et al. (2002), Baldwin et al. (2012), and updates from the Jepson Online Interchange (UCB 2021).

3.2.2 Wildlife

General wildlife surveys were conducted through incidental observations made during the reconnaissance surveys with particular attention on native habitat and those areas with lower levels of disturbance and a higher likelihood of supporting special-status species, particularly burrowing owl, desert tortoise, and desert kit fox. Rincon biologists conducted vehicular windshield surveys and walked a variety of meandering transects during the reconnaissance surveys. Animal species observed directly or detected from calls, tracks, scat, nests, or other signs were documented. Zoological nomenclature for birds is in accordance with American Ornithologists' Union (AOU) Checklist of North American Birds (AOU 2021); for mammals is in accordance with Mammals of California (Wilson and Reeder 2005); and for amphibians and reptiles is in accordance with Society for the Study of Amphibians and Reptiles' (SSAR) Checklist of the Standard English & Scientific Names of Amphibians & Reptiles (SSAR 2017).

3.3 Jurisdictional Waters

On July 20 through 22, 2021, Rincon regulatory specialists and wetland biologists evaluated the Project area for the presence of potential jurisdictional areas subject to regulatory agency jurisdiction, including the USACE, Lahontan Regional Water Quality Control Board (LRWQCB), and CDFW. Rincon biologists also documented the locations of potential areas and features that warranted closer examination during subsequent surveys. A range of delineation techniques were used. In general, the surveys were conducted by driving throughout the site to selected areas where representative samples of potential jurisdictional ephemeral streams were identified during the pre-field literature review, including the streambeds mapped in the NWI and NHD. Existing baseline datasets such as the NWI and NHD were mapped at coarser scales than are appropriate for accurately delineating jurisdictional features, such as top of bank, and some older datasets have not been updated to reflect current land use conditions. Nonetheless, these datasets can provide important baseline information.

Rincon imported the locations of potential jurisdictional features into a global positioning system (GPS)-enabled tablet displayed over high-resolution aerial imagery to allow for evaluation of those features in the field. These features, and any other potential jurisdictional features that were encountered during the survey, were examined for the presence of defined channels with characteristic bed and bank features and indicators of water flow. Potential jurisdictional streams were mapped on recent aerial photographs. The landforms, vegetation, hydrology, and soil conditions were noted where these characteristics were relevant to identification of the feature. A handheld GPS unit with sub-meter horizontal accuracy was also used to record locations and collect general data, and to guide digitization of features with a geographic information system (GIS) software package. A summary of status of jurisdictional features in the Project area is presented within this GBRA. A full jurisdictional delineation report is presented under separate cover.

4 General Biological Survey Results

Based on the database and literature review, in conjunction with Rincon knowledge and expertise, Rincon identified 72 special-status plant species and 10 special-status wildlife species that required evaluation for potential to occur in the Project area. Special-status plant and wildlife species recorded within the vicinity of the Project area by the CNDDB, CNPS, or otherwise known to occur in the Project area, are listed in Appendix D.

4.1 Vegetation

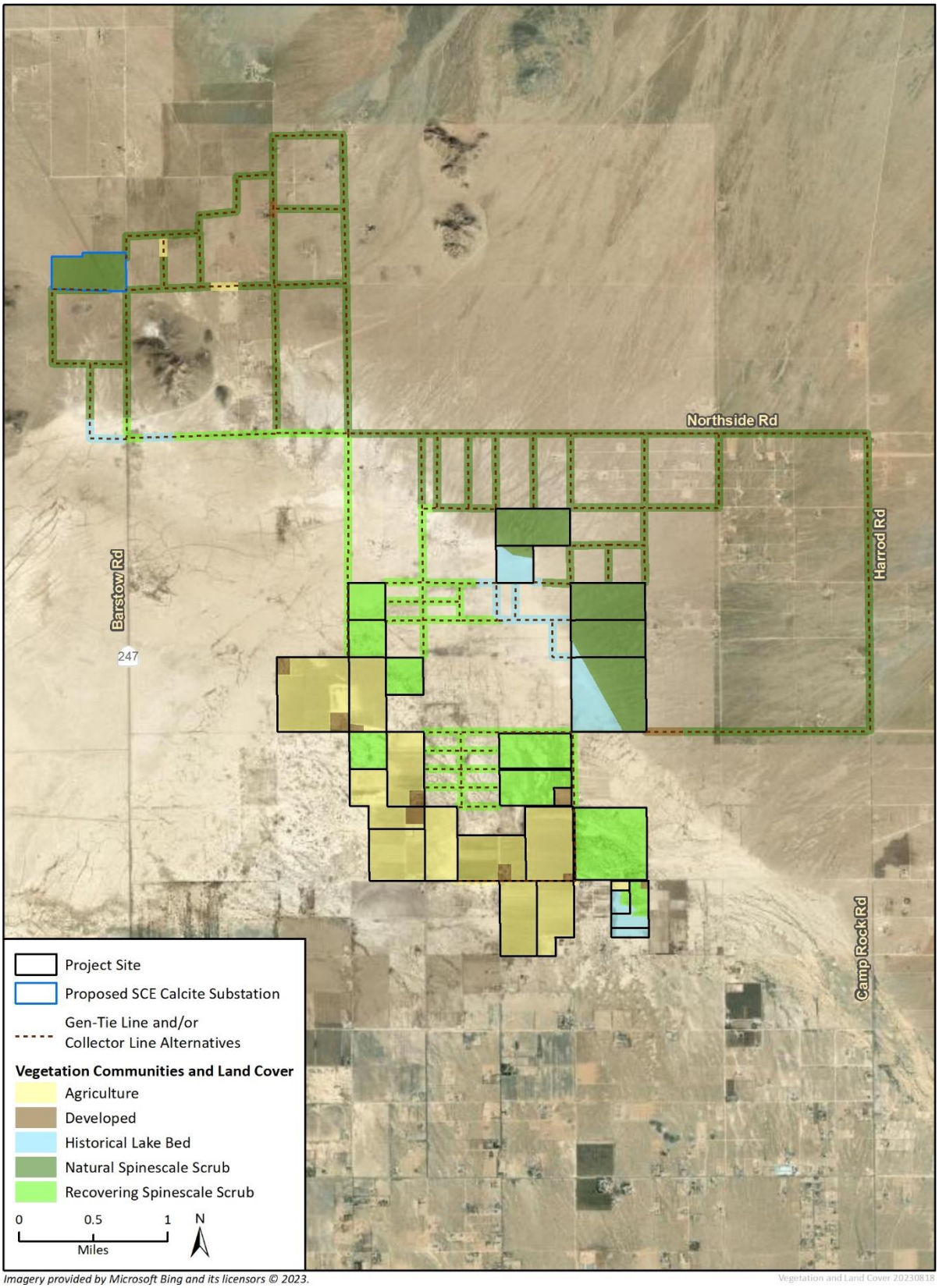
Vegetation types in the Mojave Desert are strongly influenced by arid climatic conditions and desert soils. Vegetation in the region includes a predominance of plant morphological adaptations to extreme aridity (e.g., waxy or resinous leaf cuticles, drought deciduous or succulent plants, woolly leaf pubescence, deep tap root systems, etc.) and saline-alkali soils (e.g., salt excretion, active transport systems, etc.). Vegetation structure is generally characterized by short-statured and widely spaced shrubs and arborescent shrubs resulting from a competition for soil water resources (Baldwin et al. 2012). Three vegetation types contribute to 75 percent of the land cover in the Mojave Desert region: Mojave creosote bush (*Larrea tridentata*) scrub (16,398 square miles), Mojave mixed woody scrub (Joshua tree woodland; 3,646 square miles), and desert saltbush (*Atriplex* spp.) scrub (1,510 square miles) (Davis et al. 1998). Other common vegetation types occurring in the region include desert and valley sink scrub, Mojave Desert wash scrub, and Mojave mixed steppe (Holland 1986). The primary disturbed or nonnative vegetation/land cover types within the Mojave Desert include annual grasslands, agricultural lands, and developed areas.

Desert-adapted plant species often show low resilience to disturbance, typically requiring long periods to recover. Often, full recovery to a natural community fails and the community follows successional pathways towards alternative stable states dominated by invasive species (Beisner et al. 2003; Chartier and Rostagno 2006). Portions of the Mojave Desert that were at one time cleared for agriculture or other development currently consists of moderate to highly degraded conditions, and often contain a high proportion of associated invasive, nonnative species (Thomas et al. 2004).

Rincon biologists recorded and identified a total of 16 plants during the reconnaissance survey. Appendix C provides a list of all plant species observed.

Rincon biologists mapped one natural vegetation community within the Project area: spinescale scrub (*Atriplex spinifera* Shrubland Alliance). This vegetation community consists of natural spinescale scrub outside of the historic limits of the dry lake, and areas of recovering spinescale scrub located within the historical lakebed. Three additional land cover types that did not meet the membership rules for classification as one of the recognized vegetation types in the Manual of California Vegetation, Second Edition (MCV2) (Sawyer et al. 2009) were also identified and mapped within the Project area. These land cover types include historical lakebed, developed, and agriculture (Figure 5). Brief descriptions of the natural vegetation community and the other land cover types present in the Project area are provided below. Appendix C provides a complete list of plant species observed during surveys. Mapping of vegetation communities and land cover along the gen-tie and collector line alternative routes was completed at a course scale and shows the dominant land cover within the 300-foot corridor. Acreages of land cover types along these alternative routes have not been included in the project acreage tallies listed below.

Figure 5 Vegetation Communities and Land Cover Types



Spinescale Scrub (*Atriplex spinifera* Shrubland Alliance)

Spinescale scrub is found throughout portions of the Project area (Figure 5). Associated shrub species include burrobush (*Ambrosia salsola*), allscale saltbush (*Atriplex polycarpa*), California jointfir (*Ephedra californica*), alkali heath (*Frankenia salina*), San Joaquin snakeweed (*Gutierrezia californica*), alkali goldenbush (*Isocoma acradenia*), and budsage (*Picrothamnus desertorum*). Within the Project area, this vegetation community was often interspersed with varying amounts of creosote bush (*Larrea tridentata*). This vegetation community is often found on alluvial fans and old lake beds (Sawyer et al. 2009). Within the Project area, the spinescale scrub vegetation community can be divided into two distinct types: natural spinescale scrub and recovering spinescale scrub.

Natural Spinescale Scrub

The natural spinescale scrub vegetation community is located in the northern portion of the Project area in the proposed substation development area and in the eastern parts of the Project area (Figure 5). The natural spinescale scrub vegetation community generally consists of a dense shrub canopy layer and moderate levels of vegetation diversity. Human disturbances such as vehicle tracks, trash dumps, and man-made berms related to surrounding residential and agricultural development. The least disturbed portions of natural spinescale scrub with the highest vegetation diversity currently exists within the northern portion. Soils in these areas consist mainly of loamy sand (Figure 4). This vegetation community comprises 422 acres of the Project area.

Recovering Spinescale Scrub

The remaining spinescale scrub vegetation community is located within the historical lakebed throughout the central and southern portions of the Project area and displays varying levels of disturbance (Figure 5). The spinescale scrub is these areas is characterized by a sparse shrub canopy layer, signs of human disturbance, and clay-dominated soils. Overall, this vegetation community is low quality due to high levels of disturbance and low vegetation diversity. This vegetation community comprises 471 acres of the Project area.

Historical Lakebed

This land cover type consists of the dry bed of Lucerne Lake, which is largely unvegetated. Soils are very alkaline due to repeated inundation and evaporation events. What little vegetation is present is concentrated within cracks in the soils and low points where water is present for longer durations. Common species include bush seepweed and spinescale scrub. This land cover type comprises 132 acres of the Project area.

Developed

This type of land use typically does not contain naturally occurring vegetation communities and is typically graded, and in many cases is bordered by ruderal vegetation. These areas tend to have high levels of disturbance immediately adjacent to structures. Within the Project area, developed areas consist of roadways, cleared areas, pull-outs, road shoulders, and residential development. Fifty-four (54) acres of developed land and 0.5-mile of paved roads are present in the Project area.

Agriculture

This type of land use is occupied by agricultural development. Within the Project area, agricultural areas include fallow fields and land currently being maintained for agricultural purposes. Eight hundred and fifty-three (853) acres of agriculture are present in the Project area.

4.2 General Wildlife

The desert scrub communities in the vicinity of the Project area support a wide variety of reptiles, birds, and mammals. Common reptiles observed or expected to occur include, but are not limited to, side-blotched lizard (*Uta stansburiana*), western whiptail (*Aspidoscelis tigris*), desert spiny lizard (*Sceloporus magister*), Mojave green rattlesnake (*Crotalus scutulatus*), zebra-tailed lizard (*Callisaurus draconoides rhodostictus*), coachwhip (*Coluber flagellum piceus*), and gopher snake (*Pituophis melanoleucus*). Bird species found within the Project area include, but are not limited to, red-tailed hawk (*Buteo jamaicensis*), common raven (*Corvus corax*), horned lark (*Eremophila alpestris*), and loggerhead shrike (*Lanius ludovicianus*). Mammals occupying desert scrub habitat types are black-tailed jackrabbit (*Lepus californicus*), desert cottontail (*Sylvilagus audubonii*), white-tailed antelope ground squirrel (*Ammospermophilus leucurus*), kangaroo rats (*Dipodomys* sp.), deer mouse (*Peromyscus maniculatus*), desert kit fox (*Vulpes macrotis*), coyote (*Canis latrans*), and American badger (*Taxidea taxus*). Many of these species were observed within the Project area during the reconnaissance field surveys. Appendix C provides a complete list of wildlife species observed during surveys.

4.3 Sensitive Biological Resources

Local, State, and Federal agencies regulate special-status species and require an assessment of their presence or potential presence to be conducted on-site prior to the approval of any proposed development on a property. This section discusses sensitive biological resources observed on the Project area and evaluates the potential for the Project area to support other sensitive biological resources. Assessments for the potential occurrence of special-status species are based upon known ranges, habitat preferences for the species, species occurrence records from the CNDDB, species occurrence records from other sites in the vicinity of the survey area, and previous reports for the Project area. The potential for each special-status species to occur in the PV development, the substation parcels, and portions of the gen-tie alternatives with natural scrub habitat was evaluated according to the following criteria:

- **Not Expected.** Habitat on and adjacent to the site is clearly unsuitable for the species requirements (foraging, breeding, cover, substrate, elevation, hydrology, plant community, site history, disturbance regime).
- **Low Potential.** Few of the habitat components meeting the species requirements are present, and/or the majority of habitat on and adjacent to the site is unsuitable or of very poor quality. The species is not likely to be found on the site.
- **Moderate Potential**. Some of the habitat components meeting the species requirements are present, and/or only some of the habitat on or adjacent to the site is unsuitable. The species has a moderate probability of being found on the site.
- **High Potential.** All of the habitat components meeting the species requirements are present and/or most of the habitat on or adjacent to the site is highly suitable. The species

has a high probability of being found on the site.

- **Present.** Species is observed on the site or has been recorded (e.g., CNDDB, other reports) on the site recently (within the last 5 years).

Appendix D provides the complete list of all special-status resources with records within a 5-mile CNDDB search and 9-quad CNPS query for the Project area.

4.3.1 Special-Status Plant Species

Based on the literature review, 72 special-status plant species have been documented in the vicinity of the Project area and surrounding quadrangles. Sixty-four of these species were eliminated from the analysis due to a lack of habitat or soil requirements and/or known distribution and elevation ranges. Most of these species are known to occur in the San Bernardino Mountains and foothills to the south of the Project area, but do not occur within the Project area or within Lucerne Valley. Eight species have a low to moderate potential to occur in the natural scrub communities present on the Project area and have a CRPR ranking of 1B.1 to 2B.2. None are Federally or State-listed. This list of species consists primarily of annual herbs known to occur in Mojavean desert scrub and playa habitats.

Two species have been assessed as having a moderate potential to occur within the Project area: Beaver Dam breadroot (*Pediomelum castoreum*) and Parish's phacelia (*Phacelia parishii*).

Six species have been assessed as having a low potential to occur within the Project area: Parish's brittlescale (*Atriplex parishii*), alkali mariposa lily (*Calochortus striatus*), purple-nerve cymopterus (*Cymopterus multinervatus*), Parish's popcornflower (*Plagiobothrys parishii*), thorny milkwort (*Polygala acanthoclada*), and California alkali grass (*Puccinellia simplex*).

Of these species, four have the potential to occur within the natural and recovering spinescale scrub habitats on site: Parish's brittlescale, alkali mariposa lily, thorny milkwort, and California alkali grass. Purple-nerve cymopterus has the potential to occur within the easternmost parcels outside of the dry lakebed, particularly within areas of higher creosote concentration. Beaver Dam breadroot has the potential to occur within the northern portion, particularly within areas of higher creosote concentration. Due to alkali soil requirements, Parish's phacelia has the potential to occur within the dry lakebed and recovering spinescale habitats. Parish's popcornflower occur in very mesic sites, therefore, would only be found in very wet areas of the Project area.

No special-status plants were observed during the reconnaissance surveys.

4.3.2 Special-Status Wildlife Species

Rincon evaluated 10 special-status wildlife species for their potential to occur within the Project area. Species are considered to have special status based on a State and/or Federal listing, or because they are considered a California Species of Special Concern (SSC) or are protected by CDFW. Three special-status wildlife species were observed directly or by sign during the reconnaissance surveys. These species are:

- burrowing owl, SSC (*Athene cunicularia*)
- prairie falcon, WL (*Falco mexicanus*)
- loggerhead shrike, SSC

Four species have been assessed as having a moderate to high potential to occur within the Project area: desert tortoise (*Gopherus agassizii*), golden eagle (*Aquila chrysaetos*), Bendire's thrasher (*Toxostoma bendirei*), and Le Conte's thrasher (*Toxostoma lecontei*).

Two species have been assessed as having low potential to occur within the Project area: western mastiff bat (*Eumops perotis californicus*) and California condor (*Gymnogyps californianus*).

Two species have been assessed as not expected to occur within the Project area: silver-haired bat (*Lasionycteris noctivagans*) and Mohave ground squirrel (*Xerospermophilus mohavensis*). These species are not expected to occur within the Project area based on the absence of records within Lucerne Valley, lack of suitable habitat on site, and the location of the Project is outside of the known range of the species.

Special-status species with a moderate to high potential to occur within or adjacent to the Project area are described in detail below. Mohave ground squirrel and mountain lions (though not expected) are also discussed given their regional significance.

Desert Tortoise

The desert tortoise is a long-lived species that is slow growing with low reproductive rates. The species is found on flats, alluvial fans, bajadas, and rocky terrain throughout the Mojave Desert and in portions of the Sonoran Desert. This species has a suite of adaptations for survival in arid environments, and can regulate water, salt, and energy imbalances over short and long durations allowing individuals to meet annual energy requirements when water and food resource availability is unpredictable (Peterson 1996). Activity patterns of the desert tortoise is influenced by temperature, with daily activity patterns varying both among seasons and within seasons based on annual and daily variations in ambient temperature (Averill-Murray et al. 2002; Luckenbach 1982; Wilson et al. 1999). Plant species composition may be important for local distribution, but the communities of choice vary among populations of the species. In the Western Mojave Desert the species is often associated with creosote scrub habitat, Joshua tree woodland, and desert washes, as well as other communities (Baxter 1988; Germano et al. 1994).

The desert tortoise is Federally- and State-listed as threatened. Therefore, potential impacts to the species require incidental take permits from both the USFWS and CDFW.

The northern and eastern portions in the Project area (Figure 10)contains approximately 422 acres of suitable habitat for desert tortoise where relatively undisturbed natural desert scrub communities are present. The remaining spinescale scrub communities within the Project area are not suitable for desert tortoise. The areas of recovering spinescale and the historic lakebed exhibit high levels of human disturbance and low vegetation diversity, and do not provide the critical habitat components necessary to support desert tortoise occupation.

The CNDDB contains two occurrences of desert tortoise within 5 miles of the Project area (Occurrence No. 5, 1986, and No. 20, 1986). Given the lack of any recent records of desert tortoise in this area, it is possible that the species is not currently present in the immediate vicinity of the Project area. However, based on the proximity to DRECP modeled habitat (Nussear et al. 2009) and the presence of marginally to moderately suitable native scrub habitat, the desert tortoise has a moderate potential to occur in the parts of the Project area mapped as natural spinescale scrub.

Burrowing Owl

The burrowing owl is a small owl found in dry, open areas with low vegetation in western North America. Preferred habitats include grasslands, rangelands, or agricultural areas, but may also occur in fallow fields or vacant lots in developed areas. Burrowing owls are primarily insectivores, but will also eat small mammals such as mice and voles. They rely on existing burrows of other animals, particularly California ground squirrel, which they modify for their own use. The burrowing owl is an SSC and is protected by CFGC Section 3503 et. seq. and the Federal MBTA.

Two burrowing owls were flushed from an active burrow located within a drainage pipe during the reconnaissance surveys in the southwestern portion of the Project area (Appendix B, Figure 11**;** Appendix B, Photo 8). The CNDDB includes four records of burrowing owl within 5 miles of the Project area: Occurrence No. 1296 (2010), No. 1295 (2009), No. 1294 (2009), and No. 1047 (2006).

Portions of the Project area and adjacent areas with low density scrub cover include potentially suitable foraging habitat for the species and burrows suitable for occupation by burrowing owls. Based on the CNDDB occurrences, presence of suitable habitat, and the siting of two individual burrowing owls and an active burrow, the species is considered present within the Project area and may occur for wintering or breeding throughout the Project area, wherever suitable burrows occur.

Le Conte's Thrasher

Specific breeding populations of Le Conte's thrasher are considered a California SSC, and all populations are protected during nesting season under the MBTA and CFG Code 3503. This species typically inhabits sparsely vegetated desert flats, dunes, alluvial fans, or gently rolling hills that have a high proportion of cholla cactus (*Cylindropuntia* spp.), or other desert habitats with similar structural profiles. Sparsely vegetated areas or areas lacking vegetation, and developed areas are generally avoided by the species. This species typically hunts insects on the ground and nests in saltbush shrubs. In its habitat, shrubs are well scattered with contiguous or closed cover usually less than 45 feet in any direction. Substrates are typically sandy and rarely composed of a large proportion of rock or of deep silty clays.

The CNDDB includes four records of Le Conte's thrasher within 5 miles of the Project area: Occurrence No. 18 (1925), No. 68 (1964), No. 71 (1978), No. 70 (1978), and No. 144 (1988). Based on the presence of suitable foraging and nesting habitat, the species was determined to have a high potential to nest within suitable natural scrub habitat throughout the Project area. Suitable nesting habitat for Le Conte's thrasher is limited to the relatively undisturbed scrub habitat to the east and north of the historical dry lake margins.

Golden Eagle

The Mojave Desert region provides habitat for a number of year-round resident and migratory raptor species, including golden eagle. Raptors are generally protected by CFGC Section 3503 et. seq. and the Federal MBTA. Specific legal protections are afforded to the golden eagle pursuant to BGEPA and CFGC Section 3511. Mitigation measures for potential project impacts typically include nesting surveys and avoidance of active nests and surrounding buffers.

Golden eagles typically nest on cliffs and in tall trees able to support large platform nests that can be up to 10 feet in diameter. The species usually nests in rugged open habitats with canyons and escarpments. Golden eagles feed primarily on lagomorphs and other large rodents, but diet can be highly variable and include other mammals, birds, and reptiles, as well as carrion. The species typically requires open terrain such as grasslands, deserts, and savannahs for foraging.

No golden eagles were observed site during surveys; however, the CNDDB contains 11 occurrences within 5 miles of the Project area, the closest is from a nest on a cliff 1.03 miles west of the site (Occurrence No. 161, 2011). Transmission line towers occur adjacent to the Project area and within the northwestern portion of the site. Research was conducted in 2012 to assess golden eagle home range size in the DRECP plan Area. A nest was located east of White Horse Mountain and an eagle was tracked using radio telemetry. The nest site was located in the core home range that extended to the northeastern edge of Lucerne Lake (Katzner et al., 2012).

Desert scrub within the Project area provides suitable foraging habitat for this species. Based on the absence of suitable nesting habitat within the Project, there is no potential for the species to nest on site; however, this species has a moderate potential to forage within undeveloped portions of the Project area.

Prairie Falcon

Prairie falcon are pale brown, medium sized raptors. They occur in dry open habitats with cliffs or rocky bluffs for nesting. Adults may forage far afield over various habitat types including wetlands; however, this species primarily forages on grassland habitats. The CNDDB contains five occurrences of prairie falcon within 5 miles of the Project area: Occurrence No. 88 (1980), No. 103 (2017), No. 87 (1978), No. 91 (1980), and No. 92 (1979). Suitable foraging habitat occurs within the Project area, and suitable nesting habitat occurs in the mountains to the west of the Project area. In addition, an individual prairie falcon was observed flying over an active agricultural area in the southern portion of the Project area during the July 2021 reconnaissance surveys. Therefore, there is a high potential for this species to forage within the Project area, but there is a low potential for this species to nest on site.

Loggerhead Shrike

The loggerhead shrike is a USFWS Bird of Conservation Concern (BCC) and State SSC. This species can be found in lowlands and foothills throughout California. It is absent or rare in the State in the highest mountain ranges and the north coast. This species is a year-round resident in the southern deserts, parts of the south and central coasts, and the Central Valley, where numbers are augmented by migrants from November to February (Yosef 1996). Loggerhead shrikes prefer open habitats with scattered shrubs, trees, posts, fences, utility lines, or other perches, and require impaling sites, such as thorns, sharp twigs, or barbed wire, for skewering and manipulating their prey. The species nests in densely foliated trees or shrubs and feeds on, “arthropods, amphibians, small to medium-sized reptiles, small mammals and birds” (Yosef 1996).

Although there are no CNDDB records of loggerhead shrike within 5 miles of the Project area, an individual was observed during the reconnaissance surveys. Suitable nesting habitat (predominantly in desert scrub, but anywhere with shrub heights of 1 to 2 meters or more) is present in the Project area. Based on presence of potential nesting and foraging habitat and nearby observations, the species is considered to have high potential to nest within the 924 acres of suitable scrub habitat within the Project area.

Bendire’s Thrasher

Bendire’s thrasher is a migratory spring/summer resident in flat areas of the southern California desert. This species is found in sparse desert habitats such as sagebrush (*Artemisia* sp.) with scattered junipers (*Juniperus* sp.) at higher elevations. In the Mojave Desert, this species is primarily

found in Joshua tree, cactus, or yucca habitats. Suitable nest species include cholla (*Cylindropuntia* sp.), yucca (*Yucca* sp.), paloverde (*Parkinsonia* sp.), thorny shrubs, or small trees.

There are two CNDDB records within 5 miles of the Project area (Occurrence No. 143, 1986 and No. 184, 2008). The site is also within the DRECP modeled range (Davis and Soong 2013), and suitable nesting habitat is present in portions of the Project area and within a 500-foot buffer. The species may use the spinescale scrub vegetation community in the Project area for nesting and foraging; therefore, there is moderate potential for this species to occur in the Project area.

Desert Kit Fox

The desert kit fox is generally protected as a fur-bearing mammal by the CFGC Section 4000 et. seq., which requires a permit for the take of this species for commercial purposes, and limits the methods used to take the animal. It is a widespread resident of the North American southwest, found in arid climates from southern Oregon and Idaho to Baja California and central Mexico. This species is about the size of a house cat, weighing 4-7 pounds and is about 30 inches in length. Its diet consists of black-tailed jackrabbits and desert cottontails, rodents (especially kangaroo rats [*Dipodomys* sp.]) and ground squirrels, insects, reptiles, and some birds, bird eggs, and vegetation. Desert kit foxes can be found in grasslands, open desert scrub, and occasionally in farmland. The species is locally common in portions of its range and is not listed as a Special Animal by the CDFW (2021c).

Desert kit fox occurrences are not currently maintained by the CNDDB; however, the species was recently observed in the Lucerne Valley (URS 2012), and the proposed Project area includes suitable habitat for the species. The species has a high potential to den within the natural scrub habitat areas of the Project area, and, and as such, the species may also occur transiently (during dispersal and foraging) over the disturbed areas of the Project area.

Mohave Ground Squirrel

The Mohave ground squirrel is a small (approximately 8 to 9 inches long), brown, diurnal ground squirrel with no conspicuous markings, and a short tail that is broadly haired. Despite its listing as threatened under the CESA and its designation as a State-listed as threatened species since 1971, the species has not been well studied; Leitner (2008) notes that few studies had been published on the distribution, abundance, or population trends since the listing of the species. The Mohave ground squirrel occupies a wide variety of desert vegetation communities; however, the species prefers sandy/gravelly soils as a burrow substrate (Burt 1936; Wessman 1977). The species relies on a specific set of plant species as food resources including Joshua tree fruits, winterfat (*Krascheninnikovia lanata*), and spiny hopsage (*Grayia spinosa*) (Stewart 2005); however, the Mohave ground squirrel often behaves as a generalist, switching among several plant species seasonally or possibly by preferences (Burt 1936; Recht 1977; Wessman 1977; Zembal and Gall 1980; Leitner and Leitner 1989; Leitner and Leitner 1990).

The species is found in the Western Mohave Desert and its historical range totaled roughly 20,000 square kilometers (Leitner 2008). The Mohave ground squirrel's range extends from Palmdale and Victorville in the south to Owens Lake in the north and is generally bounded to the west by the escarpment of the Sierra Nevada, and to the east by the Mohave River (Gustafson 1993; Stewart 2005; Leitner 2015). The historic range of the Mohave ground squirrel extends to the southwest of Lucerne Valley but does not include Lucerne Valley. The closest CNDDB occurrence is within 5 miles of the Project area; however, this occurrence was recorded in 1886.

According to the most recent Five-Year Status review, between 2008 and 2012, protocol trapping and camera surveys were conducted at 27 locations between Barstow and Lucerne Valley, and no Mojave ground squirrel were found (Leitner 2015). Additionally, no Mojave ground squirrel have been reported east of the Mojave River since 1977, and it may be extirpated from this region (Leitner 2015).

Based on all available information, the Mohave ground squirrel is not expected to occur in the Project area. The Project area is located outside of the known historical range of the species, and there are no recent occurrences of the species in the vicinity of the Project area.

Mountain Lion

The Fish and Game Commission received a petition on June 25, 2019 to list an evolutionarily significant unit (ESU), comprised of six populations of mountain lion in southern and central coastal California, as threatened or endangered under the CESA. The Fish and Game Commission's determination on the status of the species is due November 3, 2021. Until the determination is made, the mountain lion is granted "candidate" status, and receives protection as though it were listed. Mountain lions require large areas of relatively undisturbed habitats with adequate connectivity. They have large home ranges that include heterogenous habitats that often consist of pine forests, riparian and oak woodlands, streams, chaparral, and grasslands, though they are also known to occur in desert habitats. Suitable habitat for this species is present within the Project area as all sites are located within open desert habitat within the species' range and may be subject to transient travel by mountain lions in the regional vicinity.

Nesting Birds

The Project area contains suitable nesting habitat for a variety of native avian species common to the desert, including black-throated sparrow (*Amphispiza bilineata*), horned lark, northern mockingbird (*Mimus polyglottos*), and cactus wren (*Campylorhynchus brunneicapillus*). Native bird nests are protected by CFGC Section 3503 and the MBTA. The nesting season generally extends from February through July in the Mojave Desert but can vary based upon annual climatic conditions.

4.3.3 Sensitive Plant Communities and Critical Habitats

No sensitive natural communities have been recorded in the Project area, and none were observed during the surveys.

No Federally designated critical habitats occur within the Project area.

4.3.4 Jurisdictional Waters and Wetlands

Within the arid and semi-arid western United States limited precipitation restricts wetland and riparian resources to 1-5% of the land surface, a relatively low proportion compared to other systems globally; the proportion of wetland resources is even lower (<1%) in extremely arid areas such as the Mojave Desert and the Great Basin (USACE 2008a).

Rincon delineated 8.34 acres of retention basins, leaked pipeline, and ephemeral streams, and 91,251 linear feet of ephemeral streams within the Project area. The only riparian habitat observed is limited to a small, isolated wetland at what is likely an irrigation pipeline leak.

Figure 6 through Figure 9 depict the location and extent of delineated stream segments and retention basins. Table 3 lists the delineated segment ID, type, hydroperiod, average top of bank width (in feet), and potential CDFW and RWQCB jurisdiction in linear feet and acreage.

Indicators of fluvial activity such sediment transport and deposition, shelving, and the presence of litter and debris were observed in the ephemeral streams. Soils in these channels include smaller particle sizes such as silt and clay. Indicators of fluvial activity were often absent or severely obscured where a stream is present on roads. Stream segments were only delineated where at least faint evidence of flow was present.

The slope gradient nears zero in areas adjacent to the dry lakebed, and any infrequent, low-volume, short-duration water flows in the very small and shallow delineated streams disperse, dissipate, and percolate into the mostly level ground before reaching the dry lake. They lack a clear surface connection, via defined channels with bed and bank, to the dry lakebed, and there is no discernible distinction with adjacent uplands.

Rincon biologists delineated and mapped 33 stream segments, 4 retention basins, and 1 isolated wetland. These streams convey flows only during and immediately after high precipitation events. Evidence of fluvial activity in the majority of the streams is faint, and primarily consists of weakly defined multiple-thread channels with very low banks, minor changes in soil character, and marginally decreased vegetative cover. The delineated streams were distinct and separated by local topography and elevations of land that confine them to a definite course when waters rise to their highest level. Vegetation species composition in the streams and stream margins does not differ from the surrounding areas, while vegetation density is generally slightly lower. Soils consist primarily of unconsolidated small particles including sand and gravel. No evidence of higher concentrations of suspended sediment or greater transport rates of bedload sediment was observed in these features. Infiltration rates are high. Overall, the movement of sediment, organic debris, and nutrients is extremely limited.

Based on a review of historical aerial photographs, it is likely that these streams conveyed higher volume flows and were more clearly defined prior to the construction of roads and increased human activity on and around the site. In their current condition, most streams have been fragmented or isolated by formal and informal roads and OHV tracks, greatly reducing fluvial activity. Many of these are indicative of partially abandoned channels, based on the isolation from their source and very low fluvial activity.

A number of ephemeral streams surrounding the dry lakebed are mapped in the NWI. They are classified as riverine, intermittently flooded streambeds (Cowardin code R4SBJ). In these areas, most of the streambeds are depicted as connecting to the dry lakebed; however, field observations indicate that the streams on-site lack a clear surface connection via defined channels with bed and bank to the dry lakebed, with any channel flow currently dissipating to sheet flow prior to entering the modern extent of the dry lake. The NHD mapping data is similar to the NWI in that streambed features are depicted in approximately the same locations, only fewer features are depicted. Similarly, some features are depicted connecting to the dry lakebed, and others are not.

The four retention basins on the Project area are man-made and associated with agricultural uses from surrounding farmlands. Of the four basins, one was determined to consist of wetland waters based on a sampling point examined in the bed (see Soils section). Two basins could not be accessed and were therefore assumed to consist of wetland waters. The other basin did not contain hydric soils and was therefore not a wetland. According to the State Wetland Definition and Procedures for Discharges of Dredged or Fill Material to Waters of the State (SWRCB 2019), artificially constructed

lakes and ponds created in dry land such as settling basins are excluded from the definition of Waters of the State. Therefore, the four detention basins are not under jurisdiction of the RWQCB.

One isolated wetland was observed in the western portion of the Project area in a small puddle dominated by cattails. Ponding and a hydrogen sulfide odor were observed at the time of the survey.

Figure 6 Jurisdictional Delineation Results

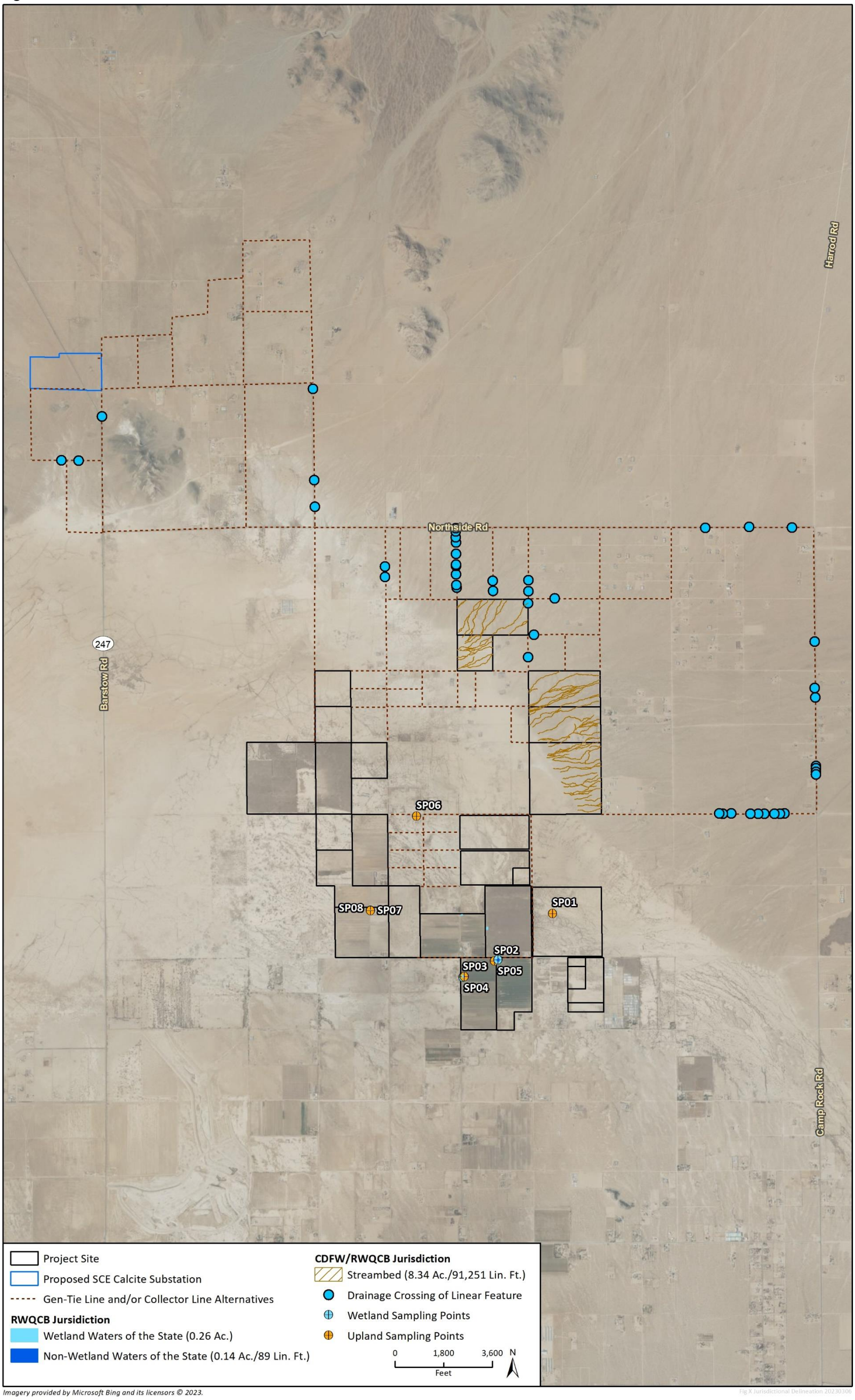


Figure 7 Jurisdictional Delineation Results- Page 1

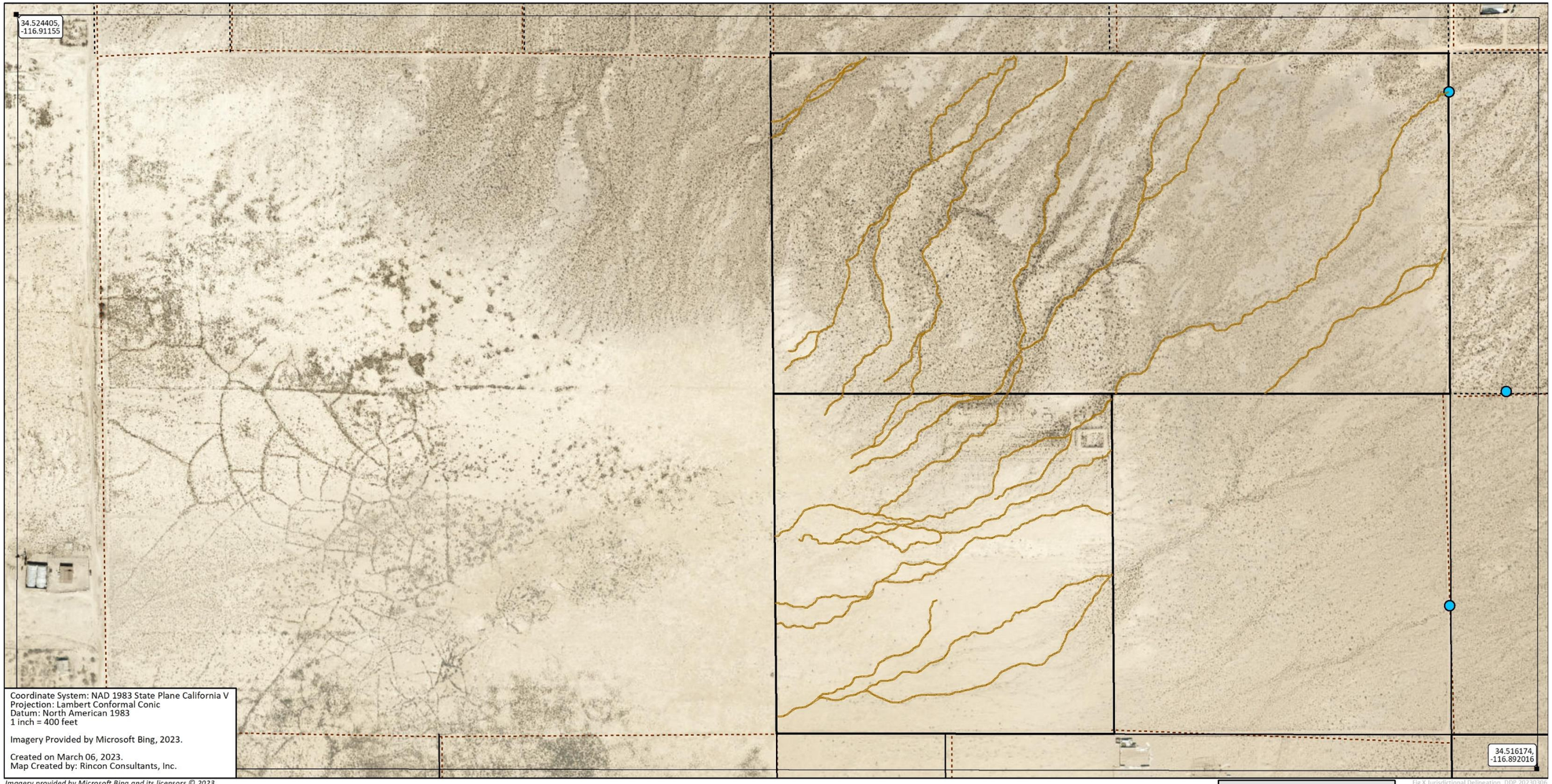


Figure 8 Jurisdictional Delineation Results – Page 2

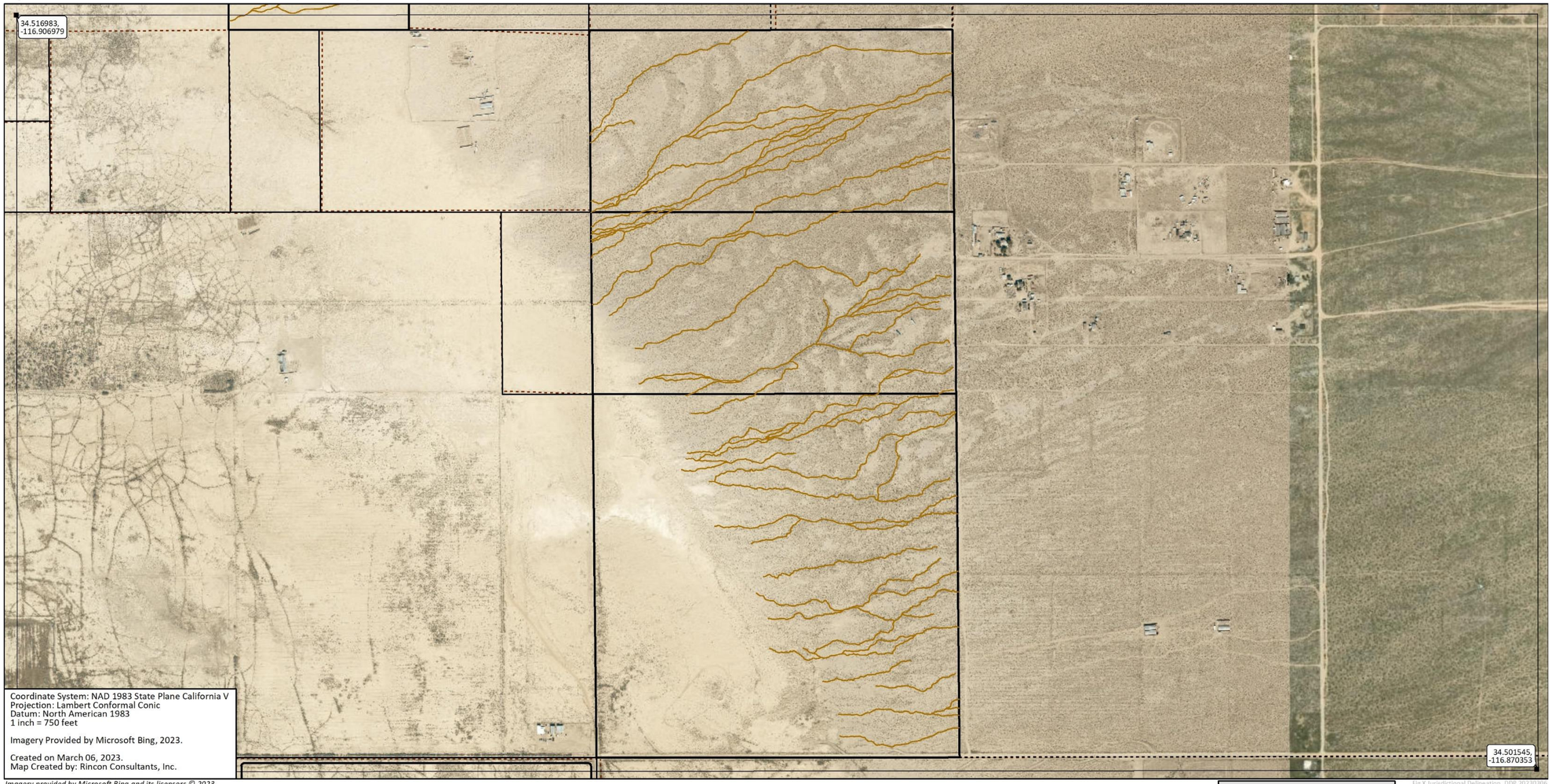


Figure 9 Jurisdictional Delineation Results- Page 3



Table 3 Summary of Delineated Features On-site

				RWQCB / CDFW Jurisdiction			
Segment ID	Feature Type	Hydroperiod	Average Top of Bank Width (feet)	Non-wetland Waters of the State / Streambed (linear feet)	Non-wetland Waters of the State / Streambed (acres)	Wetland Waters of the State / Streambed (linear feet)	Wetland Waters of the State / Streambed (acres)
1	Stream	Ephemeral	4	967.353891	0.085814	--	--
2	Stream	Ephemeral	4	1360.567557	0.116149	--	--
3	Stream	Ephemeral	4	647.256921	0.059694	--	--
4	Stream	Ephemeral	4	726.078323	0.06688	--	--
5	Stream	Ephemeral	4	2354.15673	0.214291	--	--
6	Stream	Ephemeral	4	1940.806549	0.177999	--	--
7	Stream	Ephemeral	4	2962.534702	0.271922	--	--
8	Stream	Ephemeral	4	1418.101864	0.130374	--	--
9	Stream	Ephemeral	4	3211.508584	0.293353	--	--
10	Stream	Ephemeral	4	1967.575367	0.180915	--	--
11	Stream	Ephemeral	4	3206.660969	0.294281	--	--
12	Stream	Ephemeral	4	1226.670083	0.112977	--	--
13	Stream	Ephemeral	4	6039.176888	0.552948	--	--
14	Stream	Ephemeral	4	6956.778157	0.637677	--	--
15	Stream	Ephemeral	4	1931.452749	0.177812	--	--
16	Stream	Ephemeral	4	2432.641993	0.223512	--	--
17	Stream	Ephemeral	4	3130.295395	0.28758	--	--
18	Stream	Ephemeral	4	3591.798215	0.329689	--	--
19	Stream	Ephemeral	4	8533.160415	0.777839	--	--
20	Stream	Ephemeral	4	6689.497974	0.611747	--	--
21	Stream	Ephemeral	4	2225.193131	0.204429	--	--
22	Stream	Ephemeral	4	411.540518	0.037304	--	--
23	Stream	Ephemeral	4	1506.96875	0.138513	--	--
24	Stream	Ephemeral	4	3434.120656	0.312483	--	--
25	Stream	Ephemeral	4	2251.0278	0.20584	--	--
26	Stream	Ephemeral	4	6254.476332	0.569626	--	--
27	Stream	Ephemeral	4	1287.965251	0.116998	--	--
28	Stream	Ephemeral	4	3128.28807	0.28699	--	--
29	Stream	Ephemeral	4	2878.73219	0.264365	--	--
30	Stream	Ephemeral	4	2217.845314	0.203613	--	--
31	Stream	Ephemeral	4	3438.343709	0.314869	--	--
32	Stream	Ephemeral	4	921.599924	0.08394	--	--
33	Stream	Ephemeral	4	0.906222	0.000222	--	--
34	Retention Basin	N/A	N/A	N/A	--	N/A	0.10

				RWQCB / CDFW Jurisdiction			
Segment ID	**Feature Type**	**Hydroperiod**	**Average Top of Bank Width (feet)**	**Non-wetland Waters of the State / Streambed (linear feet)**	**Non-wetland Waters of the State / Streambed (acres)**	**Wetland Waters of the State / Streambed (linear feet)**	**Wetland Waters of the State / Streambed (acres)**
35	Retention Basin	N/A	N/A	N/A	--	N/A	0.14
36	Retention Basin	N/A	N/A	N/A	--	N/A	0.12
37	Retention Basin	N/A	N/A	N/A	--	N/A	0.04
38	Isolated Wetland	N/A	N/A	N/A	--	N/A	0.001
Total				**101,985**	**9.29**	**0**	**0.401**

4.4 Wildlife Movement

Wildlife movement corridors, or habitat linkages, are generally defined as connections between habitat patches that allow for physical and genetic exchange between otherwise isolated animal populations. Such linkages may serve a local purpose, such as providing a linkage between foraging and denning areas, or they may be regional in nature. Some habitat linkages may serve as migration corridors, wherein animals periodically move away from an area and then subsequently return. Others may be important as dispersal corridors for young animals. A group of habitat linkages in an area can form a wildlife corridor network.

Habitats within a linkage are not necessarily the same as those being linked. Rather, the linkage needs only contain sufficient cover and forage to allow temporary inhabitation by ground-dwelling species during periods of movement among areas of suitable habitat. Typically, habitat linkages are contiguous strips of natural areas, though dense plantings of landscape vegetation can be used by certain disturbance-tolerant species. Depending on the species, a linkage may require specific minimum physical characteristics (such as rock outcroppings, vernal pools, specific vegetation cover, etc.) to function as an effective wildlife corridor, and allow those species to traverse the linkage. For highly mobile or aerial species, habitat linkages may be discontinuous patches of suitable resources spaced sufficiently close together to permit travel along a route in a relatively short period of time.

The CDFW BIOS website (CDFW 2021b) and the California Essential Habitat Connectivity Project: A Strategy for Conserving Connected California (Spencer et al. 2010) were reviewed for wildlife movement information. The Project area is not located within an identified wildlife movement corridor or linkage (CDFW 2021b; Spencer et al. 2010).

The Project area and surrounding area contain expanses of open habitat with little development, and the site lacks any significant barriers to local wildlife movement. High temperatures and lack of cover within disturbed areas of the Project area may deter wildlife from crossing directly. Little development is present within the Project area and wildlife would be expected to traverse the site during foraging and dispersal. Various species may travel between and among surrounding areas of low disturbance (predominantly present immediately to the north and west of the Project area). The most likely areas for wildlife movement in this portion of the Mojave Desert would be within larger drainages, uninterrupted spans of native vegetation (creosote scrub, Joshua tree woodland, etc.), or

along the foothills of the Granite Mountains to the north and west. While the Project area does contain areas of relatively undisturbed native vegetation communities, habitats are largely fragmented on the site and would limit the value of the Project area as a significant wildlife movement corridor.

4.5 Resources Protected by Local Policies and Ordinances

In accordance with Chapter 88.01 of the San Bernardino County Development Code (plant protection and management), a permit is required where protected trees or plants are proposed for removal or relocation. Within the Desert Region, protected trees or plants requiring a Tree or Plant Removal permit include the following:

1. *Dalea spinosa* (smoketree), with stems two inches or greater in diameter or six feet or greater in height
2. All species of the genus *Prosopis* (mesquites), with stems two inches or greater in diameter or six feet or greater in height
3. All species of the family Agavaceae (century plants, nolinas, yuccas)
4. Creosote Rings, 10 feet or greater in diameter
5. All Joshua trees
6. Any part of any of the following species, whether living or dead:
    a. *Olneya tesota* (desert ironwood)
    b. All species of the genus *Prosopis* (mesquites)
    c. All species of the genus *Cercidium* (palos verdes)

At this time, it is unknown whether trees will be removed for the implementation of this project; however, based on observations made during the reconnaissance survey, few trees are present within the solar development areas of the Project. Prior to finalizing plans a focused survey should be performed to identify protected tree or other desert plants in the Project area.

4.6 Consistency with Habitat Conservation Plans

The Project area is located within the broader boundaries of the DRECP, a joint collaboration between the California Energy Commission, BLM, USFWS, and CDFW. This conservation plan is currently being developed. A phased approach to implementation is currently underway. Phase I addresses conservation and development goals on public lands. BLM is responsible for the implementation of this phase through preparation of the Land Use Planning Amendment (LUPA), which was approved in September 2016. During Phase II Counties in the DRECP plan area, through the use of Renewable Energy Conservation Planning Grants, will develop or update rules and policies related to renewable energy resources on private lands. This phase will require agency coordination to develop the best options to protect and conserve desert ecosystems while promoting renewable energy. San Bernardino County has completed Phase II and has revised the Countywide General Plan to include a Renewable Energy and Conservation Element as of August 8, 2017. However, the Project area occurs on private land only, and is not located within any other local, regional, or State conservation planning areas.

5 Impacts and Recommendations

Implementation of the proposed Project in the natural scrub habitats of the Project area has the potential to affect various special-status species. Jurisdictional waters could be impacted from project development in portions of the overall Project area. The following sections provide an analysis of potential project effects to these resources and recommendations for additional analysis that may be pertinent. The final determination of effects of significance and required mitigation measures for the Project will be made by San Bernardino County.

5.1 Special Status Species

The proposed Project would have a significant effect on biological resources if it would:

a) *Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service.*

During the reconnaissance surveys burrowing owl, loggerhead shrike, and prairie falcon were observed in the Project area. The site contains suitable habitat for these and other special-status wildlife species. Direct and indirect impacts to these species from project activities would be considered *potentially significant but mitigable* through implementation of appropriate mitigation measures described in Section 6 and additional recommended surveys as outlined below.

5.1.1 Special Status Plant Species

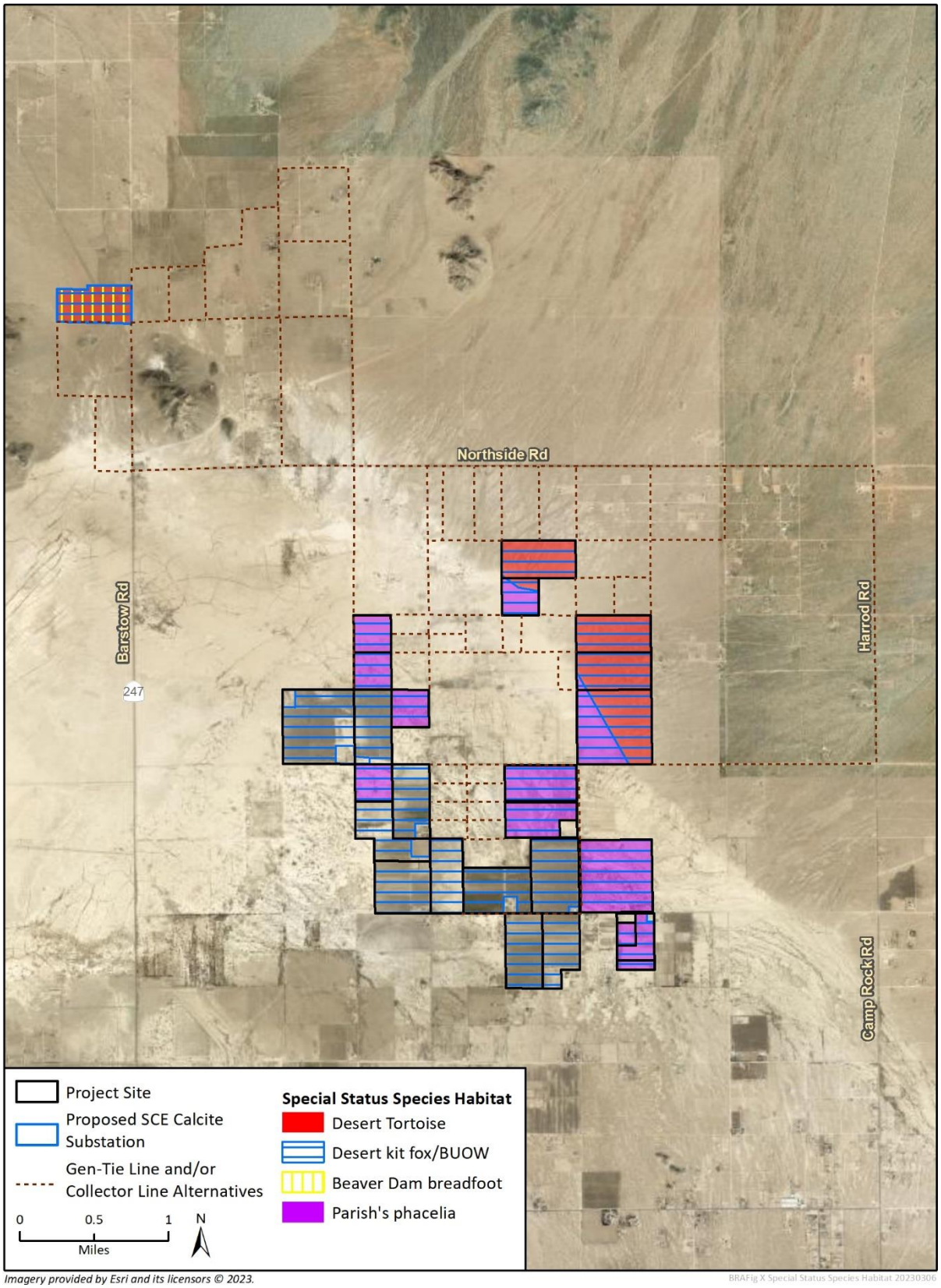
Overall, the Project area contains marginal habitat for most of the special-status plants with potential to occur on-site. The determination of marginality is based on prior use, existing disturbances, limited suitable habitat characteristics (e.g., preferred soils), and prevalence of nonnative species.

Although habitat is marginal, there is potential for eight special-status plant species to occur in the Project area. Project development could result in direct impacts to special status plant species, particularly, if present on site. Depending on the species and numbers of individuals identified, impacts to special-status plants could be considered *potentially significant but mitigable* at the species level through implementation of buffers and creation of a translocation plan as described in MM BIO 1.1A (see Section 6). Focused surveys for special-status plants with a moderate potential to occur should be conducted during the appropriate blooming periods and within the appropriate habitats and locations in the Project area.

Focused surveys for Beaver Dam breadroot should be conducted in the northern portion, with particular attention paid to areas of higher creosote concentration. Focused surveys for Parish's phacelia should be conducted in alkali soils within the dry lakebed and recovering spinescale habitats (Figure 10).

All species observed on-site should be identified to the level of determining rarity status.

Figure 10 Special Status Species Habitat



Special Status Animal Species

Burrowing owl, loggerhead shrike, and prairie falcon were observed within the Project area. No other special-status wildlife species were observed on-site during the field surveys. Portions of the Project area contain suitable habitat for desert kit fox, desert tortoise, burrowing owl, and other special-status wildlife species.

Species-specific surveys for desert kit fox, burrowing owl and desert tortoise should be conducted in accordance with applicable protocols [i.e., the 2010 USFWS Pre-project Field Survey Protocol for Potential Desert Tortoise Habitats and the CDFW 2012 Staff Report on Burrowing Owl Survey Protocol and Mitigation Guidelines (CDFG 2012)]. Desert kit fox and burrowing owl surveys should be conducted in agricultural areas, within the historical lakebed and within natural and recovering spinescale scrub, while desert tortoise surveys should be conducted in the natural spinescale scrub vegetation community in the northern and eastern portions (Figure 10). Non-protocol level surveys may be performed with prior agency approval. Direct and indirect impacts to these species from project activities would be considered *potentially significant but mitigable* through implementation of protective measures and mitigation as described in MM BIO 1.1B, BIO 1.1C, and BIO 1.1D (see Section 6).

No USFWS-designated critical habitat for Federally listed wildlife species is mapped in the Project area, and thus no critical habitat would be affected by the proposed Project; however, some of the special-status species outlined above, if present on-site during construction, could be affected directly (loss of individuals) or indirectly (construction noise, dust, and other human disturbances) by project activities. These impacts would be *potentially significant but mitigable* through implementation of general protective measures.

Desert Tortoise Impacts

The northern and eastern portions of the Project contain the least disturbed natural saltbush scrub communities and therefore, the greatest potential to support desert tortoise. Protocol surveys are recommended for desert tortoise in accordance with the USFWS protocol within the northern portion of the Project area that contain suitable habitat for the species. Results of these surveys would determine the potential for impacts, inform the applicability of the proposed mitigation measures to reduce impacts, and clarify the necessity for federal and state incidental take authorization. The desert tortoise is a Federally and State threatened species and consequently, potential impacts to the species would require the issuance of Incidental Take Permits from both the USFWS and CDFW to comply with FESA and CESA.

Direct and indirect impacts to desert tortoise from Project activities would be considered *potentially significant but mitigable* through implementation of protective measures and mitigation as described in MM BIO 1.1C (see Section 6).

5.1.2 Avian Impacts

Many common MBTA bird species were observed throughout the Project area and vicinity. Native birds protected by the CFGC and the MBTA (potentially including prairie falcon and loggerhead shrike) may nest on-site. Construction activity has the potential to directly (by destroying a nest) or indirectly (by causing an active nest to fail) impact nesting birds protected under the CFGC and MBTA, and this would be *potentially significant but mitigable* through implementation of preconstruction nesting bird surveys and protective nest buffers, as described in MM BIO 1.1E (see Section 6).

The Project area contains suitable foraging habitat for special-status birds of prey (e.g., golden eagle and prairie falcon). Loss of foraging raptor habitat could be considered significant if it had substantial adverse effects to local populations of special-status raptors protected under the CFGC, Bald and Golden Eagle Protection act (BGEPA) or the MBTA. The Project area is located in the Lucerne Valley, a region continuous with the larger Mojave Desert habitat. The DRECP modeled 506,622 acres of suitable golden eagle breeding habitat, and 21,373,122 acres of suitable foraging habitat in the DRECP plan area, however the Project area is not within this modeled habitat (Dudek and ICF 2012).

Five pairs of golden eagles were tracked for a radio telemetry study in the Granite Mountains to the north of the Project area (Katzner et al. 2012). The authors evaluated breeding home ranges using kernel density estimators (KDE) and defined home ranges as general areas used by eagles (90% KDE) and core home ranges (50% KDE). Of the five eagles in the Granite Mountains only one had a general range that overlapped slightly with the northwestern portions of the Project area. No core home range areas occur within the Project area. The authors note that core areas, which can occur at long distances from nest sites, may function as important resource areas for the eagles. Approximately 72% (1,807 acres) of the PV development area is low to high quality foraging habitat (spinescale scrub), and no core home range areas are present within the Project area. As such, loss of foraging habitat from Project development would not constitute a significant impact under CEQA. Direct significant impacts to foraging raptors under CEQA are not expected from project development, and no mitigation is recommended.

5.1.3 Mountain Lion Impacts

Direct impacts to mountain lions are not anticipated as the species is large and highly visible and therefore, can be easily avoided by equipment and personnel during project activities. Potential indirect impacts could include increased sound and vibration levels and exposure to dust. The Project area is surrounded by undeveloped land and open space providing a multitude of regional movement options within and adjacent to the Project area. Therefore, project activities would not significantly impact the amount of regional habitat available for mountain lions in the vicinity.

5.2 Sensitive Plant Communities

The proposed Project would have a significant effect on biological resources if it would:

b) Have a substantial adverse impact on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Wildlife or US Fish and Wildlife Service.

No special-status plant communities were recorded in the Project area; therefore, no mitigation is recommended.

5.3 Jurisdictional Waters and Wetlands

The proposed Project would have a significant effect on biological resources if it would:

c) Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means.

Multiple ephemeral streams and drainages were observed within the Project area. These drainages are potentially subject to LRWQCB and CDFW jurisdiction. The USACE is not expected to assert jurisdiction over the features based on previous approved jurisdictional determinations for features in the Lucerne Lake watershed. Construction activities from the proposed Project could impact these potentially jurisdictional features. If avoidance of jurisdictional waters is not feasible, impacts to jurisdictional areas would be considered *significant but mitigable* through implementation of protective measures as described in MM BIO 1.2A (see Section 6).

5.4 Wildlife Movement

The proposed Project would have a significant effect on biological resources if it would:

d) Interfere substantially with the movement of any resident or migratory fish or wildlife species or with established resident or migratory wildlife corridors or impede the use of wildlife nursery sites.

No regional wildlife linkages or corridors are mapped within the Project area. The Project area is bordered to the north by mountains, to the west by mountains and dry lakebed, and to the east and south by minor development. Local wildlife likely use the natural habitats at the base of the hills to the west and drainage features including those within the Project area for movement; however, development of the Project area would not create a significant barrier for wildlife movement. The Project area does not occur within a corridor that links between or among larger habitat areas on a local or regional basis. The Project area is not within any areas mapped as Essential Connectivity Areas by the California Essential Habitat Connectivity Project. Therefore, potential impacts of the proposed Project on wildlife movement would be *less than significant* and no mitigation is recommended.

5.5 Local Policies and Ordinances

The proposed Project would have a significant effect on biological resources if it would:

e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance

The proposed Project would require a development permit from the San Bernardino County Planning Department, and therefore would be designed in compliance with applicable San Bernardino County policies and ordinances. To comply with the County's Development Code, the following species should be included for evaluation during recommended botanical surveys: smoketree, all mesquite species, all members of the Agave family, creosote bush rings, Joshua trees, desert ironwood, and palo verdes. Direct and indirect impacts to these species from project activities would be mitigated through the County permitting process; which includes the preparation of a native tree and plant removal plan, indicating exactly which protected trees or plants are proposed to be removed or relocated. Therefore, the proposed Project would not conflict with any local policies or ordinances.

5.6 Adopted or Approved Plans

The proposed Project would have a significant effect on biological resources if it would:

f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Conservation Community Plan, or other approved local, regional, or state habitat conservation plan.

The Project area is located within the boundaries of the DRECP, a joint collaboration between the California Energy Commission, BLM, USFWS, and CDFW. The Project area is also within the boundaries of the West Mojave Plan. Both of these plans are applicable to Projects on public lands (e.g., BLM). The Project area occurs on private land and is not located within any other local, regional, or State conservation planning area. Therefore, the proposed Project would not conflict with any adopted Habitat Conservation Plan, Natural Conservation Community Plan, or other approved local, regional, or State habitat conservation plans.

6 Proposed Mitigation Measures

6.1 Special-Status Species

As described in Section 5.1, implementation of the proposed Project could result in direct and indirect impacts to special-status plant and wildlife species. If focused rare plant surveys document the occurrence of rare plant species for which the loss of those plants would result in a substantial risk to the viability of a local or regional population of said species, the following mitigation measures are recommended and may be implemented to reduce potential impacts to less than significant levels.

BIO 1.1A Mitigation Measures for Special-Status Plant Species

BIO 1.1A-1 Special-status Plant Buffer

If special status plant species (i.e., endangered, threatened, or California Native Plant Society CRPR 1 and 2 species) are observed during the focused botanical surveys within the development area of the Project area, the proposed Project should be designed to reduce impacts to these species through the establishment of buffers, to the extent feasible. Buffer distances should be determined by the Qualified Biologist, typically 50 feet or greater from an identified special status plant species, unless the Qualified Biologist determines a reduced buffer would suffice to avoid impacts to the species.

BIO 1.1A-2 Special-status Plant Relocation Plan

If avoidance of special-status plant species is not feasible, a Special-Status Plant Relocation Plan should be developed and implemented. The Special-Status Plant Relocation Plan shall address mitigation for special-status plants, including topsoil salvage to preserve seed bank and management of salvaged topsoil; seed collection, storage, possible nursery propagation, and planting; salvage and planting of bulbs as feasible; location of on-site receptor sites; land protection instruments for receptor areas; and funding mechanisms. The Rare Plant Relocation Plan shall include methods, monitoring, reporting, success criteria, adaptive management, and contingencies for achieving success.

All special-status plant species identified on site shall be mapped onto a site-specific aerial photograph and topographic map and included on the construction, grading, fuel modification, and landscape plans.

BIO 1.1B General Measures for Special-Status Wildlife Species

BIO 1.1B-1 Biological Monitoring

Prior to the issuance of grading or building permits, the project proponent should retain a Qualified Biologist, with experience and expertise in desert species to oversee compliance with protection measures for all listed and other special-status species. If State or Federally listed species or other special status biological resources are identified on the Project area during protocol and/or preconstruction surveys, then the Qualified Biologist may need to be approved by USFWS and/or CDFW as an authorized biologist for handling listed species. The Qualified Biologist or other

Qualified Biological Monitors should be on the Project area during initial grading, ground disturbance and vegetation removal activities in natural scrub vegetation communities to monitor construction activity where that activity could directly or indirectly impact special status biological resources. The Qualified Biologist should have the authority to halt all activities that are in violation of the special-status species protection measures. Work should proceed only after potential hazards to special-status species are removed and the species is no longer at risk. The Qualified Biologist should have in her/his possession a copy of all the compliance measures while work is being conducted on the Project area.

BIO 1.1B-2 Construction Worker Environmental Awareness Training and Education Program

Prior to any activity on site and for the duration of construction activities, all personnel at the Project area (including laydown areas and/or transmission routes) should attend a Worker Environmental Awareness Program (WEAP) developed and presented by the Qualified Biologist. New personnel should receive WEAP training on the first day of work and prior to commencing work on the site. Any employee responsible for the operation and maintenance (O&M) or decommissioning of the Project facilities should also attend WEAP training.

1. The program should include information on the life history of the desert tortoise, burrowing owl, golden eagle, and other raptors; nesting birds, desert kit fox; as well as other wildlife and plant species that may be encountered during construction activities.
2. The program should also discuss the legal protection status of each species, the definition of "take" under the Federal Endangered Species Act and California Endangered Species Act, measures the project proponent is implementing to protect the species, reporting requirements, specific measures that each worker should employ to avoid take of wildlife species, and penalties for violation of the Federal Endangered Species Act or California Endangered Species Act.
3. The program should provide information on how and where to bring injured animals for treatment in the case any animals are injured on the Project area.
4. An acknowledgement form signed by each worker indicating that WEAP training has been completed should be kept on record.
5. A sticker should be placed on hard hats indicating that the worker has completed the WEAP training. Construction workers should not be permitted to operate equipment within the construction areas unless they have attended the WEAP training and are wearing hard hats with the required sticker.
6. A copy of the training transcript and/or training video, as well as a list of the names of all personnel who attended the WEAP training and copies of the signed acknowledgement forms should be submitted to the San Bernardino County Planning and Community Development Department upon the County's request.

BIO 1.1C Recommended Measures for Desert Tortoise

BIO 1.1C-1 Pre-construction Surveys

Desert Tortoise presence/absence surveys should be conducted by a Qualified Biologist during their appropriate season. The surveys should be conducted in areas of suitable habitat (natural spinescale scrub) and conform to USFWS guidelines. If desert tortoise are not documented during seasonally

timed protocol desert tortoise surveys, no additional measures related to desert tortoise avoidance and minimization are recommended. If tortoise are documented inhabiting any portion of the project area during presence/absence surveys, the following measures should be implemented:

BIO 1.1C-2 Additional Measures for Desert Tortoise

If protocol desert tortoise surveys document that the species is inhabiting portions of the Project area, the following measure are recommended, and limited to those portions of the Project for which DT occupancy has been determined, to reduce impacts to less than significant. Note, implementation of any measures that would result in the "take" of desert tortoise cannot be undertaken without formal authorization from CDFW and USFWS.

- Develop a plan for desert tortoise translocation and monitoring prior to Project construction. The plan should provide the framework for implementing the following measures, or similar measures deemed sufficient and approved during agency consultation (Note: any desert tortoise translocation plan must be reviewed and approved by CDFW and USFWS):
    - If a permanent tortoise-proof exclusion fence is practicable, a fence should be installed around all construction areas prior to the initiation of ground disturbing activities, in coordination with a Qualified Biologist. The fence should be constructed of 0.5-inch mesh hardware cloth and extend 18 inches above ground and 12 inches below ground. Where burial of the fence is not possible, the lower 12 inches should be folded outward against the ground and fastened to the ground so as to prevent desert tortoise entry. The fence should be supported sufficiently to maintain its integrity, be checked at least monthly during construction and operations, and maintained when necessary by the project proponent to ensure its integrity. Provisions should be made for closing off the fence at the point of vehicle entry. Raven perching deterrents should be installed as part of the fence construction.
    - After fence installation, an authorized biologist should conduct a pre- construction survey for desert tortoise within the construction site. The authorized biologist should have the appropriate education and experience to accomplish biological monitoring and mitigation tasks and is approved by the CDFW and the USFWS. Two surveys without finding any tortoises or new tortoise sign should occur prior to declaring the site clear of tortoises.
    - All burrows that could provide shelter for a desert tortoise should be hand-excavated prior to ground-disturbing activities.
    - An authorized biologist should remain on-site until all vegetation is cleared and, at a minimum, conduct site and fence inspections on a regular basis throughout construction in order to ensure Project compliance with mitigation measures.
    - A biologist should remain on-call throughout fencing and grading activities in the event a desert tortoise wanders onto the Project area.
    - Compensatory mitigation in the form of a conservation easement or purchase of mitigation bank credits to compensate for the loss of occupied desert tortoise habitat at a minimum ratio of 1:1, with habitat of equal or greater value.

BIO 1.1D Recommended Measures for Desert Kit Fox and Burrowing Owl

Preconstruction surveys should be conducted by a Qualified Biologist for the presence of desert kit fox and burrowing owl prior to commencement of construction activities in all areas with potential to support these species. This survey should be conducted no fewer than 30 days prior to ground disturbing activities without prior agency approval. The surveys should be conducted in areas of suitable habitat for each species which includes natural and recovering spinescale scrub for desert kit fox and burrowing owl, as well as ruderal habitat for burrowing owl. Surveys should conform to CDFW guidelines for burrowing owl and to industry standards for desert kit fox.

BIO 1.1D-1 Measures for Desert Kit Fox

- If potential desert kit fox dens are observed and avoidance is feasible, buffer distances should be established by the Qualified Biologist prior to construction activities. Typical buffer distances for desert kit fox are:
    - Desert kit fox potential den: 50 feet
    - Desert kit fox active den: 100 feet
    - Desert kit fox natal den: 500 feet
- If avoidance of the potential desert kit fox dens is not feasible, the following measures are recommended to minimize potential adverse effects to the desert kit fox:
    - If a Qualified Biologist determines that potential dens are inactive, the biologist should excavate these dens by hand with a shovel and collapse them to prevent desert kit foxes from re-using them during construction.
    - If the Qualified Biologist determines that potential dens may be active, an on-site passive relocation program should be implemented. This program should only be implemented during the non-breeding season (September 1 through February 1) and consist of passive eviction of desert kit foxes from occupied burrows by installation of one-way doors at burrow entrances and monitoring of the burrow for seven days to confirm usage has been discontinued, and excavation and collapse of the burrow to prevent reoccupation. After the Qualified Biologist determines that desert kit foxes have stopped using active dens within the Project boundary, the dens should be hand-excavated with a shovel and collapsed to prevent re-use during construction. Only non-natal dens should be passively excluded, disturbance to natal dens should be avoided.

BIO 1.1D-2 Measures for Burrowing Owl

- If burrowing owls are detected on-site, a no-work buffer should be established, restricting all ground-disturbing activities, such as vegetation clearance or grading, from occurring within the buffer. Typical avoidance buffer distances for burrowing owl range from 100 meters (330 feet) to 250 meters (825 feet) depending on project activity, line of sight and local topography, during the breeding season (February 1 to August 31). During the non-breeding (winter) season (September 1 to January 31), typical avoidance buffers range from 50 meters (165 feet) to 100 meters (330 feet) from the burrow. Depending on the level of disturbance, a smaller buffer may be established in consultation with CDFW.
- If burrowing owl burrow avoidance is infeasible during the non-breeding season or during the breeding season (February 1 through August 31), where resident owls have not yet begun egg laying or incubation, or where the juveniles are foraging independently and capable of independent survival, a Qualified Biologist should implement a passive relocation program consistent with Appendix E1 (i.e., Example Components for Burrowing Owl

Artificial Burrow and Exclusion Plans) of the 2012 CDFW Staff Report on Burrowing Owl Mitigation.

BIO 1.1E Mitigation Measures for Nesting Birds and Raptors

BIO 1.1E-1 Pre-construction Surveys

If construction is scheduled to commence during the non-breeding season (September 1 to January 31), no pre-construction surveys or additional measures with regard to nesting birds and other raptors are required. To avoid impacts to nesting birds in the project area, a qualified wildlife biologist should conduct pre-construction surveys of all potential nesting habitats within the Project area for project activities that are initiated during the breeding season (February 1 to August 31). The raptor survey should focus on potential nest sites (e.g., cliffs, large trees, windrows, Joshua trees, and shrubs) within a 0.5-mile buffer around the Project area. These surveys should be conducted no fewer than 14 days prior to ground-disturbing activities without prior agency approval. Surveys need not be conducted for the entire Project area at one time; they may be conducted in phases so that surveys occur shortly before a portion of the site is disturbed. The surveying biologist must be qualified to determine the status and stage of nesting by migratory birds and all locally breeding raptor species without causing intrusive disturbance.

BIO 1.1E-2 Nest Buffers

If active nests are found, a suitable buffer as determined by the Qualified Biologist (e.g., 200-300 feet for common raptors; 30-50 feet for passerines, 0.5 mile for golden eagle) should be established around active nests, and no construction within the buffer should be allowed until a Qualified Biologist has determined that the nest is no longer active (i.e., the nestlings have fledged and are no longer reliant on the nest). Encroachment into the buffer may occur at the discretion of a Qualified Biologist; however, for State-listed species, consultation with the CDFW should occur prior to encroachment into the aforementioned buffers.

6.2 Sensitive Plant Communities

No sensitive plant communities were observed in the Project area. Therefore, impacts to sensitive plant communities are not expected and no mitigation is recommended.

6.3 Jurisdictional Waters and Wetlands

Implementation of the proposed project could result in direct and indirect impacts to protected wetlands. Therefore, the following mitigation measures are recommended and may be implemented to reduce potential impacts to less than significant levels.

BIO 1.2 Mitigation Measures for Jurisdictional Waters

BIO 1.2-A Avoidance and Minimization

Jurisdictional features (ephemeral drainages) identified in the delineation should be avoided where possible. If all waters of the U.S and waters of the State can be avoided, no further mitigation is recommended. If the project will directly impact waters of US por waters of the State, the following measures should be implemented to reduce impacts to less than significant (Note: any activities

that would result in impacts to waters of the US and/or waters of the State would be required to receive issuance of regulatory permits from USACE, CDFW and/or RWQCB.):

- Any material/spoils generated from project activities should be located away from jurisdictional areas or special-status habitat and protected from storm water run-off using temporary perimeter sediment barriers such as berms, silt fences, fiber rolls, covers, sand/gravel bags, and straw bale barriers, as appropriate.
- Materials should be stored on impervious surfaces or plastic ground covers to prevent any spills or leakage from contaminating the ground and generally at least 50 feet from the top of bank.
- Any spillage of material will be stopped if it can be done safely. The contaminated area will be cleaned, and any contaminated materials properly disposed. For all spills, the project foreman or designated environmental representative will be notified.
- Compensatory mitigation to offset permanent impacts to waters of the State. Mitigation should occur at a minimum ratio of 1:1 through the establishment of a conservation easement, restoration of existing habitat and/or payment of in-leu fees. A Compensatory Mitigation and Restoration Plan is recommended for inclusion with agency permit applications that are proposing on-site restoration and should include the following components:
  - A description of the purpose and goals of the mitigation project including the improvement of specific physical, chemical, and/or biological functions at the mitigation site.
  - A description of the plant community type(s) and amount(s) that will be provided by the mitigation and how the mitigation method will achieve the mitigation project goals.
  - A description of the mitigation site, including a site plan of the location and rationale for site selection.
  - A plant palette and methods of salvaging, propagating, and planting the site to be restored.
  - Methods of soil preparation.
  - Best Management Practices (BMPs) that will be utilized to avoid erosion and excessive runoff before plant establishment.
  - Maintenance and monitoring necessary to ensure that the restored plant communities meet the success criteria.
  - Schedule for restoration activities including weed abatement, propagating and planting, soil preparation, irrigation, erosion control, qualitative and quantitative monitoring, and reporting to the County. Identification of measurable performance standards for each objective to evaluate the success of the compensatory mitigation.
  - Identification of contingency and adaptive management measures to address unforeseen changes in site conditions or other components of the mitigation project. Or,
  - As an alternative to on-site mitigation, identification or an appropriate mitigation bank and the purchase of credits commensurate with the type of impacts associated with the project.

6.4 Wildlife Movement

Potential impacts of the proposed project on wildlife movement would be less than significant; therefore, no mitigation is recommended.

6.5 Local Policies and Ordinances

There would be no conflicts with local policies and ordinances, therefore no mitigation is recommended.

6.6 Adopted or Approved Plans

The proposed project would not conflict with any existing conservation plans; therefore, no mitigation is recommended.

7 Limitations, Assumptions, and Use Reliance

This General Biological Resources Assessment has been performed in accordance with professionally accepted biological investigation practices conducted at this time and in this geographic area. The biological investigation is limited by the scope of work performed. Reconnaissance biological surveys for certain taxa may have been conducted as part of this assessment but were not performed during a particular blooming period, nesting period, or particular portion of the season when positive identification would be expected if present, and therefore, cannot be considered definitive. The biological surveys are limited also by the environmental conditions present at the time of the surveys. In addition, general biological (or protocol) surveys do not guarantee that the organisms are not present and will not be discovered in the future within the site. In particular, mobile wildlife species could occupy the site on a transient basis or re-establish populations in the future. Our field studies were based on current industry practices, which change over time and may not be applicable in the future. No other guarantees or warranties, expressed or implied, are provided. The findings and opinions conveyed in this report are based on findings derived from site reconnaissance, jurisdictional areas, review of CNDDB RareFind5, and specified historical and literature sources. Standard data sources relied upon during the completion of this report, such as the CNDDB, may vary with regard to accuracy and completeness. In particular, the CNDDB is compiled from research and observations reported to CDFW that may or may not have been the result of comprehensive or site-specific field surveys. Although Rincon believes the data sources are reasonably reliable, Rincon cannot and does not guarantee the authenticity or reliability of the data sources it has used. Additionally, pursuant to our contract, the data sources reviewed included only those that are practically reviewable without the need for extraordinary research and analysis.

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9 Certification

The report must include the certification statement within the body of the report as shown below:

CERTIFICATION: "I hereby certify that the statements furnished above and in the attached exhibits present the data and information required for this biological evaluation, and that the facts, statements, and information presented are true and correct to the best of my knowledge and belief. Field work conducted for this assessment was performed by me or under my direct supervision. I certify that I have not signed a nondisclosure or consultant confidentiality agreement with the project applicant or applicant's representative and that I have no financial interest in the project."

Date: October 12, 2021 Signature: Sarah Toback

Report Author: Sarah Toback

Include names and signatures for those performing fieldwork.

1) Fieldwork Performed By:



Amy Leigh Trost, Biologist

2) Fieldwork Performed By:



Jacob Hargis, Associate Biologist

3) Fieldwork Performed By:

Sarah Toback

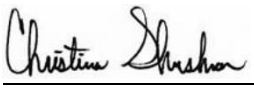
Sarah Toback, Associate Biologist

4) Fieldwork Performed By:

Jorge Saavedra-Alvarado

Jorge Saavedra-Alvarado, Intern Biologist

Check here __X__ if adding any additional names/signatures, below or on other side of page.



Christina Shushnar
Senior Biologist (Report and Analysis QA/QC)



David Daitch, Ph.D.
Report and Analysis QA/QC

Appendix A

Regulatory Setting

Regulatory Setting

Special-status habitats are vegetation types, associations, or sub-associations that support concentrations of special-status plant or animal species, are of relatively limited distribution, or are of particular value to wildlife.

Listed species are those taxa that are formally listed as endangered or threatened by the federal government (e.g., U.S. Fish and Wildlife Service [USFWS]), pursuant to the Federal Endangered Species Act (FESA) or as endangered, threatened, or rare (for plants only) by the State of California (i.e., California Fish and Game Commission), pursuant to the California Endangered Species Act or the California Native Plant Protection Act. Some species are considered rare (but not formally listed) by resource agencies, organizations with biological interests/expertise (e.g., Audubon Society, CNPS, The Wildlife Society), and the scientific community.

The following is a brief summary of the regulatory context under which biological resources are managed at the federal, state, and local levels. A number of federal and state statutes provide a regulatory structure that guides the protection of biological resources. Agencies with the responsibility for protection of biological resources within the Project area include:

- U.S. Army Corps of Engineers (wetlands and other waters of the United States);
- Lahontan Regional Water Quality Control Board (waters of the State);
- U.S. Fish and Wildlife Service (federally listed species and migratory birds);
- California Department Fish and Wildlife (riparian areas, streambeds, and lakes; state-listed species; Species of Special Concern; nesting birds);
- San Bernardino County Development Code (Chapter 88.01)

U.S. Army Corps of Engineers

Under Section 404 of the Clean Water Act, the U.S. Army Corps of Engineers (USACE) has authority to regulate activities that could discharge fill of material into wetlands or other "waters of the United States." Perennial and intermittent creeks are considered waters of the United States if they are hydrologically connected to other jurisdictional waters (typically a navigable water). The USACE also implements the federal policy embodied in Executive Order 11990, which is intended to result in no net loss of wetland value or acres. In achieving the goals of the Clean Water Act, the USACE seeks to avoid adverse impacts and offset unavoidable adverse impacts on existing aquatic resources. Any fill of wetlands that are hydrologically connected to jurisdictional waters would require a permit from the USACE prior to the start of work. Typically, when a project involves impacts to waters of the United States, the goal of no net loss of wetland acres or values is met through avoidance and minimization to the extent practicable, followed by compensatory mitigation involving creation or enhancement of similar habitats.

Regional Water Quality Control Board

The State Water Resources Control Board (SWRCB) and the local Regional Water Quality Control Board (RWQCB) have jurisdiction over "waters of the State," pursuant to the Porter-Cologne Water Quality Control Act, which are defined as any surface water or groundwater, including saline waters, within the boundaries of the State. The SWRCB has issued general Waste Discharge Requirements (WDRs) regarding discharges to "isolated" waters of the State (Water Quality Order No. 2004-0004-

DWQ, Statewide General Waste Discharge Requirements for Dredged or Fill Discharges to Waters Deemed by the U.S. Army Corps of Engineers to be Outside of Federal Jurisdiction). The RWQCB administers actions under this general order for isolated waters not subject to federal jurisdiction, and is also responsible for the issuance of water quality certifications pursuant to Section 401 of the Clean Water Act for waters subject to federal jurisdiction.

United States Fish and Wildlife Service

The USFWS implements the Migratory Bird Treaty Act (16 United States Code [USC] Section 703-711) and the Bald and Golden Eagle Protection Act (16 USC Section 668). The USFWS and National Marine Fisheries Service (NMFS) share responsibility for implementing the Federal Endangered Species Act (FESA) (16 USC § 153 et seq.). Generally, the USFWS implements the FESA for terrestrial and freshwater species, while the NMFS implements the FESA for marine and anadromous species. Projects that would result in "take" of any federally threatened or endangered species are required to obtain permits from the USFWS or NMFS through either Section 7 (interagency consultation with a federal nexus) or Section 10 (Habitat Conservation Plan) of the FESA, depending on the involvement by the federal government in permitting and/or funding of the project. The permitting process is used to determine if a project would jeopardize the continued existence of a listed species and what measures would be required to avoid jeopardizing the species. "Take" under federal definition means to harass, harm (which includes habitat modification), pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. Proposed or candidate species do not have the full protection of the FESA; however, the USFWS and NMFS advise project applicants that they could be elevated to listed status at any time.

California Department of Fish and Wildlife

The California Department of Fish and Wildlife (CDFW) derives its authority from the Fish and Game Code of California. The California Endangered Species Act (CESA) (Fish and Game Code Section 2050 et. seq.) prohibits take of state listed threatened or endangered. Take under CESA is restricted to direct mortality of a listed species and the law does not prohibit indirect harm by way of habitat modification. Where incidental take would occur during construction or other lawful activities, CESA allows the CDFW to issue an Incidental Take Permit upon finding, among other requirements, that impacts to the species have been minimized and fully mitigated.

The CDFW also enforces Sections 3511, 4700, 5050, and 5515 of the Fish and Game Code, which prohibits take of species designated as Fully Protected. The CDFW is not allowed to issue an Incidental Take Permit for Fully Protected species; therefore, impacts to these species must be avoided.

California Fish and Game Code sections 3503, 3503.5, and 3513 describe unlawful take, possession, or destruction of native birds, nests, and eggs. Section 3503.5 of the Code protects all birds-of-prey and their eggs and nests against take, possession, or destruction of nests or eggs. Section 3513 makes it a state-level office to take any bird in violation of the federal Migratory Bird Treaty Act. CDFW administers these requirements.

Species of Special Concern (SSC) is a category used by the CDFW for those species which are considered to be indicators of regional habitat changes or are considered to be potential future protected species. Species of Special Concern do not have any special legal status except that which may be afforded by the Fish and Game Code as noted above. The SSC category is intended by the CDFW for use as a management tool to include these species in special consideration when decisions are made concerning the development of natural lands. The CDFW also has authority to

administer the Native Plant Protection Act (NPPA) (Fish and Game Code Section 1900 et seq.). The NPPA requires the CDFW to establish criteria for determining if a species, subspecies, or variety of native plant is endangered or rare. Effective in 2015, CDFW promulgated regulations (14 CCR 786.9) under the authority of the NPPA, establishing that the CESA's permitting procedures would be applied to plants listed under the NPPA as "Rare." With this change, there is little practical difference for the regulated public between plants listed under CESA and those listed under the NPPA.

Perennial, intermittent, and ephemeral streams and associated riparian vegetation, when present, also fall under the jurisdiction of the CDFW. Section 1600 *et seq*. of the Fish and Game Code (Lake and Streambed Alteration Agreements) gives the CDFW regulatory authority over activities that divert, obstruct, or alter the channel, bed, or bank of any river, stream or lake.

San Bernardino Countywide General Plan

The San Bernardino Countywide General Plan (General Plan) identifies the Federal, State, and local statutes, ordinances, or policies that govern the conservation of biological resources that must be considered by San Bernardino County (County) during the decision-making process for any project that could impact biological resources. The General Plan is currently under revision to include a Renewable Energy and Conservation Element, which aims to maintain the natural and scenic values of the landscape while providing safe and reliable renewable energy sources for California. The draft of this element was released in April 2017. The element was adopted in August 2017 and amended in February 2019. An interim Urgency Ordinance for renewable energy projects was put in effect in 2014. This amended County Development Codes to restrict land use zoning districts for renewable energy projects and requires avoidance or minimization of impacts to special status species and their habitats.

Amendment Section 84.29.035 – Required Findings

- "(9) The proposed commercial solar energy generation facility will be sited so as to avoid or minimize impacts to the habitat of special status species, including threatened, endangered, or rare species, Critical Habitat Areas as designated by the U.S. Fish and Wildlife Service, important habitat/wildlife linkages or areas of connectivity designated by County, state or Federal agencies, and areas of Habitat Conservation Plans or Natural Community Conservation Plans that discourage or preclude development."
- "(10) Adequate provision has been made to maintain and promote native vegetation and avoid the proliferation of invasive weeds during and following construction."

The Draft Renewable Energy and Conservation Element of the General Plan provides goals, policies, and implementation measures to encourage sustainable energy production and consumption while protecting the environmental resources of San Bernardino County.

Section IV – Environmental Compatibility

- **Policy 4.1:** Apply standards to the design, siting, and operation of all renewable energy facilities that protect the environment, including sensitive biological resources, air quality, water supply and quality, cultural, archaeological, paleontological and scenic resources.
- **Policy 4.4:** Encourage siting, construction and screening of RE generation facilities to avoid, minimize or mitigate significant changes to the visual environment including minimizing light and glare.

- **4.4.1:** Reduce visual impacts through a combination of minimized reflective surfaces, context-sensitive color treatments, nature-oriented geometry, minimized vegetation clearing under and around arrays, conservation of pre-existing native plants, replanting of native plants as appropriate, maintenance of natural landscapes around the edges of facility complexes, and lighting design to minimize night-sky impacts, including attraction of and impact to nocturnal migratory birds.

- **Policy 4.7:** RE Project area selection and site design shall be guided by the following priorities relative to habitat conservation and mitigation:
  - Avoid sensitive habitat, including wildlife corridors, when feasible, during through site selection and project design.
  - Where necessary and feasible, conduct mitigation on-site.
  - When on-site habitat mitigation is not possible or adequate, conduct establish mitigation off-site in an area designated for habitat conservation.

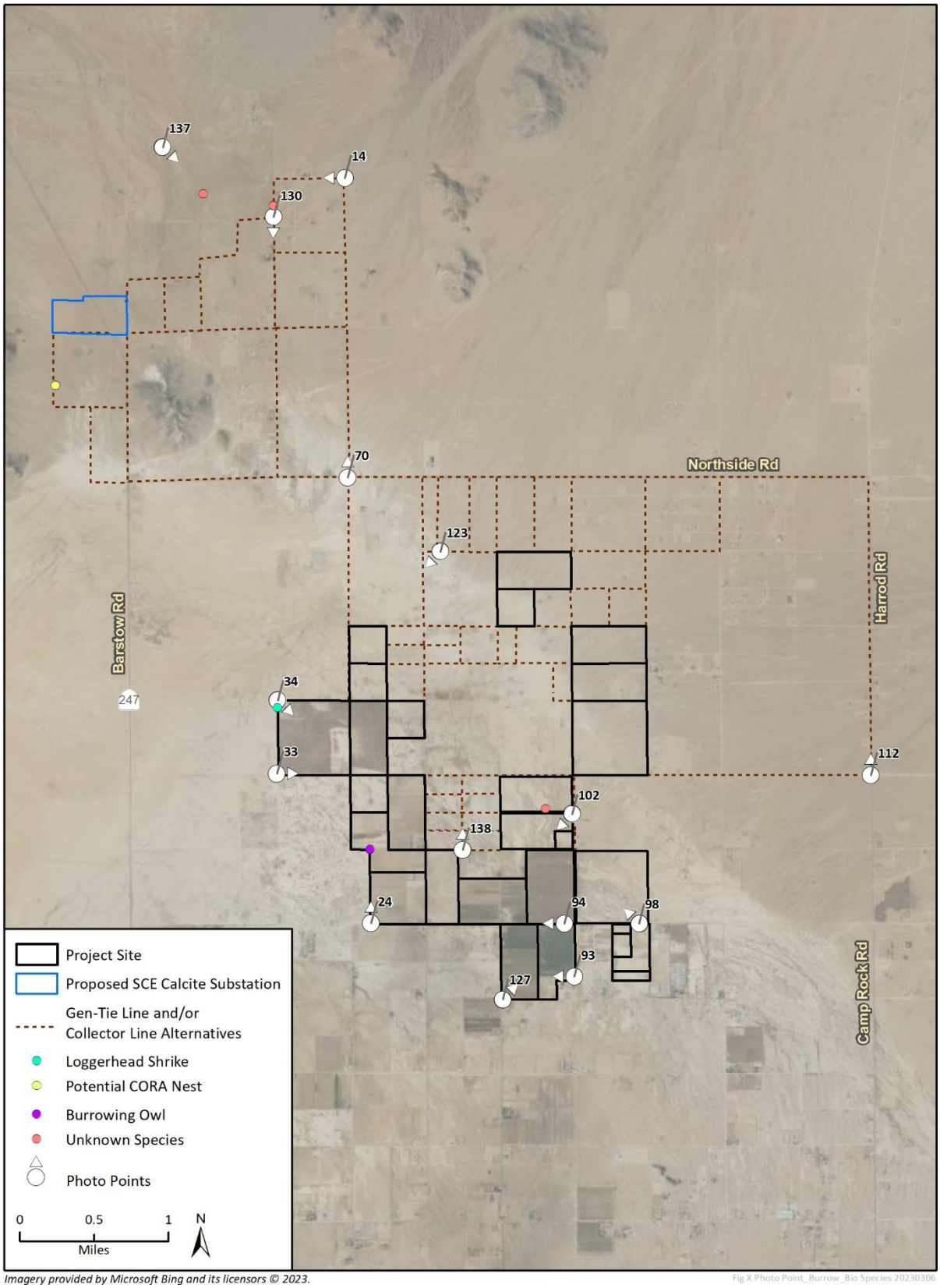
- **Policy 4.8:** Encourage mitigation for RE generation facility projects to locate habitat conservation offsets on public lands where suitable habitat is available.
  - **4.8.1:** Collaborate with appropriate state and Federal agencies to facilitate mitigation/habitat conservation activities on public lands.

- **Policy 4.9:** Encourage RE facility developers to design projects in ways that provide sanctuary (i.e., a safe place to nest, breed and/or feed) for native bees, butterflies and birds where feasible and appropriate, according to expert recommendations.

Appendix B

Site Photographs

Figure 11 Photo Point, Burrow Point, and Species Point Locations





Photograph 1. View facing west from the southeast corner of parcel 045212142 showing cultivated agriculture (FID 93)



Photograph 2. View facing northeast from the southwest corner of parcel 045212112 showing cultivated agriculture (FID 127)



Photograph 3. View facing north west from the southeast corner of parcel 045211317 showing spine scale shrub (FID 98)



Photograph 4 View facing north from the southwest corner of parcel 045206224 showing fallow agriculture (FID 24)



Photograph 5. View facing north west from the southeast corner of parcel 045211225 showing mulched agriculture with Russian thistle (FID 94)



Photograph 6. View facing southwest from the northeast corner of parcel 045211218 showing spine scale shrub (FID 102)



Photograph 7. View facing north from the southwest corner of parcel 045211215 showing sparse spine scale shrub (FID 138)



Photograph 8. Burrowing Owl burrow littered with fecal pellets near entrance located at western edge of parcel 045206222 (Burrow 001)



Photograph 9. View facing east at from the southwest corner of parcel 045207111 showing disturbed spine scale shrub (FID 33)



Photograph 10. View facing north at possible gen-tie route along Harrod Rd (FID 112)



Photograph 11. View facing north at possible gen-tie route along Huff Rd (FID 70)



Photograph 12. Burrow appears to be caved in with fecal pellets surrounding entrance, located at the center of parcel 045309129 (Burrow 003)



Photograph 13. View facing south at the intersection of parcels 045309148 and 045309152 showing creosote and spine scale shrub alliance (FID 130)



Photograph 14. View facing southwest from center of parcel 045304107 showing transmission lines (FID 123)



Photograph 15. View facing west at possible gen-tie route along Waalew Rd (FID 14)



Photograph 16. View facing southeast from the north west corner of parcel 045309124 showing sparse creosote (FID 137)



Photograph 17. Burrow located at the eastern edge of parcel 045309129 (Burrow 002)



Photograph 18. Burrow located at the southern edge of parcel 045211219 (Burrow 004) with no sign of recent activity.



Photograph 19. View facing southeast from the northwest corner of parcel 045207111 showing tamarisk, logger head shrike located in adjacent tamarisk (FID 34)



Photograph 20. Burrowing owl pellet located at center of parcel 045309129, no burrow nearby (Bio point 2)



Photograph 21. Large mound with small burrows and white-wash located at the northeast corner of parcel 045212139 (Bio point 1)

Appendix C

Floral and Faunal Compendium

Plant Species Observed Within the Project Area on July 20-22, 2021

Scientific Name	Common Name	Status	Native or Introduced
Plants			
Trees/Shrubs/Grasses			
Atriplex spinifera	salt bush	–	Native
Ambrosia dumosa	white bursage	–	Native
Ambrosia salsola	cheesebush	–	Native
Cylindropuntia echinocarpa	golden cholla	–	Native
Cuscuta sp.	desert dodder	–	Native
Ephedra nevadensis	Nevada Jointfir	–	Native
Larrea tridentata	creosote bush	–	Native
Lotus scoparius	deer weed	–	Native
Lycium fremontii	Fremont boxthorn	–	Native
Psorothamnus fremontii	indigo bush	–	Native
Salsola tragus	Russian thistle	–	Non-native
Schismus arabicus	Mediterranean grass	–	Non-native
Solanum parishii	nightshade	–	Native
Stanleya pinnata	Prince's plume	–	Native
Suaeda nigra	bush seep weed	–	Native
Tamarix sp.	salt cedar	–	Non-native
Animals			
Birds			
Accipiter cooperii	Cooper's hawk	–	Native
Athene cunicularia	burrowing owl	SSC	Native
Auriparus flaviceps	verdin	–	Native
Buteo jamaicensis	red-tailed hawk	–	Native
Callipepla gambelii	Gambel's quail	–	Native
Cathartes aura	turkey vulture	–	Native
Corvus corax	common raven	–	Native
Eremophila alpestris	horned lark	–	Native
Falco mexicanus	prairie falcon	WL	Native
Falco sparverius	American kestrel	–	Native
Geococcyx californiaus	roadrunner	–	Native
Haemorhous mexicanus	house finch	–	Native
Lanius ludovicianus	loggerhead shrike	SSC	Native
Melospiza melodia	song sparrow	–	Native
Mimus polyglottos	northern mockingbird	–	Native
Myiarchus cinerascens	ash-throated flycatcher	–	Native
Plegadis chihi	white faced ibis	–	Native
Sayornis saya	say's phoebe	_	Native
Streptopelia decaocto	Eurasian collared dove	_	Native

Scientific Name	Common Name	Status	Native or Introduced
Toxostoma lecontei	Leconte's thrasher	–	Native
Tyrannus verticalis	western kingbird	_	Native
Zenaida macroura	mourning dove	–	Native
Reptile			
Aspidoscelis tigris	western whiptail lizard	–	Native
Dipsosaurus dorsalis	desert iguana	--	Native
Lampropeltis getula	kingsnake	–	Native
Masticophis flagellum	coachwhip	--	Native
Uta stansburiana	side blotched lizard	–	Native
Mammals			
Ammospermophilus	antelope ground squirrel	–	Native
Canis latrans	coyote	–	Native
Dipodomys deserti	desert kangaroo rat	–	Native
Lepus californicus	black tailed jack rabbit	–	Native
Otospermophilus beecheyi	California ground squirrel	–	Native
Peromyscus maniculatus	deer mouse	_	Native

Appendix D

Special-Status Species Evaluation Tables

Special-Status Plant and Animal Species in the Regional Vicinity of the Project Area

Scientific Name Common Name	Status	Habitat Requirements	Potential to Occur in Project Area	Habitat Suitability/ Observations
Plants and Lichens				
Acanthoscyphus parishii var. *cienegensis* Cienega Seca oxytheca	None/None G4?T2/S2 1B.3	Annual herb. Blooms Jun-Sep. Occurs in upper montane coniferous forest. Dry gravelly banks and granitic sand. 2090-2450m (6857-8038ft).	Not Expected	The Project area is out of the known elevation range of this species.
Acanthoscyphus parishii var. *goodmaniana* Cushenbury oxytheca	FE/None G4?T1/S1 1B.1	Annual herb. Blooms May-Oct. Occurs in pinyon and juniper woodland. On limestone talus and rocky slopes. 1220-2380 m (4002-7808ft).	Not Expected	The Project area is out of the known elevation range of this species.
Ambrosia pumila San Diego ambrosia	FE/None G1/S1 1B.1	Chaparral, coastal scrub, valley and foothill grassland, vernal pools. Sandy loam or clay soil, sometimes alkaline. In valleys; persists where disturbance has been superficial. Sometimes on margins or near vernal pools. 3-580 m.	Not Expected	The Project area is out of the known elevation range of this species.
Arenaria ursina Bear Valley sandwort	FT/None G1/S1 1B.2	Meadows and seeps, pebble (pavement) plain, pinyon and juniper woodland. Mesic, rocky sites. 1795-2895 m. Blooms May-Aug.	Not Expected	The Project area is out of the known elevation range of this species.
Astragalus albens Cushenbury milk-vetch	FE/None G1/S1 1B.1	Joshua tree woodland, Mojavean desert scrub, Pinyon and juniper woodland. Sandy or stony flats, rocky hillsides, canyon washes, & fans, on carbonate or mixed granitic-calcareous debris. 1095-2000m. Blooms Mar-Jun.	Not Expected	The Project area is out of the known elevation range of this species.
Astragalus bernardinus San Bernardino milk-vetch	None/None G3/S3 1B.2	Joshua tree woodland, Pinyon and juniper woodland. Granitic or carbonate substrates. 900-2000m. Blooms Apr-Jun.	Not Expected	Suitable habitat (Joshua tree woodland, pinyon and juniper woodland) does not occur within the Project area.
Astragalus brauntonii Braunton's milk-vetch	FE/None G2/S2 1B.1	Chaparral, coastal scrub, valley and foothill grassland. Recent burns or disturbed areas; usually on sandstone with carbonate layers. Soil specialist, requires shallow soils to defeat pocket gophers and open areas, preferably on hilltops, saddles, or bowls between hills. 3-640 m. Blooms Jan-Aug.	Not Expected	The Project area is out of the known elevation range of this species.

Scientific Name Common Name	Status	Habitat Requirements	Potential to Occur in Project Area	Habitat Suitability/ Observations
Astragalus jaegerianus Lane Mountain milk-vetch	FE/None G2/S2 1B.1	Joshua tree woodland, Mojavean desert scrub. Dry, stony hillsides and desert mesas, in granite sand and gravel. Commonly with Joshua trees, usually under shrubs. 975-1250 m. Blooms Apr-Jun.	Not Expected	The Project area is out of the known elevation range of this species.
Astragalus lentiginosus var. *coachellae*= Coachella Valley milk-vetch	FE/None G5T1/S1 1B.2	Desert dunes, Sonoran desert scrub. Sandy flats, washes, outwash fans, sometimes on dunes. 35-695 m.	Not Expected	The Project area is out of the known elevation range of this species.
Astragalus lentiginosus var. *sierrae* Big Bear Valley milk-vetch	None/None G5T2/S2 1B.2	Meadows and seeps, Mojavean desert scrub, Pinyon and juniper woodland, Upper montane coniferous forest. Stony meadows and open pinewoods; sandy and gravelly soils in a variety of habitats. 1800-2600m. Blooms Apr-Aug.	Not Expected	The Project area is out of the known elevation range of this species.
Astragalus leucolobus Big Bear Valley woollypod	None/None G2/S2 1B.2	Lower montane coniferous forest, Pebble (Pavement) plain, Pinyon and juniper woodland, Upper montane coniferous forest. Dry pine woods, gravelly knolls among sagebrush, or stony lake shores in the pine belt. 1100-2885m. Blooms May-Jul.	Not Expected	The Project area is out of the known elevation range of this species.
Astragalus tidestromii Tidestrom's milk-vetch	None/None G4/S2 2B.2	Mojavean desert scrub. Washes, in sandy or gravelly soil. On limestone. 600-1785m. Blooms (Jan)Apr-Jul.	Not Expected	Marginally suitable desert scrub habitat occurs in the Project area; however, there are no known occurrences within 5 miles of the Project area.
Astragalus tricarinatus triple-ribbed milk-vetch	FE/None G2/S2 1B.2	Joshua tree woodland, Sonoran desert scrub. Hot, rocky slopes in canyons and along edge of boulder-strewn desert washes, with Larrea and Encelia. 455-1585 m.	Not Expected	Suitable Joshua tree woodland and Sonoran desert scrub habitat does not occur within the Project area. There are no known occurrences within 5 miles of the Project area.

Scientific Name Common Name	Status	Habitat Requirements	Potential to Occur in Project Area	Habitat Suitability/ Observations
Atriplex parishii Parish's brittlescale	None/None G1G2/S1 1B.1	Chenopod scrub, Playas, Vernal pools. Usually on drying alkali flats with fine soils. 25-1900m. Blooms Jun-Oct.	Low Potential	Marginally suitable desert scrub habitat occurs within the Project area. There are no known occurrences within 5 miles of the Project area.
Berberis fremontii Fremont barberry	None/None G5/S3 2B.3	Joshua tree "woodland", Pinyon and juniper woodland. Rocky, sometimes granitic. 1145-1720m. Blooms Mar-May.	Not Expected	The Project area is out of the known elevation range of this species.
Berberis nevinii Nevin's barberry	FE/SE G1/S1 1B.1	Chaparral, cismontane woodland, coastal scrub, riparian scrub. On steep, north-facing slopes or in low grade sandy washes. 90-1590m. Blooms (Feb)Mar-Jun.	Not Expected	Suitable chaparral, cismontane woodland, coastal scrub, and riparian scrub habitats do not occur within the Project area. There are no known occurrences within 5 miles of the Project area.
Boechera dispar pinyon rockcress	None/None G3/S3 2B.3	Joshua tree "woodland", Mojavean desert scrub, Pinyon and juniper woodland. Granitic, gravelly slopes & mesas. Often under desert shrubs which support it as it grows. 1200-2540m. Blooms Mar-Jun.	Not Expected	The Project area is out of the known elevation range of this species.
Boechera lincolnensis Lincoln rockcress	None/None G4G5/S3 2B.3	Chenopod scrub, Mojavean desert scrub. On limestone. 1100-2705m. Blooms Mar-May.	Not Expected	The Project area is out of the known elevation range of this species.
Boechera parishii Parish's rockcress	None/None G2/S2 1B.2	Pebble (Pavement) plain, Pinyon and juniper woodland, Upper montane coniferous forest. Generally found on pebble plains on clay soil with quartzite cobbles; sometimes on limestone. 1770-2990m. Blooms Apr-May.	Not Expected	The Project area is out of the known elevation range of this species.
Boechera shockleyi Shockley's rockcress	None/None G3/S2 2B.2	Pinyon and juniper woodland. On ridges, rocky outcrops and openings on limestone or quartzite. 875-2310m. Blooms May-Jun.	Not Expected	Suitable woodland habitat and rocky outcrops do not occur within the Project area. There are no known occurrences within 5 miles of the Project area.

Scientific Name Common Name	Status	Habitat Requirements	Potential to Occur in Project Area	Habitat Suitability/ Observations
Brodiaea filifolia thread-leaved brodiaea	FT/SE G2/S2 1B.1	Chaparral, cismontane woodland, coastal scrub, playas, valley and foothill grassland, vernal pools. Usually associated with annual grassland and vernal pools; often surrounded by shrubland habitats. Occurs in openings on clay soils. 15-1030 m. Blooms Mar-Jun.	Not Expected	Suitable chaparral, cismontane woodland, coastal scrub, playas, valley and foothills grassland, and vernal pool habitats do not occur within the Project area. There are no known occurrences within 5 miles of the Project area.
Calochortus palmeri var. *palmeri* Palmer's mariposa-lily	None/None G3T2/S2 1B.2	Chaparral, Lower montane coniferous forest, Meadows and seeps. Vernally moist places in yellow-pine forest, chaparral. 710-2390m. Blooms Apr-Jul.	Not Expected	Suitable habitat (chaparral, coniferous forest, meadows and seeps) does not occur within the Project area. There are no recorded occurrences within 5 miles of the Project area.
Calochortus striatus alkali mariposa lily	None/None G3?/S2S3 1B.2	Chaparral, Chenopod scrub, Meadows and seeps, Mojavean desert scrub. Alkaline meadows and ephemeral washes. 70-1600m. 70-1595m. Blooms Apr-Jun.	Low Potential	Marginally suitable chenodpod scrub habitat occurs within the Project area. The nearest recorded occurrence (Occ. No. 27 from 2016) is approximately 3.4 miles southwest of the Project area.
Calyptridium pygmaeum pygmy pussypaws	None/None G1G2/S1S2 1B.2	Subalpine coniferous forest, Upper montane coniferous forest. Sandy or gravelly sites. 1980-3110m. Blooms Jun-Aug.	Not Expected	The Project area is out of the known elevation range of this species.
Carex scirpoidea ssp. *pseudoscirpoidea* western single-spiked sedge	None/None G5T4/S2 2B.2	Alpine boulder and rock field, Meadows and seeps, Subalpine coniferous forest. Often on limestone; mesic sites. 2990-3700m. Blooms Jul-Sep.	Not Expected	The Project area is out of the known elevation range of this species.
Castilleja cinerea ash-gray paintbrush	FT/None G1G2/S1S2 1B.2	Meadows and seeps, Mojavean desert scrub, Pebble (Pavement) plain, Pinyon and juniper woodland, Upper montane coniferous forest. Endemic to the San Bernardino Mountains, in clay openings; often in meadow edges. 1800-2960m. Blooms Jun-Aug.	Not Expected	The Project area is out of the known elevation range of this species.

Scientific Name Common Name	Status	Habitat Requirements	Potential to Occur in Project Area	Habitat Suitability/ Observations
Castilleja lasiorhyncha San Bernardino Mountains owl's-clover	None/None G2?/S2? 1B.2	Chaparral, Meadows and seeps, Pebble (Pavement) plain, Riparian woodland, Upper montane coniferous forest. Mesic to drying soils in open areas of stream and meadow margins or in vernally wet areas. 1300-2390m. Blooms May-Aug.	Not Expected	The Project area is out of the known elevation range of this species.
Chorizanthe xanti var. *leucotheca* white-bracted spineflower	None/None G4T3/S3 1B.2	Coastal scrub, Mojavean desert scrub, Pinyon and juniper woodland. Sandy or gravelly places. 300-1200m. Blooms Apr-Jun.	Not Expected	Suitable coastal scrub, Mojavean desert scrub, and pinyon and juniper woodland habitats do not occur within the Project area. Additionally, there are no recorded occurrences within 5 miles of the Project area.
Claytonia peirsonii ssp. *bernardinus* San Bernardino spring beauty	None/None G2G3T1/S1 1B.1	Pinyon and juniper woodland, Upper montane coniferous forest. Carbonate, Openings (usually), Rocky, Talus 2360-2465m. Blooms Mar-Apr.	Not Expected	The Project area is out of the known elevation range of this species.
Claytonia peirsonii ssp. *californacis* Furnace spring beauty	None/None G2G3T1/S1 1B.1	Pinyon and juniper woodland, Upper montane coniferous forest. Carbonate, Openings (usually), Rocky, Talus 2300-2300m. Blooms Mar-May.	Not Expected	The Project area is out of the known elevation range of this species.
Cryptantha clokeyi Clokey's cryptantha	None/None G3/S3 1B.2	Mojavean desert scrub. Sandy or gravelly soils. 725-1365m. Blooms Apr.	Not Expected	Marginally suitable desert scrub habitat occurs within the Project area; however, no rocky slopes occur within the Project area. The nearest recorded occurrence (Occ. No. 16 from 2010) is approximately 0.75-mile east of the Project area.
Cymopterus multinervatus purple-nerve cymopterus	None/None G4G5/S2 2B.2	Mojavean desert scrub, Pinyon and juniper woodland. Sandy or gravelly places. 790-1800m. Blooms Mar-Apr.	Low Potential	Marginally suitable desert scrub habitat occurs within the Project area. There are five recorded occurrences within 5 miles of the Project area.

Scientific Name Common Name	Status	Habitat Requirements	Potential to Occur in Project Area	Habitat Suitability/ Observations
Diplacus mohavensis Mojave monkeyflower	None/None G2/S2 1B.2	Joshua tree "woodland", Mojavean desert scrub. Dry sandy or rocky washes along the Mojave River. 600-1200m. Blooms Apr-Jun.	Not Expected	Suitable Joshua tree woodland and Mojavean desert scrub habitats do not occur within the Project area. Additionally, there are no recorded occurrences within 5 miles of the Project area.
Dodecahema leptoceras slender-horned spineflower	FE/SE G1/S1 1B.1	Chaparral, cismontane woodland, coastal scrub. Flood deposited terraces and washes; associates include *Encelia, Dalea*, and *Lepidosprartum*. Sandy soils. 20-765 m Blooms Apr-Jun.	Not Expected	Suitable chaparral, cismontane woodland, and coastal scrub habitat does not occur within the Project area. There are no known occurrences within 5 miles of the Project area.
Drymocallis cuneifolia var. *cuneifolia* wedgeleaf woodbeauty	None/None G2T1/S1 1B.1	Riparian scrub, Upper montane coniferous forest. Sometimes on carbonate. 1800-2415m. Blooms Jun-Aug.	Not Expected	The Project area is out of the known elevation range of this species.
Dryopteris filix-mas male fern	None/None G5/S2 2B.3	Upper montane coniferous forest. In granite crevices. 2400-3100m. Blooms Jul-Sep.	Not Expected	The Project area is out of the known elevation range of this species.
Dudleya abramsii ssp. *affinis* San Bernardino Mountains dudleya	None/None G4T2/S2 1B.2	Pebble (Pavement) plain, Pinyon and juniper woodland, Upper montane coniferous forest. Outcrops, granite or quartzite, rarely limestone. 1250-2600m. Blooms Apr-Jul.	Not Expected	The Project area is out of the known elevation range of this species.
Dudleya cymosa ssp. *ovatifolia* Santa Monica Mountains dudleya	FT/None G5T1/S1 1B.1	Chaparral, coastal scrub. In canyons on volcanic or sedimentary substrates; primarily on north-facing slopes. 150-335 m. Blooms Mar-Jun.	Not Expected	Suitable chaparral and coastal scrub habitat does not occur within the Project area. There are no known occurrences within 5 miles of the Project area.
Elymus salina Salina Pass wild-rye	None/None G4G5/S2S3 2B.3	Pinyon and juniper woodland. Rocky sites. 1350-2135m. Blooms May-Jun.	Not Expected	The Project area is out of the known elevation range of this species.
Eremogone ursina Big Bear Valley sandwort	FT/None G1/S1 1B.2	Meadows and seeps, Pebble (Pavement) plain, Pinyon and juniper woodland. Mesic, rocky sites. 1800-2900m. Blooms May-Aug.	Not Expected	The Project area is out of the known elevation range of this species.

Scientific Name Common Name	Status	Habitat Requirements	Potential to Occur in Project Area	Habitat Suitability/ Observations
Eriastrum densifolium ssp. *Sanctorum* Santa Ana River wooly-star	FE/SE G4T1/S1 1B.1	Chaparral, coastal scrub. In sandy soils on river floodplains or terraced fluvial deposits. 180-705 m. Blooms Apr-Sep.	Not Expected	Suitable chaparral and coastal scrub habitats do not occur within the Project area. There are no known occurrences within 5 miles of the Project area.
Erigeron parishii Parish's daisy	FT/None G2/S2 1B.1	Mojavean desert scrub, Pinyon and juniper woodland. Often on carbonate; limestone mountain slopes; often associated with drainages. Sometimes on granite. 800-2000m. Blooms May-Aug.	Not Expected	Suitable Mojavean desert scrub and pinyon and juniper woodland habitats do not occur within the Project area. Additionally, there are no recorded occurrences within 5 miles of the Project area.
Eriogonum evanidum vanishing wild buckwheat	None/None G2/S1 1B.1	Chaparral, Cismontane woodland, Lower montane coniferous forest, Pinyon and juniper woodland. Sandy sites. 1100-2225m. Blooms Jul-Oct.	Not Expected	The Project area is out of the known elevation range of this species.
Eriogonum kennedyi var. *austromontanum* southern mountain buckwheat	FT/None G4T2/S2 1B.2	Lower montane coniferous forest, Pebble (Pavement) plain. Usually found in pebble plain habitats. 1770-2890m. Blooms Jun-Sep.	Not Expected	The Project area is out of the known elevation range of this species.
Eriogonum microthecum var. *johnstonii* Johnston's buckwheat	None/None G5T2/S2 1B.3	Subalpine coniferous forest, Upper montane coniferous forest. Slopes and ridges on granite or limestone. 1795-2865 m 1829-2926m. Blooms Jul-Sep.	Not Expected	The Project area is out of the known elevation range of this species.
Eriogonum ovalifolium var. *vineum* Cushenbury buckwheat	FE/None G5T1/S1 1B.1	Joshua tree "woodland", Mojavean desert scrub, Pinyon and juniper woodland. Limestone mountain slopes. Dry, usually rocky places. 1400-2440m. Blooms May-Aug.	Not Expected	The Project area is out of the known elevation range of this species.
Erythranthe exigua San Bernardino Mountains monkeyflower	None/None G2/S2 1B.2	Meadows and seeps, Pebble (Pavement) plain, Upper montane coniferous forest. Seeps and sandy sometimes disturbed soil in moist drainages of annual streams; clay soils. 1800-2315m. Blooms May-Jul.	Not Expected	The Project area is out of the known elevation range of this species.

Scientific Name Common Name	Status	Habitat Requirements	Potential to Occur in Project Area	Habitat Suitability/ Observations
Erythranthe purpurea little purple monkeyflower	None/None G2/S2 1B.2	Meadows and seeps, Pebble (Pavement) plain, Upper montane coniferous forest. Dry clay or gravelly soils under Jeffrey pines, along annual streams or vernal springs & seeps. 1900-2300m. Blooms May-Jun.	Not Expected	The Project area is out of the known elevation range of this species.
Euphorbia platysperma flat-seeded spurge	None/None G3/S1 1B.2	Desert dunes, Sonoran desert scrub. Sandy places or shifting dunes. Possibly a waif in California; more common in Arizona and Mexico. 65-100m. Blooms Feb-Sep.	Not Expected	The Project area is out of the known elevation range of this species.
Heuchera parishii Parish's alumroot	None/None G3/S3 1B.3	Alpine boulder and rock field, Lower montane coniferous forest, Subalpine coniferous forest, Upper montane coniferous forest. Rocky places. Sometimes on carbonate. 1500-3800m. Blooms Jun-Aug.	Not Expected	The Project area is out of the known elevation range of this species.
Ivesia argyrocoma var. *argyrocoma* silver-haired ivesia	None/None G2T2/S2 1B.2	Meadows and seeps, Pebble (Pavement) plain, Upper montane coniferous forest. In pebble plains and meadows with other rare plants. 1463-2960m. Blooms Jun-Aug.	Not Expected	The Project area is out of the known elevation range of this species.
Lesquerella kingii ssp. *Bernardina* San Bernardino Mountains bladderpod	FE/None G5T1/S1 1B.1	Lower montane coniferous forest, pinyon and juniper woodland, subalpine coniferous forest. Dry sandy to rocky carbonate soils. 1980-2590 m. Blooms May-Jun.	Not Expected	Suitable lower montane coniferous forest, pinyon and juniper woodland, and subalpine coniferous forest habitats do not occur within the Project area. There are no known occurrences within 5 miles of the Project area.
Lewisia brachycalyx short-sepaled lewisia	None/None G4/S2 2B.2	Lower montane coniferous forest, Meadows and seeps. Dry to moist meadows in rich loam. 1370-2300m. Blooms (Feb)Apr-Jun(Jul).	Not Expected	The Project area is out of the known elevation range of this species.
Lilium parryi lemon lily	None/None G3/S3 1B.2	Lower montane coniferous forest, Meadows and seeps, riparian forest, Upper montane coniferous forest. Wet, mountainous terrain; generally in forested areas; on shady edges of streams, in open boggy meadows & seeps. 1220-2745m. Blooms Jul-Aug.	Not Expected	The Project area is out of the known elevation range of this species.

Scientific Name Common Name	Status	Habitat Requirements	Potential to Occur in Project Area	Habitat Suitability/ Observations
Linanthus killipii Baldwin Lake linanthus	None/None G1/S1 1B.2	Joshua tree "woodland", Meadows and seeps, Pebble (Pavement) plain, Pinyon and juniper woodland. Usually on pebble plains with other rare species. 1700-2400m. Blooms May-Jul.	Not Expected	The Project area is out of the known elevation range of this species.
Linanthus maculatus ssp. *maculatus* Little San Bernardino Mtns. linanthus	None/None G2T2/S2 1B.2	Desert dunes, Joshua tree "woodland", Mojavean desert scrub, Sonoran desert scrub. Sandy places. Usually in light-colored quartz sand; often in wash or bajada. 140-1220m. Blooms Mar-May.	Not Expected	Suitable desert dunes, Joshua tree woodland, Mojavean desert scrub, and Sonoran desert scrub habitats do not occur within the Project area. Additionally, there are no recorded occurrences within 5 miles of the Project area.
Menodora spinescens var. *mohavensis* Mojave menodora	None/None G4T2/S2 1B.2	Mojavean desert scrub. Rocky hillsides, canyons. Andesite gravel. 690-2000m. Blooms Apr-May.	Not Expected	Suitable Mojavean desert scrub, rocky hillsides, and canyon habitats do not occur within the Project area. The nearest recorded occurrence (Occ. No. 6 from 1906) is located approximately 3.1 miles northeast of the Project area. However, this occurrence is over 100 years old.
Mentzelia tridentata creamy blazing star	None/None G3/S3 1B.3	Mojavean desert scrub. 700-1175m. Blooms Mar-May.	Not Expected	Marginally suitable desert scrub habitat occurs within the Project area. The nearest recorded occurrence (Occ. No. 14 from 1978) is located approximately 3.7 miles north of the Project area.
Navarretia peninsularis Baja navarretia	None/None G3/S2 1B.2	Chaparral, Lower montane coniferous forest, Meadows and seeps, Pinyon and juniper woodland. Wet areas in open forest. 1500-2300m. Blooms (May)Jun-Aug.	Not Expected	The Project area is out of the known elevation range of this species.

Scientific Name Common Name	Status	Habitat Requirements	Potential to Occur in Project Area	Habitat Suitability/ Observations
Oxytheca parishii var. *goodmaniana* Cushenbury oxytheca	FE/None G4?T1/S1 1B.1	Annual herb. Blooms May-Oct. Occurs in pinyon and juniper woodland. On limestone talus and rocky slopes. 1220-2380 m (4002-7808 ft).	Not Expected	Suitable pinyon and juniper woodland habitats do not occur within the Project area. There are no known occurrences within 5 miles of the Project area.
Packera bernardina San Bernardino ragwort	None/None G2/S2 1B.2	Meadows and seeps, Pebble (Pavement) plain, Upper montane coniferous forest. Mesic, sometimes alkaline meadows, and dry rocky slopes. 1800-2300m. Blooms May-Jul.	Not Expected	The Project area is out of the known elevation range of this species.
Pediomelum castoreum Beaver Dam breadroot	None/None G3/S2 1B.2	Joshua tree woodland, Mojavean desert scrub. Sandy soils; washes and roadcuts. 610-1525m. Blooms Apr-May.	Moderate Potential	Marginally suitable desert scrub habitat occurs within the Project area. The nearest recorded occurrence (Occ. No. 24 from 2017) is located approximately 0.1-mile from the Project area.
Perideridia parishii ssp. *parishii* Parish's yampah	None/None G4T3T4/S2 2B.2	Lower montane coniferous forest, Meadows and seeps, Upper montane coniferous forest. Damp meadows or along streambeds-prefers an open pine canopy. 1465-3000m. Blooms Jun-Aug.	Not Expected	The Project area is out of the known elevation range of this species.
Phacelia parishii Parish's phacelia	None/None G2G3/S1 1B.1	Mojavean desert scrub, Playas. Alkaline flats and slopes or on clay soils. 540-1200m. Blooms Apr-May(Jun-Jul).	Moderate Potential	Suitable spinescale scrub occurs on the Project area. Additionally, there are three recorded occurrences within 5 miles of the Project area.
Phlox dolichantha Big Bear Valley phlox	None/None G2/S2 1B.2	Pebble (Pavement) plain, Upper montane coniferous forest. Sloping hillsides, in shade under pines and Quercus kelloggii, with heavy pine litter; also in openings. 1830-2970m. Blooms May-Jul.	Not Expected	The Project area is out of the known elevation range of this species.
Physaria kingii ssp. *bernardina* San Bernardino Mountains bladderpod	FE/None G5T1/S1 1B.1	Lower montane coniferous forest, Pinyon and juniper woodland, Subalpine coniferous forest. Dry sandy to rocky carbonate soils. 1850-2700m. Blooms May-Jun.	Not Expected	The Project area is out of the known elevation range of this species.

Scientific Name Common Name	Status	Habitat Requirements	Potential to Occur in Project Area	Habitat Suitability/ Observations
Plagiobothrys parishii Parish's popcornflower	None/None G1/S1 1B.1	Great Basin scrub, Joshua tree "woodland". Alkaline soils; mesic sites. 750-1400m. Blooms Mar-Jun(Nov).	Low Potential	Suitable Great Basin scrub and Joshua tree woodland habitats do not occur within the Project area. The nearest recorded occurrence (Occ. No. 1 from 2005) is located approximately 3.3 miles southwest of the Project area.
Poa atropurpurea San Bernardino blue grass	FE/None G2/S2 1B.2	Meadows and seeps. Mesic meadows of open pine forests and grassy slopes, loamy alluvial to sandy loam soil. 1360-2455m. Blooms (Apr)May-Jul(Aug).	Not Expected	The Project area is out of the known elevation range of this species.
Poliomintha incana frosted mint	None/None G5/SH 2A	Lower montane coniferous forest. In boggy soil. 1600-1700m. Blooms Jun-Jul.	Not Expected	The Project area is out of the known elevation range of this species.
Polygala acanthoclada thorny milkwort	None/None G4/S2S3 2B.3	Chenopod scrub, Joshua tree "woodland", Pinyon and juniper woodland. 760-2285m. Blooms May-Aug.	Low Potential	Marginally suitable chenopod scrub habitat occurs within the Project area. There are no recorded occurrences within 5 miles of the Project area.
Polygala intermontana intermountain milkwort	None/None G4/S2 2B.1	Pinyon and juniper woodland. 2010-3080m. Blooms Jun-Jul(Oct).	Not Expected	The Project area is out of the known elevation range of this species.
Puccinellia parishii Parish's alkali grass	None/None G3/S1 1B.1	Meadows and seeps. Alkali springs and seeps in deserts. 700-1000m. Blooms Apr-May.	Not Expected	Suitable meadows and seeps do not occur within the Project area. The nearest recorded occurrence (Occ. No. 1 from 2015) is located approximately 3.3 miles southwest of the Project area.

Scientific Name Common Name	Status	Habitat Requirements	Potential to Occur in Project Area	Habitat Suitability/ Observations
Puccinellia simplex California alkali grass	None/None G3/S2 1B.2	Chenopod scrub, Meadows and seeps, Valley and foothill grassland, Vernal pools. Alkaline, vernally mesic. Sinks, flats, and lake margins. 2-930m. Blooms Mar-May.	Low Potential	Marginally suitable chenopod scrub habitat occurs within the Project area. The nearest recorded occurrence (Occ. No. 1 from 2017) is located approximately 3.3 miles southwest of the Project area.
Pyrrocoma uniflora var. *gossypina* Bear Valley pyrrocoma	None/None G5T1/S1 1B.2	Meadows and seeps, Pebble (Pavement) plain. Meadows, meadow edges, and along streams in or near pebble plain habitat. 1600-2300m. Blooms Jul-Sep.	Not Expected	The Project area is out of the known elevation range of this species.
Rorippa gambellii Gambel's watercress	FE/ST G1/S1 1B.1	Marshes and swamps. Freshwater and brackish marshes at the margins of lakes and along streams, in or just above the water level. 5-305 m. Blooms Apr-Oct.	Not Expected	Suitable marshes and swamps habitats do not occur within the Project area. There are no known occurrences within 5 miles of the Project area.
Rosa woodsii var. *glabrata* Cushenbury rose	None/None G5T1/S1 1B.1	Mojavean desert scrub. Springs. 910-1435m. Blooms (Apr)May-Aug.	Not Expected	Suitable spring habitat does not occur within the Project area. Additionally. there are no recorded occurrences within 5 miles of the Project area.
Saltugilia latimeri Latimer's woodland-gilia	None/None G3/S3 1B.2	Chaparral, Mojavean desert scrub, Pinyon and juniper woodland. Rocky or sandy substrate; sometimes in washes, sometimes limestone. 400-1900m. Blooms Mar-Jun.	Not Expected	Suitable chaparral, Mojavean desert scrub, and pinyon and juniper woodland habitats do not occur within the Project area. Additionally, there are no recorded occurrences within 5 miles of the Project area.
Sidalcea hickmanii ssp. *parishii* Parish's checkerbloom	None/SR G3T1/S1 1B.2	Chaparral, Cismontane woodland, Lower montane coniferous forest. Disturbed burned or cleared areas on dry, rocky slopes, in fuel breaks & fire roads along the mountain summits. 1000-2499m. Blooms (May)Jun-Aug.	Not Expected	The Project area is out of the known elevation range of this species.

Scientific Name Common Name	Status	Habitat Requirements	Potential to Occur in Project Area	Habitat Suitability/ Observations
Sidalcea malviflora ssp. *dolosa* Bear Valley checkerbloom	None/None G5T2/S2 1B.2	Lower montane coniferous forest, Meadows and seeps, Riparian woodland, Upper montane coniferous forest. Known from wet areas within forested habitats. Affected by hydrological changes. 1495-2685m. Blooms May-Aug.	Not Expected	The Project area is out of the known elevation range of this species.
Sidalcea neomexicana salt spring checkerbloom	None/None G4/S2 2B.2	Chaparral, Coastal scrub, Lower montane coniferous forest, Mojavean desert scrub, Playas. Alkali springs and marshes. 15-1530m. Blooms Mar-Jun.	Not Expected	Alkali springs and marshes are not present within the Project area. Marginally suitable desert scrub habitat occurs within the Project area. The nearest recorded occurrence (Occ. No. 5 from 2005) is located approximately 3.3 miles southwest of the Project area.
Sidalcea pedata bird-foot checkerbloom	FE/SE G1/S1 1B.1	Meadows and seeps, Pebble (Pavement) plain. Vernally mesic sites in meadows or pebble plains. 1600-2500m. Blooms May-Aug.	Not Expected	The Project area is out of the known elevation range of this species.
Sphenopholis obtusata prairie wedge grass	None/None G5/S2 2B.2	Cismontane woodland, Meadows and seeps. Open moist sites, along rivers and springs, alkaline desert seeps. 300-2000m. Blooms Apr-Jul.	Not Expected	Suitable habitat (cismontane woodland, meadows, and seeps) does not occur within the Project area. There are no recorded occurrences within 5 miles of the Project area.
Symphyotrichum defoliatum San Bernardino aster	None/None G2/S2 1B.2	Cismontane woodland, Coastal scrub, Lower montane coniferous forest, Marshes and swamps, Meadows and seeps, Valley and foothill grassland. Vernally mesic grassland or near ditches, streams and springs; disturbed areas. 2-2040m. Blooms Jul-Nov.	Not Expected	Suitable habitat (cismontane woodland, coastal scrub, marshes, swamps, meadows, seeps, grasslands) do not occur within the Project area. There are no recorded occurrences within 5 miles of the Project area.
Taraxacum californicum California dandelion	FE/None G1G2/S1S2 1B.1	Meadows and seeps. Mesic meadows, usually free of taller vegetation. 1620-2800m. Blooms May-Aug.	Not Expected	The Project area is out of the known elevation range of this species.

Scientific Name Common Name	Status	Habitat Requirements	Potential to Occur in Project Area	Habitat Suitability/ Observations
Thelypodium stenopetalum slender-petaled thelypodium	FE/SE G1/S1 1B.1	Meadows and seeps. Seasonally moist alkaline clay soils; associated with seeps and springs in the pebble plains. 1600-2500m. Blooms May-Sep.	Not Expected	The Project area is out of the known elevation range of this species.
Viola pinetorum ssp. *grisea* grey-leaved violet	None/None G4G5T3/S3 1B.2	Meadows and seeps, Subalpine coniferous forest, Upper montane coniferous forest. Dry mountain peaks and slopes. 1500-3400m. Blooms Apr-Jul.	Not Expected	The Project area is out of the known elevation range of this species.
Animals				
Reptiles				
Gopherus agassizii desert tortoise	FT/ST G3/S2S3	Most common in desert scrub, desert wash, and Joshua tree habitats; occurs in almost every desert habitat. Require friable soil for burrow and nest construction. Creosote bush habitat with large annual wildflower blooms preferred.	Moderate Potential (in natural scrub habitat)	The Project area is within the DRECP modeled range and historic tortoise burrows were observed in this area. Additionally, there are recorded occurrences within 5 miles of the Project area.
Amphibians				
Anaxyrus californicus arroyo toad	FE/None G2G3/S2S3 SSC	Semi-arid regions near washes or intermittent streams, including valley-foothill and desert riparian, desert wash, etc. Rivers with sandy banks, willows, cottonwoods, and sycamores; loose, gravelly areas of streams in drier parts of range.	Not Expected	Suitable wash and intermittent stream habitats do not occur within the Project area. There are no recorded occurrences within 5 miles of the Project area.
Rana draytonii California red-legged frog	FT/None G2G3/S2S3 SSC	Lowlands and foothills in or near permanent sources of deep water with dense, shrubby or emergent riparian vegetation. Requires 11-20 weeks of permanent water for larval development. Must have access to estivation habitat.	Not Expected	Required permanent sources of deep water do not occur within the Project area. There are no recorded occurrences within 5 miles of the Project area.
Rana muscosa mountain yellow-legged frog	FT/SE G1/S1 WL	Federal listing refers to populations in the San Gabriel, San Jacinto and San Bernardino mountains (southern DPS). Northern DPS was determined to warrant listing as endangered, Apr 2014, effective June 30, 2014. Always encountered within a few feet of water. Tadpoles may require 2-4 years to complete their aquatic development,	Not Expected	Suitable aquatic habitat does not occur within the Project area. There are no recorded occurrences within 5 miles of the Project area.

Scientific Name Common Name	Status	Habitat Requirements	Potential to Occur in Project Area	Habitat Suitability/ Observations
Fish				
Catostomus santaanae Santa Ana sucker	FT/None G1/S1	Endemic to Los Angeles Basin south coastal streams. Habitat generalists, but prefer sand-rubble-boulder bottoms, cool, clear water, and algae.	Not Expected	Suitable aquatic habitat does not occur within the Project area. There are no recorded occurrences within 5 miles of the Project area.
Gasterosteus aculeatus williamsoni unarmored threespine stickleback	FE/SE G5T1/S1 FP	Weedy pools, backwaters, and among emergent vegetation at the stream edge in Southern California streams. Cool (<24 C) clear water with abundant vegetation.	Not Expected	Suitable aquatic habitat does not occur within the Project area. There are no recorded occurrences within 5 miles of the Project area.
Gila bicolor ssp. *Mohavensis* Mohave tui chub	FE/SE G4T1/S1 FP	Endemic to the Mojave River basin, adapted to alkaline, mineralized waters. Needs deep pools, ponds, or slough-like areas. Needs vegetation for spawning.	Not Expected	Suitable aquatic habitat does not occur within the Project area. There are no recorded occurrences within 5 miles of the Project area.
Gila elegans bonytail	FE/SE G1/SH	Found in the Colorado River bordering California. Adapted for swimming in swift water, but both adults and young need backwaters and eddies. Needs gravel riffles for spawning.	Not Expected	Suitable aquatic habitat does not occur within the Project area. There are no recorded occurrences within 5 miles of the Project area.
Xyrauchen texanus razorback sucker	FE/SE G1/S1S2 FP	Found in the Colorado River bordering California. Adapted for swimming in swift currents but also need quiet waters. Spawn in areas of sand/gravel/rocks in shallow water.	Not Expected	Suitable aquatic habitat does not occur within the Project area. There are no recorded occurrences within 5 miles of the Project area.
Invertebrates				
Branchinecta sandiegonensis San Diego fairy shrimp	FE/None G2/S2	Endemic to San Diego and Orange County mesas within vernal pools.	Not Expected	The Project area is outside the known range of the species. There are no recorded occurrences within 5 miles of the Project area.
Danaus plexippus monarch butterfly	FC/None G4T2T3/ S2S3	Winter roost sites extend along the coast from northern Mendocino to Baja California, Mexico. Roosts located in wind-protected tree groves with nectar and water sources nearby.	Not Expected	The Project area is outside the known range of the species. There are no recorded occurrences within 5 miles of the Project area.

Scientific Name Common Name	Status	Habitat Requirements	Potential to Occur in Project Area	Habitat Suitability/ Observations
Euphydryas editha quino quino checkerspot butterfly	FE/None G5T1T2/ S1S2	Sunny openings within chaparral and coastal sage shrublands in parts of Riverside and San Diego counties. Hills and mesas near the coast.	Not Expected	The Project area is outside the known range of the species. There are no recorded occurrences within 5 miles of the Project area.
Rhaphiomidas terminatus abdominalis Delhi sands flower-loving fly	FE/None G1T1/S1	Found only in areas of the Delhi Sands formation in southwestern San Bernardino and northwestern Riverside counties. Requires fine, sandy soils, often with wholly or partly consolidated dunes and sparse vegetation.	Not Expected	The Project area is outside the known range of the species. There are no recorded occurrences within 5 miles of the Project area.
Birds				
Aquila chrysaetos golden eagle	None/None G5/S3 FP WL	Rolling foothills, mountain areas, sage-juniper flats, and desert. Cliff-walled canyons provide nesting habitat in most parts of range; also, large trees in open areas.	Moderate Potential (foraging)	Suitable nesting habitat does not occur within the Project area. However, suitable foraging habitat is present. Additionally, there are recorded breeding occurrences within 5 miles of the Project area.
Athene cunicularia burrowing owl	None/None G4/S3 SSC	Open, dry annual or perennial grasslands, deserts, and scrublands characterized by low-growing vegetation. Subterranean nester, dependent upon burrowing mammals, most notably, the California ground squirrel.	Present	Burrowing owl were observed within the Project area during the July 2021 reconnaissance surveys.
Charadrius nivosus western snowy plover	FT/None G3T3/S2 SSC	Sandy beaches, salt pond levees, and shores of large alkali lakes. Needs sandy, gravelly or friable soils for nesting	Not Expected	Suitable sandy beach, salt pond levee, and alkali lake habitats do not occur within the Project area. There are no known occurrences within 5 miles of the Project area.
Empidonax traillii extimus southwestern willow flycatcher	FE/SE G5T2/S1	Inhabits riparian woodlands in southern California.	Not Expected	Suitable riparian woodland habitat does not occur within the Project area. There are no known occurrences within 5 miles of the Project area.

Scientific Name Common Name	Status	Habitat Requirements	Potential to Occur in Project Area	Habitat Suitability/ Observations
Falco mexicanus prairie falcon	None/None G5/S4 WL	Inhabits dry, open terrain, either level or hilly. Breeding sites located on cliffs. Forages far afield, even to marshlands and ocean shores.	Present (foraging), Not expected (nesting)	A prairie falcon was observed within the Project area during the July 2021 reconnaissance surveys. Suitable foraging habitat occurs on site. No suitable cliffs for nesting occur on the Project area. r
Gymnogyps californianus California condor	FE/SE G1/S1 FP	Require vast expanses of open savannah, grasslands, and foothills chaparral in mountain ranges of moderate altitude. Deep canyons containing clefts in the rocky walls provide nesting sites. Forages up to 100 miles from roost/nest.	Low Potential (foraging)	Suitable foraging habitat is present within the Project area. However, there are no recorded occurrences within 5 miles of the Project area.
Pipilo crissalis eremophilus Inyo California towhee	FT/SE G4G5T2/S2	Resident of the Argus Mountains of Inyo County. Inhabits willow thickets growing at permanent springs or seepages in canyons; ranges into adjacent desert brushland to forage.	Not Expected	The Project area is outside the known range of the species. Additionally, suitable willow thickets do not occur within the Project area.
Polioptila californica coastal California gnatcatcher	FT/None G4G5T3Q/S2 SSC	Obligate, permanent resident of coastal sage scrub below 2500 ft in southern California. Low, coastal sage scrub in arid washes, on mesas and slopes. Not all areas classified as coastal sage scrub are occupied.	Not Expected	Suitable coastal sage scrub habitat does not occur within the Project area. There are no known occurrences within 5 miles of the Project area.
Rallus obsoletus yumanensis Yuma Ridgways rail	FE/ST G5T3/S1S2 FP	A marsh bird found in dense cattail or cattail-bulrush marshes along the lower Colorado River.	Not Expected	Suitable marsh habitat does not occur within the Project area. There are no known occurrences within 5 miles of the Project area.

Scientific Name Common Name	Status	Habitat Requirements	Potential to Occur in Project Area	Habitat Suitability/ Observations
Toxostoma bendirei Bendire's thrasher	None/None G4/S3 SSC	Migratory; local spring/summer resident in flat areas of desert succulent shrub/Joshua tree habitats in Mojave Desert. Nests in cholla, yucca, palo verde, thorny shrub, or small tree, usually 0.5 to 20 feet above ground.	Moderate Potential	Suitable breeding habitat occurs within the Project area. Additionally, the Project area is within the species' distribution as modeled by the DRECP. There are recorded occurrences within 5 miles of the Project area.
Toxostoma lecontei Le Conte's thrasher	None/None G4/S3 SSC	Desert resident; primarily of open desert wash, desert scrub, alkali desert scrub, and desert succulent scrub habitats. Commonly nests in a dense, spiny shrub or densely branched cactus in desert wash habitat, usually 2-8 feet above ground.	High Potential	Suitable desert scrub habitat occurs within the Project area.
Vireo bellii pusillus least Bell's vireo	FE/SE G5T2/S2	Summer resident of southern California in low riparian in vicinity of water or in dry river bottoms; below 2000 ft. Nests placed along margins of bushes or on twigs projecting into pathways, usually willow, Baccharis, or mesquite.	Not Expected	Suitable riparian habitat does not occur within the Project area. There are no known occurrences within 5 miles of the Project area.
Mammals				
Dipodomys merriami parvus San Bernardino Merriam's kangaroo rat	FE/SCE G5T1/S1 SSC	Alluvial scrub vegetation on sandy loam substrates characteristic of alluvial fans and flood plains. Needs early to intermediate seral stages.	Not Expected	Suitable alluvial scrub vegetation habitat does not occur within the Project area. There are no known occurrences within 5 miles of the Project area.
Dipodomys stephensi Stephen's kangaroo rat	FE/ST G2/S2	Primarily annual and perennial grasslands, but also occurs in coastal scrub and sagebrush with sparse canopy cover. Prefers buckwheat, chamise, brome grass and filaree. Will burrow into firm soil.	Not Expected	Suitable annual and perennial grasslands and coastal scrub habitats do not occur within the Project area. There are no known occurrences within 5 miles of the Project area.

Scientific Name Common Name	Status	Habitat Requirements	Potential to Occur in Project Area	Habitat Suitability/ Observations
Eumops perotis californicus western mastiff bat	None/None G4G5T4/ S3S4 SSC	Occurs in open, semi-arid to arid habitats, including coniferous and deciduous woodlands, coastal scrub, grasslands, and chaparral. Roosts in crevices in cliff faces and caves, and buildings. Roosts typically occur high above ground.	Low Potential (foraging)	Suitable roosting habitat does not occur within the Project area. The nearest recorded occurrence (Occ. No. 174 from 1954) is located approximately 0.6-mile west of the Project area. However, this occurrence is over 50 years old.
Lasionycteris noctivagans silver-haired bat	None/None G3G4/S3S4	Primarily a coastal and montane forest dweller, feeding over streams, ponds & open brushy areas. Roosts in hollow trees, beneath exfoliating bark, abandoned woodpecker holes, and rarely under rocks. Needs drinking water.	Not Expected	Suitable coastal and montane forest habitat does not occur within the Project area.
Microtus californicus scirpensis Amargosa vole	FE/SE G5T1/S1	Known only from bulrush marshes along the Amargosa River. Burrows in soft soils. Nests are constructed in the burrows. Creates runway system through grasses from burrow.	Not Expected	The Project area is outside the known range of the species. There are no known occurrences within 5 miles of the Project area.
Xerospermophilus mohavensis Mohave ground squirrel	None/ST G2G3/S2S3	Open desert scrub, alkali scrub & Joshua tree woodland. Also feeds in annual grasslands. Restricted to Mojave Desert. Prefers sandy to gravelly soils, avoids rocky areas. Uses burrows at base of shrubs for cover. Nests are in burrows.	Not Expected	The Project area is outside of the current known range for this species.

Regional Vicinity refers to within a 5- mile (CNDDB) and 10-quad (CNPS) search radius of site.

Status (Federal/State)

FE = Federal Endangered
FT = Federal Threatened
FC = Federal Candidate
SE = State Endangered
ST = State Threatened
SCE = State Candidate Endangered
SR = State Rare
SSC = CDFW Species of Special Concern
FP = CDFW Fully Protected
WL = CDFW Watch List

CRPR (CNPS California Rare Plant Rank)

1B = Rare, Threatened, or Endangered in California and elsewhere
2A = Presumed extirpated in California, but common elsewhere
2B= Rare, Threatened, or Endangered in California, but more common elsewhere

CRPR Threat Code Extension

.1 = Seriously endangered in California (>80% of occurrences threatened/high degree and immediacy of threat)
.2 = Moderately threatened in California (20-80% of occurrences threatened/moderate degree and immediacy of threat)
.3 = Not very endangered in California (<20% of occurrences threatened/low degree and immediacy of threat)

Other Statuses

G1 or S1 Critically Imperiled Globally or Subnationally (state)

G2 or S2	Imperiled Globally or Subnationally (state)
G3 or S3	Vulnerable to extirpation or extinction Globally or Subnationally (state)
G4/5 or S4/5	Apparently secure, common and abundant
GH or SH	Possibly Extirpated – missing; known from only historical occurrences but still some hope of rediscovery

Additional notations may be provided as follows

T – Intraspecific Taxon (subspecies, varieties, and other designations below the level of species)
Q – Questionable taxonomy that may reduce conservation priority
? – Inexact numeric rank

Appendix E

Agency Communications

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July 16, 2021
Project Number: 21-11216

Scott Sobiech
Field Supervisor
U.S. Fish and Wildlife Service - Carlsbad Office
2177 Salk Avenue - Suite 250
Carlsbad, CA 92008
Phone: (760) 431-9440
scott_sobiech@fws.gov

Subject: **Notification of Biological Resources Assessment Surveys to Evaluate a Proposed Solar Project in Lucerne Valley, San Bernardino County, California**

Dear Mr. Sobiech:

Rincon Consultants, Inc. (Rincon) is providing this letter as notification of biological studies that will be underway in the Lucerne Valley area of San Bernardino County, California. San Bernardino County guidelines require submission of scoping letters to regulatory agencies, including CDFW. Reconnaissance surveys will be used to evaluate a proposed photovoltaic project and associated generation intertie lines. The study area is situated in part within the eastern extent of Lucerne Dry Lake, and adjacent desert flats, desert scrub (e.g. creosote scrub, rubber rabbitbrush scrub) and grassland, with portions of the site present on fallow agricultural lands. The study area includes alternatives for generation intertie lines.

Rincon is currently completing a general biological resources assessment to initiate review of potential biological resources and evaluate project alternatives. This effort includes surveys to be conducted in late July 2021. During these surveys, Rincon biologists will complete general vegetation and habitat mapping, and will also assess habitat suitability for federally listed species and critical habitat, specifically desert tortoise, raptors and migratory birds. Habitat suitability assessments will be based on a combination of field conditions supplemented with a review of published literature and records recorded in the California Natural Database, recovery plans and five year reviews, and other data sources.

Results of the field surveys and habitat assessments will be presented in a General Biological Resources Assessment (BRA) Report for the County of San Bernardino, that will follow the County's guidelines for preparation of such reports. The report will discuss site conditions, habitat suitability, and wildlife movement, as well as identifying any further study or consultation(s) required to evaluate biological resources. Rincon currently anticipates that additional protocol level or focused surveys may be required for desert tortoise, as well as federally-listed plant species if identified during the habitat assessment, in some areas of the proposed project. The final BRA will provide both impact assessments and recommendations for additional protocol surveys as applicable.

If you have any questions or comments regarding this letter, please contact Dr. David Daitch at ddaitch@rinconconsultants.com or 303-818-6072.

Sincerely,
Rincon Consultants, Inc.



David Daitch, Ph.D.
Principal/Senior Ecologist

Rincon Consultants, Inc.

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July 16, 2021
Rincon Project No. 21-11216

Magdalena Rodriguez
California Department of Fish and Wildlife
Inland Deserts Region (Region 6)
Renewable Energy Program
3602 Inland Empire Blvd, Suite C-220,
Ontario, CA 91764
Magdalena.Rodriguez@wildlife.ca.gov

Subject: **Notification of Biological Resources Assessment Surveys to Evaluate a Proposed Solar Project in Lucerne Valley, San Bernardino County, California**

Dear Ms. Rodriguez:

Rincon Consultants, Inc. (Rincon) is providing this letter as notification of biological studies that will be underway in the Lucerne Valley area of San Bernardino County, California. San Bernardino County guidelines require submission of scoping letters to regulatory agencies, including CDFW. Reconnaissance surveys will be used to evaluate a proposed photovoltaic project and associated generation intertie lines. The study area is situated in part within the eastern extent of Lucerne Dry Lake, and adjacent desert flats, desert scrub (e.g. creosote scrub, rubber rabbitbrush scrub) and grassland, with portions of the site present on fallow agricultural lands. The study area includes alternatives for generation intertie lines.

Rincon is currently completing a general biological resources assessment to initiate review of potential biological resources and evaluate project alternatives. This effort includes surveys to be conducted in late July 2021. During these surveys, Rincon biologists will complete general vegetation and habitat mapping, and will also assess habitat suitability for listed species and other species of special concern, including desert tortoise, raptors and other migratory birds, and special status plants. Habitat suitability assessments will based on a combination of field conditions supplemented with a review of published literature and records recorded in the California Natural Database, recovery plans and five year reviews, and other data sources.

Results of the field surveys and habitat assessments will be presented in a General Biological Resources Assessment (BRA) Report for the County of San Bernardino, that will follow the County's guidelines for preparation of such reports. The report will discuss site conditions, habitat suitability, and wildlife movement, as well as identifying any further study or consultation(s) required to evaluate biological resources. Rincon currently anticipates that additional protocol level or focused surveys are likely to be required for desert tortoise, as well as special status plants, in some areas of the proposed project. The

final BRA will provide both impact assessments and recommendations for additional protocol surveys as applicable.

If you have any questions or comments regarding this letter, please contact Dr. David Daitch at ddaitch@rinconconsultants.com or 303-818-6072.

Sincerely,
Rincon Consultants, Inc.



David Daitch, Ph.D.
Principal/Senior Ecologist

Appendix D2. Biological Inventory Findings Report

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Biological Inventory
Findings Report

Proposed Sienna Solar and Storage Project
Lucerne Valley, California





Prepared For:
99MT 8ME, LLC

June 5, 2022

Prepared By:

Wildland International

Biological Inventory Findings Report

Proposed Sienna Solar and Storage Project

Lucerne Valley, California

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Executive Summary

Sienna Solar and Storage Project (Project Area) is a proposed utility-scale solar generation facility and/or energy storage facility, with up to 500-megawatts of solar and/or energy storage capacity. It is located near Lucerne Valley in San Bernardino County, California. The Project Area comprises a mixture of residential properties, ruderal/fallow properties, undeveloped playa and desert scrub communities, and agricultural land that includes alfalfa and jojoba farms and large-scale hemp growing operations. Human use/disturbance of the broader project area is considerable with active and abandoned hemp growing operations, active agriculture, temporary worker housing resulting in a significant amount of fugitive trash and debris scattered across the landscape. Of particular note, were the number of feral and domestic canines roaming within the Project Area.

Special Status Wildlife

Mojave desert tortoise surveys followed established U.S. Fish and Wildlife Service protocols. The potential Mojave desert tortoise habitat that was surveyed was considered marginal as it lies within a transitional habitat community between creosote bush scrub and the non-habitat area of the more alkaline periphery of Lucerne Dry Lake. This marginal habitat has been further degraded by extensive use by feral and roaming domestic canines. No Mojave desert tortoises or desert tortoise sign was observed during an April 5 May 10, 2022 protocol survey for the proposed Project Area.

California species of special concern that were observed included two live Western burrowing owls associated with three burrows, three LeConte's thrashers, and one loggerhead shrike. Note: again, a likely factor negatively impacting wildlife in the vicinity of the Project Area was the ubiquitous presence of domestic and feral dogs roaming freely. The survey team routinely observed packs of 3 to 15 dogs at any one time throughout the day.

Special Status Plants

Approximately 1,033 acres were surveyed for the presence of special status species and rare plants at nine separate locations within the broader 1,854 acre Project. The remaining 821 acres were not surveyed because these parcels were either under active agriculture or had been disced/harrowed and some of the parcel had a thick layer of organic material/debris over them and were not considered appropriate or potential habitat.

No federal or state special status plant species were observed during the botanical surveys conducted concurrently with the desert tortoise protocol survey. However, potentially occurring special status plants were not observed at reference populations in the project vicinity that were visited prior to the survey. Potential habitat for two potentially occurring special status species, Beaver Dam breadroot and Parish's phacelia were mapped.

California Desert Native Plant Act Species

The only CDNPA plant species found to occur on the Project Area was silver cholla. A total of 83 silver cholla were recorded and mapped. It should be noted that recruitment on both sites was incredibly low.

Sensitive Natural Communities

No sensitive natural communities were located within the Project Area.

Invasive Species and Weeds

Invasive weeds were observed throughout the surveyed areas, mainly tamarisk, African rue, fivehorn bassia, cheatgrass, Russian thistle, and London rocket. A total of 258 tamarisk individuals were observed. Large groves of tamarisk occur to the southwest of the Project Area at the margins of Lucerne Dry Lake. These are readily observable from satellite imagery. All invasive weed populations were also recorded.

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1.0 Proposed Project Description

99MT 8ME, LLC (the "Applicant") is seeking approval of a Conditional Use Permit (CUP) associated with the construction of a utility-scale solar generation facility and/or energy storage facility, with up to 500-megawatts of solar and/or energy storage capacity known as the Sienna Solar and Storage Project ("Sienna" or the "Project") near the Lucerne Valley in San Bernardino County, California. The area of consideration comprises approximately 1,854 acres (Project Area) for potential development of photovoltaic solar facility, a Battery Energy Storage System, Project substation, and collection system, among other associated infrastructure. Additionally, the Applicant anticipates interconnection at the future site of the Southern California Edison (SCE) Calcite Substation (a 77-acre site) (currently pending final permits and construction) via a new 230-kilovolt generation-interconnect ("gen-tie") line utilizing private and potentially public rights-of-way (ROWs). SCE has proposed to engineer, design, construct, and test the SCE Calcite Facilities in response to an interconnection application(s). The Applicant intends to secure a CUP from San Bernardino County as the lead agency for approval to construct the components discussed herein along with permits and approvals from other relevant agencies as required by law.

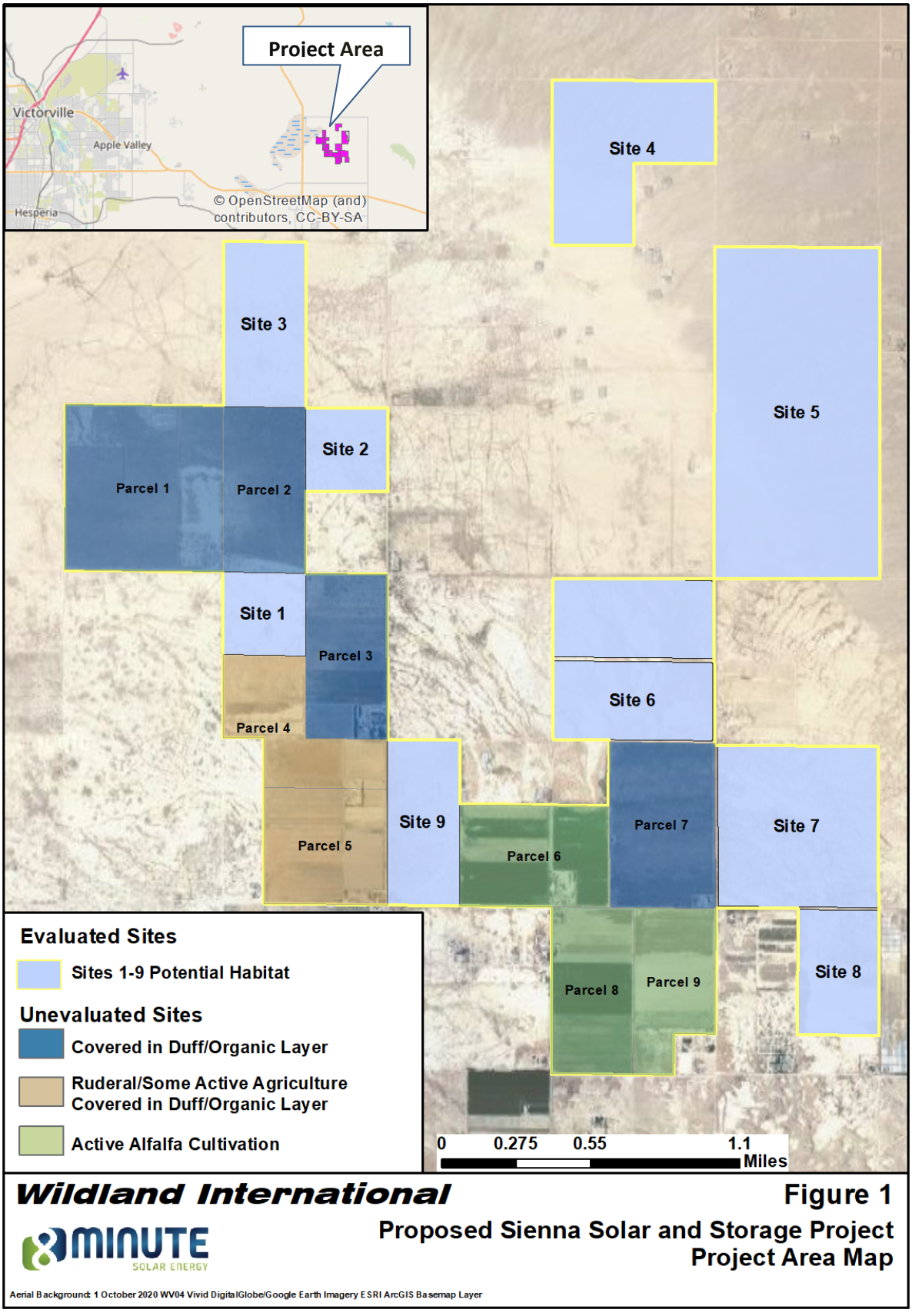
1.1 Proposed Project Location and Existing Land Use

The proposed Project Area lies in unincorporated San Bernardino County California, approximately 25 miles east of the City of Victorville and five (5) miles north of Lucerne Valley. The proposed Project Area is currently located primarily east of Barstow Road/State Route (SR) 247, with some areas of the Project Area located to the north and northeast of SR 247 (Figure 1).

Existing land use within the Project Area in within the vicinity is primarily rural residential, recreation, farmland, open space, and transportation corridors.

1.2 Naming Nomenclature

The naming conventions provided in the Table 1 were assigned by Wildland International. The table also provides the Accessor's Parcel Number (APN) of the parcels for easy cross reference. Wildland International and KDJ & Associates surveyed approximately 1,033 acres of the entire 1,854-acre Project Area, which comprised suitable natural habitat for sensitive wildlife and plant species (Evaluated Sites) based on a preliminary literature review as to current land use within the Project Area. The parcels that were not surveyed are shown below as Parcels 1-9 (Unevaluated Parcels) (Figure 1). These areas were either under previous or current agricultural production or they were fallow and covered with a deep organic duff layer. Presumably this was done for wind erosion protection and weed abatement.



Wildland International

Figure 1

Proposed Sienna Solar and Storage Project
Project Area Map

MINUTE SOLAR ENERGY

Aerial Background: 1 October 2020 WV04 Vivid DigitalGlobe/Google Earth Imagery ESRI ArcGIS Basemap Layer

Table 1 – Evaluated Sites

Evaluated Sites	APNs	Acreage*	Vegetation Community	Soil Type
Site 1	**045-206-221**	40.2	Modified *Atriplex confertifolia* Shrubland Alliance	Bousic and Peterman Clays
Site 2	**045-207-125**	40.2	Modified *Atriplex confertifolia* Shrubland Alliance	Bousic and Peterman Clays
Site 3	**045-207-119, 045-207-120**	80.41	Modified *Atriplex confertifolia* Shrubland Alliance	Bousic and Peterman Clays and Playa
Site 4	**045-239-108, 045-239-109**	119.93	*Atriplex canescens* Shrubland Alliance	Bousic Clay, Joshua Loam, Kimberlina Fine Loamy Sand, Bryman Fine Sands
Site 5	**045-236-146, 045-236-147, 045-236-148**	322.63	*Larrea tridentata Shrubland* and *Atriplex polycarpa* Shrubland Alliance Transition	Kimberlina Fine Loamy Sand, Glendale Variant Silt Loam, Joshua Loam
Site 6	**045-211-218, 045-211-219**	138.19	*Atriplex polycarpa* Shrubland Alliance	Bousic and Peterman Clays, Glendale Variant Silt Loam, and Dune
Site 7	**045-211-317**	151.40	*Atriplex polycarpa* Shrubland Alliance	Glendale Variant Silt Loam
Site 8	**045-212-138, 045-212-139, 045-212-148, 045-212-152**	61.03	*Atriplex polycarpa* Shrubland Alliance	Glendale Variant Silt Loam
Site 9	**045-211-220**	70.20	*Atriplex polycarpa* Shrubland Alliance	Bousic and Peterman Clays

***Any discrepancies in total acreage are attributable to County easements and property boundaries within roadways.**

Table 2 – Unevaluated Parcels

Unevaluated Parcels	APNs	Acreage	Land Use
Parcel 1	**045-207-111**	154.93	No Habitat -Ruderal, Former Agriculture, Covered in Duff/Organic Debris
Parcel 2	**045-207-110**	80.41	No Habitat -Ruderal, Former Agriculture, Covered in Duff/Organic Debris
Parcel 3	**045-206-223**	80.44	No Habitat -Ruderal, Former Agriculture, Covered in Duff/Organic Debris
Parcel 4	**045-206-222**	76.43	No Habitat -Ruderal, Covered in Duff/Organic Debris, Some Active Agriculture
Parcel 5	**045-206-224**	84.47	No Habitat -Ruderal, Covered in Duff/Organic Debris, Some Active Agriculture
Parcel 6	**045-211-224**	89.90	No Habitat -Active Alfalfa Field
Parcel 7	**045-211-225**	103.45	No Habitat -Ruderal, Former Agriculture, Covered in Duff/Organic Debris
Parcel 8	**045-212-112**	80.72	No Habitat -Active Alfalfa Field
Parcel 9	**045-212-142**	70.84	No Habitat -Active Alfalfa Field

2.0 Environmental Setting

The Sienna Solar Project is located at the south and eastern margins of the Lucerne Dry Lake playa in the Lucerne Valley and White Horse Mountain quadrangles and is contained entirely within Township 5 North and Range 1 East. The Project Area is a consolidated contiguous mixture of residential properties, ruderal/fallow properties, undeveloped playa and desert scrub communities, and agricultural land that includes alfalfa and jojoba farms and large-scale hemp growing operations. As of 2022, approximately 241 acres of the broader project is currently under cultivation for alfalfa. In addition, approximately 580 acres of the Project Area is under fallow management covered by a duff layer as wind protection or weed barrier. The remaining acreage is barren/formerly tilled or is native desert scrub or playa habitat totaling approximately 1,033 acres. Native habitat communities range from low growing shadscale (*Atriplex confertifolia*) at the playa margins to larger allscale (*Atriplex polycarpa*) communities (collectively saltbush scrub) for most of the Project Area as well as open playa. There is a minor creosote bush (*Larrea tridentata*) scrub community that is identified as "transitional" on the eastern edge of the Project Area encompassed by a 320-acre parcel (Site 5). One extant parcel (Site 4) exists at the northern most portion of the Project Area and this is an "L" shaped 120-acre parcel positioned at the corner of Lincoln Avenue and Smoke Bush Road. Terrain throughout the Project Area was mainly flat to gently sloping with some minor rolling terrain.

The pedons present were mainly Bousic and Peterman Clays for much of the playa and near playa areas and Joshua and Kimberlina sandy loams in the north and east (Sites 4 and 5). Sites 7, 8 and a portion of the southern alfalfa fields were Glendale variant silty loams. Table 3 shows the soil types identified with in the Project Area and these are mapped on Figure 2 in Appendix A.

Table 3 Soil Mapping Units within the Sienna Solar and Storage Project Area

Soil Mapping Unit	Soil Mapping Unit Name	Percent Slopes	Elevation Where Found (ft)	Landform	Parent Material
135	JOSHUA LOAM	2-5	2,600 to 3,000 feet	Fan remnants	Alluvium derived from mixed sources
156	PLAYAS	0-1	100 to 5,000 feet	Playas	Lacustrine deposits derived from mixed sources
154	PETERMAN CLAY	0-2	2,800 to 3,000 feet	Fan skirts	Fine-textured alluvium derived from mixed sources
140	LAVIC LOAMY FINE SAND	0-5	2,800 to 3,100 feet	Fan skirts, fan aprons	Alluvium derived from mixed sources
137	KIMBERLINA LOAMY FINE SAND	0-2	120 to 1,000 feet	Fan skirts, fan aprons	Alluvium derived from mixed sources
125	GLENDALE VARIANT SILT LOAM, SALINE-ALKALI	0-2	2,850 to 2,950 feet	Lake plains	Alluvium derived from mixed sources
123	DUNE	0-10	0 to 3000 feet	Dunes	Aeolian deposits derived from mixed sources
104	BOUSIC CLAY	0-1	2,850 to 2,900 feet	Lake plains	Alluvium derived from mixed sources
105	BRYMAN LOAMY FINE SAND	0-2	2,800 to 3,200 feet	Fan remnants	Alluvium derived from granite sources

Human use/disturbance of the broader Project Area is considerable with active and abandoned hemp growing operations, active agriculture, temporary worker housing resulting in a significant amount of fugitive trash and debris scattered across the landscape. There are many named roads in a grid pattern in the area. Of particular note, were the number of feral and domestic canines roaming the general area and the large number of excavations of lizard and small mammal burrows which as almost ubiquitous on every site evaluated.

The following sections include detailed descriptions of each of the nine Evaluated Sites. Photos showing typical vegetative cover and habitat are included in Appendix B - Site Photos.

2.1 Site 1 – 40.20 acres APN 045-206-221

Site 1 is located in the western portion of the broader Project Area in Section 30, T5N, R1E, of the Lucerne Valley Quadrangle, approximately 0.25 miles west of the intersection Locust Avenue and Granite Road. Site 1 is a mix of agricultural, ruderal, and native habitat extending southeast from the greater Lucerne Dry Lake playa. Vegetation at the site includes shadscale, bush seepweed (*Suaeda nigra*), and a few Torrey's saltbush (*Atriplex torreyi*), all scattered in loosely distributed patches and concentrated in areas of disturbance (road edges) and in particular fissures created by both subsidence in the area and also along natural drainage channels. Where vegetative cover is present, densities ranged from 5-60%. The site is over 70% open with no vegetation or shrub cover and approximately 25% of the site contains some form of shrub or herbaceous cover. More specifically the site contains 11 acres of vegetation and 29 acres of open ground. Site 1 appears to be an old homestead, likely from the early part of the 20th century, with the remains of an old chimney and some foundation materials present. There is considerable evidence of off-road vehicles use and many vehicle tracks on Site 1.

Pedons at the site were classified as Bousic and Peterman clays. Fine textured clays and silts with some minor surface gravels and the characteristic muddy craquelure surface mosaic typical of playa or near playa substrates.

Weedy species at the site were 39 small to large tamarisk (*Tamarix ramosissima*) mainly scattered around the periphery of the site and around the old homestead. Also observed were Russian thistle (*Salsola tragus*), London rocket (*Sisymbrium irio*), and cheatgrass (*Bromus tectorum*).

2.2 Site 2 - 40.20 acres APN 045-207-125

Site 2 is located in the western portion of the broader Project Area in Section 19, T5N, R1E, of the White Horse Mtn. Quadrangle, at the intersection Amber and Locust Avenue and approximately 0.25 miles north of Granite Road. Site 2 is a mix of agricultural, ruderal, and native habitat extending southeast from the greater Lucerne Dry Lake playa. Vegetation at the site is a mix of shadscale, bush seepweed, and scattered Torrey's saltbush in loosely distributed patches and concentrated in areas of disturbance (road edges) and, in particular, fissures created by both subsidence in the area and also along natural drainage channels. Where vegetative cover is present, densities ranged from 5-60%. The site is over 70% open with no vegetation or shrub cover and approximately 28% of the site contains some form of shrub or herbaceous cover. More specifically the site contains 11 acres of vegetation and 29 acres of open ground that is potential Parish's phacelia (*Phacelia parishii*) habitat.

Pedons at the site were also classified as Bousic and Peterman clays. Fine textured with some minor surface gravels and the characteristic muddy craquelure surface mosaic typical of playa or near playa substrates.

Weedy species at the site were small to large tamarisk and were mainly concentrated along a set of deep fissures extending from the northwest to the southeast of the property. Also observed were Russian thistle, London rocket, and cheatgrass, again concentrated along the fissures on the property.

2.3 Site 3 – 80.41 acres APNs 045-207-119, 045-207-120

Site 3 is located in the western portion of the broader Project Area in Section 19, T5N, R1E, of the White Horse Mtn. Quadrangle, approximately 0.25 miles west of the intersection Amber and Locust Avenue and approximately 0.25 miles north of Granite Road. Site 3 extends into the northeastern corner of the greater Lucerne Dry Lake playa. Vegetation at the site is a mix of shadscale, bush seepweed, scattered allscale saltbush (*Atriplex polycarpa*), Torrey's saltbush scattered in loosely distributed patches and concentrated in areas of disturbance (road edges and fencelines) and in particular, the fissures created by both subsidence in the area and also along natural drainage channels. Where vegetative cover is present, densities ranged from 5-60%. The site is over 80% open with no vegetation or shrub cover and approximately 16% of the site contains some form of shrub or herbaceous cover. More specifically the site contains approximately 13 acres of vegetation and 67 acres of open ground that is potential Parish's phacelia habitat.

Pedons at the site were also classified as Bousic and Peterman clays. Fine textured with some minor surface gravels and the characteristic muddy craquelure surface mosaic typical of playa or near playa substrates.

Weedy species at the site included 42 moderate to large tamarisk were mainly concentrated along a set of fissures in the southwest corner of the property. Also observed were Russian thistle, London rocket, and cheatgrass, again concentrated in the depressions, dense shrub cover, and along the fissures on the property.

2.4 Site 4 – 119.93 acres APNs 045-239-108 & 045-239-109

Site 4 is located in the northern extent of broader Project Area in Section 17, T5N, R1E, of the White Horse Mtn. Quadrangle. Site 4 is an "L" shaped parcel extending west for 80 acres and south for 39.91 acres in two contiguous parcels at the intersection Smokebush Road and Lincoln Avenue. Site 4 extends into the margins of northeastern corner of the greater Lucerne Dry Lake playa. Vegetation at the site is mainly a saltbush scrub community and a mix of shadscale, bush seepweed, scattered allscale saltbush. The site is gently sloping to the southwest and contains some mildly rolling features composed of packed sands in the westernmost portion of the 80 acres. The eastern portion of the site has open patches of fine to coarse gravels following the general trend of the terrain. The southern 40 acres enters the margins the Lucerne dry lake playa. Where vegetative cover is present, shrub and forb densities range from 5-30%. The site is over 33% open with no vegetation or shrub cover and approximately 67% of the site contains some form of shrub or herbaceous cover. More specifically the

site contains approximately 90 acres of vegetation and 29.9 acres of open ground that is potential Parish's phacelia habitat.

Cacti occurred on the site, with the sole species being silver cholla (*Cylindropuntia echinocarpa*). These cacti were concentrated in the northern and east portion of the property on the more sandy loam/silt portions of the site. Most of the cacti were quite old with portions of the skeletal infrastructure visible on many of the plants observed. Very little recruitment was observed.

Pedons at the site were also classified as Bousic and Peterman clays. Fine textured with some minor surface gravels and the characteristic muddy craquelure surface mosaic typical of playa or near playa substrates.

Weedy species at the site were moderate to large tamarisk, were mainly concentrated along a set of fissures in the southwest corner of the property. Also observed were concentrated patches London rocket, and cheatgrass, along the drainages on inner corner of the property.

2.5 Site 5 – 322.63 acres APN 045-236-146, 045-236-147, & 045-237-101

Site 5 in located in the northeastern portion of the overall Project Area occupying the western half of Section 19, T5N, R1E immediately northeast of the intersection of Granite Road and Lincoln Avenue in the White Horse Mountain Quadrangle. This site was identified as potential Mojave desert tortoise habitat prior to the site evaluation. Of the nine sites evaluated, Site 5 was the most diverse in terms of vegetation and habitat. Vegetation at the site is a mix of a transition between creosote bush scrub and mainly a saltbush scrub community and a mix of allscale, bush seepweed, scattered shadscale. Creosote bush was a very minor component of this vegetation community and was estimated at 1% overall cover. It is confined to the eastern and northeastern periphery of the site. The site is a transition zone from a more robust creosote bush scrub community to the east and north as it extends westward to the margins of the broader Lucerne Dry lake playa. The site was composed of salt bush scrub species such as allscale saltbush, shadscale, and bush seepweed in varying degrees of dominance depending on location. Nevada jointfir (*Ephedra nevadensis*) was present throughout the sites and particularly prevalent in the northwestern portion of the property where there was some minor relief and some smaller rills had developed as drainage into the broader Lucerne Dry Lake playa margins. Also present were minor amounts of Anderson's desert thorn (*Lycium andersonii*) and four-wing saltbush (*Atriplex canescens*). The southwestern 1/3 of the property is nearly barren playa forming an elongated triangle that extends approximately 3,000 feet along the western edge of the property with scattered patches of allscale saltbush scattered mainly along the periphery of the area. This area is potential habitat for Parish's phacelia and the margins of this zone extending north and east into the saltbush scrub community are potential habitat for Beaver Dam breadroot (*Pediomelum castoreum*) particularly where the soil becomes more sandy.

It should be noted that human disturbance at the site was considerable approximately 45 acres in the east central portion of the property were partially bladed and 6-15 foot berms were built as wind breaks. And inner seven acres was completely cleared within the 45 acre perimeter and contained abandoned greenhouses.

Cacti were present on the site, with the sole species being silver cholla (*Cylindropuntia echinocarpa*). These cacti were concentrated in the northern and east portion of the property on the more sandy loam/silt portions of the site. Most of these cacti were quite mature and some nearly senescent. Very little recruitment was observed.

The site is 34% open ground with no vegetation or shrub cover and approximately 76% of the site contains some form of shrub or herbaceous cover. More specifically the site contains approximately 189 acres of vegetation and 60 acres of open ground.

Pedons on the site were classified as Kimberlina Loamy Fine Sand with a smaller proportion identified as Joshua Loam by SSURGO.

2.6 Site 6 – 147.02 acres APN 045-211-219, 045-211-218, 045-211-217

Site 6 is located in the southeastern portion of the Project Area in Section 28, T5N, R1E of the Lucerne Valley Quadrangle immediately southeast of the intersection of Granite Road and Lincoln Avenue. This site is comprised of two parcels that are not contiguous but separated by a 60-foot wide County easement extending around the periphery and east-west for the lengths of the properties. Because they are essentially contiguous habitat these two parcels were evaluated as a single site. Vegetation at the site is a primarily a saltbush scrub community and dominated by mature shadscale on the western portion of the site and allscale on the eastern portion. A low rising stabilized aeolian deposit that extends through the middle of the parcels north to south contained a slightly more diverse shrub structure including a greater amount of Nevada joint fir, Anderson's boxthorn, and scattered winterfat (*Kraschenninikovia lanata*).

Substrates at the site were a more diverse mix of Peterman Clays in the western portion of the site and Bousic Clays in the east separated along with Glendale Variant Silt Loam by a low rising stabilized aeolian deposit (dune) that was composed of a more composite mixture of firm sands and silts. The northeastern portion of the site had some fissuring but also the silts/clays were overlain with sand and deeper (i.e., not firm) and likely were a result of aeolian deposition.

The open flats were fine textured with some minor surface gravels and the characteristic muddy craquelure surface mosaic typical of playa or near playa substrates.

Forbs and grasses at the site are limited to mainly annual weedy species such as London rocket, cheat grass, fivehorn bassia, and Russian thistle and were primarily confined to the southern margins of the site along the abutting fallow or ruderal fields. Tamarisk was scattered in the southwest corner and along the southern border of the site.

The site is 55% open ground with no vegetation or shrub cover and approximately 55% of the site contains some form of shrub or herbaceous cover. More specifically the site contains approximately 146 acres of vegetation and 81 acres of open ground.

2.7 Site 7 – 151.4 acres APN 045-211-317

Site 7 is located in the southeastern portion of the Project Area in Section 28, T5N, R1E of the Lucerne Valley Quadrangle immediately northeast of the intersection of Cambria Road and Lincoln Avenue. Vegetation at the site is a mainly a saltbush scrub community and dominated by mature allscale. The site is a mosaic of small to large open patches of barren soil and allscale. The site is heavily fissured and the scrub community is concentrated along those fissures. Forbs and grasses at the site are limited to weedy non-natives such as London rocket along with foxtail barley and cheatgrass. The fissures and shrub community are acting as repositories for these invasive species. The western portion of the site contains a heavy infestation of Russian thistle, some of which blew into the site from the west and some which germinated in the native shrub community. Also present are a scattering of tamarisk concentrated in the northwestern corner and southcentral portion of the site.

Pedons at the site were classified as Glendale variant silt loams. These are fine textured soils with no surface gravels and also the characteristic muddy craquelure surface mosaic typical of playa or near playa substrates.

The site is over 66% open ground in mosaic with no vegetation or shrub cover and approximately 34% of the site contains some form of shrub or herbaceous cover. More specifically the site contains approximately 52 acres of vegetation and 99 acres of open ground.

2.8 Site 8 – 61.03 acres APN 045-212-138, 045-212-139, 045-212-148, & 045-212-152

Site 8 is located in the southeastern-most portion of the Project Area in Section 33, T5N, R1E of the Lucerne Valley Quadrangle approximately 0.25 miles east of the intersection of Cambria Road and Lincoln Avenue. This site appears to be formerly tilled and reclaimed by native vegetation in selected locations. Lateral scars are still visible on the ground and from satellite images. In the northwest corner of the parcel there remains a remnant of a small 10-acre pistachio orchard that was started and apparently failed. The dead trees are still present. The southern portion of the property is dominated by an old playa and is largely barren of any vegetation. Vegetation at the site is a saltbush scrub community and dominated by allscale. Portions of the western edge of the property have been recolonized by allscale as has the eastern central portion and to a lesser degree the northeastern portion of the property.

The site is approximately 66% open ground with no vegetation or shrub cover and approximately 34% of the site contains some form of shrub or herbaceous cover. More specifically the site contains approximately 21 acres of vegetation and 40 acres of open ground.

Forbs and grasses at the site are limited to weedy non-natives such as London rocket and fivehorn bassia (*Bassia hyssopifolia*) along with foxtail barley and cheatgrass. The fissures and shrub community are acting as repositories for these invasive species, particularly along the western edge of the property. The western portion of the site contains a heavy infestation of Russian thistle and fivehorn bassia, some of which blew into the site from the ruderal properties to the west and some which germinated in the

native shrub community. Also present are a scattering of tamarisk in the northern ½ of the property and a concentration in the southeastern corner of the site.

Pedons at the site were classified as Glendale variant silt loams. These are fine textured with no surface gravels and also the characteristic muddy craquelure surface mosaic.

2.9 Site 9 – 70.2 acres APN# 045-211-220

Site 9 is located in the south central portion of the Project Area in the southwestern corner of Section 29, T5N, R1E of the Lucerne Valley Quadrangle immediately northeast of the intersection of Locust Avenue and Cambria Road. This site is currently an abandoned agricultural field that is largely barren with some residual weed cover that appears to have been mowed within the last year.

Pedons at the site were classified as a mix of Bousic and Peterman clays. These are fine textured soils with no surface gravels and also include characteristic muddy craquelure surface mosaic.

Although this site is heavily disturbed and ruderal, it was included because it contains the substrate requirements for potential Parish's phacelia habitat and location records from 2017 are located in formerly disturbed habitat less than 0.5 miles to the southwest.

Forbs and grasses at the site are limited to annual weedy non-natives such as London rocket and fivehorn bassia along with foxtail barley and cheatgrass. There is a small concentration of two tamarisk in the southwestern corner of the property along with Siberian elm.

3.0 Natural Community Alliances

The entire Project Area is within the western Mojave Desert, specifically Lucerne Valley, California. There are several natural community alliances present. These natural community alliances are discussed below, but for graphical context they are referred to collectively on the maps as Saltbush Scrub and Creosote Bush Scrub with the representative alliances named and shown in different colors. No sensitive natural communities were located within the Project Area. The Natural Community Alliances observed on the Project Area are shown in Table 4 along with the rounded acreages and described in the following sections.

Table 4 – Natural Community Alliances Identified Within the Sienna Solar and Storage Project Area

Evaluated Sites	Acreage	Natural Community Alliance
Site 1	11	Modified *Atriplex confertifolia* Shrubland Alliance
Site 2	11	Modified *Atriplex confertifolia* Shrubland Alliance
Site 3	13	Modified *Atriplex confertifolia* Shrubland Alliance
Site 4	90	*Atriplex canescens* Shrubland Alliance
Site 5	71	*Larrea tridentata* Shrubland and *Atriplex polycarpa* Shrubland Alliance Transition Zone
Site 5*	182	*Atriplex polycarpa* Shrubland Alliance
Site 6	60	*Atriplex polycarpa* Shrubland Alliance
Site 6	21	Modified *Atriplex confertifolia* Shrubland Alliance
Site 7	52	*Atriplex polycarpa* Shrubland Alliance
Site 8	21	*Atriplex polycarpa* Shrubland Alliance
Site 9	70	Fallow/Ruderal, but potential habitat for Parish's phacelia

*** 7 acres were removed due to the Abandoned Hemp Grow Operation where this bermed area was completely bladed/disturbed**.

3.1 *Atriplex polycarpa* Shrubland Alliance

Allscale shrub is typically found in washes, playa lake beds and shores, dissected alluvial fans, rolling hills, terraces, and edges of large, low gradient washes. Soils may be carbonate rich, alkaline, sandy, or sandy clay loams. Allscale shrub occurs at elevations between 75 and 1500 meters (Sawyer 2009). It is the most widespread saltbush alliance in the Mojave Desert. Allscale is dominant in the shrub canopy with bush seepweed and four-wing saltbush, and to a lesser degree white bursage (*Ambrosia dumosa*), cheeseweed (*Ambrosia salsola*), alkali goldenbush (*Isocoma acradenia*) and creosote bush. Senescent cheatgrass was also present. The shrubs averaged less than three meters in height with fairly open canopy. The absolute percent cover averaged 12 percent with allscale being more than 50 percent of the cover. Due to the drought conditions, this year's annuals were sparse consisting of only rattlesnake weed (*Euphorbia albomarginata***)** and red-stemmed filaree (*Erodium cicutarium*) in a few isolated areas that had received water from outflow originating from the hemp growing operations. A total of 315 acres of *Atriplex polycarpa* Shrubland Alliance were identified within the Project Area.

This natural community was observed on Sites 5, 6, 7, and 8. (Figure 3 in Appendix C)

3.2 *Larrea tridentata* Alliance/*Atriplex polycarpa* Shrubland Alliance Transition Zone

Creosote bush scrub is found on alluvial fans, bajadas, upland slopes, and minor intermittent washes occurring at elevations between 75 and 1,303 meters (Sawyer 2009). Soils are well drained, sometimes with desert pavement (Sawyer 2009). To be considered creosote bush scrub the site may have no shrub

with total cover greater than creosote bush with a few exceptions. The exceptions do not include allscale which is the co-dominant with creosote bush within this portion of the Project Area. The portion of the Project Area with creosote bush as a co-dominant in the shrub canopy with allscale, Nevada jointfir and Anderson's desert thorn is a transition zone from the *Atriplex polycarpa* Shrubland Alliance to the *Larrea tridentata* Shrubland Alliance. The creosote bush component, at approximately two percent, is too high for this area to be considered a pure *Atriplex polycarpa* Shrubland Alliance though it is too low to be considered a *Larrea tridentata* Shrubland Alliance. Essentially, this area is the absolute perimeter extent of creosote bush as the terrain gently descends into the apron of the broader lake bed. The soils in this area are very sandy with a silt component and sparse surface gravel. A total of 71 acres of *Larrea tridentata Shrubland and Atriplex polycarpa Shrubland Alliance Transition* were identified with the Project Area.

This natural community occurs in the northeast and mid-eastern portion of Site 5 (Figure 4 in Appendix C).

3.3 *Atriplex canescens* Shrubland Alliance

This four-wing saltbush scrub community is found in playas, old beach and shores, lake deposits, dissected alluvial fans, rolling hills or channel beds (Sawyer 2009). Soils are carbonate rich, alkaline, sandy, or sandy clay loams (Sawyer 2009). Four-wing saltbush is the dominant in the shrub canopy with associated plants including white bursage, shadscale, allscale, Nevada jointfir, and bush seepweed. The Project Area contains Nevada jointfir instead of *E. viridis*. Shrubs average less than three meters in height with an open canopy. The absolute percent cover averaged 12% and Four-wing saltbush greater than 50 percent relative cover. A total of 90 acres of *Atriplex canescens* Shrubland Alliance were identified with the Project Area.

This natural community was observed on Site 4 (Figure 4 – Appendix C).

3.4 Modified *Atriplex confertifolia* Shrubland Alliance

Shadscale shrub (collectively Saltbush Scrub) is typically found on bajadas, flats, lower slopes, rocky hills, exposed bedrock, erosional highlands, valleys, minor rills, washes, and edges of playas. Soils are variable and may be carbonate rich, clay rich, or have a high sand content, and may be covered with desert pavement (Sawyer 2009). Shadscale is dominant in the shrub canopy with a greater than two percent absolute cover in the shrub canopy with no other species having a greater absolute cover. Bush seepweed is the next dominant shrub though it is less than two percent absolute cover. Shrubs are less than one meter with a very open canopy. An herbaceous layer is sparse and present only in the fissures that crisscross the playa.

Shadescale shrub is found within the Project Area and mainly present within the fissures and slight mounds. Soils in this area are typically fine clays with a silt component often in broad barren stretches and with some fine surface gravels. At total of 56 acres of Modified *Atriplex confertifolia* Shrubland Alliance were identified within the Project Area.

This natural community occurs in Sites 1, 2, and 3 within the overall playa as well as Site 6 (Figures 3 and 5 in Appendix C).

It should be noted that the structure and composition of this natural community did not fit the parameters of the pure *Atriplex confertifolia* Shrubland Alliance well, but no other alliances were close, so a decision was made to give it the term Modified *Atriplex confertifolia* Alliance.

4.0 Biological Studies

At the request of the EnviroPlus Consulting (EPC), Wildland International was contracted to provide a biological inventory of selected wildlife species and all sensitive plant species occurring within the Project Area. The focus of the surveys were:

1. To provide a general biological overview of terrestrial biological resources of the Project Area.
2. To provide focused, protocol based surveys to identify and document the presence of Mojave desert tortoise within Project Area.
3. To provide surveys to identify and document the presence of potential sensitive plant habitat within the Project Area.
4. To identify and document any other special status observed within the Project Area.
5. To identify and document any sensitive natural community that is observed within the Project Area.
6. Inventory 100 percent of all CDNPA plants within the Project Area.

A species was determined to have some potential for inhabiting the Project Area if it is known to occur in the same general area, in a similar habitat, and/or at a similar elevation as the Project Area. A species was included on the special status list if it fell into one or more of the following categories:

- Taxa that are officially listed or proposed for listing under the State and/or Federal Endangered Species Acts.
- Taxa that are State or Federal candidates for possible listing.
- Taxa listed in the California Native Plant Society's (CNPS) *Inventory of Rare and Endangered Plants of California*.
- Taxa for which there are existing records in the California Natural Diversity Data Base (CNDDB).
- Taxa which meet the criteria for listing, even if not currently included on any list, as described in Section 15380 of the California Environmental Quality Act (CEQA) Guidelines (e.g., all CRPR 1 and CRPR 2 and some CRPR 3 and CRPR 4 plants may fall under Section 15380 of CEQA).
- Taxa that are biologically rare, very restricted in distribution, or declining throughout their range but not currently threatened with extirpation.
- Populations in California that may be on the periphery of a taxon's range, but are threatened with extirpation in California.
- Taxa closely associated with a habitat that is declining in California at a significant rate.
- Taxa included as CDFW fur-bearers which are protected from "take" pursuant to the California Code of Regulations (CCR), Title 14 [Natural Resources], Division 1 [Fish and Game Commission-Department of Fish and Game], Subdivision 2 [Game, Furbearers, Nongame, and Depredators], Chapter 5 [Furbearing Mammals], Section 460 [Fisher, Marten, River Otter, Desert Kit Fox and Red Fox] (Westlaw 2019a).

In addition, taxa protected under the California Desert Native Plants Act (CDNPA) (Division 23 of the California Food and Agricultural Code, Section 80071-80075), which include cacti and yuccas, were also considered. These taxa include:

- Smoke tree (*Psorothamnus spinosus*);
- all native species in the genus *Prosopis*, i.e., mesquites;
- all native species in the genus *Nolina*, i.e., beargrass;
- all native species in the family *Cactaceae*, i.e., cacti; and
- all native species in the family *Agavaceae*, i.e., century plants (*Agave* spp.), Western Joshua trees (*Yucca brevifolia*), other *Yucca* spp., desert lilies (*Hesperocallis undulata*).

4.1 Personnel

The biological inventory was conducted by experienced desert field biologists from Wildland International and Wildland International subcontractors. The field personnel had between 30 and 37 years of experience in desert ecosystems and in particular with the target species. Participating biologists were Dan Malueg (Wildland International) and Karen Jones (KDJ & Associates). Both Mr. Malueg and Ms. Jones have worked extensively with the Mojave desert tortoise on well over 1,300 projects in the Mojave and Sonoran deserts as well Parish's phacelia and Beaver Dam breadroot in Nevada. They have identified numerous new populations of both plant species numbering in the tens of thousands to millions of plants. Andy Sanders (UCR Herbarium curator) was also consulted during the field inventories.

4.2 Methodology

Surveys conducted by Wildland International and its subcontractors were focused on the Mojave desert tortoise, sensitive plants, and a 100 percent inventory of all botanical species, including California Desert Native Plant Act (CDNPA) species occurring within the Project Area. In addition, Wildland International recorded all wildlife species observed as a matter of standard protocol. Prior to field investigations the project boundaries and survey transect lines were downloaded to GPS units.

Sensitive annual plant species that could occur in the area were not identifiable given the drought conditions, but adequate habitat was noted and mapped if present. Additional sensitive species that were searched for included desert kit fox, American badger, Western burrowing owl, LeConte's thrasher, loggerhead shrike, and any raptors.

Within identified potential Mojave desert tortoise habitat, survey methodology for the inventories consisted of parallel linear pedestrian transects at 10 meter intervals providing 100 percent visual coverage of the survey area. This survey methodology provided an acceptable transect frequency to locate and identify any of the target sensitive species which might occur within the survey corridor. The basis for this survey methodology is the U. S. Department of Interior Fish and Wildlife Service (2019) protocols for surveying for Mojave desert tortoises. This methodology also allows sufficient coverage to characterize general habitat quality, species diversity, and the distribution of natural community alliances including sensitive natural community alliances. Surveys were conducted from April 5 to May 12, 2022.

Sensitive annual plant species that could occur in the area were not identifiable given the protracted drought conditions, but potential habitat was noted and mapped if present. Potential habitats were identified for four special status species. These species were Parish's phacelia, Beaver Dam breadroot, depressed standing cypress, and thorny milkwort. Habitat for one other special status species, alkali mariposa lily, was not found in the Project Area. Additional focused surveys may be required in a year with sufficient fall and winter precipitation to germinate any potentially occurring species to meet the requirements for a complete protocol-level survey (CDFW 2018).

4.2.1 Literature Review

A list of special status wildlife, special status plants and sensitive natural communities that occur or have the potential to occur within the Project Area was developed using information from the California Natural Diversity Database (CNDDB, 2022a; CNDDB, 2022b), California Native Plant Society (CNPS, 2022b), Consortium of California Herbariums, and regional planning documents (e.g., the Desert Renewable Energy Conservation Plan [DRECP; Dudek, 2014]). The database searches covered the following U.S. Geological Survey 7.5-minute topographic quadrangle maps within 5 miles of the Project Area: Whitehorse Mountain, Grand View Mine, Fifteen Mile Valley, Lucerne Valley and Cougar Buttes. Tables 5 and 6 include list of Special Status Plants and Wildlife with the potential to occur within the Project Area. These lists were developed prior to conducting Reference Population Site Visits and field inventories.

4.2.2 Reference Population Site Visits

A series of four reference population site visits was made prior to and during the inventories to determine if sensitive annual/biennial species had emerged or were flowering. Reference population site visits were conducted on 4/3/2022, 4/18/2022, 5/5/2022, and finally 5/10/2022. The only species seen was alkali mariposa lily in representative habitat at Rabbit Springs on 5/10/2022 and it was in full anthesis. No Parish's phacelia or Beaver Dam breadroot were observed at their reference populations on any of the visits.

4.2.3 Taxonomic Nomenclature Changes

Bird identification and nomenclature resources included The Sibley Field Guide to Birds of Western North America (Sibley, 2003), nest identification was aided by A Guide to the Nests, Eggs, and Nestlings of North American Birds, 2nd Ed. (Baicich and Harrison, 1997). Mammal identification resources included California Mammals (Jameson, 1988), National Audubon Society Field Guide to North American Mammals (Whitaker, 1996) and The Trackers Field Guide (Lowery, 2013). Reptile identification resources included A Field Guide to Western Reptiles and Amphibians (Stebbins, 1985). Plant nomenclature throughout this report follows *The Jepson Manual, 2nd Ed.* (Baldwin, 2012).

Table 5 Special Status Plant Species with the Potential to Occur in the Project Area

Scientific Name, Family Name	Common Name	Rank or Status				Flowering Period	Habitat and Distribution Notes	Potential Occurrence Within the Project Area
		Federal/ State	G-Rank	S-Rank	CRPR			
Pediomelum castoreum ***Fabaceae***	Beaver Dam breadroot	**-/-**	G3	S2	1B.2	April-May	Creosote bush scrub; Open areas, roadcuts; Elevation: < 1750 m.	Low potential on Site 4, 5 and 6. Known from NW Lucerne Valley in Creosote/Atriplex transition zone.
Phacelia parishii ***Hydrophyllaceae***	Parish's phacelia	**-/-**	G2G3	S1	1B.1	April-May	Dessert Scrub: clay or alkaline soils-often in thick cracks of clay accumulation, in playas, barren dry lakes, and gypsum beds' 540-1200 (1800) meters elevation.	Moderate potential on all Sites within playa areas. Data Basin lists the "habitat intactness" as low to very low in the Project Area. Known from Lucerne Valley Dry Lake east of Hwy 247.
Loeseliastrum depressum ***Polemoniaceae***	depressed standing cypress	**-/-**	G4	S3	4.3	April-July	Sandy, gravelly or clay soils of flats and gentle slopes; **Elevation:** 1000--2100 m	Very low at Site 5 in Transition Zone. Known from Rabbit Springs area of Lucerne Valley.
Calochortus striatus ***Liliaceae***	alkali mariposa lily	**-/-**	G3	S2S3	1B.2	April-June	Alkaline meadows, moist creosote-bush scrub; **Elevation:** 800--1400 m	Data Basin model shows no habitat in Project Area. Known from Rabbit Springs Lucerne Valley.
Polygala acanthoclada ***Polygalaceae***	thorny milkwort	**-/-**	G4	S2S3	2B.3	May-August (Oct.)	Desert scrub, Joshua-tree or pinyon/juniper woodland, generally in loose, sandy or gravelly soil; **Elevation:** 945--1830 m.	Low Potential at Sites 4 and 5 - Known from Lucerne Valley near Hwy 247 and Locust Ave.

1 The Global rank (G rank) is a reflection of the overall status of an element throughout its global range. Both Global and State ranks represent a letter + number score that reflects a combination of Rarity, Threat and Trend factors, with weighting being heavier on Rarity.

Species or natural community level:

• G2 - Imperiled; at high risk of extinction or elimination due to restricted range, few populations or occurrences, steep declines, severe threats, or other factors.

• G3 - Vulnerable; at moderate risk of extinction or elimination due to a fairly restricted range, relatively few populations or occurrences, recent and widespread declines, threats, or other factors.

• G4 - Apparently secure; at fairly low risk of extinction or elimination due to an extensive range and/or many populations or occurrences, but with possible cause for some concern as a result of local recent declines, threats, or other factors.

The State rank (S rank) is assigned much the same way as the Global rank, but State ranks refer to the imperilment status only within California's state boundaries.

• S1 - Critically imperiled; at very high risk of extirpation in the jurisdiction due to very restricted range, very few populations or occurrences, very steep declines, severe threats, or other factors.

• S2 - Imperiled; at high risk of extirpation in the jurisdiction due to restricted range, few populations or occurrences, steep declines, severe threats, or other factors.

• S3 - Vulnerable; at moderate risk of extirpation in the jurisdiction due to a fairly restricted range, relatively few populations or occurrences, recent and widespread declines, threats, or other factors.

1B: Plants Rare, Threatened, or Endangered in California and Elsewhere

2B: Plants Rare, Threatened, or Endangered in California, but More Common Elsewhere

4: Plants of Limited Distribution – A Watch List

Threat Ranks

.1 – Seriously threatened in California

.2 – Moderately threatened in California

.3 – Not very threatened in California

Table 6 Special Status Wildlife Species with the Potential To Occur in the Project Area

Scientific Name	Common Name	Rank or Status					Activity Period	Habitat and Distribution Notes	Potential Occurrence Within the Project Area
		FESA	CESA	Other	G-Rank	S-Rank			
Gopherus agassizii	Mojave desert tortoise	FT	SE*	CDFW-SSC	G3	S2S3	Most active March through June and September through October-but can be active any time of year; Often in morning or evening, however anytime temperatures are moderate.	Found in a variety of vegetative communities though strongly associated with creosote bush scrub with friable soil.	Very Low potential only on Sites 4 and 5. No potential on other Sites.
Athene cunicularia hypugaea	Western burrowing owl	-	-	CDFW-SSC	G4	S3	Maybe in area all year long. More active in the mornings and evenings.	Open areas; Uses burrows of other species-occasionally digs its own; Known to occur in and near the Project Area.	Observed at burrows on Sites 4 and 5. Moderate potential on all sites.
Toxostoma lecontei	LeConte's thrasher	-	-	CDFW-SSC	G4	S3	Breeding can begin in December and last through June.	Creosote or salt bush scrub. Active during daylight. Known from Lucerne Valley.	Observed on Site 6. High potential on all sites.
Lanius ludovicianus	loggerhead shrike	-	-	CDFW-SSC	G4	S4	Breeding can begin in mid-February.	Open country with low shrubs and trees. Known from Lucerne Valley	Moderate potential on Sites 1, 2, 4, 5, 6 and 7.
Vulpes macrotis arsipus	desert kit fox	-	-	CDFW-Fur-bearer			All year. Typically, at night.	It's presence in the Mojave is strongly linked to creosote bush scrub. Known from Lucerne Valley.	Low Potential on all Sites.
Taxidea taxus	American badger	-	-	CDFW-SSC	G5	S3	All year. Anytime of day though typically shelters in extreme heat.	Variety of vegetation types; main criteria are friable soils and sufficient food.	Low Potential on all Sites.

Listing and Special Status Information
- SSC Species of Special Concern
- SE State listed as endangered
- SE* State listed as endangered (Conditional Listing)
- ST State listed as threatened
- FE Federally listed as endangered
- FT Federally listed as threatened
- FPE Federally proposed for listing as Endangered

State Ranking
- S2: Imperiled – At high risk of extirpation in the state
- S3: Vulnerable – At moderate risk of extirpation in the state widespread declines, threats, or other factors.
- S4: Apparently Secure – At a fairly low risk of extirpation in the state

Global Ranking
- G3: Vulnerable – At moderate risk of extinction
- G4: Apparently Secure – At fairly low risk of extinction
- G5: Secure – At very low risk of extinction

4.2.4 Mojave Desert Tortoise Inventory

A map of potential Mojave desert tortoise habitat was provided to Wildland International prior to field investigations. This map appears to have been generated by mapping areas that identified native vegetation and were not fallow farm fields and not playa using Google Earth. Within this Mojave desert tortoise potential habitat, survey methodology consisted of parallel linear pedestrian transects at 10 meter intervals providing 100 percent visual coverage of the survey area with over 90 miles of transects completed. A Garmin GPS was used with preloaded transects to follow. In addition, a compass was utilized to pick landscape features at a distance so little time was spent looking at the GPS unit while maintaining an accurate bearing. The transect line was maintained except when necessary to leave it to investigate a potential burrow or other wildlife sign. This survey methodology provides an acceptable transect frequency to locate and identify any of the target sensitive species which might occur within the survey corridor. The biologists have extensive experience with surveying in this fashion. The basis for this survey methodology is the U. S. Department of Interior Fish and Wildlife Service (2019) protocols for surveying for Mojave desert tortoises. This methodology also allows sufficient coverage to characterize general habitat quality, species diversity, and the distribution of natural vegetation communities. Surveys were conducted from April 4 to May 10, 2022.

4.2.5 Special Status Wildlife Inventory

During the course of the inventories for Mojave desert tortoise or sensitive plants and natural communities, Wildland International crews documented any other sensitive wildlife species that were encountered such as desert kit fox, American badger, Western burrowing owl, LeConte's thrasher, loggerhead shrike, and any raptors. Where appropriate and useful, GPS location data was recorded along with numbers of individuals observed and any other pertinent notes about the observations.

A special status wildlife species was determined to have the potential to occur within the Project Area if there were records CNDDB listed within a 5 mile radius of the area. A species was determined to have some potential for inhabiting the Project Area if it is known to occur in the same general area, in a similar habitat, and/or at a similar elevation as the Project Area or had CNDDB records nearby.

4.2.6 Sensitive Plant and Sensitive Natural Community Inventory

Prior to initiating field surveys, reference populations in the area were checked as mentioned under 5.2.3 Reference Population Site Visits. Plants within these reference populations had not emerged this in 2022 so the survey focused on determination of the extent of potential habitat for sensitive plant species and habitats.

As with special status wildlife species, special status flora was determined to have the potential to occur within the Project Area if there were records CNDDB-listed records within a 5 mile radius of the area. Sites with the potential to have sensitive plant species but not within potential Mojave desert tortoise habitat were walked at 100-foot intervals and were modified with an intuitive component. If microhabitat was observed that could support a sensitive plant species, the botanist deviated from the line to investigate this area and record any additional species observed. These transects were walked using the same methodology as with the Mojave desert tortoise surveys using a GPS and a compass. This methodology allowed for identification of any Sensitive Natural Communities as well as sensitive plant populations.

4.2.7 California Desert Native Plants Act Information

A complete inventory for cactus and yucca species was conducted within the Project Area. All cactus were tallied by height class. Height classes were divided into three groups, plants under three feet in height, between 3-10 feet in height, and over 10 feet in height.

4.2.8 Invasive Weed Inventory

During the protocol surveys for Mojave desert tortoise and sensitive plants as well as natural community identification, any and all invasive weeds occurring on a site were documented. Notes were made as to the general numbers and areas of significant concentrations were mapped.

4.3 Data Collection

Physical field data were recorded on a set of standardized data sheets provided by Wildland International. These forms include a **General Biological Survey and Habitat Evaluation Form, Mojave desert tortoise Habitat Evaluation and Observed Sign Form, Botanical Survey Form, Cactus Inventory Form, Sensitive Plant Form, Burrowing Owl Form, and Rapid Relive Form**.

Mojave desert tortoise sign key is listed below. The carcass classification shown here is for general reference. Carcass classification is based on age since time of death (Berry and Woodman, 1984).

BURROWS and PALLETS

Class: 1 = Currently active, with tortoise or recent sign
2 = Good condition, definitely tortoise, no recent sign
3 = Fair condition, definitely tortoise
4 = Deteriorated, definitely tortoise

SCATS

Class: 1 = Wet or freshly dried, obvious odor
2= Dry with glaze and some odor, no bleaching
3 = Dry w/out glaze or odor brown, packed
4 = Dry w/out glaze or odor, yellow, loose mat'l.

LIVE TORTOISE

1 = Healthy activity:	A = Foraging
2 = URTD	B = Traveling
3 = Shell cracked	C = Basking
4 = Peeling Scutes	D = In Burrow
5 = Ticks	E = Digging

CARCASS

Class: 1 = Fresh or putrid
2 = Normal color, scutes adhering to bone
3 = Scutes peeled off bone
4 = Bones falling apart
5 = Disarticulated

4.4 Data Presentation and Mapping

Data is presented here in map form and a complete data set of attributed shapefiles (points and polygons) is also available. Vegetation was mapped using snapshots from Google Earth and then manipulated in imagery evaluation software to select the target vegetation imagery using various tone/color selection tools. This was then ported into ESRI ArcMap as a Portable Network Graphic (PNG) file and georectified. Once the spatial aspect of the layer was completed it was converted from raster to vector polygons giving a very accurate representation of the vegetation layer at those evaluated sites where there was a mosaic of vegetation and open ground that could not be easily separated by simply drawing shapefiles.

5.0 Survey Results

No Mojave desert tortoise or American badger individuals or sign were observed during the surveys. Sign of desert kit fox and two individuals of Western burrowing owl (with burrows), three Le Conte's thrashers, and one loggerhead shrike were observed.

No sensitive natural communities were located within the Project Area.

No habitat for alkali mariposa lily or depressed standing-cypress exists within the Project Area. Although thorny milkwort occurs 3 miles to the south of the Project Area, upon field review it was determined that suitable habitat did not exist within the Project Area. However, potential habitat for Beaver Dam breadroot and Parish's phacelia does exist.

As a matter of standard practice Wildland International and KDJ & Associates recorded all general botanical and wildlife species observed within the Project Area. These are shown in Tables 7 and 8 in Appendix D.

5.1 Potentially Occurring Special Status Wildlife

5.1.1 Mojave desert tortoise (*Gopherus agassizii*)

The Mojave desert tortoise is a completely terrestrial tortoise occurring in the Mojave and Sonoran deserts. The Mojave species is listed as threatened by the USFWS and was conditionally listed as endangered by CDFW. It requires firm, friable soils to dig its burrow or rock shelters. Found in a variety of vegetative communities though strongly associated with creosote bush scrub with friable soil from sandy flats to rocky foothills, including alluvial fans, and washes and canyons. This species is threatened mostly by habitat fragmentation, degradation, and loss; though in this area an additional threat would be the extensive feral and roaming domestic dog population.

CNDDB records show Mojave desert tortoise records two miles to the east of the Project Area in more typical habitat. No CNDDB records exist in within the Project Area and the "Mojave desert tortoise Predicted Habitat Map" shows the entire Project Area and nearby vicinity as "Low" (CDFW, 2016). According to Data Basin maps (USFWS, 2013) this area was once considered for inclusion into a map for linkage corridors for Mojave desert tortoise, but upon an onsite field investigation by the evaluation team it was dropped from consideration due to extensive habitat degradation and lack of appropriate habitat.

No Mojave desert tortoises or desert tortoise sign were observed during the surveys of Sites 4 and 5, which were the two areas shown as potential habitat. The northeast corner and eastern edge of site 5 has very limited potential for Mojave desert tortoise as defined by the creosote bush scrub community shown in Appendix C, Figure 4. No Mojave desert tortoise habitat exists at any other Evaluated Site within the Project Area. There are records on the bajadas surrounding the Project Area as stated above and it cannot be discounted that a Mojave desert tortoise may travel into the area, it is unlikely that it would stay in the area due to the poor quality habitat, lack of food, and probable harassment by dogs and potentially humans.

5.1.2 Western Burrowing Owl (*Athene cunicularia hypugaea*)

The Western burrowing owl is a relatively small owl with long legs. It is considered a Species of Special Concern the CDFW. It nests in burrows in the ground, typically taking over other animals burrows but occasionally it will excavate its own. This owl appears to prefer a burrow in a relatively open area with a high location nearby for perching. The burrow itself may be on a hill or there could be a rock or vegetation to perch on. The area needs to contain lizards, insects, beetles, and rodents for the owl to prey upon. This species is most threatened by habitat loss. Within the Project Area the harassment by feral and roaming domestic dogs probably plays a significant role in limiting population and recruitment.

The CNDDB shows Western burrowing owl records within four miles of the Project Area and suitable habitat exists within the project sites.

Two owls were observed during the surveys; one on Site 4 and one on Site 5. No pairs were observed and the sex of the owls at either location was not determined. The owl at Site 4 had two additional satellite burrows for a total of three burrows potentially being used by this owl. A return visit on May 10th, 2022 showed that the owl on Site 4 had moved from its original location about 240 feet north to a satellite burrow. Here the owl had decorated the burrowing opening with canine scat. See Western Burrowing Owl Location Map (Figure 6) and Photos in Appendix E. Another inactive burrow was identified at the south edge of an old dry water catchment that had been bermed in the past. There was no sign of recent use and only old pellets and some bits of whitewash.

No satellite burrows were observed for the owl at Site 5. All of the active burrows used by burrowing owls were inactive kit fox natal dens. There is moderate potential to use and nest on all sites within the Project Area.

5.1.3 LeConte's Thrasher (*Toxostoma lecontei*)

The LeConte's Thrasher is a medium sized, pale brownish-gray bird with a rust colored vent and downward curved bill. It tends to move to the ground and run when startled instead of flying. It is typically found in desert areas in creosote or salt bush scrub. They feed on insects and sometimes lizards and snakes; occasionally fruits or seeds. While uncommon they can be found in the general area of the Project in all seasons. Breeding can begin as early as December and last through June. Pairs may mate for life. Nests are located in shrubs, trees or in cactus and typically placed less than five feet from the ground. Cactus appears to be a favorite nesting location. CDFW lists this species as a Species of Special Concern. Threats include habitat degradation and loss.

CNDDB records for LeConte's thrasher exist within and surrounding the Project Area. All of these records are dated, the more recent being 1988. The records within the Project Area are from 1978.

Data Basin modeling by Frank Davis (Davis, 2013b) shows the area as having a high occurrence for this species. Three individuals were observed on Site 6 on April 9, 2022. However, during a return visit early the next morning they were not observed again and were likely transients. No LeConte's thrashers were observed at any other location though suitable habitat exists within the project vicinity including any project area that is not actively being farmed.

5.1.4 Loggerhead Shrike (*Lanius ludovicianus*)

The loggerhead shrike is a medium sized, gray bird with dark mask, wings and tail. The wings and tail have white markings and are seen as white flashes while the bird is in flight. It has a thick, hooked bill. This species is found in open country with short shrubs or low trees, particularly if the vegetation is thorny. They are found in desert scrub, agricultural fields, and pastures. They feed on insects, lizards, snakes and occasionally small rodents and birds. Breeding can begin in mid-February. The nest is built over 6 - 11 days, the female broods for approximately 14-16 days, and the young fledge at 17-21 days, becoming independent between 40-45 days. This species will have one to three broods in a year. Nests are typically located in a shrub or small tree, occasionally in brush piles. The nest is located 2.5 to 15 feet from the ground (Baichich and Harrison, 1997). CDFW lists this species as a Species of Special Concern. Threats are thought to include potential pesticide ingestion and habitat loss.

No CNDDB records for loggerhead shrike exist in or near the Project Area.

Modeling by Frank Davis (Davis, 2013c and 2017) indicates this area is habitat for loggerhead shrikes. One loggerhead shrike was observed foraging near the intersection of Cambria Road and Midway Road on April 10, 2022.

Potential habitat for loggerhead shrike is found on Evaluated Sites 1 through 8.

5.1.5 Desert Kit Fox (*Vulpes macrotis arsipus*)

The desert kit fox is a small, slender canine with very large ears relative to its body size. The desert kit fox does not have a federal or California state special status; although as a fur-bearing mammal it is protected from hunting. As the common name suggests this fox inhabits various desert spaces. Their presence is strongly linked to creosote bush scrub (though they may be found in other desert spaces) and around human habitation if they have been conditioned to find enough food resources there. As an opportunistic species they will eat lizards, snakes, insects and rodents. The primary prey seems to be kangaroo rats. They require a rodent population large enough to survive and feed their young. This species is threatened by habitat fragmentation, degradation and loss. An additional threat is disease introduced into the population by domestic canines.

As of 2022, CDFW does not maintain records of desert kit fox in the CNDDB. Modeling uploaded to Data Basin (Penrod, 2012) indicates this area as probably being occupied by desert kit fox. CDFW provides mapping data showing Site 4 and a small portion of Site 5's western boundary as part of the "Linkage Design for the California Desert Linkage Network" (CDFW, 2012). It is assumed part of the purpose of this linkage is to allow desert kit foxes to move between occupied habitats. However, the extensive presence of feral and domestic canines in the area and their extensive impact on rodent and lizard populations makes this habitat marginal at best. Data Basin (Conservation Biology Institute, 2013) modeling shows low intactness levels for this area.

All of the Evaluated Sites have potential to be used by desert kit fox. Observations of very old scat and three inactive natal dens indicate that this area was occupied, at least in the past, and it still may be being used as a corridor for movement. No fresh kit fox sign and no individual foxes were observed though night time surveys were not conducted. There is a low potential for occurrence of desert kit fox on all of the Evaluated Sites within the Project Area.

5.1.6 American Badger (*Taxidea taxus*)

American badgers are flat bodied, short-legged mustelids. These animals live in a variety of habitats. Their main requirements are friable soil and sufficient food in the area, most often rodents. CDFW lists this species as a Species of Special Concern being threatened with habitat fragmentation, degradation, and loss.

There are no CNDDB records for American badger within or near the Project Area.

Modeling uploaded to Data Basin (Davis, 2016) indicates this area as probably occupied. However, no individuals observed and no sign was found to indicate that badgers are currently using this area. Once again, this may be due to the extensive presence of feral and roaming domestic canines.

Despite the lack of sign and the roaming canines, there is habitat and the area is within the range of American badgers, therefore American badgers have a low potential to occur on any of the sites within the Project Area.

5.2 Potentially Occurring Special Status Plants

5.2.1 Beaver Dam Breadroot (*Pediomelum castoreum*)

Beaver Dam breadroot is a California Rare Plant Rank (CRPR) 1B.2 species meaning the CNPS considers it rare throughout its range and fairly threatened in California. Beaver Dam breadroot is a low-growing perennial herb. It is single stemmed and smooth with palmate leaves flowering from April to June. The flowers are bluish and showy with a distinct lower calyx lobe. Beaver Dam breadroot occurs on firm sands, sandy gravels, and sandy silts at elevations of 1,200-5,000 feet (Baldwin et. al, 2012). Populations can range from a few individual plants to thousands of plants covering a large area. Potential threats include road widening and vehicular traffic (CNPS, 2022b).

The nearest location records for Beaver Dam breadroot is approximately 2.59 miles northwest of northern periphery of Site 4.

No Beaver Dam breadroot plants were observed in the Project Area. Potential habitat for Beaver Dam breadroot plants occurs within Sites 4, 5 and 6 on the stabilized dunes area of the site (Figure 7 in Appendix F). Table 9 below provides the location, acreage (rounded) and soil type of potential Parish's phacelia at each site.

Table 9 Beaver Dam breadroot Acreage by Site and Soil Type

Name	Acres	Soil Type
Site 4	13	Joshua loam
Site 5	21	Kimberlina loamy Fine Sand with Joshua loam in the NE corner of the site
Site 5	42	Kimberlina loamy fine sand
Site 6	4	Mostly Glendale variant, sandy loam, slightly aeolian, Bousic clay underneath
Site 6	15	Aeolian sands and loams

5.2.2 Parish's phacelia (*Phacelia parishii*)

Parish's phacelia is a California Rare Plant Rank (CRPR) 1B.1 meaning the CNPS considers it rare throughout its range and seriously threatened in California. It is a relatively small annual reaching 5 to 15 centimeters, branching at the base. The stem has short hairs and is minutely glandular. It has narrow bell-shaped flowers with a yellow tube and purple petals flowering from April - July. This plant is found in California and Nevada in open stretches of clay or alkaline soils at the edges and/or within dry lake beds at elevations between 540 and 1200, up to 1800 meters (Baldwin et. al, 2012). Potential threats include military expansion and solar project (CNPS, 2022b).

The nearest location records for Parish's phacelia are approximately 0.5 miles southwest of the Project Area.

Viable potential habitat for Parish's phacelia was observed on all of the Evaluated Sites. Table 10 below provides the location, acreage (rounded) and soil type of potential Parish's phacelia at each site. Figure 8 in Appendix F provides the mapped extent of potential habitat at each Evaluated site. A total of 451 acres of potential Parish's phacelia habitat was identified.

Table 10 Parish's phacelia Acreage by Site and Soil Type

Site	Acres	Soil Type
Site 1	29	Bousic and Peterman Clays
Site 2	29	Bousic and Peterman Clays
Site 3	67	Bousic and Peterman Clays and Playa
Site 4	30	Bousic and Peterman Clays
Site 5	60	Mostly Glendale variant - Alkali loams, northern portion is Bousic Clay
Site 6	65	Bousic and Peterman Clays majority, Glendale variant on east portion
Site 7	99	Glendale variant - Alkali loams
Site 8	40	Glendale variant - Alkali loams
Site 9	32	Bousic and Peterman Clays

5.2.3 Depressed standing-cypress (*Loeseliastrum depressum*)

Depressed standing-cypress has a CRPR of 4.3 meaning it is a plant of limited distribution but no very threatened in California. It is a small annual with a bilateral white corolla with yellow blotches at the corolla base. It flowers April through July. Depressed standing-cypress is found in pinyon-juniper woodlands and Mojave desert scrub (CNPS, 2022b) in sandy to clay soils on flats or gentle slopes at elevations from 1,000 to 2,100 meters (Baldwin et. al, 2012).

No records for depressed standing-cypress exist within the CNDDB data set, however, CalFlora shows a record at Rabbit Springs near the intersection of Rabbit Springs Road and Kendall Road. The elevation at this record location is approximately 887 meters. However, the record is from the late 1800's and no newer records were found (CNPS, 2022b).

All other records for this species occur much farther north in a different micro-habitat and given the date of the original record it likely this is an errant data point.

5.2.4 Alkali Mariposa Lily (*Calochortus striatus*)

The alkali mariposa lily has a CRPR of 1B.2 meaning the CNPS considers it rare throughout its range and fairly threatened in California. This is a perennial herb arising from a bulb with a smooth, hairless stem. The few leaves are basal and grass-like. The petals are white to lavender and striated with purple veins flowering April through June. The nectary at the base of each petal is oblong and densely tufted. It is found in alkaline meadows and moist creosote bush scrub at elevations between 800 and 1,400 meters (Baldwin et. al, 2012). It has been documented in washes, low flats, and seasonal water courses (CNPS, 2022b). It is threatened by water drawdown and diversions as well as habitat degradation and loss due to urbanization, grazing, trampling and road construction (CNPS, 2022b).

A pre-field work assessment of the project vicinity included a review of the USFWS National Wetland Mapper (NWI, 2022). The information provided indicated several manmade ponds as wetlands, Freshwater Forested/Shrub Wetland, and Freshwater Emergent Wetland and therefore the alkali mariposa lily was included as a potential for the Project Area. The Freshwater Forested/Shrub Wetland, and Freshwater Emergent Wetland are simply mapping errors.

The nearest location record for alkali mariposa lily is at Rabbit Springs near the intersection of Rabbit Springs Road and Kendall Road approximately 3.6 miles from the Project Area. This is a wet meadow and alkali mariposa lily requires some form of seasonally wet habitat.

No habitat for alkali mariposa lily occurred at any of the Evaluated Sites.

5.2.5 Thorny milkwort (*Polygala acanthoclada*)

Thorny milkwort has a CRPR of 2B.3 meaning CNPS considers it rare in California but more common elsewhere. This sprawling shrub has densely hairy white twigs with hairy pedicels, outer sepals and leaves. The inflorescence is thorn tipped. The flowers are greenish-yellow with a purple tip on the banner with anthesis in May through August. It is found in creosote bush scrub (CNPS, 2022b), desert scrub, Joshua tree woodland, and pinyon-juniper woodland, generally in loose, sandy or gravelly soils at elevations between 945-1830 meters (Baldwin et. al., 2012;). The lowest elevation it has been recorded at is 760 meters (CNPS, 2022b).

Nearest records are located approximately three miles from the Project Area just south of the intersection of Locust Avenue and Hwy 247 and at the junction of Santa Fe Fire Road and Hwy 247. Both populations were located in creosote bush scrub. This second location is approximately six miles southeast of the nearest portion of the project (Site 8) and approximately seven miles southeast of Site 5. Habitat for this species is creosote bush scrub which occurs higher up on the alluvial fan and it was determined that there was not suitable habitat on the any of the Evaluated Sites.

5.3 Potentially Occurring Sensitive Natural Communities

No sensitive natural communities were found within the Project Area.

5.4 CDNPA Species Occurrence

The only CDNPA plant species found to occur on the Project Area was silver cholla. This species was observed only on Sites 4 and 5. A total of 22 cacti were tallied on Site 4 and 61 on Site 5 for a total tally of 83 silver cholla. Locations of all cacti observed in the Project Area were taken with GPS units. It should be noted that recruitment on both sites was incredibly low.

No yucca, smoke tree, mesquite, beargrass, agave, desert lilies or additional species of cactus were found within the Project Area and no cactus over three feet were documented within the Project Area.

Cacti data observed within the Project Area is presented in Appendix G–Table 11 and mapped locations shown in Figure 9.

5.5 Invasive Weed Inventory

Invasive weeds were present on all of the Evaluated Sites. However, all the invasive annual weeds were dead with the exception of one plant African rue (*Peganum harmala*) present on the edge of Cambria Road near Site 7, technically outside the Project Area, but close enough to mentioned. African rue is a highly drought and alkaline tolerant plant and it was in anthesis. In normal precipitation years most of these are spring blooming species (with the exception of Russian thistle), but due to the protracted drought in the general region nothing germinated. Sites 1, 2, 3, 7, and 8 had significant concentrations of fivehorn bassia, cheatgrass, Russian thistle, and London rocket. To a lesser extent foxtail barley was present on Sites 7 and 9. Evaluated Sites 7 and 8 had the highest concentrations of Russian thistle, fivehorn bassia, and cheatgrass (Figure 10 in Appendix H). There was a large concentration of Russian thistle along the west edge of Site 7 concentrated in the fissures and dense allscale shrub cover. This was likely due to the proximity of active agriculture and field clearing/harrowing on adjacent parcels.

Sites 4, 5, and 6 had much lower concentrations of invasive weeds species. On Site 4 London rocket and minimal fivehorn bassia were located in the washes near the inside corner of the parcel. Site 5 had wide spread and sparsely scattered distribution of London rocket and no significant concentration the site so it was not mapped as showing an invasive weed layer.

Tamarisk was observed 8 of the 9 Evaluated sites for a total of 258 tamarisk individuals. Many of tamarisk are also found in the Unevaluated parcels. These are readily observable from satellite imagery. Large groves of tamarisk occur to the southwest of the Project Area at the margins of Lucerne Dry Lake.

6.0 Discussion

The Project Area and general vicinity has been fragmented by roads, human habitation and agricultural activities for over a century. All of the Evaluated Sites were impacted by some form of human use. The lack of any observation of desert tortoise sign is not surprising given the low quality of the habitat for Mojave desert tortoise. Saltbush scrub communities are not preferred habitat for Mojave desert tortoises and 99% of the Project Area occurs within one of the alliances for Saltbush Scrub. Only a very small section of one Evaluated Site (Site 5) contained any creosote bush and this community is a transition zone between a more robust creosote bush scrub community higher up on the alluvial fan to the east and the saltbush scrub communities at the periphery of the broader playa zone of Lucerne Dry Lake. This marginal habitat has been further degraded by extensive use by feral and roaming domestic canines. Most rodent mounds or any form of subterranean denning has suffered some digging by domestic/feral canines. There were hundreds of canid excavations within the Evaluated Sites.

The lack of live tortoises, burrows, scat, tracks, courtship rings, and drinking depressions in approximately 90 miles of transects walked by two experienced biologists lends credence to the fact that the Project Area is not currently occupied by Mojave desert tortoise and may have only been visited by transient animals in the past.

There were two live burrowing owl observations within the Project Area. The owl at Site 4 occupied the burrow complex it was using (inactive natal kit fox den) and two additional satellite nests (one was an inactive natal kit fox den). The owl on Site 5 appeared to only use one burrow complex (inactive natal kit fox den). Avoidance is probably not possible therefore any owls present should be passively relocated and the burrows plugged or excavated prior to initiation of ground disturbing work.

No active desert kit fox dens were found within the Project Area. However, three inactive natal dens were located and as discussed above were being used by burrowing owls. One of the natal dens on Site 4 had very old kit fox scat at one of the entrances. One set of small canine tracks was located on Site 4, however the tracks were not clear enough to distinguish if they were kit fox or small dog tracks. Given the large number of domestic/feral canines roaming the area day and night it is possible that kit foxes no longer use this area. If they are present, it is likely to be a transient move through the area. However, if a den is located during pre-construction surveys a passive relocation plan consistent with County and State specifications should be developed and implemented.

No American badger sign was located during the survey of the Project Area. Due to the mobility of this species and its preferred foraging habitat, the American badger is anticipated to potentially occur on the Project Area as an occasional transient, dispersing young adult, or forager. However, if a den is located during pre-construction a passive relocation consistent with County and State specifications should be developed and implemented.

Three LeConte's thrashers were observed on Site 6 and one loggerhead shrike was observed in the vicinity of Site 9. Much of the Project Area is habitat for both of these species. If construction of the

project occurs during breeding season a biologist should survey for potential nests and establish appropriate construction avoidance buffers if they are found.

The rare plant survey did not document any special status plant species in the Project Area. Because of the existing drought conditions during the time of the survey, the presence of rare plants could not be determined. However, potential habitats were identified for two special status plant species. These species were Parish's phacelia and Beaver Dam breadroot. Specific habitats for three other special status species identified as potentially occurring in the general area were not found within or near the Project Area.

Additional surveys may be required for special status plants in a year with sufficient fall and winter precipitation to germinate any potentially occurring species to meet the requirements for a complete protocol-level survey (CDFW 2018). Avoidance of Parish's phacelia potential habitat will not be possible within the solar array areas. Although the potential habitat for Beaver Dam breadroot is much smaller and restricted to Sites 4, 5, and 6, it is unlikely that avoidance would be a viable measure. No know records of Beaver Dam breadroot occur in this portion of Lucerne Valley.

One CDNPA plant species, silver cholla, was present in the Project Area. These cacti may not be harvested except under a permit issued by the San Bernardino County agricultural commissioner or sheriff as per the California Food and Agricultural Code, Section 80071-80075. Avoidance of silver cholla within the solar array will not be possible. Like the majority of plant life in the area these cacti are severely stressed from prolonged drought conditions and many were dying.

No sensitive natural communities occur within the Project Area.

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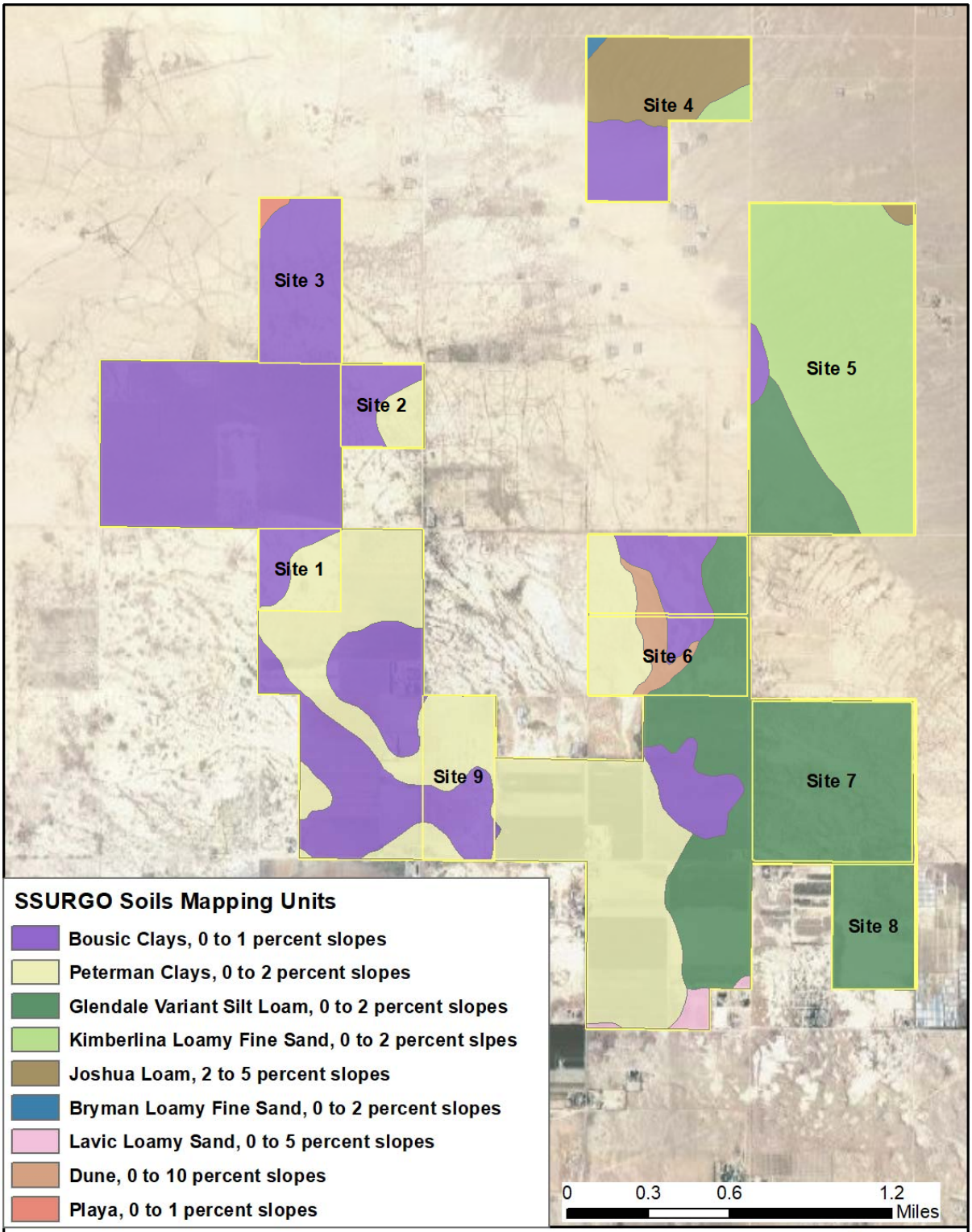
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Appendix A

Soil Mapping Units
Proposed Sienna Solar and Storage Project



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Figure 2

Proposed Sienna Solar and Storage Project
SSURGO Soils Mapping Units

Aerial Background: 1 October 2020 WV04 Vivid DigitalGlobe/Google Earth Imagery ESRI ArcGIS Basemap Layer
USDA/NRCS Web Soil Survey SSURGO Soils Data

Appendix B

Site Photographs
Proposed Sienna Solar and Storage Project



Site 1 - Looking southwest.
Modified *Atriplex confertifolia* Shrubland Alliance.



Site 1 - Looking Southwest showing sparse vegetation cover (Potential Parish's phacelia habitat) and a portion of Unevaluated Parcel 4 to the south (top of photo), note organic debris on fields.



Site 2 - Looking northwest.
Modified *Atriplex confertifolia* Shrubland Alliance.



Site 2 - Looking southwest showing sparse vegetation cover with shrubs concentrated in fissures, open areas are potential Parish's phacelia habitat, a portion of Unevaluated Parcel 2 to the northwest, note organic debris.



Site 3 - Looking southwest across playa and vegetation.
Modified *Atriplex confertifolia* Shrubland Alliance.



Site 3 - Looking north showing sparse vegetation cover vegetation concentrated in fissures.
Potential Parish's phacelia habitat.



Site 4 - Looking southwest.
***Atriplex canescens* Shrubland Alliance.**



Site 4 - Looking northwest across playa portion of site.
Potential Parish's phacelia habitat.



Site 4 - Looking south-southwest. Broad overview of site showing vegetation and playa. Potential Beaver Dam breadroot habitat in sandy rolling hills in left half of photo.



Site 5 - Looking southwest across Saltbush Scrub to towards playa. *Atriplex polycarpa* Shrubland Alliance.



Site 5 - Looking southwest. Potential Beaver Dam breadroot and marginal desert tortoise habitat. *Larrea tridentata* Shrubland-*Atriplex polycarpa* Shrubland Alliance Transition Zone.



Site 5 - Looking north across playa. Potential Parish's phacelia habitat. Abandoned hemp operation within Site 5 in the distance.



Site 4 - Looking south. Broad overview of site showing vegetation and playa on west half of site. Potential Beaver Dam breadroot habitat in sandy rolling hills in center of photo.



Site 5 - Looking west over abandoned hemp growing operation.
The facility's outer berm encompasses 45 acres and the inner berm with hoop houses is 7 acres.



Site 6 - Looking west over potential *Parish's phacelia* habitat on barren playa substrates.
Modified *Atriplex confertifolia* Shrubland Alliance



Site 6 - Looking northwest across dune habitat, also potential Beaver Dam breadroot habitat.
***Atriplex polycarpa* Shrubland Alliance**



Site 6 - Looking northwest along playa substrate on east half of site. Potential Parish's phacelia habitat on barren substrates.



Site 6 – Small patch of sandy habitat in north portion of site. Potential Beaver Dam breadroot habitat. *Atriplex polycarpa* Shrubland Alliance



Site 6 - Looking southeast. Broad overview of site showing vegetation and playa on west half of site. Unevaluated Parcel 7 in background, note organic debris covering field.



Site 6 - Looking south across site. Potential Beaver Dam breadroot on lower left corner of photo. Unevaluated Parcels, 6, 7, 8, and 9, top of photo. Active alfalfa farming or organic debris on parcels.



Site 7 - Looking northwest on east half of site. Potential Parish's phacelia habitat on barren substrates. *Atriplex polycarpa* Shrubland Alliance



Site 7 - Looking northwest across Saltbush Scrub towards playa. Heavy weed infestation on west and south edges of site.



Site 8 - Looking southeast showing vegetation, weeds, and playa on west half of site.
***Atriplex polycarpa* Shrubland Alliance.**



Site 8 - Looking south across site. Potential Parish's phacelia habitat on barren substrates.
Heavy weed infestation on west edge of site.



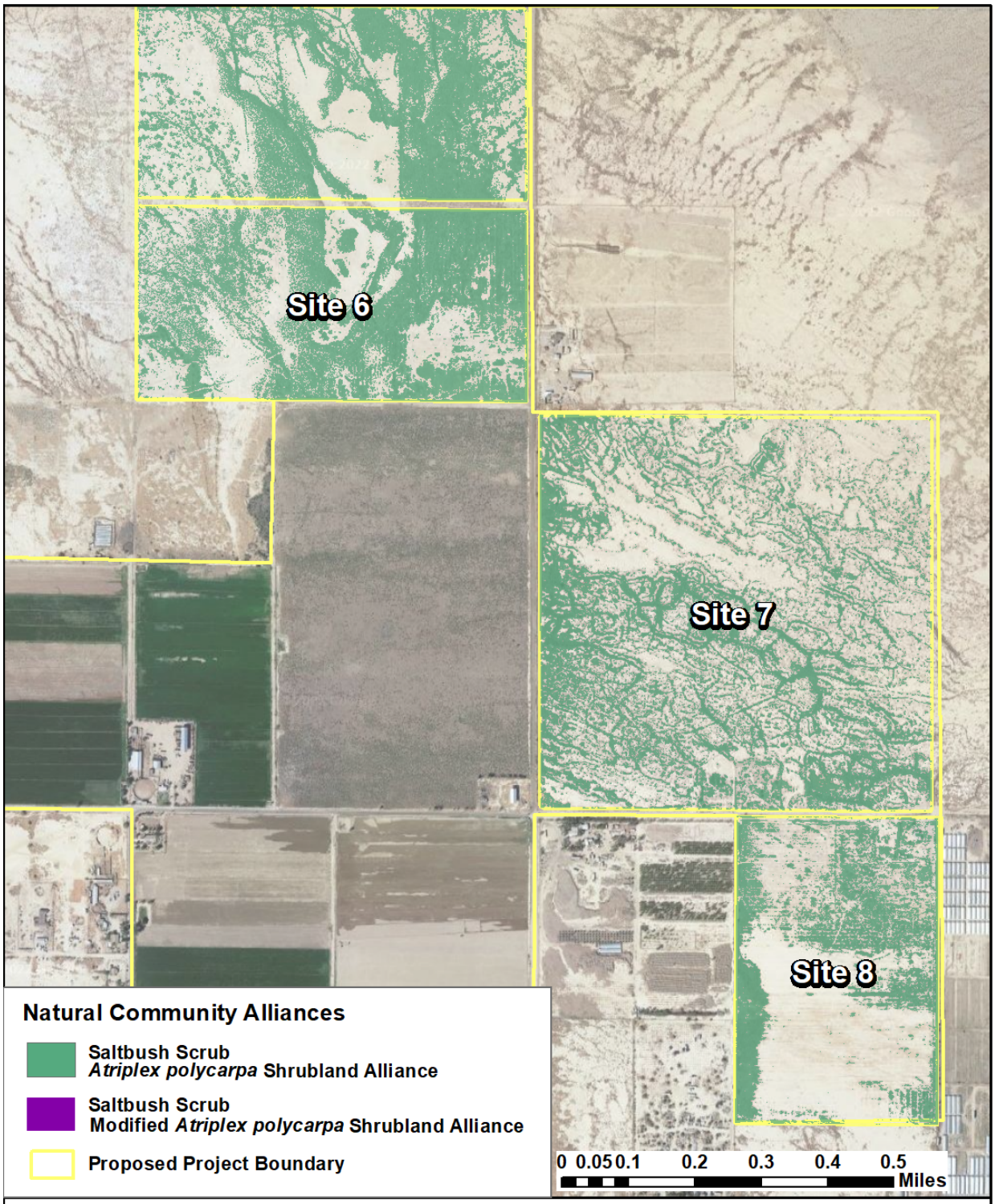
Site 9 - Looking northwest. Site was included in Evaluated Sites because CNDDB Parish's phacelia records from 2017 are 0.5 miles from this site in similar conditions.



Site 9 - Looking south-southwest across site. Potential Parish's phacelia habitat at south portion of site in appropriate substrates. Unevaluated Parcels 4 and 5, top of photo, partially tilled and some are covered with organic debris. Parcel 6 on left side of photo is under active alfalfa farming.

Appendix C

Natural Community Alliances Map
Proposed Sienna Solar and Storage Project

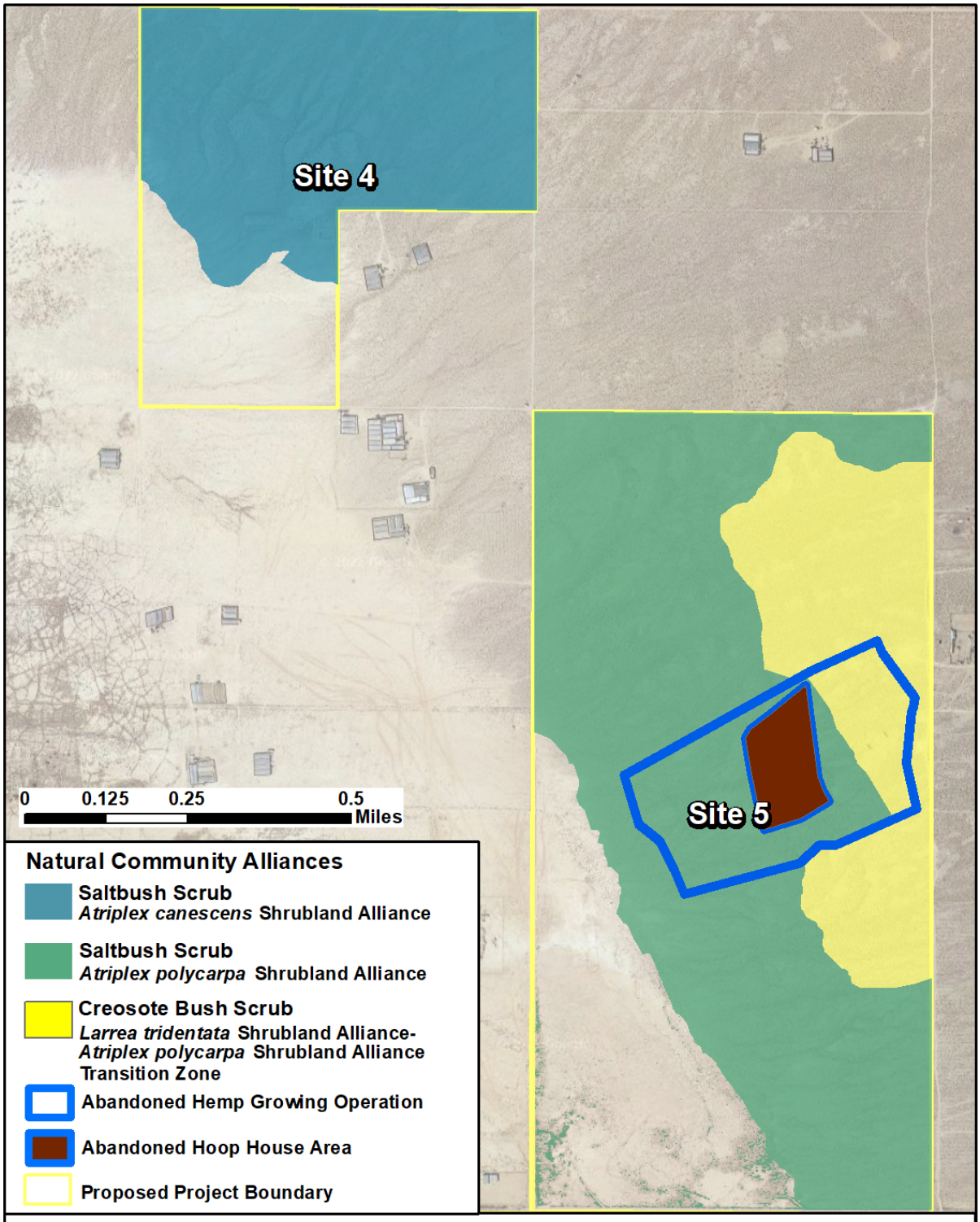


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Figure 3
Proposed Sienna Solar and Storage Project
Natural Community Alliances Map
***Atriplex polycarpa* Shrubland Alliance**
Modified *Atriplex confertifolia* Shrubland Alliance

Aerial Background: 1 October 2020 WV04 Vivid DigitalGlobe/Google Earth Imagery ESRI ArcGIS Basemap Layer



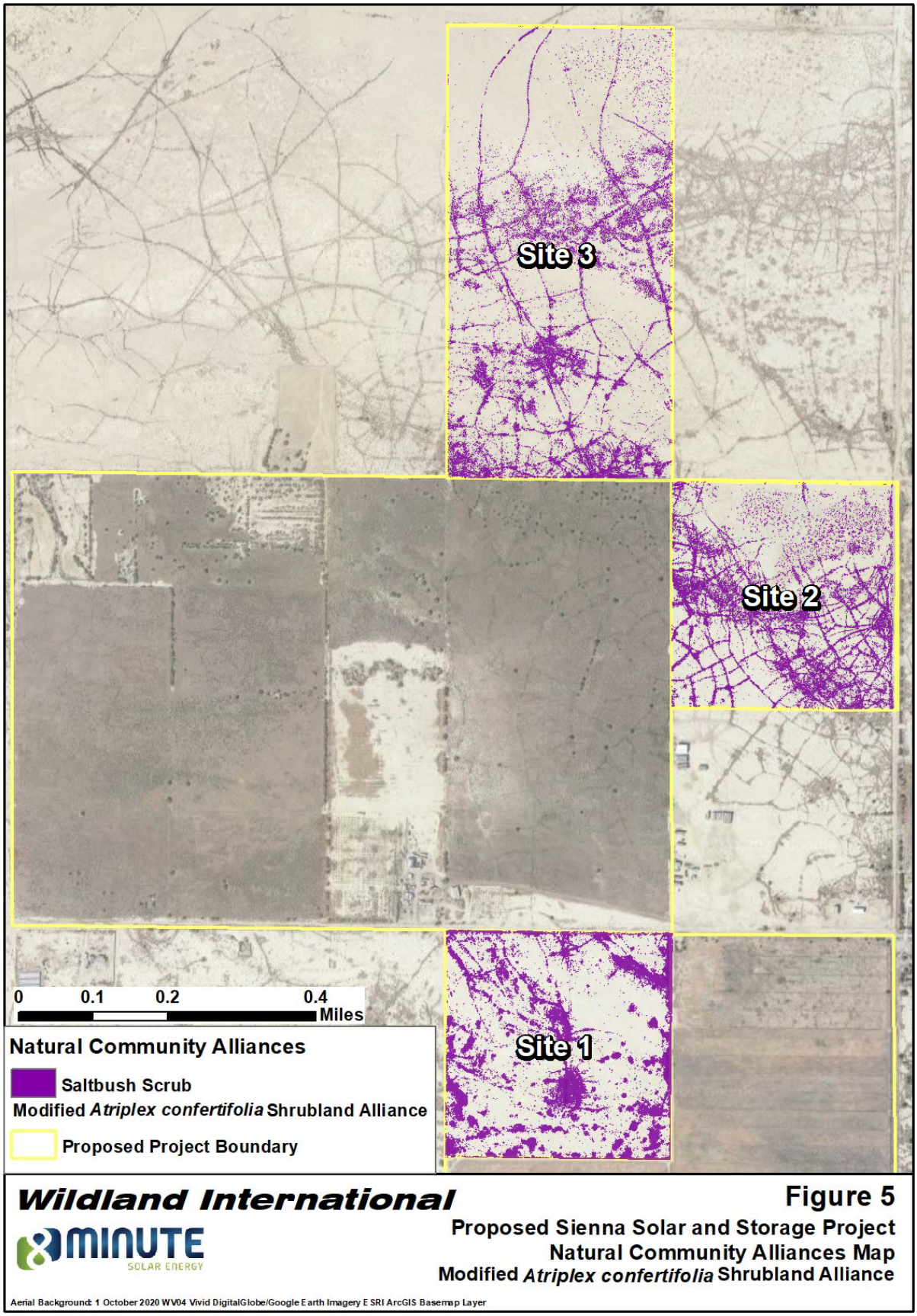
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Figure 4

Proposed Sienna Solar and Storage Project
Natural Community Alliances Map
***Atriplex canescens* Shrubland Alliance**
***Atriplex polycarpa* Shrubland Alliance**
***Larrea tridentata* Shrubland Alliance- *Atriplex polycarpa* Shrubland Alliance Transition Zone**

Aerial Background: 1 October 2020 WV04 Vivid DigitalGlobe/Google Earth Imagery ESRI ArcGIS Basemap Layer



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Figure 5

Proposed Sienna Solar and Storage Project
Natural Community Alliances Map
Modified *Atriplex confertifolia* Shrubland Alliance

Aerial Background: 1 October 2020 WV04 Vivid DigitalGlobe/Google Earth Imagery ESRI ArcGIS Basemap Layer

Appendix D

General Plant and Wildlife Species Observed
Proposed Sienna Solar and Storage Project

Table 7 – General Plant List for the Proposed Sienna Solar and Storage Project

Family Name	Scientific Name	Common Name	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7	Site 8	Site 9
ASTERACEAE	*Ambrosia dumosa*	burroweed	I		I	I	O	I			
ASTERACEAE	*Artemisia spinescens*	budsage		O	I	O	C	O	I	I	
ASTERACEAE	*Chaenactis sp.*	pincushion	I	I	I	O	C	I			
ASTERACEAE	*Ericameria nauseosa*	rubber rabbitbrush					I	I			
ASTERACEAE	*Gutierrezia microcephala*	sticky snakeweed	C			I	I				
ASTERACEAE	*Isocoma acradenia*	alkali goldenbush	O	O	C			O	I	I	
ASTERACEAE	*Stephanomeria pauciflora*	wire lettuce		C	O	I	O	I		I	I
ASTERACEAE	*Tetradymia glabrata*	littleleaf horsebrush	C	I				O			
ASTERACEAE	*Xylorhiza tortifolia*	Mojave aster				I	I				
BORAGINACEAE	*Amsinckia tessellata*	devil's lettuce	C			O	O	I	I	O	
BORAGINACEAE	*Greeneocharis circumscissa*	matted cryptantha				I					
BRASSICACEAE	*Descurainia pinnata ssp. glabra*	smooth western	O							C	C
BRASSICACEAE	*Lepidium fremontii*	desert pepper grass	C	C	I	C	C	C			
BRASSICACEAE	*Lepidium lasiocarpum*	shaggyfruit					O	O			
BRASSICACEAE	*Sisymbrium irio*	London rocket	O	C	O	C	O	C	C	C	C
BRASSICACEAE	*Stanleya pinnata*	prince's plume	O	I		O	I	O			
BRASSICACEAE	*Streptanthella longirostris*	long beaked twist			I	C					
CACTACEAE	*Cylindropuntia echinocarpa*	silver cholla				O	C				
CHENOPODIACEAE	*Atriplex argentea*	silverscale	O	C	O	O	C	O	O		I
CHENOPODIACEAE	*Atriplex canescens*	four-wing saltbush			O	C	I	O	I	I	
CHENOPODIACEAE	*Atriplex confertifolia*	shadscale	C	C	C	C	O		I		I
CHENOPODIACEAE	*Atriplex polycarpa*	allscale saltbush		O	O	C	C	C	C	C	I
CHENOPODIACEAE	*Atriplex torreyi*	Torry's saltbush	O	C	O	I	I			C	
CHENOPODIACEAE	*Bassia hyssopifolia*	fivehorn	I	I	I	I	I	O	C		O
CHENOPODIACEAE	*Krascheninnikovia lanata*	winterfat						O			
CHENOPODIACEAE	*Salsola tragus*	Russian thistle		O	O		I			C	
CHENOPODIACEAE	*Suaeda nigra*	bush seepweed	C	C	C	C	C	C		I	C
EPHEDRACEAE	*Ephedra nevadensis*	Nevada ephedra	O	I		C	C	C		I	
EUPHORBIACEAE	*Euphorbia albomarginata*	rattlesnake sandmat				I	I				
FABACEAE	*Astragalus didymocarpus*	two-seeded				I					
GERANIACEAE	*Erodium cicutarium*	redstem filaree					I				
LOASACEAE	*Petalonyx thurberi ssp. thurberi*	Thurber's sandpaper				I	I				
NITRARIACEAE	*Peganum harmala*	African rue							I		
ONAGRACEAE	*Eremothera boothii ssp. condensata*	clustered booth's			I	O	O	I		I	
POACEAE	*Stipa hymenoides*	Indian rice grass					I	I			
POACEAE	*Bromus rubens*	red brome			O						

Family Name	Scientific Name	Common Name	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7	Site 8	Site 9
POACEAE	*Bromus tectorum*	cheatgrass	O	O	C			O	O	C	
POACEAE	*Hilaria rigida*	big galleta grass					I	I			
POACEAE	*Hordeum murinum*	wall barley							I		
POACEAE	*Schismus barbatus*	old han schismus			C	C	O	C	O	I	
POLEMONIACEAE	*Eriastrum sp*	woolly star						O			
POLYGONACEAE	*Eriogonum deflexum*	skeleton weed	I	I	I	O	C	C	O	I	
POLYGONACEAE	*Eriogonum nidularium*	birdnest wild				I	I				
POLYGONACEAE	*Eriogonum palmerianum*	Palmer's wild				O	I				
RANUNCULACEAE	*Delphinium parishii*	Parish's larkspur				I					
SOLANACEAE	*Lycium andersonii*	Anderson's desert	O			O	O	O			
SOLANACEAE	*Lycium pallidum*	pale desert thorn	I			O	I				
TAMARICACEAE	*Tamarix ramosissima*	tamarisk	O	O	O		I		I	O	
ZYGOPHYLLACEAE	*Larrea tridentata*	creosote bush				O	O	I			

C = Common – Plants seen every few hundred feet in a survey location

O = Occasional – Plants seen randomly through in a survey location

I = Incidental – 1 or 2 plants seen in a survey location

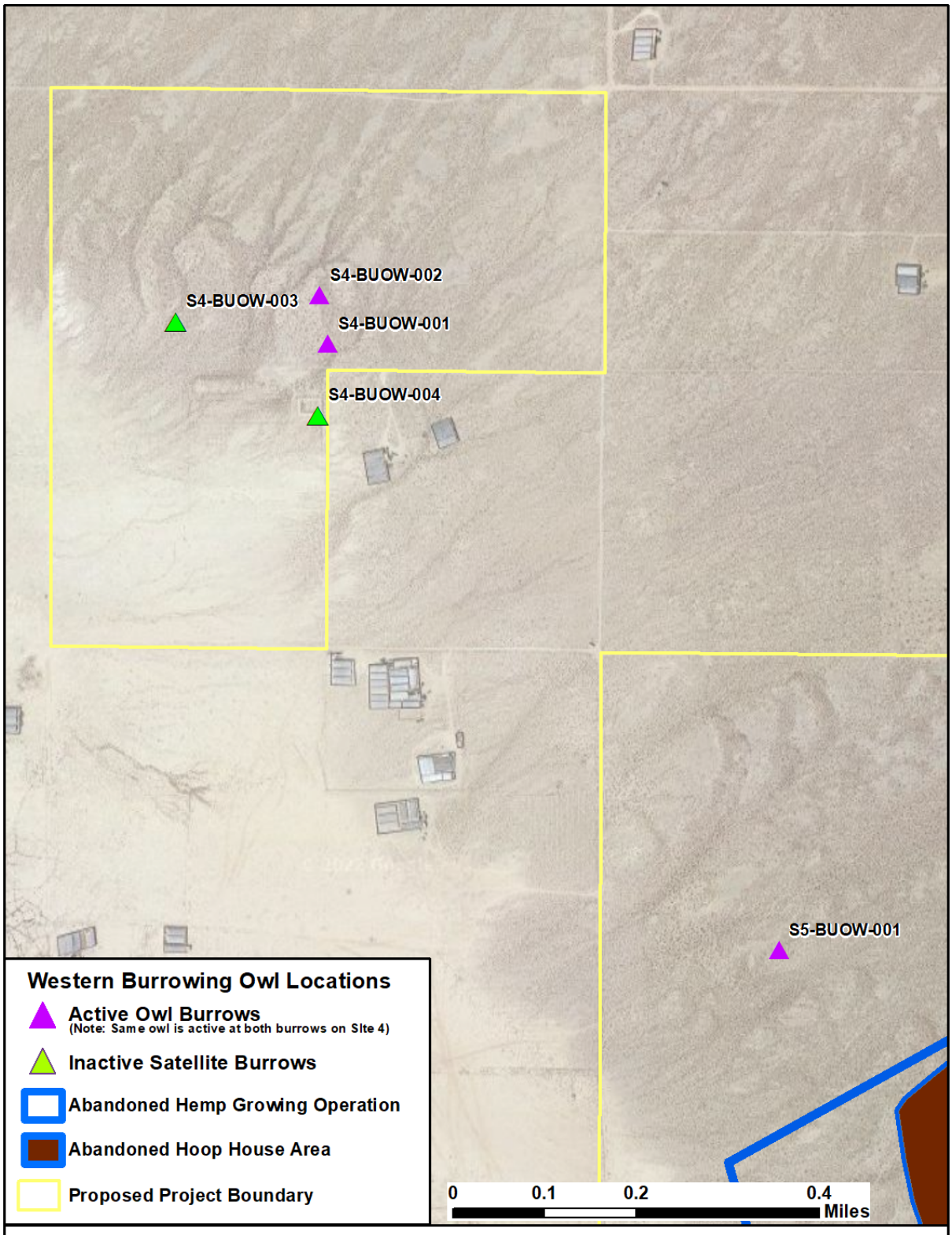
Table 8 – General Wildlife List for the Proposed Sienna Solar and Storage Project

Group	Scientific Name	Common Name	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6	Site 7	Site 8	Site 9
Reptiles	*Aspidoscelis tigris*	western whiptail lizard	X	X	X	X	X	X	X	X	
	Callisaurus draconoides	zebra-tail lizard				X	X				
	Gambelia wislizenii	long-nosed leopard lizard				X	X				
	Uta stansburiana	common sideblotch				X	X	X	X	X	
Birds	*Corvus corax*	common raven	X	X	X	X	X	X	X	X	X
	Eremophila alpestris	horned lark				X		X	X		
	Artemisiospiza belli	Bell's sparrow				X	X	X	X		
	Lanius ludovicianus	loggerhead shrike									X
	Athene cunicularia	western burrowing owl				X	X				
	Toxostoma lecontei	Le Conte's thrasher						X			
	Buteo jamaicensis	red-tailed hawk	X	X			X	X		X	
	Zonotrichia leucophrys	white-crowned sparrow	X	X	X	X	X	X	X	X	X
	Sturnus vulgaris	European starling							X	X	
	Streptopelia decaocto	Eurasian collared dove							X	X	
	Mimus polyglottos	Northern mockingbird							X	X	
	Stelgidopteryx serripennis	Northern rough-winged swallow				X	X		X	X	
	Callipepla californica	California quail								X	
Mammals	*Lepus californicus*	black-tailed jackrabbit	X	X	X	X	X	X	X	X	
	Ammospermophilus leucurus	white tailed antelope squirrel		X		X	X	X	X		
	Canis familiaris	domestic dog (feral/free roaming)	X	X	X	X	X	X	X	X	X
	Canis latrans	coyote (vocalizations)					X		X		

X = Observed during surveys

Appendix E

Western Burrowing Location Map and Photos
Proposed Sienna Solar and Storage Project



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Figure 6

Proposed Sienna Solar and Storage Project
Western Burrowing Owl Location Map

Aerial Background: 1 October 2020 WV04 Vivid DigitalGlobe/Google Earth Imagery ESRI ArcGIS Basemap Layer



Site 5 - Adult western burrowing owl on S5-BUOW-001 burrow ramp.



Site 5 –Western burrowing owl burrows (S5-BUOW-001) located in an inactive desert kit fox natal den complex.



Site 4 Western burrowing owl burrows at S4-BUOW-001 in an inactive desert kit fox natal den complex.



Site 4 - Satellite burrow (S4-BUOW-002), 240 feet north of S4-BUOW-001. Same adult owl is using both burrows. Canine scat has been used as decoration at this burrow mouth.



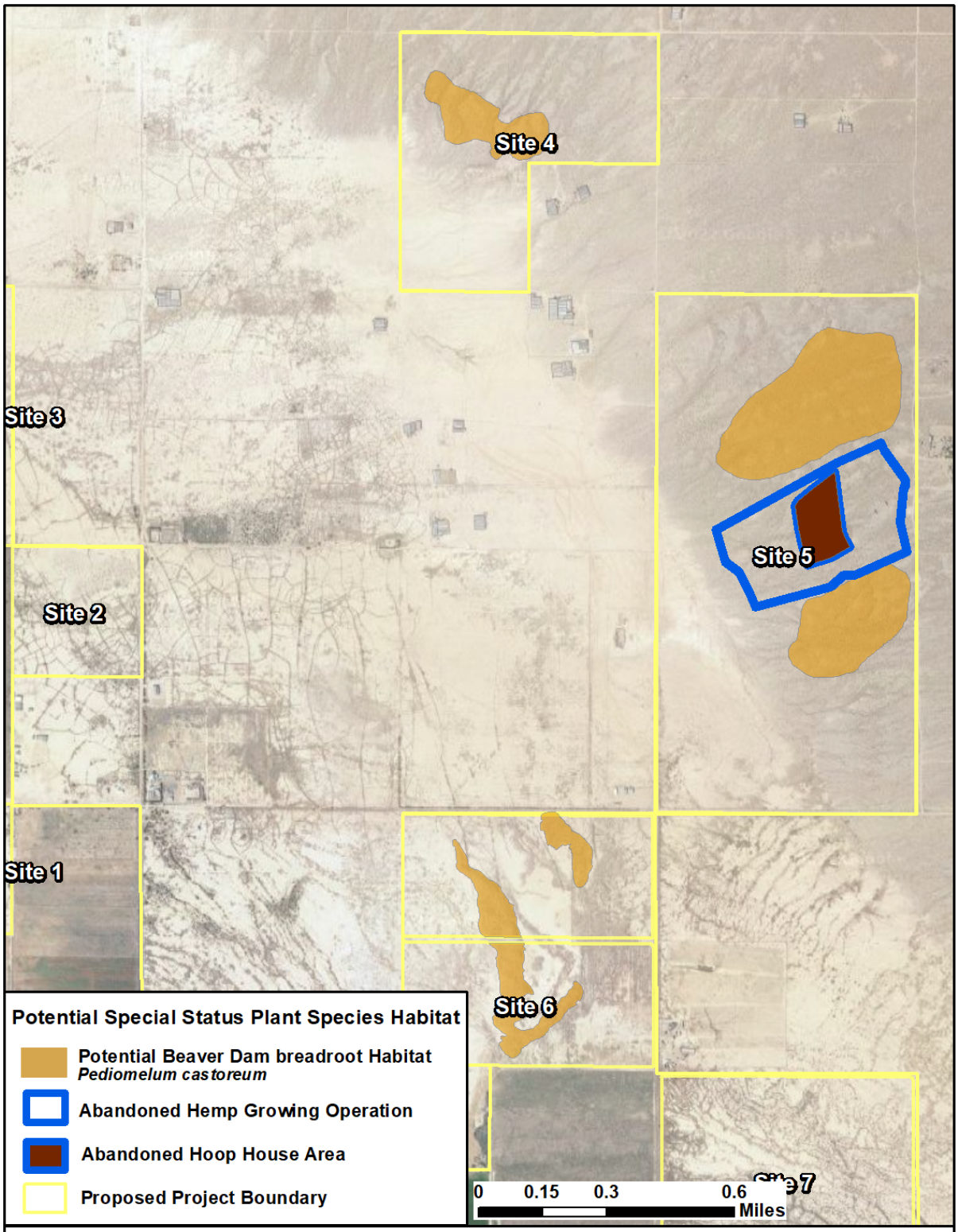
Site 4 - Satellite burrow S4-BUOW-003. Inactive and rarely used.



Site 4 –Inactive western burrowing owl burrow. South of S4-BUPW-001 at base of a dry, bermed, water catchment. Old pellets and minor whitewash. No sign of recent use.

Appendix F

Potential Habitat for Special Status Plants
Proposed Sienna Solar and Storage Project



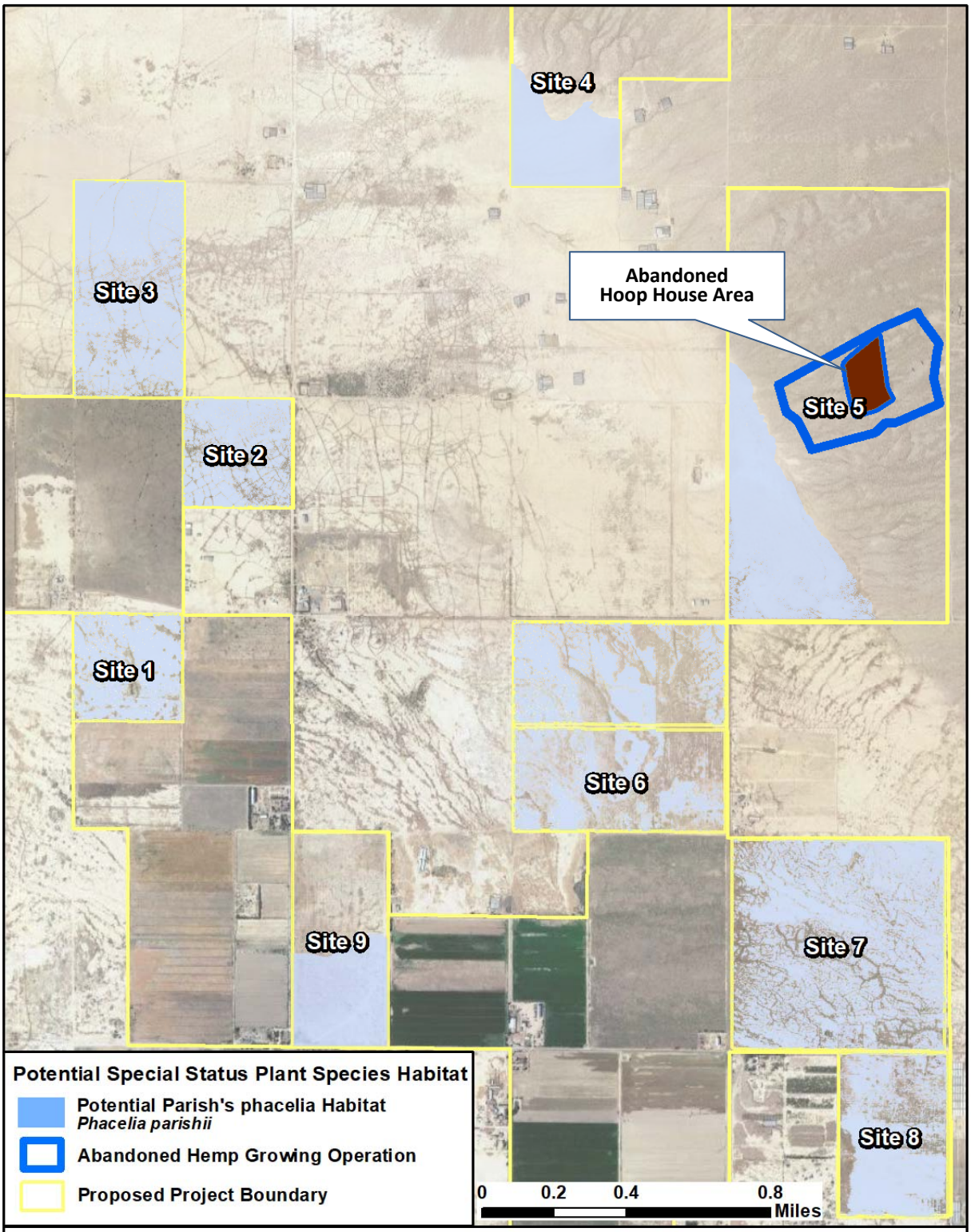
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Figure 7

Proposed Sienna Solar and Storage Project
Potential Beaver Dam breadroot Habitat
Location Map

Aerial Background: 1 October 2020 WV04 Vivid DigitalGlobe/Google Earth Imagery ESRI ArcGIS Basemap Layer



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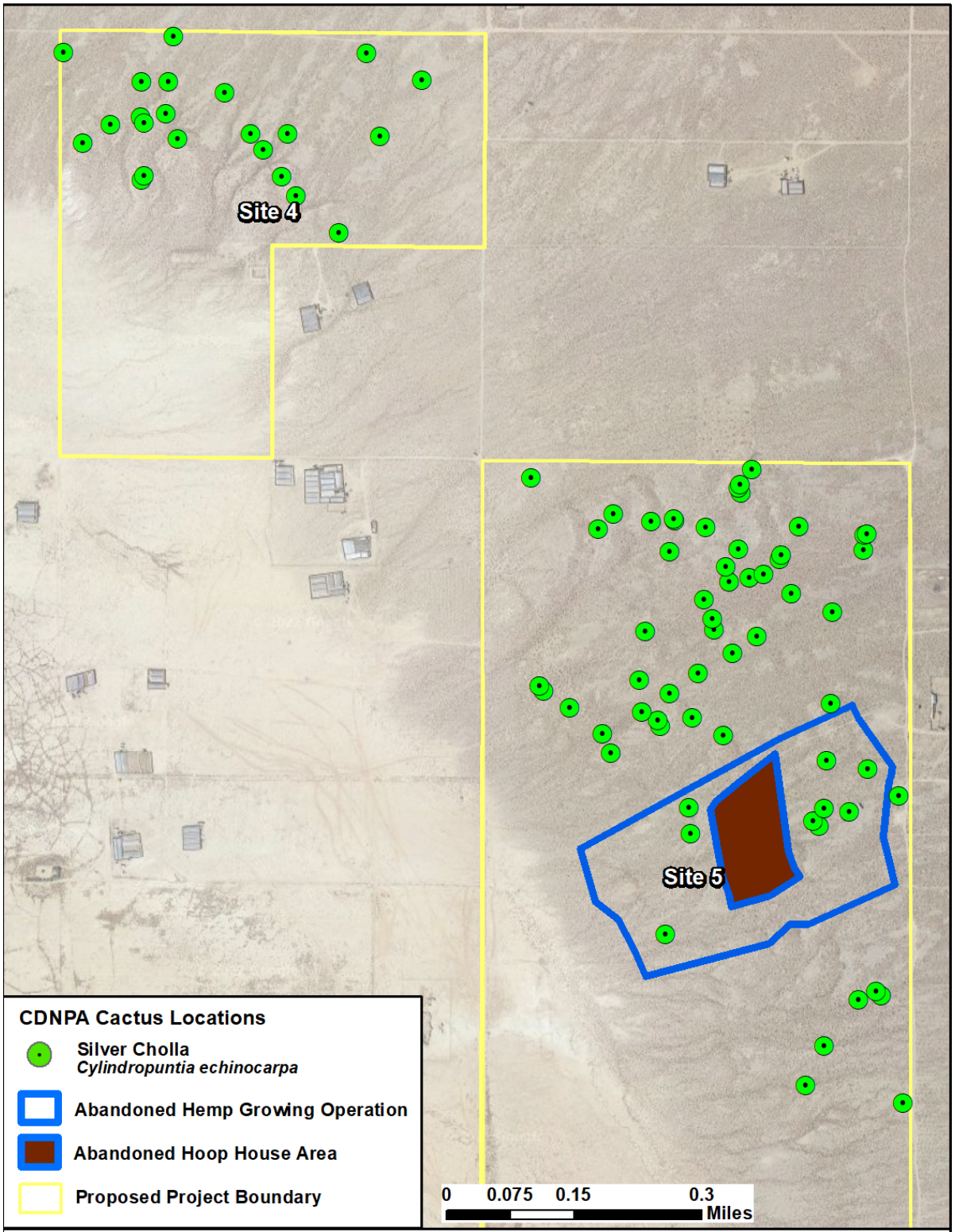
Figure 8

Proposed Sienna Solar and Storage Project
Potential Parish's phacelia Habitat
Location Map

Aerial Background: 1 October 2020 WV04 Vivid DigitalGlobe/Google Earth Imagery ESRI ArcGIS Basemap Layer

Appendix G

CDNPA Cactus Location Map
Proposed Sienna Solar and Storage Project



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Figure 9

Proposed Sienna Solar and Storage Project
CDNPA Cactus Location Map

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Aerial Background: 1 October 2020 WV04 Vivid DigitalGlobe/Google Earth Imagery E SRI ArcGIS Basemap Layer

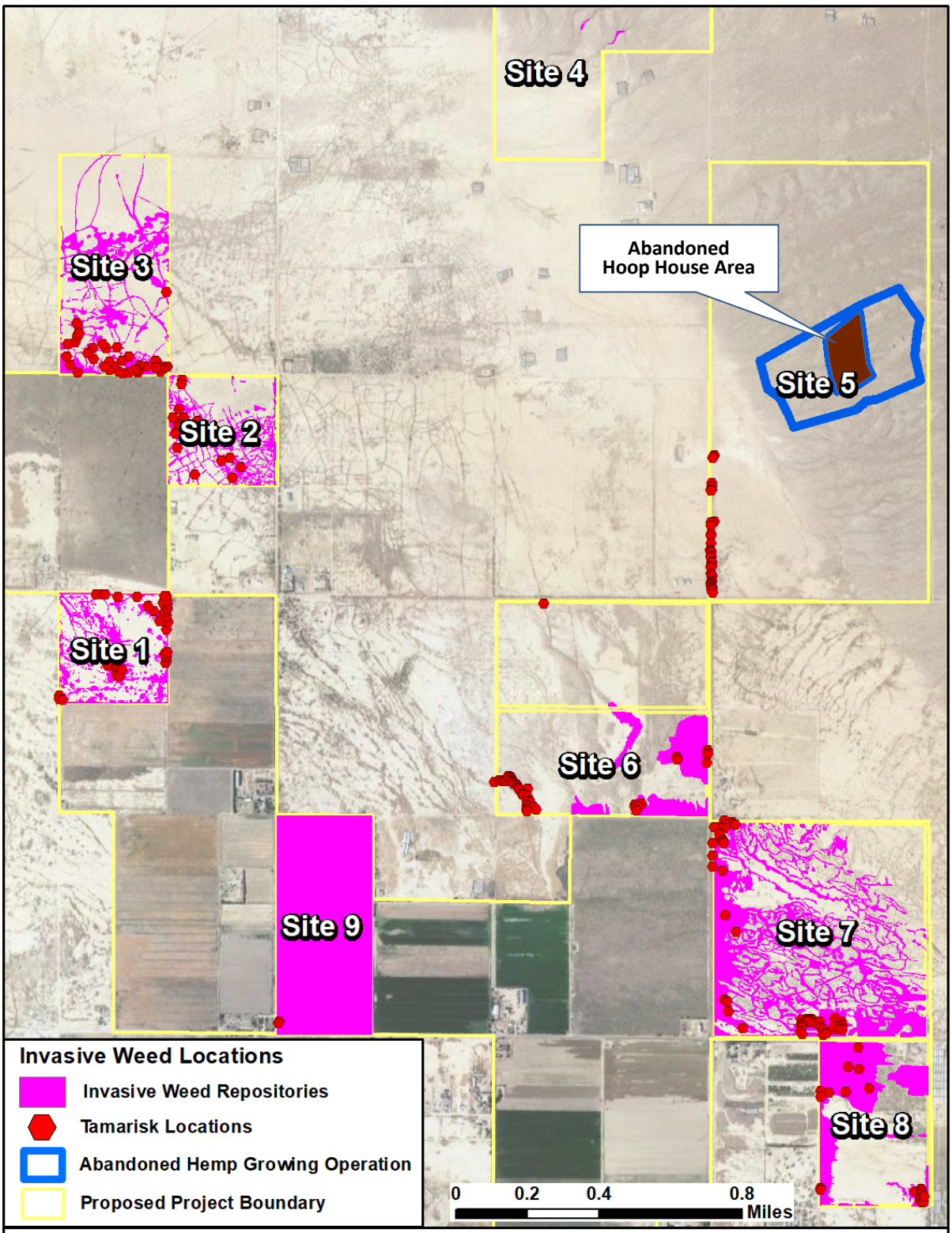
Table 11 CDNPA Species –Silver Cholla (*Cylindropuntia echinocarpa*) Locations

Name	Zone	Easting	Northing	Elevation		Name	Zone	Easting	Northing	Elevation
S4-CE-001	11 N	509537	3819869	2872 ft		S5-CE-021	11 N	510145	3818936	2906 ft
S4-CE-002	11 N	509615	3820051	2879 ft		S5-CE-022	11 N	510141	3818946	2906 ft
S4-CE-003	11 N	509695	3820158	2888 ft		S5-CE-023	11 N	510206	3818951	2902 ft
S4-CE-004	11 N	509589	3820208	2902 ft		S5-CE-024	11 N	510110	3818962	2867 ft
S4-CE-005	11 N	509457	3819938	2867 ft		S5-CE-025	11 N	510163	3818997	2902 ft
S4-CE-006	11 N	509429	3819975	2866 ft		S5-CE-026	11 N	509974	3818971	2862 ft
S4-CE-007	11 N	509395	3820026	2898 ft		S5-CE-027	11 N	509925	3819002	2860 ft
S4-CE-008	11 N	509440	3820056	2870 ft		S5-CE-028	11 N	509916	3819011	2861 ft
S4-CE-009	11 N	509371	3820056	2870 ft		S5-CE-029	11 N	510105	3819023	2871 ft
S4-CE-010	11 N	509322	3820134	2862 ft		S5-CE-030	11 N	510217	3819036	2871 ft
S4-CE-011	11 N	509164	3819969	2883 ft		S5-CE-031	11 N	510282	3819073	2891 ft
S4-CE-012	11 N	509169	3819976	2883 ft		S5-CE-032	11 N	510328	3819105	2873 ft
S4-CE-013	11 N	509232	3820047	2876 ft		S5-CE-033	11 N	510471	3819152	2879 ft
S4-CE-014	11 N	509210	3820094	2875 ft		S5-CE-034	11 N	510247	3819118	2882 ft
S4-CE-015	11 N	509215	3820154	2864 ft		S5-CE-035	11 N	510244	3819138	2881 ft
S4-CE-016	11 N	509225	3820240	2874 ft		S5-CE-036	11 N	510117	3819114	2880 ft
S4-CE-017	11 N	509164	3820154	2891 ft		S5-CE-037	11 N	510228	3819175	2888 ft
S4-CE-018	11 N	509163	3820088	2877 ft		S5-CE-038	11 N	510275	3819209	2861 ft
S4-CE-019	11 N	509169	3820077	2888 ft		S5-CE-039	11 N	510314	3819216	2862 ft
S4-CE-020	11 N	509105	3820073	2864 ft		S5-CE-040	11 N	510341	3819222	2862 ft
S4-CE-021	11 N	509053	3820039	2887 ft		S5-CE-041	11 N	510393	3819187	2886 ft
S4-CE-022	11 N	509017	3820210	2865 ft		S5-CE-042	11 N	510530	3819269	2823 ft
S5-CE-001	11 N	510604	3818222	2884 ft		S5-CE-043	11 N	510531	3819297	2884 ft
S5-CE-002	11 N	510419	3818256	2885 ft		S5-CE-044	11 N	510535	3819299	2908 ft
S5-CE-003	11 N	510455	3818331	2874 ft		S5-CE-045	11 N	510371	3819252	2834 ft
S5-CE-004	11 N	510519	3818418	2878 ft		S5-CE-046	11 N	510374	3819259	2834 ft
S5-CE-005	11 N	510562	3818426	2911 ft		S5-CE-047	11 N	510407	3819313	2803 ft
S5-CE-006	11 N	510553	3818434	2905 ft		S5-CE-048	11 N	510293	3819271	2842 ft
S5-CE-007	11 N	510154	3818542	2863 ft		S5-CE-049	11 N	510269	3819237	2877 ft
S5-CE-008	11 N	510203	3818732	2873 ft		S5-CE-050	11 N	510163	3819266	2837 ft
S5-CE-009	11 N	510199	3818782	2875 ft		S5-CE-051	11 N	510028	3819309	2758 ft
S5-CE-010	11 N	510445	3818747	2872 ft		S5-CE-052	11 N	510057	3819337	2874 ft
S5-CE-011	11 N	510434	3818756	2873 ft		S5-CE-053	11 N	510128	3819322	2767 ft
S5-CE-012	11 N	510454	3818780	2878 ft		S5-CE-054	11 N	510172	3819325	2778 ft
S5-CE-013	11 N	510503	3818774	2866 ft		S5-CE-055	11 N	510170	3819327	2777 ft
S5-CE-014	11 N	510596	3818804	2884 ft		S5-CE-056	11 N	510231	3819312	2880 ft
S5-CE-015	11 N	510537	3818855	2885 ft		S5-CE-057	11 N	510298	3819376	2727 ft
S5-CE-016	11 N	510459	3818871	2881 ft		S5-CE-058	11 N	510293	3819386	2726 ft
S5-CE-017	11 N	510467	3818979	2915 ft		S5-CE-059	11 N	510296	3819393	2722 ft
S5-CE-018	11 N	510265	3818918	2923 ft		S5-CE-060	11 N	510318	3819421	2870 ft
S5-CE-019	11 N	510052	3818885	2911 ft		S5-CE-061	11 N	509901	3819405	2871 ft
S5-CE-020	11 N	510035	3818921	2904 ft						

Datum: WGS 84 UTM 11N

Appendix H

Invasive Weed Repository Tables and Location Map
Proposed Sienna Solar and Storage Project



Wildland International

MINUTE SOLAR ENERGY

Figure 10
Proposed Sienna Solar and Storage Project
Invasive Weed Repository and
Tamarisk Location Map

Aerial Background: 1 October 2020 WV04 Vivid DigitalGlobe/Google Earth Imagery E SRI ArcGIS Basemap Layer

Appendix D3. 2024 Special Status Plants and Western Burrowing Owl Survey Reports

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Sienna Solar and Storage Project

2024 Special Status Plant and Western Burrowing Owl Protocol Survey Results



Prepared For:

99MT 8ME, LLC

Prepared By:

Wildland International

August 26, 2024

Sienna Solar and Storage Project

2024 Special Status Plant and

Western Burrowing Owl Protocol Surveys

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Appendix A - 2024 Western Burrowing Owl Burrow Habitat Evaluation and Inventory Data

Appendix B - 2024 Western Burrowing Owl Burrow Location Map and Active Burrow and Owl Photographs

1.0 Proposed Project Description

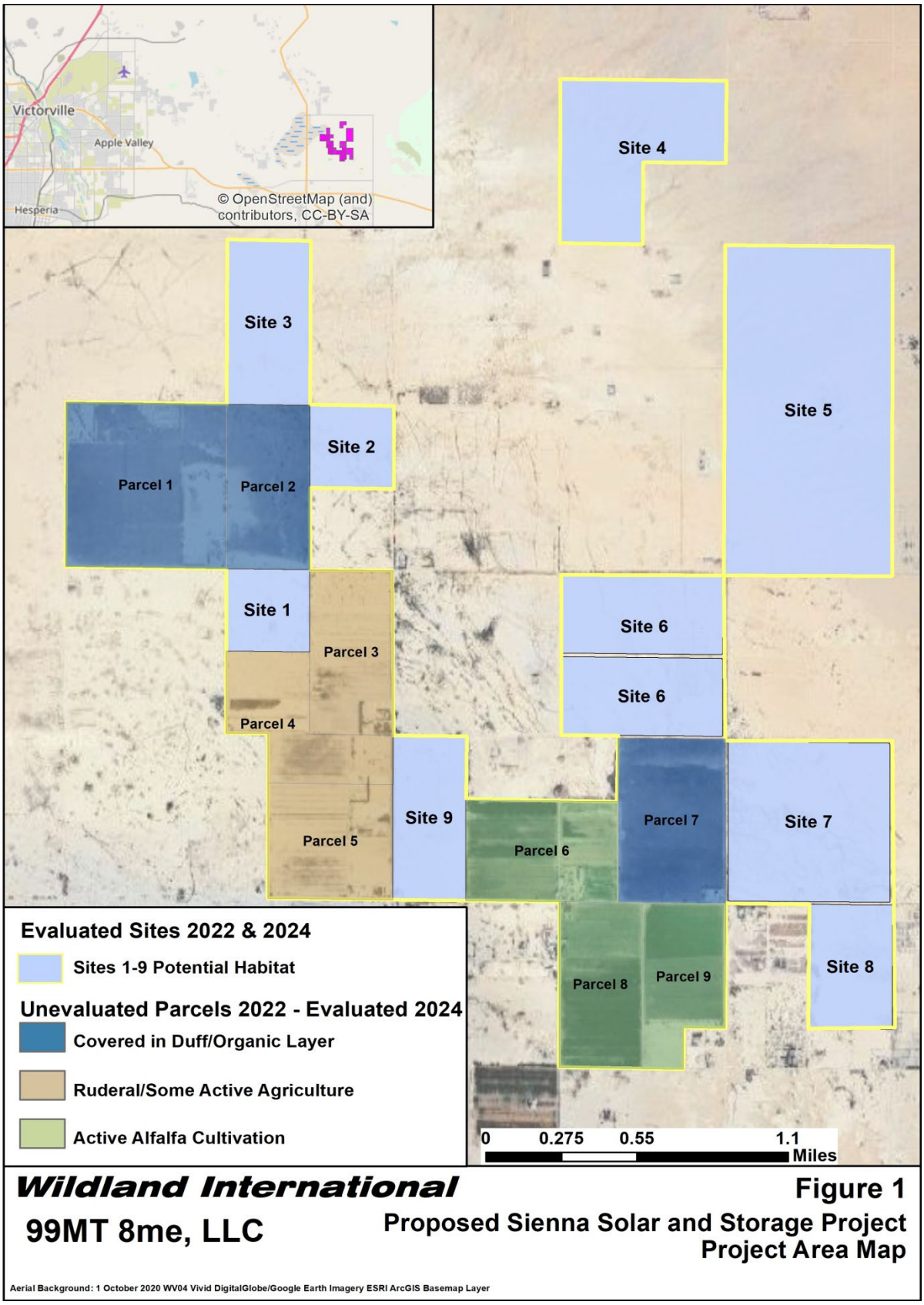
99MT 8me, LLC is currently seeking approval of a Conditional Use Permit (CUP) associated with the construction of a utility-scale solar generation facility and/or energy storage facility. The proposed Sienna Solar and Storage Project (Project) is an up to 525-megawatt (MW) utility-scale solar farm with up to 525-MW of proposed battery storage near the Lucerne Valley in San Bernardino County, California. The area of consideration comprises approximately 1,854 acres (Project Area) for potential development of photovoltaic solar facility, a Battery Energy Storage System, Project substation, and collection system, among other associated infrastructure. Additionally, the Project anticipates interconnection at the future site of the Southern California Edison (SCE) Calcite Substation (a 77-acre site) (currently pending final permits and construction) via a new 230-kilovolt generation-interconnect ("gen-tie") line utilizing private and potentially public rights-of-way (ROWs). Approximately 39 miles of collector lines and gen-tie alternatives were originally analyzed for the Project, with an additional 12.3 miles of gen-tie line optionality added in 2023, and 2.6 miles of gen-tie line optionality analyzed in 2024. SCE has proposed to engineer, design, construct, and test the SCE Calcite Facilities in response to an interconnection application(s). The Project intends to secure a CUP from San Bernardino County as the lead agency for approval to construct the components discussed herein along with permits and approvals from other relevant agencies as required by law.

2.0 Purpose

In April and May of 2022, a biological inventory for special status plants and wildlife for the proposed Project was conducted (Wildland International, Biological Inventory Findings Report, 2022) , including in particular, protocol-level surveys for Mojave desert tortoise (*Gopherus agassizii*) and preliminary investigation(s) for western burrowing owl (*Athene cunicularia hypugea*). Surveys in 2022 resulted in no observations of special status plants nor desert tortoise, while two (2) western burrowing owls associated with three burrows were observed.

Both 2023 and the spring of 2024 were extremely wet growing seasons and reference populations for Parish's phacelia and Beaver Dam breadroot (the two special status plants species with potential habitat identified within the Project area) were visited prior to initiating 2024 surveys; Parish's phacelia and Beaver Dam breadroot were up and in flower at the reference site as of April 4, 2024. Due to greater likelihood of observing any special status plants that may occur within the Project area as a result of increased precipitation, protocol -level special status plant surveys were again conducted at the site during the appropriate blooming periods for each species. Likewise, review of existing/known western burrowing owl burrows and areas previously unevaluated in 2022 were revisited to inform 2024 protocol-level surveys for western burrowing owl regarding habitat viability and potential burrowing owl presence. See Project Area Map in Figure 1.

Concurrent with 2024 special status plant surveys and protocol-level burrowing owl surveys, informal surveys for desert tortoise were conducted in areas previously identified as "very low" potential (within Sites 4 and 5) as no potential habitat exists on other sites within the Project area for the species. Large portions of both Sites 4 and 5 were resurveyed in 2024 for Beaver Dam breadroot and western burrowing owl. As a matter of standard practice, all special status species are recorded if observed. No desert tortoise, desert tortoise burrows, or desert tortoise sign were observed during these surveys.


Victorville
Apple Valley
Hesperia
© OpenStreetMap (and) contributors, CC-BY-SA
Site 4
Site 3
Site 5
Site 2
Parcel 1
Parcel 2
Site 1
Parcel 3
Parcel 4
Site 6
Site 6
Parcel 5
Site 9
Parcel 6
Parcel 7
Site 7
Parcel 8
Parcel 9
Site 8
Evaluated Sites 2022 & 2024
Sites 1-9 Potential Habitat
Unevaluated Parcels 2022 - Evaluated 2024
Covered in Duff/Organic Layer
Ruderal/Some Active Agriculture
Active Alfalfa Cultivation
0 0.275 0.55 1.1
Miles
Wildland International
99MT 8me, LLC
Figure 1
Proposed Sienna Solar and Storage Project
Project Area Map
Aerial Background: 1 October 2020 WV04 Vivid DigitalGlobe/Google Earth Imagery ESRI ArcGIS Basemap Layer

3.0 Methods

3.1 Special Status Plant Inventory

Special status plant inventories were conducted in representative habitat areas identified in 2022 for Parish's phacelia (*Phacelia parishii*) and Beaver Dam breadroot (*Pediomelum castoreum*). No suitable habitat exists in the project footprint for other special status species that occur in the broader project area. Reference populations for both Parish's phacelia and Beaver Dam breadroot were visited prior to initiating surveys. Both Parish's phacelia and Beaver Dam breadroot were up and in flower as of April 4, 2024. Pedestrian surveys consisting of parallel transects spaced 10m or less were conducted between April 4 and April 28, 2024 within suitable habitat and extending outside as a buffer for potential representative habitat for Parish's phacelia and Beaver Dam breadroot.

In addition, a "spot-check" survey along accessible portions of the proposed gen-tie alternatives was also conducted. Potential viable special status plant habitats within 25 feet of the proposed gen-tie alternatives were identified and documented if present.

3.2 Western Burrowing Owl Habitat Evaluation and Inventory

A habitat evaluation and subsequent surveys in viable habitat for western burrowing owls were conducted between April and June. The habitat evaluation consisted of a combination of walking 10-20m parallel transects and glassing with 10x42 binoculars and a Zeiss 15-60X spotting scope at strategic locations of the abandoned and active farm fields that were not part of the 2022 survey effort for special status plants or desert tortoise. The special status plant survey effort in 2022 afforded adequate and comprehensive coverage of the native habitat within the overall project footprint and western burrowing owls were observed at two locations (Sites 4 and 5).

Surveys of suitable western burrowing owl habitat consisted of parallel 10m transects and glassing with binoculars between dawn and 10-10:30 am. Weather, winds, and temperatures were recorded. To stay consistent with California Department of Fish and Wildlife (CDFW) 2012 protocols four separate surveys were conducted between April and June spaced at or close to 21 days apart. The last survey was conducted at 18 days from the previous survey because presence had already been established.

In addition, a "spot-check" survey along accessible portions of the proposed gen-tie alternatives was also conducted. Although less rigorous, potential viable western burrowing habitats within 250 feet of the proposed gen-tie alternatives were identified and documented if present.

4.0 Results

4.1 Special Status Plants

Neither Parish's phacelia or Beaver Dam breadroot were observed within identified suitable habitat or within the buffers around those areas identified as suitable habitat; these species were present at the reference site locations in similar habitat. In addition, no other special status plant species were observed.

Suitable habitat for Parish's phacelia was identified along most of the western and southern gen-tie alternatives were there was playa or deep silts. Scattered areas of fine alluvial soils within a fragmented band of creosote bush scrub were identified in the north and eastern portions of the gen-tie alternatives and this is potential habitat for Beaver Dam breadroot. These areas of potential habitat were mapped for future inventories.

4.2 Western Burrowing Owls

4.2.1 Habitat Evaluation

A Habitat Evaluation of approximately 1000 acres of potential western burrowing owl habitat was conducted in early April 2024. These areas were the Unevaluated Parcels in 2022 that were not suitable special status plant or desert tortoise habitat, i.e. those areas under current agricultural production, recently abandoned agricultural efforts, or areas that had been covered with an 8-10 inch layer of duff and shredded bark. The areas covered with duff were determined to not be viable habitat nor were the areas under current alfalfa production. These areas were glassed and/or walked multiple times in early April with negative results. See Tables 3 and 4 in Appendix A for details.

The abandoned agricultural areas were evaluated and found to have low potential for western burrowing owls. No medium to large mammal/rodent burrows were observed during the site evaluations. The low irrigation berms were walked and the entire area was glassed several times over 3 separate weeks with no sign of western burrowing owl activity observed. It was determined that, at least at this time, these parcels were not viable western burrowing owl habitat or had very low potential.

It should be noted that Wildland International and KDJ & Associates returned to these low potential sites in May and June to glass the area for potential western burrowing owls. All glassing efforts had negative results.

4.2.2 Protocol Inventories

As stated above, two locations (Site 4 and Site 5) had active burrowing owl burrows in 2022 (APNs **045-239-108 (& -109), 045-236-147**). The active burrow at Site 4 was the same burrow location identified in 2022. During the resurvey of these locations and the surrounding area, the western burrowing owls at Site 5 (APN **045-236-147**), were gone and their burrow had been excavated by feral or domestic canines. Table 1 shows the locations, dates, times, weather condition, temperatures, and results of the 2024 western burrowing owl surveys.

Table 1 – Summary of Sienna Solar 2024 Western Burrowing Owl Inventories

Date	Sites	Time	Weather	Temps	Action	Results
4/6/2024	4	6:30 am-9:30am	Clear, fair, no wind	36F	BUOW surveys done in conjunction with rare plant surveys	No Owls Seen, whitewash and tracks present
4/7/2024	5	8:15 am-9:30am	Clear, fair, light wind	45F	BUOW surveys done in conjunction with rare plant surveys	No Owls Seen, Burrow excavated by canines

Date	Sites	Time	Weather	Temps	Action	Results
4/29/2024	4, 5, 8	6:10 am-8:00am	Clear, fair, no wind	49F	2nd BUOW survey	No Owls Seen, whitewash and tracks present at Site 4
5/26/2024	4, 5	6:04 am-8:00am	Clear, fair, no wind	57F	3rd BUOW survey	Pair Observed with 7 owlets present at Site 4
5/26/2024	8			63F	3rd BUOW survey	No Owls Seen
6/14/2024	5, 8	6:30 am-9:15am	Clear, fair, light wind	70F	4th BUOW survey	Surveys negative at both Site 5 and Site 8
6/15/2024	4	6:06 am-7:15am	Clear, fair, light wind	70F	4th BUOW survey	Pair Observed with 6 owlets present at Site 4

The western burrowing owls at Site 4 (APNs **045-239-108 (& -109)** were still on site and during the first protocol survey on April 6. 2024 and it appeared that this site might be used by a pair of burrowing owls given the amount of tracks and whitewash. The active burrow is located at this coordinate (E 509403.99, N 3819954.99). A satellite burrow was located at this coordinate (E 509403.99, N 3819954.99) approximately 20 feet south of the active burrow. No decorations or prey items were observed at this time.

The 2nd survey on April 29, 2024 revealed more whitewash, tracks, and decorations at the site which is an old burrow complex. However, unlike the surveys in 2022, we were unable to observe the owl(s) on site.

During the 3rd protocol survey on May 26, 2024, a single owl was observed flushing from the satellite burrow and joined a mate to the north. Both burrowing owls were chattering and agitated so we quickly left the site to reduce any further stress on the birds in case there were owlets. Later that afternoon on May 26th, trail cameras were placed at the main burrow and the satellite burrow overnight. The owls again flushed the morning of the May 27th when retrieving the trail cameras. Reviewing the trail camera videos, there were at least 7 owlets that had hatched. All the owlets looked to be between 3-4 weeks old and healthy. Interestingly, we observed that the parents stayed low in the shrubs near the burrow site and communicated danger to the owlets upon any human activity approaching or likely any canine activity as well. Activity spanned over several hours and the owlets were out of the burrow within 4 minutes of our field team departing. Owl activity at the burrow extended until almost midnight on the night of the May 26th.

A final 4th protocol survey was conducted at Site 4 on June 14-15th. Trail cameras were again placed at the burrow location at Site 4 on June 14th. Owlet and adult burrowing owl activity at the burrow extended through the night to 2am on the morning of June 15th. The owlets were much more active and flying to and from the burrow location. Parents were still augmenting feeding. It is unclear if an owlet had perished or the oldest owlet had disbursed. A search of the area yielded no evidence of a dead or predated owlet. See Tables 5 and 6 in Appendix A for 2024 Inventory details. See Figure 2 Appendix B for the western burrowing owl burrow location map on Site 4 and photographs of the burrows and owls/owlets.

Replicate surveys at the other potential locations were done by both walking and glassing with binoculars that had been previously negative for burrowing owl presence. This was done to be certain no burrowing

owls had taken up residence or excavated their own burrows at these locations. All of these surveys were negative.

Table 2: Summary of 2022 and 2024 Inventory Results

Year	Location/APN	Active Burrows	# of Individuals	Pairs	Owlets
2022	**Sites 4 and 5 045-239-108 (& -109), 045-236-147**	3	2	0	0
2024	**Site 4 045-239-108 (&-109)**	1	9	1	7

Note: As previously mentioned, concurrent with 2024 special status plant surveys and protocol-level burrowing owl surveys, informal surveys for desert tortoise were conducted in areas previously identified as "very low" potential (within Sites 4 and 5) as no potential habitat exists on other sites within the Project area for the species. No desert tortoises, desert tortoise burrows, or desert tortoise sign were observed during other fieldwork activities in 2024.

Appendix A

2024 Western Burrowing Owl Burrow Habitat Evaluation and Inventory Data

Western Burrowing Owl Habitat Evaluation, Full and Cursory Survey Data by Date

Table 3 - Habitat Evaluation by Parcels Unevaluated in 2022, but evaluated in 2024

Parcels*	BUOW Habitat Evaluation
Parcel 1	No Habitat - Duff covered with 8-12 inches, no mounds, no pipes.
Parcel 2	No Habitat - Duff covered with 8-12 inches, no mounds, no pipes.
Parcel 3	Abandoned Ag - Some potential, field irrigation mounds every 100 ft. 2 broken pipes.
Parcel 4	Abandoned Ag - Low potential - some piles of dirt, but no use by rodents.
Parcel 5	Abandoned Ag - Some potential, field irrigation mounds every 100 ft. 2 broken pipes.
Parcel 6	Active Ag - Rancho del Sol Alfalfa fields- Low to no Potential, if left fallow it may turn into habitat.
Parcel 7	No Habitat - Duff covered with 8-12 inches, no mounds, no pipes.
Parcel 8	Active Ag- Rancho del Sol Alfalfa fields- Low to no Potential, if left fallow it may turn into habitat.
Parcel 9	Active Ag- Rancho del Sol Alfalfa fields- Low to no Potential, if left fallow it may turn into habitat.

* These sites were not evaluated in 2022, but were evaluated for potential habitat for Special Status Plants and Sensitive Wildlife Species and 2024

Table 4 - Habitat Evaluation by Sites Evaluated in 2022 and 2024

Sites*	BUOW Habitat Evaluation
Site 1	Low to Moderate - No evidence of BUOW use in 2022 or 2024.
Site 2	Low to Moderate - No evidence of BUOW use in 2022 or 2024.
Site 3	Low - Mostly open playa no mounds or elevated areas- No evidence of BUOW use in 2022 or 2024.
Site 4	High (Active) - Nesting owls on site, established burrows that have been used year over year.
Site 5	Mod-High - Existing burrows in 2022 excavated by domestic/feral canines. Berms from abandoned Cannabis grow operations could be used as burrowing habitat. No evidence of BUOW use in 2024.
Site 6	Moderate - Existing elevation from dunes could provide burrowing habitat - No evidence of BUOW use in 2022 or 2024.
Site 7	Moderate - Existing scattered mounds could provide burrowing habitat - No evidence of BUOW use in 2022 or 2024.
Site 8	Low - Existing mounds in Southeast corner of Site could provide burrowing habitat - No evidence of BUOW use in 2022 or 2024.
Site 9	Low to Moderate - Portions very overgrown with weed cover. Close to existing Ag for forage. No elevated areas or mounds. No evidence of BUOW use in 2022 or 2024.

* These sites were evaluated and inventoried at 100% coverage (10m transects) for Special Status Plants and Sensitive Wildlife Species in 2022 and 2024

2024 Cursory BUOW Surveys at 2022 Unevaluated Parcels

Date	Parcels	Time	Weather	Temps	Action	Results	Notes
4/3/2024	3, 4, 5, 6 8, 9	6:20 am-8am	Clear, fair, no wind	42F	Glassed fields from roads surrounding and within parcels	No Owls Seen	Although there is low to no potential at these sites cursory surveys were conducted just to make sure no BUOWs were present.
4/4/2024	3, 4, 5, 6 8, 9	6:30 am-8am	Clear, fair, light wind	43F	Glassed fields from roads surrounding and within parcels	No Owls Seen	Although there is low to no potential at these sites cursory surveys were conducted just to make sure no BUOWs were present.
4/7/2024	3	6:30 am-8am	Clear, fair, light wind	30F	Glassed and walked irrigation rows in field	No Owls or useable burrows observed	Although there is low to no potential at these sites cursory surveys were conducted just to make sure no BUOWs were present.
4/8/2024	4	6:30 am-8am	Clear, fair, light wind	38F	Glassed and walked irrigation rows in field	No Owls or useable burrows observed	Although there is low to no potential at these sites cursory surveys were conducted just to make sure no BUOWs were present.
4/9/2024	5	6:30 am-8am	Clear, fair, light wind	41F	Glassed and walked irrigation rows in field	No Owls or useable burrows observed	Although there is low to no potential at these sites cursory surveys were conducted just to make sure no BUOWs were present.
4/29/2024	3, 4, 5, 6 8, 9	8:15 am-10:30am	Clear, fair, no wind	54F	Glassed and walked some irrigation rows in field	No Owls or useable burrows observed	Although there is low to no potential at these sites cursory surveys were conducted just to make sure no BUOWs were present.
5/26/2024	3, 4, 5, 6 8, 9	8:15 am-10:00am	Clear, fair, no wind	62F	Glassed and walked some irrigation rows in field	No Owls or useable burrows observed	Although there is low to no potential at these sites cursory surveys were conducted just to make sure no BUOWs were present.
6/15/2024	3, 4, 5, 6 8, 9	7:25 am-10:00am	Clear, fair, light wind	73F	Glassed and walked some irrigation rows in field	No Owls or useable burrows observed	Although there is low to no potential at these sites cursory surveys were conducted just to make sure no BUOWs were present.

Note: These parcels had little to no potential but were still surveyed (glassed with binoculars and widely spaced pedestrian surveys) over the dates shown, to be certain no western burrowing established burrows.

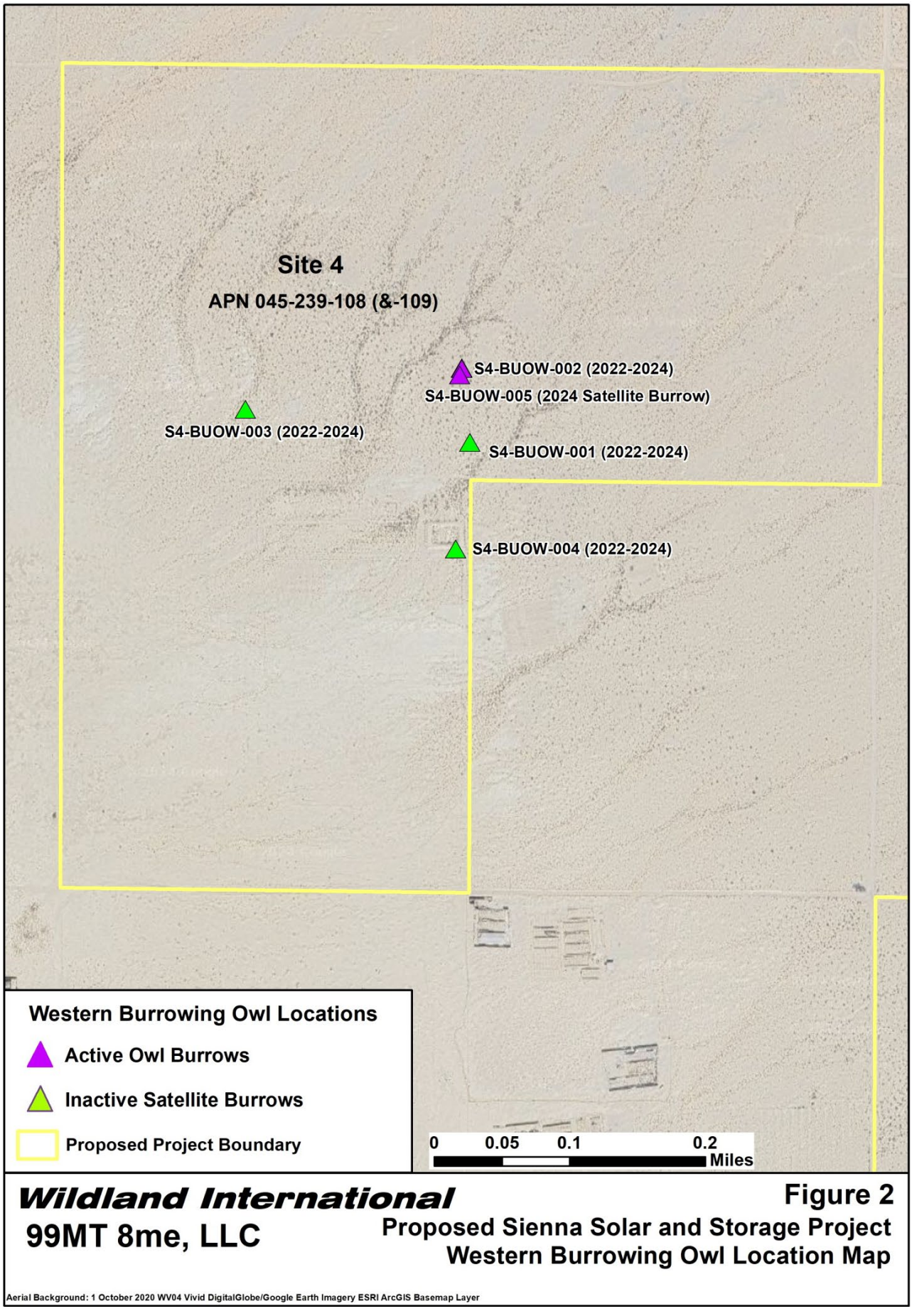
Full Protocol Burrowing Owl Surveys at Sites Evaluated in 2022 and 2024

Date	Sites	Time	Weather	Temps	Action	Results	Notes
4/6/2024	4	6:30 am-9:30am	Clear, fair, no wind	36F	BUOW surveys done in conjunction with rare plant surveys	No Owls Observed, whitewash and tracks present	This site had an active owl burrow in 2022, the southernmost burrow entrances have been excavated by feral/domestic canines. Northern entrances still intact.
4/7/2024	5	8:15 am-9:30am	Clear, fair, light wind	45F	BUOW surveys done in conjunction with rare plant surveys	No Owls Observed, Burrow excavated by canines	This site had an active owl burrow in 2022, the site and burrow has been excavated by feral/domestic canines.
4/29/2024	4, 5, 8	6:10 am-8:00am	Clear, fair, no wind	49F	2nd BUOW survey	No Owls Observed, whitewash and tracks present at Site 4	Much more activity, whitewash, decorations, prey items, tracks at Site 4.
5/26/2024	4, 5	6:04 am-8:00am	Clear, fair, no wind	57F	3rd BUOW survey	Pair Observed with 7 owlets present at Site 4	Put out trail cameras at 2 locations, one at the main burrow and another at a satellite entrance approx. 25 ft. away. Owlets recorded receiving food from parents.
5/26/2024	8			63F	3rd BUOW survey	No Owls Observed	Walked out to Site 8 corner. No BUOWS observed.
6/14/2024	5, 8	6:30 am-9:15am	Clear, fair, light wind	70F	4th BUOW survey	Surveys negative at both Site 5 and Site 8	Walked/drove berms at Site 5 and walked out to Site 8 corner. No BUOWS or usable burrows observed.
6/15/2024	4	6:06 am-7:15am	Clear, fair, light wind	70F	4th BUOW survey	Pair Observed with 6 owlets present at Site 4	Put out trail cameras at 2 locations, one at the main burrow and another at a satellite entrance approx. 25 ft. away. 6 Owlets recorded receiving food from parents.

Appendix B

2024 Western Burrowing Owl Burrow Location Map
and
Active Burrow and Owl Photographs

Western Burrowing Owl Burrow Location Map



Wildland International

99MT 8me, LLC

Figure 2

Proposed Sienna Solar and Storage Project
Western Burrowing Owl Location Map

Aerial Background: 1 October 2020 WV04 Vivid DigitalGlobe/Google Earth Imagery ESRI ArcGIS Basemap Layer

Western Burrowing Owl Burrow and Owl Photographs



Site 4 Active western burrowing owl burrow location with scattered whitewash in foreground



Site 4 Active western burrowing owl burrow with tracks and decorations



Site 4 Active western burrowing owl burrow with adult and 7 owlets

Appendix E. Jurisdictional Delineation Report

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Sienna Solar and Storage Project

Jurisdictional Waters and Wetlands Delineation Report

prepared for

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March 2023

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Executive Summary

Rincon Consultants, Inc. (Rincon) conducted a jurisdictional delineation for the proposed Sienna Solar and Storage Project (Project) located approximately 3.5 miles north of the unincorporated community of Lucerne Valley in San Bernardino County, California. The delineation was conducted to determine the location and extent of resources potentially subject to the jurisdiction of the California Department of Fish and Wildlife (CDFW) and Regional Water Quality Control Board (RWQCB). Proposed impacts to potential CDFW and RWQCB jurisdictional features may be subject to the notification and permit requirements of the CDFW pursuant to Sections 1600 *et seq.* of the California Fish and Game Code (CFGC) and Porter-Cologne Act for the RWQCB.

Under Section 1602 of the CFGC, the CDFW regulates activities impacting the bed, bank or channel of any river, stream, or lake system that supports fish or wildlife. As part of Project scoping, planning, and design, this report was prepared to support CDFW consultation, notification, and permitting, as needed. The State Water Resources Control Board (SWRCB) and local RWQCB have jurisdiction over "waters of the State," which are defined as any surface water or groundwater, including saline waters, within the boundaries of the state. The Porter-Cologne Act provides the State with very broad authority to regulate "waters of the State." The Porter-Cologne Act has become an important tool with respect to the State's authority over isolated waters. Generally, any person proposing to discharge waste into a water body that could affect its water quality must file a dredge/fill application when there is no federal nexus, such as under Section 401 of the Clean Water Act (CWA).

The Project area drains to inland areas of California, specifically Lucerne Dry Lake, for which the U.S. Army Corps of Engineers (USACE) previously issued an Approved Jurisdictional Determination (AJD) stating that the tributaries and dry lake are not waters of the United States regulated under the CWA. Based on this determination, the USACE is not expected to assert jurisdiction over Lucerne Dry Lake and tributaries.

The majority of the Project area is situated within the historic bed of Lucerne Dry Lake. The lake is an area of low relief that is typically dry and only collects water in its lowest points during above average precipitation events. Based on review of current and historical aerial imagery and field observations, including recent Project-specific high-resolution aerial drone imagery, the dry lakebed is not ponded frequently, or for long durations. As noted above, the USACE assessed Lucerne Dry Lake in an AJD and found that it is a dry lake, not a traditional lake, due to the general lack of surface water precluding use for recreation or other purposes, including harvesting fish or shellfish. Due to major hydromodification in the watershed, primarily from road construction and maintenance, which completely block or severely restrict the flow of tributary ephemeral streams toward the lake, hydrologic inputs to the dry lake are very low. Any low-volume, short-duration ponding in the dry lakebed appears to primarily originate from onsite direct rainfall. Much of the dry lakebed is topographically planar and unvegetated and provides extremely limited value for wildlife. The dry lake does not support fish or other aquatic life.

The dry lakebed also contains numerous large polygonal cracks associated with geologic phenomena called desiccation polygons (fractures or fissures). These fissures commonly develop in clay playas/dry lakebeds in the arid west, including California and the Mojave Desert, and are attributed to water table retreat. These features have not been created by the flow of water, and do not exhibit characteristics typical of CDFW streams with typical bed and bank and channel

features or indicators of fluvial activity. The fissures typically retain water in the low elevations of the fracture channels during periods of above average precipitation.

Based on the factors presented above, three retention basins and one seep within the dry lakebed were delineated as CDFW and RWQCB jurisdictional resources. The retention basins are used for agricultural runoff and the seep is likely a result of a broken agricultural pipe. To the north and west of the dry lakebed, 33 ephemeral streams are potentially under jurisdiction of the CDFW and RWQCB.

A total 8.34 acres and 91,251 linear feet of ephemeral streams were delineated in the Project area. Four retention basins were mapped, with three collectively containing 0.26 acre wetland waters of the state and one containing 0.14 acre non-wetland waters of the state. A small (40 square feet) isolated wetland containing cattails (*Typha domingensis*) was observed on site, originating near an assumed agricultural pipe leak.

Introduction

This report details the findings of the jurisdictional delineation conducted by Rincon Consultants, Inc. (Rincon) for the 1,854-acre Sienna Solar and Storage Project (Project) located in the Lucerne Valley, San Bernardino County, California. The delineation was conducted on July 20-22, 2021, to determine the location and extent of waters and/or wetlands within the Project area that are potentially subject to the permit requirements of the U.S. Army Corps of Engineers (USACE), under Section 404 of the Clean Water Act (CWA), Colorado River Regional Water Quality Control Board (RWQCB) under Section 401 of the CWA and Porter-Cologne Water Quality Act, and a Streambed Alteration Agreement from the California Department of Fish and Wildlife (CDFW) pursuant to Section 1600 et. seq. of the California Fish and Game Code (CFGC). Actual jurisdictional areas are confirmed by the state and federal authorities at the time that permits are requested.

Project Location

The 1,854-acre Project area is located in the southwestern portion of the Mojave Desert in and near Lucerne Dry Lake, in unincorporated San Bernardino County, California. The Project is predominately located east of State Route 247 (Barstow Road), north of the unincorporated community of Lucerne Valley, with portions of the gen-tie alternative corridors that include possible connections along Haynes Road, Huff Road, and Northside Road to the east of Barstow Road. The site is generally located approximately 35 miles south of the City of Barstow, 45 miles northwest of the town of Yucca Valley, 15 miles southeast of the town of Apple Valley, and 20 miles north of the City of Big Bear Lake. Barstow Road would provide primary access to the Project area. Land uses in the area are primarily rural residential, recreation, farmland, open space, and transportation corridors.

Figure 1 shows the regional location of the Project area. Figure 2 shows the 27 parcels that comprise the site, and Table 1 lists the parcels and the acreage of each. Figures are provided in Appendix D. The site is depicted on the *White Horse Mountain, California* and *Lucerne Valley, California* United States Geological Survey (USGS) 7.5-minute topographic quadrangle maps (Figure 3).

Table 1 Parcels Within the Project Area

APN	Acreage (per Assessor's Map)	APN	Acreage (per Assessor's Map)
45207120	40.201988	45211217	8.8374063
45207119	40.21116	45211317	151.40044
45207111	154.92994	45212112	80.724638
45207125	40.206093	45212142	70.847518
45207110	80.411658	45212138	5.0164927
45206223	80.447237	45212139	12.554045
45206221	40.207435	45212148	33.286326
45206222	76.437885	45212152	10.188996
45206224	84.470432	45237101	161.27385
45211220	70.208881	45236147	80.707295
45211224	89.9045	45236146	80.667639
45211225	103.44547	45239109	39.915267
45211219	73.471912	45239108	80.023993
45211218	64.725183		

Project Description

The proposed Sienna Solar and Storage Project is a 525-megawatt (MW) utility-scale solar farm with 525-MW battery storage located in unincorporated San Bernardino County. The site is located east of Barstow Road/State Route (SR) 247 roughly between Northside Road and Wilshire Road, northeast of the community of Lucerne Valley.

The Project consists of the installation of a photovoltaic (PV) solar facility, Battery Energy Storage System (BESS), project substation, Operations and Maintenance building(s), underground collection system, 230 kV generation-interconnect (gen-tie) line. The Sienna Project will interconnect at the SCE Calcite Substation (currently pending environmental clearance and construction) via a proposed overhead and/or underground 230-kV gen-tie line in addition to other ancillary facilities utilizing private and potentially public ROWs. The Project area encompasses 1,854 acres with an additional 77-acre substation site. Approximately 39 miles of collector lines and gen-tie alternatives will be analyzed in this assessment, although not all routes will be developed.

The Project area is characterized by a mixture of residential properties, undeveloped playa and desert scrub communities, and agricultural land that includes alfalfa and jojoba farms and large-scale hemp growing operations. Small-scale abandoned and operational hemp and/or marijuana growing operations were present throughout the playa region of the Project area.

Environmental Setting

The Project area is located in the southwestern portion of Mojave Desert in and near Lucerne Dry Lake. The area is in a rain shadow formed by the adjacent mountains and features alkaline soils. This high desert ecological subregion is characterized by arid scrub, creosote bush scrub, playas, and desert washes. The site is primarily located on the floor of the Lucerne Dry Lake, and along its eastern and northern margins. Topography is mostly flat to gently sloped along the dry lake

margins. The Granite Mountains and White Horse Mountain are west of the site, and Peterman Hill is within the gen-tie matrix, east of Barstow Road. Elevation at the site ranges between 2,850 and 2,910 feet above mean sea level.

The dry lakebed is heavily used for recreational activities, including off highway vehicle (OHV) travel (including racing) and assorted day use and camping activities. The Rocketry Organization of California (ROC) uses the dry lake as one of its designated launch sites, with scheduled launches occurring monthly throughout the year. Additionally, areas outside the dry lake within the Project area are also subject to various ongoing disturbances related to road maintenance, utility activities (electrical transmission towers and lines; underground gas pipeline), recreation, OHV travel, and illegal dumping.

Methodology

Federal Clean Water Act Jurisdiction

Section 404 of the CWA establishes a program to regulate the discharge of dredged or fill material into waters of the United States (WOUS), including wetlands (Appendix B). Section 404 requires a permit before dredged or fill material may be discharged into WOUS, unless the activity is exempt from Section 404 regulation. The USACE, under provisions of Section 404 of the CWA and USACE implementing regulations, has jurisdiction over WOUS.

The USACE previously evaluated Lucerne Dry Lake as the lowest point in the Lucerne Valley watershed to determine if the dry lakebed and washes terminating there constitute WOUS that would be regulated under Section 404 of the CWA. The USACE considered Lucerne Dry Lake in an approved jurisdictional determination (AJD) dated November 16, 2010, for the Granite Mountain Wind Project (USACE File No. SPL-2010-00791-SLP, JD-2). In this determination, the USACE found that it is a dry lake, and surface flows that enter the dry lakebed percolate into the groundwater table. The determination concluded that Lucerne Dry Lake is not a Traditional Navigable Water (TNW) and is not an "other" water. It does not have use for surface water used for recreation or other purposes by foreign or interstate travelers, it does not support harvesting activities of fish or shellfish that may be sold in interstate or foreign commerce, and it does not support surface water industrial usage by industries in interstate commerce. Additionally, the current definition of WOUS under the Navigable Water Protection Rule excludes dry lakebeds that do not contribute surface water flow to a TNW or territorial sea in a typical year. Therefore, the Lucerne Dry Lake would not be considered a WOUS under the Navigable Waters Protection Rule.

As part of a determination regarding ephemeral washes within the Lucerne Valley watershed, the USACE stated that the Lucerne Valley basin is a closed basin with no external surface water flows leaving the basin, with Lucerne Dry Lake as the low point. The USACE concluded that ephemeral washes flowing toward Lucerne Dry Lake are isolated and not under federal jurisdiction (Approved Jurisdictional Determination for Agincourt Solar Project, USACE File No. SPL-2012-00498 [JD-BEM], May 29, 2013).

Based on these determinations, the USACE is not expected to assert jurisdiction over Lucerne Dry Lake and tributaries. These features are hydrologically isolated from TNWs or interstate waters and do not have the potential to directly or indirectly affect interstate or foreign commerce (33 CFR 3.28.3(a)(3)). Therefore, federal CWA jurisdiction and USACE delineation methods are not considered further in this report.

Literature Review

Pre-field investigations generally consisted of reviewing existing background literature, data, and information to identify areas of potential CDFW and RWQCB jurisdiction and prepare for delineation field surveys. Rincon reviewed existing resource information related to the Project area and vicinity. Pertinent sources reviewed include the *General Biological Resources Assessment* (Rincon 2021); recent and historical aerial photography; *White Horse Mountain, California* and *Lucerne Valley, California* quads; *Soil Survey of San Bernardino County, California, Mojave River Area*; Web Soil Survey (U.S. Department of Agriculture Natural Resources Conservation Service

[USDA NRCS] 2021); San Bernardino County General Plan (SBC 2017); Lucerne Valley Community Plan (SBC 2018); and Desert Renewable Energy Conservation Plan (DRECP). The National Wetland Inventory (NWI) (USFWS 2021) and National Hydrography Dataset (NHD) (U.S. Geological Survey [USGS] 2021) were reviewed to determine if any wetland and/or other jurisdictional waters had been previously documented and mapped on or in the vicinity of the site. The *National Hydric Soils List* (USDA NRCS 2021b) was reviewed to determine if any soil map unit types mapped on or in the vicinity of the site were classified as hydric. Other data sources reviewed included geologic maps, climate and hydrology data, and previous studies for similar or nearby solar projects. Additionally, a detailed review of the Lucerne Dry Lake and its unique geomorphic characteristics was completed and is summarized above in Environmental Setting.

Field Survey

After completing the initial literature review, Rincon conducted a reconnaissance-level field survey on July 20-22, 2021, to determine the general presence and locations of ephemeral streams and isolated wetlands potentially under CDFW and RWQCB jurisdiction onsite. Current USACE delineation procedures and guidance were used to identify and delineate any wetlands and/or waters of the State potentially subject to RWQCB jurisdiction (Lichvar et al. 2016; USACE 1987, 2008a, 2008b). Likewise, current CDFW procedures and guidance were considered to identify and delineate any streambeds, rivers, or associated riparian habitat potentially subject to CDFW jurisdiction (CFGC 2017, Brady and Vyverberg 2013, Vyverberg 2010). Wetland Determination Data Forms and Ordinary High Water Mark (OHWM) Data Forms for determining jurisdiction are presented in Appendix A.

Rincon imported the locations of potential jurisdictional features into a global positioning system (GPS)-enabled tablet displayed over high resolution aerial imagery to allow for evaluation of those features in the field. These features, and any other potential jurisdictional features that were encountered during the survey, were examined for the presence of defined channels with characteristic bed and bank features and indicators of water flow. Potential jurisdictional streams were mapped on recent aerial imagery. The landforms, vegetation, hydrology, and soil conditions were noted where these characteristics were relevant to identification of the feature. A handheld GPS unit with sub-meter horizontal accuracy was also used to record locations and collect general data, and to guide digitization of features with a geographic information system (GIS) software package. Representative photographs of potential jurisdictional features were recorded to document their physical characteristics in the context of the site (Appendix C).

Results

Vegetation

Vegetation types in the Mojave Desert are strongly influenced by arid climatic conditions and desert soils. Vegetation in the region includes a predominance of plant morphological adaptations to extreme aridity and saline alkali soils. Vegetation structure is generally characterized by short-statured and widely-spaced shrubs, and arborescent shrubs resulting from a competition for soil water resources (Baldwin, et al. 2012). Three vegetation types contribute to 75 percent of the land cover in the Mojave Desert region: Mojave creosote bush (*Larrea tridentata*) scrub (16,398 square miles), Mojave mixed woody scrub (Joshua tree woodland; 3,646 square miles), and desert saltbush (*Atriplex* spp.) scrub (1,510 square miles) (Davis et al., 1998). Other common vegetation types occurring in the region include desert and valley sink scrub, Mojave Desert wash scrub, and Mojave mixed steppe (Holland 1986, CDFW 2010). The primary disturbed or nonnative vegetation/land cover types within the Mojave Desert include annual grasslands, agricultural lands, and developed areas.

Rincon prepared a Jurisdictional Delineation Report (Rincon 2017a) and Biological Resource Assessment (BRA) (Rincon 2017b) for an alternative alignment for the Project. Rincon had determined at the time that jurisdictional features were limited to ephemeral washes that drained into the dry lake. The alignment has since shifted, thereby requiring a new delineation to be conducted. In June 2017 for the BRA, Rincon conducted vegetation mapping consisting of a windshield survey and meandering pedestrian transects to generally characterize the distribution of natural vegetation communities, habitats, residential development, and other disturbed areas in the general area. Meandering pedestrian transects were conducted in areas containing natural habitat, which allowed for a more thorough assessment to distinguish vegetation communities and identify approximate community boundaries within natural areas. Natural vegetation communities identified in the BRA were generally classified based on the classification system presented in *A Manual of California Vegetation, Second Edition* (MCV) (Sawyer et al. 2009).

Three natural vegetation communities were mapped in the general setting: creosote bush scrub (*Larrea tridentata* Shrubland Alliance), allscale scrub (*Atriplex polycarpa* Shrubland Alliance, and fourwing saltbush scrub (*Atriplex canescens* Shrubland Alliance). Two additional land cover types that did not meet the membership rules for classification as one of the recognized vegetation types in the MCV were also identified and mapped at the site. These land cover types include rock outcrop and dry lakebed.

The majority of the general area consists of the dry lakebed, which is largely unvegetated. This is the dominant land cover type at the site; it exceeds all other land cover types and vegetation communities combined.

Hydrology

Hydrology of the site and vicinity was evaluated through review of topographic maps, aerial photos, the NHD (USGS 2021), and the NWI (USFWS 2021), in conjunction with field survey data.

The site is located within the central portion of the Lucerne Lake watershed, Hydrologic Unit Code [HUC] 181001000404. It is located within the Este hydrologic groundwater sub-basin, a hydrologic

subarea of the Mojave Groundwater Basin which contains two primary groundwater basins separated by a fault (Mojave Water Agency [MWA] 2005). The groundwater below the site is stored in an aquifer within the Lucerne Valley Groundwater Basin (LVGB). The northern portion of the site extends slightly outside of the LVGB. Water is provided to the residents of Lucerne Valley from groundwater pumping (MWA 2005).

The majority of the site is mostly level and slope gradients across the site are extremely low. Thirty-nine (39) small, shallow, ephemeral streams drain generally to the west and southwest in the direction of the dry lakebed. The streams convey water flows only during and immediately after high precipitation events. Hydromodification, primarily from roads, has fragmented stream flow in areas north and west of the dry lakebed. Road maintenance activities include clearing and blading, which create large soil berms on each side of the roads, blocking flow in most of the drainages at the road edge. Additionally, OHV tracks interrupt the flow of small shallow channels.

Climate data for the Lucerne Valley obtained from four sources, including the Western Regional Climate Center (WRCC 2021), WeatherBase (WeatherBase 2021), Climate-Data (Climate-Data 2021), and Intellicast (Intellicast 2021), indicate that average annual rainfall in the vicinity is approximately 6.04 inches.

Soils

The USDA NRCS (2021) has mapped and inventoried soils at both landscape (coarse) scales and detailed (fine) scales. These data are catalogued in previously published soil surveys, the Soil Survey Geographic Database, and the U.S. General Soil Map. These data were accessed through the Web Soil Survey Application (USDA NRCS 2021). This subsection summarizes soil resources as mapped by the NRCS that overlap the site at the landscape level.

The site is covered by the *Soil Survey of San Bernardino County, California, Mojave River Area*. The soil survey indicates that soils in the Lucerne Valley floor are primarily derived from alluvium parent materials from granitic sources and other mixed sources. Within the Project area, soils are associated with alluvial fans, toe slopes, playas, and other gently sloped landforms. Based on Web Soil Survey data, the site contains 19 soil map units, which are briefly described below. Soil map units across the site are shown on Figure 4 (Appendix D).

Hydric soils are defined by the National Technical Committee for Hydric Soils as soils that in their undrained condition, are saturated, flooded, or ponded long enough during a growing season to develop anaerobic conditions that support the growth and regeneration of hydrophytic vegetation (59 Federal Register 16835). Soils that are sufficiently wet to support the growth and regeneration of hydrophytic vegetation due to artificial measures are included in the concept of hydric soils on the list “Hydric Soils of the United States” (National List) (USDA NRCS 2021b). Soils are identified for inclusion on the list based on specific criteria established by law (67 Federal Register 58756). The National List is “a compilation of all map units with either a major or minor component that is at least in part hydric. …Because the list includes both major and minor (small) percentages for map units, in some cases most of the map unit may not be hydric… Some components may be phases of soil series that have a range of characteristics… therefore, only a portion of that component’s concept (or range in characteristics) may in fact be hydric. The list is useful in identifying map units that may contain hydric soils.”

Of the soils mapped in the Project area, further discussed below, at least one minor component of the following soil map units have been identified as hydric when they occur in depressions or playas that are during the growing season:

- Bousic Clay; Cajon Sand
- Cave Loam, Dry, 0 to 2 Percent Slopes
- Lavic Loamy Fine Sand
- Peterman clay
- Playas

Of these units, only Playas has a major component identified as hydric on the National List. The majority of the dry lakebed is mapped as Playas. However, the dry lakebed is not frequently ponded for long or very long durations. During and immediately after infrequent heavy rainfall, low volumes of water appear to collect in the lowest elevations for brief durations. The dry lakebed contains a dense, hardpan layer of clay soil. The soils contain a high alkaline pH, and high levels of salts. These soils often do not form hydric soil indicators even when saturated for extended periods.

The following soil units identified in the Web Soil Survey (USDA NRCS 2021) are summarized below.

Bousic Clay

This soil map unit typically occurs on toeslopes of lake plains and talfs (geomorphic components of an essentially flat and broad area dominated by closed depressions) in low areas with very little slope. The dominant soil series, Bousic clay, is formed in alluvium from mixed sources. A typical soil profile consists of clay horizons to at least 60 inches of depth. This soil is well drained, alkaline, and strongly saline. Minor components within this map unit are Peterman soils. This soil map unit is considered hydric.

Bryman Loamy Fine Sand, 2 to 5 Percent Slopes

This granitic soil map unit usually occurs on terraces and older alluvial fans, at elevations from 2,800 to 3,800 feet. A typical soil profile consists of a pale topsoil layer that is loamy or sandy. The second horizon is usually pink to reddish brown and is generally sandy clay loam, loam or gravelly sandy loam. The third horizon is pale yellowish brown to strong brown, is usually alkaline, and may be loamy coarse sand to sand. This soil map unit is not considered hydric.

Cajon Sand, 0 to 2 Percent Slopes

This soil map unit typically occurs on alluvial fans on gentle slopes. The dominant soil series, Cajon sand, is formed in alluvium from granitic sources. A typical soil profile consists of sandy topsoil, underlain by a second sand horizon to approximately 25 inches, with layers of gravelly sand, stratified sand and loamy fine sand below to at least 60 inches of depth. This soil is somewhat excessively drained. Minor components within this map unit are Manet, Kimberlina, and Helendale soils. This soil map unit is not considered hydric.

Cajon Sand, 2 to 9 Percent Slopes

This soil map unit is similar to the Cajon map unit except it occurs on slightly greater slopes (2 to 9 percent) and may have more layers of stratified gravelly sand in the subsoil. This soil map unit is not considered hydric.

Cajon Gravelly Sand, 2 to 15 Percent Slopes

This soil map unit is similar to the previous two Cajon map units except it occurs on slightly greater slopes (2 to 15 percent) and the topsoil and subsoil horizons have increased gravel content. This soil map unit is not considered hydric.

Cave Loam, Dry, 0 to 2 Percent Slopes

This soil map unit typically occurs on alluvial fan remnants on gentle slopes. The dominant soil series, Cave loam, is formed in alluvium from granitic sources. A typical soil profile consists of loam topsoil, underlain by stratified sandy loam to loam subsoil between 21 and at least 66 inches of depth. This soil is well drained, and very slightly to slightly saline. Minor components within this map unit are a Cave soil with clayey subsoil, Kimberlina, and Lavic soils. This soil map unit is considered hydric.

Dune Sand

This soil map unit consists of unstable hills and ridges of loose, wind-deposited sand that is excessively drained and barren. Dunes are typically less than 15 feet high and slopes are between 5 to 15 percent. Minor components within this map unit are Cajon sand, Riverwash and Villa loamy sand along the Mojave River, and Halloran soils. This soil map unit is not considered hydric.

Glendale Variant Silt Loam, Saline-Alkali

This soil map unit occurs on basin rims and lower margins of narrow alluvial fans with slopes ranging from 0 to 2 percent with vegetation consisting of salt-tolerant shrubs, grasses, and forbs. Soil profiles are very pale brown silt loam down to 11 inches with underlying material consisting of light yellowish brown and pale brown silty clay loam. Surface layer and underlying layers are moderately or strongly alkaline. Minor components within this map unit are small areas of Lavic soils. This soil is suited for irrigated crops in areas where they are reclaimed. This soil map unit is not considered hydric.

Helendale Loamy Sand, 0 to 2 Percent Slopes

This soil map unit typically occurs on alluvial fan remnants on gentle slopes. The dominant soil series, Helendale loamy sand, is formed in alluvium from granitic sources. A typical soil profile consists of loamy sand topsoil topsoil, underlain by sandy loam subsoil between 4 and at least 66 inches of depth. This soil is well drained, and nonsaline to very slightly saline. Minor components within this map unit are Bryman, Kimberlina, and Cajon soils. This soil map unit is not considered hydric.

Helendale Loamy Sand, 2 to 5 Percent Slopes

This soil map unit occurs on alluvial fans and terraces and is derived primarily from granitic material. Slopes are broad and nearly level with many areas dissected by shallow intermittent drainageways. Vegetation is primarily yucca, desert shrubs, grasses, and forbs. The surface layer is

very pale brown loamy sand about 4 inches thick with subsoil and the upper part of the substratum are brown, yellowish brown, and light yellowish brown sandy loam about 62 inches thick. Clay content decreases below a depth of 30 inches. Minor components include Bryman, Kimberlina, and Cajon soils. This soil map unit is not considered hydric.

Joshua Loam, 2 to 5 Percent Slopes

This soil map unit occurs on old stable terraces that have desert pavement. It formed in alluvium derived from mixed sources with broad, slightly convex slopes. Most areas are dissected by moderately deep intermittent drainageways. Typically, 70-90 percent of the surface layer is covered by desert pavement with a light yellowish-brown loam about 3 inches thick. Subsoils are brown and reddish brown gravelly sandy clay loam around 17 inches thick. These soils are often strongly alkali. Minor components within this map unit are Cajon soils. This soil map unit is not considered hydric.

Kimberlina Loamy Fine Sand, Cool, 0 to 2 Percent Slopes

This soil map unit typically occurs on skirts and aprons of alluvial fans on gentle slopes. The dominant soil series, Kimberlina loamy fine sand, is formed in alluvium from mixed sources. A typical soil profile consists of loamy fine sand topsoil, underlain by sandy loam, fine sandy loam, and loam subsoil between 7 and at least 60 inches of depth. This soil is well drained, and nonsaline to very slightly saline. Minor components within this map unit are Helendale and Cajon soils. This soil map unit is not considered hydric.

Kimberlina Loamy Fine Sand, Cool, 2 to 5 Percent Slopes

This soil map unit is similar to the Kimberlina map unit except it occurs on slightly greater slopes (2 to 5 percent) and may have more layers of stratified gravelly sand in the subsoil. This soil map unit is not considered hydric.

Lavic Loamy Fine Sand

This soil map unit typically occurs on skirts and aprons of alluvial fans on gentle slopes. The dominant soil series, Lavic loamy fine sand, is formed in alluvium from granitic sources. A typical soil profile consists of loamy fine sand topsoil, underlain by multiple layers of sandy loam, loamy fine sand, loamy sand and loam subsoil between 10 and at least 49 inches of depth. This soil is well drained, and slightly to moderately saline. Minor components within this map unit are unnamed soils. This soil map unit is considered hydric.

Peterman Clay

This soil map unit typically occurs on skirts of alluvial fans on gentle slopes. The dominant soil series, Peterman clay, is formed in fine-textured alluvium from mixed sources. A typical soil profile consists of clay topsoil, underlain by clay and gravelly clay subsoil to at least 60 inches of depth. This soil is moderately well drained, alkaline, and strongly saline. Minor components within this map unit are unnamed soils. This soil map unit is considered hydric.

Playas

This soil map unit consists of playa areas consisting of lacustrine deposits derived from mixed sources. Minor components within this map unit are Bousic, Norob, and Halloran soils. This soil map unit is considered hydric.

Rock Outcrop – Lithic Torriorthents Complex, 15 to 50 Percent Slopes

This soil map unit typically occurs on summits, backslopes and flanks of mountains on moderate to steep slopes. This map unit does not contain named soils. Rock outcrops, typically granitic, are interspersed with minimally developed soil underlain by bedrock within 8 to 20 inches of the soil surface. Minor components within this map unit are Sparkhule, and Trigger soils. This soil map unit is not considered hydric.

Wasco Sandy Loam, Cool, 0 to 2 Percent Slopes

This soil map unit typically occurs on aprons of alluvial fans on gentle slopes. The dominant soil series, Wasco sandy loam, is formed in alluvium derived from granite. A typical soil profile consists of sandy loam topsoil, underlain by additional sandy loam horizons to at least 60 inches of depth. This soil is well drained, and nonsaline to very slightly saline. Minor components within this map unit are Cajon, Lucerne and Bryman soils. This soil map unit is not considered hydric.

Sample Points

Based on soil pit data from the field survey, hydric soils occur in at least one retention basin and potentially two others that were inaccessible at the time of the survey. All three wetland parameters were observed at a location where an irrigation pipe likely has a leak. These all occur within the dry lake portion of the Project, and hydric soils were not observed outside of the dry lake. Therefore, hydric soils are considered present within retention basins in the Project area. Please refer to Table 2 below for a summary of data collected at the soil pits, Appendix A for completed datasheets, and Appendix D Figures 5a-d for soil pit locations. Vegetation at retention basins primarily consisted of alfalfa (*Medicago sativa*), common purslane (*Portulaca oleracea*), narrowleaf plantain (*Plantago lanceolata*), knotgrass (*Paspalum distichum*), and salt heliotrope (*Heliotropium curassavicum*) (Appendix A).

Table 2 Summary of Hydrophytic Vegetation, Hydric Soils, and Wetlands Hydrology Wetlands Indicator Status by Soil Test Pit Location

Sampling Point	Plant Species Scientific Name	Plant Species Common Name	Absolute Percent Cover	Wetland Indicator Status[1]	Passed Dominance Test	Passed Prevalence Index	Meets Hydrophytic Vegetation Criterion	Meets Hydric Soils Criterion	Meets Wetlands Hydrology Criterion
1	*N/A*	N/A	N/A	N/A	N/A	N/A	Yes	No	Yes
2	*Bromus catharticus*	rescuegrass	30	UPL	No	No	No	No	Yes
	Plantago lanceolata	ribwort plantain	20	FAC					
	Medicago sativa	alfalfa	48	UPL					
3	*Ulmus pumila*	Siberian elm	20	UPL	Yes	Yes	Yes	Yes	Yes
	Paspalum distichum	knotgrass	60	FACW					
4	*Medicago sativa*	Alfalfa	100	UPL	No	No	No	No	No
5	*Panicum miliaceum*	proto millet	60	UPL	No	No	No	No	Yes
	Portulaca oleracea	common purslane	10	FAC					
	Cynodon dactylon	Bermuda grass	5	FACU					
6	*Suaeda nigra*	bush seepweed	15	OBL	No	No	No	No	Yes
	Atriplex confertifolia	shadscale	5	UPL					
	Atriplex canscens	fourwing saltbush	5	UPL					
7	*Typha domingensis*	southern cattail	40	OBL	Yes	Yes	Yes	Yes	Yes
	Kali tragus ssp. *Tragus*	tumbleweed	5	UPL					
8	*Kali tragus* ssp. *Tragus*	tumbleweed	40	UPL	No	No	No	No	No

[1] OBL=obligate wetland species; FACW=facultative wetland species; FAC=facultative species; FACU=facultative upland species; UPL=obligate upland species (See Appendix A for full data detailed in datasheets).

Lucerne Dry Lake

The majority of the Project area consists of Lucerne Dry Lake. Southeastern California deserts, including the Mojave Desert where the Project area is located, contain a number of lakebeds that were filled with water during the Pleistocene Epoch (approximately 2,600,000 to 11,700 years ago) under a cooler and wetter climate regime than currently exists. The regional climate has since changed, and the extremely arid climate and low precipitation (less than 8 inches) conditions of the Mojave Desert have replaced the Pleistocene lakes with dry beds and native desert vegetation (Vyverberg 2010). They are characterized by accumulations of stratified fine textured soil materials and a number of evaporite minerals, and large polygonal desiccation fractures.

The Lucerne Dry Lake is a large Pleistocene lakebed, approximately 3 km by 7 km in size (El-Maarry 2015). It is now typically dry in most years and only collects water in its lowest points during extreme precipitation events (MWA 2005, Stoffer 2004).

Visual evidence of previous inundation and/or saturation (e.g., cracked soils, salt crusts) was observed in the dry lakebed during the field surveys. However, these features are not indicative of the lake's present hydrology. Indicators such as cracked soils can occur readily as the result of repeated intervals of short-term wetting and drying of areas dominated almost entirely by clay soils. Salt crusts often form on the surface in dry desert conditions where salts are abundant in the soils and precipitate out onto the soil surface when sporadic rainfall quickly evaporates.

In the vicinity of the site, no large tributaries directly enter the dry lake from adjacent areas. Small, shallow ephemeral streams originate in the Granite Mountains, Whitehorse Mountain, and near Peterman Hill to the northwest and north of the site, but due to significant hydromodification, primarily from road construction and maintenance, the infrequent, low-volume, short-duration surface flow in these features does not reach the dry lakebed. A main utility access road and other minor roads are present along the north and west sides of the dry lakebed. During regular road maintenance, large berms of dirt up to 3 feet high are formed on each side of the roads as a result of clearing and blading. Overall, these berms completely block or severely restrict ephemeral stream flows south and east of the roads toward the lake. Some streams do flow across the roads and continue toward the lake. As the slope gradient nears zero in areas adjacent to the dry lakebed, any infrequent, low-volume, short-duration water flows in these very small and shallow streams disperse, dissipate, and percolate into the mostly level ground before reaching the dry lake. They lack a clear surface connection, via defined channels with bed and bank, to the dry lakebed. Any low-volume, short-duration ponding in the dry lakebed appears to primarily originate from onsite direct rainfall, since outside hydrologic inputs have been significantly decreased by the presence of the roads.

As noted in the Methodology Section, in 2010, the USACE considered Lucerne Dry Lake in an AJD for the Granite Mountain Wind Project. The USACE found that it is a dry lake, not a traditional lake, due to the general lack of surface water precluding use for harvesting fish or shellfish.

CFGC Sections 1600 *et seq.* were enacted to conserve wildlife associated with lake and stream ecosystems. The vast majority of the dry lakebed is topographically planar and unvegetated and provides extremely limited, low-quality value for wildlife. Soils are highly alkaline and lack nutrients due to repeated inundation and evaporation events, and high and low temperatures are extreme. What little vegetation is present is primarily concentrated within larger fractures at the edges of the dry lakebed. Riparian habitat is limited to retention basins and sporadic pipeline leakages, and the dry lake does not support fish or other aquatic life.

The dry lakebed contains numerous large polygonal cracks, oriented in every direction. Based on background research and field observations, these fractures are not formed by fluvial processes typical to streams regulated by CDFW and RWQCB but are in fact geologic phenomena called desiccation polygons (fractures or fissures) which are associated with the clayey soils comprised largely of smectites or vermiculites sedimentary deposits (El-Maarry, et al. 2015, USDA NRCS 2021). Published studies, as recent as December 2015 (El-Maarry, et al. 2015), show that these fissures commonly develop in clay playas/dry lakebeds in the arid west including California and Mojave Desert, and are attributed to desiccation phenomena and water table retreat. The fractures are generally created by smectites that undergo a reversible expansion on absorbing water and are found at the lower elevations of the lakebed. The large desiccation polygons occur through lowering of the water table rather than surface evaporation (El-Maarry, et al. 2012). As dehydration proceeds from the surface downward and penetrates the capillary fringe above the water table, shrinkage occurs, which ultimately results in rupture at depth that extends upward to the surface. The mineral constituents of sediments in both the fissured and nonfissured areas are predominantly clay minerals, carbonates, salines, and analcite, with fine grains of quartz, feldspar, and ferro-magnesian silicates. Fissured lakebeds possess significantly greater quantities of clay and carbonate minerals as compared to nonfissured playas. The clay minerals, carbonates, and analcite are primarily present in <2 micron size fraction. This colloidal aggregate is believed to exert a major influence on the physical behavior of the sediments which contain the large polygons. In particular, the dehydration to an almost dry condition of a clay mass, in which the water content may exceed the mineral content, results in a major loss of volume. The shrinkage leads to rupture with the formation of fissures. The fissures form orthogonal polygons characteristic of volume change in a largely uniform horizontal mass with one surface exposed (Neal, et al. 1968). In summary, the polygonal cracks on the surface of Lucerne Dry Lake are the result of geologic processes and were not carved by the flow of water.

The conclusion that Lucerne Lake's polygonal fractures are not streambeds is supported by the fact that these features do not exhibit typical characteristics of streambeds such as bed, bank, and channel features and indicators of fluvial activity. The lakebed is generally very flat, with elevation change in the lower levels near zero. The fractures do not convey water flow from higher elevations to lower elevations as in a typical stream and lack an origin and terminus or a discernable direction of flow. They appear to simply retain water in the low elevations of the fracture channels during periods of extreme precipitation, which appears to primarily originate from onsite direct rainfall, as discussed above. Most of the fractures are devoid of vegetation. Some of the fractures are vegetated with upland species that are also present outside of the lakebed, primarily allscale. The vegetation appears to occur in older fractures near the dry lakebed edges where enough time has passed for seeds to disperse into the fractures and vegetation to colonize and persist. This vegetation consists almost exclusively of upland species, primarily allscale.

Based on the factors presented above, only the retention basins and leaked pipe within the dry lakebed were delineated as CDFW/RWQCB-jurisdictional features. All other features under the jurisdiction of CDFW/RWQCB are the 33 ephemeral streams outside of the lakebed.

Fish and Wildlife Resources

Rincon conducted biological surveys across the site in July 2021 and documented onsite biological resources and the site's potential to support special status species. The BRA (Rincon 2021) assesses potential Project impacts to biological resources at the site. The majority of the site is located in the dry lakebed, which provides extremely limited value for wildlife. No substantial aquatic or riparian

habitat is present, and the site does not support fish or other aquatic life. Project impacts in the dry lakebed would not be expected to adversely affect fish and wildlife resources.

The ephemeral streams present at the site outside of the dry lakebed are small and water flows are low in volume and short in duration. The streams do not contain habitat characteristics that differentiate them from the surrounding landscape, including riparian or other vegetation that is distinct from adjacent areas or known to support special status species. Common and special status wildlife species expected to utilize the site are wide-ranging and are not specifically dependent on these streams; in other words, the streams don't provide any additional resources that may benefit wildlife that are not present in the adjacent areas.

Assessment of Jurisdictional Waters and Wetlands

Delineation of Potential CDFW and RWQCB Jurisdiction

This section presents the results of the delineation of ephemeral streams and retention basins/leaked pipes that are potentially under the jurisdiction of the CDFW and RWQCB at the 1,854-acre Project area. A total 8.34 acres/91,251 linear feet of retention basins, leaked pipeline, and ephemeral streams were delineated onsite. Riparian habitat is limited to the small (less than 0.01 acres), isolated wetland at what is likely a leaked pipeline.

Figure 5a through Figure 5d depict the location and extent of delineated stream segments and retention basins. Table 3 lists the delineated segment ID, type, hydroperiod, average top of bank width (in feet), and potential CDFW and RWQCB jurisdiction in linear feet and acreage. A discussion of delineated streams and retention basins is provided below.

Indicators of fluvial activity, such as sediment transport and deposition, shelving, and the presence of litter and debris, were observed in the ephemeral streams. Soils in these channels include smaller particle sizes such as silt and clay. Indicators of fluvial activity were often absent or severely obscured where a stream is present on roads. Stream segments were only delineated where at least faint evidence of flow was present.

As noted before, the slope gradient nears zero in areas adjacent to the dry lakebed, and any infrequent, low-volume, short-duration water flows in the shallow delineated streams disperse, dissipate, and percolate into the mostly-level ground before reaching the dry lake. The streams lack a clear surface connection, via defined channels with bed and bank, to the dry lakebed, and there is no discernible distinction with adjacent uplands.

Table 3 Summary of Delineated Features Onsite

				RWQCB/CDFW Jurisdiction		
Segment ID	Feature Type	Hydroperiod	Average Top of Bank Width (feet)	Non-wetland Waters of the State/ Streambed (linear feet)	Non-wetland Waters of the State/ Streambed (acres)	Wetland Waters of the State/ Streambed (acres)
1	Stream	Ephemeral	4	967.35	0.0858	–
2	Stream	Ephemeral	4	1,360.57	0.1161	–
3	Stream	Ephemeral	4	647.26	0.0597	–
4	Stream	Ephemeral	4	726.08	0.0669	–
5	Stream	Ephemeral	4	2,354.16	0.2143	–
6	Stream	Ephemeral	4	1,940.81	0.1780	–
7	Stream	Ephemeral	4	2,962.53	0.2719	–
8	Stream	Ephemeral	4	1,418.10	0.1304	–
9	Stream	Ephemeral	4	3,211.51	0.2934	–
10	Stream	Ephemeral	4	1,967.58	0.1809	–

Segment ID	Feature Type	Hydroperiod	Average Top of Bank Width (feet)	RWQCB/CDFW Jurisdiction		
				Non-wetland Waters of the State/ Streambed (linear feet)	Non-wetland Waters of the State/ Streambed (acres)	Wetland Waters of the State/ Streambed (acres)
11	Stream	Ephemeral	4	3,206.66	0.2943	–
12	Stream	Ephemeral	4	1,226.67	0.1130	–
13	Stream	Ephemeral	4	6,039.18	0.5529	–
14	Stream	Ephemeral	4	6,956.78	0.6377	–
15	Stream	Ephemeral	4	1,931.45	0.1778	–
16	Stream	Ephemeral	4	2,432.64	0.2235	–
17	Stream	Ephemeral	4	3,130.30	0.2876	–
18	Stream	Ephemeral	4	3,591.80	0.3297	–
19	Stream	Ephemeral	4	8,533.16	0.7778	–
20	Stream	Ephemeral	4	6,689.50	0.6117	–
21	Stream	Ephemeral	4	2,225.19	0.2044	–
22	Stream	Ephemeral	4	411.54	0.0373	–
23	Stream	Ephemeral	4	1,506.97	0.1385	–
24	Stream	Ephemeral	4	3,434.12	0.3125	–
25	Stream	Ephemeral	4	2,251.03	0.2058	–
26	Stream	Ephemeral	4	6,254.48	0.5696	–
27	Stream	Ephemeral	4	1,287.97	0.1170	–
28	Stream	Ephemeral	4	3,128.29	0.2870	–
29	Stream	Ephemeral	4	2,878.73	0.2644	–
30	Stream	Ephemeral	4	2,217.85	0.2036	–
31	Stream	Ephemeral	4	3,438.34	0.3149	–
32	Stream	Ephemeral	4	921.60	0.0839	–
33	Stream	Ephemeral	4	0.91	0.0002	–
34	Retention Basin	N/A	N/A	N/A	–	0.10
35	Retention Basin	N/A	N/A	N/A	–	0.14
36	Retention Basin	N/A	N/A	N/A	–	0.12
37	Retention Basin	N/A	N/A	N/A	–	0.04
38	Isolated Wetland	N/A	N/A	N/A	–	0.001
Total				**101,985.00**	**9.29**	**0.401**

A total of 33 stream segments, four (4) retention basins, and one (1) isolated wetland were delineated at the Project area. Stream widths (from top of banks) ranged from 2 to 8 feet, and the average width was 4 feet. These streams convey flows only during and immediately after high precipitation events. Evidence of fluvial activity in the majority of the streams is faint, and primarily consists of weakly defined multiple-thread channels with very low banks, minor changes in soil character, and marginally decreased vegetative cover. The delineated streams were distinct and separated by local topography and elevations of land that confine them to a definite course when waters rise to their highest level. Vegetation species composition in the streams and stream margins

does not differ from the surrounding areas, while vegetation density is generally slightly lower. Soils consist primarily of unconsolidated small particles including sand and gravel. No evidence of higher concentrations of suspended sediment or greater transport rates of bedload sediment was observed in these features. Infiltration rates are high. Overall, the movement of sediment, organic debris, and nutrients is extremely limited.

Based on a review of historical aerial photographs, it is likely that these streams conveyed higher volume flows and were more clearly defined prior to the construction of roads and increased human use and manipulation of the site. In their current condition, most streams have been fragmented or isolated by formal and informal roads and OHV tracks, which have greatly reduced fluvial activity. Many of these may be partially abandoned channels, based on the isolation from their source and very low fluvial activity.

A number of ephemeral streams surrounding the dry lakebed are mapped in the NWI. They are classified as riverine, intermittently flooded streambeds (Cowardin code R4SBJ). In these areas, most of the streambeds are depicted as connecting to the dry lakebed. However, as discussed above, field observations indicate that the streams onsite lack a clear surface connection via defined channels with bed and bank to the dry lakebed and flows dissipate to sheet flow before entering the lake. The NHD mapping data is similar to the NWI. Streambed features are depicted in approximately the same locations but fewer features are depicted. Similarly, some features are depicted connecting to the dry lakebed, and others are not.

The four retention basins on the Project area are man-made and associated with agricultural uses from surrounding farmlands. Of the four basins, one was determined to consist of wetland waters based on a sampling point examined in the bed (see Soils section above and Figure 5d in Appendix D). Two basins could not be accessed and were conservatively assumed to consist of wetland waters for the purposes of this report. The other basin did not contain hydric soils and is therefore not a wetland. According to the State Wetland Definition and Procedures for Discharges of Dredged or Fill Material to Waters of the State (SWRCB 2019), artificially constructed lakes and ponds created in dry land such as settling basins are excluded from the definition of Waters of the State. Therefore, the four detention basins are not under jurisdiction of the RWQCB.

One isolated wetland was observed in the western portion of the Project area in a small puddle dominated by cattails. Ponding and a hydrogen sulfide odor were observed at the time of the survey.

Conclusion

It is anticipated that the proposed Project may proceed under the authorization of a Waste Discharge Requirements permit from the RWQCB and a Lake or Streambed Alteration Agreement from CDFW. A notice of intent to RWQCB and 1602 notification to CDFW would be required. A permit from USACE would not be required. However, the final design of the proposed Project is still in preparation. It is recommended that the final Project design implement avoidance of jurisdictional aquatic features to the maximum extent feasible to support the permit application process with RWQCB and CDFW.

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Appendix A

Wetland Determination Data Forms

Appendix B

Regulatory Overview and Definitions

USACE Jurisdiction

The USACE, under provisions of Section 404 of the Clean Water Act and USACE implementing regulations, has jurisdiction over the "waters of the United States." "Waters" include all waters subject to the ebb and flow of the tide, all interstate waters, all other waters (intrastate lakes, rivers, streams, mudflats, sandflats, playa lakes, natural ponds, seasonal drainage channels, etc.), all impoundments of waters otherwise defined as waters of the U.S., tributaries of waters otherwise defined as waters of the U.S., territorial seas, and wetlands adjacent to waters of the U.S. USACE jurisdictional limits are typically identified by the presence of an Ordinary High Water Mark (OHWM). The OHWM is the line on the shore or banks of a water course established by the fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding area. The USACE defines wetlands as containing three parameters: hydrophytic vegetation, hydric soils, and wetland hydrology.

Areas not considered to be jurisdictional waters include non-tidal drainage and irrigation ditches excavated on dry land, artificially-irrigated areas, artificial lakes or ponds excavated on dry land used for irrigation or stock watering, small artificial water bodies such as swimming pools, and water filled depressions (51 Fed. Reg. 41, 217 1986). In addition, a Supreme Court ruling (Solid Waste Agency of Northern Cook Counties [SWANCC] vs. USACE, January 9, 2001) determined that the USACE exceeded its statutory authority by asserting Clean Water Act jurisdiction over "an abandoned sand and gravel pit in northern Illinois, which provides habitat for migratory birds." Based solely on the use of such waters by migratory birds, the Supreme Court's holding was strictly limited to waters that are "non-navigable, isolated, and intrastate."

The Supreme Court further addressed the extent of the USACE jurisdiction in Rapanos v. U.S. (June 19, 2006). There, a sharply divided Court issued multiple opinions, none of which garnered the support of a majority of Justices. This created substantial uncertainty as to which jurisdictional test should be used. The Ninth Circuit Court of Appeal, which encompasses California, answered this in Northern California River Watch v. City of Healdsburg (August 11, 2006). There, the Court held that Justice Kennedy's opinion in Rapanos provides the controlling rule of law. Under that rule, wetlands or other waters which are not navigable in fact are subject to USACE jurisdiction if they have a "significant nexus" to a navigable-in-fact waterway. As Justice Kennedy explained, whether a significant nexus exists in any given situation will have to be decided on a case-by-case basis, depending on site-specific circumstances.

USACE Headquarters in Washington, D.C. issued substantive guidance on June 5, 2007, to its District Offices as to how to apply these rulings. Based on this guidance, additional quantitative, qualitative, and other physical data is required for the USACE to make a determination of jurisdictional authority. This determination is reviewed by the United States Environmental Protection Agency (USEPA).

In accordance with the Rapanos guidance, the USACE will assert jurisdiction over traditional navigable waters (TNWs), non-navigable tributaries of TNWs that are relatively permanent waters (RPWs), and wetlands that directly abut such tributaries. TNWs include all of the "navigable waters of the U.S.," defined in 33 CFR Part 329 and by pertinent federal court decisions. RPWs convey water flow seasonally, typically for at least 3 months. In addition, non-navigable tributaries that are

not relatively permanent (non-RPWs), wetlands adjacent to non-RPWs, and wetlands adjacent to but that do not directly abut a TNW will be found jurisdictional based on a fact-specific analysis that they have a significant nexus with a TNW. The significant nexus evaluation considers the volume, duration, and frequency of water flow in the tributary and the proximity of the tributary to a TNW, as well as the hydrologic, ecologic, and other functions performed by the tributary and all of its adjacent wetlands.

RWQCB Jurisdiction

The State Water Resources Control Board (SWRCB) and local RWQCB have jurisdiction over "waters of the State," which are defined as any surface water or groundwater, including saline waters, within the boundaries of the state. The SWRCB has issued general Waste Discharge Requirements (WDRs) regarding discharges to "isolated" waters of the State (Water Quality Order No. 2004-0004-DWQ, Statewide General Waste Discharge Requirements for Dredged or Fill Discharges to Waters Deemed by the USACE to be Outside of Federal Jurisdiction). The local RWQCB enforces actions under this general order, and is also responsible for Clean Water Act Section 401 certification determinations over USACE defined jurisdictional waters.

The Porter-Cologne Act provides the State with very broad authority to regulate "waters of the State" (which are defined as any surface water or groundwater, including saline waters). The Porter-Cologne Act has become an important tool in the post-SWANCC and Rapanos era with respect to the State's authority over isolated waters. Generally, any person proposing to discharge waste into a water body that could affect its water quality must file a "Report of Waste Discharge" (ROWD) when there is no federal nexus, such as under Section 401of the CWA. Although "waste" is partially defined as any waste substance associated with human habitation, the RWQCB interprets this to include fill discharge into water bodies.

It should be noted that the RWQCB shares USACE jurisdiction unless isolated conditions are present. If isolated waters conditions are present, the RWQCB takes jurisdiction using the USACE's definition of the OHWM and/or the three-parameter wetlands methodology pursuant to the 1987 Wetlands Manual. The CDFW's jurisdiction is defined as the top of the bank to the top of the bank of the stream, channel, or basin or to the outer limit of riparian vegetation located within or immediately adjacent to the river, stream, creek, pond, or lake or other impoundment, whichever is greater.

CDFW Jurisdiction

The CDFW has regulatory authority over any work within rivers, streams, and lakes of the State of California (California Fish and Game Code Section 1600 et. seq.) on public, private, and agricultural lands. Water features that are regulated by CDFW include all rivers, streams, or lakes, including man-made watercourses with or without wetlands, if they contain a definable bed and bank and support a fish or wildlife resource.

Wetlands

The USACE defines wetlands as containing three parameters: hydrophytic vegetation, hydric soils, and wetland hydrology. The following is a discussion of each of these parameters.

Hydrophytic Vegetation

Hydrophytic vegetation dominates areas where frequency and duration of inundation or soil saturation exerts a controlling influence on the plant species present. Plant species are assigned wetland indicator status according to the probability of their occurring in wetlands. More than fifty percent of the dominant plant species must have a wetland indicator status to meet the hydrophytic vegetation criterion. The USFWS published the National List of Plant Species That Occur In Wetlands (Lichvar, 2013), which separates vascular plants into the following four basic categories based on plant species frequency of occurrence in wetlands:

- **Obligate Wetland (OBL).** Occur almost always (estimated probability >99%) under natural conditions in wetlands.
- **Facultative Wetland (FACW).** Usually occur in wetlands (estimated probability 67%-99%), but occasionally found in non-wetlands.
- **Facultative (FAC).** Equally likely to occur in wetlands or non-wetlands (estimated probability 34%-66%).
- **Facultative Upland (FACU).** Usually occur in non-wetlands (estimated probability 67%-99%), but occasionally found in wetlands (estimated probability 1%-33%).
- **Obligate Upland (UPL).** May occur in wetlands in another region, but occur almost always (estimated probability >99%) under natural conditions in non-wetlands in the region specified.

The ACOE considers OBL, FACW and FAC species to be indicators of wetlands. An area is considered to have hydrophytic vegetation when greater than 50 percent of the dominant species in each vegetative stratum (tree, shrub, and herb) fall within these categories. Any species not appearing on the USFWS list is assumed to be an upland species, almost never occurring in wetlands. In addition, an area needs to contain at least 5% vegetative cover to be considered as a vegetated wetland.

Hydric Soils

Hydric soils are saturated or inundated for a sufficient duration during the growing season to develop anaerobic or reducing conditions that favor the growth and regeneration of hydrophytic vegetation. Field indicators of wetland soils include observations of ponding, inundation, or saturation, dark (low chroma) soil colors, bright mottles (concentrations of oxidized minerals such as iron), gleying, which indicates reducing conditions by a blue-grey color, or accumulation of organic material. Additional supporting information includes documentation of soil as hydric or reference to wet conditions in the local soils survey, both of which must be verified in the field.

Wetland Hydrology

Wetland hydrology is inundation or soil saturation with a frequency and duration long enough to cause the development of hydric soils and plant communities dominated by hydrophytic vegetation. If direct observation of wetland hydrology is not possible (as in seasonal wetlands), or records of wetland hydrology are not available (such as stream gauges), assessment of wetland hydrology is frequently supported by field indicators, such as water marks, drift lines, sediment deposits, or drainage patterns in wetlands.

Appendix C

Site Photographs

Appendix D

Figures



Sienna Solar and Storage Project

Jurisdictional Waters and Wetlands Delineation Report

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Executive Summary

Rincon Consultants, Inc. (Rincon) conducted a jurisdictional delineation for the proposed Sienna Solar and Storage Project (Project) located approximately 3.5 miles north of the unincorporated community of Lucerne Valley in San Bernardino County, California. The delineation was conducted to determine the location and extent of resources potentially subject to the jurisdiction of the California Department of Fish and Wildlife (CDFW) and Regional Water Quality Control Board (RWQCB). Proposed impacts to potential CDFW and RWQCB jurisdictional features may be subject to the notification and permit requirements of the CDFW pursuant to Sections 1600 *et seq.* of the California Fish and Game Code (CFGC) and Porter-Cologne Act for the RWQCB.

Under Section 1602 of the CFGC, the CDFW regulates activities impacting the bed, bank or channel of any river, stream, or lake system that supports fish or wildlife. As part of Project scoping, planning, and design, this report was prepared to support CDFW consultation, notification, and permitting, as needed. The State Water Resources Control Board (SWRCB) and local RWQCB have jurisdiction over "waters of the State," which are defined as any surface water or groundwater, including saline waters, within the boundaries of the state. The Porter-Cologne Act provides the State with very broad authority to regulate "waters of the State." The Porter-Cologne Act has become an important tool with respect to the State's authority over isolated waters. Generally, any person proposing to discharge waste into a water body that could affect its water quality must file a dredge/fill application when there is no federal nexus, such as under Section 401 of the Clean Water Act (CWA).

The Project area drains to inland areas of California, specifically Lucerne Dry Lake, for which the U.S. Army Corps of Engineers (USACE) previously issued an Approved Jurisdictional Determination (AJD) stating that the tributaries and dry lake are not waters of the United States regulated under the CWA. Based on this determination, the USACE is not expected to assert jurisdiction over Lucerne Dry Lake and tributaries.

The majority of the Project area is situated within the historic bed of Lucerne Dry Lake. The lake is an area of low relief that is typically dry and only collects water in its lowest points during above average precipitation events. Based on review of current and historical aerial imagery and field observations, including recent Project-specific high-resolution aerial drone imagery, the dry lakebed is not ponded frequently, or for long durations. As noted above, the USACE assessed Lucerne Dry Lake in an AJD and found that it is a dry lake, not a traditional lake, due to the general lack of surface water precluding use for recreation or other purposes, including harvesting fish or shellfish. Due to major hydromodification in the watershed, primarily from road construction and maintenance, which completely block or severely restrict the flow of tributary ephemeral streams toward the lake, hydrologic inputs to the dry lake are very low. Any low-volume, short-duration ponding in the dry lakebed appears to primarily originate from onsite direct rainfall. Much of the dry lakebed is topographically planar and unvegetated and provides extremely limited value for wildlife. The dry lake does not support fish or other aquatic life.

The dry lakebed also contains numerous large polygonal cracks associated with geologic phenomena called desiccation polygons (fractures or fissures). These fissures commonly develop in clay playas/dry lakebeds in the arid west, including California and the Mojave Desert, and are attributed to water table retreat. These features have not been created by the flow of water, and do not exhibit characteristics typical of CDFW streams with typical bed and bank and channel

features or indicators of fluvial activity. The fissures typically retain water in the low elevations of the fracture channels during periods of above average precipitation.

Based on the factors presented above, three retention basins and one seep within the dry lakebed were delineated as RWQCB jurisdictional resources. The retention basins are used for agricultural runoff and the seep is likely a result of a broken agricultural pipe. To the north and west of the dry lakebed, 33 ephemeral streams are potentially under jurisdiction of the CDFW and RWQCB.

A total 9.29 acres and 91,250 linear feet of ephemeral streams were delineated in the Project area. Four retention basins were mapped, with three collectively containing 0.26 acre of wetland waters of the state and one containing 0.14 acre of non-wetland waters of the state. A small (40 square feet) isolated wetland containing cattails (*Typha domingensis*) was observed on site, originating near an assumed agricultural pipe leak.

Introduction

This report details the findings of the jurisdictional delineation conducted by Rincon Consultants, Inc. (Rincon) for the 1,854-acre Sienna Solar and Storage Project (Project) located in the Lucerne Valley, San Bernardino County, California. The delineation was conducted on July 20-22, 2021, to determine the location and extent of waters and/or wetlands within the Project area that are potentially subject to the permit requirements of the U.S. Army Corps of Engineers (USACE), under Section 404 of the Clean Water Act (CWA), Colorado River Regional Water Quality Control Board (RWQCB) under Section 401 of the CWA and Porter-Cologne Water Quality Act, and a Streambed Alteration Agreement from the California Department of Fish and Wildlife (CDFW) pursuant to Section 1600 et. seq. of the California Fish and Game Code (CFGC). Actual jurisdictional areas are confirmed by the state and federal authorities at the time that permits are requested.

Project Location

The 1,854-acre Project area is located in the southwestern portion of the Mojave Desert in and near Lucerne Dry Lake, in unincorporated San Bernardino County, California. The Project is predominately located east of State Route 247 (Barstow Road), north of the unincorporated community of Lucerne Valley, with portions of the gen-tie alternative corridors that include possible connections along Haynes Road, Huff Road, and Northside Road to the east of Barstow Road. The site is generally located approximately 35 miles south of the City of Barstow, 45 miles northwest of the town of Yucca Valley, 15 miles southeast of the town of Apple Valley, and 20 miles north of the City of Big Bear Lake. Barstow Road would provide primary access to the Project area. Land uses in the area are primarily rural residential, recreation, farmland, open space, and transportation corridors.

Figure 1 shows the regional location of the Project area. Figure 2 shows the 27 parcels that comprise the site, and Table 1 lists the parcels and the acreage of each. Figures are provided in Appendix D. The site is depicted on the *White Horse Mountain, California* and *Lucerne Valley, California* United States Geological Survey (USGS) 7.5-minute topographic quadrangle maps (Figure 3).

Table 1 Parcels Within the Project Area

APN	Acreage (per Assessor's Map)	APN	Acreage (per Assessor's Map)
45207120	40.201988	45211217	8.8374063
45207119	40.21116	45211317	151.40044
45207111	154.92994	45212112	80.724638
45207125	40.206093	45212142	70.847518
45207110	80.411658	45212138	5.0164927
45206223	80.447237	45212139	12.554045
45206221	40.207435	45212148	33.286326
45206222	76.437885	45212152	10.188996
45206224	84.470432	45237101	161.27385
45211220	70.208881	45236147	80.707295
45211224	89.9045	45236146	80.667639
45211225	103.44547	45239109	39.915267
45211219	73.471912	45239108	80.023993
45211218	64.725183		

Project Description

The proposed Sienna Solar and Storage Project is a 525-megawatt (MW) utility-scale solar farm with 525-MW battery storage located in unincorporated San Bernardino County. The site is located east of Barstow Road/State Route (SR) 247 roughly between Northside Road and Wilshire Road, northeast of the community of Lucerne Valley.

The Project consists of the installation of a photovoltaic (PV) solar facility, Battery Energy Storage System (BESS), project substation, Operations and Maintenance building(s), underground collection system, 230 kV generation-interconnect (gen-tie) line. The Sienna Project will interconnect at the SCE Calcite Substation (currently pending environmental clearance and construction) via a proposed overhead and/or underground 230-kV gen-tie line in addition to other ancillary facilities utilizing private and potentially public ROWs. The Project area encompasses 1,854 acres with an additional 77-acre substation site. Approximately 39 miles of collector lines and gen-tie alternatives will be analyzed in this assessment, although not all routes will be developed.

The Project area is characterized by a mixture of residential properties, undeveloped playa and desert scrub communities, and agricultural land that includes alfalfa and jojoba farms and large-scale hemp growing operations. Small-scale abandoned and operational hemp and/or marijuana growing operations were present throughout the playa region of the Project area.

Environmental Setting

The Project area is located in the southwestern portion of Mojave Desert in and near Lucerne Dry Lake. The area is in a rain shadow formed by the adjacent mountains and features alkaline soils. This high desert ecological subregion is characterized by arid scrub, creosote bush scrub, playas, and desert washes. The site is primarily located on the floor of the Lucerne Dry Lake, and along its eastern and northern margins. Topography is mostly flat to gently sloped along the dry lake

margins. The Granite Mountains and White Horse Mountain are west of the site, and Peterman Hill is within the gen-tie matrix, east of Barstow Road. Elevation at the site ranges between 2,850 and 2,910 feet above mean sea level.

The dry lakebed is heavily used for recreational activities, including off highway vehicle (OHV) travel (including racing) and assorted day use and camping activities. The Rocketry Organization of California (ROC) uses the dry lake as one of its designated launch sites, with scheduled launches occurring monthly throughout the year. Additionally, areas outside the dry lake within the Project area are also subject to various ongoing disturbances related to road maintenance, utility activities (electrical transmission towers and lines; underground gas pipeline), recreation, OHV travel, and illegal dumping.

Methodology

Federal Clean Water Act Jurisdiction

Section 404 of the CWA establishes a program to regulate the discharge of dredged or fill material into waters of the United States (WOUS), including wetlands (Appendix B). Section 404 requires a permit before dredged or fill material may be discharged into WOUS, unless the activity is exempt from Section 404 regulation. The USACE, under provisions of Section 404 of the CWA and USACE implementing regulations, has jurisdiction over WOUS.

The USACE previously evaluated Lucerne Dry Lake as the lowest point in the Lucerne Valley watershed to determine if the dry lakebed and washes terminating there constitute WOUS that would be regulated under Section 404 of the CWA. The USACE considered Lucerne Dry Lake in an approved jurisdictional determination (AJD) dated November 16, 2010, for the Granite Mountain Wind Project (USACE File No. SPL-2010-00791-SLP, JD-2). In this determination, the USACE found that it is a dry lake, and surface flows that enter the dry lakebed percolate into the groundwater table. The determination concluded that Lucerne Dry Lake is not a Traditional Navigable Water (TNW) and is not an "other" water. It does not have use for surface water used for recreation or other purposes by foreign or interstate travelers, it does not support harvesting activities of fish or shellfish that may be sold in interstate or foreign commerce, and it does not support surface water industrial usage by industries in interstate commerce. Additionally, current USACE regulations defining WOUS (33 CFR 328.3) limit Clean Water Act jurisdiction to navigable waters, their relatively permanent tributaries, and wetlands with a continuous surface connection to jurisdictional waters. Therefore, the Lucerne Dry Lake would not be considered a WOUS under current regulations.

As part of a determination regarding ephemeral washes within the Lucerne Valley watershed, the USACE stated that the Lucerne Valley basin is a closed basin with no external surface water flows leaving the basin, with Lucerne Dry Lake as the low point. The USACE concluded that ephemeral washes flowing toward Lucerne Dry Lake are isolated and not under federal jurisdiction (Approved Jurisdictional Determination for Agincourt Solar Project, USACE File No. SPL-2012-00498 [JD-BEM], May 29, 2013).

Based on these determinations, the USACE is not expected to assert jurisdiction over Lucerne Dry Lake and tributaries. These features are hydrologically isolated from TNWs or interstate waters and do not have the potential to directly or indirectly affect interstate or foreign commerce (33 CFR 3.28.3(a)(3)). Therefore, federal CWA jurisdiction and USACE delineation methods are not considered further in this report.

Literature Review

Pre-field investigations generally consisted of reviewing existing background literature, data, and information to identify areas of potential CDFW and RWQCB jurisdiction and prepare for delineation field surveys. Rincon reviewed existing resource information related to the Project area and vicinity. Pertinent sources reviewed include the *General Biological Resources Assessment* (Rincon 2021); recent and historical aerial photography; *White Horse Mountain, California* and *Lucerne Valley, California* quads; *Soil Survey of San Bernardino County, California, Mojave River*

Area; Web Soil Survey (U.S. Department of Agriculture Natural Resources Conservation Service [USDA NRCS] 2021); San Bernardino County General Plan (SBC 2017); Lucerne Valley Community Plan (SBC 2018); and Desert Renewable Energy Conservation Plan (DRECP). The National Wetland Inventory (NWI) (USFWS 2021) and National Hydrography Dataset (NHD) (U.S. Geological Survey [USGS] 2021) were reviewed to determine if any wetland and/or other jurisdictional waters had been previously documented and mapped on or in the vicinity of the site. The *National Hydric Soils List* (USDA NRCS 2021b) was reviewed to determine if any soil map unit types mapped on or in the vicinity of the site were classified as hydric. Other data sources reviewed included geologic maps, climate and hydrology data, and previous studies for similar or nearby solar projects. Additionally, a detailed review of the Lucerne Dry Lake and its unique geomorphic characteristics was completed and is summarized above in Environmental Setting.

Field Survey

After completing the initial literature review, Rincon conducted a reconnaissance-level field survey on July 20-22, 2021, to determine the general presence and locations of ephemeral streams and isolated wetlands potentially under CDFW and RWQCB jurisdiction onsite. Current USACE delineation procedures and guidance were used to identify and delineate any wetlands and/or waters of the State potentially subject to RWQCB jurisdiction (Lichvar et al. 2016; USACE 1987, 2008a, 2008b). Likewise, current CDFW procedures and guidance were considered to identify and delineate any streambeds, rivers, or associated riparian habitat potentially subject to CDFW jurisdiction (CFGC 2017, Brady and Vyverberg 2013, Vyverberg 2010). Wetland Determination Data Forms and Ordinary High Water Mark (OHWM) Data Forms for determining jurisdiction are presented in Appendix A.

Rincon imported the locations of potential jurisdictional features into a global positioning system (GPS)-enabled tablet displayed over high resolution aerial imagery to allow for evaluation of those features in the field. These features, and any other potential jurisdictional features that were encountered during the survey, were examined for the presence of defined channels with characteristic bed and bank features and indicators of water flow. Potential jurisdictional streams were mapped on recent aerial imagery. The landforms, vegetation, hydrology, and soil conditions were noted where these characteristics were relevant to identification of the feature. A handheld GPS unit with sub-meter horizontal accuracy was also used to record locations and collect general data, and to guide digitization of features with a geographic information system (GIS) software package. Representative photographs of potential jurisdictional features were recorded to document their physical characteristics in the context of the site (Appendix C).

Results

Vegetation

Vegetation types in the Mojave Desert are strongly influenced by arid climatic conditions and desert soils. Vegetation in the region includes a predominance of plant morphological adaptations to extreme aridity and saline alkali soils. Vegetation structure is generally characterized by short-statured and widely-spaced shrubs, and arborescent shrubs resulting from a competition for soil water resources (Baldwin, et al. 2012). Three vegetation types contribute to 75 percent of the land cover in the Mojave Desert region: Mojave creosote bush (*Larrea tridentata*) scrub (16,398 square miles), Mojave mixed woody scrub (Joshua tree woodland; 3,646 square miles), and desert saltbush (*Atriplex* spp.) scrub (1,510 square miles) (Davis et al., 1998). Other common vegetation types occurring in the region include desert and valley sink scrub, Mojave Desert wash scrub, and Mojave mixed steppe (Holland 1986, CDFW 2010). The primary disturbed or nonnative vegetation/land cover types within the Mojave Desert include annual grasslands, agricultural lands, and developed areas.

Rincon prepared a Jurisdictional Delineation Report (Rincon 2017a) and Biological Resource Assessment (BRA) (Rincon 2017b) for an alternative alignment for the Project. Rincon had determined at the time that jurisdictional features were limited to ephemeral washes that drained into the dry lake. The alignment has since shifted, thereby requiring a new delineation to be conducted. In June 2017 for the BRA, Rincon conducted vegetation mapping consisting of a windshield survey and meandering pedestrian transects to generally characterize the distribution of natural vegetation communities, habitats, residential development, and other disturbed areas in the general area. Meandering pedestrian transects were conducted in areas containing natural habitat, which allowed for a more thorough assessment to distinguish vegetation communities and identify approximate community boundaries within natural areas. Natural vegetation communities identified in the BRA were generally classified based on the classification system presented in *A Manual of California Vegetation, Second Edition* (MCV) (Sawyer et al. 2009).

Three natural vegetation communities were mapped in the general setting: creosote bush scrub (*Larrea tridentata* Shrubland Alliance), allscale scrub (*Atriplex polycarpa* Shrubland Alliance, and fourwing saltbush scrub (*Atriplex canescens* Shrubland Alliance). Two additional land cover types that did not meet the membership rules for classification as one of the recognized vegetation types in the MCV were also identified and mapped at the site. These land cover types include rock outcrop and dry lakebed.

The majority of the general area consists of the dry lakebed, which is largely unvegetated. This is the dominant land cover type at the site; it exceeds all other land cover types and vegetation communities combined.

Hydrology

Hydrology of the site and vicinity was evaluated through review of topographic maps, aerial photos, the NHD (USGS 2021), and the NWI (USFWS 2021), in conjunction with field survey data.

The site is located within the central portion of the Lucerne Lake watershed, Hydrologic Unit Code [HUC] 181001000404. It is located within the Este hydrologic groundwater sub-basin, a hydrologic

subarea of the Mojave Groundwater Basin which contains two primary groundwater basins separated by a fault (Mojave Water Agency [MWA] 2005). The groundwater below the site is stored in an aquifer within the Lucerne Valley Groundwater Basin (LVGB). The northern portion of the site extends slightly outside of the LVGB. Water is provided to the residents of Lucerne Valley from groundwater pumping (MWA 2005).

The majority of the site is mostly level and slope gradients across the site are extremely low. Thirty-three (33) small, shallow, ephemeral streams drain generally to the west and southwest in the direction of the dry lakebed. The streams convey water flows only during and immediately after high precipitation events. Hydromodification, primarily from roads, has fragmented stream flow in areas north and west of the dry lakebed. Road maintenance activities include clearing and blading, which create large soil berms on each side of the roads, blocking flow in most of the drainages at the road edge. Additionally, OHV tracks interrupt the flow of small shallow channels.

Climate data for the Lucerne Valley obtained from four sources, including the Western Regional Climate Center (WRCC 2021), WeatherBase (WeatherBase 2021), Climate-Data (Climate-Data 2021), and Intellicast (Intellicast 2021), indicate that average annual rainfall in the vicinity is approximately 6.04 inches.

Soils

The USDA NRCS (2021) has mapped and inventoried soils at both landscape (coarse) scales and detailed (fine) scales. These data are catalogued in previously published soil surveys, the Soil Survey Geographic Database, and the U.S. General Soil Map. These data were accessed through the Web Soil Survey Application (USDA NRCS 2021). This subsection summarizes soil resources as mapped by the NRCS that overlap the site at the landscape level.

The site is covered by the *Soil Survey of San Bernardino County, California, Mojave River Area*. The soil survey indicates that soils in the Lucerne Valley floor are primarily derived from alluvium parent materials from granitic sources and other mixed sources. Within the Project area, soils are associated with alluvial fans, toe slopes, playas, and other gently sloped landforms. Based on Web Soil Survey data, the site contains 19 soil map units, which are briefly described below. Soil map units across the site are shown on Figure 4 (Appendix D).

Hydric soils are defined by the National Technical Committee for Hydric Soils as soils that in their undrained condition, are saturated, flooded, or ponded long enough during a growing season to develop anaerobic conditions that support the growth and regeneration of hydrophytic vegetation (59 Federal Register 16835). Soils that are sufficiently wet to support the growth and regeneration of hydrophytic vegetation due to artificial measures are included in the concept of hydric soils on the list “Hydric Soils of the United States” (National List) (USDA NRCS 2021b). Soils are identified for inclusion on the list based on specific criteria established by law (67 Federal Register 58756). The National List is “a compilation of all map units with either a major or minor component that is at least in part hydric. …Because the list includes both major and minor (small) percentages for map units, in some cases most of the map unit may not be hydric… Some components may be phases of soil series that have a range of characteristics… therefore, only a portion of that component’s concept (or range in characteristics) may in fact be hydric. The list is useful in identifying map units that may contain hydric soils.”

Of the soils mapped in the Project area, further discussed below, at least one minor component of the following soil map units have been identified as hydric when they occur in depressions or playas that are during the growing season:

- Bousic Clay; Cajon Sand
- Cave Loam, Dry, 0 to 2 Percent Slopes
- Lavic Loamy Fine Sand
- Peterman clay
- Playas

Of these units, only Playas has a major component identified as hydric on the National List. The majority of the dry lakebed is mapped as Playas. However, the dry lakebed is not frequently ponded for long or very long durations. During and immediately after infrequent heavy rainfall, low volumes of water appear to collect in the lowest elevations for brief durations. The dry lakebed contains a dense, hardpan layer of clay soil. The soils contain a high alkaline pH, and high levels of salts. These soils often do not form hydric soil indicators even when saturated for extended periods.

The following soil units identified in the Web Soil Survey (USDA NRCS 2021) are summarized below.

Bousic Clay

This soil map unit typically occurs on toeslopes of lake plains and talfs (geomorphic components of an essentially flat and broad area dominated by closed depressions) in low areas with very little slope. The dominant soil series, Bousic clay, is formed in alluvium from mixed sources. A typical soil profile consists of clay horizons to at least 60 inches of depth. This soil is well drained, alkaline, and strongly saline. Minor components within this map unit are Peterman soils. This soil map unit is considered hydric.

Bryman Loamy Fine Sand, 2 to 5 Percent Slopes

This granitic soil map unit usually occurs on terraces and older alluvial fans, at elevations from 2,800 to 3,800 feet. A typical soil profile consists of a pale topsoil layer that is loamy or sandy. The second horizon is usually pink to reddish brown and is generally sandy clay loam, loam or gravelly sandy loam. The third horizon is pale yellowish brown to strong brown, is usually alkaline, and may be loamy coarse sand to sand. This soil map unit is not considered hydric.

Cajon Sand, 0 to 2 Percent Slopes

This soil map unit typically occurs on alluvial fans on gentle slopes. The dominant soil series, Cajon sand, is formed in alluvium from granitic sources. A typical soil profile consists of sandy topsoil, underlain by a second sand horizon to approximately 25 inches, with layers of gravelly sand, stratified sand and loamy fine sand below to at least 60 inches of depth. This soil is somewhat excessively drained. Minor components within this map unit are Manet, Kimberlina, and Helendale soils. This soil map unit is not considered hydric.

Cajon Sand, 2 to 9 Percent Slopes

This soil map unit is similar to the Cajon map unit except it occurs on slightly greater slopes (2 to 9 percent) and may have more layers of stratified gravelly sand in the subsoil. This soil map unit is not considered hydric.

Cajon Gravelly Sand, 2 to 15 Percent Slopes

This soil map unit is similar to the previous two Cajon map units except it occurs on slightly greater slopes (2 to 15 percent) and the topsoil and subsoil horizons have increased gravel content. This soil map unit is not considered hydric.

Cave Loam, Dry, 0 to 2 Percent Slopes

This soil map unit typically occurs on alluvial fan remnants on gentle slopes. The dominant soil series, Cave loam, is formed in alluvium from granitic sources. A typical soil profile consists of loam topsoil, underlain by stratified sandy loam to loam subsoil between 21 and at least 66 inches of depth. This soil is well drained, and very slightly to slightly saline. Minor components within this map unit are a Cave soil with clayey subsoil, Kimberlina, and Lavic soils. This soil map unit is considered hydric.

Dune Sand

This soil map unit consists of unstable hills and ridges of loose, wind-deposited sand that is excessively drained and barren. Dunes are typically less than 15 feet high and slopes are between 5 to 15 percent. Minor components within this map unit are Cajon sand, Riverwash and Villa loamy sand along the Mojave River, and Halloran soils. This soil map unit is not considered hydric.

Glendale Variant Silt Loam, Saline-Alkali

This soil map unit occurs on basin rims and lower margins of narrow alluvial fans with slopes ranging from 0 to 2 percent with vegetation consisting of salt-tolerant shrubs, grasses, and forbs. Soil profiles are very pale brown silt loam down to 11 inches with underlying material consisting of light yellowish brown and pale brown silty clay loam. Surface layer and underlying layers are moderately or strongly alkaline. Minor components within this map unit are small areas of Lavic soils. This soil is suited for irrigated crops in areas where they are reclaimed. This soil map unit is not considered hydric.

Helendale Loamy Sand, 0 to 2 Percent Slopes

This soil map unit typically occurs on alluvial fan remnants on gentle slopes. The dominant soil series, Helendale loamy sand, is formed in alluvium from granitic sources. A typical soil profile consists of loamy sand topsoil topsoil, underlain by sandy loam subsoil between 4 and at least 66 inches of depth. This soil is well drained, and nonsaline to very slightly saline. Minor components within this map unit are Bryman, Kimberlina, and Cajon soils. This soil map unit is not considered hydric.

Helendale Loamy Sand, 2 to 5 Percent Slopes

This soil map unit occurs on alluvial fans and terraces and is derived primarily from granitic material. Slopes are broad and nearly level with many areas dissected by shallow intermittent drainageways. Vegetation is primarily yucca, desert shrubs, grasses, and forbs. The surface layer is

very pale brown loamy sand about 4 inches thick with subsoil and the upper part of the substratum are brown, yellowish brown, and light yellowish brown sandy loam about 62 inches thick. Clay content decreases below a depth of 30 inches. Minor components include Bryman, Kimberlina, and Cajon soils. This soil map unit is not considered hydric.

Joshua Loam, 2 to 5 Percent Slopes

This soil map unit occurs on old stable terraces that have desert pavement. It formed in alluvium derived from mixed sources with broad, slightly convex slopes. Most areas are dissected by moderately deep intermittent drainageways. Typically, 70-90 percent of the surface layer is covered by desert pavement with a light yellowish-brown loam about 3 inches thick. Subsoils are brown and reddish brown gravelly sandy clay loam around 17 inches thick. These soils are often strongly alkali. Minor components within this map unit are Cajon soils. This soil map unit is not considered hydric.

Kimberlina Loamy Fine Sand, Cool, 0 to 2 Percent Slopes

This soil map unit typically occurs on skirts and aprons of alluvial fans on gentle slopes. The dominant soil series, Kimberlina loamy fine sand, is formed in alluvium from mixed sources. A typical soil profile consists of loamy fine sand topsoil, underlain by sandy loam, fine sandy loam, and loam subsoil between 7 and at least 60 inches of depth. This soil is well drained, and nonsaline to very slightly saline. Minor components within this map unit are Helendale and Cajon soils. This soil map unit is not considered hydric.

Kimberlina Loamy Fine Sand, Cool, 2 to 5 Percent Slopes

This soil map unit is similar to the Kimberlina map unit except it occurs on slightly greater slopes (2 to 5 percent) and may have more layers of stratified gravelly sand in the subsoil. This soil map unit is not considered hydric.

Lavic Loamy Fine Sand

This soil map unit typically occurs on skirts and aprons of alluvial fans on gentle slopes. The dominant soil series, Lavic loamy fine sand, is formed in alluvium from granitic sources. A typical soil profile consists of loamy fine sand topsoil, underlain by multiple layers of sandy loam, loamy fine sand, loamy sand and loam subsoil between 10 and at least 49 inches of depth. This soil is well drained, and slightly to moderately saline. Minor components within this map unit are unnamed soils. This soil map unit is considered hydric.

Peterman Clay

This soil map unit typically occurs on skirts of alluvial fans on gentle slopes. The dominant soil series, Peterman clay, is formed in fine-textured alluvium from mixed sources. A typical soil profile consists of clay topsoil, underlain by clay and gravelly clay subsoil to at least 60 inches of depth. This soil is moderately well drained, alkaline, and strongly saline. Minor components within this map unit are unnamed soils. This soil map unit is considered hydric.

Playas

This soil map unit consists of playa areas consisting of lacustrine deposits derived from mixed sources. Minor components within this map unit are Bousic, Norob, and Halloran soils. This soil map unit is considered hydric.

Rock Outcrop – Lithic Torriorthents Complex, 15 to 50 Percent Slopes

This soil map unit typically occurs on summits, backslopes and flanks of mountains on moderate to steep slopes. This map unit does not contain named soils. Rock outcrops, typically granitic, are interspersed with minimally developed soil underlain by bedrock within 8 to 20 inches of the soil surface. Minor components within this map unit are Sparkhule, and Trigger soils. This soil map unit is not considered hydric.

Wasco Sandy Loam, Cool, 0 to 2 Percent Slopes

This soil map unit typically occurs on aprons of alluvial fans on gentle slopes. The dominant soil series, Wasco sandy loam, is formed in alluvium derived from granite. A typical soil profile consists of sandy loam topsoil, underlain by additional sandy loam horizons to at least 60 inches of depth. This soil is well drained, and nonsaline to very slightly saline. Minor components within this map unit are Cajon, Lucerne and Bryman soils. This soil map unit is not considered hydric.

Sample Points

Based on soil pit data from the field survey, all three wetland parameters were met in one retention basin and were assumed to be met in two retention basins that were inaccessible at the time of the survey. A fourth retention basin did not qualify as a wetland. All three wetland parameters were also observed at a location where an irrigation pipe likely has a leak. These all occur within the dry lake portion of the Project, and hydric soils were not observed outside of the dry lake. Please refer to Table 2 below for a summary of data collected at the soil pits, Appendix A for completed datasheets, and Appendix D Figures 5a-d for soil pit locations. Vegetation at retention basins primarily consisted of alfalfa (*Medicago sativa*), common purslane (*Portulaca oleracea*), narrowleaf plantain (*Plantago lanceolata*), knotgrass (*Paspalum distichum*), and salt heliotrope (*Heliotropium curassavicum*) (Appendix A). Some soil cracks within the dry lakebed included wetland plants, such as bush seepweed (*Sueda nigra*). However, these soils cracks did not contain hydric soils or wetland hydrology.

Table 2 Summary of Hydrophytic Vegetation, Hydric Soils, and Wetlands Hydrology Wetlands Indicator Status by Soil Test Pit Location

Sampling Point	Plant Species Scientific Name	Plant Species Common Name	Absolute Percent Cover	Wetland Indicator Status[1]	Passed Dominance Test	Passed Prevalence Index	Meets Hydrophytic Vegetation Criterion	Meets Hydric Soils Criterion	Meets Wetlands Hydrology Criterion
1	*N/A*	N/A	N/A	N/A	N/A	N/A	Yes	No	Yes
2	*Bromus catharticus*	rescuegrass	30	UPL	No	No	No	No	Yes
	Plantago lanceolata	ribwort plantain	20	FAC					
	Medicago sativa	alfalfa	48	UPL					
3	*Ulmus pumila*	Siberian elm	20	UPL	Yes	Yes	Yes	Yes	Yes
	Paspalum distichum	knotgrass	60	FACW					
4	*Medicago sativa*	Alfalfa	100	UPL	No	No	No	No	No
5	*Panicum miliaceum*	proto millet	60	UPL	No	No	No	No	Yes
	Portulaca oleracea	common purslane	10	FAC					
	Cynodon dactylon	Bermuda grass	5	FACU					
6	*Suaeda nigra*	bush seepweed	15	OBL	No	Yes	No	No	No
	Atriplex confertifolia	shadscale	5	UPL					
	Atriplex canscens	fourwing saltbush	5	UPL					
7	*Typha domingensis*	southern cattail	40	OBL	Yes	Yes	Yes	Yes	Yes
	Kali tragus ssp. *Tragus*	tumbleweed	5	UPL					
8	*Kali tragus* ssp. *Tragus*	tumbleweed	40	UPL	No	No	No	No	No

[1] OBL=obligate wetland species; FACW=facultative wetland species; FAC=facultative species; FACU=facultative upland species; UPL=obligate upland species (See Appendix A for full data detailed in datasheets).

Lucerne Dry Lake

The majority of the Project area consists of Lucerne Dry Lake. Southeastern California deserts, including the Mojave Desert where the Project area is located, contain a number of lakebeds that were filled with water during the Pleistocene Epoch (approximately 2,600,000 to 11,700 years ago) under a cooler and wetter climate regime than currently exists. The regional climate has since changed, and the extremely arid climate and low precipitation (less than 8 inches) conditions of the Mojave Desert have replaced the Pleistocene lakes with dry beds and native desert vegetation (Vyverberg 2010). They are characterized by accumulations of stratified fine textured soil materials and a number of evaporite minerals, and large polygonal desiccation fractures.

The Lucerne Dry Lake is a large Pleistocene lakebed, approximately 3 km by 7 km in size (El-Maarry 2015). It is now typically dry in most years and only collects water in its lowest points during extreme precipitation events (MWA 2005, Stoffer 2004).

Visual evidence of previous inundation and/or saturation (e.g., cracked soils, salt crusts) was observed in the dry lakebed during the field surveys. However, these features are not indicative of the lake's present hydrology. Indicators such as cracked soils can occur readily as the result of repeated intervals of short-term wetting and drying of areas dominated almost entirely by clay soils. Salt crusts often form on the surface in dry desert conditions where salts are abundant in the soils and precipitate out onto the soil surface when sporadic rainfall quickly evaporates.

In the vicinity of the site, no large tributaries directly enter the dry lake from adjacent areas. Small, shallow ephemeral streams originate in the Granite Mountains, Whitehorse Mountain, and near Peterman Hill to the northwest and north of the site, but due to significant hydromodification, primarily from road construction and maintenance, the infrequent, low-volume, short-duration surface flow in these features does not reach the dry lakebed. A main utility access road and other minor roads are present along the north and west sides of the dry lakebed. During regular road maintenance, large berms of dirt up to 3 feet high are formed on each side of the roads as a result of clearing and blading. Overall, these berms completely block or severely restrict ephemeral stream flows south and east of the roads toward the lake. Some streams do flow across the roads and continue toward the lake. As the slope gradient nears zero in areas adjacent to the dry lakebed, any infrequent, low-volume, short-duration water flows in these very small and shallow streams disperse, dissipate, and percolate into the mostly level ground before reaching the dry lake. They lack a clear surface connection, via defined channels with bed and bank, to the dry lakebed. Any low-volume, short-duration ponding in the dry lakebed appears to primarily originate from onsite direct rainfall, since outside hydrologic inputs have been significantly decreased by the presence of the roads.

As noted in the Methodology Section, in 2010, the USACE considered Lucerne Dry Lake in an AJD for the Granite Mountain Wind Project. The USACE found that it is a dry lake, not a traditional lake, due to the general lack of surface water precluding use for harvesting fish or shellfish. The feature has not historically been regulated as a lake, and there are homes, farms, and roads scattered throughout the dry lakebed.

CFGC Sections 1600 *et seq.* were enacted to conserve wildlife associated with lake and stream ecosystems. The vast majority of the dry lakebed is topographically planar and unvegetated and provides extremely limited, low-quality value for wildlife. Soils are highly alkaline and lack nutrients due to repeated inundation and evaporation events, and high and low temperatures are extreme. What little vegetation is present is primarily concentrated within larger fractures at the edges of the

dry lakebed. Riparian habitat is not present, and the dry lake does not support fish or other aquatic life.

The dry lakebed contains numerous large polygonal cracks, oriented in every direction. Based on background research and field observations, these fractures are not formed by fluvial processes typical to streams regulated by CDFW and RWQCB but are in fact geologic phenomena called desiccation polygons (fractures or fissures) which are associated with the clayey soils comprised largely of smectites or vermiculites sedimentary deposits (El-Maarry, et al. 2015, USDA NRCS 2021). Published studies, as recent as December 2015 (El-Maarry, et al. 2015), show that these fissures commonly develop in clay playas/dry lakebeds in the arid west including California and Mojave Desert, and are attributed to desiccation phenomena and water table retreat. The fractures are generally created by smectites that undergo a reversible expansion on absorbing water and are found at the lower elevations of the lakebed. The large desiccation polygons occur through lowering of the water table rather than surface evaporation (El-Maarry, et al. 2012). As dehydration proceeds from the surface downward and penetrates the capillary fringe above the water table, shrinkage occurs, which ultimately results in rupture at depth that extends upward to the surface. The mineral constituents of sediments in both the fissured and nonfissured areas are predominantly clay minerals, carbonates, salines, and analcite, with fine grains of quartz, feldspar, and ferro-magnesian silicates. Fissured lakebeds possess significantly greater quantities of clay and carbonate minerals as compared to nonfissured playas. The clay minerals, carbonates, and analcite are primarily present in <2 micron size fraction. This colloidal aggregate is believed to exert a major influence on the physical behavior of the sediments which contain the large polygons. In particular, the dehydration to an almost dry condition of a clay mass, in which the water content may exceed the mineral content, results in a major loss of volume. The shrinkage leads to rupture with the formation of fissures. The fissures form orthogonal polygons characteristic of volume change in a largely uniform horizontal mass with one surface exposed (Neal, et al. 1968). In summary, the polygonal cracks on the surface of Lucerne Dry Lake are the result of geologic processes and were not carved by the flow of water.

The conclusion that Lucerne Lake's polygonal fractures are not streambeds is supported by the fact that these features do not exhibit typical characteristics of streambeds such as bed, bank, and channel features and indicators of fluvial activity. The lakebed is generally very flat, with elevation change in the lower levels near zero. The fractures do not convey water flow from higher elevations to lower elevations as in a typical stream and lack an origin and terminus or a discernable direction of flow. They appear to simply retain water in the low elevations of the fracture channels during periods of extreme precipitation, which appears to primarily originate from onsite direct rainfall, as discussed above. Most of the fractures are devoid of vegetation. Some of the fractures are vegetated with upland species that are also present outside of the lakebed, primarily allscale. The vegetation appears to occur in older fractures near the dry lakebed edges where enough time has passed for seeds to disperse into the fractures and vegetation to colonize and persist. This vegetation consists almost exclusively of upland species, primarily allscale.

Based on the factors presented above, only the retention basins and leaked pipe within the dry lakebed were delineated as RWQCB-jurisdictional features. Features under the jurisdiction of CDFW and RWQCB include the 33 ephemeral streams outside of the lakebed.

Fish and Wildlife Resources

Rincon conducted biological surveys across the site in July 2021 and documented onsite biological resources and the site's potential to support special status species. The BRA (Rincon 2021) assesses

potential Project impacts to biological resources at the site. The majority of the site is located in the dry lakebed, which provides extremely limited value for wildlife. No substantial aquatic or riparian habitat is present, and the site does not support fish or other aquatic life. Project impacts in the dry lakebed would not be expected to adversely affect fish and wildlife resources.

The ephemeral streams present at the site outside of the dry lakebed are small and water flows are low in volume and short in duration. The streams do not contain habitat characteristics that differentiate them from the surrounding landscape, including riparian or other vegetation that is distinct from adjacent areas or known to support special status species. Common and special status wildlife species expected to utilize the site are wide-ranging and are not specifically dependent on these streams; in other words, the streams don't provide any additional resources that may benefit wildlife that are not present in the adjacent areas.

Assessment of Jurisdictional Waters and Wetlands

Delineation of Potential CDFW and RWQCB Jurisdiction

This section presents the results of the delineation of ephemeral streams and retention basins/leaked pipes that are potentially under the jurisdiction of the CDFW and/or RWQCB at the 1,854-acre Project area. A total of 9.29 acres/91,250 linear feet of ephemeral streams and 0.401 acres of retention basins, and leaked pipeline were delineated onsite. Wetlands are limited to the small (less than 0.01 acres), isolated wetland at what is likely a leaked pipeline and three of the four retention basins.

Figure 5a through Figure 5d depict the location and extent of delineated stream segments and other aquatic features. Table 3 lists the delineated segment ID, type, hydroperiod, average top of bank width (in feet), and potential CDFW and RWQCB jurisdiction in linear feet and acreage. A discussion of delineated streams and retention basins is provided below.

Indicators of fluvial activity, such as sediment transport and deposition, shelving, and the presence of litter and debris, were observed in the ephemeral streams. Soils in these channels include smaller particle sizes such as silt and clay. Indicators of fluvial activity were often absent or severely obscured where a stream is present on roads. Stream segments were only delineated where at least faint evidence of flow was present.

As noted before, the slope gradient nears zero in areas adjacent to the dry lakebed, and any infrequent, low-volume, short-duration water flows in the shallow delineated streams disperse, dissipate, and percolate into the mostly-level ground before reaching the dry lake. The streams lack a clear surface connection, via defined channels with bed and bank, to the dry lakebed, and there is no discernible distinction with adjacent uplands.

Table 3 Summary of Delineated Features Onsite

Segment ID	Feature Type	Hydroperiod	Average Top of Bank Width (feet)	RWQCBJurisdiction			CDFW Jurisdictional Streambed (acres)
				Non-wetland Waters of the State (linear feet)	Non-wetland Waters of the State (acres)	Wetland Waters of the State(acres)	
1	Stream	Ephemeral	4	967.35	0.0858	–	0.0858
2	Stream	Ephemeral	4	1,360.57	0.1161	–	0.1161
3	Stream	Ephemeral	4	647.26	0.0597	–	0.0597
4	Stream	Ephemeral	4	726.08	0.0669	–	0.0669
5	Stream	Ephemeral	4	2,354.16	0.2143	–	0.2143
6	Stream	Ephemeral	4	1,940.81	0.1780	–	0.1780
7	Stream	Ephemeral	4	2,962.53	0.2719	–	0.2719
8	Stream	Ephemeral	4	1,418.10	0.1304	–	0.1304
9	Stream	Ephemeral	4	3,211.51	0.2934	–	0.2934

Segment ID	Feature Type	Hydroperiod	Average Top of Bank Width (feet)	RWQCBJurisdiction			CDFW Jurisdictional Streambed (acres)
				Non-wetland Waters of the State (linear feet)	Non-wetland Waters of the State (acres)	Wetland Waters of the State(acres)	
10	Stream	Ephemeral	4	1,967.58	0.1809	–	0.1809
11	Stream	Ephemeral	4	3,206.66	0.2943	–	0.2943
12	Stream	Ephemeral	4	1,226.67	0.1130	–	0.1130
13	Stream	Ephemeral	4	6,039.18	0.5529	–	0.5529
14	Stream	Ephemeral	4	6,956.78	0.6377	–	0.6377
15	Stream	Ephemeral	4	1,931.45	0.1778	–	0.1778
16	Stream	Ephemeral	4	2,432.64	0.2235	–	0.2235
17	Stream	Ephemeral	4	3,130.30	0.2876	–	0.2876
18	Stream	Ephemeral	4	3,591.80	0.3297	–	0.3297
19	Stream	Ephemeral	4	8,533.16	0.7778	–	0.7778
20	Stream	Ephemeral	4	6,689.50	0.6117	–	0.6117
21	Stream	Ephemeral	4	2,225.19	0.2044	–	0.2044
22	Stream	Ephemeral	4	411.54	0.0373	–	0.0373
23	Stream	Ephemeral	4	1,506.97	0.1385	–	0.1385
24	Stream	Ephemeral	4	3,434.12	0.3125	–	0.3125
25	Stream	Ephemeral	4	2,251.03	0.2058	–	0.2058
26	Stream	Ephemeral	4	6,254.48	0.5696	–	0.5696
27	Stream	Ephemeral	4	1,287.97	0.1170	–	0.1170
28	Stream	Ephemeral	4	3,128.29	0.2870	–	0.2870
29	Stream	Ephemeral	4	2,878.73	0.2644	–	0.2644
30	Stream	Ephemeral	4	2,217.85	0.2036	–	0.2036
31	Stream	Ephemeral	4	3,438.34	0.3149	–	0.3149
32	Stream	Ephemeral	4	921.60	0.0839	–	0.0839
33	Stream	Ephemeral	4	0.91	0.0002	–	0.0002
34	Retention Basin	N/A	N/A	N/A	–	0.10	–
35	Retention Basin	N/A	N/A	N/A	0.14	–	–
36	Retention Basin	N/A	N/A	N/A	–	0.12	–
37	Retention Basin	N/A	N/A	N/A	–	0.04	–
38	Isolated Wetland	N/A	N/A	N/A	–	0.001	–
Total				**91,250.20**	**9.43**	**0.261**	**9.29**

A total of 33 stream segments, four (4) retention basins, and one (1) isolated wetland were delineated at the Project area. Stream widths (from top of banks) ranged from 2 to 8 feet, and the average width was 4 feet. These streams convey flows only during and immediately after high precipitation events. Evidence of fluvial activity in the majority of the streams is faint, and primarily consists of weakly defined multiple-thread channels with very low banks, minor changes in soil character, and marginally decreased vegetative cover. The delineated streams were distinct and separated by local topography and elevations of land that confine them to a definite course when

waters rise to their highest level. Vegetation species composition in the streams and stream margins does not differ from the surrounding areas, while vegetation density is generally slightly lower. Soils consist primarily of unconsolidated small particles including sand and gravel. No evidence of higher concentrations of suspended sediment or greater transport rates of bedload sediment was observed in these features. Infiltration rates are high. Overall, the movement of sediment, organic debris, and nutrients is extremely limited.

Based on a review of historical aerial photographs, it is likely that these streams conveyed higher volume flows and were more clearly defined prior to the construction of roads and increased human use and manipulation of the site. In their current condition, most streams have been fragmented or isolated by formal and informal roads and OHV tracks, which have greatly reduced fluvial activity. Many of these may be partially abandoned channels, based on the isolation from their source and very low fluvial activity.

A number of ephemeral streams surrounding the dry lakebed are mapped in the NWI. They are classified as riverine, intermittently flooded streambeds (Cowardin code R4SBJ). In these areas, most of the streambeds are depicted as connecting to the dry lakebed. However, as discussed above, field observations indicate that the streams onsite lack a clear surface connection via defined channels with bed and bank to the dry lakebed and flows dissipate to sheet flow before entering the lake. The NHD mapping data is similar to the NWI. Streambed features are depicted in approximately the same locations but fewer features are depicted. Similarly, some features are depicted connecting to the dry lakebed, and others are not.

The four retention basins on the Project area are man-made and associated with agricultural uses from surrounding farmlands. Of the four basins, one was determined to consist of wetland waters based on a sampling point examined in the bed (see Soils section above and Figure 5d in Appendix D). Two basins could not be accessed and were conservatively assumed to consist of wetland waters for the purposes of this report. The other basin did not contain hydric soils and is therefore not a wetland.

One isolated wetland was observed in the western portion of the Project area in a small puddle dominated by cattails. Ponding and a hydrogen sulfide odor were observed at the time of the survey.

Conclusion

It is anticipated that the proposed Project may proceed under the authorization of a Waste Discharge Requirements permit from the RWQCB and a Lake or Streambed Alteration Agreement from CDFW. A notice of intent to RWQCB and 1602 notification to CDFW would be required. A permit from USACE would not be required. However, the final design of the proposed Project is still in preparation. It is recommended that the final Project design implement avoidance of jurisdictional aquatic features to the maximum extent feasible to support the permit application process with RWQCB and CDFW. A summary of agency jurisdiction is presented in Table 4 below.

Table 4 Summary of Agency Jurisdiction

Waters of the United States (acres)	CDFW Jurisdictional Streambed		Non-wetland Waters of the State		Wetland Waters of the State (acres)
	Acres	Linear Feet	Acres	Linear Feet	
0.00	9.29	91,250	9.43	91,250	0.261

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Appendix A

Wetland Determination Data Forms

Arid West Ephemeral and Intermittent Streams OHWM Datasheet

Project: Sienna Solar
Project Number:
Stream: unnamed ephemeral
Investigator(s): Malek Al-Marayati, Christian Nordal

Date: 7/21/21 **Time:** 10:15am
Town: Lucerne **State:** CA
Photo begin file#: **Photo end file#:**

Y ☑ / N ☐ Do normal circumstances exist on the site?

Y ☐ / N ☑ Is the site significantly disturbed?

Location Details: NE of dry lake

Projection: **Datum:**
Coordinates: 34.507432, -116.884799

Potential anthropogenic influences on the channel system:
dirt road bisects stream directly upstream of sampled cross section, adjacent developments.

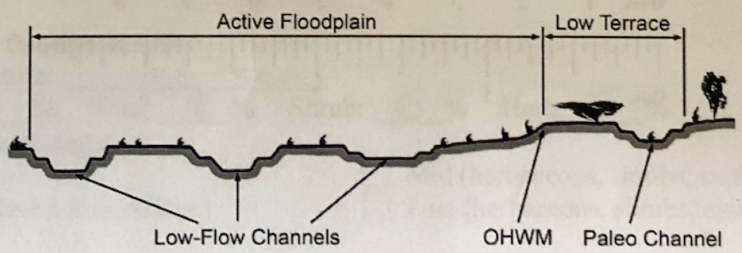
Brief site description:
Large system of ephemeral tributaries to Lucerne Dry Lake conveying flow southwest on flat desert landscape

Checklist of resources (if available):

- ☑ Aerial photography
  Dates:
- ☑ Topographic maps
- ☐ Geologic maps
- ☐ Vegetation maps
- ☑ Soils maps
- ☐ Rainfall/precipitation maps
- ☐ Existing delineation(s) for site
- ☑ Global positioning system (GPS)
- ☐ Other studies

- ☐ Stream gage data
  Gage number:
  Period of record:
  - ☐ History of recent effective discharges
  - ☐ Results of flood frequency analysis
  - ☐ Most recent shift-adjusted rating
  - ☐ Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event

Hydrogeomorphic Floodplain Units

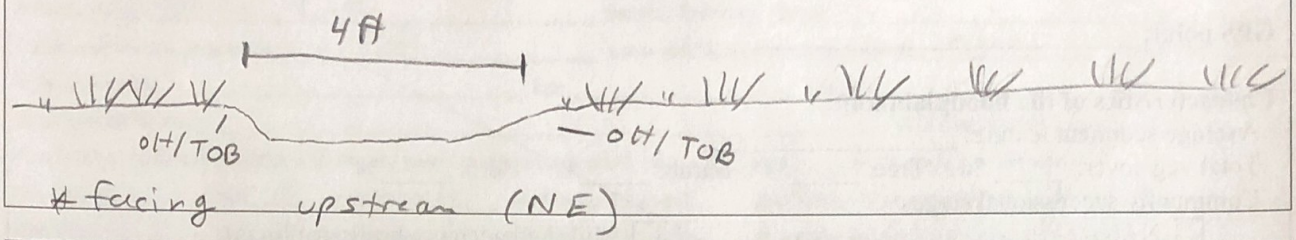


Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:

1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site.
2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units.
3. Determine a point on the cross section that is characteristic of one of the hydrogeomorphic floodplain units.
   a) Record the floodplain unit and GPS position.
   b) Describe the sediment texture (using the Wentworth class size) and the vegetation characteristics of the floodplain unit.
   c) Identify any indicators present at the location.
4. Repeat for other points in different hydrogeomorphic floodplain units across the cross section.
5. Identify the OHWM and record the indicators. Record the OHWM position via:
   - ☐ Mapping on aerial photograph
   - ☑ Digitized on computer
   - ☑ GPS
   - ☐ Other:

Project ID: **Cross section ID:** **Date:** **Time:**

Cross section drawing:



facing upstream (NE)

OHWM

GPS point: 34.507403, -116.884930

Indicators:

- [x] Change in average sediment texture
- [ ] Change in vegetation species
- [x] Change in vegetation cover
- [x] Break in bank slope
- [ ] Other: _____
- [ ] Other: _____

Comments:

Larrea tridentata + Atriplex canescens dominant above OHWM.

Floodplain unit:

- [ ] Low-Flow Channel
- [x] Active Floodplain
- [ ] Low Terrace

GPS point: 34.507376, -116.885002

Characteristics of the floodplain unit:

Average sediment texture: coarse sand

Total veg cover: 5 % Tree: 0 % Shrub: 0 % Herb: 5 %

Community successional stage:

- [ ] NA
- [x] Early (herbaceous & seedlings)
- [ ] Mid (herbaceous, shrubs, saplings)
- [ ] Late (herbaceous, shrubs, mature trees)

Indicators:

- [ ] Mudcracks
- [ ] Ripples
- [x] Drift and/or debris
- [x] Presence of bed and bank
- [x] Benches
- [x] Soil development
- [x] Surface relief
- [ ] Other: _____
- [ ] Other: _____
- [ ] Other: _____

Comments:

Schismus barbatus growing in floodplain

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: 21-11216 Sienna Solar City/County: Lucerne / San Bernardino Sampling Date: 7/20/2021

Applicant/Owner: 99MT 8me, LLC State: CA Sampling Point: SP01

Investigator(s): Malek Al-Marayati, Christian Nordal Section, Township, Range: 28, 05N, 01E

Landform (hillslope, terrace, etc.): playa Local relief (concave, convex, none): none Slope (%): 0

Subregion (LRR): D Lat: 34.491908 Long: -116.890489 Datum: WGS84

Soil Map Unit Name: GLENDALE VARIANT SILT LOAM, SALINE-ALKALI NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✔	No _____	**Is the Sampled Area within a Wetland?** Yes _____ No ✔
Hydric Soil Present?	Yes _____	No ✔	
Wetland Hydrology Present?	Yes ✔	No _____	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1. NA			
2.			
3.			
4.			
	0	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1. NA			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Herb Stratum (Plot size: 5 ft.)			
1. NA			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	0	= Total Cover	
Woody Vine Stratum (Plot size: 15 ft.)			
1. NA			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 100 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 0 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

✔ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✔ No _____

Remarks:

Unvegetated playa

SOIL

Sampling Point: SP01

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-20	10 YR 4/3	100					C	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No ✔

Remarks:

AAD+ reaction negative throughout entire layer, pH = 6-7 at 0-6 in. depth (not alkaline).

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ✔ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No ✔ Depth (inches): _____

Water Table Present? Yes _____ No ✔ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✔ Depth (inches): _____

Wetland Hydrology Present? Yes ✔ No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: 21-11216 Sienna Solar City/County: Lucerne / San Bernardino Sampling Date: 7/20/2021

Applicant/Owner: 99MT 8me, LLC State: CA Sampling Point: SP02

Investigator(s): Malek Al-Marayati, Christian Nordal Section, Township, Range: 32, 05N, 01E

Landform (hillslope, terrace, etc.): ag field Local relief (concave, convex, none): concave Slope (%): 3

Subregion (LRR): D Lat: 34.487146 Long: -116.897694 Datum: WGS84

Soil Map Unit Name: PETERMAN CLAY NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology ✔ significantly disturbed? Are "Normal Circumstances" present? Yes _____ No ✔

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✔	**Is the Sampled Area within a Wetland?** Yes _____ No ✔
Hydric Soil Present?	Yes _____	No ✔	
Wetland Hydrology Present?	Yes ✔	No _____	

Remarks:

Hydrology manipulated via irrigation systems for agricultural purposes.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1. NA			
2.			
3.			
4.			
	0	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1. NA			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Herb Stratum (Plot size: 5 ft.)			
1. Bromus catharticus	30	Y	UPL
2. Plantago lanceolata	20	Y	FAC
3. Medicago sativa	48	Y	UPL
4.			
5.			
6.			
7.			
8.			
	98	= Total Cover	
Woody Vine Stratum (Plot size: 15 ft.)			
1. NA			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 0 % Cover of Biotic Crust 2

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 33% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes _____ No ✔

Remarks:

SOIL

Sampling Point: SP02

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-20	10 YR 4/3	100					CL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No ✔

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ✔ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No ✔ Depth (inches): _____

Water Table Present? Yes _____ No ✔ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✔ Depth (inches): _____

Wetland Hydrology Present? Yes ✔ No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Green algal matting on soil surface - likely associated with agricultural activities.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: 21-11216 Sienna Solar City/County: Lucerne / San Bernardino Sampling Date: 7/21/2021

Applicant/Owner: 99MT 8me, LLC State: CA Sampling Point: SP03

Investigator(s): Malek Al-Marayati, Christian Nordal Section, Township, Range: 32, 05N, 01E

Landform (hillslope, terrace, etc.): detention basin Local relief (concave, convex, none): concave Slope (%): 5

Subregion (LRR): D Lat: 34.485528 Long: -116.901589 Datum: WGS84

Soil Map Unit Name: PETERMAN CLAY NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology ✔ significantly disturbed? Are "Normal Circumstances" present? Yes _____ No ✔

Are Vegetation _____, Soil ✔, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✔ No _____	**Is the Sampled Area within a Wetland?** Yes ✔ No _____
Hydric Soil Present?	Yes ✔ No _____	
Wetland Hydrology Present?	Yes ✔ No _____	

Remarks:

Hydrology manipulated via constructed basin for agricultural purposes.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1. Ulmus pumila	20	Y	UPL
2.			
3.			
4.			
	20	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1. NA			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Herb Stratum (Plot size: 5 ft.)			
1. Paspalum distichum	60	Y	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	60	= Total Cover	
Woody Vine Stratum (Plot size: 15 ft.)			
1. NA			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 30 % Cover of Biotic Crust 10

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species	x 1 =	
FACW species 60	x 2 =	120
FAC species	x 3 =	
FACU species	x 4 =	
UPL species 20	x 5 =	100
Column Totals: 80 (A)		220 (B)

Prevalence Index = B/A = 2.75

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

✔ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✔ No _____

Remarks:

SOIL

Sampling Point: SP03

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-2	2.5 Y 4/2	100					C	
2-4	2.5 Y 4/1	100					C	
4-11	2.5 Y 4/2	100					C	
11-20	2.5 Y 5/2	100					C	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ✔ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✔ No ___

Remarks:

AAD+ reaction positive at 4.5-20 inches.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ✔ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ✔ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✔ Depth (inches): _____

Water Table Present? Yes ✔ No ___ Depth (inches): 13

Saturation Present? (includes capillary fringe) Yes ✔ No ___ Depth (inches): 13

Wetland Hydrology Present? Yes ✔ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

AAD+ reaction positive starting at 4.5-inch depth

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: 21-11216 Sienna Solar City/County: Lucerne / San Bernardino Sampling Date: 7/21/2021

Applicant/Owner: 99MT 8me, LLC State: CA Sampling Point: SP04

Investigator(s): Malek Al-Marayati, Christian Nordal Section, Township, Range: 32, 05N, 01E

Landform (hillslope, terrace, etc.): ag field Local relief (concave, convex, none): concave Slope (%): 2

Subregion (LRR): D Lat: 34.485592 Long: -116.901409 Datum: WGS84

Soil Map Unit Name: PETERMAN CLAY NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No _____ (If no, explain in Remarks.)

Are Vegetation ✔, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes _____ No ✔

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✔	**Is the Sampled Area within a Wetland?** Yes _____ No ✔
Hydric Soil Present?	Yes _____	No ✔	
Wetland Hydrology Present?	Yes _____	No ✔	

Remarks:

Alfalfa field planted from previous agricultural use.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1. NA			
2.			
3.			
4.			
	0	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1. NA			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Herb Stratum (Plot size: 5 ft.)			
1. Medicago sativa	100	Y	UPL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	100	= Total Cover	
Woody Vine Stratum (Plot size: 15 ft.)			
1. NA			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 0 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes _____ No ✔

Remarks:

SOIL

Sampling Point: SP04

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-20	10 YR 4/3	100					CL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No ✔

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No ✔ Depth (inches): _____

Water Table Present? Yes _____ No ✔ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✔ Depth (inches): _____

Wetland Hydrology Present? Yes _____ No ✔

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: 21-11216 Sienna Solar City/County: Lucerne / San Bernardino Sampling Date: 7/21/2021

Applicant/Owner: 99MT 8me, LLC State: CA Sampling Point: SP05

Investigator(s): Malek Al-Marayati, Christian Nordal Section, Township, Range: 32, 05N, 01E

Landform (hillslope, terrace, etc.): detention basin Local relief (concave, convex, none): concave Slope (%): 2

Subregion (LRR): D Lat: 34.487258 Long: -116.897231 Datum: WGS84

Soil Map Unit Name: PETERMAN CLAY NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology ✔ significantly disturbed? Are "Normal Circumstances" present? Yes _____ No ✔

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✔	**Is the Sampled Area within a Wetland?** Yes _____ No ✔
Hydric Soil Present?	Yes _____	No ✔	
Wetland Hydrology Present?	Yes ✔	No _____	

Remarks:

Hydrology manipulated for agricultural purposes via constructed basin.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 30 ft.)			
1. NA			
2.			
3.			
4.			
	0	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1. NA			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Herb Stratum (Plot size: 5 ft.)			
1. Panicum milaceum	60	Y	UPL
2. Portulaca oleracea	10	N	FAC
3. Cynodon dactylon	5	N	FACU
4.			
5.			
6.			
7.			
8.			
	75	= Total Cover	
Woody Vine Stratum (Plot size: 15 ft.)			
1. NA			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 25 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes _____ No ✔

Remarks:

SOIL

Sampling Point: SP05

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-6	10 YR 4/3	100					SiCL	
6-20	10 YR 4/3	100					CL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ **No** ✔

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ✔ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No ✔ Depth (inches): _____

Water Table Present? Yes _____ No ✔ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✔ Depth (inches): _____

Wetland Hydrology Present? Yes ✔ **No** _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: 21-11216 Sienna Solar City/County: Lucerne / San Bernardino Sampling Date: 7/20/2021

Applicant/Owner: 99MT 8me, LLC State: CA Sampling Point: SP01

Investigator(s): Malek Al-Marayati, Christian Nordal Section, Township, Range: 28, 05N, 01E

Landform (hillslope, terrace, etc.): playa Local relief (concave, convex, none): none Slope (%): 0

Subregion (LRR): D Lat: 34.491908 Long: -116.890489 Datum: WGS84

Soil Map Unit Name: GLENDALE VARIANT SILT LOAM, SALINE-ALKALI NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✔	No ____	**Is the Sampled Area within a Wetland?** Yes ____ No ✔
Hydric Soil Present?	Yes ____	No ✔	
Wetland Hydrology Present?	Yes ✔	No ____	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1. NA			
2.			
3.			
4.			
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1. NA			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 5 ft.)			
1. NA			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	0 = Total Cover		
Woody Vine Stratum (Plot size: 15 ft.)			
1. NA			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 100 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 0 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: (A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ___ Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ✔ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✔ No ____

Remarks:

Unvegetated playa

SOIL

Sampling Point: SP01

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-20	10 YR 4/3	100					C	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) (**LRR C**)
- ☐ 1 cm Muck (A9) (**LRR D**)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ☐ 1 cm Muck (A9) (**LRR C**)
- ☐ 2 cm Muck (A10) (**LRR B**)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ☐ No ☑

Remarks:

AAD+ reaction negative throughout entire layer, pH = 6-7 at 0-6 in. depth (not alkaline).

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1) (**Nonriverine**)
- ☐ Sediment Deposits (B2) (**Nonriverine**)
- ☐ Drift Deposits (B3) (**Nonriverine**)
- ☑ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Water-Stained Leaves (B9)
- ☐ Salt Crust (B11)
- ☐ Biotic Crust (B12)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ☐ Water Marks (B1) (**Riverine**)
- ☐ Sediment Deposits (B2) (**Riverine**)
- ☐ Drift Deposits (B3) (**Riverine**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ☐ No ☑ Depth (inches): _____

Water Table Present? Yes ☐ No ☑ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ☐ No ☑ Depth (inches): _____

Wetland Hydrology Present? Yes ☑ No ☐

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: 21-11216 Sienna Solar City/County: Lucerne / San Bernardino Sampling Date: 7/22/2021

Applicant/Owner: 99MT 8me, LLC State: CA Sampling Point: SP07

Investigator(s): Malek Al-Marayati, Christian Nordal Section, Township, Range: 30, 05N, 01E

Landform (hillslope, terrace, etc.): depression Local relief (concave, convex, none): concave Slope (%): 8

Subregion (LRR): D Lat: 34.492433 Long: -116.912845 Datum: WGS84

Soil Map Unit Name: PETERMAN CLAY NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology ✔ significantly disturbed? Are "Normal Circumstances" present? Yes _____ No ✔

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✔	No _____	**Is the Sampled Area within a Wetland?** Yes ✔ No _____
Hydric Soil Present?	Yes ✔	No _____	
Wetland Hydrology Present?	Yes ✔	No _____	

Remarks:

Small patch of cattails growing in a roadside puddle where source of hydrology is unknown but likely caused by irrigation associated with surrounding agricultural land use.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1. NA			
2.			
3.			
4.			
	0	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1. NA			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Herb Stratum (Plot size: 5 ft.)			
1. Typha domingensis	40	Y	OBL
2. Kali tragus ssp. tragus	5	N	UPL
3.			
4.			
5.			
6.			
7.			
8.			
	45	= Total Cover	
Woody Vine Stratum (Plot size: 15 ft.)			
1. NA			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 55 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

✔ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✔ No _____

Remarks:

SOIL

Sampling Point: SP07

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
NA								

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ✔ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✔ **No** _____

Remarks:

No soil pit needed due to H2S odor at surface

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ✔ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ✔ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ✔ No _____ Depth (inches): 5

Water Table Present? Yes _____ No _____ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No _____ Depth (inches): _____

Wetland Hydrology Present? Yes ✔ **No** _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: 21-11216 Sienna Solar City/County: Lucerne / San Bernardino Sampling Date: 7/22/2021

Applicant/Owner: 99MT 8me, LLC State: CA Sampling Point: SP08

Investigator(s): Malek Al-Marayati, Christian Nordal Section, Township, Range: 30, 05N, 01E

Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): none Slope (%): 0

Subregion (LRR): D Lat: 34.492398 Long: -116.912827 Datum: WGS84

Soil Map Unit Name: PETERMAN CLAY NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✔ No _____ (If no, explain in Remarks.)

Are Vegetation ✔, Soil ✔, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes _____ No ✔

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✔	**Is the Sampled Area within a Wetland?** Yes _____ No ✔
Hydric Soil Present?	Yes _____	No ✔	
Wetland Hydrology Present?	Yes _____	No ✔	

Remarks:

Compacted soil in a junkyard cleared of vegetation.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1. NA			
2.			
3.			
4.			
	0	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1. NA			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Herb Stratum (Plot size: 5 ft.)			
1. Kali tragus ssp. tragus	40	Y	UPL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	40	= Total Cover	
Woody Vine Stratum (Plot size: 15 ft.)			
1. NA			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 60 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes _____ No ✔

Remarks:

SOIL

Sampling Point: SP08

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
NA								

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No ✔

Remarks:

Unable to dig soil pit due to compacted soil, hydric soils presumed absent.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No ✔ Depth (inches): _____

Water Table Present? Yes _____ No _____ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No _____ Depth (inches): _____

Wetland Hydrology Present? Yes _____ No ✔

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No surface indicators of hydrology present.

Appendix B

Regulatory Overview and Definitions

Regulatory Framework

The following is a brief summary of the regulatory context under which biological resources are managed at the federal, State, and local levels. A number of federal and State statutes provide a regulatory structure which guide the protection of jurisdictional features. Agencies with the responsibility for protection of jurisdictional features within the project site include:

- United States Army Corps of Engineers (non-wetland waters and wetlands of the United States)
- Regional Water Quality Control Board (waters of the State)
- California Department Fish and Wildlife (riparian areas, streambeds, and lakes)

United States Army Corps of Engineers Jurisdiction

The United States Army Corps of Engineers (USACE), is responsible for administering several federal programs related to ensuring the quality and navigability of the nation's waters.

Clean Water Act Section 404

Congress enacted the Clean Water Act (CWA) "to restore and maintain the chemical, physical, and biological integrity of the Nation's waters." Section 404 of the CWA authorizes the Secretary of the Army, acting through the USACE, to issue permits regulating the discharge of dredged or fill materials into the "navigable waters at specified disposal sites."

Section 502 of the CWA further defines "navigable waters" as "waters of the United States, including the territorial seas." "Waters of the United States" are broadly defined at 33 CFR Part 328.3 to include navigable, tidal, and interstate waters and certain impoundments, tributaries, and wetlands. The agencies' most recent regulatory definition of the term was promulgated in January 2023, following failed attempts in prior years that had been frustrated by legal challenges. However, in May 2023 the U.S. Supreme Court issued its ruling in *Sackett v. Environmental Protection Agency,* which invalidated portions of the updated regulations. To address this ruling, in September 2023 the agencies issued a "conforming rule" (88 FR 61964-61969) modifying their definition of "waters of the United States" to comport with the Court's ruling. This definition is described in detail below.

Waters of the U.S.

Current USACE and USEPA regulations, reflecting of the January 2023 definition as modified by the September 2023 Conforming Rule, define "waters of the United States" as follows (33 CFR 328.3; see also 88 FR 61964-61969):

(1) Waters which are:

(i) Currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;

(ii) The territorial seas; or

(iii) Interstate waters;

(2) Impoundments of waters otherwise defined as waters of the United States under this definition, other than impoundments of waters identified under paragraph (a)(5) of this section;

(3) Tributaries of waters identified in paragraph (a)(1) or (2) of this section that are relatively permanent, standing or continuously flowing bodies of water;

(4) Wetlands adjacent to the following waters:

(i) Waters identified in paragraph (a)(1) of this section; or

(ii) Relatively permanent, standing or continuously flowing bodies of water identified in paragraph (a)(2) or (a)(3) of this section and with a continuous surface connection to those waters;

(5) Intrastate lakes and ponds, not identified in paragraphs (a)(1) through (4) of this section that are relatively permanent, standing or continuously flowing bodies of water with a continuous surface connection to the waters identified in paragraph (a)(1) or (a)(3) of this section.

The definition specifies that the following features are not “waters of the United States” even where they otherwise meet the terms of provisions (2) through (5) above:

(1) Waste treatment systems, including treatment ponds or lagoons, designed to meet the requirements of the Clean Water Act;

(2) Prior converted cropland designated by the Secretary of Agriculture. The exclusion would cease upon a change of use, which means that the area is no longer available for the production of agricultural commodities. Notwithstanding the determination of an area's status as prior converted cropland by any other Federal agency, for the purposes of the Clean Water Act, the final authority regarding Clean Water Act jurisdiction remains with EPA;

(3) Ditches (including roadside ditches) excavated wholly in and draining only dry land and that do not carry a relatively permanent flow of water;

(4) Artificially irrigated areas that would revert to dry land if the irrigation ceased;

(5) Artificial lakes or ponds created by excavating or diking dry land to collect and retain water and which are used exclusively for such purposes as stock watering, irrigation, settling basins, or rice growing;

(6) Artificial reflecting or swimming pools or other small ornamental bodies of water created by excavating or diking dry land to retain water for primarily aesthetic reasons;

(7) Waterfilled depressions created in dry land incidental to construction activity and pits excavated in dry land for the purpose of obtaining fill, sand, or gravel unless and until the construction or excavation operation is abandoned and the resulting body of water meets the definition of waters of the United States; and

(8) Swales and erosional features (e.g., gullies, small washes) characterized by low volume, infrequent, or short duration flow.

The lateral limits of USACE jurisdiction in non-tidal waters is defined by the "ordinary high-water mark" (OHWM) unless adjacent wetlands are present. The OHWM is a line on the shore or edge of a channel established by the fluctuations of water and indicated by physical characteristics such as a

clear, natural line impressed upon the bank, shelving, changes in the character of soil, destruction of vegetation, or the presence of debris (33 CFR 328.3(c)(1)). As such, waters are recognized in the field by the presence of a defined watercourse with appropriate physical and topographic features. If wetlands occur within, or adjacent to, waters of the United States, the lateral limits of USACE jurisdiction extend beyond the OHWM to the outer edge of the wetlands (33 CFR 328.4 (c)). The upstream limit of jurisdiction in the absence of adjacent wetlands is the point beyond which the OHWM is no longer perceptible (33 CFR 328.4; see also 51 FR 41217).

Wetlands

The USACE defines wetlands as "those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions" (33 CFR 328.3(c)(1)). The USACE's delineation procedures identify wetlands in the field based on indicators of three wetland parameters: hydrophytic vegetation, hydric soils, and wetland hydrology. The following is a discussion of each of these parameters.

Hydrophytic Vegetation

Hydrophytic vegetation dominates areas where frequency and duration of inundation or soil saturation exerts a controlling influence on the plant species present. Plant species are assigned wetland indicator status according to the probability of their occurring in wetlands. More than fifty percent of the dominant plant species must have a wetland indicator status to meet the hydrophytic vegetation criterion. The USACE published the National Wetland Plant List (USACE 2018), which separates vascular plants into the following four basic categories based on plant species frequency of occurrence in wetlands:

- **Obligate Wetland (OBL).** Almost always occur in wetlands
- **Facultative Wetland (FACW).** Usually occur in wetlands, but occasionally found in non-wetlands
- **Facultative (FAC).** Occur in wetlands or non-wetlands
- **Facultative Upland (FACU).** Usually occur in non-wetlands, but may occur in wetlands
- **Obligate Upland (UPL).** Almost never occur in wetlands

The USACE considers OBL, FACW and FAC species to be indicators of wetlands. An area is considered to have hydrophytic vegetation when greater than 50 percent of the dominant species in each vegetative stratum (tree, shrub, and herb) fall within these categories. Any species not appearing on the United States Fish and Wildlife Service's list is assumed to be an upland species, almost never occurring in wetlands. In addition, an area needs to contain at least 5% vegetative cover to be considered as a vegetated wetland.

Hydric Soils

Hydric soils are saturated or inundated for a sufficient duration during the growing season to develop anaerobic or reducing conditions that favor the growth and regeneration of hydrophytic vegetation. Field indicators of wetland soils include observations of ponding, inundation, saturation, dark (low chroma) soil colors, bright mottles (concentrations of oxidized minerals such as iron), gleying (indicates reducing conditions by a blue-grey color), or accumulation of organic material. Additional supporting information includes documentation of soil as hydric or reference to wet conditions in the local soils survey, both of which must be verified in the field.

Wetland Hydrology

Wetland hydrology is inundation or soil saturation with a frequency and duration long enough to cause the development of hydric soils and plant communities dominated by hydrophytic vegetation. If direct observation of wetland hydrology is not possible (as in seasonal wetlands), or records of wetland hydrology are not available (such as stream gauges), assessment of wetland hydrology is frequently supported by field indicators, such as water marks, drift lines, sediment deposits, or drainage patterns in wetlands.

Limitations on Jurisdiction based on Sackett v. USEPA Supreme Court Decision

On May 25, 2023, the Supreme Court issued its decision on the petition from the Sacketts, a family in Idaho that was subject to a compliance order from the USEPA for backfilling their lot near Priest Lake, which the USEPA claimed contained federally regulated wetlands. The wetlands in question were adjacent to a ditch that fed a creek that ultimately drained into Priest Lake, a navigable water body. The USEPA asserted that the Sacketts had violated the law by filling the wetlands on their property without a permit. The Court's decision addressed controversy over whether, and under what conditions, the CWA reaches navigable waters' tributaries or adjacent wetlands. The Supreme Court's decision in *Sackett* provides definitive guidance to the agencies in determining the limits of their Clean Water Act authority. Major tenets of the decision have been incorporated into the agencies' current regulations through the September 2023 Conforming Rule.

The Court decided:

- "Adjacent wetlands" are WOTUS only if there is a continuous surface connection between the wetland and a navigable or relatively permanent water body, such that it is difficult to determine the boundary between the wetland and the water body. The opinion notes that "temporary interruptions to surface connection may sometimes occur because of phenomena like low tides or dry spells." The agencies addressed this element by defining the term "adjacent" to mean "having a continuous surface connection" in the Conforming Rule.

- The Significant Nexus Standard, introduced by the Court in prior decisions, is not mentioned in the Clean Water Act and should not be used. The Court determined that the standard applies ecological factors whose use in determining jurisdiction is not supported by the statute. The Conforming Rule removed significant nexus considerations from the definition.
- Although jurisdiction over tributaries was not addressed by the Court, the decision stated that "…the [Clean Water Act's] use of "waters" encompasses only those relatively permanent, standing or continuously flowing bodies of water forming geographical features that are described in ordinary parlance as streams, oceans, rivers, and lakes." The Conforming Rule makes clear that only relatively permanent tributaries qualify as "waters of the United States."

Rivers and Harbors Act Section 10

Section 10 of the Rivers and Harbors Act of 1899 requires authorization from the USACE for the construction of any structure in or over any navigable water of the United States. Structures or work outside the limits defined for navigable waters of the United States require a Section 10 permit if the structure or work affects the course, location, or condition of the water body. The law applies to any dredging or disposal of dredged materials, excavation, filling, re-channelization, or any other

modification of a navigable water of the United States, and applies to all structures and work. It further includes, without limitation, any wharf, dolphin, weir, boom breakwater, jetty, groin, bank protection (e.g. riprap, revetment, bulkhead), mooring structures such as pilings, aerial or subaqueous power transmission lines, intake or outfall pipes, permanently moored floating vessel, tunnel, artificial canal, boat ramp, aids to navigation, and any other permanent, or semi-permanent obstacle or obstruction. It is important to note that Section 10 applies only to navigable waters, and thus does not apply to work in non-navigable wetlands or tributaries. In some cases, Section 10 authorization is issued by the USACE concurrently with CWA Section 404 authorization, such as when certain Nationwide Permits are used.

Regional Water Quality Control Board Jurisdiction

The State Water Resources Control Board (SWRCB) and nine Regional Water Quality Control Boards (RWQCBs) have jurisdiction over "waters of the State," which are defined as any surface water or groundwater, including saline waters, within the boundaries of the state (California Water Code sec. 13050(e)). These agencies also have responsibilities for administering portions of the CWA.

Clean Water Act Section 401

Section 401 of the CWA requires an applicant requesting a federal license or permit for an activity that may result in any discharge into navigable waters (such as a Section 404 Permit) to provide state certification that the proposed activity will not violate state and federal water quality standards. In California, CWA Section 401 Water Quality Certification (Section 401 Certification) is issued by the RWQCBs and by the SWRCB for multi-region projects. The process begins when an applicant requests a pre-application meeting with the RWQCB, waits no less than 30 days, and then submits an application to the RWQCB and informs the USACE (or the applicable agency from which a license or permit was requested) that an application has been submitted. The USACE will then determine a "reasonable period of time" for the RWQCB to act on the application; this is typically 60 days for routine projects and longer for complex projects but may not exceed one year. Under current regulations, once initiated, the reasonable period of time cannot be stopped or paused. When the period has elapsed, if the RWQCB has not either issued or denied the application for Section 401 Certification, the USACE may determine that Certification has been waived and issue the requested permit. If a Section 401 Certification is issued it may include binding conditions, imposed either through the Certification itself or through the requested federal license or permit.

Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act (Porter-Cologne Act) is the principal law governing water quality regulation in California. It establishes a comprehensive program to protect water quality and the beneficial uses of water. The Porter-Cologne Act applies to surface waters, wetlands, and ground water and to both point and nonpoint sources of pollution. Pursuant to the Porter-Cologne Act (California Water Code section 13000 *et seq*.), the policy of the State is as follows:

- The quality of all the waters of the State shall be protected
- All activities and factors affecting the quality of water shall be regulated to attain the highest water quality within reason

- The State must be prepared to exercise its full power and jurisdiction to protect the quality of water in the State from degradation

The Porter-Cologne Act established nine RWQCBs (based on watershed boundaries) and the SWRCB, which are charged with implementing its provisions and which have primary responsibility for protecting water quality in California. The SWRCB provides program guidance and oversight, allocates funds, and reviews RWQCB decisions. In addition, the SWRCB allocates rights to the use of surface water. The RWQCBs have primary responsibility for individual permitting, inspection, and enforcement actions within each of nine hydrologic regions. The SWRCB and RWQCBs have numerous nonpoint source related responsibilities, including monitoring and assessment, planning, financial assistance, and management.

Section 13260 of the Porter-Cologne Act requires any person discharging or proposing to discharge waste that could affect the quality of waters of the State to file a Report of Waste Discharge with the appropriate RWQCB. The RWQCB may then authorize the discharge, subject to conditions, by issuing Waste Discharge Requirements (WDRs). While this requirement was historically applied primarily to outfalls and similar point source discharges, the SWRCB's *State Wetland Definition and Procedures for Discharges of Dredged or Fill Material to Waters of the State*, effective May 2020, make it clear that the agency will apply the Porter-Cologne Act's requirements to discharges of dredge and fill material as well. The *Procedures* state that they are to be used in issuing CWA Section 401 Certifications and WDRs, and largely mirror the existing review requirements for CWA Section 404 Permits and Section 401 Certifications, incorporating most elements of the USEPA's *Section 404(b)(1) Guidelines*. Following issuance of the *Procedures*, the SWRCB produced a consolidated application form for dredge/fill discharges that can be used to obtain a CWA Section 401 Water Quality Certification, WDRs, or both.

Non-Wetland Waters of the State

The SWRCB and RWQCBs have not established regulations for field determinations of waters of the state except for wetlands currently. In many cases the RWQCBs interpret the limits of waters of the State to be bounded by the OHWM unless isolated conditions or ephemeral waters are present. However, in the absence of statewide guidance each RWQCB may interpret jurisdictional boundaries within their region and the SWRCB has encouraged applicants to confirm jurisdictional limits with their RWQCB before submitting applications. As determined by the RWQCB, waters of the State may include riparian areas or other locations outside the OHWM, leading to a larger jurisdictional area over a given water body compared to the USACE.

Wetland Waters of the State

Procedures for defining wetland waters of the State pursuant to the SWRCB's *State Wetland Definition and Procedures for Discharges of Dredged or Fill Material to Waters of the State* went into effect May 28, 2020. The SWRCB defines an area as wetland if, under normal circumstances:

1) the area has continuous or recurrent saturation of the upper substrate caused by groundwater, or shallow surface water, or both;
2) the duration of such saturation is sufficient to cause anaerobic conditions in the upper substrate; and
3) the area's vegetation is dominated by hydrophytes or the area lacks vegetation.

The SWRCB's *Implementation Guidance for the Wetland Definition and Procedures for Discharges of Dredge and Fill Material to Waters of the State* (2020), states that waters of the U.S. and waters of the State should be delineated using the standard USACE delineation procedures, taking into consideration that the methods shall be modified only to allow for the fact that a lack of vegetation does not preclude an area from meeting the definition of a wetland.

California Department of Fish and Wildlife Jurisdiction

California Fish and Game Code section 1602 states that it is unlawful for any person to "substantially divert or obstruct the natural flow of, or substantially change or use any material from the bed, channel, or bank of, any river, stream, or lake" without first notifying the California Department of Fish and Wildlife (CDFW) of that activity. Thereafter, if CDFW determines and informs the entity that the activity will not substantially adversely affect any existing fish or wildlife resources, the entity may commence the activity. If, however, CDFG determines that the activity may substantially adversely affect an existing fish or wildlife resource, the entity may be required to obtain from CDFW a Streambed Alteration Agreement (SAA), which will include reasonable measures necessary to protect the affected resource(s), before the entity may conduct the activity described in the notification. Upon receiving a complete Notification of Lake/Streambed Alteration, CDFW has 60 days to present the entity with a Draft SAA. Upon review of the Draft SAA by the applicant, any problematic terms are negotiated with CDFW and a final SAA is executed.

The CDFW has not defined the term "stream" for the purposes of implementing its regulatory program under Section 1602, and the agency has not promulgated regulations directing how jurisdictional streambeds may be identified, or how their limits should be delineated. However, four relevant sources of information offer insight as to the appropriate limits of CDFW jurisdiction as discussed below.

The plain language of Section 1602 of CFGC establishes the following general concepts:

- References "river," "stream," and "lake"
- References "natural flow"
- References "bed," "bank," and "channel"

Applicable court decisions, in particular *Rutherford v. State of California* (188 Cal App. 3d 1276 (1987), which interpreted Section 1602's use of "stream" to be as defined in common law. The Court indicated that a "stream" is commonly understood to:

- Have a source and a terminus
- Have banks and a channel
- Convey flow at least periodically, but need not flow continuously and may at times appear outwardly dry
- Represent the depression between the banks worn by the regular and usual flow of the water
- Include the area between the opposing banks measured from the foot of the banks from the top of the water at its ordinary stage, including intervening sand bars
- Include the land that is covered by the water in its ordinary low stage
- Include lands below the OHWM

CDFW regulations defining "stream" for other purposes, including sport fishing (14 CCR 1.72) and streambed alterations associated with cannabis production (14 CCR 722(c)(21)), which indicate that a stream:

- Flows at least periodically or intermittently

- Flows through a bed or channel having banks
- Supports fish or aquatic life
- Can be dry for a period of time
- Includes watercourses where surface or subsurface flow supports or has supported riparian vegetation

Guidance documents, *including A Field Guide to Lake and Streambed Alteration Agreements* (CDFG 1994) and *Methods to Describe and Delineate Episodic Stream Processes on Arid Landscapes for Permitting Utility-Scale Solar Power Plants* (Brady and Vyverberg 2013), which suggest the following:

- A stream may flow perennially or episodically
- A stream is defined by the course in which water currently flows, or has flowed during the historic hydrologic course regime (approximately the last 200 years)
- Width of a stream course can reasonably be identified by physical or biological indicators
- A stream may have one or more channels (single thread vs. compound form)
- Features such as braided channels, low-flow channels, active channels, banks associated with secondary channels, floodplains, islands, and stream-associated vegetation, are interconnected parts of the watercourse
- Canals, aqueducts, irrigation ditches, and other means of water conveyance can be considered streams if they support aquatic life, riparian vegetation, or stream-dependent terrestrial wildlife
- Biologic components of a stream may include aquatic and riparian vegetation, all aquatic animals including fish, amphibians, reptiles, invertebrates, and terrestrial species which derive benefits from the stream system
- The lateral extent of a stream can be measured in different ways depending on the particular situation and the type of fish or wildlife resource at risk

The tenets listed above, among others, are applied to establish the boundaries of streambeds in various environments. Importance of each factor may be weighted based on site-specific considerations and the applicability of the indicators to the streambed at hand.

Wetlands

The USACE defines wetlands as containing three parameters: hydrophytic vegetation, hydric soils, and wetland hydrology. The following is a discussion of each of these parameters.

Hydrophytic Vegetation

Hydrophytic vegetation dominates areas where frequency and duration of inundation or soil saturation exerts a controlling influence on the plant species present. Plant species are assigned wetland indicator status according to the probability of their occurring in wetlands. More than fifty percent of the dominant plant species must have a wetland indicator status to meet the hydrophytic vegetation criterion. The USFWS published the National List of Plant Species That Occur In Wetlands (Lichvar, 2013), which separates vascular plants into the following four basic categories based on plant species frequency of occurrence in wetlands:

- **Obligate Wetland (OBL).** Occur almost always (estimated probability >99%) under natural conditions in wetlands.
- **Facultative Wetland (FACW).** Usually occur in wetlands (estimated probability 67%-99%), but occasionally found in non-wetlands.
- **Facultative (FAC).** Equally likely to occur in wetlands or non-wetlands (estimated probability 34%-66%).
- **Facultative Upland (FACU).** Usually occur in non-wetlands (estimated probability 67%-99%), but occasionally found in wetlands (estimated probability 1%-33%).
- **Obligate Upland (UPL).** May occur in wetlands in another region, but occur almost always (estimated probability >99%) under natural conditions in non-wetlands in the region specified.

The ACOE considers OBL, FACW and FAC species to be indicators of wetlands. An area is considered to have hydrophytic vegetation when greater than 50 percent of the dominant species in each vegetative stratum (tree, shrub, and herb) fall within these categories. Any species not appearing on the USFWS list is assumed to be an upland species, almost never occurring in wetlands. In addition, an area needs to contain at least 5% vegetative cover to be considered as a vegetated wetland.

Hydric Soils

Hydric soils are saturated or inundated for a sufficient duration during the growing season to develop anaerobic or reducing conditions that favor the growth and regeneration of hydrophytic vegetation. Field indicators of wetland soils include observations of ponding, inundation, or saturation, dark (low chroma) soil colors, bright mottles (concentrations of oxidized minerals such as iron), gleying, which indicates reducing conditions by a blue-grey color, or accumulation of organic material. Additional supporting information includes documentation of soil as hydric or reference to wet conditions in the local soils survey, both of which must be verified in the field.

Wetland Hydrology

Wetland hydrology is inundation or soil saturation with a frequency and duration long enough to cause the development of hydric soils and plant communities dominated by hydrophytic vegetation. If direct observation of wetland hydrology is not possible (as in seasonal wetlands), or records of wetland hydrology are not available (such as stream gauges), assessment of wetland hydrology is frequently supported by field indicators, such as water marks, drift lines, sediment deposits, or drainage patterns in wetlands.

Appendix C

Site Photographs



Photograph 1. Looking south down Lincoln Road at saltbush habitat. Location 34.491753, -116.893051



Photograph 2. Showing saltbush in 'crack' features on the dry lakebed. Location 34.491905, -116.889972



Photograph 3. Showing retention basin at sampling point 5. Facing east at 34.487129, -116.897436



Photograph 4. Showing tamarisk thickets. Facing southeast at 34.509430, -116.927496



Photograph 5. Showing alfalfa agricultural fields on site. Facing west at 34.487159, -116.897515



Photograph 6. Showing access limitations on site. Facing southeast at 34.492057, -116.906815



Photograph 7. Showing small wetland from potential broken pipe at 34.492423, -116.912858



Photograph 8. Showing ephemeral stream with benching. Facing southeast at 34.517905, -116.893197

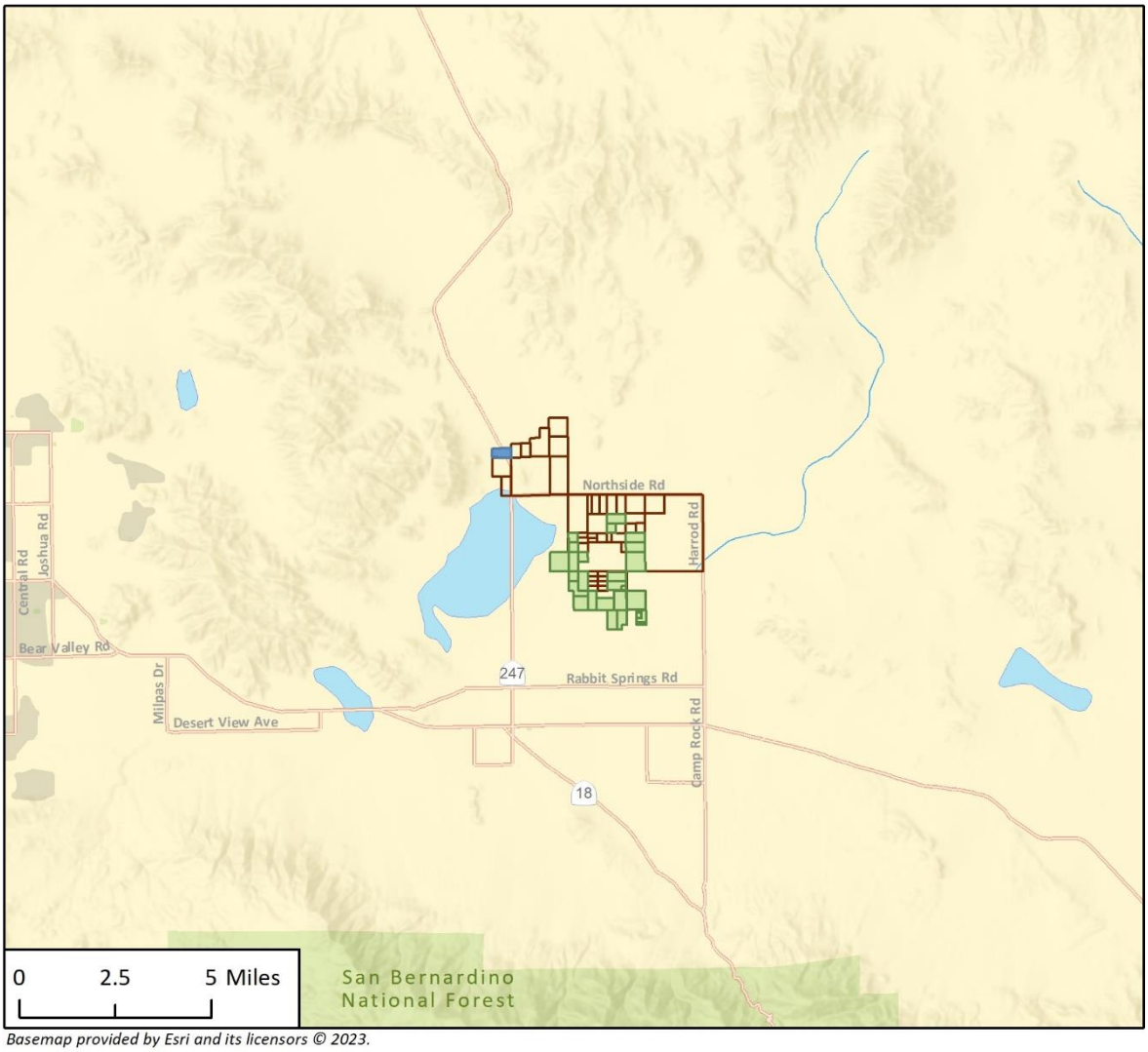
Appendix D

Figures

Appendix D

Figures

Figure 1 Regional Location



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Project Site
Proposed SCE Calcite Substation
Gen-tie Line and/or
Collector Line Alternatives

N



Figure 2 Project Location with APNs

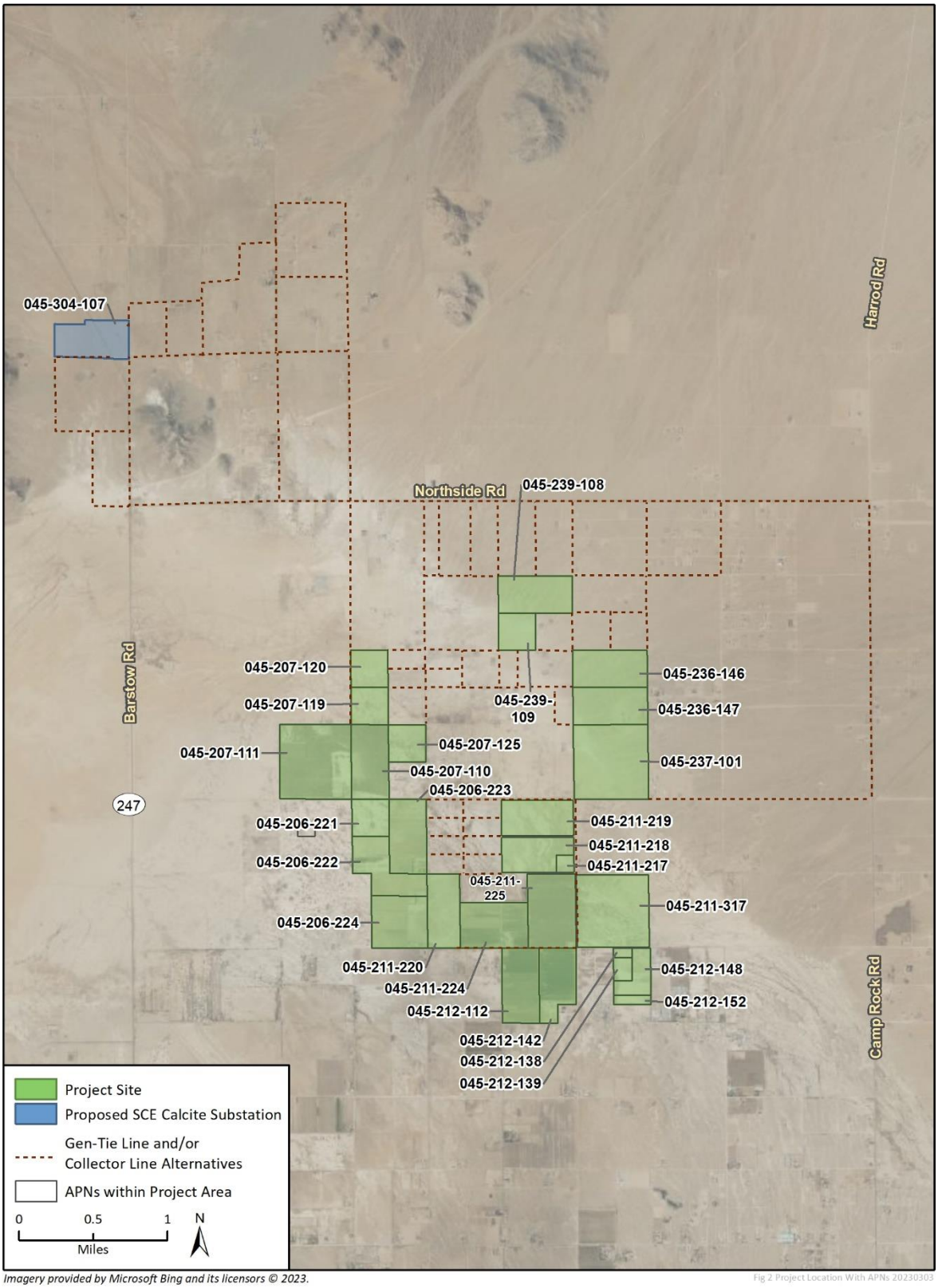
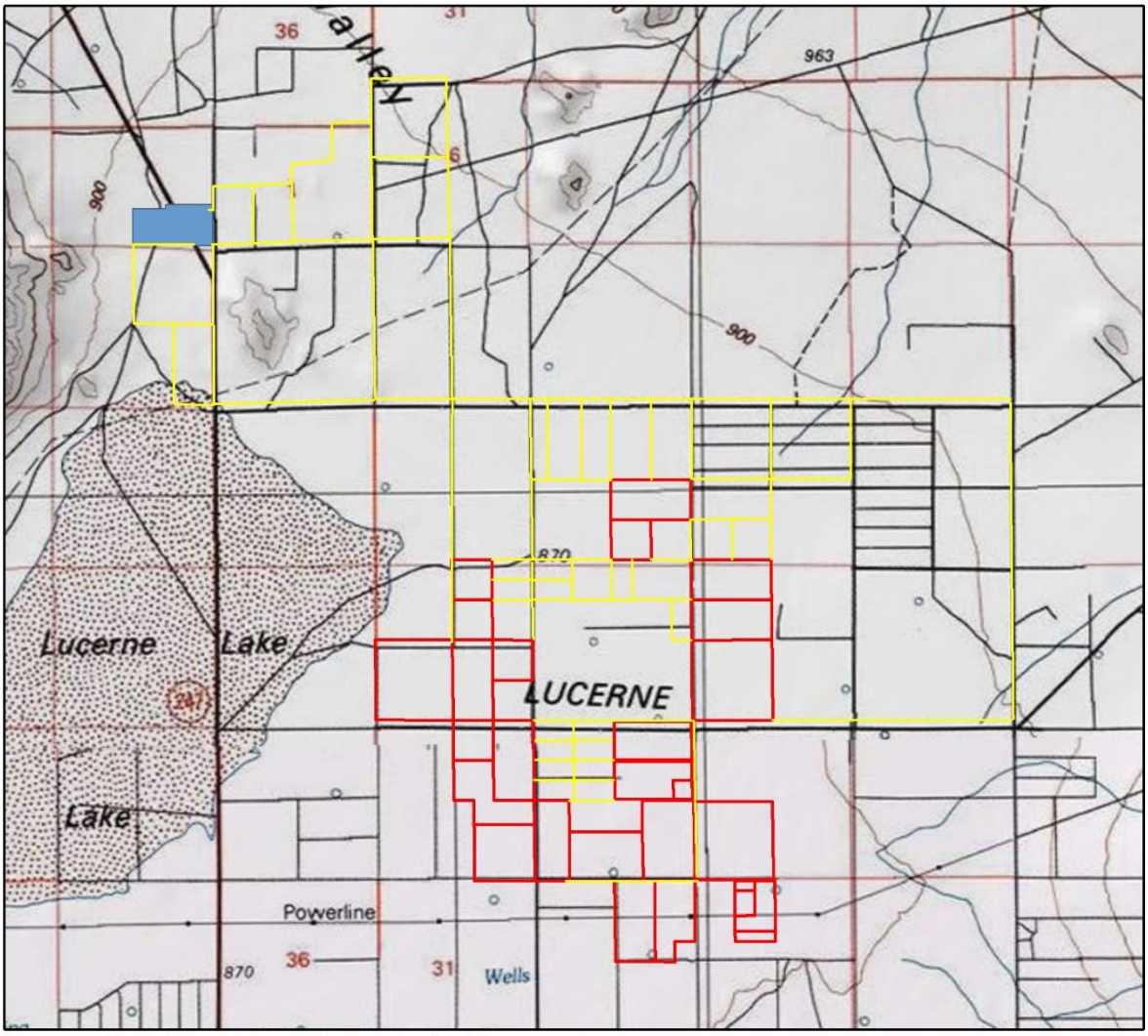


Figure 3 Project Location



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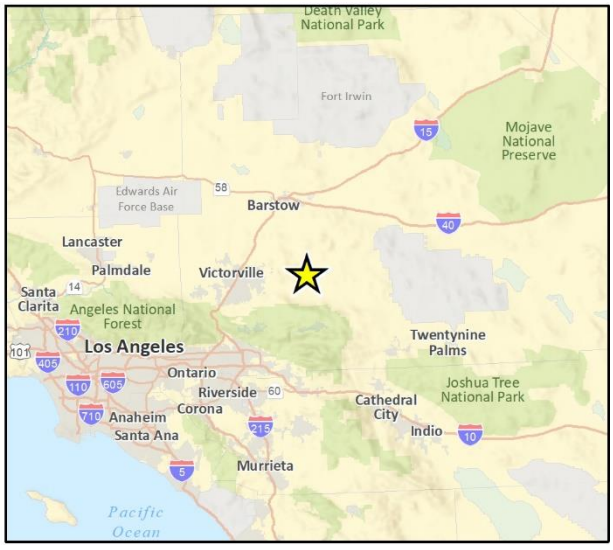
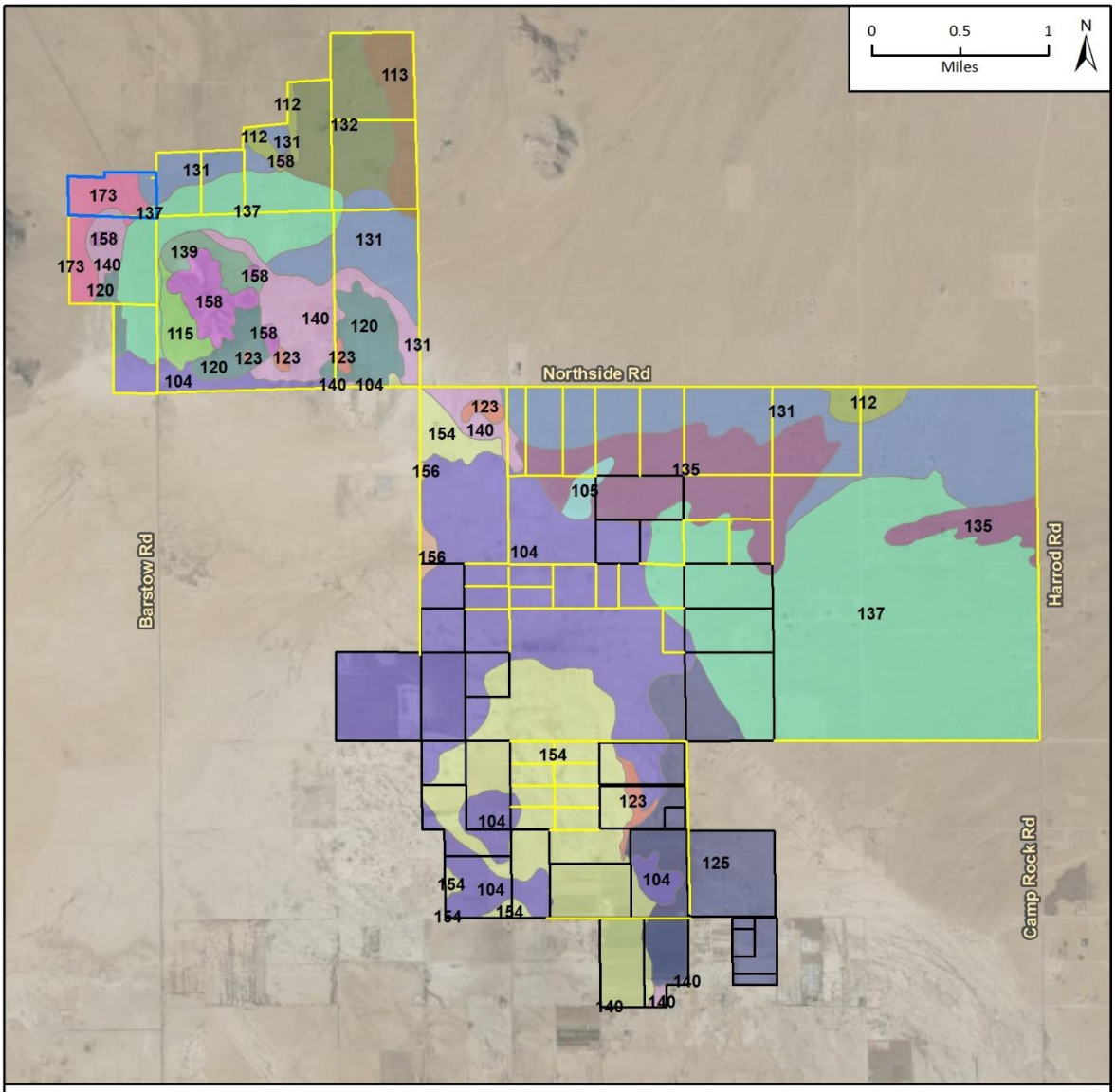


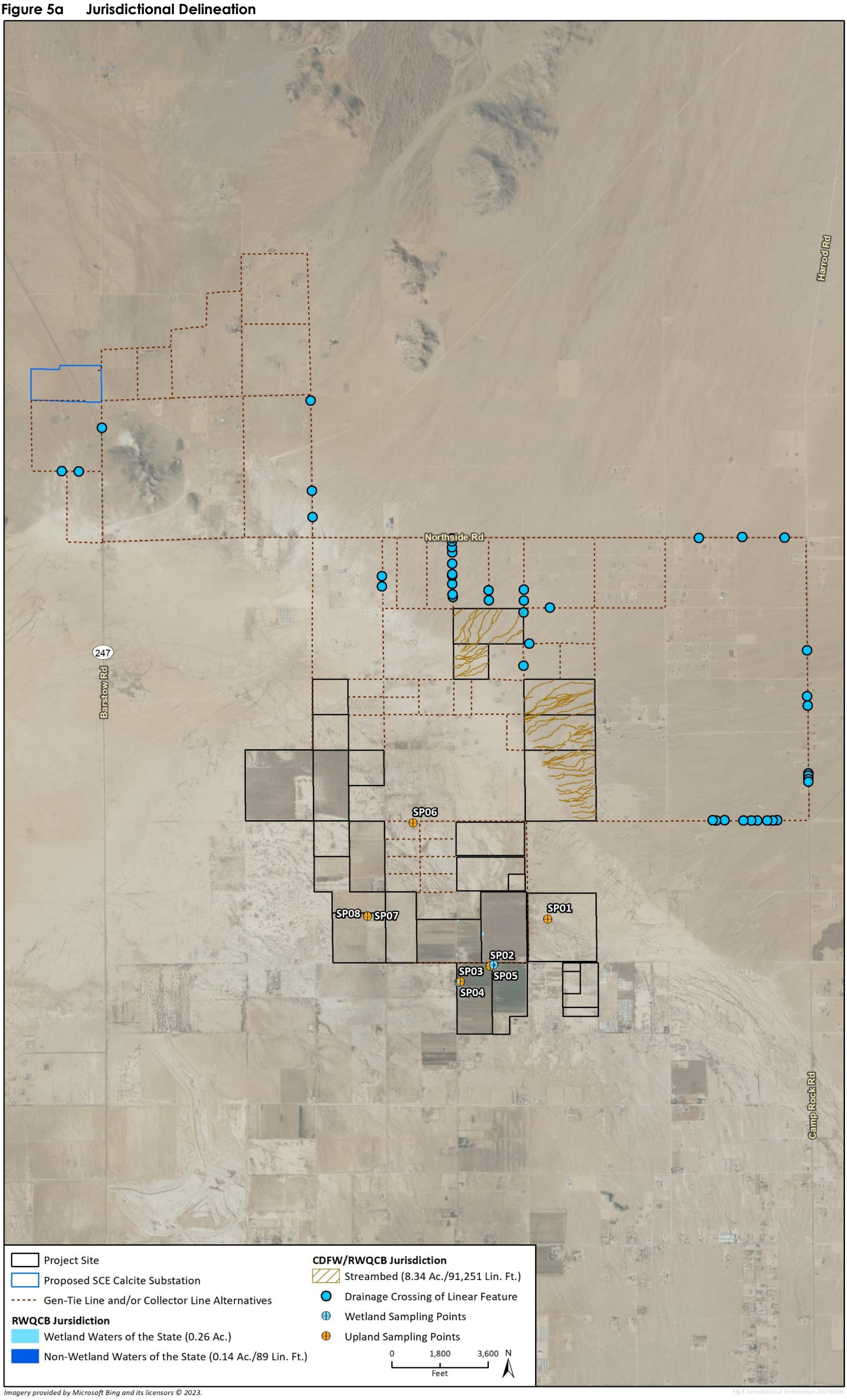
Figure 4 Soils



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Soil data provided by SSURGO, NRCS, USDA, 2021.

Fig X Soils 20230303

Figure 5a Jurisdictional Delineation



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Fig X Jurisdictional Delineation 20230306

Figure 5b Jurisdictional Delineation



Figure 5c Jurisdictional Delineation

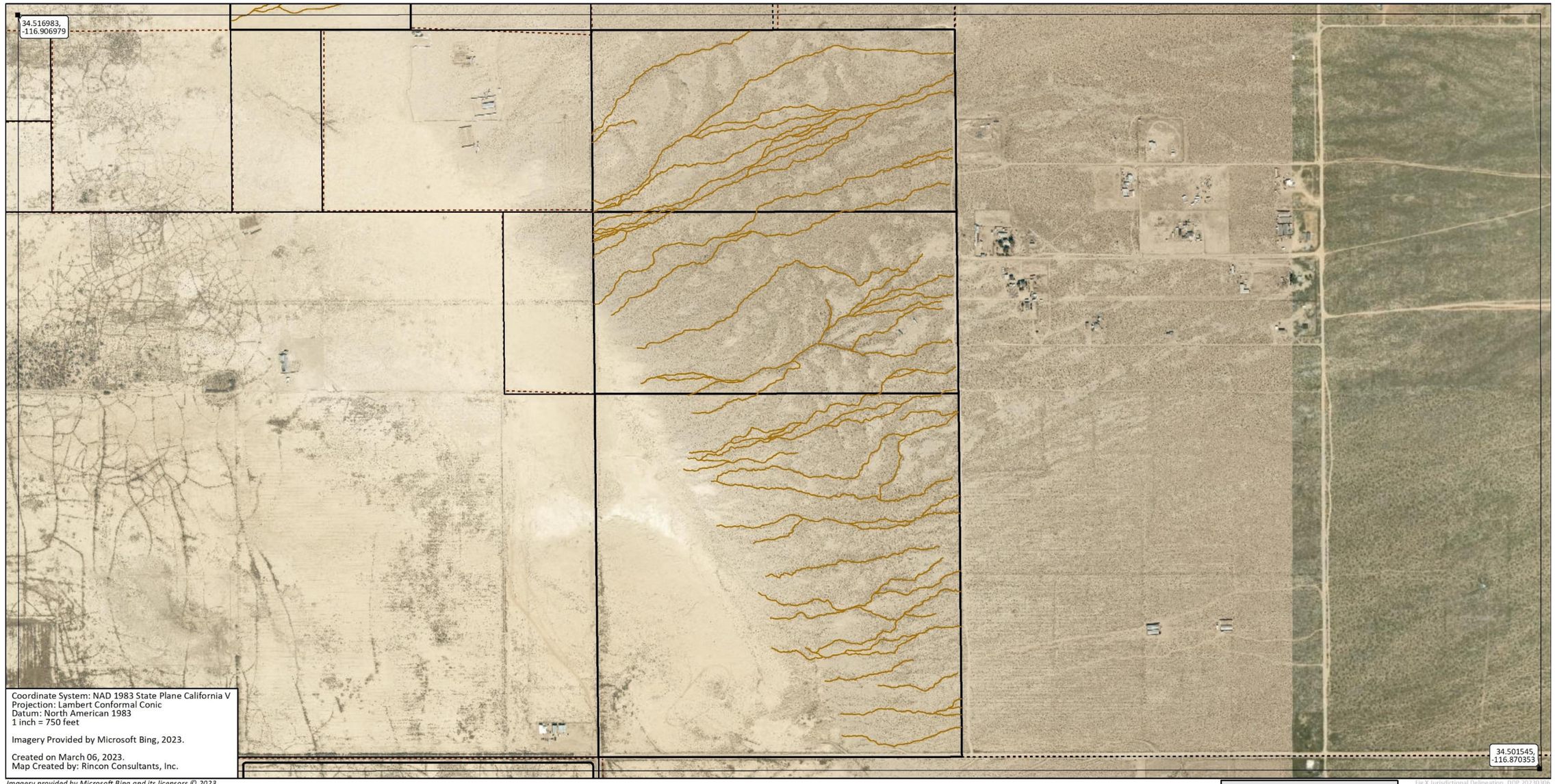


Figure 5d Jurisdictional Delineation



Appendix F. Cultural Resources Assessment

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Sienna Solar and Storage Project

Cultural Resources Study

prepared for

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June 2023

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Public Version

The following document has been redacted to exclude confidential archaeological site locational information

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Executive Summary

99MT 8me, LLC (applicant) retained Rincon Consultants, Inc. (Rincon) to conduct a Phase I Cultural Resources Study for the Sienna Solar and Storage Project (Project) located 3.5 miles north of the unincorporated community of Lucerne Valley in San Bernardino County, California. This Cultural Resources Study includes a cultural resources records search, a Sacred Lands File search conducted by the Native American Heritage Commission which produced negative results, field survey, and the preparation of this technical report that adheres to Archaeological Resources Management Report guidelines and follows the requirements of the California Environmental Quality Act (CEQA).

The cultural resource records search identified 40 previously recorded cultural resources within a 0.5-mile radius of the Project area, 11 of which are within the Project area. An additional 48 cultural resources were newly identified and recorded during the survey including 38 archaeological and 10 built-environment resources. The archaeological resources are comprised of 15 isolates (4 prehistoric, 11 historical) and 23 sites (1 prehistoric, 1 multicomponent, and 21 historical). Of the 59 resources within the Project area, 5 built-environment resources are recommended eligible for the National Register of Historical Places (NRHP) and California Register of Historical Resources (CRHR); the properties therefore qualify as historical resources as defined by Section 15064.5(a) of the CEQA Guidelines. The current project does not entail any alteration to or demolition of the five resources. It is presumed that the Project will not involve significant alteration to the historic transmission lines nor construction that will affect the historic-era road and its delineation; therefore, the Project would not result in a substantial adverse change to the significance of the historic resources and does not result in a significant impact to historical resources pursuant to Section 15064.5(b) of the CEQA Guidelines.

Rincon also recommends avoidance of two archaeological sites, prehistoric site Sienna-S-8 and multicomponent site Sienna-S-28, to reduce the potential for unintentional impacts. Avoidance of the resources is discussed in greater detail below. In the event that avoidance is infeasible, additional mitigation such as testing and data recovery may be required to reduce any impacts to less-than-significant levels. In addition to avoidance, Rincon recommends the preparation of a Cultural Resources Mitigation and Monitoring Program (CRMMP), archaeological and Native American monitoring of Project related ground disturbance within Project areas of moderate to high archaeological sensitivity as established in and defined by the CRMMP, and a cultural resources sensitivity training program to assist in identifying any unanticipated cultural resources that may be encountered during ground disturbing activities associated with Project construction.

Retain a Qualified Principal Investigator

Rincon recommends that the applicant retain a qualified archaeologist, defined as an archaeologist who meets the Secretary of the Interior's Professional Qualification Standards for archaeology (National Park Service 1983) to carry out all mitigation measures related to archaeological and historic resources.

Avoidance of Resources

Preservation in place (avoidance) is the preferred manner of mitigating impacts to archaeological sites. Preservation in place maintains the relationship between artifacts and the archaeological

context. Preservation may also avoid conflict with religious or cultural values of groups associated with the site (e.g., affiliated Native American tribes). If feasible, archaeological sites Sienna-S-8 and Sienna-S-28 identified within the Project area during the current study plus a 200-foot buffer should be avoided. The 200-foot buffer should be delineated using a high visibility barrier (i.e. Environmentally Sensitive Area [ESA] fencing). If avoidance is not feasible, additional mitigation such as Phase II testing and Phase III data recovery may be required to reduce any impacts to less-than-significant levels.

Phase II Testing

The project site contains two archaeological sites (Sienna-S-8 and Sienna-S-28) that may include a subsurface deposit with significant data potential. If avoidance of these sites is not feasible, Rincon recommends a Phase II study to determine whether a subsurface deposit with significant data potential exists at each of these sites and to establish the subsurface boundaries of the resource. The Phase II study should be conducted by a qualified archaeologist. The qualified archaeologist should prepare a subsurface testing plan for review and approval by San Bernardino County prior to execution. The Phase II testing plan should include, but is not limited to, a research design, testing methods, laboratory methods, and list any applicable special studies to be completed. The Phase II plan should also include testing locations proposed within the site. The Phase II study should comprise subsurface testing designed to establish the presence or absence and extent of intact archaeological deposits and to assess whether the site(s) retains enough data potential to be considered significant under CEQA. Rincon recommends that Phase II testing be observed by a Native American monitor. If avoidance remains infeasible after the Phase II investigation, additional measures may be recommended such as a Phase III data recovery and/or archaeological and Native American monitoring of project construction activity. These measures are discussed further below.

Phase III Data Recovery

If a Phase II investigation at sites Sienna-S-8 and/or Sienna-S-28 finds the resource(s) as eligible for listing in the NRHP and CRHR and avoidance is not feasible, a Phase III data recovery program (Phase III) should be undertaken to mitigate any significant impacts. Mitigation consists of obtaining sufficient cultural materials such that no further material recovery would result in additional knowledge regarding the site. A Phase III investigation should begin with the development of a data recovery plan prepared by a qualified archaeologist and reviewed and approved by San Bernardino County prior to execution. The data recovery plan should include, but is not limited to, an expanded research design, testing methods, proposed testing locations, laboratory methods and analyses, and special studies. A Phase III should include extensive subsurface testing and a full analysis of artifacts identified during each phase of subsurface investigation with the goal of exhausting the data potential of the site(s). Excavations under a Phase III program should be observed by a Native American monitor. These studies should include but not be limited to faunal analysis of any animal bones, radiocarbon dating where appropriate, and/or protein residue analysis of stone tools and groundstone. The results of the Phase III study should be presented in a technical report documenting the prehistoric and ethnographic background of the area, the field and laboratory methods used, results, and final deposition of the artifact collection. The data collected during the study may also be prepared for publication in a scientific journal as part of the data recovery mitigation.

Preparation of a Cultural Resources Mitigation and Monitoring Program

Prior to the start of any ground-disturbing activity for Project construction, including but not limited to site clearing, grubbing, trenching, and excavation, a qualified archaeologist who meets or exceeds the Secretary of Interior's Professional Qualifications Standards for archaeology should be retained to prepare a CRMMP for unanticipated discoveries during Project construction. The CRMMP should be prepared in consultation with Native American tribes who have participated in consultation for the Project. The CRMMP should include provisions for archaeological and Native American monitoring of all construction related ground disturbance within Project areas of moderate to high archaeological sensitivity as established in and defined by this study. The CRMMP should also include the Project construction schedule, procedures to be followed in the event of discovery of archaeological resources, and protocols for Native American coordination and input, including review of documents. The CRMMP should outline the role and responsibilities of both the archaeological and Native American monitor(s). It should include communication protocols and opportunity and timelines for review of cultural resources documents related to discoveries that are Native American in origin. The CRMMP should include provisions for Native American monitoring during testing or data recovery efforts for unknown resources that are Native American in origin.

Archaeological Sensitivity Training

Rincon recommends that the qualified archaeologist conduct a worker's environmental awareness program training for archaeological sensitivity for all construction personnel prior to the commencement of any ground disturbing activities in the Project area. Archaeological sensitivity training should include a description of the types of cultural material that may be encountered, cultural sensitivity issues, regulatory issues, and the proper protocol for treatment of the materials in the event of a find.

Archaeological and Native American Monitoring

The vicinities of newly recorded archaeological sites Sienna-S-8 and S-28 and isolates Sienna-Iso-87 and Iso-88 as well as previously recorded isolate 36-29899 should be considered to have high archaeological sensitivity. These resources are located on relatively sandy alluvial soils where there is an increased likelihood that erosional dynamics (e.g. from wind and/or intermittent drainages) have created subsurface deposits. A review of soils studies and historical aerial imagery indicate the presence of alluvial soils and minimal past ground disturbance within other portions of the Project area. Both factors increase the likelihood of encountering intact buried archaeological deposits during Project-related ground-disturbance. These areas should be considered moderately sensitive for archaeological resources. The soils within the southwestern portions of the Project area, however, are highly disturbed from agricultural use and primarily composed of Peterman and Bousic clays. Additionally, fluctuating exposure within and near the limits of Lucerne Lake during the Holocene would have discouraged long-term settlement during the pre-contact period, providing limited opportunities for prehistoric site accumulation. This is evidenced by a lack of observed prehistoric resources within the southwestern portions of the Project area. Collectively, these factors decrease the likelihood of encountering intact buried archaeological deposits that retain integrity during Project-related ground-disturbance. Due to dense agriculture and the resulting lack

of ground visibility, 229 acres at the south-central extent of Project area were not surveyed. The archaeological sensitivity of this portion of the Project area is thus unknown.

Rincon recommends archaeological and Native American monitoring of Project-related ground-disturbing activities in areas of moderate to high archaeological sensitivity. Additionally, initial ground disturbing activities including grading, scraping and other clearing that causes ground disturbance within areas of unknown archaeological sensitivity should be monitored. Within areas of moderate to high archaeological sensitivity, archaeological monitoring should be performed under the direction of the qualified archaeologist. The qualified archaeologist, in consultation with the County of San Bernardino and the Native American monitor, should have the power to reduce or suspend monitoring depending upon observed conditions. If archaeological resources are encountered during ground-disturbing activities, work within the immediate area must halt and the find evaluated for significance under CEQA.

Unanticipated Discovery of Cultural Resources

If cultural resources are encountered during ground-disturbing activities, work in the immediate area must halt and an archaeologist meeting the Secretary of the Interior's Professional Qualifications Standards for archaeology (National Park Service 1983) must be contacted immediately to evaluate the find. If the discovery proves to be significant under CEQA, additional work such as testing and data recovery excavation may be warranted.

Unanticipated Discovery of Human Remains

The discovery of human remains is always a possibility during ground-disturbing activities. If human remains are found, the State of California Health and Safety Code Section 7050.5 states that no further disturbance shall occur until the County Coroner has made a determination of origin and disposition pursuant to Public Resources Code Section 5097.98. In the event of an unanticipated discovery of human remains, the county coroner must be notified immediately. If the human remains are determined to be prehistoric, the coroner will notify the Native American Heritage Commission, which will determine and notify a Most Likely Descendant. The MLD has 48 hours from being granted site access to make recommendations for the disposition of the remains. If the MLD does not make recommendations within 48 hours, the landowner shall reinter the remains in an area of the property secure from subsequent disturbance.

1 Introduction

99MT 8me, LLC (applicant) retained Rincon Consultants, Inc. (Rincon) to conduct a Phase I Cultural Resources Study for the 1,854-acre Sienna Solar and Storage Project (Project) located 3.5 miles north of the unincorporated community of Lucerne Valley in San Bernardino County, California. The purpose of this report is to document the results of a cultural resources records search, Sacred Lands File (SLF) search conducted by the Native American Heritage Commission (NAHC), field survey, and an assessment of potential project-related impacts to cultural resources for the Project. The study was completed in accordance with the requirements of the California Environmental Quality Act (CEQA) and applicable state and local guidelines and regulations. The County of San Bernardino is the CEQA lead agency.

1.1 Project Location and Description

The proposed 1,854-acre Project area is in the southwestern portion of the Mojave Desert and includes the Lucerne Dry Lake, in unincorporated San Bernardino County, California. The Project is predominately located east of State Route 247 (Barstow Road/SR 247), north of the unincorporated community of Lucerne Valley, with portions of the generation-interconnect (gen-tie) alternative corridors that include possible connections along Haynes Road, Huff Road, and Northside Road to the east of Barstow Road. The site is generally located approximately 35 miles south of Barstow, 45 miles northwest of the town of Yucca Valley, 15 miles southeast of the town of Apple Valley, and 20 miles north of the city of Big Bear Lake. Barstow Road would provide primary access to the Project area. Land uses in the area are primarily rural residential, recreation, farmland, open space, and transportation corridors.

Figure 1 depicts the regional location of the Project area. Figure 2 depicts the 27 parcels that comprise the site, and Table 1 lists the parcels and the acreage of each. The Project area is depicted on the *White Horse Mountain, California and Lucerne Valley, California* United States Geological Survey (USGS) 7.5-minute topographic quadrangle maps (Figure 3).

The Project consists of the installation of a photovoltaic (PV) solar facility, Battery Energy Storage System, Operations and Maintenance building(s), underground collection system, 230 kV gen-tie line, and other ancillary facilities. The Project will interconnect at the Southern California Edison (SCE) Calcite Substation (currently pending environmental clearance and construction) via a proposed overhead and/or underground 230-kV gen-tie line in addition to other ancillary facilities utilizing private and potentially public right-of-ways. The Project area encompasses approximately 1,854 acres with an additional proposed 77-acre SCE Calcite Substation. This cultural resources assessment includes analysis of the 1,854-acre Project area and the additional 77-acre proposed SCE Calcite Substation as well as 12.69 miles of collector lines and the preferred gen-tie alternative route over a 300-foot-wide corridor (Figure 4). The remaining gen-tie alternative routes over a 300-foot-wide corridor were visually inspected but as these are not the preferred routes, no formal cultural resources documentation occurred. If any of the remaining gen-tie alternative routes become part of the Project area, a supplemental report may be required to fully document cultural resources within these alternative areas.

The Project area is characterized by a mixture of residential properties, undeveloped playa and desert scrub communities, and agricultural land that includes alfalfa and jojoba farms and large-

scale hemp-growing operations. Small-scale abandoned and operational hemp and/or marijuana-growing operations were present throughout the playa region of the Project area.

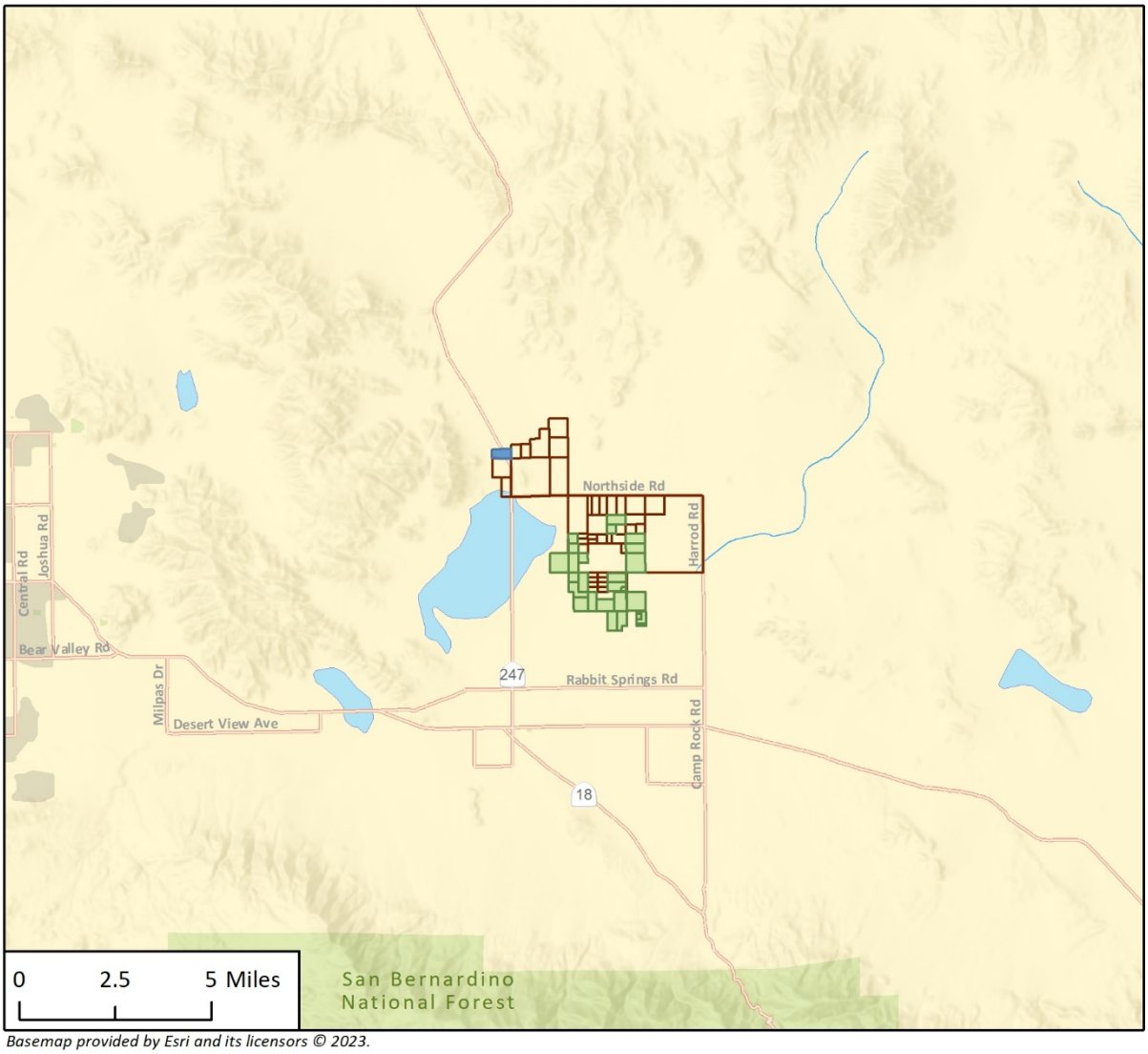
Table 1 Parcels within the Project Area

APN	Acreage (per Assessor's Map)	APN	Acreage (per Assessor's Map)
045212139	12.55404541	045212148	33.28632614
045239109	39.91526707	045212138	5.016492695
045211220	70.20888055	045236147	80.70729535
045211217	8.837406315	045207119	40.21115962
045211225	103.4454746	045211317	151.4004447
045239108	80.02399333	045212142	70.84751799
045207111	154.929939	045212112	80.72463791
045206221	40.20743454	045236146	80.66763908
045207110	80.41165783	045206222	76.4378852
045237101	161.2738532	045207120	40.20198758
045206223	80.44723722	045212152	10.18899555
045207125	40.20609255	045211218	64.7251832
045211219	73.47191205	045206224	84.47043199
045211224	89.90449969		

1.2 Personnel

Rincon Cultural Resources Principal Investigator Breana Campbell-King, MA, Registered Professional Archaeologist (RPA), served as principal investigator for the study and provided program-level oversight for this Project. Ms. Campbell-King meets the Secretary of the Interior's Professional Qualification Standards for prehistoric and historic archaeology (National Park Service [NPS] 1983). Rincon Principals Christopher Duran, MA, RPA, and David Daitch, PhD, and Rincon Architectural History Program Manager Steven Treffers, MHP, and Rincon Project Manager, Megan Jones and Technical Editor, Dario Campos provided quality control for this report. Rincon Archaeologist Mark Strother, MA, RPA, served as field director and is the primary author of this report. Rincon Archaeologist Derek Reaux, PhD, RPA, coauthored this report and participated in the field survey. Rincon Architectural Historian, Ashley Losco, MHP is also a contributing author of this report. Rincon Archaeologists Robert Guardado, Kyle Montgomery, Breanna Rotella, Juan Avilla, Jaime Wojak, Mary Pfeiffer, Rebecca Rutherford, Isaiah Moose, Danielle Stanzak, Alex Wechter, Adallana Sasone, and Sabdy Jimenez-Franco participated in the field survey. GIS Analysts Erik Holtz and Josh Patterson prepared the figures found in this report.

Figure 1 Regional Location Map



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Project Site

Proposed SCE Calcite Substation

Gen-tie Line and/or
Collector Line Alternatives

N



Figure 2 Project Location Map Depicting 27 Parcels that Comprise Project Area

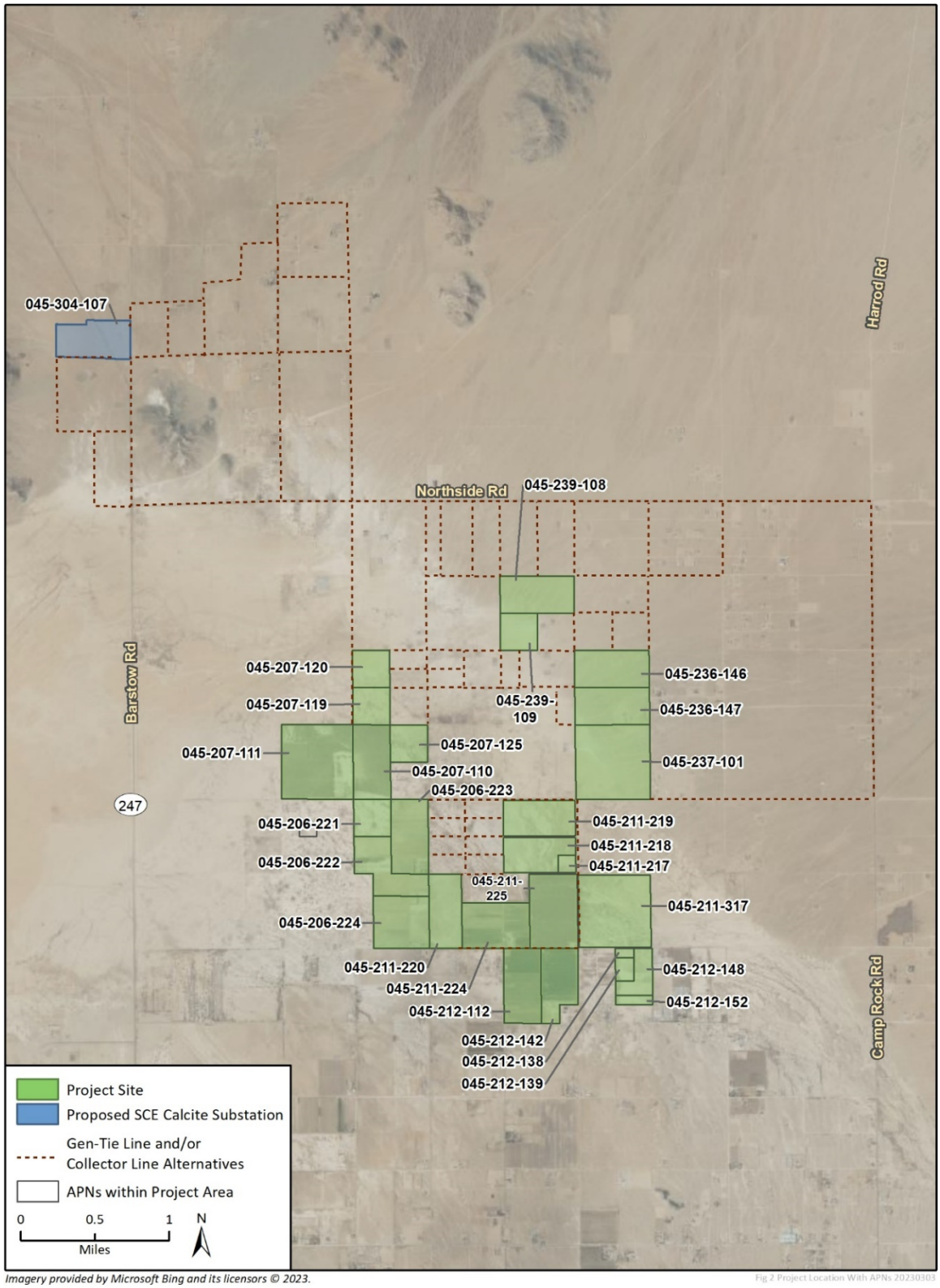
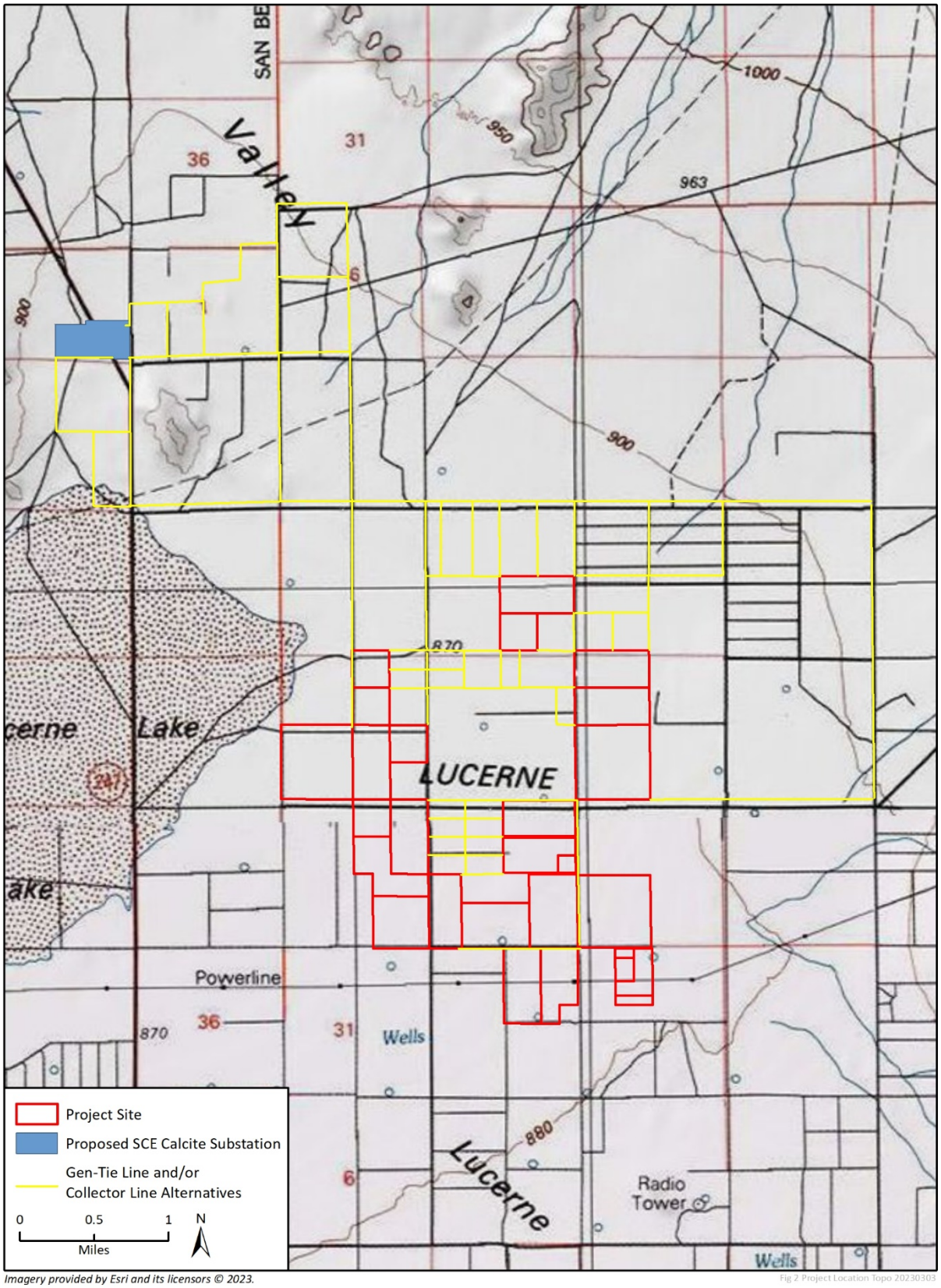


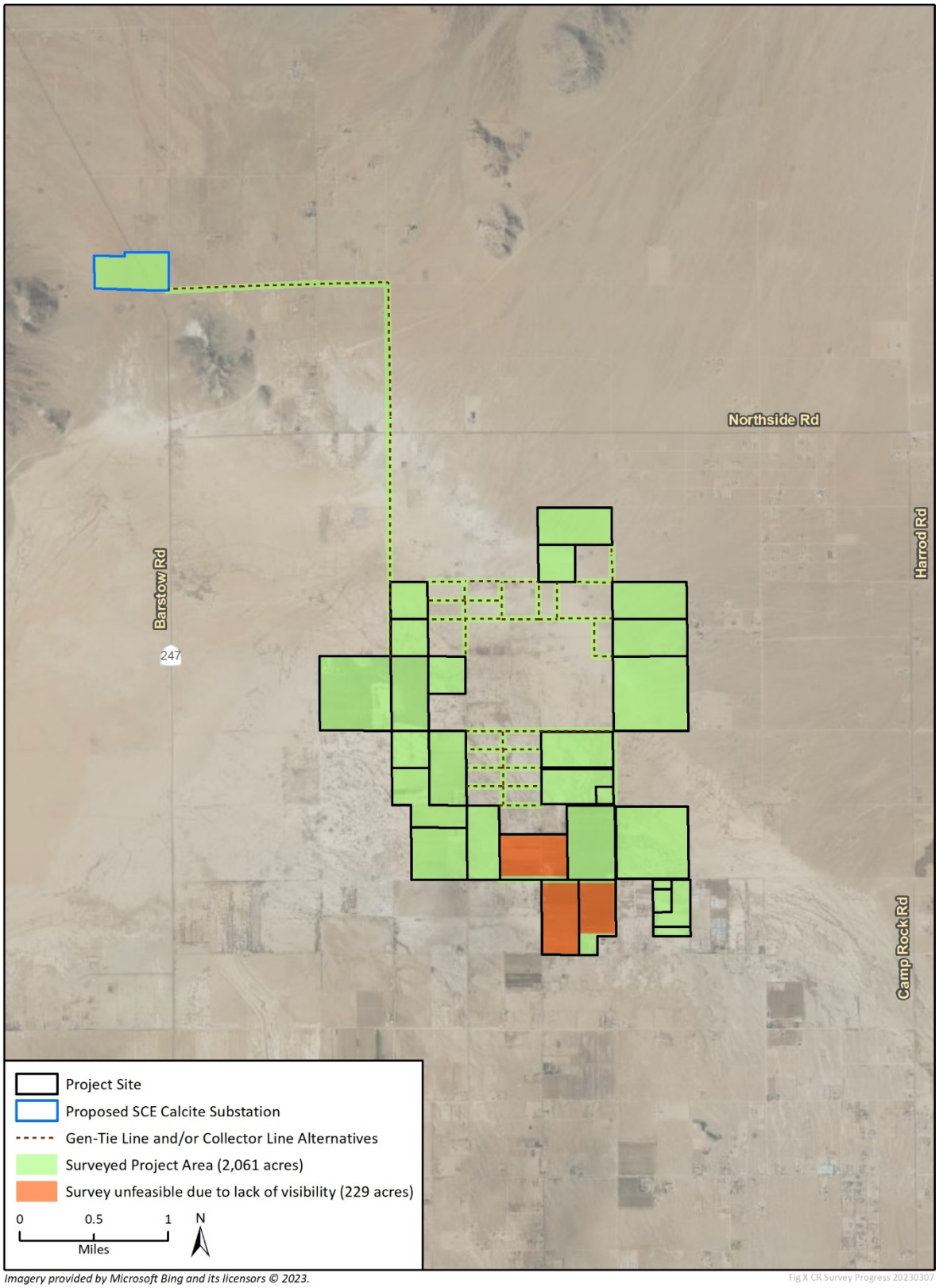
Figure 3 Project Location Map with Topographic Background



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Fig 2 Project Location Topo 20230303

Figure 4 Portions of Project Area including Preferred Gen-Tie Corridor where Formal Cultural Resources Documentation Occurred



2 Regulatory Setting

This section includes a discussion of the applicable state and local laws, ordinances, regulations, and standards governing cultural resources, which must be adhered to before and during implementation of the proposed project.

2.1 California Environmental Quality Act

California Public Resources Code (PRC) Section 21804.1 requires lead agencies determine if a project could have a significant impact on historical or unique archaeological resources. As defined in PRC Section 21084.1, a historical resource is a resource listed in, or determined eligible for listing in, the California Register of Historical Resources (CRHR), a resource included in a local register of historical resources or identified in a historical resources survey pursuant to PRC Section 5024.1(g), or any object, building, structure, site, area, place, record, or manuscript that a lead agency determines to be historically significant. PRC Section 21084.1 also states resources meeting the above criteria are presumed to be historically or cultural significant unless the preponderance of evidence demonstrates otherwise. Resources listed in the National Register of Historic Places (NRHP) are automatically listed in the CRHR and are, therefore, historical resources under CEQA. Historical resources may include eligible built-environment resources and archaeological resources of the precontact or historic periods.

CEQA Guidelines Section 15064.5(c) provides further guidance on the consideration of archaeological resources. If an archaeological resource does not qualify as a historical resource, it may meet the definition of a “unique archaeological resource” as identified in PRC Section 21083.2. PRC Section 21083.2(g) defines a unique archaeological resource as an artifact, object, or site about which it can be clearly demonstrated that, without merely adding to the current body of knowledge, there is a high probability that it meets any of the following criteria: 1) it contains information needed to answer important scientific research questions and that there is a demonstrable public interest in that information, 2) has a special and particular quality such as being the oldest of its type or the best available example of its type, or 3) is directly associated with a scientifically recognized important prehistoric or historic event or person.

If an archaeological resource does not qualify as a historical or unique archaeological resource, the impacts of a project on those resources will be less than significant and need not be considered further (CEQA Guidelines Section 15064.5[c][4]). CEQA Guidelines Section 15064.5 also provides guidance for addressing the potential presence of human remains, including those discovered during the implementation of a project.

According to CEQA, an impact that results in a substantial adverse change in the significance of a historical resource is considered a significant impact on the environment. A substantial adverse change could result from physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of the historical resource would be materially impaired (CEQA Guidelines Section 15064.5 [b][1]). Material impairment is defined as demolition or alteration in an adverse manner [of] those characteristics of a historical resource that convey its historical significance and that justify its inclusion in, or eligibility for inclusion in, the CRHR or a local register (CEQA Guidelines Section 15064.5[b][2][A]).

If it can be demonstrated that a project will cause damage to a unique archaeological resource, the lead agency may require reasonable efforts be made to permit any or all of these resources to be preserved in place or left in an undisturbed state. To the extent that resources cannot be left undisturbed, mitigation measures are required (PRC Section21083.2[a][b]).

Section 15126.4 of the CEQA Guidelines stipulates an Environmental Impact Report shall describe feasible measures to minimize significant adverse impacts. In addition to being fully enforceable, mitigation measures must be completed within a defined time period and be proportional to the impacts of the project. Generally, a project which is found to comply with the Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring, and Reconstructing Historic Buildings (the Standards) is considered to be mitigated below a level of significance (CEQA Guidelines Section 15126.4 [b][1]). For historical resources of an archaeological nature, lead agencies should also seek to avoid damaging effects where feasible. Preservation in place is the preferred manner to mitigate impacts to archaeological sites; however, data recovery through excavation may be the only option in certain instances (CEQA Guidelines Section 15126.4[b][3]).

2.2 National Register of Historic Places

Although the project does not have a federal nexus, properties which are listed in or have been formally determined eligible for listing in the NRHP are automatically listed in the CRHR. The following is therefore presented to provide applicable regulatory context. The NRHP was authorized by Section 101 of the National Historic Preservation Act and is the nation's official list of cultural resources worthy of preservation. The NRHP recognizes the quality of significance in American, state, and local history, architecture, archaeology, engineering, and culture is present in districts, sites, buildings, structures, and objects. Per 36 CFR Part 60.4, a property is eligible for listing in the NRHP if it meets one or more of the following criteria:

Criterion A: Is associated with events that have made a significant contribution to the broad patterns of our history

Criterion B: Is associated with the lives of persons significant in our past

Criterion C: Embodies the distinctive characteristics of a type, period, or method of installation, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction

Criterion D: Has yielded, or may be likely to yield, information important in prehistory or history

In addition to meeting at least one of the above designation criteria, resources must also retain integrity. The NPS recognizes seven aspects or qualities that, considered together, define historic integrity. To retain integrity, a property must possess several, if not all, of these seven qualities, defined as follows:

Location: The place where the historic property was constructed or the place where the historic event occurred

Design: The combination of elements that create the form, plan, space, structure, and style of a property

Setting: The physical environment of a historic property

Materials: The physical elements that were combined or deposited during a particular period of time and in a particular pattern or configuration to form a historic property

Workmanship: The physical evidence of the crafts of a particular culture or people during any given period in history or prehistory

Feeling: A property's expression of the aesthetic or historic sense of a particular period of time

Association: The direct link between an important historic event or person and a historic property

Certain properties are generally considered ineligible for listing in the NRHP, including cemeteries, birthplaces, graves of historical figures, properties owned by religious institutions, relocated structures, or commemorative properties. Additionally, a property must be at least 50 years of age to be eligible for listing in the NRHP. The NPS states that 50 years is the general estimate of the time needed to develop the necessary historical perspective to evaluate significance (NPS 1997: 41). Properties which are less than 50 years must be determined to have "exceptional importance" to be considered eligible for NRHP listing.

2.3 California Register of Historical Resources

The CRHR was established in 1992 and codified by PRC Sections 5024.1 and 4852. The CRHR is an authoritative listing and guide to be used by state and local agencies, private groups, and citizens in identifying the existing historical resources of the state and to indicate which resources deserve to be protected, to the extent prudent and feasible, from substantial adverse change (Public Resources Code, 5024.1(a)). The criteria for eligibility for the CRHR are consistent with the NRHP criteria but have been modified for state use in order to include a range of historical resources that better reflect the history of California (Public Resources Code, 5024.1(b)). Unlike the NRHP however, the CRHR does not have a defined age threshold for eligibility; rather, a resource may be eligible for the CRHR if it can be demonstrated sufficient time has passed to understand its historical or architectural significance (California Office of Historic Preservation 2006). Furthermore, resources may still be eligible for listing in the CRHR even if they do not retain sufficient integrity for NRHP eligibility (California Office of Historic Preservation 2006). Generally, the California Office of Historic Preservation recommends resources over 45 years of age be recorded and evaluated for historical resources eligibility (California Office of Historic Preservation 1995:2).

A property is eligible for listing in the CRHR if it meets one of more of the following criteria:

Criterion 1: Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage

Criterion 2: Is associated with the lives of persons important to our past

Criterion 3: Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values

Criterion 4: Has yielded, or may be likely to yield, information important in prehistory or history

2.4 California Assembly Bill 52 of 2014

As of July 1, 2015, Assembly Bill (AB) 52 was enacted and expands CEQA by defining a new resource category, "tribal cultural resources". AB 52 establishes, "a project with an effect that may cause a substantial adverse change in the significance of a tribal cultural resource is a project that may have a significant effect on the environment" (PRC Section 21084.2). It further states the CEQA lead agency shall establish measures to avoid impacts that would alter the significant characteristics of a tribal cultural resource, when feasible (PRC Section 21084.3).

PRC Section 21074 (a)(1)(A) and (B) define tribal cultural resources as "sites, features, places, cultural landscapes, sacred places, and objects with cultural value to a California Native American tribe" and that meets at least one of the following criteria, as summarized in CEQA Guidelines Appendix G:

1) Listed or eligible for listing in the CRHR, or in a local register of historical resources as defined in PRC Section 5020.1(k)
1) A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of PRC Section 5024.1. In applying these criteria, the lead agency shall consider the significance of the resource to a California Native American tribe.

AB 52 also establishes a formal consultation process with California Native American tribes that must be completed before a CEQA document can be certified. Under AB 52, lead agencies are required to "begin consultation with a California Native American tribe that is traditionally and culturally affiliated with the geographic area of the proposed project." California Native American tribes to be included in the process are those that have requested notice of projects proposed within the jurisdiction of the lead agency.

3 Methods

3.1 Background and Archival Research

3.1.1 California Historical Resource Information System

Rincon requested a search of cultural resources records housed at the California Historical Resources Information System (CHRIS), South Central Coastal Information Center (SCCIC) located at the California State University, Fullerton on July 9, 2021. The search was conducted to identify previous cultural resources work and previously recorded cultural resources within a 0.5-mile radius of the Project area. The CHRIS search included a review of the NRHP, the CRHR, the California Points of Historical Interest list, the California Historical Landmarks list, the Archaeological Determinations of Eligibility list, and the California State Historic Resources Inventory list. The records search also included a review of available historic USGS 7.5-, 15-, and 30-minute quadrangle maps.

3.1.2 Archival Research

Rincon completed background and archival research in support of this assessment from August through October of 2021. A variety of primary and secondary source materials were consulted. Sources included, but were not limited to, historical maps, aerial photographs, and written histories of the area. The following sources were utilized to develop an understanding of the Project area and its context:

- San Bernardino County Assessor's Office
- United States Department of the Interior Bureau of Land Management (BLM) General Land Office (GLO) Records
- Historical aerial photographs accessed via NETR Online
- Historical aerial photographs accessed via University of California, Santa Barbara Library FrameFinder
- Historical USGS topographic maps
- National Archives at Riverside, Riverside, California
- Historical newspaper clippings obtained from Newspapers.com, ProQuest Historical Newspapers.com, and the California Digital Newspaper Collection

3.1.3 Sacred Lands File Search

Rincon requested a review of the SLF by the NAHC on August 6, 2021. The NAHC sent a response on September 3, 2021, stating that a search of the SLF was completed with negative results (Appendix A).

3.2 Field Survey

3.2.1 Archaeological Resources Survey

Rincon archaeologists (see Section 1.2) conducted two field surveys of the Project area between July 21-30 and September 16-20, 2021. The archaeologists surveyed the Project area using transects spaced 15 meters apart. The archaeologists examined exposed ground surface for artifacts (e.g., flaked stone tools, tool-making debris, stone milling tools, ceramics, fire-affected rock), ecofacts (marine shell and bone), soil discoloration that might indicate the presence of a cultural midden, soil depressions, and features indicative of the former presence of structures or buildings (e.g., standing exterior walls, postholes, foundations) or historic debris (e.g., metal, glass, ceramics). Ground disturbances, such as burrows and drainages, were visually inspected. Survey notes were prepared by the surveyor and are available upon request. Archaeological resources (isolates and sites) were recorded on California Department of Parks (DPR) 523 series forms.

3.2.2 Built Environment Survey

Under the direction of Rincon Architectural Historian Steven Treffers, MHP, Rincon cultural resources specialists (see Section 1.2) conducted a built environment survey of the Project area. The built environment resources within the Project area, including buildings and structures were visually inspected. Pursuant to California Office of Historic Preservation Guidelines (California OHP 1995:2), properties over 45 years of age were evaluated for inclusion in the NRHP, CRHR, and local listing and recorded on DPR 523 series forms. Overall condition and integrity of these resources were documented and assessed. Site characteristics and conditions were documented using notes and digital photographs which are maintained at the Rincon San Diego office. It should be noted that the roads within the Project area that were surveyed were not formally evaluated as the project does not include alterations to the roads or any substantial changes to their setting; therefore, there will be no significant impact.

4 Natural and Cultural Setting

4.1 Natural Setting

The Project area is located in the Lucerne Valley of County of San Bernardino, situated at an average elevation of 885 meters (2,900 feet [ft]) above mean sea level. Vegetation communities in the Project area consisted of Mojave Desert scrub communities including creosote bush scrub, allscale scrub, Russian thistle, and fourwing saltbush scrub.

4.1.1 Geology and Soils

The Project area includes four geologic units mapped at ground surface: Quaternary young (Holocene) alluvium (Qa), Quaternary young (Holocene) dune sand (Qs), Quaternary young (Holocene) playa deposits (Qc), and Quaternary old (Pleistocene) gravel deposits (Qog).

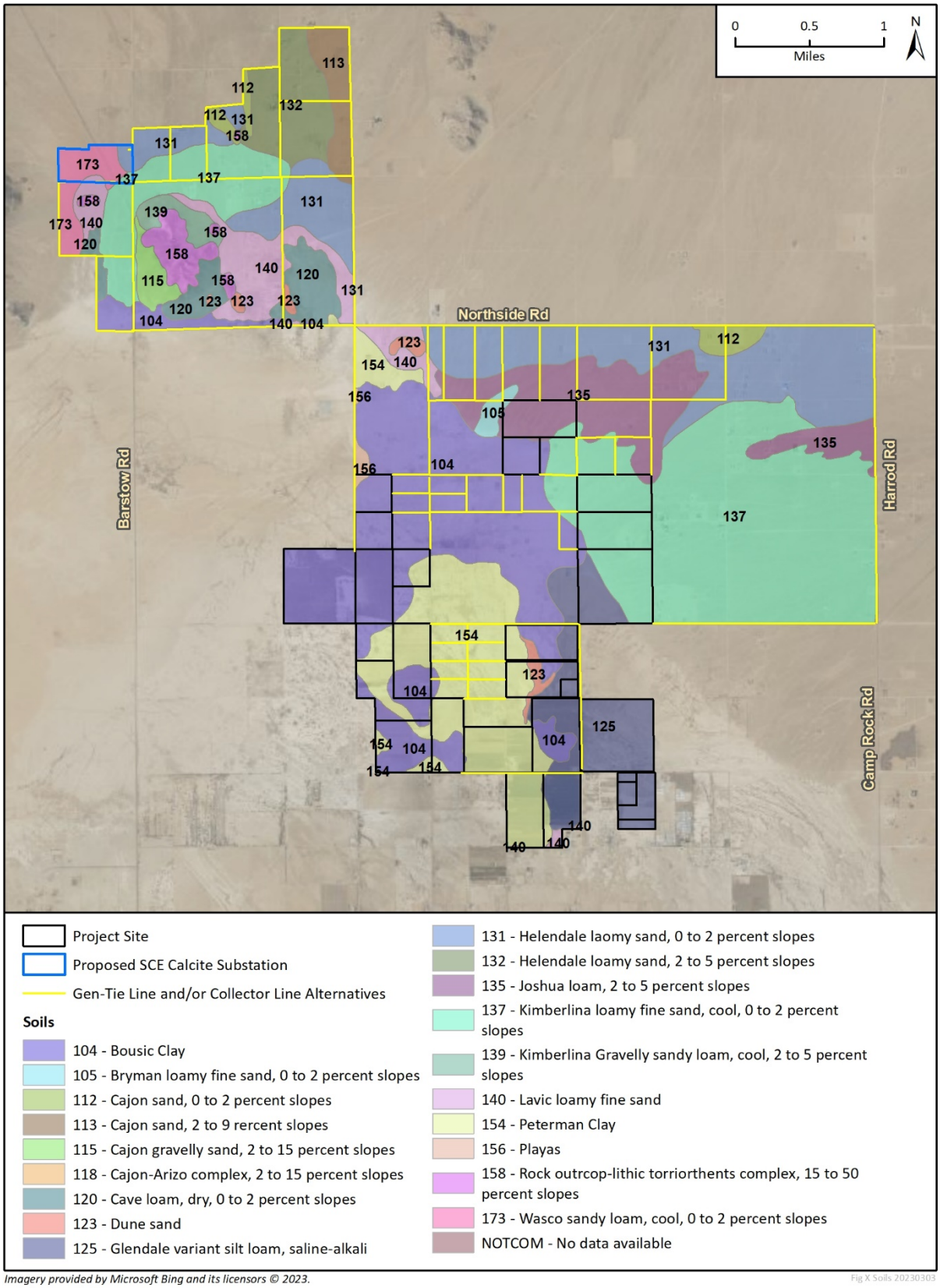
Quaternary young (Holocene) alluvium (Qa), derived from the Ord Mountains to the north, form an unconsolidated layer of alluvial sand, silt, and gravel across much of the Project area and Lucerne Valley. Mapped at the surface within the central portion of the Project area, the Quaternary young (Holocene) dune sand deposits (Qs) consist of loose, well-sorted, fine-grained sand deposited as dunes or thin veneers on alluvium and clay (Dibblee and Minch 2008a, b). Mapped simultaneously in several areas, the Quaternary young (Holocene) playa deposits (Qc) are composed of a layer of light gray, micaceous, clay and are formed from the lakebed of the Lucerne Dry Lake.

Quaternary old (Pleistocene) gravel deposits (Qog), mapped within portions of the gen-tie corridor, are composed gray gravel of rounded cobbles derived from the Ord and East Ord Mountains (Dibblee and Minch 2008a, b).

The U.S. Department of Agriculture (USDA) National Resource Conservation Service (NRCS) has mapped and inventoried soils at both landscape (coarse) scales and detailed (fine) scales. These data are catalogued in previously published soil surveys, the Soil Survey Geographic Database, and the U.S. General Soil Map. These can be accessed through the Web Soil Survey Application (USDA NRCS 2021). This subsection summarizes soil resources as mapped by the NRCS that overlap the Project area at the landscape level.

The Project area is covered by the *Soil Survey of San Bernardino County, California, Mojave River Area*. The soil survey indicates that soils in the Lucerne Valley floor are primarily derived from alluvium parent materials from granitic sources and other mixed sources. Within the Project area, soils are associated with alluvial fans, toe slopes, playas, and other gently sloped landforms. Based on Web Soil Survey data, the site contains 18 soil map units, which are briefly described below. Soil map units across the Project area are depicted in Figure 5, below.

Figure 5 Soils Map



Imagery provided by Microsoft Bing and its licensors © 2023.
Soil data provided by SSURGO, NRCS, USDA, 2021.

Fig X Soils 20230303

Bousic Clay

This soil map unit typically occurs on toeslopes of lake plains and talfs (geomorphic components of an essentially flat and broad area dominated by closed depressions) in low areas with very little slope. The dominant soil series, Bousic clay, is formed in alluvium from mixed sources. A typical soil profile consists of clay horizons to at least 60 inches of depth. This soil is well drained, alkaline, and strongly saline. Minor components within this map unit are Peterman soils. This soil covers approximately 19 percent of the Project area.

Bryman Loamy Fine Sand, 2 to 5 Percent Slopes

This granitic soil map unit usually occurs on terraces and older alluvial fans, at elevations from 2,800 to 3,800 ft. A typical soil profile consists of a pale topsoil layer that is loamy or sandy. The second horizon is usually pink to reddish brown and is generally sandy clay loam, loam or gravelly sandy loam. The third horizon is pale yellowish brown to strong brown, is usually alkaline, and may be loamy coarse sand to sand. This soil covers approximately 0.4 percent of the Project area.

Cajon Sand, 0 to 2 Percent Slopes

This soil map unit typically occurs on alluvial fans on gentle slopes. The dominant soil series, Cajon sand, is formed in alluvium from granitic sources. A typical soil profile consists of sandy topsoil, underlain by a second sand horizon to approximately 25 inches, with layers of gravelly sand, stratified sand and loamy fine sand below to at least 60 inches of depth. This soil is somewhat excessively drained. Minor components within this map unit are Manet, Kimberlina, and Helendale soils. This soil covers approximately 0.9 percent of the Project area.

Cajon Sand, 2 to 9 Percent Slopes

This soil map unit is similar to the Cajon map unit except it occurs on slightly greater slopes (2 to 9 percent) and may have more layers of stratified gravelly sand in the subsoil. This soil covers approximately 1.5 percent of the Project area.

Cajon Gravelly Sand, 2 to 15 Percent Slopes

This soil map unit is similar to the previous two Cajon map units except it occurs on slightly greater slopes (2 to 15 percent) and the topsoil and subsoil horizons have increased gravel content. This soil covers approximately 0.7 percent of the Project area.

Cave Loam, Dry, 0 to 2 Percent Slopes

This soil map unit typically occurs on alluvial fan remnants on gentle slopes. The dominant soil series, Cave loam, is formed in alluvium from granitic sources. A typical soil profile consists of loam topsoil, underlain by stratified sandy loam to loam subsoil between 21 and at least 66 inches of depth. This soil is well drained, and very slightly to slightly saline. Minor components within this map unit are a Cave soil with clayey subsoil, Kimberlina, and Lavic soils. This soil covers approximately 2.5 percent of the Project area.

Dune Sand

This soil map unit consists of unstable hills and ridges of loose, wind-deposited sand that is excessively drained and barren. Dunes are typically less than 15 feet high, and slopes are between 5 to 15 percent. Minor components within this map unit are Cajon sand, Riverwash and Villa loamy

sand along the Mojave River, and Halloran soils. This soil covers approximately 6.5 percent of the Project area.

Glendale Variant Silt Loam, Saline-Alkali

This soil map unit occurs on basin rims and lower margins of narrow alluvial fans with slopes ranging from 0 to 2 percent with vegetation consisting of salt-tolerant shrubs, grasses, and forbs. Soil profiles are very pale brown silt loam down to 11 inches with underlying material consisting of light yellowish brown and pale brown silty clay loam. Surface layer and underlying layers are moderately or strongly alkaline. Minor components within this map unit are small areas of Lavic soils. This soil is suited for irrigated crops in areas where they are reclaimed. This soil covers approximately 6 percent of the Project area.

Helendale Loamy Sand, 0 to 2 Percent Slopes

This soil map unit typically occurs on alluvial fan remnants on gentle slopes. The dominant soil series, Helendale loamy sand, is formed in alluvium from granitic sources. A typical soil profile consists of loamy sand topsoil, underlain by sandy loam subsoil between 4 and at least 66 inches of depth. This soil is well drained, and non-saline to very slightly saline. Minor components within this map unit are Bryman, Kimberlina, and Cajon soils. This soil covers approximately 13 percent of the Project area.

Helendale Loamy Sand, 2 to 5 Percent Slopes

This soil map unit occurs on alluvial fans and terraces and is derived primarily from granitic material. Slopes are broad and nearly level with many areas dissected by shallow intermittent drainageways. Vegetation is primarily yucca, desert shrubs, grasses, and forbs. The surface layer is very pale brown loamy sand about 4 inches thick with subsoil and the upper part of the substratum are brown, yellowish brown, and light yellowish brown sandy loam about 62 inches thick. Clay content decreases below a depth of 30 inches. Minor components include Bryman, Kimberlina, and Cajon soils. This soil covers approximately 3.1 percent of the Project area.

Joshua Loam, 2 to 5 Percent Slopes

This soil map unit occurs on old stable terraces that have desert pavement. It formed in alluvium derived from mixed sources with broad, slightly convex slopes. Most areas are dissected by moderately deep intermittent drainageways. Typically, 70-90 percent of the surface layer is covered by desert pavement with a light yellowish-brown loam about 3 inches thick. Subsoils are brown and reddish brown gravelly sandy clay loam around 17 inches thick. These soils are often strongly alkali. Minor components within this map unit are Cajon soils. This soil covers approximately 7.4 percent of the Project area.

Kimberlina Loamy Fine Sand, Cool, 0 to 2 Percent Slopes

This soil map unit typically occurs on skirts and aprons of alluvial fans on gentle slopes. The dominant soil series, Kimberlina loamy fine sand, is formed in alluvium from mixed sources. A typical soil profile consists of loamy fine sand topsoil, underlain by sandy loam, fine sandy loam, and loam subsoil between 7 and at least 60 inches of depth. This soil is well drained, and non-saline to very slightly saline. Minor components within this map unit are Helendale and Cajon soils. This soil covers approximately 25 percent of the Project area.

Kimberlina Loamy Fine Sand, Cool, 2 to 5 Percent Slopes

This soil map unit is similar to the Kimberlina map unit except it occurs on slightly greater slopes (2 to 5 percent) and may have more layers of stratified gravelly sand in the subsoil. This soil covers approximately 0.7 percent of the Project area.

Lavic Loamy Fine Sand

This soil map unit typically occurs on skirts and aprons of alluvial fans on gentle slopes. The dominant soil series, Lavic loamy fine sand, is formed in alluvium from granitic sources. A typical soil profile consists of loamy fine sand topsoil, underlain by multiple layers of sandy loam, loamy fine sand, loamy sand and loam subsoil between 10 and at least 49 inches of depth. This soil is well drained, and slightly to moderately saline. Minor components within this map unit are unnamed soils. This soil covers approximately 4.1 percent of the Project area.

Peterman Clay

This soil map unit typically occurs on skirts of alluvial fans on gentle slopes. The dominant soil series, Peterman clay, is formed in fine-textured alluvium from mixed sources. A typical soil profile consists of clay topsoil, underlain by clay and gravelly clay subsoil to at least 60 inches of depth. This soil is moderately well drained, alkaline, and strongly saline. Minor components within this map unit are unnamed soils. This soil covers approximately 11 percent of the Project area.

Playas

This soil map unit consists of playa areas consisting of lacustrine deposits derived from mixed sources. Minor components within this map unit are Bousic, Norob, and Halloran soils. This soil covers approximately 0.2 percent of the Project area.

Rock Outcrop – Lithic Torriorthents Complex, 15 to 50 Percent Slopes

This soil map unit typically occurs on summits, backslopes and flanks of mountains on moderate to steep slopes. This map unit does not contain named soils. Rock outcrops, typically granitic, are interspersed with minimally developed soil underlain by bedrock within 8 to 20 inches of the soil surface. Minor components within this map unit are Sparkhule and Trigger soils. This soil covers approximately 1.4 percent of the Project area.

Wasco Sandy Loam, Cool, 0 to 2 Percent Slopes

This soil map unit typically occurs on aprons of alluvial fans on gentle slopes. The dominant soil series, Wasco sandy loam, is formed in alluvium derived from granite. A typical soil profile consists of sandy loam topsoil, underlain by additional sandy loam horizons to at least 60 inches of depth. This soil is well drained, and non-saline to very slightly saline. Minor components within this map unit are Cajon, Lucerne, and Bryman soils. This soil covers approximately 1.3 percent of the Project area.

A majority of the soils within the Project area are alluvial. Because of the episodic nature of alluvial sedimentation, the sudden burial of artifacts is possible, and alluvial soils have an increased likelihood of containing buried archaeological deposits (Waters 1992, Borejaza et al. 2014). Although derived from alluvium, Bousic and Peterman Clay are a micaceous clay formed from the lakebed of the Lucerne Dry Lake. These map units generally consist of clay to at least five feet below

surface and are less likely to contain buried archaeological deposits as artifact intrusion and accumulation of soil overtime are less likely to occur.

4.2 Cultural Setting

4.2.1 Indigenous History

Several chronological sequences have been proposed by archaeologists to describe cultural change in Southern California (Jones and Klar 2007, Moratto 2004). Sutton et al. (2007) devised an updated Mojave Desert culture history, dividing it into four temporal periods: Pleistocene, Early Holocene, Middle Holocene, and Late Holocene. Here, we use a modified version from Sutton et al. (2007) Mojave Desert chronology that incorporates updated dates and information regarding the Terminal Pleistocene and Early Holocene Periods (i.e., Grayson 2011, Rosencrance 2019, Smith et al. 2020).

Terminal Pleistocene Period (ca. 14,000 to 11,600 cal BP)

The climate of the Terminal Pleistocene Period in the Mojave Desert is generally characterized as being much cooler and wetter that the periods that followed (Sutton et al. 2007). During this time, the Mojave Desert featured several pluvial lakes (Grayson 2011). Although pluvial lakes vary in size, depth, and productivity, many lakes in the region likely fostered shallow marshes and wetlands along their shores. These lacustrine wetland environments often contained a wide variety of plant (e.g., cattail, tule) and animal resources (e.g., waterfowl, fish, deer/antelope). Vegetation in the Mojave Desert was also much different during the Terminal Pleistocene than it is today. Shadscale communities dominated the valley floors and Utah Juniper grew thousands of feet lower in elevation than they do today (Grayson 2011). Common plants seen today such as creosote bush, brittlebush, and rabbitbrush would not arrive in the region for hundreds to thousands of years following the end of the period (ca. 11,600 cal BP [Grayson 2011]).

To date, there are no securely dated archaeological sites attributed to the Terminal Pleistocene Period (Rosencrance 2019, Smith et al. 2020) in the Mojave Desert or southern Great Basin. However, it is possible that groups associated with the Western Stemmed Tradition (WST) and Clovis technological complexes did occupy the region during this time. The WST is a Paleoindian technological complex found across the Intermountain West and California that is characterized by the use of large-stemmed-lanceolate projectile points, a mobile hunter-gatherer settlement-subsistence system, and a broad diet often dominated by lacustrine resources (Reaux 2020). Campbell and Campbell (1937) discovered the first WST points on the shores of Pleistocene Lake Mojave and suggested that they dated to the Terminal Pleistocene; however, they lacked a means to reliably date the sites at the time. Although, there are no currently well-dated Terminal Pleistocene WST sites in the Mojave Desert or southern Great Basin, recent discoveries at the Paisley Caves, Oregon and Cooper's Ferry, Idaho indicate that WST groups have been in the Intermountain West since at least 14,000 cal BP, making it the oldest well-defined technological complex in North America (Davis et al. 2019, Jenkins et al. 2012, Smith et al. 2020). Current evidence suggests that WST groups may not have occupied the Mojave Desert region until the Early Holocene period (Rosencrance 2019).

Fluted lanceolate points, often attributed to the Clovis Paleoindian Complex, have also been found in the Mojave Desert and southern Great Basin (Grayson 2011). The Clovis Complex, once thought to be the oldest Paleoindian technological complex in the Americas (Jenkins et al. 2012) is generally defined by the presence of fluted lanceolate concave-based bifaces and the use of blades derived

from prepared cores (Justice 2002). Clovis groups are often described as being highly mobile, megafauna hunting specialists based on their large toolstone conveyance patterns and the relatively common occurrence of Pleistocene megafauna kill sites associated with Clovis material (Grayson 2011). However, this was likely not the case in the Mojave Desert and Great Basin given the limited amount of Pleistocene megafauna that occupied the desert region due to limited grassland availability (Grayson 2016). Instead, Clovis points in the Mojave Desert and Great Basin tend to be found along the shores of relict pluvial lakes and/or drainages that fed pluvial lakes, often overlapping with WST sites. It is likely that groups using fluted-point technology practiced a similar wetland-focused lifestyle as WST groups. Unfortunately, no well-stratified or dated Clovis sites exist in the Mojave Desert and Great Basin, and little else is known about their existence in the region or their relationship to the WST. Some researchers believe that fluted-point groups in the Great Basin and California may have arrived sometime during the late Paleoindian period (i.e., the Early Holocene) given the age and dominance the WST in the region and differences in the morphology of fluted points in the west compared to traditional Clovis points found in the eastern United States. (Rosencrance 2019, Smith et al. 2020).

Early Holocene Period (ca.11,600 to 8,000 cal BP)

The Pleistocene-Holocene transition began at approximately 11,600 cal BP following the termination of the Younger Dryas climatic event. The onset of the Early Holocene Period was marked by warmer temperatures, reduced precipitation, and the eventual desiccation of many of the region's Pleistocene pluvial lakes. During this period, we see a shift to more modern vegetation distributions with the arrivals of white bursage and creosote bush and the retreat of Utah Juniper to higher elevations (Grayson 2011). Although very few dated sites exist for this period, both fluted and WST technologies are associated with the Early Holocene in the Mojave Desert and southern Great Basin. WST sites, sometimes associated with the Lake Mojave Complex (Sutton et al., 2007), are the most common Early Holocene archaeological tradition in the region. These sites are often found near relict pluvial lake shores and generally contain the Lake Mojave and Silver Lake type WST points (Rosencrance 2019). Other Lake Mojave Complex tools include bifaces, steep-edged unifaces, crescents, the occasional cobble-core tool, and, infrequently, ground stone implements (Justice 2002). Based on large toolstone-conveyance zones, small site sizes, and the lack of evidence for long-term occupations (e.g., house features, middens), researchers believe WST groups in the region continued to practice a highly mobile, wetland-focused settlement-subsistence strategy (Basgall and Hall 1993, Grayson 2011) during this period.

Unlike the Terminal Pleistocene Period, a small number of sites have been securely dated to the Early Holocene in the Mojave Desert region. For example, the Roger's Ridge Site contained Lake Mojave WST points associated with a date range of 11,095-10,200 cal BP (Jenkins 1991) and the Awl Site possessed Parman and Silver Lake WST points dating between 10,125-8,655 cal BP (Basgall and Hall 1993). Finally, the China Lake Site contains both WST and fluted points argued to date to the Terminal Pleistocene and Early Holocene periods (Basgall and Overly 2004, Sutton 2007); however, these dates are associated with relict landforms and cannot be directly associated with those artifacts or occupations (Rosencrance 2019).

Middle Holocene Period (8,000 to 5,000 cal BP)

The Middle Holocene climate was generally more arid than periods before and after but experienced multiple oscillations between wetter and drier conditions throughout the period. The nearly complete desiccation of the Early Holocene lakes and marshes required the region's

inhabitants to rely on streams and springs for water, likely resulting in lower occupational densities (Aikens 1978, Basgall 2000, Cleland and Spaulding 1992, Sutton 1996, Warren 1984). Average temperatures and aridity increased, peaking between 8,000 and 6,000 cal BP. Settlement patterns appear to change during this time, including a shift to upland settings where reliable waters could still be found. The onset of the Middle Holocene Period also saw dramatic shifts in the archaeological record with the gradual replacement of WST spear-point technology by dart points of the Pinto Complex, marking the onset of the Early Archaic period (Grayson 2011).

The Pinto Complex was defined by Campbell and Campbell (1935) based on their work at the Pinto Basin site, but it has a wider distribution throughout the Mojave Desert than previous complexes. During the latter part of the Early Holocene, archaeological data indicate that the Pinto Complex overlaps the WST Lake Mojave Complex (Sutton et al., 2007). The Pinto Complex reflects shifts in subsistence patterns and adaptation to the shrinking of the Pleistocene lakes, including a greater emphasis on the exploitation of plants, with the continued pursuit of artiodactyls and smaller game. The broad distribution of this complex implies a high degree of mobility. The hallmarks of the Pinto Complex tool assemblage include concave base and bifurcate base projectile points with strong basal ears and more gradual shoulders (Jenkins 1991). Other diagnostic artifacts of this complex include domed and keeled scrapers, large and small leaf-shaped bifaces, core/cobble tools, large metates and milling slabs, and shaped and unshaped handstones.

Near the end of the Middle Holocene, approximately 5,000 to 4,000 cal BP, the climate became increasingly hotter and more arid. Very few sites date to this time period, suggesting that populations were very low. It is possible that some areas were abandoned during this increasing hot and dry period (Sutton et al. 2007).

Late Holocene Period (5,000 cal BP to European Contact)

The climate of the Late Holocene was similar to current conditions: cooler and more mesic than the Middle Holocene but not as cool and moist as the Terminal Pleistocene or Early Holocene. The climate remained highly variable with periods that included the Mojave lakes refilling to levels of earlier high stands, contrasted with at least two major droughts, ca. 1,124 to 904 cal BP, and ca. 807 to 660 cal BP (Stine 1994). A cooler and wetter period occurred between 550 and 100 cal BP (Cleland and Spaulding 1992). These climatic changes at the onset of the late Holocene once again resulted in modified subsistence strategies and a number of new cultural complexes developed during this time including the: Middle Archaic Complex, Gypsum Complex, Rose Spring Complex/Late Archaic Period, and the Late Prehistoric Complex (or period).

Dart-point-size projectile points such as Elko and Humboldt series points appear in the region during the early-Late Holocene and are often attributed to the Middle Archaic cultural complex found across the Great Basin region (Grayson 2011), although they are sometimes included as a part of the Gypsum Complex. This period saw a boom in population densities and shift towards a more residentially stable lifestyle that included an increased reliance on low-ranked plant resources and a dramatic rise in the use of groundstone implements such as manos and metates (Grayson 2011). Around 4,000 cal BP, the Gypsum Complex emerged in the Mojave Desert region. Gypsum Complex sites are generally characterized by small-stemmed and leaf-shaped points, rectangular-based knives, flake scrapers, drills, and occasionally, large scraper planes, choppers, and hammerstones (Warren 1984). Other artifacts found at Gypsum Complex sites include split-twig animal figurines, Olivella shell beads, and Haliotis spp. beads and ornaments, which are indicative of trade with people from the Southern California coast and southern Great Basin.

By 1,750 cal BP, a slightly cooler climate further increased population growth as seen by the higher frequency of Late Archaic archaeological sites found throughout the region. The Rose Spring Complex dominated the Late Archaic period and was present from approximately 1,815 to 915 cal BP, with regional temporal variations known as the Saratoga Springs, Haiwee, or Amargosa periods (Sutton 1996, Sutton et al. 2007). The smaller Rose Spring projectile points replaced the dart-size points of previous complexes and marked the introduction of the bow and arrow (Yohe 1998). The bow and arrow provided its user a way to rapidly fire multiple projectiles during hunting or warfare and from a position of relative security compared to the atlatl or spear. Bedrock milling features supplement portable milling stones in villages and ancillary sites within the California deserts.

The Late Prehistoric period (ca. 900–250 cal BP) corresponds to the introduction of ceramic artifacts in the Mojave Desert region as well as replacement of Rose Spring projectile points with even smaller Desert Side-notched points and Cottonwood series arrow points. The use of the mortar and pestle became more widespread during this period and evidence of food storage facilities becomes increasingly common in the archaeological record. In the central Mojave Desert, the Mojave River became a primary focus of occupation, and trade networks increased along the Mojave River and over the San Gabriel Mountains (Sutton 1996). Archaeological evidence left by highly mobile hunter-gatherers in the Mojave Desert during the Late Prehistoric period is typified by sparse scatters of flaked stone, groundstone, and ceramic artifacts and features such as hearths, rock rings, and trails.

4.2.2 Ethnographic Overview

The Serrano occupied an area in and around the San Bernardino Mountains between approximately 450 and 3,350 meters (1,500-11,000 ft) above mean sea level. Their territory extended west of the Cajon Pass, east past Twentynine Palms, north of Victorville, and south to Yucaipa Valley. The Serrano language is part of the Serran division of a branch of the Takic family of the Uto-Aztecan linguistic stock (Mithun 2006: 539, 543). The two Serran languages, Kitanemuk and Serrano, are closely related. Kitanemuk lands were northwest of Serrano lands.

Serrano was originally spoken by a relatively small group located within the San Bernardino and Sierra Madre mountains, and the term “Serrano” has come to be ethnically defined as the name of the people in the San Bernardino Mountains (Kroeber 1925:611). The Vanyume, who lived along the Mojave River and associated Mojave Desert areas and are also referred to as the Desert Serrano, spoke either a dialect of Serrano or a closely related language (Mithun 2006: 543). Year-round habitation tended to be located on the desert floor, at the base of the mountains, and up into the foothills, with all habitation areas requiring year-round water sources (Bean and Smith 1978, Kroeber 1908).

Most Serrano lived in small villages located near water sources (Bean and Smith 1978: 571). Houses measuring 12 to 14 ft in diameter were domed and constructed of willow branches and tule thatching and occupied by a single extended family. Many of the villages had a ceremonial house, used both as a religious center and the residence of the lineage leaders. Additional structures within a village might include granaries and a large circular subterranean sweathouse. The sweathouses were typically built along streams or pools. A village was usually composed of at least two lineages. The Serrano were loosely organized along patrilineal lines and associated themselves with one of two exogamous moieties or “clans”—the Wahiyam (coyote) or the Tukum (wildcat) moiety.

The subsistence economy of the Serrano was one of hunting and collecting plant goods, with occasional fishing (Bean and Smith 1978: 571). They hunted large and small animals, including mountain sheep, deer, antelope, rabbits, small rodents, and various birds, particularly quail. Plant

staples consisted of seeds, acorn nuts of the black oak, piñon nuts, bulbs and tubers, and shoots, blooms, and roots of various plants, including yucca, berries, barrel cacti, and mesquite. The Serrano used fire as a management tool to increase yields of specific plants, particularly chía.

Trade and exchange was an important aspect of the Serrano economy. Those living in the lower-elevation, desert-floor villages traded foodstuffs with people living in the foothill villages who had access to a different variety of edible resources. In addition to inter-village trade, ritualized communal food procurement events, such as rabbit and deer hunts and piñon, acorn, and mesquite nut-gathering events, integrated the economy and helped distribute resources that were available in different ecozones.

Contact between Serrano and Europeans was relatively minimal prior to the early 1800s. As early as 1790, however, Serrano were forcibly moved to missions (Bean and Vane 2002). More Serrano were relocated to Mission San Gabriel in 1811 after a failed indigenous attack on that mission. Most of the remaining western Serrano were moved to an asistencia built near Redlands in 1819 (Bean and Smith 1978: 573).

A smallpox epidemic in the 1860s killed many indigenous Southern Californians, including many Serrano (Bean and Vane 2002). Oral history accounts of a massacre in the 1860s at Twentynine Palms may have been part of a larger American military campaign that lasted 32 days (Bean and Vane 2002: 10). Surviving Serrano sought shelter at Morongo with their Cahuilla neighbors. Morongo later became a reservation (Bean and Vane 2002). Other survivors followed the Serrano leader Santos Manuel down from the mountains and toward the valley floors and eventually settled what later became the San Manuel Band of Mission Indians Reservation, formally established in 1891.

Today, many Serrano live either on the Morongo or San Manuel reservations (California Indian Assistance Program 2003). The Morongo Band of Mission Indians of the Morongo Reservation, established through presidential executive orders in 1877 and 1889, includes both Cahuilla and Serrano members. Established in 1893, the San Manuel Band of Mission Indians Reservation included 84 Serrano tribal members in 2004. Both Morongo and San Manuel are federally recognized tribes. People of both reservations participate in cultural programs to revitalize traditional languages, knowledge, and practices.

4.2.3 Post-Contact Overview

The post-Contact history of California is generally divided into three periods: the Spanish period (1769-1822), the Mexican period (1822-1848), and the American period (1848-present). Each of these periods is briefly described below.

Spanish Period (1769–1822)

In 1542, Juan Rodriguez Cabrillo led the first European expedition to observe what is now called Southern California. For more than 200 years, Cabrillo and other Spanish, Portuguese, British, and Russian explorers sailed the Alta (upper) California coast and made limited inland expeditions, but they did not establish permanent settlements (Bean 1968, Rolle 2003).

Gaspar de Portolá and Franciscan Father Junípero Serra established the first Spanish settlement in Alta California at Mission San Diego de Alcalá in 1769. This was the first of 21 missions erected by the Spanish between 1769 and 1823. While Spanish missions were established in San Bernardino

County, Native Americans in the region were influenced by other Native Americans migrating to the area, driven from their homelands by encroachment of the Spanish.

During this period, Spain also deeded ranchos to prominent citizens and soldiers, though very few in comparison to the following Mexican Period. To manage and expand herds of cattle on these large ranchos, colonists enlisted the labor of the surrounding Native American population (Engelhardt 1927a). The missions were responsible for administrating the local people as well as converting the population to Christianity (Engelhardt 1927b). Inevitably, this increased local population density and contact with diseases brought by Europeans greatly reduced the Native American population (McCawley 1996). Native American populations in San Bernardino County were less affected by the missions. However, in some cases, individuals were taken from their tribes to be educated at one of the missions before being sent back (Morgan 1914).

The first known Spanish explorers to enter the Mojave Desert were a group of soldiers led by Pedro Fages in 1772. In 1776, Friar Francisco Garcés, traveled through the area coming from the Colorado River (Hoover et al. 2002: 321). Friar Garcés traveled as far as the Pacific coast along an ancient trade route, known as the Mojave Trail, and he named the Mojave River *Arroyo de los Mártires* (Stream of the Martyrs). The river was later named *Rio de las Animas* (River of Souls) by Fr. Joaquín Pasqual Nuez, who accompanied the 1819 expedition of Lt. Gabriel Moraga.

Mexican Period (1822–1848)

The Mexican period commenced when news of the success of the Mexican Revolution (1810-1821) against the Spanish crown reached California in 1822. This period saw extensive interior land grant development as well as exploration west of the Sierra Nevada Mountains by American fur trappers. The California missions declined in power and were ultimately secularized in 1834. The hallmark of the Mexican period was large ranchos deeded to prominent Mexican citizens, frequently soldiers, by the governor. These ranchos became important economic and social centers. However, no ranchos were claimed in the arid Mojave Desert. Rancho San Bernardino, situated in the southwestern corner of San Bernardino County, was the closest land grant to the current APE, located approximately 160 kilometers (100 miles) to the west. Governor Pío Pico and his predecessors made more than 600 rancho grants between 1833 and 1846, putting most of the state's lands into private ownership for the first time (Gumprecht 1999). During the Mexican period, trappers and explorers from the eastern United States repeatedly journeyed westward. Jedidiah Strong Smith, one of these early American adventurers, traveled through the Mojave Desert in 1826 and 1827 and nicknamed the Mojave River the "Inconstant River" because of its frequent disappearance beneath the ground surface.

American Period (1848–Present)

The American period officially began with the signing of the Treaty of Guadalupe Hidalgo in 1848, in which the United States agreed to pay Mexico $15 million for the conquered territory, including California, Nevada, Utah, and parts of Colorado, Arizona, New Mexico, and Wyoming. In 1850, California was admitted to the Union as the 31st state.

The discovery of gold in Northern California in 1848 led to the California Gold Rush and subsequent farming and city/town development in the northern/central portions of California, but Southern California remained dominated by cattle ranches in the early American period, though droughts and increasing population resulted in farming and more urban professions increasingly supplanting ranching through the late nineteenth century. By 1853, the population of California exceeded

300,000. Thousands of settlers and immigrants continued to immigrate into the state, particularly after the completion of the transcontinental railroad in 1869.

During the Gold Rush, thousands of people traveled the Mojave River Trail from points east, attempting to reach the fabled goldfields of California. The Mojave River Trail was called the Old Spanish Trail by Captain John C. Frémont until he met a group of Native Americans northeast of Victorville who told Frémont they had lived along the Mojave River and the mountains to the north and traded with other indigenous peoples in the region along the Mojave River Trail (Frémont 1845: 260).

Lucerne Valley

Euromericans began settling in the Lucerne Valley in the 1800s, pushing out the Native Americans who had previously used the area for its natural springs. In 1867, hostilities between Euromericans and Native Americans led to a massacre at Chimney Rock, causing the Native Americans to retreat. After that point, Euromerican settlement increased leading to large ranching developments including Box S Ranch and Old Woman Springs Ranch. James Goulding, the owner of Box S Ranch, is considered the Euromerican “founder” of Lucerne Valley. He established the Lucerne Valley School District and donated land to establish a church. The first Lucerne Valley Library was started in the front room of the Box S ranch house. The Lucerne Valley Post Office was established in 1912. The settlement continued to develop into a small town with a volunteer fire department and a number of small businesses such as a general store, bakery, gift shop, and beauty shop (Owen 1988). The Lucerne Valley remains a small unincorporated rural community with an economy driven by agriculture.

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5 Findings

5.1 Known Cultural Resources Studies

The SCCIC records search identified 12 cultural resources studies that have been conducted within a 0.5-mile radius of the Project area (Table 2 and Appendix B). Of these studies, six were within the Project area. Brief descriptions of cultural resource studies within the Project area that resulted in the recordation of cultural resources relevant to this study are provided below.

Table 2 Known Cultural Resource Studies within a 0.5-Mile Radius of the Project Site

Report Number	Author	Year	Title	Relationship to Project Area
SB-00871	Leonard, Joanne	1979	*An Archaeological Assessment of the Properties in the Lucerne Valley*	**Within**
SB-02689	Brown, Joan	1992	*Archaeological Literature and Records Review for the Rancho Lucerne Planned Development Project in the County of San Bernardino, California*	N/A
SB-02690	Brown, Joan	1992	*Addendum to: Archaeological Literature and Records Review for the Rancho…*	N/A
SB-02830	Brown, Joan and Tim Gregory	1992	*Archaeological Literature and Records Review for the Rancho Lucerne Planned Development Project in the County of San Bernardino, California*	N/A
SB-04027	Love, Bruce	1998	*Cultural Resources Report: Ranch Lucerne Development, Lucerne Valley, San Bernardino County*	N/A
SB-04028	Urbas, Andrea	1998	*Adaptive Use Report: The Oasis/Rabbit Springs Ranch Historic Buildings, Rancho Lucerne Valley Development, Lucerne Valley, San Bernardino County, CA*	N/A
SB-05158	Ahmet, Koral, and Michael Lerch	2005	*Deteriorated Pole Replacement Project Archaeological Survey of Ten Pole Locations on the Poco 33KV, Cement 33KV, Rabbit 12KV, Sky HI 12KV, and Cushenbury 33KV Transmission Lines, San Bernardino County, California*	**Within**
SB-06512	Backes, Clarus, Jessica DeBusk, and John Dietler	2009	*Cultural Resources Survey for the Lucerne Valley PV Solar Project, San Bernardino County, California*	**Within**
SB-07020	Woodman, Craig	2011	*Supplemental Class III Archaeological Survey of a Redundant Fiber Optic Line for the Granite Mountain Wind Energy Project, San Bernardino County, CA*	N/A

Report Number	Author	Year	Title	Relationship to Project Area
SB-07273	Orfila, Rebecca	2011	*Archaeological Survey for the Southern California Edison Company: GRM Project in Lucerne, CA*	**Within**
SB-07366	Winslow, Diane and Sherri Andrews	2013	*Class III Inventory for the Granite Wind Energy Telecommunication Lines Granite Mountain, Gentie Line and Jasper Substation Interconnection Projects, San Bernardino County, California*	**Within**
SB-07984	Stanton, Patrick, Kenneth Becker, Mark Sutton, and Karen Swope	2015	*Class III Cultural Resource Inventory of the Line 4000 Anomaly Digs Project, San Bernardino County, California*	**Within**

Source: South Central Coastal Information Center, September 2021

SB-06512

SWCA Environmental Consultants prepared SB-06512, Cultural Resources Survey, for the Lucerne Valley PV Solar Project, San Bernardino County, California, in 2009. The study included a records search, Native American consultation, and pedestrian survey of a 440-acre project area that includes most of the northwestern parcels that Rincon covered during this study. This study identified nine cultural resources, including three historical archaeological sites and six prehistoric isolates. The three historical sites (LV-S1, LV-S2, and LV-S3) were evaluated and found ineligible for inclusion in the CRHR. The six prehistoric isolates were also determined to be unlikely to be included in the CRHR due to limited data potential and lack of contextual integrity. This study did not recommend any mitigation for the resources found in the project area.

SB-07366

ASM Affiliates prepared SB-07366, Class III Inventory for the Granite Wind Energy Telecommunication Lines, Granite Mountain Gen-tie Line, and Jasper Substation Interconnection Projects, San Bernardino County, California, in 2013. This study included a Class III cultural resource inventory of a 3,633-acre study that encompassed portions of the current study's survey parcels and gen-tie lines. ASM Affiliates recorded 19 archaeological sites, including prehistoric lithic scatters, rock features, and numerous historic period refuse scatters. They also revisited and updated 15 previously recorded cultural resources. Five of the newly recorded sites were determined to be eligible for the NRHP and CRHR, and they concurred that five sites previously recommended eligible were correct. The study recommended that all sites found eligible for the NRHP and CRHR be avoided by development activities.

SB-07984

Statistical Research, Inc. prepared SB-07984, Class III Cultural Resource Inventory of the Line 400 Anomaly Digs Project, San Bernardino County, California, in 2015. This study included a Class III cultural resource inventory of a 488-acre project area for a natural gas-transmission line project. The study area crosses two gen-tie lines in the current project area. This study identified 24 new sites

and 65 isolates; however, only one (P-36-028357), a small portion of Huff Road, falls within the current Project area. They did not evaluate the resource for its eligibility for the NRHP and CRHR.

5.2 Known Cultural Resources

Forty cultural resources have been recorded within a 0.5-mile radius of the Project area, 11 of which are located within the Project area. The results of the records search are summarized below in Table 3. The SCCIC results are also provided in Appendix B. Resources recorded within the Project area are discussed in further detail below.

Table 3 Known Cultural Resources within a 0.5-Mile Radius of the Project Site

Primary Number	Trinomial	Resource Type	Description	Recorder(s) and Year(s)	NRHP/CRHR Status	Relationship to Project Area
P-36-014876	CA-SBR-13115H	Historical site	SCE Lugo-Pisgah No. 1 220 kV Transmission Line	URS 2009 Urbana Preservation & Planning 2018 Kautz Environmental Consultants 2019	Recommended Eligible	**Within**
P-36-021160	CA-SBR-13657H	Historical site	Historic concrete foundations, pads, and steel pipes	SWCA 2009 Dudek 2016	Unevaluated	Outside
P-36-021161		Historical site	Wooden power poles	SWCA 2009 Dudek 2016	Unevaluated	Outside
P-36-021162	CA-SBR-13659	Historical site	Three concrete foundation pads	SWCA 2009 Dudek 2016	Unevaluated	Outside
P-36-021163	None	Prehistoric isolate	Granitic metate fragment	SWCA 2009	Not Eligible	Outside
P-36-021164		Prehistoric isolate	Chert flake	SWCA 2009	Not Eligible	Outside
P-36-021165		Prehistoric isolate	Basalt flake	SWCA 2009	Not Eligible	Outside
P-36-021166		Prehistoric isolate	Basalt flake	SWCA 2009	Not Eligible	Outside
P-36-021167		Prehistoric isolate	Granitic Metate	SWCA 2009	Not Eligible	Outside
P-36-021168		Prehistoric isolate	Chert flake	SWCA 2009	Not Eligible	Outside
P-36-021200	CA-SBR-13662H	Historical site	Prospecting pit and refuse scatter	URS 2010 ASM 2011 Pacific Legacy 2013 ASM 2018	Not Eligible	**Within**
P-36-024157	CA-SBR-15342H	Historical site	Fern Road	Kremkau 2011 Dudek 2018	Unevaluated	**Within**

Primary Number	Trinomial	Resource Type	Description	Recorder(s) and Year(s)	NRHP/CRHR Status	Relationship to Project Area
P-36-024158	CA-SBR-15343H	Historical site	Unnamed road	Kremkau 2011	Unknown	Outside
P-36-024224	CA-SBR-15409H	Historical site	Chuckwalla Road	Kremkau 2011 Dudek 2018	Not Eligible	**Within**
P-36-024225	CA-SBR-151410H	Historical site	Refuse scatter	Dudek 2018	Unevaluated	Outside
P-36-027410		Historical site	Barstow Road/ State Route 247	SRI 2014	Recommended Eligible	**Within**
P-36-027752		Historical site	Eldorado-Lugo 500kV Transmission Line	Kautz Environmental Consultants 2019	Recommended Eligible	**Within**
P-36-027757		Historical site	Lugo-Mojave 500kV Transmission Line	Kautz Environmental Consultants 2019	Recommended Eligible	**Within**
P-36-028149	CA-SBR-17557H	Historical site	Foundation and refuse scatter	Pacific Legacy 2012 ASM 2018	Not Eligible	Outside
P-36-028356	CA-SBR-28356H	Historical site	Unnamed road	SRI 2015	Unevaluated	Outside
P-36-028357	CA-SBR-28357H	Historical site	Huff Road	SRI 2015	Unevaluated	**Within**
P-36-028365	CA-SBR-28365H	Historical site	Meridian Road	SRI 2015 Dudek 2018	Unevaluated	**Within**
P-36-028417		Historical isolate	Refuse scatter	SRI 2015	Unevaluated	Outside
P-36-028418		Historical isolate	Refuse (AH4)	SRI 2015	Unevaluated	Outside
P-36-028424		Historical isolate	Church key-opened can	SRI 2015	Unevaluated	Outside
P-36-028438		Historical isolate	Sanitary food can	SRI 2015	Unevaluated	Outside
P-36-028439		Historical isolate	Two cans	SRI 2015	Unevaluated	Outside
P-36-028440		Prehistoric isolate	Granite metate	SRI 2015	Unevaluated	Outside
P-36-029774		Historical site	Historic residence	Dudek 2016	Not Eligible	Outside
P-36-029775	CA-SBR-29775H	Historical site	Concrete troughs, concrete wellhead, chain-linked fence	Dudek 2016	Unevaluated	Outside
P-36-029899		Prehistoric isolate	One obsidian flake	ICF International 2016	Unevaluated	**Within**

Primary Number	Trinomial	Resource Type	Description	Recorder(s) and Year(s)	NRHP/CRHR Status	Relationship to Project Area
P-36-031200		Historical site	Eldorado-Lugo 500 kV Transmission Line System	ASM 2017	Recommended Eligible	Outside
P-36-032690	CA-SBR-32690H	Historical site	Historic refuse scatter and concrete foundation	ASM 2017	Not Eligible	Outside
P-36-032691	CA-SBR-32691H	Historical site	Historic refuse scatter	ASM 2017	Not Eligible	Outside
P-36-032694	CA-SBR-32694H	Historical site	Historic refuse scatter	ASM 2017	Not Eligible	**Within**
P-36-033007		Historical site	Structure pads and refuse scatter	Dudek 2018	Not Eligible	Outside
P-36-033010	CA-SBR-33010H	Multi-component site	Historical refuse scatter and one prehistoric lithic flake	Dudek 2018	Not Eligible	Outside
P-36-033011	CA-SBR-33011H	Historical site	Steel well pipe	Dudek 2018	Not Eligible	Outside
P-36-033012	CA-SBR-33012H	Historical site	Refuse scatter	Dudek 2018	Not Eligible	Outside
P-36-033072	CA-SBR-33072	Prehistoric site	Rock mounds	ASM 2018	Unevaluated	Outside

P-36-014876

Resource P-36-014876 is a 663-meter section of the SCE Lugo-Pisgah No. 1 Transmission Lines constructed between 1938 and 1941. The towers are steel lattice suspension towers with concrete footings. The resource was recorded by Kautz Environmental Consultants in 2019 which found the resource eligible for the NRHP and CRHR under Criterion A/1 for its association with the early operation of the Hoover Dam and provision of electricity to Southern California's World War II industries.

P-36-021200

Resource P-36-021200 was initially recorded in 2010 by URS as a historic prospector's pit containing an open pit with dilapidated wooden shoring and a thick berm. Located within the pit was a historic hole-in-top can and other modern trash including plastic liter bottles, foil, cardboard, and modern cans. In 2011 the resource was re-evaluated by ASM Affiliates and determined to be a naturally formed drainage channel. Upon an additional site revisit, the resource was determined to be a possible mine shaft measuring approximately 12 ft in length by 12 ft in width and 10 ft in depth. This site was recommended as ineligible for the NRHP and CRHR in 2018 by ASM Affiliates.

P-36-024157

Resource P-36-024157 is a segment of historic period road alignment, referred to now as Fern Road. The road is visible on the 1955 Ord Mountains 15-minute USGS quad. The road is in good condition, and no cultural material is associated with it. This resource was previously recorded by Dudek in 2018 but was not evaluated for the NRHP or CRHR.

P-36-024224

Resource P-36-024224 is a historic road alignment referred to as Chuckwalla Road. The dirt road runs north-south along the eastern base of the White Horse Mountains in Lucerne Valley. This road was evaluated by Dudek in 2018 and was determined not eligible for listing in the NRHP or CRHR in 2011.

P-36-027410

Resource P-36-027410 (CA-SBR-017863H) is a segment of a historic road alignment known as SR 247 or Barstow Road. The highway is an asphalt, two-lane road that extends from Yucca Valley to Barstow, California. This resource was found eligible by Pacific Legacy, Inc. in 2013 for listing in the NRHP and CRHR under Criterion A/1 for its use as the main thoroughfare in the Mojave Desert Communities during the early to mid-twentieth century. The resource has been evaluated since 2014, all concurring with Pacific Legacy's findings.

P-36-027752

Resource P-36-027752 is a 1,458-meter segment of the SCE Eldorado-Lugo 500 kV Transmission Line. The entire line spans 177 miles from the SCE Eldorado Substation near Boulder City, Nevada to the SCE Lugo Substation in Hesperia, California. The resource was fully recorded and evaluated for NRHP eligibility in 2016 by Urbana Preservation & Planning, LLC and was deemed eligible under Criterion A. The resources was reevaluated in 2019 by Kautz Environmental Consultants, which agreed with Urbana's findings.

P-36-027757

Resource P-36-027757 consists of the SCE Lugo-Mohave 500kV Transmission Line installed in 1968. The towers were installed at regular intervals of approximately 1,500 ft. The towers convey electricity 176 miles between the SCE Lugo Substation in Hesperia, California to the Mohave Substation in Laughlin, Nevada. In 2016, this resource was recommended eligible by Urbana Preservation & Planning, LLC for listing in the NRHP/CRHR under Criterion A/1 for its association with SCE's earliest 500kV transmission line systems in Southern California. The resources was reevaluated in 2019 by Kautz Environmental Consultants, which agreed with Urbana's findings.

P-36-028357

Resource P-36-028357 is a segment of a north-south historic road alignment known as Huff Road. The road was identified on the Ord Mountains 1955 15-minute USGS topographic quad. No artifacts were found associated with this resource. This resource was recorded by SRI in 2015 but was not evaluated for the NRHP or CRHR.

P-36-028365

Resource P-36-028365 is a north-south oriented historic road alignment known as Meridian Road. The road was identified on the Ord Mountains 1955 15-minute USGS topographic quad. No artifacts are associated with this site. This resource was recorded by Dudek in 2018 but was not evaluated for the NRHP or CRHR.

P-36-029899

Resource P-36-029899 is a prehistoric isolate consisting of a single, gray-banded obsidian secondary flake. This resource was recorded in 2016 by ICF International but was not evaluated. In general, isolated resources are not eligible for the NRHP or CRHR, because their data potential is exhausted upon recording (Criterion 4/D).

P-36-032694

Resource P-36-032694 consists of a historic refuse scatter containing 115 cans, six glass bottles, a modified bucket, wire, and plywood. Can types include flat-top beverage, bi-metal pull tab, aerosol, vent hole, and sanitary. Most artifacts date between the 1930s to the 1960s and are likely associated with multiple trash dumping episodes along Barstow Road and Fern Road. This site was recommended as ineligible for the NRHP and CRHR in 2017 by ASM.

5.3 Survey Results

5.3.1 Built Environment Resources

The following section summarizes the results of all background research and fieldwork as they pertain to built environment resources that may qualify as historical resources. The field work and background research resulted in the identification of 10 historic-age (at least 45 years old) resources (five properties, four roads, and one transmission line) within the Project area (Table 4). Historic-age properties include 13324 Locust Avenue (Sienna-S-68, Figure 4), 12924 Locust Avenue (Sienna-S-69, Figure 8), 4900 Cambria Road (Sienna-S-72, Figure 6), 33383 Haynes Road (Sienna-S-85, Figure 13), and 33223 Haynes Road (Sienna-S-86, Figure 14). Historic-age roads include Northside Road (Sienna-S-60, Figure 6), Cove Road (Sienna-S-70, Figure 9), Cambria Road (Sienna-S-71, Figure 10), and Midway Avenue (Sienna-S-84, Figure 12), and the historic-age transmission line is the SCE Lugo-Pisgah No. 2 220 kV Transmission Line (Sienna-S-7, Figure 5), which is a distinct transmission line from the previously recorded SCE Lugo-Pisgah No. 1 220 kV Transmission Line (P-36-014876). The five properties, four roads, and one transmission line were recorded on DPR 523 series forms, which are included in Appendix C and summarized below. Only the properties and the transmission line were evaluated for historical resources eligibility. As the project does not entail alteration to the roads recorded in the project area and an impact will not occur, they were not evaluated as part of this project. Only the SCE Lugo-Pisgah No. 2 220 kV Transmission Line was found eligible for listing in the NRHP and CRHR.

Table 4 Newly Recorded Built Environment Resources

Site ID	Description	Address	APN	NRHP/CRHR Eligibility Recommendation
Sienna-S-7	SCE Lugo-Pisgah No. 2 220 kV Transmission Line	N/A	N/A	**Recommended Eligible**

Site ID	Description	Address	APN	NRHP/CRHR Eligibility Recommendation
Sienna-S-60	Northside Road	N/A	N/A	Unevaluated
Sienna-S-68	Single-family Dwelling, Garage, and Two Barns	13324 Locust Avenue	045206223	Recommended Ineligible
Sienna-S-69	Single-family Dwelling	12924 Locust Avenue	045206224	Recommended Ineligible
Sienna-S-70	Cove Road	N/A	N/A	Unevaluated
Sienna-S-71	Cambria Road	N/A	N/A	Unevaluated
Sienna-S-72	Single-family Dwelling, Barn, and Corral	4900 Cambria Road	045211224	Recommended Ineligible
Sienna-S-84	Midway Avenue	N/A	N/A	Unevaluated
Sienna-S-85	Single-family Dwelling and Barn	33383 Haynes Road	045306261	Recommended Ineligible
Sienna-S-86	Single-family Dwelling	33223 Haynes Road	045306209	Recommended Ineligible

SCE Lugo-Pisgah No. 2 220 kV Transmission Line (Sienna-S-7)

The Sienna-S-7 resource is known as SCE Lugo-Pisgah No. 2 220 kV Transmission Line, a 220 kV transmission line which runs for 1.05 miles within the Project area. The towers are steel lattice suspension towers with concrete footings. The transmission line runs through private parcels and is surrounded by open farmland.

Sienna-S-7 was constructed between 1938 and 1941 by SCE to bring power to Southern California from the Hoover Dam. The line, then referred to as the Boulder-Chino South 220 kV Transmission Line, extended 65 miles from the Hoover Dam to the Chino Substation via the Pisgah Substation. In 1973, 5 years after the Lugo Substation was put in service, this transmission line was renamed the Lugo-Pisgah No. 1 line. This transmission line is separate from the previously recorded SCE Lugo-Pisgah No. 1 220 kV Transmission Line (P-36-014876), which was then referred to as the Boulder-Chino North 220 kV Transmission Line. South of the Pisgah Substation and Highway 40, the North and South (now No.1 and No. 2) lines split and run separately until rejoining southwest of Lucerne Valley. Only segments of the Lugo-Pisgah No.1 and No. 2 lines have been previously recorded, not including this segment of Lugo-Pisgah No. 2. As part of the current study, Sienna-S-7 was evaluated for listing in the NRHP and the CRHR and was found eligible for the NRHP under Criterion A and the CRHR under Criterion 1 for its association with the early operation of Hoover Dam and the provision of electricity to Southern California's World War II industries. Lugo-Pisgah No. 2 appears to retain integrity of location, materials, design, workmanship, feeling, setting, and association. It is recommended as a contributing element of the overall transmission line.

Figure 6 Lugo-Pisgah No. 2 Transmission Line (Sienna-S-7)



Northside Road (Sienna-S-60)

Sienna-S-60 is a 250-foot segment of paved, historic-period road alignment located in northern Lucerne Valley referred to as Northside Road. Constructed circa 1952, the two-lane, paved, and maintained dirt road spans in its entirety approximately 10 miles east-west, initiating at Firethorn Road in eastern Lucerne Valley, running west unpaved to Harrod Road where it continues west paved to Barstow Road where it terminates. The road is approximately 25 feet in width and is located on a flat, valley floor containing low-density Mojave Desert scrub including creosote bush, Russian thistle, and saltbush.

The Project does not intend to alter the existing conditions of the road. Northside Road may be used during the course of project implementation, but such use would remain consistent with its original and intended purpose (transportation). Therefore, Sienna-S-60/Northside Road was not formally evaluated for listing in the NRHP nor the CRHR under the current study as the project will not result in any significant impacts to the resource.

Figure 7 Northside Road (Sienna-S-60)



13324 Locust Ave. (Sienna-S-68)

The Sienna-S-68 property addressed as 13324 Locust Avenue (APN 045206223) is approximately 4 miles north of the town of Lucerne Valley. The property is surrounded by open farmland and few single-family properties. The 80-acre parcel encompasses open farmland, which appears no longer in use, one vernacular-style dwelling and garage constructed in 1933, a barn from circa 1969, and four ancillary structures. The buildings and structures are sited at the southeast corner of the parcel.

The Sienna-S-68 property at 13324 Locust Avenue and all its respective buildings and structures were evaluated for listing in the NRHP and the CRHR and found ineligible for either under any designation criteria due to a lack of historical or architectural significance. Research did not indicate that the property is associated with any important events or individuals significant in the history of the city, region, state, or nation (Criteria A/1 and B/2). The buildings and structures are relatively ordinary and do not embody the distinctive characteristics of a type, period, or method of construction, nor represent the work of a master, nor possess high artistic values (Criteria C/3). A review of available evidence and records search results did not indicate that the property may yield important information about prehistory or history (Criteria D/4).

Figure 8 13324 Locust Avenue (Sienna-S-68)



12924 Locust Ave. (Sienna-S-69)

The Sienna-S-69 property addressed as 12924 Locust Avenue (APN 045206224) is approximately 4 miles north of the town of Lucerne Valley. The property is surrounded by open farmland and few single-family properties. The 80-acre parcel encompasses open farmland, which appears to be no longer used, one dwelling with an attached garage. The vernacular-style dwelling constructed in 1948 and attached garage are sited at the southeast corner of the parcel.

The Sienna-S-69 property at 12924 Locust Avenue was evaluated for listing in the NRHP and the CRHR and was found ineligible for either under any designation criteria due to a lack of historical or architectural significance. Research did not indicate that the property is associated with any important events or individuals significant in the history of the city, region, state, or nation (Criteria A/1 and B/2). The vernacular single-family dwelling is a relatively ordinary building and does not embody the distinctive characteristics of a type, period, or method of construction, nor represent the work of a master, or possess high artistic values (Criteria C/3). A review of available evidence and records search results did not indicate that the property may yield important information about prehistory or history (Criteria D/4).

Figure 9 12924 Locust Avenue (Sienna-S-69)



Cove Road (Sienna-S-70)

Sienna-S-70, is a segment of a maintained dirt road known as Cove Road, orientated east-west across the Lucerne Dry Lake playa between two large agricultural fields. Developed between 1945 and 1952, the road spans approximately 2 miles in its entirety between Locust Avenue and Meridian Avenue. The road section within the Project area measures 0.38 mile in length (east-west) by 25 feet in width and is located on a flat, silty playa surrounding by low-density Mojave Desert scrub (e.g., creosote bush, Russian thistle, and saltbush), alfalfa agricultural fields, and residential properties. Modern trash was present along the margins of the road.

The Project does not intend to alter the existing conditions of the road. Cove Road may be used during the course of project implementation, but such use would remain consistent with its original and intended purpose (transportation). Therefore, Sienna-S-70/Cove Road was not formally evaluated for listing in the NRHP nor the CRHR under the current study as the project will not result in any significant impacts to the resource.

Figure 10 Cove Road (Sienna-S-70)



Cambria Road (Sienna-S-71)

Sienna-S-71, is a segment of paved and dirt road known as Cambria Road, orientated east-west across the Lucerne Dry Lake playa between a series of large agricultural fields. Developed between 1945 and 1952, the road spans approximately 2 miles in its entirety between Locust Avenue and Fairlane Avenue. Lincoln Avenue, which runs north-south, intersects the road at its midway point. Most of the road is dirt and appears to be poorly maintained (numerous ruts and holes); however, a small, 0.5-mile portion between Midway Avenue and Lincoln Avenue has been paved. The road section within the project site, which measures 1.5 miles in length (east-west) by 25 feet in width, runs east from Locust Avenue and stops 0.5 mile east of Fairlane Avenue. Within the project site, 1.0-mile of road is unpaved between Locust Avenue and Midway Avenue and Lincoln Avenue and Fairlane Avenue, and 0.5-mile of the road is paved within the segment mentioned above. The road is located on a flat, silty playa surrounded by low-density Mojave Desert scrub (e.g., creosote bush, Russian thistle, and saltbush), alfalfa agricultural fields, and residential properties. Modern trash was present along the margins of the road.

The Project does not intend to alter the existing conditions of the road. Cambria Road may be used during the course of project implementation, but such use would remain consistent with its original and intended purpose (transportation). Therefore, Sienna-S-71/Cambria Road was not formally evaluated for listing in the NRHP nor the CRHR under the current study as the project will not result in any significant impacts to the resource.

Figure 11 Cambria Road (Sienna-S-71)



4900 Cambria Road (Sienna-S-72)

The Sienna-S-72 property addressed as 4900 Cambria Road (APN 045211224) is approximately 4 miles north of the town of Lucerne Valley and was developed circa 1973 with no discernable architectural style. The property is surrounded by open farmland and few single-family properties. The 90-acre parcel encompasses open farmland, one prefabricated dwelling, a barn, three structures and a large circular corral. The buildings and structures are sited at the southeast corner of the parcel.

The Sienna-S-72 property at 4900 Cambria Road and its respective buildings and structures were evaluated for listing in the NRHP and the CRHR and were found ineligible for either under any designation criteria due to a lack of historical or architectural significance. Research did not indicate that the property is associated with any important events or individuals significant in the history of the city, region, state, or nation (Criteria A/1 and B/2). The buildings are relatively ordinary buildings and do not embody the distinctive characteristics of a type, period, or method of construction, nor represent the work of a master, or possess high artistic values (Criteria C/3). A review of available evidence and records search results did not indicate that the property may yield important information about prehistory or history (Criteria D/4).

Figure 12 4900 Cambria Road (Sienna-S-72)



Midway Avenue (Sienna-S-84)

Sienna-S-84, is a segment of recently repaved road known as Midway Avenue orientated north-south across the Lucerne Dry Lake playa. The road was developed circa 1945 as an unpaved road and currently spans 5.3 miles in its entirety between Cambria Road and State Route 18. The road section within the project site, which measures 0.5 mile in length (north-south) by 25 feet in width, is situated between Cambria Road and Sherman Way. The road is located on a flat, silty playa surrounding by low density Mojave Desert scrub (e.g., creosote bush, Russian thistle, and saltbush), alfalfa agricultural fields, and residential properties. Modern trash was present along the margins of the road.

The Project does not intend to alter the existing conditions of the road. Midway Avenue may be used during the course of project implementation, but such use would remain consistent with its original and intended purpose (transportation). Therefore, Sienna-S-71/Midway Avenue was not formally evaluated for listing in the NRHP nor the CRHR under the current study as the project will not result in any significant impacts to the resource.

Figure 13 Midway Avenue (Sienna-S-84)



33383 Haynes Road (Sienna-S-85)

The Sienna-S-85 property addressed as 33383 Haynes Road (APN 045306261) is approximately 7 miles north of the town of Lucerne Valley. The property is surrounded by open farmland and few single-family properties. The 1.2-acre parcel encompasses one Minimal Traditional dwelling from 1967, a barn from ca. 2020, and a small outbuilding/shed from ca. 1983. The dwelling and shed are set back from the street with a white post fence separating the parcel from Haynes Road. A carport sits east of the dwelling, added to the property ca. 1983. The barn sits south of the dwelling and shed and is separated from the two buildings by a wood fence.

The Sienna-S-85 property at 33383 Haynes Road and its respective buildings and structures were evaluated for listing in the NRHP and the CRHR and were found ineligible for either under any designation criteria due to a lack of historical or architectural significance. Research did not indicate that the property is associated with any important events or individuals significant in the history of the city, region, state, or nation (Criteria A/1 and B/2). The buildings are relatively ordinary and do not embody the distinctive characteristics of a type, period, or method of construction, nor represent the work of a master, or possess high artistic values (Criteria C/3). A review of available evidence and records search results did not indicate that the property may yield important information about prehistory or history (Criteria D/4).

Figure 14 33383 Haynes (Sienna-S-85)



33223 Haynes Road (Sienna-S-86)

The Sienna-S-86 property addressed as 33223 Haynes Road (APN 045306209) is approximately 7 miles north of the town of Lucerne Valley. The property is surrounded by open farmland and few single-family properties. The 4.8-acre parcel encompasses one Minimal Traditional dwelling constructed sometime between 1960 and 1968. The dwelling is set back from the street with a curved driveway connecting the dwelling to Haynes Road.

The Sienna-S-86 property at 33223 Haynes Road was evaluated for listing in the NRHP and the CRHR and was found ineligible for either under any designation criteria due to a lack of historical or architectural significance. Research did not indicate that the property is associated with any important events or individuals significant in the history of the city, region, state, or nation (Criteria A/1 and B/2). The dwelling is a relatively ordinary example of the Minimal Traditional style and does not embody the distinctive characteristics of a type, period, or method of construction, nor represent the work of a master, or possess high artistic values (Criteria C/3). A review of available evidence and records search results did not indicate that the property may yield important information about prehistory or history (Criteria D/4).

Figure 15 33223 Haynes Road (Sienna-S-86)



5.3.2 Archaeological Resources

The following section summarizes the results of all background research and fieldwork as they pertain to archaeological resources that may qualify as historical resources and/or unique archaeological resources.

Ground visibility ranged from poor (0-35 percent) to very good (76-90 percent) throughout the Project area. A total of 229 acres could not surveyed due to dense agriculture (Figure 16). Vegetation in the remainder of the Project area primarily consisted of a low- to moderate-density Mojave Desert scrub community that included creosote, Russian thistle, brittlebush, rabbitbrush, and various perennial grasses. Much of the Project area has been heavily disturbed by agricultural operations. Large and small-scale hemp/marijuana growing operations were common throughout the Project area.

Figure 16 Dense Agriculture in Survey Parcels



5.3.3 Newly Recorded Archaeological Sites

Thirty-eight new archaeological resources were identified and recorded during the survey, including 15 isolates (4 prehistoric, 11 historical) and 23 sites (1 prehistoric, 1 multicomponent, and 21 historical). Table 5 lists all newly recorded archaeological sites and isolates and their NRHP and CRHR eligibility status. Resources are described in more detail below. DPR 523 series forms for each site and isolate are available in Appendix C.

Table 5 Newly Recorded Archaeological Sites

Site ID	Age	Description	NRHP/CRHR Eligibility Recommendation
Sienna-S-1	Historical	Refuse scatter	Recommended ineligible
Sienna-S-2	Historical	Granite Road and associated refuse	Unevaluated
Sienna-S-6	Historical	Refuse scatter	Recommended ineligible
Sienna-S-8	Prehistoric	Lithic scatter	**Potentially Significant**
Sienna-S-10	Historical	Refuse scatter	Recommended ineligible
Sienna-S-12	Historical	Chimney feature	Recommended ineligible
Sienna-S-13	Historical	Refuse scatter	Recommended ineligible
Sienna-S-14	Historical	Refuse scatter	Recommended ineligible
Sienna-S-15	Historical	Refuse scatter	Recommended ineligible
Sienna-S-16	Historical	Refuse scatter	Recommended ineligible

Site ID	Age	Description	NRHP/CRHR Eligibility Recommendation
Sienna-S-18	Historical	Foundation and refuse scatter	Recommended ineligible
Sienna-S-19	Historical	Refuse scatter	Recommended ineligible
Sienna-S-20	Historical	Refuse scatter	Recommended ineligible
Sienna-S-27	Historical	Refuse scatter	Recommended ineligible
Sienna-S-28	Multicomponent	Lithic and refuse scatter	**Potentially significant**
Sienna-S-32	Historical	Haynes Road and associated refuse	Unevaluated
Sienna-S-41	Historical	Locust Avenue and associated refuse	Unevaluated
Sienna-S-47	Historical	Refuse scatter	Recommended ineligible
Sienna-S-50	Historical	Smoke Bush Road and associated refuse	Unevaluated
Sienna-S-51	Historical	Foundation, well, refuse scatter	Recommended ineligible
Sienna-S-56	Historical	Lincoln Road and associated refuse	Unevaluated
Sienna-S-66	Historical	Refuse scatter	Recommended ineligible
Sienna-S-81	Historical	Earthen canal and retention Pond	Recommended ineligible

Lithic Scatters and Single-Activity Sites

This site type is defined by the presence of surface scatters of lithic debitage. Only one Lithic Scatter site type, Sienna-S-8, was identified during the survey. Sienna-S-8 is a large lithic scatter containing 65 cryptocrystalline silicate (CCS) tertiary flakes and 2 basalt tertiary flakes (Figure 17). This site likely represents a short-term occupation and single lithic-reduction event that involved the resharpening and/or rejuvenation of multiple chipped stone implements based on the variety of material types and dominance of biface thinning flakes at the site.

Because this resource is located on sandy valley floor with potential for buried deposits, Rincon recommends Sienna-S-8 as potentially significant and recommends avoidance of the resource. If avoidance is not feasible, a Phase II testing program would be needed to determine if the resource is significant under CEQA. Should the resource prove to be significant under CEQA and avoidance remains infeasible, a Phase III data recovery may be required to reduce Project related impacts to less-than-significant levels.

Figure 17 Overview Photo of Sienna-S-8



Multicomponent Sites

Multicomponent sites contain both historical and prehistoric components within the same site boundaries. Only one multicomponent site, Sienna-S-28, was recorded during the survey. Sienna-S-28 is a multicomponent site containing six prehistoric lithic flakes (materials include CCS, obsidian, and metavolcanic), a mid-stage rhyolite biface, a rhyolite Pinto Series projectile point, a basalt scraper, a granitic metate fragment, and a moderate-density historical refuse scatter. Flake types noted at the site appear to represent early to late-stage reduction. Some large metavolcanic flakes present at the site indicate core preparation while some late-stage CCS flakes (possible biface thinning flakes) indicates that late-stage biface reduction also occurred at the site. The presence of a Pinto Series point (Figure 18) indicates this site dates to the terminal Early Holocene or Middle Holocene between approximately 8,000 and 5,000 cal BP (Sutton et al. 2007). This prehistoric component of the resource likely represents a short-term camp site with an associated lithic reduction and rejuvenation event.

The historical component of the site includes 27 church key-opened sanitary cans, 7 bi-metal pull-tab cans, five knife-opened cans, a syrup can, and six glass bottle bases with diagnostic maker's marks that date to the mid-twentieth century. Based on the artifacts present, this component likely represents multiple mid-twentieth century dumping events along Barstow and Fern Roads.

Because this resource is located on sandy valley floor with potential for buried deposits and contains temporally diagnostic prehistoric tools, Rincon recommends Sienna-S-28 as potentially significant and recommends avoidance of the resource. If avoidance is not feasible, a Phase II testing program would be needed to determine if the resource is significant under CEQA. Should the resource prove to be significant under CEQA and avoidance remains infeasible, a Phase III data recovery may be required to reduce Project related impacts to less-than-significant levels.

Figure 18 Pinto Projectile Point from Sienna-S-28



Historical Refuse Scatters

These sites represent the most common historical site type found within the Project area. This site type was defined by the presence of diagnostic historic-era domestic and industrial refuse. Typical diagnostic artifacts present within the Project area include church key-opened beverage and sanitary cans, bi-metal pull-tab, hole-in-top, and cone-top cans, and glass bottle fragments of various color and density—some of which consist of date-stamped bottle bases. Based on the artifacts present, most of these sites likely date to the mid-twentieth century. Twelve newly recorded resources identified during the survey were assigned to this category, including Sienna-S-1, 6, 10, 13, 14, 15, 16, 19, 20, 27, 47, and 66.

Rincon reviewed the BLM's GLO records for the site locations and did not identify an association with significant persons or events (USDI 2021). No evidence is present to suggest resources are associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage (does not meet Criterion A/1) or that they are associated with the lives of persons important in our past (does not meet Criterion B/2). These resources do not embody any distinctive characteristics (does not meet Criterion C/3). Twentieth-century refuse scatters are ubiquitous throughout the Mojave Desert, particularly in rural areas where unregulated trash dumping is common. Because these resources primarily consist of cans, ceramics, and bottle glass dating to the mid-twentieth century, they likely represent single or multiple historic refuse-dumping episodes associated with the many roads, residential properties, and/or agricultural operations in the area. Lastly, these resources are all surface scatters of artifacts, and their data potential was exhausted during their recording (does not meet Criterion D/4). Thus, Rincon

recommends these resources (Sienna S-1, 6, 10, 13, 14, 15, 16, 19, 20, 27, 47, and 66) ineligible for the NRHP/CRHR.

Homesteads and Agricultural Features

These sites consist of features such as foundations, structures, retention ponds, and wells indicative of long-term use and possible settlement/habitation. A total of four newly recorded sites identified during the survey were assigned to this category, including Sienna-S-12, 18, 51, and 81. Sienna-S-12 is a lone stone chimney feature surrounded by modern trash. A review of historic aerials (Historicaerials 2021) indicated that a homestead was present on the property in the 1940s but was demolished by 2012. Sienna-S-18 consists of the structural remains of a building and historical refuse. The structural remains include milled lumber and two features that include a concrete structural wall outline and a subterranean concrete structure with metal piping that may have served a water retention function. Historical refuse at the site included church key-opened cans, bi-metal pull-tab cans, hole-in-top cans, bottle glass and ceramic plate fragments, and multiple bottle bases with maker's marks that date to the mid-twentieth century. Historical aerial imagery indicates this structure was present sometime between 1952 and 1969 (Historicaerials 2021). Sienna-S-51 is a historic-era homestead consisting of two concrete foundations, a retention pond, portions of perimeter fencing, and associated sparse refuse scatter. The refuse scatter includes four diagnostic bottle bases, glass fragments, six church key-opened sanitary cans, and miscellaneous metal and construction debris fragments, including concrete rubble. Historic aerial imagery (Historicaerials 2021) indicate that this homestead was constructed sometime between 1952 and 1983 and was eventually demolished by 1995. Artifacts present at this site suggest a mid-twentieth century occupation. Sienna-S-81 consists of two large water retention ponds separated by a berm and lined with a barbed wire fence made of branches and milled wood beams. No artifacts were identified at the site. The retention ponds were constructed sometime between 1952 and 1969 based on a review of historic aerial imagery (Historicaerials 2021). This site likely represents a mid-twentieth century water retention location used to support the agricultural operations that bordered the site to the south and east.

Rincon reviewed the BLM's GLO records for the site locations and did not identify an association with significant persons or events (USDI 2021). No evidence is present that these resources are associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage (does not meet Criterion A/1) or that they are associated with the lives of persons important in our past (does not meet Criterion B/2). These resources do not embody any distinctive characteristics (does not meet Criterion C/3). Remnants of early to mid-twentieth century homesteads and agricultural features are common throughout the Mojave Desert region. Furthermore, these resources are in relatively in poor condition and, excluding Sienna-S-81, have been impacted by modern refuse dumping. Lastly, given the poor condition of these resources, their data potential was likely exhausted during their recording (does not meet Criterion D/4). Thus, Rincon recommends these resources (Sienna S-12, 18, 51, and 81) ineligible for the NRHP/CRHR.

Roads

These resources are linear resources consisting of historic-period road alignments with associated historical refuse scatters. These typically date to the mid-twentieth century and are in varying conditions and states of use. Five resources identified during the survey were assigned to this category. The five newly recorded historic-period road alignments include Sienna-S-2 (Granite Road), S-32 (Haynes Road), S-41 (Locust Avenue), S-50 (Smoke Bush Road), and S-56 (Lincoln Road).

The Project does not intend to alter the existing conditions of these roads. Granite Road, Haynes Road, Locust Avenue, Smoke Bush Road and Lincoln Road may be used during the course of project implementation, but such use would remain consistent with its original and intended purpose (transportation). Therefore, these resources (Sienna-S-2 [Granite Road], S-32 [Haynes Road], S-41 [Locust Avenue], S-50 [Smoke Bush Road] and S-56 [Lincoln Road] were not formally evaluated for listing in the NRHP nor the CRHR under the current study as the project will not result in any significant impacts to the resources.

Isolates

Isolates are generally defined as 1 to 3 artifacts of various time periods not in proximity or association to larger sites. Four prehistoric isolates and 11 historical isolates were identified during the survey (Table 6). The prehistoric isolates consist solely of CCS flakes. The historic-period isolates primarily include various cans such as church key-opened cans, bi-metal pull-tab cans, and tobacco tins and broken glass bottle bases. Because the data potential for isolates in generally exhausted upon recording, they are typically not eligible for listing on the NRHP/CRHR (Criterion 4/D). Given that the isolates recorded during this survey are all isolated flakes or mid-twentieth century refuse, **Rincon recommends all isolate resources ineligible for the NRHP/CRHR.**

Table 6 Newly Recorded Isolates

Site ID	Age	Description	Eligibility Recommendation
Sienna-Iso-4	Historical	Fragmented whisky bottle	Recommended ineligible
Sienna-Iso-5	Historical	Two church key-opened cans	Recommended ineligible
Sienna-Iso-11	Prehistoric	Lithic flake	Recommended ineligible
Sienna-Iso-17	Historical	Church key-opened can and bottle base	Recommended ineligible
Sienna-Iso-22	Historical	Bi-metal pull-tab can	Recommended ineligible
Sienna-Iso-42	Historical	Two church key-opened cans	Recommended ineligible
Sienna-Iso-54	Historical	Cone-top beer can	Recommended ineligible
Sienna-Iso-58	Historical	Church key-opened beverage can	Recommended ineligible
Sienna-Iso-59	Historical	Tobacco tin	Recommended ineligible
Sienna-Iso-61	Historical	Tobacco tin	Recommended ineligible
Sienna-Iso-62	Historical	Church key-opened can	Recommended ineligible
Sienna-Iso-64	Historical	Duraglass bottle base	Recommended ineligible
Sienna-Iso-65	Prehistoric	Lithic flake	Recommended ineligible
Sienna-Iso-87	Prehistoric	Two lithic flakes	Recommended ineligible
Sienna-Iso-88	Prehistoric	Lithic flake	Recommended ineligible

5.3.4 Known Archaeological Resources

Three previously known archaeological resources (one isolate and two sites) were present in the Project area. The two sites were relocated, but the isolate was not relocated during the survey. The two relocated sites were found to be in a similar condition as their previous recording. Table 7 lists all previously known resources and their updated NRHP and CRHR eligibility status.

Table 7 Known Archaeological Resources

Primary Number	Trinomial	Description	Previous Eligibility Recommendations	Rincon's Eligibility Recommendation
P-36-021200	CA-SBR-13662H	Historical site - prospecting pit and refuse scatter	Recommended ineligible	Recommended ineligible
P-36-029899	N/A	Prehistoric Isolate – lithic flake	Recommended ineligible	Recommended ineligible
P-36-032694	CA-SBR-32694H	Historical site - refuse scatter	Recommended ineligible	Recommended ineligible

5.3.5 Known Built Environment Resources

Eight previously recorded built environment resources (three transmission lines and five roads) are present in the Project area. The eight resources were relocated and found to be in a similar condition as their previous recording. Table 8 lists all previously known resources and their updated NRHP and CRHR eligibility status. Known resources recommended eligible for the NRHP/CRHR are described in further detail below.

Table 8 Known Built Environment Resources

Primary Number	Trinomial	Description	Previous Eligibility Recommendations	Rincon's Eligibility Recommendation
P-36-014876	CA-SBR-13115H	SCE Lugo-Pisgah No. 1 Transmission Line	Recommended Eligible	Recommended Eligible
P-36-024157	CA-SBR-15342H	Fern Road	Unevaluated	Unevaluated
P-36-024224	CA-SBR-15409H	Chuckwalla Road	Recommended Ineligible	Recommended Ineligible
P-36-027410	N/A	Barstow Road/ State Route 247	Recommended Eligible	Recommended Eligible
P-36-027752	N/A	SCE Eldorado-Lugo 500kV Transmission Line	Recommended Eligible	Recommended Eligible
P-36-027757	N/A	SCE Lugo-Mojave 500kV Transmission Line	Recommended Eligible	Recommended Eligible
P-36-028357	CA-SBR-28357H	Huff Road	Unevaluated	Unevaluated
P-36-028365	CA-SBR-28365H	Meridian Road	Unevaluated	Unevaluated

P-36-014876

Resource P-36-014876 (CA-SBR-13115H) is a section of the SCE Lugo-Pisgah No. 1 Transmission Line constructed between 1938 and 1941. This resource was previously found eligible for the NRHP and CRHR under Criterion A/1 for its association with the early operation of the Hoover Dam and provision of electricity to Southern California's World War II industries. Rincon agrees with this recommendation and finds the resource eligible for listing in the NRHP/CRHR.

P-36-027410

Resource P-36-027410 (CA-SBR-017863H) is a segment of a historic-road alignment known as SR 247 or Barstow Road. Segments of this resource have been previously recorded and evaluated in 2018 and found eligible for listing in the NRHP and CRHR under Criterion A/1 for its use as the main thoroughfare in the Mojave Desert Communities during the early to mid-twentieth century. The segment which runs through the project area is the same segment as recorded in 2018, and Rincon agrees with the previous recommendation and finds the resource eligible for listing in the NRHP/CRHR.

P-36-027752

Resource P-36-027752 is a 1,458-meter segment of the SCE Eldorado-Lugo 500kV Transmission Line. The entire line spans 177 miles from the SCE Eldorado Substation near Boulder City, Nevada to the SCE Lugo Substation in Hesperia, California. The resource was fully recorded and evaluated for the NRHP in 2016 and deemed eligible under Criterion A. Rincon agrees with this recommendation and finds the resource eligible for listing in the NRHP/CRHR.

P-36-027757

Resource P-36-027757 consists of the SCE Lugo-Mojave 500kV Transmission Line installed in 1968. The entire line, which spans 176 miles from the SCE Lugo Substation in Hesperia, California to the Mojave Substation in Laughlin, Nevada, was fully recorded and evaluated for NRHP eligibility in 2016 and was recommended eligible for listing in the NRHP/CRHR under Criterion A/1 for its association with SCE's earliest 500kV transmission line systems in Southern California. An approximately 2-mile portion of the transmission line runs through the Project area, and for this segment Rincon agrees with previous evaluation and finds the resource eligible for listing in the NRHP/CRHR.

Figure 19 Newly Recorded Cultural Resources within the Project Area

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Figure 20 Known Cultural Resources within the Project Area

Redacted for Confidentiality Purposes

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6 Impact Analysis and Conclusions

The impact analysis included here is organized based on the cultural resources thresholds included in CEQA Guidelines Appendix G: Environmental Checklist Form:

a) Would the project cause a substantial adverse change in the significance of a historical resource pursuant to Section 15064.5?
b) Would the project cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5?
c) Would the project disturb any human remains, including those interred outside of dedicated cemeteries?

Threshold A broadly refers to historical resources. To more clearly differentiate between archaeological and built environment resources, we have chosen to limit analysis under Threshold A to built environment resources. Archaeological resources, including those that may be considered historical resources pursuant to Section 15064.5 and those that may be considered unique archaeological resources pursuant to Section 21083.2, are considered under Threshold B.

6.1 Historical Built Environment Resources

The field survey and background research identified 18 historic-age built environment resources within the Project area, including segments of five transmission lines, segments of eight roads, and five residential properties. Of these 18 resources, five are eligible for listing in the NRHP and/or CRHR and are therefore considered historical resources pursuant to Section 15064.5(a) of the CEQA Guidelines. The eligible five resources include: Barstow Road/SR 247 (P-36-027410), SCE Lugo-Pisgah No. 1 220 kV Transmission Line (P-36-014876), SCE Eldorado-Lugo 500kV Transmission Line (P-36-027752), SCE Lugo-Mojave 500kV Transmission Line (P-36-027757), and SCE Lugo-Pisgah No. 2 220 kV Transmission Line (Sienna S-7).

Barstow Road/SR 247 (P-36-027410) is eligible for listing in the NRHP and CRHR under Criterion A/1 for its use as the main thoroughfare in the Mojave Desert Communities during the early to mid-twentieth century. The project does not propose any direct modifications to the road and would not introduce any major visual changes to its setting which would impair its ability to convey its significance. As such, it would not result in a significant impact to this historical resource as defined by Section 15064.5(b) of the CEQA Guidelines.

In relation to the four historic transmission lines which traverse the Project area, it is presumed that the project would not entail the demolition or substantial alteration of any association utility towers. All of the four transmission lines extend upwards of 100 miles and the potential minor modification of some towers to accommodate new infrastructure from the proposed SCE Calcite substation would not affect the ability any of these resources to convey the reason for their significance. Therefore the proposed Project would not result in a significant impact to these four historical resource as defined by Section 15064.5(b) of the CEQA Guidelines.

6.2 Historical and Unique Archaeological Resources

This assessment includes recordation of 23 newly identified archaeological sites and 15 newly identified archaeological isolates as well as record updates to two known archaeological sites and one archaeological isolate in the Project area. Of these, two archaeological sites (prehistoric site Sienna-S-8 and multicomponent site Sienna-S-28) were found to be potentially eligible for listing in the NRHP and CRHR and Rincon recommends avoidance of the resources. If avoidance is not feasible, additional mitigation such as Phase II testing and Phase III data recovery may be required to reduce any impacts to less-than-significant levels.

6.3 Recommended Mitigation

Retain a Qualified Principal Investigator

Rincon recommends that the applicant retain a qualified archaeologist, defined as an archaeologist who meets the Secretary of the Interior's Professional Qualification Standards for archaeology (NPS 1983), to perform all mitigation measures related to archaeological and historic resources.

Avoidance of Resources

Preservation in place (avoidance) is the preferred manner of mitigating impacts to archaeological sites. Preservation in place maintains the relationship between artifacts and the archaeological context. Preservation may also avoid conflict with religious or cultural values of groups associated with the site (e.g., affiliated Native American tribes). If feasible, archaeological sites Sienna-S-8 and Sienna-S-28 identified within the Project area during the current study plus a 200-foot buffer should be avoided. The 200-foot buffer should be delineated using a high visibility barrier (i.e. Environmentally Sensitive Area [ESA] fencing). If avoidance is not feasible, additional mitigation such as Phase II testing and Phase III data recovery may be required to reduce any impacts to less-than-significant levels.

Phase II Testing

The project site contains two archaeological sites (Sienna-S-8 and Sienna-S-28) that may include a subsurface deposit with significant data potential. If avoidance of these sites is not feasible, Rincon recommends a Phase II study to determine whether a subsurface deposit with significant data potential exists at each of these sites and to establish the subsurface boundaries of the resource. The Phase II study should be conducted by a qualified archaeologist. The qualified archaeologist should prepare a subsurface testing plan for review and approval by San Bernardino County prior to execution. The Phase II testing plan should include, but is not limited to, a research design, testing methods, laboratory methods, and list any applicable special studies to be completed. The Phase II plan should also include testing locations proposed within the site. The Phase II study should comprise subsurface testing designed to establish the presence or absence and extent of intact archaeological deposits and to assess whether the site(s) retains enough data potential to be considered significant under CEQA. Rincon recommends that Phase II testing be observed by a Native American monitor. If avoidance remains infeasible after the Phase II investigation, additional measures may be recommended such as a Phase III data recovery and/or archaeological and Native American monitoring of project construction activity. These measures are discussed further below.

Phase III Data Recovery

If a Phase II investigation at sites Sienna-S-8 and/or Sienna-S-28 finds the resource(s) as eligible for listing in the NRHP and CRHR and avoidance is not feasible, a Phase III data recovery program (Phase III) should be undertaken to mitigate any significant impacts. Mitigation consists of obtaining sufficient cultural materials such that no further material recovery would result in additional knowledge regarding the site. A Phase III investigation should begin with the development of a data recovery plan prepared by a qualified archaeologist and reviewed and approved by San Bernardino County prior to execution. The data recovery plan should include, but is not limited to, an expanded research design, testing methods, proposed testing locations, laboratory methods and analyses, and special studies. A Phase III should include extensive subsurface testing and a full analysis of artifacts identified during each phase of subsurface investigation with the goal of exhausting the data potential of the site(s). These studies should include but not be limited to faunal analysis of any animal bones, radiocarbon dating where appropriate, and/or protein residue analysis of stone tools and groundstone. The results of the Phase III study should be presented in a technical report documenting the prehistoric and ethnographic background of the area, the field and laboratory methods used, results, and final deposition of the artifact collection. The data collected during the study may also be prepared for publication in a scientific journal as part of the data recovery mitigation.

Preparation of a Cultural Resources Mitigation and Monitoring Program

Prior to the start of any ground-disturbing activity for Project construction, including but not limited to site clearing, grubbing, trenching, and excavation, a qualified archaeologist who meets or exceeds the Secretary of Interior's Professional Qualifications Standards for archaeology should be retained to prepare a CRMMP for unanticipated discoveries during Project construction. The CRMMP should be prepared in consultation with Native American tribes who have participated in consultation for the Project. The CRMMP should include provisions for archaeological and Native American monitoring of all construction related ground disturbance within Project areas of moderate to high archaeological sensitivity (Figure 21). The CRMMP should also include the Project construction schedule, procedures to be followed in the event of discovery of archaeological resources, and protocols for Native American coordination and input, including review of documents. The CRMMP should outline the role and responsibilities of both the archaeological and Native American monitor(s). It should include communication protocols and opportunity and timelines for review of cultural resources documents related to discoveries that are Native American in origin. The CRMMP should include provisions for Native American monitoring during testing or data recovery efforts for unknown resources that are Native American in origin.

Archaeological Sensitivity Training

Rincon recommends that the qualified archaeologist conduct a worker's environmental awareness program training for archaeological sensitivity for all construction personnel prior to the commencement of any ground disturbing activities. Archaeological sensitivity training should include a description of the types of cultural material that may be encountered, cultural sensitivity issues, regulatory issues, and the proper protocol for treatment of the materials in the event of a find.

Archaeological and Native American Monitoring

The vicinities of newly recorded archaeological sites Sienna-S-8 and S-28 and isolates Sienna-Iso-87 and Iso-88 as well as previously recorded isolate 36-29899 should be considered to have high archaeological sensitivity. These resources are located on relatively sandy alluvial soils where there

is an increased likelihood that erosional dynamics (e.g., from wind and/or intermittent drainages) have created subsurface deposits. A review of soils studies and historical aerial imagery indicate the presence of alluvial soils and minimal past ground disturbance within other portions of the Project area. Both factors increase the likelihood of encountering intact buried archaeological deposits during Project-related ground-disturbance. These areas should be considered moderately sensitive for archaeological resources. The soils within the southwestern portions of the Project area, however, are highly disturbed from agricultural use and primarily composed of Peterman and Bousic clays. Additionally, fluctuating exposure within and near the limits of Lucerne Lake during the Holocene would have discouraged long-term settlement during the pre-contact period, providing limited opportunities for prehistoric site accumulation. This is evidenced by a lack of observed prehistoric resources within the southwestern portions of the Project area. Collectively, these factors decrease the likelihood of encountering intact buried archaeological deposits that retain integrity during Project-related ground-disturbance. Due to dense agriculture and the resulting lack of ground visibility, 229 acres at the south-central extent of Project area were not surveyed. The archaeological sensitivity of this portion of the Project area is thus unknown.

Rincon recommends archaeological and Native American monitoring of Project-related ground-disturbing activities in areas of moderate to high archaeological sensitivity (Figure 21). Additionally, initial ground disturbing activities including grading, scraping and other clearing that causes ground disturbance within areas of unknown archaeological sensitivity should be monitored. Within areas of moderate to high archaeological sensitivity, archaeological monitoring should be performed under the direction of the qualified archaeologist. The qualified archaeologist, in consultation with the County of San Bernardino and the Native American monitor, should have the power to reduce or suspend monitoring depending upon observed conditions. If archaeological resources are encountered during ground-disturbing activities, work within the immediate area must halt and the find evaluated for significance under CEQA.

Figure 21 Archaeological Sensitivity Map

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6.4 Unanticipated Discovery of Cultural Resources

If cultural resources are encountered during ground-disturbing activities, work in the immediate area must halt and an archaeologist meeting the Secretary of the Interior's Professional Qualifications Standards for archaeology (NPS 1983) must be contacted immediately to evaluate the find. If the discovery proves to be significant under CEQA, additional work such as data recovery excavation may be warranted.

6.5 Unanticipated Discovery of Human Remains

The discovery of human remains is always a possibility during ground-disturbing activities. If human remains are found, the State of California Health and Safety Code Section 7050.5 states that no further disturbance shall occur until the County Coroner has made a determination of origin and disposition pursuant to Public Resources Code Section 5097.98. In the event of an unanticipated discovery of human remains, the county coroner must be notified immediately. If the human remains are determined to be prehistoric, the coroner will notify the Native American Heritage Commission, which will determine and notify a Most Likely Descendant. The MLD has 48 hours from being granted site access to make recommendations for the disposition of the remains. If the MLD does not make recommendations within 48 hours, the landowner shall reinter the remains in an area of the property secure from subsequent disturbance. With adherence to existing regulations, Rincon recommends a finding of less-than-significant impact to human remains under CEQA.

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Appendix A

NAHC SLF Search Results

NATIVE AMERICAN HERITAGE COMMISSION

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VICE CHAIRPERSON
Reginald Pagaling
Chumash

SECRETARY
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Paiute/White Mountain Apache

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September 3, 2021

Mark Strother
Rincon Consultants, Inc.

Via Email to: mstrother@rinconconsultants.com

Re: Sienna Solar 2021 Project, San Bernardino County

Dear Mr. Strother:

A record search of the Native American Heritage Commission (NAHC) Sacred Lands File (SLF) was completed for the information you have submitted for the above referenced project. The results were negative. However, the absence of specific site information in the SLF does not indicate the absence of cultural resources in any project area. Other sources of cultural resources should also be contacted for information regarding known and recorded sites.

Attached is a list of Native American tribes who may also have knowledge of cultural resources in the project area. This list should provide a starting place in locating areas of potential adverse impact within the proposed project area. I suggest you contact all of those indicated; if they cannot supply information, they might recommend others with specific knowledge. By contacting all those listed, your organization will be better able to respond to claims of failure to consult with the appropriate tribe. If a response has not been received within two weeks of notification, the Commission requests that you follow-up with a telephone call or email to ensure that the project information has been received.

If you receive notification of change of addresses and phone numbers from tribes, please notify me. With your assistance, we can assure that our lists contain current information.

If you have any questions or need additional information, please contact me at my email address: Andrew.Green@nahc.ca.gov.

Sincerely,

Andrew Green

Andrew Green
Cultural Resources Analyst

Attachment

Native American Heritage Commission
Native American Contact List
San Bernardino County
9/3/2021

Agua Caliente Band of Cahuilla Indians
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5401 Dinah Shore Drive — Cahuilla
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Kern Valley Indian Community
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abrierty@morongo-nsn.gov

Quechan Tribe of the Fort Yuma Reservation
Manfred Scott, Acting Chairman
Kw'ts'an Cultural Committee
P.O. Box 1899 — Quechan
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scottmanfred@yahoo.com

Quechan Tribe of the Fort Yuma Reservation
Jill McCormick, Historic Preservation Officer
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Phone: (760) 572 - 2423
historicpreservation@quechantribe.com

San Fernando Band of Mission Indians
Donna Yocum, Chairperson
P.O. Box 221838 — Kitanemuk
Newhall, CA, 91322 — Vanyume
Phone: (503) 539 - 0933 — Tataviam
Fax: (503) 574-3308
ddyocum@comcast.net

San Manuel Band of Mission Indians
Jessica Mauck, Director of Cultural Resources
26569 Community Center Drive — Serrano
Highland, CA, 92346
Phone: (909) 864 - 8933
Jessica.Mauck@sanmanuel-nsn.gov

This list is current only as of the date of this document. Distribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resource Section 5097.98 of the Public Resources Code.

This list is only applicable for contacting local Native Americans with regard to cultural resources assessment for the proposed Sienna Solar 2021 Project, San Bernardino County.

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P. O. Box 343 Serrano
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Phone: (253) 370 - 0167
serranonation1@gmail.com

Serrano Nation of Mission Indians
Mark Cochrane, Co-Chairperson
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Phone: (909) 528 - 9032
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Twenty-Nine Palms Band of Mission Indians
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Coachella, CA, 92236
Phone: (760) 863 - 2444
Fax: (760) 863-2449
29chairman@29palmsbomi-nsn.gov

Twenty-Nine Palms Band of Mission Indians
Anthony Madrigal, Tribal Historic Preservation Officer
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Coachella, CA, 92236
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amadrigal@29palmsbomi-nsn.gov

This list is current only as of the date of this document. Distribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resource Section 5097.98 of the Public Resources Code.

This list is only applicable for contacting local Native Americans with regard to cultural resources assessment for the proposed Sienna Solar 2021 Project, San Bernardino County.

Appendix B

SCCIC Records Search Results

Report List

Report No.	Other IDs	Year	Author(s)	Title	Affiliation	Resources
SB-00871	NADB-R - 1060871; Voided - 79-11.14	1979	LEONARD, JOANNE C.	AN ARCHAEOLOGICAL ASSESSMENT OF THE PROPERTIES IN THE LUCERNE VALLEY	SAN BERNARDINO COUNTY MUSEUM ASSOCIATION	
SB-02689	NADB-R - 1062689; Voided - 92-10.8	1992	BROWN, JOAN C.	ARCHAEOLOGICAL LITERATURE AND RECORDS REVIEW FOR THE RANCHO LUCERNE PLANNED DEVELOPMENT PROJECT IN THE COUNTY OF SAN BERNARDINO, CALIFORNIA	RMW PALEO	
SB-02690	NADB-R - 1062690; Voided - 92-10.9	1992	BROWN, JOAN C.	ADDENDUM TO: ARCHAEOLOGICAL LITERATURE AND RECORDS REVIEW FOR THE RANCHO	RMW PALEO	
SB-02830	NADB-R - 1062830	1992	BROWN, JOAN C. and TIM GREGORY	ARCHAEOLOGICAL LITERATURE REVIEW AND HISTORICAL RESOURCE EVALUATION FOR THE RANCHO LUCERNE PLANNED DEVELOPMENT PROJECT IN THE COUNTY OF SAN BERNARDINO, CA	RMW PALEO	
SB-04027	NADB-R - 1064027	1998	LOVE, BRUCE	CULTURAL RESOURCES REPORT RANCH LUCERNE DEVELOPMENT, LUCERNE VALLEY, SAN BERNARDINO COUNTY. 35PP	CRM TECH	36-020181, 36-020182
SB-04028	NADB-R - 1064028	1998	URBAS, ANDREA	ADAPTIVE USE REPORT: THE OASIS/RABBIT SPRINGS RANCH HISTORIC BUILDINGS, RANCHO LUCERNE VALLEY DEVELOPMENT, LUCERNE VALLEY, SAN BERNARDINO COUNTY, CA. 48PP		
SB-05158	NADB-R - 1065158	2005	AHMET, KORAL and LERCH, MICHAEL K.	DETERIORATED POLE REPLACEMENT PROJECT ARCHAEOLOGICAL SURVEY OF TEN POLE LOCATIONS ON THE POCO 33KV, CEMENT 33KV, RABBIT 12KV, SKY HI 12 KV, AND CUSHENBURY 33KV TRANSMISSION LINES, SAN BERNARDINO COUNTY, CALIFORNIA		
SB-06512	NADB-R - 1066512	2009	Backes, Clarus, Jessica DeBusk, and John Dietler	Cultural Resources Survey for the Lucerne Valley PV Solar Project, San Bernardino County, California.	SWCA	36-021161, 36-021162
SB-07020		2011	Woodman, Craig	Supplemental Class III Archaeological Survey of a Redundant Fiber Optic Line for the Granite Mountain Wind Energy Project, San Bernardino County, CA	URS	

Report List

Report No.	Other IDs	Year	Author(s)	Title	Affiliation	Resources
SB-07273	NADB-R - 1067273; Other - SCE	2011	Orfila, Rebecca S.	Archaeological Survey for the Southern California Edison Company: GRM Project in Lucerne, CA (2012 WCR Rabbit 12kV-BLF Addition: IO 319221/TD520570; RSOC CWA-210.	RSO Consulting	
SB-07366	NADB-R - 1067366	2013	Winslow, Diane and Sherri Andrews	Class III Inventory for the Granite Wind Energy Telecommunication Lines Granite Mountain, Gentie Line and Jasper Substation Interconnection Projects, San Bernardino County, California.	ASM Affiliates, Inc.	36-000317, 36-001908, 36-002910, 36-005598, 36-005599, 36-010508, 36-010535, 36-010538, 36-014632, 36-014875, 36-014876, 36-014877, 36-014878, 36-014879, 36-020872, 36-021200, 36-023975, 36-024155, 36-025636, 36-025637, 36-025638, 36-025639, 36-025640, 36-025641, 36-025642, 36-025643, 36-025644, 36-025645, 36-025646, 36-025647, 36-025648, 36-025649, 36-025650, 36-025668, 36-025669
SB-07482						

Report List

Report No.	Other IDs	Year	Author(s)	Title	Affiliation	Resources
SB-07984		2015	Stanton, Patrick B., Kenneth M. Becker, Mark Q. Sutton, and Karen K. Swope	Class III Cultural Resource Inventory of the Line 4000 Anomaly Digs Project, San Bernardino County, California	Statistical Research, Inc.	36-012189, 36-023973, 36-024000, 36-024617, 36-024619, 36-027410, 36-028355, 36-028356, 36-028357, 36-028358, 36-028359, 36-028360, 36-028361, 36-028362, 36-028363, 36-028364, 36-028365, 36-028366, 36-028367, 36-028368, 36-028369, 36-028370, 36-028371, 36-028372, 36-028373, 36-028374, 36-028375, 36-028376, 36-028377, 36-028378, 36-028379, 36-028380, 36-028381, 36-028382, 36-028383, 36-028384, 36-028385, 36-028386, 36-028387, 36-028388, 36-028389, 36-028390, 36-028391, 36-028392, 36-028393, 36-028394, 36-028395, 36-028396, 36-028397, 36-028398, 36-028399, 36-028400, 36-028401, 36-028402, 36-028403, 36-028404, 36-028405, 36-028406, 36-028407, 36-028408, 36-028409, 36-028410, 36-028411, 36-028412, 36-028413, 36-028414, 36-028415, 36-028416, 36-028417, 36-028418, 36-028419, 36-028420, 36-028421, 36-028422, 36-028423, 36-028424, 36-028425, 36-028426, 36-028427, 36-028428, 36-028429, 36-028430, 36-028431, 36-028432, 36-028433, 36-028434, 36-028435, 36-028436, 36-028437, 36-028438, 36-028439, 36-028440, 36-028441

All resources are verified by SCCIC Staff

Resource List

Primary No.	Trinomial	Other IDs	Type	Age	Attribute codes	Recorded by	Reports
P-36-002145	CA-SBR-002145	Resource Name - Lucerne Dry Lake; Other - SBCM-261	Site	Prehistoric	AP02; AP04	1940 (SMITH); 2018 (Diane Winslow, ASM Affiliates)	
P-36-003750	CA-SBR-003750		Site	Prehistoric	AP04	1979 (Gerrit Fenega)	SB-00874
P-36-014876	CA-SBR-013115H	Resource Name - SCE 220-Kv North Transmission Line; Other - Pisgah Substation Triangle; Other - Lugo-Pisgah #1; Other - Hoover-Chino #1; Other - T-Mobile West LLC IE04970B/SB563 SCE Sultana High School; Other - SRI-65; Other - SRI-2012; Resource Name - Hoover-Chino No. 1; Other - SRI-1053, SRI-8; Voided - 36-024619	Structure, Site	Historic	AH16; HP11	2008 (K. Erickson, URS Corporation); 2010 (Kristen Erickson, URS); 2011 (Joshua Trampler, SRI); 2011 (J. Trampier, SRI); 2011 (J. Trampier, S. Kremkau, Statistical Research); 2011 (D. Winslow and S. Andrews, ASM Affiliates); 2012 (Wendy L. Tinsley, Pacific Legacy); 2013 (E. Gingerich, Far Western); 2014 (K. A. Crawford, Michael Brandman Associates); 2015 (Matthew Hyland, SRI); 2017 (Shannon Davis, ASM); 2018 (Shannon Davis, ASM); 2018; 2018; 2019 (J. Spidell, Kautz)	SB-07366, SB-07788, SB-07789, SB-07844, SB-08031
P-36-021160	CA-SBR-013657H	Resource Name - LV-S1	Object, Site	Historic	AH02	2009 (King Covert; Sherman Hares, SWCA); 2016	
P-36-021161	CA-SBR-013658H	Resource Name - LV-S2	Object	Prehistoric	AH16	2009 (King Covert; Sherman Hares, SWCA); 2016 (P. Sharp-Garcia, Dudek)	SB-06512
P-36-021162	CA-SBR-013659H	Resource Name - LV-S3	Object	Historic	AH02	2009 (King Covert; Sherman Hares, SWCA); 2016	SB-06512
P-36-021163			Other	Prehistoric	AP16	2009 (King Covert; Sherman Hares, SWCA)	
P-36-021164			Other	Prehistoric	AP16	2009 (King Covert; Sherman Hares, SWCA)	
P-36-021165			Other	Prehistoric	AP02	2009 (King Covert; Sherman Hares, SWCA)	
P-36-021166		Resource Name - LV-I4	Other	Prehistoric	AP02	2009 (Covert et al., SWCA Environemental Consultants)	

Resource List

Primary No.	Trinomial	Other IDs	Type	Age	Attribute codes	Recorded by	Reports
P-36-021167			Other	Prehistoric	AP04	2009 (King Covert; Sherman Hares, SWCA)	
P-36-021168			Other	Prehistoric	AP02	2009 (King Covert; Sherman Hares, SWCA)	
P-36-021200	CA-SBR-013662H	Resource Name - URS 1-B	Site	Historic	AH04; AH09	2010 (Whitney Wilkinson; Brent Leftwich, URS); 2011 (D. Winslow and S. Andrews, ASM Affiliates); 2013 (M. O'Neill, Pacific legacy); 2018 (Diane Winslow, ASM Affiliates)	SB-06320, SB-07366
P-36-021201	CA-SBR-013663H	Resource Name - URS-2B	Site	Historic	AH05	2010 (Whitney Wilkinson; Brent Leftwich, URS); 2012 (M. O'Neill, Pacific legacy, Inc); 2018	SB-06320
P-36-021202		Resource Name - ISO-1B	Other	Prehistoric	AP02	2010 (Whitney Wilkinson; Brent Leftwich, URS); 2018 (A. Pham, Dudek)	SB-06320
P-36-024156	CA-SBR-015341H	Resource Name - SRI-64	Site	Historic	AH07	2011 (S Kremkau, SRI); 2012 (L. Schrader, Pacific Legacy); 2016 (Nara Cox and Karolina Chmiel, ICF)	
P-36-024157	CA-SBR-015342H	Resource Name - SRI-67	Site	Historic	AH07; HP37	2011 (S Kremkau, SRI); 2018	
P-36-024158	CA-SBR-015343H		Site	Historic	AH07; HP37	2011 (S Kremkau, SRI)	
P-36-024190	CA-SBR-015375H	Resource Name - SRI-1072	Structure, Site	Historic	AH07; HP37	2011 (S Kremkau, SRI); 2013 (M. O'Neill, Pacific Legacy, Inc); 2018	
P-36-024204	CA-SBR-015389H	Resource Name - SRI-2047	Site	Historic	AH07; HP37	2011 (S. Kremkau, Statistical Research, Inc.); 2018	
P-36-024224	CA-SBR-015409H	Other - SRI-3022, SRI-3017, SRI-1006; Resource Name - Chuckwalla Road; Voided - 36-028361; Voided - 36-028369	Site	Historic	AH04; AH07; HP37	2011 (S Kremkau, SRI); 2012 (M. O'Neill, Pacific Legacy); 2015 (Patrick Stanton, SRI); 2016; 2018	

Resource List

Primary No.	Trinomial	Other IDs	Type	Age	Attribute codes	Recorded by	Reports
P-36-024225	CA-SBR-015410H	Resource Name - SRI-3024	Site	Historic	AH04	2011 (S Kremkau, SRI); 2018	
P-36-024245	CA-SBR-015430H	Resource Name - SRI-4676	Site	Historic	AH07; HP37	2011 (S Kremkau, SRI); 2018; 2018 (Shannon Davis, ASM)	
P-36-025638	CA-SBR-016179H		Site	Historic	AH04	2011 (S. Andrews et al., ASM Affiliates, Inc.)	SB-07366
P-36-025668	CA-SBR-025668		Site	Historic	AH16	2013 (D. Winslow and S. Andrews, ASM Affiliates, Inc.,)	SB-07366
P-36-025669	CA-SBR-016200H		Site	Historic	AH04; AH09	2013 (D. Winslow and S. Andrews, ASM Affiliates)	SB-07366
P-36-027410	CA-SBR-017863H	Resource Name - Barstow Road / State Route 247; SRI-1105; PL-LUGO-BRK-025; Other - SRI-3058, SRI-1516; Voided - 36-028005	Structure, Object, Site	Historic	AH04; AH07; AH15; HP37	2013 (M. O'Neill, Pacific Legacy, Inc.); 2014 (Justin Lev-Tov, SRI); 2015 (Patrick Stanton, SRI); 2018	SB-07984
P-36-027752		Resource Name - SCE Eldorado-Lugo 500 kV Transmission Line	Structure	Historic	HP11	2013 (Wendy Tinsley Becker, Urbana); 2016 (Christina Chiang, Urbana); 2017 (Shannon Davis, ASM); 2018; 2018; 2019 (J. Spidell, Kautz)	
P-36-027757		Resource Name - SCE Lugo-Mohave 500kV Transmission Line	Structure, Element of district	Historic	HP11	2013 (Wendy L. Tinsley Becker, Urbana); 2016 (Christine Chiang, Urbana); 2017 (Shannon Davis, ASM); 2018; 2019 (J. Spidell, Kautz)	
P-36-027880	CA-SBR-017374H	Resource Name - PL-CWLTP-MMO-086	Site	Historic	AH04	2014 (T. Fuerstenberg, Pacific Legacy, Inc.); 2018 (Diane Winslow, ASM)	
P-36-028149	CA-SBR-017557H	Resource Name - PL-SOK-LNS-027	Site	Historic	AH02; AH04	2012 (M. O'Neill, Pacific Legacy, Inc.); 2018 (Diane Winslow, ASM)	
P-36-028356	CA-SBR-028356H	Resource Name - SRI-21	Site	Historic	AH07	2015 (Patrick B. Stanton, SRI)	SB-07984
P-36-028357	CA-SBR-028357H	Resource Name - SRI-22	Site, Other	Historic	AH07	2015 (Patrick B. Stanton, SRI)	SB-07984
P-36-028362	CA-SBR-028362H	Resource Name - SRI-1010	Site, Other	Historic	AH07	2015 (Patrick B. Stanton, SRI)	SB-07984

Resource List

Primary No.	Trinomial	Other IDs	Type	Age	Attribute codes	Recorded by	Reports
P-36-028365	CA-SBR-028365H	Other - SRI-2025; Resource Name - Meridian Rd	Site, Other	Historic	AH07	2015 (Patrick B. Stanton, SRI); 2018	SB-07984
P-36-028371	CA-SBR-028371H	Resource Name - SRI-3024	Site, Other	Historic	AH07	2015 (Patrick B. Stanton, SRI)	SB-07984
P-36-028372	CA-SBR-028372H	Resource Name - SRI-3025	Site	Historic	AH04	2015 (Patrick B. Stanton, SRI)	SB-07984
P-36-028417		Resource Name - IO-19	Other	Historic	AH04	2015 (Patrick B. Stanton, SRI)	SB-07984
P-36-028418		Resource Name - IO-20	Other	Historic	AH04	2015 (Patrick B. Stanton, SRI)	SB-07984
P-36-028424		Resource Name - IO-1007	Other	Historic	AH04	2015 (Patrick B. Stanton, SRI)	SB-07984
P-36-028425		Resource Name - IO-1008	Other	Historic	AH04	2015 (Patrick B. Stanton, SRI)	SB-07984
P-36-028426		Resource Name - IO-1009	Other	Historic	AH04	2015 (Patrick B. Stanton, SRI)	SB-07984
P-36-028438		Resource Name - IO-3021	Other	Historic	AH04	2015 (Patrick B. Stanton, SRI)	SB-07984
P-36-028439		Resource Name - IO-3022	Other	Historic	AH04	2015 (Patrick B. Stanton, SRI)	SB-07984
P-36-028440		Resource Name - IO-3023	Other	Prehistoric	AP02	2015 (Patrick B. Stanton, SRI)	SB-07984
P-36-029774		Resource Name - OM-PK-004	Building, Site	Historic	HP02; HP22; HP33	2016 (PK Sharpe-Garcia, Dudek)	
P-36-029775	CA-SBR-029775H	Resource Name - OM-PK-009	Site	Historic	AH06	2016	
P-36-029899		Resource Name - ICF-CAL-001	Other	Prehistoric	AP02; AP16	2016 (N. Cox, ICF International)	
P-36-029901		Resource Name - ICF-CAL-02	Site	Historic	AH04	2016 (N. Cox, ICF International); 2018 (A. Pham, Dudek); 2018	
P-36-031200		Resource Name - Eldorado 500kV Transmission Line System	Structure, District	Historic	HP11	2016 (Christina Chiang, Urbana); 2017 (Shannon Davis, ASM)	
P-36-032690	CA-SBR-032690H	Resource Name - ELM-SJM-89	Site	Historic	AH02; AH04	2017 (S. Moore, ASM)	
P-36-032691	CA-SBR-032691H	Resource Name - ELM-SJM-90	Site	Historic	AH04	2017 (S. Moore, ASM)	
P-36-032692	CA-SBR-032692H	Resource Name - ELM-SJM-92	Site	Historic	AH04	2017 (S. Moore, ASM)	
P-36-032693	CA-SBR-032693H	Resource Name - ELM-SJM-93	Site	Historic	AH04	2017 (S. Moore, ASM)	
P-36-032694	CA-SBR-032694H	Resource Name - ELM-SJM-94	Site	Historic	AH04	2017 (S. Moore, ASM)	
P-36-033005	CA-SBR-033005H	Resource Name - CS-S-1	Site	Historic	AH04	2018 (A. Pham, Dudek)	
P-36-033006	CA-SBR-033006H	Resource Name - CS-S-2	Site	Historic	AH05; AH06	2018 (A. Pham, Dudek)	
P-36-033007	CA-SBR-033007H	Resource Name - CS-S-3	Site	Historic	AH02; AH04; AH05	2018 (A. Pham, Dudek)	
P-36-033008	CA-SBR-033008H	Resource Name - CS-S-4	Site	Historic	AH04; AH05	2018 (A. Pham, Dudek)	
P-36-033009	CA-SBR-033009H	Resource Name - CS-S-5	Site	Historic	AH04	2018 (A. Pham, Dudek)	

Resource List

Primary No.	Trinomial	Other IDs	Type	Age	Attribute codes	Recorded by	Reports
P-36-033010	CA-SBR-033010/H	Resource Name - CS-S-7	Site	Prehistoric, Historic	AH04; AP02	2018 (A. Pham, Dudek)	
P-36-033011	CA-SBR-033011H	Resource Name - CS-S-8	Site	Historic	AH05	2018 (A. Pham, Dudek)	
P-36-033012	CA-SBR-033012H	Resource Name - CS-S-9	Site	Historic	AH04; AH16	2018 (A. Pham, Dudek)	
P-36-033013		Resource Name - CS-I-1	Other	Prehistoric	AP02	2018 (A. Pham, Dudek)	
P-36-033014		Resource Name - CS-I-2	Other	Historic	AH16	2018 (A. Pham, Dudek)	
P-36-033015		Resource Name - CS-I-3	Other	Prehistoric	AP02	2018 (A. Pham, Dudek)	
P-36-033072	CA-SBR-033072	Resource Name - Rabbit Springs-1	Site	Prehistoric	AP08	2018 (S. Andrews, ASM)	
P-36-033074	CA-SBR-033074H	Resource Name - Rabbit Springs-3	Site	Historic	HP39	2018 (S. Andrews, ASM)	

Appendix C

Resource Records

Redacted for Confidentiality Purposes

Appendix G. Geotechnical Study

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CEQA Level Geotechnical Study

Sienna Solar

Lucerne Valley, San Bernardino County, California

July 29, 2022

Terracon Project No. LA225044

Prepared for:

8minute Energy

San Francisco, California

Prepared by:

Terracon Consultants, Inc.

Tustin, California

July 29, 2022

8minute Energy
1132 N 7th
San Francisco, California 95112

Attn: Mr. Kiran Tuniki
P: (415) 517-3034
E: KTuniki@8minute.com

Re: CEQA Level Geotechnical Study
Sienna Solar
Lucerne Valley, San Bernardino County, California
Terracon Project No. LA225044

Dear Mr. Tuniki:

We have prepared this California Environmental Quality Act (CEQA) Level Geotechnical Study to provide support documentation for the "Environmental Checklist Form" in accordance with the CEQA Guidelines for the proposed Sienna Solar development, located west of Barstow Road and North of Old Woman Springs Road in Lucerne Valley, San Bernardino County, California.

Our report includes data from the U.S. Department of Agriculture for the soils found on site Although the site is not within a state- or county-designated earthquake fault zone, the site is within a seismically active region. The report therefore summarizes important fault information in the area of your project and discusses potential geotechnical/geologic concerns, such as fault rupture, liquefaction and erosion. This report does not include specific mitigation recommendations other than those already stated in our prior geotechnical report.

Purpose and Scope of Work

Throughout April 2022, a geotechnical investigation for the proposed project was performed. The purpose of this investigation was to explore and evaluate the geotechnical engineering conditions at the subject site and to provide appropriate geotechnical engineering recommendations. The results of our geotechnical investigation and our geologic evaluation for CEQA study are presented in this report. Terracon's geotechnical engineering scope of work for this project included the following:

- Site reconnaissance and examination of existing conditions
- Marking exploration locations and notifying Underground Service Alert in accordance with State requirements
- Drilling and sampling of thirty-nine (39) soil test borings
- Excavation and logging of five (5) geologic trenches
- Laboratory testing of soil samples
- Evaluation of geotechnical properties of soils pertinent to the CEQA Guidelines

- Evaluation of geologic hazards typically addressed in CEQA documents, including seismic shaking, surface fault rupture, liquefaction, landslides, erosion, unstable geologic units (including evaluation of surface fissures), expansive soils, and capacity of native soils for wastewater/storm water infiltration
- Development of 2019 California Building Code (CBC) seismic design parameters
- Evaluation of the geotechnical engineering/geologic data to develop preliminary recommendations for site grading/preparation and mitigation of potential geologic and geotechnical constraints

Site Description

The proposed project site is located west of Barstow Road and North of Old Woman Springs Road in Lucerne Valley, San Bernardino County, California. The project site boundary is irregularly shaped and occupies an approximate area of 1,850 acres. The GPS coordinates for the approximate center of the project site are 34.50076°N, 116.90145°W. The proposed 200 MWAC photovoltaic solar farm is to be developed using single-axis tracker photovoltaic (PV) arrays and includes a substation in the northern most parcel. At the time of our investigation, the site generally consisted of undeveloped land with sparse to moderate desert vegetation.

Field Investigation

Terracon advanced hollow stem auger soil borings, test pits, and trenches as outlined in the table below:

Number of Explorations	Depth (feet)	Planned Location
37 borings	21½	Array areas
2 borings	51½	Substation Areas
37 test pits	10	Array Areas
5 trenches	5	Geologic Trenches

The test pits are redundant data for the purposes of this report. As such, logs of the test pits are not included.

Terracon personnel provided the layout of the explorations. Coordinates were obtained with a handheld GPS unit (estimated horizontal accuracy of about ±10 feet) and approximate elevations were obtained by interpolation from Google Earth.

We advanced the borings with a truck-mounted drill rig using continuous hollow stem flight augers. Four driven samples were obtained in the upper 10 feet of each boring and at intervals of 5 feet thereafter. Soil sampling was performed using split-barrel sampling procedures. In the split-barrel sampling procedure, a standard 2-inch outer diameter split-barrel sampling spoon is driven into

the ground by a 140-pound automatic hammer falling a distance of 30 inches. The number of blows required to advance the sampling spoon the last 12 inches of a normal 18-inch penetration is recorded as the Standard Penetration Test (SPT) resistance value. The SPT resistance values, also referred to as N-values, are indicated on the boring logs at the test depths. A 2.5-inch O.D. split-barrel Modified California sampling spoon with 2.0-inch I.D. tube lined sampler was also used for sampling. The Modified California split-barrel sampling procedures are similar to standard split spoon sampling procedure; however, blow counts are typically recorded for 6-inch intervals for a total of 12 inches of penetration. Groundwater was not encountered during the field exploration.

The test pits were excavated with a rubber-tire backhoe with a 3-foot-wide bucket. Bulk samples were obtained from the test pits.

For safety purposes, all borings and test pits were backfilled with soil cuttings after their completion. It is possible that some settlement of the backfilled material may occur. Our firm does not monitor boring locations for surface settlement. This is deemed to be and is accepted to be the responsibility of our client.

The sampling depths, penetration distances, and other sampling information was recorded on the field boring and test pit logs. The samples were placed in appropriate containers and taken to our soil laboratory for testing and classification by a Geotechnical Engineer. Our exploration team prepared field boring and test pit logs as part of the drilling operations. These field logs included visual classifications of the materials encountered during drilling and excavation, and our interpretation of the subsurface conditions between samples. Final boring and test pit logs were prepared from the field logs. The final boring and test pit logs represent the Geotechnical Engineer's interpretation of the field logs and include modifications based on observations and tests of the samples in our laboratory.

Laboratory Soil Testing

The project engineer reviewed the field data and assigned various laboratory tests to better understand the engineering properties of the various soil strata as necessary for this project. The following laboratory tests were performed on samples collected at the site:

- ASTM D2216 Standard Test Methods for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass
- ASTM D7263 Standard Test Methods for Laboratory Determination of Density (Unit Weight) of Soil Specimens
- ASTM D4318 Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils
- ASTM D1140 Standard Test Methods for Determining the Amount of Material Finer than 75-µm (No. 200) Sieve in Soils by Washing

- ASTM D2435 Standard Test Methods for One-Dimensional Consolidation Properties of Soils Using Incremental Loading
- ASTM D3080 Standard Test Method for Direct Shear Test of Soils Under Consolidated Drained Conditions
- ASTM D698 Moisture Density Relationship using Standard Effort (Standard Proctor)

Summaries of laboratory test results are presented on the boring logs and in the attachments of this report. Atterberg limit test results indicate that the on-site soils generally are medium to high plasticity clayey soils. Laboratory Moisture-Density test (Modified Proctor) results indicate that the near surface sand materials have a maximum dry-density ranging between approximately 94.4 pcf and 127.2 pcf with a corresponding optimum moisture content ranging between 9.6% and 24%. Laboratory Moisture-Density test (Modified Proctor) results indicate that the near surface clay materials have a maximum dry-density ranging between approximately 95.3 pcf and 114.8 pcf with a corresponding optimum moisture content ranging between 13.8% and 25%. Direct Shear testing indicates the sand soil samples have an effective internal angle of friction of 30 to 42 degrees with an effective cohesion of 216 to 648 psf. Direct Shear testing indicates the clay soil samples have an effective internal angle of friction of 13 to 27 degrees with an effective cohesion of 564 to 1536 psf.

Site Geology and Subsurface Soil Conditions

The site is located within the Mojave Desert geomorphic province. The Mojave Desert province is bounded on the southwest by the San Andreas fault and the Transverse Ranges (locally San Bernardino Mountains) and on the northeast by the Garlock fault. The Mojave Desert is an ancient feature formed in response to the inception of movement on the San Andreas and Garlock faults. The region is characterized by broad alluviated basins that conceal the previously mountainous topography.

The Mojave Desert includes various closed basins, or basins with internal drainage, referred to as dry lakes. Lucerne Valley includes a large closed basin referred to as Lucerne Valley playa. It is normally dry but surface water perches on the playa after rain events. All of the subject property of this investigation is located east and southeast of the playa.

The westerly parcels are located immediately east of the playa and are mapped as Holocene-age (recent) “clay” by Dibblee (1964A, 1964B). A Geologic Index Map is attached. The ground surface tends to be light in color but the soils are mixtures of clay and silt.

Most of the easterly parcels are mapped as Holocene-age “alluvium” by Dibblee. Geologic mapping and trenching conducted during this investigation found that the “alluvium” in the northeasterly site parcels includes a degraded desert pavement of Pleistocene age, and so the northeasterly parcels are largely underlain by older alluvium.

The southerly parcels are all mapped by Dibblee as Holocene-age alluvium. Observations of soils within trenches in this area are consistent with a Holocene-age assignment.

Based on the results of the borings, onsite soils generally consist of medium stiff to very stiff lean clay/fat clay with varying amounts of silt and sand to the maximum depth explored of 51.5 feet bgs.

Conditions encountered at each boring location are indicated on the individual boring logs shown in the attachments of this report. Stratification boundaries on the boring logs represent the approximate location of changes in native soil types; in situ, the transition between materials may be gradual.

Soils

Based on soils mapping published by the U.S. Department of Agriculture (2022), the project site is underlain by several USDA soils types including Bousic Clay, Dune Land, Glendale Variant Silt Loam, Joshua Loam, Kimberlina Loamy Fine Sand, Lavic Loamy Fine Sand, Peterman Clay, and Playas. These soils vary in depth, depending on slope aspect (with deeper soils occurring on areas of lower gradient), degree of permeability (with less permeable soils derived from parent materials/bedrock having clay-forming mineralogies) and susceptibility to erosion.

The following table summarizes the USDA properties for soils units identified on the site. The unit numbers correspond to the areas shown on the attached USDA Soils Map.

Summary of USDA Soil Properties					
Unit Name	**Map Unit**	**Acres % of Site**	**Surface Water Management**	**Subsurface Water Management**	**Erosion Hazard (Road, Trail)**
Bousic Clay	104	33.6	Not Rated	Not Rated	Slight
Dune Land	123	1.1	Not Rated	Not Rated	Not Rated
Glendale Variant Silt Loam, Saline-Alkali	125	25.2	Not Rated	Not Rated	Slight
Joshua Loam	135	0.3	Somewhat Limited	Very Limited	Moderate
Kimberlina Loamy Fine Sand	137	15.2	Not Rated	Not Rated	Slight
Lavic Loamy Fine Sand	140	0.3	Not Rated	Not Rated	Moderate
Peterman Clay	154	24.1	Not Rated	Not Rated	Slight
Playas	156	0.2	Not Rated	Not Rated	Not Rated

The rating for surface water management is based on the soil properties that affect the capacity of the soil to convey water across the landscape. The term "somewhat limited" for surface water management rating indicates that the soil has features that are moderately favorable for the

specified use and that limitations can be overcome or minimized by planning, design or installation.

The rating for subsurface water management is based on the soil properties that affect the capacity of the soil to be drained. The term "very limited" for subsurface water management indicates that the soil has features that are unfavorable for the specified use. Poor performance can be expected.

The ratings for erosion hazard indicate the hazard of soil loss from unsurfaced roads and trails. The term "slight" indicates that the no erosion is likely. The term "moderate" indicates that some erosion is likely.

Erosional features related to subsidence cracking (fissures) occur across the site and these are discussed later.

Mineral Resources

The aggregate resource potential for the area of the site is addressed in a report titled, "Mineral Land Classification of Concrete Resources in the Barstow-Victorville Area" (CDMG, 1993). This report addresses the sand and gravel resource potential according to the presence or absence of significant sand and gravel deposits for use in construction-grade aggregate. The resource quality of surrounding lands was reported according to the following Mineral Resource Zone (MRZ) classification system:

MRZ-1: Areas where adequate information indicates that no significant mineral deposits are present, or where it is judged that little likelihood exists for their presence.

MRZ-2: Areas where adequate information indicates mineral deposits are present, or where it is judged that a high likelihood for their presence exists.

MRZ-3: Areas containing mineral deposits, the significance of which cannot be evaluated from available data.

MRZ-4: Areas where available information is inadequate for assignment to any other MRZ.

The site is situated in primarily alluvial terrain. No economically significant sources of aggregate material were observed within the site. The project site is placed within MRZ-3a defined as "may contain significant aggregate deposits". No aggregate mining currently occurs in similar geologic terrain in the immediate project vicinity. Our assessment of the geology and soils in trenches and borings is that no economically significant aggregate resources exist on the site currently and are not expected to be economical in the foreseeable future. Aggregates are commercially available from quarries along Meridian Road and along the front of the San Bernardino Mountains at a minimum..

The mineral resource potential for the area of the site is addressed in a report titled, "Mineral Land Classification of a Part of Southwestern San Bernardino County: The Big Bear Lake-Lucerne Valley Area, California" (CDMG, 1994). This report addresses the mineral resource potential according to the presence or absence of significant metallic or industrial mineral deposits. The resource quality of surrounding lands was reported according to the following MRZ classification system:

MRZ-1: Areas where adequate information indicates that no significant mineral deposits are present, or where it is judged that little likelihood exists for their presence.

MRZ-2: Areas where adequate information indicates mineral deposits are present, or where it is judged that a high likelihood for their presence exists.

MRZ-3: Areas containing mineral deposits, the significance of which cannot be evaluated from available data.

MRZ-4: Areas where available information is inadequate for assignment to any other MRZ.

No economically significant sources of metallic or industrial materials were observed within the site. The project site is placed within MRZ-4, defined as "unknown mineral resource significance". As the project area is not presently used for mineral resource extraction and does not contain identified mineral sources, the proposed project will not result in the loss of availability of any known mineral resources. Thus, no significant impacts are anticipated.

Regional Groundwater

According to the California Department of Water Resources, the site is located within the Lucerne Valley basin, part of the Colorado River Hydrologic Region. Large areas within the basin are irrigated for alfalfa (Schaefer, 1978) and cannabis. Irrigation of fields by groundwater extraction has occurred for greater than 100 years.

Significant declines in groundwater levels in wells were reported in the basin as early as 1917 (Schaefer, 1978). The reported decline was at least 40 feet as of 1954, and at least an additional 60 feet as of 1976, for a total of at least 100 feet of decline as of 1976 (Schaefer, 1978). Long-term hydrographs of wells in the basin in the general area of the site (Mojave Water Agency, 2005) for the years 1953 to 2003 show water level declines of approximately 80 feet during that period.

Declines in groundwater levels that have occurred in Lucerne Valley are considered sufficient to cause subsidence and associated subsidence fissuring. The hazards of subsidence and ground fissuring are addressed later in this report.

Local Groundwater

Groundwater was not observed in the borings while drilling or for the short duration they could remain open. These observations represent groundwater conditions at the time of the field exploration and may not be indicative of other times, or at other locations.

In clayey soils with low permeability, the accurate determination of groundwater level may not be possible without long term observation. Long term observation after drilling could not be performed as borings were backfilled immediately upon completion due to safety concerns. Groundwater levels can best be determined by implementation of a groundwater monitoring plan.

Groundwater level fluctuations occur due to seasonal variations in the amount of rainfall, runoff and other factors not evident at the time the borings were performed. Therefore, groundwater levels during construction or at other times in the life of the structure may be higher or lower than the levels indicated on the boring logs. The possibility of groundwater level fluctuations should be considered when developing the design and construction plans for the project.

Seismic Design Parameters

The 2019 California Building Code (CBC) Seismic Design Parameters have been generated using the SEAOC/OSHPD Seismic Design Maps Tool. This web-based software application calculates seismic design parameters in accordance with ASCE 7-16 and 2019 CBC. The 2019 CBC requires that a site-specific ground motion study be performed in accordance with Section 11.4.8 of ASCE 7-16 for Site Class D sites with a mapped S_1 value greater than or equal 0.2.

However, Section 11.4.8 of ASCE 7-16 includes an exception from such analysis for specific structures on Site Class D sites. The commentary for Section 11 of ASCE 7-16 (Page 534 of Section C11 of ASCE 7-16) states that “In general, this exception effectively limits the requirements for site-specific hazard analysis to very tall and or flexible structures at Site Class D sites.” Based on our understanding of the proposed structures, it is our assumption that the exception in Section 11.4.8 applies to the proposed project. However, the structural engineer should verify the applicability of this exception.

Based on this exception, the spectral response accelerations for the substation area presented below were calculated using the site coefficients (F_a and F_v) from Tables 1613.2.3(1) and 1613.2.3(2) presented in Section 16.4.4 of the 2019 CBC.

Description	Substation Area
2019 California Building Code Site Classification (CBC) [1]	D [2]
Site Latitude (°N)	34.5226
Site Longitude (°W)	116.8946

Description	Substation Area
S_s Spectral Acceleration for a 0.2-Second Period	1.179
S_1 Spectral Acceleration for a 1-Second Period	0.418
F_a Site Coefficient for a 0.2-Second Period	1.029
F_v Site Coefficient for a 1-Second Period	1.884
Project Site Mean Magnitude[4]	6.40
Modified Peak Ground Acceleration (PGA_m)[5]	0.547

1. Seismic site classification in general accordance with the *2019 California Building Code*.
2. The 2019 California Building Code (CBC) requires a site soil profile determination extending to a depth of 100 feet for seismic site classification. The current scope does not include the required 100-foot soil profile determination. Borings were extended to a maximum depth of 51½ feet, and this seismic site class definition considers that similar or denser soils continue below the maximum depth of the subsurface exploration. Additional exploration to deeper depths would be required to confirm the conditions below the current depth of exploration.

Regional Seismicity

The site is located in the southern California, which is a seismically active area. The type and magnitude of seismic hazards affecting the site are dependent on the distance to causative faults, the intensity, and the magnitude of the seismic event. As calculated using the USGS Unified Hazard Tool, an unnamed gridded point source that is considered to have the most significant effect at the site from a design standpoint has a maximum magnitude of 5.49 and is located approximately 6 kilometers from the site. Nearby USGS mapped faults include the Helendale fault at 10 kilometers and Lenwood-Lockhart at 12 kilometers distance from the site.

Based on the USGS Design Maps Summary Report, using the American Society of Civil Engineers (ASCE 7-16) standard, the design peak ground acceleration (PGA_M) for the project site is 0.547g. Based on the USGS Unified Hazard Tool, design ground motions are controlled by seismic sources with modal magnitudes between 5.5 and 7.4 .

Fault Rupture

The site is not located within an Alquist-Priolo Special Studies Fault Zone (CDMG, 2002b). As noted above, the nearest active fault (unnamed grid source) is located approximately 6 kilometers from the site. Based on the distance to the site from known (USGS) active faults at site, it is our opinion that the potential for surface fault rupture to occur on the project site is low.

Liquefaction

Liquefaction is a mode of ground failure that results when a saturated soil loses substantial strength in response to earthquake shaking. Liquefaction is typically a hazard where loose sand

or non-plastic silt soils exist below groundwater but may also occur with sensitive plastic silt or clay below groundwater. The California Geological Survey (CGS) has designated certain areas within the state as potential liquefaction hazard zones. These are areas considered at a risk of liquefaction-related ground failure during a seismic event, based upon mapped surficial deposits and the presence of relatively shallow groundwater. The project site is not mapped within a liquefaction hazard potential area as designated by the CGS, as their mapping efforts have not reached the region of the site. The site is not included within a liquefaction hazard zone designated by San Bernardino County on their Geologic Hazard Overlay Maps.

The substation portion of the proposed project is located on Pleistocene-age alluvium as evidenced by the petrocalcic layer observed in Geologic Trench 1, and the presence of the degraded desert pavement (geomorphic surface). Pleistocene-age alluvium is not considered to be susceptible to liquefaction due to its age and density. Based on the encountered subsurface conditions and depth of groundwater, we conclude that the potential for liquefaction at the proposed substation location is very low. Other geologic hazards related to liquefaction, such as lateral spreading, are also considered very low.

Strong Ground Shaking

The site could be subjected to strong ground shaking from earthquakes on local to distant sources during the life span of the project. Faulting and ground motion parameters for the site are addressed above. Mitigation of strong ground shaking is typically provided by designing structures in accordance with the latest addition of the California Building Code.

Ground Fissuring and Subsidence

Ground fissuring attributed to past groundwater withdrawal is apparent on many of the parcels. In areas where the slope of the ground surface is slight, including the project area, narrow ground cracks (less than 2 mm wide) can channel surface water for long distances. This channeling can erode the upper soils and create wider/deeper fissures. At the site, we observed fissures up to approximately 5 feet wide and 4 feet deep on parcels that have had no apparent agricultural use. Some parcels are in current or recent use for alfalfa production. These parcels have apparently been flattened to facilitate “flood” irrigation. Evidence for prior fissuring is not evident on the parcels in current use for agriculture.

As part of this investigation, we reviewed readily available aerial photographs (Fairchild Collection, US Department of Agriculture and hsitoricaerials.com). A list of these photographs is attached. These aerials cover large portions of the site and date back to 1945. Based on our review, the parcels that are currently in agricultural use generally exhibit fissuring prior to agricultural use, as observed on the 1945 range of available photography. Some parcels were in agricultural use prior to the 1945 aerial photography and so no inference can be made about fissuring relative to 1945 from the photography. It should be noted that some of the parcels along

the northern, eastern and southern sides of the project do not exhibit fissuring visible on aerial photography but do exhibit incipient fissuring visible on the ground.

Subsurface Investigation of Fissuring

A subsurface investigation of ground fissuring was conducted to evaluate the presence or absence of subsurface voids. Significant voids in the subsurface could be expected to reduce the capacities of the driven solar piles.

Five geologic trenches were excavated with a rubber-tire backhoe. The trenches were limited to 5 feet in depth or less due to sidewall stability concerns. The trenches were placed at a high angle across fissures in various states of maturity, including incipient cracks, open (eroded) fissures, and one filled, mounded fissure. The trenches were extended laterally to traverse the entire width of cracking associated with each feature, so the trenches varied in length. The trenches were entered, the trench walls were cleaned with hand tools, and the walls were logged by a Certified Engineering Geologist (CEG). Observations made of each trench are discussed below. The trench logs are attached to this report. All trenches were placed across fissure features observed during prior geologic field reconnaissance by the CEG.

Geologic Trench 1 (GT-1) was placed across incipient, nearly east-west trending, cracking observed near the location of the proposed substation on the Luisa parcel (APN 045-239-108). This location is characterized by a degraded desert pavement (closely-packed pebbles on the ground surface) of suspected Pleistocene age. Desert pavements characteristically are ancient features (Pleistocene age). Observation of the soils in the trench confirmed the Pleistocene age, as a well-developed petrocalcic layer (abundant secondary carbonate accumulation) was present. The fissure at the surface was locally 3 to 4 inches wide and quickly narrowed downward to about 2mm within about 2 feet of the surface. This feature is referred to as incipient because very little erosion had occurred along it.

Geologic Trench 2 (GT-2) was placed across incipient, N69W-trending, cracking observed on a Luisa parcel (APN 045-239-109) adjacent to the substation parcel. This location is southwest of the limit of the degraded desert pavement (closely-packed pebbles on the ground surface) of suspected Pleistocene age. Observation of the soils in the trench confirmed the Pleistocene age, as a well-developed layer with carbonate nodules (abundant secondary carbonate accumulation) was present. The pavement at this location is apparently completely degraded. The fissure at the surface was locally 24 inches wide and quickly narrowed downward to about 1mm within about 2 feet of the surface. This feature is referred to as incipient because very little erosion had occurred along it, and it was not laterally extensive.

Geologic Trenches GT-1 and GT-2 exposed ancient soils (Pleistocene age). The cracking observed is minor and considered incipient, as little erosion had occurred. The cracking observed in these soils is characterized as subsidence cracking.

Geologic Trench 3 (GT-3) was placed across a mature N20W-trending filled fissure observed on the Dalugdugan parcel (APN 045-211-219), southwest of the intersection of Lincoln Road, south of Granite Road. Extensive mature (eroded) ground fissuring is prominent on both sides of Lincoln Road south of Granite Road. Fissuring up to approximately 4 feet deep was observed on both sides of the road. GT-3 was placed across a prominent filled fissure characterized by a vegetated ridge approximately 1 to 2 feet high and approximately 4 feet wide. The ridge is considered to be a result of windblown sand filling a prior fissure, allowing vegetation to establish, then collecting more windblown sand. The main fissure associated with the mound was a filled fissure approximately 1 ½ inches wide extending to about 3 feet below ground surface. A few other minor fissures of 1 inch to 1 mm wide were observed, all of which narrowed to 1 mm within 3 feet of the surface. Carbonate nodules (secondary carbonate accumulation) were observed in the lowermost layer but no confidence as to Pleistocene age could be made. This feature is referred to as mature because it is infilled. It extends at least 500 feet northward to Granite Road. It is one of a subparallel series of approximate N20W-trending fissures extending north and south of Granite Road.

Geologic Trench 4 (GT-4) was placed across a N70E-trending fissure observed on the Abel parcel (APN 045-211-317), northeast of the intersection of Lincoln Road and Cambria Road. This parcel is characterized by large, open fissures with moderate vegetation established in them. Fissuring up to approximately 4 feet deep was observed on this parcel. GT-4 was placed across a prominent vegetational lineament with no surface fissuring. This feature was selected for trenching based on the strong linearity and the observation that it crosses various open fissures to the northeast of the trench location. It was postulated to be a man-made trench based on its linearity. Only two narrow (1-2 mm) fissures were observed in the trench. No evidence of prior erosion was found at this location. This feature is not considered to be man-made (trench) because no backfill of any trench was observed. This feature appears to absent from 1952 imagery but is partially visible on 1969 imagery. The nature of this feature is unknown, but it is preliminarily considered to be subsidence cracking.

Geologic Trench 5 (GT-5) was placed across a N80W-trending fissure observed on the Young parcel (APN 045-212-148), south of Cambria Road. This parcel is characterized by some small open fissures and some incipient fissures with little to no vegetation established in them. This parcel has apparently been graded or plowed for past agricultural use, resulting in large areas with little to no vegetation. At GT-5, 2 sets of minor open fissures trending roughly N80W were observed. All but one fissure were logged as diminishing in width to 1-2 mm at a shallow depth. One wider fissure (1 inch) was observed to extend to about 4 feet deep, terminating at a sand bed.

Based on our subsurface observation of fissures using the geologic trenches, the fissuring is generally narrow (1 - 2 mm wide) at depths greater than approximately 2 to 3 feet. Significant fissures apparently do not extend deeper than 2 to 3 feet below the surface. Therefore, it does

not appear that subsurface fissuring jeopardizes the stability of the proposed PV piles or substation structures, except where large open fissures exist. The large fissures are created by surficial erosion through an initially narrow fissure, creating the widened fissures that are common at the site. Where significant open fissures exist, we recommend grading including removal/excavations and backfill to provide suitable subsurface conditions to support the proposed element onsite. Grading and installation of surface drainage improvements is expected to mitigate erosion that previously caused enhancement of fissures.

Subsidence

It should be recognized that Lucerne Valley has experienced subsidence due to groundwater withdrawal. The presence or absence of subsidence has been investigated using standard survey methods, GPS data, and InSAR (Interferometric Synthetic Aperture Radar) (Sneed and others, 2003; Brandt and Sneed, 2021). The combined subsidence during the period from1992 to 2019 is estimated to be approximately 14 inches in parts of the Lucerne Valley basin (Brandt and Sneed, 2021). Since the available data may not capture all of the subsidence that has occurred, the actual subsidence may be greater.

Ground subsidence can occur when groundwater levels decline significantly. When the fluid pressure in an aquifer decreases due to groundwater withdrawal, the sediment can compact. This compaction is generally permanent; however, the compaction/subsidence may not occur contemporaneously with the decline in water levels – it may be delayed. Fissuring often is associated with localized differential compaction of unconsolidated sediment. Fissures formed by this mechanism are caused by the stretching of the aquifer-system structure owing to the bending of the overlying sediment of the differentially compacting zone (Sneed and others, 2003, citing Holzer, 1984).

The observed fissuring on the site parcels is considered to be the result of subsidence. Subsidence is expected to continue. The amount and location of expected subsidence cannot be reliably predicted with the information that is currently available. Future subsidence may negatively impact level-sensitive structures such as gravity flow pipelines but the proposed solar development is expected to have a low sensitivity to future subsidence. The approximate boundary of the US Geological Survey subsidence zone relative to the project area is shown on the Geologic Index Map attached. Based on our field observations, the extent of subsidence cracking is larger than shown by the US Geological Survey.

Most of the shallow site soils are cohesive, commonly with some expansion potential as shown by the laboratory testing. Some of the parcels in the western portion exhibit polygonal cracking consistent with expansive soils. Distinguishing shrink-swell polygonal cracking from subsidence cracking is problematic and was not attempted during this investigation. We acknowledge that some of the fissures observed on the site may result from erosion of polygonal-type cracking associated with expansive soils. For this project, this distinction is unimportant.

The existing eroded fissures present a hazard to site development. Mass grading of these erosional features will be needed at the site. Improvements to drainage such as detention basins, berms other measures will be required to improve and maintain adequate drainage for the project.

Slope Stability and Landslides

The site is relatively flat and there are no slopes near the site. According to the County of San Bernardino General Plan (2010), the site is not located within an area identified as having a potential for slope instability. The site is situated in relatively flat-lying terrain that lacks significant natural relief or slopes. Therefore, the potential for landslide or slope instability is considered low and it is not necessary to perform a slope stability analysis.

Erosion

The majority of the site contains fine grained soils which are potentially susceptible to erosion or the loss of topsoil where slopes are present. However, the site is relatively flat, and there are no slopes near the site vicinity; furthermore, the majority of the native soils at the site are considered slightly susceptible to erosion, based on data available from the USDA (2022) The existing eroded ground fissures across many of the parcels are related to subsidence cracking and are evidence that uncontrolled runoff across relatively flat terrain can create significant erosion. Improvements to drainage, such as detention basins and berms are likely needed to mitigate the future potential of erosion to the project.

Expansive Soil Potential

Atterberg limit test results indicate that the on-site soils are generally medium to high plasticity clayey soils. Therefore, expansive soils should be anticipated during construction. Polygonal cracking that is a characteristic of playa clays was observed on some of the westerly parcels, confirming the presence of expansive clays..Expansive soils can be mitigated by incorporating structural reinforcement in foundations and slabs, by avoidance, or by removal.

Wastewater and Infiltration

Due to the clayey nature of the onsite soils, the use of septic tanks or other wastewater disposal systems, as well as infiltration systems for stormwater management, may not be feasible to service the subject project. The capacity of site soils to infiltrate storm water flows will be addressed in project-specific investigations, if necessary.

Off-Site Impacts

Potential geotechnical impacts to off-site areas are not anticipated due to requirements regarding grading permitting, erosion control and avoidance of non-permitted disturbance to off-site areas required by local regulations. The flat-lying character of the site and adjacent topography precludes slope effects to off-site or adjacent properties.

Conclusions

Based on the findings of this CEQA Level Geotechnical Study, a completed CEQA questionnaire for the Geology and Soils Section has been included in the attachments.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning this report or if we may be of further service, please contact us.

Sincerely,
Terracon Consultants, Inc.



Abigail K. McCranie, E.I.T.
Staff Engineer

Jay J. Martin, C.E.G
Principal Geologist

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AERIAL PHOTOGRAPHS REVIEWED

Fairchild Collection, Black and White Aerial Photograph, July 19, 1973, Flight No. 3358, Frame 61.

Fairchild Collection, Black and White Aerial Photograph, October 7, 1995, Flight No. 6877, Frame 23.

Fairchild Collection, Black and White Aerial Photograph, October 7, 1995, Flight No. 6877, Frame 23.

Fairchild Collection, Black and White Aerial Photograph, July 19, 1973, Flight No. 3358, Frame 61.

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ATTACHMENTS

SITE LOCATION PLAN

Sienna Solar - CEQA Report ■ Lucerne Valley, CA
July 28, 2022 ■ Terracon Project No. LA225044

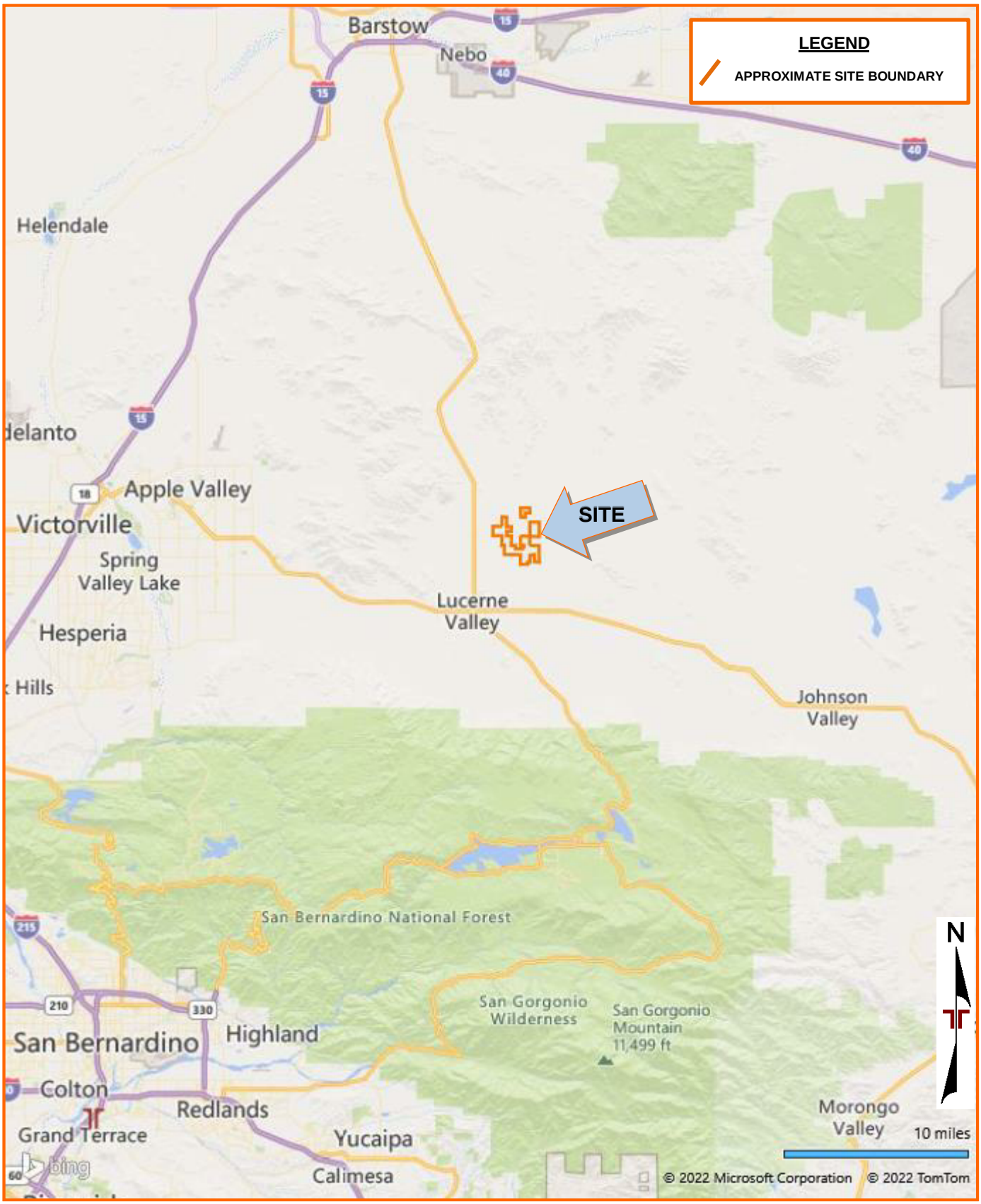


DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS
NOT INTENDED FOR CONSTRUCTION PURPOSES

EXPLORATION PLAN

Sienna Solar - CEQA Report ■ Lucerne Valley, CA

July 28, 2022 ■ Terracon Project No. LA225044

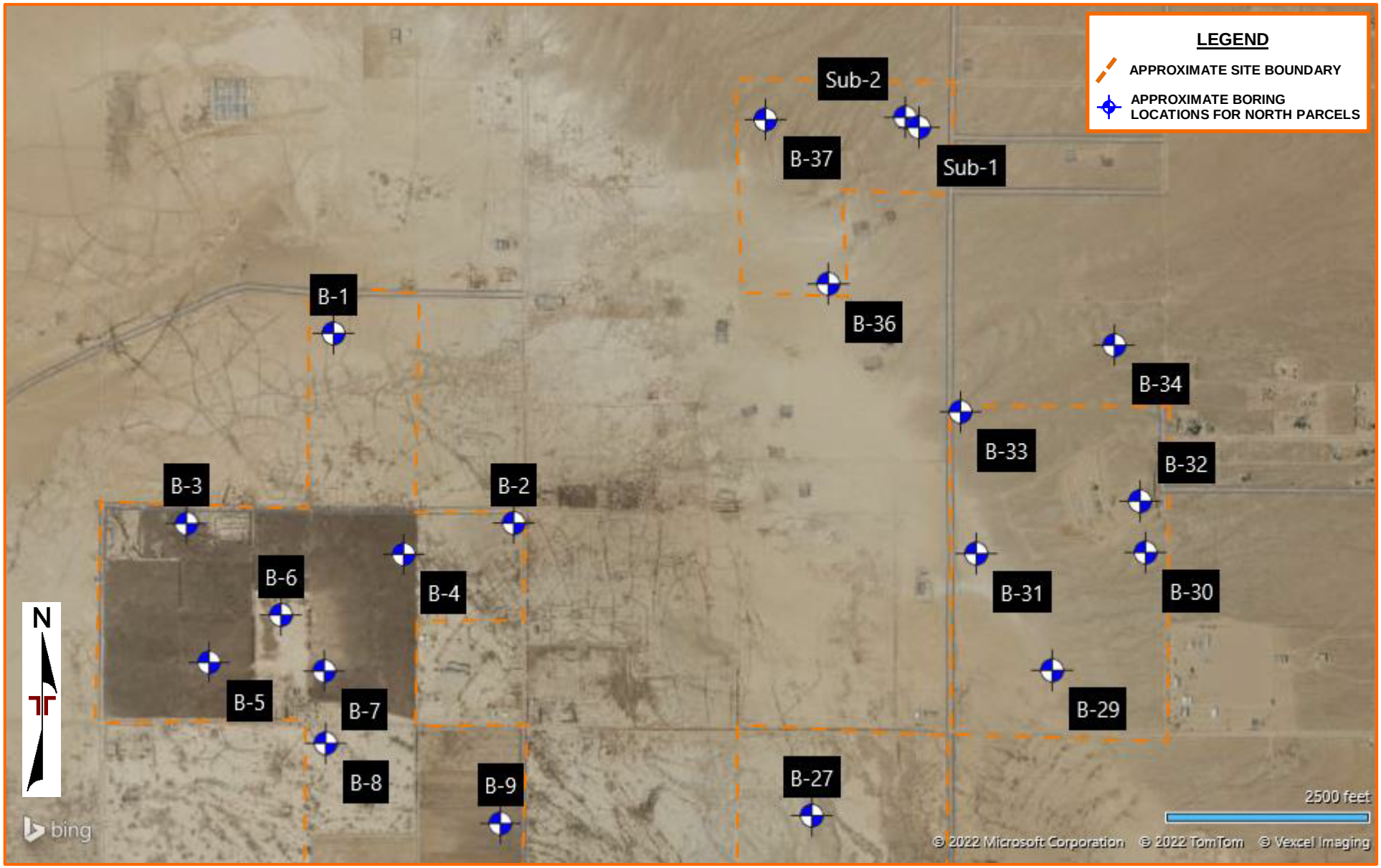


DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

AERIAL PHOTOGRAPHY PROVIDED BY MICROSOFT BING MAPS

EXPLORATION PLAN

Sienna Solar - CEQA Report ■ Lucerne Valley, CA

July 28, 2022 ■ Terracon Project No. LA225044

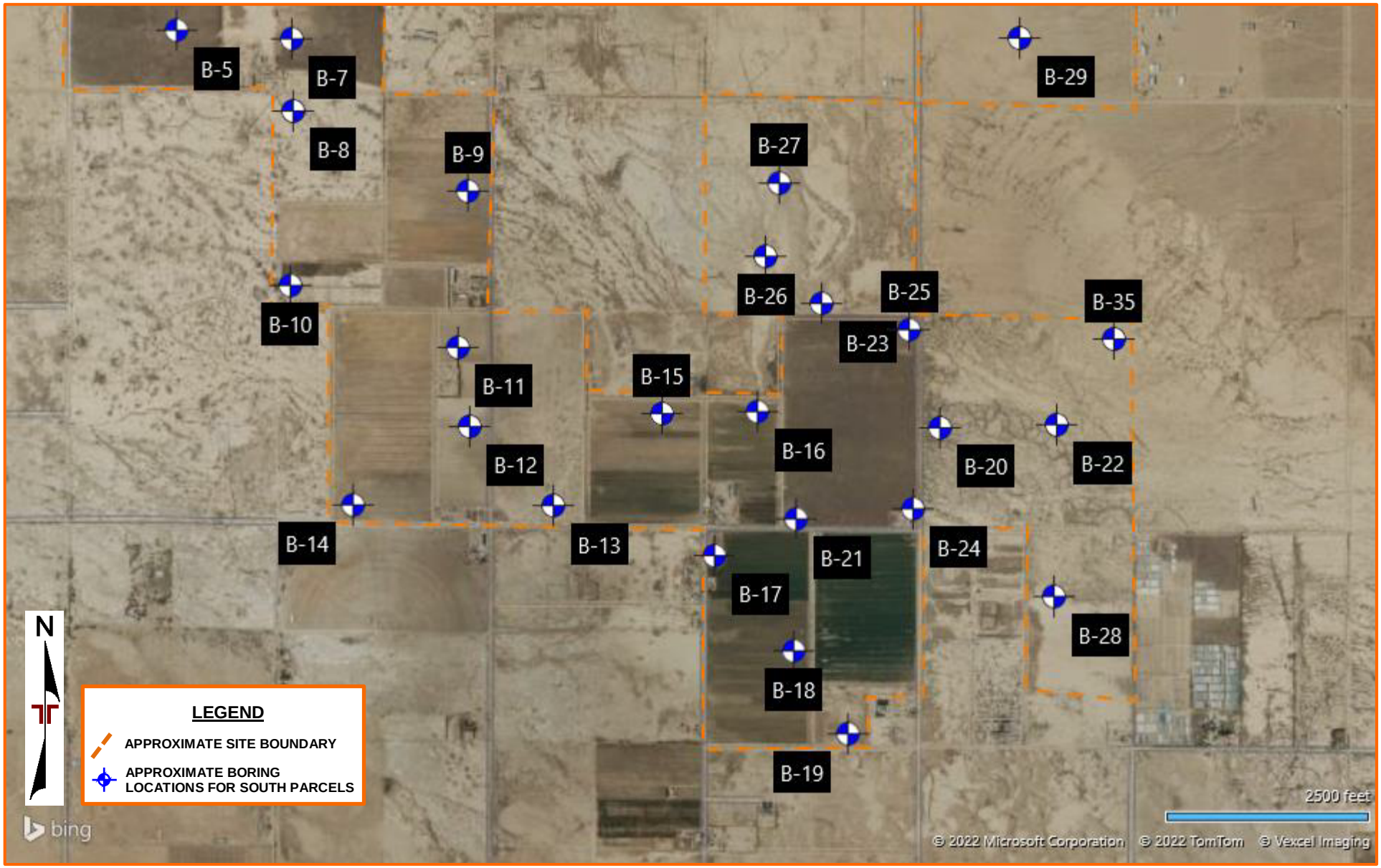
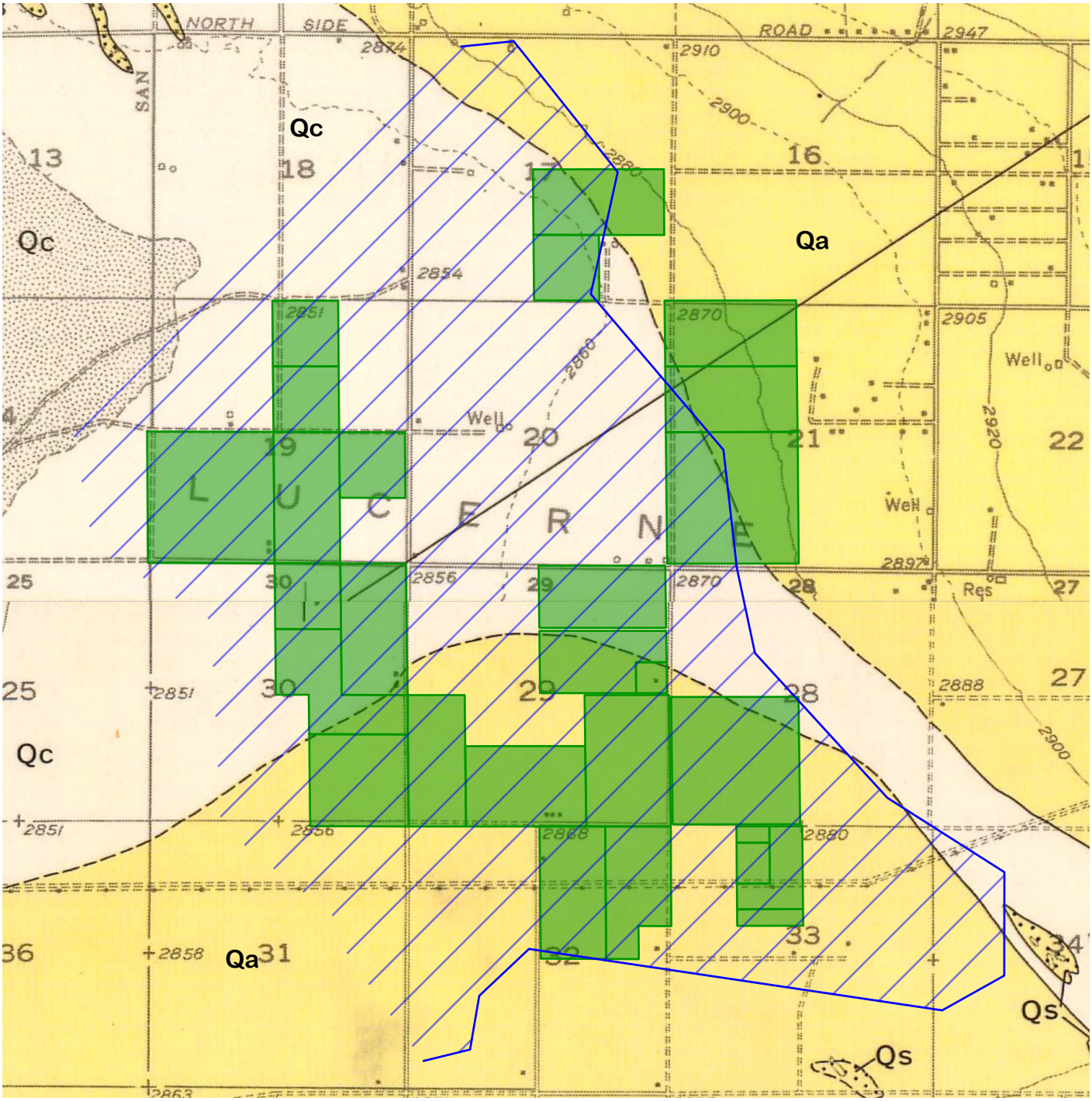


DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

AERIAL PHOTOGRAPHY PROVIDED BY MICROSOFT BING MAPS

GEOLOGIC INDEX MAP

Sienna Solar - CEQA Report ■ Lucerne Valley, CA
July 26, 2022 ■ Terracon Project No. LA225044



GEOLOGY:

Qc	Clay
Qa	Alluvium
Qs	Sand

Subsidence Zone per Brandt and Sneed (2021)

Sienna Project Parcels

SCALE
0 1500 3000 6000
(1 inch = 3000 feet)

N

Base Map: Dibblee (1964A and 1964B)

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other

Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

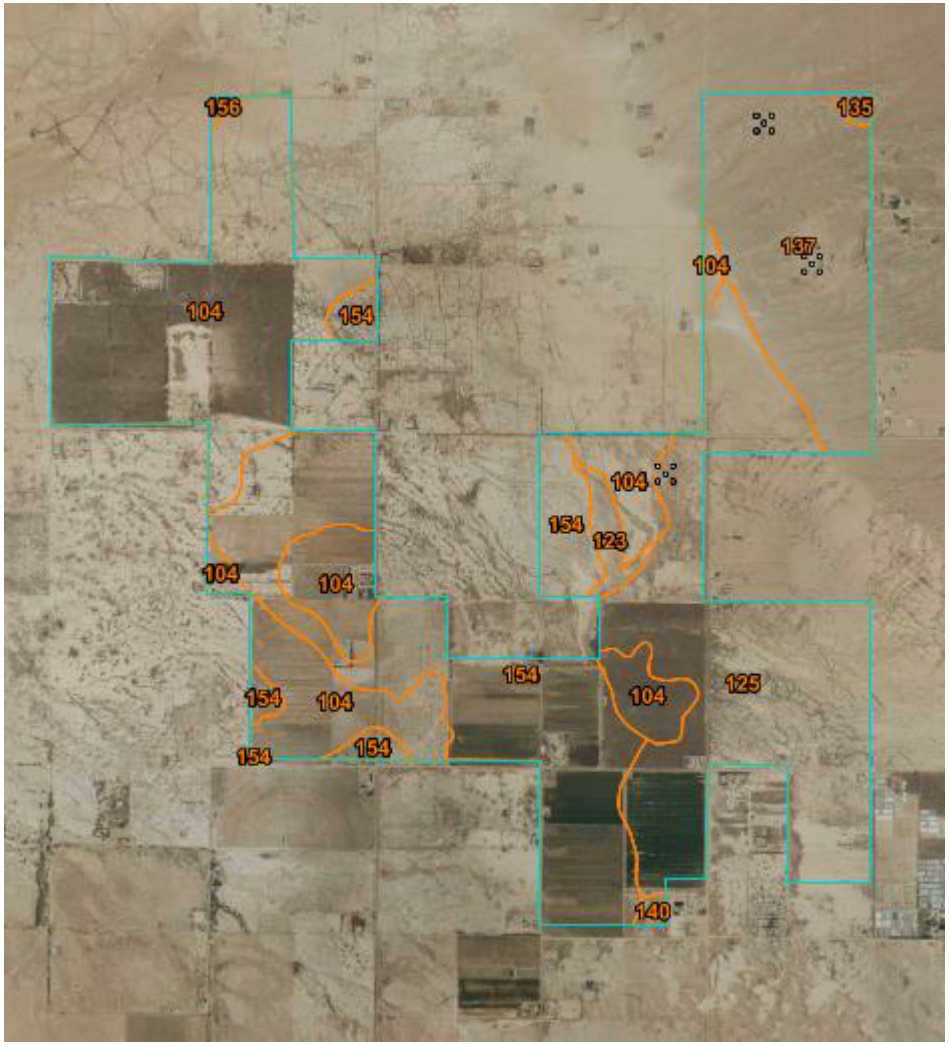
This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: San Bernardino County, California, Mojave River Area
Survey Area Data: Version 13, Sep 13, 2021

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Feb 27, 2021—May 27, 2021

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

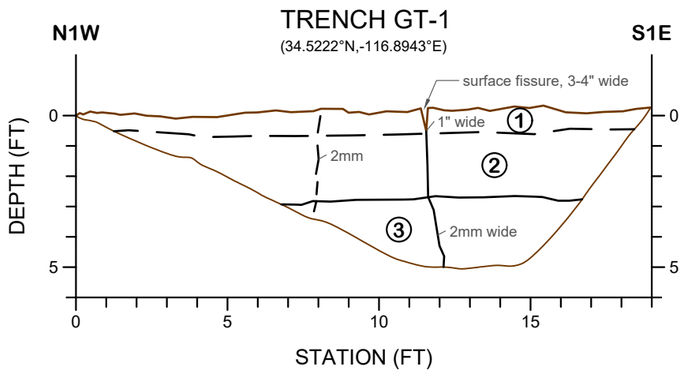


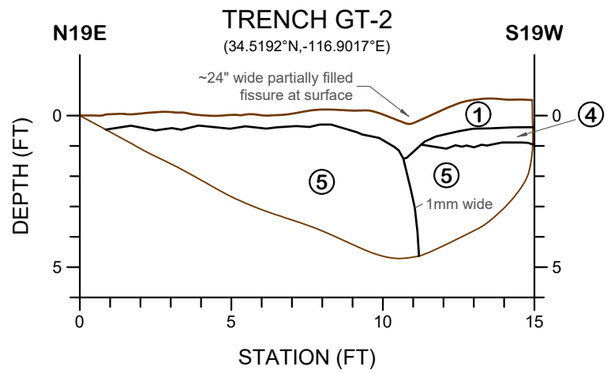
Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
104	BOUSIC CLAY	594.0	33.6%
123	DUNE LAND	20.1	1.1%
125	GLENDALE VARIANT SILT LOAM, SALINE-ALKALI	446.5	25.2%
135	JOSHUA LOAM, 2 TO 5 PERCENT SLOPES	5.3	0.3%
137	KIMBERLINA LOAMY FINE SAND, COOL, 0 TO 2 PERCENT SLOPES	269.7	15.2%
140	LAVIC LOAMY FINE SAND	5.1	0.3%
154	PETERMAN CLAY	426.3	24.1%
156	PLAYAS	3.2	0.2%
Totals for Area of Interest		**1,770.2**	**100.0%**

DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

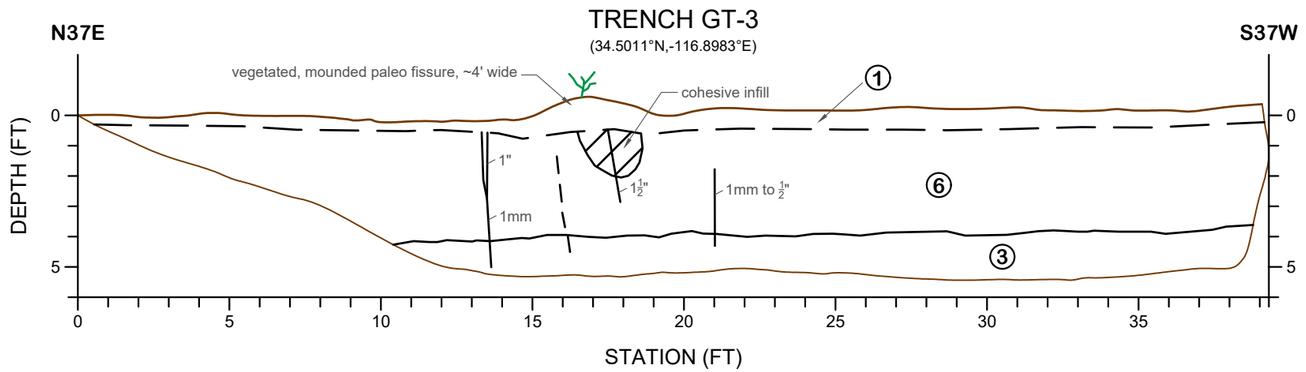
Terracon GeoReport

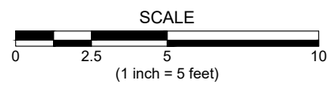


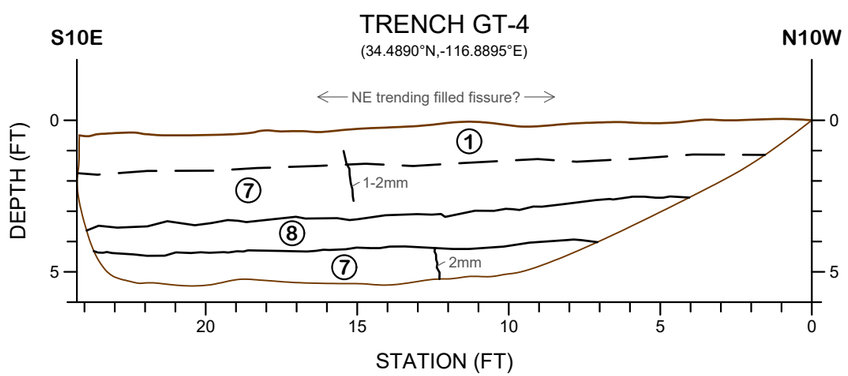


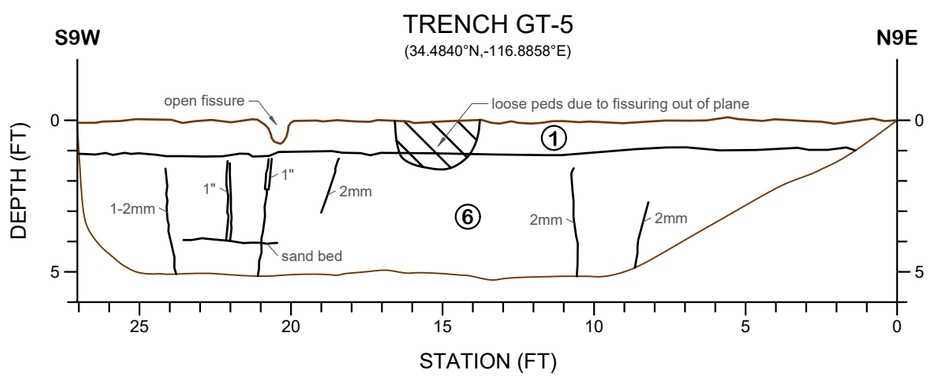
GEOLOGY:

1. Silty sand (SM), fine to medium, bioturbated (topsoil)
2. Silty sand (SM), fine to medium, carbonate nodules
3. Sand (SP), fine to coarse, hard, abundant carbonate (petrocalcic)
4. Sand (SP), fine to medium, bedded
5. Clayey sand (SC), fine to medium, carbonate nodules
6. Silty sand (SM), fine to medium
7. Sandy silt (ML)
8. Silt (ML), laminated









BORING LOG NO. B-01

PROJECT: Sienna Solar

CLIENT: 8 Minute Energy Renewables
San Francisco, CA

SITE: Barstow Rd and North of Old Woman Springs Rd
Lucerne Valley, CA

LOCATION See Exploration Plan

Latitude: 34.5154° Longitude: -116.9184°

GRAPHIC LOG	DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
	SILTY SAND (SM), brown								
	medium dense				7-20-21	17	107		
	5.0	5							
	SILTY CLAY (CL-ML), trace sand, brown, medium stiff				4-4-2 N=6				92
	very stiff				7-9-13	18	113		
	stiff	10			3-3-6 N=9				
	15.0	15							
	LEAN CLAY (CL), trace sand, brown, stiff				4-5-8	35	83		
		20			4-4-6 N=10				
	21.5								
	Boring Terminated at 21.5 Feet								

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Hollow Stem Auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1421 Edinger Ave, Ste C
Tustin, CA

Boring Started: 04-11-2022 | Boring Completed: 04-11-2022

Drill Rig: D90 | Driller: Terracon

Project No.: 60225032

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL 60225032 SIENNA SOLAR.GPJ TERRACON_DATATEMPLATE.GDT 6/30/22

BORING LOG NO. B-02

PROJECT: Sienna Solar

CLIENT: 8 Minute Energy Renewables
San Francisco, CA

SITE: Barstow Rd and North of Old Woman Springs Rd
Lucerne Valley, CA

LOCATION See Exploration Plan

Latitude: 34.509° Longitude: -116.911°

DEPTH	GRAPHIC LOG	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
0	**SILT WITH SAND (ML)**, brown						45-28-17	84
2.5	**LEAN CLAY (CL)**, trace sand, brown, medium stiff			4-4-4 N=8				
5	very stiff			8-10-13	21	97		
	medium stiff			3-2-3 N=5				
10	brown and grayish brown, stiff			3-6-8	29	89		
15	trace gravel, grayish brown			3-4-6 N=10				
20				5-7-10	37	83		
21.5	***Boring Terminated at 21.5 Feet***							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Hollow Stem Auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1421 Edinger Ave, Ste C
Tustin, CA

Boring Started: 04-12-2022 | Boring Completed: 04-12-2022

Drill Rig: D90 | Driller: Terracon

Project No.: 60225032

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL 60225032 SIENNA SOLAR.GPJ TERRACON_DATATEMPLATE.GDT 6/30/22

BORING LOG NO. B-03

PROJECT: Sienna Solar

CLIENT: 8 Minute Energy Renewables
San Francisco, CA

SITE: Barstow Rd and North of Old Woman Springs Rd
Lucerne Valley, CA

LOCATION See Exploration Plan

Latitude: 34.509° Longitude: -116.9244°

DEPTH	GRAPHIC LOG		SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
0		**SILTY CLAYEY SAND (SC-SM)**, brown						
2.5		**CLAYEY SAND (SC)**, light brown to brown, dense		18-26-35	18	109		
5		stiff		4-4-5 N=9				
7.5		**SILTY SAND (SM)**, medium dense		8-10-11	19	97		
10		**SILTY CLAY (CL-ML)**, brown, medium stiff		3-3-4 N=7				
15		gray and brown, very stiff		6-16-20	25	96		
20		**LEAN CLAY (CL)**, trace sand, light brown, medium stiff		3-4-4 N=8				
21.5		***Boring Terminated at 21.5 Feet***						

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Hollow Stem Auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1421 Edinger Ave, Ste C
Tustin, CA

Boring Started: 04-11-2022 | Boring Completed: 04-11-2022

Drill Rig: D90 | Driller: Terracon

Project No.: 60225032

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL 60225032 SIENNA SOLAR.GPJ TERRACON_DATATEMPLATE.GDT 6/30/22

BORING LOG NO. B-04

PROJECT: Sienna Solar

CLIENT: 8 Minute Energy Renewables
San Francisco, CA

SITE: Barstow Rd and North of Old Woman Springs Rd
Lucerne Valley, CA

LOCATION See Exploration Plan

Latitude: 34.508° Longitude: -116.9155°

GRAPHIC LOG	DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
	LEAN CLAY (CL), trace sand, brown								
	medium stiff				3-2-2 N=4				
	very stiff	5			5-9-12	16	92		
	medium stiff				4-3-3 N=6				
	grayish brown, very stiff	10			5-8-14	22	97		
	15.0								
	FAT CLAY WITH SAND (CH), grayish green to grayish brown, medium stiff	15			4-3-3 N=6			50-19-31	76
	20.0								
	LEAN CLAY (CL), stiff	20			4-5-8 N=13				
	21.5								
	Boring Terminated at 21.5 Feet								

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Hollow Stem Auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1421 Edinger Ave, Ste C
Tustin, CA

Boring Started: 04-12-2022 | Boring Completed: 04-12-2022

Drill Rig: D90 | Driller: Terracon

Project No.: 60225032

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL 60225032 SIENNA SOLAR.GPJ TERRACON_DATATEMPLATE.GDT 6/30/22

BORING LOG NO. B-05

PROJECT: Sienna Solar

CLIENT: 8 Minute Energy Renewables
San Francisco, CA

SITE: Barstow Rd and North of Old Woman Springs Rd
Lucerne Valley, CA

LOCATION See Exploration Plan

Latitude: 34.5043° Longitude: -116.9235°

DEPTH	GRAPHIC LOG		WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
		CLAYEY SAND (SC), light brown							
		medium dense			7-11-14	15	96		
5		loose			6-4-5 N=9			48-23-25	
7.5									
		LEAN CLAY (CL), trace sand, brown, very stiff			6-10-15	23	96		
10.0									
10		**SILTY CLAYEY SAND (SC-SM)**, white and brown, loose			5-3-4 N=7				
15.0									
15		**LEAN CLAY (CL)**, brown, very stiff			6-9-11	23	97		
		medium stiff			3-3-5 N=8				
20									
21.5		***Boring Terminated at 21.5 Feet***							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Hollow Stem Auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1421 Edinger Ave, Ste C
Tustin, CA

Boring Started: 04-12-2022 | Boring Completed: 04-12-2022

Drill Rig: D90 | Driller: Terracon

Project No.: 60225032

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL 60225032 SIENNA SOLAR.GPJ TERRACON_DATATEMPLATE.GDT 6/30/22

BORING LOG NO. B-06

PROJECT: Sienna Solar

CLIENT: 8 Minute Energy Renewables
San Francisco, CA

SITE: Barstow Rd and North of Old Woman Springs Rd
Lucerne Valley, CA

LOCATION See Exploration Plan

Latitude: 34.5059° Longitude: -116.9206°

DEPTH	GRAPHIC LOG	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
0							
	SILTY SAND (SM), trace gravel, light brown						
2.5							
	LEAN CLAY WITH SAND (CL), trace sand, brown, medium stiff		4-4-4 N=8				
5	light brown to brown, very stiff		7-11-17	23	91		
	with sand, light brown, stiff		5-6-7 N=13			36-19-17	71
10	very stiff		5-10-19	20	100		
15	light brown, medium stiff		2-3-3 N=6				
20	stiff		4-6-8 N=14				
21.5							
	Boring Terminated at 21.5 Feet						

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Hollow Stem Auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1421 Edinger Ave, Ste C
Tustin, CA

Boring Started: 04-12-2022 | Boring Completed: 04-12-2022

Drill Rig: D90 | Driller: Terracon

Project No.: 60225032

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL 60225032 SIENNA SOLAR.GPJ TERRACON_DATATEMPLATE.GDT 6/30/22

BORING LOG NO. B-07

PROJECT: Sienna Solar

CLIENT: 8 Minute Energy Renewables
San Francisco, CA

SITE: Barstow Rd and North of Old Woman Springs Rd
Lucerne Valley, CA

LOCATION See Exploration Plan

Latitude: 34.504° Longitude: -116.9188°

GRAPHIC LOG	DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
	CLAYEY SAND (SC), brown								
	2.5								
	LEAN CLAY (CL), trace sand, brown, very stiff				6-8-12	20	91		
	medium stiff	5			3-2-3 N=5				
	very stiff				5-8-12	24	93		
	medium stiff	10			3-4-4 N=8				
	grayish brown, stiff	15			4-7-7	36	84		
	medium stiff	20			3-4-4 N=8				
	21.5								
	Boring Terminated at 21.5 Feet								

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Hollow Stem Auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1421 Edinger Ave, Ste C
Tustin, CA

Boring Started: 04-12-2022 | Boring Completed: 04-12-2022

Drill Rig: D90 | Driller: Terracon

Project No.: 60225032

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL 60225032 SIENNA SOLAR.GPJ TERRACON_DATATEMPLATE.GDT 6/30/22

BORING LOG NO. B-08

PROJECT: Sienna Solar

CLIENT: 8 Minute Energy Renewables
San Francisco, CA

SITE: Barstow Rd and North of Old Woman Springs Rd
Lucerne Valley, CA

LOCATION See Exploration Plan

Latitude: 34.5016° Longitude: -116.9187°

DEPTH	GRAPHIC LOG		WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
		SILTY SAND (SM), trace gravel, light brown							
2.5		**SANDY LEAN CLAY (CL)**, brown, very stiff			8-11-7 N=18				69
5					8-12-18	21	85		
		medium stiff			3-3-3 N=6				
10		trace gravel, very stiff			6-9-14	27	100		
15		medium stiff			3-2-3 N=5				
20		stiff			4-5-7 N=12				
21.5		***Boring Terminated at 21.5 Feet***							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Hollow Stem Auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1421 Edinger Ave, Ste C
Tustin, CA

Boring Started: 04-12-2022 | Boring Completed: 04-12-2022

Drill Rig: D90 | Driller: Terracon

Project No.: 60225032

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL 60225032 SIENNA SOLAR.GPJ TERRACON_DATATEMPLATE.GDT 6/30/22

BORING LOG NO. B-09

PROJECT: Sienna Solar

CLIENT: 8 Minute Energy Renewables
San Francisco, CA

SITE: Barstow Rd and North of Old Woman Springs Rd
Lucerne Valley, CA

LOCATION See Exploration Plan

Latitude: 34.4989° Longitude: -116.9116°

GRAPHIC LOG	DEPTH	DESCRIPTION	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
		SANDY LEAN CLAY (CL), trace gravel, light brown							40-22-18	59
	2.5	**ELASTIC SILT (MH)**, trace gravel, brown, very stiff				9-9-12	20	83		
		soft	5			3-2-2 N=4			69-36-33	
		brown and white, very stiff				7-9-15	23	74		
		grayish white	10			8-8-11 N=19				
	15.0	**LEAN CLAY (CL)**, trace sand, grayish green, stiff	15			4-7-11	40	69		
		trace gravel, grayish green to grayish brown, medium stiff	20			3-2-4 N=6				
	21.5	***Boring Terminated at 21.5 Feet***								

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Hollow Stem Auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1421 Edinger Ave, Ste C
Tustin, CA

Boring Started: 04-12-2022 | Boring Completed: 04-12-2022

Drill Rig: D90 | Driller: Terracon

Project No.: 60225032

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL 60225032 SIENNA SOLAR.GPJ TERRACON_DATATEMPLATE.GDT 6/30/22

BORING LOG NO. B-10

PROJECT: Sienna Solar

CLIENT: 8 Minute Energy Renewables
San Francisco, CA

SITE: Barstow Rd and North of Old Woman Springs Rd
Lucerne Valley, CA

LOCATION See Exploration Plan

Latitude: 34.4957° Longitude: -116.9188°

DEPTH	GRAPHIC LOG		WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
		SILTY CLAY WITH SAND (CL-ML), brown							
		medium stiff			2-3-2 N=5				71
5.0		**LEAN CLAY (CL)**, trace sand, brown, stiff			3-5-9	33	96		
5		grayish brown, medium stiff			3-2-4 N=6				
10		trace gravel, brown, stiff			4-5-9	31	80		
15		medium stiff			3-4-5 N=9				
20					4-5-2	26	97		
21.5		***Boring Terminated at 21.5 Feet***							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Hollow Stem Auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1421 Edinger Ave, Ste C
Tustin, CA

Boring Started: 04-12-2022 | Boring Completed: 04-12-2022

Drill Rig: D90 | Driller: Terracon

Project No.: 60225032

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL 60225032 SIENNA SOLAR.GPJ TERRACON_DATATEMPLATE.GDT 6/30/22

BORING LOG NO. B-11

PROJECT: Sienna Solar

CLIENT: 8 Minute Energy Renewables
San Francisco, CA

SITE: Barstow Rd and North of Old Woman Springs Rd
Lucerne Valley, CA

LOCATION See Exploration Plan

Latitude: 34.4936° Longitude: -116.912°

DEPTH	GRAPHIC LOG		DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
		SILTY SAND (SM), trace gravel, light brown								
		medium dense				6-8-12	22	84		
5.0		**FAT CLAY (CH)**, trace sand, brown, very stiff	5			6-8-11 N=19				
		trace gravel				6-11-22	32	87		
		stiff	10			5-6-8 N=14			80-35-45	
15.0		**LEAN CLAY (CL)**, trace sand, brown, very stiff	15			5-8-14	28	93		
		medium stiff	20			2-2-3 N=5				
21.5		***Boring Terminated at 21.5 Feet***								

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Hollow Stem Auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1421 Edinger Ave, Ste C
Tustin, CA

Boring Started: 04-12-2022 | Boring Completed: 04-12-2022

Drill Rig: D90 | Driller: Terracon

Project No.: 60225032

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL 60225032 SIENNA SOLAR.GPJ TERRACON_DATATEMPLATE.GDT 6/30/22

BORING LOG NO. B-12

PROJECT: Sienna Solar

CLIENT: 8 Minute Energy Renewables
San Francisco, CA

SITE: Barstow Rd and North of Old Woman Springs Rd
Lucerne Valley, CA

LOCATION See Exploration Plan

Latitude: 34.4909° Longitude: -116.9115°

DEPTH	GRAPHIC LOG		FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
0		**SILTY SAND (SM)**, trace gravel, light brown					
		loose	4-3-5 N=8				
5.0		**LEAN CLAY WITH SAND (CL)**, trace gravel, brown, stiff	4-6-8	22	76		
7.5		**SILTY CLAYEY SAND (SC-SM)**, trace gravel, brown, loose	4-4-5 N=9				
10.0		**LEAN CLAY (CL)**, trace sand, brown, very stiff	7-11-20	28	89		
		trace gravel, grayish brown	6-8-11 N=19				
		brown, stiff	5-7-10	32	88		
21.5		***Boring Terminated at 21.5 Feet***					

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Hollow Stem Auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1421 Edinger Ave, Ste C
Tustin, CA

Boring Started: 04-12-2022 | Boring Completed: 04-12-2022

Drill Rig: D90 | Driller: Terracon

Project No.: 60225032

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL 60225032 SIENNA SOLAR.GPJ TERRACON_DATATEMPLATE.GDT 6/30/22

BORING LOG NO. B-13

PROJECT: Sienna Solar

CLIENT: 8 Minute Energy Renewables
San Francisco, CA

SITE: Barstow Rd and North of Old Woman Springs Rd
Lucerne Valley, CA

LOCATION See Exploration Plan

Latitude: 34.4883° Longitude: -116.9081°

DEPTH	GRAPHIC LOG	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
0							
	SILTY SAND (SM), trace gravel, light brown						
	loose		9-6-6	12	74		
5	very loose		2-2-1 N=3				
7.5							
	SILTY CLAY (CL-ML), trace sand and gravel, light brown, medium stiff		7-8-8	14	83		
10			3-3-4 N=7				88
15.0							
	LEAN CLAY (CL), trace sand, brown, very stiff		5-8-15	28	87		
15							
	stiff						
20			5-5-9 N=14				
21.5							
	Boring Terminated at 21.5 Feet						

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Hollow Stem Auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1421 Edinger Ave, Ste C
Tustin, CA

Boring Started: 04-13-2022 | Boring Completed: 04-13-2022

Drill Rig: D90 | Driller: Terracon

Project No.: 60225032

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL 60225032 SIENNA SOLAR.GPJ TERRACON_DATATEMPLATE.GDT 6/30/22

BORING LOG NO. B-14

PROJECT: Sienna Solar

CLIENT: 8 Minute Energy Renewables
San Francisco, CA

SITE: Barstow Rd and North of Old Woman Springs Rd
Lucerne Valley, CA

LOCATION See Exploration Plan

Latitude: 34.4883° Longitude: -116.9163°

GRAPHIC LOG	DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
	CLAYEY SAND (SC), trace gravel, light brown								
	loose			X	3-3-4 N=7			42-23-19	
	5.0 **SILTY CLAYEY SAND (SC-SM)**, trace gravel, light brown, loose	5			4-7-8	13	98		
				X	4-5-4 N=9				
	brown, medium dense	10			8-15-23	18	108		
	loose	15		X	6-4-2 N=6				
	20.0 **LEAN CLAY (CL)**, trace gravel, brown, very stiff	20		X	5-9-11 N=20				
	21.5 ***Boring Terminated at 21.5 Feet***								

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Hollow Stem Auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1421 Edinger Ave, Ste C
Tustin, CA

Boring Started: 04-13-2022 | Boring Completed: 04-13-2022

Drill Rig: D90 | Driller: Terracon

Project No.: 60225032

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL 60225032 SIENNA SOLAR.GPJ TERRACON_DATATEMPLATE.GDT 6/30/22

BORING LOG NO. B-15

PROJECT: Sienna Solar

CLIENT: 8 Minute Energy Renewables
San Francisco, CA

SITE: Barstow Rd and North of Old Woman Springs Rd
Lucerne Valley, CA

LOCATION See Exploration Plan

Latitude: 34.4914° Longitude: -116.9036°

DEPTH	GRAPHIC LOG		WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
		LEAN CLAY WITH SAND (CL), trace gravel, light brown						41-23-18	72
		hard			10-34-50/5"	28	67		
5.0		**LEAN CLAY (CL)**, trace sand, white to light brown, stiff			5-5-4 N=9				
		brown			7-6-9	33	82		
10					3-4-5 N=9				
15		brown to grayish brown, very stiff			5-8-14	32	84		
		stiff			5-5-7 N=12				
21.5		***Boring Terminated at 21.5 Feet***							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Hollow Stem Auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1421 Edinger Ave, Ste C
Tustin, CA

Boring Started: 04-13-2022 | Boring Completed: 04-13-2022

Drill Rig: D90 | Driller: Terracon

Project No.: 60225032

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL 60225032 SIENNA SOLAR.GPJ TERRACON_DATATEMPLATE.GDT 6/30/22

BORING LOG NO. B-16

PROJECT: Sienna Solar

CLIENT: 8 Minute Energy Renewables
San Francisco, CA

SITE: Barstow Rd and North of Old Woman Springs Rd
Lucerne Valley, CA

LOCATION See Exploration Plan

Latitude: 34.4914° Longitude: -116.8997°

DEPTH	GRAPHIC LOG		DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
		SILTY SAND (SM), trace gravel, light brown								
2.5										
		SILTY CLAY WITH SAND (CL-ML), white and brown, hard				8-33-31 N=64				77
			5			13-21-22	24	77		
		stiff				3-4-6 N=10				
10.0			10							
		LEAN CLAY (CL), trace sand, brown, very stiff				4-7-12	28	92		
		stiff	15			4-5-8 N=13				
		grayish brown, very stiff	20			4-13-20 N=33	2	114		
21.5										
		Boring Terminated at 21.5 Feet								

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Hollow Stem Auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1421 Edinger Ave, Ste C
Tustin, CA

Boring Started: 04-13-2022 | Boring Completed: 04-13-2022

Drill Rig: D90 | Driller: Terracon

Project No.: 60225032

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL 60225032 SIENNA SOLAR.GPJ TERRACON_DATATEMPLATE.GDT 6/30/22

BORING LOG NO. B-17

PROJECT: Sienna Solar

CLIENT: 8 Minute Energy Renewables
San Francisco, CA

SITE: Barstow Rd and North of Old Woman Springs Rd
Lucerne Valley, CA

LOCATION See Exploration Plan

Latitude: 34.4866° Longitude: -116.9015°

DEPTH	GRAPHIC LOG		WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
		SILTY SAND (SM), trace gravel, light brown							
		very dense			15-50/6"	11	86		
5.0		**SILTY CLAYEY SAND (SC-SM)**, grayish white, medium dense			5-7-4 N=11				
		grayish green			5-9-12	38	63		
10.0		**LEAN CLAY (CL)**, trace sand, brown, medium stiff			3-3-5 N=8				
		very stiff			5-11-15	22	102		
		grayish brown							
21.5		***Boring Terminated at 21.5 Feet***							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Hollow Stem Auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1421 Edinger Ave, Ste C
Tustin, CA

Boring Started: 04-13-2022 | Boring Completed: 04-13-2022

Drill Rig: D90 | Driller: Terracon

Project No.: 60225032

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL 60225032 SIENNA SOLAR.GPJ TERRACON_DATATEMPLATE.GDT 6/30/22

BORING LOG NO. B-18

PROJECT: Sienna Solar

CLIENT: 8 Minute Energy Renewables
San Francisco, CA

SITE: Barstow Rd and North of Old Woman Springs Rd
Lucerne Valley, CA

LOCATION See Exploration Plan

Latitude: 34.4834° Longitude: -116.8982°

GRAPHIC LOG	DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
	SILTY SAND (SM), brown								
	medium dense				3-7-13 N=20				
	5.0	5							
	SILTY CLAYEY SAND (SC-SM), trace gravel, gray, medium dense				12-17-20	23	79		
	7.5								
	SILTY CLAY (CL-ML), trace sand, grayish green, very stiff				5-7-8 N=15				93
		10			8-13-17	29	72		
	15.0	15							
	CLAYEY SAND (SC), grayish brown to brown, medium dense				5-6-6 N=12				35
	light brown	20			7-14-23	30	88		
	21.5								
	Boring Terminated at 21.5 Feet								

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Hollow Stem Auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1421 Edinger Ave, Ste C
Tustin, CA

Boring Started: 04-13-2022 | Boring Completed: 04-13-2022

Drill Rig: D90 | Driller: Terracon

Project No.: 60225032

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL 60225032 SIENNA SOLAR.GPJ TERRACON_DATATEMPLATE.GDT 6/30/22

BORING LOG NO. B-19

PROJECT: Sienna Solar

CLIENT: 8 Minute Energy Renewables
San Francisco, CA

SITE: Barstow Rd and North of Old Woman Springs Rd
Lucerne Valley, CA

LOCATION See Exploration Plan

Latitude: 34.4806° Longitude: -116.896°

DEPTH	GRAPHIC LOG		DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
		SILTY SAND (SM), trace gravel								
		medium dense				8-11-13	8	95		
5.0		**SILTY CLAYEY SAND (SC-SM)**, gray, loose	5			3-4-5 N=9				
		grayish white, medium dense				11-17-24	23	87		
10.0		**SILTY CLAY (CL-ML)**, gray, very stiff	10			5-7-9 N=16				
		grayish green	15			6-15-26	17	108		
20.0		**LEAN CLAY (CL)**, brown, medium stiff	20			3-3-4 N=7				
21.5		***Boring Terminated at 21.5 Feet***								

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Hollow Stem Auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1421 Edinger Ave, Ste C
Tustin, CA

Boring Started: 04-14-2022 | Boring Completed: 04-14-2022

Drill Rig: D90 | Driller: Terracon

Project No.: 60225032

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL 60225032 SIENNA SOLAR.GPJ TERRACON_DATATEMPLATE.GDT 6/30/22

BORING LOG NO. B-20

PROJECT: Sienna Solar

CLIENT: 8 Minute Energy Renewables
San Francisco, CA

SITE: Barstow Rd and North of Old Woman Springs Rd
Lucerne Valley, CA

LOCATION See Exploration Plan

Latitude: 34.4909° Longitude: -116.8922°

DEPTH	GRAPHIC LOG		DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
0		**CLAYEY SAND (SC)**, light brown								
		medium dense				8-8-9 N=17			43-24-19	
		dense	5			9-27-38	10	84		
7.5		**SILTY CLAYEY SAND (SC-SM)**, grayish green, medium dense				6-6-5 N=11				
			10			7-12-16	26	73		
15.0		**LEAN CLAY (CL)**, trace sand, grayish green, very stiff	15			7-9-15 N=24				
		hard	20			10-13-31 N=44	25	89		96
21.5		***Boring Terminated at 21.5 Feet***								

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Hollow Stem Auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1421 Edinger Ave, Ste C
Tustin, CA

Boring Started: 04-13-2022 | Boring Completed: 04-13-2022

Drill Rig: D90 | Driller: Terracon

Project No.: 60225032

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL 60225032 SIENNA SOLAR.GPJ TERRACON_DATATEMPLATE.GDT 6/30/22

BORING LOG NO. B-21

PROJECT: Sienna Solar

CLIENT: 8 Minute Energy Renewables
San Francisco, CA

SITE: Barstow Rd and North of Old Woman Springs Rd
Lucerne Valley, CA

LOCATION See Exploration Plan

Latitude: 34.4878° Longitude: -116.8981°

DEPTH	GRAPHIC LOG		WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
		SILTY SAND (SM), trace gravel, light brown							
2.5		**SILTY CLAYEY SAND (SC-SM)**, light brown, medium dense			9-18-27	12	92		
5.0		**SILTY SAND (SM)**, white to light brown, dense			11-15-19 N=34				
7.5		**SILTY CLAYEY SAND (SC-SM)**, trace gravel, grayish brown, medium dense			7-15-18	34	65		
					5-4-6 N=10				
15.0		**LEAN CLAY (CL)**, trace sand, brown, hard			11-28-25				
		grayish brown, very stiff			6-9-12 N=21				
21.5		***Boring Terminated at 21.5 Feet***							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Hollow Stem Auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1421 Edinger Ave, Ste C
Tustin, CA

Boring Started: 04-13-2022 | Boring Completed: 04-13-2022

Drill Rig: D90 | Driller: Terracon

Project No.: 60225032

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL 60225032 SIENNA SOLAR.GPJ TERRACON_DATATEMPLATE.GDT 6/30/22

BORING LOG NO. B-22

PROJECT: Sienna Solar

CLIENT: 8 Minute Energy Renewables
San Francisco, CA

SITE: Barstow Rd and North of Old Woman Springs Rd
Lucerne Valley, CA

LOCATION See Exploration Plan

Latitude: 34.491° Longitude: -116.8875°

DEPTH	GRAPHIC LOG	DESCRIPTION	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
		SILTY SAND (SM), trace gravel, light brown								
		medium dense				6-6-8 N=14				
5.0		**SILTY CLAYEY SAND (SC-SM)**, light brown, dense	5			16-18-42	8	101		
		medium dense				11-9-11 N=20				
9.0		**LEAN CLAY (CL)**, light brown, hard								
		gray	10			12-23-34	20	105		
14.0		**ELASTIC SILT (MH)**, trace sand, gray, very stiff								
		brown	15			6-8-8 N=16			74-35-39	
		trace gravel, white and brown	20			8-13-19	26	70		
21.5		***Boring Terminated at 21.5 Feet***								

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Hollow Stem Auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1421 Edinger Ave, Ste C
Tustin, CA

Boring Started: 04-14-2022 | Boring Completed: 04-14-2022

Drill Rig: D90 | Driller: Terracon

Project No.: 60225032

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL 60225032 SIENNA SOLAR.GPJ TERRACON_DATATEMPLATE.GDT 6/30/22

BORING LOG NO. B-23

PROJECT: Sienna Solar

CLIENT: 8 Minute Energy Renewables
San Francisco, CA

SITE: Barstow Rd and North of Old Woman Springs Rd
Lucerne Valley, CA

LOCATION See Exploration Plan

Latitude: 34.4951° Longitude: -116.8971°

DEPTH	GRAPHIC LOG		WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
		LEAN CLAY WITH SAND (CL), trace gravel, light brown						34-17-17	80
		hard			13-25-42	12	83		
5					15-17-25 N=42				
7.5		**LEAN CLAY (CL)**, brown, very stiff			8-15-24	28	73		
10					7-8-12 N=20				
15		grayish green, hard			16-29-38	23	87		
20		brown, stiff			5-7-6 N=13				
21.5		***Boring Terminated at 21.5 Feet***							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Hollow Stem Auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1421 Edinger Ave, Ste C
Tustin, CA

Boring Started: 04-14-2022 | Boring Completed: 04-14-2022

Drill Rig: D90 | Driller: Terracon

Project No.: 60225032

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL 60225032 SIENNA SOLAR.GPJ TERRACON_DATATEMPLATE.GDT 6/30/22

BORING LOG NO. B-24

PROJECT: Sienna Solar

CLIENT: 8 Minute Energy Renewables
San Francisco, CA

SITE: Barstow Rd and North of Old Woman Springs Rd
Lucerne Valley, CA

LOCATION See Exploration Plan

Latitude: 34.4882° Longitude: -116.8933°

DEPTH	GRAPHIC LOG		WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
		SILTY SAND (SM), trace gravel, light brown							
		medium dense			7-9-13 N=22				
5		white to grayish white, dense			4-22-44	13	89		
		grayish white to gray, medium dense			7-6-7 N=13				
10.0									
10		**SILTY CLAYEY SAND (SC-SM)**, grayish green, medium dense			7-16-24	24	81		
15.0									
15		**LEAN CLAY (CL)**, trace sand, grayish brown, stiff			7-7-7 N=14				
		very stiff							
20					6-14-24 N=38				
21.5		***Boring Terminated at 21.5 Feet***							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Hollow Stem Auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1421 Edinger Ave, Ste C
Tustin, CA

Boring Started: 04-13-2022 | Boring Completed: 04-13-2022

Drill Rig: D90 | Driller: Terracon

Project No.: 60225032

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL 60225032 SIENNA SOLAR.GPJ TERRACON_DATATEMPLATE.GDT 6/30/22

BORING LOG NO. B-25

PROJECT: Sienna Solar

CLIENT: 8 Minute Energy Renewables
San Francisco, CA

SITE: Barstow Rd and North of Old Woman Springs Rd
Lucerne Valley, CA

LOCATION See Exploration Plan

Latitude: 34.4942° Longitude: -116.8935°

DEPTH	GRAPHIC LOG		WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
		SILTY SAND (SM), brown							
2.5									
		SILTY CLAYEY SAND (SC-SM), brown, medium dense			16-17-25	12	91		
5		dense			12-16-19 N=35				
					12-27-33	29	76		
10.0									
10		**LEAN CLAY (CL)**, trace sand, grayish brown, very stiff			7-8-10 N=18				
15		hard			7-16-27	29	94		
20		medium stiff			3-2-3 N=5				
21.5		***Boring Terminated at 21.5 Feet***							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Hollow Stem Auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1421 Edinger Ave, Ste C
Tustin, CA

Boring Started: 04-13-2022 | Boring Completed: 04-13-2022

Drill Rig: D90 | Driller: Terracon

Project No.: 60225032

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL 60225032 SIENNA SOLAR.GPJ TERRACON_DATATEMPLATE.GDT 6/30/22

BORING LOG NO. B-26

PROJECT: Sienna Solar

CLIENT: 8 Minute Energy Renewables
San Francisco, CA

SITE: Barstow Rd and North of Old Woman Springs Rd
Lucerne Valley, CA

LOCATION See Exploration Plan

Latitude: 34.4967° Longitude: -116.8994°

DEPTH	GRAPHIC LOG		WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
		SILTY SAND (SM), trace gravel, light brown							
2.5		**SILTY CLAYEY SAND (SC-SM)**, light brown, medium dense			5-6-11 N=17				
5.0		**SILT (ML)**, trace sand and gravel, light brown, stiff			11-20-20	14	80		
		gray			5-6-5 N=11				90
10.0		**SILTY CLAY (CL-ML)**, green and brown, very stiff			8-12-15	22	93		
		trace gravel, gray, stiff			3-4-5 N=9				
		grayish green, very stiff			5-13-17	23	94		
21.5		***Boring Terminated at 21.5 Feet***							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Hollow Stem Auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1421 Edinger Ave, Ste C
Tustin, CA

Boring Started: 04-14-2022 | Boring Completed: 04-14-2022

Drill Rig: D90 | Driller: Terracon

Project No.: 60225032

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL 60225032 SIENNA SOLAR.GPJ TERRACON_DATATEMPLATE.GDT 6/30/22

BORING LOG NO. B-27

PROJECT: Sienna Solar

CLIENT: 8 Minute Energy Renewables
San Francisco, CA

SITE: Barstow Rd and North of Old Woman Springs Rd
Lucerne Valley, CA

LOCATION See Exploration Plan

Latitude: 34.4992° Longitude: -116.8988°

DEPTH	GRAPHIC LOG		WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
		LEAN CLAY (CL), trace gravel, light brown						48-25-23	96
		trace sand, hard			14-24-22	16	76		
5		gray, stiff			5-4-4 N=8				
7.5									
		FAT CLAY (CH), trace sand, brown, very stiff			5-8-14	24	86		
10		grayish brown			4-5-5 N=10			63-29-34	
15.0									
15		**LEAN CLAY (CL)**, trace sand and gravel, brown, very stiff			6-8-12	24	87		
20		grayish brown			2-4-5 N=9				
21.5									
		Boring Terminated at 21.5 Feet							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Hollow Stem Auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1421 Edinger Ave, Ste C
Tustin, CA

Boring Started: 04-14-2022 | Boring Completed: 04-14-2022

Drill Rig: D90 | Driller: Terracon

Project No.: 60225032

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL 60225032 SIENNA SOLAR.GPJ TERRACON_DATATEMPLATE.GDT 6/30/22

BORING LOG NO. B-28

PROJECT: Sienna Solar

CLIENT: 8 Minute Energy Renewables
San Francisco, CA

SITE: Barstow Rd and North of Old Woman Springs Rd
Lucerne Valley, CA

LOCATION See Exploration Plan

Latitude: 34.4852° Longitude: -116.8876°

DEPTH	GRAPHIC LOG		WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
		SILTY SAND (SM), light brown							
		medium dense			5-5-7 N=12				
4.0		**LEAN CLAY (CL)**, trace sand, brown							
5		very stiff			12-15-22	17	83		
		stiff			4-6-6 N=12				
10.0									
10		**SILTY CLAYEY SAND (SC-SM)**, grayish brown to light brown, medium dense			10-19-23	19	83		
15.0									
15		**SILTY CLAY WITH SAND (CL-ML)**, brown, stiff			5-7-6 N=13				82
		light brown, hard							
20					14-22-27	15	95		
21.5		***Boring Terminated at 21.5 Feet***							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Hollow Stem Auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1421 Edinger Ave, Ste C
Tustin, CA

Boring Started: 04-14-2022 | Boring Completed: 04-14-2022

Drill Rig: D90 | Driller: Terracon

Project No.: 60225032

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL 60225032 SIENNA SOLAR.GPJ TERRACON_DATATEMPLATE.GDT 6/30/22

BORING LOG NO. B-29

PROJECT: Sienna Solar

CLIENT: 8 Minute Energy Renewables
San Francisco, CA

SITE: Barstow Rd and North of Old Woman Springs Rd
Lucerne Valley, CA

LOCATION See Exploration Plan

Latitude: 34.5041° Longitude: -116.889°

GRAPHIC LOG	DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
	SANDY LEAN CLAY (CL), trace gravel, brown to tan								
	hard				4-22-37	7	114		
	stiff	5			6-6-4 N=10				
	brown, hard				24-38-49	9	113		
		10			7-14-18 N=32				
		15			11-19-28	6	111		
	20.0	20			11-24-50/6"				
	CLAYEY SAND (SC), brown, very dense 21.5								
	Boring Terminated at 21.5 Feet								

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Hollow Stem Auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1421 Edinger Ave, Ste C
Tustin, CA

Boring Started: 04-07-2022 | Boring Completed: 04-07-2022

Drill Rig: D90 | Driller: Terracon

Project No.: 60225032

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL 60225032 SIENNA SOLAR.GPJ TERRACON_DATATEMPLATE.GDT 6/30/22

BORING LOG NO. B-30

PROJECT: Sienna Solar

CLIENT: 8 Minute Energy Renewables
San Francisco, CA

SITE: Barstow Rd and North of Old Woman Springs Rd
Lucerne Valley, CA

LOCATION See Exploration Plan

Latitude: 34.508° Longitude: -116.8852°

DEPTH	GRAPHIC LOG		DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
		SILTY SAND (SM), trace gravel, tan								
		dense				19-19-17 N=36				31
5.0		**SANDY LEAN CLAY (CL)**, brown, hard	5			18-48-50/6"	11	114		
						17-30-43 N=73				
			10			30-50/4"	6	114		
15.0		**POORLY GRADED SAND (SP)**, trace gravel, brown, very dense	15			25-31-31 N=62				
			20			23-50/3"				
20.8		***Boring Terminated at 20.75 Feet***								

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Hollow Stem Auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1421 Edinger Ave, Ste C
Tustin, CA

Boring Started: 04-07-2022 | Boring Completed: 04-07-2022

Drill Rig: D90 | Driller: Terracon

Project No.: 60225032

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL 60225032 SIENNA SOLAR.GPJ TERRACON_DATATEMPLATE.GDT 6/30/22

BORING LOG NO. B-31

PROJECT: Sienna Solar

CLIENT: 8 Minute Energy Renewables
San Francisco, CA

SITE: Barstow Rd and North of Old Woman Springs Rd
Lucerne Valley, CA

LOCATION See Exploration Plan

Latitude: 34.508° Longitude: -116.8921°

DEPTH	GRAPHIC LOG	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
0							
						37-22-15	75
2.5							
			9-11-22	10	91		
5			8-8-8 N=16				
			18-16-19	5	107		
10			4-8-7 N=15				
15.0							
			11-25-39	12	113		
20.0							
			14-16-18 N=34				
21.5							

LEAN CLAY WITH SAND (CL), trace gravel, tan

POORLY GRADED SAND WITH CLAY (SP-SC), trace gravel, tan, medium dense

LEAN CLAY (CL), trace sand, brown, hard

POORLY GRADED SAND (SP), trace gravel, brown, medium dense

Boring Terminated at 21.5 Feet

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Hollow Stem Auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1421 Edinger Ave, Ste C
Tustin, CA

Boring Started: 04-07-2022 | Boring Completed: 04-07-2022

Drill Rig: D90 | Driller: Terracon

Project No.: 60225032

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL 60225032 SIENNA SOLAR.GPJ TERRACON_DATATEMPLATE.GDT 6/30/22

BORING LOG NO. B-32

PROJECT: Sienna Solar

CLIENT: 8 Minute Energy Renewables
San Francisco, CA

SITE: Barstow Rd and North of Old Woman Springs Rd
Lucerne Valley, CA

LOCATION See Exploration Plan

Latitude: 34.5098° Longitude: -116.8854°

GRAPHIC LOG	DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
	CLAYEY SAND (SC), trace gravel, tan								
	dense				11-16-20 N=36				
	brown, very dense	5			3-29-50/4"	5	115		
	dense				13-13-17 N=30				
	very dense	10			20-50/5"	6	121		
	20.0	15			23-27-27 N=54				
	SANDY LEAN CLAY (CL), hard 20.9	20			15-50/5"	8	105		
	Boring Terminated at 20.9 Feet								

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Hollow Stem Auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1421 Edinger Ave, Ste C
Tustin, CA

Boring Started: 04-07-2022 | Boring Completed: 04-07-2022

Drill Rig: D90 | Driller: Terracon

Project No.: 60225032

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL 60225032 SIENNA SOLAR.GPJ TERRACON_DATATEMPLATE.GDT 6/30/22

BORING LOG NO. B-33

PROJECT: Sienna Solar

CLIENT: 8 Minute Energy Renewables
San Francisco, CA

SITE: Barstow Rd and North of Old Woman Springs Rd
Lucerne Valley, CA

LOCATION See Exploration Plan

Latitude: 34.5128° Longitude: -116.8927°

GRAPHIC LOG	DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
	CLAYEY SAND (SC), trace gravel, tan							33-18-15	28
	medium dense				9-13-17	6	102		
	brown	5			7-8-10 N=18				
					11-24-27	3	99		
		10			1-8-9 N=17				
	15.0								
	POORLY GRADED SAND WITH SILT (SP-SM), brown, very dense	15			24-50/6"	3	113		
	medium dense	20			11-13-14 N=27				
	21.5								
	Boring Terminated at 21.5 Feet								

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Hollow Stem Auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1421 Edinger Ave, Ste C
Tustin, CA

Boring Started: 04-07-2022 | Boring Completed: 04-07-2022

Drill Rig: D90 | Driller: Terracon

Project No.: 60225032

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL 60225032 SIENNA SOLAR.GPJ TERRACON_DATATEMPLATE.GDT 6/30/22

BORING LOG NO. B-34

PROJECT: Sienna Solar

CLIENT: 8 Minute Energy Renewables
San Francisco, CA

SITE: Barstow Rd and North of Old Woman Springs Rd
Lucerne Valley, CA

LOCATION See Exploration Plan

Latitude: 34.515° Longitude: -116.8864°

DEPTH	GRAPHIC LOG	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
0							
	CLAYEY SAND (SC), tan						
2.5							
	SANDY LEAN CLAY (CL), trace gravel, tan, hard		13-17-16 N=33				
	brown		19-26-32	3	113		
			11-17-20 N=37				
10.0							
	CLAYEY SAND (SC), brown, very dense		14-50/4"	11	106		
	medium dense		9-11-13 N=24				
20.0							
	SANDY LEAN CLAY (CL), brown, hard		12-39-50/6"				
21.5							
	Boring Terminated at 21.5 Feet						

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Hollow Stem Auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1421 Edinger Ave, Ste C
Tustin, CA

Boring Started: 04-07-2022 | Boring Completed: 04-07-2022

Drill Rig: D90 | Driller: Terracon

Project No.: 60225032

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL 60225032 SIENNA SOLAR.GPJ TERRACON_DATATEMPLATE.GDT 6/30/22

BORING LOG NO. B-35

PROJECT: Sienna Solar

CLIENT: 8 Minute Energy Renewables
San Francisco, CA

SITE: Barstow Rd and North of Old Woman Springs Rd
Lucerne Valley, CA

LOCATION See Exploration Plan

Latitude: 34.4939° Longitude: -116.8851°

DEPTH	GRAPHIC LOG		WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
		SILTY SAND (SM), light brown							
		loose			3-6-11	23	73		
5.0		**SILTY CLAYEY SAND (SC-SM)**, light brown to brown, dense			11-15-19 N=34				
		white to gray			29-44-39	12	92		
		grayish brown, medium dense			9-8-8 N=16				
15.0		**LEAN CLAY WITH SAND (CL)**, brown, very stiff			6-13-20	23	96		
		trace gravel, grayish brown, hard			10-13-21 N=34				
21.5		***Boring Terminated at 21.5 Feet***							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Hollow Stem Auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1421 Edinger Ave, Ste C
Tustin, CA

Boring Started: 04-14-2022 | Boring Completed: 04-14-2022

Drill Rig: D90 | Driller: Terracon

Project No.: 60225032

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL 60225032 SIENNA SOLAR.GPJ TERRACON_DATATEMPLATE.GDT 6/30/22

BORING LOG NO. B-36

PROJECT: Sienna Solar

CLIENT: 8 Minute Energy Renewables
San Francisco, CA

SITE: Barstow Rd and North of Old Woman Springs Rd
Lucerne Valley, CA

LOCATION See Exploration Plan

Latitude: 34.5171° Longitude: -116.8981°

DEPTH	GRAPHIC LOG	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
POORLY GRADED SAND WITH SILT (SP-SM), trace gravel, tan with silt, light brown, medium dense					6-7-8 N=15				
5.0		5							
SANDY SILT (ML), brown, very stiff					6-14-25	18	90		
7.5									
CLAYEY SAND (SC), brown, medium dense					14-16-12 N=28				
		10			6-16-24	13	116		
15.0		15							
SILTY SAND (SM), brown, medium dense					8-10-13 N=23			NP	19
very dense		20			20-50/5"	10	110		
20.9									
Boring Terminated at 20.9 Feet									

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Hollow Stem Auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1421 Edinger Ave, Ste C
Tustin, CA

Boring Started: 04-07-2022 | Boring Completed: 04-07-2022

Drill Rig: D90 | Driller: Terracon

Project No.: 60225032

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL 60225032 SIENNA SOLAR.GPJ TERRACON_DATATEMPLATE.GDT 6/30/22

BORING LOG NO. B-37

PROJECT: Sienna Solar

CLIENT: 8 Minute Energy Renewables
San Francisco, CA

SITE: Barstow Rd and North of Old Woman Springs Rd
Lucerne Valley, CA

LOCATION See Exploration Plan

Latitude: 34.5226° Longitude: -116.9007°

DEPTH	GRAPHIC LOG	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
0						NP	14
			11-24-50/6"	3	116		
5			11-12-8 N=20				
			11-19-20	8	99		
10			7-9-10 N=19				22
15			6-23-31	30	94		
20			9-12-13 N=25				
21.5							

SILTY SAND (SM), tan

brown, very dense

medium dense

Boring Terminated at 21.5 Feet

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Hollow Stem Auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1421 Edinger Ave, Ste C
Tustin, CA

Boring Started: 04-07-2022 | Boring Completed: 04-07-2022

Drill Rig: D90 | Driller: Terracon

Project No.: 60225032

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL 60225032 SIENNA SOLAR.GPJ TERRACON_DATATEMPLATE.GDT 6/30/22

BORING LOG NO. SUB-1

PROJECT: Sienna Solar

CLIENT: 8 Minute Energy Renewables
San Francisco, CA

SITE: Barstow Rd and North of Old Woman Springs Rd
Lucerne Valley, CA

LOCATION See Exploration Plan

Latitude: 34.5224° Longitude: -116.8944°

GRAPHIC LOG	DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
	CLAYEY SAND (SC), trace gravel, tan							44-19-25	36
	brown, very dense				10-21-50/4"	10	105		
	medium dense	5			5-6-9 N=15			59-20-39	
	dense	10			12-15-15 N=30				
	dense	15			13-26-50/6"	10	114		
		20			12-17-21 N=38				25
		25							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Hollow Stem Auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1421 Edinger Ave, Ste C
Tustin, CA

Boring Started: 04-07-2022 | Boring Completed: 04-07-2022

Drill Rig: D90 | Driller: Terracon

Project No.: 60225032

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL 60225032 SIENNA SOLAR.GPJ TERRACON_DATATEMPLATE.GDT 6/30/22

BORING LOG NO. SUB-1

PROJECT: Sienna Solar

CLIENT: 8 Minute Energy Renewables
San Francisco, CA

SITE: Barstow Rd and North of Old Woman Springs Rd
Lucerne Valley, CA

LOCATION See Exploration Plan

Latitude: 34.5224° Longitude: -116.8944°

GRAPHIC LOG	DEPTH		DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
		CLAYEY SAND (SC), trace gravel, tan *(continued)*				13-14-29 N=43				
		very dense	30			44-50/4"				
			35			50/6"				14
			40			16-20-42 N=62				
	45.0									
		SILTY SAND (SM), trace gravel, brown, dense	45			8-12-18 N=30				34
	50.0		50							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Hollow Stem Auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1421 Edinger Ave, Ste C
Tustin, CA

Boring Started: 04-07-2022 | Boring Completed: 04-07-2022

Drill Rig: D90 | Driller: Terracon

Project No.: 60225032

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-NO WELL 60225032 SIENNA SOLAR.GPJ TERRACON_DATATEMPLATE.GDT 6/30/22

BORING LOG NO. SUB-1

PROJECT: Sienna Solar

CLIENT: 8 Minute Energy Renewables
San Francisco, CA

SITE: Barstow Rd and North of Old Woman Springs Rd
Lucerne Valley, CA

GRAPHIC LOG	LOCATION See Exploration Plan Latitude: 34.5224° Longitude: -116.8944° DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
	POORLY GRADED SAND WITH GRAVEL (SP), brown, dense				19-25-35 N=60				
	51.5 ***Boring Terminated at 51.5 Feet***								

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Hollow Stem Auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
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Tustin, CA

Boring Started: 04-07-2022 | Boring Completed: 04-07-2022

Drill Rig: D90 | Driller: Terracon

Project No.: 60225032

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BORING LOG NO. SUB-2

PROJECT: Sienna Solar

CLIENT: 8 Minute Energy Renewables
San Francisco, CA

SITE: Barstow Rd and North of Old Woman Springs Rd
Lucerne Valley, CA

LOCATION See Exploration Plan

Latitude: 34.5227° Longitude: -116.895°

GRAPHIC LOG	DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
	CLAYEY SAND (SC), trace gravel, tan							55-28-27	41
	tan and brown, medium dense				9-14-13 N=27				
	dense	5			9-28-34	13	102		
	trace gravel, reddish brown, medium dense				8-13-14 N=27			35-16-19	14
	dense	10			24-50/4"	9	107		
	trace cobbles	15			50/1"				
		20			18-20-20 N=40				
		25							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Hollow Stem Auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1421 Edinger Ave, Ste C
Tustin, CA

Boring Started: 04-07-2022 | Boring Completed: 04-07-2022

Drill Rig: D90 | Driller: Terracon

Project No.: 60225032

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BORING LOG NO. SUB-2

PROJECT: Sienna Solar

CLIENT: 8 Minute Energy Renewables
San Francisco, CA

SITE: Barstow Rd and North of Old Woman Springs Rd
Lucerne Valley, CA

GRAPHIC LOG	LOCATION See Exploration Plan Latitude: 34.5227° Longitude: -116.895° DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
	CLAYEY SAND (SC), trace gravel, tan *(continued)* very dense				50/2"				44
		30			30-50/4"				
	reddish brown and white, dense	35			16-18-18 N=36				24
	trace clay, grayish brown, medium dense	40			15-10-11 N=21				
		45			14-13-13 N=26				
		50							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Hollow Stem Auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

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Tustin, CA

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Drill Rig: D90 | Driller: Terracon

Project No.: 60225032

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BORING LOG NO. SUB-2

PROJECT: Sienna Solar

CLIENT: 8 Minute Energy Renewables
San Francisco, CA

SITE: Barstow Rd and North of Old Woman Springs Rd
Lucerne Valley, CA

GRAPHIC LOG	LOCATION See Exploration Plan Latitude: 34.5227° Longitude: -116.895° DEPTH	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	DRY UNIT WEIGHT (pcf)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
	CLAYEY SAND (SC), trace gravel, tan *(continued)* dense 51.5				8-16-22 N=38				
	Boring Terminated at 51.5 Feet								

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Hollow Stem Auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

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Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
1421 Edinger Ave, Ste C
Tustin, CA

Boring Started: 04-07-2022 | Boring Completed: 04-07-2022

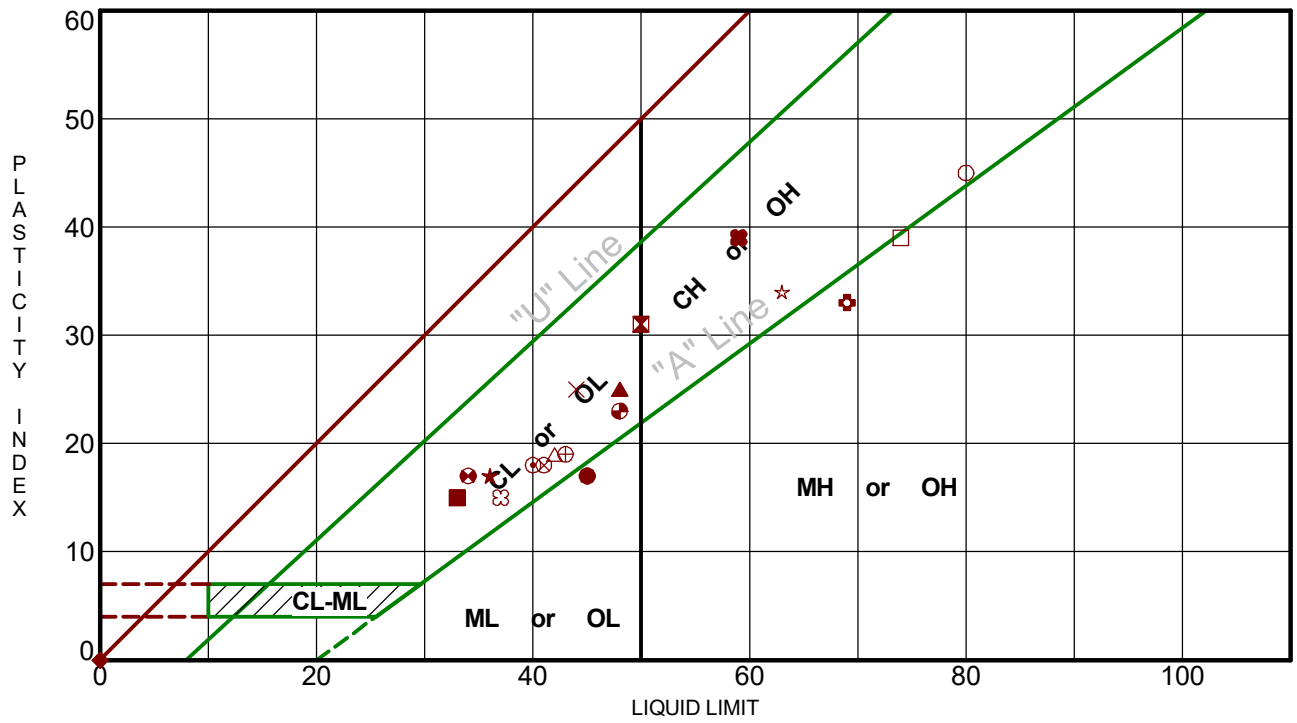
Drill Rig: D90 | Driller: Terracon

Project No.: 60225032

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ATTERBERG LIMITS RESULTS

ASTM D4318



Boring ID		Depth (Ft)	LL	PL	PI	Fines	USCS	Description
●	B-02	0 - 2.5	45	28	17	84.3	ML	SILT with SAND
⊠	B-04	15 - 16.5	50	19	31	76.5	CH	FAT CLAY with SAND
▲	B-05	5 - 6.5	48	23	25		SC	CLAYEY SAND
★	B-06	7.5 - 9	36	19	17	70.7	CL	LEAN CLAY with SAND
⊙	B-09	0 - 2.5	40	22	18	58.8	CL	SANDY LEAN CLAY
✿	B-09	5 - 6.5	69	36	33		MH	ELASTIC SILT
○	B-11	10 - 11.5	80	35	45		CH	FAT CLAY
△	B-14	2.5 - 4	42	23	19		SC	CLAYEY SAND
⊗	B-15	0 - 2.5	41	23	18	72.3	CL	LEAN CLAY WITH SAND
⊕	B-20	0 - 5	43	24	19		SC	CLAYEY SAND
□	B-22	15 - 16.5	74	35	39		MH	ELASTIC SILT
⊛	B-23	0 - 2.5	34	17	17	79.5	CL	LEAN CLAY WITH SAND
◕	B-27	0 - 2.5	48	25	23	96.3	CL	LEAN CLAY
☆	B-27	10 - 11.5	63	29	34		CH	FAT CLAY
❀	B-31	0 - 2.5	37	22	15	75.0	CL	LEAN CLAY with SAND
■	B-33	0 - 2.5	33	18	15	28.3	SC	CLAYEY SAND
◆	B-36	15 - 16.5	NP	NP	NP	19.0	SM	SILTY SAND
◇	B-37	0 - 2.5	NP	NP	NP	13.7	SM	SILTY SAND
×	SUB-1	0 - 2.5	44	19	25	36.0	SC	CLAYEY SAND
✖	SUB-1	5 - 6.5	59	20	39		SC	CLAYEY SAND

PROJECT: Sienna Solar

PROJECT NUMBER: 60225032

SITE: Barstow Rd and North of Old Woman Springs Rd
Lucerne Valley, CA

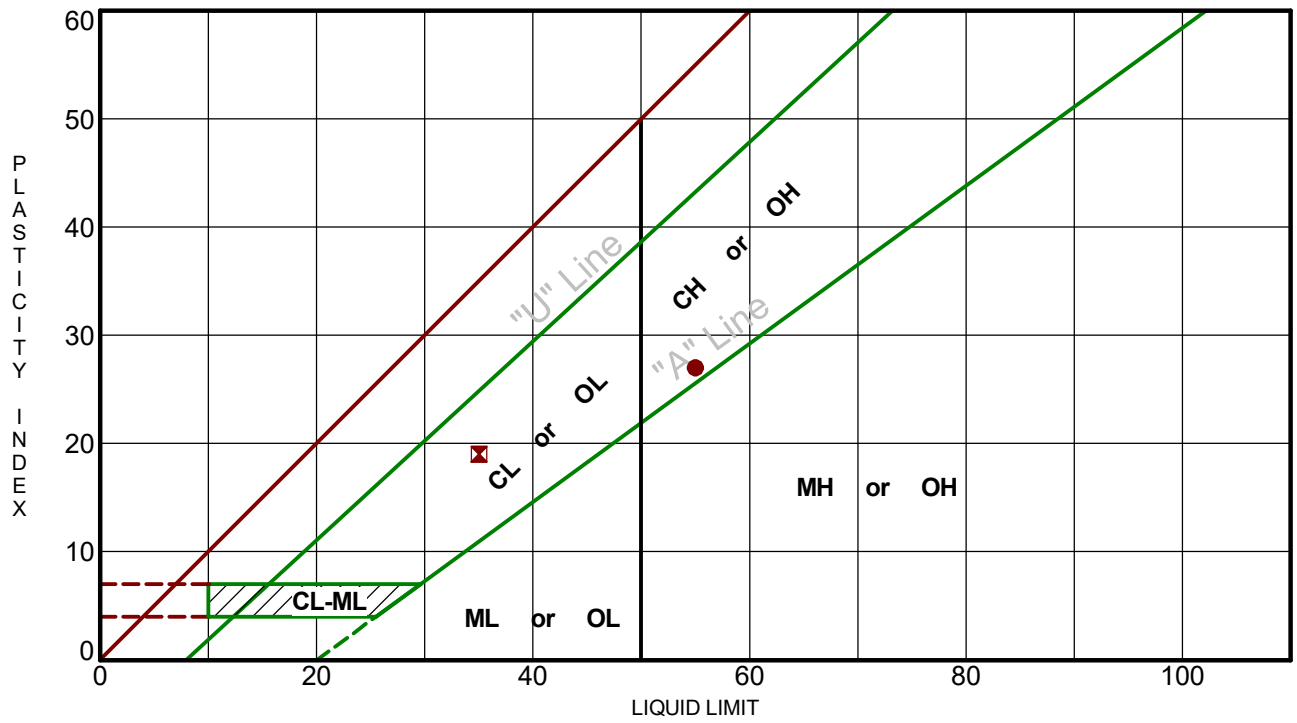
Terracon
23041 Avenida De La Carlota Ste 350
Laguna Hills, CA

CLIENT: 8 Minute Energy Renewables
San Francisco, CA

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. ATTERBERG LIMITS 60225032 SIENNA SOLAR.GPJ TERRACON_DATATEMPLATE.GDT 7/28/22

ATTERBERG LIMITS RESULTS

ASTM D4318



Boring ID		Depth (Ft)	LL	PL	PI	Fines	USCS	Description
●	SUB-2	0 - 2.5	55	28	27	41.3	SC	CLAYEY SAND
⊠	SUB-2	7.5 - 9	35	16	19	13.9	SC	CLAYEY SAND

PROJECT: Sienna Solar

PROJECT NUMBER: 60225032

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Lucerne Valley, CA

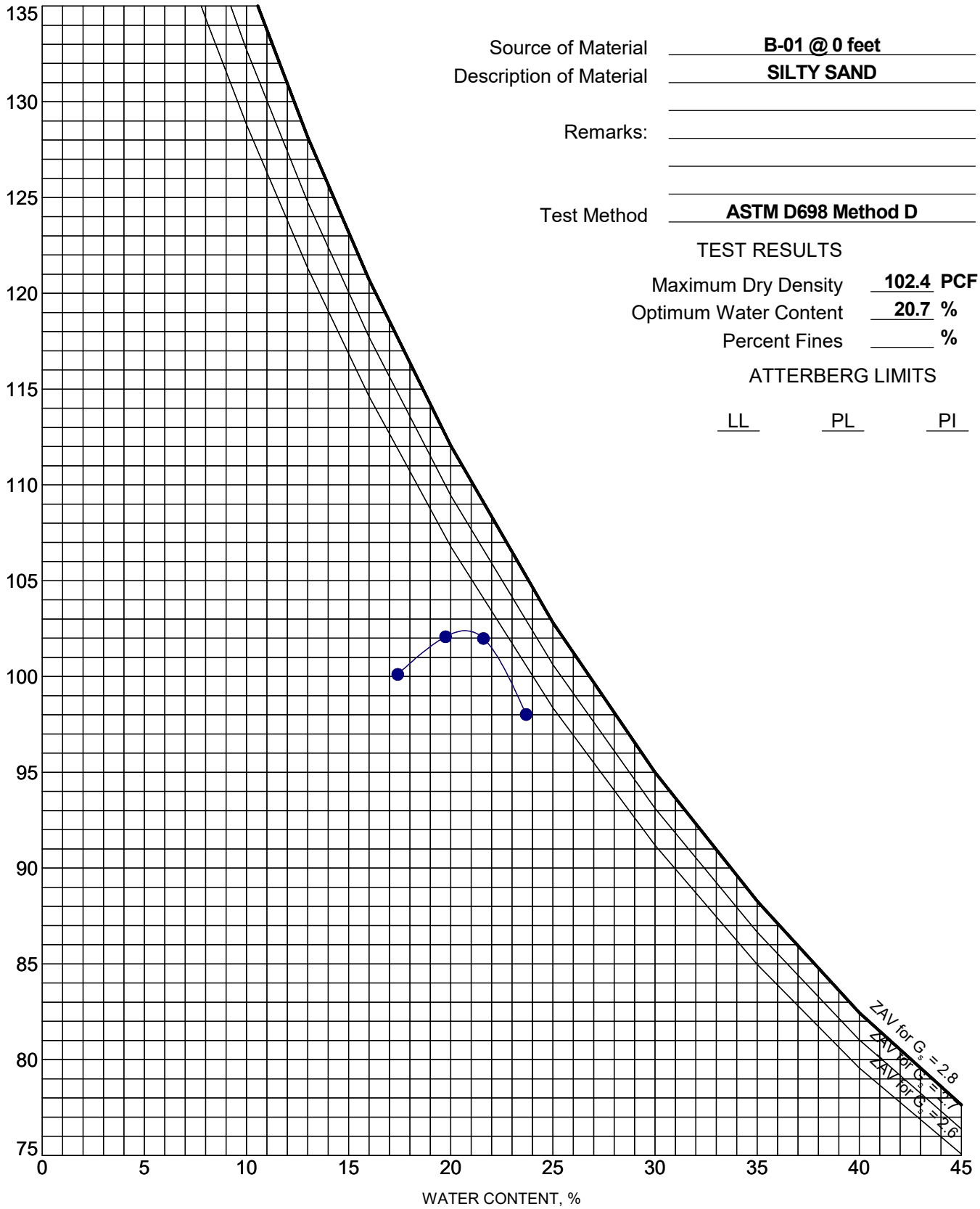
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San Francisco, CA

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MOISTURE-DENSITY RELATIONSHIP

ASTM D698/D1557



Source of Material: **B-01 @ 0 feet**

Description of Material: **SILTY SAND**

Remarks:

Test Method: **ASTM D698 Method D**

TEST RESULTS

Maximum Dry Density	**102.4**	**PCF**
Optimum Water Content	**20.7**	**%**
Percent Fines		**%**

ATTERBERG LIMITS

LL	PL	PI

PROJECT: Sienna Solar

PROJECT NUMBER: 60225032

SITE: Barstow Rd and North of Old Woman Springs Rd
Lucerne Valley, CA

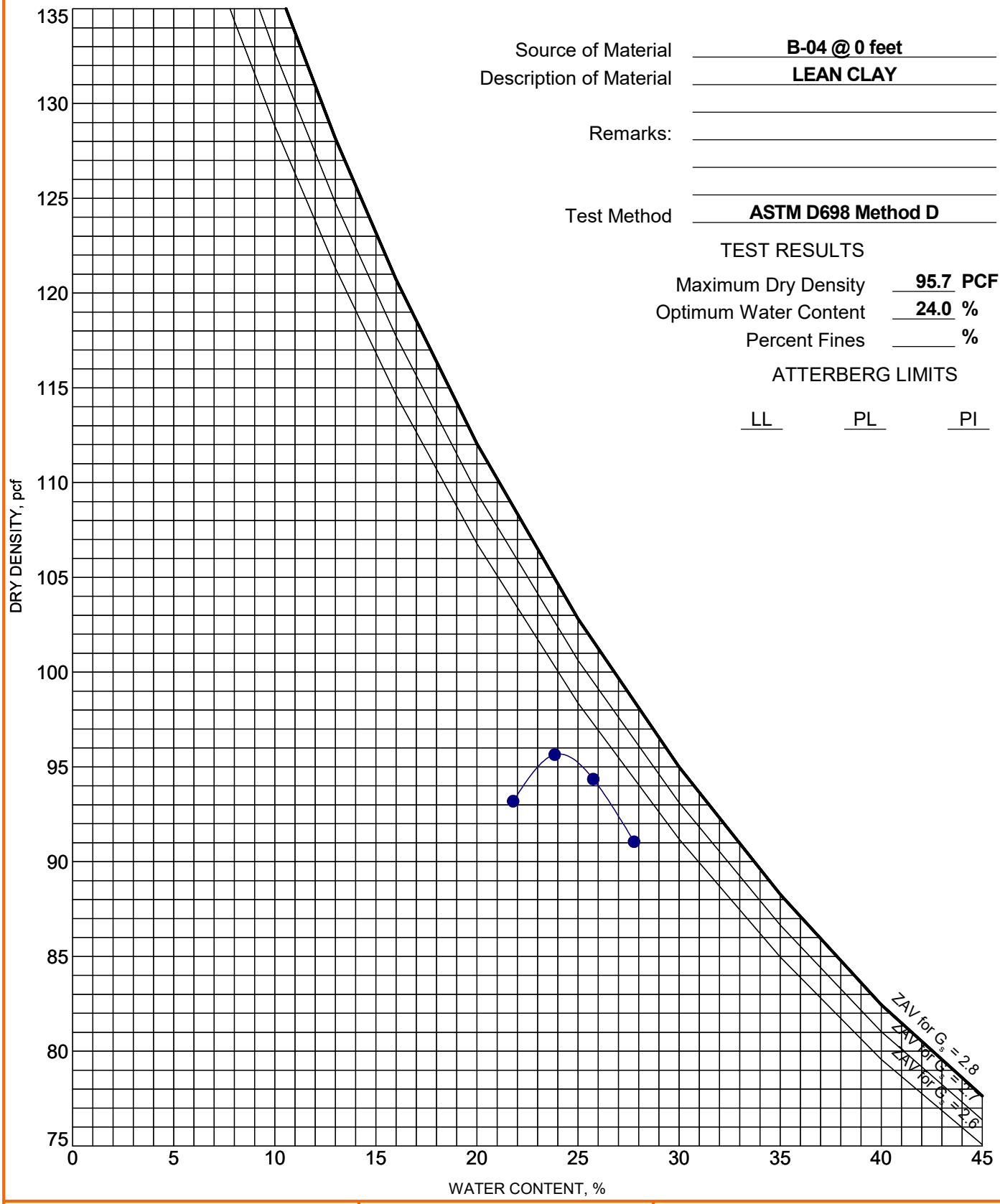
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23041 Avenida De La Carlota Ste 350
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San Francisco, CA

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MOISTURE-DENSITY RELATIONSHIP

ASTM D698/D1557



Source of Material: **B-04 @ 0 feet**

Description of Material: **LEAN CLAY**

Remarks:

Test Method: **ASTM D698 Method D**

TEST RESULTS

Maximum Dry Density	**95.7**	**PCF**
Optimum Water Content	**24.0**	**%**
Percent Fines		**%**

ATTERBERG LIMITS

LL	PL	PI

PROJECT: Sienna Solar

SITE: Barstow Rd and North of Old Woman Springs Rd
Lucerne Valley, CA

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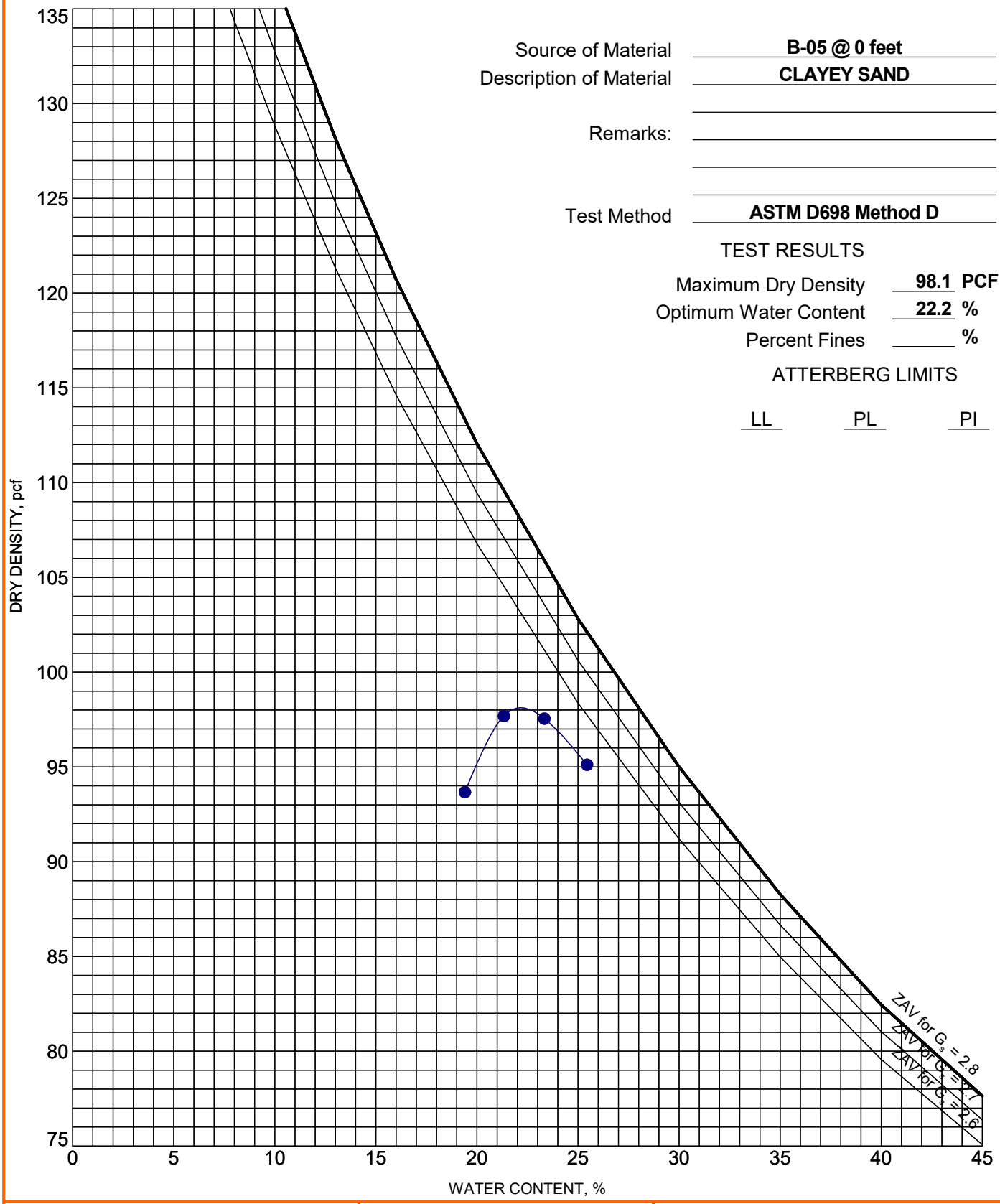
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San Francisco, CA

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MOISTURE-DENSITY RELATIONSHIP

ASTM D698/D1557



Source of Material	**B-05 @ 0 feet**
Description of Material	**CLAYEY SAND**
Remarks:	
Test Method	**ASTM D698 Method D**

TEST RESULTS

Maximum Dry Density	**98.1**	**PCF**
Optimum Water Content	**22.2**	**%**
Percent Fines		**%**

ATTERBERG LIMITS

LL	PL	PI

PROJECT: Sienna Solar

PROJECT NUMBER: 60225032

SITE: Barstow Rd and North of Old Woman Springs Rd
Lucerne Valley, CA

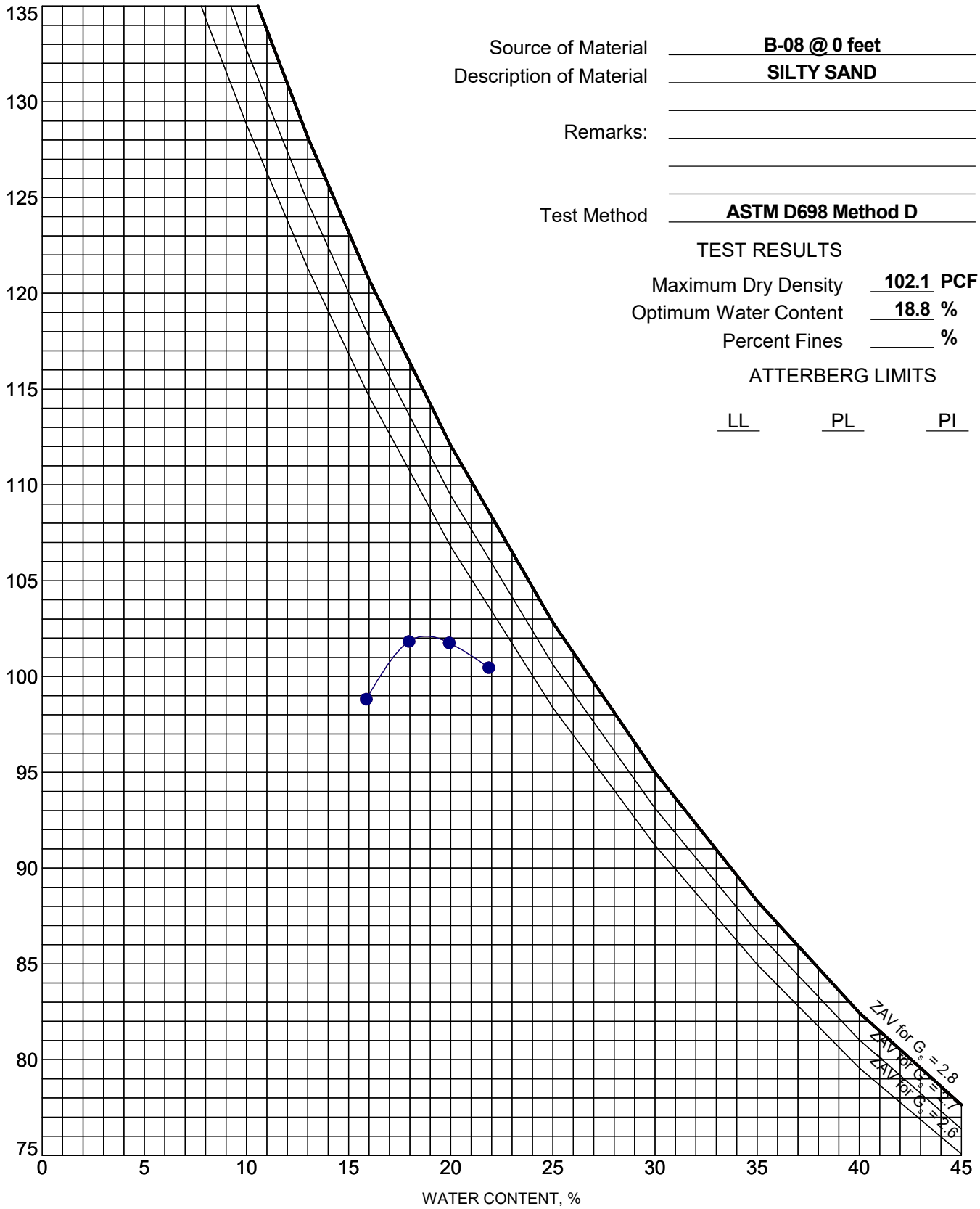
Terracon
23041 Avenida De La Carlota Ste 350
Laguna Hills, CA

CLIENT: 8 Minute Energy Renewables
San Francisco, CA

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MOISTURE-DENSITY RELATIONSHIP

ASTM D698/D1557



Source of Material: **B-08 @ 0 feet**

Description of Material: **SILTY SAND**

Remarks:

Test Method: **ASTM D698 Method D**

TEST RESULTS

Maximum Dry Density	**102.1**	**PCF**
Optimum Water Content	**18.8**	**%**
Percent Fines		**%**

ATTERBERG LIMITS

LL	PL	PI

PROJECT: Sienna Solar

PROJECT NUMBER: 60225032

SITE: Barstow Rd and North of Old Woman Springs Rd
Lucerne Valley, CA

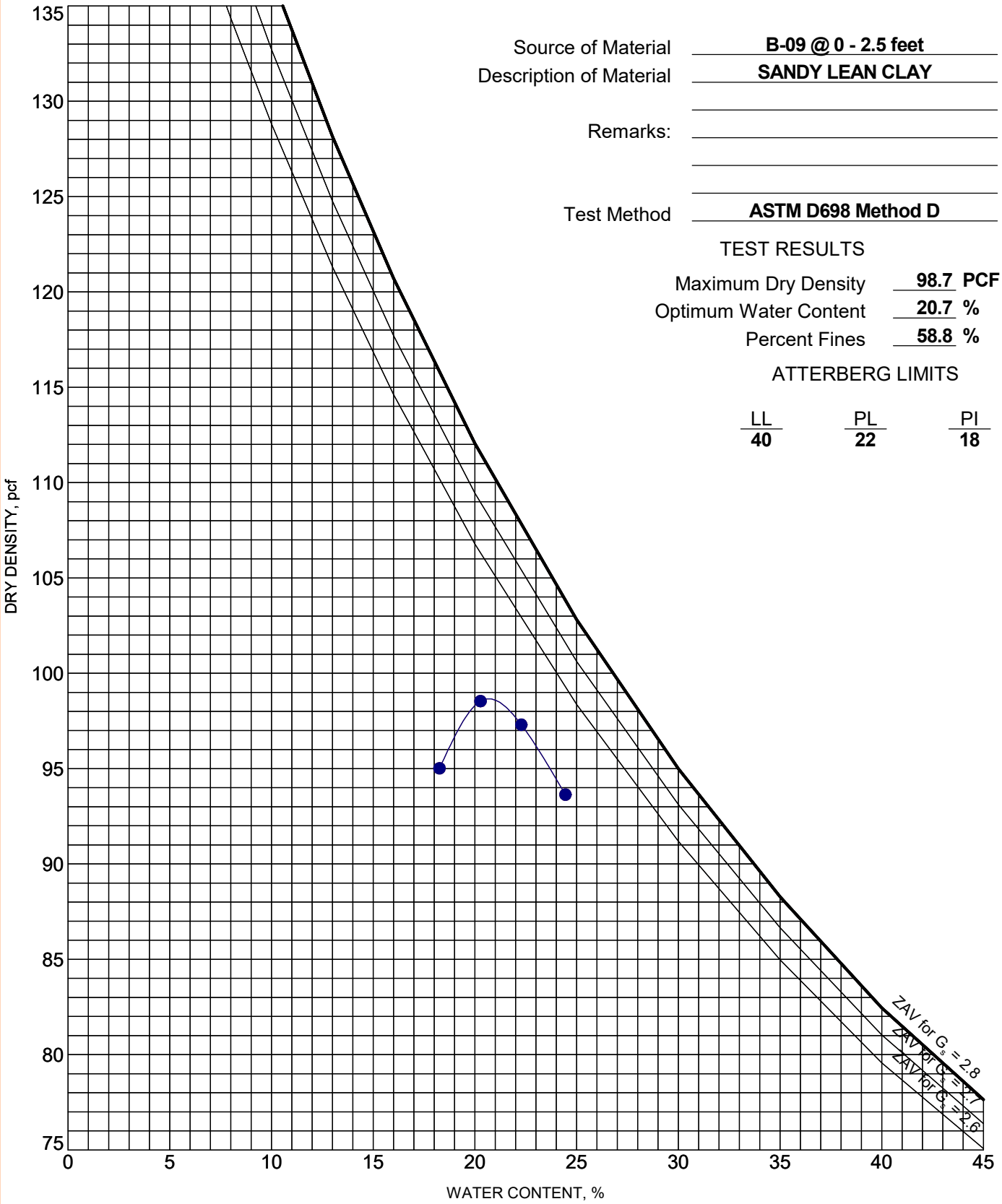
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San Francisco, CA

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MOISTURE-DENSITY RELATIONSHIP

ASTM D698/D1557



Source of Material	**B-09 @ 0 - 2.5 feet**
Description of Material	**SANDY LEAN CLAY**
Remarks:	
Test Method	**ASTM D698 Method D**

TEST RESULTS

Maximum Dry Density	**98.7**	**PCF**
Optimum Water Content	**20.7**	**%**
Percent Fines	**58.8**	**%**

ATTERBERG LIMITS

LL	PL	PI
40	**22**	**18**

PROJECT: Sienna Solar

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Lucerne Valley, CA

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Laguna Hills, CA

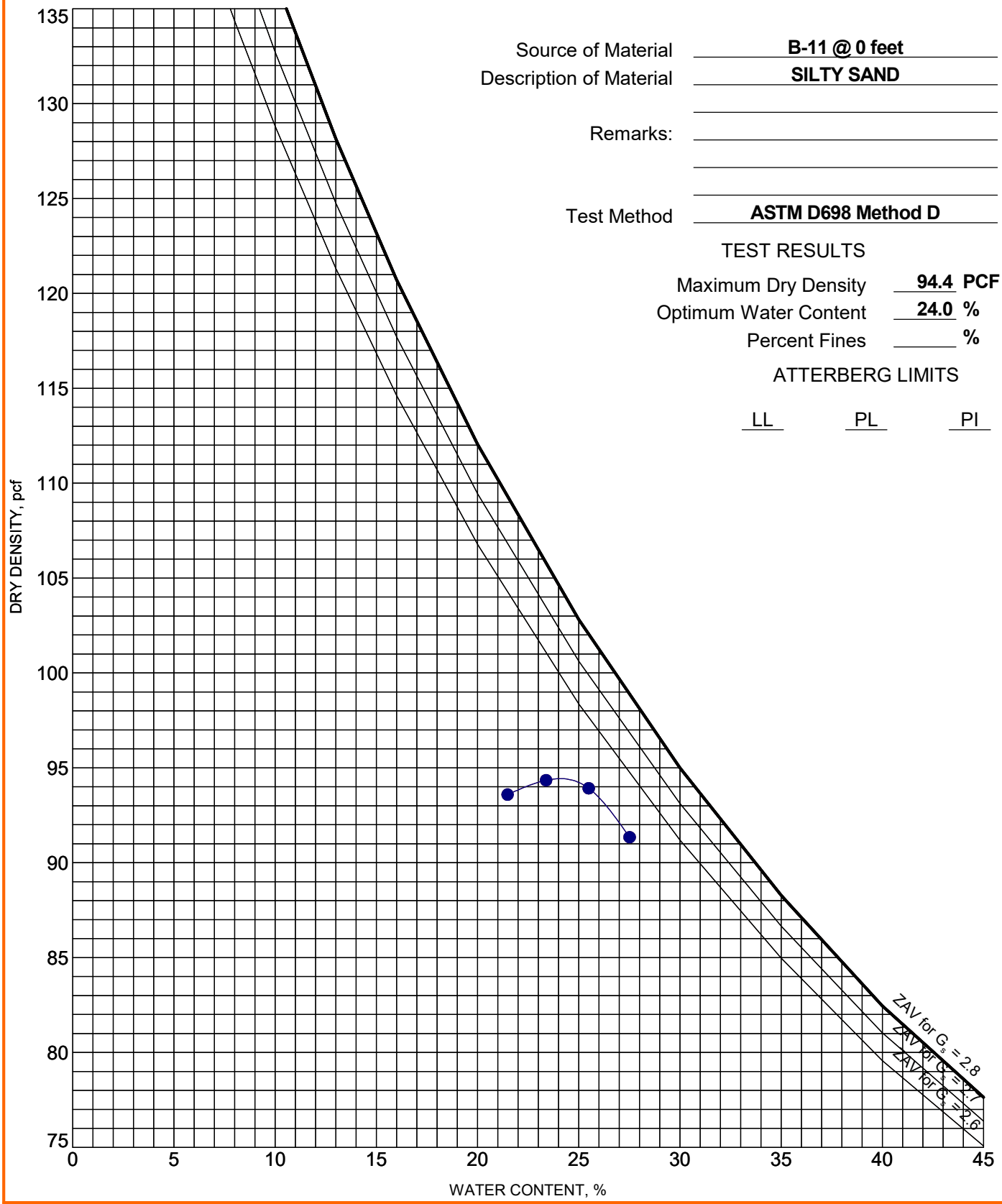
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MOISTURE-DENSITY RELATIONSHIP

ASTM D698/D1557



Source of Material: **B-11 @ 0 feet**

Description of Material: **SILTY SAND**

Remarks:

Test Method: **ASTM D698 Method D**

TEST RESULTS

Maximum Dry Density	**94.4**	**PCF**
Optimum Water Content	**24.0**	**%**
Percent Fines		**%**

ATTERBERG LIMITS

LL	PL	PI

PROJECT: Sienna Solar

PROJECT NUMBER: 60225032

SITE: Barstow Rd and North of Old Woman Springs Rd
Lucerne Valley, CA

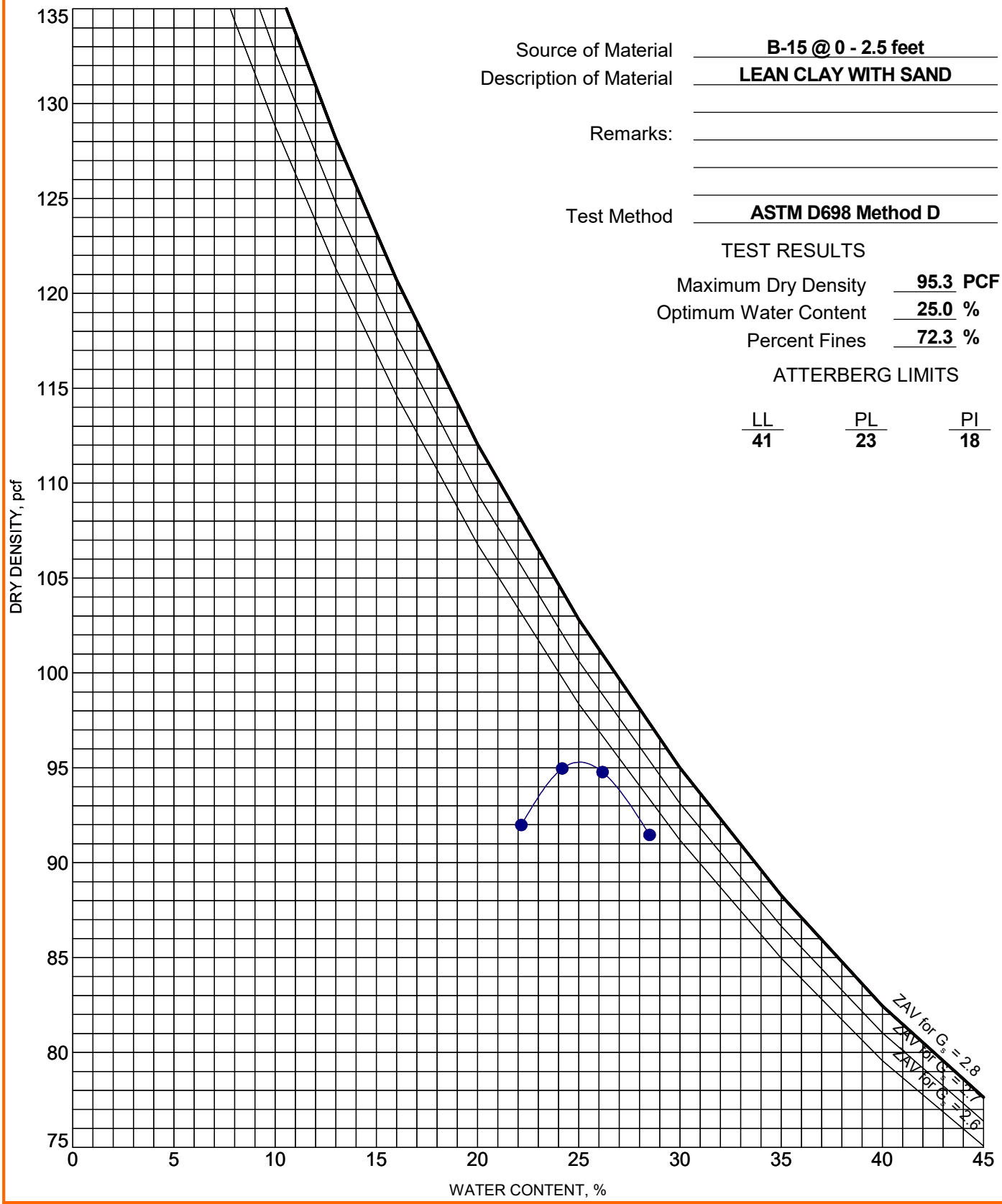
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Laguna Hills, CA

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San Francisco, CA

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MOISTURE-DENSITY RELATIONSHIP

ASTM D698/D1557



Source of Material	**B-15 @ 0 - 2.5 feet**
Description of Material	**LEAN CLAY WITH SAND**
Remarks:	
Test Method	**ASTM D698 Method D**

TEST RESULTS

Maximum Dry Density	**95.3**	**PCF**
Optimum Water Content	**25.0**	**%**
Percent Fines	**72.3**	**%**

ATTERBERG LIMITS

LL	PL	PI
41	**23**	**18**

PROJECT: Sienna Solar

SITE: Barstow Rd and North of Old Woman Springs Rd
Lucerne Valley, CA

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23041 Avenida De La Carlota Ste 350
Laguna Hills, CA

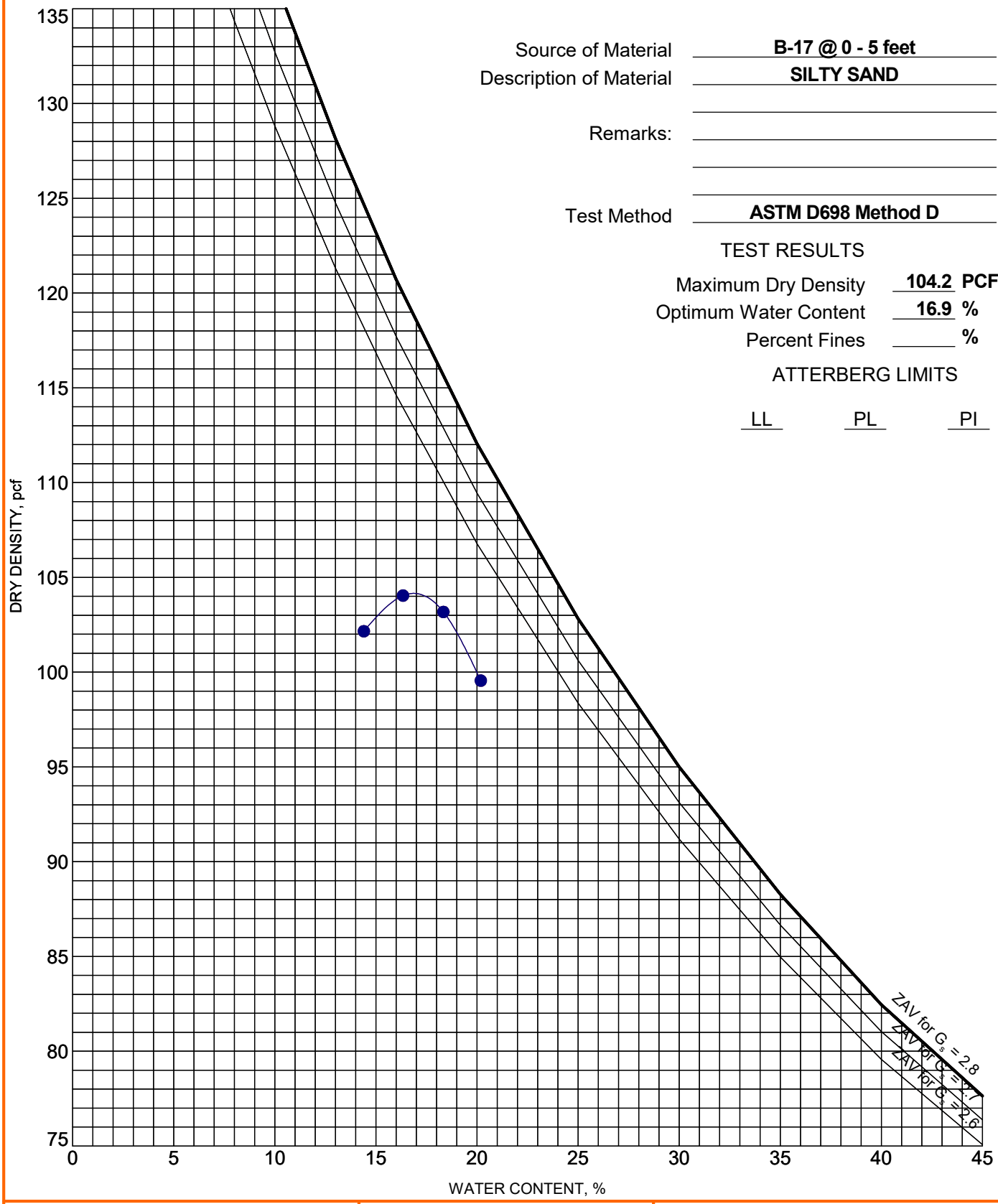
PROJECT NUMBER: 60225032

CLIENT: 8 Minute Energy Renewables
San Francisco, CA

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MOISTURE-DENSITY RELATIONSHIP

ASTM D698/D1557



Source of Material: **B-17 @ 0 - 5 feet**

Description of Material: **SILTY SAND**

Remarks:

Test Method: **ASTM D698 Method D**

TEST RESULTS

Maximum Dry Density	**104.2**	**PCF**
Optimum Water Content	**16.9**	**%**
Percent Fines		**%**

ATTERBERG LIMITS

LL	PL	PI

PROJECT: Sienna Solar

PROJECT NUMBER: 60225032

SITE: Barstow Rd and North of Old Woman Springs Rd
Lucerne Valley, CA

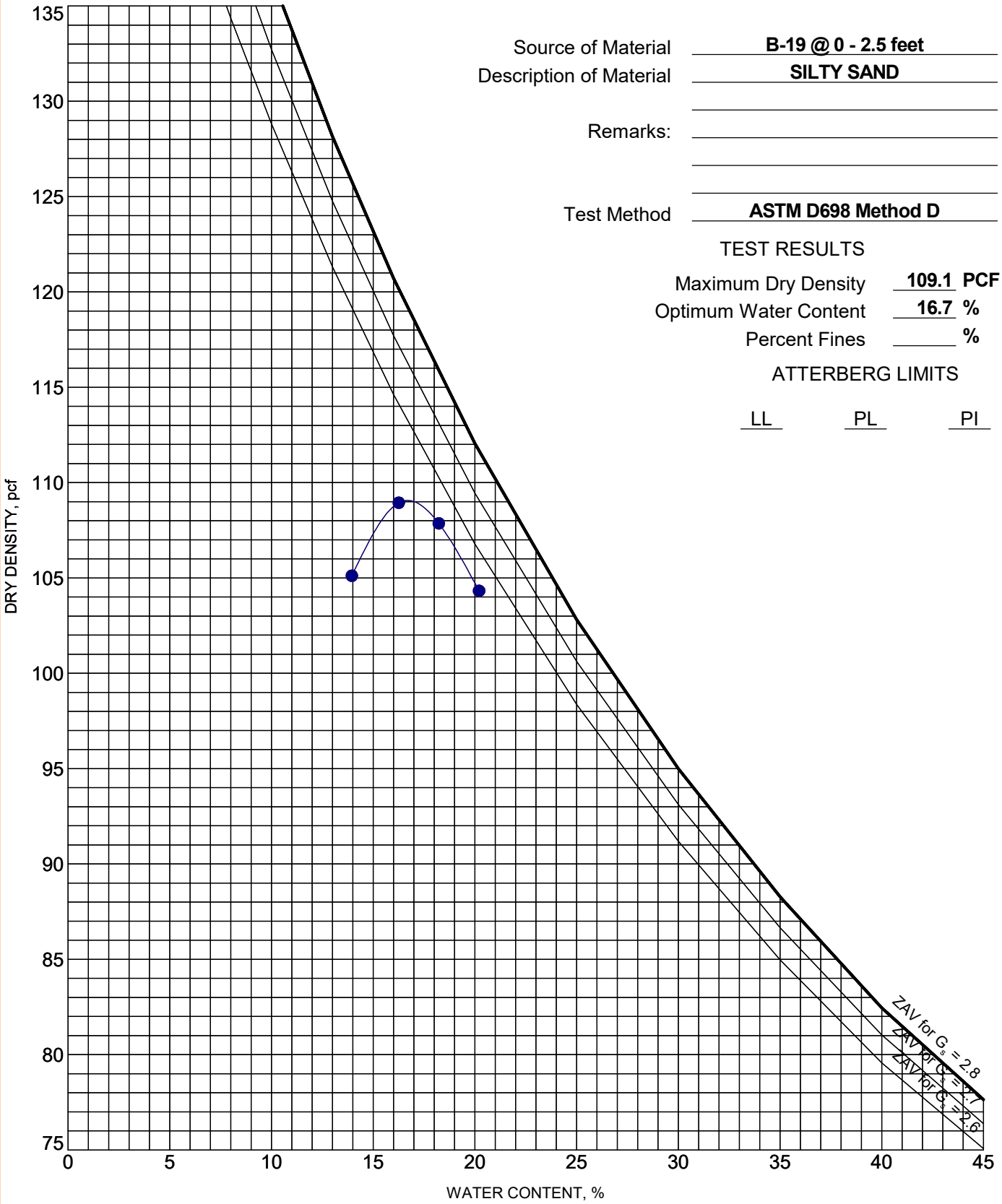
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MOISTURE-DENSITY RELATIONSHIP

ASTM D698/D1557



Source of Material	**B-19 @ 0 - 2.5 feet**
Description of Material	**SILTY SAND**
Remarks:	
Test Method	**ASTM D698 Method D**

TEST RESULTS

Maximum Dry Density	**109.1**	**PCF**
Optimum Water Content	**16.7**	**%**
Percent Fines		**%**

ATTERBERG LIMITS

LL	PL	PI

PROJECT: Sienna Solar

PROJECT NUMBER: 60225032

SITE: Barstow Rd and North of Old Woman Springs Rd
Lucerne Valley, CA

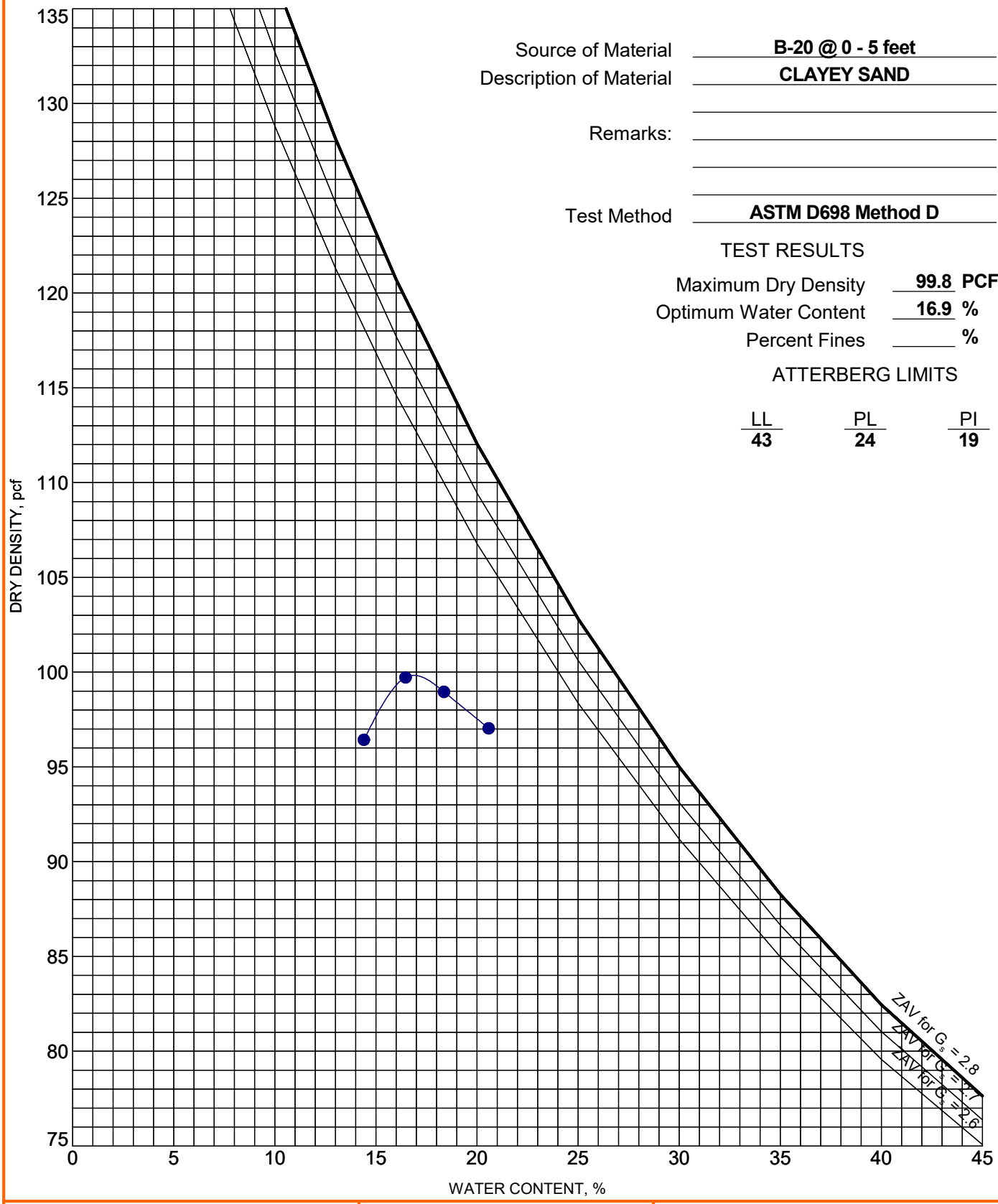
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Laguna Hills, CA

CLIENT: 8 Minute Energy Renewables
San Francisco, CA

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MOISTURE-DENSITY RELATIONSHIP

ASTM D698/D1557



Source of Material	**B-20 @ 0 - 5 feet**
Description of Material	**CLAYEY SAND**
Remarks:	
Test Method	**ASTM D698 Method D**

TEST RESULTS

Maximum Dry Density	**99.8**	**PCF**
Optimum Water Content	**16.9**	**%**
Percent Fines		**%**

ATTERBERG LIMITS

LL	PL	PI
43	**24**	**19**

PROJECT: Sienna Solar

SITE: Barstow Rd and North of Old Woman Springs Rd
Lucerne Valley, CA

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Laguna Hills, CA

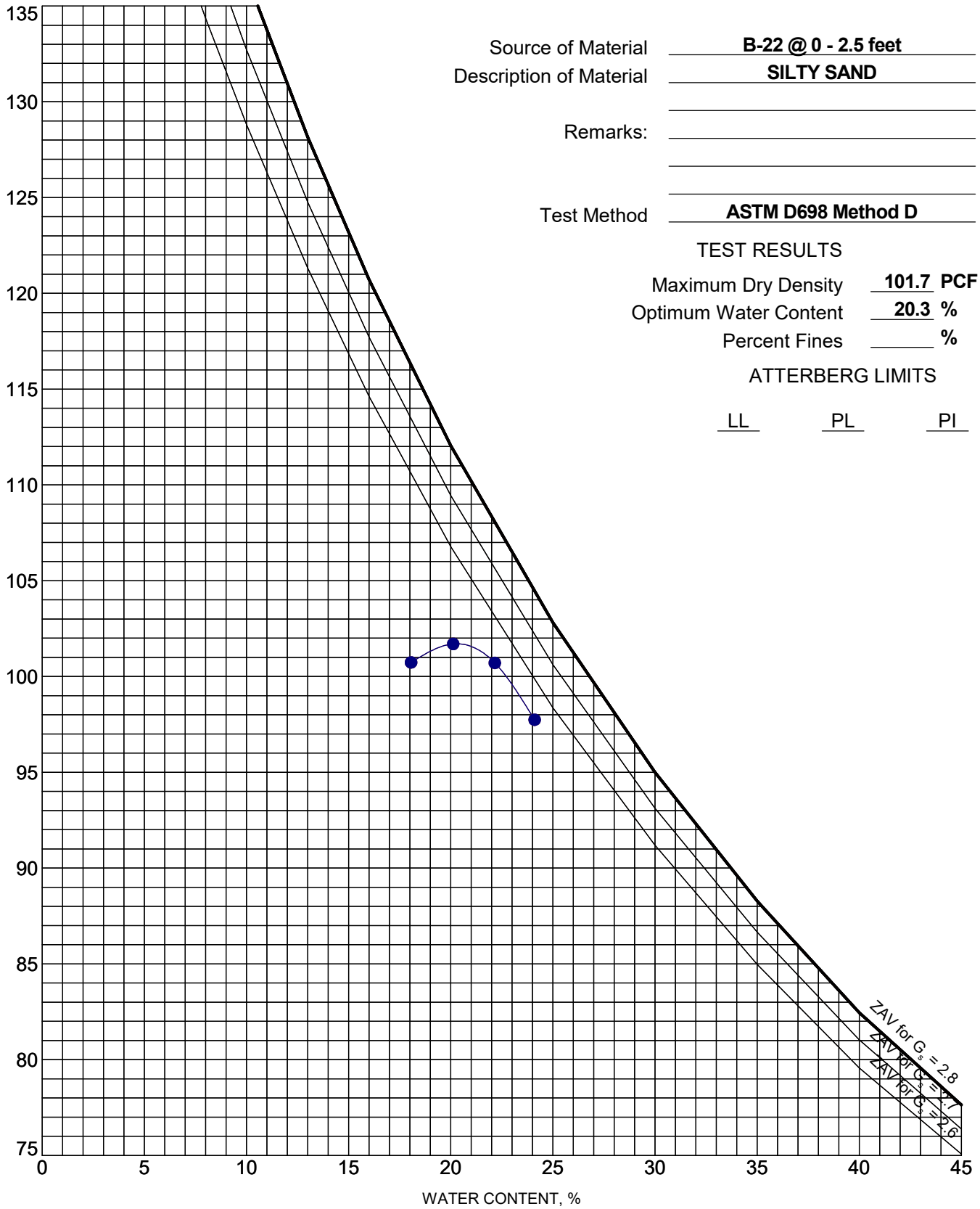
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CLIENT: 8 Minute Energy Renewables
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MOISTURE-DENSITY RELATIONSHIP

ASTM D698/D1557



Source of Material: **B-22 @ 0 - 2.5 feet**

Description of Material: **SILTY SAND**

Remarks:

Test Method: **ASTM D698 Method D**

TEST RESULTS

Maximum Dry Density	**101.7**	**PCF**
Optimum Water Content	**20.3**	**%**
Percent Fines		**%**

ATTERBERG LIMITS

LL	PL	PI

PROJECT: Sienna Solar

PROJECT NUMBER: 60225032

SITE: Barstow Rd and North of Old Woman Springs Rd
Lucerne Valley, CA

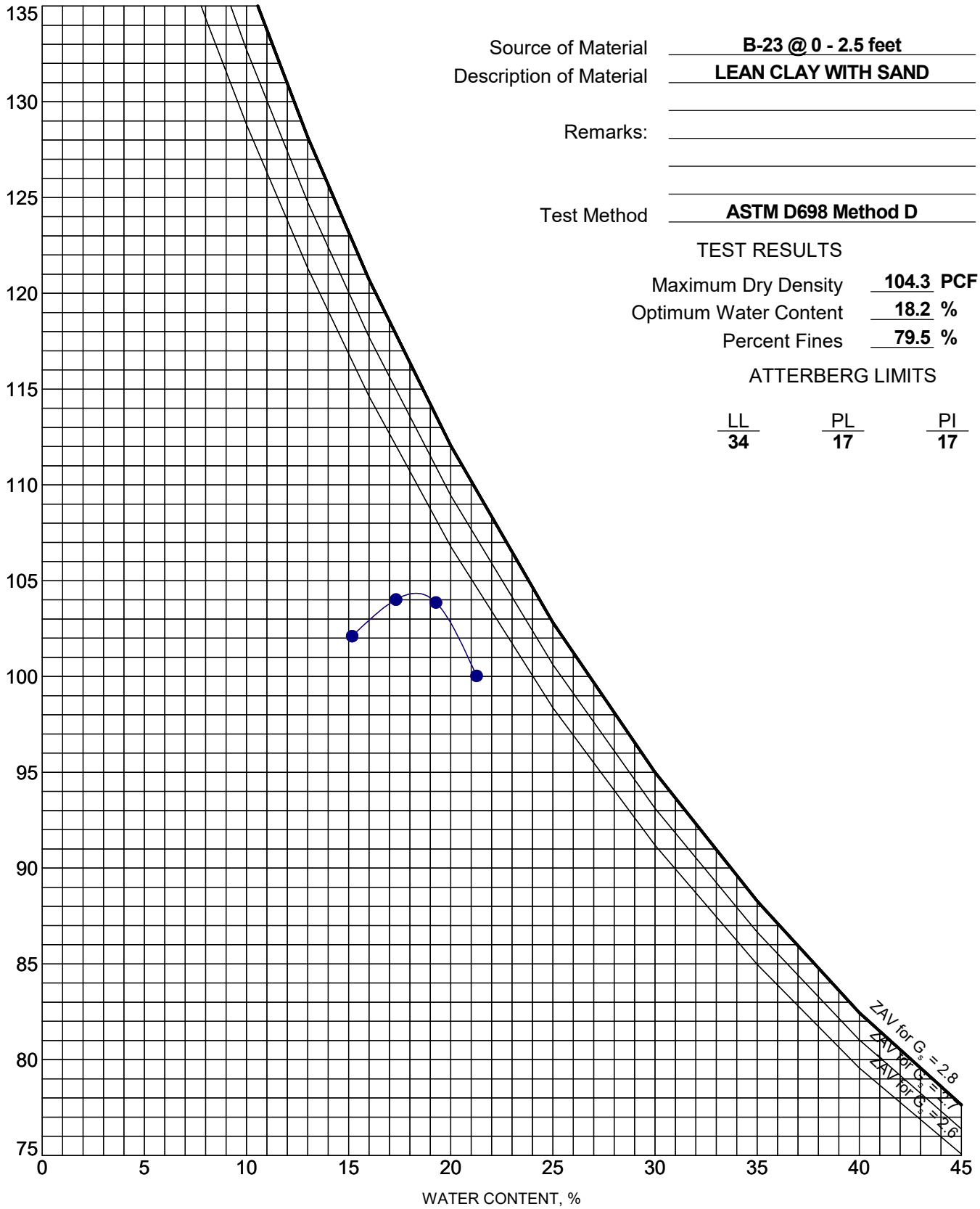
Terracon
23041 Avenida De La Carlota Ste 350
Laguna Hills, CA

CLIENT: 8 Minute Energy Renewables
San Francisco, CA

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MOISTURE-DENSITY RELATIONSHIP

ASTM D698/D1557



Source of Material	**B-23 @ 0 - 2.5 feet**
Description of Material	**LEAN CLAY WITH SAND**
Remarks:	
Test Method	**ASTM D698 Method D**

TEST RESULTS

Maximum Dry Density	**104.3 PCF**
Optimum Water Content	**18.2 %**
Percent Fines	**79.5 %**

ATTERBERG LIMITS

LL	PL	PI
34	**17**	**17**

PROJECT: Sienna Solar

SITE: Barstow Rd and North of Old Woman Springs Rd
Lucerne Valley, CA

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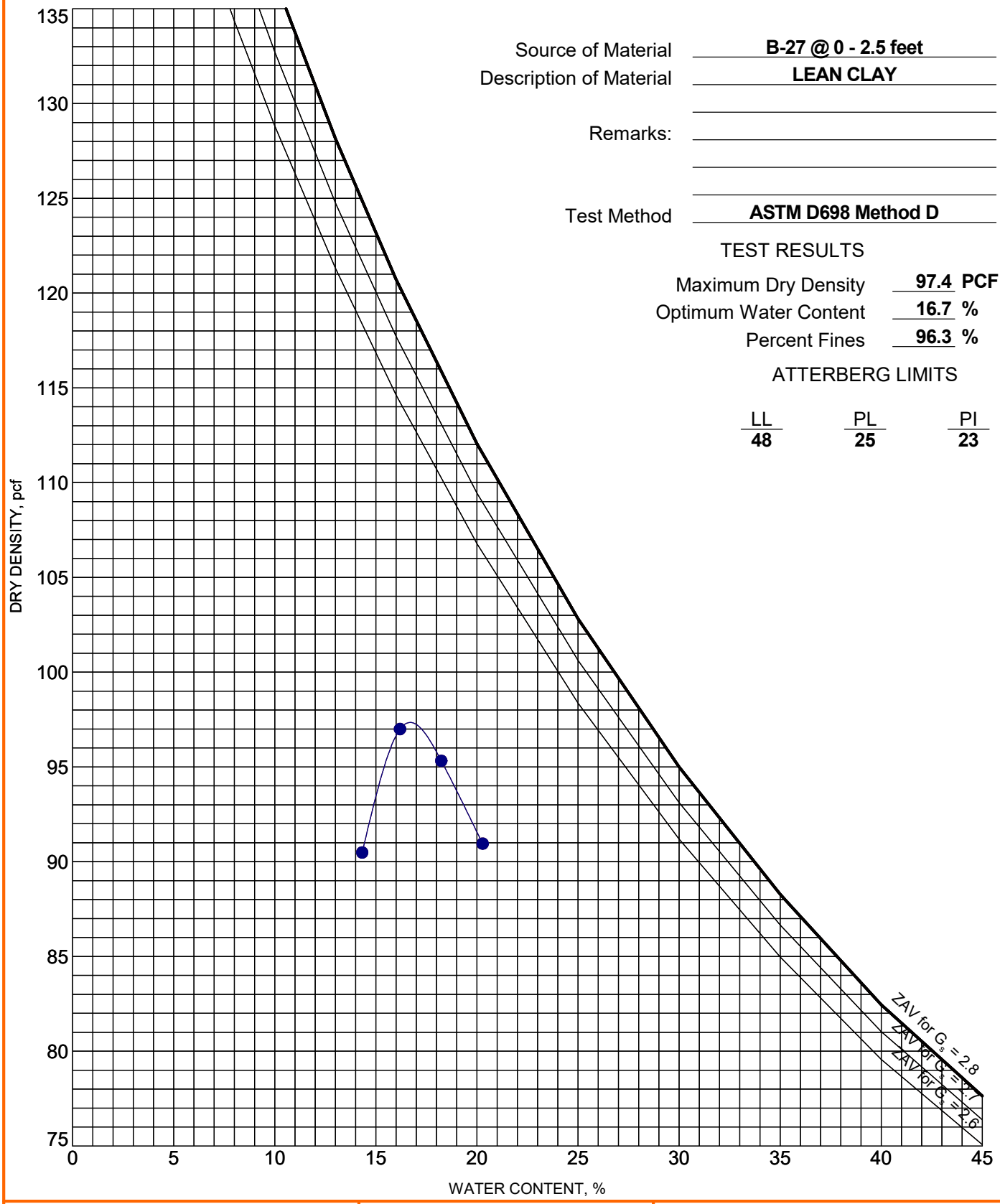
PROJECT NUMBER: 60225032

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MOISTURE-DENSITY RELATIONSHIP

ASTM D698/D1557



Source of Material	**B-27 @ 0 - 2.5 feet**
Description of Material	**LEAN CLAY**
Remarks:	
Test Method	**ASTM D698 Method D**

TEST RESULTS

Maximum Dry Density	**97.4 PCF**
Optimum Water Content	**16.7 %**
Percent Fines	**96.3 %**

ATTERBERG LIMITS

LL	PL	PI
48	**25**	**23**

PROJECT: Sienna Solar

PROJECT NUMBER: 60225032

SITE: Barstow Rd and North of Old Woman Springs Rd
Lucerne Valley, CA

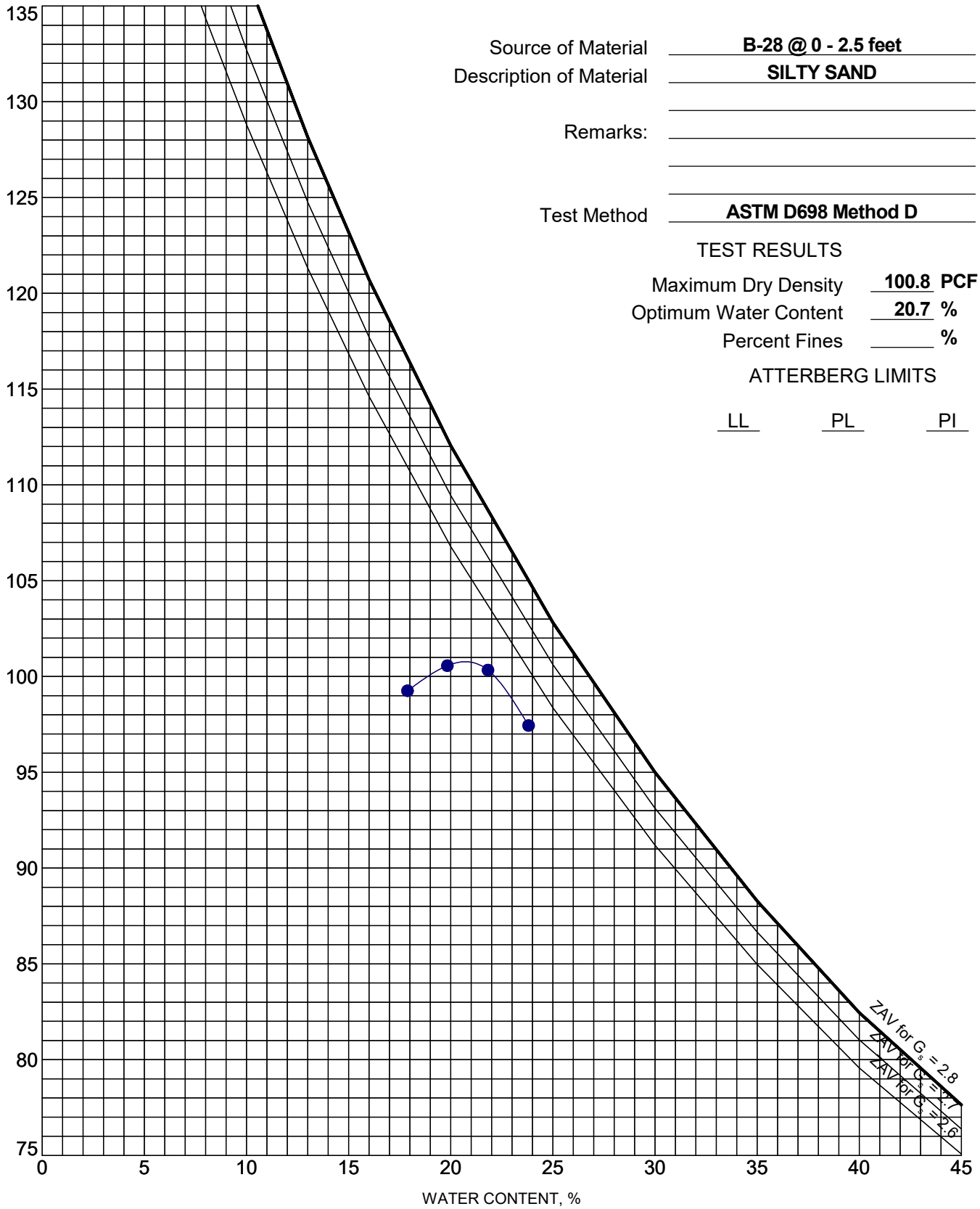
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MOISTURE-DENSITY RELATIONSHIP

ASTM D698/D1557



Source of Material: **B-28 @ 0 - 2.5 feet**

Description of Material: **SILTY SAND**

Remarks:

Test Method: **ASTM D698 Method D**

TEST RESULTS

Maximum Dry Density	**100.8**	**PCF**
Optimum Water Content	**20.7**	**%**
Percent Fines		**%**

ATTERBERG LIMITS

LL	PL	PI

PROJECT: Sienna Solar

PROJECT NUMBER: 60225032

SITE: Barstow Rd and North of Old Woman Springs Rd
Lucerne Valley, CA

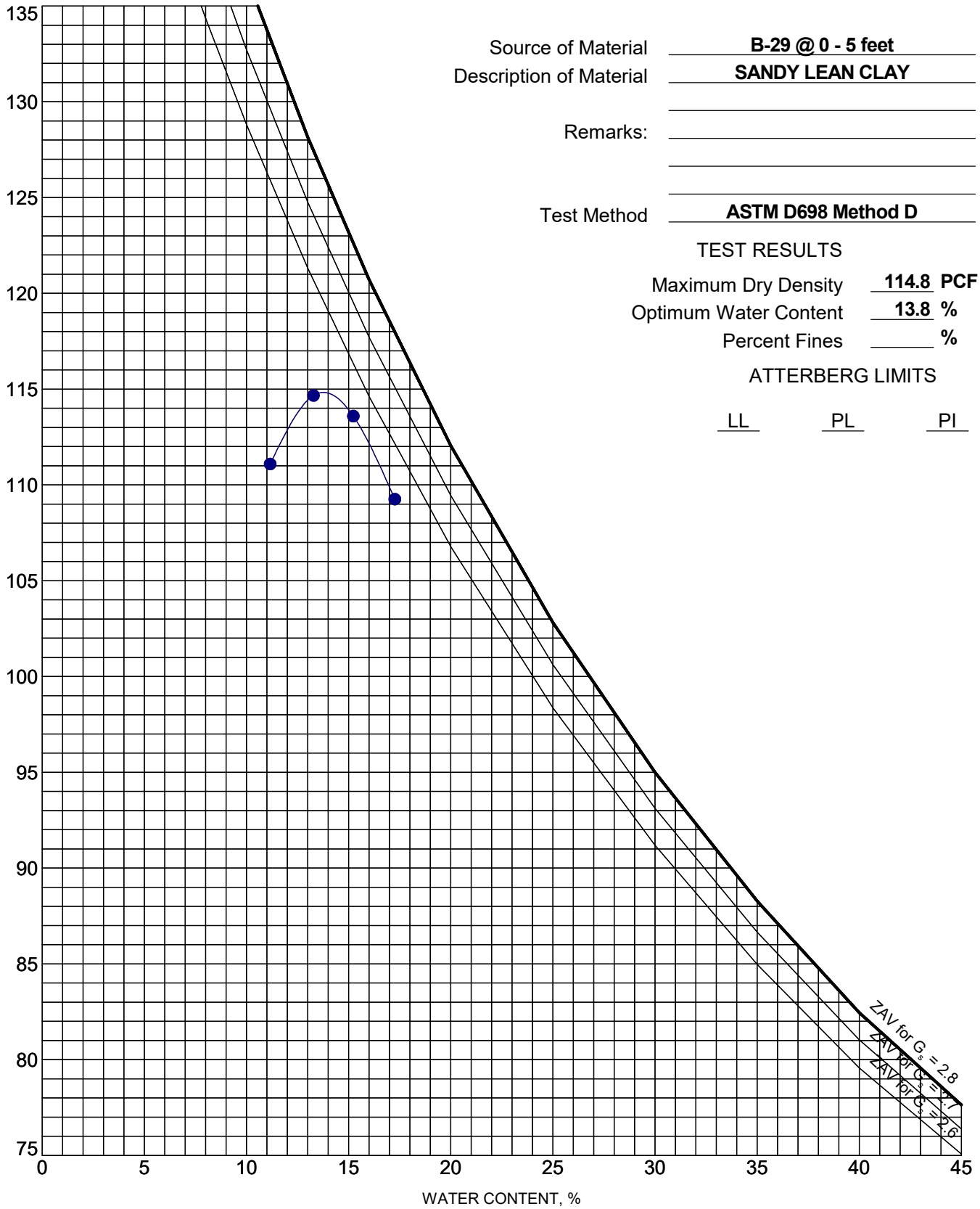
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MOISTURE-DENSITY RELATIONSHIP

ASTM D698/D1557



Source of Material	**B-29 @ 0 - 5 feet**
Description of Material	**SANDY LEAN CLAY**
Remarks:	
Test Method	**ASTM D698 Method D**

TEST RESULTS

Maximum Dry Density	**114.8**	**PCF**
Optimum Water Content	**13.8**	**%**
Percent Fines		**%**

ATTERBERG LIMITS

LL	PL	PI

PROJECT: Sienna Solar

SITE: Barstow Rd and North of Old Woman Springs Rd
Lucerne Valley, CA

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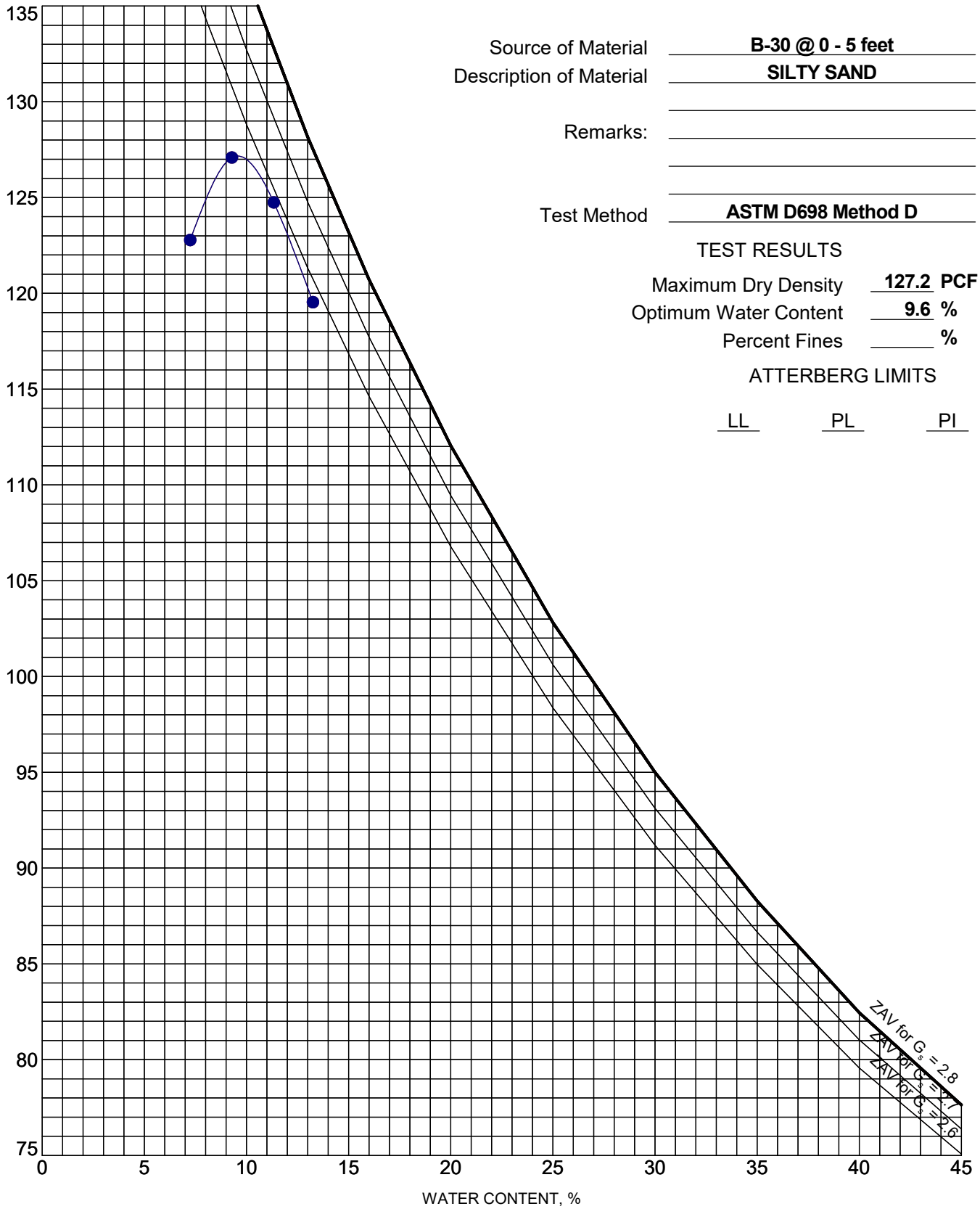
PROJECT NUMBER: 60225032

CLIENT: 8 Minute Energy Renewables
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LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. COMPACTION - V2 60225032 SIENNA SOLAR.GPJ TERRACON_DATATEMPLATE.GDT 6/28/22

MOISTURE-DENSITY RELATIONSHIP

ASTM D698/D1557



Source of Material	**B-30 @ 0 - 5 feet**
Description of Material	**SILTY SAND**
Remarks:	
Test Method	**ASTM D698 Method D**

TEST RESULTS

Maximum Dry Density	**127.2**	**PCF**
Optimum Water Content	**9.6**	**%**
Percent Fines		**%**

ATTERBERG LIMITS

LL	PL	PI

PROJECT: Sienna Solar

PROJECT NUMBER: 60225032

SITE: Barstow Rd and North of Old Woman Springs Rd
Lucerne Valley, CA

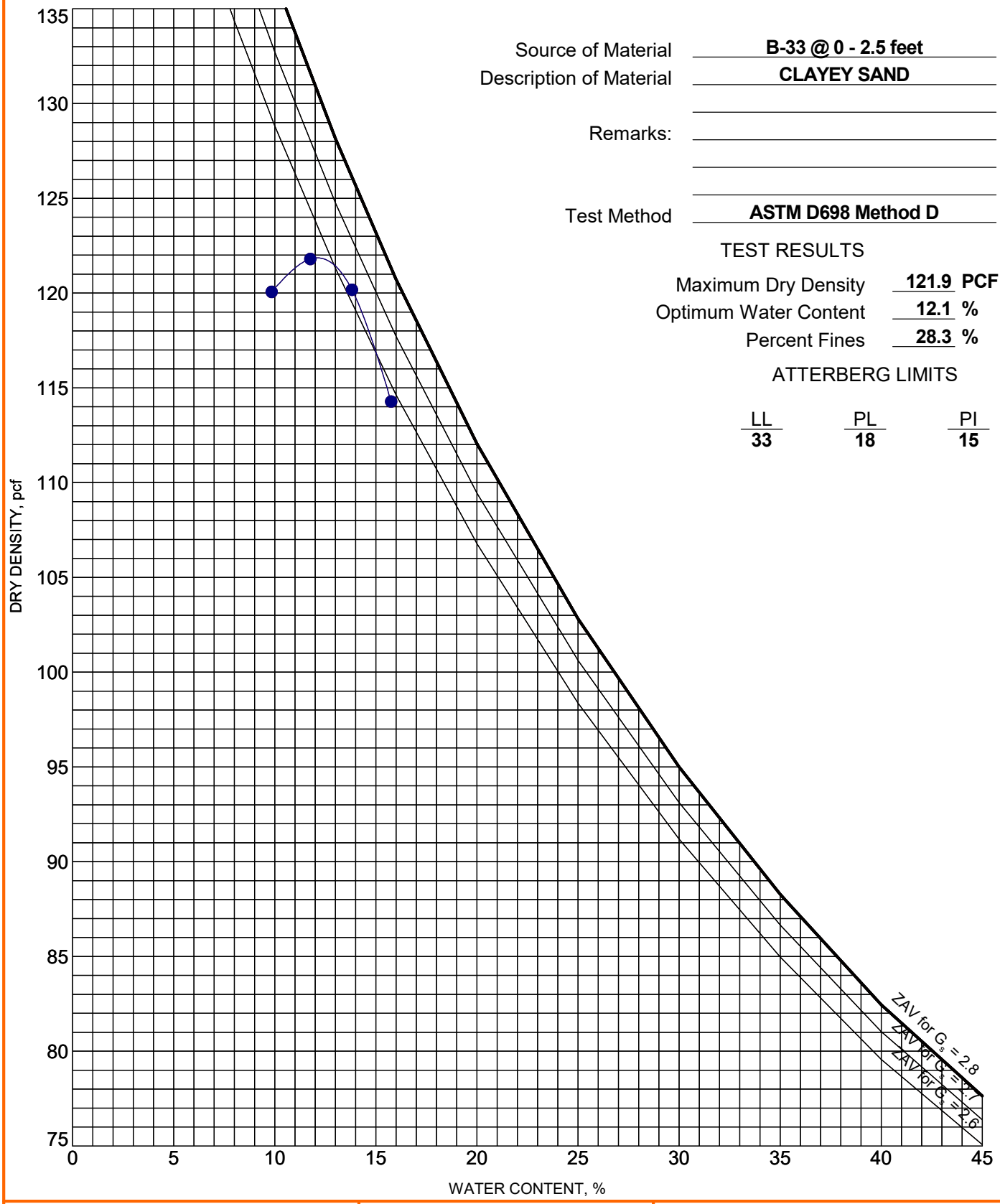
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San Francisco, CA

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MOISTURE-DENSITY RELATIONSHIP

ASTM D698/D1557



Source of Material	**B-33 @ 0 - 2.5 feet**
Description of Material	**CLAYEY SAND**
Remarks:	
Test Method	**ASTM D698 Method D**

TEST RESULTS

Maximum Dry Density	**121.9 PCF**
Optimum Water Content	**12.1 %**
Percent Fines	**28.3 %**

ATTERBERG LIMITS

LL	PL	PI
33	**18**	**15**

PROJECT: Sienna Solar

SITE: Barstow Rd and North of Old Woman Springs Rd
Lucerne Valley, CA

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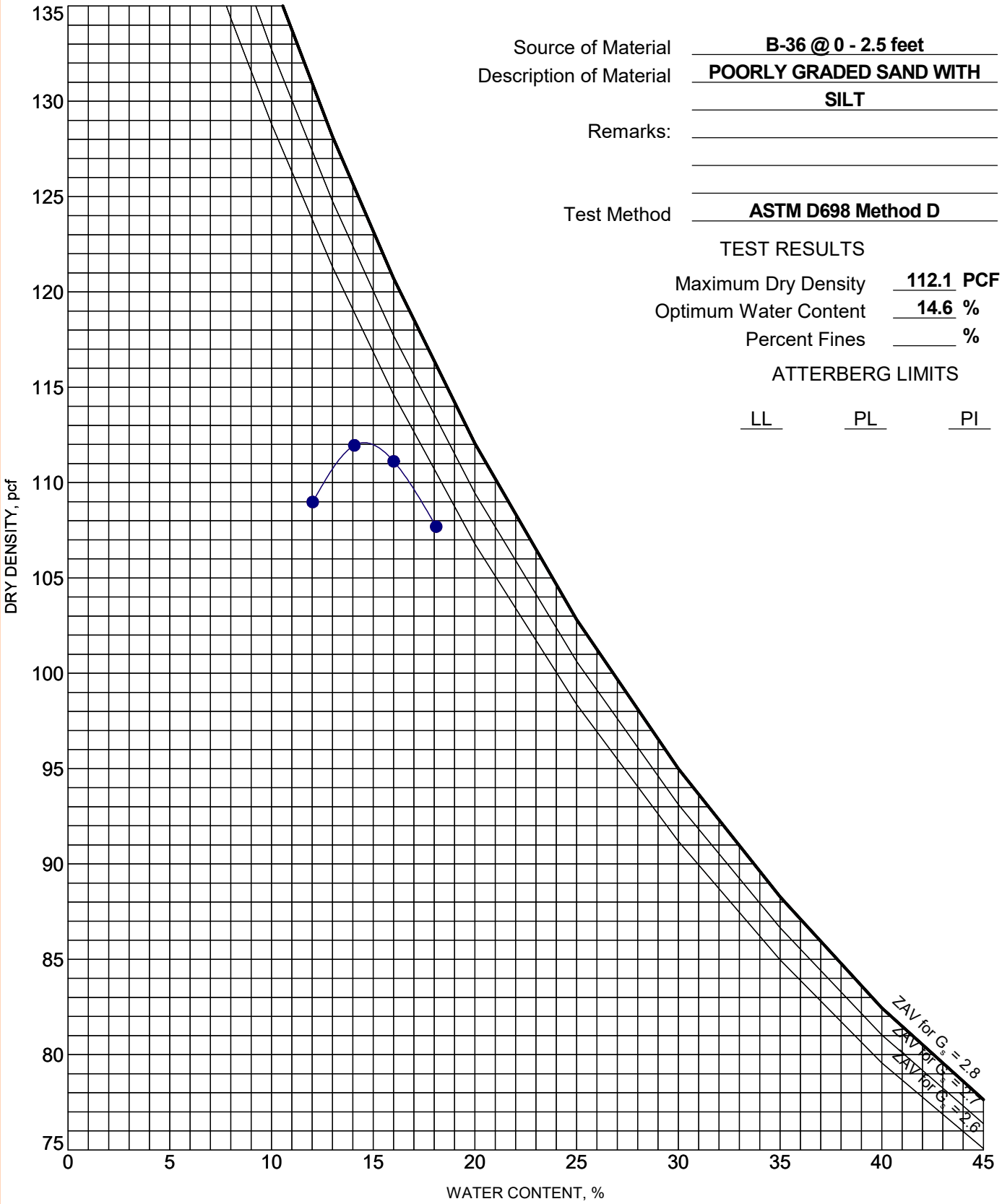
PROJECT NUMBER: 60225032

CLIENT: 8 Minute Energy Renewables
San Francisco, CA

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. COMPACTION - V2 60225032 SIENNA SOLAR.GPJ TERRACON_DATATEMPLATE.GDT 6/28/22

MOISTURE-DENSITY RELATIONSHIP

ASTM D698/D1557



Source of Material	**B-36 @ 0 - 2.5 feet**
Description of Material	**POORLY GRADED SAND WITH SILT**
Remarks:	
Test Method	**ASTM D698 Method D**

TEST RESULTS

Maximum Dry Density	**112.1**	**PCF**
Optimum Water Content	**14.6**	**%**
Percent Fines		**%**

ATTERBERG LIMITS

LL	PL	PI

PROJECT: Sienna Solar

SITE: Barstow Rd and North of Old Woman Springs Rd
Lucerne Valley, CA

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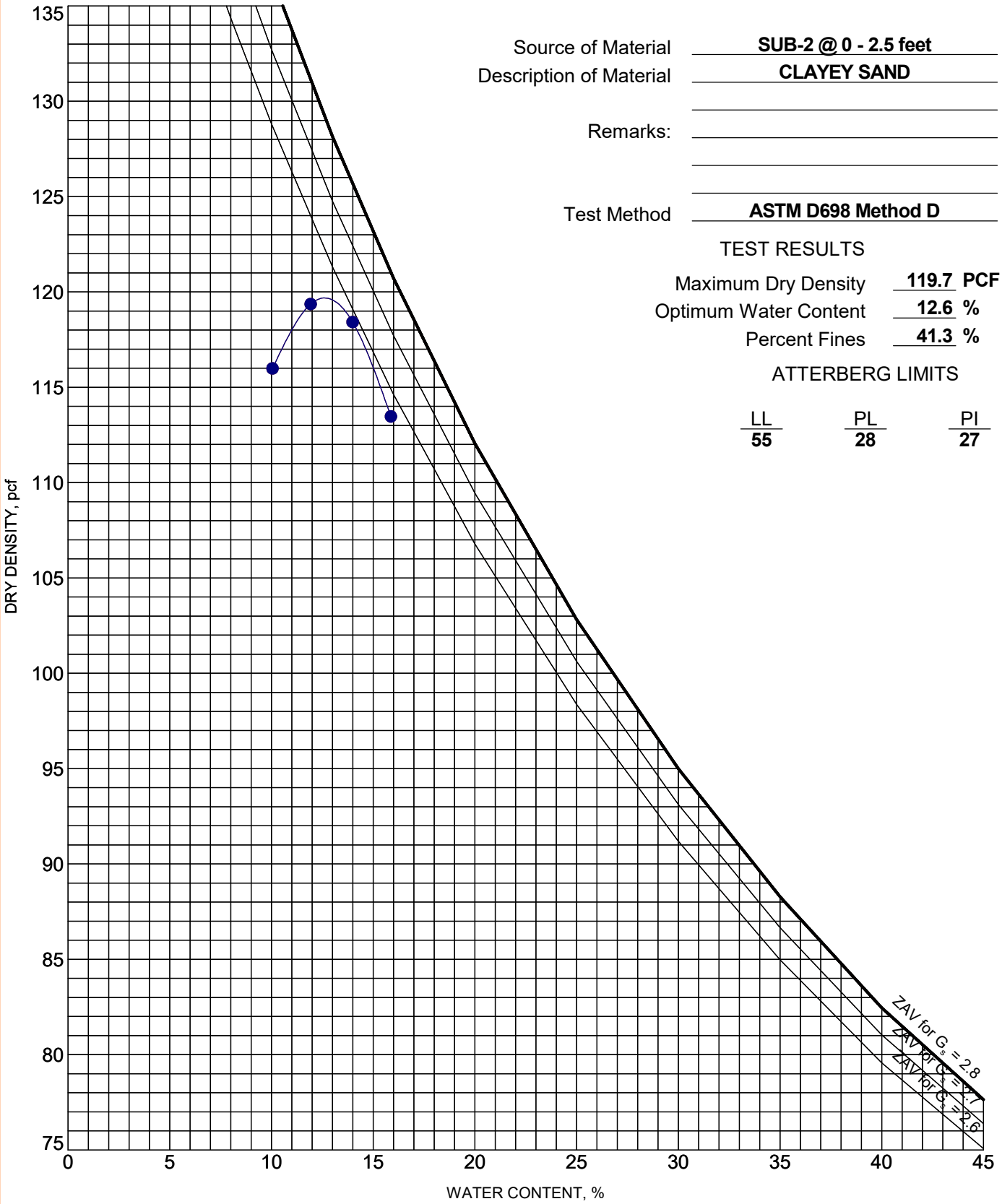
PROJECT NUMBER: 60225032

CLIENT: 8 Minute Energy Renewables
San Francisco, CA

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. COMPACTION - V2 60225032 SIENNA SOLAR.GPJ TERRACON_DATATEMPLATE.GDT 6/28/22

MOISTURE-DENSITY RELATIONSHIP

ASTM D698/D1557



Source of Material	**SUB-2 @ 0 - 2.5 feet**
Description of Material	**CLAYEY SAND**
Remarks:	
Test Method	**ASTM D698 Method D**

TEST RESULTS

Maximum Dry Density	**119.7 PCF**
Optimum Water Content	**12.6 %**
Percent Fines	**41.3 %**

ATTERBERG LIMITS

LL	PL	PI
55	**28**	**27**

PROJECT: Sienna Solar

SITE: Barstow Rd and North of Old Woman Springs Rd
Lucerne Valley, CA

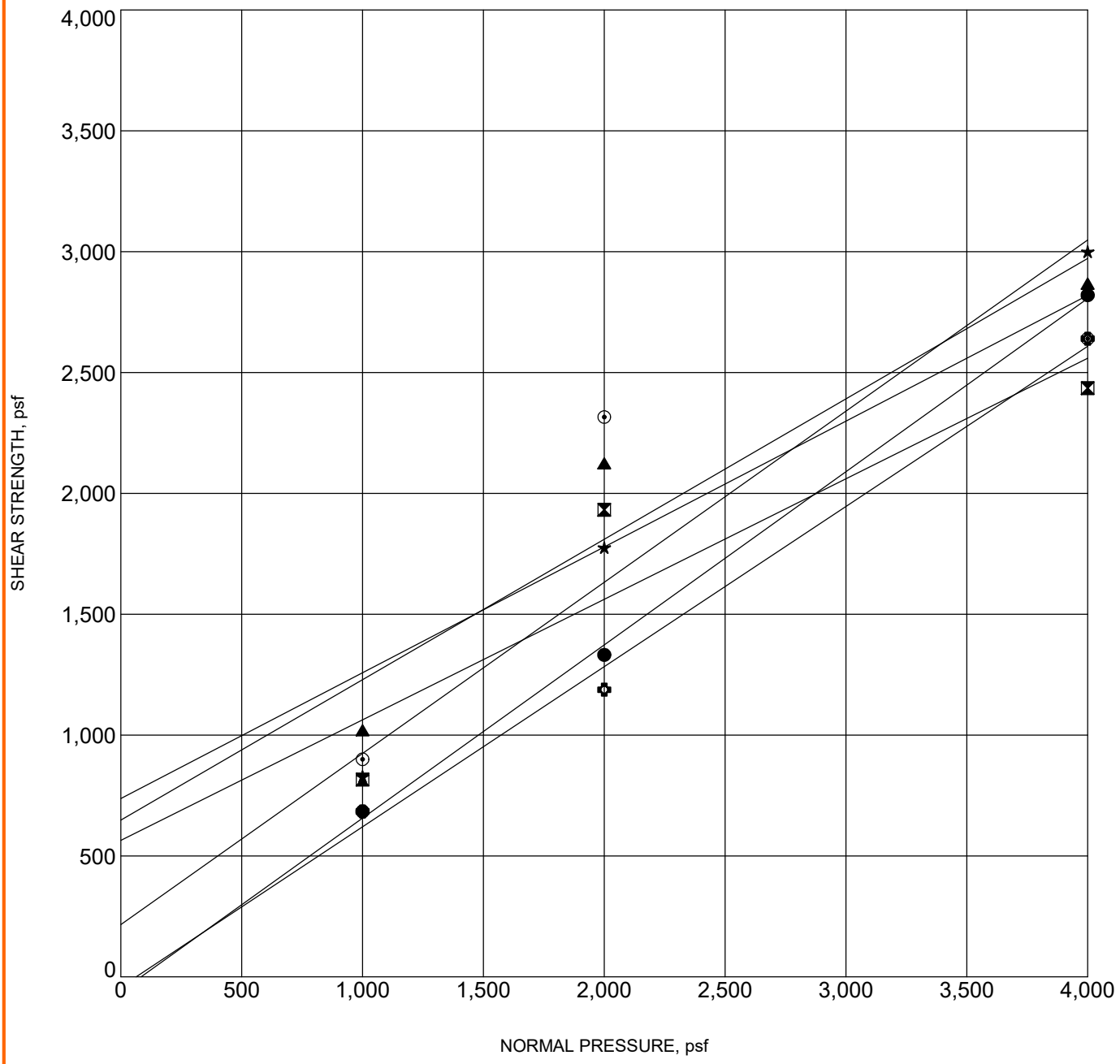
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PROJECT NUMBER: 60225032

CLIENT: 8 Minute Energy Renewables
San Francisco, CA

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DIRECT SHEAR TEST ASTM D3080



Specimen Identification			Classification	γ_d, pcf	WC,%	c, psf	$\phi°$
●	B-03	7.5ft	CLAYEY SAND (SC)	97	19	0	35
⊠	B-08	10.0ft	SANDY LEAN CLAY (CL)	100	27	564	27
▲	B-14	10.0ft	SILTY CLAYEY SAND (SC-SM)	108	18	648	30
★	B-19	7.5ft	SILTY CLAYEY SAND (SC-SM)	87	23	216	35
⊙	B-29	7.5ft	SANDY LEAN CLAY (CL)	113	9	738	27
✿	B-35	7.5ft	SILTY CLAYEY SAND (SC-SM)	92	12	0	33

PROJECT: Sienna Solar

SITE: Barstow Rd and North of Old Woman Springs Rd
Lucerne Valley, CA

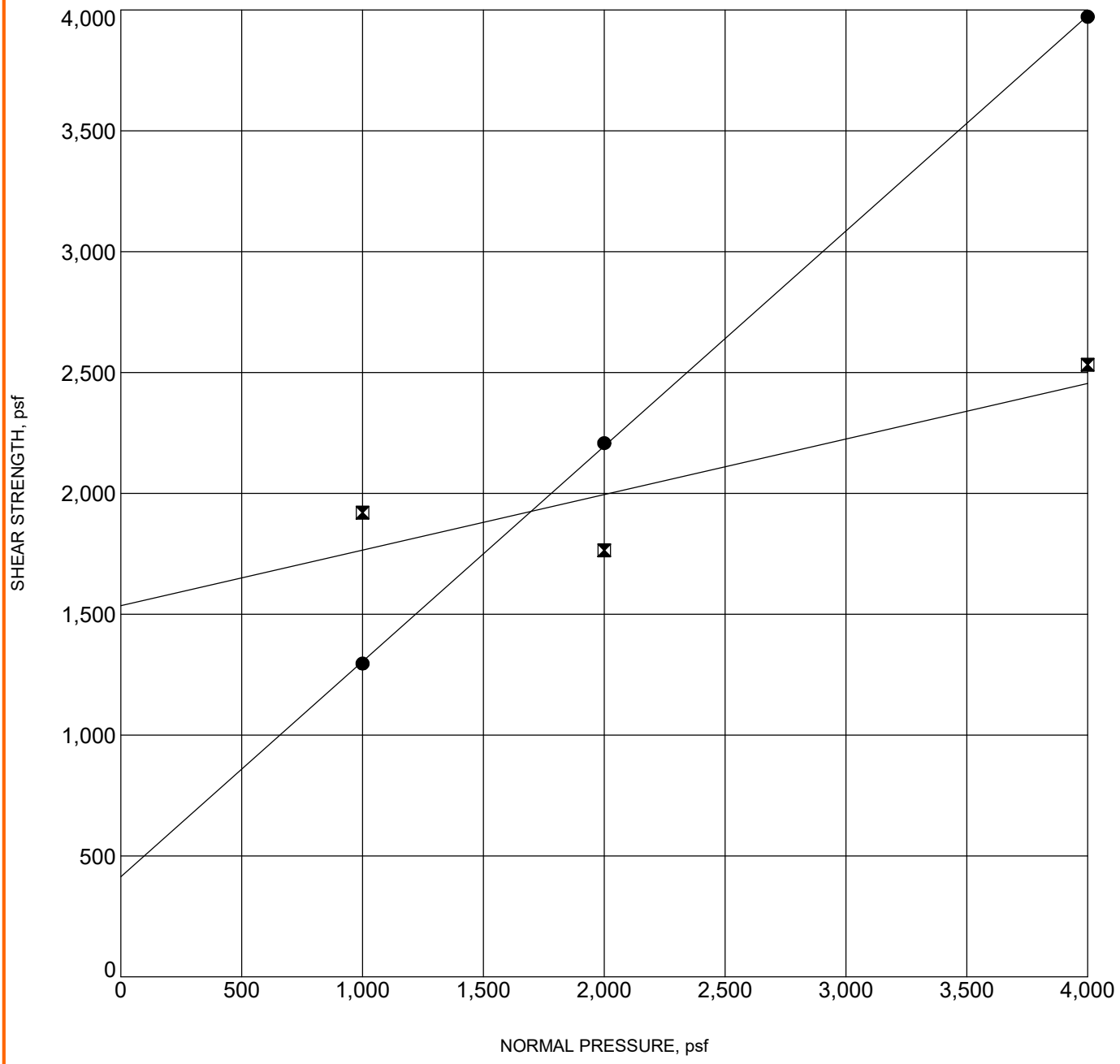
Terracon
23041 Avenida De La Carlota Ste 350
Laguna Hills, CA

PROJECT NUMBER: 60225032

CLIENT: 8 Minute Energy Renewables
San Francisco, CA

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. TC_DIRECT_SHEAR 60225032 SIENNA SOLAR.GPJ TERRACON_DATATEMPLATE.GDT 6/28/22

DIRECT SHEAR TEST ASTM D3080



Specimen Identification			Classification	γ_d, pcf	WC,%	c, psf	$\phi°$
●	B-36	10.0ft	CLAYEY SAND (SC)	116	13	414	42
⊠	SUB-2	10.0ft	SANDY LEAN CLAY (CL)	107	9	1536	13

PROJECT: Sienna Solar

SITE: Barstow Rd and North of Old Woman Springs Rd
Lucerne Valley, CA

Terracon
23041 Avenida De La Carlota Ste 350
Laguna Hills, CA

PROJECT NUMBER: 60225032

CLIENT: 8 Minute Energy Renewables
San Francisco, CA

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT. TC_DIRECT_SHEAR 60225032 SIENNA SOLAR.GPJ TERRACON_DATATEMPLATE.GDT 6/28/22

GENERAL NOTES

DESCRIPTION OF SYMBOLS AND ABBREVIATIONS

Sienna Solar ■ Lucerne Valley, CA

Terracon Project No. 60225032

SAMPLING

- Auger Cuttings
- Modified Dames & Moore Ring Sampler
- Grab Sample
- No Recovery
- Standard Penetration Test

WATER LEVEL

- **Water Initially Encountered**
- **Water Level After a Specified Period of Time**
- **Water Level After a Specified Period of Time**
- **Cave In Encountered**

Water levels indicated on the soil boring logs are the levels measured in the borehole at the times indicated. Groundwater level variations will occur over time. In low permeability soils, accurate determination of groundwater levels is not possible with short term water level observations.

FIELD TESTS

N	**Standard Penetration Test Resistance (Blows/Ft.)**
(HP)	**Hand Penetrometer**
(T)	**Torvane**
(DCP)	**Dynamic Cone Penetrometer**
UC	**Unconfined Compressive Strength**
(PID)	**Photo-Ionization Detector**
(OVA)	**Organic Vapor Analyzer**

DESCRIPTIVE SOIL CLASSIFICATION

Soil classification as noted on the soil boring logs is based Unified Soil Classification System. Where sufficient laboratory data exist to classify the soils consistent with ASTM D2487 "Classification of Soils for Engineering Purposes" this procedure is used. ASTM D2488 "Description and Identification of Soils (Visual-Manual Procedure)" is also used to classify the soils, particularly where insufficient laboratory data exist to classify the soils in accordance with ASTM D2487. In addition to USCS classification, coarse grained soils are classified on the basis of their in-place relative density, and fine-grained soils are classified on the basis of their consistency. See "Strength Terms" table below for details. The ASTM standards noted above are for reference to methodology in general. In some cases, variations to methods are applied as a result of local practice or professional judgment.

LOCATION AND ELEVATION NOTES

Exploration point locations as shown on the Exploration Plan and as noted on the soil boring logs in the form of Latitude and Longitude are approximate. See Exploration and Testing Procedures in the report for the methods used to locate the exploration points for this project. Surface elevation data annotated with +/- indicates that no actual topographical survey was conducted to confirm the surface elevation. Instead, the surface elevation was approximately determined from topographic maps of the area.

STRENGTH TERMS

RELATIVE DENSITY OF COARSE-GRAINED SOILS (More than 50% retained on No. 200 sieve.) Density determined by Standard Penetration Resistance		**CONSISTENCY OF FINE-GRAINED SOILS** (50% or more passing the No. 200 sieve.) Consistency determined by laboratory shear strength testing, field visual-manual procedures or standard penetration resistance		
Descriptive Term (Density)	**Standard Penetration or N-Value Blows/Ft.**	**Descriptive Term (Consistency)**	**Unconfined Compressive Strength Qu, (tsf)**	**Standard Penetration or N-Value Blows/Ft.**
Very Loose	0 - 3	Very Soft	less than 0.25	0 - 1
Loose	4 - 9	Soft	0.25 to 0.50	2 - 4
Medium Dense	10 - 29	Medium Stiff	0.50 to 1.00	4 - 8
Dense	30 - 50	Stiff	1.00 to 2.00	8 - 15
Very Dense	> 50	Very Stiff	2.00 to 4.00	15 - 30
		Hard	> 4.00	> 30

RELEVANCE OF SOIL BORING LOG

The soil boring logs contained within this document are intended for application to the project as described in this document. Use of these soil boring logs for any other purpose may not be appropriate.

UNIFIED SOIL CLASSIFICATION SYSTEM

Terracon GeoReport

Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests [A]					Soil Classification	
					Group Symbol	Group Name [B]
Coarse-Grained Soils: More than 50% retained on No. 200 sieve	**Gravels:** More than 50% of coarse fraction retained on No. 4 sieve	**Clean Gravels:** Less than 5% fines [C]	Cu ≥ 4 and 1 ≤ Cc ≤ 3 [E]		GW	Well-graded gravel [F]
			Cu < 4 and/or [Cc<1 or Cc>3.0] [E]		GP	Poorly graded gravel [F]
		Gravels with Fines: More than 12% fines [C]	Fines classify as ML or MH		GM	Silty gravel [F, G, H]
			Fines classify as CL or CH		GC	Clayey gravel [F, G, H]
	Sands: 50% or more of coarse fraction passes No. 4 sieve	**Clean Sands:** Less than 5% fines [D]	Cu ≥ 6 and 1 ≤ Cc ≤ 3 [E]		SW	Well-graded sand [I]
			Cu < 6 and/or [Cc<1 or Cc>3.0] [E]		SP	Poorly graded sand [I]
		Sands with Fines: More than 12% fines [D]	Fines classify as ML or MH		SM	Silty sand [G, H, I]
			Fines classify as CL or CH		SC	Clayey sand [G, H, I]
Fine-Grained Soils: 50% or more passes the No. 200 sieve	**Silts and Clays:** Liquid limit less than 50	**Inorganic:**	PI > 7 and plots on or above "A"		CL	Lean clay [K, L, M]
			PI < 4 or plots below "A" line [J]		ML	Silt [K, L, M]
		Organic:	Liquid limit - oven dried	< 0.75	OL	Organic clay [K, L, M, N]
			Liquid limit - not dried			Organic silt [K, L, M, O]
	Silts and Clays: Liquid limit 50 or more	**Inorganic:**	PI plots on or above "A" line		CH	Fat clay [K, L, M]
			PI plots below "A" line		MH	Elastic Silt [K, L, M]
		Organic:	Liquid limit - oven dried	< 0.75	OH	Organic clay [K, L, M, P]
			Liquid limit - not dried			Organic silt [K, L, M, Q]
Highly organic soils:	Primarily organic matter, dark in color, and organic odor				PT	Peat

[A] Based on the material passing the 3-inch (75-mm) sieve.

[B] If field sample contained cobbles or boulders, or both, add "with cobbles or boulders, or both" to group name.

[C] Gravels with 5 to 12% fines require dual symbols: GW-GM well-graded gravel with silt, GW-GC well-graded gravel with clay, GP-GM poorly graded gravel with silt, GP-GC poorly graded gravel with clay.

[D] Sands with 5 to 12% fines require dual symbols: SW-SM well-graded sand with silt, SW-SC well-graded sand with clay, SP-SM poorly graded sand with silt, SP-SC poorly graded sand with clay.

[E] $Cu = D_{60}/D_{10}$ $\quad Cc = \dfrac{(D_{30})^2}{D_{10} \times D_{60}}$

[F] If soil contains ≥ 15% sand, add "with sand" to group name.

[G] If fines classify as CL-ML, use dual symbol GC-GM, or SC-SM.

[H] If fines are organic, add "with organic fines" to group name.

[I] If soil contains ≥ 15% gravel, add "with gravel" to group name.

[J] If Atterberg limits plot in shaded area, soil is a CL-ML, silty clay.

[K] If soil contains 15 to 29% plus No. 200, add "with sand" or "with gravel," whichever is predominant.

[L] If soil contains ≥ 30% plus No. 200 predominantly sand, add "sandy" to group name.

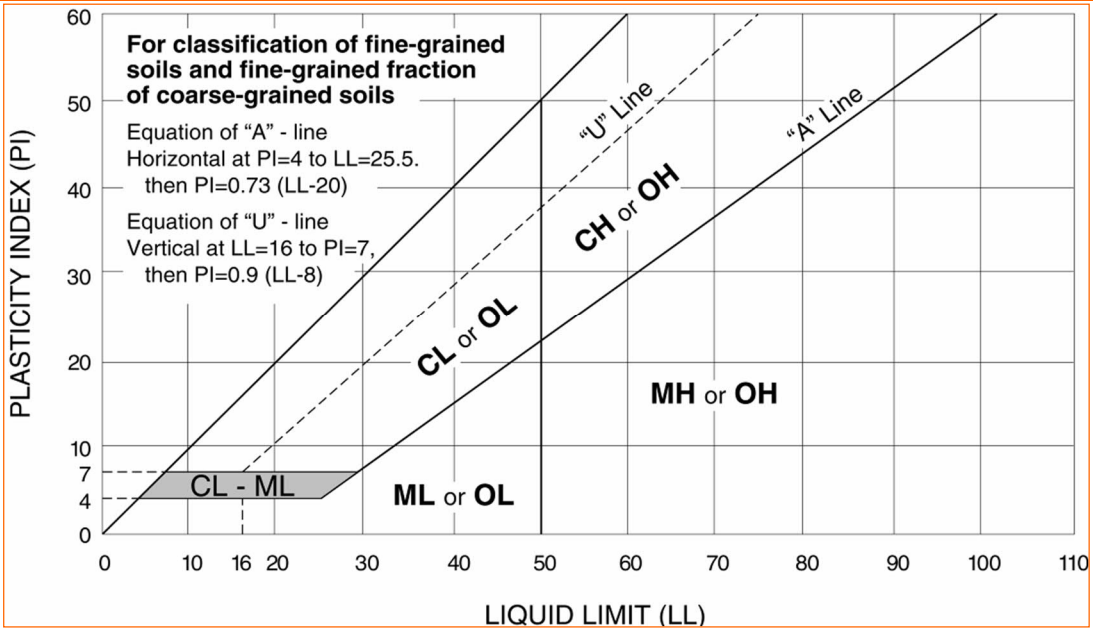
[M] If soil contains ≥ 30% plus No. 200, predominantly gravel, add "gravelly" to group name.

[N] PI ≥ 4 and plots on or above "A" line.

[O] PI < 4 or plots below "A" line.

[P] PI plots on or above "A" line.

[Q] PI plots below "A" line.



	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
VI. GEOLOGY AND SOILS. Would the project:				
a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:				
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.	☐	☐	☒	☐
ii) Strong seismic ground shaking?	☐	☐	☒	☐
iii) Seismic-related ground failure, including liquefaction?	☐	☐	☒	☐
iv) Landslides?	☐	☐	☒	☐
b) Result in substantial soil erosion or the loss of topsoil?	☐	☐	☒	☐
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?	☐	☒	☐	☐
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?	☐	☒	☐	☐
e) Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?	☒	☐	☐	☐

Appendix H. Paleontological Resources Assessment

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Sienna Solar and Storage Project

Paleontological Resources Assessment

prepared for

99MT 8me, LLC
211 Sutter Street, 6th Floor
San Francisco, California 94108
Contact: Erec DeVost

prepared by

Rincon Consultants, Inc.
1980 Orange Tree Lane, Suite 105
Redlands, California 92374

March 2023

RINCON CONSULTANTS, INC.
Environmental Scientists | Planners | Engineers
rinconconsultants.com

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Executive Summary

Rincon Consultants, Inc. (Rincon) was retained by 99MT 8me, LLC (applicant) to conduct a paleontological resource assessment for the Sienna Solar and Storage Project (Project) located in the Lucerne Valley, San Bernardino County, California. This study has been prepared in conformance with the California Environmental Quality Act (CEQA) and includes a records search, literature review, and paleontological sensitivity assessment, consistent with the professional standards of the Society of Vertebrate Paleontology (SVP) (2010). The purpose of the literature review and records search was to identify the geologic units underlying the Project and to determine whether previously recorded paleontological localities occur either within the Project boundaries or elsewhere in the same geologic unit. Using the results of the literature review and records search, the paleontological resource potential of the Project area was determined in accordance with the 2010 SVP guidelines.

Results of Investigation

Published geologic mapping indicates that the Project area is underlain by four geologic units: Quaternary young (Holocene) alluvium (Qa), Quaternary young (Holocene) dune sand (Qs), Quaternary young (Holocene) playa deposits (Qc), and Quaternary old (Pleistocene) gravel deposits (Qog). A records search for paleontological locality data within the Project area and the vicinity was obtained from the Natural History Museum of Los Angeles County (NHMLAC) and online records were reviewed at the University of California's Museum of Paleontology. Based on the NHMLAC records search results, no vertebrate fossil localities have been previously recorded directly in the Project boundary; however, multiple vertebrate fossil localities have been previously recorded nearby within fine-grained Quaternary old (Pleistocene) alluvial deposits (e.g., Qoa), which may underlie the Project area at shallow or unknown depths. These localities yielded scientifically significant fossilized specimens of large terrestrial mammals, rodents, and reptiles (Bell 2021). Based on this assessment, the surficial geology of the Project area has a low paleontological sensitivity but increases with depth. Fine-grained Quaternary old (Pleistocene) sediments (e.g., Qoa) may underlie Quaternary young (Holocene) deposits (Qa, Qs, Qc) and coarse-grained Quaternary old sediments (Qog) at depths as shallow as five feet below ground surface in the vicinity of the Project area. As proposed, ground disturbing activities associated with the proposed foundations for mounting structures can extend up to 10 feet below ground surface. Therefore, the proposed Project has potential for impacts to scientifically significant vertebrate fossils as a result of construction activities.

Recommendations

Rincon recommends that a Qualified Paleontologist be retained to develop and implement measures to reduce impacts to paleontological resources to a less-than-significant level. These measures include paleontological training for construction staff (to be included with the Project's Worker's Environmental Awareness Program), paleontological monitoring in areas of high paleontological sensitivity, including areas requiring excavations exceeding five feet below ground surface within intact (native) Quaternary young (Holocene) and Quaternary old (Pleistocene) deposits (Qa, Qs, Qc, Qog), and preparation of a paleontological monitoring report, which shall be submitted to the County of San Bernardino. If the monitoring efforts produced fossils, then a copy

of the report shall also be submitted to the approved curation facility and accompanied by any significant fossils recovered during construction monitoring. These measures have been proven to be effective in reducing or eliminating adverse impacts to paleontological resources and would satisfy CEQA requirements.

1 Introduction

Paleontological resources (i.e., fossils) are the remains or traces of prehistoric life. Fossils are typically preserved in layered sedimentary rocks and the distribution of fossils across the landscape is controlled by the distribution and exposure of the fossiliferous sedimentary rock units at and near the surface. Construction related impacts that typically affect or have the potential to affect paleontological resources include mass excavation operations, drilling/borehole excavations, trenching/tunneling, and grading.

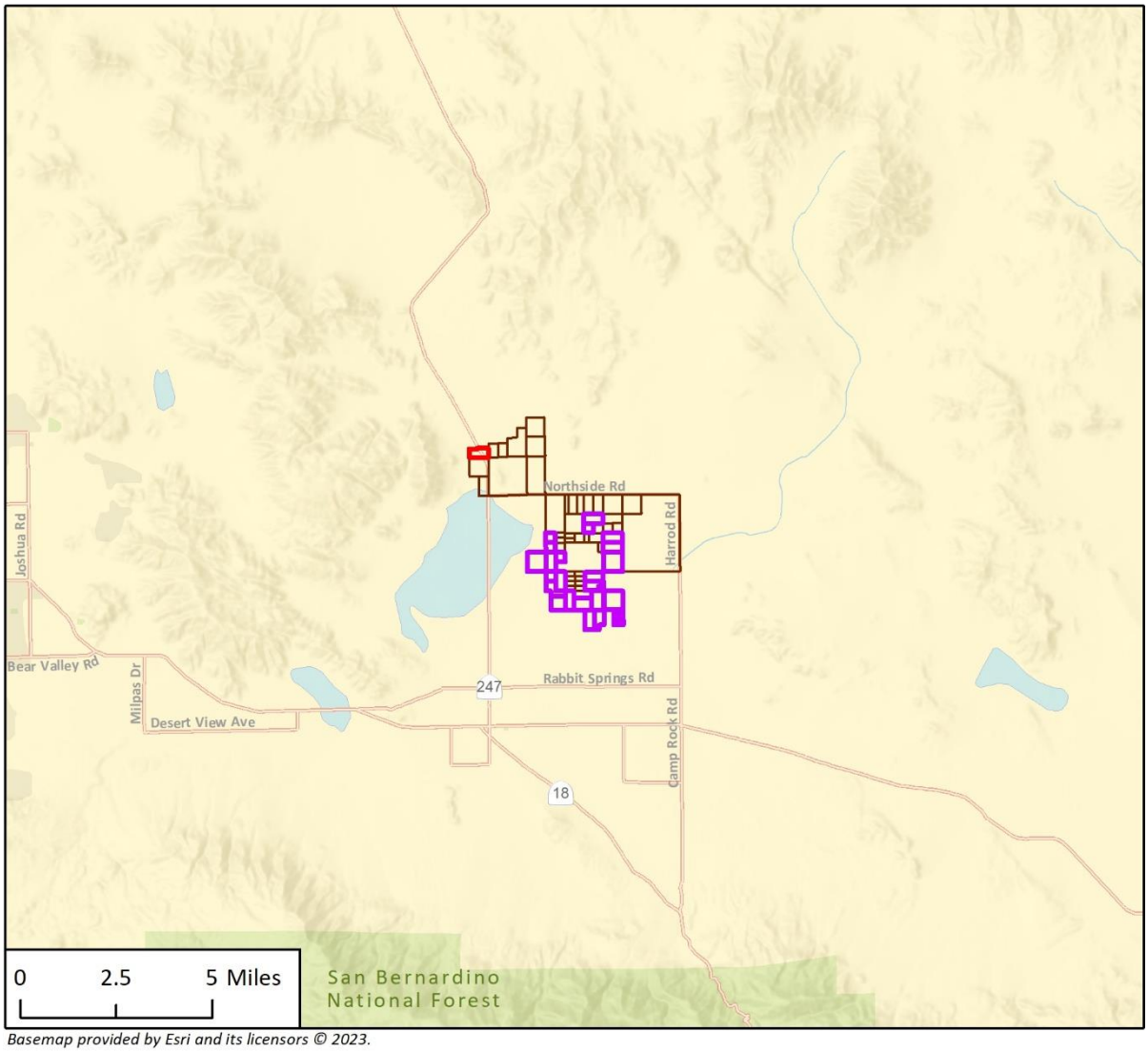
This Paleontological Resources Assessment provides a description of the geologic units mapped at the surface within the Project area, including types of fossils known to occur within the units (if any), the paleontological sensitivity for each unit, a review of relevant agency regulation, an assessment of potential impacts from Project development, and recommended mitigation measures for the protection and recovery of significant fossils that may be impacted. This study has also been conducted in accordance with the requirements of the California Environmental Quality Act (CEQA). The County of San Bernardino (County) is the CEQA Lead Agency for the Project.

1.1 Project Location and Description

The proposed Sienna Solar and Storage Project (Project) is a 525-megawatt (MW) utility-scale solar farm with 525-MW battery storage located in unincorporated San Bernardino County. Figure 1 and Figure 2 show the regional location and immediate vicinity of the Project area, respectively. The site is located east of Barstow Road/State Route (SR) 247 roughly between Northside Road and Wilshire Road, northeast of the community of Lucerne Valley. The Project area is depicted on the *White Horse Mountain, Grand View Mine,* and *Lucerne Valley*, 7.5-minute U.S. Geological Survey topographic quadrangles and falls within: Township (T) T06N Range (R) 01W, Section (S) 36; T06N R01E S31; T05N R01W S1-2, 11-14, 24; T05N R01E S06-09, 16-21, 28-30; T05N R01E S10, 15, 22, 27; T05N R01E S28-33.

The Project consists of the installation of a photovoltaic (PV) solar facility, Battery Energy Storage System (BESS), and Operations and Maintenance (O&M) building(s).The Sienna Project will interconnect at the SCE Calcite Substation (currently pending environmental clearance and construction) via a proposed overhead and/or underground 230-kV generation tie-in (gen-tie) line in addition to other ancillary facilities utilizing private and potentially public ROWs. The Project area encompasses 1,854 acres with an additional 77-acre substation site. Approximately 39 miles of collector lines and gen-tie alternatives will be analyzed in this assessment, although not all routes will be developed. The Project area is characterized by a mixture of residential properties, undeveloped playa and desert scrub communities, and agricultural land that includes alfalfa and jojoba farms and large-scale, hemp-growing operations.

Figure 1 Regional Location



Basemap provided by Esri and its licensors © 2023.

Project Site

Proposed SCE Calcite Substation

Gen-Tie Line and/or Collector Line Alternatives

N

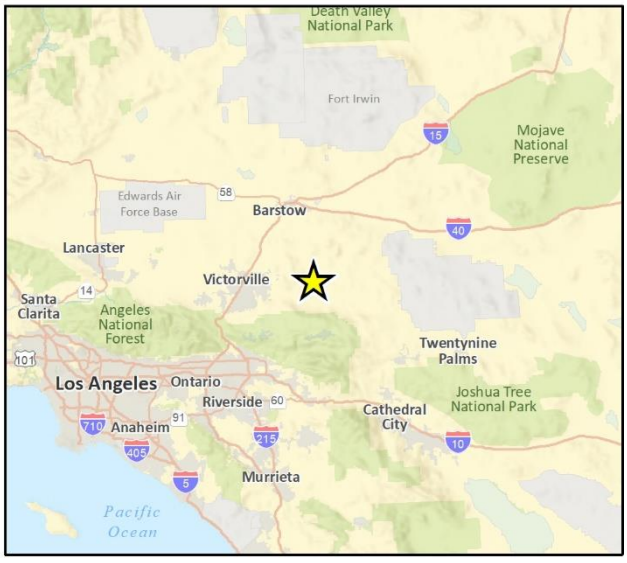
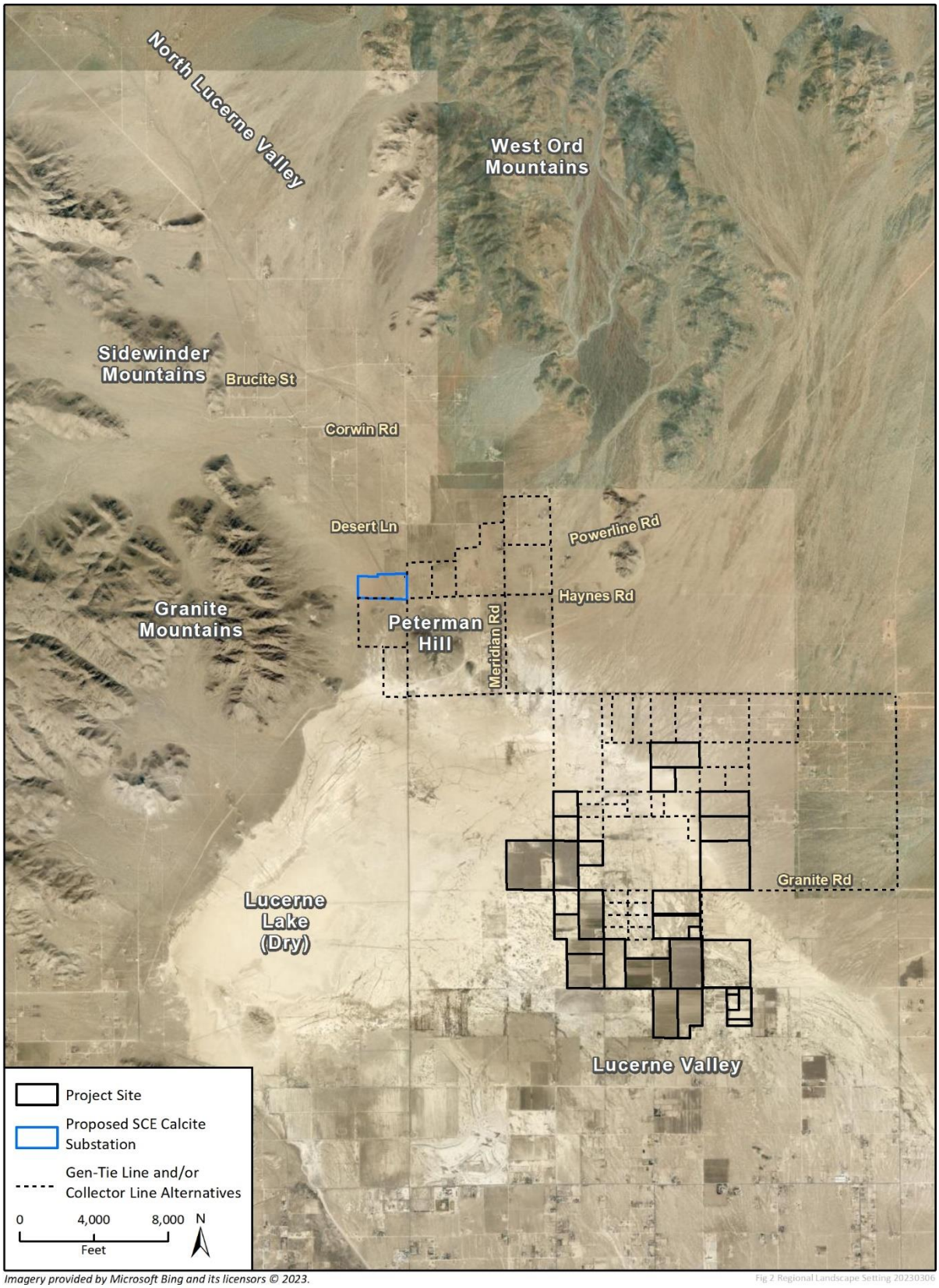


Fig 1 Regional Location Paleo

Figure 2 Project Location



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Fig 2 Regional Landscape Setting 20230306

Construction of the facility will include site preparation, grading and earthwork, concrete foundations, structural steel work, electrical/instrumentation work, collector line installation, architecture, and landscaping. Ground disturbing activities are expected to be limited to the construction of the access roads, site grading, electrical trenching, foundation work for O&M building and substation, boring for transmission lines, and panel post installations. Groundwork is generally shallow, with trenching to moderate depths (3 to 5 feet) and foundation work typically shallower than 10 feet.

2 Regulatory Setting

Paleontological resources are considered nonrenewable scientific resources, because once destroyed, they cannot be replaced. As such, paleontological resources are afforded protection under various federal, state, and local laws, ordinances, regulations, and standards. Regulations applicable to potential paleontological resources on the Project area are summarized below.

2.1 State

California Environmental Quality Act

CEQA requires public agencies and private interests to identify the potential environmental consequences of their proposed Projects on any object or site considered to be a historical resource of California (California Public Resources Code [PRC], section 21084.1, California Code of Regulations Title 14, section 15064.5). Appendix G of the *State CEQA Guidelines* (California Code of Regulations Title 14, Chapter 3) provides an Environmental Checklist of questions, including a single question related to paleontological resources (Section VII.f) as follows: "Would the project directly or indirectly destroy a unique paleontological resource or site?"

CEQA does not define "a unique paleontological resource or site." However, the Society of Vertebrate Paleontology (SVP) has defined a "significant paleontological resource" in the context of environmental review. The SVP defines a significant paleontological resource as:

> Fossils and fossiliferous deposits, here defined as consisting of identifiable vertebrate fossils, large or small, uncommon invertebrate, plant, and trace fossils, and other data that provide taphonomic, taxonomic, phylogenetic, paleoecologic, stratigraphic, and/or biochronologic information. Paleontological resources are considered older than recorded human history and/or older than middle Holocene (i.e., older than about 5,000 radiocarbon years) [p. 11] (SVP 2010).

The loss of significant paleontological resources would be a significant impact under CEQA. The CEQA lead agency is responsible for ensuring that paleontological resources are protected in compliance with CEQA and other applicable statutes.

2.2 Local

San Bernardino County

The County of San Bernardino's Countywide Plan addresses paleontological resources within the *Cultural Resources Element*. The *Cultural Resources Element* contains the following goal and policy relating to paleontological resources that are relevant to the current Project:

- **Goal CR-2 Historic and Paleontological Prehistoric Resources.** Historic resources (buildings, structures, or archaeological resources) and paleontological resources that are protected and preserved for their cultural importance to local communities as well as their research and educational potential.
- **Policy CR-2.3 Paleontological and Archaeological Resources.** We strive to protect paleontological and archaeological resources from loss or destruction by requiring that new

development include appropriate mitigation to preserve the quality and integrity of these resources. We require new development to avoid paleontological and archeological resources whenever possible. If avoidance is not possible, we require the salvage and preservation of paleontological and archeological resources.

3 Resource Assessment Guidelines

Paleontological resources are limited, nonrenewable resources of scientific, cultural, and educational value and are afforded protection under CEQA. This assessment satisfies CEQA (13 Public Resource Code [PRC], 2100 et seq.), PRC Section 5097.5 (Stat. 1965, c 1136, p. 2792) requirements, and follows guidelines and significance criteria specified by the SVP *Standard Procedures for the Assessment and Mitigation of Adverse Impacts to Paleontological Resources* (SVP 2010).

3.1 Paleontological Sensitivity

Paleontological sensitivity refers to the potential for a geologic unit to produce scientifically significant fossils. Direct impacts to paleontological resources occur when earthwork activities, such as grading or trenching, cut into geologic deposits (e.g., formations) within which fossils are buried, and result in physical damage to or destruction of the fossils. Because fossils are the remains of prehistoric animal and plant life, they are nonrenewable. Such impacts have the potential to be significant under CEQA guidelines and may require mitigation.

Significant paleontological resources are fossils or assemblages of fossils that are unique, unusual, rare, diagnostically important, or are common but have the potential to provide valuable scientific information for evaluating evolutionary patterns and processes, or which could improve our understanding of paleochronology, paleoecology, paleophylogeography (study of historical processes responsible for past geographic distributions of genealogical lineages), or depositional histories. New or unique specimens can provide new insights into evolutionary history; however, additional specimens of even well-represented lineages can be equally important for studying evolutionary pattern and process, evolutionary rates, and paleophylogeography. Even unidentifiable material can provide useful data for dating geologic units if radiocarbon dating is possible. As such, common fossils (especially vertebrates) may be scientifically important and therefore considered significant.

Paleontological sensitivity is determined by rock type, history of the geologic unit in producing significant fossils, and previously recorded fossil localities from that unit. Paleontological sensitivity is derived from the known fossil data collected from the entire geologic unit, not just from any one specific survey. The SVP system outlined in the SVP *Standard Procedures for the Assessment and Mitigation of Adverse Impacts to Paleontological Resources* is the generally accepted paleontological sensitivity classification scheme for projects on non-federal lands in California (SVP 2010). Rincon has characterized the paleontological sensitivity for the proposed Project according to the SVP procedures, as described below.

The SVP (2010) describes sedimentary rock units as having high, low, undetermined, or no potential for containing significant nonrenewable paleontological resources. This criterion is based on rock units within which vertebrate or significant invertebrate fossils have been determined by previous studies to be present or likely to be present. The SVP sensitivity categories are:

I. **High Potential.** Rock units from which vertebrate or significant invertebrate, plant, or trace fossils have been recovered are considered to have a high potential for containing additional significant paleontological resources. Rocks units classified as having high potential for producing paleontological resources include, but are not limited to,

sedimentary formations and some volcaniclastic formations (e.g., ashes or tephras), some low-grade metamorphic rocks which contain significant paleontological resources anywhere within their geographical extent, and sedimentary rock units temporally or lithologically suitable for the preservation of fossils (e. g., middle Holocene and older, fine-grained fluvial sandstones, argillaceous and carbonate-rich paleosols, cross-bedded point bar sandstones, fine-grained marine sandstones). Paleontological potential consists of both (a) the potential for yielding abundant or significant vertebrate fossils or for yielding a few significant fossils, large or small, vertebrate, invertebrate, plant, or trace fossils and (b) the importance of recovered evidence for new and significant taxonomic, phylogenetic, paleoecologic, taphonomic, biochronologic, or stratigraphic data. Rock units which contain potentially datable organic remains older than late Holocene, including deposits associated with animal nests or middens, and rock units which may contain new vertebrate deposits, traces, or trackways are also classified as having high potential.

II. **Undetermined Potential.** Rock units for which little information is available concerning their paleontological content, geologic age, and depositional environment are considered to have undetermined potential. Further study is necessary to determine if these rock units have high or low potential to contain significant paleontological resources. A field survey by a qualified professional paleontologist to specifically determine the paleontological resource potential of these rock units is required before a paleontological resource impact mitigation program can be developed. In cases where no subsurface data are available, paleontological potential can sometimes be determined by strategically located excavations into subsurface stratigraphy.

III. **Low Potential.** Reports in the paleontological literature or field surveys by a qualified professional paleontologist may allow determination that some rock units have low potential for yielding significant fossils. Such rock units will be poorly represented by fossil specimens in institutional collections or based on general scientific consensus only preserve fossils in rare circumstances and the presence of fossils is the exception not the rule, e.g. basalt flows or recent colluvium. Rock units with low potential typically will not require impact mitigation measures to protect fossils.

IV. **No Potential.** Some rock units have no potential to contain significant paleontological resources, for instance high-grade metamorphic rocks (such as gneisses and schists) and plutonic igneous rocks (such as granites and diorites). Rock units with no potential require no protection or impact mitigation measures relative to paleontological resources.

4 Methods

Paleontological resources are contained within the geologic deposits or bedrock that underlies the soil layer. Therefore, to determine whether a given Project area has the potential to contain significant fossil resources at the subsurface, it is necessary to review relevant scientific literature to determine the geology and stratigraphy of the area. For this assessment, published geologic maps, fossil locality data, and literature were reviewed to identify the geologic units present at and below the surface within the Project boundary, assess the paleontological sensitivity of the geologic units identified, and to determine the potential impacts to nonrenewable paleontological resources from Project development.

Based on a review of aerial imagery, the Project area is located on a flat (lacking any significant topographic relief), sandy alluvial plain with low to moderate density vegetation consisting primarily of creosote and saltbush. The Project area is devoid of any bedrock exposures and has limited ground visibility; therefore, no paleontological field survey was conducted for this analysis. However, a 100 percent pedestrian survey was conducted for cultural resources over the entire Project study area by qualified archeologists. Any potential paleontological resources would have been recorded by the field archeologists and brought to the attention of the Project paleontologist to be evaluated and addressed in this report.

A formal paleontological locality search was requested from the NHMLAC on July 14, 2021. In addition, Rincon reviewed the online paleontological collections database of the University of California Museum of Paleontology (UCMP) to identify known fossil localities in San Bernardino County from geologic formations similar to those identified in the Project area.

Following the paleontological inventory and assessment, the paleontological sensitivity ratings of the geological units were assigned based on the findings of the record search and literature review. Based on the paleontological sensitivity findings, the potential impact to nonrenewable paleontological resources due to Project development was determined in accordance with the professional standards of the SVP (2010).

5 Description of Resources

5.1 Regional Geology

California is divided into 11 geomorphic provinces that are "naturally defined geologic regions that display a distinct landscape or landform" (California Geologic Survey 2002). The Project area lies within the Lucerne Valley region of the Mojave Desert province. The Mojave Desert province is a "broad interior region of isolated mountain ranges separated by expanses of desert plains" (California Geological Survey 2002) that is effectively wedged to the west between the Sierra Nevada Range (by the Garlock Fault) and the Transverse Range (by the San Andreas Fault). The western Mojave Desert acts as a sediment catch from three geomorphic provinces: Basin and Range, Sierra Nevada, and Transverse Ranges. By the early Miocene or late Oligocene, an erosional surface rising eastward from the Garlock-San Andreas convergence (at the western end of the Mojave Desert) had developed, and depression of the region began. Depression resulted in the Mojave Desert province becoming an internal drainage area, with deposits of Miocene, Pliocene, and Pleistocene sediments accumulating in local basins (Norris and Webb 1990). Miocene sedimentary units deposited during this time contain basalt, volcanic mud flows, and air-fall tuff. Repeated glacial advance and retreat during the Pleistocene created numerous lakes which provided conditions for the preservation of fossils. The area around the Project area comprises a thick cover of Holocene to Pleistocene aged alluvium, composed of materials eroded from the surrounding mountains and accumulated during these periods of glacial advance and retreat.

Geology and Paleontology of the Project Area

The Project area is mapped at a scale of 1:62,500 by Dibblee and Minch (2008a, b) and includes four geologic units mapped at ground surface: Quaternary young (Holocene) alluvium (Qa), Quaternary young (Holocene) dune sand (Qs), Quaternary young (Holocene) playa deposits (Qc), Quaternary old (Pleistocene) gravel deposits (Qog). Figure 3 depicts the surficial geologic units in the Project area, as well as the corresponding paleontological sensitivity assigned to each of these units.

Quaternary young (Holocene) Sedimentary Deposits (Qa, Qs, Qc)

Quaternary young (Holocene) alluvium (Qa), derived from the Ord Mountains to the north, form an unconsolidated layer of alluvial sand, silt, and gravel across much of the Project area and Lucerne Valley. Mapped at the surface within the central portion of the Project area, the Quaternary young (Holocene) dune sand deposits (Qs) consist of loose, well-sorted, fine-grained sand deposited as dunes or thin veneers on alluvium and clay (Dibblee and Minch 2008 a, b). Mapped simultaneously in several areas, the Quaternary young (Holocene) playa deposits (Qc) are composed of a layer of light gray, micaceous, clay and are formed from the lakebed of the Lucerne Dry Lake. Holocene-aged units are too young to contain scientifically significant paleontological resources and are considered to have low paleontological sensitivity. However, these younger deposits may grade downward into fine-grained Quaternary old (i.e., Pleistocene) alluvial deposits (e.g., Qoa), which may preserve fossil remains, at unknown depths within the Project area.

Quaternary old (Pleistocene) Sedimentary Deposits (Qog)

Quaternary old (Pleistocene) gravel deposits (Qog), mapped within portions of the gen-tie corridor, are composed gray gravel of rounded cobbles derived from the Ord and East Ord Mountains

(Dibblee and Minch 2008a, b). Quaternary old (Pleistocene) sedimentary deposits underlying the Project area are old enough to preserve fossil resources. In particular, fine-grained alluvial deposits are generally deposited under conditions that are conducive to fossil preservation. However, coarse-grained alluvial deposits (e.g., Qog) are deposited in high-energy conditions that tend to destroy and disperse organic material, and as such, are not conducive to fossil preservation.

Fine-grained Quaternary old (Pleistocene) alluvial deposits (i.e., Qoa) are mapped at the margins of the Ord Mountains approximately four miles southwest of the Project area. These units are not mapped within the Project area but are expected to underlie the Project area at shallow or unknown depths. Quaternary old (Pleistocene) alluvial deposits would be expected to occur at shallow depths (less than five feet) near the margins of the basin; however, the depth at which Quaternary old (Pleistocene) alluvial deposits occurs may vary throughout a basin, ranging from shallow to more than 100 feet depending on the local topography. In the absence of geotechnical data, the depth to Quaternary old (Pleistocene) alluvial deposits cannot be reliably estimated; however, sensitive older deposits are unlikely to occur at depths of less than five feet at the Project area based on the Project area being situated toward the center of the basin.

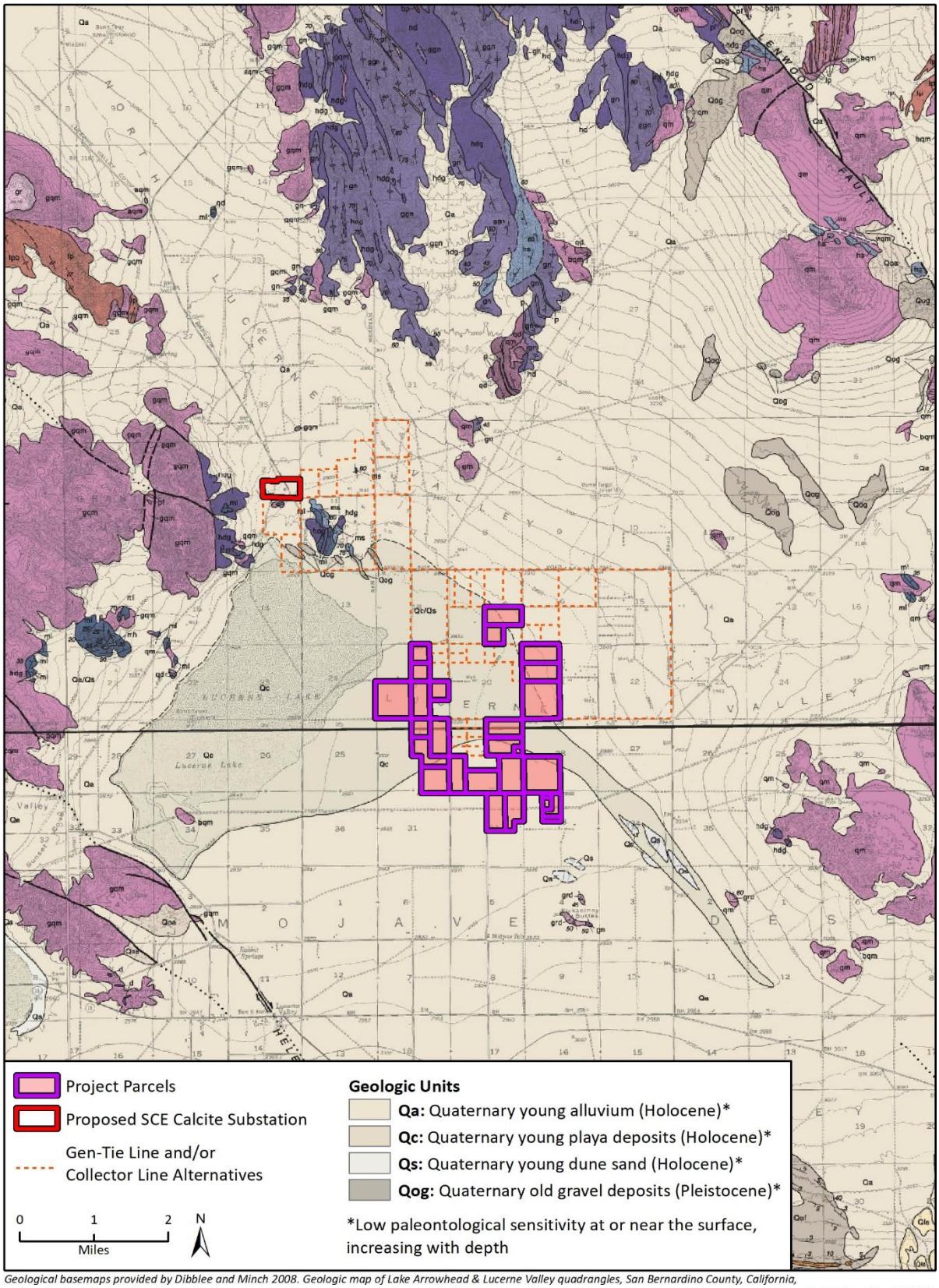
Quaternary old (Pleistocene) alluvial deposits (e.g., Qoa) have proven to yield significant vertebrate fossil localities throughout California, including San Bernardino County. Localities have produced fossil specimens of terrestrial mammals, such as mammoth, horse, elephant, camel, bison, birds, rodents, and reptiles (Jefferson 1991; Paleobiology Database 2021; Springer et al. 2009; UCMP 2021).

5.2 Locality Record Search Results

A search of the paleontological locality records at the NHMLAC resulted in no previously recorded fossil localities within the Project boundary; however, at least eight Pleistocene vertebrate localities (LACM VP 3350, 1224, 3352, 3353, 3498, 7786, 1123, and CIT 211) were identified in the general vicinity of the Project area. LACM VP 3350 produced fossil specimens of bison (*Bison*), camel (*Camelops*), and horse (*Equus*) southeast of the Project area near Surprise Spring in San Bernardino County. LACM VP 1224, 3352, 3353, 3498, and CIT 211 yielded specimens of the camel family (Camelidae), horse (*Equus*), mammoth (*Mammuthus*), deer family (*Cervidae*), and antelope family (*Antilocapridae*) approximately 20 miles west of the Project area near the city of Victorville. LACM VP 7786, which produced a fossil specimen of vole (*Microtus mexicanus*) at a depth of approximately 10 feet below ground surface, was documented approximately 25 miles west from the Project area near Southern California Logistics Airport. LACM VP 1123 yielded specimens of horse (*Equus*), antelope (*Breameryx*), fox (*Urocyon*), camel (*Camelops*), llama (*Tanupolama*), badger (*Taxidea*), wolf (*Canis*), human (*Homo sapiens*), sheep (*Ovis*), hare (*Lepus*), rabbit (*Sylvilagus*), kangaroo rat (*Dipodomys*), pocket mouse (*Perognathus*), pack rat (*Neotoma*), gopher tortoise (*Gopherus*), chuckwalla (*Sauromalus*), rattlesnake (*Crotalus*), vulture (*Gymnogyps*), horned owl (*Bubo*), Scops owl (*Otus*), duck (*Anas, Oxyura, Aythya*), coot (*Fulica*), merganser (*Mergus*), woodpecker (*Colaptes*), hawk (*Buteo*), cat (*Felis, Lynx*), crow (*Corvus*), dove (*Zenaida*), eagle (*Aquila*), less than 30 miles north of the Project area.

A supplemental review of the museum records maintained in the UCMP online collections database did not yield records of any vertebrate fossil localities in the general vicinity of the Project area.

Figure 3 Geologic Units and Paleontological Sensitivity in the Project Area



Geological basemaps provided by Dibblee and Minch 2008. Geologic map of Lake Arrowhead & Lucerne Valley quadrangles, San Bernardino County, California, and Geologic Map of Apple Valley and Ord Mountains 15 minute quadrangles, San Bernardino County, California.

However, at least two vertebrate UCMP vertebrate localities are recorded from Pleistocene sedimentary deposits in unspecified locations within San Bernardino County (UCMP 2021). UCMP Locality-676 yielded fossil specimens of horse (*Equus*), camel (*Camelops*), mammoth (*Mammuthus*), pelican (*Pelecanus erythrorhynchos*), and bat (*Pseudorhinolophus*). In addition, UCMP Locality-791 produced fossil specimens of bighorn sheep (*Ovis canadensis*) and coyote (*Canis latrans*) (UCMP 2021). The results of the museum records search are summarized in Table 1.

Table 1 Museum Records Search Results

Locality No.	Geologic Unit	Age	Taxa	Depth of Recovery
LACM VP 3350	Unknown formation	Pleistocene	Bison (*Bison*), camel (*Camelops*), (*Tanupolama*), horse (*Equus*)	Unreported
LACM VP 1224, 3352, 3353, 3498, CIT 211	Shoemaker Gravel Formation	Pleistocene	Camel family (Camelidae), horse (*Equus*), Mammoth (*Mammuthus*), deer family (Cervidae), antelope family (Antilocapridae)	Unreported
LACM VP 7786	Alluvial deposits	Pleistocene	Vole (*Microtus mexicanus*)	10-11 feet
LACM VP 1123	Unknown formation	Pleistocene	Horse (*Equus*), antelope (*Breameryx*), fox (*Urocyon*), camel (*Camelops*), lama (*Tanupolama*), badger (*Taxidae*), wolf (*Canis*), human (*Homo sapiens*), sheep (*Ovis*), hare (*Lepus*), rabbit (Sylvilagus), kangaroo rat (*Dipodomys*), pocket mouse (Perognathus), pack rat (*Neotoma*); gopher tortoise (*Gopherus*), chuckwalla (*Sauromalus*), rattlesnake (*Crotalus*); vulture (*Gymnogyps*), horned owl (*Bubo*), Scops owl (*Otus*), duck (*Anas, Oxyura, Aythya*), coot (*Fulca*), merganser (*Mergus*), woodpecker (*Colaptes*), hawk (*Buteo*), cat (*Felis, Lynx*), crow (*Corvus*), dove (*Zenaida),* eagle *(Aquila*).	Unreported
UCMP-676, -791	Unknown formation	Pleistocene	Horse (*Equus*), camel (*Camelops*), elephant (*Elephas*), mammoth (*Mammuthus*), pelican (*Pelecanus erythrorhynchos*), and bat (*Pseudorhinolophus*), bighorn sheep (*Ovis canadensis*) and coyote (*Canis latrans*)	Unreported

Source: Bell 2021; UCMP 2021

6 Evaluation, Impacts, and Recommendations

6.1 Paleontological Sensitivity Evaluation

Holocene sedimentary deposits younger than 5,000 years old (younger than middle Holocene) are too young to contain fossilized material. Therefore, Quaternary young (Holocene) alluvium (Qa), Quaternary young (Holocene) dune sand (Qs), and Quaternary young (Holocene) playa deposits (Qc) mapped in the Project area have been assigned a **low paleontological sensitivity** at or near the surface.

The coarseness of Quaternary old (Pleistocene) gravel deposits (Qog) generally preclude the preservation of significant paleontological resources and are assigned a **low paleontological sensitivity.**

According to existing paleontological locality data, fine-grained Quaternary old (Pleistocene) alluvial deposits may underlie Quaternary young (Holocene) deposits (i.e., Qa, Qs, Qc) and coarse-grained Quaternary old (Pleistocene) sediments (i.e., Qog) at depths as shallow as five feet deep in the vicinity of the Project. Although paleontologically sensitive older units may be overlain by thick units of low sensitivity younger alluvium (potentially exceeding 100 feet in thickness), the depth at which geologic units transition from low sensitivity younger units to high sensitivity older units is highly variable. Accurately assessing the boundaries between younger and older units is generally not possible without some form of radiometric dating, or fossil analysis, so conservative estimates of the depth at which paleontologically sensitive units may occur ensures impact avoidance. Quaternary old (Pleistocene) alluvial deposits that are likely to occur at an unknown depth but potentially as shallow as 10 feet below the surface have a **high paleontological sensitivity** throughout California (Bell 2021).

6.2 Impacts

Grading, trenching and other ground disturbing activities associated with development of this Project that may impact previously undisturbed, paleontologically sensitive geologic deposits have the potential for the destruction of significant paleontological resources.

The surficial geology of the Project area has a low paleontological sensitivity that increases with depth. Fine-grained Quaternary old (Pleistocene) sediments (e.g., Qoa) may underlie Quaternary young (Holocene) deposits and coarse-grained Quaternary old (Pleistocene) sediments at unknown depths within the Project area at depths of 10 feet or greater below ground surface.

The Project area is determined to have **low paleontological sensitivity** for paleontological resources at depths of 10 feet or less. The Project area is determined to have **high paleontological sensitivity** at depths exceeding 10 feet below ground surface.

Ground disturbing activities in previously undisturbed portions of the Project area may result in significant impacts to paleontological resources under Appendix G of CEQA if Quaternary old (Pleistocene) sediments are impacted at a depth. Impacts would be significant if construction activities result in the destruction, damage, or loss of scientifically important paleontological

resources and associated stratigraphic and paleontological data. Activities with the potential to impact paleontological resources include grading, excavation, trenching or other activity that disturbs geologic formations with a high-paleontological sensitivity.

6.3 Recommendations

The following recommendations would address the potentially significant impacts relating to the potential discovery of paleontological resources during Project implementation. Monitoring would only apply to Project construction activities requiring excavations exceeding 10 feet in depth within intact Quaternary young (Holocene) and Quaternary old (Pleistocene) deposits (i.e., Qa, Qc, Qs, Qog). Implementation of the following recommendations would reduce potential Project impacts to paleontological resources to a less-than-significant level pursuant to the requirements of CEQA.

- **Paleontological Worker Environmental Awareness Program (WEAP).** Prior to the start of construction, construction personnel shall be alerted to the potential for paleontological resources to be present on site and educated on the appearance of fossils and the procedures for notifying paleontological staff should fossils be discovered by construction staff. This information should be conveyed to all new staff during WEAP presentation.
- **Paleontological Monitoring.** Initially, full-time monitoring should be conducted during ground construction activities (i.e., grading, trenching, foundation work, and other excavations) where ground disturbance exceeds 10 feet in depth within intact Holocene and Pleistocene deposits (i.e., Qa, Qs, Qc, Qog). Monitoring should be conducted by a qualified paleontological monitor or cross-trained monitor, who is defined as an individual who meets the minimum qualifications per standards set forth by the SVP (2010), which includes a B.S. or B.A. degree in geology or paleontology with one year of monitoring experience and knowledge of collection and salvage of paleontological resources, or requisite field experience and training and a B.S. or B.A. degree in a similar scientific field. The duration and timing of the monitoring should be determined by the Qualified Paleontologist and the location and extent of proposed ground disturbance. If the Qualified Paleontologist determines that full-time monitoring is no longer warranted based on the specific geologic conditions, the Qualified Paleontologist may recommend that monitoring be reduced to periodic spot-checking or ceased entirely. If paleontological resources are discovered, the qualified paleontologist should establish an avoidance buffer, develop a paleontological recovery plan in consultation with the County, and implement the specifics of the recovery plan.

7 References

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Appendix I. Phase I Environmental Site Assessment

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Phase I Environmental Site Assessment for the Sienna Solar and Storage Project; San Bernardino County, California

JANUARY 2022

PREPARED FOR

99MT 8ME, LLC

PREPARED BY

SWCA Environmental Consultants

PHASE I ENVIRONMENTAL SITE ASSESSMENT FOR THE SIENNA SOLAR AND STORAGE PROJECT; SAN BERNARDINO COUNTY, CALIFORNIA

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SWCA Project No. 70922

January 2022

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EXECUTIVE SUMMARY

This executive summary presents the results of a Phase I Environmental Site Assessment (ESA) completed by SWCA Environmental Consultants (SWCA) for the proposed Sienna Solar and Storage Project (the "subject property"). The subject property consists of 28 privately owned parcels that total approximately 1,932 acres of land. One of these parcels is 77 acres of land located 2.5 miles northwest of the main body of the subject property (the "outlying parcel") that is proposed for construction of an electrical substation and point of interconnect with existing electrical transmission lines. The subject property is situated within the Lucerne Valley of the southern Mojave Desert, in the southwestern portion of San Bernardino County, California. Most parcels are vacant and unoccupied; they are either active or former agricultural land or vacant desert land. Some include rural residences or farmsteads, and one includes electrical transmission lines. Adjoining properties are similar in nature.

The purpose of this Phase I ESA is to satisfy part of the due diligence requirements in order to qualify for the innocent landowner, contiguous property owner, or bona fide prospective purchaser limitations on Comprehensive Environmental Response, Compensation and Liability Act liability prior to purchase of the subject property.

The following list presents selected findings of this Phase I ESA:

- SWCA's review of historical aerial photographs and historical topographic maps found that the subject property historically included some agricultural and rural residential use in the 1940s or earlier. Over the next 50 years, farmland and the number of homes and farmsteads increased, but appear to have begun dwindling in the 1990s. Many illegal marijuana growing facilities have appeared in the nearby desert over the past few years. One general observation was that most occupied areas of the subject property have experienced ebbs and flows of accumulated debris and scrap over time. The following observations were noted:
    - In the north of Parcel 045206224 and the south of Parcel 045206222 (both owned by Miguel Gaeta), the southern portion of a 2.5-acre area appears to have been used as a junkyard in the 2003 and in 2006 photographs. At least 50 vehicles were present in 2003. The area was mostly cleaned up in 2009. Because this does not appear to have been a long-term property use, because it is not known to have been a commercial junkyard facility, and because no significant leaks or spills are known to have occurred, The past use of this area is not considered to be a recognized environmental condition (REC) for the subject property.
    - Much of the farmstead in the southeast of Parcel 045206223 (owner: Miguel Gaeta) was covered in junk and debris during the period from 2003 to 2009. The area was mostly cleaned up in 2009. Because this does not appear to have been a long-term property use, because it is not known to have been a commercial facility, and because no significant leaks or spills are known to have occurred, the past use of this area is not considered to be a REC for the subject property.
    - The occupied area in the southeast corner of Parcel 045206224 began accumulating vehicles in 2009. Over two dozen vehicles were present by 2013 and all had been removed by 2014. A group of 10 or more 55-gallon drums has been along the south of that area since 2013 or prior; these are discussed further below. Because this does not appear to have been a long-term property use, because it is not known to have been a commercial facility, and because no significant leaks or spills are known to have occurred, the past use of this area is not considered to be a REC for the subject property.

  - Part of the southern portion of Parcel 045212142 (owner: MB Landscaping & Nursery, Inc.) began accumulating debris and scrap in 2009. One pile of approximately a dozen drums has been present since 2016; these drums are discussed further below. In the October 2020 photograph, a group of approximately 130 drums is adjacent to the southeast of an L-shaped structure. The drums are bundled in four-drum groups as they would be for shipping, and they appear consistent in color, possibly indicating that they are new and in good condition. Another group of approximately 40 drums sits 100 feet farther southeast. Although the purpose of the drums and whether they are full or empty remains unknown, they were only in place a short time and are not known to have leaked or spilled. Therefore, the two large groups of drums are not considered to be a REC for the subject property.
  - Some areas on-site and nearby had hundreds of loads of soil or soil amendments delivered and spread over the desert soils for farming. One example of this is at Parcel 045206222 (owner: Miguel Gaeta). Because this is common practice to amend soils with low carbon content, this is not considered to be a REC for the subject property.
  - An 80-acre area adjoining the southeast of the subject property had been used for farming in the past. Between December 2019 and October 2020, that parcel added approximately 350 large greenhouses and many more were under construction. Approximately half of the 80 acres was covered in greenhouses. A 6-acre portion of the site includes over a dozen campers and a shanty-town of shacks. Based on our professional knowledge of the region, SWCA believes that this had been an illegal marijuana growing operation under the guise of a legal hemp growing operation. Because this facility is believed to have been shut down, because it was not operating for a long period of time, and because leaks or spills are expected to be localized to where they occurred, this facility is not considered to be a REC for the subject property.
  - Also in 2020, a few dozen smaller marijuana growing operations appeared in the open area enveloped by the northern portion of the subject property, and many more appeared in the vicinity. These are each groups of two to 12 greenhouses. Because they are small operations and have not been operating for a long period of time and because any potential contamination is likely to be localized, they are not considered to be RECs for the subject property.
  - The outlying parcel is crossed by three sets of parallel transmission lines, each with three cables. A mineshaft was mapped in the missile of the parcel, which was later mapped as a mine prospect. A mine prospect in desert alluvium is not considered to be a REC.

- Phase I ESA User Questionnaires completed by landowners covered topics including past property use, stored chemicals and petroleum products, storage tanks, and known issues related to potential contamination. None of the respondents indicated knowledge of stored hazardous substances or petroleum products, 55-gallon drums, or of any hazardous wastes generated on-site. None of the respondents indicated knowledge of stained soil; aboveground storage tanks (ASTs) or underground storage tanks (USTs); dumped, buried, or burned materials; or environmental liens or environmental activity and use limitations. None of the responses indicated conditions that SWCA would consider to be RECs.
- Representatives of 99MT 8ME, LLC, completed Phase I ESA User Questionnaires regarding the subject property. The respondents were not aware of any significant spills, releases, or environmental cleanups that have occurred on the subject property and were not aware of any obvious indicators that point to the presence or likely presence of releases at the subject property.

- SWCA's review of an Environmental Data Resources, Inc., database search report dated January 20, 2022, and supplemental records from state and federal regulatory databases found the following:
    - The Howard Pettigrew property, located in the southwestern quadrant of the subject property at 13324 Locust Avenue (Parcel 045206223, owned by Miguel Gaeta), is identified in UST databases that indicated two or three USTs were installed in 1988: one or two 280-gallon leaded gasoline tanks and one 550-gallon leaded gasoline tank. A San Bernardino County Permit listing indicates that the facility was inactive for a 1990 annual UST inspection. Because the facility is inactive, because the tanks did not operate for a long period of time, because they are not identified in modern UST listings, and because no indications of leaks, spills, or potential contamination are identified in conjunction with the tanks, these USTs are not considered to be RECs for the subject property. However, their removal does not appear to have been documented, and they may present an environmental business risk if they are still present.
    - This property is also identified in the Clandestine Drug Laboratory (CDL) database. In 2002, it was identified as a location where an illegal drug lab was operated or drug lab equipment and/or materials were stored. Because of the amount of time that has passed and because no indications of contamination are indicated in conjunction with the listing, the former CDL is not considered to be a REC for the subject property.
    - The NB Nursery / Bob Burns property, located in the south of the subject property at 12881 Midway Avenue (Parcel 045212112, owner: MB Landscaping & Nursery Inc.), is identified as having been in the state's Hazardous Waste Tracking System. This is an administrative database and not an indicator of potential contamination.
    - The Dan Pettigrew property, adjoining the south of the subject property at 12860 Locust Avenue, is identified as a UST site. A 550-gallon leaded gasoline tank was installed in 1988. A San Bernardino County Permit listing indicates that the facility was inactive for a 1995 annual UST inspection. Because the facility is inactive, because the tank did not operate for a long period of time, because it is not identified in modern UST listings, and because no indications of leaks, spills, or potential contamination are identified in conjunction with the tank, these USTs are not considered to be RECs for the subject property.
    - A petroleum AST is identified adjoining the south of the subject property at 12332 Midway Avenue. The farmstead at this property, where the tank is most likely located, is located 0.2 mile south of the subject property. Because no indications of leaks, spills, or potential contamination are identified in conjunction with this listing, it is not considered to be a REC for the subject property.

SWCA's reconnaissance of the subject property on January 14 and 20, 2022, found that most parcels of the subject property are vacant and unoccupied; they are either active or former agricultural land, or vacant desert land. Some include rural residences or farmsteads. Most adjoining properties appear to be similar in nature. Select findings from SWCA's site reconnaissance include the following:

- Parcel 045236147: As recently as October 2020, this parcel was vacant desert land. By the time of the site visit, an illegal marijuana growing operation had been constructed, used, and abandoned. It included approximately 24 greenhouses (many full of dead plants), 12 other structures (some with thousands of black plastic landscaping pots), 2 shipping containers, and a mobile office trailer that had been used as two housing units. A somewhat elaborate watering system had been set up that included underground pipes and a makeshift drainage ditch. Because of the short time it was in operation, and because no pesticides, chemicals, or petroleum products were noted in this area, this is not considered to be a REC for the subject property.

- Parcel 045207111: The occupied area in the southeast of this parcel appears to house several parties in a small home with numerous makeshift additions (some are simply a camper integrated into the structure or parked alongside), in a garage, and in campers. The area appears to function as a water supply hub: a well is on-site and three large upright water tanks are present, each possibly 5,000-gallons in capacity. Security cameras were present. The barn had a lookout platform on the roof, metal bars in the windows, and a locked steel man-door. Because no evidence of significant leaks, spills, or potential contamination was noted, SWCA did not identify RECs in this area.
- Parcel 045206222: Many truckloads of soil or soil amendment had been dumped here in an area covering approximately 3.5 acres. Aerial photography indicates over 1,000 loads were dumped. The material appeared significantly loamier than local native soils. Importing soil and amendments to areas with naturally poor soils is not an unusual practice. Because no unusual odors, staining, or contents were observed, the dumped soil is not considered to be a REC for the subject property.
- Point 16 (Parcels 045206222 and 045206224): Approximately 15 abandoned inoperable cars, trucks, and a double-decker bus are present. A location along the south of this area had approximately twenty-seven 55-gallon drums that appeared to be in fair condition. Three drums sat on pallets, apart from the others. One of these had an oil-saturated lid, and staining had reached the pallet and the soil. Soil staining appeared light, surficial, and contained to a small area. Another of these drums had also leaked a small amount via the lid, but even less material had reached the pallet and soil. These stained areas are considered to be de minimis. Because no evidence of significant leaks, spills, or potential contamination was noted, SWCA did not identify RECs in this area.
- Point 17 (Parcel 045206224): This area has a home in poor condition. It appears to have a functioning domestic well. An open area west of the home had a few individual fair-condition 55-gallon drums on pallets, a few abandoned vehicles, and some debris piles. Because no evidence of significant leaks, spills, or potential contamination was noted, SWCA did not identify RECs in this area.
- Point 19 (Parcel 045211224): This parcel had approximately twelve 55-gallon drums in various parts of the occupied area and they appeared to be in fair condition. Two large upright water tanks are in the southeast of this area, with a 300-gallon fuel tank between them. The tank appears to have stored fuel in the past but lacked a functioning dispenser. It was not within secondary containment and de minimis staining was in the area. Two additional fuel tanks, estimated to be 300 and 500 gallons in capacity, were within a secondary containment structure along the east of the occupied area. An old abandoned fuel tank sat to the north of these tanks. It was not in use and no significant staining was noted. Because no evidence of significant leaks, spills, or potential contamination was noted, SWCA did not identify RECs in this area.
- Point 26 (Parcel 045212148): Two large debris dumping areas were south of the formerly occupied area. They were each approximately 60 feet across and debris was scattered not mounded. Because they appeared to contain only innocuous broken-up household debris, wood, metal, etc., they are not considered to be RECs for the subject property.
- Point 29 (Parcel 045212142): A strip of land in the south of this parcel is used for storage of some equipment, materials, scrap, and debris. This included white goods, scrap metal, fencing, well casings, several dozen telephone poles, as many as 200 used tires, and approximately 16 inoperable vehicles.

A 35-gallon tank on a stand was next to an inoperable well. The tank was previously used for drip lubrication of the well. The tank appeared to be sound and no leaks were noted. Two polyethylene mixing tanks on skids were south of the truck, one empty and one half full. No evidence of leaks was noted.

Ten 55-gallon drums, a 35-gallon drum, and a 60-gallon steel tank were along the north of the eastern portion of this area. They appeared to be in fair condition, though one drum exhibited de minimis staining at its base. Some drums were labeled as hydraulic fluid. A second group of drums was 80 feet west of the first. This grouping held approximately twenty-six 55-gallon drums. Some were on pallets atop other drums. Visible drums appeared to be in fair condition. De minimis staining was evident, but adjacent vegetation appeared to have been healthy (it was dormant at the time). At least one hundred empty 5-gallon buckets were present; those with visible labels had held transmission oil. Because no evidence of significant leaks, spills, or potential contamination was noted, SWCA did not identify RECs in this area.

- Adjoining properties: Most adjoining property is vacant desert land. Some agricultural land, farmsteads, and rural residences adjoin the subject property, primarily in the southern portion. Several likely-illegal marijuana growing operations adjoin the subject property. These are typically three to twelve greenhouses in a fenced area, with an RV camper for the caretaker and a water tank for the plants. Because of the short time they have been in operation, and because any leaks or spills are expected to be localized to the footprint of the facilities, these growing operations are not considered to be a REC for the subject property

  An 80-acre farm with several hundred greenhouses adjoins the southeast of the subject property. SWCA believes that this had been an illegal marijuana growing operation under the guise of a legal hemp growing operation. This facility is discussed above.

- Overall: No evidence of significant leaks, spills, potential contamination was noted during the site reconnaissance. No significant quantities of hazardous substances or petroleum products were observed that had been released to the environment; were under conditions indicative of a release to the environment; or under conditions that likely pose a material threat of a release to the environment.

SWCA has completed this Phase I ESA of the subject property based on information obtained during the site investigation and through the activities of this Phase I ESA, excluding the limitations. The information contained in this report relates only to the subject property and should not be extrapolated or construed to apply to any other site. The description of the subject property as provided herein represents the conditions of the subject property as it existed on the date of the site reconnaissance. The contents of this report are valid for 180 days from the date of the first data collected. In this case, data were first collected on October 15, 2021 (the date of the earliest landowner interviews). The information presented in this report is intended for the exclusive use of 99MT 8ME, LLC; and its affiliates, lenders, and counsel. Reliance of any other parties on the information presented herein is the sole responsibility of said parties.

We have performed a *Phase I Environmental Site Assessment* in conformance with the scope and limitations of ASTM International Standard E2247-16 for the subject property, as described in Section 2.0 of this report. Any exceptions to, or deletions from, this practice are described in Section 1.3 of this *report*. This assessment has revealed no evidence of *recognized environmental conditions* in connection with the *property*. Likewise, SWCA does not have reason to believe that significant releases of hazardous substances or petroleum products have occurred on the subject property.

1 INTRODUCTION

This report presents the results of a Phase I Environmental Site Assessment (ESA) completed by SWCA Environmental Consultants (SWCA) for the proposed Sienna Solar and Storage Project (the "subject property"). The subject property consists of 28 privately owned parcels that total approximately 1,932 acres of land. One of these parcels is 77 acres of land located 2.5 miles northwest of the main body of the subject property (the "outlying parcel") that is proposed for construction of an electrical substation and point of interconnect with existing electrical transmission lines. The subject property is situated within the Lucerne Valley of the southern Mojave Desert, in the southwestern portion of San Bernardino County, California. Most parcels are vacant and unoccupied; they are either active or former agricultural land or vacant desert land. Some include rural residences or farmsteads, and one includes electrical transmission lines. Adjoining properties are similar in nature.

SWCA completed this Phase I ESA for 99MT 8ME, LLC in accordance with the scope of work included in Appendix A.

1.1 Purpose

The purpose of this Phase I ESA is to satisfy part of the due diligence requirements in order to qualify for the innocent landowner, contiguous property owner, or bona fide prospective purchaser limitations on Comprehensive Environmental Response, Compensation and Liability Act liability prior to purchase of the subject property.

This Phase I ESA was completed in general accordance with ASTM International (ASTM) Standard E2247-16, *Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process for Forestland or Rural Property* (ASTM 2016). Deletions or deviations from ASTM Standard E2247-16 are documented in this report. The goal of the processes established by this practice is to assess the property, to the extent practical, for the potential presence of recognized environmental conditions (RECs), defined in the ASTM standard as "the presence or likely presence of any hazardous substances or petroleum products in, on, or at a property: (1) due to any release to the environment; (2) under conditions indicative of a release to the environment; or (3) under conditions that pose a material threat of a future release to the environment." De minimis conditions, which generally do not present risks of harm to public health or the environment and which generally would not be the subject of enforcement actions if brought to the attention of appropriate regulating agencies, are not RECs.

According to ASTM, all appropriate inquiry is not an exhaustive assessment of a clean property. There is a point at which the cost of information obtained, or the time required to gather it outweighs the usefulness of the information and, in fact, may be a material detriment to the orderly completion of transactions. One of the purposes of the practice is to identify a balance between the competing goals of limiting the costs and time demands inherent in performing an environmental site assessment and the reduction of uncertainty about unknown conditions resulting from additional information.

This Phase I ESA did not include activities such as inspections or sampling for the presence of asbestos-containing materials, radon, other radioactive substances, vapor intrusion, lead-based paint, non-hazardous wastes and materials, mold, or biological and medical wastes. No soil, air, or water samples were collected for this Phase I ESA.

1.2 Scope of Work

To achieve the objective referenced above, the following tasks were completed:

- Reviewed historical topographic maps and historical aerial photographs
- Surveyed relevant documents in order to assess the subject property's physiography, including a review of the local hydrogeology and geology of the surrounding area
- Reviewed available federal and state regulatory databases
- Interviewed landowners of the subject property
- Visually surveyed the subject property by driving and walking throughout the subject property, and visually surveyed the surrounding properties from the subject property perimeter

1.3 Limitations

SWCA warrants that a qualified Environmental Professional prepared this report in conformance with ethical business practices and industry standards. Appendix B contains the credentials of the Environmental Professional responsible for preparation of this report.

Some standard historical sources are not readily available and thus were not used to prepare this Phase I ESA. SWCA was not provided with title reports or judicial records of environmental liens and activity and use limitations (AULs) for all sites. Because of the lack of available aerial photographs and U.S. Geological Survey (USGS) topographic maps, the commonly used 5-year interval between photographs and topographic map dates could not be followed for all photographs and maps reviewed. Standard historical sources dating back to 1940 were not reasonably obtainable for the subject property.

Landowner interviews were administered by the client by mailed questionnaires prior to contracting with SWCA. Not all landowners completed questionnaires. SWCA staff was not able to visit all occupied areas of the subject property. Portions of Parcel 045211224 could not be assessed in detail due to aggressive dogs. Staff left Parcel 045207111 for other safety reasons before a detailed assessment could be completed.

Sections 8.3 to 8.3.4 of ASTM Standard E2247-16 allow for other historical sources to be relied upon when standard historical sources are not reasonably ascertainable and where past experience of the Environmental Professional indicates that they are not likely to produce additional useful information. This task requires reviewing only as many of the standard historical sources as are necessary and as are both reasonably ascertainable and likely to be useful.

Although not all standard historical sources dating back to 1940 were obtained for the subject property, historical topographic maps and interviews confirmed that the subject property has primarily been vacant desert land use and agriculture. Historical research was deemed to be complete because the objectives in Sections 8.3.1 through 8.3.2.2 of ASTM Standard E2247-16 were achieved: 1) develop a history of the previous uses of the property and surrounding area sufficient to identify the likelihood of past uses having led to RECs in connection with the property; 2) identify all obvious uses of the property from the present, back to the property's first developed use, or back to 1940, whichever is earlier; and 3) identify the general type of use.

According to Section 8.3.2.3 of the standard, "Data failure occurs when all of the standard historical sources that are reasonably ascertainable and likely to be useful have been reviewed and yet the objectives have not been met" (ASTM 2016:17). While the above represents a data gap, it does not represent a data

failure. Because alternatives to standard sources served as a solid basis for learning past property uses and conditions, and because supplemental data sources provided sufficient information, SWCA believes that the data gaps did not significantly affect SWCA's ability to identify RECs on the subject property. SWCA's findings and conclusions within this assessment do not consider the limitations identified in this report.

1.4 User Reliance

The information contained in this report relates only to the subject property and should not be extrapolated or construed to apply to any other location. The description of the subject property as provided herein represents the conditions of the subject property as it existed on the dates of the site reconnaissance and data source searches. The information presented in this report is intended for the exclusive use of 99MT 8ME, LLC; and its affiliates, underwriters, lenders, and counsel. Reliance by any other parties on the information presented herein is the sole responsibility of said parties.

The findings presented here are based solely on the above-referenced methods and limitations and are valid for 180 days from the date of the first data collected. In this case, data were first collected on October 15, 2021 (the date of the earliest landowner interviews). The validity of the report can be renewed by updating the following elements:

- Interviews with owners, operators, and occupants
- Review of federal, tribal, state, and local government records
- Visual inspections of the subject property and of adjoining properties
- The declaration by the Environmental Professional responsible for the assessment or update

2 PROPERTY DESCRIPTION

The subject property consists of 28 parcels with 18 different private owners that total approximately 1,932 acres of land (San Bernardino County 2022). The main body of the subject proerty lies between Meridian Road to the west and Amber Road to the east. Smoke Bush Road is to the north, and Sherman Way is to the south. It is approximately one mile east of State Highway (SH) 247 (Barstow Road) and 2.5 miles north of SH 247 (Old Woman Springs Road) (SH 247 has different road names west and south of the subject property). A 77-acre parcel, referred to herein as the "outlying parcel," is 2.5 miles northwest of the main body of the subject property. This parcel is proposed for construction of an electrical substation as a point of interconnection with existing electrical transmission lines.

The subject property is situated within the Lucerne Valley of the southern Mojave Desert, in the southwestern portion of San Bernardino County, California. Most parcels are vacant and unoccupied; they are either active or former agricultural land or vacant desert land. Some include rural residences or farmsteads, and the outlying parcel includes electrical transmission lines. Adjoining properties are similar in nature.

The main body of the subject property is located within portions of Township 5 North, Range 1 East, Sections 17–33, with the exception of Sections 18, 20, and 31. The outlying parcel is located within Township 5 North, Range 1 West, Section 2. The subject property is depicted in Figures 1, 2a, 2b, and 3a–3e. A parcel map and a list of parcels and property owners are provided in Appendix C.

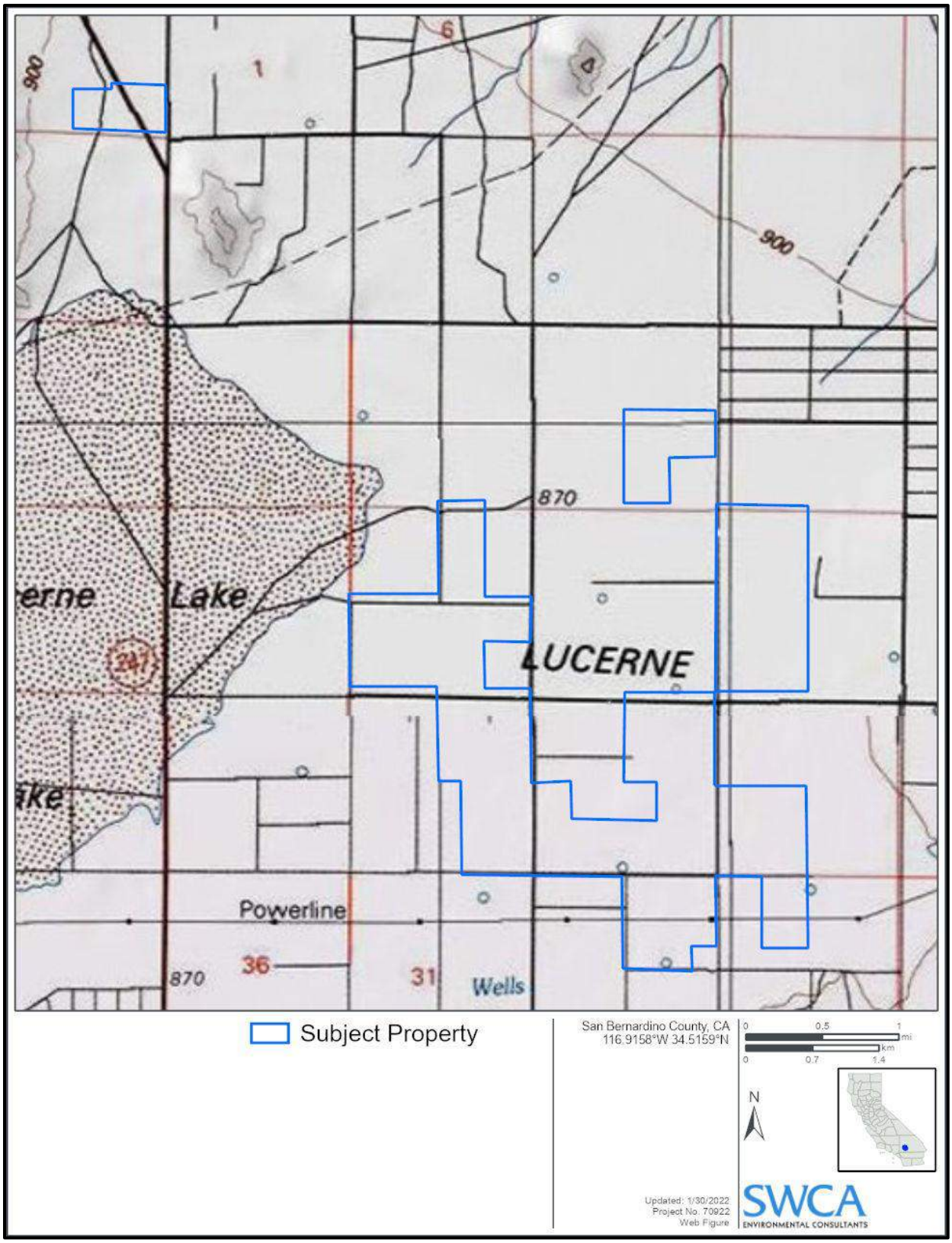


Figure 1. Topographic map of the subject property.

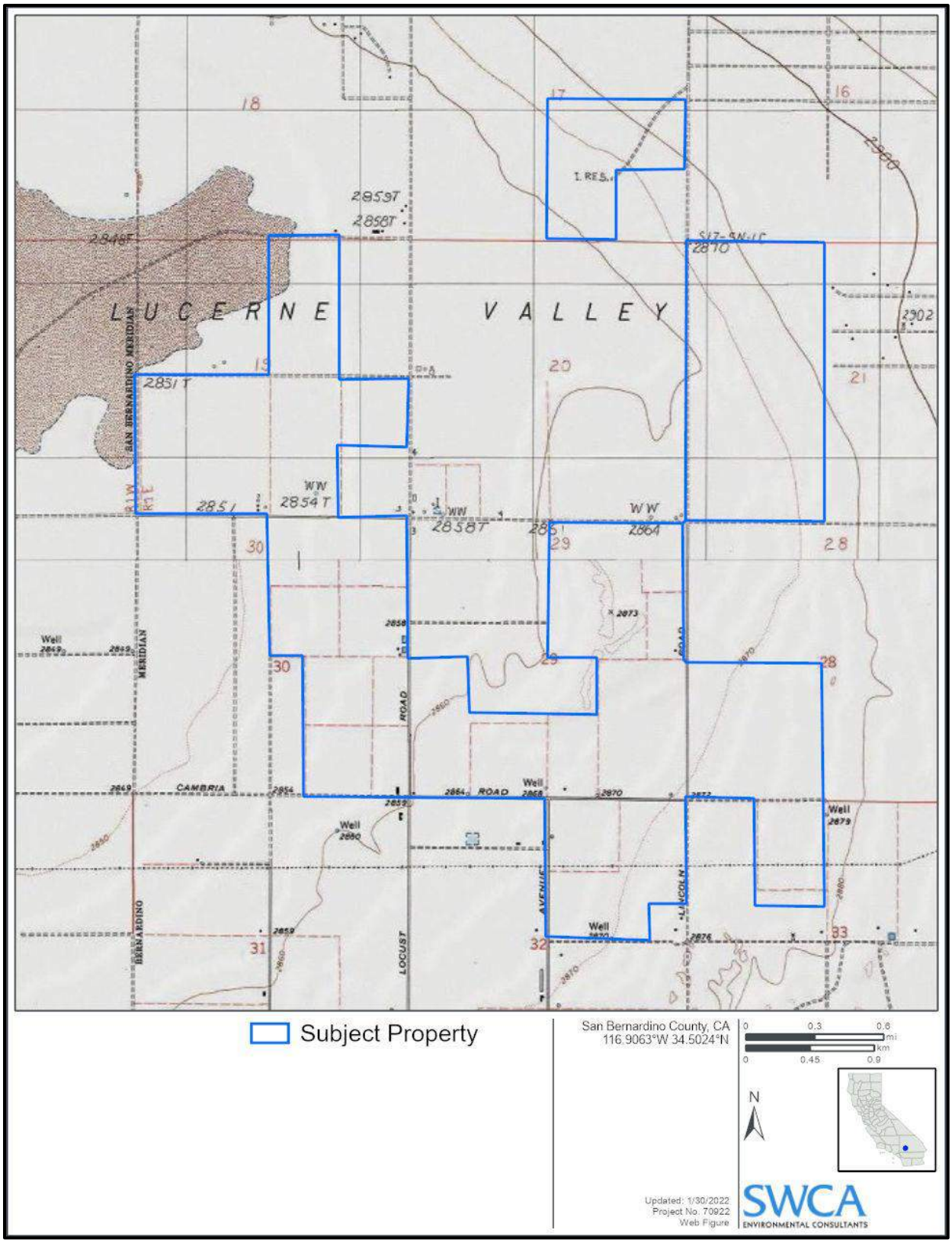


Figure 2a. Topographic map of the main body of the subject property.

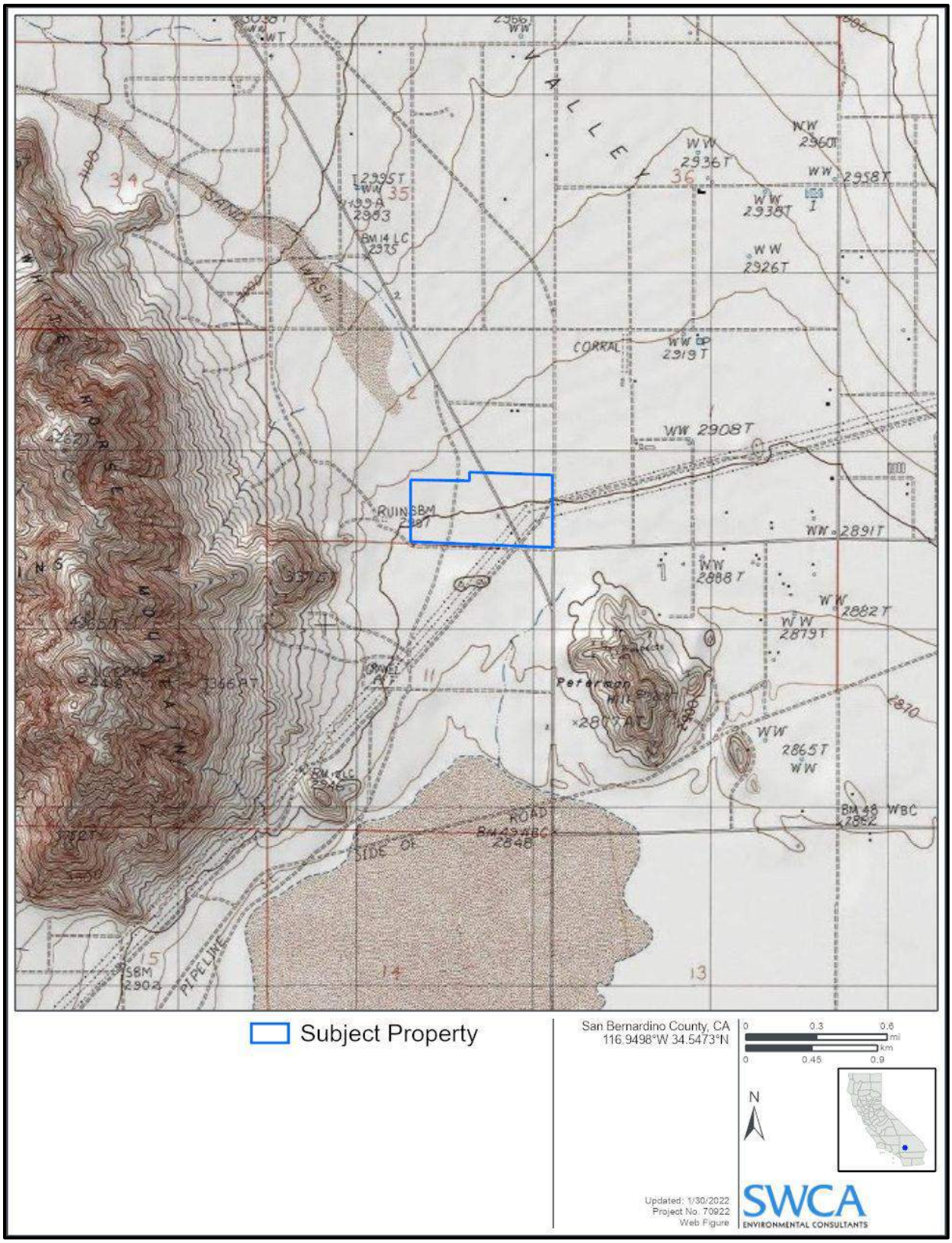


Figure 2b. Topographic map of the outlying parcel of the subject property.

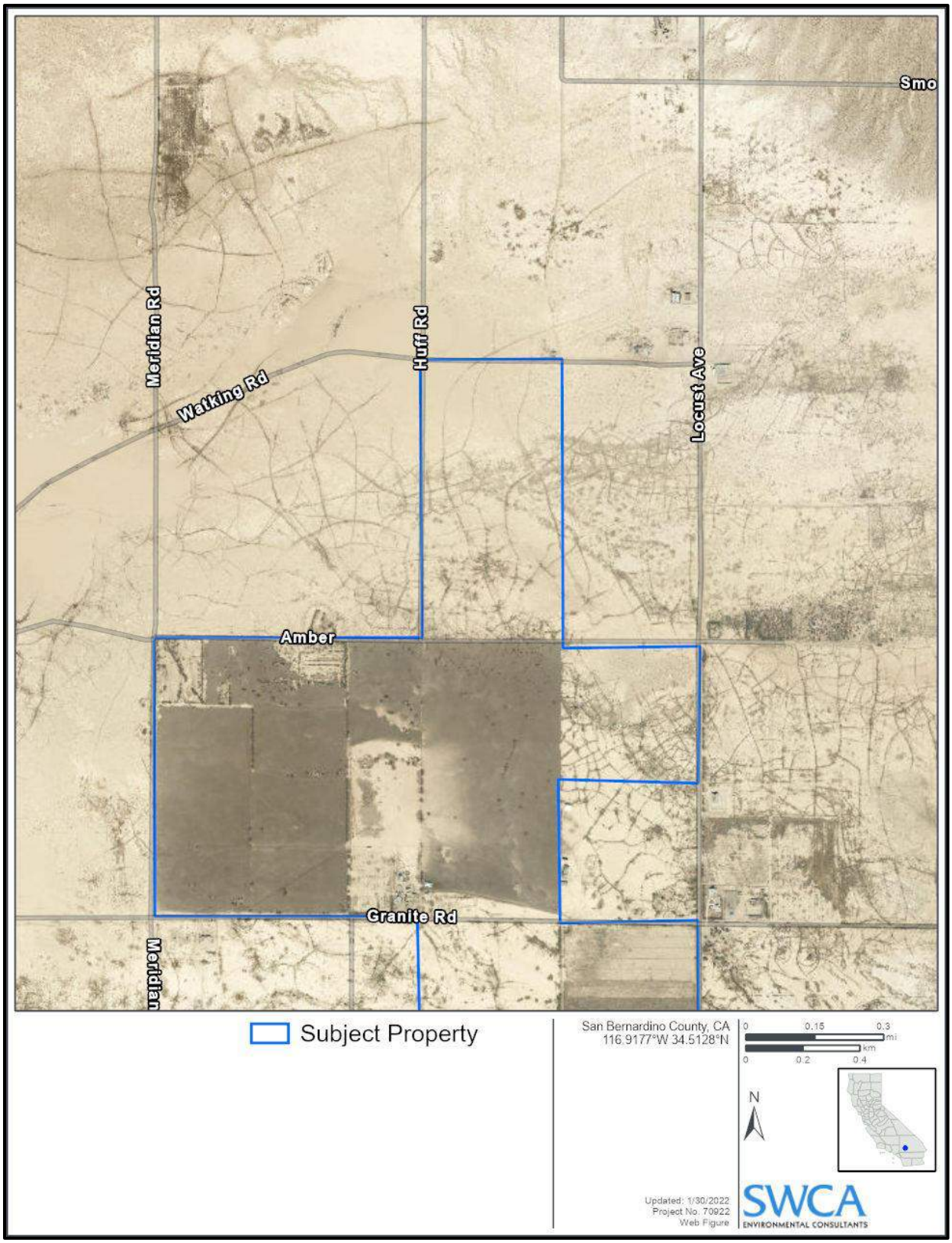


Figure 3a. Aerial photograph of the main body of the subject property, northwest quadrant.

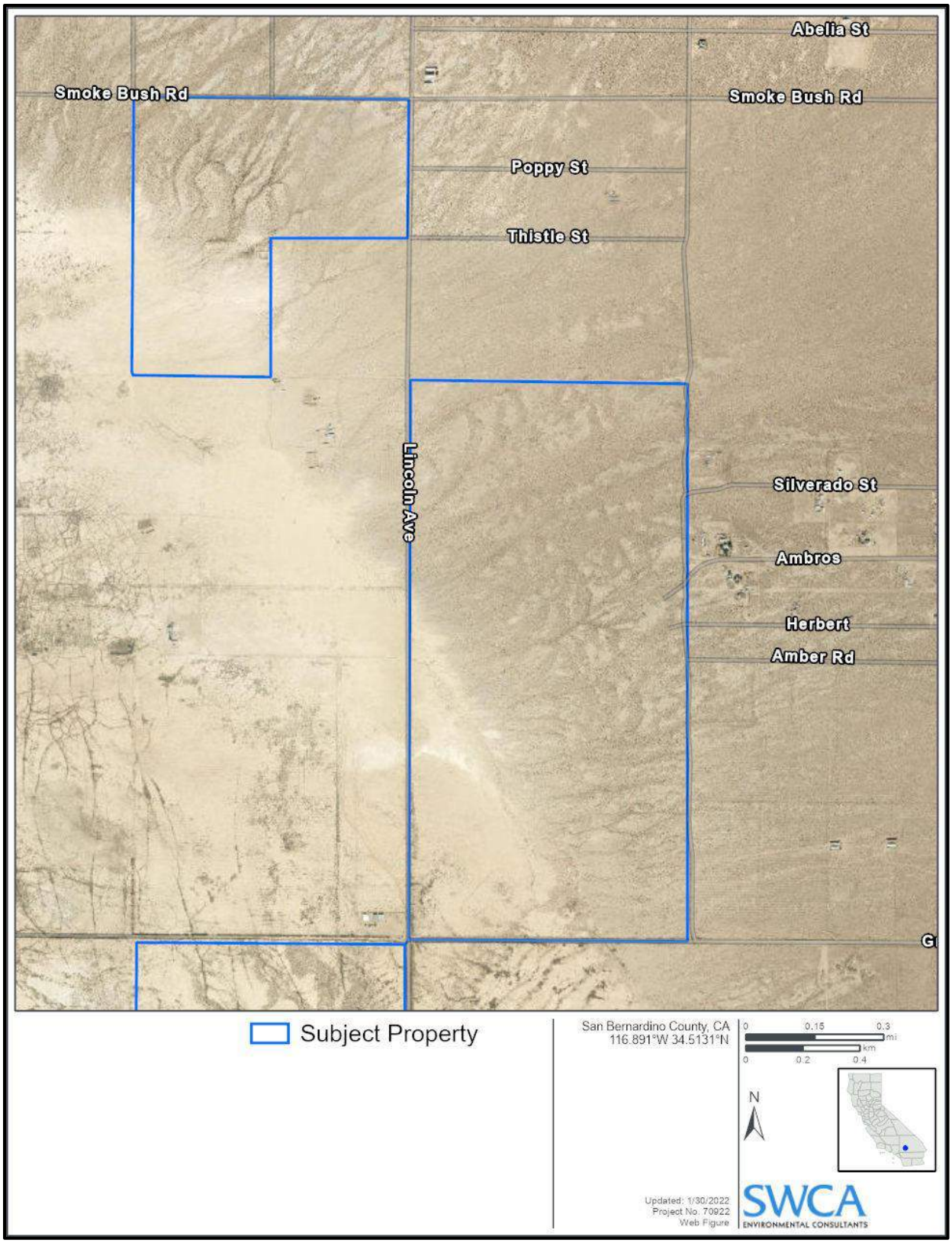


Figure 3b. Aerial photograph of the main body of the subject property, northeast quadrant.

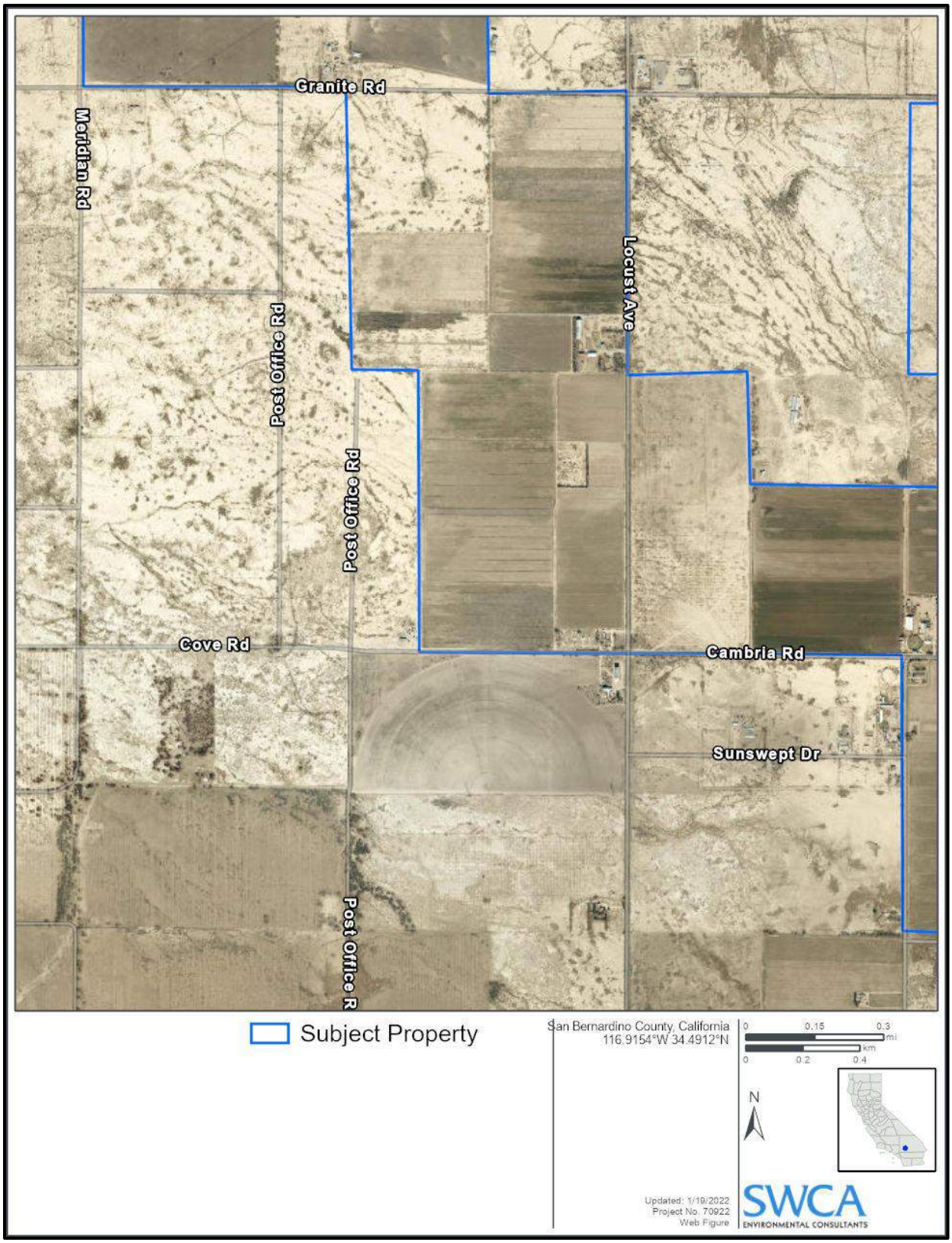


Figure 3c. Aerial photograph of the main body of the subject property, southwest quadrant.

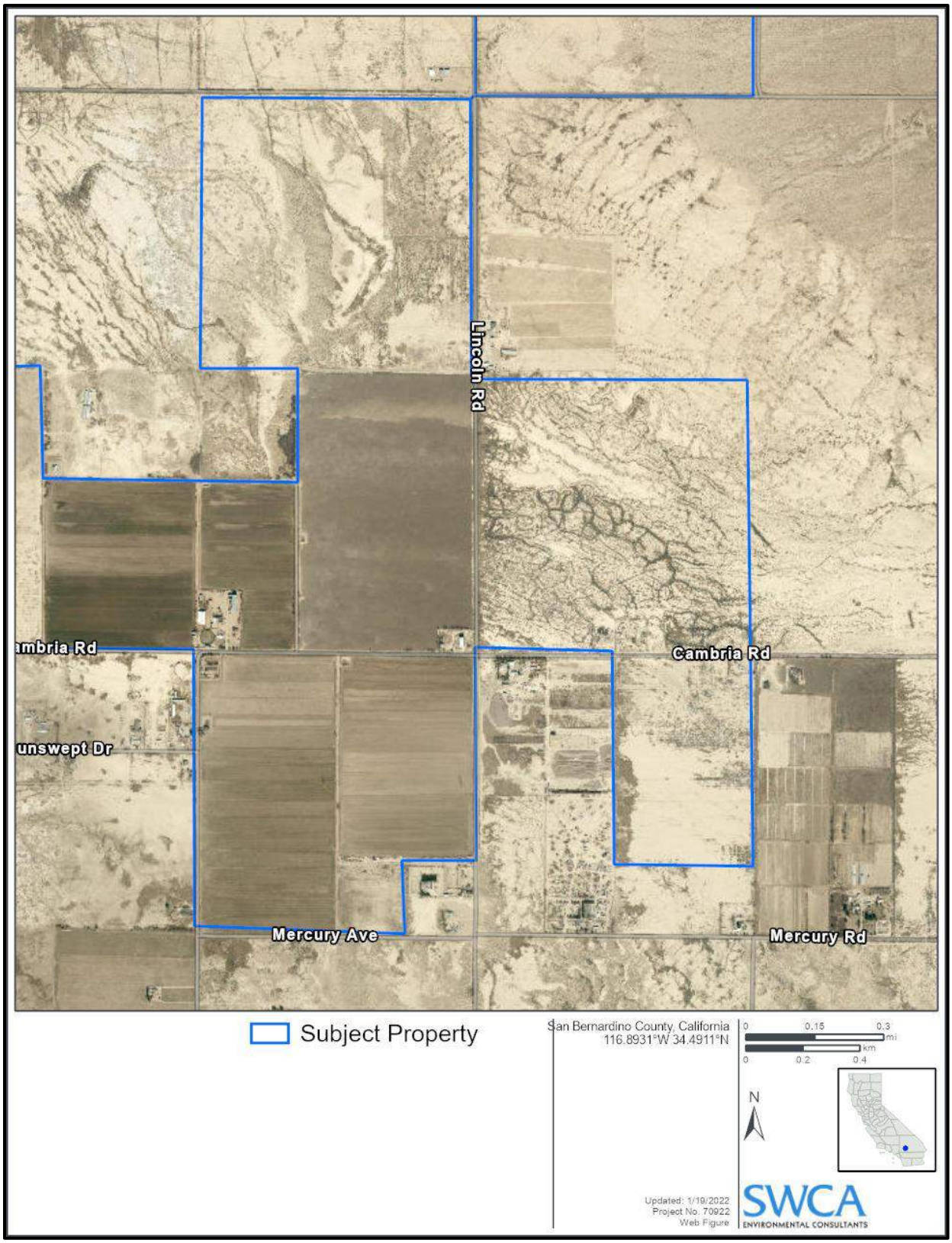


Figure 3d. Aerial photograph of the main body of the subject property, southeast quadrant.

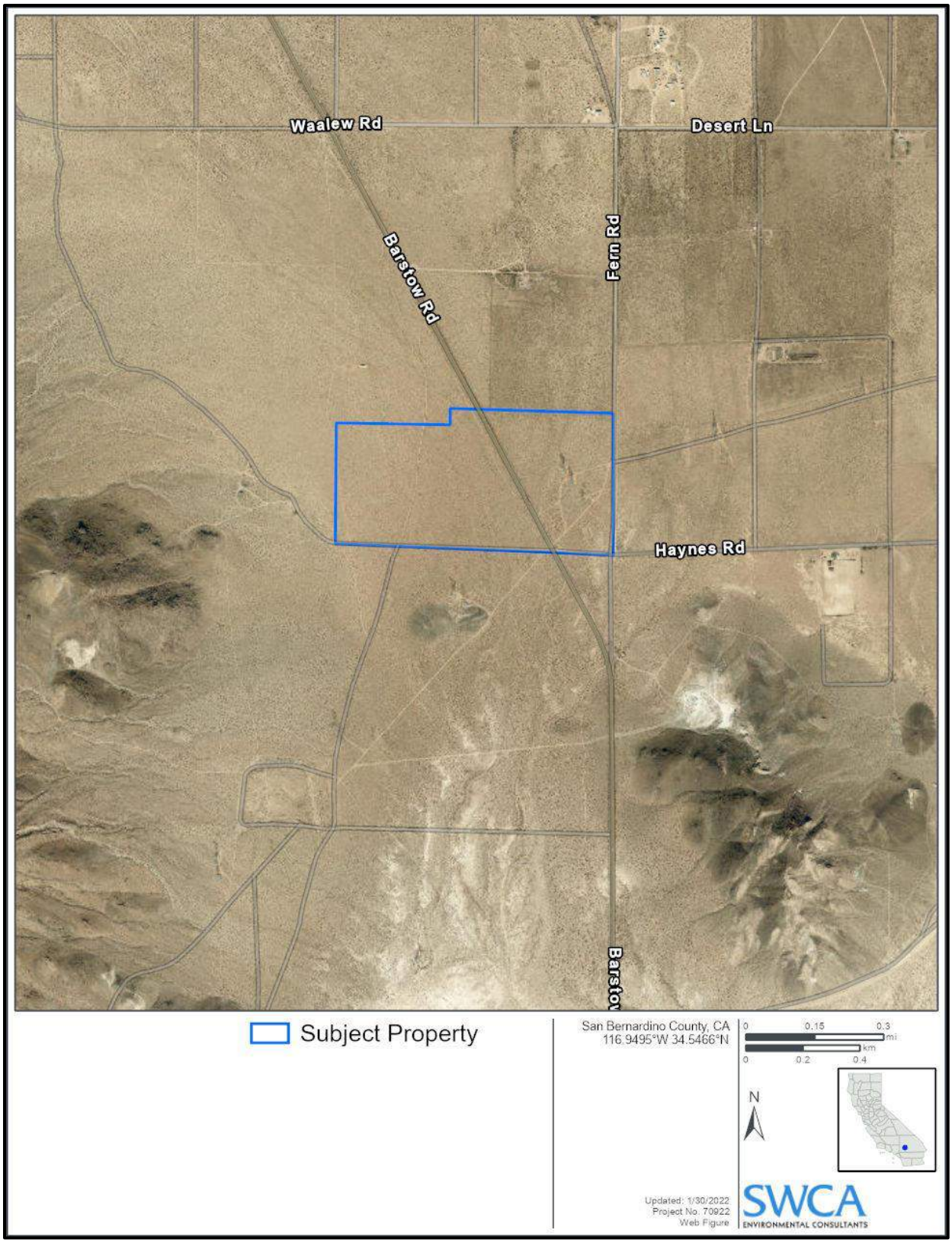


Figure 3e. Aerial photograph of the outlying parcel of the subject property.

3 PHYSICAL SETTING ANALYSIS

The following sections present physical characteristics of the subject property, as obtained from available natural history information sources.

3.1 Topography

USGS topographic maps of the region (USGS 2022a) indicate that the main body of the subject property is situated within the Lucerne Valley of the southern Mojave Desert, just east of Lucerne Lake. It appears to lie over the alluvial fan of an unnamed wash that drains a small watershed southeast of the subject property, the unnamed valley that SH 247 runs through. The main body of the subject property slopes overall to the northwest, toward Lucerne Lake, a dry lake. It has very little topographic relief; the elevation ranges from approximately 2,950 feet above mean sea level in the west to 2,890 feet above mean sea level in the northeast.

The outlying parcel of the subject property is 0.75 mile north of Lucerne Lake. It appears to lie within basin alluvium, and it slopes southward toward the dry lake. It has little topographic relief; the elevation ranges from approximately 2,895 feet above mean sea level in the west to 2,920 feet above mean sea level in the northeast.

3.2 Geology

Mineral resources spatial data from the USGS (2022b) indicate that the subject property is underlain by Quaternary alluvium and marine deposits. This geologic unit is composed of unconsolidated and semi-consolidated alluvium, lake, playa, and terrace deposits of the Pleistocene to Holocene geologic age. Deposits are typically non-marine but may contain some marine deposits near the coast (USGS 2022b).

3.3 Soils

A review of Soil Survey Geographic Database (SSURGO) soils data from the U.S. Department of Agriculture Natural Resources Conservation Service (NRCS) (2022a) indicates that soils on the main body of the subject property appear to vary by landscape position, from side slope, to dry wash corridor, to alluvial fan, and to the tier above the lake floor, the mapped soils are Kimberlina, Glendale, Peterman, and Bousic clay soils, respectively. The outlying parcel is mapped primarily as Waco soils. Subject property soils are described in Table 1.

Table 1. Predominant Soil Types on the Subject Property

Soil Name	Description
Kimberlina	Side slopes: Very deep, well-drained soils on floodplains and recent alluvial fans. These soils formed in mixed alluvium derived dominantly from igneous and/or sedimentary rock sources. Slopes are 0 to 9 percent.
Glendale	Dry wash corridor: Very deep, well-drained soils formed in stratified alluvium. Glendale soils are on alluvial fans, floodplains, and stream terraces and have slopes of 0 to 5 percent.
Peterman	Alluvial fan: Deep, moderately well-drained soils that formed in fine-textured alluvium derived from mixed material. Peterman soils are on lower margins of alluvial fans and basin rim areas and have slopes of 0 to 2 percent.
Bousic clay	Perimeter of lake: Deep, moderately well-drained soils that formed in fine-textured alluvium derived from mixed material. Bousic soils are on basin rim areas and have slopes of 0 to 1 percent.

Soil Name	Description
Wasco	Very deep, well drained soils on recent alluvial fans and flood plains. These soils formed in mixed alluvium derived mainly from igneous and/or sedimentary rock sources.

Source: NRCS (2022b)

3.4 Hydrogeology

The subject property lies within the Lucerne Valley Subbasin of the Lucerne Valley Groundwater Basin. Surface water in the basin drains centrally toward Lucerne Lake in the western portion of the basin. The subject property is just east of the lake. Groundwater is believed to generally mimic surface topography and generally flows from areas of recharge (mountain runoff) toward Lucerne Lake. The principal water-bearing deposits are Quaternary age alluvium and dune sand. The deposits are unconsolidated or semi-consolidated, and the alluvium is composed of gravel, sand, silt, clay, and occasional boulders. The thickness of the alluvium averages about 600 feet (California Department of Water Resources 2022).

Many water wells are present in the vicinity of the subject property; 11 water wells are mapped on the main body of the subject property by the California State Water Resources Control Board (2022a, 2022b). All 11 of these mapped wells have a listed use of "water supply, other." An additional three water wells are mapped on-site by the USGS (2022a). Depth-to-water data are not provided for on-site or adjoining wells. Landowner Miguel Gaeta indicated to the client that there is a domestic well that has been covered up on his property. The mapped locations of on-site water wells are depicted in Figure 4.

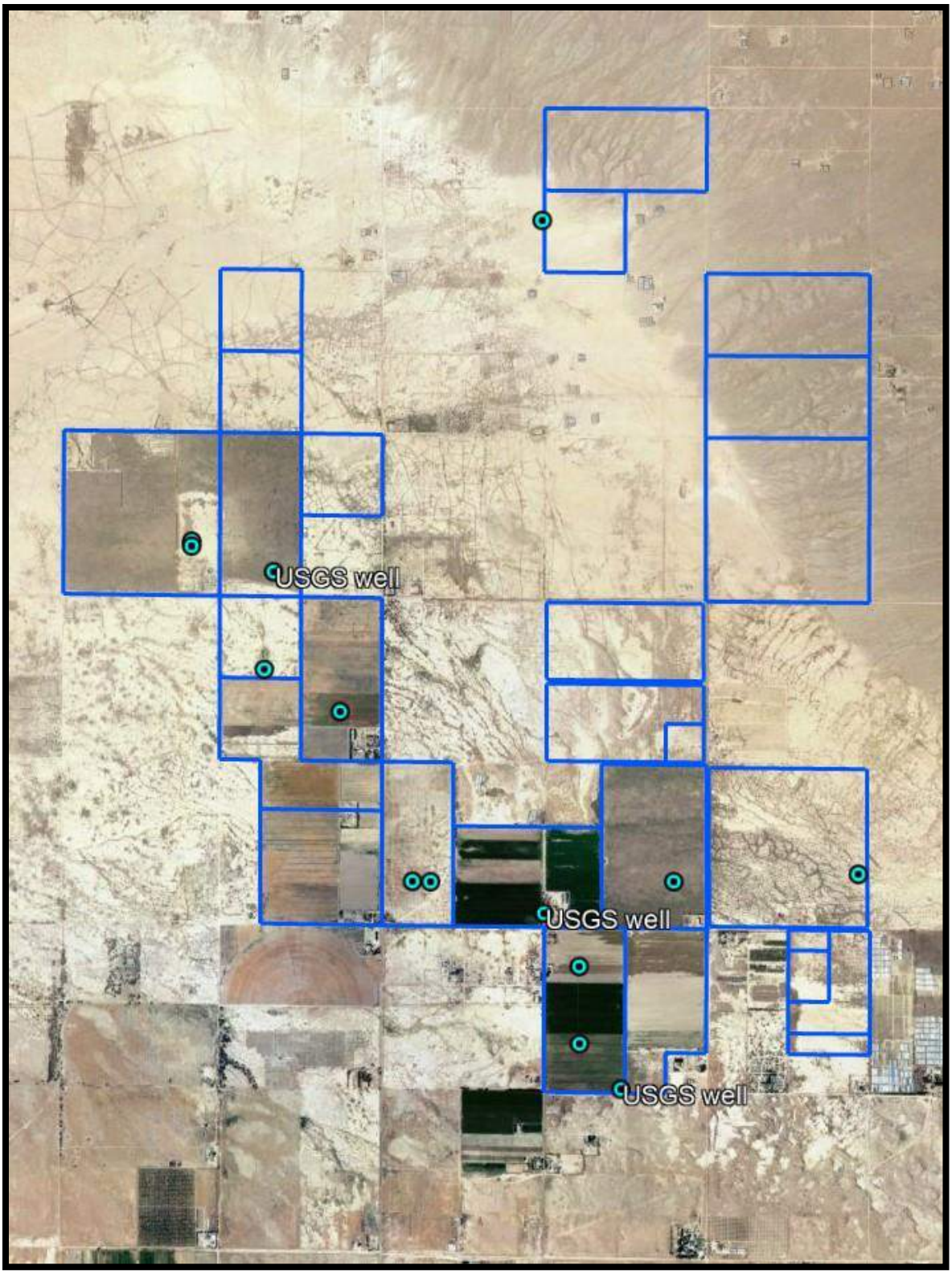


Figure 4. Locations of mapped water wells on the subject property.
(no wells are mapped on the outlying parcel)

4 HISTORICAL PROPERTY USES AND RECORDS REVIEW

The history of the subject property and adjacent properties was reviewed in accordance with the applicable ASTM standards, except as noted in Section 1.3. Historical uses of the subject property were determined based on a review of readily available, reasonably ascertainable historical data, including historical topographic maps, historical aerial photographs, interviews, and a search for environmental liens and AULs.

4.1 Historical Map Review

SWCA reviewed USGS topographic maps of the area dated from 1901 to 2018 (USGS 2022a). Our observations are described below.

Main body of the subject property: The 1901 map only includes the southern portion of the subject property, which is depicted as vacant desert land with a few nearby unimproved roads. More local roads were present by 1949. At that time several structures were present on-site along various roads that were in a grid pattern. An electrical transmission line was depicted along a road crossing through the southern portion of the subject property where Power Line Road / Transmission Line Road exists today.

The first detailed (1:24,000 scale) maps available are from 1971. Several water wells were depicted on and near the subject property. Maps through the year 1996 do not depict significant changes; the only land uses appear to be residential and agricultural. Structures are not depicted on subsequent maps; only roadways are mapped in the subject property vicinity in the modern topographic maps.

Outlying Parcel: The earliest map of this area is from 1953. It is depicted as vacant land with a road crossing through where SH 247 (Barstow Road) is located today. The 1956 map is a smaller scale map with more detail. It depicts an electrical transmission line in the southeast corner where one exists today. It also depicts a mineshaft near the center of the parcel (coordinates: 34.5472, -116.9485). Two small structures adjoin the west of the parcel and a water well adjoins the southeast. The 1982 map is smaller resolution. It depicts three parallel transmission lines in the southeast. Structures adjoining the west are depicted as ruins, and the mineshaft is depicted as a prospect. A slight ground disturbance is still evident in this area today. No further changes are evident in subsequent maps.

4.2 Historical Aerial Photograph Review

SWCA reviewed available historical aerial photographs of the subject property from 1945 to 2020 (Google Earth 2022; Nationwide Environmental Title Research, LLC 2022). Our observations are described below.

Main body of the subject property: The 1945 photograph does not depict the northern third of the subject property. Much of the subject property was vacant desert land, but several parcels were already in agricultural use. Farmsteads existed at 045207111 (owner: Michel Benito), 045206223 (owner: Miguel Gaeta), and 045211217 (owner: Jacque Montero). The latter farmstead was removed in the early 2010s. Over the next 50 years, farmland increased in area and the number of homes and farmsteads increased also.

Farmland acreage on-site and in the vicinity appears to have begun dwindling in the 1990s. Much of the subject property, especially in the northeastern portion, still remained vacant desert land. Photographs with very good resolution are available for the period from 2003 to 2020. Select observations from that time period include the following:

- In the north of Parcel 045206224 and the south of Parcel 045206222, the southern portion of a 2.5-acre area appears to have been used as a junkyard in the 2003 and in 2006 photographs. At least 50 vehicles were present in 2003. Much of the farmstead in the southeast of Parcel 045206223 was covered in junk and debris during the same period. Both areas were mostly cleaned up in 2009. The former junkyard still holds scrap and a few vehicles, and a group of 10 or more drums has been along the south of that area since 2013 or prior. The occupied area in the southeast corner of Parcel 045206224 began accumulating vehicles in 2009. Over two dozen vehicles were present by 2013 and all had been removed by 2014. All three of these parcels are owned by Miguel Gaeta.
- The occupied portion of Parcel 045211224 (owned by MB Landscaping & Nursery, Inc.) has had two aboveground storage tanks (ASTs) visible on photographs from 2013 to 2020, and they are still present. The tanks have been within a secondary containment structure during this time. Part of the southern portion of Parcel 045212142 (same owner) began accumulating debris in 2009. One pile of approximately a dozen drums has been present since 2016. In the October 2020 photograph, a group of approximately 130 drums is adjacent to the southeast of an L-shaped structure. The drums are bundled in four-drum groups as they would be for shipping and they appear consistent in color, possibly indicating that they are new and in good condition. Another group of approximately 40 drums sits 100 feet farther southeast. These drums are not bundled but appear similar in color to the larger group.
- Most occupied areas of the subject property experienced ebbs and flows of accumulated debris over time.
- Some areas on-site and nearby apparently had hundreds of loads of soil or soil amendments delivered and spread over the desert soils for farming. One example of this is at Parcel 045206222, owned by Miguel Gaeta.
- An 80-acre area adjoining the southeast of the subject property had been used for farming in the past. Between December 2019 and October 2020, that parcel added approximately 350 greenhouses and many more were under construction. Most greenhouses are 2,000 to 3,000 square feet in area. Approximately half of the 80 acres was covered in greenhouses. A 6-acre portion of the site includes over a dozen campers and a shanty-town of shacks. Based on our professional knowledge of the region, this is most likely an illegal marijuana growing operation, one of many that have appeared in the region in recent years.
- Also in 2020, a few dozen smaller marijuana growing operations appeared in the open area enveloped by the northern portion of the subject property, and many more appeared in the vicinity. These are each groups of two to 12 greenhouses surrounded by a fence, with a water tank for the plants and a camper for the caretaker.

Outlying Parcel: In 1952, this parcel appears to have been vacant land with a few unimproved roads. The most prominent road is where SH 247 crosses the parcel today. A few small structures adjoined the west. A triple electrical transmission line crossed through the southeast corner of the parcel in 1969. A small disturbance at the locations of the mine prospect is first visible in the 1983 photograph. The outlying parcel does not appear to have changed significantly since that time, except that in 2020 there were three sets of parallel transmission lines, each with three cables.

In 1989, an area 0.15 mile west of the parcel had what appeared to be a few mobile homes or semi trailers, and some debris. More debris was present by 2005 and 2006. It appears the area was occupied. Debris was consolidated into a pile in the 2009 photograph, and the trailers or structures had also been moved together. In 2013 there were two half-mobile homes or RVs in a small fenced area. Two debris

piles were southeast of them, and were 80 and 60 feet in diameter. In 2016 the RVs were gone, but the debris piles still remained in 2020.

What appears to be an illegal marijuana growing operation appeared 0.2 mile west-southwest of this parcel October 2020 in an area that was vacant desert land in April 2020.

4.3 Previous Phase I Environmental Site Assessment Reports

SWCA is not aware of any other Phase I ESA reports or other relevant environmental reports for the subject property.

4.4 Interviews

The client had conducted landowner interviews by questionnaire prior to contracting with SWCA. The questionnaire was adapted from the Phase I ESA Landowner Questionnaire and covered topics including past property use, stored chemicals and petroleum products, storage tanks, and known issues related to potential contamination. Of the 18 landowners contacted, 10 returned completed questionnaires. The earliest responses were on October 15, 2021. None of the respondents indicated knowledge of stored hazardous substances or petroleum products, 55-gallon drums, or any hazardous wastes generated on-site. None of the respondents indicated knowledge of stained soil; ASTs or underground storage tanks (USTs); dumped, buried, or burned materials; or environmental liens or environmental AULs.

Venai Shenoy, representing 99MT 8ME, LLC, completed a Phase I ESA User Questionnaire regarding the subject property on October 13, 2021. Venai noted that the purchase price being paid for the subject property reasonably reflects its fair market value. Venai does not know any past uses of the subject property, nor of any significant spills or chemical releases or environmental cleanups that have occurred on the subject property and is not aware of any obvious indicators that point to the presence or likely presence of releases at the subject property.

Jennifer Jackson, who is also associated with 99MT 8ME, LLC, completed a Phase I ESA User Questionnaire on October 25, 2021. She was not aware of any environmental liens or AULs for the subject property. She does not know of any past uses of the subject property other than portions having been used for agriculture. She does not know of any significant spills or chemical releases, or environmental cleanups that have occurred on the subject property. She is not aware of any obvious indicators that point to the presence or likely presence of releases at the subject property. Copies of the Phase I ESA User Questionnaires are provided in Appendix D.

4.5 Environmental Liens and Activity and Use Limitations

SWCA was provided with Commitments for Title Insurance for 10 of the 18 identified landowners, listed below. SWCA's review of these documents did not identify environmental liens or environmental AULs for the parcels under those owners. Commitments for Title Insurance were reviewed for the following landowners: Feliciano Dalugdugan, Abel Garcia, Young Kim, Martinez Family Trust, Mopal Coproration, Hai Nguyen, Ostrow Partnership, Lusia Shafran, Sochor Revocable Living Trust, and Xian Zhang.

5 ENVIRONMENTAL REGULATORY REVIEW

SWCA conducted an environmental regulatory review to establish the environmental history of the subject property and surrounding area to ascertain whether hazardous waste or hazardous material management, handling, treatment, or disposal activities have occurred on or near the subject property.

5.1 Environmental Records Searched

An environmental database search report generated by Environmental Data Resources, Inc. (EDR), on January 20, 2022, was used to access environmental records for the subject property and the surrounding properties (Appendix E). The databases searched include those specified by ASTM Standard E12247-16, as well as several additional federal and state databases and databases proprietary to EDR. EDR updates its records in accordance with ASTM Standard E2247-16 guidelines, and ASTM's standard search distances were followed, as detailed in Table 2. Additional listed facilities that EDR has not identified may exist within a 1-mile radius.

Table 2. Approximate Minimum Search Distances

Record Sources	Approximate Minimum Search Distance (miles)
Federal Databases	
National Priority List (NPL)	1.0
Delisted NPL	0.5
Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS)/CERCLIS No Further Remedial Action Planned (NFRAP) sites	0.5
Resource Conservation and Recovery Act (RCRA) Corrective Action Sites (CORRACTS) facilities	1.0
RCRA non-CORRACTS Treatment Storage and Disposal facilities	0.5
RCRA generators list	Property and adjoining
Institutional control / engineering control registries	Property only
Emergency Response Notification System (ERNS)	Property only
State and Tribal Databases	
NPL	1.0
CERCLIS	0.5
Landfill and/or solid waste disposal site lists	0.5
Leaking storage tank lists	0.5
Registered storage tank lists	Property and adjoining
Institutional control / Engineering control registries	Property only
Voluntary cleanup sites	0.5
State and tribal Brownfield sites	0.5

Source: ASTM (2016)

SWCA supplemented the EDR database search with a review of environmental databases from the California Department of Conservation (2022a, 2022b), California Department of Toxic Substances Control (2022), California Environmental Protection Agency (2022), California State Water Resources Control Board (2022b–d), U.S. Department of Transportation (2022), and U.S. Environmental Protection Agency (2022a–2022d). Facilities listed in the environmental databases are described below, and their potential to be RECs is addressed in Section 7.0. A copy of the EDR report is included in Appendix E.

5.2 Environmental Database Listings

SWCA's review of the EDR database report and supplemental records from federal and state regulatory databases identified the following:

- The Howard Pettigrew property, located in the southwestern quadrant of the subject property at 13324 Locust Avenue (Parcel 045206223, owned by Miguel Gaeta), is identified in the UST and Statewide Environmental Evaluation and Planning System underground storage tank (SWEEPS UST) databases. The SWEEPS listing indicates that there were two or three USTs installed in 1988. These were one or two 280-gallon leaded gasoline tanks (the listing is unclear) and one 550-gallon leaded gasoline tank. The SWEEPS database has not been updated since 1994. A San Bernardino County Permit listing indicates that for a 1990 annual UST inspection the facility was inactive. No indications of leaks, spills, or potential contamination are identified in conjunction with this listing, and no active USTs are identified in current state records.

  This property is also identified in the Clandestine Drug Laboratory (CDL) database. In 2002, it was identified as a location where an illegal drug lab was operated or drug lab equipment and/or materials were stored.

- The NB Nursery / Bob Burns property, located in the south of the subject property at 12881 Midway Avenue (Parcel 045212112), is identified as having been in the state's Hazardous Waste Tracking System. This is an administrative database that has stored identification number information since the early 1980s and shipping manifest data since 1993. No indications of leaks, spills, or potential contamination are identified in conjunction with this listing.

- The Dan Pettigrew property, adjoining the south of the subject property at 12860 Locust Avenue, is identified as a UST site. The SWEEPS listing indicates that a 550-gallon leaded gasoline tank was installed in 1988. A San Bernardino County Permit listing indicates that for a 1995 annual UST inspection the facility was inactive. No indications of leaks, spills, or potential contamination are identified in conjunction with this listing, and no active USTs are identified in current state records.

- A petroleum AST is identified as adjoining the south of the subject property at 12332 Midway Avenue. The farmstead at this property is located 0.2 mile south of the subject property. No indications of leaks, spills, or potential contamination are identified in conjunction with this listing.

- EDR identified 26 unmapped sites (facilities with incomplete locational information). Twenty-five of the listings are not believed to be relevant to the subject property due to the type of listing or their distance from and/or location relative to the subject property. The remaining listing is the CDL site described above.

- No oil and gas wells or mines are mapped on the subject property.

- No gas or hazardous liquid pipelines are mapped on or in the vicinity of the subject property. No accidents (liquid) or incidents (gas) are mapped on or in the vicinity of the subject property.

6 PROPERTY RECONNAISSANCE

Sharif Durzi of SWCA completed the Phase I ESA site investigation for the subject property on January 14 and 20, 2022. Observations were made by driving and walking throughout the subject property, subject to the limitations in Section 1.3. Prior to the site reconnaissance, detailed aerial photography and topographic maps were used to identify areas of the subject property that required

a more detailed analysis. These locations were throughout the subject property but were concentrated in occupied areas. Photographs taken during the property reconnaissance are included in Appendix F.

6.1 Property Inspection

As previously described, most parcels of the subject property are vacant and unoccupied; they are either active or former agricultural land, or vacant desert land. Some include rural residences or farmsteads. Most adjoining properties appear to be similar in nature.

Points of interest on the subject property are described below and are mapped in Figure 4. Except as noted otherwise, no stored chemicals or petroleum products, or significant leaks, spills, or potential contamination were noted. The numbers below represent location point numbers as described to field staff. Omitted point numbers are non-noteworthy locations where Sharif observed and took photographs, such as overview photographs of types of landscape or land use, "typical" photographs of roads, power lines, water wells, and other such features.

Point 3 (Parcel 045236147): Two shipping containers on native desert are shown in this area in 2020 aerial photography. Upon arrival, however, soil had been pushed into mounds as a perimeter. The containers were open and metal beams, the type used for warehouse shelving, were strewn about the area. A single-wide mobile office trailer with two separate areas and a porta-john were present, likely to have been used as housing. Two rows of 12 abandoned greenhouses, many some full of dead plants, were present. Approximately 12 large shoe-box shaped metal frames were in row between them, some filled with thousands of black plastic landscaping pots, some with dead plants. A makeshift drainage ditch ran along the frames, and an underground pipe had been exposed. No pipelines are known to be in this area. It appeared that a somewhat elaborate watering system had been set up. No pesticides, chemicals, or petroleum products were noted in this area.

Point 9 (Parcel 045207111): The occupied area in the southeast of this parcel appears to contain several individual "residences." The area appears to function as a water supply hub. The original farmstead structures were a small home, a shack possibly for a tenant, a garage, a shed, and a metal-sided barn. At the present time the home has had numerous makeshift additions; some are simply a camper integrated into the structure or parked alongside. The garage appears to be occupied, and a few occupied RV trailers are present. The occupied areas can be described as squalor. A well is on-site and three large upright water tanks are present, each possibly 5,000-gallons in capacity. It is notable that a pole-mounted security camera was present and another was mounted at a raised metal water tank. Also, the barn had a lookout platform on the roof, metal bars in the windows, and a locked steel man-door. A shipping container and a few semi trailers were next to the barn. New black SUVs and a newer black Dodge Charger were parked elsewhere on site.

Point 13 (Parcel 045206222): Many truckloads of soil or soil amendment had been dumped here in an area covering approximately 3.5 acres. Aerial photography indicates over 1,000 loads were dumped. The material appeared significantly loamier than local native soils. No unusual odors, staining, or contents were observed.

Point 15 (Parcel 045206223): This occupied area includes a small home with residents, a one-car detached garage, a large open-sided hay barn, a smaller open-sided structure, a small barn with several stalls, and a medium-sized building set up as an open air workshop.

Point 16 (Parcels 045206222 and 045206224): Approximately 15 abandoned inoperable cars, trucks, and a double-decker bus are present. A location along the south of this area had approximately twenty-seven 55-gallon drums that appeared to be in fair condition. Three drums sat on pallets, apart from the others.

One of these had an oil-saturated lid, and staining had reached the pallet and the soil. Soil staining appeared light, surficial, and contained to a small area. Another of these drums had also leaked a small amount via the lid, but even less material had reached the pallet and soil. These stained areas are considered to be de minimis.

Point 17 (Parcel 045206224): This area has a home in poor condition. It appears to have a functioning domestic well. An open area west of the home had a few individual fair-condition 55-gallon drums on pallets, a few abandoned vehicles, and some debris piles

Point 19 (Parcel 045211224): This farmstead has several structures including two small homes, a steel building set up as a repair area, a livestock barn, and an open-sided steel-roofed structure used for hay storage. Typical debris, implements, and scrap line the northern and northeastern perimeters of the occupied area but no drums or tanks were noted there. Approximately twelve 55-gallon drums were noted in various parts of the occupied area and appeared to be in fair condition. Some were empty and simply used as trash cans. Two large upright water tanks are in the southeast of this area, with a 300-gallon fuel tank between them. The tank appears to have stored fuel in the past but lacked a functioning dispenser. It was not within secondary containment and de minimis staining was in the area. Two additional fuel tanks, estimated to be 300 and 500 gallons in capacity, were within a secondary containment structure along the east of the occupied area. An old abandoned fuel tank sat to the north of these tanks. It was not in use and no significant staining was noted. These tanks and the northern portion of the occupied area could not be assessed in detail due to aggressive dogs that were present. A well mapped in the west of this area also was not observed.

Point 21 (Parcel 045212112): An agricultural water well is along the south of a water holding pond that was dry at the time. The well was served by an electrical drop but its status could not be readily determined.

Point 22 (Parcel 045211224): A water well is present that appears to be operational. It is powered by a generator and has a concrete and a steel water tank.

Point 23 (Parcel 045211225): An open-sided steel-roofed structure and a standalone garage are present here. An agricultural well is east of the structure and appears unused and inoperable. A cement water rank and a small steel shed are next to the well.

Point 26 (Parcel 045212148): A home and some old animal shelters are present here. They were in poor condition and appeared to be abandoned. A concrete water tank and an inoperable well were east of the home. The well had no pump. Two debris dumping areas were south of the formerly occupied area. They were each approximately 60 feet across and debris was scattered not mounded. They appeared to contain only innocuous broken-up household debris, wood, metal, etc.

Point 29 (Parcel 045212142): A strip of land in the south of this parcel is used for storage of some equipment, materials, scrap, and debris. This included white goods, scrap metal, fencing, well casings, several dozen telephone poles, as many as 200 used tires, and approximately 16 inoperable vehicles.

An old well-drilling truck with a tall boom was in the east of this area with a pile of well casings nearby. An inoperable agricultural well was under the rear of the rig as if work stopped in the middle of redrilling the well or drilling it deeper. A 35-gallon tank on a stand was previously used for drip lubrication of the well. Part of the rig had been dismantled for repair. Two polyethylene mixing tanks on skids were south of the truck, one empty and one half full.

Ten 55-gallon drums, a 35-gallon drum, and a 60-gallon steel tank were along the north of the eastern portion of this area. They appeared to be in fair condition, though one drum exhibited de minimis staining at its base. Some drums were labeled as hydraulic fluid. A second group of drums was 80 feet west of the first. This grouping held approximately twenty-six 55-gallon drums. Some were on pallets atop other drums. Visible drums appeared to be in fair condition. De minimis staining was evident, but adjacent vegetation appeared to have been healthy (it was dormant at the time). At least one hundred empty 5-gallon buckets were present; those with visible labels had held transmission oil.

Adjoining properties: Most adjoining property is vacant desert land. Some agricultural land, farmsteads, and rural residences adjoin the subject property, primarily in the southern portion. Several likely-illegal marijuana growing operations adjoin the subject property. These are typically three to twelve greenhouses in a fenced area, with an RV camper for the caretaker and a water tank for the plants.

An 80-acre farm with several hundred greenhouses adjoins the southeast of the subject property. At the time of the site visit it appeared to not be in operation. SWCA believes that this had been an illegal marijuana growing operation under the guise of a legal hemp growing operation. No obvious evidence of potential sources of contamination from adjoining properties was observed during the site reconnaissance.

Overall: No evidence of significant leaks, spills, potential contamination was noted during the site reconnaissance. No significant quantities of hazardous substances or petroleum products were observed that had been released to the environment; were under conditions indicative of a release to the environment; or under conditions that likely pose a material threat of a release to the environment.

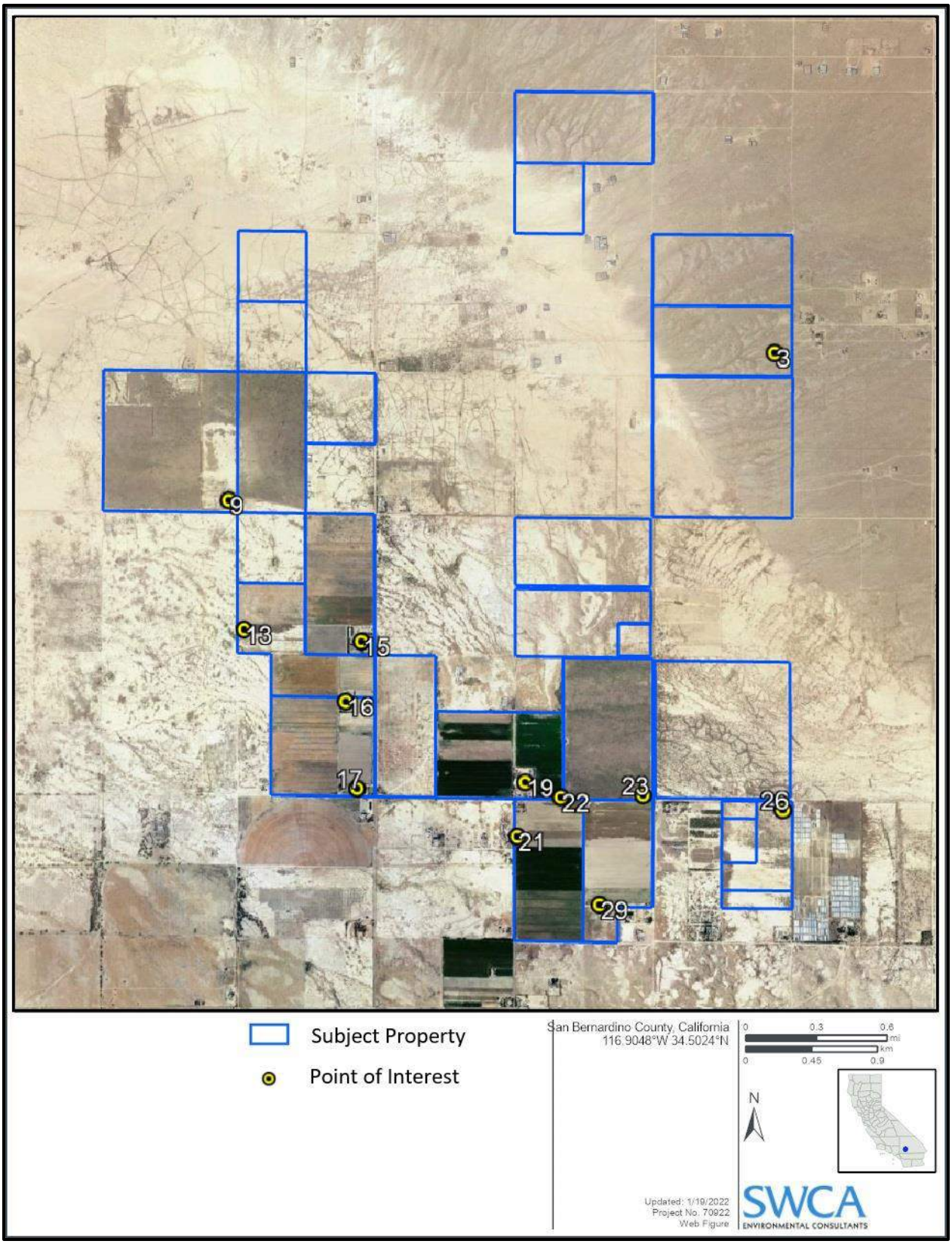


Figure 5. Select points of interest on the subject property.

(no points of interest are mapped on the outlying parcel)

7 PHASE I ENVIRONMENTAL SITE ASSESSMENT FINDINGS

The following list presents selected findings of this Phase I ESA:

- SWCA's review of historical aerial photographs and historical topographic maps found that the subject property historically included some agricultural and rural residential use in the 1940s or earlier. Over the next 50 years, farmland and the number of homes and farmsteads increased, but appear to have begun dwindling in the 1990s. Many illegal marijuana growing facilities have appeared in the nearby desert over the past few years. One general observation was that most occupied areas of the subject property have experienced ebbs and flows of accumulated debris and scrap over time. The following observations were noted:
    - In the north of Parcel 045206224 and the south of Parcel 045206222 (both owned by Miguel Gaeta), the southern portion of a 2.5-acre area appears to have been used as a junkyard in the 2003 and in 2006 photographs. At least 50 vehicles were present in 2003. The area was mostly cleaned up in 2009. Because this does not appear to have been a long-term property use, because it is not known to have been a commercial junkyard facility, and because no significant leaks or spills are known to have occurred, The past use of this area is not considered to be a REC for the subject property.
    - Much of the farmstead in the southeast of Parcel 045206223 (owner: Miguel Gaeta) was covered in junk and debris during the period from 2003 to 2009. The area was mostly cleaned up in 2009. Because this does not appear to have been a long-term property use, because it is not known to have been a commercial facility, and because no significant leaks or spills are known to have occurred, the past use of this area is not considered to be a REC for the subject property.
    - The occupied area in the southeast corner of Parcel 045206224 began accumulating vehicles in 2009. Over two dozen vehicles were present by 2013 and all had been removed by 2014. A group of 10 or more 55-gallon drums has been along the south of that area since 2013 or prior; these are discussed further below. Because this does not appear to have been a long-term property use, because it is not known to have been a commercial facility, and because no significant leaks or spills are known to have occurred, the past use of this area is not considered to be a REC for the subject property.
    - Part of the southern portion of Parcel 045212142 (owner: MB Landscaping & Nursery, Inc.) began accumulating debris and scrap in 2009. One pile of approximately a dozen drums has been present since 2016; these drums are discussed further below. In the October 2020 photograph, a group of approximately 130 drums is adjacent to the southeast of an L-shaped structure. The drums are bundled in four-drum groups as they would be for shipping, and they appear consistent in color, possibly indicating that they are new and in good condition. Another group of approximately 40 drums sits 100 feet farther southeast. Although the purpose of the drums and whether they are full or empty remains unknown, they were only in place a short time and are not known to have leaked or spilled. Therefore, the two large groups of drums are not considered to be a REC for the subject property.
    - Some areas on-site and nearby had hundreds of loads of soil or soil amendments delivered and spread over the desert soils for farming. One example of this is at Parcel 045206222 (owner: Miguel Gaeta). Because this is common practice to amend soils with low carbon content, this is not considered to be a REC for the subject property.

  - An 80-acre area adjoining the southeast of the subject property had been used for farming in the past. Between December 2019 and October 2020, that parcel added approximately 350 large greenhouses and many more were under construction. Approximately half of the 80 acres was covered in greenhouses. A 6-acre portion of the site includes over a dozen campers and a shanty-town of shacks. Based on our professional knowledge of the region, SWCA believes that this had been an illegal marijuana growing operation under the guise of a legal hemp growing operation. Because this facility is believed to have been shut down, because it was not operating for a long period of time, and because leaks or spills are expected to be localized to where they occurred, this facility is not considered to be a REC for the subject property.
  - Also in 2020, a few dozen smaller marijuana growing operations appeared in the open area enveloped by the northern portion of the subject property, and many more appeared in the vicinity. These are each groups of two to 12 greenhouses. Because they are small operations and have not been operating for a long period of time and because any potential contamination is likely to be localized, they are not considered to be RECs for the subject property.
  - The outlying parcel is crossed by three sets of parallel transmission lines, each with three cables. A mineshaft was mapped in the missile of the parcel, which was later mapped as a mine prospect. A mine prospect in desert alluvium is not considered to be a REC.

- Phase I ESA User Questionnaires completed by landowners covered topics including past property use, stored chemicals and petroleum products, storage tanks, and known issues related to potential contamination. None of the respondents indicated knowledge of stored hazardous substances or petroleum products, 55-gallon drums, or of any hazardous wastes generated on-site. None of the respondents indicated knowledge of stained soil; ASTs or USTs; dumped, buried, or burned materials; or environmental liens or environmental AULs. None of the responses indicated conditions that SWCA would consider to be RECs.
- Representatives of 99MT 8ME, LLC, completed Phase I ESA User Questionnaires regarding the subject property. The respondents were not aware of any significant spills, releases, or environmental cleanups that have occurred on the subject property and were not aware of any obvious indicators that point to the presence or likely presence of releases at the subject property.
- SWCA's review of an EDR, database search report dated January 20, 2022, and supplemental records from state and federal regulatory databases found the following:
  - The Howard Pettigrew property, located in the southwestern quadrant of the subject property at 13324 Locust Avenue (Parcel 045206223, owned by Miguel Gaeta), is identified in UST databases that indicated two or three USTs were installed in 1988: one or two 280-gallon leaded gasoline tanks and one 550-gallon leaded gasoline tank. A San Bernardino County Permit listing indicates that the facility was inactive for a 1990 annual UST inspection. Because the facility is inactive, because the tanks did not operate for a long period of time, because they are not identified in modern UST listings, and because no indications of leaks, spills, or potential contamination are identified in conjunction with the tanks, these USTs are not considered to be RECs for the subject property. However, their removal does not appear to have been documented, and they may present an environmental business risk if they are still present.
  - This property is also identified in the CDL database. In 2002, it was identified as a location where an illegal drug lab was operated or drug lab equipment and/or materials were stored. Because of the amount of time that has passed and because

no indications of contamination are indicated in conjunction with the listing, the former CDL is not considered to be a REC for the subject property.

- The NB Nursery / Bob Burns property, located in the south of the subject property at 12881 Midway Avenue (Parcel 045212112, owner: MB Landscaping & Nursery Inc.), is identified as having been in the state's Hazardous Waste Tracking System. This is an administrative database and not an indicator of potential contamination.
- The Dan Pettigrew property, adjoining the south of the subject property at 12860 Locust Avenue, is identified as a UST site. A 550-gallon leaded gasoline tank was installed in 1988. A San Bernardino County Permit listing indicates that the facility was inactive for a 1995 annual UST inspection. Because the facility is inactive, because the tank did not operate for a long period of time, because it is not identified in modern UST listings, and because no indications of leaks, spills, or potential contamination are identified in conjunction with the tank, these USTs are not considered to be RECs for the subject property.
- A petroleum AST is identified adjoining the south of the subject property at 12332 Midway Avenue. The farmstead at this property, where the tank is most likely located, is located 0.2 mile south of the subject property. Because no indications of leaks, spills, or potential contamination are identified in conjunction with this listing, it is not considered to be a REC for the subject property.

SWCA's reconnaissance of the subject property on January 14 and 20, 2022, found that most parcels of the subject property are vacant and unoccupied; they are either active or former agricultural land, or vacant desert land. Some include rural residences or farmsteads. Most adjoining properties appear to be similar in nature. Select findings from SWCA's site reconnaissance include the following:

- Parcel 045236147: As recently as October 2020, this parcel was vacant desert land. By the time of the site visit, an illegal marijuana growing operation had been constructed, used, and abandoned. It included approximately 24 greenhouses (many full of dead plants), 12 other structures (some with thousands of black plastic landscaping pots), 2 shipping containers, and a mobile office trailer that had been used as two housing units. A somewhat elaborate watering system had been set up that included underground pipes and a makeshift drainage ditch. Because of the short time it was in operation, and because no pesticides, chemicals, or petroleum products were noted in this area, this is not considered to be a REC for the subject property.
- Parcel 045207111: The occupied area in the southeast of this parcel appears to house several parties in a small home with numerous makeshift additions (some are simply a camper integrated into the structure or parked alongside), in a garage, and in campers. The area appears to function as a water supply hub: a well is on-site and three large upright water tanks are present, each possibly 5,000-gallons in capacity. Security cameras were present. The barn had a lookout platform on the roof, metal bars in the windows, and a locked steel man-door. Because no evidence of significant leaks, spills, or potential contamination was noted, SWCA did not identify RECs in this area.
- Parcel 045206222: Many truckloads of soil or soil amendment had been dumped here in an area covering approximately 3.5 acres. Aerial photography indicates over 1,000 loads were dumped. The material appeared significantly loamier than local native soils. Importing soil and amendments to areas with naturally poor soils is not an unusual practice. Because no unusual odors, staining, or contents were observed, the dumped soil is not considered to be a REC for the subject property.

- Point 16 (Parcels 045206222 and 045206224): Approximately 15 abandoned inoperable cars, trucks, and a double-decker bus are present. A location along the south of this area had approximately twenty-seven 55-gallon drums that appeared to be in fair condition. Three drums sat on pallets, apart from the others. One of these had an oil-saturated lid, and staining had reached the pallet and the soil. Soil staining appeared light, surficial, and contained to a small area. Another of these drums had also leaked a small amount via the lid, but even less material had reached the pallet and soil. These stained areas are considered to be de minimis. Because no evidence of significant leaks, spills, or potential contamination was noted, SWCA did not identify RECs in this area.
- Point 17 (Parcel 045206224): This area has a home in poor condition. It appears to have a functioning domestic well. An open area west of the home had a few individual fair-condition 55-gallon drums on pallets, a few abandoned vehicles, and some debris piles. Because no evidence of significant leaks, spills, or potential contamination was noted, SWCA did not identify RECs in this area.
- Point 19 (Parcel 045211224): This parcel had approximately twelve 55-gallon drums in various parts of the occupied area and they appeared to be in fair condition. Two large upright water tanks are in the southeast of this area, with a 300-gallon fuel tank between them. The tank appears to have stored fuel in the past but lacked a functioning dispenser. It was not within secondary containment and de minimis staining was in the area. Two additional fuel tanks, estimated to be 300 and 500 gallons in capacity, were within a secondary containment structure along the east of the occupied area. An old abandoned fuel tank sat to the north of these tanks. It was not in use and no significant staining was noted. Because no evidence of significant leaks, spills, or potential contamination was noted, SWCA did not identify RECs in this area.
- Point 26 (Parcel 045212148): Two large debris dumping areas were south of the formerly occupied area. They were each approximately 60 feet across and debris was scattered not mounded. Because they appeared to contain only innocuous broken-up household debris, wood, metal, etc., they are not considered to be RECs for the subject property.
- Point 29 (Parcel 045212142): A strip of land in the south of this parcel is used for storage of some equipment, materials, scrap, and debris. This included white goods, scrap metal, fencing, well casings, several dozen telephone poles, as many as 200 used tires, and approximately 16 inoperable vehicles.

  A 35-gallon tank on a stand was next to an inoperable well. The tank was previously used for drip lubrication of the well. The tank appeared to be sound and no leaks were noted. Two polyethylene mixing tanks on skids were south of the truck, one empty and one half full. No evidence of leaks was noted.

  Ten 55-gallon drums, a 35-gallon drum, and a 60-gallon steel tank were along the north of the eastern portion of this area. They appeared to be in fair condition, though one drum exhibited de minimis staining at its base. Some drums were labeled as hydraulic fluid. A second group of drums was 80 feet west of the first. This grouping held approximately twenty-six 55-gallon drums. Some were on pallets atop other drums. Visible drums appeared to be in fair condition. De minimis staining was evident, but adjacent vegetation appeared to have been healthy (it was dormant at the time). At least one hundred empty 5-gallon buckets were present; those with visible labels had held transmission oil. Because no evidence of significant leaks, spills, or potential contamination was noted, SWCA did not identify RECs in this area.
- Adjoining properties: Most adjoining property is vacant desert land. Some agricultural land, farmsteads, and rural residences adjoin the subject property, primarily in the southern portion. Several likely-illegal marijuana growing operations adjoin the subject property. These are

typically three to twelve greenhouses in a fenced area, with an RV camper for the caretaker and a water tank for the plants. Because of the short time they have been in operation, and because any leaks or spills are expected to be localized to the footprint of the facilities, these growing operations are not considered to be a REC for the subject property

An 80-acre farm with several hundred greenhouses adjoins the southeast of the subject property. SWCA believes that this had been an illegal marijuana growing operation under the guise of a legal hemp growing operation. This facility is discussed above.

- Overall: No evidence of significant leaks, spills, potential contamination was noted during the site reconnaissance. No significant quantities of hazardous substances or petroleum products were observed that had been released to the environment; were under conditions indicative of a release to the environment; or under conditions that likely pose a material threat of a release to the environment.

8 PHASE I ENVIRONMENTAL SITE ASSESSMENT CONCLUSIONS

SWCA completed this Phase I ESA of the subject property based on information obtained during the site investigation and through the activities of this Phase I ESA, excluding certain limitations. The information contained in this report relates only to the subject property and should not be extrapolated or construed to apply to any other site. The description of the subject property as provided herein represents the conditions of the subject property as it existed on the date of the site reconnaissance.

We have performed a *Phase I Environmental Site Assessment* in conformance with the scope and limitations of ASTM International Standard E2247-16 for the subject property, as described in Section 2.0 of this report. Any exceptions to, or deletions from, this practice are described in Section 1.3 of this *report*. This assessment has revealed no evidence of *recognized environmental conditions* in connection with the *property*. Likewise, SWCA does not have reason to believe that significant releases of hazardous substances or petroleum products have occurred on the subject property.

9 LITERATURE CITED

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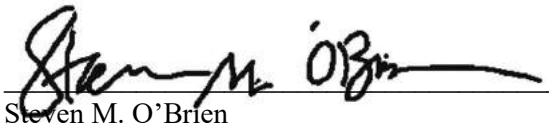
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10 SIGNATURES OF ENVIRONMENTAL PROFESSIONAL

I declare that, to the best of my professional knowledge and belief, I meet the definition of environmental professional as defined in §312.10 of 40 Code of Federal Regulations (CFR) 312. I have the specific qualifications based on education, training, and experience to assess a property of the nature, history, and setting of the subject property. I have developed and performed all appropriate inquiries in conformance with the standards and practices set forth in 40 CFR 312. My qualifications are presented in Appendix B of this report.



Steven M. O'Brien
Environmental Professional / Project Manager

January 31, 2022
Date

APPENDIX A

Phase I Environmental Site Assessment Scope of Work

TASK 1. PHASE I ENVIRONMENTAL SITE ASSESSMENT

A Phase I Environmental Site Assessment (ESA) will be completed in general accordance with the standards described in the current ASTM Standard E 2247-16, *Phase I Environmental Site Assessment Process for Forestland or Rural Property* (2016).

The goal of a Phase I ESA is to assess a subject property, to the extent practical, for the potential presence of recognized environmental conditions (RECs), defined as "the presence or likely presence of any hazardous substances or petroleum products in, on, or at a property: (1) due to any release to the environment; (2) under conditions indicative of a release to the environment; or (3) under conditions that pose a material threat of a future release to the environment. De minimis conditions are not recognized environmental conditions." The following scope of work applies to a Phase I ESA and consists of the following subtasks.

1.1 RECORDS REVIEW

SWCA will review appropriate documents including historical aerial photographs, topographic maps, and other land-use documents in order to identify past operations or activities that may have caused the release of hazardous substances into the environment. If made available by the client, SWCA also will review copies of environmental reports previously prepared for the site, environmental liens and activity and use limitations (AULs), and other available environmental documents relating to the site. As part of the review process, site location, hydrogeological characteristics, geographic setting, and physiography also will be summarized.

Additionally, available state and federal regulatory databases will be reviewed to determine whether the subject property or nearby facilities have been subject to environmental actions or review. The regulatory database review will, at a minimum, include the databases required to satisfy the ASTM standard. An in-person regulatory file review is not anticipated.

1.2 INTERVIEWS

If contact information is provided by the client, SWCA personnel will attempt to interview those individuals who are knowledgeable about the history of the site (typically past or current owners, managers, or users of the site). Reasonable attempts will be made to interview at least one staff member of state or local government agencies regarding information that indicates RECs in connection with the property.

1.3 SITE RECONNAISSANCE

SWCA staff will complete a reconnaissance of the site and vicinity to visually identify and photograph areas with potential RECs and to document current site conditions. Access to private, locked, or restricted areas would be arranged by a client representative.

1.4 USER-PROVIDED INFORMATION

User-provided information is an essential component of the Phase I ESA and includes items such as relevant environmental documents, a completed Phase I ESA User Questionnaire, a completed initial data request, and access to the subject property. A 50-year chain-of-title report and a search for liens and AULs will not be obtained by SWCA under this scope of work. However, SWCA will review these sources if supplied by the client.

1.5 REPORT GENERATION

The Phase I ESA findings will be summarized and documented in one report. Sections within the report will include 1) a description of the site, 2) a summary of the site history, 3) a regulatory database review, 4) a description of the site reconnaissance and interviews, 5) report findings and conclusions, and 6) figures and appendices. The potential for contaminant migration, including vapor in the subsurface, will be assessed in accordance with ASTM Standard E 1527-13, but a formal ASTM Standard E 2600-10 Vapor Encroachment Screening to identify vapor encroachment conditions will not be conducted as part of this scope of work.

According to ASTM, the content of a Phase I ESA is valid for only 180 days. If the date of the intended use for Phase I ESA is not within 180 days of the completion of the report, an update will be necessary.

COST

Cost to provide the Phase I ESA reports: time-and-materials of[redacted]

ASSUMPTIONS

- The report will be delivered in electronic PDF format only.
- Any task not expressly described herein is not included in the proposed cost.
- This scope of work includes one round of revisions to the report text. Substantial revisions, such as a revised scope or project area, will incur additional cost
- Phase I ESA Reliance Letters would be provided at an additional cost for our standard fee[redacted]
- The date of the intended use of the Phase I ESA is within 180 days of the completion of the report.
- The attached Initial Data Request and User Questionnaire are returned to SWCA upon commencement of the project.

APPENDIX B

Environmental Professional's Credentials

SWCA ENVIRONMENTAL CONSULTANTS

STEVEN M. O'BRIEN
Environmental Professional

Education / Training

- B.A., Biology / Chemistry, Gettysburg College; 1994

Expertise

- Large-scale Phase I ESAs (2247-16)
- Commercial Phase I ESA (1527-13)
- Wetland delineation and hydric soils
- Stream channel assessment and restoration
- State/National Environmental Policy Act (S/NEPA) documentation
- Protected species
- 404/401 permitting
- Project management

Relevant Projects

- Over 500 Phase I ESAs Nationwide in 34 States
- 17 Phase I ESAs for Cell Tower Sites; WyoLink Project; Throughout Wyoming
- Many Phase I ESAs for Wind and Solar Projects in 25 states
- Painted Desert Power Solar Project Phase I ESA and report update; Coconino County, Arizona
- Perrin Ranch Phase I ESA, 43,000-acres, Coconino County, Arizona
- Phase I ESAs at 23 Sites; U.S. Army Corps of Engineers; Washington
- Phase I Environmental Site Assessment 435 Acres; Pascua Yaqui Tribe of Arizona; Pima County, Arizona
- 9 Phase I Environmental Site Assessments; Aveda Transportation and Energy Services; Multiple States
- 450,000-acre Phase I ESA for a wind energy project, Eastern Montana

Mr. O'Brien is an Environmental Professional and Project manager with 24 years of experience in environmental consulting and technical writing, including 20 years of extensive experience performing Phase I Environmental Site Assessments (ESAs). He leads SWCA's nationwide Phase I ESA Work Group and is an integral part of SWCA's NEPA team.

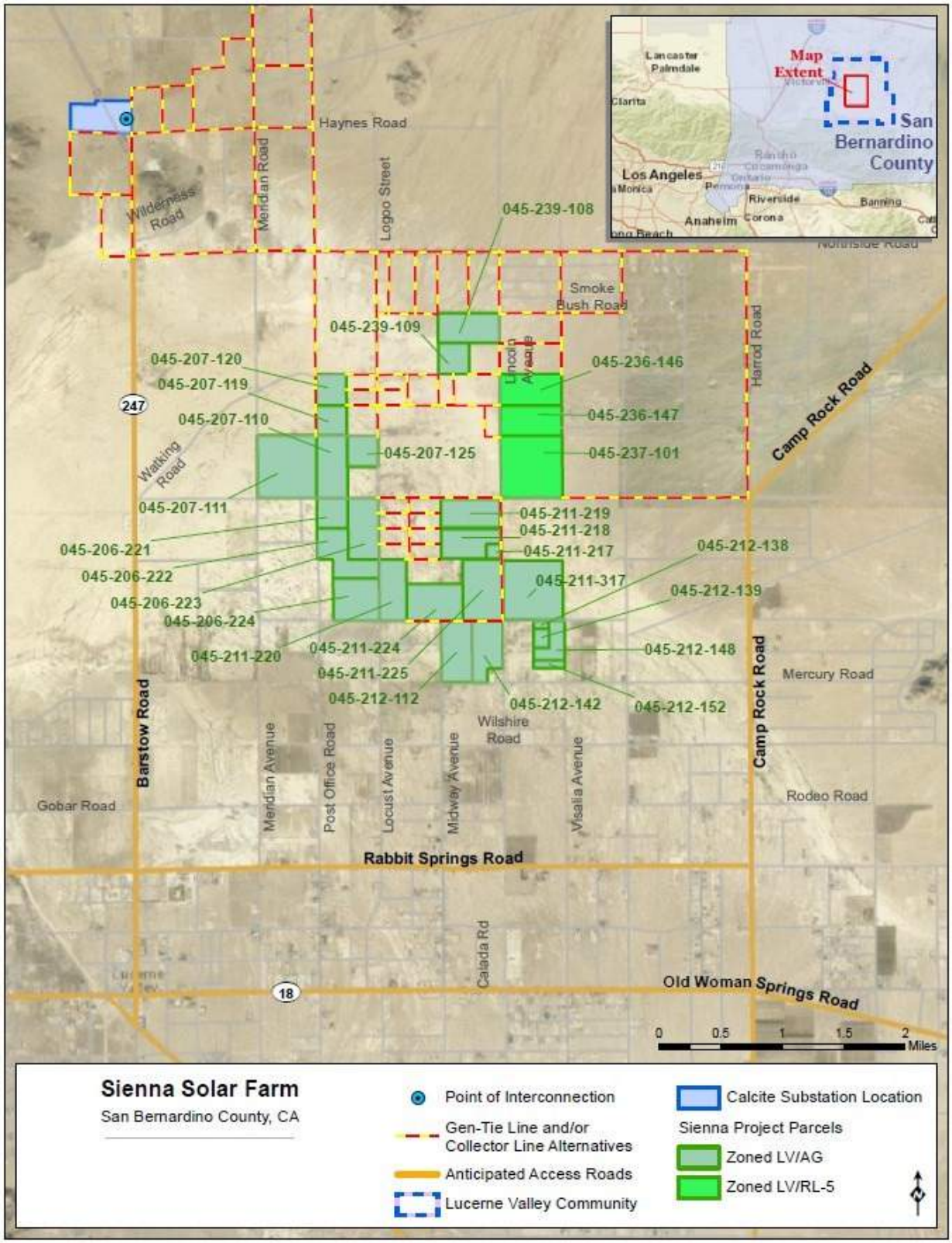
He has completed over 500 Phase I ESAs of ESAs in a variety of settings in 34 states and Guam, from tiny easements to 900–square mile assemblages, including many dozens of wind and solar sites and several dozen cellular tower sites. His projects also include oil and gas fields, U.S. Environmental Protection Agency (EPA) Superfund sites, and Department of Defense sites. His specialties include using ASTM Standard 2247-16 for large-scale projects, performing FAA-Standard ESAs for airport projects, and applying the principles of ESAs to Environmental Baseline Surveys (EBSs) for Department of Defense sites and classification of environmental condition of property area types. He manages the large and difficult Phase I ESAs for SWCA companywide. He teaches others to conduct ESAs with a focus on field and reporting techniques. He has been an expert witness for ESA cases.

Mr. O'Brien is also experienced in performing soil mapping, wetland delineations, habitat assessments, permitting, protected species, and stream morphology assessments. He has performed assessment, design, and construction oversight for more than 250 stream stabilization sites. He has completed M.A.-level coursework in natural resources, forestry, soil characterization, and hydric soils. He has extensive experience performing construction oversight and has experience training clients, contractors, staff, and local officials.

Mr. O'Brien has extensive plant, soil, and hydrology fieldwork experience, in locations from coastal marshes to deserts to high in the Rocky Mountains. He has been 40-hour Hazardous Waste and Emergency Response (HAZWOPER)–certified since 1998, earned a Watershed Training Certificate from the EPA, and a Water Supply Watershed Protection certificate.

APPENDIX C

Additional Records


Map Extent
San Bernardino County
Lancaster
Palmdale
Los Angeles
Riverside
Anaheim
Corona
Haynes Road
Wilderness Road
Meridian Road
Logpo Street
Smoke Bush Road
Lincoln Avenue
Harrod Road
Camp Rock Road
Watking Road
247
045-239-108
045-239-109
045-207-120
045-207-119
045-207-110
045-207-125
045-207-111
045-206-221
045-206-222
045-206-223
045-206-224
045-211-220
045-211-224
045-211-225
045-212-112
045-211-219
045-211-218
045-211-217
045-211-317
045-236-146
045-236-147
045-237-101
045-212-138
045-212-139
045-212-148
045-212-142
045-212-152
Barstow Road
Meridian Avenue
Post Office Road
Locust Avenue
Midway Avenue
Wilshire Road
Visalia Avenue
Mercury Road
Rodeo Road
Gobar Road
Rabbit Springs Road
Calada Rd
18
Old Woman Springs Road
0 0.5 1 1.5 2 Miles
Sienna Solar Farm
San Bernardino County, CA
Point of Interconnection
Gen-Tie Line and/or Collector Line Alternatives
Anticipated Access Roads
Lucerne Valley Community
Calcite Substation Location
Sienna Project Parcels
Zoned LV/AG
Zoned LV/RL-5

#	APN	Owner/Rep	Zone
1	0452-071-20	Benito	LV/AG
2	0452-071-11		LV/AG
3	0452-062-21	Martinez	LV/AG
4	0452-062-22	Gaeta	LV/AG
5	0452-062-23		LV/AG
6	0452-062-24		LV/AG
7	0452-112-20	Lua Family Trust	LV/AG
8	0452-112-24	MB Landscaping Inc.	LV/AG
9	0452-121-12		LV/AG
10	0452-121-42		LV/AG
11	0452-121-38	Kim	LV/AG
12	0452-121-39		LV/AG
13	0452-121-48		LV/AG
14	0452-121-52		LV/AG
15	0452-391-08	Shafran	LV/AG
16	0452-391-09		LV/AG
17	0452-361-46	Sochor Trust	LV/RL-5
18	0452-361-47	Zhang	LV/RL-5
19	0452-371-01	Ostrow Partnership	LV/RL-5
20	0452-112-19	Dalugdugan	LV/AG
21	0452-112-18	Mopal	LV/AG
22	0452-112-17		LV/AG
23	0452-113-17	Garcia	LV/AG
24	0452-071-25	Fix Family Trust	LV/AG
25	0452-071-10	Nguyen	LV/AG
26	0452-112-25	Ahn	LV/AG
27	0452-071-19	Jussek	LV/AG
**Calcite Substation (SCE)	0453-041-07	Wright Trust	LV/AG-40

APPENDIX D

Correspondence

User Questionnaire

21-11216

Site Name and Full Address: Sienna Solar Project, San Bernardino County, California

To qualify for one of the Landowner Liability Protections (LLPs) offered by the Small Business Liability Relief and Brownfields Revitalization Act of 2001 (the "Brownfields Amendments"), the user must provide the following information to the environmental professional. Failure to conduct these inquiries could result in a determination that "all appropriate inquiries" is not complete.

We respectfully request that you fill out this form and email it to . at n within one week from the date of this transmittal.

Project Description

1. **Why is the Phase I ESA required or being performed?**

development of solar project

2. **What type of property transaction is planned? (i.e. sale, purchase, exchange)**

lease and purchase of various parcels

3. **What is the entire site address?**

vacant land, no fixed addresses yet

4. **What is the Assessor's Parcel Number(s)?**

various

5. **Are any considerations beyond the requirements of Practice E1527 to be considered? (i.e. lien search, asbestos & lead based paint, radon)**

unknown

21-11216

Site Name and Full Address: Sienna Solar Project, San Bernardino County, California

6. **Identify all parties who will rely on the Phase I report.**

multiple parties associated with the development of a utility scale solar farm

7. **Identify the Site Manager/Contact and how the contact can be reached.**

Jenn Jackson
(m) 303.588.3855
(e) jjackson@8minute.com

8. **Identify the Site Owner and how the owner can be reached.**

multiple parties. landowner contact info will be provided on any owner questionnaires

9. **Do you have copies of any available prior environmental site assessment reports, documents, correspondence, etc., concerning any other knowledge or experience with the property that may be pertinent to the environmental professional (i.e. lien search, title report, previous Ph I and II ESAs,Environmental Impact Studies)?**

no

21-11216

Site Name and Full Address: Sienna Solar Project, San Bernardino County, California

Subject Property Information

1. **Did a search of recorded land title records (or judicial records, where appropriate) identify any environmental liens filed or recorded against the property?**

Please mark the box with the most appropriate response:

- [■] I **have not** reviewed the records and **do not know** if there are any filed or recorded environmental liens.
- [ ] I **have** reviewed the records, and **No, there aren't any** filed or recorded environmental liens.
- [ ] I **have** reviewed the records, and **Yes, there are** environmental liens. Explain:

2. **Did a search of recorded land title records (or judicial records, where appropriate) identify any activity and land use limitations (AULs), such as engineering controls, land use restrictions or institutional controls that are in place at the property and/or have been filed or recorded against the property under federal, tribal, state or local law?**

Please mark the box with the most appropriate response:

- [■] I **have not** reviewed the records and **do not know** if there are any filed/recorded AULs or any AULs in place at the site.
- [ ] I **have** reviewed the records, and **No, there aren't any** filed/recorded AULs or any AULs in place at the site.
- [ ] I **have** reviewed the records, and **Yes, there are** AULs filed, recorded, and/or in place at the site. Explain:

3. **Does the Title Report provide any information pertaining to environmental cleanup liens or activity and use limitations (AULs) for the subject property?**

Please mark the box with the most appropriate response:

- [■] I **have not** reviewed the Title Report and **do not know** if it provides environmental cleanup liens or AULs information.
- [ ] I **have** reviewed the Title Report, and **No, it does not provide** environmental cleanup liens or AULs information..
- [ ] I **have** reviewed the Title Report, and **Yes, it does provide** environmental cleanup liens or AULs information. Explain:

Site Name and Full Address: Sienna Solar Project, San Bernardino County, California

4. **Do you have any specialized knowledge or experience related to the property or nearby properties? For example, are you involved in the same line of business as the current or former occupants of the property or an adjoining property so that you would have specialized knowledge of the chemicals and processes used by this type of business?**

Please mark the box with the most appropriate response:

- [■] **No,** I **do not** have any specialized knowledge and/or experience related to the property or nearby properties.
- [ ] Yes, I **do** have specialized knowledge and/or experience related to the property or nearby properties. Explain:

5. **As the user of this ESA, based on your knowledge and experience related to the property, are you aware of any information pertaining to a reduction in value for the subject property relative to any known environmental issues?**

Please mark the box with the most appropriate response:

- [■] **No,** I **do not** have any information about a reduction in property value relative to environmental issues.
- [ ] **Yes**, I **do** have information about a reduction in property value relative to environmental issues. Explain:

6. **Does the purchase price being paid for this property reasonably reflect the fair market value of the property?**

Please mark the box with the most appropriate response:

- [■] **Yes**, I **do** believe the purchase price being paid for this property reasonably reflects the fair market value of the property. Skip to question #7.
- [ ] **No**, I **do not** believe the purchase price being paid for this property reasonably reflects the fair market value of the property. Proceed to question #6a.

   a. **If you conclude that there is a difference, have you considered whether the lower purchase price is because contamination is known or believed to be present at the property? (40 CFR 312.29)**

      Please mark the box with the most appropriate response

      - [ ] **No**, I **have not** considered the idea that known or believed contamination at the site has caused the lower purchase price.
      - [ ] **Yes**, I **have** considered the idea that known or believed contamination at the site has caused the lower purchase price. Explain:

21-11216

Site Name and Full Address: Sienna Solar Project, San Bernardino County, California

7. Are you aware of commonly known or reasonably ascertainable information about the property that would help the environmental professional to identify conditions indicative of releases or threatened releases? For example:

Please mark the box with the most appropriate response:

a. Do you know the past uses of the property?

- ■ I **do not** know.
- ☐ I **do** know. Explain:

b. Do you know of specific chemicals are present or once were present at the property?

- ■ I **do not** know.
- ☐ I **do** know. Explain:

c. Do you know of any spills or other chemical releases that have taken place at the property?

- ■ I **do not** know.
- ☐ I **do** know. Explain:

d. Do you know of any environmental cleanups have taken place at the property?

- ■ I **do not** know.
- ☐ I **do** know. Explain:

8. Based on your knowledge and experience related to the property are there any obvious indicators that point to the presence or likely presence of releases at the property?

Please mark the box with the most appropriate response:

- ■ **No**, I do not know and/or do not have any experience with any obvious indicators that point to the presence or likely presence of contamination at the property.
- ☐ **Yes**, I do know of and/or do have experience with obvious indicators that point to the presence or likely presence of contamination at the property. Explain:

Site Name and Full Address: Sienna Solar Project, San Bernardino County, California

9. Are you aware of any pending, threatened, or past litigation relevant to hazardous substances or petroleum products, in, on, or from the site?

Please mark the box with the most appropriate response:

- [■] **No**, I am not aware of any pending, threatened, or past litigation relevant to hazardous substances or petroleum products, in, on, or from the site.
- [ ] **Yes**, I am aware of pending, threatened, or past administrative proceedings relevant to hazardous substances or petroleum products in, on, or from the site. Explain:

10. Are you aware of any pending, threatened, or past administrative proceedings relevant to hazardous substances or petroleum products in, on, or from the site?

Please mark the box with the most appropriate response:

- [■] **No**, I am not aware of any pending, threatened, or past administrative proceedings relevant to hazardous substances or petroleum products in, on, or from the site.
- [ ] **Yes**, I am aware of pending, threatened, or past administrative proceedings relevant to hazardous substances or petroleum products in, on, or from the site. Explain:

11. Are you aware of any notice from any government entity regarding any possible violation of environmental laws or possible liability relating to hazardous substances or petroleum products?

Please mark the box with the most appropriate response:

- [■] **No**, I am not aware of any notice from any government entity regarding any possible violation of environmental laws or possible liability relating to hazardous substances or petroleum products..
- [ ] **Yes**, I am aware of a notice, or notices, from a government entity (or multiple government entities) regarding a possible violation of environmental laws or possible liability relating to hazardous substances or petroleum products. Explain:

21-11216

Site Name and Full Address: Sienna Solar Project, San Bernardino County, California

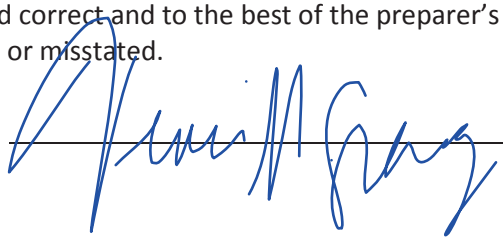
This questionnaire was completed by (please print)

Name	Venai Shenoy
Title	Director, Development
Firm	99MT 8me, LLC
Street Address	5455 Wilshire Blvd Suite 2010
City, State, Zip Code	Los Angeles, CA 90036
Phone Number	323.525.0900
Fax Number	

What is the Preparer's relationship to the property (i.e., owner, occupant, property manager, employee, agent, consultant, etc.)? Developer

Copies of the completed questionnaire should be faxed, emailed (preferably) or mailed to:

Preparer represents that to the best of the preparer's knowledge the above statements and facts are true and correct and to the best of the preparer's knowledge no material facts have been suppressed or misstated.

Signature  Date 10/13/2021

PHASE I ENVIRONMENTAL SITE ASSESSMENT (ESA)

INITIAL DATA REQUEST

As part of the Phase I ESA process, there is some standard information that we'll need for the report. Please provide the following to SWCA:

1) The name of the project/site, as you want it to appear in the report.

   Sienna Solar and Storage Project

2) To whom the report should be addressed: Name/Entity/Mailing Address.

   Applicant:
   99MT 8ME, LLC
   4370 Town Center Blvd., Suite 110
   El Dorado Hills, CA 95762
   c/o Erec DeVost
   c/o Jennifer Jackson

3) Name(s) of any additional party relying on the report.

   NA

4) The date you need the completed report.

   21 January 2022

5) The reason the Phase I ESA is being performed (i.e., liability protection, lender requirement, property purchase, etc.).

   All the above

6) Contact information for all property owners and contact information to arrange for a site visit.

   We can arrange through 8minute land team

7) Mapping of the site boundaries in KMZ or Shapefile format, if not already provided.

   Provided

8) A completed Phase I ESA User Questionnaire (attached). Answers of n/a or unknown are fine. No signature is needed. To be completed by each party relying on the Phase I ESA, not the property owner.

   Provided

PHASE I ENVIRONMENTAL SITE ASSESSMENT (ESA)

***USER* QUESTIONNAIRE**

(*to be completed by each party that will rely upon the report*)

Completed by:

Date:

Site Name:

INTRODUCTION

In order to qualify for one of the *Landowner Liability Protections (LLPs)* [1] offered by the Small Business Liability Relief and Brownfields Revitalization Act of 2001 (the "Brownfields Amendments")[2], the *user* must conduct the following inquires required by 40 CFR 312.25, 312.28, 312.29, 312.30, and 312.31. The inquiries must also be conducted by EPA Brownfield Assessment and Characterization grantees. The *user* should provide the following information to the *environmental professional*. Failure to conduct these inquiries could result in a determination that "*all appropriate inquiries*" is not complete.

The *user* is defined as "the party seeking to use Practice E1527 to complete an *environmental site assessment* of the *property*. A *user* may include, without limitation, a potential purchaser of *property*, a potential tenant of *property*, an owner of *property*, a lender, or a *property* manager. The *user* has specific obligations for completing a successful application of this practice outlined in Section 6" of ASTM Standard E1527-13, *Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process*.

1) Environmental cleanup liens that are filed or recorded against the *property* (40 CFR 312.25) – Did a search of *recorded land title records* (or judicial records where appropriate, see Note 1 below) identify any environmental liens filed against the *property* under federal, tribal, state, or local law? ( ) Yes ( ) No
If yes, please describe:

Note 1 – In certain jurisdictions, federal, tribal, state, or local statuses, or regulations specify that environmental liens and AULs be filed in judicial records rather than in land title records. In such cases judicial records must be searched for environmental liens and AULs.

2) Activity and land use limitations that are in place on the *property* or that have been filed or recorded against the *property* (40 CFR 312.26(a)(1)(v) and vi) – Did a search of *recorded land title records* (or judicial records where appropriate, see Note 1 above) identify any Activity and Use Limitations (AULs), such as *engineering controls*, land use restrictions or *institutional controls* that are in place at the *property* and/or have been filed or recorded against the *property* under federal, tribal, state or local law? ( ) Yes ( ) No. If yes, please describe:

[1] *Landowner Liability Protections, or LLPs*, is the term used to describe the three types of potential defenses to Superfund liability in EPA's *Interim Guidance Regarding Criteria Landowners Must Meet in Order to Qualify for Bona Fide Prospective Purchaser, Contiguous Property Owner, or Innocent Landowner Limitations on CERCLA Liability ("Common Elements" Guide*) issued on March 6, 2003.

[2] Public Law 107-118.

3) Specialized knowledge or experience of the person seeking to qualify for the LLP (40 CFR 312.28) -
Do you have any specialized knowledge or experience related to the *property* or nearby properties? For example, are you involved in the same line of business as the current or former *occupants* of the *property* or an adjoining *property* so that you would have specialized knowledge of the chemicals and processes used by this type of business? ( ) Yes ( ) No If yes, please explain:

4) Relationship of the purchase price to the fair market value of the *property* if it were not contaminated (40 CFR 312.29) – Does the purchase price being paid for this *property* reasonably reflect the fair market value of the *property*? ( ) Yes ( ) No

If you conclude that there is a difference, have you considered whether the lower purchase price is because contamination is known or believed to be present at the property? ( ) Yes ( ) No If yes, please describe:

5) Commonly known or *reasonably ascertainable information about the property* (40 CFR 312.30) –
Are you aware of commonly known or *reasonably ascertainable* information about the *property* that would help the *environmental professional* to identify conditions indicative of releases or threatened releases? For example, as *user*,

a. Do you know the past uses of the *property*?

b. Do you know of specific chemicals that are present or once were present at the *property*?

c. Do you know of spills or other chemical releases that have taken place at the *property*?

d. Do you know of any environmental cleanups that have taken place at the *property*?

e. Do you know of any previous Phase I Environmental Site Assessment performed for the *property*? ( ) Yes ( ) No. If yes, can copies be provided?

f. If available, please provide contact information for someone knowledgeable about past uses of the *property* (present or past owner, operator or occupant).

6) The degree of obviousness of the presence or likely presence of contamination at the *property*, and the ability to detect the contamination by appropriate investigation (40 CFR 312.31) – Based on your knowledge and experience related to the *property* are there any *obvious* indicators that point to the presence or likely presence of releases at the *property*? ( ) Yes ( ) No If yes, please describe:

In order to qualify for one of the *Landowner Liability Protections (LLPs)* offered by the Small Business Liability Relief and Brownfields Revitalization Act of 2001 (the "*Brownfields Amendments*"), the *user* (the person or entity on whose behalf the Phase I Environmental Site Assessment is being conducted) must conduct the following inquiries required by 40 CFR 312.25, 312.28, 312.29, 312.30, and 312.31. These inquiries must also be conducted by EPA Brownfield Assessment and Characterization grantees. The *user* should provide the following information to the *environmental professional*. Failure to conduct these inquiries could result in a determination that "*all appropriate inquiries*" is not complete. The questions are as follows:

1. Are you aware of any environmental cleanup liens against the property that are filed or recorded under federal, tribal, state, or local law?

2. Are you aware of any activity and land use limitations, such as engineering controls, land use restrictions, or institutional controls that are in place at the site and/or have been filed or recorded in a registry under federal, tribal, state, or local law?

3. As the user of this ESA, do you have any specialized knowledge or experience related to the property or nearby properties? For example, are you involved in the same line of business as the current or former occupants of the property or an adjoining property so that you would have specialized knowledge of the chemicals and processes used by this type of business?

4. If the purchase price of the subject property was below fair market value, did this occur because contamination was/is known or believed to be present at the property?

5. Are you aware of commonly known or reasonably ascertainable information about the property that would help the environmental professional to identify conditions indicative of releases or threatened releases?

a. Do you know the past uses of the property?

Agriculture

b. Do you know of specific chemicals that are present or once were present at the property?

No

c. Do you know of spills or other chemical releases that have taken place at the property?

Non

d. Do you know of any environmental cleanups that have taken place at the property?

No

6. As the user of this ESA, based on your knowledge and experience related to the property, are there any obvious indicators that point to the presence or likely presence of contamination at the property?

Jennifer Jackson

Signature

25 Oct 2021

Date

Jennifer Jackson, Permitting Lead

Printed Name and Title

8minute Solar Energy

Company/Position

[redacted]

APPENDIX E

Environmental Database Records

70922 Lucerne Solar Project
San Bernardino County
Lucerne Valley, CA 92356

Inquiry Number: 6825493.5s
January 19, 2022

EDR Area / Corridor Report

6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

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Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

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EXECUTIVE SUMMARY

A search of available environmental records was conducted by Environmental Data Resources, Inc (EDR). The report was designed to assist parties seeking to meet the search requirements of EPA's Standards and Practices for All Appropriate Inquiries (40 CFR Part 312), the ASTM Standard Practice for Environmental Site Assessments (E1527-21), the ASTM Standard Practice for Environmental Site Assessments for Forestland or Rural Property (E 2247-16), the ASTM Standard Practice for Limited Environmental Due Diligence: Transaction Screen Process (E 1528-14) or custom requirements developed for the evaluation of environmental risk associated with a parcel of real estate.

SUBJECT PROPERTY INFORMATION

ADDRESS

SAN BERNARDINO COUNTY
LUCERNE VALLEY, CA 92356

TARGET PROPERTY SEARCH RESULTS

The Target Property was identified in the following databases.

Page Numbers and Map Identifcations refer to the EDR Area/Corridor Report where detailed data on individual sites can be reviewed.

Sites listed in ***bold italics*** are in multiple databases.

STANDARD ENVIRONMENTAL RECORDS

Lists of state and tribal registered storage tanks

UST: Active UST Facilities

A review of the UST list, as provided by EDR, has revealed that there are 2 UST sites within the requested target property.

Site	Address	Map ID / Focus Map(s)	Page
AG-PETTIGREW, HOWARD Database: UST, Date of Government Version: 09/07/2021 Facility Id: 87014193	13324 LOCUST AVE	A2 / 8	31
AG-PETTIGREW, DAN Database: UST, Date of Government Version: 09/07/2021 Facility Id: 87014299	12860 LOCUST AVE	B5 / 8	35

ADDITIONAL ENVIRONMENTAL RECORDS

Local Lists of Registered Storage Tanks

SWEEPS UST: SWEEPS UST Listing

A review of the SWEEPS UST list, as provided by EDR, and dated 06/01/1994 has revealed that there are

EXECUTIVE SUMMARY

2 SWEEPS UST sites within the requested target property.

Site	Address	Map ID / Focus Map(s)	Page
PETTIGREW, HOWARD	***13324 LOCUST***	***A3 / 8***	***32***
Status: A Tank Status: A Comp Number: 47700			
NONE	***12860 LOCUST AVE***	***B6 / 8***	***35***
Status: A Tank Status: A Comp Number: 48097			

HIST UST: Hazardous Substance Storage Container Database

A review of the HIST UST list, as provided by EDR, and dated 10/15/1990 has revealed that there are 3 HIST UST sites within the requested target property.

Site	Address	Map ID / Focus Map(s)	Page
HOWARD PETTIGREW	13324 LOCUST	A1 / 8	31
Facility Id: 00000047700			
NONE	***12860 LOCUST AVENUE***	***B4 / 8***	***34***
NONE	***12860 LOCUST AVE***	***B6 / 8***	***35***
Facility Id: 00000048097			

Other Ascertainable Records

HWTS: Hazardous Waste Tracking System

A review of the HWTS list, as provided by EDR, and dated 07/13/2021 has revealed that there are 2 HWTS sites within the requested target property.

Site	Address	Map ID / Focus Map(s)	Page
MB LANDSCAPING & NUR	12881 MIDWAY AVE	C7 / 8	36
BOB BURNS	12881 MIDWAY	C8 / 8	37

SURROUNDING SITES: SEARCH RESULTS

Surrounding sites were identified in the following databases.

Page Numbers and Map Identifcations refer to the EDR Area/Corridor Report where detailed data on individual sites can be reviewed.

Sites listed in ***bold italics*** are in multiple databases.

Unmappable (orphan) sites are not considered in the foregoing analysis.

EXECUTIVE SUMMARY

STANDARD ENVIRONMENTAL RECORDS

Lists of state and tribal registered storage tanks

AST: Aboveground Petroleum Storage Tank Facilities

A review of the AST list, as provided by EDR, has revealed that there is 1 AST site within approximately 0.25 miles of the requested target property.

Site	Address	Direction / Distance	Map ID / Focus Map(s)	Page
HERT FARMS	***12332 MIDWAY***	***S 0 - 1/8 (0.125 mi.)***	***9 / 11***	***37***
Database: AST, Date of Government Version: 07/06/2016				

ADDITIONAL ENVIRONMENTAL RECORDS

Local Lists of Registered Storage Tanks

CERS TANKS: California Environmental Reporting System (CERS) Tanks

A review of the CERS TANKS list, as provided by EDR, and dated 10/18/2021 has revealed that there is 1 CERS TANKS site within approximately 0.25 miles of the requested target property.

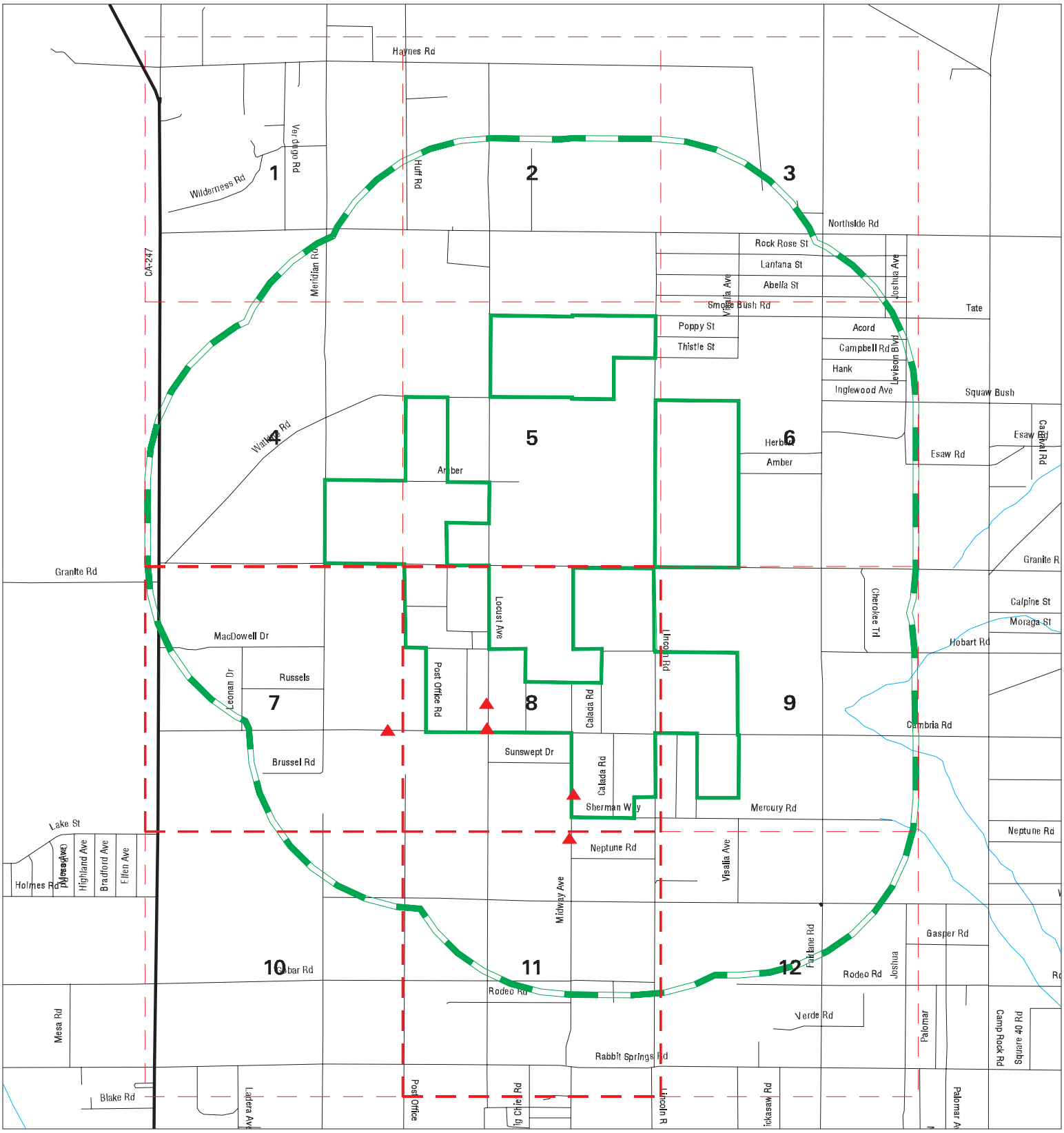
Site	Address	Direction / Distance	Map ID / Focus Map(s)	Page
HERT FARMS	***12332 MIDWAY***	***S 0 - 1/8 (0.125 mi.)***	***9 / 11***	***37***

MAPPED SITES SUMMARY

Target Property:
SAN BERNARDINO COUNTY
LUCERNE VALLEY, CA 92356

MAP ID / FOCUS MAP	SITE NAME	ADDRESS	DATABASE ACRONYMS	DIST (ft. & mi.) DIRECTION
A1 / 8	HOWARD PETTIGREW	13324 LOCUST	HIST UST	TP
A2 / 8	AG-PETTIGREW, HOWARD	13324 LOCUST AVE	UST	TP
A3 / 8	PETTIGREW, HOWARD	13324 LOCUST	SWEEPS UST, San Bern. Co. Permit	TP
B4 / 8	NONE	12860 LOCUST AVENUE	HIST UST, San Bern. Co. Permit	TP
B5 / 8	AG-PETTIGREW, DAN	12860 LOCUST AVE	UST	TP
B6 / 8	NONE	12860 LOCUST AVE	SWEEPS UST, HIST UST	TP
C7 / 8	MB LANDSCAPING & NUR	12881 MIDWAY AVE	HWTS	TP
C8 / 8	BOB BURNS	12881 MIDWAY	HWTS	TP
9 / 11	HERT FARMS	12332 MIDWAY	AST, CERS TANKS, San Bern. Co. Permit, C...	658 0.125 South
10 / 7	RANCHO DEL SOL	34900 CAMBRIA	San Bern. Co. Permit	1216 0.230 West

Key Map - 6825493.5s



SITE NAME: 70922 Lucerne Solar Project	CLIENT: SWCA Environmental Consultants
ADDRESS: San Bernardino County	CONTACT: Steve Obrien
CITY/STATE: Lucerne Valley CA	INQUIRY #: 6825493.5s
ZIP: 92356	DATE: 01/19/22 6:23 PM

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MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
STANDARD ENVIRONMENTAL RECORDS								
Lists of Federal NPL (Superfund) sites								
NPL	1.000		0	0	0	0	NR	0
Proposed NPL	1.000		0	0	0	0	NR	0
NPL LIENS	1.000		0	0	0	0	NR	0
Lists of Federal Delisted NPL sites								
Delisted NPL	1.000		0	0	0	0	NR	0
Lists of Federal sites subject to CERCLA removals and CERCLA orders								
FEDERAL FACILITY	0.500		0	0	0	NR	NR	0
SEMS	0.500		0	0	0	NR	NR	0
Lists of Federal CERCLA sites with NFRAP								
SEMS-ARCHIVE	0.500		0	0	0	NR	NR	0
Lists of Federal RCRA facilities undergoing Corrective Action								
CORRACTS	1.000		0	0	0	0	NR	0
Lists of Federal RCRA TSD facilities								
RCRA-TSDF	0.500		0	0	0	NR	NR	0
Lists of Federal RCRA generators								
RCRA-LQG	0.250		0	0	NR	NR	NR	0
RCRA-SQG	0.250		0	0	NR	NR	NR	0
RCRA-VSQG	0.250		0	0	NR	NR	NR	0
Federal institutional controls / engineering controls registries								
LUCIS	0.500		0	0	0	NR	NR	0
US ENG CONTROLS	0.500		0	0	0	NR	NR	0
US INST CONTROLS	0.500		0	0	0	NR	NR	0
Federal ERNS list								
ERNS	TP		NR	NR	NR	NR	NR	0
Lists of state- and tribal (Superfund) equivalent sites								
RESPONSE	1.000		0	0	0	0	NR	0
Lists of state- and tribal hazardous waste facilities								
ENVIROSTOR	1.000		0	0	0	0	NR	0
Lists of state and tribal landfills and solid waste disposal facilities								
SWF/LF	0.500		0	0	0	NR	NR	0

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
Lists of state and tribal leaking storage tanks								
LUST	0.500		0	0	0	NR	NR	0
INDIAN LUST	0.500		0	0	0	NR	NR	0
CPS-SLIC	0.500		0	0	0	NR	NR	0
Lists of state and tribal registered storage tanks								
FEMA UST	0.250		0	0	NR	NR	NR	0
UST	0.250	2	0	0	NR	NR	NR	2
AST	0.250		1	0	NR	NR	NR	1
INDIAN UST	0.250		0	0	NR	NR	NR	0
Lists of state and tribal voluntary cleanup sites								
INDIAN VCP	0.500		0	0	0	NR	NR	0
VCP	0.500		0	0	0	NR	NR	0
Lists of state and tribal brownfield sites								
BROWNFIELDS	0.500		0	0	0	NR	NR	0
ADDITIONAL ENVIRONMENTAL RECORDS								
Local Brownfield lists								
US BROWNFIELDS	0.500		0	0	0	NR	NR	0
Local Lists of Landfill / Solid Waste Disposal Sites								
WMUDS/SWAT	0.500		0	0	0	NR	NR	0
SWRCY	0.500		0	0	0	NR	NR	0
HAULERS	TP		NR	NR	NR	NR	NR	0
INDIAN ODI	0.500		0	0	0	NR	NR	0
ODI	0.500		0	0	0	NR	NR	0
DEBRIS REGION 9	0.500		0	0	0	NR	NR	0
IHS OPEN DUMPS	0.500		0	0	0	NR	NR	0
Local Lists of Hazardous waste / Contaminated Sites								
US HIST CDL	TP		NR	NR	NR	NR	NR	0
HIST Cal-Sites	1.000		0	0	0	0	NR	0
SCH	0.250		0	0	NR	NR	NR	0
CDL	TP		NR	NR	NR	NR	NR	0
Toxic Pits	1.000		0	0	0	0	NR	0
CERS HAZ WASTE	0.250		0	0	NR	NR	NR	0
US CDL	TP		NR	NR	NR	NR	NR	0
PFAS	0.500		0	0	0	NR	NR	0
AQUEOUS FOAM	TP		NR	NR	NR	NR	NR	0
Local Lists of Registered Storage Tanks								
SWEEPS UST	0.250	2	0	0	NR	NR	NR	2
HIST UST	0.250	3	0	0	NR	NR	NR	3
CERS TANKS	0.250		1	0	NR	NR	NR	1

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
CA FID UST	0.250		0	0	NR	NR	NR	0
Local Land Records								
LIENS	TP		NR	NR	NR	NR	NR	0
LIENS 2	TP		NR	NR	NR	NR	NR	0
DEED	0.500		0	0	0	NR	NR	0
Records of Emergency Release Reports								
HMIRS	TP		NR	NR	NR	NR	NR	0
CHMIRS	TP		NR	NR	NR	NR	NR	0
LDS	TP		NR	NR	NR	NR	NR	0
MCS	TP		NR	NR	NR	NR	NR	0
SPILLS 90	TP		NR	NR	NR	NR	NR	0
Other Ascertainable Records								
RCRA NonGen / NLR	0.250		0	0	NR	NR	NR	0
FUDS	1.000		0	0	0	0	NR	0
DOD	1.000		0	0	0	0	NR	0
SCRD DRYCLEANERS	0.500		0	0	0	NR	NR	0
US FIN ASSUR	TP		NR	NR	NR	NR	NR	0
EPA WATCH LIST	TP		NR	NR	NR	NR	NR	0
2020 COR ACTION	0.250		0	0	NR	NR	NR	0
TSCA	TP		NR	NR	NR	NR	NR	0
TRIS	TP		NR	NR	NR	NR	NR	0
SSTS	TP		NR	NR	NR	NR	NR	0
ROD	1.000		0	0	0	0	NR	0
RMP	TP		NR	NR	NR	NR	NR	0
RAATS	TP		NR	NR	NR	NR	NR	0
PRP	TP		NR	NR	NR	NR	NR	0
PADS	TP		NR	NR	NR	NR	NR	0
ICIS	TP		NR	NR	NR	NR	NR	0
FTTS	TP		NR	NR	NR	NR	NR	0
MLTS	TP		NR	NR	NR	NR	NR	0
COAL ASH DOE	TP		NR	NR	NR	NR	NR	0
COAL ASH EPA	0.500		0	0	0	NR	NR	0
PCB TRANSFORMER	TP		NR	NR	NR	NR	NR	0
RADINFO	TP		NR	NR	NR	NR	NR	0
HIST FTTS	TP		NR	NR	NR	NR	NR	0
DOT OPS	TP		NR	NR	NR	NR	NR	0
CONSENT	1.000		0	0	0	0	NR	0
INDIAN RESERV	1.000		0	0	0	0	NR	0
FUSRAP	1.000		0	0	0	0	NR	0
UMTRA	0.500		0	0	0	NR	NR	0
LEAD SMELTERS	TP		NR	NR	NR	NR	NR	0
US AIRS	TP		NR	NR	NR	NR	NR	0
US MINES	0.250		0	0	NR	NR	NR	0
ABANDONED MINES	0.250		0	0	NR	NR	NR	0
FINDS	TP		NR	NR	NR	NR	NR	0
DOCKET HWC	TP		NR	NR	NR	NR	NR	0
UXO	1.000		0	0	0	0	NR	0
ECHO	TP		NR	NR	NR	NR	NR	0

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
FUELS PROGRAM	0.250		0	0	NR	NR	NR	0
CA BOND EXP. PLAN	1.000		0	0	0	0	NR	0
Cortese	0.500		0	0	0	NR	NR	0
CUPA Listings	0.250		0	0	NR	NR	NR	0
DRYCLEANERS	0.250		0	0	NR	NR	NR	0
EMI	TP		NR	NR	NR	NR	NR	0
ENF	TP		NR	NR	NR	NR	NR	0
Financial Assurance	TP		NR	NR	NR	NR	NR	0
HAZNET	TP		NR	NR	NR	NR	NR	0
ICE	TP		NR	NR	NR	NR	NR	0
HIST CORTESE	0.500		0	0	0	NR	NR	0
HWP	1.000		0	0	0	0	NR	0
HWT	0.250		0	0	NR	NR	NR	0
MINES	0.250		0	0	NR	NR	NR	0
MWMP	0.250		0	0	NR	NR	NR	0
NPDES	TP		NR	NR	NR	NR	NR	0
PEST LIC	TP		NR	NR	NR	NR	NR	0
PROC	0.500		0	0	0	NR	NR	0
Notify 65	1.000		0	0	0	0	NR	0
UIC	TP		NR	NR	NR	NR	NR	0
UIC GEO	TP		NR	NR	NR	NR	NR	0
WASTEWATER PITS	0.500		0	0	0	NR	NR	0
WDS	TP		NR	NR	NR	NR	NR	0
WIP	0.250		0	0	NR	NR	NR	0
MILITARY PRIV SITES	TP		NR	NR	NR	NR	NR	0
PROJECT	TP		NR	NR	NR	NR	NR	0
WDR	TP		NR	NR	NR	NR	NR	0
CIWQS	TP		NR	NR	NR	NR	NR	0
CERS	TP		NR	NR	NR	NR	NR	0
NON-CASE INFO	TP		NR	NR	NR	NR	NR	0
OTHER OIL GAS	TP		NR	NR	NR	NR	NR	0
PROD WATER PONDS	TP		NR	NR	NR	NR	NR	0
SAMPLING POINT	TP		NR	NR	NR	NR	NR	0
WELL STIM PROJ	TP		NR	NR	NR	NR	NR	0
MINES MRDS	TP		NR	NR	NR	NR	NR	0
HWTS	TP	2	NR	NR	NR	NR	NR	2
EDR HIGH RISK HISTORICAL RECORDS								
EDR Exclusive Records								
EDR MGP	1.000		0	0	0	0	NR	0
EDR Hist Auto	0.125		0	NR	NR	NR	NR	0
EDR Hist Cleaner	0.125		0	NR	NR	NR	NR	0
EDR RECOVERED GOVERNMENT ARCHIVES								
Exclusive Recovered Govt. Archives								
RGA LF	TP		NR	NR	NR	NR	NR	0
RGA LUST	TP		NR	NR	NR	NR	NR	0
- Totals --		9	2	0	0	0	0	11

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted

NOTES:

TP = Target Property

NR = Not Requested at this Search Distance

Sites may be listed in more than one database

Focus Map - 1 - 6825493.5s



Sites
Target Property
Search Buffer
Focus Map - No Sites
Focus Map - Sites
Power Line
National Priority List Sites
Areas of Concern
Dept. Defense Sites
Indian Reservations BIA

0 1/8 1/4 Miles

SITE NAME: 70922 Lucerne Solar Project	CLIENT: SWCA Environmental Consultants
ADDRESS: San Bernardino County	CONTACT: Steve Obrien
CITY/STATE: Lucerne Valley CA	INQUIRY #: 6825493.5s
ZIP: 92356	DATE: 01/19/22

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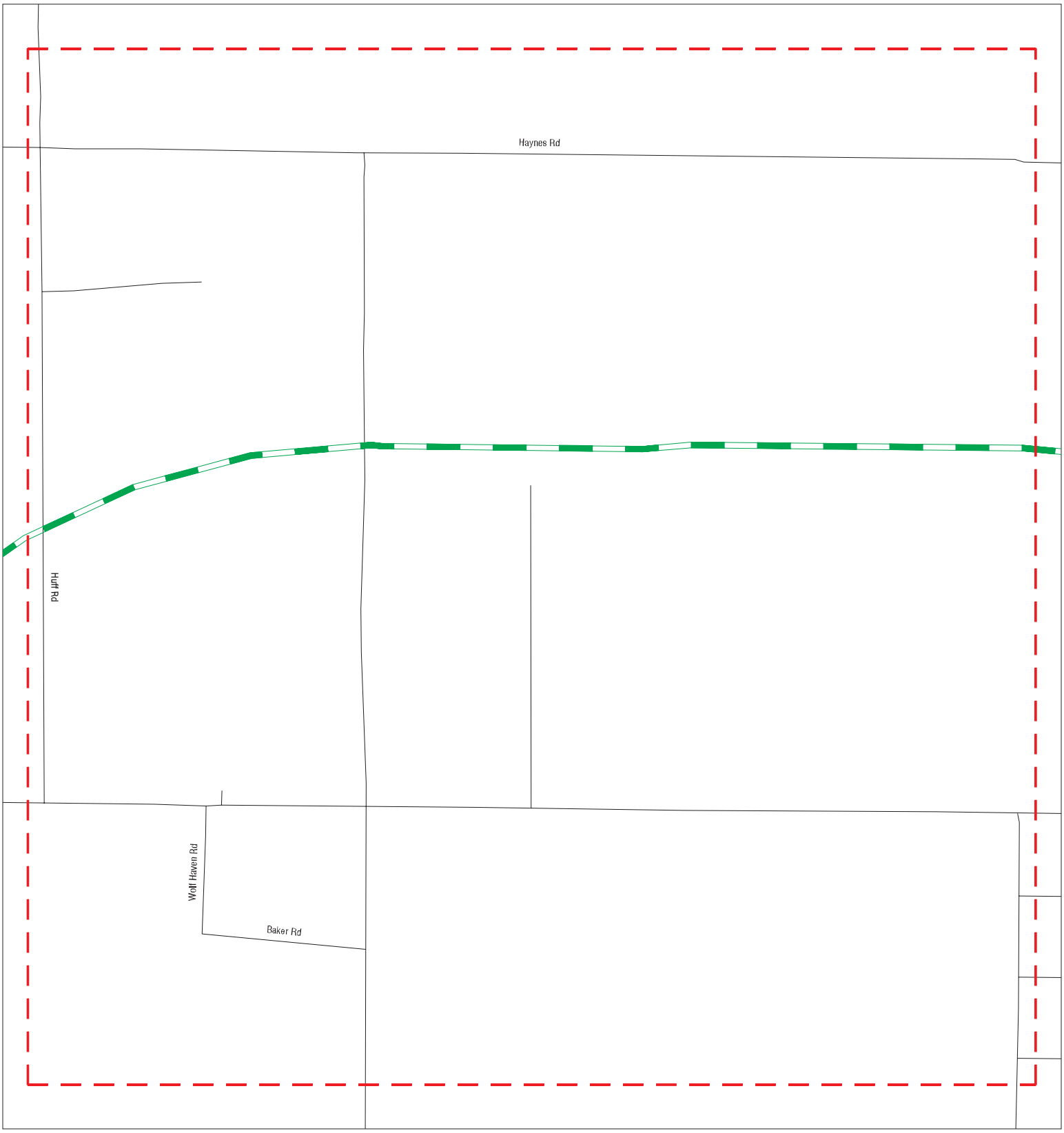
MAPPED SITES SUMMARY - FOCUS MAP 1

Target Property:
SAN BERNARDINO COUNTY
LUCERNE VALLEY, CA 92356

MAP ID / FOCUS MAP	SITE NAME	ADDRESS	DATABASE ACRONYMS	DIST (ft. & mi.) DIRECTION

NO MAPPED SITES FOUND

Focus Map - 2 - 6825493.5s



Sites
Target Property
Search Buffer
Focus Map - No Sites
Focus Map - Sites
Power Line
National Priority List Sites
Areas of Concern
Dept. Defense Sites
Indian Reservations BIA

0 1/8 1/4 Miles

SITE NAME: 70922 Lucerne Solar Project	CLIENT: SWCA Environmental Consultants
ADDRESS: San Bernardino County	CONTACT: Steve Obrien
CITY/STATE: Lucerne Valley CA	INQUIRY #: 6825493.5s
ZIP: 92356	DATE: 01/19/22

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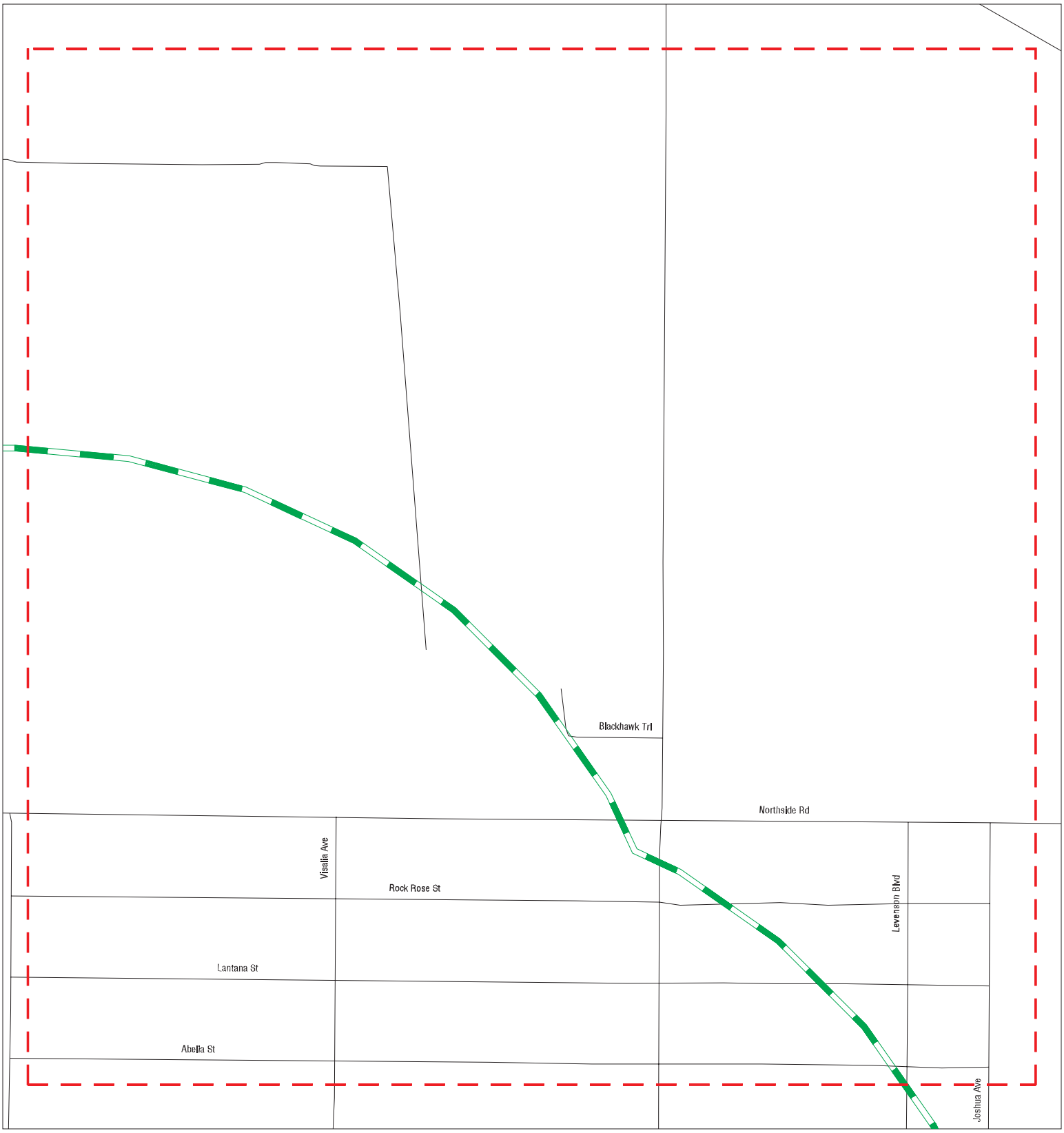
MAPPED SITES SUMMARY - FOCUS MAP 2

Target Property:
SAN BERNARDINO COUNTY
LUCERNE VALLEY, CA 92356

MAP ID / FOCUS MAP	SITE NAME	ADDRESS	DATABASE ACRONYMS	DIST (ft. & mi.) DIRECTION

NO MAPPED SITES FOUND

Focus Map - 3 - 6825493.5s



Sites
Target Property
Search Buffer
Focus Map - No Sites
Focus Map - Sites
Power Line
National Priority List Sites
Areas of Concern
Dept. Defense Sites
Indian Reservations BIA

SITE NAME: 70922 Lucerne Solar Project	CLIENT: SWCA Environmental Consultants
ADDRESS: San Bernardino County	CONTACT: Steve Obrien
CITY/STATE: Lucerne Valley CA	INQUIRY #: 6825493.5s
ZIP: 92356	DATE: 01/19/22

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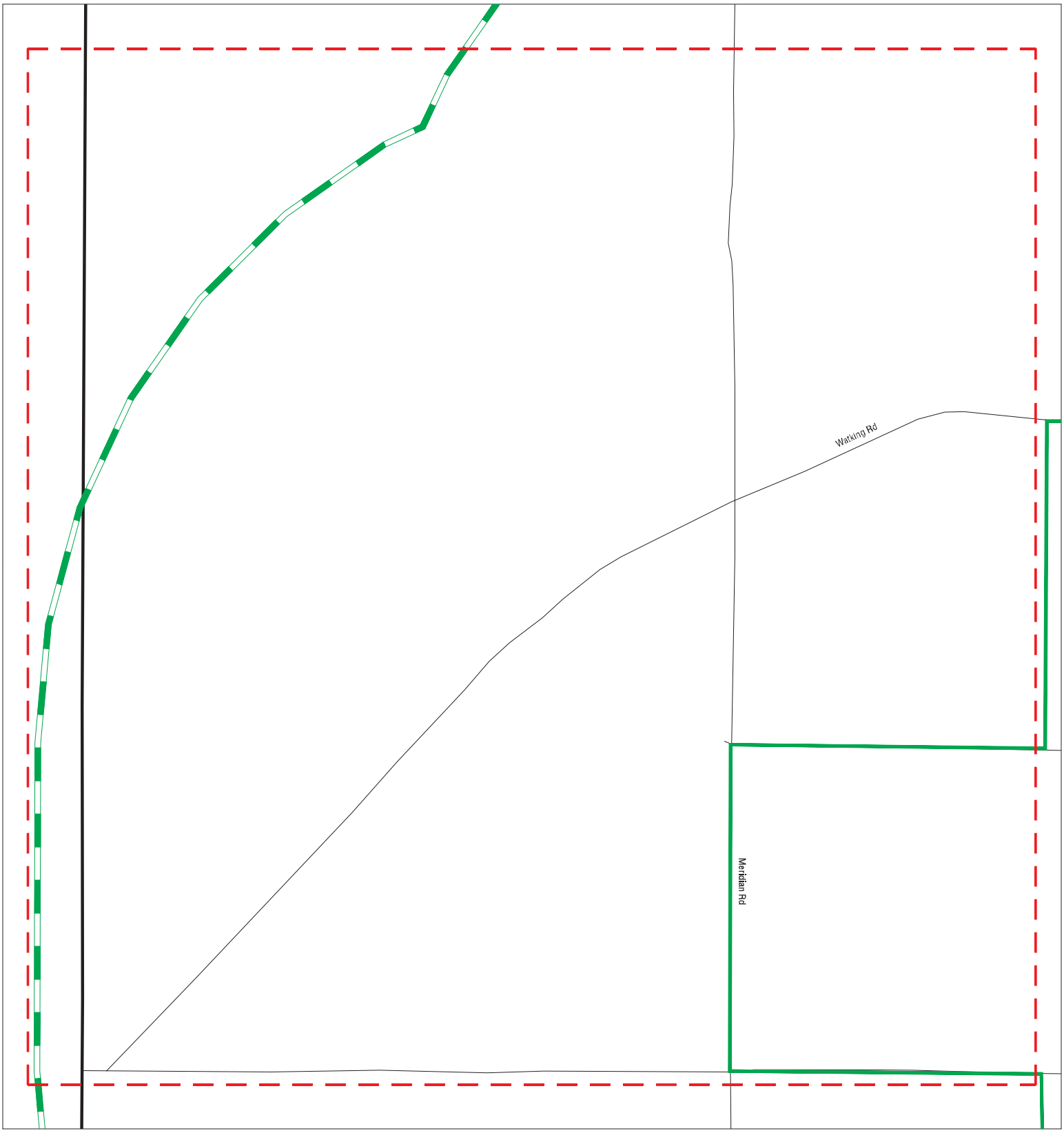
MAPPED SITES SUMMARY - FOCUS MAP 3

Target Property:
SAN BERNARDINO COUNTY
LUCERNE VALLEY, CA 92356

MAP ID / FOCUS MAP	SITE NAME	ADDRESS	DATABASE ACRONYMS	DIST (ft. & mi.) DIRECTION

NO MAPPED SITES FOUND

Focus Map - 4 - 6825493.5s



Sites
Target Property
Search Buffer
Focus Map - No Sites
Focus Map - Sites
Power Line
National Priority List Sites
Areas of Concern
Dept. Defense Sites
Indian Reservations BIA

0 1/8 1/4 Miles

SITE NAME: 70922 Lucerne Solar Project	CLIENT: SWCA Environmental Consultants
ADDRESS: San Bernardino County	CONTACT: Steve Obrien
CITY/STATE: Lucerne Valley CA	INQUIRY #: 6825493.5s
ZIP: 92356	DATE: 01/19/22

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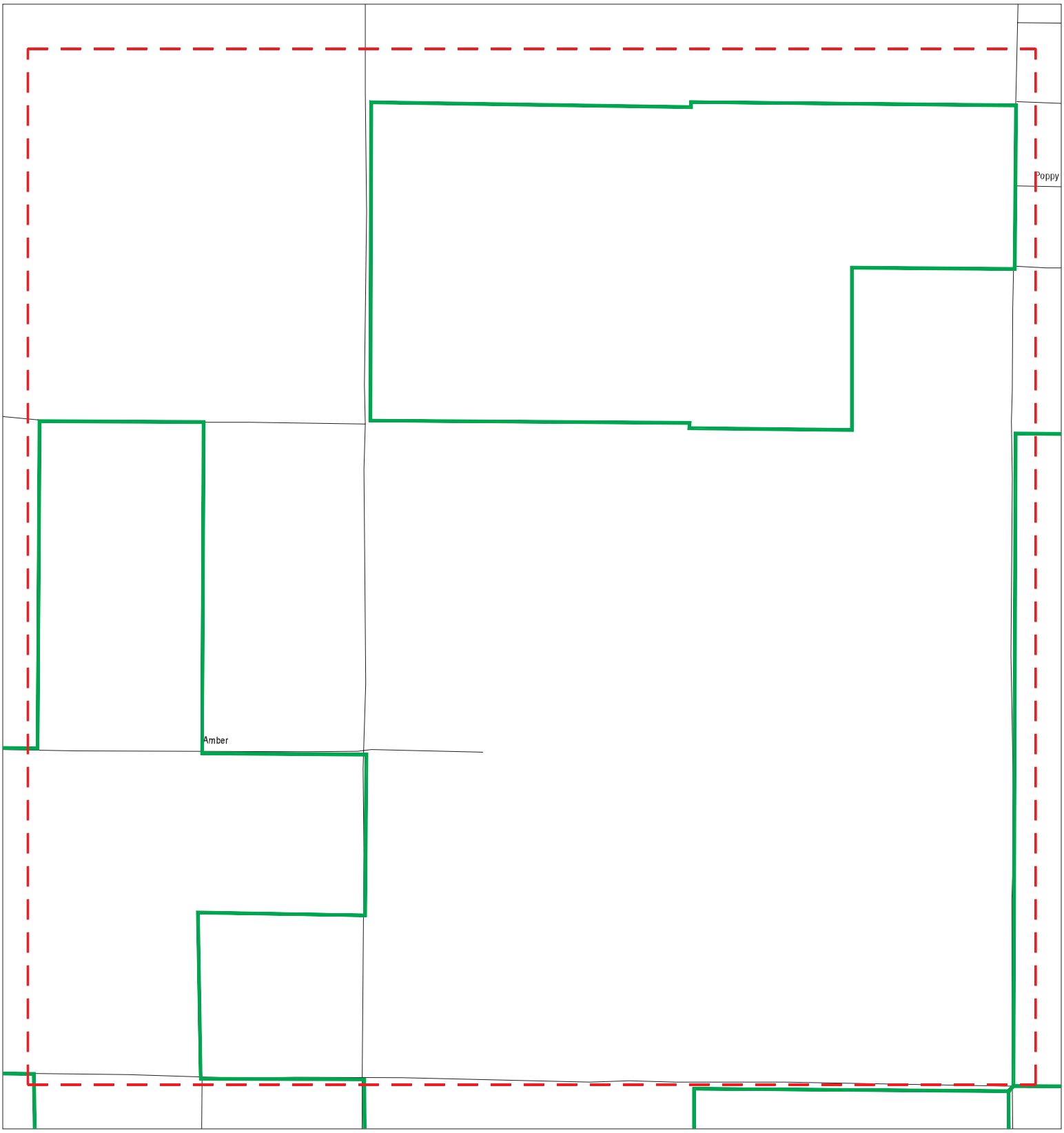
MAPPED SITES SUMMARY - FOCUS MAP 4

Target Property:
SAN BERNARDINO COUNTY
LUCERNE VALLEY, CA 92356

MAP ID / FOCUS MAP	SITE NAME	ADDRESS	DATABASE ACRONYMS	DIST (ft. & mi.) DIRECTION

NO MAPPED SITES FOUND

Focus Map - 5 - 6825493.5s



Sites
Target Property
Search Buffer
Focus Map - No Sites
Focus Map - Sites
Power Line
National Priority List Sites
Areas of Concern
Dept. Defense Sites
Indian Reservations BIA

0 1/8 1/4 Miles

SITE NAME: 70922 Lucerne Solar Project	CLIENT: SWCA Environmental Consultants
ADDRESS: San Bernardino County	CONTACT: Steve Obrien
CITY/STATE: Lucerne Valley CA	INQUIRY #: 6825493.5s
ZIP: 92356	DATE: 01/19/22

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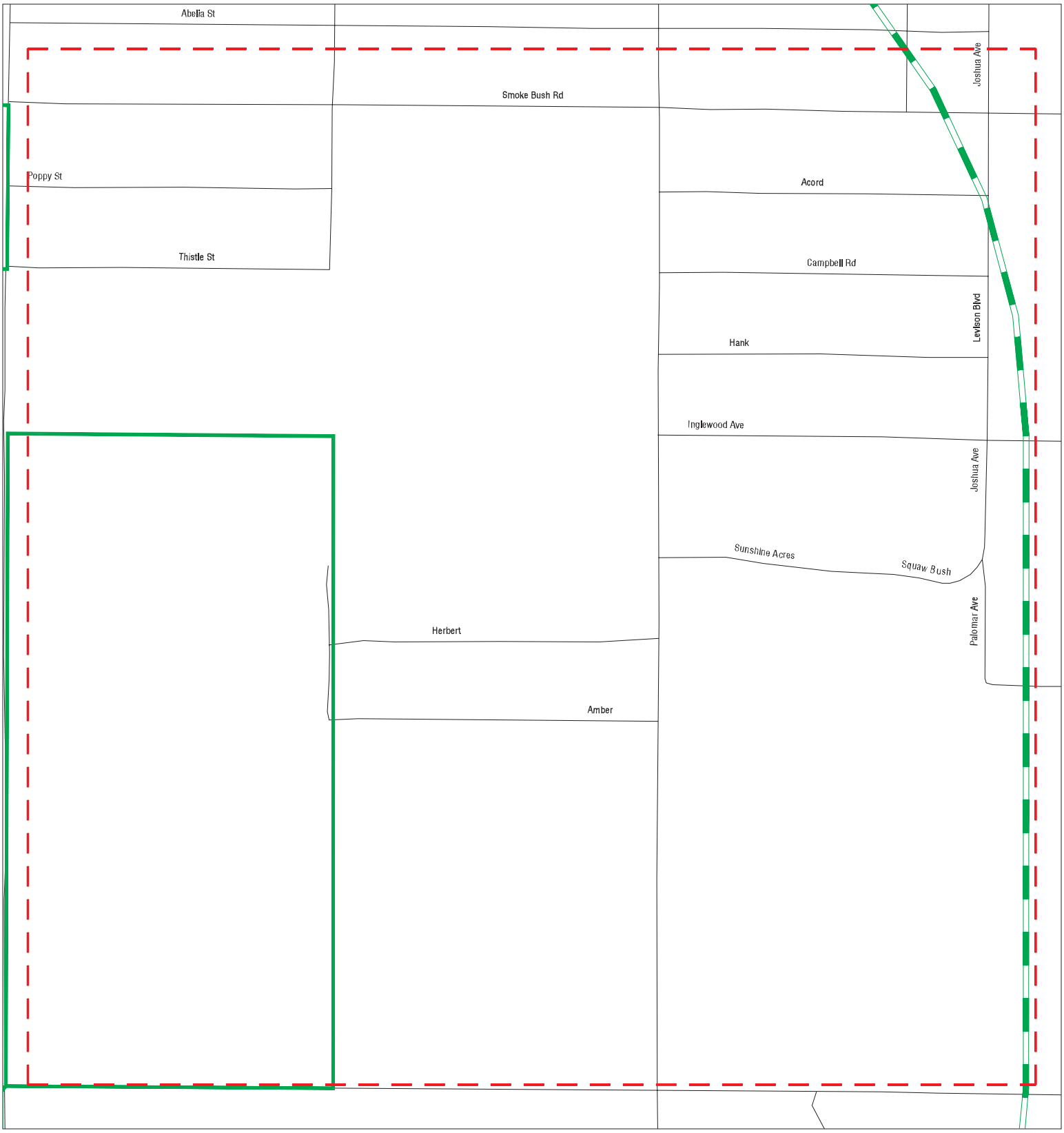
MAPPED SITES SUMMARY - FOCUS MAP 5

Target Property:
SAN BERNARDINO COUNTY
LUCERNE VALLEY, CA 92356

MAP ID / FOCUS MAP	SITE NAME	ADDRESS	DATABASE ACRONYMS	DIST (ft. & mi.) DIRECTION

NO MAPPED SITES FOUND

Focus Map - 6 - 6825493.5s



Sites
Target Property
Search Buffer
Focus Map - No Sites
Focus Map - Sites
Power Line
National Priority List Sites
Areas of Concern
Dept. Defense Sites
Indian Reservations BIA

SITE NAME: 70922 Lucerne Solar Project	CLIENT: SWCA Environmental Consultants
ADDRESS: San Bernardino County	CONTACT: Steve Obrien
CITY/STATE: Lucerne Valley CA	INQUIRY #: 6825493.5s
ZIP: 92356	DATE: 01/19/22

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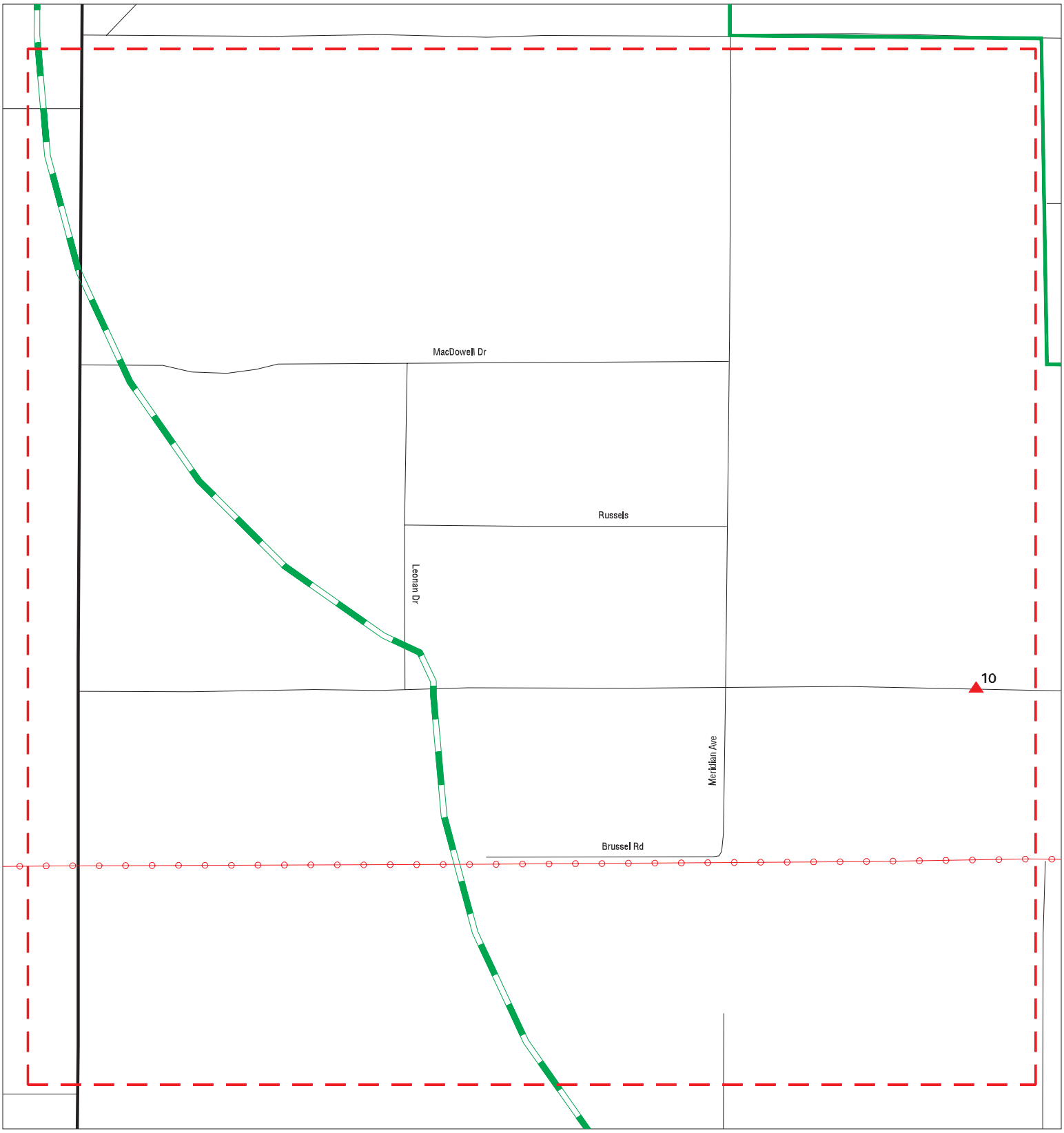
MAPPED SITES SUMMARY - FOCUS MAP 6

Target Property:
SAN BERNARDINO COUNTY
LUCERNE VALLEY, CA 92356

MAP ID / FOCUS MAP	SITE NAME	ADDRESS	DATABASE ACRONYMS	DIST (ft. & mi.) DIRECTION

NO MAPPED SITES FOUND

Focus Map - 7 - 6825493.5s



Sites
Target Property
Search Buffer
Focus Map - No Sites
Focus Map - Sites
Power Line
National Priority List Sites
Areas of Concern
Dept. Defense Sites
Indian Reservations BIA

0 1/8 1/4 Miles

SITE NAME: 70922 Lucerne Solar Project	CLIENT: SWCA Environmental Consultants
ADDRESS: San Bernardino County	CONTACT: Steve Obrien
CITY/STATE: Lucerne Valley CA	INQUIRY #: 6825493.5s
ZIP: 92356	DATE: 01/19/22

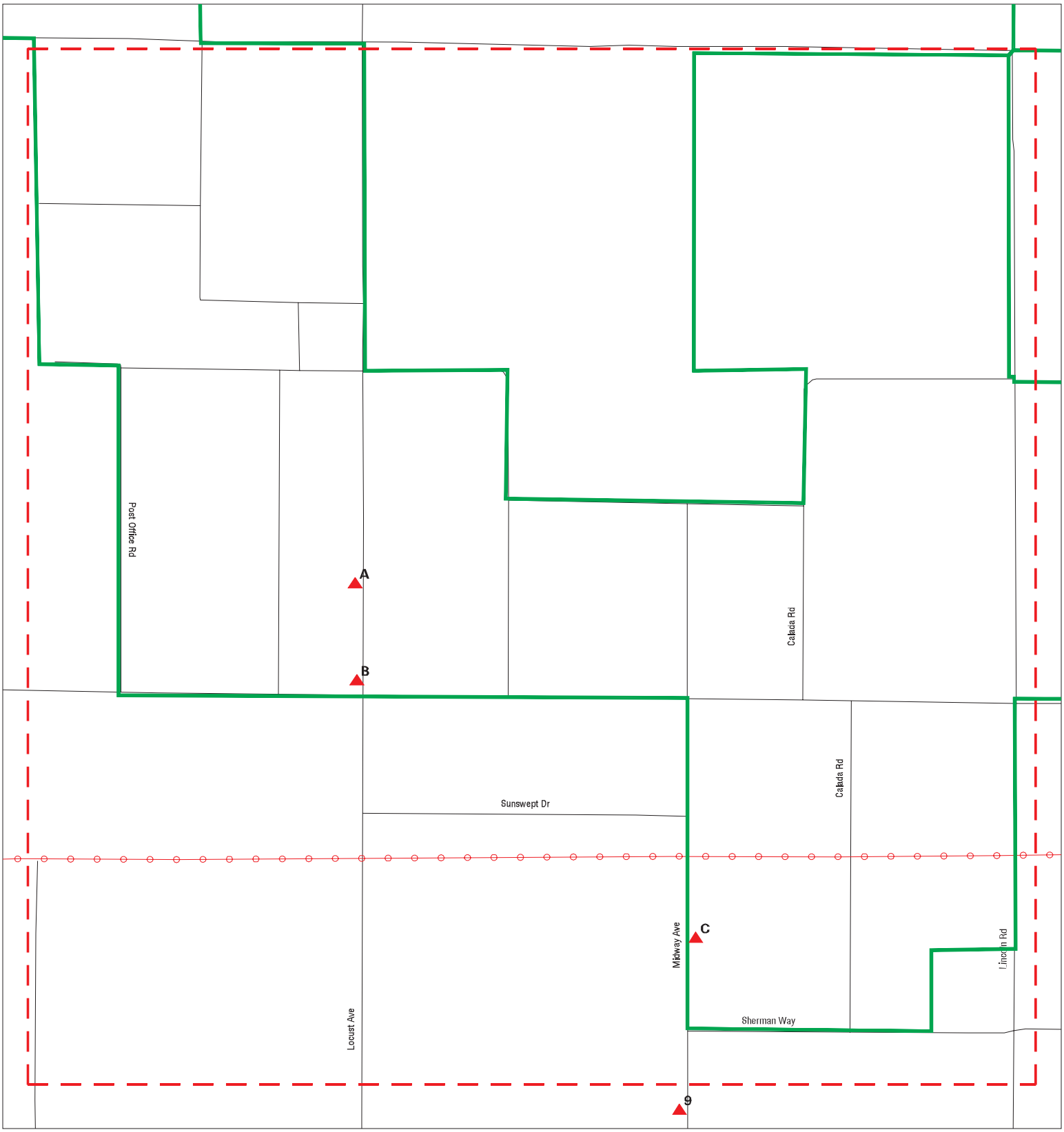
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MAPPED SITES SUMMARY - FOCUS MAP 7

Target Property:
SAN BERNARDINO COUNTY
LUCERNE VALLEY, CA 92356

MAP ID / FOCUS MAP	SITE NAME	ADDRESS	DATABASE ACRONYMS	DIST (ft. & mi.) DIRECTION
10 / 7	RANCHO DEL SOL	34900 CAMBRIA	San Bern. Co. Permit	1216 0.230 West

Focus Map - 8 - 6825493.5s



Sites
Target Property
Search Buffer
Focus Map - No Sites
Focus Map - Sites
Power Line
National Priority List Sites
Areas of Concern
Dept. Defense Sites
Indian Reservations BIA

0 1/8 1/4 Miles

SITE NAME: 70922 Lucerne Solar Project	CLIENT: SWCA Environmental Consultants
ADDRESS: San Bernardino County	CONTACT: Steve Obrien
CITY/STATE: Lucerne Valley CA	INQUIRY #: 6825493.5s
ZIP: 92356	DATE: 01/19/22

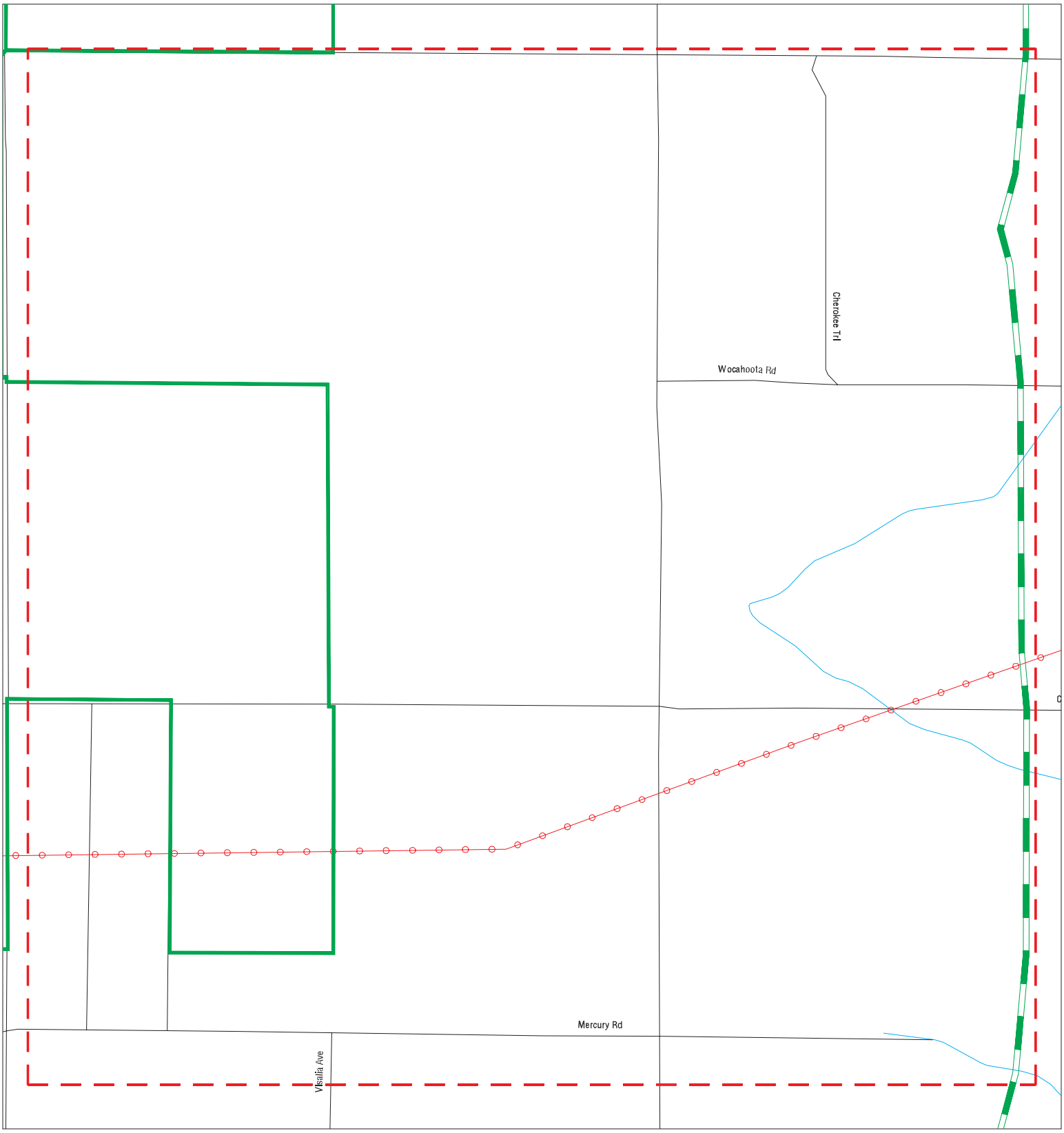
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MAPPED SITES SUMMARY - FOCUS MAP 8

Target Property:
SAN BERNARDINO COUNTY
LUCERNE VALLEY, CA 92356

MAP ID / FOCUS MAP	SITE NAME	ADDRESS	DATABASE ACRONYMS	DIST (ft. & mi.) DIRECTION
A1 / 8	HOWARD PETTIGREW	13324 LOCUST	HIST UST	TP
A2 / 8	AG-PETTIGREW, HOWARD	13324 LOCUST AVE	UST	TP
A3 / 8	PETTIGREW, HOWARD	13324 LOCUST	SWEEPS UST, San Bern. Co. Permit	TP
B4 / 8	NONE	12860 LOCUST AVENUE	HIST UST, San Bern. Co. Permit	TP
B5 / 8	AG-PETTIGREW, DAN	12860 LOCUST AVE	UST	TP
B6 / 8	NONE	12860 LOCUST AVE	SWEEPS UST, HIST UST	TP
C7 / 8	MB LANDSCAPING & NUR	12881 MIDWAY AVE	HWTS	TP
C8 / 8	BOB BURNS	12881 MIDWAY	HWTS	TP

Focus Map - 9 - 6825493.5s



Sites
Target Property
Search Buffer
Focus Map - No Sites
Focus Map - Sites
Power Line
National Priority List Sites
Areas of Concern
Dept. Defense Sites
Indian Reservations BIA

0 1/8 1/4 Miles

SITE NAME: 70922 Lucerne Solar Project	CLIENT: SWCA Environmental Consultants
ADDRESS: San Bernardino County	CONTACT: Steve Obrien
CITY/STATE: Lucerne Valley CA	INQUIRY #: 6825493.5s
ZIP: 92356	DATE: 01/19/22

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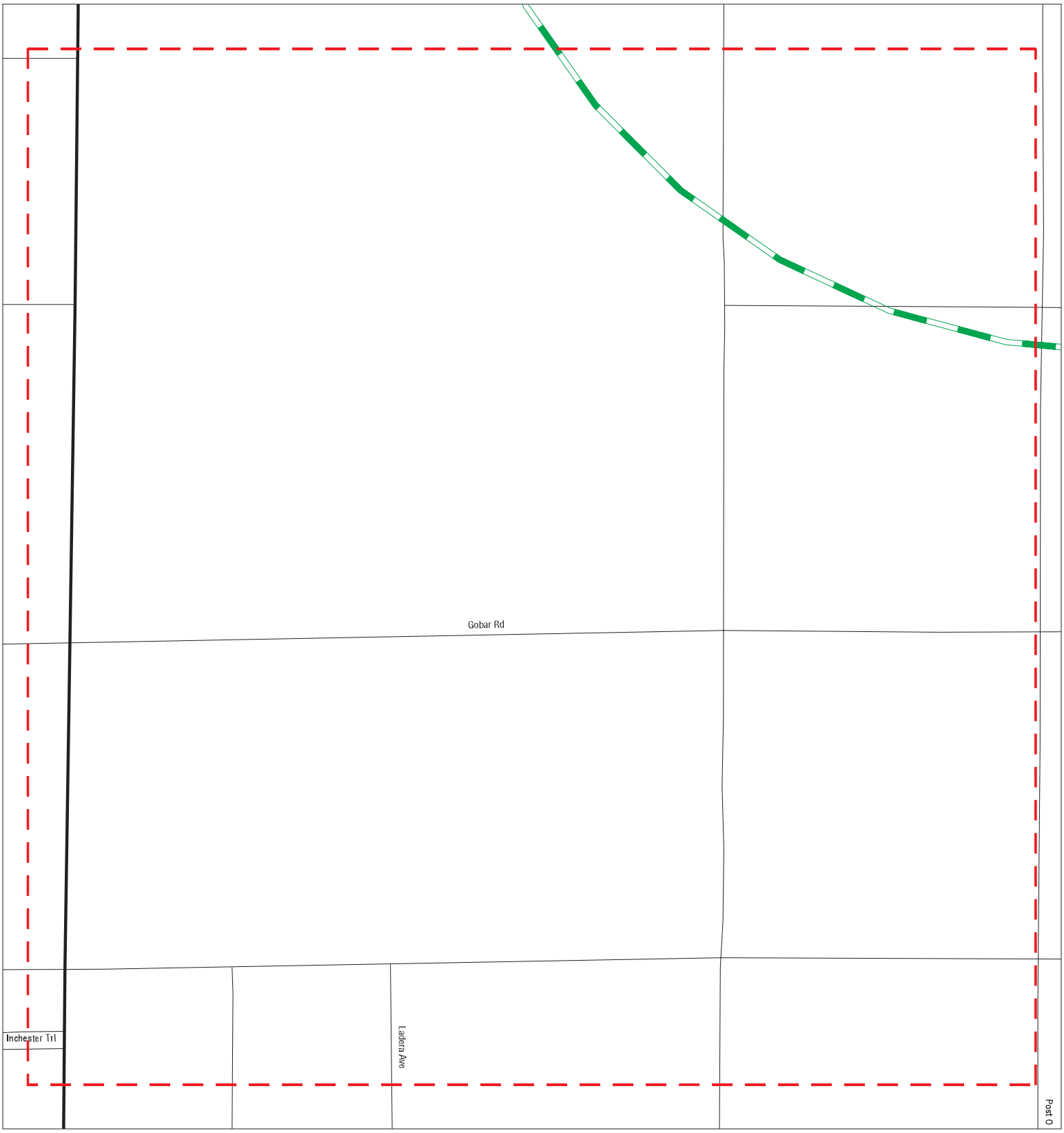
MAPPED SITES SUMMARY - FOCUS MAP 9

Target Property:
SAN BERNARDINO COUNTY
LUCERNE VALLEY, CA 92356

MAP ID / FOCUS MAP	SITE NAME	ADDRESS	DATABASE ACRONYMS	DIST (ft. & mi.) DIRECTION

NO MAPPED SITES FOUND

Focus Map - 10 - 6825493.5s



Sites
Target Property
Search Buffer
Focus Map - No Sites
Focus Map - Sites
Power Line
National Priority List Sites
Areas of Concern
Dept. Defense Sites
Indian Reservations BIA

0 1/8 1/4 Miles

SITE NAME: 70922 Lucerne Solar Project	CLIENT: SWCA Environmental Consultants
ADDRESS: San Bernardino County	CONTACT: Steve Obrien
CITY/STATE: Lucerne Valley CA	INQUIRY #: 6825493.5s
ZIP: 92356	DATE: 01/19/22

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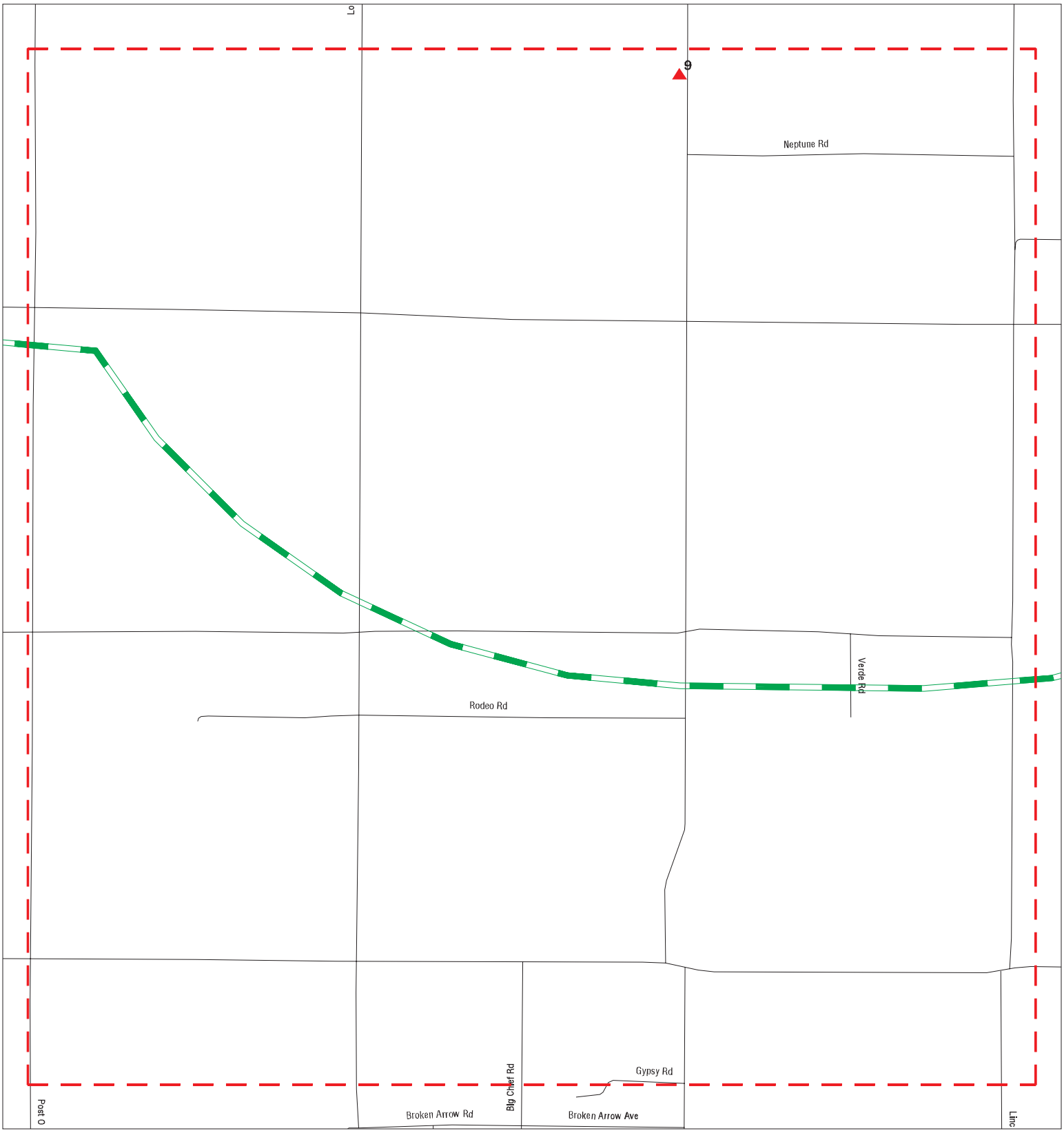
MAPPED SITES SUMMARY - FOCUS MAP 10

Target Property:
SAN BERNARDINO COUNTY
LUCERNE VALLEY, CA 92356

MAP ID / FOCUS MAP	SITE NAME	ADDRESS	DATABASE ACRONYMS	DIST (ft. & mi.) DIRECTION

NO MAPPED SITES FOUND

Focus Map - 11 - 6825493.5s



Sites
Target Property
Search Buffer
Focus Map - No Sites
Focus Map - Sites
Power Line
National Priority List Sites
Areas of Concern
Dept. Defense Sites
Indian Reservations BIA

SITE NAME: 70922 Lucerne Solar Project	CLIENT: SWCA Environmental Consultants
ADDRESS: San Bernardino County	CONTACT: Steve Obrien
CITY/STATE: Lucerne Valley CA	INQUIRY #: 6825493.5s
ZIP: 92356	DATE: 01/19/22

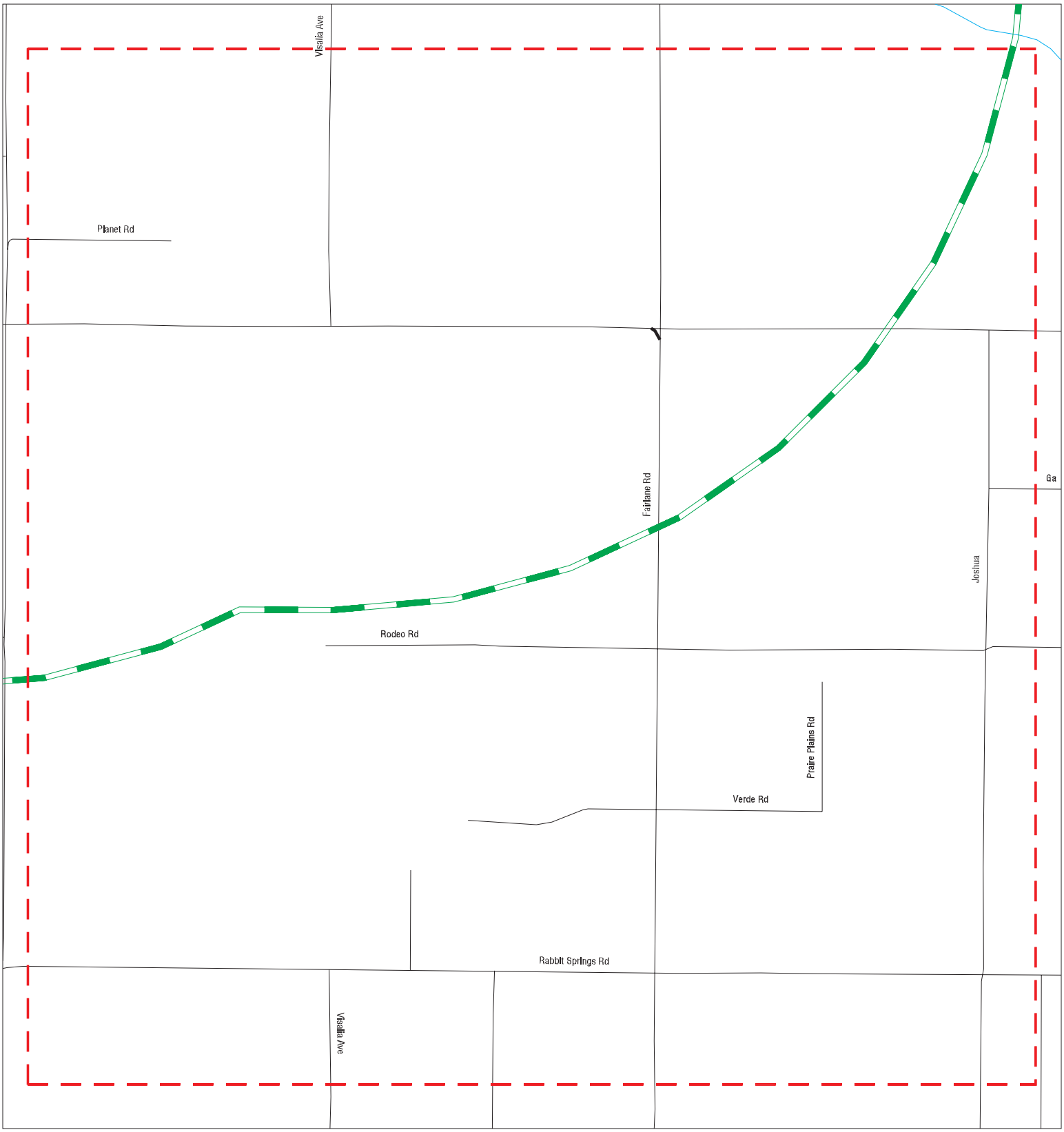
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MAPPED SITES SUMMARY - FOCUS MAP 11

Target Property:
SAN BERNARDINO COUNTY
LUCERNE VALLEY, CA 92356

MAP ID / FOCUS MAP	SITE NAME	ADDRESS	DATABASE ACRONYMS	DIST (ft. & mi.) DIRECTION
9 / 11	HERT FARMS	12332 MIDWAY	AST, CERS TANKS, San Bern. Co. Permit, C...	658 0.125 South

Focus Map - 12 - 6825493.5s



Sites
Target Property
Search Buffer
Focus Map - No Sites
Focus Map - Sites
Power Line
National Priority List Sites
Areas of Concern
Dept. Defense Sites
Indian Reservations BIA

0 1/8 1/4 Miles

SITE NAME: 70922 Lucerne Solar Project	CLIENT: SWCA Environmental Consultants
ADDRESS: San Bernardino County	CONTACT: Steve Obrien
CITY/STATE: Lucerne Valley CA	INQUIRY #: 6825493.5s
ZIP: 92356	DATE: 01/19/22

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MAPPED SITES SUMMARY - FOCUS MAP 12

Target Property:
SAN BERNARDINO COUNTY
LUCERNE VALLEY, CA 92356

MAP ID / FOCUS MAP	SITE NAME	ADDRESS	DATABASE ACRONYMS	DIST (ft. & mi.) DIRECTION

NO MAPPED SITES FOUND

A1 **HOWARD PETTIGREW** **HIST UST** **U001575168**
Target **13324 LOCUST** **N/A**
Property **LUCERNE VALLEY, CA 92356**

Site 1 of 3 in cluster A

Actual: **2864 ft.**

Focus Map: 8

HIST UST:

Name:	HOWARD PETTIGREW
Address:	13324 LOCUST
City,State,Zip:	LUCERNE VALLEY, CA 92356
File Number:	00029FDA
URL:	http://geotracker.waterboards.ca.gov/ustpdfs/pdf/00029FDA.pdf
Region:	STATE
Facility ID:	00000047700
Facility Type:	Other
Other Type:	AGRICULTURE
Contact Name:	Not reported
Telephone:	6192487174
Owner Name:	HOWARD PETTIGREW
Owner Address:	13324 LOCUST
Owner City,St,Zip:	LUCERNE VALLEY, CA 92356
Total Tanks:	0002
Tank Num:	001
Container Num:	1
Year Installed:	Not reported
Tank Capacity:	00000280
Tank Used for:	PRODUCT
Type of Fuel:	REGULAR
Container Construction Thickness:	Not reported
Leak Detection:	None
Tank Num:	002
Container Num:	2
Year Installed:	Not reported
Tank Capacity:	00000550
Tank Used for:	PRODUCT
Type of Fuel:	REGULAR
Container Construction Thickness:	Not reported
Leak Detection:	None

Click here for Geo Tracker PDF:

A2 **AG-PETTIGREW, HOWARD** **UST** **U004050736**
Target **13324 LOCUST AVE** **N/A**
Property **LUCERNE VALLEY, CA 92356**

Site 2 of 3 in cluster A

Actual: **2864 ft.**

Focus Map: 8

UST:

Name:	AG-PETTIGREW, HOWARD
Address:	13324 LOCUST AVE
City,State,Zip:	LUCERNE VALLEY, CA 92356
Facility ID:	87014193
Permitting Agency:	SAN BERNARDINO COUNTY
CERSID:	Not reported
Latitude:	34.491524
Longitude:	-116.912546

A3 **PETTIGREW, HOWARD** **SWEEPS UST** **S104762063**
Target **13324 LOCUST** **San Bern. Co. Permit** **N/A**
Property **LUCERNE VALLEY, CA 92356**

Site 3 of 3 in cluster A

Actual:
2864 ft.

Focus Map:
8

SWEEPS UST:

Name:	PETTIGREW, HOWARD
Address:	13324 LOCUST
City:	LUCERNE VALLEY
Status:	Active
Comp Number:	47700
Number:	9
Board Of Equalization:	Not reported
Referral Date:	09-03-91
Action Date:	09-03-91
Created Date:	02-29-88
Owner Tank Id:	1
SWRCB Tank Id:	36-000-047700-000001
Tank Status:	A
Capacity:	280
Active Date:	07-07-88
Tank Use:	M.V. FUEL
STG:	P
Content:	LEADED
Number Of Tanks:	2

Name:	PETTIGREW, HOWARD
Address:	13324 LOCUST
City:	LUCERNE VALLEY
Status:	Active
Comp Number:	47700
Number:	9
Board Of Equalization:	Not reported
Referral Date:	09-03-91
Action Date:	09-03-91
Created Date:	02-29-88
Owner Tank Id:	2
SWRCB Tank Id:	36-000-047700-000002
Tank Status:	A
Capacity:	550
Active Date:	07-07-88
Tank Use:	M.V. FUEL
STG:	P
Content:	LEADED
Number Of Tanks:	Not reported

San Bern. Co. Permit:

Name:	COOKY HAY FARM
Address:	13324 LOCUST
City,State,Zip:	LUCERNE VALLEY, CA 92356
Region:	SAN BERNARDINO
Facility ID:	FA0000606
Owner:	GAETA, MIGUEL
Permit Number:	PT0018987
Permit Category:	HAZMAT HANDLER 0-10 EMPLOYEES
Facility Status:	INACTIVE
Expiration Date:	09/30/2013

PETTIGREW, HOWARD (Continued) **S104762063**

Name: ABANDONED HAZARDOUS WASTE
Address: 13324 LOCUST
City,State,Zip: LUCERNE VALLEY, CA 92356
Region: SAN BERNARDINO
Facility ID: FA0011105
Owner: PETTIGREW, HOWARD
Permit Number: PT0019128
Permit Category: HAZARDOUS WASTE GENERATOR - 0-10 EMPLOYEES
Facility Status: INACTIVE
Expiration Date: 09/30/2008

Name: ABANDONED HAZARDOUS WASTE
Address: 13324 LOCUST
City,State,Zip: LUCERNE VALLEY, CA 92356
Region: SAN BERNARDINO
Facility ID: FA0011105
Owner: PETTIGREW, HOWARD
Permit Number: PT0019129
Permit Category: HAZMAT HANDLER 0-10 EMPLOYEES (W/GEN PRMT)
Facility Status: INACTIVE
Expiration Date: 09/30/2008

Name: COOKY HAY FARM
Address: 13324 LOCUST
City,State,Zip: LUCERNE VALLEY, CA 92356
Region: SAN BERNARDINO
Facility ID: FA0000606
Owner: GAETA, MIGUEL
Permit Number: PT0011102
Permit Category: REGULAR UST ANNUAL INSPECTION (PER TANK)
Facility Status: INACTIVE
Expiration Date: 09/30/1990

Name: COOKY HAY FARM
Address: 13324 LOCUST
City,State,Zip: LUCERNE VALLEY, CA 92356
Region: SAN BERNARDINO
Facility ID: FA0000606
Owner: GAETA, MIGUEL
Permit Number: PT0011103
Permit Category: REGULAR UST ANNUAL INSPECTION (PER TANK)
Facility Status: INACTIVE
Expiration Date: 09/30/1990

Name: COOKY HAY FARM
Address: 13324 LOCUST
City,State,Zip: LUCERNE VALLEY, CA 92356
Region: SAN BERNARDINO
Facility ID: FA0000606
Owner: GAETA, MIGUEL
Permit Number: PT0003483
Permit Category: SPECIAL HANDLER
Facility Status: INACTIVE
Expiration Date: 09/30/1989

B4 **NONE** **HIST UST** **S108724272**
Target **12860 LOCUST AVENUE** **San Bern. Co. Permit** **N/A**
Property **LUCERNE VALLEY, CA 92356**

Site 1 of 3 in cluster B

Actual:
2864 ft.

Focus Map:
8

HIST UST:

Name:	NONE
Address:	12860 LOCUST AVENUE
City,State,Zip:	LUCERNE VALLEY, CA 92356
File Number:	00029D6B
URL:	http://geotracker.waterboards.ca.gov/ustpdfs/pdf/00029D6B.pdf
Region:	Not reported
Facility ID:	Not reported
Facility Type:	Not reported
Other Type:	Not reported
Contact Name:	Not reported
Telephone:	Not reported
Owner Name:	Not reported
Owner Address:	Not reported
Owner City,St,Zip:	Not reported
Total Tanks:	Not reported
Tank Num:	Not reported
Container Num:	Not reported
Year Installed:	Not reported
Tank Capacity:	Not reported
Tank Used for:	Not reported
Type of Fuel:	Not reported
Container Construction Thickness:	Not reported
Leak Detection:	Not reported

Click here for Geo Tracker PDF:

San Bern. Co. Permit:

Name:	JAMES PETTIGREW
Address:	12860 LOCUST AVE
City,State,Zip:	LUCERNE VALLEY, CA 92356
Region:	SAN BERNARDINO
Facility ID:	FA0000605
Owner:	PETTIGREW, JAMES
Permit Number:	PT0003507
Permit Category:	HAZMAT HANDLER, UST ONLY - PER YEAR
Facility Status:	INACTIVE
Expiration Date:	05/31/1995
Name:	JAMES PETTIGREW
Address:	12860 LOCUST AVE
City,State,Zip:	LUCERNE VALLEY, CA 92356
Region:	SAN BERNARDINO
Facility ID:	FA0000605
Owner:	PETTIGREW, JAMES
Permit Number:	PT0011130
Permit Category:	REGULAR UST ANNUAL INSPECTION (PER TANK)
Facility Status:	INACTIVE
Expiration Date:	05/31/1995
Name:	D T RANCH
Address:	12860 LOCUST

NONE (Continued) **S108724272**

City,State,Zip: LUCERNE VALLEY, CA 92356
Region: SAN BERNARDINO
Facility ID: FA0000405
Owner: PETTIGREW, DAN
Permit Number: PT0003765
Permit Category: HAZMAT HANDLER - AGRICULTURAL(FE)
Facility Status: INACTIVE
Expiration Date: 04/30/1991

B5 **AG-PETTIGREW, DAN** **UST** **U004050742**
Target Property **12860 LOCUST AVE** **N/A**
LUCERNE VALLEY, CA 92356

Site 2 of 3 in cluster B

Actual: 2864 ft.
Focus Map: 8

UST:
Name: AG-PETTIGREW, DAN
Address: 12860 LOCUST AVE
City,State,Zip: LUCERNE VALLEY, CA 92356
Facility ID: 87014299
Permitting Agency: SAN BERNARDINO COUNTY
CERSID: Not reported
Latitude: 34.49362
Longitude: -116.91065

B6 **NONE** **SWEEPS UST** **U001575172**
Target Property **12860 LOCUST AVE** **HIST UST** **N/A**
LUCERNE VALLEY, CA 92356

Site 3 of 3 in cluster B

Actual: 2864 ft.
Focus Map: 8

SWEEPS UST:
Name: PETTIGREW, DAN
Address: 12860 LOCUST AVE
City: LUCERNE VALLEY
Status: Active
Comp Number: 48097
Number: 9
Board Of Equalization: Not reported
Referral Date: 09-03-91
Action Date: 09-03-91
Created Date: 02-29-88
Owner Tank Id: #1
SWRCB Tank Id: 36-000-048097-000001
Tank Status: A
Capacity: 550
Active Date: 07-07-88
Tank Use: M.V. FUEL
STG: P
Content: LEADED
Number Of Tanks: 1

HIST UST:
Name: NONE
Address: 12860 LOCUST AVE
City,State,Zip: LUCERNE VALLEY, CA 92356

NONE (Continued) **U001575172**

File Number:	Not reported
URL:	Not reported
Region:	STATE
Facility ID:	00000048097
Facility Type:	Other
Other Type:	FARM
Contact Name:	Not reported
Telephone:	6192487930
Owner Name:	DAN PETTIGREW
Owner Address:	12860 LOCUST AVE
Owner City,St,Zip:	LUCERNE VLY, CA 92356
Total Tanks:	0001
Tank Num:	001
Container Num:	#1
Year Installed:	Not reported
Tank Capacity:	00000550
Tank Used for:	PRODUCT
Type of Fuel:	REGULAR
Container Construction Thickness:	Not reported
Leak Detection:	Visual

C7 **MB LANDSCAPING & NURSERY** **HWTS** **S124877637**
Target **12881 MIDWAY AVE** **N/A**
Property **LUCERNE VALLEY, CA 92356**

Site 1 of 2 in cluster C

Actual:
2870 ft.

Focus Map:
8

HWTS:

Name:	MB LANDSCAPING & NURSERY
Address:	12881 MIDWAY AVE
Address 2:	Not reported
City,State,Zip:	LUCERNE VALLEY, CA 923568784
EPA ID:	CAL000345067
Inactive Date:	06/30/2015
Create Date:	07/23/2009
Last Act Date:	01/27/2016
Mailing Name:	Not reported
Mailing Address:	20300 FIGUEROA ST
Mailing Address 2:	Not reported
Mailing City,State,Zip:	CARSON, CA 907451005
Owner Name:	MARIA MARTINEZ
Owner Address:	20300 FIGUEROA ST
Owner Address 2:	Not reported
Owner City,State,Zip:	CARSON, CA 907451005
Contact Name:	MARIA MARTINEZ
Contact Address:	20300 FIGUEROA ST
Contact Address 2:	Not reported
City,State,Zip:	CARSON, CA 907451005

NAICS:

EPA ID:	CAL000345067
Create Date:	2009-07-23 13:33:47.250
NAICS Code:	44422
NAICS Description:	Nursery and Garden Centers
Issued EPA ID Date:	2009-07-23 13:33:47.22000
Inactive Date:	2015-06-30 00:00:00
Facility Name:	MB LANDSCAPING & NURSERY

MB LANDSCAPING & NURSERY (Continued) **S124877637**

Facility Address:	12881 MIDWAY AVE
Facility Address 2:	Not reported
Facility City:	LUCERNE VALLEY
Facility County:	Not reported
Facility State:	CA
Facility Zip:	923568784

C8 **BOB BURNS** **HWTS** **S124759696**
Target **12881 MIDWAY** **N/A**
Property **LUCERNE VALLEY, CA 92356**

Site 2 of 2 in cluster C

Actual: **2870 ft.**
Focus Map: **8**

HWTS:

Name:	BOB BURNS
Address:	12881 MIDWAY
Address 2:	Not reported
City,State,Zip:	LUCERNE VALLEY, CA 923560000
EPA ID:	CAL000006522
Inactive Date:	01/01/1995
Create Date:	11/14/1989
Last Act Date:	06/28/2001
Mailing Name:	Not reported
Mailing Address:	12881 MIDWAY
Mailing Address 2:	Not reported
Mailing City,State,Zip:	LUCERNE VALLEY, CA 923560000
Owner Name:	BURNS BOB
Owner Address:	--
Owner Address 2:	Not reported
Owner City,State,Zip:	--, 99 --
Contact Name:	CANCEL PER SURVEY 2-1-95 LC
Contact Address:	--
Contact Address 2:	Not reported
City,State,Zip:	--, 99 --

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9 **HERT FARMS** **AST** **S108536448**
South **12332 MIDWAY** **CERS TANKS** **N/A**
< 1/8 **LUCERNE VALLEY, CA 92356** **San Bern. Co. Permit**
0.125 mi. **CERS**
658 ft.

Actual: **2874 ft.**
Focus Map: **11**

AST:

Name:	HERT FARMS
Address:	12332 MIDWAY
City/Zip:	LUCERNE VALLEY,92356
Certified Unified Program Agencies:	Not reported
Owner:	HERT, SCOTT S.
Total Gallons:	Not reported
CERSID:	10052161
Facility ID:	FA0011029
Business Name:	HERT FARMS
Phone:	(760) 953-1418
Fax:	(760) 248-2122
Mailing Address:	P.O. BOX 590
Mailing Address City:	LUCERNE VALLEY

HERT FARMS (Continued) **S108536448**

Mailing Address State:	CA
Mailing Address Zip Code:	92356
Operator Name:	Scott S. Hert
Operator Phone:	760-248-9327
Owner Phone:	(760) 248-9327
Owner Mail Address:	P.O. BOX 590
Owner State:	CA
Owner Zip Code:	92356
Owner Country:	United States
Property Owner Name:	Scott S. Hert
Property Owner Phone:	760-248-9327
Property Owner Mailing Address:	PO Box 590
Property Owner City:	Lucerne Valley
Property Owner Stat :	CA
Property Owner Zip Code:	92356
Property Owner Country:	United States
EPAID:	Not reported

CERS TANKS:

Name:	HERT FARMS
Address:	12332 MIDWAY
City,State,Zip:	LUCERNE VALLEY, CA 92356
Site ID:	36181
CERS ID:	10052161
CERS Description:	Aboveground Petroleum Storage

San Bern. Co. Permit:

Name:	HERT FARMS
Address:	12332 MIDWAY
City,State,Zip:	LUCERNE VALLEY, CA 92356
Region:	SAN BERNARDINO
Facility ID:	FA0011029
Owner:	HERT, SCOTT S.
Permit Number:	PT0019000
Permit Category:	HAZARDOUS MATERIALS 1-3 CHEMICALS SPECIAL
Facility Status:	ACTIVE
Expiration Date:	11/30/2021

Name:	HERT FARMS
Address:	12332 MIDWAY
City,State,Zip:	LUCERNE VALLEY, CA 92356
Region:	SAN BERNARDINO
Facility ID:	FA0011029
Owner:	HERT, SCOTT S.
Permit Number:	PT0025498
Permit Category:	APSA FARM/CONSTRUCTION CONDITIONALLY EXEMPT
Facility Status:	ACTIVE
Expiration Date:	11/30/2021

CERS:

Name:	HERT FARMS
Address:	12332 MIDWAY
City,State,Zip:	LUCERNE VALLEY, CA 92356
Site ID:	36181
CERS ID:	10052161
CERS Description:	Chemical Storage Facilities

HERT FARMS (Continued) **S108536448**

Evaluation:

Eval General Type:	Compliance Evaluation Inspection
Eval Date:	04-23-2015
Violations Found:	No
Eval Type:	Routine done by local agency
Eval Notes:	INSPECTION - APSA EXEMPT
Eval Division:	San Bernardino County Fire Department
Eval Program:	APSA
Eval Source:	CERS,

Eval General Type:	Compliance Evaluation Inspection
Eval Date:	05-30-2018
Violations Found:	No
Eval Type:	Routine done by local agency
Eval Notes:	Not reported
Eval Division:	San Bernardino County Fire Department
Eval Program:	APSA
Eval Source:	CERS,

Eval General Type:	Compliance Evaluation Inspection
Eval Date:	10-12-2021
Violations Found:	No
Eval Type:	Routine done by local agency
Eval Notes:	Not reported
Eval Division:	San Bernardino County Fire Department
Eval Program:	APSA
Eval Source:	CERS,

Eval General Type:	Compliance Evaluation Inspection
Eval Date:	04-23-2015
Violations Found:	No
Eval Type:	Routine done by local agency
Eval Notes:	INSPECTION - BP
Eval Division:	San Bernardino County Fire Department
Eval Program:	HMRRP
Eval Source:	CERS,

Eval General Type:	Compliance Evaluation Inspection
Eval Date:	05-30-2018
Violations Found:	No
Eval Type:	Routine done by local agency
Eval Notes:	Not reported
Eval Division:	San Bernardino County Fire Department
Eval Program:	HMRRP
Eval Source:	CERS,

Eval General Type:	Compliance Evaluation Inspection
Eval Date:	10-12-2021
Violations Found:	No
Eval Type:	Routine done by local agency
Eval Notes:	Not reported
Eval Division:	San Bernardino County Fire Department
Eval Program:	HMRRP
Eval Source:	CERS,

Affiliation:

HERT FARMS (Continued) **S108536448**

Affiliation Type Desc:	CUPA District
Entity Name:	San Bernardino County Fire
Entity Title:	Not reported
Affiliation Address:	620 South E Street
Affiliation City:	San Bernardino
Affiliation State:	CA
Affiliation Country:	Not reported
Affiliation Zip:	92415-0153
Affiliation Phone:	(909) 386-8401,

Affiliation Type Desc:	Legal Owner
Entity Name:	HERT, SCOTT S.
Entity Title:	Not reported
Affiliation Address:	P.O. BOX 590
Affiliation City:	LUCERNE VALLEY
Affiliation State:	CA
Affiliation Country:	United States
Affiliation Zip:	92356
Affiliation Phone:	(760) 248-9327,

Affiliation Type Desc:	Operator
Entity Name:	SCOTT S. HERT
Entity Title:	Not reported
Affiliation Address:	Not reported
Affiliation City:	Not reported
Affiliation State:	Not reported
Affiliation Country:	Not reported
Affiliation Zip:	Not reported
Affiliation Phone:	(760) 248-9327,

Affiliation Type Desc:	Parent Corporation
Entity Name:	HERT FARMS
Entity Title:	Not reported
Affiliation Address:	Not reported
Affiliation City:	Not reported
Affiliation State:	Not reported
Affiliation Country:	Not reported
Affiliation Zip:	Not reported
Affiliation Phone:	,

Affiliation Type Desc:	Environmental Contact
Entity Name:	SCOTT S. HERT
Entity Title:	Not reported
Affiliation Address:	PO BOX 590
Affiliation City:	LUCERNE VALLEY
Affiliation State:	CA
Affiliation Country:	Not reported
Affiliation Zip:	92356
Affiliation Phone:	,

Affiliation Type Desc:	Facility Mailing Address
Entity Name:	Mailing Address
Entity Title:	Not reported
Affiliation Address:	P.O. BOX 590
Affiliation City:	LUCERNE VALLEY
Affiliation State:	CA
Affiliation Country:	Not reported

HERT FARMS (Continued) **S108536448**

Affiliation Zip: 92356
Affiliation Phone: ,

Affiliation Type Desc: Identification Signer
Entity Name: SCOTT S. HERT
Entity Title: OWNER
Affiliation Address: Not reported
Affiliation City: Not reported
Affiliation State: Not reported
Affiliation Country: Not reported
Affiliation Zip: Not reported
Affiliation Phone: ,

Affiliation Type Desc: Property Owner
Entity Name: Scott S. Hert
Entity Title: Not reported
Affiliation Address: PO Box 590
Affiliation City: Lucerne Valley
Affiliation State: CA
Affiliation Country: United States
Affiliation Zip: 92356
Affiliation Phone: (760) 248-9327,

10
West
1/8-1/4
0.230 mi.
1216 ft.

RANCHO DEL SOL
34900 CAMBRIA
LUCERNE VALLEY, CA 92356

San Bern. Co. Permit **S108724312**
N/A

Actual:
2857 ft.

Focus Map:
7

San Bern. Co. Permit:
Name: RANCHO DEL SOL
Address: 34900 CAMBRIA
City,State,Zip: LUCERNE VALLEY, CA 92356
Region: SAN BERNARDINO
Facility ID: FA0011083
Owner: MB LANDSCAPING & NURSERY
Permit Number: PT0019112
Permit Category: HAZARDOUS MATERIALS 1-3 CHEMICALS
Facility Status: INACTIVE
Expiration Date: 11/30/2016

Name: RANCHO DEL SOL
Address: 34900 CAMBRIA
City,State,Zip: LUCERNE VALLEY, CA 92356
Region: SAN BERNARDINO
Facility ID: FA0011083
Owner: MB LANDSCAPING & NURSERY
Permit Number: PT0019111
Permit Category: CONDITIONALLY EXEMPT SM QTY GENERATOR
Facility Status: INACTIVE
Expiration Date: 11/30/2016

Count: 26 records

ORPHAN SUMMARY

City	EDR ID	Site Name	Site Address	Zip	Database(s)
LUCERNE	1024783576	SPECIALTY MINERALS INC	END OF MERIDIAN RD	92356	RCRA NonGen / NLR
LUCERNE	1024620615	SPECIALTY MINERALS INC	END OF MERIDIAN RD	92356	FINDS, ECHO
LUCERNE	S112907079	LADD & ASSOCIATES	65 MERIDIAN RD	92356	HAZNET, HWTS
LUCERNE	S113013095	SPECIALTY MINERALS	END OF MERIDIAN RD	92356	HAZNET, HWTS
LUCERNE VALLEY	S107529838		17721 MERIDIAN TRAIL/POWERLINE RD	92356	CDL
LUCERNE VALLEY	S107539930		ON LOCUST ROAD, 2.5 MILES OFF OF NORTH SIDE ROAD	92356	CDL
LUCERNE VALLEY	S106930652	PFIZER INC., LUCERNE VALLEY	END OF MERIDIAN RD	92356	SWEEPS UST
LUCERNE VALLEY	S125737303		STATE ROUTE 18 JUST WEST OF MIDWAY AVENUE	92356	CHMIRS
LUCERNE VALLEY	S100278442		I MILE WEST OF MIDWAY AVENUE	92356	CHMIRS
LUCERNE VALLEY	S110981408		HWY 247 AT MIDWAY		CHMIRS
LUCERNE VALLEY	S117455019		WEST SIDE OF MERIDIAN, 1/2 MILE NORTH OF DESERT LN.		CHMIRS
LUCERNE VALLEY	1023355556	PFIZER INC	MERIDIAN ROAD	92356	FINDS
LUCERNE VALLEY	1006249047	SPECIALTY MINERALS	MERIDIAN & SFRR	92356	EMI
LUCERNE VALLEY	S118172035	SPECIALTY MINERALS (COPY)	MERIDIAN & SFRR	92356	EMI
LUCERNE VALLEY	S113162119	WEISER FAMILY FARMS INC	35726 SHERMAN WAY	92356	HAZNET, HWTS
LUCERNE VALLEY	S113181293	VICTOR SMITH & ANNETTE KRAFT	17721 MERIDIAN TRAIL	92356	HAZNET
LUCERNE VALLEY	S123779048	1X PFIZER INC.	MERIDIAN RD.	92356	HAZNET, HWTS
LUCERNE VALLEY	S105024784	PFIZER, INC.	MERIDIAN RD	92356	HIST CORTESE
LUCERNE VALLEY	S117704336	LUCERNE ASPHALT PLANT	MERIDIAN RD	92356	NPDES, CIWQS
LUCERNE VALLEY	S121683635	TRACT 18158	N SIDE RD AND LOCUST AVE APN 0453 063 19	92356	CIWQS
LUCERNE VALLY	S106837406	PFIZER INC M	MERIDIAN & SFRR	92356	EMI
SAN BERNARDINO COUNT	S106390212		R/R TRACKS NEAR COLTON NEAREST INTERSECTION IS MERIDIAN		CHMIRS
SAN BERNARDINO COUNT	S106389350		QUAIL HOLLOW S 16 T 2N R 27E (SAN BERNARDINO MERIDIAN)		CHMIRS
SAN BERNARDINO COUNT	M300003168	VULCAN MATERIALS CO.	SAN BERNARDINO (#010)		US MINES
SAN BERNARDINO COUNT	M300003174	HOLLIDAY TRUCKING, INC.	SAN BERARDINO PIT		US MINES
SAN BERNARDINO COUNT	S127028956	TRACT MAP 18478	SAN BERNARDINO/MUSCOY		CIWQS

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

To maintain currency of the following federal and state databases, EDR contacts the appropriate governmental agency on a monthly or quarterly basis, as required.

Number of Days to Update: Provides confirmation that EDR is reporting records that have been updated within 90 days from the date the government agency made the information available to the public.

STANDARD ENVIRONMENTAL RECORDS

Lists of Federal NPL (Superfund) sites

NPL: National Priority List

National Priorities List (Superfund). The NPL is a subset of CERCLIS and identifies over 1,200 sites for priority cleanup under the Superfund Program. NPL sites may encompass relatively large areas. As such, EDR provides polygon coverage for over 1,000 NPL site boundaries produced by EPA's Environmental Photographic Interpretation Center (EPIC) and regional EPA offices.

Date of Government Version: 10/20/2021
Date Data Arrived at EDR: 11/05/2021
Date Made Active in Reports: 11/29/2021
Number of Days to Update: 24

Source: EPA
Telephone: N/A
Last EDR Contact: 01/13/2022
Next Scheduled EDR Contact: 04/11/2022
Data Release Frequency: Quarterly

NPL Site Boundaries

Sources:

EPA's Environmental Photographic Interpretation Center (EPIC)
Telephone: 202-564-7333

EPA Region 1
Telephone 617-918-1143

EPA Region 3
Telephone 215-814-5418

EPA Region 4
Telephone 404-562-8033

EPA Region 5
Telephone 312-886-6686

EPA Region 6
Telephone: 214-655-6659

EPA Region 7
Telephone: 913-551-7247

EPA Region 8
Telephone: 303-312-6774

EPA Region 9
Telephone: 415-947-4246

EPA Region 10
Telephone 206-553-8665

Proposed NPL: Proposed National Priority List Sites

A site that has been proposed for listing on the National Priorities List through the issuance of a proposed rule in the Federal Register. EPA then accepts public comments on the site, responds to the comments, and places on the NPL those sites that continue to meet the requirements for listing.

Date of Government Version: 10/20/2021
Date Data Arrived at EDR: 11/05/2021
Date Made Active in Reports: 11/29/2021
Number of Days to Update: 24

Source: EPA
Telephone: N/A
Last EDR Contact: 01/13/2022
Next Scheduled EDR Contact: 04/11/2022
Data Release Frequency: Quarterly

NPL LIENS: Federal Superfund Liens

Federal Superfund Liens. Under the authority granted the USEPA by CERCLA of 1980, the USEPA has the authority to file liens against real property in order to recover remedial action expenditures or when the property owner received notification of potential liability. USEPA compiles a listing of filed notices of Superfund Liens.

Date of Government Version: 10/15/1991
Date Data Arrived at EDR: 02/02/1994
Date Made Active in Reports: 03/30/1994
Number of Days to Update: 56

Source: EPA
Telephone: 202-564-4267
Last EDR Contact: 08/15/2011
Next Scheduled EDR Contact: 11/28/2011
Data Release Frequency: No Update Planned

Lists of Federal Delisted NPL sites

Delisted NPL: National Priority List Deletions

The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) establishes the criteria that the EPA uses to delete sites from the NPL. In accordance with 40 CFR 300.425.(e), sites may be deleted from the NPL where no further response is appropriate.

Date of Government Version: 10/20/2021
Date Data Arrived at EDR: 11/05/2021
Date Made Active in Reports: 11/29/2021
Number of Days to Update: 24

Source: EPA
Telephone: N/A
Last EDR Contact: 01/13/2022
Next Scheduled EDR Contact: 04/11/2022
Data Release Frequency: Quarterly

Lists of Federal sites subject to CERCLA removals and CERCLA orders

FEDERAL FACILITY: Federal Facility Site Information listing

A listing of National Priority List (NPL) and Base Realignment and Closure (BRAC) sites found in the Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) Database where EPA Federal Facilities Restoration and Reuse Office is involved in cleanup activities.

Date of Government Version: 05/25/2021
Date Data Arrived at EDR: 06/24/2021
Date Made Active in Reports: 09/20/2021
Number of Days to Update: 88

Source: Environmental Protection Agency
Telephone: 703-603-8704
Last EDR Contact: 12/29/2021
Next Scheduled EDR Contact: 04/11/2022
Data Release Frequency: Varies

SEMS: Superfund Enterprise Management System

SEMS (Superfund Enterprise Management System) tracks hazardous waste sites, potentially hazardous waste sites, and remedial activities performed in support of EPA's Superfund Program across the United States. The list was formerly know as CERCLIS, renamed to SEMS by the EPA in 2015. The list contains data on potentially hazardous waste sites that have been reported to the USEPA by states, municipalities, private companies and private persons, pursuant to Section 103 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). This dataset also contains sites which are either proposed to or on the National Priorities List (NPL) and the sites which are in the screening and assessment phase for possible inclusion on the NPL.

Date of Government Version: 10/20/2021
Date Data Arrived at EDR: 11/05/2021
Date Made Active in Reports: 11/29/2021
Number of Days to Update: 24

Source: EPA
Telephone: 800-424-9346
Last EDR Contact: 01/13/2022
Next Scheduled EDR Contact: 04/25/2022
Data Release Frequency: Quarterly

Lists of Federal CERCLA sites with NFRAP

SEMS-ARCHIVE: Superfund Enterprise Management System Archive

SEMS-ARCHIVE (Superfund Enterprise Management System Archive) tracks sites that have no further interest under the Federal Superfund Program based on available information. The list was formerly known as the CERCLIS-NFRAP, renamed to SEMS ARCHIVE by the EPA in 2015. EPA may perform a minimal level of assessment work at a site while it is archived if site conditions change and/or new information becomes available. Archived sites have been removed and archived from the inventory of SEMS sites. Archived status indicates that, to the best of EPA's knowledge, assessment at a site has been completed and that EPA has determined no further steps will be taken to list the site on the National Priorities List (NPL), unless information indicates this decision was not appropriate or other considerations require a recommendation for listing at a later time. The decision does not necessarily mean that there is no hazard associated with a given site; it only means that. based upon available information, the location is not judged to be potential NPL site.

Date of Government Version: 10/20/2021
Date Data Arrived at EDR: 11/05/2021
Date Made Active in Reports: 11/29/2021
Number of Days to Update: 24

Source: EPA
Telephone: 800-424-9346
Last EDR Contact: 01/13/2022
Next Scheduled EDR Contact: 04/25/2022
Data Release Frequency: Quarterly

Lists of Federal RCRA facilities undergoing Corrective Action

CORRACTS: Corrective Action Report

CORRACTS identifies hazardous waste handlers with RCRA corrective action activity.

Date of Government Version: 09/13/2021
Date Data Arrived at EDR: 09/15/2021
Date Made Active in Reports: 10/12/2021
Number of Days to Update: 27

Source: EPA
Telephone: 800-424-9346
Last EDR Contact: 12/17/2021
Next Scheduled EDR Contact: 04/04/2022
Data Release Frequency: Quarterly

Lists of Federal RCRA TSD facilities

RCRA-TSDF: RCRA - Treatment, Storage and Disposal

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Transporters are individuals or entities that move hazardous waste from the generator offsite to a facility that can recycle, treat, store, or dispose of the waste. TSDFs treat, store, or dispose of the waste.

Date of Government Version: 09/13/2021
Date Data Arrived at EDR: 09/15/2021
Date Made Active in Reports: 10/12/2021
Number of Days to Update: 27

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 12/17/2021
Next Scheduled EDR Contact: 04/04/2022
Data Release Frequency: Quarterly

Lists of Federal RCRA generators

RCRA-LQG: RCRA - Large Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Large quantity generators (LQGs) generate over 1,000 kilograms (kg) of hazardous waste, or over 1 kg of acutely hazardous waste per month.

Date of Government Version: 09/13/2021
Date Data Arrived at EDR: 09/15/2021
Date Made Active in Reports: 10/12/2021
Number of Days to Update: 27

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 12/17/2021
Next Scheduled EDR Contact: 04/04/2022
Data Release Frequency: Quarterly

RCRA-SQG: RCRA - Small Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Small quantity generators (SQGs) generate between 100 kg and 1,000 kg of hazardous waste per month.

Date of Government Version: 09/13/2021
Date Data Arrived at EDR: 09/15/2021
Date Made Active in Reports: 10/12/2021
Number of Days to Update: 27

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 12/17/2021
Next Scheduled EDR Contact: 04/04/2022
Data Release Frequency: Quarterly

RCRA-VSQG: RCRA - Very Small Quantity Generators (Formerly Conditionally Exempt Small Quantity Generators)

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Very small quantity generators (VSQGs) generate less than 100 kg of hazardous waste, or less than 1 kg of acutely hazardous waste per month.

Date of Government Version: 09/13/2021
Date Data Arrived at EDR: 09/15/2021
Date Made Active in Reports: 10/12/2021
Number of Days to Update: 27

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 12/17/2021
Next Scheduled EDR Contact: 04/04/2022
Data Release Frequency: Quarterly

Federal institutional controls / engineering controls registries

LUCIS: Land Use Control Information System

LUCIS contains records of land use control information pertaining to the former Navy Base Realignment and Closure properties.

Date of Government Version: 07/12/2021
Date Data Arrived at EDR: 08/06/2021
Date Made Active in Reports: 10/22/2021
Number of Days to Update: 77

Source: Department of the Navy
Telephone: 843-820-7326
Last EDR Contact: 11/08/2021
Next Scheduled EDR Contact: 02/21/2022
Data Release Frequency: Varies

US ENG CONTROLS: Engineering Controls Sites List

A listing of sites with engineering controls in place. Engineering controls include various forms of caps, building foundations, liners, and treatment methods to create pathway elimination for regulated substances to enter environmental media or effect human health.

Date of Government Version: 08/23/2021
Date Data Arrived at EDR: 08/23/2021
Date Made Active in Reports: 11/12/2021
Number of Days to Update: 81

Source: Environmental Protection Agency
Telephone: 703-603-0695
Last EDR Contact: 11/18/2021
Next Scheduled EDR Contact: 03/06/2022
Data Release Frequency: Varies

US INST CONTROLS: Institutional Controls Sites List

A listing of sites with institutional controls in place. Institutional controls include administrative measures, such as groundwater use restrictions, construction restrictions, property use restrictions, and post remediation care requirements intended to prevent exposure to contaminants remaining on site. Deed restrictions are generally required as part of the institutional controls.

Date of Government Version: 08/23/2021
Date Data Arrived at EDR: 08/23/2021
Date Made Active in Reports: 11/12/2021
Number of Days to Update: 81

Source: Environmental Protection Agency
Telephone: 703-603-0695
Last EDR Contact: 11/19/2021
Next Scheduled EDR Contact: 03/07/2022
Data Release Frequency: Varies

Federal ERNS list

ERNS: Emergency Response Notification System

Emergency Response Notification System. ERNS records and stores information on reported releases of oil and hazardous substances.

Date of Government Version: 09/13/2021
Date Data Arrived at EDR: 09/21/2021
Date Made Active in Reports: 12/15/2021
Number of Days to Update: 85

Source: National Response Center, United States Coast Guard
Telephone: 202-267-2180
Last EDR Contact: 12/16/2021
Next Scheduled EDR Contact: 04/04/2022
Data Release Frequency: Quarterly

Lists of state- and tribal (Superfund) equivalent sites

RESPONSE: State Response Sites

Identifies confirmed release sites where DTSC is involved in remediation, either in a lead or oversight capacity. These confirmed release sites are generally high-priority and high potential risk.

Date of Government Version: 10/25/2021
Date Data Arrived at EDR: 10/26/2021
Date Made Active in Reports: 01/14/2022
Number of Days to Update: 80

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 10/26/2021
Next Scheduled EDR Contact: 02/07/2022
Data Release Frequency: Quarterly

Lists of state- and tribal hazardous waste facilities

ENVIROSTOR: EnviroStor Database

The Department of Toxic Substances Control's (DTSC's) Site Mitigation and Brownfields Reuse Program's (SMBRP's) EnviroStor database identifes sites that have known contamination or sites for which there may be reasons to investigate further. The database includes the following site types: Federal Superfund sites (National Priorities List (NPL)); State Response, including Military Facilities and State Superfund; Voluntary Cleanup; and School sites. EnviroStor provides similar information to the information that was available in CalSites, and provides additional site information, including, but not limited to, identification of formerly-contaminated properties that have been released for reuse, properties where environmental deed restrictions have been recorded to prevent inappropriate land uses, and risk characterization information that is used to assess potential impacts to public health and the environment at contaminated sites.

Date of Government Version: 10/25/2021
Date Data Arrived at EDR: 10/26/2021
Date Made Active in Reports: 01/14/2022
Number of Days to Update: 80

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 10/26/2021
Next Scheduled EDR Contact: 02/07/2022
Data Release Frequency: Quarterly

Lists of state and tribal landfills and solid waste disposal facilities

SWF/LF (SWIS): Solid Waste Information System

Active, Closed and Inactive Landfills. SWF/LF records typically contain an inve ntory of solid waste disposal facilities or landfills. These may be active or i nactive facilities or open dumps that failed to meet RCRA Section 4004 criteria for solid waste landfills or disposal sites.

Date of Government Version: 08/09/2021
Date Data Arrived at EDR: 08/10/2021
Date Made Active in Reports: 11/05/2021
Number of Days to Update: 87

Source: Department of Resources Recycling and Recovery
Telephone: 916-341-6320
Last EDR Contact: 11/09/2021
Next Scheduled EDR Contact: 02/21/2022
Data Release Frequency: Quarterly

Lists of state and tribal leaking storage tanks

LUST REG 5: Leaking Underground Storage Tank Database

Leaking Underground Storage Tank locations. Alameda, Alpine, Amador, Butte, Colusa, Contra Costa, Calveras, El Dorado, Fresno, Glenn, Kern, Kings, Lake, Lassen, Madera, Mariposa, Merced, Modoc, Napa, Nevada, Placer, Plumas, Sacramento, San Joaquin, Shasta, Solano, Stanislaus, Sutter, Tehama, Tulare, Tuolumne, Yolo, Yuba counties.

Date of Government Version: 07/01/2008
Date Data Arrived at EDR: 07/22/2008
Date Made Active in Reports: 07/31/2008
Number of Days to Update: 9

Source: California Regional Water Quality Control Board Central Valley Region (5)
Telephone: 916-464-4834
Last EDR Contact: 07/01/2011
Next Scheduled EDR Contact: 10/17/2011
Data Release Frequency: No Update Planned

LUST REG 6L: Leaking Underground Storage Tank Case Listing

For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 09/09/2003
Date Data Arrived at EDR: 09/10/2003
Date Made Active in Reports: 10/07/2003
Number of Days to Update: 27

Source: California Regional Water Quality Control Board Lahontan Region (6)
Telephone: 530-542-5572
Last EDR Contact: 09/12/2011
Next Scheduled EDR Contact: 12/26/2011
Data Release Frequency: No Update Planned

LUST REG 4: Underground Storage Tank Leak List

Los Angeles, Ventura counties. For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 09/07/2004
Date Data Arrived at EDR: 09/07/2004
Date Made Active in Reports: 10/12/2004
Number of Days to Update: 35

Source: California Regional Water Quality Control Board Los Angeles Region (4)
Telephone: 213-576-6710
Last EDR Contact: 09/06/2011
Next Scheduled EDR Contact: 12/19/2011
Data Release Frequency: No Update Planned

LUST REG 3: Leaking Underground Storage Tank Database

Leaking Underground Storage Tank locations. Monterey, San Benito, San Luis Obispo, Santa Barbara, Santa Cruz counties.

Date of Government Version: 05/19/2003
Date Data Arrived at EDR: 05/19/2003
Date Made Active in Reports: 06/02/2003
Number of Days to Update: 14

Source: California Regional Water Quality Control Board Central Coast Region (3)
Telephone: 805-542-4786
Last EDR Contact: 07/18/2011
Next Scheduled EDR Contact: 10/31/2011
Data Release Frequency: No Update Planned

LUST REG 2: Fuel Leak List

Leaking Underground Storage Tank locations. Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, Sonoma counties.

Date of Government Version: 09/30/2004
Date Data Arrived at EDR: 10/20/2004
Date Made Active in Reports: 11/19/2004
Number of Days to Update: 30

Source: California Regional Water Quality Control Board San Francisco Bay Region (2)
Telephone: 510-622-2433
Last EDR Contact: 09/19/2011
Next Scheduled EDR Contact: 01/02/2012
Data Release Frequency: No Update Planned

LUST REG 7: Leaking Underground Storage Tank Case Listing

Leaking Underground Storage Tank locations. Imperial, Riverside, San Diego, Santa Barbara counties.

Date of Government Version: 02/26/2004
Date Data Arrived at EDR: 02/26/2004
Date Made Active in Reports: 03/24/2004
Number of Days to Update: 27

Source: California Regional Water Quality Control Board Colorado River Basin Region (7)
Telephone: 760-776-8943
Last EDR Contact: 08/01/2011
Next Scheduled EDR Contact: 11/14/2011
Data Release Frequency: No Update Planned

LUST REG 1: Active Toxic Site Investigation

Del Norte, Humboldt, Lake, Mendocino, Modoc, Siskiyou, Sonoma, Trinity counties. For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 02/01/2001
Date Data Arrived at EDR: 02/28/2001
Date Made Active in Reports: 03/29/2001
Number of Days to Update: 29

Source: California Regional Water Quality Control Board North Coast (1)
Telephone: 707-570-3769
Last EDR Contact: 08/01/2011
Next Scheduled EDR Contact: 11/14/2011
Data Release Frequency: No Update Planned

LUST: Leaking Underground Fuel Tank Report (GEOTRACKER)

Leaking Underground Storage Tank (LUST) Sites included in GeoTracker. GeoTracker is the Water Boards data management system for sites that impact, or have the potential to impact, water quality in California, with emphasis on groundwater.

Date of Government Version: 09/07/2021
Date Data Arrived at EDR: 09/07/2021
Date Made Active in Reports: 11/29/2021
Number of Days to Update: 83

Source: State Water Resources Control Board
Telephone: see region list
Last EDR Contact: 12/07/2021
Next Scheduled EDR Contact: 03/21/2022
Data Release Frequency: Quarterly

LUST REG 9: Leaking Underground Storage Tank Report

Orange, Riverside, San Diego counties. For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 03/01/2001
Date Data Arrived at EDR: 04/23/2001
Date Made Active in Reports: 05/21/2001
Number of Days to Update: 28

Source: California Regional Water Quality Control Board San Diego Region (9)
Telephone: 858-637-5595
Last EDR Contact: 09/26/2011
Next Scheduled EDR Contact: 01/09/2012
Data Release Frequency: No Update Planned

LUST REG 8: Leaking Underground Storage Tanks

California Regional Water Quality Control Board Santa Ana Region (8). For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 02/14/2005
Date Data Arrived at EDR: 02/15/2005
Date Made Active in Reports: 03/28/2005
Number of Days to Update: 41

Source: California Regional Water Quality Control Board Santa Ana Region (8)
Telephone: 909-782-4496
Last EDR Contact: 08/15/2011
Next Scheduled EDR Contact: 11/28/2011
Data Release Frequency: No Update Planned

LUST REG 6V: Leaking Underground Storage Tank Case Listing

Leaking Underground Storage Tank locations. Inyo, Kern, Los Angeles, Mono, San Bernardino counties.

Date of Government Version: 06/07/2005
Date Data Arrived at EDR: 06/07/2005
Date Made Active in Reports: 06/29/2005
Number of Days to Update: 22

Source: California Regional Water Quality Control Board Victorville Branch Office (6)
Telephone: 760-241-7365
Last EDR Contact: 09/12/2011
Next Scheduled EDR Contact: 12/26/2011
Data Release Frequency: No Update Planned

INDIAN LUST R5: Leaking Underground Storage Tanks on Indian Land

Leaking underground storage tanks located on Indian Land in Michigan, Minnesota and Wisconsin.

Date of Government Version: 04/06/2021
Date Data Arrived at EDR: 06/11/2021
Date Made Active in Reports: 09/07/2021
Number of Days to Update: 88

Source: EPA, Region 5
Telephone: 312-886-7439
Last EDR Contact: 01/18/2022
Next Scheduled EDR Contact: 05/02/2022
Data Release Frequency: Varies

INDIAN LUST R10: Leaking Underground Storage Tanks on Indian Land

LUSTs on Indian land in Alaska, Idaho, Oregon and Washington.

Date of Government Version: 04/27/2021
Date Data Arrived at EDR: 06/11/2021
Date Made Active in Reports: 09/07/2021
Number of Days to Update: 88

Source: EPA Region 10
Telephone: 206-553-2857
Last EDR Contact: 01/18/2022
Next Scheduled EDR Contact: 05/02/2022
Data Release Frequency: Varies

INDIAN LUST R9: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Arizona, California, New Mexico and Nevada

Date of Government Version: 05/27/2021
Date Data Arrived at EDR: 06/11/2021
Date Made Active in Reports: 09/07/2021
Number of Days to Update: 88

Source: Environmental Protection Agency
Telephone: 415-972-3372
Last EDR Contact: 01/18/2022
Next Scheduled EDR Contact: 05/02/2022
Data Release Frequency: Varies

INDIAN LUST R8: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Colorado, Montana, North Dakota, South Dakota, Utah and Wyoming.

Date of Government Version: 05/27/2021
Date Data Arrived at EDR: 06/11/2021
Date Made Active in Reports: 09/07/2021
Number of Days to Update: 88

Source: EPA Region 8
Telephone: 303-312-6271
Last EDR Contact: 01/18/2022
Next Scheduled EDR Contact: 05/02/2022
Data Release Frequency: Varies

INDIAN LUST R7: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Iowa, Kansas, and Nebraska

Date of Government Version: 06/01/2021
Date Data Arrived at EDR: 06/11/2021
Date Made Active in Reports: 09/07/2021
Number of Days to Update: 88

Source: EPA Region 7
Telephone: 913-551-7003
Last EDR Contact: 01/18/2022
Next Scheduled EDR Contact: 05/02/2022
Data Release Frequency: Varies

INDIAN LUST R1: Leaking Underground Storage Tanks on Indian Land
A listing of leaking underground storage tank locations on Indian Land.

Date of Government Version: 04/28/2021
Date Data Arrived at EDR: 06/11/2021
Date Made Active in Reports: 09/07/2021
Number of Days to Update: 88

Source: EPA Region 1
Telephone: 617-918-1313
Last EDR Contact: 01/18/2022
Next Scheduled EDR Contact: 05/02/2022
Data Release Frequency: Varies

INDIAN LUST R6: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in New Mexico and Oklahoma.

Date of Government Version: 05/17/2021
Date Data Arrived at EDR: 06/11/2021
Date Made Active in Reports: 09/07/2021
Number of Days to Update: 88

Source: EPA Region 6
Telephone: 214-665-6597
Last EDR Contact: 01/18/2022
Next Scheduled EDR Contact: 05/02/2022
Data Release Frequency: Varies

INDIAN LUST R4: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Florida, Mississippi and North Carolina.

Date of Government Version: 05/28/2021
Date Data Arrived at EDR: 06/22/2021
Date Made Active in Reports: 09/20/2021
Number of Days to Update: 90

Source: EPA Region 4
Telephone: 404-562-8677
Last EDR Contact: 01/18/2022
Next Scheduled EDR Contact: 05/02/2022
Data Release Frequency: Varies

CPS-SLIC: Statewide SLIC Cases (GEOTRACKER)
Cleanup Program Sites (CPS; also known as Site Cleanups [SC] and formerly known as Spills, Leaks, Investigations, and Cleanups [SLIC] sites) included in GeoTracker. GeoTracker is the Water Boards data management system for sites that impact, or have the potential to impact, water quality in California, with emphasis on groundwater.

Date of Government Version: 09/07/2021
Date Data Arrived at EDR: 09/07/2021
Date Made Active in Reports: 11/29/2021
Number of Days to Update: 83

Source: State Water Resources Control Board
Telephone: 866-480-1028
Last EDR Contact: 12/07/2021
Next Scheduled EDR Contact: 03/21/2022
Data Release Frequency: Varies

SLIC REG 1: Active Toxic Site Investigations

The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 04/03/2003
Date Data Arrived at EDR: 04/07/2003
Date Made Active in Reports: 04/25/2003
Number of Days to Update: 18

Source: California Regional Water Quality Control Board, North Coast Region (1)
Telephone: 707-576-2220
Last EDR Contact: 08/01/2011
Next Scheduled EDR Contact: 11/14/2011
Data Release Frequency: No Update Planned

SLIC REG 2: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing

The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 09/30/2004
Date Data Arrived at EDR: 10/20/2004
Date Made Active in Reports: 11/19/2004
Number of Days to Update: 30

Source: Regional Water Quality Control Board San Francisco Bay Region (2)
Telephone: 510-286-0457
Last EDR Contact: 09/19/2011
Next Scheduled EDR Contact: 01/02/2012
Data Release Frequency: No Update Planned

SLIC REG 3: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing

The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 05/18/2006
Date Data Arrived at EDR: 05/18/2006
Date Made Active in Reports: 06/15/2006
Number of Days to Update: 28

Source: California Regional Water Quality Control Board Central Coast Region (3)
Telephone: 805-549-3147
Last EDR Contact: 07/18/2011
Next Scheduled EDR Contact: 10/31/2011
Data Release Frequency: No Update Planned

SLIC REG 4: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing

The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 11/17/2004
Date Data Arrived at EDR: 11/18/2004
Date Made Active in Reports: 01/04/2005
Number of Days to Update: 47

Source: Region Water Quality Control Board Los Angeles Region (4)
Telephone: 213-576-6600
Last EDR Contact: 07/01/2011
Next Scheduled EDR Contact: 10/17/2011
Data Release Frequency: No Update Planned

SLIC REG 5: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing

The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 04/01/2005
Date Data Arrived at EDR: 04/05/2005
Date Made Active in Reports: 04/21/2005
Number of Days to Update: 16

Source: Regional Water Quality Control Board Central Valley Region (5)
Telephone: 916-464-3291
Last EDR Contact: 09/12/2011
Next Scheduled EDR Contact: 12/26/2011
Data Release Frequency: No Update Planned

SLIC REG 6V: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing

The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 05/24/2005
Date Data Arrived at EDR: 05/25/2005
Date Made Active in Reports: 06/16/2005
Number of Days to Update: 22

Source: Regional Water Quality Control Board, Victorville Branch
Telephone: 619-241-6583
Last EDR Contact: 08/15/2011
Next Scheduled EDR Contact: 11/28/2011
Data Release Frequency: No Update Planned

SLIC REG 6L: SLIC Sites
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 09/07/2004
Date Data Arrived at EDR: 09/07/2004
Date Made Active in Reports: 10/12/2004
Number of Days to Update: 35
Source: California Regional Water Quality Control Board, Lahontan Region
Telephone: 530-542-5574
Last EDR Contact: 08/15/2011
Next Scheduled EDR Contact: 11/28/2011
Data Release Frequency: No Update Planned

SLIC REG 7: SLIC List
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 11/24/2004
Date Data Arrived at EDR: 11/29/2004
Date Made Active in Reports: 01/04/2005
Number of Days to Update: 36
Source: California Regional Quality Control Board, Colorado River Basin Region
Telephone: 760-346-7491
Last EDR Contact: 08/01/2011
Next Scheduled EDR Contact: 11/14/2011
Data Release Frequency: No Update Planned

SLIC REG 8: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 04/03/2008
Date Data Arrived at EDR: 04/03/2008
Date Made Active in Reports: 04/14/2008
Number of Days to Update: 11
Source: California Region Water Quality Control Board Santa Ana Region (8)
Telephone: 951-782-3298
Last EDR Contact: 09/12/2011
Next Scheduled EDR Contact: 12/26/2011
Data Release Frequency: No Update Planned

SLIC REG 9: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 09/10/2007
Date Data Arrived at EDR: 09/11/2007
Date Made Active in Reports: 09/28/2007
Number of Days to Update: 17
Source: California Regional Water Quality Control Board San Diego Region (9)
Telephone: 858-467-2980
Last EDR Contact: 08/08/2011
Next Scheduled EDR Contact: 11/21/2011
Data Release Frequency: No Update Planned

Lists of state and tribal registered storage tanks

FEMA UST: Underground Storage Tank Listing
A listing of all FEMA owned underground storage tanks.

Date of Government Version: 01/29/2021
Date Data Arrived at EDR: 02/17/2021
Date Made Active in Reports: 03/22/2021
Number of Days to Update: 33
Source: FEMA
Telephone: 202-646-5797
Last EDR Contact: 12/18/2021
Next Scheduled EDR Contact: 04/18/2022
Data Release Frequency: Varies

MILITARY UST SITES: Military UST Sites (GEOTRACKER)
Military ust sites

Date of Government Version: 09/07/2021
Date Data Arrived at EDR: 09/07/2021
Date Made Active in Reports: 11/29/2021
Number of Days to Update: 83
Source: State Water Resources Control Board
Telephone: 866-480-1028
Last EDR Contact: 12/07/2021
Next Scheduled EDR Contact: 03/21/2022
Data Release Frequency: Varies

UST CLOSURE: Proposed Closure of Underground Storage Tank (UST) Cases

UST cases that are being considered for closure by either the State Water Resources Control Board or the Executive Director have been posted for a 60-day public comment period. UST Case Closures being proposed for consideration by the State Water Resources Control Board. These are primarily UST cases that meet closure criteria under the decisional framework in State Water Board Resolution No. 92-49 and other Board orders. UST Case Closures proposed for consideration by the Executive Director pursuant to State Water Board Resolution No. 2012-0061. These are cases that meet the criteria of the Low-Threat UST Case Closure Policy. UST Case Closure Review Denials and Approved Orders.

Date of Government Version: 08/18/2021
Date Data Arrived at EDR: 09/08/2021
Date Made Active in Reports: 12/03/2021
Number of Days to Update: 86

Source: State Water Resources Control Board
Telephone: 916-327-7844
Last EDR Contact: 12/07/2021
Next Scheduled EDR Contact: 03/21/2022
Data Release Frequency: Varies

UST: Active UST Facilities

Active UST facilities gathered from the local regulatory agencies

Date of Government Version: 09/07/2021
Date Data Arrived at EDR: 09/07/2021
Date Made Active in Reports: 11/30/2021
Number of Days to Update: 84

Source: SWRCB
Telephone: 916-341-5851
Last EDR Contact: 12/07/2021
Next Scheduled EDR Contact: 03/21/2022
Data Release Frequency: Semi-Annually

AST: Aboveground Petroleum Storage Tank Facilities

A listing of aboveground storage tank petroleum storage tank locations.

Date of Government Version: 07/06/2016
Date Data Arrived at EDR: 07/12/2016
Date Made Active in Reports: 09/19/2016
Number of Days to Update: 69

Source: California Environmental Protection Agency
Telephone: 916-327-5092
Last EDR Contact: 12/08/2021
Next Scheduled EDR Contact: 03/28/2022
Data Release Frequency: Varies

INDIAN UST R9: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 9 (Arizona, California, Hawaii, Nevada, the Pacific Islands, and Tribal Nations).

Date of Government Version: 05/27/2021
Date Data Arrived at EDR: 06/11/2021
Date Made Active in Reports: 09/07/2021
Number of Days to Update: 88

Source: EPA Region 9
Telephone: 415-972-3368
Last EDR Contact: 01/18/2022
Next Scheduled EDR Contact: 05/02/2022
Data Release Frequency: Varies

INDIAN UST R8: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 8 (Colorado, Montana, North Dakota, South Dakota, Utah, Wyoming and 27 Tribal Nations).

Date of Government Version: 05/27/2021
Date Data Arrived at EDR: 06/11/2021
Date Made Active in Reports: 09/07/2021
Number of Days to Update: 88

Source: EPA Region 8
Telephone: 303-312-6137
Last EDR Contact: 01/18/2022
Next Scheduled EDR Contact: 05/02/2022
Data Release Frequency: Varies

INDIAN UST R7: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 7 (Iowa, Kansas, Missouri, Nebraska, and 9 Tribal Nations).

Date of Government Version: 06/01/2021
Date Data Arrived at EDR: 06/11/2021
Date Made Active in Reports: 09/07/2021
Number of Days to Update: 88

Source: EPA Region 7
Telephone: 913-551-7003
Last EDR Contact: 01/18/2022
Next Scheduled EDR Contact: 05/02/2022
Data Release Frequency: Varies

INDIAN UST R5: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 5 (Michigan, Minnesota and Wisconsin and Tribal Nations).

Date of Government Version: 04/06/2021
Date Data Arrived at EDR: 06/11/2021
Date Made Active in Reports: 09/07/2021
Number of Days to Update: 88

Source: EPA Region 5
Telephone: 312-886-6136
Last EDR Contact: 01/18/2022
Next Scheduled EDR Contact: 05/02/2022
Data Release Frequency: Varies

INDIAN UST R10: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 10 (Alaska, Idaho, Oregon, Washington, and Tribal Nations).

Date of Government Version: 04/27/2021
Date Data Arrived at EDR: 06/11/2021
Date Made Active in Reports: 09/07/2021
Number of Days to Update: 88

Source: EPA Region 10
Telephone: 206-553-2857
Last EDR Contact: 01/18/2022
Next Scheduled EDR Contact: 05/02/2022
Data Release Frequency: Varies

INDIAN UST R1: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 1 (Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont and ten Tribal Nations).

Date of Government Version: 04/28/2021
Date Data Arrived at EDR: 06/11/2021
Date Made Active in Reports: 09/07/2021
Number of Days to Update: 88

Source: EPA, Region 1
Telephone: 617-918-1313
Last EDR Contact: 01/18/2022
Next Scheduled EDR Contact: 05/02/2022
Data Release Frequency: Varies

INDIAN UST R4: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 4 (Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee and Tribal Nations)

Date of Government Version: 05/28/2021
Date Data Arrived at EDR: 06/22/2021
Date Made Active in Reports: 09/20/2021
Number of Days to Update: 90

Source: EPA Region 4
Telephone: 404-562-9424
Last EDR Contact: 01/18/2022
Next Scheduled EDR Contact: 05/02/2022
Data Release Frequency: Varies

INDIAN UST R6: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 6 (Louisiana, Arkansas, Oklahoma, New Mexico, Texas and 65 Tribes).

Date of Government Version: 05/17/2021
Date Data Arrived at EDR: 06/11/2021
Date Made Active in Reports: 09/07/2021
Number of Days to Update: 88

Source: EPA Region 6
Telephone: 214-665-7591
Last EDR Contact: 01/18/2022
Next Scheduled EDR Contact: 05/02/2022
Data Release Frequency: Varies

Lists of state and tribal voluntary cleanup sites

VCP: Voluntary Cleanup Program Properties

Contains low threat level properties with either confirmed or unconfirmed releases and the project proponents have request that DTSC oversee investigation and/or cleanup activities and have agreed to provide coverage for DTSC's costs.

Date of Government Version: 10/25/2021
Date Data Arrived at EDR: 10/26/2021
Date Made Active in Reports: 01/14/2022
Number of Days to Update: 80

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 10/26/2021
Next Scheduled EDR Contact: 02/07/2022
Data Release Frequency: Quarterly

INDIAN VCP R7: Voluntary Cleanup Priority Lisitng
A listing of voluntary cleanup priority sites located on Indian Land located in Region 7.

Date of Government Version: 03/20/2008
Date Data Arrived at EDR: 04/22/2008
Date Made Active in Reports: 05/19/2008
Number of Days to Update: 27

Source: EPA, Region 7
Telephone: 913-551-7365
Last EDR Contact: 07/08/2021
Next Scheduled EDR Contact: 07/20/2009
Data Release Frequency: Varies

INDIAN VCP R1: Voluntary Cleanup Priority Listing
A listing of voluntary cleanup priority sites located on Indian Land located in Region 1.

Date of Government Version: 07/27/2015
Date Data Arrived at EDR: 09/29/2015
Date Made Active in Reports: 02/18/2016
Number of Days to Update: 142

Source: EPA, Region 1
Telephone: 617-918-1102
Last EDR Contact: 12/14/2021
Next Scheduled EDR Contact: 04/04/2022
Data Release Frequency: Varies

Lists of state and tribal brownfield sites

BROWNFIELDS: Considered Brownfieds Sites Listing
A listing of sites the SWRCB considers to be Brownfields since these are sites have come to them through the MOA Process.

Date of Government Version: 09/20/2021
Date Data Arrived at EDR: 09/21/2021
Date Made Active in Reports: 12/08/2021
Number of Days to Update: 78

Source: State Water Resources Control Board
Telephone: 916-323-7905
Last EDR Contact: 12/16/2021
Next Scheduled EDR Contact: 04/04/2022
Data Release Frequency: Quarterly

ADDITIONAL ENVIRONMENTAL RECORDS

Local Brownfield lists

US BROWNFIELDS: A Listing of Brownfields Sites
Brownfields are real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant. Cleaning up and reinvesting in these properties takes development pressures off of undeveloped, open land, and both improves and protects the environment. Assessment, Cleanup and Redevelopment Exchange System (ACRES) stores information reported by EPA Brownfields grant recipients on brownfields properties assessed or cleaned up with grant funding as well as information on Targeted Brownfields Assessments performed by EPA Regions. A listing of ACRES Brownfield sites is obtained from Cleanups in My Community. Cleanups in My Community provides information on Brownfields properties for which information is reported back to EPA, as well as areas served by Brownfields grant programs.

Date of Government Version: 06/10/2021
Date Data Arrived at EDR: 06/10/2021
Date Made Active in Reports: 08/17/2021
Number of Days to Update: 68

Source: Environmental Protection Agency
Telephone: 202-566-2777
Last EDR Contact: 12/08/2021
Next Scheduled EDR Contact: 03/28/2022
Data Release Frequency: Semi-Annually

Local Lists of Landfill / Solid Waste Disposal Sites

WMUDS/SWAT: Waste Management Unit Database
Waste Management Unit Database System. WMUDS is used by the State Water Resources Control Board staff and the Regional Water Quality Control Boards for program tracking and inventory of waste management units. WMUDS is composed of the following databases: Facility Information, Scheduled Inspections Information, Waste Management Unit Information, SWAT Program Information, SWAT Report Summary Information, SWAT Report Summary Data, Chapter 15 (formerly Subchapter 15) Information, Chapter 15 Monitoring Parameters, TPCA Program Information, RCRA Program Information, Closure Information, and Interested Parties Information.

Date of Government Version: 04/01/2000
Date Data Arrived at EDR: 04/10/2000
Date Made Active in Reports: 05/10/2000
Number of Days to Update: 30

Source: State Water Resources Control Board
Telephone: 916-227-4448
Last EDR Contact: 10/22/2021
Next Scheduled EDR Contact: 02/07/2022
Data Release Frequency: No Update Planned

SWRCY: Recycler Database
A listing of recycling facilities in California.

Date of Government Version: 09/07/2021
Date Data Arrived at EDR: 09/08/2021
Date Made Active in Reports: 11/29/2021
Number of Days to Update: 82

Source: Department of Conservation
Telephone: 916-323-3836
Last EDR Contact: 12/07/2021
Next Scheduled EDR Contact: 03/21/2022
Data Release Frequency: Quarterly

HAULERS: Registered Waste Tire Haulers Listing
A listing of registered waste tire haulers.

Date of Government Version: 09/14/2021
Date Data Arrived at EDR: 11/11/2021
Date Made Active in Reports: 11/23/2021
Number of Days to Update: 12

Source: Integrated Waste Management Board
Telephone: 916-341-6422
Last EDR Contact: 11/05/2021
Next Scheduled EDR Contact: 02/21/2022
Data Release Frequency: Varies

INDIAN ODI: Report on the Status of Open Dumps on Indian Lands
Location of open dumps on Indian land.

Date of Government Version: 12/31/1998
Date Data Arrived at EDR: 12/03/2007
Date Made Active in Reports: 01/24/2008
Number of Days to Update: 52

Source: Environmental Protection Agency
Telephone: 703-308-8245
Last EDR Contact: 10/22/2021
Next Scheduled EDR Contact: 02/07/2022
Data Release Frequency: Varies

DEBRIS REGION 9: Torres Martinez Reservation Illegal Dump Site Locations
A listing of illegal dump sites location on the Torres Martinez Indian Reservation located in eastern Riverside County and northern Imperial County, California.

Date of Government Version: 01/12/2009
Date Data Arrived at EDR: 05/07/2009
Date Made Active in Reports: 09/21/2009
Number of Days to Update: 137

Source: EPA, Region 9
Telephone: 415-947-4219
Last EDR Contact: 01/13/2022
Next Scheduled EDR Contact: 05/02/2022
Data Release Frequency: No Update Planned

ODI: Open Dump Inventory
An open dump is defined as a disposal facility that does not comply with one or more of the Part 257 or Part 258 Subtitle D Criteria.

Date of Government Version: 06/30/1985
Date Data Arrived at EDR: 08/09/2004
Date Made Active in Reports: 09/17/2004
Number of Days to Update: 39

Source: Environmental Protection Agency
Telephone: 800-424-9346
Last EDR Contact: 06/09/2004
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

IHS OPEN DUMPS: Open Dumps on Indian Land
A listing of all open dumps located on Indian Land in the United States.

Date of Government Version: 04/01/2014
Date Data Arrived at EDR: 08/06/2014
Date Made Active in Reports: 01/29/2015
Number of Days to Update: 176

Source: Department of Health & Human Serivces, Indian Health Service
Telephone: 301-443-1452
Last EDR Contact: 10/28/2021
Next Scheduled EDR Contact: 02/07/2022
Data Release Frequency: Varies

Local Lists of Hazardous waste / Contaminated Sites

US HIST CDL: National Clandestine Laboratory Register

A listing of clandestine drug lab locations that have been removed from the DEAs National Clandestine Laboratory Register.

Date of Government Version: 05/18/2021
Date Data Arrived at EDR: 05/18/2021
Date Made Active in Reports: 08/03/2021
Number of Days to Update: 77

Source: Drug Enforcement Administration
Telephone: 202-307-1000
Last EDR Contact: 11/16/2021
Next Scheduled EDR Contact: 03/07/2022
Data Release Frequency: No Update Planned

HIST CAL-SITES: Calsites Database

The Calsites database contains potential or confirmed hazardous substance release properties. In 1996, California EPA reevaluated and significantly reduced the number of sites in the Calsites database. No longer updated by the state agency. It has been replaced by ENVIROSTOR.

Date of Government Version: 08/08/2005
Date Data Arrived at EDR: 08/03/2006
Date Made Active in Reports: 08/24/2006
Number of Days to Update: 21

Source: Department of Toxic Substance Control
Telephone: 916-323-3400
Last EDR Contact: 02/23/2009
Next Scheduled EDR Contact: 05/25/2009
Data Release Frequency: No Update Planned

SCH: School Property Evaluation Program

This category contains proposed and existing school sites that are being evaluated by DTSC for possible hazardous materials contamination. In some cases, these properties may be listed in the CalSites category depending on the level of threat to public health and safety or the environment they pose.

Date of Government Version: 10/25/2021
Date Data Arrived at EDR: 10/26/2021
Date Made Active in Reports: 01/14/2022
Number of Days to Update: 80

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 10/26/2021
Next Scheduled EDR Contact: 02/07/2022
Data Release Frequency: Quarterly

CDL: Clandestine Drug Labs

A listing of drug lab locations. Listing of a location in this database does not indicate that any illegal drug lab materials were or were not present there, and does not constitute a determination that the location either requires or does not require additional cleanup work.

Date of Government Version: 12/31/2019
Date Data Arrived at EDR: 01/20/2021
Date Made Active in Reports: 04/08/2021
Number of Days to Update: 78

Source: Department of Toxic Substances Control
Telephone: 916-255-6504
Last EDR Contact: 01/13/2022
Next Scheduled EDR Contact: 04/18/2022
Data Release Frequency: Varies

CERS HAZ WASTE: CERS HAZ WASTE

List of sites in the California Environmental Protection Agency (CalEPA) Regulated Site Portal which fall under the Hazardous Chemical Management, Hazardous Waste Onsite Treatment, Household Hazardous Waste Collection, Hazardous Waste Generator, and RCRA LQ HW Generator programs.

Date of Government Version: 10/18/2021
Date Data Arrived at EDR: 10/19/2021
Date Made Active in Reports: 01/12/2022
Number of Days to Update: 85

Source: CalEPA
Telephone: 916-323-2514
Last EDR Contact: 10/19/2021
Next Scheduled EDR Contact: 01/31/2022
Data Release Frequency: Quarterly

TOXIC PITS: Toxic Pits Cleanup Act Sites

Toxic PITS Cleanup Act Sites. TOXIC PITS identifies sites suspected of containing hazardous substances where cleanup has not yet been completed.

Date of Government Version: 07/01/1995
Date Data Arrived at EDR: 08/30/1995
Date Made Active in Reports: 09/26/1995
Number of Days to Update: 27

Source: State Water Resources Control Board
Telephone: 916-227-4364
Last EDR Contact: 01/26/2009
Next Scheduled EDR Contact: 04/27/2009
Data Release Frequency: No Update Planned

US CDL: Clandestine Drug Labs

A listing of clandestine drug lab locations. The U.S. Department of Justice ("the Department") provides this web site as a public service. It contains addresses of some locations where law enforcement agencies reported they found chemicals or other items that indicated the presence of either clandestine drug laboratories or dumpsites. In most cases, the source of the entries is not the Department, and the Department has not verified the entry and does not guarantee its accuracy. Members of the public must verify the accuracy of all entries by, for example, contacting local law enforcement and local health departments.

Date of Government Version: 05/18/2021
Date Data Arrived at EDR: 05/18/2021
Date Made Active in Reports: 08/03/2021
Number of Days to Update: 77

Source: Drug Enforcement Administration
Telephone: 202-307-1000
Last EDR Contact: 11/16/2021
Next Scheduled EDR Contact: 03/07/2022
Data Release Frequency: Quarterly

PFAS: PFAS Contamination Site Location Listing

A listing of PFAS contaminated sites included in the GeoTracker database.

Date of Government Version: 09/07/2021
Date Data Arrived at EDR: 09/08/2021
Date Made Active in Reports: 12/01/2021
Number of Days to Update: 84

Source: State Water Resources Control Board
Telephone: 866-480-1028
Last EDR Contact: 12/07/2021
Next Scheduled EDR Contact: 03/21/2022
Data Release Frequency: Varies

AQUEOUS FOAM: Former Fire Training Facility Assessments Listing

Airports shown on this list are those believed to use Aqueous Film Forming Foam (AFFF), and certified by the Federal Aviation Administration (FAA) under Title 14, Code of Federal Regulations (CFR), Part 139 (14 CFR Part 139). This list was created by SWRCB using information available from the FAA. Location points shown are from the latitude and longitude listed on the FAA airport master record.

Date of Government Version: 12/01/2019
Date Data Arrived at EDR: 08/19/2021
Date Made Active in Reports: 10/28/2021
Number of Days to Update: 70

Source: State Water Resources Control Board
Telephone: 916-341-5455
Last EDR Contact: 12/10/2021
Next Scheduled EDR Contact: 03/21/2022
Data Release Frequency: Varies

Local Lists of Registered Storage Tanks

SWEEPS UST: SWEEPS UST Listing

Statewide Environmental Evaluation and Planning System. This underground storage tank listing was updated and maintained by a company contacted by the SWRCB in the early 1990's. The listing is no longer updated or maintained. The local agency is the contact for more information on a site on the SWEEPS list.

Date of Government Version: 06/01/1994
Date Data Arrived at EDR: 07/07/2005
Date Made Active in Reports: 08/11/2005
Number of Days to Update: 35

Source: State Water Resources Control Board
Telephone: N/A
Last EDR Contact: 06/03/2005
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

HIST UST: Hazardous Substance Storage Container Database

The Hazardous Substance Storage Container Database is a historical listing of UST sites. Refer to local/county source for current data.

Date of Government Version: 10/15/1990
Date Data Arrived at EDR: 01/25/1991
Date Made Active in Reports: 02/12/1991
Number of Days to Update: 18

Source: State Water Resources Control Board
Telephone: 916-341-5851
Last EDR Contact: 07/26/2001
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

SAN FRANCISCO AST: Aboveground Storage Tank Site Listing
Aboveground storage tank sites

Date of Government Version: 08/05/2021
Date Data Arrived at EDR: 08/05/2021
Date Made Active in Reports: 10/29/2021
Number of Days to Update: 85

Source: San Francisco County Department of Public Health
Telephone: 415-252-3896
Last EDR Contact: 10/31/2021
Next Scheduled EDR Contact: 02/14/2022
Data Release Frequency: Varies

CERS TANKS: California Environmental Reporting System (CERS) Tanks
List of sites in the California Environmental Protection Agency (CalEPA) Regulated Site Portal which fall under the Aboveground Petroleum Storage and Underground Storage Tank regulatory programs.

Date of Government Version: 10/18/2021
Date Data Arrived at EDR: 10/19/2021
Date Made Active in Reports: 01/12/2022
Number of Days to Update: 85

Source: California Environmental Protection Agency
Telephone: 916-323-2514
Last EDR Contact: 10/19/2021
Next Scheduled EDR Contact: 01/31/2022
Data Release Frequency: Quarterly

CA FID UST: Facility Inventory Database
The Facility Inventory Database (FID) contains a historical listing of active and inactive underground storage tank locations from the State Water Resource Control Board. Refer to local/county source for current data.

Date of Government Version: 10/31/1994
Date Data Arrived at EDR: 09/05/1995
Date Made Active in Reports: 09/29/1995
Number of Days to Update: 24

Source: California Environmental Protection Agency
Telephone: 916-341-5851
Last EDR Contact: 12/28/1998
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

Local Land Records

LIENS: Environmental Liens Listing
A listing of property locations with environmental liens for California where DTSC is a lien holder.

Date of Government Version: 08/25/2021
Date Data Arrived at EDR: 09/03/2021
Date Made Active in Reports: 11/22/2021
Number of Days to Update: 80

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 11/22/2021
Next Scheduled EDR Contact: 03/14/2022
Data Release Frequency: Varies

LIENS 2: CERCLA Lien Information
A Federal CERCLA ('Superfund') lien can exist by operation of law at any site or property at which EPA has spent Superfund monies. These monies are spent to investigate and address releases and threatened releases of contamination. CERCLIS provides information as to the identity of these sites and properties.

Date of Government Version: 10/20/2021
Date Data Arrived at EDR: 11/05/2021
Date Made Active in Reports: 11/29/2021
Number of Days to Update: 24

Source: Environmental Protection Agency
Telephone: 202-564-6023
Last EDR Contact: 01/13/2022
Next Scheduled EDR Contact: 04/11/2022
Data Release Frequency: Semi-Annually

DEED: Deed Restriction Listing

Site Mitigation and Brownfields Reuse Program Facility Sites with Deed Restrictions & Hazardous Waste Management Program Facility Sites with Deed / Land Use Restriction. The DTSC Site Mitigation and Brownfields Reuse Program (SMBRP) list includes sites cleaned up under the program's oversight and generally does not include current or former hazardous waste facilities that required a hazardous waste facility permit. The list represents deed restrictions that are active. Some sites have multiple deed restrictions. The DTSC Hazardous Waste Management Program (HWMP) has developed a list of current or former hazardous waste facilities that have a recorded land use restriction at the local county recorder's office. The land use restrictions on this list were required by the DTSC HWMP as a result of the presence of hazardous substances that remain on site after the facility (or part of the facility) has been closed or cleaned up. The types of land use restriction include deed notice, deed restriction, or a land use restriction that binds current and future owners.

Date of Government Version: 08/30/2021
Date Data Arrived at EDR: 08/31/2021
Date Made Active in Reports: 11/19/2021
Number of Days to Update: 80
Source: DTSC and SWRCB
Telephone: 916-323-3400
Last EDR Contact: 11/30/2021
Next Scheduled EDR Contact: 03/14/2022
Data Release Frequency: Semi-Annually

Records of Emergency Release Reports

HMIRS: Hazardous Materials Information Reporting System

Hazardous Materials Incident Report System. HMIRS contains hazardous material spill incidents reported to DOT.

Date of Government Version: 09/12/2021
Date Data Arrived at EDR: 09/13/2021
Date Made Active in Reports: 09/28/2021
Number of Days to Update: 15
Source: U.S. Department of Transportation
Telephone: 202-366-4555
Last EDR Contact: 12/16/2021
Next Scheduled EDR Contact: 04/04/2022
Data Release Frequency: Quarterly

CHMIRS: California Hazardous Material Incident Report System

California Hazardous Material Incident Reporting System. CHMIRS contains information on reported hazardous material incidents (accidental releases or spills).

Date of Government Version: 09/30/2021
Date Data Arrived at EDR: 10/19/2021
Date Made Active in Reports: 01/12/2022
Number of Days to Update: 85
Source: Office of Emergency Services
Telephone: 916-845-8400
Last EDR Contact: 10/19/2021
Next Scheduled EDR Contact: 01/31/2022
Data Release Frequency: Semi-Annually

LDS: Land Disposal Sites Listing (GEOTRACKER)

Land Disposal sites (Landfills) included in GeoTracker. GeoTracker is the Water Boards data management system for sites that impact, or have the potential to impact, water quality in California, with emphasis on groundwater.

Date of Government Version: 09/07/2021
Date Data Arrived at EDR: 09/07/2021
Date Made Active in Reports: 11/29/2021
Number of Days to Update: 83
Source: State Water Qualilty Control Board
Telephone: 866-480-1028
Last EDR Contact: 12/07/2021
Next Scheduled EDR Contact: 03/21/2022
Data Release Frequency: Quarterly

MCS: Military Cleanup Sites Listing (GEOTRACKER)

Military sites (consisting of: Military UST sites; Military Privatized sites; and Military Cleanup sites [formerly known as DoD non UST]) included in GeoTracker. GeoTracker is the Water Boards data management system for sites that impact, or have the potential to impact, water quality in California, with emphasis on groundwater.

Date of Government Version: 09/07/2021
Date Data Arrived at EDR: 09/07/2021
Date Made Active in Reports: 11/29/2021
Number of Days to Update: 83
Source: State Water Resources Control Board
Telephone: 866-480-1028
Last EDR Contact: 12/07/2021
Next Scheduled EDR Contact: 03/21/2022
Data Release Frequency: Quarterly

SPILLS 90: SPILLS90 data from FirstSearch

Spills 90 includes those spill and release records available exclusively from FirstSearch databases. Typically, they may include chemical, oil and/or hazardous substance spills recorded after 1990. Duplicate records that are already included in EDR incident and release records are not included in Spills 90.

Date of Government Version: 06/06/2012
Date Data Arrived at EDR: 01/03/2013
Date Made Active in Reports: 02/22/2013
Number of Days to Update: 50

Source: FirstSearch
Telephone: N/A
Last EDR Contact: 01/03/2013
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

Other Ascertainable Records

RCRA NonGen / NLR: RCRA - Non Generators / No Longer Regulated

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Non-Generators do not presently generate hazardous waste.

Date of Government Version: 09/13/2021
Date Data Arrived at EDR: 09/15/2021
Date Made Active in Reports: 10/12/2021
Number of Days to Update: 27

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 12/17/2021
Next Scheduled EDR Contact: 04/04/2022
Data Release Frequency: Quarterly

FUDS: Formerly Used Defense Sites

The listing includes locations of Formerly Used Defense Sites properties where the US Army Corps of Engineers is actively working or will take necessary cleanup actions.

Date of Government Version: 08/10/2021
Date Data Arrived at EDR: 08/17/2021
Date Made Active in Reports: 10/22/2021
Number of Days to Update: 66

Source: U.S. Army Corps of Engineers
Telephone: 202-528-4285
Last EDR Contact: 11/16/2021
Next Scheduled EDR Contact: 02/28/2022
Data Release Frequency: Varies

DOD: Department of Defense Sites

This data set consists of federally owned or administered lands, administered by the Department of Defense, that have any area equal to or greater than 640 acres of the United States, Puerto Rico, and the U.S. Virgin Islands.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 11/10/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 62

Source: USGS
Telephone: 888-275-8747
Last EDR Contact: 01/14/2022
Next Scheduled EDR Contact: 04/25/2022
Data Release Frequency: Semi-Annually

FEDLAND: Federal and Indian Lands

Federally and Indian administrated lands of the United States. Lands included are administrated by: Army Corps of Engineers, Bureau of Reclamation, National Wild and Scenic River, National Wildlife Refuge, Public Domain Land, Wilderness, Wilderness Study Area, Wildlife Management Area, Bureau of Indian Affairs, Bureau of Land Management, Department of Justice, Forest Service, Fish and Wildlife Service, National Park Service.

Date of Government Version: 04/02/2018
Date Data Arrived at EDR: 04/11/2018
Date Made Active in Reports: 11/06/2019
Number of Days to Update: 574

Source: U.S. Geological Survey
Telephone: 888-275-8747
Last EDR Contact: 01/07/2022
Next Scheduled EDR Contact: 04/18/2022
Data Release Frequency: N/A

SCRD DRYCLEANERS: State Coalition for Remediation of Drycleaners Listing

The State Coalition for Remediation of Drycleaners was established in 1998, with support from the U.S. EPA Office of Superfund Remediation and Technology Innovation. It is comprised of representatives of states with established drycleaner remediation programs. Currently the member states are Alabama, Connecticut, Florida, Illinois, Kansas, Minnesota, Missouri, North Carolina, Oregon, South Carolina, Tennessee, Texas, and Wisconsin.

Date of Government Version: 01/01/2017
Date Data Arrived at EDR: 02/03/2017
Date Made Active in Reports: 04/07/2017
Number of Days to Update: 63

Source: Environmental Protection Agency
Telephone: 615-532-8599
Last EDR Contact: 11/08/2021
Next Scheduled EDR Contact: 02/21/2022
Data Release Frequency: Varies

US FIN ASSUR: Financial Assurance Information

All owners and operators of facilities that treat, store, or dispose of hazardous waste are required to provide proof that they will have sufficient funds to pay for the clean up, closure, and post-closure care of their facilities.

Date of Government Version: 09/13/2021
Date Data Arrived at EDR: 09/15/2021
Date Made Active in Reports: 09/28/2021
Number of Days to Update: 13

Source: Environmental Protection Agency
Telephone: 202-566-1917
Last EDR Contact: 12/17/2021
Next Scheduled EDR Contact: 04/04/2022
Data Release Frequency: Quarterly

EPA WATCH LIST: EPA WATCH LIST

EPA maintains a "Watch List" to facilitate dialogue between EPA, state and local environmental agencies on enforcement matters relating to facilities with alleged violations identified as either significant or high priority. Being on the Watch List does not mean that the facility has actually violated the law only that an investigation by EPA or a state or local environmental agency has led those organizations to allege that an unproven violation has in fact occurred. Being on the Watch List does not represent a higher level of concern regarding the alleged violations that were detected, but instead indicates cases requiring additional dialogue between EPA, state and local agencies - primarily because of the length of time the alleged violation has gone unaddressed or unresolved.

Date of Government Version: 08/30/2013
Date Data Arrived at EDR: 03/21/2014
Date Made Active in Reports: 06/17/2014
Number of Days to Update: 88

Source: Environmental Protection Agency
Telephone: 617-520-3000
Last EDR Contact: 11/01/2021
Next Scheduled EDR Contact: 02/14/2022
Data Release Frequency: Quarterly

2020 COR ACTION: 2020 Corrective Action Program List

The EPA has set ambitious goals for the RCRA Corrective Action program by creating the 2020 Corrective Action Universe. This RCRA cleanup baseline includes facilities expected to need corrective action. The 2020 universe contains a wide variety of sites. Some properties are heavily contaminated while others were contaminated but have since been cleaned up. Still others have not been fully investigated yet, and may require little or no remediation. Inclusion in the 2020 Universe does not necessarily imply failure on the part of a facility to meet its RCRA obligations.

Date of Government Version: 09/30/2017
Date Data Arrived at EDR: 05/08/2018
Date Made Active in Reports: 07/20/2018
Number of Days to Update: 73

Source: Environmental Protection Agency
Telephone: 703-308-4044
Last EDR Contact: 11/05/2021
Next Scheduled EDR Contact: 02/14/2022
Data Release Frequency: Varies

TSCA: Toxic Substances Control Act

Toxic Substances Control Act. TSCA identifies manufacturers and importers of chemical substances included on the TSCA Chemical Substance Inventory list. It includes data on the production volume of these substances by plant site.

Date of Government Version: 12/31/2016
Date Data Arrived at EDR: 06/17/2020
Date Made Active in Reports: 09/10/2020
Number of Days to Update: 85

Source: EPA
Telephone: 202-260-5521
Last EDR Contact: 12/17/2021
Next Scheduled EDR Contact: 03/28/2022
Data Release Frequency: Every 4 Years

TRIS: Toxic Chemical Release Inventory System

Toxic Release Inventory System. TRIS identifies facilities which release toxic chemicals to the air, water and land in reportable quantities under SARA Title III Section 313.

Date of Government Version: 12/31/2018
Date Data Arrived at EDR: 08/14/2020
Date Made Active in Reports: 11/04/2020
Number of Days to Update: 82

Source: EPA
Telephone: 202-566-0250
Last EDR Contact: 11/16/2021
Next Scheduled EDR Contact: 02/28/2022
Data Release Frequency: Annually

SSTS: Section 7 Tracking Systems

Section 7 of the Federal Insecticide, Fungicide and Rodenticide Act, as amended (92 Stat. 829) requires all registered pesticide-producing establishments to submit a report to the Environmental Protection Agency by March 1st each year. Each establishment must report the types and amounts of pesticides, active ingredients and devices being produced, and those having been produced and sold or distributed in the past year.

Date of Government Version: 10/18/2021
Date Data Arrived at EDR: 10/20/2021
Date Made Active in Reports: 01/10/2022
Number of Days to Update: 82

Source: EPA
Telephone: 202-564-4203
Last EDR Contact: 10/20/2021
Next Scheduled EDR Contact: 01/31/2022
Data Release Frequency: Annually

ROD: Records Of Decision

Record of Decision. ROD documents mandate a permanent remedy at an NPL (Superfund) site containing technical and health information to aid in the cleanup.

Date of Government Version: 10/20/2021
Date Data Arrived at EDR: 11/05/2021
Date Made Active in Reports: 11/29/2021
Number of Days to Update: 24

Source: EPA
Telephone: 703-416-0223
Last EDR Contact: 12/01/2021
Next Scheduled EDR Contact: 03/14/2022
Data Release Frequency: Annually

RMP: Risk Management Plans

When Congress passed the Clean Air Act Amendments of 1990, it required EPA to publish regulations and guidance for chemical accident prevention at facilities using extremely hazardous substances. The Risk Management Program Rule (RMP Rule) was written to implement Section 112(r) of these amendments. The rule, which built upon existing industry codes and standards, requires companies of all sizes that use certain flammable and toxic substances to develop a Risk Management Program, which includes a(n): Hazard assessment that details the potential effects of an accidental release, an accident history of the last five years, and an evaluation of worst-case and alternative accidental releases; Prevention program that includes safety precautions and maintenance, monitoring, and employee training measures; and Emergency response program that spells out emergency health care, employee training measures and procedures for informing the public and response agencies (e.g the fire department) should an accident occur.

Date of Government Version: 10/20/2021
Date Data Arrived at EDR: 11/05/2021
Date Made Active in Reports: 11/12/2021
Number of Days to Update: 7

Source: Environmental Protection Agency
Telephone: 202-564-8600
Last EDR Contact: 01/18/2022
Next Scheduled EDR Contact: 05/02/2022
Data Release Frequency: Varies

RAATS: RCRA Administrative Action Tracking System

RCRA Administration Action Tracking System. RAATS contains records based on enforcement actions issued under RCRA pertaining to major violators and includes administrative and civil actions brought by the EPA. For administration actions after September 30, 1995, data entry in the RAATS database was discontinued. EPA will retain a copy of the database for historical records. It was necessary to terminate RAATS because a decrease in agency resources made it impossible to continue to update the information contained in the database.

Date of Government Version: 04/17/1995
Date Data Arrived at EDR: 07/03/1995
Date Made Active in Reports: 08/07/1995
Number of Days to Update: 35

Source: EPA
Telephone: 202-564-4104
Last EDR Contact: 06/02/2008
Next Scheduled EDR Contact: 09/01/2008
Data Release Frequency: No Update Planned

PRP: Potentially Responsible Parties
A listing of verified Potentially Responsible Parties

Date of Government Version: 10/20/2021
Date Data Arrived at EDR: 11/05/2021
Date Made Active in Reports: 12/15/2021
Number of Days to Update: 40
Source: EPA
Telephone: 202-564-6023
Last EDR Contact: 01/13/2022
Next Scheduled EDR Contact: 02/14/2022
Data Release Frequency: Quarterly

PADS: PCB Activity Database System
PCB Activity Database. PADS Identifies generators, transporters, commercial storers and/or brokers and disposers of PCB's who are required to notify the EPA of such activities.

Date of Government Version: 11/19/2020
Date Data Arrived at EDR: 01/08/2021
Date Made Active in Reports: 03/22/2021
Number of Days to Update: 73
Source: EPA
Telephone: 202-566-0500
Last EDR Contact: 01/07/2022
Next Scheduled EDR Contact: 04/18/2022
Data Release Frequency: Annually

ICIS: Integrated Compliance Information System
The Integrated Compliance Information System (ICIS) supports the information needs of the national enforcement and compliance program as well as the unique needs of the National Pollutant Discharge Elimination System (NPDES) program.

Date of Government Version: 11/18/2016
Date Data Arrived at EDR: 11/23/2016
Date Made Active in Reports: 02/10/2017
Number of Days to Update: 79
Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 12/29/2021
Next Scheduled EDR Contact: 04/18/2022
Data Release Frequency: Quarterly

FTTS: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
FTTS tracks administrative cases and pesticide enforcement actions and compliance activities related to FIFRA, TSCA and EPCRA (Emergency Planning and Community Right-to-Know Act). To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 04/09/2009
Date Data Arrived at EDR: 04/16/2009
Date Made Active in Reports: 05/11/2009
Number of Days to Update: 25
Source: EPA/Office of Prevention, Pesticides and Toxic Substances
Telephone: 202-566-1667
Last EDR Contact: 08/18/2017
Next Scheduled EDR Contact: 12/04/2017
Data Release Frequency: No Update Planned

FTTS INSP: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
A listing of FIFRA/TSCA Tracking System (FTTS) inspections and enforcements.

Date of Government Version: 04/09/2009
Date Data Arrived at EDR: 04/16/2009
Date Made Active in Reports: 05/11/2009
Number of Days to Update: 25
Source: EPA
Telephone: 202-566-1667
Last EDR Contact: 08/18/2017
Next Scheduled EDR Contact: 12/04/2017
Data Release Frequency: No Update Planned

MLTS: Material Licensing Tracking System
MLTS is maintained by the Nuclear Regulatory Commission and contains a list of approximately 8,100 sites which possess or use radioactive materials and which are subject to NRC licensing requirements. To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 07/29/2021
Date Data Arrived at EDR: 08/24/2021
Date Made Active in Reports: 11/19/2021
Number of Days to Update: 87
Source: Nuclear Regulatory Commission
Telephone: 301-415-7169
Last EDR Contact: 01/18/2022
Next Scheduled EDR Contact: 05/02/2022
Data Release Frequency: Quarterly

COAL ASH DOE: Steam-Electric Plant Operation Data
A listing of power plants that store ash in surface ponds.

Date of Government Version: 12/31/2019
Date Data Arrived at EDR: 12/01/2020
Date Made Active in Reports: 02/09/2021
Number of Days to Update: 70
Source: Department of Energy
Telephone: 202-586-8719
Last EDR Contact: 11/30/2021
Next Scheduled EDR Contact: 03/14/2022
Data Release Frequency: Varies

COAL ASH EPA: Coal Combustion Residues Surface Impoundments List
A listing of coal combustion residues surface impoundments with high hazard potential ratings.

Date of Government Version: 01/12/2017
Date Data Arrived at EDR: 03/05/2019
Date Made Active in Reports: 11/11/2019
Number of Days to Update: 251
Source: Environmental Protection Agency
Telephone: N/A
Last EDR Contact: 12/02/2021
Next Scheduled EDR Contact: 03/14/2022
Data Release Frequency: Varies

PCB TRANSFORMER: PCB Transformer Registration Database
The database of PCB transformer registrations that includes all PCB registration submittals.

Date of Government Version: 09/13/2019
Date Data Arrived at EDR: 11/06/2019
Date Made Active in Reports: 02/10/2020
Number of Days to Update: 96
Source: Environmental Protection Agency
Telephone: 202-566-0517
Last EDR Contact: 11/05/2021
Next Scheduled EDR Contact: 02/14/2022
Data Release Frequency: Varies

RADINFO: Radiation Information Database
The Radiation Information Database (RADINFO) contains information about facilities that are regulated by U.S. Environmental Protection Agency (EPA) regulations for radiation and radioactivity.

Date of Government Version: 07/01/2019
Date Data Arrived at EDR: 07/01/2019
Date Made Active in Reports: 09/23/2019
Number of Days to Update: 84
Source: Environmental Protection Agency
Telephone: 202-343-9775
Last EDR Contact: 12/27/2021
Next Scheduled EDR Contact: 04/11/2022
Data Release Frequency: Quarterly

HIST FTTS: FIFRA/TSCA Tracking System Administrative Case Listing
A complete administrative case listing from the FIFRA/TSCA Tracking System (FTTS) for all ten EPA regions. The information was obtained from the National Compliance Database (NCDB). NCDB supports the implementation of FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) and TSCA (Toxic Substances Control Act). Some EPA regions are now closing out records. Because of that, and the fact that some EPA regions are not providing EPA Headquarters with updated records, it was decided to create a HIST FTTS database. It included records that may not be included in the newer FTTS database updates. This database is no longer updated.

Date of Government Version: 10/19/2006
Date Data Arrived at EDR: 03/01/2007
Date Made Active in Reports: 04/10/2007
Number of Days to Update: 40
Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 12/17/2007
Next Scheduled EDR Contact: 03/17/2008
Data Release Frequency: No Update Planned

HIST FTTS INSP: FIFRA/TSCA Tracking System Inspection & Enforcement Case Listing
A complete inspection and enforcement case listing from the FIFRA/TSCA Tracking System (FTTS) for all ten EPA regions. The information was obtained from the National Compliance Database (NCDB). NCDB supports the implementation of FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) and TSCA (Toxic Substances Control Act). Some EPA regions are now closing out records. Because of that, and the fact that some EPA regions are not providing EPA Headquarters with updated records, it was decided to create a HIST FTTS database. It included records that may not be included in the newer FTTS database updates. This database is no longer updated.

Date of Government Version: 10/19/2006
Date Data Arrived at EDR: 03/01/2007
Date Made Active in Reports: 04/10/2007
Number of Days to Update: 40

Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 12/17/2008
Next Scheduled EDR Contact: 03/17/2008
Data Release Frequency: No Update Planned

DOT OPS: Incident and Accident Data

Department of Transporation, Office of Pipeline Safety Incident and Accident data.

Date of Government Version: 01/02/2020
Date Data Arrived at EDR: 01/28/2020
Date Made Active in Reports: 04/17/2020
Number of Days to Update: 80

Source: Department of Transporation, Office of Pipeline Safety
Telephone: 202-366-4595
Last EDR Contact: 10/26/2021
Next Scheduled EDR Contact: 02/07/2022
Data Release Frequency: Quarterly

CONSENT: Superfund (CERCLA) Consent Decrees

Major legal settlements that establish responsibility and standards for cleanup at NPL (Superfund) sites. Released periodically by United States District Courts after settlement by parties to litigation matters.

Date of Government Version: 09/30/2021
Date Data Arrived at EDR: 10/13/2021
Date Made Active in Reports: 01/10/2022
Number of Days to Update: 89

Source: Department of Justice, Consent Decree Library
Telephone: Varies
Last EDR Contact: 01/03/2022
Next Scheduled EDR Contact: 04/18/2022
Data Release Frequency: Varies

BRS: Biennial Reporting System

The Biennial Reporting System is a national system administered by the EPA that collects data on the generation and management of hazardous waste. BRS captures detailed data from two groups: Large Quantity Generators (LQG) and Treatment, Storage, and Disposal Facilities.

Date of Government Version: 12/31/2019
Date Data Arrived at EDR: 09/15/2021
Date Made Active in Reports: 12/14/2021
Number of Days to Update: 90

Source: EPA/NTIS
Telephone: 800-424-9346
Last EDR Contact: 12/17/2021
Next Scheduled EDR Contact: 04/04/2022
Data Release Frequency: Biennially

INDIAN RESERV: Indian Reservations

This map layer portrays Indian administered lands of the United States that have any area equal to or greater than 640 acres.

Date of Government Version: 12/31/2014
Date Data Arrived at EDR: 07/14/2015
Date Made Active in Reports: 01/10/2017
Number of Days to Update: 546

Source: USGS
Telephone: 202-208-3710
Last EDR Contact: 01/04/2022
Next Scheduled EDR Contact: 04/18/2022
Data Release Frequency: Semi-Annually

FUSRAP: Formerly Utilized Sites Remedial Action Program

DOE established the Formerly Utilized Sites Remedial Action Program (FUSRAP) in 1974 to remediate sites where radioactive contamination remained from Manhattan Project and early U.S. Atomic Energy Commission (AEC) operations.

Date of Government Version: 07/26/2021
Date Data Arrived at EDR: 07/27/2021
Date Made Active in Reports: 10/22/2021
Number of Days to Update: 87

Source: Department of Energy
Telephone: 202-586-3559
Last EDR Contact: 11/01/2021
Next Scheduled EDR Contact: 02/14/2022
Data Release Frequency: Varies

UMTRA: Uranium Mill Tailings Sites

Uranium ore was mined by private companies for federal government use in national defense programs. When the mills shut down, large piles of the sand-like material (mill tailings) remain after uranium has been extracted from the ore. Levels of human exposure to radioactive materials from the piles are low; however, in some cases tailings were used as construction materials before the potential health hazards of the tailings were recognized.

Date of Government Version: 08/30/2019
Date Data Arrived at EDR: 11/15/2019
Date Made Active in Reports: 01/28/2020
Number of Days to Update: 74

Source: Department of Energy
Telephone: 505-845-0011
Last EDR Contact: 12/09/2021
Next Scheduled EDR Contact: 02/28/2022
Data Release Frequency: Varies

LEAD SMELTER 1: Lead Smelter Sites

A listing of former lead smelter site locations.

Date of Government Version: 10/20/2021
Date Data Arrived at EDR: 11/05/2021
Date Made Active in Reports: 11/29/2021
Number of Days to Update: 24

Source: Environmental Protection Agency
Telephone: 703-603-8787
Last EDR Contact: 01/13/2022
Next Scheduled EDR Contact: 04/11/2022
Data Release Frequency: Varies

LEAD SMELTER 2: Lead Smelter Sites

A list of several hundred sites in the U.S. where secondary lead smelting was done from 1931and 1964. These sites may pose a threat to public health through ingestion or inhalation of contaminated soil or dust

Date of Government Version: 04/05/2001
Date Data Arrived at EDR: 10/27/2010
Date Made Active in Reports: 12/02/2010
Number of Days to Update: 36

Source: American Journal of Public Health
Telephone: 703-305-6451
Last EDR Contact: 12/02/2009
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

US AIRS (AFS): Aerometric Information Retrieval System Facility Subsystem (AFS)

The database is a sub-system of Aerometric Information Retrieval System (AIRS). AFS contains compliance data on air pollution point sources regulated by the U.S. EPA and/or state and local air regulatory agencies. This information comes from source reports by various stationary sources of air pollution, such as electric power plants, steel mills, factories, and universities, and provides information about the air pollutants they produce. Action, air program, air program pollutant, and general level plant data. It is used to track emissions and compliance data from industrial plants.

Date of Government Version: 10/12/2016
Date Data Arrived at EDR: 10/26/2016
Date Made Active in Reports: 02/03/2017
Number of Days to Update: 100

Source: EPA
Telephone: 202-564-2496
Last EDR Contact: 09/26/2017
Next Scheduled EDR Contact: 01/08/2018
Data Release Frequency: Annually

US AIRS MINOR: Air Facility System Data

A listing of minor source facilities.

Date of Government Version: 10/12/2016
Date Data Arrived at EDR: 10/26/2016
Date Made Active in Reports: 02/03/2017
Number of Days to Update: 100

Source: EPA
Telephone: 202-564-2496
Last EDR Contact: 09/26/2017
Next Scheduled EDR Contact: 01/08/2018
Data Release Frequency: Annually

US MINES: Mines Master Index File

Contains all mine identification numbers issued for mines active or opened since 1971. The data also includes violation information.

Date of Government Version: 08/09/2021
Date Data Arrived at EDR: 08/24/2021
Date Made Active in Reports: 11/19/2021
Number of Days to Update: 87

Source: Department of Labor, Mine Safety and Health Administration
Telephone: 303-231-5959
Last EDR Contact: 11/22/2021
Next Scheduled EDR Contact: 03/07/2022
Data Release Frequency: Semi-Annually

MINES VIOLATIONS: MSHA Violation Assessment Data

Mines violation and assessment information. Department of Labor, Mine Safety & Health Administration.

Date of Government Version: 06/30/2021
Date Data Arrived at EDR: 07/01/2021
Date Made Active in Reports: 09/28/2021
Number of Days to Update: 89

Source: DOL, Mine Safety & Health Admi
Telephone: 202-693-9424
Last EDR Contact: 12/20/2021
Next Scheduled EDR Contact: 03/14/2022
Data Release Frequency: Quarterly

US MINES 2: Ferrous and Nonferrous Metal Mines Database Listing

This map layer includes ferrous (ferrous metal mines are facilities that extract ferrous metals, such as iron ore or molybdenum) and nonferrous (Nonferrous metal mines are facilities that extract nonferrous metals, such as gold, silver, copper, zinc, and lead) metal mines in the United States.

Date of Government Version: 05/06/2020
Date Data Arrived at EDR: 05/27/2020
Date Made Active in Reports: 08/13/2020
Number of Days to Update: 78

Source: USGS
Telephone: 703-648-7709
Last EDR Contact: 11/22/2021
Next Scheduled EDR Contact: 03/07/2022
Data Release Frequency: Varies

US MINES 3: Active Mines & Mineral Plants Database Listing

Active Mines and Mineral Processing Plant operations for commodities monitored by the Minerals Information Team of the USGS.

Date of Government Version: 04/14/2011
Date Data Arrived at EDR: 06/08/2011
Date Made Active in Reports: 09/13/2011
Number of Days to Update: 97

Source: USGS
Telephone: 703-648-7709
Last EDR Contact: 11/22/2021
Next Scheduled EDR Contact: 03/07/2022
Data Release Frequency: Varies

ABANDONED MINES: Abandoned Mines

An inventory of land and water impacted by past mining (primarily coal mining) is maintained by OSMRE to provide information needed to implement the Surface Mining Control and Reclamation Act of 1977 (SMCRA). The inventory contains information on the location, type, and extent of AML impacts, as well as, information on the cost associated with the reclamation of those problems. The inventory is based upon field surveys by State, Tribal, and OSMRE program officials. It is dynamic to the extent that it is modified as new problems are identified and existing problems are reclaimed.

Date of Government Version: 09/14/2021
Date Data Arrived at EDR: 09/15/2021
Date Made Active in Reports: 12/15/2021
Number of Days to Update: 91

Source: Department of Interior
Telephone: 202-208-2609
Last EDR Contact: 12/14/2021
Next Scheduled EDR Contact: 03/21/2022
Data Release Frequency: Quarterly

FINDS: Facility Index System/Facility Registry System

Facility Index System. FINDS contains both facility information and 'pointers' to other sources that contain more detail. EDR includes the following FINDS databases in this report: PCS (Permit Compliance System), AIRS (Aerometric Information Retrieval System), DOCKET (Enforcement Docket used to manage and track information on civil judicial enforcement cases for all environmental statutes), FURS (Federal Underground Injection Control), C-DOCKET (Criminal Docket System used to track criminal enforcement actions for all environmental statutes), FFIS (Federal Facilities Information System), STATE (State Environmental Laws and Statutes), and PADS (PCB Activity Data System).

Date of Government Version: 05/05/2021
Date Data Arrived at EDR: 05/18/2021
Date Made Active in Reports: 08/17/2021
Number of Days to Update: 91

Source: EPA
Telephone: (415) 947-8000
Last EDR Contact: 11/22/2021
Next Scheduled EDR Contact: 03/14/2022
Data Release Frequency: Quarterly

DOCKET HWC: Hazardous Waste Compliance Docket Listing

A complete list of the Federal Agency Hazardous Waste Compliance Docket Facilities.

Date of Government Version: 05/06/2021
Date Data Arrived at EDR: 05/21/2021
Date Made Active in Reports: 08/11/2021
Number of Days to Update: 82

Source: Environmental Protection Agency
Telephone: 202-564-0527
Last EDR Contact: 11/23/2021
Next Scheduled EDR Contact: 03/07/2022
Data Release Frequency: Varies

UXO: Unexploded Ordnance Sites
A listing of unexploded ordnance site locations

Date of Government Version: 12/31/2018
Date Data Arrived at EDR: 07/02/2020
Date Made Active in Reports: 09/17/2020
Number of Days to Update: 77
Source: Department of Defense
Telephone: 703-704-1564
Last EDR Contact: 01/11/2022
Next Scheduled EDR Contact: 04/25/2022
Data Release Frequency: Varies

ECHO: Enforcement & Compliance History Information
ECHO provides integrated compliance and enforcement information for about 800,000 regulated facilities nationwide.

Date of Government Version: 01/01/2022
Date Data Arrived at EDR: 01/04/2022
Date Made Active in Reports: 01/10/2022
Number of Days to Update: 6
Source: Environmental Protection Agency
Telephone: 202-564-2280
Last EDR Contact: 01/04/2022
Next Scheduled EDR Contact: 04/18/2022
Data Release Frequency: Quarterly

FUELS PROGRAM: EPA Fuels Program Registered Listing
This listing includes facilities that are registered under the Part 80 (Code of Federal Regulations) EPA Fuels Programs. All companies now are required to submit new and updated registrations.

Date of Government Version: 08/13/2021
Date Data Arrived at EDR: 08/13/2021
Date Made Active in Reports: 10/22/2021
Number of Days to Update: 70
Source: EPA
Telephone: 800-385-6164
Last EDR Contact: 11/15/2021
Next Scheduled EDR Contact: 02/28/2022
Data Release Frequency: Quarterly

CA BOND EXP. PLAN: Bond Expenditure Plan
Department of Health Services developed a site-specific expenditure plan as the basis for an appropriation of Hazardous Substance Cleanup Bond Act funds. It is not updated.

Date of Government Version: 01/01/1989
Date Data Arrived at EDR: 07/27/1994
Date Made Active in Reports: 08/02/1994
Number of Days to Update: 6
Source: Department of Health Services
Telephone: 916-255-2118
Last EDR Contact: 05/31/1994
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

CORTESE: "Cortese" Hazardous Waste & Substances Sites List
The sites for the list are designated by the State Water Resource Control Board (LUST), the Integrated Waste Board (SWF/LS), and the Department of Toxic Substances Control (Cal-Sites).

Date of Government Version: 09/20/2021
Date Data Arrived at EDR: 09/21/2021
Date Made Active in Reports: 12/08/2021
Number of Days to Update: 78
Source: CAL EPA/Office of Emergency Information
Telephone: 916-323-3400
Last EDR Contact: 12/16/2021
Next Scheduled EDR Contact: 04/04/2022
Data Release Frequency: Quarterly

CUPA LIVERMORE-PLEASANTON: CUPA Facility Listing
list of facilities associated with the various CUPA programs in Livermore-Pleasanton

Date of Government Version: 05/01/2019
Date Data Arrived at EDR: 05/14/2019
Date Made Active in Reports: 07/17/2019
Number of Days to Update: 64
Source: Livermore-Pleasanton Fire Department
Telephone: 925-454-2361
Last EDR Contact: 11/19/2021
Next Scheduled EDR Contact: 02/21/2022
Data Release Frequency: Varies

DRYCLEANERS: Cleaner Facilities
A list of drycleaner related facilities that have EPA ID numbers. These are facilities with certain SIC codes: power laundries, family and commercial; garment pressing and cleaner's agents; linen supply; coin-operated laundries and cleaning; drycleaning plants, except rugs; carpet and upholster cleaning; industrial launderers; laundry and garment services.

Date of Government Version: 08/27/2021
Date Data Arrived at EDR: 09/01/2021
Date Made Active in Reports: 11/19/2021
Number of Days to Update: 79

Source: Department of Toxic Substance Control
Telephone: 916-327-4498
Last EDR Contact: 01/07/2022
Next Scheduled EDR Contact: 03/14/2022
Data Release Frequency: Annually

DRYCLEAN SOUTH COAST: South Coast Air Quality Management District Drycleaner Listing
A listing of dry cleaners in the South Coast Air Quality Management District

Date of Government Version: 08/18/2021
Date Data Arrived at EDR: 08/23/2021
Date Made Active in Reports: 11/12/2021
Number of Days to Update: 81

Source: South Coast Air Quality Management District
Telephone: 909-396-3211
Last EDR Contact: 11/16/2021
Next Scheduled EDR Contact: 03/07/2022
Data Release Frequency: Varies

DRYCLEAN AVAQMD: Antelope Valley Air Quality Management District Drycleaner Listing
A listing of dry cleaners in the Antelope Valley Air Quality Management District.

Date of Government Version: 08/24/2021
Date Data Arrived at EDR: 08/25/2021
Date Made Active in Reports: 11/17/2021
Number of Days to Update: 84

Source: Antelope Valley Air Quality Management District
Telephone: 661-723-8070
Last EDR Contact: 11/23/2021
Next Scheduled EDR Contact: 03/14/2022
Data Release Frequency: Varies

EMI: Emissions Inventory Data
Toxics and criteria pollutant emissions data collected by the ARB and local air pollution agencies.

Date of Government Version: 12/31/2019
Date Data Arrived at EDR: 06/10/2021
Date Made Active in Reports: 08/27/2021
Number of Days to Update: 78

Source: California Air Resources Board
Telephone: 916-322-2990
Last EDR Contact: 12/17/2021
Next Scheduled EDR Contact: 03/28/2022
Data Release Frequency: Varies

ENF: Enforcement Action Listing
A listing of Water Board Enforcement Actions. Formal is everything except Oral/Verbal Communication, Notice of Violation, Expedited Payment Letter, and Staff Enforcement Letter.

Date of Government Version: 04/16/2021
Date Data Arrived at EDR: 04/20/2021
Date Made Active in Reports: 07/07/2021
Number of Days to Update: 78

Source: State Water Resoruces Control Board
Telephone: 916-445-9379
Last EDR Contact: 01/13/2022
Next Scheduled EDR Contact: 05/02/2022
Data Release Frequency: Varies

Financial Assurance 1: Financial Assurance Information Listing
Financial Assurance information

Date of Government Version: 10/05/2021
Date Data Arrived at EDR: 10/06/2021
Date Made Active in Reports: 12/29/2021
Number of Days to Update: 84

Source: Department of Toxic Substances Control
Telephone: 916-255-3628
Last EDR Contact: 01/13/2022
Next Scheduled EDR Contact: 05/02/2022
Data Release Frequency: Varies

Financial Assurance 2: Financial Assurance Information Listing
A listing of financial assurance information for solid waste facilities. Financial assurance is intended to ensure that resources are available to pay for the cost of closure, post-closure care, and corrective measures if the owner or operator of a regulated facility is unable or unwilling to pay.

Date of Government Version: 08/13/2021
Date Data Arrived at EDR: 08/13/2021
Date Made Active in Reports: 11/05/2021
Number of Days to Update: 84

Source: California Integrated Waste Management Board
Telephone: 916-341-6066
Last EDR Contact: 11/16/2021
Next Scheduled EDR Contact: 02/21/2022
Data Release Frequency: Varies

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

HAZNET: Facility and Manifest Data

Facility and Manifest Data. The data is extracted from the copies of hazardous waste manifests received each year by the DTSC. The annual volume of manifests is typically 700,000 - 1,000,000 annually, representing approximately 350,000 - 500,000 shipments. Data are from the manifests submitted without correction, and therefore many contain some invalid values for data elements such as generator ID, TSD ID, waste category, and disposal method. This database begins with calendar year 1993.

Date of Government Version: 12/31/2019
Date Data Arrived at EDR: 04/15/2020
Date Made Active in Reports: 07/02/2020
Number of Days to Update: 78

Source: California Environmental Protection Agency
Telephone: 916-255-1136
Last EDR Contact: 01/07/2022
Next Scheduled EDR Contact: 04/18/2022
Data Release Frequency: Annually

ICE: ICE

Contains data pertaining to the Permitted Facilities with Inspections / Enforcements sites tracked in Envirostor.

Date of Government Version: 08/13/2021
Date Data Arrived at EDR: 08/13/2021
Date Made Active in Reports: 11/08/2021
Number of Days to Update: 87

Source: Department of Toxic Subsances Control
Telephone: 877-786-9427
Last EDR Contact: 11/15/2021
Next Scheduled EDR Contact: 02/28/2022
Data Release Frequency: Quarterly

HIST CORTESE: Hazardous Waste & Substance Site List

The sites for the list are designated by the State Water Resource Control Board [LUST], the Integrated Waste Board [SWF/LS], and the Department of Toxic Substances Control [CALSITES]. This listing is no longer updated by the state agency.

Date of Government Version: 04/01/2001
Date Data Arrived at EDR: 01/22/2009
Date Made Active in Reports: 04/08/2009
Number of Days to Update: 76

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 01/22/2009
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

HWP: EnviroStor Permitted Facilities Listing

Detailed information on permitted hazardous waste facilities and corrective action ("cleanups") tracked in EnviroStor.

Date of Government Version: 08/13/2021
Date Data Arrived at EDR: 08/13/2021
Date Made Active in Reports: 11/08/2021
Number of Days to Update: 87

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 11/15/2021
Next Scheduled EDR Contact: 02/28/2022
Data Release Frequency: Quarterly

HWT: Registered Hazardous Waste Transporter Database

A listing of hazardous waste transporters. In California, unless specifically exempted, it is unlawful for any person to transport hazardous wastes unless the person holds a valid registration issued by DTSC. A hazardous waste transporter registration is valid for one year and is assigned a unique registration number.

Date of Government Version: 10/04/2021
Date Data Arrived at EDR: 10/05/2021
Date Made Active in Reports: 12/22/2021
Number of Days to Update: 78

Source: Department of Toxic Substances Control
Telephone: 916-440-7145
Last EDR Contact: 01/04/2022
Next Scheduled EDR Contact: 04/18/2022
Data Release Frequency: Quarterly

MINES: Mines Site Location Listing

A listing of mine site locations from the Office of Mine Reclamation.

Date of Government Version: 09/07/2021
Date Data Arrived at EDR: 09/07/2021
Date Made Active in Reports: 11/29/2021
Number of Days to Update: 83

Source: Department of Conservation
Telephone: 916-322-1080
Last EDR Contact: 12/07/2021
Next Scheduled EDR Contact: 03/21/2022
Data Release Frequency: Quarterly

MWMP: Medical Waste Management Program Listing

The Medical Waste Management Program (MWMP) ensures the proper handling and disposal of medical waste by permitting and inspecting medical waste Offsite Treatment Facilities (PDF) and Transfer Stations (PDF) throughout the state. MWMP also oversees all Medical Waste Transporters.

Date of Government Version: 08/05/2021
Date Data Arrived at EDR: 08/31/2021
Date Made Active in Reports: 11/19/2021
Number of Days to Update: 80

Source: Department of Public Health
Telephone: 916-558-1784
Last EDR Contact: 11/30/2021
Next Scheduled EDR Contact: 03/14/2022
Data Release Frequency: Varies

NPDES: NPDES Permits Listing

A listing of NPDES permits, including stormwater.

Date of Government Version: 05/10/2021
Date Data Arrived at EDR: 05/11/2021
Date Made Active in Reports: 07/27/2021
Number of Days to Update: 77

Source: State Water Resources Control Board
Telephone: 916-445-9379
Last EDR Contact: 11/09/2021
Next Scheduled EDR Contact: 02/21/2022
Data Release Frequency: Quarterly

PEST LIC: Pesticide Regulation Licenses Listing

A listing of licenses and certificates issued by the Department of Pesticide Regulation. The DPR issues licenses and/or certificates to: Persons and businesses that apply or sell pesticides; Pest control dealers and brokers; Persons who advise on agricultural pesticide applications.

Date of Government Version: 08/30/2021
Date Data Arrived at EDR: 08/31/2021
Date Made Active in Reports: 11/19/2021
Number of Days to Update: 80

Source: Department of Pesticide Regulation
Telephone: 916-445-4038
Last EDR Contact: 11/30/2021
Next Scheduled EDR Contact: 03/14/2022
Data Release Frequency: Quarterly

PROC: Certified Processors Database

A listing of certified processors.

Date of Government Version: 06/04/2021
Date Data Arrived at EDR: 06/04/2021
Date Made Active in Reports: 08/27/2021
Number of Days to Update: 84

Source: Department of Conservation
Telephone: 916-323-3836
Last EDR Contact: 11/29/2021
Next Scheduled EDR Contact: 03/21/2022
Data Release Frequency: Quarterly

NOTIFY 65: Proposition 65 Records

Listings of all Proposition 65 incidents reported to counties by the State Water Resources Control Board and the Regional Water Quality Control Board. This database is no longer updated by the reporting agency.

Date of Government Version: 03/12/2021
Date Data Arrived at EDR: 03/16/2021
Date Made Active in Reports: 06/01/2021
Number of Days to Update: 77

Source: State Water Resources Control Board
Telephone: 916-445-3846
Last EDR Contact: 12/08/2021
Next Scheduled EDR Contact: 03/28/2022
Data Release Frequency: No Update Planned

UIC: UIC Listing

A listing of wells identified as underground injection wells, in the California Oil and Gas Wells database.

Date of Government Version: 06/03/2021
Date Data Arrived at EDR: 06/03/2021
Date Made Active in Reports: 08/25/2021
Number of Days to Update: 83

Source: Deaprtment of Conservation
Telephone: 916-445-2408
Last EDR Contact: 12/07/2021
Next Scheduled EDR Contact: 03/21/2022
Data Release Frequency: Varies

UIC GEO: Underground Injection Control Sites (GEOTRACKER)
Underground control injection sites

Date of Government Version: 09/07/2021
Date Data Arrived at EDR: 09/07/2021
Date Made Active in Reports: 11/29/2021
Number of Days to Update: 83
Source: State Water Resource Control Board
Telephone: 866-480-1028
Last EDR Contact: 12/07/2021
Next Scheduled EDR Contact: 03/21/2022
Data Release Frequency: Varies

WASTEWATER PITS: Oil Wastewater Pits Listing
Water officials discovered that oil producers have been dumping chemical-laden wastewater into hundreds of unlined pits that are operating without proper permits. Inspections completed by the Central Valley Regional Water Quality Control Board revealed the existence of previously unidentified waste sites. The water boards review found that more than one-third of the region's active disposal pits are operating without permission.

Date of Government Version: 02/11/2021
Date Data Arrived at EDR: 07/01/2021
Date Made Active in Reports: 09/29/2021
Number of Days to Update: 90
Source: RWQCB, Central Valley Region
Telephone: 559-445-5577
Last EDR Contact: 01/07/2022
Next Scheduled EDR Contact: 04/18/2022
Data Release Frequency: Varies

WDS: Waste Discharge System
Sites which have been issued waste discharge requirements.

Date of Government Version: 06/19/2007
Date Data Arrived at EDR: 06/20/2007
Date Made Active in Reports: 06/29/2007
Number of Days to Update: 9
Source: State Water Resources Control Board
Telephone: 916-341-5227
Last EDR Contact: 11/15/2021
Next Scheduled EDR Contact: 02/28/2022
Data Release Frequency: No Update Planned

WIP: Well Investigation Program Case List
Well Investigation Program case in the San Gabriel and San Fernando Valley area.

Date of Government Version: 07/03/2009
Date Data Arrived at EDR: 07/21/2009
Date Made Active in Reports: 08/03/2009
Number of Days to Update: 13
Source: Los Angeles Water Quality Control Board
Telephone: 213-576-6726
Last EDR Contact: 12/14/2021
Next Scheduled EDR Contact: 04/04/2022
Data Release Frequency: No Update Planned

MILITARY PRIV SITES: Military Privatized Sites (GEOTRACKER)
Military privatized sites

Date of Government Version: 09/07/2021
Date Data Arrived at EDR: 09/07/2021
Date Made Active in Reports: 11/29/2021
Number of Days to Update: 83
Source: State Water Resources Control Board
Telephone: 866-480-1028
Last EDR Contact: 12/07/2021
Next Scheduled EDR Contact: 03/21/2022
Data Release Frequency: Varies

PROJECT: Project Sites (GEOTRACKER)
Projects sites

Date of Government Version: 09/07/2021
Date Data Arrived at EDR: 09/07/2021
Date Made Active in Reports: 11/29/2021
Number of Days to Update: 83
Source: State Water Resources Control Board
Telephone: 866-480-1028
Last EDR Contact: 12/07/2021
Next Scheduled EDR Contact: 03/21/2022
Data Release Frequency: Varies

WDR: Waste Discharge Requirements Listing
In general, the Waste Discharge Requirements (WDRs) Program (sometimes also referred to as the "Non Chapter 15 (Non 15) Program") regulates point discharges that are exempt pursuant to Subsection 20090 of Title 27 and not subject to the Federal Water Pollution Control Act. Exemptions from Title 27 may be granted for nine categories of discharges (e.g., sewage, wastewater, etc.) that meet, and continue to meet, the preconditions listed for each specific exemption. The scope of the WDRs Program also includes the discharge of wastes classified as inert, pursuant to section 20230 of Title 27.

Date of Government Version: 09/07/2021
Date Data Arrived at EDR: 09/08/2021
Date Made Active in Reports: 12/01/2021
Number of Days to Update: 84

Source: State Water Resources Control Board
Telephone: 916-341-5810
Last EDR Contact: 12/07/2021
Next Scheduled EDR Contact: 03/21/2022
Data Release Frequency: Quarterly

CIWQS: California Integrated Water Quality System

The California Integrated Water Quality System (CIWQS) is a computer system used by the State and Regional Water Quality Control Boards to track information about places of environmental interest, manage permits and other orders, track inspections, and manage violations and enforcement activities.

Date of Government Version: 08/30/2021
Date Data Arrived at EDR: 08/31/2021
Date Made Active in Reports: 11/19/2021
Number of Days to Update: 80

Source: State Water Resources Control Board
Telephone: 866-794-4977
Last EDR Contact: 11/30/2021
Next Scheduled EDR Contact: 03/14/2022
Data Release Frequency: Varies

CERS: CalEPA Regulated Site Portal Data

The CalEPA Regulated Site Portal database combines data about environmentally regulated sites and facilities in California into a single database. It combines data from a variety of state and federal databases, and provides an overview of regulated activities across the spectrum of environmental programs for any given location in California. These activities include hazardous materials and waste, state and federal cleanups, impacted ground and surface waters, and toxic materials

Date of Government Version: 10/18/2021
Date Data Arrived at EDR: 10/19/2021
Date Made Active in Reports: 01/12/2022
Number of Days to Update: 85

Source: California Environmental Protection Agency
Telephone: 916-323-2514
Last EDR Contact: 10/19/2021
Next Scheduled EDR Contact: 01/31/2022
Data Release Frequency: Varies

NON-CASE INFO: Non-Case Information Sites (GEOTRACKER)

Non-Case Information sites

Date of Government Version: 09/07/2021
Date Data Arrived at EDR: 09/07/2021
Date Made Active in Reports: 11/29/2021
Number of Days to Update: 83

Source: State Water Resources Control Board
Telephone: 866-480-1028
Last EDR Contact: 12/07/2021
Next Scheduled EDR Contact: 03/21/2022
Data Release Frequency: Varies

OTHER OIL GAS: Other Oil & Gas Projects Sites (GEOTRACKER)

Other Oil & Gas Projects sites

Date of Government Version: 09/07/2021
Date Data Arrived at EDR: 09/07/2021
Date Made Active in Reports: 11/29/2021
Number of Days to Update: 83

Source: State Water Resources Control Board
Telephone: 866-480-1028
Last EDR Contact: 12/07/2021
Next Scheduled EDR Contact: 03/21/2022
Data Release Frequency: Varies

PROD WATER PONDS: Produced Water Ponds Sites (GEOTRACKER)

Produced water ponds sites

Date of Government Version: 09/07/2021
Date Data Arrived at EDR: 09/07/2021
Date Made Active in Reports: 11/29/2021
Number of Days to Update: 83

Source: State Water Resources Control Board
Telephone: 866-480-1028
Last EDR Contact: 12/07/2021
Next Scheduled EDR Contact: 03/21/2022
Data Release Frequency: Varies

SAMPLING POINT: Sampling Point ? Public Sites (GEOTRACKER)

Sampling point - public sites

Date of Government Version: 09/07/2021
Date Data Arrived at EDR: 09/07/2021
Date Made Active in Reports: 11/29/2021
Number of Days to Update: 83
Source: State Water Resources Control Board
Telephone: 866-480-1028
Last EDR Contact: 12/07/2021
Next Scheduled EDR Contact: 03/21/2022
Data Release Frequency: Varies

WELL STIM PROJ: Well Stimulation Project (GEOTRACKER)
Includes areas of groundwater monitoring plans, a depiction of the monitoring network, and the facilities, boundaries, and subsurface characteristics of the oilfield and the features (oil and gas wells, produced water ponds, UIC wells, water supply wells, etc?) being monitored

Date of Government Version: 09/07/2021
Date Data Arrived at EDR: 09/07/2021
Date Made Active in Reports: 11/29/2021
Number of Days to Update: 83
Source: State Water Resources Control Board
Telephone: 866-480-1028
Last EDR Contact: 12/07/2021
Next Scheduled EDR Contact: 03/21/2022
Data Release Frequency: Varies

PCS INACTIVE: Listing of Inactive PCS Permits
An inactive permit is a facility that has shut down or is no longer discharging.

Date of Government Version: 11/05/2014
Date Data Arrived at EDR: 01/06/2015
Date Made Active in Reports: 05/06/2015
Number of Days to Update: 120
Source: EPA
Telephone: 202-564-2496
Last EDR Contact: 12/29/2021
Next Scheduled EDR Contact: 04/18/2022
Data Release Frequency: Semi-Annually

PCS: Permit Compliance System
PCS is a computerized management information system that contains data on National Pollutant Discharge Elimination System (NPDES) permit holding facilities. PCS tracks the permit, compliance, and enforcement status of NPDES facilities.

Date of Government Version: 07/14/2011
Date Data Arrived at EDR: 08/05/2011
Date Made Active in Reports: 09/29/2011
Number of Days to Update: 55
Source: EPA, Office of Water
Telephone: 202-564-2496
Last EDR Contact: 12/29/2021
Next Scheduled EDR Contact: 04/18/2022
Data Release Frequency: Semi-Annually

HWTS: Hazardous Waste Tracking System
DTSC maintains the Hazardous Waste Tracking System that stores ID number information since the early 1980s and manifest data since 1993. The system collects both manifest copies from the generator and destination facility.

Date of Government Version: 07/13/2021
Date Data Arrived at EDR: 07/14/2021
Date Made Active in Reports: 10/06/2021
Number of Days to Update: 84
Source: Department of Toxic Substances Control
Telephone: 916-324-2444
Last EDR Contact: 01/13/2022
Next Scheduled EDR Contact: 04/18/2022
Data Release Frequency: Varies

MINES MRDS: Mineral Resources Data System
Mineral Resources Data System

Date of Government Version: 04/06/2018
Date Data Arrived at EDR: 10/21/2019
Date Made Active in Reports: 10/24/2019
Number of Days to Update: 3
Source: USGS
Telephone: 703-648-6533
Last EDR Contact: 11/23/2021
Next Scheduled EDR Contact: 03/07/2022
Data Release Frequency: Varies

PCS ENF: Enforcement data
No description is available for this data

Date of Government Version: 12/31/2014
Date Data Arrived at EDR: 02/05/2015
Date Made Active in Reports: 03/06/2015
Number of Days to Update: 29

Source: EPA
Telephone: 202-564-2497
Last EDR Contact: 12/29/2021
Next Scheduled EDR Contact: 04/18/2022
Data Release Frequency: Varies

EDR HIGH RISK HISTORICAL RECORDS

EDR Exclusive Records

EDR MGP: EDR Proprietary Manufactured Gas Plants

The EDR Proprietary Manufactured Gas Plant Database includes records of coal gas plants (manufactured gas plants) compiled by EDR's researchers. Manufactured gas sites were used in the United States from the 1800's to 1950's to produce a gas that could be distributed and used as fuel. These plants used whale oil, rosin, coal, or a mixture of coal, oil, and water that also produced a significant amount of waste. Many of the byproducts of the gas production, such as coal tar (oily waste containing volatile and non-volatile chemicals), sludges, oils and other compounds are potentially hazardous to human health and the environment. The byproduct from this process was frequently disposed of directly at the plant site and can remain or spread slowly, serving as a continuous source of soil and groundwater contamination.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

EDR Hist Auto: EDR Exclusive Historical Auto Stations

EDR has searched selected national collections of business directories and has collected listings of potential gas station/filling station/service station sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include gas station/filling station/service station establishments. The categories reviewed included, but were not limited to gas, gas station, gasoline station, filling station, auto, automobile repair, auto service station, service station, etc. This database falls within a category of information EDR classifies as "High Risk Historical Records", or HRHR. EDR's HRHR effort presents unique and sometimes proprietary data about past sites and operations that typically create environmental concerns, but may not show up in current government records searches.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

EDR Hist Cleaner: EDR Exclusive Historical Cleaners

EDR has searched selected national collections of business directories and has collected listings of potential dry cleaner sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include dry cleaning establishments. The categories reviewed included, but were not limited to dry cleaners, cleaners, laundry, laundromat, cleaning/laundry, wash & dry etc. This database falls within a category of information EDR classifies as "High Risk Historical Records", or HRHR. EDR's HRHR effort presents unique and sometimes proprietary data about past sites and operations that typically create environmental concerns, but may not show up in current government records searches.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

EDR RECOVERED GOVERNMENT ARCHIVES

Exclusive Recovered Govt. Archives

RGA LF: Recovered Government Archive Solid Waste Facilities List

The EDR Recovered Government Archive Landfill database provides a list of landfills derived from historical databases and includes many records that no longer appear in current government lists. Compiled from Records formerly available from the Department of Resources Recycling and Recovery in California.

Date of Government Version: N/A
Date Data Arrived at EDR: 07/01/2013
Date Made Active in Reports: 01/13/2014
Number of Days to Update: 196

Source: Department of Resources Recycling and Recovery
Telephone: N/A
Last EDR Contact: 06/01/2012
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

RGA LUST: Recovered Government Archive Leaking Underground Storage Tank

The EDR Recovered Government Archive Leaking Underground Storage Tank database provides a list of LUST incidents derived from historical databases and includes many records that no longer appear in current government lists. Compiled from Records formerly available from the State Water Resources Control Board in California.

Date of Government Version: N/A
Date Data Arrived at EDR: 07/01/2013
Date Made Active in Reports: 12/30/2013
Number of Days to Update: 182

Source: State Water Resources Control Board
Telephone: N/A
Last EDR Contact: 06/01/2012
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

COUNTY RECORDS

ALAMEDA COUNTY:

CS ALAMEDA: Contaminated Sites

A listing of contaminated sites overseen by the Toxic Release Program (oil and groundwater contamination from chemical releases and spills) and the Leaking Underground Storage Tank Program (soil and ground water contamination from leaking petroleum USTs).

Date of Government Version: 01/09/2019
Date Data Arrived at EDR: 01/11/2019
Date Made Active in Reports: 03/05/2019
Number of Days to Update: 53

Source: Alameda County Environmental Health Services
Telephone: 510-567-6700
Last EDR Contact: 12/28/2021
Next Scheduled EDR Contact: 04/18/2022
Data Release Frequency: Semi-Annually

UST ALAMEDA: Underground Tanks

Underground storage tank sites located in Alameda county.

Date of Government Version: 09/30/2021
Date Data Arrived at EDR: 10/01/2021
Date Made Active in Reports: 12/15/2021
Number of Days to Update: 75

Source: Alameda County Environmental Health Services
Telephone: 510-567-6700
Last EDR Contact: 12/28/2021
Next Scheduled EDR Contact: 04/18/2022
Data Release Frequency: Semi-Annually

AMADOR COUNTY:

CUPA AMADOR: CUPA Facility List

Cupa Facility List

Date of Government Version: 08/05/2021
Date Data Arrived at EDR: 08/06/2021
Date Made Active in Reports: 09/17/2021
Number of Days to Update: 42

Source: Amador County Environmental Health
Telephone: 209-223-6439
Last EDR Contact: 10/29/2021
Next Scheduled EDR Contact: 02/14/2022
Data Release Frequency: Varies

BUTTE COUNTY:

CUPA BUTTE: CUPA Facility Listing
Cupa facility list.

Date of Government Version: 04/21/2017
Date Data Arrived at EDR: 04/25/2017
Date Made Active in Reports: 08/09/2017
Number of Days to Update: 106

Source: Public Health Department
Telephone: 530-538-7149
Last EDR Contact: 12/28/2021
Next Scheduled EDR Contact: 04/18/2022
Data Release Frequency: No Update Planned

CALVERAS COUNTY:

CUPA CALVERAS: CUPA Facility Listing
Cupa Facility Listing

Date of Government Version: 09/15/2021
Date Data Arrived at EDR: 09/16/2021
Date Made Active in Reports: 12/09/2021
Number of Days to Update: 84

Source: Calveras County Environmental Health
Telephone: 209-754-6399
Last EDR Contact: 12/28/2021
Next Scheduled EDR Contact: 04/04/2022
Data Release Frequency: Quarterly

COLUSA COUNTY:

CUPA COLUSA: CUPA Facility List
Cupa facility list.

Date of Government Version: 04/06/2020
Date Data Arrived at EDR: 04/23/2020
Date Made Active in Reports: 07/10/2020
Number of Days to Update: 78

Source: Health & Human Services
Telephone: 530-458-0396
Last EDR Contact: 10/29/2021
Next Scheduled EDR Contact: 02/14/2022
Data Release Frequency: Semi-Annually

CONTRA COSTA COUNTY:

SL CONTRA COSTA: Site List
List includes sites from the underground tank, hazardous waste generator and business plan/2185 programs.

Date of Government Version: 07/20/2021
Date Data Arrived at EDR: 07/20/2021
Date Made Active in Reports: 10/11/2021
Number of Days to Update: 83

Source: Contra Costa Health Services Department
Telephone: 925-646-2286
Last EDR Contact: 10/22/2021
Next Scheduled EDR Contact: 02/07/2022
Data Release Frequency: Semi-Annually

DEL NORTE COUNTY:

CUPA DEL NORTE: CUPA Facility List
Cupa Facility list

Date of Government Version: 06/29/2021
Date Data Arrived at EDR: 07/23/2021
Date Made Active in Reports: 10/08/2021
Number of Days to Update: 77

Source: Del Norte County Environmental Health Division
Telephone: 707-465-0426
Last EDR Contact: 10/29/2021
Next Scheduled EDR Contact: 02/07/2022
Data Release Frequency: Varies

EL DORADO COUNTY:

CUPA EL DORADO: CUPA Facility List
CUPA facility list.

Date of Government Version: 07/30/2021
Date Data Arrived at EDR: 08/03/2021
Date Made Active in Reports: 10/26/2021
Number of Days to Update: 84

Source: El Dorado County Environmental Management Department
Telephone: 530-621-6623
Last EDR Contact: 11/16/2021
Next Scheduled EDR Contact: 02/07/2022
Data Release Frequency: Varies

FRESNO COUNTY:

CUPA FRESNO: CUPA Resources List
Certified Unified Program Agency. CUPA's are responsible for implementing a unified hazardous materials and hazardous waste management regulatory program. The agency provides oversight of businesses that deal with hazardous materials, operate underground storage tanks or aboveground storage tanks.

Date of Government Version: 04/09/2021
Date Data Arrived at EDR: 06/23/2021
Date Made Active in Reports: 09/17/2021
Number of Days to Update: 86

Source: Dept. of Community Health
Telephone: 559-445-3271
Last EDR Contact: 12/21/2021
Next Scheduled EDR Contact: 04/11/2022
Data Release Frequency: Semi-Annually

GLENN COUNTY:

CUPA GLENN: CUPA Facility List
Cupa facility list

Date of Government Version: 01/22/2018
Date Data Arrived at EDR: 01/24/2018
Date Made Active in Reports: 03/14/2018
Number of Days to Update: 49

Source: Glenn County Air Pollution Control District
Telephone: 830-934-6500
Last EDR Contact: 01/13/2022
Next Scheduled EDR Contact: 05/02/2022
Data Release Frequency: No Update Planned

HUMBOLDT COUNTY:

CUPA HUMBOLDT: CUPA Facility List
CUPA facility list.

Date of Government Version: 08/12/2021
Date Data Arrived at EDR: 08/12/2021
Date Made Active in Reports: 11/08/2021
Number of Days to Update: 88

Source: Humboldt County Environmental Health
Telephone: N/A
Last EDR Contact: 11/11/2021
Next Scheduled EDR Contact: 02/28/2022
Data Release Frequency: Semi-Annually

IMPERIAL COUNTY:

CUPA IMPERIAL: CUPA Facility List
Cupa facility list.

Date of Government Version: 10/18/2021
Date Data Arrived at EDR: 10/20/2021
Date Made Active in Reports: 01/12/2022
Number of Days to Update: 84

Source: San Diego Border Field Office
Telephone: 760-339-2777
Last EDR Contact: 01/13/2022
Next Scheduled EDR Contact: 05/02/2022
Data Release Frequency: Varies

INYO COUNTY:

CUPA INYO: CUPA Facility List
Cupa facility list.

Date of Government Version: 04/02/2018
Date Data Arrived at EDR: 04/03/2018
Date Made Active in Reports: 06/14/2018
Number of Days to Update: 72

Source: Inyo County Environmental Health Services
Telephone: 760-878-0238
Last EDR Contact: 11/11/2021
Next Scheduled EDR Contact: 02/28/2022
Data Release Frequency: Varies

KERN COUNTY:

CUPA KERN: CUPA Facility List
A listing of sites included in the Kern County Hazardous Material Business Plan.

Date of Government Version: 07/06/2021
Date Data Arrived at EDR: 08/12/2021
Date Made Active in Reports: 10/07/2021
Number of Days to Update: 56

Source: Kern County Public Health
Telephone: 661-321-3000
Last EDR Contact: 11/11/2021
Next Scheduled EDR Contact: 02/14/2022
Data Release Frequency: Varies

UST KERN: Underground Storage Tank Sites & Tank Listing
Kern County Sites and Tanks Listing.

Date of Government Version: 07/06/2021
Date Data Arrived at EDR: 08/12/2021
Date Made Active in Reports: 08/18/2021
Number of Days to Update: 6

Source: Kern County Environment Health Services Department
Telephone: 661-862-8700
Last EDR Contact: 11/11/2021
Next Scheduled EDR Contact: 02/14/2022
Data Release Frequency: Quarterly

KINGS COUNTY:

CUPA KINGS: CUPA Facility List
A listing of sites included in the county's Certified Unified Program Agency database. California's Secretary for Environmental Protection established the unified hazardous materials and hazardous waste regulatory program as required by chapter 6.11 of the California Health and Safety Code. The Unified Program consolidates the administration, permits, inspections, and enforcement activities.

Date of Government Version: 12/03/2020
Date Data Arrived at EDR: 01/26/2021
Date Made Active in Reports: 04/14/2021
Number of Days to Update: 78

Source: Kings County Department of Public Health
Telephone: 559-584-1411
Last EDR Contact: 12/22/2021
Next Scheduled EDR Contact: 02/28/2022
Data Release Frequency: Varies

LAKE COUNTY:

CUPA LAKE: CUPA Facility List
Cupa facility list

Date of Government Version: 07/27/2021
Date Data Arrived at EDR: 07/28/2021
Date Made Active in Reports: 10/21/2021
Number of Days to Update: 85

Source: Lake County Environmental Health
Telephone: 707-263-1164
Last EDR Contact: 01/10/2022
Next Scheduled EDR Contact: 04/25/2022
Data Release Frequency: Varies

LASSEN COUNTY:

CUPA LASSEN: CUPA Facility List
Cupa facility list

Date of Government Version: 07/31/2020
Date Data Arrived at EDR: 08/21/2020
Date Made Active in Reports: 11/09/2020
Number of Days to Update: 80

Source: Lassen County Environmental Health
Telephone: 530-251-8528
Last EDR Contact: 01/13/2022
Next Scheduled EDR Contact: 05/02/2022
Data Release Frequency: Varies

LOS ANGELES COUNTY:

AOCONCERN: Key Areas of Concerns in Los Angeles County
San Gabriel Valley areas where VOC contamination is at or above the MCL as designated by region 9 EPA office. Date of Government Version: 3/30/2009 Exide Site area is a cleanup plan of lead-impacted soil surrounding the former Exide Facility as designated by the DTSC. Date of Government Version: 7/17/2017

Date of Government Version: 03/30/2009
Date Data Arrived at EDR: 03/31/2009
Date Made Active in Reports: 10/23/2009
Number of Days to Update: 206

Source: N/A
Telephone: N/A
Last EDR Contact: 12/08/2021
Next Scheduled EDR Contact: 03/28/2022
Data Release Frequency: No Update Planned

HMS LOS ANGELES: HMS: Street Number List
Industrial Waste and Underground Storage Tank Sites.

Date of Government Version: 10/14/2021
Date Data Arrived at EDR: 10/19/2021
Date Made Active in Reports: 01/13/2022
Number of Days to Update: 86

Source: Department of Public Works
Telephone: 626-458-3517
Last EDR Contact: 01/13/2022
Next Scheduled EDR Contact: 04/18/2022
Data Release Frequency: Semi-Annually

LF LOS ANGELES: List of Solid Waste Facilities
Solid Waste Facilities in Los Angeles County.

Date of Government Version: 10/08/2021
Date Data Arrived at EDR: 10/08/2021
Date Made Active in Reports: 12/29/2021
Number of Days to Update: 82

Source: La County Department of Public Works
Telephone: 818-458-5185
Last EDR Contact: 01/11/2022
Next Scheduled EDR Contact: 04/25/2022
Data Release Frequency: Varies

LF LOS ANGELES CITY: City of Los Angeles Landfills
Landfills owned and maintained by the City of Los Angeles.

Date of Government Version: 01/01/2021
Date Data Arrived at EDR: 02/18/2021
Date Made Active in Reports: 05/10/2021
Number of Days to Update: 81

Source: Engineering & Construction Division
Telephone: 213-473-7869
Last EDR Contact: 01/07/2022
Next Scheduled EDR Contact: 04/25/2022
Data Release Frequency: Varies

LOS ANGELES AST: Active & Inactive AST Inventory
A listing of active & inactive above ground petroleum storage tank site locations, located in the City of Los Angeles.

Date of Government Version: 06/01/2019
Date Data Arrived at EDR: 06/25/2019
Date Made Active in Reports: 08/22/2019
Number of Days to Update: 58

Source: Los Angeles Fire Department
Telephone: 213-978-3800
Last EDR Contact: 12/16/2021
Next Scheduled EDR Contact: 04/04/2022
Data Release Frequency: Varies

LOS ANGELES CO LF METHANE: Methane Producing Landfills

This data was created on April 30, 2012 to represent known disposal sites in Los Angeles County that may produce and emanate methane gas. The shapefile contains disposal sites within Los Angeles County that once accepted degradable refuse material. Information used to create this data was extracted from a landfill survey performed by County Engineers (Major Waste System Map, 1973) as well as historical records from CalRecycle, Regional Water Quality Control Board, and Los Angeles County Department of Public Health

Date of Government Version: 10/12/2021
Date Data Arrived at EDR: 10/13/2021
Date Made Active in Reports: 01/04/2022
Number of Days to Update: 83

Source: Los Angeles County Department of Public Works
Telephone: 626-458-6973
Last EDR Contact: 01/07/2022
Next Scheduled EDR Contact: 04/25/2022
Data Release Frequency: No Update Planned

LOS ANGELES HM: Active & Inactive Hazardous Materials Inventory

A listing of active & inactive hazardous materials facility locations, located in the City of Los Angeles.

Date of Government Version: 04/19/2021
Date Data Arrived at EDR: 06/17/2021
Date Made Active in Reports: 06/28/2021
Number of Days to Update: 11

Source: Los Angeles Fire Department
Telephone: 213-978-3800
Last EDR Contact: 12/17/2021
Next Scheduled EDR Contact: 04/04/2022
Data Release Frequency: Varies

LOS ANGELES UST: Active & Inactive UST Inventory

A listing of active & inactive underground storage tank site locations and underground storage tank historical sites, located in the City of Los Angeles.

Date of Government Version: 04/19/2021
Date Data Arrived at EDR: 06/17/2021
Date Made Active in Reports: 09/14/2021
Number of Days to Update: 89

Source: Los Angeles Fire Department
Telephone: 213-978-3800
Last EDR Contact: 12/17/2021
Next Scheduled EDR Contact: 04/04/2022
Data Release Frequency: Varies

SITE MIT LOS ANGELES: Site Mitigation List

Industrial sites that have had some sort of spill or complaint.

Date of Government Version: 05/26/2021
Date Data Arrived at EDR: 07/09/2021
Date Made Active in Reports: 09/29/2021
Number of Days to Update: 82

Source: Community Health Services
Telephone: 323-890-7806
Last EDR Contact: 01/13/2022
Next Scheduled EDR Contact: 04/24/2022
Data Release Frequency: Annually

UST EL SEGUNDO: City of El Segundo Underground Storage Tank

Underground storage tank sites located in El Segundo city.

Date of Government Version: 01/21/2017
Date Data Arrived at EDR: 04/19/2017
Date Made Active in Reports: 05/10/2017
Number of Days to Update: 21

Source: City of El Segundo Fire Department
Telephone: 310-524-2236
Last EDR Contact: 01/07/2022
Next Scheduled EDR Contact: 04/25/2022
Data Release Frequency: No Update Planned

UST LONG BEACH: City of Long Beach Underground Storage Tank

Underground storage tank sites located in the city of Long Beach.

Date of Government Version: 04/22/2019
Date Data Arrived at EDR: 04/23/2019
Date Made Active in Reports: 06/27/2019
Number of Days to Update: 65

Source: City of Long Beach Fire Department
Telephone: 562-570-2563
Last EDR Contact: 01/13/2022
Next Scheduled EDR Contact: 05/02/2022
Data Release Frequency: Varies

UST TORRANCE: City of Torrance Underground Storage Tank
Underground storage tank sites located in the city of Torrance.

Date of Government Version: 02/02/2021
Date Data Arrived at EDR: 04/28/2021
Date Made Active in Reports: 07/13/2021
Number of Days to Update: 76

Source: City of Torrance Fire Department
Telephone: 310-618-2973
Last EDR Contact: 01/13/2022
Next Scheduled EDR Contact: 05/02/2022
Data Release Frequency: Semi-Annually

MADERA COUNTY:

CUPA MADERA: CUPA Facility List
A listing of sites included in the county's Certified Unified Program Agency database. California's Secretary for Environmental Protection established the unified hazardous materials and hazardous waste regulatory program as required by chapter 6.11 of the California Health and Safety Code. The Unified Program consolidates the administration, permits, inspections, and enforcement activities.

Date of Government Version: 08/10/2020
Date Data Arrived at EDR: 08/12/2020
Date Made Active in Reports: 10/23/2020
Number of Days to Update: 72

Source: Madera County Environmental Health
Telephone: 559-675-7823
Last EDR Contact: 11/11/2021
Next Scheduled EDR Contact: 02/28/2022
Data Release Frequency: Varies

MARIN COUNTY:

UST MARIN: Underground Storage Tank Sites
Currently permitted USTs in Marin County.

Date of Government Version: 09/26/2018
Date Data Arrived at EDR: 10/04/2018
Date Made Active in Reports: 11/02/2018
Number of Days to Update: 29

Source: Public Works Department Waste Management
Telephone: 415-473-6647
Last EDR Contact: 12/20/2021
Next Scheduled EDR Contact: 04/11/2022
Data Release Frequency: Semi-Annually

MENDOCINO COUNTY:

UST MENDOCINO: Mendocino County UST Database
A listing of underground storage tank locations in Mendocino County.

Date of Government Version: 09/22/2021
Date Data Arrived at EDR: 11/18/2021
Date Made Active in Reports: 11/22/2021
Number of Days to Update: 4

Source: Department of Public Health
Telephone: 707-463-4466
Last EDR Contact: 11/16/2021
Next Scheduled EDR Contact: 03/07/2022
Data Release Frequency: Annually

MERCED COUNTY:

CUPA MERCED: CUPA Facility List
CUPA facility list.

Date of Government Version: 08/11/2021
Date Data Arrived at EDR: 08/12/2021
Date Made Active in Reports: 11/08/2021
Number of Days to Update: 88

Source: Merced County Environmental Health
Telephone: 209-381-1094
Last EDR Contact: 11/23/2021
Next Scheduled EDR Contact: 02/28/2022
Data Release Frequency: Varies

MONO COUNTY:

CUPA MONO: CUPA Facility List
CUPA Facility List

Date of Government Version: 02/22/2021
Date Data Arrived at EDR: 03/02/2021
Date Made Active in Reports: 05/19/2021
Number of Days to Update: 78

Source: Mono County Health Department
Telephone: 760-932-5580
Last EDR Contact: 01/13/2022
Next Scheduled EDR Contact: 03/07/2022
Data Release Frequency: Varies

MONTEREY COUNTY:

CUPA MONTEREY: CUPA Facility Listing
CUPA Program listing from the Environmental Health Division.

Date of Government Version: 10/04/2021
Date Data Arrived at EDR: 10/06/2021
Date Made Active in Reports: 12/29/2021
Number of Days to Update: 84

Source: Monterey County Health Department
Telephone: 831-796-1297
Last EDR Contact: 01/07/2022
Next Scheduled EDR Contact: 04/11/2022
Data Release Frequency: Varies

NAPA COUNTY:

LUST NAPA: Sites With Reported Contamination
A listing of leaking underground storage tank sites located in Napa county.

Date of Government Version: 01/09/2017
Date Data Arrived at EDR: 01/11/2017
Date Made Active in Reports: 03/02/2017
Number of Days to Update: 50

Source: Napa County Department of Environmental Management
Telephone: 707-253-4269
Last EDR Contact: 11/16/2021
Next Scheduled EDR Contact: 03/07/2022
Data Release Frequency: No Update Planned

UST NAPA: Closed and Operating Underground Storage Tank Sites
Underground storage tank sites located in Napa county.

Date of Government Version: 09/05/2019
Date Data Arrived at EDR: 09/09/2019
Date Made Active in Reports: 10/31/2019
Number of Days to Update: 52

Source: Napa County Department of Environmental Management
Telephone: 707-253-4269
Last EDR Contact: 11/16/2021
Next Scheduled EDR Contact: 03/07/2022
Data Release Frequency: No Update Planned

NEVADA COUNTY:

CUPA NEVADA: CUPA Facility List
CUPA facility list.

Date of Government Version: 07/28/2021
Date Data Arrived at EDR: 07/28/2021
Date Made Active in Reports: 10/21/2021
Number of Days to Update: 85

Source: Community Development Agency
Telephone: 530-265-1467
Last EDR Contact: 10/22/2021
Next Scheduled EDR Contact: 02/07/2022
Data Release Frequency: Varies

ORANGE COUNTY:

IND_SITE ORANGE: List of Industrial Site Cleanups
Petroleum and non-petroleum spills.

Date of Government Version: 07/09/2021
Date Data Arrived at EDR: 08/03/2021
Date Made Active in Reports: 10/26/2021
Number of Days to Update: 84

Source: Health Care Agency
Telephone: 714-834-3446
Last EDR Contact: 10/29/2021
Next Scheduled EDR Contact: 02/14/2022
Data Release Frequency: Annually

LUST ORANGE: List of Underground Storage Tank Cleanups
Orange County Underground Storage Tank Cleanups (LUST).

Date of Government Version: 07/09/2021
Date Data Arrived at EDR: 08/03/2021
Date Made Active in Reports: 10/26/2021
Number of Days to Update: 84

Source: Health Care Agency
Telephone: 714-834-3446
Last EDR Contact: 10/29/2021
Next Scheduled EDR Contact: 02/14/2022
Data Release Frequency: Quarterly

UST ORANGE: List of Underground Storage Tank Facilities
Orange County Underground Storage Tank Facilities (UST).

Date of Government Version: 07/09/2021
Date Data Arrived at EDR: 07/29/2021
Date Made Active in Reports: 10/19/2021
Number of Days to Update: 82

Source: Health Care Agency
Telephone: 714-834-3446
Last EDR Contact: 10/29/2021
Next Scheduled EDR Contact: 02/14/2022
Data Release Frequency: Quarterly

PLACER COUNTY:

MS PLACER: Master List of Facilities
List includes aboveground tanks, underground tanks and cleanup sites.

Date of Government Version: 09/07/2021
Date Data Arrived at EDR: 09/09/2021
Date Made Active in Reports: 11/29/2021
Number of Days to Update: 81

Source: Placer County Health and Human Services
Telephone: 530-745-2363
Last EDR Contact: 11/23/2021
Next Scheduled EDR Contact: 03/14/2022
Data Release Frequency: Semi-Annually

PLUMAS COUNTY:

CUPA PLUMAS: CUPA Facility List
Plumas County CUPA Program facilities.

Date of Government Version: 03/31/2019
Date Data Arrived at EDR: 04/23/2019
Date Made Active in Reports: 06/26/2019
Number of Days to Update: 64

Source: Plumas County Environmental Health
Telephone: 530-283-6355
Last EDR Contact: 01/13/2022
Next Scheduled EDR Contact: 05/02/2022
Data Release Frequency: Varies

RIVERSIDE COUNTY:

LUST RIVERSIDE: Listing of Underground Tank Cleanup Sites
Riverside County Underground Storage Tank Cleanup Sites (LUST).

Date of Government Version: 09/29/2021
Date Data Arrived at EDR: 09/30/2021
Date Made Active in Reports: 12/14/2021
Number of Days to Update: 75

Source: Department of Environmental Health
Telephone: 951-358-5055
Last EDR Contact: 12/08/2021
Next Scheduled EDR Contact: 03/28/2022
Data Release Frequency: Quarterly

UST RIVERSIDE: Underground Storage Tank Tank List
Underground storage tank sites located in Riverside county.

Date of Government Version: 09/29/2021
Date Data Arrived at EDR: 09/30/2021
Date Made Active in Reports: 12/15/2021
Number of Days to Update: 76
Source: Department of Environmental Health
Telephone: 951-358-5055
Last EDR Contact: 12/08/2021
Next Scheduled EDR Contact: 03/28/2022
Data Release Frequency: Quarterly

SACRAMENTO COUNTY:

CS SACRAMENTO: Toxic Site Clean-Up List
List of sites where unauthorized releases of potentially hazardous materials have occurred.

Date of Government Version: 06/18/2021
Date Data Arrived at EDR: 09/28/2021
Date Made Active in Reports: 12/14/2021
Number of Days to Update: 77
Source: Sacramento County Environmental Management
Telephone: 916-875-8406
Last EDR Contact: 12/29/2021
Next Scheduled EDR Contact: 04/11/2022
Data Release Frequency: Quarterly

ML SACRAMENTO: Master Hazardous Materials Facility List
Any business that has hazardous materials on site - hazardous material storage sites, underground storage tanks, waste generators.

Date of Government Version: 08/02/2021
Date Data Arrived at EDR: 08/04/2021
Date Made Active in Reports: 11/02/2021
Number of Days to Update: 90
Source: Sacramento County Environmental Management
Telephone: 916-875-8406
Last EDR Contact: 12/29/2021
Next Scheduled EDR Contact: 04/11/2022
Data Release Frequency: Quarterly

SAN BENITO COUNTY:

CUPA SAN BENITO: CUPA Facility List
Cupa facility list

Date of Government Version: 07/27/2021
Date Data Arrived at EDR: 07/28/2021
Date Made Active in Reports: 10/21/2021
Number of Days to Update: 85
Source: San Benito County Environmental Health
Telephone: N/A
Last EDR Contact: 10/29/2021
Next Scheduled EDR Contact: 02/14/2022
Data Release Frequency: Varies

SAN BERNARDINO COUNTY:

PERMITS SAN BERNARDINO: Hazardous Material Permits
This listing includes underground storage tanks, medical waste handlers/generators, hazardous materials handlers, hazardous waste generators, and waste oil generators/handlers.

Date of Government Version: 08/11/2021
Date Data Arrived at EDR: 08/12/2021
Date Made Active in Reports: 11/08/2021
Number of Days to Update: 88
Source: San Bernardino County Fire Department Hazardous Materials Division
Telephone: 909-387-3041
Last EDR Contact: 11/01/2021
Next Scheduled EDR Contact: 02/14/2022
Data Release Frequency: Quarterly

SAN DIEGO COUNTY:

HMMD SAN DIEGO: Hazardous Materials Management Division Database

The database includes: HE58 - This report contains the business name, site address, business phone number, establishment 'H' permit number, type of permit, and the business status. HE17 - In addition to providing the same information provided in the HE58 listing, HE17 provides inspection dates, violations received by the establishment, hazardous waste generated, the quantity, method of storage, treatment/disposal of waste and the hauler, and information on underground storage tanks. Unauthorized Release List - Includes a summary of environmental contamination cases in San Diego County (underground tank cases, non-tank cases, groundwater contamination, and soil contamination are included.)

Date of Government Version: 08/30/2021
Date Data Arrived at EDR: 08/31/2021
Date Made Active in Reports: 11/19/2021
Number of Days to Update: 80

Source: Hazardous Materials Management Division
Telephone: 619-338-2268
Last EDR Contact: 11/30/2021
Next Scheduled EDR Contact: 03/14/2022
Data Release Frequency: Quarterly

LF SAN DIEGO: Solid Waste Facilities

San Diego County Solid Waste Facilities.

Date of Government Version: 10/01/2020
Date Data Arrived at EDR: 11/23/2020
Date Made Active in Reports: 02/08/2021
Number of Days to Update: 77

Source: Department of Health Services
Telephone: 619-338-2209
Last EDR Contact: 01/13/2022
Next Scheduled EDR Contact: 05/02/2022
Data Release Frequency: Varies

SAN DIEGO CO LOP: Local Oversight Program Listing

A listing of all LOP release sites that are or were under the County of San Diego's jurisdiction. Included are closed or transferred cases, open cases, and cases that did not have a case type indicated. The cases without a case type are mostly complaints; however, some of them could be LOP cases.

Date of Government Version: 07/22/2021
Date Data Arrived at EDR: 10/19/2021
Date Made Active in Reports: 01/13/2022
Number of Days to Update: 86

Source: Department of Environmental Health
Telephone: 858-505-6874
Last EDR Contact: 01/13/2022
Next Scheduled EDR Contact: 05/02/2022
Data Release Frequency: Varies

SAN DIEGO CO SAM: Environmental Case Listing

The listing contains all underground tank release cases and projects pertaining to properties contaminated with hazardous substances that are actively under review by the Site Assessment and Mitigation Program.

Date of Government Version: 03/23/2010
Date Data Arrived at EDR: 06/15/2010
Date Made Active in Reports: 07/09/2010
Number of Days to Update: 24

Source: San Diego County Department of Environmental Health
Telephone: 619-338-2371
Last EDR Contact: 11/23/2021
Next Scheduled EDR Contact: 03/14/2022
Data Release Frequency: No Update Planned

SAN FRANCISCO COUNTY:

CUPA SAN FRANCISCO CO: CUPA Facility Listing

Cupa facilities

Date of Government Version: 08/05/2021
Date Data Arrived at EDR: 08/05/2021
Date Made Active in Reports: 10/29/2021
Number of Days to Update: 85

Source: San Francisco County Department of Environmental Health
Telephone: 415-252-3896
Last EDR Contact: 11/11/2021
Next Scheduled EDR Contact: 02/14/2022
Data Release Frequency: Varies

LUST SAN FRANCISCO: Local Oversite Facilities

A listing of leaking underground storage tank sites located in San Francisco county.

Date of Government Version: 09/19/2008
Date Data Arrived at EDR: 09/19/2008
Date Made Active in Reports: 09/29/2008
Number of Days to Update: 10

Source: Department Of Public Health San Francisco County
Telephone: 415-252-3920
Last EDR Contact: 11/01/2021
Next Scheduled EDR Contact: 02/14/2022
Data Release Frequency: No Update Planned

UST SAN FRANCISCO: Underground Storage Tank Information
Underground storage tank sites located in San Francisco county.

Date of Government Version: 08/05/2021
Date Data Arrived at EDR: 08/05/2021
Date Made Active in Reports: 10/29/2021
Number of Days to Update: 85

Source: Department of Public Health
Telephone: 415-252-3920
Last EDR Contact: 10/31/2021
Next Scheduled EDR Contact: 02/14/2022
Data Release Frequency: Quarterly

SAN JOAQUIN COUNTY:

UST SAN JOAQUIN: San Joaquin Co. UST
A listing of underground storage tank locations in San Joaquin county.

Date of Government Version: 06/22/2018
Date Data Arrived at EDR: 06/26/2018
Date Made Active in Reports: 07/11/2018
Number of Days to Update: 15

Source: Environmental Health Department
Telephone: N/A
Last EDR Contact: 09/09/2021
Next Scheduled EDR Contact: 12/27/2021
Data Release Frequency: Semi-Annually

SAN LUIS OBISPO COUNTY:

CUPA SAN LUIS OBISPO: CUPA Facility List
Cupa Facility List.

Date of Government Version: 08/10/2021
Date Data Arrived at EDR: 08/11/2021
Date Made Active in Reports: 11/08/2021
Number of Days to Update: 89

Source: San Luis Obispo County Public Health Department
Telephone: 805-781-5596
Last EDR Contact: 11/11/2021
Next Scheduled EDR Contact: 02/28/2022
Data Release Frequency: Varies

SAN MATEO COUNTY:

BI SAN MATEO: Business Inventory
List includes Hazardous Materials Business Plan, hazardous waste generators, and underground storage tanks.

Date of Government Version: 02/20/2020
Date Data Arrived at EDR: 02/20/2020
Date Made Active in Reports: 04/24/2020
Number of Days to Update: 64

Source: San Mateo County Environmental Health Services Division
Telephone: 650-363-1921
Last EDR Contact: 12/10/2021
Next Scheduled EDR Contact: 03/21/2022
Data Release Frequency: Annually

LUST SAN MATEO: Fuel Leak List
A listing of leaking underground storage tank sites located in San Mateo county.

Date of Government Version: 03/29/2019
Date Data Arrived at EDR: 03/29/2019
Date Made Active in Reports: 05/29/2019
Number of Days to Update: 61

Source: San Mateo County Environmental Health Services Division
Telephone: 650-363-1921
Last EDR Contact: 12/02/2021
Next Scheduled EDR Contact: 03/21/2022
Data Release Frequency: Semi-Annually

SANTA BARBARA COUNTY:

CUPA SANTA BARBARA: CUPA Facility Listing
CUPA Program Listing from the Environmental Health Services division.

Date of Government Version: 09/08/2011
Date Data Arrived at EDR: 09/09/2011
Date Made Active in Reports: 10/07/2011
Number of Days to Update: 28

Source: Santa Barbara County Public Health Department
Telephone: 805-686-8167
Last EDR Contact: 11/11/2021
Next Scheduled EDR Contact: 02/28/2022
Data Release Frequency: No Update Planned

SANTA CLARA COUNTY:

CUPA SANTA CLARA: Cupa Facility List
Cupa facility list

Date of Government Version: 08/04/2021
Date Data Arrived at EDR: 08/05/2021
Date Made Active in Reports: 10/29/2021
Number of Days to Update: 85

Source: Department of Environmental Health
Telephone: 408-918-1973
Last EDR Contact: 11/18/2021
Next Scheduled EDR Contact: 02/27/2022
Data Release Frequency: Varies

HIST LUST SANTA CLARA: HIST LUST - Fuel Leak Site Activity Report
A listing of open and closed leaking underground storage tanks. This listing is no longer updated by the county. Leaking underground storage tanks are now handled by the Department of Environmental Health.

Date of Government Version: 03/29/2005
Date Data Arrived at EDR: 03/30/2005
Date Made Active in Reports: 04/21/2005
Number of Days to Update: 22

Source: Santa Clara Valley Water District
Telephone: 408-265-2600
Last EDR Contact: 03/23/2009
Next Scheduled EDR Contact: 06/22/2009
Data Release Frequency: No Update Planned

LUST SANTA CLARA: LOP Listing
A listing of leaking underground storage tanks located in Santa Clara county.

Date of Government Version: 03/03/2014
Date Data Arrived at EDR: 03/05/2014
Date Made Active in Reports: 03/18/2014
Number of Days to Update: 13

Source: Department of Environmental Health
Telephone: 408-918-3417
Last EDR Contact: 11/16/2021
Next Scheduled EDR Contact: 03/07/2022
Data Release Frequency: No Update Planned

SAN JOSE HAZMAT: Hazardous Material Facilities
Hazardous material facilities, including underground storage tank sites.

Date of Government Version: 11/03/2020
Date Data Arrived at EDR: 11/05/2020
Date Made Active in Reports: 01/26/2021
Number of Days to Update: 82

Source: City of San Jose Fire Department
Telephone: 408-535-7694
Last EDR Contact: 11/23/2021
Next Scheduled EDR Contact: 02/14/2022
Data Release Frequency: Annually

SANTA CRUZ COUNTY:

CUPA SANTA CRUZ: CUPA Facility List
CUPA facility listing.

Date of Government Version: 01/21/2017
Date Data Arrived at EDR: 02/22/2017
Date Made Active in Reports: 05/23/2017
Number of Days to Update: 90

Source: Santa Cruz County Environmental Health
Telephone: 831-464-2761
Last EDR Contact: 11/11/2021
Next Scheduled EDR Contact: 02/28/2022
Data Release Frequency: Varies

SHASTA COUNTY:

CUPA SHASTA: CUPA Facility List
Cupa Facility List.

Date of Government Version: 06/15/2017
Date Data Arrived at EDR: 06/19/2017
Date Made Active in Reports: 08/09/2017
Number of Days to Update: 51

Source: Shasta County Department of Resource Management
Telephone: 530-225-5789
Last EDR Contact: 11/11/2021
Next Scheduled EDR Contact: 02/28/2022
Data Release Frequency: Varies

SOLANO COUNTY:

LUST SOLANO: Leaking Underground Storage Tanks
A listing of leaking underground storage tank sites located in Solano county.

Date of Government Version: 06/04/2019
Date Data Arrived at EDR: 06/06/2019
Date Made Active in Reports: 08/13/2019
Number of Days to Update: 68

Source: Solano County Department of Environmental Management
Telephone: 707-784-6770
Last EDR Contact: 11/23/2021
Next Scheduled EDR Contact: 03/14/2022
Data Release Frequency: Quarterly

UST SOLANO: Underground Storage Tanks
Underground storage tank sites located in Solano county.

Date of Government Version: 09/15/2021
Date Data Arrived at EDR: 09/16/2021
Date Made Active in Reports: 12/09/2021
Number of Days to Update: 84

Source: Solano County Department of Environmental Management
Telephone: 707-784-6770
Last EDR Contact: 11/23/2021
Next Scheduled EDR Contact: 03/14/2022
Data Release Frequency: Quarterly

SONOMA COUNTY:

CUPA SONOMA: Cupa Facility List
Cupa Facility list

Date of Government Version: 07/02/2021
Date Data Arrived at EDR: 07/06/2021
Date Made Active in Reports: 07/14/2021
Number of Days to Update: 8

Source: County of Sonoma Fire & Emergency Services Department
Telephone: 707-565-1174
Last EDR Contact: 12/14/2021
Next Scheduled EDR Contact: 04/04/2022
Data Release Frequency: Varies

LUST SONOMA: Leaking Underground Storage Tank Sites
A listing of leaking underground storage tank sites located in Sonoma county.

Date of Government Version: 06/30/2021
Date Data Arrived at EDR: 06/30/2021
Date Made Active in Reports: 09/24/2021
Number of Days to Update: 86

Source: Department of Health Services
Telephone: 707-565-6565
Last EDR Contact: 12/14/2021
Next Scheduled EDR Contact: 04/04/2022
Data Release Frequency: Quarterly

STANISLAUS COUNTY:

CUPA STANISLAUS: CUPA Facility List
Cupa facility list

Date of Government Version: 05/14/2021
Date Data Arrived at EDR: 05/17/2021
Date Made Active in Reports: 08/03/2021
Number of Days to Update: 78

Source: Stanislaus County Department of Ennvironmental Protection
Telephone: 209-525-6751
Last EDR Contact: 01/10/2022
Next Scheduled EDR Contact: 04/25/2022
Data Release Frequency: Varies

SUTTER COUNTY:

UST SUTTER: Underground Storage Tanks
Underground storage tank sites located in Sutter county.

Date of Government Version: 08/23/2021
Date Data Arrived at EDR: 08/25/2021
Date Made Active in Reports: 11/17/2021
Number of Days to Update: 84

Source: Sutter County Environmental Health Services
Telephone: 530-822-7500
Last EDR Contact: 11/23/2021
Next Scheduled EDR Contact: 03/14/2022
Data Release Frequency: Semi-Annually

TEHAMA COUNTY:

CUPA TEHAMA: CUPA Facility List
Cupa facilities

Date of Government Version: 01/13/2021
Date Data Arrived at EDR: 01/14/2021
Date Made Active in Reports: 04/06/2021
Number of Days to Update: 82

Source: Tehama County Department of Environmental Health
Telephone: 530-527-8020
Last EDR Contact: 12/20/2021
Next Scheduled EDR Contact: 02/14/2022
Data Release Frequency: Varies

TRINITY COUNTY:

CUPA TRINITY: CUPA Facility List
Cupa facility list

Date of Government Version: 10/18/2021
Date Data Arrived at EDR: 10/20/2021
Date Made Active in Reports: 01/13/2022
Number of Days to Update: 85

Source: Department of Toxic Substances Control
Telephone: 760-352-0381
Last EDR Contact: 01/13/2022
Next Scheduled EDR Contact: 05/02/2022
Data Release Frequency: Varies

TULARE COUNTY:

CUPA TULARE: CUPA Facility List
Cupa program facilities

Date of Government Version: 04/26/2021
Date Data Arrived at EDR: 04/28/2021
Date Made Active in Reports: 07/13/2021
Number of Days to Update: 76

Source: Tulare County Environmental Health Services Division
Telephone: 559-624-7400
Last EDR Contact: 11/01/2021
Next Scheduled EDR Contact: 02/14/2022
Data Release Frequency: Varies

TUOLUMNE COUNTY:

CUPA TUOLUMNE: CUPA Facility List
Cupa facility list

Date of Government Version: 04/23/2018
Date Data Arrived at EDR: 04/25/2018
Date Made Active in Reports: 06/25/2018
Number of Days to Update: 61

Source: Divison of Environmental Health
Telephone: 209-533-5633
Last EDR Contact: 01/13/2022
Next Scheduled EDR Contact: 05/02/2022
Data Release Frequency: Varies

VENTURA COUNTY:

BWT VENTURA: Business Plan, Hazardous Waste Producers, and Operating Underground Tanks
The BWT list indicates by site address whether the Environmental Health Division has Business Plan (B), Waste Producer (W), and/or Underground Tank (T) information.

Date of Government Version: 09/29/2021
Date Data Arrived at EDR: 10/26/2021
Date Made Active in Reports: 01/13/2022
Number of Days to Update: 79
Source: Ventura County Environmental Health Division
Telephone: 805-654-2813
Last EDR Contact: 01/18/2022
Next Scheduled EDR Contact: 05/02/2022
Data Release Frequency: Quarterly

LF VENTURA: Inventory of Illegal Abandoned and Inactive Sites
Ventura County Inventory of Closed, Illegal Abandoned, and Inactive Sites.

Date of Government Version: 12/01/2011
Date Data Arrived at EDR: 12/01/2011
Date Made Active in Reports: 01/19/2012
Number of Days to Update: 49
Source: Environmental Health Division
Telephone: 805-654-2813
Last EDR Contact: 12/20/2021
Next Scheduled EDR Contact: 04/11/2022
Data Release Frequency: No Update Planned

LUST VENTURA: Listing of Underground Tank Cleanup Sites
Ventura County Underground Storage Tank Cleanup Sites (LUST).

Date of Government Version: 05/29/2008
Date Data Arrived at EDR: 06/24/2008
Date Made Active in Reports: 07/31/2008
Number of Days to Update: 37
Source: Environmental Health Division
Telephone: 805-654-2813
Last EDR Contact: 11/05/2021
Next Scheduled EDR Contact: 02/21/2022
Data Release Frequency: No Update Planned

MED WASTE VENTURA: Medical Waste Program List
To protect public health and safety and the environment from potential exposure to disease causing agents, the Environmental Health Division Medical Waste Program regulates the generation, handling, storage, treatment and disposal of medical waste throughout the County.

Date of Government Version: 09/29/2021
Date Data Arrived at EDR: 10/21/2021
Date Made Active in Reports: 01/13/2022
Number of Days to Update: 84
Source: Ventura County Resource Management Agency
Telephone: 805-654-2813
Last EDR Contact: 01/18/2022
Next Scheduled EDR Contact: 05/02/2022
Data Release Frequency: Quarterly

UST VENTURA: Underground Tank Closed Sites List
Ventura County Operating Underground Storage Tank Sites (UST)/Underground Tank Closed Sites List.

Date of Government Version: 07/26/2021
Date Data Arrived at EDR: 09/08/2021
Date Made Active in Reports: 11/29/2021
Number of Days to Update: 82
Source: Environmental Health Division
Telephone: 805-654-2813
Last EDR Contact: 12/07/2021
Next Scheduled EDR Contact: 03/21/2022
Data Release Frequency: Quarterly

YOLO COUNTY:

UST YOLO: Underground Storage Tank Comprehensive Facility Report
Underground storage tank sites located in Yolo county.

Date of Government Version: 09/23/2021
Date Data Arrived at EDR: 09/28/2021
Date Made Active in Reports: 12/15/2021
Number of Days to Update: 78
Source: Yolo County Department of Health
Telephone: 530-666-8646
Last EDR Contact: 12/20/2021
Next Scheduled EDR Contact: 04/11/2022
Data Release Frequency: Annually

YUBA COUNTY:

CUPA YUBA: CUPA Facility List
CUPA facility listing for Yuba County.

Date of Government Version: 07/20/2021
Date Data Arrived at EDR: 07/20/2021
Date Made Active in Reports: 10/08/2021
Number of Days to Update: 80

Source: Yuba County Environmental Health Department
Telephone: 530-749-7523
Last EDR Contact: 10/22/2021
Next Scheduled EDR Contact: 02/07/2022
Data Release Frequency: Varies

OTHER DATABASE(S)

Depending on the geographic area covered by this report, the data provided in these specialty databases may or may not be complete. For example, the existence of wetlands information data in a specific report does not mean that all wetlands in the area covered by the report are included. Moreover, the absence of any reported wetlands information does not necessarily mean that wetlands do not exist in the area covered by the report.

CT MANIFEST: Hazardous Waste Manifest Data
Facility and manifest data. Manifest is a document that lists and tracks hazardous waste from the generator through transporters to a tsd facility.

Date of Government Version: 07/23/2021
Date Data Arrived at EDR: 08/10/2021
Date Made Active in Reports: 11/08/2021
Number of Days to Update: 90

Source: Department of Energy & Environmental Protection
Telephone: 860-424-3375
Last EDR Contact: 11/12/2021
Next Scheduled EDR Contact: 02/21/2022
Data Release Frequency: No Update Planned

NJ MANIFEST: Manifest Information
Hazardous waste manifest information.

Date of Government Version: 12/31/2018
Date Data Arrived at EDR: 04/10/2019
Date Made Active in Reports: 05/16/2019
Number of Days to Update: 36

Source: Department of Environmental Protection
Telephone: N/A
Last EDR Contact: 01/07/2022
Next Scheduled EDR Contact: 04/18/2022
Data Release Frequency: Annually

NY MANIFEST: Facility and Manifest Data
Manifest is a document that lists and tracks hazardous waste from the generator through transporters to a TSD facility.

Date of Government Version: 01/01/2019
Date Data Arrived at EDR: 04/29/2020
Date Made Active in Reports: 07/10/2020
Number of Days to Update: 72

Source: Department of Environmental Conservation
Telephone: 518-402-8651
Last EDR Contact: 10/29/2021
Next Scheduled EDR Contact: 02/07/2022
Data Release Frequency: Quarterly

PA MANIFEST: Manifest Information
Hazardous waste manifest information.

Date of Government Version: 06/30/2018
Date Data Arrived at EDR: 07/19/2019
Date Made Active in Reports: 09/10/2019
Number of Days to Update: 53

Source: Department of Environmental Protection
Telephone: 717-783-8990
Last EDR Contact: 01/10/2022
Next Scheduled EDR Contact: 04/25/2022
Data Release Frequency: Annually

RI MANIFEST: Manifest information
Hazardous waste manifest information

Date of Government Version: 12/31/2019
Date Data Arrived at EDR: 02/11/2021
Date Made Active in Reports: 02/24/2021
Number of Days to Update: 13

Source: Department of Environmental Management
Telephone: 401-222-2797
Last EDR Contact: 11/29/2021
Next Scheduled EDR Contact: 02/28/2022
Data Release Frequency: Annually

WI MANIFEST: Manifest Information
Hazardous waste manifest information.

Date of Government Version: 05/31/2018
Date Data Arrived at EDR: 06/19/2019
Date Made Active in Reports: 09/03/2019
Number of Days to Update: 76

Source: Department of Natural Resources
Telephone: N/A
Last EDR Contact: 12/06/2021
Next Scheduled EDR Contact: 03/21/2022
Data Release Frequency: Annually

Oil/Gas Pipelines
Source: Endeavor Business Media
Petroleum Bundle (Crude Oil, Refined Products, Petrochemicals, Gas Liquids (LPG/NGL), and Specialty Gases (Miscellaneous)) N = Natural Gas Bundle (Natural Gas, Gas Liquids (LPG/NGL), and Specialty Gases (Miscellaneous)). This map includes information copyrighted by Endeavor Business Media. This information is provided on a best effort basis and Endeavor Business Media does not guarantee its accuracy nor warrant its fitness for any particular purpose. Such information has been reprinted with the permission of Endeavor Business Media.

Electric Power Transmission Line Data
Source: Endeavor Business Media
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Sensitive Receptors: There are individuals deemed sensitive receptors due to their fragile immune systems and special sensitivity to environmental discharges. These sensitive receptors typically include the elderly, the sick, and children. While the location of all sensitive receptors cannot be determined, EDR indicates those buildings and facilities - schools, daycares, hospitals, medical centers, and nursing homes - where individuals who are sensitive receptors are likely to be located.

AHA Hospitals:
Source: American Hospital Association, Inc.
Telephone: 312-280-5991
The database includes a listing of hospitals based on the American Hospital Association's annual survey of hospitals.

Medical Centers: Provider of Services Listing
Source: Centers for Medicare & Medicaid Services
Telephone: 410-786-3000
A listing of hospitals with Medicare provider number, produced by Centers of Medicare & Medicaid Services, a federal agency within the U.S. Department of Health and Human Services.

Nursing Homes
Source: National Institutes of Health
Telephone: 301-594-6248
Information on Medicare and Medicaid certified nursing homes in the United States.

Public Schools
Source: National Center for Education Statistics
Telephone: 202-502-7300
The National Center for Education Statistics' primary database on elementary and secondary public education in the United States. It is a comprehensive, annual, national statistical database of all public elementary and secondary schools and school districts, which contains data that are comparable across all states.

Private Schools
Source: National Center for Education Statistics
Telephone: 202-502-7300
The National Center for Education Statistics' primary database on private school locations in the United States.

Daycare Centers: Licensed Facilities
Source: Department of Social Services
Telephone: 916-657-4041

Flood Zone Data: This data was obtained from the Federal Emergency Management Agency (FEMA). It depicts 100-year and 500-year flood zones as defined by FEMA. It includes the National Flood Hazard Layer (NFHL) which incorporates Flood Insurance Rate Map (FIRM) data and Q3 data from FEMA in areas not covered by NFHL.
Source: FEMA
Telephone: 877-336-2627
Date of Government Version: 2003, 2015

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002, 2005 and 2010 from the U.S. Fish and Wildlife Service.

State Wetlands Data: Wetland Inventory
Source: Department of Fish and Wildlife
Telephone: 916-445-0411

STREET AND ADDRESS INFORMATION

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ON LOCUST ROAD, 2.5 MILES OFF OF NORTH SIDE ROAD
LUCERNE VALLEY, CA 92356

Inquiry Number:
January 20, 2022

EDR Site Report™

6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

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The EDR-Site Report™ is a comprehensive presentation of government filings on a facility identified in a search of federal, state and local environmental databases.

Section 1: Facility Detail Reports . . . . . Page 3

All available detailed information from databases where sites are identified.

Section 2: Databases and Update Information. . . . . Page 4

Name, source, update dates, contact phone number and description of each of the databases for this report.

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

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SECTION 1: FACILITY DETAIL REPORTS

ON LOCUST ROAD, 2.5 MILES OFF OF NORTH SIDE ROAD
LUCERNE VALLEY, CA 92356
EDR ID #S107539930

Databases:
CDL: Clandestine Drug Labs

CDL:

Name:	Not reported
Address:	ON LOCUST ROAD, 2.5 MILES OFF OF NORTH SIDE ROAD
City,State,Zip:	LUCERNE VALLEY, CA 92356
Facility ID:	2002-07-118
Date:	07/26/2002
Labtype:	Illegal Drug lab
Lab Type:	Illegal Drug Lab (L) - location where an illegal drug lab was operated or drug lab equipment and/or materials were stored.

SECTION 2: DATABASES AND UPDATE DATES

To maintain currency of the following federal, state and local databases, EDR contacts the appropriate government agency on a monthly or quarterly basis as required.

Elapsed ASTM days: Provides confirmation that this report meets or exceeds the 90-day updating requirement of the ASTM standard.

DATABASES FOUND IN THIS REPORT

CA CDL: Clandestine Drug Labs
Source: Department of Toxic Substances Control
Telephone: 916-255-6504
A listing of drug lab locations. Listing of a location in this database does not indicate that any illegal drug lab materials were or were not present there, and does not constitute a determination that the location either requires or does not require additional cleanup work.

Date of Government Version: 12/31/2019
Database Release Frequency: Varies
Date of Last EDR Contact: 01/13/2022
Date of Next Scheduled Update: 04/18/2022

APPENDIX F

Property Photographs



Photo 1. Typical view of vacant desert land on the subject property.



Photo 2. Typical view of vacant desert land on the subject property.



Photo 3. A shipping container and debris at the abandoned on-site marijuana growing operation on parcel 045236147.



Photo 4. Former living quarters at the abandoned on-site marijuana growing operation.

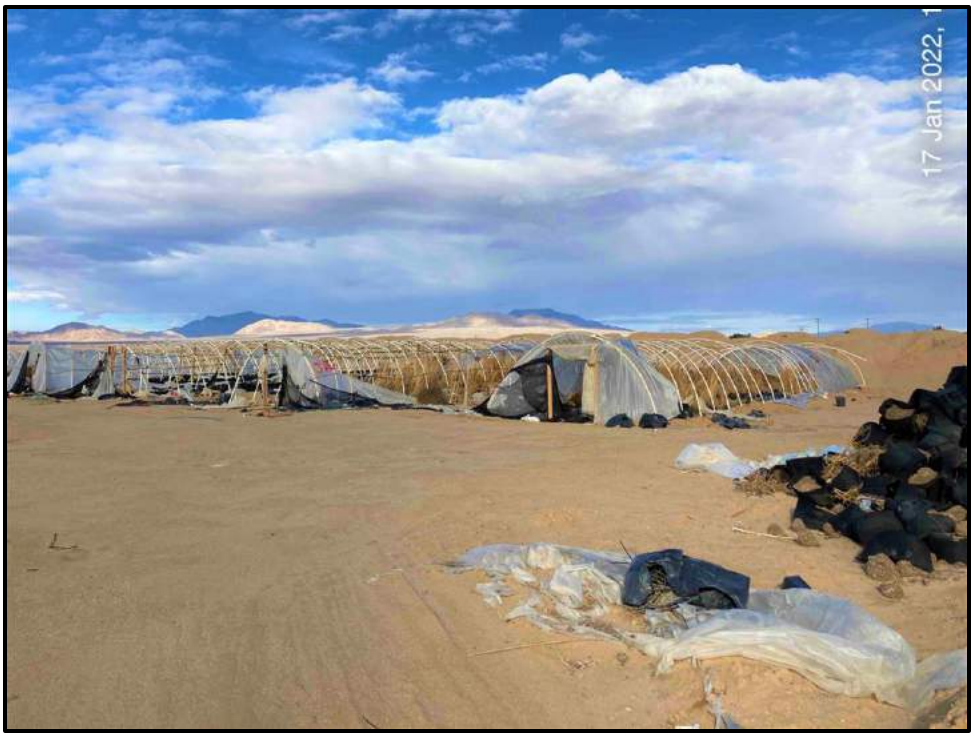


Photo 5. Greenhouses at the abandoned on-site growing operation.



Photo 6. Storage area at the abandoned on-site growing operation.



Photo 7. A non-functioning water well on parcel 045211225.



Photo 8. An abandoned well drilling rig and two mixing tanks on parcel 045212142.



Photo 9. One of two drum storage areas on parcel 045212142.



Photo 10. The second of two drum storage areas on parcel 045212142.



Photo 11. Discarded tires on parcel 045212142.



Photo 12. An electrical transmission line crossing the subject property.



Photo 13. Debris piles on parcel 045212148.



Photo 14. A non functioning water well on parcel 045212148.



Photo 15. A functioning water well on parcel 045211224.



Photo 16. Three unused fuel storage tanks on parcel 045211224.



Photo 17. An apparently unused water well on parcel 045212112.



Photo 18. An apparently functioning water well in the southeast of parcel 045206224.



Photo 19. A drum on a pallet west of the area in photo 18.



Photo 20. Typical view of debris in the northeast of parcel 045206224.



Photo 21. A drum storage area on parcel 045206224.



Photo 22. One of two leaking drums (de minimis) near the area in photo 21.



Photo 23. The second of two leaking drums (de minimis) near the area in photo 21.



Photo 24. A view of several structures on parcel 045206223.



Photo 25. Mounds of dumped soil or soil amendment on parcel 045206222.



Photo 26. The heavily modified original home on parcel 045207111.



Photo 27. A shack and a security cameras on parcel 045207111.



Photo 28. The rear of the shack in photo 27.



Photo 29. One of several water tanks on parcel 045207111, and a water delivery truck.



Photo 30. Another of several water tanks on parcel 045207111.



Photo 31. An occupied RV trailer on parcel 045207111.



Photo 32. The barn on parcel 045207111. Note the lookout, bars on windows, and locked steel door.



Photo 33. Other shacks on parcel 045207111.



Photo 34. An occupied area of parcel 045207111.

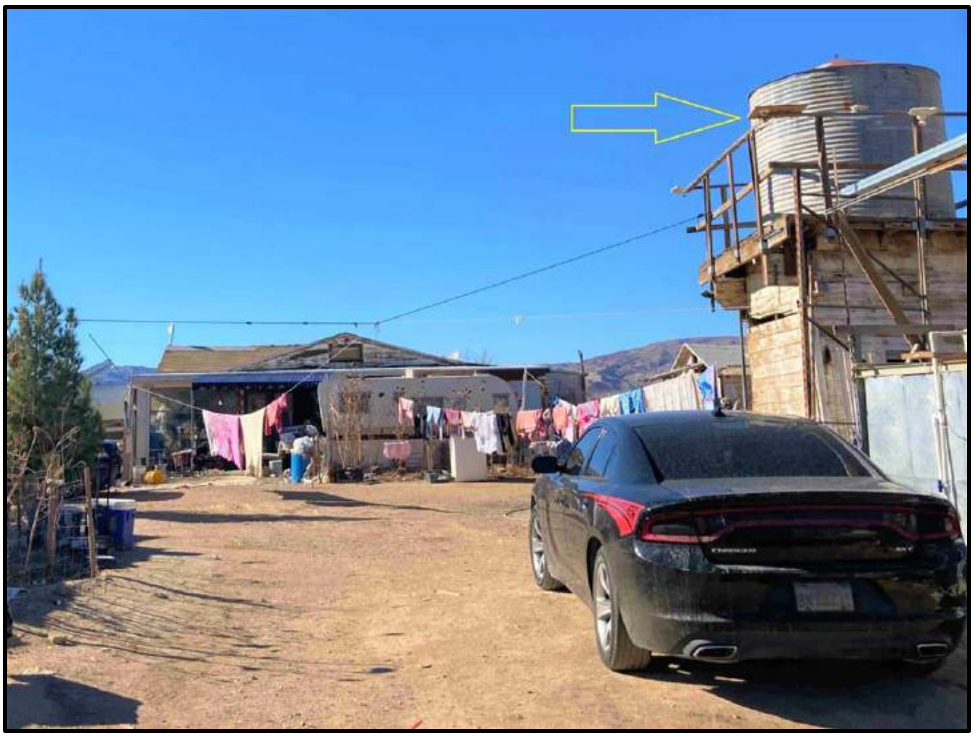


Photo 35. Another water tank on parcel 045207111. Note the security camera.

Appendix J. Preliminary Hydrology Study

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Westwood

Preliminary Hydrology Study for

Sienna Solar Energy Project

San Bernardino County, CA

August 2018 (Revised April 12, 2022)



Prepared For:

8minutenergy RENEWABLES

Westwood

Preliminary Hydrology Study for

Sienna Solar Energy Project

Prepared for:



Prepared by:
Tom Miller and Chris Carda
Westwood Professional Services
12701 Whitewater Drive, Suite 300
Minnetonka, MN 55343

Project Number: 0012746.00
Date: 08/22/2018 (Revised 02/28/2022)

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Exhibit 6A: Max Flow Depth 100-Year Project Area Map
Exhibit 7: Peak Velocity 100-Year Map
Exhibit 7A: Peak Velocity 100-Year Project Area Map

APPENDICES

Appendix A: NOAA Atlas 14 Rainfall Data
Appendix B: Curve Number Table
Appendix C: CEQA Appendix IX Hydrology and Water Quality
Appendix D: Anecdotal Flooding Accounts
Appendix E: California Water Balance Calculator

OVERVIEW

The purpose of the study is to describe the hydrology of the proposed Sienna Solar Energy Project ("the Project") and any impacts that the hydrology may play in the design of the solar array.

The revisions in the report that took place on 04/12/2022 only encompass updating the report for a new project boundary and do not cover any model updates.

The Project encompasses ~1,855 acres located in unincorporated San Bernardino County. It is situated approximately 3.5 miles north of Lucerne Valley, California. Power generated or stored by the Project will be delivered from the sites to a nearby substation. The Project is comprised of 27 parcels totaling roughly 1,855 acres.

The project sites are located in a dry lake bed that has no outlet. The watershed area encompasses ~390 square miles of the surrounding area. The project area in the dry lakebed has no slope while the watershed area leading to it has areas of steep slopes in the mountains and more moderate slopes leading to the dry lakebed.

FEMA has not completed a study to determine flood hazard for the selected location, therefore no FEMA permitting is anticipated.

The onsite and offsite hydrologic modeling in this report was created using FLO2D modeling software and a number of other hydrologic techniques. FLO-2D hydrologic/hydraulic modeling software was utilized to determine flow depths and velocities throughout the site. Additionally, historic review of high water marks and previously determined lake boundaries were used to check the accuracy of the models given the complex nature of the watershed contributing to the lake bed. Finally, historical accounts of flooding in the valley were compared to modeling results. (Appendix D) Overall, significant flooding should be expected across the majority of the lake bed due to the large drainage area that is tributary to Lucerne Lake. All of these models converge on a 100-year flood depth of 4 to 6 feet across the lake bed. The Westernmost parcels will experience the deepest flooding depths of 1 to 2 feet. The other parcels to the east experience slightly lower depths depending on location. Portions of the eastern parcels higher flood and higher velocities based on proximity to dry washes. See Exhibit 6A for a full description of results.

The Project will need to conform to the County building code requirements to stay 1' above the high water mark as determined in this report or future modeling. Since the dry lake that covers the project boundary is the terminus of the watershed, no downstream impacts are anticipated.

DATA SOURCES

The models and methods for this project utilize a combination of public and private data as shown in Table 1.

Table 1: Data Sources

Data Type	Format	Source	Use
Elevation	LiDAR las	Westwood	Onsite FLO-2D Model Elevations
Elevation	5-Meter Digital Elevation Model (DEM)	Intermap Nextmap5	Near site FLO-2D Model Elevations
Elevation	10-Meter Digital Elevation Model (DEM)	USGS	Watershed Delineation, Offsite FLO-2D Model Elevations
Precipitation	PDF File	NOAA Atlas 14	Design storms
HUC-12 Drainage Boundary	Shapefile	USGS	Define Model Extents
HUC-10 Drainage Boundary	Shapefile	USGS	Define Model Extents
Site Boundary	KMZ	8minutenergy	Define Model Extents
2014 Aerial Photography	ArcGIS Map Service	USDA FSA	Reference

ONSITE HYDROLOGY

The project area is located approximately 3.5 miles north of Lucerne Valley in San Bernardino County, CA. The project sites are located in and adjacent to a dry lakebed (Lucerne (dry) Lake) which is extremely flat with no outlet. This area has not been mapped by FEMA so no FEMA permitting is anticipated for this project. The national wetlands inventory classifies Lucerne (dry) Lake as a wetland and parcels within the project are within the wetland boundary. Soils within the dry lakebed are classified as a playa which is impermeable clay and most closely relates to a "D" soil which has high runoff potential and very little infiltration. The majority of soils in the offsite watersheds are classified as "A" soils which have low runoff potential and high infiltration. Typical of arid regions, the project areas and surrounding offsite watersheds experience short-duration, high-intensity rainfall storm events producing potentially high rates of runoff when the initial infiltration rates are exceeded. No water was present in the aerial photo review of the sites but water should be expected in the dry lakebed after rainfall events for extended periods of time due to the water having to evaporate rather than infiltrate.

OFFSITE HYDROLOGY

The total offsite watershed is ~390 square miles surrounding the project area and can be broken into 5 different contributing watersheds. These watersheds will contribute a large amount of volume to the dry lakebed but the velocities will be less of a concern from these contributing areas outside of the washes. The potential hydrologic issues in this general landscape are flooding in Lucerne Lake.

FLO-2D Modeling Inputs

FLO-2D is a physical process model that routes rainfall runoff and flood hydrographs over flow surfaces or in channels using the dynamic wave approximation to the momentum equation. FLO-2D offers advantages over 1-D models and unit hydrograph methods by allowing for breakout flows and visualization of flows across a potential site. This is particularly useful on a flat site that receives offsite flows, such as the project site. The primary inputs are a DTM (elevation data), curve numbers and precipitation. No hydraulic structures were modeled (roads/berms are overtopped).

Due to the large watershed size a model with 150' grid cells was used. The models were run modifying the curve number for varying AMC conditions throughout the contributing watersheds per the San Bernardino County Hydrology Manual Addendum.

Precipitation data downloaded from the NOAA Atlas 14 (Appendix A) for a 100-year, 24-hour rainfall is 3.57 inches for the project parcels. In order to properly model the watershed the downloaded rainfall data was spatially varied across all of the offsite and onsite watersheds (Exhibit 5). By using the 100-year rainfall event allows for the best initial analysis in order to determine the worst areas of flooding and erosion. The rainfall was also adjusted based on an aerial reduction factor of 0.8 in order to account for the large size of the watershed.

Flown LiDAR elevation data was used for the onsite areas and Intermap Nextmap 5 meter and USGS 10m DEM data for the contributing watersheds was incorporated into the DTM using the export to xyz file function in Global Mapper. These XYZ files are read directly into FLO-2D.

USDA-NRCS SSURGO soil data provides soil types within the project boundary and full coverage of the contributing watershed. Soils vary greatly throughout the watershed area with Hydrologic Soil Group (HSG) B and D soils predominating in the project boundary (Exhibit 3). Land cover was obtained from the USDA 2013 Crop Data Layer. Exhibit 4 displays the Land Cover Classes for the entire watershed. Curve numbers adjusted based on their AMC factor (San Bernardino County 2010) and were applied to each grid cell in the FLO-2D model based on intersecting the grid with the curve numbers (Exhibit 5).

Lucerne (dry) Lake Flooding Extents and Discussion

Lucerne (dry) Lake is the terminus for ~390 sq. miles of drainage from the surrounding desert landscape and mountains. Due to the varying terrain, soils, and rainfall the exact high water level is difficult to explicitly determine. However, using a variety of modeling and visual techniques, a range of water depths in the lake for the 100-year storm have been determined based upon assuming an updated bottom lakebed elevation of 2,849' based on an average lakebed bottom from the LiDAR elevation data. FLO-2D software was used to model the lake hydrology for the variable rainfall with an AMC factor condition scenario. The results of these depths in the lakebed vary, but show 4'-6' of flooding in the dry lakebed and are the results that have the highest amount of confidence. The USGS topographic map dry lake extent was digitized and compared against the FLO-2D and HydroCAD results in Exhibit 6A. The extents of the dry lake were also digitized from aerial imagery and can also be seen on Exhibit 6A.

The digitized topographic map is based on the interpretation of the lakebed from the original USGS topographic survey of the area. This area and the aerial imagery interpretation line may under predict the high water level of the lake because the extent is based primarily on the presence or absence of vegetation. Although the presence of vegetation can be correlated to high water levels, it generally correlates better to a more common event such as a 2-year or a 10-year return period.

PROPOSED CONDITIONS

The proposed use of the sites will be a solar facility. The solar facility will consist of solar modules mounted above grade on a racking system, access roads, electrical equipment and a perimeter security fence. The solar modules are located above the ground and the finished ground conditions will be restored to pre-construction conditions.

The project would require minimal site grading, with a minimal impact to existing drainage patterns and overall topography of the site. Where grading is required, cut-and-fills shall generally be balanced, resulting in minimal import or export of earthen material. Final drainage design should be completed following a detailed topographic site survey overlaid with proposed site development grading. The solar array will need to be elevated above any ponding water onsite in the 100-year event which should be determined during final design.

SAN BERNARDINO COUNTY REQUIRMENTS/STATE REQUIREMENTS

CivilD modeling software per the Unit Hydrograph San Bernardino County Hydrology Method will need to be used to calculate the offsite watershed runoff for the 100-year storm event that contributes to the Lucerne (dry) Lake where the Projects are located. In addition CivilD modeling software per the Rational Method San Bernardino County Hydrology Method will need to be used to calculate the onsite watershed runoff for the 100-year storm event. Each land parcel will need to be modeled separately. An increase in impervious area for each parcel is expected due to the construction of the piles, concrete pads for the inverters and the access roads. The increase is estimated to be very minimal. The largest increase in impervious area will be expected to come from the access road construction, but overall, the total area of the access roads would be small in comparison with the entire site. If gravel access roads are used this will allow for some level of infiltration. Based on previous experience with San Bernardino County, only minor (if any) permanent stormwater management features (basins, etc.) are expected to be required on the site. The State of CA also requires retention based on the added amount of impervious to the site. Based on previous experience the expected impervious is around 4% of the site. This will require a storage of 0.50 ac-ft onsite (Appendix E).

RESULTS AND DESIGN INFORMATION

Overall, significant flooding should be expected across the sites and high velocities should be expected in Sand Wash and other contributing washes. See Exhibit 1 for the contributing watersheds, NHD flow lines and proposed project location. FEMA has not completed a study to determine flood hazard for the selected location. Due to Lucerne (dry) Lake being the low point for ~390 square miles of drainage and not having an outlet high flood depths are expected for the 100-year storm event. The Project will need to conform to the County building code requirements to stay 1' above the high water mark as determined in this report or future modeling. The proposed project will discharge in a manner similar to the existing flow pattern for the storm events and does not alter drainage patterns. CEQA Appendix IX Hydrology and Water Quality has been filled out and can be found in Appendix C based on the 2016 CEQA Stature and Guidelines.

This study shows that the dry lake bed is expected to have a 100-year max water depth of between 4' and 6' based on the unknowns associated with studying a dry lake bed with a large, arid drainage area.

The parcels along the edge of the lake bed will have lower flood depths as seen on Exhibit 6A and higher velocities as seen on Exhibit 7A. The max 100-year flooding depths on these parcels is expected to be around 1'-4' depending on the location in the parcel. Any channelized or ponding areas should be avoided or accounted for the solar layout if possible.

NEXT STEPS

1. Following approval by San Bernardino County Flood Control District, develop the conceptual plan presented in this report into a detailed design will further refine the results of the calculations present in this report.

Included Output Files:

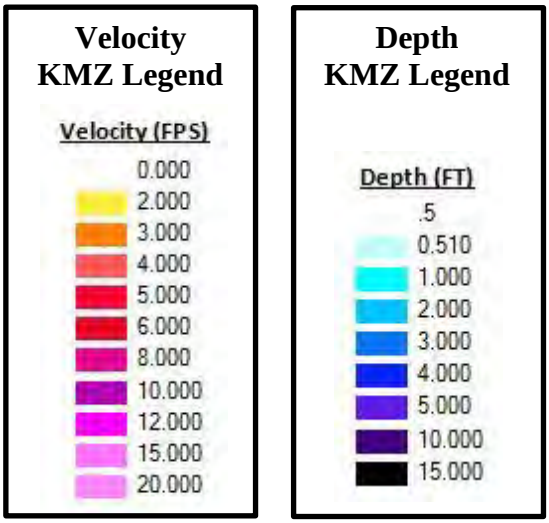
1. Shapefile of Flow Depth
   2018-07-24_Sienna_Preliminary_Flow_Depth_at_Cell.shp
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   Attribute "VAR" = Max Flow Depth (Feet)

2. KMZ of Flow Depth
   2018-07-24_Sienna_Prelim_Flow_Depth.kmz
   Overlay in Google Earth for graphical representation.

3. Shapefile of Velocity
   2018-07-24_Sienna_Preliminary_Velocity_at_Cell.shp
   Attribute "ID" = Grid Cell Number
   Attribute "VAR" = Velocity (FPS)

4. KMZ of Velocity

2018-07-24_Sienna_Prelim_Velocity.kmz
Overlay in Google Earth for graphical representation.



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USDA 2013 Crop Data Layer, Landcover data, retrieved December 2017, from https://www.nass.usda.gov/Research_and_Science/Cropland/SARS1a.php

County of San Bernardino Hydrology Manual Addendum for Arid Regions. April 2010. County of San Bernardino Department of Public Works.

State Standard For Hydrologic Modeling Guidelines. August, 2007. Arizona Department of Water Resources Flood Mitigation Section.

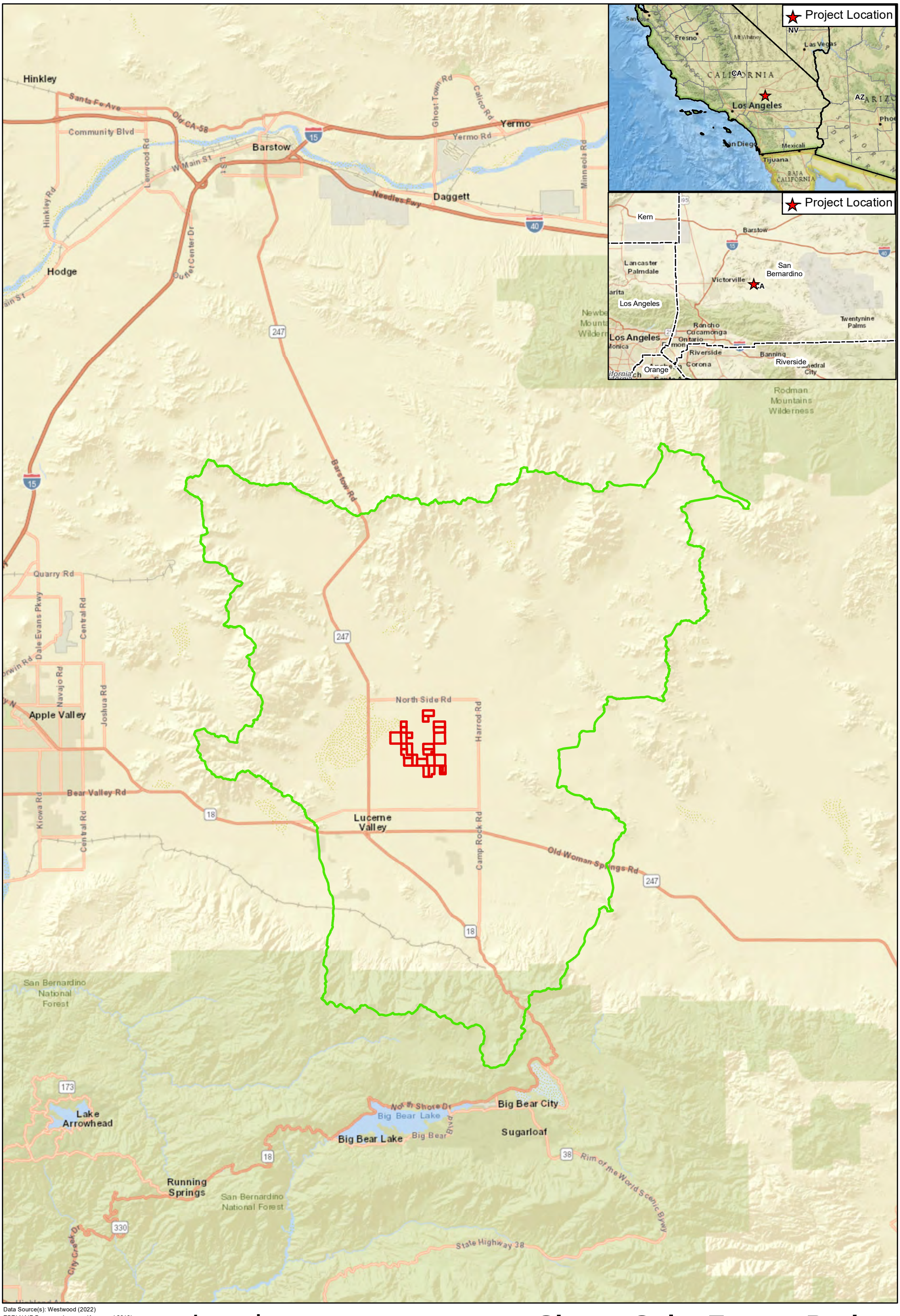
NOAA Atlas 14 Precipitation –Frequency Atlas of the United States Volume 6 Version 2.3:California. NWS. Silver Spring, Maryland, 2001, revised 2014.

National Weather Service in San Diego. Updated May 2017. A History of Significant Weather Events in Southern California: Organized by Weather Type.

Exhibits

Map Document: N:\0012746.00\GIS\Hydro Exhibits\Preliminary Hydro\2022-02-28\Sienna_EX1LocationMap_180619.mxd mshildreth 2/28/2022 2:31:35 PM

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Data Source(s): Westwood (2022)
ESRI NAIP Basemap Imagery (Accessed 2018),
USGS (2018).

Legend

- Project Boundary
- FLO-2D Boundary
- County Boundary

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N

0 Mile 4

Sienna Solar Energy Project

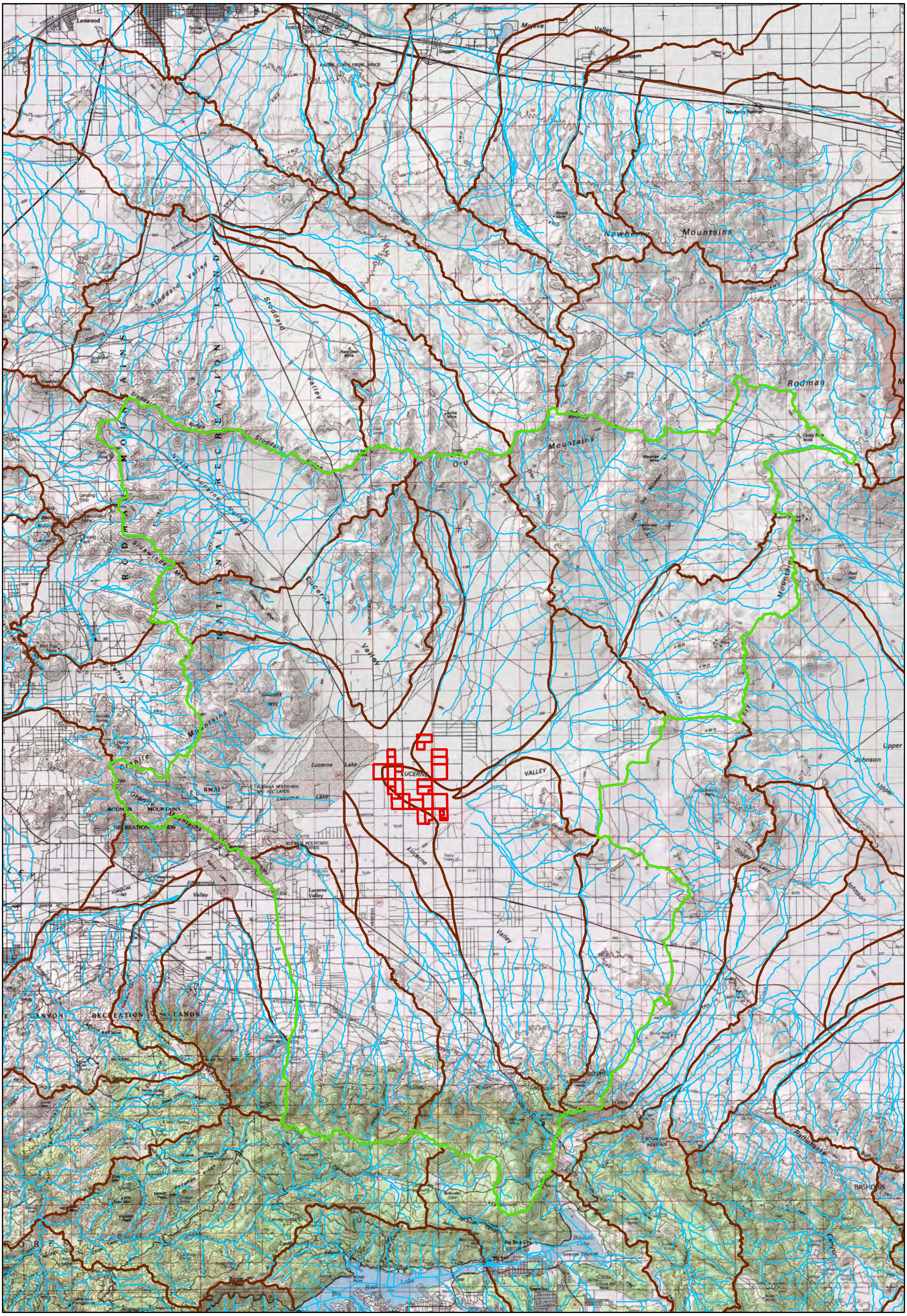
San Bernardino County, California

Exhibit 1: Location Map

February 28, 2022

Map Document: N:\0012746.00\GIS\Hydro Exhibits\Preliminary Hydro\2022-02-28\Sienna_EX2BaseMap_180619.mxd mshildreth 2/28/2022 3:13:34 PM

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Data Source(s): Westwood (2022)
ESRI NAIP Basemap Imagery (Accessed 2018),
USGS (2018).

Legend

- Project Boundary
- FLO-2D Boundary
- County Boundary
- HUC 12 Boundary
- NHD Flowline

N

0 3 Mile

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San Bernardino County, California

Exhibit 2: Base Hydrology Map

February 28, 2022

Map Document: N:\0012746.00\GIS\Hydro Exhibits\Preliminary Hydro\2022-02-28\Sienna_EX3SoilsMap_180619.mxd mshildreth 2/28/2022 2:35:45 PM

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ESRI NAIP Basemap Imagery (Accessed 2018),
USGS (2018).

Legend

- Project Boundary
- FLO-2D Boundary
- County Boundary

Hydrologic Soils Group

- A
- B
- C
- D

Sienna Solar Energy Project

San Bernardino County, California

Exhibit 3: Soils Map

N

0 3 Mile

February 28, 2022

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Map Document: N:\0012746.00\GIS\Hydro Exhibits\Preliminary Hydro\2022-02-28\Sienna_EX4LandcoverMap_180619.mxd mshildreth 2/28/2022 2:36:34 PM

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N

0 3 Mile

Data Source(s): Westwood (2022)
ESRI NAIP Basemap Imagery (Accessed 2018),
USGS (2018).

Legend

Project Boundary
FLO-2D Boundary
County Boundary

Landcover

Barren
Cultivated
Developed
Fallow
Forested
Prairie/Pasture
Shrubland
Water

Sienna Solar Energy Project

San Bernardino County, California

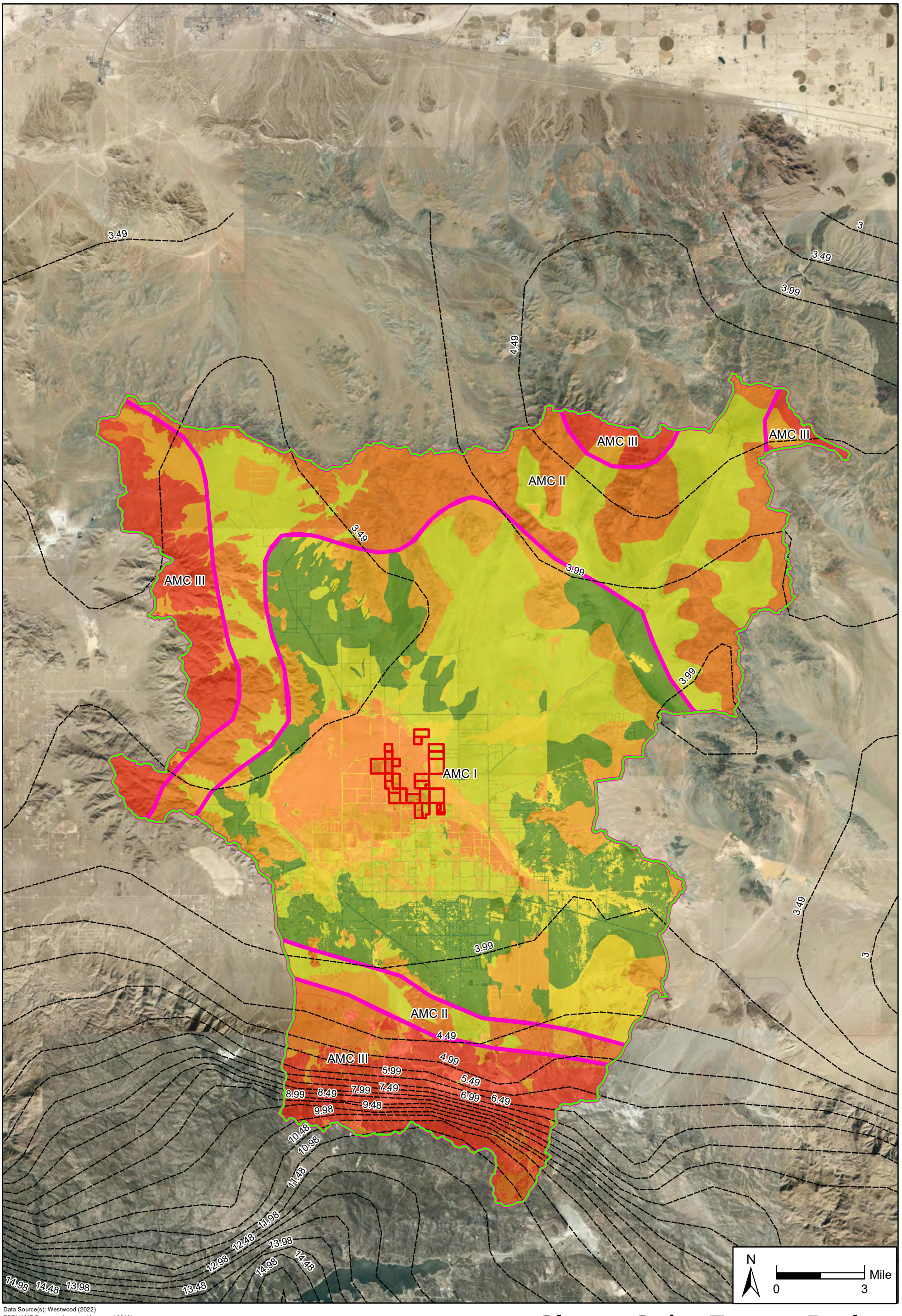
Exhibit 4: Landcover Map

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Map Document: N:\0012746.00\GIS\Hydro Exhibits\Preliminary Hydro\2022-02-28\Sienna_EX5CurveNumberMap_180619.mxd mshildreth 2/28/2022 2:39:19 PM

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Data Source(s): Westwood (2022)
ESRI NAIP Basemap Imagery (Accessed 2018),
USGS (2018).

Sienna Solar Energy Project

San Bernardino County, California

Exhibit 5: Curve Number Map

February 28, 2022

Legend

- Project Boundary
- FLO-2D Boundary
- County Boundary

Curve Number

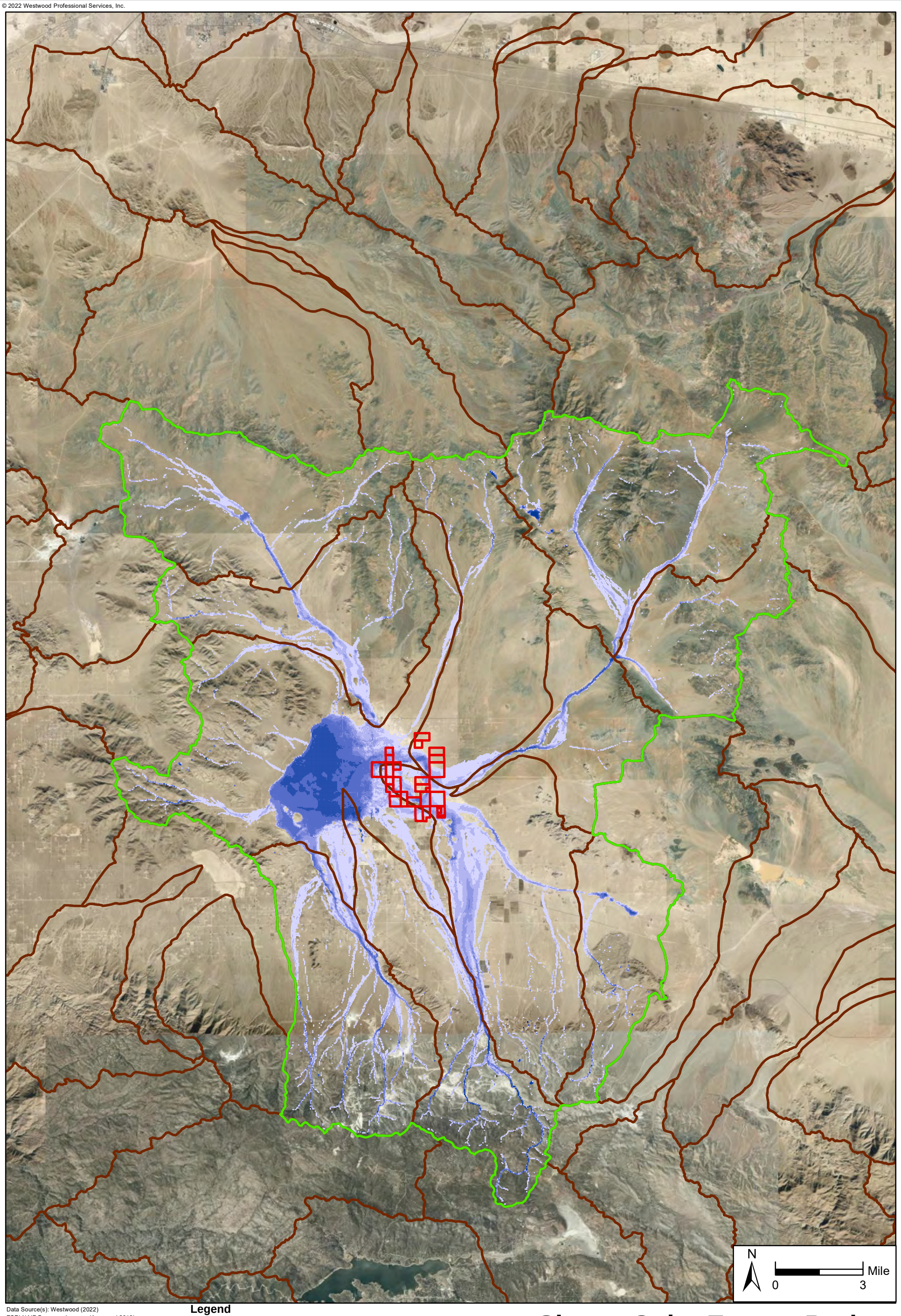
- 20 - 29
- 30 - 39
- 40 - 49
- 50 - 59
- 60 - 69
- 70 - 79
- 80 - 89
- 90 - 99

- AMC Condition
- 100-Year Variable Rainfall (in)

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ESRI NAIP Basemap Imagery (Accessed 2018),
USGS (2018).

Legend

- Project Boundary
- Project Parcel
- FLO-2D Boundary
- County Boundary
- HUC 12 Boundary

Max Flow Depth (ft)

0.50 - 1.00
1.01 - 1.50
1.51 - 2.00
2.01 - 2.50
2.51 - 3.00
3.01 - 4.00
4.01 - 6.00
6.01 - 8.00
8.01+

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Sienna Solar Energy Project

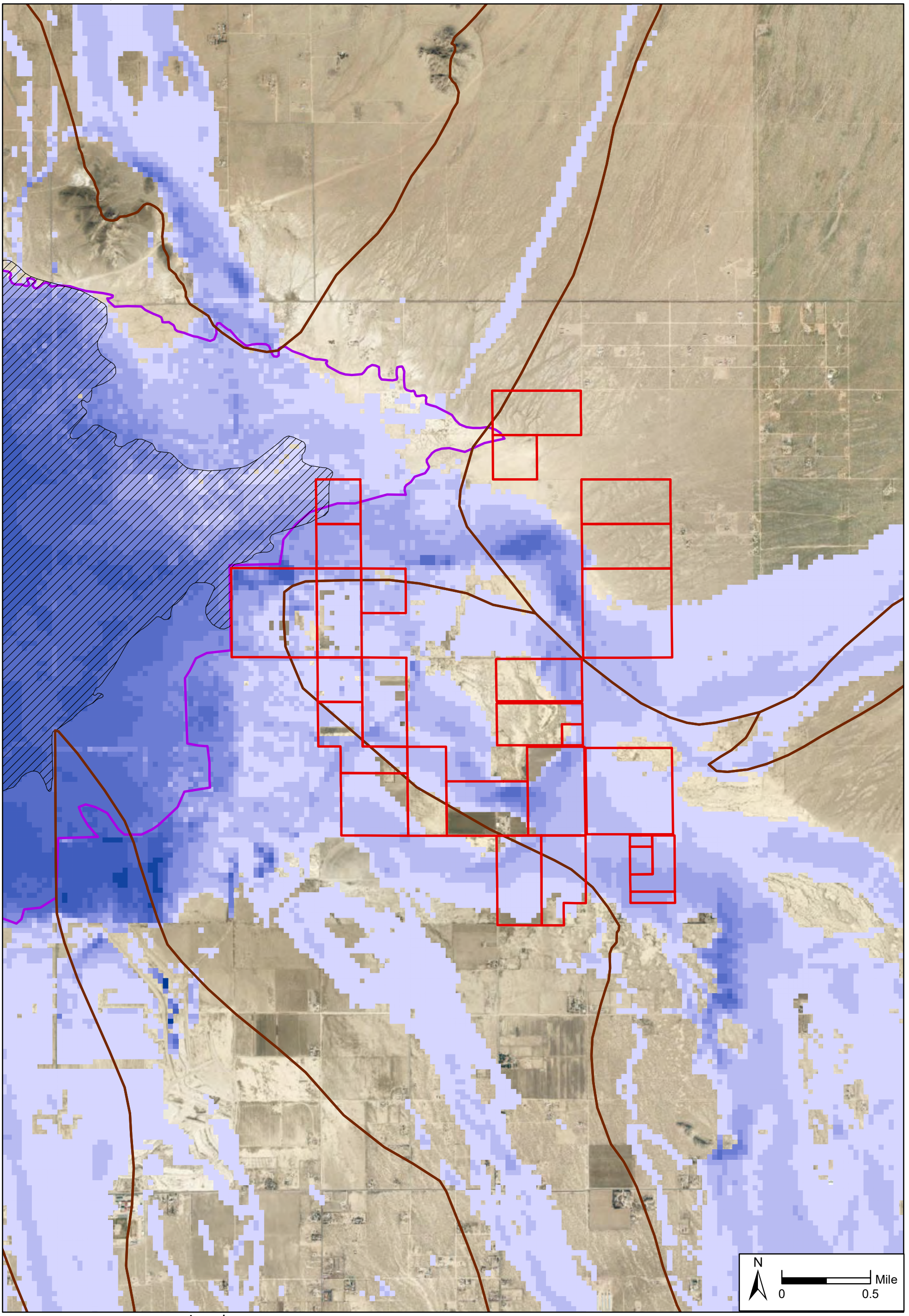
San Bernardino County, California

Exhibit 6: Max Flow Depth 100-Year Map

February 28, 2022

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Data Source(s): Westwood (2022)
ESRI NAIP Basemap Imagery (Accessed 2018),
USGS (2018).

Legend

- Project Boundary
- Project Parcel
- FLO-2D Boundary
- County Boundary
- HUC 12 Boundary
- Digitized USA Topo Lake Outline
- Visually Digitized Dry Lake Outline

Max Flow Depth (ft)

0.50 - 1.00
1.01 - 1.50
1.51 - 2.00
2.01 - 2.50
2.51 - 3.00
3.01 - 4.00
4.01 - 6.00
6.01 - 8.00
8.01+

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San Bernardino County, California

Exhibit 6A: Max Flow Depth 100-Year Project Area Map

February 28, 2022

Map Document: N:\0012746.00\GIS\Hydro Exhibits\Preliminary Hydro\2022-02-28\Sienna_EX7PeakVelocitySpatiallyVariedAMCMap_180619.mxd mshildreth 2/28/2022 2:51:35 PM

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N

0 Mile 3

Data Source(s): Westwood (2022)
ESRI NAIP Basemap Imagery (Accessed 2018),
USGS (2018).

Legend

- Project Boundary
- Project Parcel
- FLO-2D Boundary
- County Boundary
- HUC 12 Boundary

Peak Velocity (fps)

1.00 - 1.50
1.51 - 2.00
2.01 - 2.50
2.51 - 3.00
3.01 - 4.00
4.01+

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Sienna Solar Energy Project

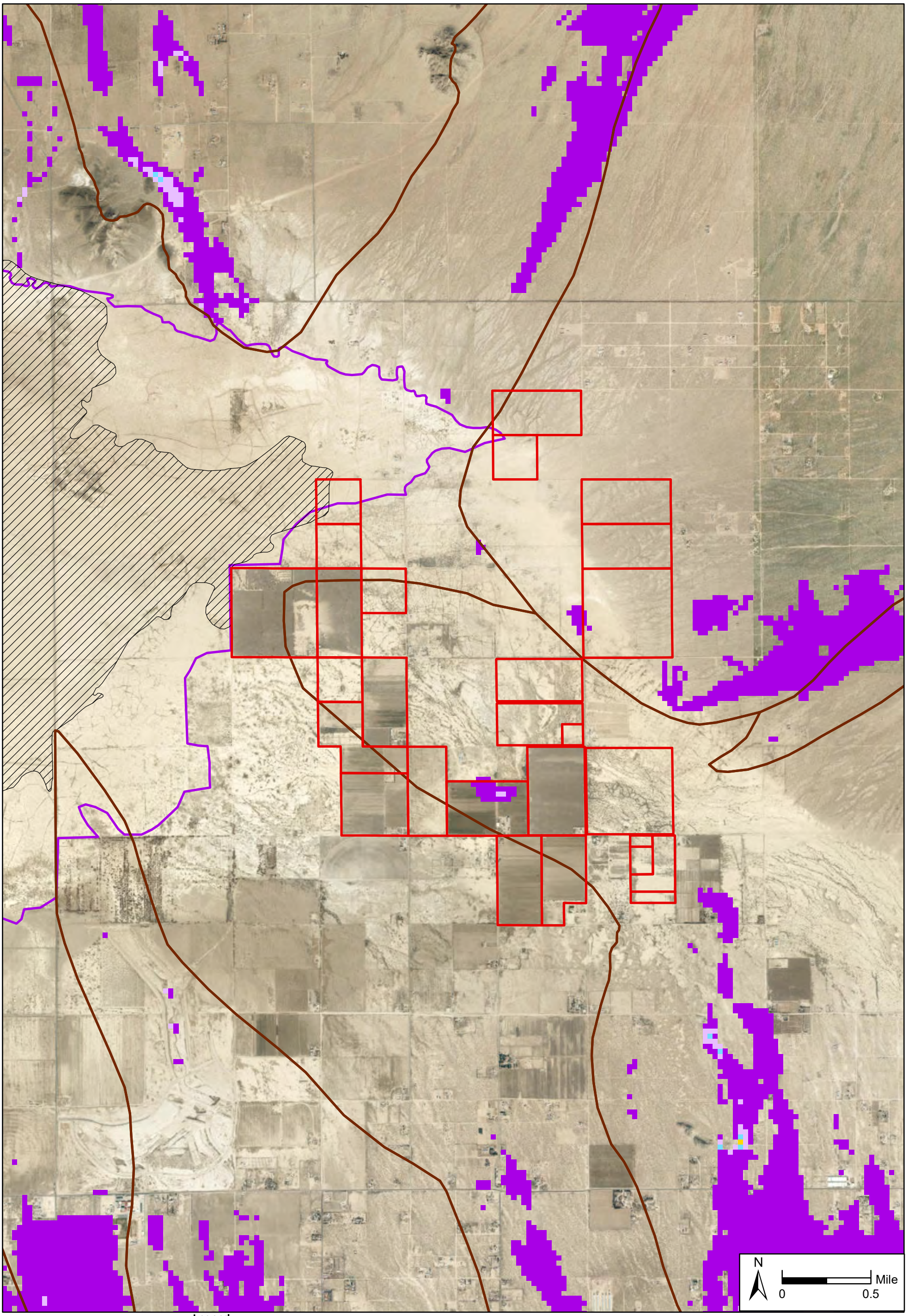
San Bernardino County, California

Exhibit 7: Peak Velocity 100-Year Map

February 28, 2022

Map Document: N:\0012746.00\GIS\Hydro Exhibits\Preliminary Hydro\2022-02-28\Sienna_EX7A_PeakVelocitySpatiallyVariedAMCProjectAreaMap_180619.mxd mshildreth 2/28/2022 3:16:11 PM

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Data Source(s): Westwood (2022)
ESRI NAIP Basemap Imagery (Accessed 2018),
USGS (2018).

Legend

- Project Boundary
- Project Parcel
- FLO-2D Boundary
- County Boundary
- HUC 12 Boundary
- Digitized USA Topo Lake Outline
- Visually Digitized Dry Lake Outline

Peak Velocity (fps)

1.00 - 1.50
1.51 - 2.00
2.01 - 2.50
2.51 - 3.00
3.01 - 4.00
4.01+

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Sienna Solar Energy Project

San Bernardino County, California

Exhibit 7A: Peak Velocity 100-Year Project Area Map

February 28, 2022

Appendix A

*Atlas 14 Rainfall Data**

At Project Site, See Exhibit 5 for regional rainfall depths.

NOAA Atlas 14, Volume 6, Version 2
Location name: Lucerne Valley, California, USA*
Latitude: 34.5051°, Longitude: -116.9574°
Elevation: 2851.47 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.086 (0.071-0.106)	0.118 (0.097-0.145)	0.163 (0.134-0.200)	0.201 (0.164-0.249)	0.257 (0.202-0.329)	0.302 (0.233-0.395)	0.351 (0.265-0.470)	0.403 (0.296-0.555)	0.478 (0.336-0.685)	0.538 (0.366-0.798)
10-min	0.124 (0.102-0.152)	0.169 (0.139-0.207)	0.233 (0.191-0.287)	0.288 (0.235-0.357)	0.368 (0.290-0.472)	0.433 (0.335-0.567)	0.503 (0.379-0.674)	0.578 (0.424-0.796)	0.685 (0.482-0.982)	0.771 (0.525-1.14)
15-min	0.150 (0.123-0.183)	0.204 (0.168-0.251)	0.282 (0.231-0.347)	0.348 (0.284-0.432)	0.445 (0.351-0.570)	0.524 (0.405-0.685)	0.609 (0.459-0.815)	0.699 (0.513-0.962)	0.828 (0.583-1.19)	0.933 (0.635-1.38)
30-min	0.209 (0.172-0.256)	0.285 (0.235-0.350)	0.393 (0.323-0.484)	0.486 (0.396-0.603)	0.621 (0.490-0.796)	0.731 (0.565-0.956)	0.849 (0.640-1.14)	0.975 (0.715-1.34)	1.16 (0.813-1.66)	1.30 (0.886-1.93)
60-min	0.274 (0.226-0.336)	0.375 (0.308-0.460)	0.517 (0.424-0.636)	0.638 (0.520-0.792)	0.816 (0.643-1.05)	0.960 (0.742-1.26)	1.12 (0.841-1.49)	1.28 (0.940-1.76)	1.52 (1.07-2.17)	1.71 (1.16-2.54)
2-hr	0.370 (0.305-0.453)	0.492 (0.405-0.604)	0.664 (0.546-0.818)	0.812 (0.661-1.01)	1.02 (0.808-1.31)	1.20 (0.924-1.57)	1.38 (1.04-1.85)	1.57 (1.15-2.16)	1.84 (1.30-2.64)	2.05 (1.40-3.04)
3-hr	0.439 (0.362-0.538)	0.580 (0.477-0.711)	0.776 (0.637-0.954)	0.944 (0.769-1.17)	1.19 (0.935-1.52)	1.38 (1.07-1.81)	1.59 (1.20-2.13)	1.81 (1.33-2.49)	2.11 (1.49-3.02)	2.34 (1.60-3.48)
6-hr	0.570 (0.470-0.699)	0.749 (0.617-0.919)	0.997 (0.818-1.23)	1.21 (0.985-1.50)	1.51 (1.19-1.94)	1.76 (1.36-2.30)	2.01 (1.52-2.70)	2.28 (1.67-3.14)	2.66 (1.87-3.81)	2.95 (2.01-4.37)
12-hr	0.687 (0.566-0.842)	0.930 (0.765-1.14)	1.27 (1.04-1.56)	1.55 (1.26-1.92)	1.95 (1.54-2.50)	2.28 (1.76-2.98)	2.61 (1.97-3.50)	2.97 (2.18-4.09)	3.45 (2.43-4.95)	3.84 (2.61-5.69)
24-hr	0.856 (0.759-0.985)	1.20 (1.07-1.39)	1.68 (1.48-1.94)	2.08 (1.82-2.42)	2.65 (2.24-3.19)	3.10 (2.57-3.81)	3.57 (2.90-4.50)	4.08 (3.21-5.28)	4.78 (3.62-6.45)	5.34 (3.91-7.46)
2-day	1.00 (0.887-1.15)	1.43 (1.26-1.65)	2.02 (1.79-2.34)	2.52 (2.21-2.93)	3.21 (2.72-3.86)	3.76 (3.12-4.62)	4.34 (3.52-5.47)	4.96 (3.91-6.42)	5.81 (4.40-7.85)	6.49 (4.75-9.07)
3-day	1.07 (0.953-1.24)	1.55 (1.37-1.78)	2.21 (1.95-2.55)	2.76 (2.42-3.21)	3.52 (2.99-4.24)	4.13 (3.43-5.08)	4.77 (3.86-6.00)	5.45 (4.29-7.05)	6.40 (4.84-8.63)	7.17 (5.24-10.0)
4-day	1.13 (0.998-1.30)	1.63 (1.44-1.88)	2.34 (2.07-2.71)	2.94 (2.57-3.42)	3.76 (3.19-4.53)	4.42 (3.67-5.43)	5.11 (4.14-6.43)	5.84 (4.60-7.56)	6.87 (5.20-9.27)	7.69 (5.62-10.7)
7-day	1.19 (1.06-1.37)	1.75 (1.55-2.01)	2.55 (2.25-2.94)	3.22 (2.82-3.75)	4.18 (3.54-5.03)	4.94 (4.10-6.07)	5.72 (4.64-7.21)	6.56 (5.17-8.49)	7.72 (5.84-10.4)	8.64 (6.31-12.1)
10-day	1.24 (1.10-1.42)	1.83 (1.62-2.11)	2.70 (2.38-3.11)	3.43 (3.01-4.00)	4.50 (3.81-5.41)	5.34 (4.43-6.56)	6.22 (5.04-7.83)	7.14 (5.63-9.24)	8.45 (6.39-11.4)	9.47 (6.92-13.2)
20-day	1.35 (1.20-1.56)	2.07 (1.83-2.39)	3.14 (2.78-3.63)	4.08 (3.57-4.75)	5.45 (4.62-6.56)	6.57 (5.45-8.07)	7.73 (6.27-9.74)	8.96 (7.06-11.6)	10.6 (8.04-14.3)	11.9 (8.73-16.7)
30-day	1.49 (1.32-1.72)	2.31 (2.04-2.66)	3.56 (3.14-4.11)	4.67 (4.09-5.44)	6.33 (5.37-7.62)	7.67 (6.37-9.43)	9.07 (7.35-11.4)	10.5 (8.31-13.6)	12.5 (9.49-16.9)	14.1 (10.3-19.6)
45-day	1.70 (1.51-1.95)	2.66 (2.35-3.06)	4.14 (3.66-4.79)	5.49 (4.81-6.39)	7.54 (6.39-9.07)	9.23 (7.66-11.3)	11.0 (8.90-13.8)	12.8 (10.1-16.6)	15.3 (11.6-20.6)	17.1 (12.5-23.9)
60-day	1.84 (1.63-2.11)	2.89 (2.56-3.33)	4.56 (4.03-5.27)	6.08 (5.33-7.08)	8.39 (7.11-10.1)	10.3 (8.57-12.7)	12.4 (10.0-15.6)	14.4 (11.4-18.7)	17.3 (13.1-23.3)	19.4 (14.2-27.0)

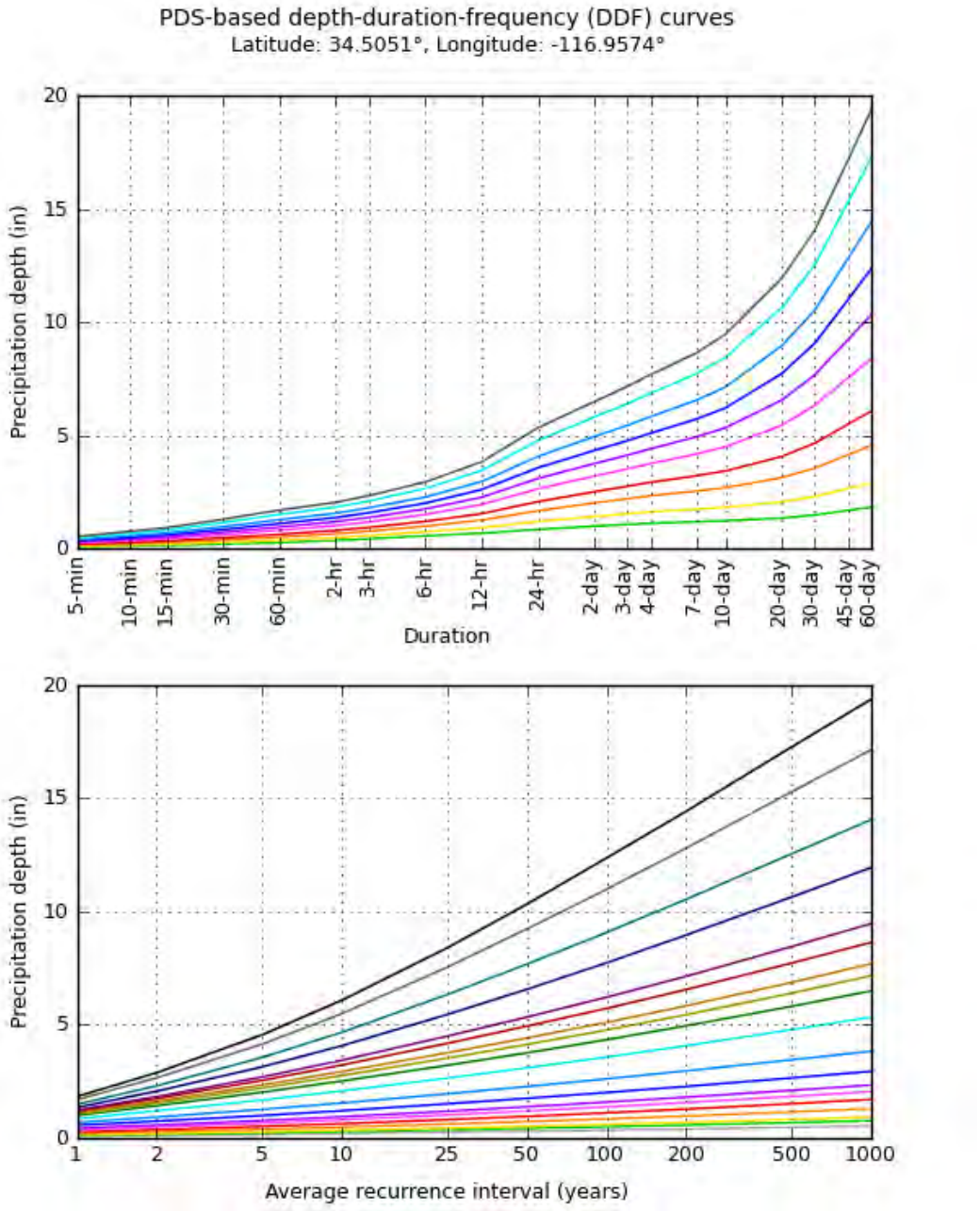
[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

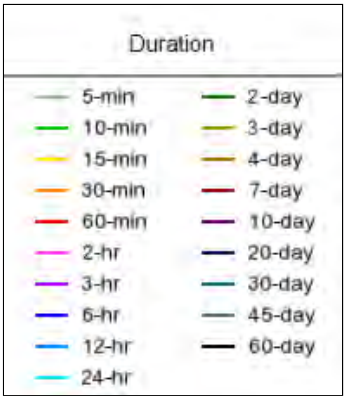
Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper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

Please refer to NOAA Atlas 14 document for more information.

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PF graphical





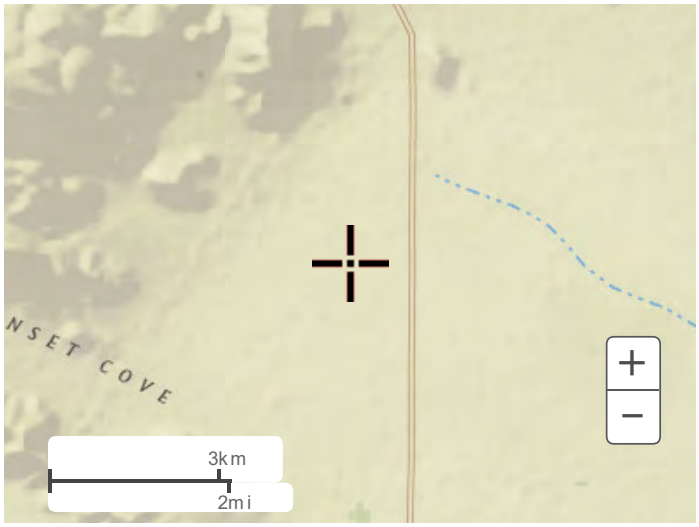
NOAA Atlas 14, Volume 6, Version 2

Created (GMT): Thu Jun 29 18:01:10 2017

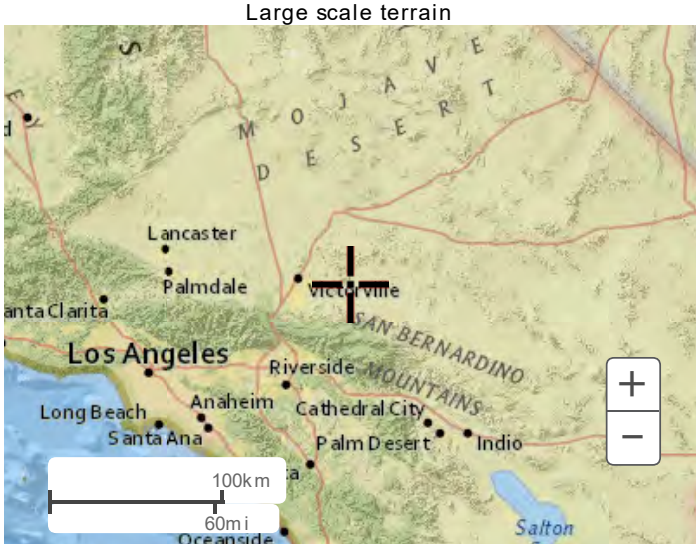
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Maps & aerials

Small scale terrain



Large scale terrain



Large scale map



Large scale aerial



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US Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

Disclaimer

Appendix B

Curve Number Table

Table 2. Semi-Arid Curve Numbers (adapted from NEH 630)

Class	Value	Classification Description	Curve Number				
			Soil Type*				
			A	B	C	D	W
Water	11	Open Water - areas of open water, generally with less than 25% cover of vegetation or soil.	98	98	98	98	100
	12	Perennial Ice/Snow - areas characterized by a perennial cover of ice and/or snow, generally greater than 25% of total cover.	98	98	98	98	100
Developed	21	Developed, Open Space - areas with a mixture of some constructed materials, but mostly vegetation in the form of lawn grasses. Impervious surfaces account for less than 20% of total cover. These areas most commonly include large-lot single-family housing units, parks, golf courses, and vegetation planted in developed settings for recreation, erosion control, or aesthetic purposes.	46	65	77	82	100
	22	Developed, Low Intensity - areas with a mixture of constructed materials and vegetation. Impervious surfaces account for 20% to 49% percent of total cover. These areas most commonly include single-family housing units.	61	75	83	87	100
	23	Developed, Medium Intensity – areas with a mixture of constructed materials and vegetation. Impervious surfaces account for 50% to 79% of the total cover. These areas most commonly include single-family housing units.	77	85	90	95	100
	24	Developed High Intensity -highly developed areas where people reside or work in high numbers. Examples include apartment complexes, row houses and commercial/industrial. Impervious surfaces account for 80% to 100% of the total cover.	89	92	94	95	100
Barren	31	Barren Land (Rock/Sand/Clay) - areas of bedrock, desert pavement, scarps, talus, slides, volcanic material, glacial debris, sand dunes, strip mines, gravel pits and other accumulations of earthen material. Generally, vegetation accounts for less than 15% of total cover.	77	86	91	94	100
Forest	41	Deciduous Forest - areas dominated by trees generally greater than 5 meters tall, and greater than 20% of total vegetation cover. More than 75% of the tree species shed foliage simultaneously in response to seasonal change.	43	55	70	77	100
	42	Evergreen Forest - areas dominated by trees generally greater than 5 meters tall, and greater than 20% of total vegetation cover. More than 75% of the tree species maintain their leaves all year. Canopy is never without green foliage.	43	55	70	77	100
	43	Mixed Forest - areas dominated by trees generally greater than 5 meters tall, and greater than 20% of total vegetation cover. Neither deciduous nor evergreen species are greater than 75% of total tree cover.	43	55	70	77	100
Shrubland	51	Dwarf Scrub - Alaska only areas dominated by shrubs less than 20 centimeters tall with shrub canopy typically greater than 20% of total vegetation. This type is often co-associated with grasses, sedges, herbs, and non-vascular vegetation.	55	71	81	89	100
	52	Shrub/Scrub - areas dominated by shrubs; less than 5 meters tall with shrub canopy typically greater than 20% of total vegetation. This class includes true shrubs, young trees in an early successional stage or trees stunted from environmental conditions.	55	71	81	89	100
Herbaceous	71	Grassland/Herbaceous - areas dominated by gramanoid or herbaceous vegetation, generally greater than 80% of total vegetation. These areas are not subject to intensive management such as tilling, but can be utilized for grazing.	55	71	81	89	100
	72	Sedge/Herbaceous - Alaska only areas dominated by sedges and forbs, generally greater than 80% of total vegetation. This type can occur with significant other grasses or other grass like plants, and includes sedge tundra, and sedge tussock tundra.	55	71	81	89	100
	73	Lichens - Alaska only areas dominated by fruticose or foliose lichens generally greater than 80% of total vegetation.	55	71	81	89	100
	74	Moss - Alaska only areas dominated by mosses, generally greater than 80% of total vegetation.	55	71	81	89	100
Planted/Cultivated	81	Pasture/Hay – areas of grasses, legumes, or grass-legume mixtures planted for livestock grazing or the production of seed or hay crops, typically on a perennial cycle. Pasture/hay vegetation accounts for greater than 20% of total vegetation.	55	71	81	89	100
	82	Cultivated Crops – areas used for the production of annual crops, such as corn, soybeans, vegetables, tobacco, and cotton, and also perennial woody crops such as orchards and vineyards. Crop vegetation accounts for greater than 20% of total vegetation. This class also includes all land being actively tilled.	67	78	85	89	100
	83	Small Grains	63	75	83	87	100
Wetlands	91	Woody Wetlands - areas where forest or shrubland vegetation accounts for greater than 20% of vegetative cover and the soil or substrate is periodically saturated with or covered with water.	45	66	77	83	100
	92	Emergent Herbaceous Wetlands - Areas where perennial herbaceous vegetation accounts for greater than 80% of vegetative cover and the soil or substrate is periodically saturated with or covered with water.	45	66	77	83	100

*A/D, B/D and C/D soils lumped as D soils, W denotes water

**Curve Numbers for NLCD Codes 41-43 have been increased from 30 to 43 as many of these areas are partially grazed Woods-grass combination.

Appendix C

CEQA Appendix IX Hydrology And Water Quality

IX. HYDROLOGY AND WATER QUALITY -- Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impac	No Impact
a) Violate any water quality standards or waste discharge requirements?	❐	❐	❐	☒
b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?	❐	❐	❐	☒
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site?	❐	❐	❐	☒
d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?	❐	❐	❐	☒
e) 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?	❐	❐	❐	☒
f) Otherwise substantially degrade water quality?	❐	❐	❐	☒
g) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?	❐	❐	❐	☒

h) Place within a 100-year flood hazard area structures which would impede or redirect flood flows?	❒	❒	❒	☒
i) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?	❒	❒	❒	☒
j) Inundation by seiche, tsunami, or mudflow?	❒	❒	❒	☒

Appendix D
Anecdotal Flooding Accounts

Westwood

7699 Anagram Drive
Eden Prairie, MN 55344

Main (952) 937-5150
Fax (952) 937-5822

westwoodps.com
(888) 937-5150

MEMORANDUM

Date: August 24, 2018

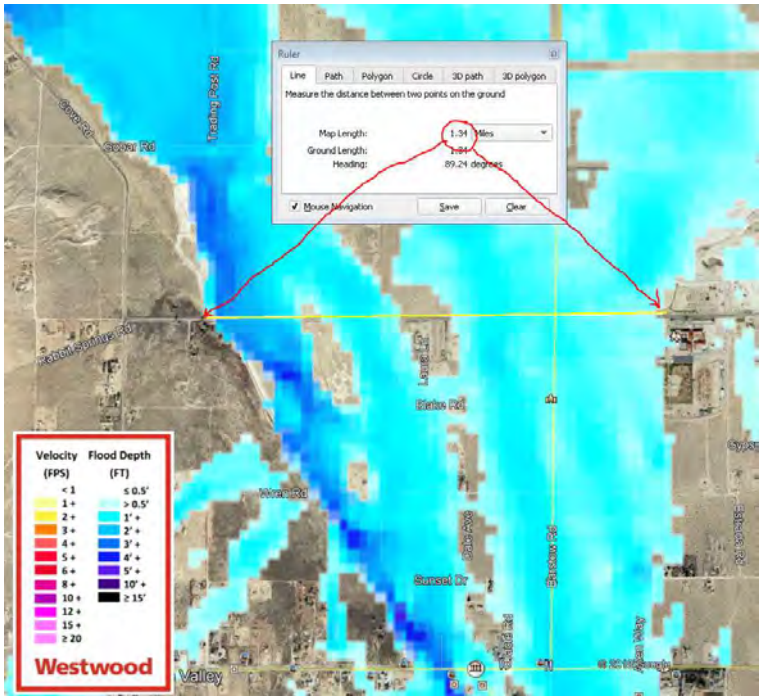
Re: **Sienna Preliminary Hydrology Study Anecdotal Flooding Accounts**
Westwood Project #R0012746.00

To: 8minuteenergy

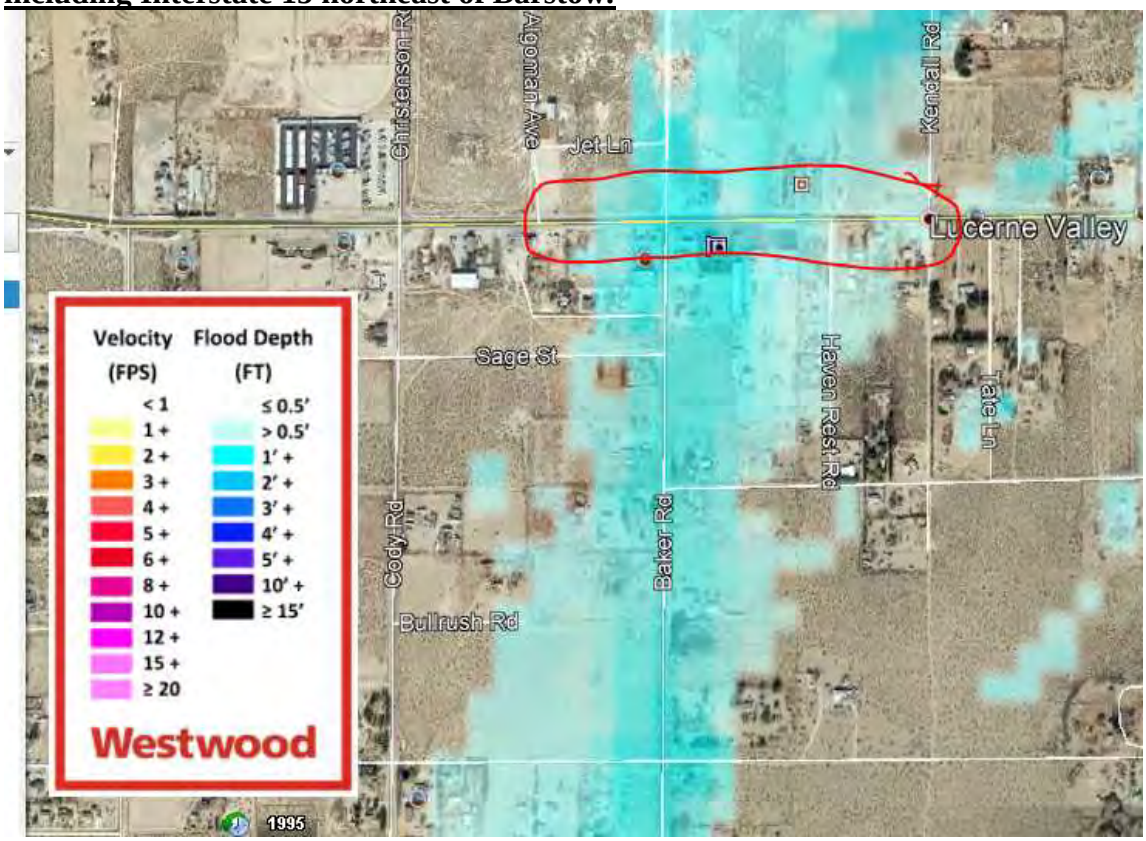
From: Westwood Professional Services

This memo serves to provide validation to the hydrologic model produced for the preliminary hydrology study for Sienna Solar Project. The anecdotal reports come from *A History of Significant Weather Events in Southern California: Organized by Weather Type* produced by the National Weather Service in San Diego in May 2017.

9/5/1958: A heavy thunderstorm struck the Lucerne Valley area. Floodwaters covered Rabbit Springs Rd up to one foot deep for over a mile.



8/12/1972 Tropical Storm Diane sent moisture into the region which produced thunderstorms across Southern California. 2.1 inches of rain fell in Lucerne Valley in less than one hour. 0.38" fell in Riverside, and 0.31" in Big Bear Lake. Flash floods left a foot of silt on downtown Lucerne Valley and closed several highways, including Interstate 15 northeast of Barstow.



Appendix E

California Water Balance Calculator

Owner Info | Developer Info | Site Info | Risk | Addl. Site Info | Post Construction | Billing Info | Attachments | Certification | Reports | Inspections | Print | Status History | Linked Users | NOTs | COIs

Is the project located within a permitted Phase I or Phase II Municipal Separate Storm Sewer System (MS4) area? No

Note: Non-traditional small MS4s that lie within a Phase I or II MS4 area but are NOT designated must comply with the Construction General Permit post construction calculator.

Will the project use an alternative method to calculate runoff volume or use different site design measures than those listed in the CGP calculator? No

Will the project be subdivided into smaller sub-areas or drainage management areas? No

INPUT FOR WATERSHED: Enter watershed details and click on the Compute & Save button.

I.a. Name: Sienna

I.b. County: San Bernardino

I.c. Closest Location: Victorville Pump Plant

I.d. Size(acres): 1855

Pre-Construction INPUT

I.e. Dominant Soil Type: Group D Soils - Very low infiltration. Clay loam, silty clay loam, sandy clay, silty clay, or clay. Infiltration rate 0 to 0.05 inch/hr when wet.

I.f. Existing Dominant Non-built Land Use Type: Natural Desert

I.g. Existing rooftop impervious area(acres): 0

I.h. Existing non-rooftop impervious area(acres): 0

Post-Construction INPUT

I.i. Proposed Dominant Non-built Land Use Type: Natural Desert

I.j. Proposed rooftop impervious area(acres): 0

I.k. Proposed non-rooftop impervious area(acres): 74.2

Compute & Save

OUTPUT:

O.a. Existing Runoff Curve Number:	88	O.d. Proposed Runoff Curve Number:	88.4
O.b. Design Storm(inches):	0.46	O.e. Net Credit of Volume Credits(Cubic feet):	
O.c. Pre-project Runoff Volume(Cubic Feet):	152,269.31	O.f. Post-project Runoff Volume(Cubic Feet):	174,070.84
O.g. Post-project Runoff Volume minus Volume Credits(Cubic Feet):			

***Post-project Runoff Volume > Pre-project Runoff Volume. Please perform volume credit calculations by clicking on the links below.

Appendix K. Noise Study

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Sienna Solar and Storage Project

Noise Study

prepared for

99MT 8me, LLC
211 Sutter Street, 6th Floor
San Francisco, California 94108
Contact: Erec DeVost

prepared by

Rincon Consultants, Inc.
180 North Ashwood Avenue
Ventura, California 93003

July 2023

RINCON CONSULTANTS, INC.
Environmental Scientists | Planners | Engineers
rinconconsultants.com

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1 Project Description

1.1 Introduction

This study analyzes the potential noise impacts of the proposed Sienna Solar and Storage Project (Project) located in unincorporated San Bernardino County. Rincon Consultants, Inc. (Rincon) prepared this study under contract to 99MT 8me, LLC (applicant) for use by San Bernardino County, the lead agency. The study evaluates the short- and long-term impacts of the Project to noise-sensitive receivers.

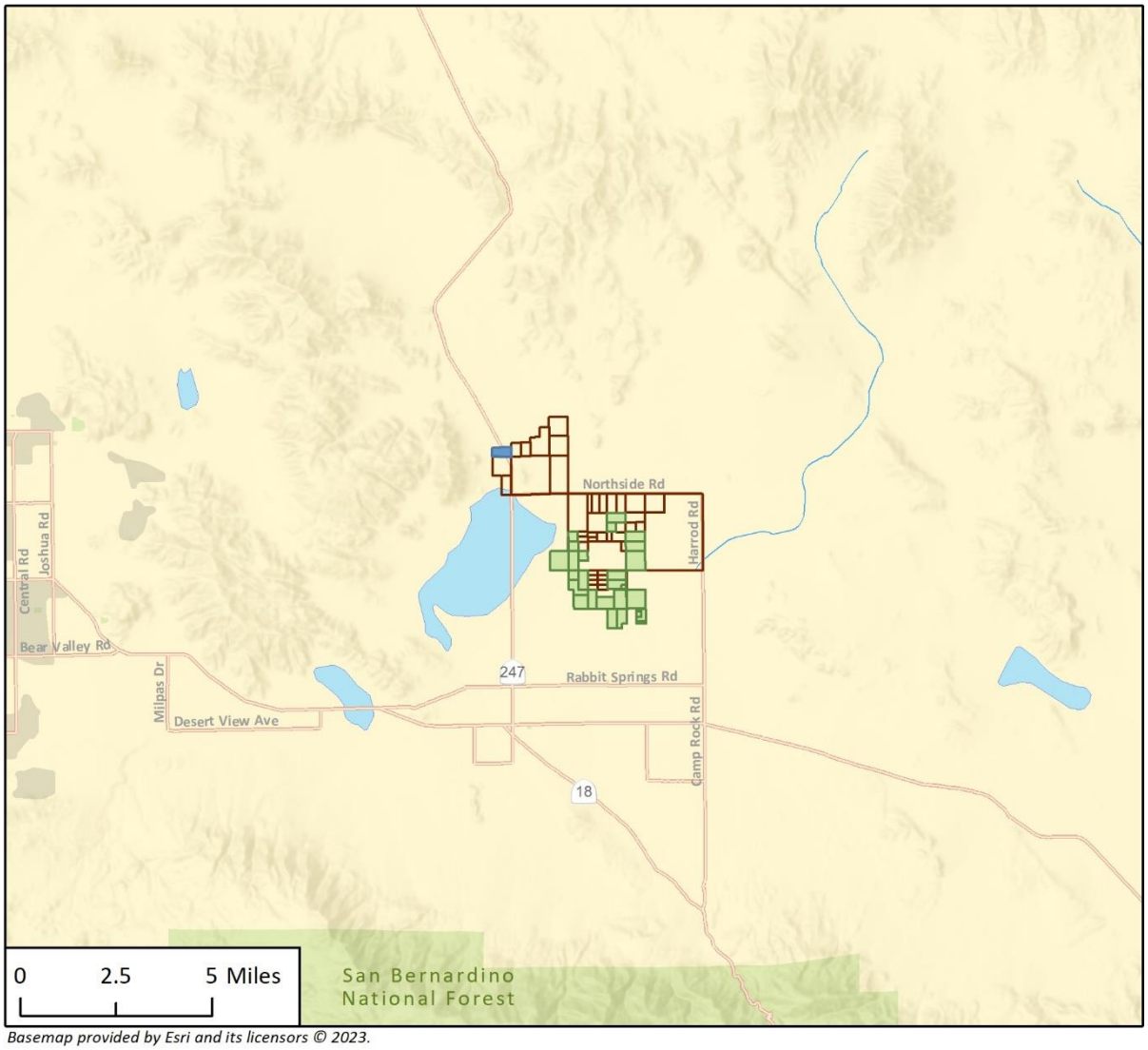
1.2 Project Area and Description

The proposed Sienna Solar Project is a 525-megawatt (MW) utility-scale solar farm with 525-MW battery storage located in unincorporated San Bernardino County. The Project area is located east of Barstow Road/State Route (SR) 247, roughly between Northside Road and Wilshire Road, northeast of the community of Lucerne Valley.

The Project consists of the installation of a photovoltaic (PV) solar facility, Battery Energy Storage System (BESS), Project substation, Operations and Maintenance building(s), underground collection system, and a 230-kV generation-interconnect (gen-tie) line. The Sienna Project will interconnect at the SCE Calcite Substation (currently pending environmental clearance and construction) via a proposed overhead and/or underground 230-kV gen-tie line in addition to other ancillary facilities utilizing private and potentially public ROWs. The Project area encompasses 1,854 acres with an additional 77-acres substation site. Approximately 39 miles of collector lines and gen-tie alternatives will be analyzed in this Assessment, although not all routes will be developed. Figure 1 and Figure 2 show the regional location and immediate vicinity of the Project Area, respectively.

The Project area is characterized by a mixture of residential properties, undeveloped playa and desert scrub communities, and agricultural land that includes alfalfa and jojoba farms and large-scale hemp growing operations. Small-scale abandoned and operational hemp and/or marijuana growing operations were present throughout the playa region of the Project area.

Figure 1 Regional Location



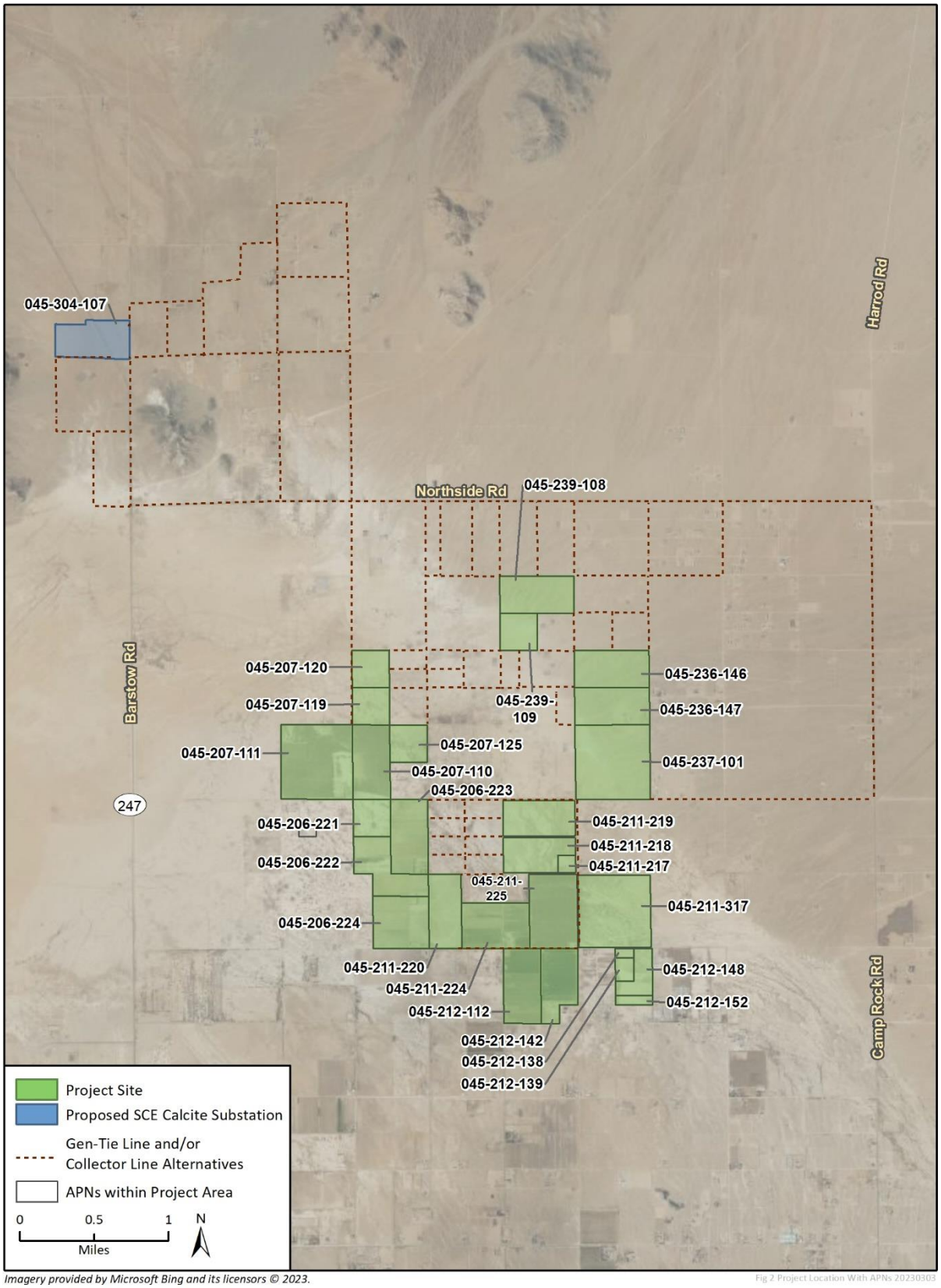
Basemap provided by Esri and its licensors © 2023.

Project Site
Proposed SCE Calcite Substation
Gen-tie Line and/or
Collector Line Alternatives

N



Figure 2 Project Location



Imagery provided by Microsoft Bing and its licensors © 2023.

Fig 2 Project Location With APNs 20230303

1.3 Construction Activities

Construction of all Project components would occur over approximately 12 to 24 months. Construction of the Project would include the following types of activities:[1]

- Site preparation
- Grading and earthwork
- Concrete foundations
- Structural steel work
- Electrical/instrumentation work
- Collector line installation
- Architecture and landscaping

Each parcel that comprises the Sienna Solar Project may be constructed simultaneously, and phases of construction would overlap. Table 1 shows the construction schedule, number of workdays, and overlapping phases for a potential 12-month period that were assumed in the following analysis.

Table 1 Overall Project Construction Schedule

Construction Phase	Workdays	Months											
		1	2	3	4	5	6	7	8	9	10	11	12
Phase 1: Site preparation & Grading	79												
Phase 2: Tracker Foundations (Piles)	125												
Phase 3: Underground Cabling	125												
Phase 4: Mechanical Installation	146												
Phase 5: Electrical Installation	167												

Note: Construction schedule assumptions are based on Eland 1 Solar Project, where number of days per phase were scaled down based a decrease in acreage. The solar capacity of Eland I and Sienna Solar is the same.

Construction traffic would access the Project area locally from Barstow Road, Camp Rock Road, Old Woman Springs Road to parcels located in the southern portion of the development areas. The substation located in the north would gain access from Haynes Road. It is estimated that up to 800 workers per day (during peak construction periods) would be required during construction. On-road traffic would consist of employee and vendor vehicle trips. The number of vehicle trips would vary by month depending on the construction activities.

[1] This list of types of construction activities is not all inclusive of the various activities that will be conducted during each phase of construction and is provided as an example of some of the work that will be conducted. For example, Phase 1 would include activities such as site preparation, grading and earth work; Phase 2 would include activities such as concrete foundations; Phase 3 would include activities such as trenching and collector line installation; Phase 4 would include activities such as structural steel work; Phase 5 would include activities such as electrical/instrumentation work. Additional activities not listed above such as material delivery would also occur during various phases of construction. As such, this list of types of construction activities is presented without respect to the construction schedule.

Heavy construction is expected to occur anytime between 7:00 a.m. and 7:00 p.m., Monday through Friday. Additional hours may be necessary to make-up schedule deficiencies or to complete critical construction activities. Some activities may continue 24 hours per day, seven days per week. Nighttime activities could include, but are not limited to, equipment refueling, staging material for the following day's construction activities, quality assurance/control, and commissioning. Earthmoving activities are expected to be limited to the construction of access roads, operations and maintenance (O&M) buildings, substations, energy storage systems, and storm water protection or storage (detention) facilities. Final grading may include revegetation with low lying grass or applying earth-binding materials to disturbed areas. Materials and supplies would be delivered to the Project area by truck. Truck deliveries would normally occur during daylight hours. However, there could be offloading and/or transporting of materials to the Project area on weekends and during evening hours.

1.4 Operational Activities

Once completed, the Project would generally be limited to the following maintenance activities:

- Cleaning PV panels
- Monitoring electricity generation
- Providing site security
- Maintaining the facility: replacing or repairing inverters, wiring, and PV modules

The Project would operate continuously, 24 hours per day, seven days a week The Project would require an operational staff of up to 15 full-time employees. The facility would generate electricity during normal daylight hours when the solar energy is available. Maintenance activities may occur seven days a week, 24 hours a day to ensure PV panel output when solar energy is available.

1.5 Decommissioning Activities

After 30 to 40 years, the Project would be repowered or decommissioned. If decommissioned, then the Project area would be reverted to undeveloped land. The decommissioning and restoration process would involve removing aboveground and belowground structures, restoring topsoil, revegetation, and seeding. All debris would be removed from the area.

2 Background

2.1 Overview of Sound Measurement

Sound is a vibratory disturbance created by a moving or vibrating source, which is capable of being detected by the hearing organs. Noise is defined as sound that is loud, unpleasant, unexpected, or undesired and may therefore be classified as a more specific group of sounds. The effects of noise on people can include general annoyance, interference with speech communication, sleep disturbance, and, in the extreme, hearing impairment (Caltrans 2013a).

In technical terms, sound levels are described as either a "sound power level" or a "sound pressure level," which while easily confused are two distinct characteristics of sound. Both share the same unit of measure, the decibel (dB). However, the sound power level, expressed as L_w, is the energy converted into sound by the source. As sound energy travels through the air, it creates a sound wave in the air that exerts pressure on receivers such as an eardrum or microphone, the SPL. Sound measurement instruments only measure SPL, and limits used in standards are generally SPL. Modeling uses the L_w of equipment to calculate the SPL at a distance.

Noise levels are commonly measured in dB using the A-weighted sound pressure level (dBA). The A-weighting scale is an adjustment to the actual sound pressure levels so that they are consistent with the human hearing response, which is most sensitive to frequencies around 4,000 Hertz and less sensitive to frequencies around and below 100 Hertz (Kinsler, et. al. 1999). Decibels are measured on a logarithmic scale that quantifies sound intensity in a manner similar to the Richter scale used to measure earthquake magnitudes. A doubling of the energy of a noise source, such as doubling of traffic volume, would increase the noise level by 3 dB; dividing the energy in half would result in a 3 dB decrease (Crocker 2007).

Human perception of noise has no simple correlation with sound energy: the perception of sound is not linear in terms of dBA or in terms of sound energy. Two sources do not "sound twice as loud" as one source. It is widely accepted that the average healthy ear can barely perceive changes of 3 dBA, increase or decrease (i.e., twice the sound energy); that a change of 5 dBA is readily perceptible (8 times the sound energy); and that an increase (or decrease) of 10 dBA sounds twice (half) as loud ([10.5x the sound energy] Crocker 2007).

Sound changes in both level and frequency spectrum as it travels from the source to the receiver. The most obvious change is the decrease in level as the distance from the source increases. The manner by which noise reduces with distance depends on factors such as the type of sources (e.g., point or line, the path the sound will travel, site conditions, and obstructions). Noise levels from a point source typically attenuate, or drop off, at a rate of 6 dBA per doubling of distance (e.g., construction, industrial machinery, ventilation units). Noise from a line source (e.g., roadway, pipeline, railroad) typically attenuates at about 3 dBA per doubling of distance (Caltrans 2013a). The propagation of noise is also affected by the intervening ground, known as ground absorption. A hard site, such as a parking lot or smooth body of water, receives no additional ground attenuation and the changes in noise levels with distance (drop-off rate) result from simply the geometric spreading of the source. An additional ground attenuation value of 1.5 dBA per doubling of distance applies to a soft site (e.g., soft dirt, grass, or scattered bushes and trees) (Caltrans 2013a). Noise levels may also be reduced by intervening structures; the amount of attenuation provided by this "shielding" depends on the size of the object and the frequencies of the noise levels. Natural terrain features such as hills and dense

woods, and man-made features such as buildings and walls, can significantly alter noise levels. Generally, any large structure blocking the line of sight will provide at least a 5-dBA reduction in source noise levels at the receiver (Federal Highway Administration [FHWA] 2017). Structures can substantially reduce exposure to noise as well. The FHWA's guidelines indicate that modern building construction generally provides an exterior-to-interior noise level reduction of 20 to 35 dBA with closed windows.

The impact of noise is not a function of loudness alone. The time of day when noise occurs and the duration of the noise are also important factors of Project noise impact. Most noise that lasts for more than a few seconds is variable in its intensity. Consequently, a variety of noise descriptors have been developed. One of the most frequently used noise metrics is the equivalent noise level (L_{eq}); it considers both duration and sound power level. L_{eq} is defined as the single steady A-weighted level equivalent to the same amount of energy as that contained in the actual fluctuating levels over time. Typically, L_{eq} is summed over a one-hour period. L_{max} is the highest root mean squared (RMS) sound pressure level within the sampling period, and L_{min} is the lowest RMS sound pressure level within the measuring period (Crocker 2007).

Noise that occurs at night tends to be more disturbing than that occurring during the day. Community noise is usually measured using Day-Night Average Level (L_{dn}), which is the 24-hour average noise level with a +10 dBA penalty for noise occurring during nighttime (10:00 PM to 7:00 AM) hours. Community noise can also be measured using Community Noise Equivalent Level (CNEL or L_{DEN}), which is the 24-hour average noise level with a +5 dBA penalty for noise occurring from 7:00 p.m. to 10:00 p.m. and a +10 dBA penalty for noise occurring from 10:00 p.m. to 7:00 a.m. (Caltrans 2013).[2] The relationship between the peak-hour L_{eq} value and the CNEL/L_{dn} depends on the distribution of traffic during the day, evening, and night.

2.2 Vibration

Ground-borne vibration of concern in environmental analysis consists of the oscillatory waves that move from a source through the ground to adjacent structures. The number of cycles per second of oscillation makes up the vibration frequency, described in terms of Hz. The frequency of a vibrating object describes how rapidly it oscillates. The normal frequency range of most ground-borne vibration that can be felt by the human body starts from a low frequency of less than 1 Hz and goes to a high of about 200 Hz (Crocker 2007).

While people have varying sensitivities to vibrations at different frequencies, in general they are most sensitive to low-frequency vibration. Vibration in buildings, such as from nearby construction activities, may cause windows, items on shelves, and pictures on walls to rattle. Vibration of building components can also take the form of an audible low-frequency rumbling noise, referred to as ground-borne noise. Ground-borne noise is usually only a problem when the originating vibration spectrum is dominated by frequencies in the upper end of the range (60 to 200 Hz), or when foundations or utilities, such as sewer and water pipes, physically connect the structure and the vibration source (Federal Transit Administration [FTA] 2018). Although ground-borne vibration is sometimes noticeable in outdoor environments, it is almost never annoying to people who are outdoors. The primary concern from vibration is that it can be intrusive and annoying to building occupants and vibration-sensitive land uses.

[2] Because DNL and CNEL are typically used to assess human exposure to noise, the use of A-weighted sound pressure level (dBA) is implicit. Therefore, when expressing noise levels in terms of DNL or CNEL, the dBA unit is not included.

Vibration energy spreads out as it travels through the ground, causing the vibration level to diminish with distance away from the source. High-frequency vibrations diminish much more rapidly than low frequencies, so low frequencies tend to dominate the spectrum at large distances from the source. Discontinuities in the soil strata can also cause diffractions or channeling effects that affect the propagation of vibration over long distances (Caltrans 2020). When a building is impacted by vibration, a ground-to-foundation coupling loss will usually reduce the overall vibration level. However, under rare circumstances, the ground-to-foundation coupling may actually amplify the vibration level due to structural resonances of the floors and walls.

Vibration amplitudes are usually expressed in peak particle velocity (PPV) or root mean squared (RMS) vibration velocity. The PPV and RMS velocity are normally described in inches per second (in./sec.). PPV is defined as the maximum instantaneous positive or negative peak of a vibration signal. PPV is often used in monitoring of blasting vibration because it is related to the stresses that are experienced by buildings (Caltrans 2020).

2.3 Existing Project Area Noise Levels

The Project area is in a rural agricultural environment with mostly agricultural uses, and agriculturally zoned single-family residences and commercial uses in the Project area. The primary sources of noise in the surrounding area include aircraft over-flights, powerline hum, motor vehicles, wind, birds, and neighborhood activities (e.g., air-conditioners, music, horses, dogs).

To evaluate existing noise levels in the area, eight 15-minute noise measurements (NM1 through NM8) were conducted on and near the Project area on July 21, 2021 and one long term 24-hour noise measurement was conducted July 21 to July 22, 2021, using an ANSI Type II integrating sound level meter. Figure 3 shows the locations of the noise measurements. The noise measurement locations were chosen to provide a representative range of ambient noise levels across the Project area and in the nearby area, especially near existing noise-sensitive residences and roadways. The short-term noise measurement results are shown in Table 2 and the long term 24-hour noise measurement results are shown in Table 3. Detailed noise meter outputs are included in Appendix A.

Table 2 Noise Monitoring Results in the Project Area – Short Term

Measurement Site	Measurement Location	Sample Times	Approximate Distance to Primary Noise Source	L_{eq} (dBA)	L_{min} (dBA)	L_{max} (dBA)
NM1	East of Meridian Road and Powerline Road	1:14 – 1:29 p.m.	20 feet from Meridian Road centerline	40	32	61
NM2	East of Meridian Road and No End Road	12:42 – 12:57 a.m.	25 feet from Meridian Road centerline	35	27	53
NM3	Cove Road west of Locust Avenue	8:15 – 8:30 a.m.	10 feet from Cove Road centerline	35	24	50
NM4	Lincoln Road south of Cambria Road	10:07 – 10:22 a.m.	10 feet from Lincoln Road centerline	30	27	44
NM5	West of Locust Avenue, center of Gaeta Parcel	8:54 – 9:09 a.m.	900 feet from Locust Avenue centerline	30	24	48

Measurement Site	Measurement Location	Sample Times	Approximate Distance to Primary Noise Source	L_{eq} (dBA)	L_{min} (dBA)	L_{max} (dBA)
NM6	Lincoln Road north of Cambria Road	11:03 – 11:18 a.m.	25 feet from Lincoln Road centerline	45	26	70
NM7	Locust Avenue north of Granite Road	9:28 – 9:43 a.m.	30 feet from Locust Road centerline	35	24	51
NM8	South of Desert Lane at Waalew Road	12:03 – 12:18 a.m.	35 feet from Desert Lane centerline	30	26	48

See Figure 3 for Noise Measurement Locations.

[1] The equivalent noise level (L_{eq}) is defined as the single steady A-weighted level that is equivalent to the same amount of energy as that contained in the actual fluctuating levels over a period of time (essentially, the average noise level). For these measurements, the L_{eq} was over a 15-minute period.

Source: Rincon Consultants, field measurements conducted on July 21 to 22, 2021, using ANSI Type II Integrating sound level meter. See Appendix A.

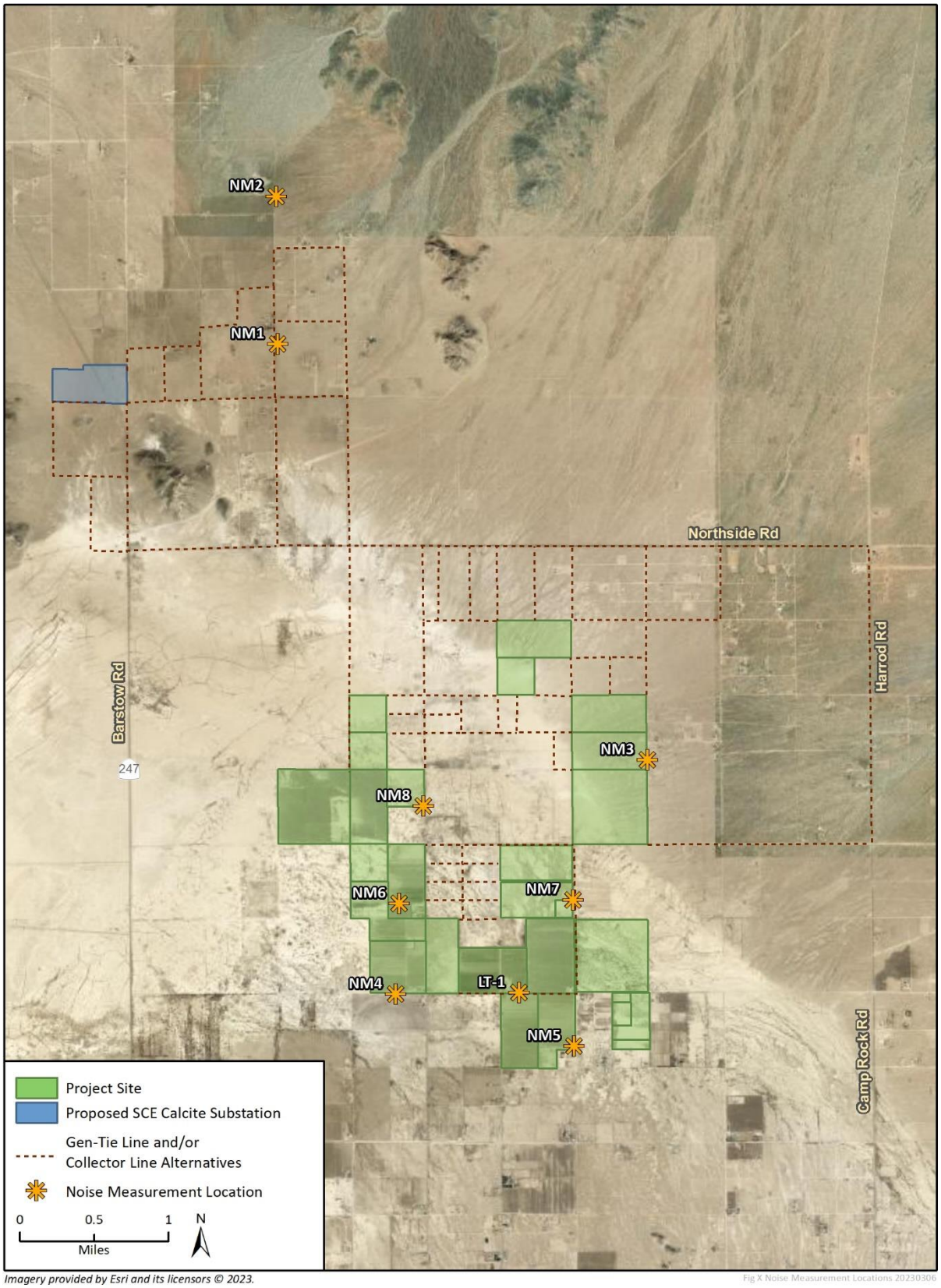
Table 3 Project Area Noise Monitoring Results – Long Term

Sample Time	dBA L_{eq}	Sample Time	dBA L_{eq}
24-hour Measurement – Cambria Road – July 21-22, 2021			
2:41 p.m.	52	2:41 a.m.	48
3:41 p.m.	44	3:41 a.m.	52
4:41 p.m.	58	4:41 a.m.	47
5:41 p.m.	48	5:41 a.m.	57
6:41 p.m.	53	6:41 a.m.	61
7:41 p.m.	47	7:41 a.m.	57
8:41 p.m.	49	8:41 a.m.	41
9:41 p.m.	50	9:41 a.m.	46
10:41 p.m.	53	10:41 a.m.	45
11:41 p.m.	53	11:41 a.m.	49
12:41 a.m.	53	12:41 p.m.	60
1:41 a.m.	50	1:41 p.m.	62
24-hour Noise Level (CNEL)			**61**

L_{eq} = average noise level equivalent; dBA = A-weighted decibel; CNEL = Community Noise Equivalent Level defined as the 24-hour average noise level with a +5 dBA penalty for noise occurring from 7:00 p.m. to 10:00 p.m. and a +10 dBA penalty for noise occurring from 10:00 p.m. to 7:00 a.m.

Source: Rincon Consultants, field measurements conducted on July 21-22, 2021, using ANSI Type II Integrating sound level meter. See Appendix A.

Figure 3 Noise Measurement Locations



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Fig X Noise Measurement Locations 20230306

2.4 Regulatory Setting

San Bernardino County General Plan

Section seven of the San Bernardino County General Plan provides a framework to limit the exposure of the community to excessive noise levels (San Bernardino County 2007). The plan contains the following goals and policies related to noise in San Bernardino County that would be relevant to the Project:

- **Goal N 1.** The County will abate and avoid excessive noise exposures through noise mitigation measures incorporated into the design of new noise-generating and new noise-sensitive land uses, while protecting areas within the County where the present noise environment is within acceptable limits.
- **Policy N 1.3.** When Industrial, commercial, or other land use, including locally regulated noise sources, are proposed for areas containing noise-sensitive land uses, noise levels generated by the proposed use will not exceed the performance standards of Table N-2 within outdoor activity areas. If outdoor activity areas have not yet been determined, noise levels shall not exceed the performance standards listed in Chapter 83.01 of the Development Code at the boundary of areas panned or zoned for residential or other noise-sensitive land uses.
- **Policy N 1.5.** Limit truck traffic in residential and commercial areas to designated truck routes; limit construction, delivery, and through-truck traffic to designated routes; and distribute maps of approved truck routes to County traffic officers.
- **Policy N 1.6.** Enforce the hourly noise-level performance standards for stationary and other locally regulated sources, such as industrial, recreational, and construction activities as well as mechanical and electrical equipment.
- **Policy N 1.7.** Prevent incompatible land uses, by reason of excessive noise levels, from occurring in the future.
- **Goal N 2.** The County will strive to preserve and maintain the quiet environment of mountain, desert and other rural areas
- **Policy N 2.1**. The county will require appropriate and feasible on-site noise attenuating measures that may include noise walls, enclosure of noise-generating equipment, site planning to located noise sources away from sensitive receptors, and other comparable features.

San Bernardino County Development Code

The San Bernardino County Development Code provides uniform performance standards for development within the County that promotes compatibility with surrounding areas and land uses. Section 83.01.080 establishes standards concerning acceptable noise levels for both noise-sensitive land uses and for noise-generating uses. The Code provides regulations for construction or operational noise that would apply to the Project.

Section 83.01.080(c)(1), *Noise Standards for Stationary Noise Sources*, Table 83-2 (Table 4 of this report) establishes noise standards for noise emanating from a stationary noise source as it affects adjacent properties.

Table 4 Noise Standards for Stationary Noise Sources

Affected Land Uses (Receiving Noise)	7 am-10 pm L_{eq}	10 pm-7 am L_{eq}
Residential	55 dBA	45 dBA
Professional Services	55 dBA)	55 dBA
Other Commercial	60 dBA	60 dBA
Industrial	70 dBA	70 dBA

L_{eq} = (Equivalent Energy Level). The sound level corresponding to a steady-state sound level containing the same total energy as a time-varying signal over a given sample period, typically 1, 8 or 24 hours.

dBA = (A-weighted Sound Pressure Level). The sound pressure level, in decibels, as measured on a sound level meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound, placing greater emphasis on those frequencies within the sensitivity range of the human ear.

Source: San Bernardino Development Code, Section 83.01.080

The following adjustments are applicable to the standards in Table 4:

For a cumulative period of more than 30 minutes in any hour.

(A) The noise standard plus 5 dBA for a cumulative period of more than 15 minutes in any hour.

(B) The noise standard plus 10 dBA for a cumulative period of more than five minutes in any hour.

(C) The noise standard plus 15 dBA for a cumulative period of more than one minute in any hour.

(D) The noise standard plus 20 dBA for any period of time.

Section 83.01.080(d), *Noise Standards for Adjacent Mobile Noise Sources*, Table 83-3 (Table 5 of this report) establishes noise standards for mobile sources that may affect adjacent properties adversely.

Table 5 Noise Standards for Adjacent Mobile Noise Sources

Categories	Land Use	Ldn (or CNEL) dBA	
		Interior [1]	Exterior [2]
Residential	Single and multi-family, duplex, mobile homes	45	60 [3]
Commercial	Hotel, motel, transient housing	45	60 [3]
	Commercial retail, bank, restaurant	50	N/A
	Office building, research and development, professional offices	45	65
	Amphitheater, concert hall, auditorium, movie theater	45	65
Institutional/Public	Hospital, nursing home, school classroom, religious institution, library	45	65
Open Space	Park	N/A	65

Notes:

(1) The indoor environment shall exclude bathrooms, kitchens, toilets, closets and corridors.

(2) The outdoor environment shall be limited to:

- Hospital/office building patios
- Hotel and motel recreation areas
- Mobile home parks
- Multi-family private patios or balconies
- Park picnic areas
- Private yard of single-family dwellings
- School playgrounds

(3) An exterior noise level of up to 65 dBA (or CNEL) shall be allowed provided exterior noise levels have been substantially mitigated through a reasonable application of the best available noise reduction technology, and interior noise exposure does not exceed 45 dBA (or CNEL) with windows and doors closed. Requiring that windows and doors remain closed to achieve an acceptable interior noise level shall necessitate the use of air conditioning or mechanical ventilation.

L_{dn} = (Day-Night Noise Level). The average equivalent A-weighted sound level during a 24-hour day obtained by adding 10 decibels to the hourly noise levels measured during the night (from 10 pm to 7 am). In this way Ldn takes into account the lower tolerance of people for noise during nighttime periods.

CNEL = (Community Noise Equivalent Level). The average equivalent A-weighted sound level during a 24-hour day, obtained after addition of approximately five decibels to sound levels in the evening from 7 p.m. to 10 a.m. and 10 decibels to sound levels in the night before 7 a.m. and after 10 p.m.

Source: San Bernardino Development Code, Section 83.01.080

Section 83.01.080(e) Increases in Allowable Noise Levels. If the measured ambient level exceeds any of the first four noise limit categories in Subsection (d)(2), above, the allowable noise exposure standard shall be increased to reflect the ambient noise level. If the ambient noise level exceeds the fifth noise limit category in Subsection (d)(2), above, the maximum allowable noise level under this category shall be increased to reflect the maximum ambient noise level.

Section 83.01.080(f) Reductions in Allowable Noise Levels. If the alleged offense consists entirely of impact noise or simple tone noise, each of the noise levels in Table 4 (Noise Standards for Stationary Noise Sources) shall be reduced by 5 dB(A).

Section 83.01.080(g) Exempt Noise. Temporary construction, maintenance, repair, or demolition activities between 7:00 a.m. and 7:00 p.m., except Sundays and Federal holidays are considered exempt from San Bernardino County Development Code noise regulations.

Section 83.01.090(a) Vibration Standard. No ground vibration shall be allowed that can be felt without the aid of instruments at or beyond the lot line, nor shall any vibration be allowed which produces a particle velocity greater than or equal to two-tenths (0.2) inches per second measured at or beyond the lot line.

Section 83.01.090(c) Exempt Vibrations. Temporary construction, maintenance, repair, or demolition activities between 7:00 a.m. and 7:00 p.m., except Sundays and Federal holidays are considered exempt from San Bernardino County Development Code vibration regulations.

3 Impact Analysis

3.1 Methodology and Significance Thresholds

To assess the potential for temporary construction and long-term operational noise impacts, noise-sensitive receivers closest to the Project area were identified. The Project parcels are generally located in a rural, agricultural area. The community of Lucerne Valley is located four miles southwest of the nearest Project parcel. Single-family residences are also present on agriculturally-zoned land throughout the Project area.

The nearest agriculturally zoned residences are located adjacent to potential gen-tie routes, collector lines, and solar arrays for the Project. For the analysis, it is assumed that gen-tie corridor and collector line construction would occur within 50 feet of noise-sensitive receivers and solar array construction would occur within 100 feet of noise-sensitive receivers.

Exposure of the proposed solar facility to ambient noise was not evaluated because the solar facility would not be a noise-sensitive land use.

Construction and Decommissioning Noise

The FHWA's software program Roadway Construction Noise Model (RCNM) was used to estimate construction noise at nearby sensitive receptors. Construction noise modeling results are provided in Appendix B. The types of construction equipment that would be used on-site were provided by 99MT 8me, LLC. RCNM provides reference noise levels at the standard distance of 50 feet and estimates noise levels at nearby sensitive receivers based on a standard noise attenuation rate of 6 dB per doubling of distance (line-of-sight method of sound attenuation for point sources of noise such as construction equipment). Although construction equipment may operate near the Project's property lines, construction equipment would be mobile throughout the day and would average a further distance from the property line over a typical construction day. This analysis conservatively assumes that in addition to the distance from the property line to each noise-sensitive receiver, the equipment would average at least 50 feet within the property lines from each noise-sensitive receiver. In addition, RCNM does not consider topography or other environmental factors that attenuate noise and is therefore a conservative model. Experience and observations from similar projects were used for the assumptions of the loudest construction equipment for each activity (gen-tie and parcel construction) that would be operating simultaneously. For gen-tie and collector line construction, this was assumed to be a crane, a pick-up truck, and an excavator operating simultaneously. For Project parcel construction, this was assumed to be an excavator, auger drill rig, loader, pneumatic tools, and a pickup truck operating simultaneously.

As San Bernardino County does not specify quantitative construction noise limits, for purposes of this analysis, the FTA Transit Noise and Vibration Impact Assessment (FTA 2018) criteria will be used. The FTA provides reasonable criteria for assessing construction noise impacts based on the potential for adverse community reaction. For residential uses, the daytime noise threshold is 80 dBA L_{eq} for an 8-hour period.

As stated in Section 1.2, *Project Area and Description*, at the end of the Project's useful life (anticipated to be 30-40 years), the proposed solar facility and associated infrastructure would be decommissioned in accordance with then-current decommissioning practices. At this time, it is not

possible to quantitatively evaluate potential noise that would result from Project decommissioning, due to the uncertainty of when decommissioning would occur and the technology or construction practices that would be available at that time. Therefore, based on current decommissioning practices and as a reasonable worst-case scenario, this analysis assumes that noise impacts generated during future decommissioning would be similar to noise impacts generated during the construction phase of the Project.

Construction Traffic Noise

Noise levels from existing traffic and with-construction traffic along Barstow Road, Northside Road, Rabbit Springs Road, State Route 247, and State Route 18 were estimated in terms of peak-hour L_{eq} using the FHWA Highway Traffic Noise Prediction Model (FHWA RD 77-108). The model calculations are based on traffic volumes from the traffic analysis prepared by GHD for this Project (GHD 2023). Vehicle daily trips generated by Project construction activities are estimated at 1,830 workers and associated construction equipment during peak overlapping (Phases 3, 4, and 5) construction periods. A vehicle trip is defined as a one-direction vehicle movement. The total number of trips generated by the Project includes both inbound and outbound trips. The roadways were modeled conservatively using a straight-line analysis (i.e., assuming no attenuation from topography and a straight roadway). Loose soil was used as the default ground type; per FHWA's *Ground and Pavement Effects using FHWA's Traffic Noise Model 2.5* report, an example of loose soil ground can be dirt soil with sparse vegetation, similar to the agricultural setting and the single-family lots of the area (FHWA 2010).

Table 6 shows the estimated number of existing and construction-generated vehicle trips at the modeled roadways (GHD 2023). The table also includes the estimated speeds for each roadway used in the model. The modal split of existing trips was assumed to be a typical 94 percent passenger cars, 4 percent medium trucks, and 2 percent heavy trucks for Barstow Road, Northside Road, and Rabbit Springs Road. Based on Caltrans Average Daily Traffic Counts, the modal split applied to State Route 247 traffic volumes is 87 percent passenger cars, 4 percent medium trucks, and 9 percent heavy trucks and the modal split applied to State Route 18 is 81 percent passenger cars, 7 percent medium trucks, and 12 percent heavy trucks (Caltrans 2019). Model results are included in Appendix C.

Table 6 Estimated Existing and Construction Vehicle Trips

Roadway Segment	Speed Limit (mph)	Existing Daily Vehicle Trips	Construction Daily Vehicle Trips	Existing + Construction Daily Vehicle Trips
Barstow Road	55	2,920	1,030	3,950
Northside Road	45	700	170	870
Rabbit Springs Road	55	1,980	90	2,070
State Route 247	45	2,350	860	3,210
State Route 18	45	8,500	520	9,020

Source: GHD 2023

For traffic-related noise, impacts are considered potentially significant if Project-generated traffic would result in exposure of sensitive receivers to an unacceptable increase in noise levels during construction and/or operational activities. Recommendations in the FTA's *Transit Noise and Vibration Impact Assessment Manual* were used to determine whether increases in traffic noise would be unacceptable (FTA 2018). Under these FTA criteria, as existing ambient noise increases, the "allowable" increase in noise exposure due to a project is reduced. Table 7 shows the FTA criteria considered when evaluating traffic noise generated by this Project. If sensitive receivers would be exposed to traffic noise increases exceeding these criteria, impacts may be considered significant.

Table 7 Significance of Changes in Roadway Noise Exposure

Existing Noise Exposure (dBA L_{dn} or L_{eq})	Allowable Noise Exposure Increase (dBA L_{dn} or L_{eq})
40-45	10
45-50	7
50-55	5
55-60	3
60-65	2
65-74	1
75+	0

Source: FTA 2018

On-Site Operational Noise

On-site operational noise sources were modeled with SoundPLAN. Propagation of modeled stationary noise sources was based on ISO Standard 9613-2, "Attenuation of Sound during Propagation Outdoors, Part 2: General Method of Calculation." The assessment methodology assumes that all receivers would be downwind of stationary sources. This is a worst-case assumption for total noise impacts, since, in reality, only some receivers would be downwind at any one time.

Operational noise sources from the Project include PV solar arrays with associated electrical equipment (such as transformers and inverters), energy storage systems, substations, collector lines, and the operations and maintenance facility. The Project would operate continuously, seven days a

week, until the anticipated repowering or decommissioning of the Project in 30 to 40 years. Stationary noise sources during operation would include PV solar arrays with associated electrical equipment (such as transformers and inverters), energy storage systems, substations, collector lines, and the operations and maintenance facility. Electrical equipment produces a discrete low-frequency humming noise. The noise from transformers is produced by alternating current flux in the core, which causes it to vibrate.

Transformers would be co-located with the inverters, which would lie within an enclosed or canopied metal structure. Within enclosures, inverters typically produce a noise level of 58 dBA L_{eq} at the source (Monterey County 2014). However, a fully enclosed metal structure would attenuate noise from inverter stations more effectively than would a canopy structure with open walls. It is unknown at this time whether the inverters/transformers would be enclosed or open. This would be determined during design once the inverter/transformer manufacturer has been selected. Open inverters would generate a noise level of 52 dBA L_{eq} at a distance of 75 feet (*California Valley Solar Project Final EIR*, San Luis Obispo County 2011). If the inverters are enclosed, each inverter enclosure may also include heating, ventilation, and air conditioning (HVAC) systems mounted on the exterior of the inverter enclosure, which would generate a noise level of 58 dBA L_{eq} at a distance of 75 feet. BESS enclosures would be 8 feet wide by 40 feet long by 9.5 feet high (2.4 meters wide by 12 meters long by 2.9 meters high). Manufacturer's specifications indicate that these units generate a noise level of 75 dBA at 1 meter (see Appendix D for specification sheets). Noise from the proposed substation step-up transformer was modeled using the noise reference level of 80 dBA L_{eq} at 6 feet, consistent with manufacturer specifications for an ABB step-up transformer under the conservative "all cooling fans on" scenario (ABB 2019).

Table 8 lists representative noise levels of equipment used for similar solar projects that are assumed to be used for this Project .

Table 8 Estimated Noise Rating for Equipment Utilized During Project Operations

Equipment Type	Reference Noise Level (dBA L_{eq})	Distance from Source (feet)
Gen-Tie [1]	20	50
PV Panel	44	50
Inverter (unenclosed)	52	75
Inverter (enclosed with HVAC system)	58	75
Transformer	58	3.3
BESS Enclosure	75	3.3
Substation	80	6

[1] Only applicable to the gen-tie transmission line.

Sources: U.S. Department of Energy 2011; San Luis Obispo County 2011; Illingworth and Rodkin 2009; Kern County 2014; Monterey County 2014

As shown in Table 8, it is expected that the loudest noise generated by on-site solar operations would come from the HVAC systems at 58 dBA L_{eq} at a distance of 75 feet from the source and from substation equipment at 80 dBA L_{eq} at six feet from the source. As the closed inverter would generate a higher noise level than an open inverter due to the inclusion of HVAC units, the enclosed inverters are conservatively used for this analysis. The combined noise levels from the inverters, HVAC systems and transformers, which would be anticipated to operate simultaneously, are analyzed below at the

closest sensitive receivers through SoundPLAN modeling. Noise levels from the gen-tie transmission line, PV panels, and substations/energy storage systems are discussed separately, as these noise sources would be minor in comparison to the HVAC systems and transformers and were not modeled.

Because the operation of the Project is dependent on sunlight, substantial operational noise would not be anticipated during nighttime hours. Operational noise would result in a significant impact if it would exceed San Bernardino County's daytime standard for stationary noise sources of 55 dBA L_{eq} at the boundary of areas planned and zoned for residential or other noise-sensitive land uses.

Modeling was originally completed with an additional parcel near R-34 that has since been removed from the project; the potential noise contours from this parcel remain in Figure 4 as a conservative analysis.

Operational Traffic Noise

Since the project would have up to 15 full-time employees, it is conservatively assumed that there would be 30 daily trips associated with workers (two one-way trips per employee). The existing traffic volumes used in this analysis are shown in Table 6. These traffic volumes were compared with the expected increase in traffic volumes after construction of the Project. Modeling of traffic noise indicates that, in general, a 10 percent increase in traffic volume would raise traffic noise by 0.4 dBA, a 20 percent increase would raise traffic noise by about 0.8 dBA, a 30 percent increase would result in a 1.1 dBA increase in traffic noise, and a 40 percent increase would increase traffic noise by about 1.5 dBA. The significance of the Project's increase in traffic noise was determined using the FTA criteria shown in Table 7.

Vibration

Vibration associated with construction of the Project has the potential to be an annoyance to nearby land uses. San Bernardino County regulates vibration producing sources in the Development Code. Project construction vibration would be considered significant if any vibration is allowed which produces a particle velocity greater than or equal to two-tenths (0.2) inches per second measured at or beyond the lot line.

3.2 Results

Construction and Decommissioning Noise

Construction and decommissioning of the Project would involve the use of noise-generating equipment during various phases, including transport of personnel and materials to the Project, heavy machinery used in grading and clearing Project parcels, pneumatic post drivers to install foundation supports for solar array modules, as well as equipment used during construction of the proposed solar arrays, infrastructure improvements, and related structures. Emergency diesel generators may be used during construction activities. Project components at all Project parcels and the gen-tie would be constructed over a 12 to 24 month period.

Table 9 shows the noise levels associated with heavy construction equipment at a reference distance of 50 feet from the source. As shown therein, noise levels at this distance can range from about 74 to 85 dBA, depending upon the types of equipment in operation at any given time and phase of construction (FHWA 2006).

Table 9 Typical Construction Equipment Noise Levels

Equipment	Acoustical Usage Factor (%)[1]	Measured L_{eq} (dBA at 50 feet)
Augur Drill Rig	20	84
Backhoe	40	78
Compactor (ground)	20	83
Concrete Mixer Truck	40	85
Crane	16	85
Dozer	40	82
Dump Truck	40	76
Excavator	40	81
Flat Bed Truck	40	74
Front End Loader	40	79
Generator	50	81
Grader	40	83
Pickup Truck	40	75
Pneumatic Tools	50	85
Roller	20	80
Scraper	40	84
Warning Horn	5	83
Welder/Torch	40	74

[1] The average fraction of time each piece of construction equipment is operating at full power (i.e., its loudest condition) during a construction operation.

Source: FHWA 2006

Construction activities would be subject to San Bernardino County policies and regulations. Heavy construction activities would normally occur on-site between the hours of 7:00 a.m. and 7:00 p.m., which is between the acceptable hours for construction listed in the San Bernardino County General Plan (7:00 a.m. and 7:00 p.m., except Sundays and Federal holidays). Additional hours may also be necessary to make up schedule deficiencies or to complete critical construction activities. As a result, some construction activities may be required to continue 24 hours per day, seven days per week. Activities that generate relatively low amounts of noise, such as refueling equipment, staging material for the following day's construction activities, quality assurance/control, and commissioning, may potentially occur between the hours of 9:00 p.m. and 6:00 a.m. on weekdays and the hours of 9:00 p.m. and 8:00 a.m. on Saturdays.

Noise-sensitive receivers near Project construction include single-family residences throughout the Project area. These land uses would experience a temporary increase in noise during construction of the Project. The following subsections detail the impacts to noise-sensitive receivers in proximity to the Project parcels and the gen-tie corridor.

Construction at Project Parcels

Table 10 shows the estimated average noise level from construction at the Project parcels at the nearest noise-sensitive land uses using RCNM.

Table 10 Noise Levels at Various Distances from Construction at the Project Parcels

Receiver	Distance from Construction (feet)[1]	Noise Level at Receptor (dBA L_{eq})
Reference Distance	50	82
Single-family residence along Meridian Road	100	79
Single-family residence along Sherman Way	150	75
Single-family residence along Midway Avenue	300	69
Single-family residence along Fern Road	600	63

See Appendix B for model outputs.

[1] Distances include the distance from the Project parcel boundary to the receivers, plus 50 feet to account for construction equipment that be mobile throughout the day and would average a further distance (of approximately 50 feet) from the property line over a typical construction day.

As shown in Table 10, although construction noise levels from simultaneous heavy equipment operation would reach 82 dBA L_{eq} at the reference distance of 50 feet, due to the further distance between construction at the Project parcels and the nearest noise-sensitive receivers, construction noise levels under the conservative scenario analyzed would only reach as high as 79 dBA L_{eq}. This would be below FTA's construction noise threshold of 80 dBA L_{eq} (8-hour). Heavy construction activity involving pneumatic tools and graders also would not occur during nighttime hours.

Construction activities outside of acceptable hours would require a variance to conduct construction activities during those hours. Project construction may occur outside of the allowed construction hours (7:00 AM to 7:00 PM, Monday through Saturday).

Gen-Tie

The gen-tie corridor may be routed along Meridian Road, Haynes Road, Huff Road, Waalew Road, Tampadero Road, Northside Road, Granite Road, Harrod Road, Lincoln Avenue, and Locust Road. Residential uses are located along each of these roadways. For the purposes of this analysis, at the closest point of construction, the gen-tie routes would be located 50 feet from single-family residences. As modeled, the loudest anticipated construction noise from gen-tie construction would potentially involve the simultaneous use of an excavator and a crane. Table 11 shows construction noise levels at the nearest noise-sensitive receiver.

Table 11 Typical Construction Noise Levels at Various Distances from Gen-Tie Construction

Receiver	Distance from Construction (feet)	Noise Level at Receptor (dBA L_{eq})
Reference Distance	50	78
Single-family residence along Harrod Road	50	78

See Appendix B for model outputs.

As shown in Table 11, simultaneous heavy equipment use during gen-tie construction would generate a noise level of up to 78 dBA L_{eq} when within 50 feet of single-family residences located along gen-tie routes. This would be below FTA's construction noise threshold of 80 dBA L_{eq} (8-hour). Most gen-tie construction activities would occur further from nearby noise receptors, and would, therefore, result in lower noise levels. Heavy construction would not occur during nighttime hours.

Construction activities outside of acceptable hours would require a variance to conduct construction activities during those hours. Project construction may occur outside of the allowed construction hours (7:00 AM to 7:00 PM, Monday through Saturday). Therefore, gen-tie construction noise would not exceed applicable thresholds.

Project Decommissioning

As stated in Section 1.2, *Project Area and Description*, at the end of the Project's useful life (anticipated to be 30-40 years), the solar facility and associated infrastructure may be decommissioned in accordance with then-current decommissioning practices. Given the Project's operating life cycle and distant timeframe for decommissioning activities, it is too speculative to quantify the potential noise impacts that could occur during decommissioning activities. On a rough basis, decommissioning would be similar to Project construction and be completed in 12 to 24 months. Assuming that the facility would be torn down and the materials present recycled or disposed, temporary noise associated with such actions are assumed to be generally similar to the noise levels that would result from Project construction. Similar to the noise generated during construction of the Project, decommissioning activities would be conducted in accordance with all applicable requirements in effect at the time of Project termination. Potential future environmental effects associated with Project decommissioning would be addressed at the time decommissioning is proposed consistent with regulations in effect at that time. A final decommissioning plan, based on then-current technology, site conditions, and regulations, would be prepared prior to actual decommissioning.

Cumulative Construction Noise

As described in Section 1.2, *Project Area and Description*, Project components at all parcels would be constructed over a 12 to 24 month period. This analysis makes a conservative assumption that construction at all Project parcels and the gen-tie would occur simultaneously. Concurrent construction activity at more than one parcel and the gen-tie line may expose nearby residences to cumulative noise impacts. This analysis of cumulative effects focuses on the effects of concurrent construction activities for the worst-case scenario (i.e., the closest residences which would be exposed to construction activities at multiple sites).

Some noise sensitive receivers located in Project area would be exposed to adjacent construction noise from gen-tie construction and more distant noise from Project parcels. Because of these residences' proximity to gen-tie construction (as close as 50 feet), cumulative noise levels are dominated by gen-tie construction noise. The residence on Lincoln Road (R-20) is the closest noise-sensitive receiver within 50 feet of gen-tie construction that is also close to multiple parcel construction, including construction on parcels 100, 150, and 200 feet. This residence is representative of a reasonable conservative scenario for combined Project construction noise impacts, assuming concurrent construction of gen-tie corridor and the nearest Project parcels. Table 12 estimates the cumulative construction noise levels for this scenario, which could reach 83 dBA L_{eq}. This would be above FTA's construction noise threshold of 80 dBA L_{eq} (8-hour). Therefore, cumulative construction noise would potentially exceed applicable FTA thresholds.

Table 12 Cumulative Construction Noise Levels for Worst-Case Scenario

Project Area	Distance from Construction (feet)	Noise Level at Receptor (dBA L_{eq})
Gen-tie	50	78

Project Parcel	100	79
Project Parcel	150	75
Project Parcel	200	73
Cumulative Noise Level		**83**

Construction Traffic Noise

Construction of the Project would increase traffic noise offsite from commuting construction workers and from haul trucks bringing materials to and from the Project area. Project components would be constructed simultaneously over a 12 to 24 month period. This could expose nearby residences to cumulative noise from construction traffic. This analysis of cumulative effects focuses on the effects of concurrent construction traffic for the worst-case scenario (i.e., traffic generated by the peak construction period). Table 6 in Section 3.1, *Methodology and Significance Thresholds*, compares existing daily traffic volumes on nearby road segments to anticipated traffic generated by Project construction. Based on these traffic volumes, Table 13 shows modeled traffic noise levels at 50 feet from roadway centerlines under existing traffic conditions and with construction traffic.

Table 13 Construction Traffic Noise

Roadway	From	To	Existing Traffic Noise (dBA L_{eq})	With-Construction Traffic Noise (dBA L_{eq})	Change in Traffic Noise (dBA L_{eq})	FTA Allowable Noise Exposure Increase (dBA L_{eq})
Barstow Road	Rabbit Springs Road	To the north	64	65	1	2
Northside Road	Barstow Road	To the east	56	57	1	3
Rabbit Springs Road	Barstow Road	To the east	62	63	1	2
State Route 247	Camp Rock Road	State Route 18	63	64	1	2
	State Route 18	Rabbit Springs Road	63	64	1	2
	Rabbit Springs Road	Lucerne Valley Cutoff	64	65	1	2
State Route 18	Lucerne Valley	State Route 247	70	70	<1	1

As shown in Table 13, construction traffic would increase noise levels by up to 1 dBA L_{eq} on Project utilized roadway segments. However, none of the traffic noise increases would exceed the applicable FTA criteria. Therefore, the short-term increase in traffic noise from Project construction would be less than significant.

On-Site Operational Noise

Solar Array Noise

Sensitive receivers nearby the Project parcels include rural single-family residences associated with agricultural properties. Noise levels from the Project's solar array operations (i.e., transformers and HVAC units associated with the inverters) are shown in Table 14, and noise level contours and receiver locations are shown in Figure 4. Modeling was originally completed with an additional parcel near R-34 that has since been removed from the project; the potential noise from this parcel remains in Table 14 and Figure 4 as a conservative analysis.

Table 14 Operational Noise Levels at Nearest Sensitive Receivers

Receiver	Receiver Description	Noise Level at Receiver dBA L_{eq}	Exceed Threshold?
R-1	Residence on agriculturally-zoned property	40	No
R-2	Residence on agriculturally-zoned property	37	No
R-3	Residence on agriculturally-zoned property	43	No
R-4	Residence on agriculturally-zoned property	43	No
R-5	Residence on agriculturally-zoned property	45	No
R-6	Residence on agriculturally-zoned property	44	No
R-7	Residence on agriculturally-zoned property	48	No
R-8	Residence on agriculturally-zoned property	42	No
R-9	Residence on agriculturally-zoned property	37	No
R-10	Residence on agriculturally-zoned property	38	No
R-11	Residence on agriculturally-zoned property	42	No
R-12	Residence on agriculturally-zoned property	45	No
R-13	Residence on agriculturally-zoned property	49	No
R-14	Residence on agriculturally-zoned property	50	No
R-15	Residence on agriculturally-zoned property	48	No
R-16	Residence on agriculturally-zoned property	48	No
R-17	Residence on agriculturally-zoned property	48	No
R-18	Residence on agriculturally-zoned property	51	No
R-19	Residence on agriculturally-zoned property	53	No
R-20	Residence on agriculturally-zoned property	51	No
R-21	Residence on agriculturally-zoned property	48	No
R-22	Residence on agriculturally-zoned property	52	No
R-23	Residence on agriculturally-zoned property	48	No
R-24	Residence on agriculturally-zoned property	45	No
R-25	Residence on agriculturally-zoned property	47	No

Receiver	Receiver Description	Noise Level at Receiver dBA L_{eq}	Exceed Threshold?
R-26	Residence on agriculturally-zoned property	47	No
R-27	Residence on agriculturally-zoned property	48	No
R-28	Residence on agriculturally-zoned property	42	No
R-29	Residence on agriculturally-zoned property	43	No
R-30	Residence on agriculturally-zoned property	43	No
R-31	Residence on agriculturally-zoned property	46	No
R-32	Residence on agriculturally-zoned property	41	No
R-33	Residence on agriculturally-zoned property	40	No
R-34	Residence on agriculturally-zoned property	44	No
R-35	Residence on agriculturally-zoned property	40	No
R-36	Residence on agriculturally-zoned property	26	No
R-37	Residence on agriculturally-zoned property	25	No

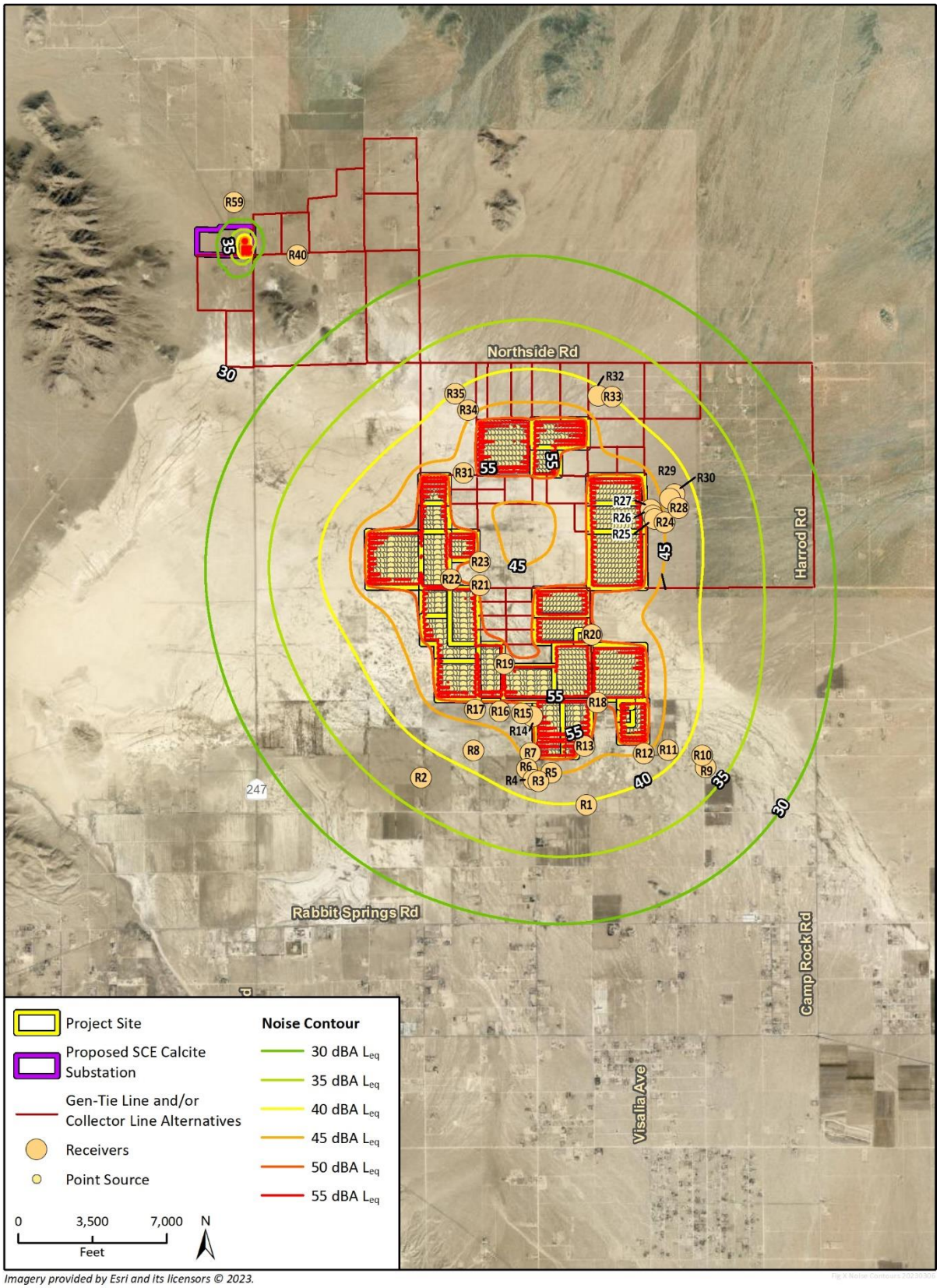
Note: Calculations completed in SoundPLAN; See Figure 4 for receiver locations.

As shown in Table 14, operational noise levels from the Project would reach up to 53 dBA L_{eq} at noise-sensitive land uses. These noise levels would be below San Bernardino County's daytime standard of 55 dBA L_{eq} for noise at noise-sensitive land uses. Because the operation of the Project is dependent on sunlight, substantial operational noise would not be anticipated during nighttime hours. Therefore, operational noise impacts from the Project would not exceed County thresholds.

Gen-Tie Noise

The gen-tie transmission line would generate noise from the corona affect, which is a phenomenon associated with the electrical ionization of the air that occurs near the surface of the energized conductor and suspension hardware due to very high electric field strength. This is audible power line noise that is generated from electric corona discharge, which is usually experienced as a random crackling or hissing sound. The corona effect on the gen-tie transmission line would generate a noise level of 20 dBA at a distance of 50 feet (*California Valley Solar Project Final EIR*, San Luis Obispo County 2011). This is the approximate distance to the nearest residences from the gen-tie route. As observed during a site visit to existing solar farms, noise levels from these transmission lines were not detected over the existing ambient noise sources in the area (wind and vehicles) just outside of the solar farm properties (Rincon 2020). Therefore, per site observations and the general low noise of transmissions lines, gen-tie noise would not exceed County's standard of 55 dBA L_{eq} at the nearest residences, and impacts would not exceed County thresholds.

Figure 4 Receiver Locations and Operational Noise Contours



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PV Panel Noise

PV panel noise would come from the tracking motors. These systems involve the panels being driven by motors to make brief, incremental adjustments to track the arc of the sun to maximize the solar effect. While these motors may generate noise of up to 44 dBA at 50 feet, these motors would operate briefly throughout an hour (e.g., several minutes per hour) as the sun moves west across the sky, and then would reset at night to face the eastern sky. By operating only several minutes per hour, the hourly noise level would be negligible at the nearest sensitive receivers. In addition, as observed during a site visit to the area and viewing of existing solar farms in the area, noise levels from PV panel tracking were not detected over the existing ambient noise sources in the area (wind, vehicles, planes, and trains) just outside of the solar farm properties. Therefore, noise levels from the PV panels would not exceed County thresholds.

Operational Traffic Noise

Once the Project is complete, vehicle trips to the Project area would be associated with operations and maintenance of the solar facility. In addition, the Project would require relatively more occasional nighttime activities, including deliveries, repairs, maintenance, office and administrative activities, security personnel, and emergency response.

Pursuant to the FTA criteria described in Table 7, a significant noise impact would occur if roadway noise would increase by more than 1 dBA for State Route 18, 2 dBA for State Route 2347, Rabbit Springs Road, and Barstow Road, and 3 dBA for Northside Road traffic. With the increase in traffic volumes from Project operation (30 trips), Project operation would increase noise by less than 1 dBA on each roadway. This increase would be imperceptible to the residents located near roadways and would not exceed applicable FTA criteria. Therefore, the Project's noise increases from operational traffic would not exceed applicable thresholds.

Vibration

Construction at Project Parcels

Construction at the Project parcels may require post driving and has the potential to result in temporary vibration impacts on structures and humans. Based on the potential parcel locations, post driving activities could occur within 100 feet of the nearest off-site residential structure. It was conservatively assumed that an impact pile driver, as discussed in Caltrans' *Transportation and Construction Vibration Guidance Manual* (Caltrans 2020), would be used for the Project. It should be noted that an impact pile driver as considered by Caltrans is larger than the type of equipment that would be used to drill in posts for the solar panels (e.g., an impact pile driver on the scale analyzed by Caltrans would typically be used for large bridge concrete footings, etc.). Other construction activities are less intensive than pile driving and would have lower PPV than pile driving. Therefore, vibration levels from pile driving are considered a conservative scenario for construction at the Project parcels. Caltrans provides the following equation to calculate PPV at sensitive receptors (Caltrans 2020):

$$\text{PPV Impact Pile Driver} = PPV_{Ref} (25/D)^{n} \times (E_{equip}/E_{Ref})^{0.5} \text{ (in./sec.)}$$

Where:

PPV_{Ref} = 0.65 in/sec for a reference pile driver at 25 feet

D = distance from pile driver to the receiver in feet

n = 1.1 is a value related to the vibration attenuation rate through ground

E_{equip} is rated energy of impact pile driver in ft-lbs

E_{Ref} is 36,000 ft-lb (rated energy of reference pile driver)

Using the referenced formula and an assumed 2,400 ft-lb rated energy for the post driver, the PPV at the nearest residential structure would be 0.091 in./sec. PPV, which would be below the County's vibration standard of 0.2 in./sec. PPV. Therefore, vibration associated with construction of the proposed Project would not exceed County thresholds.

Gen-tie Construction

Gen-tie construction may require the use of an auger drill rig that has the potential to result in temporary vibration impacts on structures and humans. Based on the potential gen-tie locations, auger drilling activities could occur within 50 feet of the nearest off-site residential structure. Other than use of an auger drill rig, other construction activities at the gen-tie corridors are less intensive than auger drill rig and would have lower PPV than the auger drill rig. Therefore, vibration levels from the auger drill rig are considered worst case for the gen-tie construction. Caltrans provides the following equation to calculate PPV at sensitive receptors (Caltrans 2020):

$$PPV\ Equipment = PPV_{Ref}\ (25/D)^{n}\ (in./sec.)$$

Where:

PPV_{Ref} = Equipment reference vibration level at 25 feet

D = distance from equipment to the receiver in feet

n = 1.1 is a value related to the vibration attenuation rate through ground

Caltrans vibration guidelines do not provide vibration levels specifically for an auger drill rig; however, the guidelines do provide vibration levels for caisson drilling of 0.089 in./sec. PPV. A caisson drill would typically drill a much larger hole than the type of bore performed for a solar foundation post (e.g., a caisson drill would be used to drill a bridge pier). Although a caisson drill is a more intensive activity that would result in greater vibration than an auger drill, it was used as a conservative reference for this analysis. Using the referenced formula, the PPV at the residential structure would be 0.031 in./sec. PPV, which would be below the County's vibration standard of 0.2 in./sec. PPV. In addition, heavy construction activity involving drilling would not occur during nighttime hours. Therefore, vibration associated with construction of the proposed Project would not exceed County thresholds.

Operation

Once constructed, the proposed PV facility would not have any components that would generate vibration levels. Thus, operation of the proposed Project would not result in any vibration and would not exceed County thresholds.

4 Recommendations

As discussed, cumulative construction noise levels from concurrent construction of the gen-tie corridor and Project parcels could reach 83 dBA L_{eq}, which is above FTA's construction noise threshold of 80 dBA L_{eq} (8-hour). Recommendation NOI-1 would reduce cumulative construction noise levels at adjacent residential properties by 10 dBA. As such, nighttime and cumulative construction noise levels would be reduced to 78 dBA and 69 dBA L_{eq} at 100 feet, respectively, which would not exceed applicable FTA construction noise level limit of 80 dBA L_{eq} at noise sensitive uses.

NOI-1 Temporary Construction Noise Reduction

Construction noise levels at the adjacent residences shall be reduced to below 80 dBA L_{eq} (one-hour) through the following measures:

- Electrically powered equipment instead of internal combustion equipment shall be used where feasible.
- Limit use of intensive excavating and earthmoving machinery to daytime hours.
- To the extent feasible, schedule construction activity during daytime working hours.
- Temporary noise barriers and/or blankets with a minimum height of eight feet shall be deployed when construction activities are within 100 feet of a sensitive receiver during nighttime or cumulative construction activities. The temporary noise barriers and/or blankets shall be constructed of material with a minimum weight of two pounds per square foot with no gaps or perforations and extend 25 feet from equipment activity area to ensure line of sight is blocked at sensitive receiver locations. Temporary noise barriers and/or blankets may be constructed of, but not limited to, 5/8-inch plywood, 5/8-inch oriented strand board, and hay bales. Example product sheets are included in Appendix E.

5 Conclusions

The Project would generate both temporary construction-related noise and long-term noise associated with operation.

Project-generated cumulative construction noise may exceed the FTA daytime construction noise threshold of 80 dBA L_{eq} at noise sensitive uses adjacent to the Project parcels. Implementation of recommendation NOI-1, *Temporary Construction Noise Reduction*, would include limiting the most intensive excavating and earthmoving machinery to daytime hours, schedule construction activity during daytime working hours, to the extent feasible, installation of temporary noise barriers and/or blankets with a minimum height of eight feet shall be deployed when construction activities are within 100 feet of a sensitive receiver. With implementation of recommendation NOI-1, construction noise levels would be reduced to a level that does not exceed the applicable FTA daytime construction noise threshold of 80 dBA L_{eq}, and impacts would be less than significant with mitigation incorporated.

The Project's stationary noise sources would not be anticipated to exceed applicable daytime exterior noise standards from the County Code at the nearest property lines. Therefore, stationary noise would comply with County Code thresholds.

Project-generated traffic would generate an increase of up to 1 dBA at adjacent roadways. This increase would not exceed applicable FTA criteria; and comply with applicable thresholds.

The Project would generate ground-borne vibration during construction, but vibration would not exceed County thresholds at the adjacent residential structures. Therefore, construction-related vibration impacts would comply with County Code thresholds.

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Appendix A

Project Area Noise Measurement Data

NM1

- Freq Weight : A
- Time Weight : SLOW
- Level Range : 40-100
- Max dB : 60.7 - 2021/07/21 13:16:45
- Level Range : 40-100
- SEL : 69.4
- Leq : 39.9
-

No.s	Date Time	(dB)				
1	2021/07/21 13:14:09	43.8	40.8	49.7	43.2	38.6
6	2021/07/21 13:14:24	35.9	36.3	38.1	40.2	47.1
11	2021/07/21 13:14:39	57.8	54.2	47.3	41.8	41.3
16	2021/07/21 13:14:54	41.8	38.1	36.8	35.5	34.4
21	2021/07/21 13:15:09	33.1	32.5	32.7	32.4	32.4
26	2021/07/21 13:15:24	34.8	32.8	32.4	33.5	32.9
31	2021/07/21 13:15:39	32.4	32.3	34.0	33.2	32.7
36	2021/07/21 13:15:54	33.1	33.1	33.3	33.3	34.1
41	2021/07/21 13:16:09	32.7	32.5	32.7	32.0	31.8
46	2021/07/21 13:16:24	32.4	32.8	34.6	36.0	37.2
51	2021/07/21 13:16:39	42.5	54.8	57.6	49.9	42.5
56	2021/07/21 13:16:54	40.0	36.8	34.9	34.0	33.1
61	2021/07/21 13:17:09	32.8	32.7	32.7	34.2	33.0
66	2021/07/21 13:17:24	34.2	35.2	33.0	32.8	32.6
71	2021/07/21 13:17:39	34.9	32.5	32.4	32.5	33.4
76	2021/07/21 13:17:54	32.5	32.1	32.8	33.4	33.0
81	2021/07/21 13:18:09	32.6	32.8	32.4	33.1	33.4
86	2021/07/21 13:18:24	32.7	34.6	34.3	34.5	33.4
91	2021/07/21 13:18:39	33.5	33.1	33.5	33.4	32.7
96	2021/07/21 13:18:54	32.5	32.7	32.3	34.0	32.6
101	2021/07/21 13:19:09	33.2	33.2	33.3	32.6	32.6
106	2021/07/21 13:19:24	32.3	32.5	32.3	32.0	32.8
111	2021/07/21 13:19:39	32.6	32.7	33.1	33.0	32.7
116	2021/07/21 13:19:54	33.3	32.8	32.9	32.9	32.7
121	2021/07/21 13:20:09	34.1	34.5	34.4	36.5	35.7
126	2021/07/21 13:20:24	39.1	37.8	39.5	39.2	36.3
131	2021/07/21 13:20:39	34.0	33.5	32.7	33.0	33.1
136	2021/07/21 13:20:54	33.5	32.7	32.8	32.8	32.7
141	2021/07/21 13:21:09	32.9	32.6	33.1	32.9	33.9
146	2021/07/21 13:21:24	34.9	33.9	33.8	34.8	35.1
151	2021/07/21 13:21:39	34.8	34.8	33.4	33.3	34.3
156	2021/07/21 13:21:54	34.3	33.0	33.4	33.2	32.8
161	2021/07/21 13:22:09	33.7	33.4	33.2	33.1	33.6
166	2021/07/21 13:22:24	33.1	33.6	33.4	32.8	32.9
171	2021/07/21 13:22:39	33.2	33.5	32.7	33.1	33.2
176	2021/07/21 13:22:54	33.2	33.4	33.8	33.3	33.9
181	2021/07/21 13:23:09	34.7	36.4	35.0	36.0	36.0
186	2021/07/21 13:23:24	37.8	38.3	38.2	37.3	39.3
191	2021/07/21 13:23:39	37.5	38.8	39.8	36.6	36.4
196	2021/07/21 13:23:54	37.5	36.2	34.6	34.6	34.4
201	2021/07/21 13:24:09	35.4	35.1	33.4	33.3	33.4
206	2021/07/21 13:24:24	33.1	33.2	33.1	33.2	33.3
211	2021/07/21 13:24:39	33.2	33.1	33.3	33.0	33.1
216	2021/07/21 13:24:54	33.4	32.8	33.1	33.2	33.0
221	2021/07/21 13:25:09	32.8	32.9	33.3	33.2	33.2
226	2021/07/21 13:25:24	33.1	33.1	33.2	32.8	32.9
231	2021/07/21 13:25:39	32.9	32.7	33.2	33.3	33.4
236	2021/07/21 13:25:54	33.8	33.8	33.7	33.9	33.3
241	2021/07/21 13:26:09	33.3	33.4	33.4	33.6	33.3
246	2021/07/21 13:26:24	33.2	33.0	33.3	33.3	33.7
251	2021/07/21 13:26:39	33.1	33.4	33.7	33.6	33.3
256	2021/07/21 13:26:54	33.4	33.4	33.0	33.0	32.9
261	2021/07/21 13:27:09	33.0	33.2	33.1	33.1	33.4
266	2021/07/21 13:27:24	33.8	33.6	33.7	34.8	34.6
271	2021/07/21 13:27:39	34.4	33.9	34.0	33.1	33.1
276	2021/07/21 13:27:54	33.3	33.4	33.3	33.5	33.2
281	2021/07/21 13:28:09	33.3	33.7	35.0	33.6	33.2
286	2021/07/21 13:28:24	33.3	33.4	33.1	33.3	33.7
291	2021/07/21 13:28:39	33.2	33.1	33.7	33.0	33.3
296	2021/07/21 13:28:54	33.7	33.5	34.1	33.6	34.4

NM2

- Freq Weight : A
- Time Weight : SLOW
- Level Range : 40-100
- Max dB : 53.4 - 2021/07/21 12:42:52
- Level Range : 40-100
- SEL : 64.2
- Leq : 34.7
-

No.s	Date Time	(dB)				
1	2021/07/21 12:42:47	41.1	51.3	41.1	48.4	42.2
6	2021/07/21 12:43:02	38.4	34.5	35.0	29.9	31.1
11	2021/07/21 12:43:17	32.5	34.8	39.1	40.0	38.0
16	2021/07/21 12:43:32	42.1	48.3	47.1	46.9	45.1
21	2021/07/21 12:43:47	45.0	40.7	41.2	40.7	39.3
26	2021/07/21 12:44:02	43.0	40.5	38.8	33.7	33.5
31	2021/07/21 12:44:17	33.4	35.9	32.9	33.9	31.5
36	2021/07/21 12:44:32	32.6	36.7	30.4	28.2	28.8
41	2021/07/21 12:44:47	28.7	28.0	28.8	31.3	29.3
46	2021/07/21 12:45:02	29.2	29.1	28.6	27.8	29.1
51	2021/07/21 12:45:17	29.3	28.5	30.0	33.9	36.2
56	2021/07/21 12:45:32	33.2	30.6	31.9	30.0	32.4
61	2021/07/21 12:45:47	30.4	28.9	28.4	28.3	27.7
66	2021/07/21 12:46:02	27.6	27.6	27.4	27.4	27.3
71	2021/07/21 12:46:17	27.2	27.2	27.1	27.7	27.3
76	2021/07/21 12:46:32	26.8	27.1	27.4	27.4	27.5
81	2021/07/21 12:46:47	27.4	27.3	27.3	27.1	27.4
86	2021/07/21 12:47:02	27.3	27.2	27.6	29.3	27.7
91	2021/07/21 12:47:17	29.7	29.2	30.8	29.8	28.8
96	2021/07/21 12:47:32	28.6	27.7	27.7	27.5	27.6
101	2021/07/21 12:47:47	27.6	28.5	28.2	27.6	28.2
106	2021/07/21 12:48:02	29.6	32.2	38.2	37.6	31.2
111	2021/07/21 12:48:17	29.8	28.9	28.8	29.7	31.9
116	2021/07/21 12:48:32	38.3	35.8	37.9	38.4	37.8
121	2021/07/21 12:48:47	35.6	36.6	35.0	34.8	37.3
126	2021/07/21 12:49:02	36.3	37.0	36.7	33.3	31.9
131	2021/07/21 12:49:17	34.3	36.0	33.4	33.0	32.8
136	2021/07/21 12:49:32	30.6	30.7	31.6	31.1	30.2
141	2021/07/21 12:49:47	31.0	28.5	28.2	28.1	28.9
146	2021/07/21 12:50:02	28.8	29.9	32.7	30.6	29.0
151	2021/07/21 12:50:17	28.4	27.6	28.0	27.9	27.9
156	2021/07/21 12:50:32	28.1	27.8	28.2	27.5	27.2
161	2021/07/21 12:50:47	27.3	27.0	27.0	27.2	27.9
166	2021/07/21 12:51:02	27.5	28.2	28.4	26.8	27.0
171	2021/07/21 12:51:17	26.9	27.4	27.0	26.8	26.5
176	2021/07/21 12:51:32	26.8	27.1	26.7	26.9	27.1
181	2021/07/21 12:51:47	26.9	26.6	26.7	26.8	26.5
186	2021/07/21 12:52:02	26.9	27.0	26.8	26.9	26.6
191	2021/07/21 12:52:17	26.8	26.8	27.0	27.0	27.0
196	2021/07/21 12:52:32	27.0	27.0	27.1	27.1	27.1
201	2021/07/21 12:52:47	27.2	26.9	27.2	27.0	27.2
206	2021/07/21 12:53:02	27.0	27.1	26.9	27.1	26.8
211	2021/07/21 12:53:17	26.9	27.1	27.2	27.3	27.2
216	2021/07/21 12:53:32	27.3	27.6	28.7	27.7	28.0
221	2021/07/21 12:53:47	27.7	27.5	28.2	27.6	27.6
226	2021/07/21 12:54:02	27.6	27.8	28.2	28.2	27.8
231	2021/07/21 12:54:17	28.2	28.5	34.0	34.4	38.1
236	2021/07/21 12:54:32	40.3	42.0	36.2	34.7	32.2
241	2021/07/21 12:54:47	29.8	30.4	32.5	30.3	32.9
246	2021/07/21 12:55:02	42.7	40.1	33.9	40.2	37.2
251	2021/07/21 12:55:17	34.8	33.3	31.3	30.8	33.4
256	2021/07/21 12:55:32	29.4	28.8	28.6	29.3	29.5
261	2021/07/21 12:55:47	44.0	39.0	34.8	39.4	37.1
266	2021/07/21 12:56:02	38.2	37.6	33.4	33.0	32.6
271	2021/07/21 12:56:17	32.6	34.1	32.1	29.9	32.5
276	2021/07/21 12:56:32	31.1	32.9	30.3	35.4	31.3
281	2021/07/21 12:56:47	35.1	39.5	38.9	35.6	33.1
286	2021/07/21 12:57:02	34.2	32.2	35.9	35.5	37.5
291	2021/07/21 12:57:17	37.3	36.5	36.0	35.9	37.7
296	2021/07/21 12:57:32	35.6	38.5	37.5	35.9	39.9

NM3

- Freq Weight : A
- Time Weight : SLOW
- Level Range : 40-100
- Max dB : 50.0 - 2021/07/21 08:25:29
- Level Range : 40-100
- SEL : 64.2
- Leq : 34.7
-

No.s	Date Time	(dB)				
1	2021/07/21 08:15:41	32.7	27.1	25.4	29.3	29.0
6	2021/07/21 08:15:56	29.8	30.0	31.2	27.9	24.9
11	2021/07/21 08:16:11	27.4	36.5	35.9	43.3	38.5
16	2021/07/21 08:16:26	37.5	31.2	30.4	29.9	27.9
21	2021/07/21 08:16:41	34.0	28.0	28.7	28.2	28.2
26	2021/07/21 08:16:56	26.3	25.5	26.9	28.3	28.1
31	2021/07/21 08:17:11	30.3	32.7	29.1	28.4	27.2
36	2021/07/21 08:17:26	28.8	27.5	28.9	29.0	32.6
41	2021/07/21 08:17:41	27.3	30.6	27.9	31.3	27.7
46	2021/07/21 08:17:56	26.8	27.0	26.3	26.1	25.0
51	2021/07/21 08:18:11	24.6	24.3	24.5	24.8	24.9
56	2021/07/21 08:18:26	24.8	25.3	25.3	25.2	25.3
61	2021/07/21 08:18:41	25.2	25.1	25.1	24.9	25.1
66	2021/07/21 08:18:56	26.6	27.3	29.1	28.8	32.1
71	2021/07/21 08:19:11	29.6	28.4	28.6	29.6	30.9
76	2021/07/21 08:19:26	29.3	28.4	32.5	34.1	35.3
81	2021/07/21 08:19:41	36.5	36.6	33.4	32.9	32.9
86	2021/07/21 08:19:56	37.8	33.1	33.9	34.5	33.5
91	2021/07/21 08:20:11	30.3	30.6	27.5	29.5	28.1
96	2021/07/21 08:20:26	27.2	27.0	26.4	27.6	25.4
101	2021/07/21 08:20:41	26.0	25.5	25.7	25.6	25.5
106	2021/07/21 08:20:56	25.1	24.8	24.9	24.6	24.8
111	2021/07/21 08:21:11	25.0	25.0	25.3	25.1	25.4
116	2021/07/21 08:21:26	26.1	24.9	24.9	24.8	24.7
121	2021/07/21 08:21:41	25.0	24.9	24.9	25.0	25.2
126	2021/07/21 08:21:56	24.8	24.9	24.7	24.7	24.8
131	2021/07/21 08:22:11	24.7	24.8	24.8	25.0	24.8
136	2021/07/21 08:22:26	25.1	25.1	25.3	26.7	25.8
141	2021/07/21 08:22:41	25.9	26.0	26.0	26.5	27.1
146	2021/07/21 08:22:56	26.0	26.0	26.2	26.6	26.5
151	2021/07/21 08:23:11	26.6	27.2	30.9	33.7	33.5
156	2021/07/21 08:23:26	30.8	29.6	27.1	26.9	27.1
161	2021/07/21 08:23:41	26.8	29.2	34.6	36.0	30.0
166	2021/07/21 08:23:56	29.1	28.6	29.8	32.5	30.9
171	2021/07/21 08:24:11	29.3	31.3	36.7	33.3	31.5
176	2021/07/21 08:24:26	34.8	33.5	32.6	32.6	31.5
181	2021/07/21 08:24:41	34.5	40.1	39.0	38.0	42.2
186	2021/07/21 08:24:56	42.7	45.1	43.2	44.7	44.9
191	2021/07/21 08:25:11	45.1	46.3	45.3	45.0	45.2
196	2021/07/21 08:25:26	46.6	47.0	44.5	45.5	41.4
201	2021/07/21 08:25:41	44.3	45.9	43.2	39.4	39.5
206	2021/07/21 08:25:56	37.4	38.0	34.9	39.4	40.0
211	2021/07/21 08:26:11	35.8	33.3	30.7	29.7	29.5
216	2021/07/21 08:26:26	28.7	29.4	29.0	29.1	27.5
221	2021/07/21 08:26:41	30.8	32.7	34.4	30.9	31.7
226	2021/07/21 08:26:56	33.1	33.2	32.3	33.2	33.8
231	2021/07/21 08:27:11	37.3	33.9	38.4	38.0	31.6
236	2021/07/21 08:27:26	34.9	34.4	37.2	33.3	34.4
241	2021/07/21 08:27:41	34.8	36.9	31.9	32.0	30.2
246	2021/07/21 08:27:56	28.2	27.9	31.4	27.9	28.7
251	2021/07/21 08:28:11	26.3	27.4	26.8	26.0	26.5
256	2021/07/21 08:28:26	26.3	25.7	25.7	26.4	26.0
261	2021/07/21 08:28:41	26.5	26.4	26.0	26.2	26.2
266	2021/07/21 08:28:56	26.1	25.9	26.3	26.2	26.5
271	2021/07/21 08:29:11	26.5	26.4	27.6	27.5	27.0
276	2021/07/21 08:29:26	26.1	26.4	27.2	26.4	26.3
281	2021/07/21 08:29:41	26.0	26.5	25.9	25.8	25.9
286	2021/07/21 08:29:56	26.4	26.3	26.2	25.9	26.2
291	2021/07/21 08:30:11	25.9	26.6	25.7	25.6	25.6
296	2021/07/21 08:30:26	25.5	25.6	25.7	25.7	25.6

NM4

- Freq Weight : A
- Time Weight : SLOW
- Level Range : 40-100
- Max dB : 43.9 - 2021/07/21 10:07:46
- Level Range : 40-100
- SEL : 59.5
- Leq : 30.0
-

No.s	Date Time	(dB)				
1	2021/07/21 10:07:43	30.6	36.6	33.9	33.0	34.1
6	2021/07/21 10:07:58	30.7	28.1	27.7	27.0	27.5
11	2021/07/21 10:08:13	36.4	33.0	29.0	32.5	31.0
16	2021/07/21 10:08:28	29.4	27.2	27.1	27.3	27.4
21	2021/07/21 10:08:43	31.0	35.1	33.8	29.9	31.7
26	2021/07/21 10:08:58	32.9	34.0	33.4	31.8	30.9
31	2021/07/21 10:09:13	36.3	34.2	32.6	37.0	29.9
36	2021/07/21 10:09:28	27.7	31.1	28.8	27.9	28.0
41	2021/07/21 10:09:43	28.8	27.6	27.7	28.0	27.9
46	2021/07/21 10:09:58	27.4	27.2	27.2	27.2	27.1
51	2021/07/21 10:10:13	27.5	27.3	27.6	27.3	27.4
56	2021/07/21 10:10:28	27.2	27.5	27.6	27.6	31.2
61	2021/07/21 10:10:43	31.0	28.6	27.2	27.0	27.3
66	2021/07/21 10:10:58	27.8	27.5	27.6	27.7	28.0
71	2021/07/21 10:11:13	28.0	27.7	27.8	27.6	27.7
76	2021/07/21 10:11:28	27.7	27.6	27.5	27.5	27.9
81	2021/07/21 10:11:43	27.8	28.2	28.0	29.1	27.9
86	2021/07/21 10:11:58	27.4	27.5	27.9	28.0	28.3
91	2021/07/21 10:12:13	30.0	28.9	28.5	28.7	28.1
96	2021/07/21 10:12:28	28.3	29.4	28.9	28.6	28.7
101	2021/07/21 10:12:43	28.4	28.6	28.4	27.9	28.0
106	2021/07/21 10:12:58	28.5	28.0	28.0	28.0	27.7
111	2021/07/21 10:13:13	27.8	28.0	27.8	28.0	28.9
116	2021/07/21 10:13:28	28.4	29.6	28.3	28.2	28.3
121	2021/07/21 10:13:43	27.9	28.0	27.9	27.9	28.1
126	2021/07/21 10:13:58	28.0	28.1	28.2	28.2	27.9
131	2021/07/21 10:14:13	28.2	28.3	28.2	28.0	28.2
136	2021/07/21 10:14:28	28.2	28.3	28.6	28.5	28.5
141	2021/07/21 10:14:43	28.5	28.4	28.9	30.1	29.5
146	2021/07/21 10:14:58	30.2	32.0	32.4	30.3	30.1
151	2021/07/21 10:15:13	29.3	29.2	30.8	33.6	32.6
156	2021/07/21 10:15:28	30.7	32.2	29.3	31.9	30.3
161	2021/07/21 10:15:43	29.5	30.5	30.7	29.6	29.1
166	2021/07/21 10:15:58	29.6	30.5	30.4	29.1	29.5
171	2021/07/21 10:16:13	28.9	28.9	29.0	29.7	29.7
176	2021/07/21 10:16:28	29.0	29.9	29.1	29.3	28.6
181	2021/07/21 10:16:43	29.0	28.7	28.1	29.0	30.1
186	2021/07/21 10:16:58	29.0	30.3	30.1	30.3	31.1
191	2021/07/21 10:17:13	29.6	28.6	28.7	28.1	27.9
196	2021/07/21 10:17:28	28.3	28.9	28.2	29.4	28.5
201	2021/07/21 10:17:43	28.0	28.6	28.2	28.0	28.6
206	2021/07/21 10:17:58	29.1	28.3	29.0	29.8	30.0
211	2021/07/21 10:18:13	29.9	29.9	30.2	30.1	28.5
216	2021/07/21 10:18:28	28.6	29.9	30.6	30.4	30.3
221	2021/07/21 10:18:43	30.4	31.2	31.3	31.0	32.0
226	2021/07/21 10:18:58	31.6	33.3	36.4	32.5	35.0
231	2021/07/21 10:19:13	33.0	31.4	29.9	32.5	30.9
236	2021/07/21 10:19:28	32.1	33.6	30.7	28.7	30.0
241	2021/07/21 10:19:43	28.6	29.0	30.2	28.7	28.4
246	2021/07/21 10:19:58	31.3	31.3	29.0	29.1	29.7
251	2021/07/21 10:20:13	31.0	30.2	29.5	30.8	29.9
256	2021/07/21 10:20:28	29.6	29.7	30.2	30.6	31.9
261	2021/07/21 10:20:43	29.8	30.4	32.0	30.4	32.3
266	2021/07/21 10:20:58	31.3	35.6	33.0	33.0	34.8
271	2021/07/21 10:21:13	33.5	34.8	34.3	34.3	34.5
276	2021/07/21 10:21:28	35.2	35.7	33.8	33.1	32.7
281	2021/07/21 10:21:43	32.5	31.0	31.0	31.7	30.8
286	2021/07/21 10:21:58	32.7	30.1	30.4	30.1	29.4
291	2021/07/21 10:22:13	30.1	31.8	31.7	35.1	40.5
296	2021/07/21 10:22:28	38.2	30.4	28.6	37.3	30.1

NM5

- Freq Weight : A
- Time Weight : SLOW
- Level Range : 40-100
- Max dB : 47.6 - 2021/07/21 08:54:48
- Level Range : 40-100
- SEL : 59.5
- Leq : 30.0
-

No.s	Date Time	(dB)				
1	2021/07/21 08:54:47	43.7	38.8	33.3	29.1	25.0
6	2021/07/21 08:55:02	24.5	24.9	24.7	25.9	25.5
11	2021/07/21 08:55:17	26.3	25.4	25.2	25.1	24.9
16	2021/07/21 08:55:32	25.0	24.8	28.6	25.0	24.4
21	2021/07/21 08:55:47	24.9	25.3	24.6	24.7	25.0
26	2021/07/21 08:56:02	25.5	24.9	26.6	26.2	26.2
31	2021/07/21 08:56:17	25.0	25.7	25.3	25.7	26.1
36	2021/07/21 08:56:32	26.0	25.9	26.1	33.7	28.5
41	2021/07/21 08:56:47	27.1	25.9	25.6	24.9	24.7
46	2021/07/21 08:57:02	25.3	24.8	24.8	24.9	24.8
51	2021/07/21 08:57:17	24.7	25.0	25.2	24.5	24.4
56	2021/07/21 08:57:32	24.3	24.6	24.2	24.3	24.1
61	2021/07/21 08:57:47	24.2	24.3	24.8	24.5	24.6
66	2021/07/21 08:58:02	24.5	24.1	24.7	24.5	24.2
71	2021/07/21 08:58:17	24.3	24.2	24.3	24.3	24.7
76	2021/07/21 08:58:32	24.3	24.4	25.4	24.7	26.8
81	2021/07/21 08:58:47	29.7	26.6	24.6	28.5	33.7
86	2021/07/21 08:59:02	30.0	33.4	32.4	28.7	31.0
91	2021/07/21 08:59:17	28.1	25.6	26.9	28.3	25.7
96	2021/07/21 08:59:32	24.6	30.6	32.9	32.9	33.6
101	2021/07/21 08:59:47	28.3	31.3	29.3	27.7	34.9
106	2021/07/21 09:00:02	29.3	24.9	24.4	24.6	24.7
111	2021/07/21 09:00:17	24.5	25.0	27.2	26.1	25.7
116	2021/07/21 09:00:32	25.5	25.8	24.8	28.0	25.0
121	2021/07/21 09:00:47	24.5	24.9	24.9	25.4	26.4
126	2021/07/21 09:01:02	26.1	27.0	26.3	25.7	25.1
131	2021/07/21 09:01:17	25.1	25.0	25.2	25.2	27.2
136	2021/07/21 09:01:32	26.7	26.6	26.6	25.7	26.5
141	2021/07/21 09:01:47	29.5	25.7	27.4	26.0	25.6
146	2021/07/21 09:02:02	25.9	26.1	25.4	25.5	26.8
151	2021/07/21 09:02:17	25.5	25.4	26.9	27.5	25.8
156	2021/07/21 09:02:32	27.8	27.4	26.3	26.5	26.8
161	2021/07/21 09:02:47	27.0	27.0	26.3	25.5	25.0
166	2021/07/21 09:03:02	25.4	25.5	25.3	25.7	25.5
171	2021/07/21 09:03:17	25.5	25.3	24.7	25.5	25.3
176	2021/07/21 09:03:32	25.2	25.1	24.7	24.7	24.7
181	2021/07/21 09:03:47	27.0	25.0	24.6	25.3	24.5
186	2021/07/21 09:04:02	25.1	25.5	25.2	25.6	25.1
191	2021/07/21 09:04:17	26.0	24.7	25.1	24.5	24.3
196	2021/07/21 09:04:32	24.6	24.4	24.5	25.9	26.1
201	2021/07/21 09:04:47	24.9	24.9	24.7	25.0	24.3
206	2021/07/21 09:05:02	24.5	24.4	25.2	24.9	25.7
211	2021/07/21 09:05:17	24.5	24.4	24.3	24.8	24.7
216	2021/07/21 09:05:32	30.1	25.1	24.5	25.8	24.5
221	2021/07/21 09:05:47	24.3	24.4	24.4	24.5	24.6
226	2021/07/21 09:06:02	25.7	26.7	26.4	26.4	24.7
231	2021/07/21 09:06:17	25.6	25.0	24.2	24.2	24.3
236	2021/07/21 09:06:32	24.0	24.0	25.4	26.1	26.2
241	2021/07/21 09:06:47	24.5	24.7	24.2	24.1	24.2
246	2021/07/21 09:07:02	24.5	24.3	24.3	24.5	24.4
251	2021/07/21 09:07:17	26.4	24.8	25.1	25.0	24.9
256	2021/07/21 09:07:32	28.0	25.8	24.8	24.4	25.3
261	2021/07/21 09:07:47	24.6	26.4	27.0	25.5	24.7
266	2021/07/21 09:08:02	25.2	24.6	24.4	24.7	24.7
271	2021/07/21 09:08:17	24.8	25.3	25.2	24.9	25.3
276	2021/07/21 09:08:32	25.9	25.0	25.6	25.9	25.1
281	2021/07/21 09:08:47	25.3	24.7	24.7	24.8	24.8
286	2021/07/21 09:09:02	24.9	25.6	24.7	24.9	26.7
291	2021/07/21 09:09:17	35.8	40.2	40.9	35.5	40.3
296	2021/07/21 09:09:32	31.3	26.3	28.7	30.5	38.4

NM6

- Freq Weight : A
- Time Weight : SLOW
- Level Range : 40-100
- Max dB : 69.9 - 2021/07/21 11:07:42
- Level Range : 40-100
- SEL : 74.5
- Leq : 45.0
-

No.s	Date Time	(dB)				
1	2021/07/21 11:03:33	38.8	38.6	35.9	45.7	37.6
6	2021/07/21 11:03:48	30.6	36.2	39.5	38.3	35.1
11	2021/07/21 11:04:03	35.7	39.3	36.4	28.9	35.1
16	2021/07/21 11:04:18	33.2	29.0	28.3	29.5	34.7
21	2021/07/21 11:04:33	34.9	30.2	27.6	27.2	29.1
26	2021/07/21 11:04:48	28.6	29.6	27.6	28.8	31.6
31	2021/07/21 11:05:03	29.4	28.8	29.6	27.2	27.1
36	2021/07/21 11:05:18	27.0	26.9	27.3	27.0	27.2
41	2021/07/21 11:05:33	26.9	28.5	27.4	28.5	27.3
46	2021/07/21 11:05:48	27.6	27.5	28.8	27.3	26.8
51	2021/07/21 11:06:03	27.1	26.7	26.9	27.9	28.1
56	2021/07/21 11:06:18	28.9	29.7	27.9	28.9	27.8
61	2021/07/21 11:06:33	27.7	27.4	27.8	27.5	27.3
66	2021/07/21 11:06:48	27.2	26.7	27.2	26.9	27.8
71	2021/07/21 11:07:03	27.8	27.8	27.9	27.9	27.8
76	2021/07/21 11:07:18	28.2	28.3	29.7	32.5	36.0
81	2021/07/21 11:07:33	40.9	48.1	69.0	63.7	54.4
86	2021/07/21 11:07:48	47.6	41.6	38.3	35.5	35.8
91	2021/07/21 11:08:03	35.4	33.0	30.4	29.2	28.7
96	2021/07/21 11:08:18	28.2	28.0	27.6	27.9	27.8
101	2021/07/21 11:08:33	29.0	28.3	28.3	28.0	30.5
106	2021/07/21 11:08:48	28.4	29.2	28.1	26.9	26.2
111	2021/07/21 11:09:03	27.4	27.0	26.4	26.2	28.3
116	2021/07/21 11:09:18	27.0	26.5	27.8	27.1	27.0
121	2021/07/21 11:09:33	26.6	26.4	26.6	26.5	28.2
126	2021/07/21 11:09:48	26.9	27.1	27.2	26.6	26.4
131	2021/07/21 11:10:03	26.1	26.4	26.2	26.3	26.3
136	2021/07/21 11:10:18	27.3	26.8	26.2	26.3	26.3
141	2021/07/21 11:10:33	26.2	26.4	26.2	25.9	26.2
146	2021/07/21 11:10:48	26.3	26.2	26.0	26.2	26.2
151	2021/07/21 11:11:03	26.3	26.3	26.4	26.3	30.7
156	2021/07/21 11:11:18	26.7	26.1	26.2	26.5	26.4
161	2021/07/21 11:11:33	26.4	26.4	26.5	27.5	26.1
166	2021/07/21 11:11:48	25.9	26.3	26.1	26.4	28.3
171	2021/07/21 11:12:03	26.8	28.6	29.0	30.2	28.2
176	2021/07/21 11:12:18	29.6	29.7	29.4	29.0	30.5
181	2021/07/21 11:12:33	34.0	33.2	31.8	32.3	30.5
186	2021/07/21 11:12:48	29.7	29.3	31.0	33.6	29.6
191	2021/07/21 11:13:03	30.2	30.7	29.0	29.0	28.0
196	2021/07/21 11:13:18	27.8	29.5	27.6	27.9	27.0
201	2021/07/21 11:13:33	27.2	27.8	27.4	27.5	27.5
206	2021/07/21 11:13:48	27.5	30.1	27.5	27.3	27.2
211	2021/07/21 11:14:03	27.8	28.7	27.7	27.4	26.2
216	2021/07/21 11:14:18	26.6	26.4	26.2	26.2	26.3
221	2021/07/21 11:14:33	26.4	26.6	27.0	26.5	26.3
226	2021/07/21 11:14:48	26.3	26.3	26.0	26.2	26.4
231	2021/07/21 11:15:03	26.2	26.2	26.3	26.2	26.4
236	2021/07/21 11:15:18	26.6	26.6	26.5	26.4	26.7
241	2021/07/21 11:15:33	30.9	27.9	27.2	26.9	26.8
246	2021/07/21 11:15:48	26.8	26.7	26.8	27.3	26.7
251	2021/07/21 11:16:03	26.9	26.9	26.8	26.7	26.8
256	2021/07/21 11:16:18	26.9	26.8	27.7	28.0	26.9
261	2021/07/21 11:16:33	27.0	26.9	26.7	26.9	26.9
266	2021/07/21 11:16:48	26.9	27.0	26.9	29.6	28.7
271	2021/07/21 11:17:03	28.0	28.0	28.2	27.9	28.0
276	2021/07/21 11:17:18	28.4	28.6	29.8	28.9	29.0
281	2021/07/21 11:17:33	28.9	29.1	29.4	28.8	29.3
286	2021/07/21 11:17:48	29.2	28.9	28.9	28.8	29.0
291	2021/07/21 11:18:03	28.8	29.3	29.4	29.3	29.5
296	2021/07/21 11:18:18	30.3	30.8	33.0	37.4	45.3

NM7

- Freq Weight : A
- Time Weight : SLOW
- Level Range : 40-100
- Max dB : 50.9 - 2021/07/21 09:42:38
- Level Range : 40-100
- SEL : 64.2
- Leq : 34.7
-

No.s	Date Time	(dB)				
1	2021/07/21 09:28:48	41.2	37.2	32.9	29.6	29.1
6	2021/07/21 09:29:03	25.8	35.8	34.2	27.2	30.2
11	2021/07/21 09:29:18	30.6	29.5	32.0	32.1	32.1
16	2021/07/21 09:29:33	26.9	30.0	29.1	25.8	25.2
21	2021/07/21 09:29:48	24.9	24.9	28.4	27.4	25.8
26	2021/07/21 09:30:03	25.3	28.2	25.8	25.8	25.4
31	2021/07/21 09:30:18	25.0	25.0	25.3	28.7	26.0
36	2021/07/21 09:30:33	28.1	25.9	24.9	24.8	28.9
41	2021/07/21 09:30:48	25.6	26.6	25.3	25.3	25.0
46	2021/07/21 09:31:03	25.1	24.7	24.6	25.4	24.9
51	2021/07/21 09:31:18	25.9	25.2	25.4	25.8	29.7
56	2021/07/21 09:31:33	25.8	26.5	25.3	25.2	25.1
61	2021/07/21 09:31:48	26.0	25.2	25.2	24.9	25.0
66	2021/07/21 09:32:03	25.2	25.0	24.8	24.7	24.8
71	2021/07/21 09:32:18	24.9	24.8	25.0	25.0	25.1
76	2021/07/21 09:32:33	24.8	24.9	25.2	24.9	25.0
81	2021/07/21 09:32:48	24.7	25.7	25.2	25.2	25.3
86	2021/07/21 09:33:03	25.1	24.9	25.0	25.4	25.0
91	2021/07/21 09:33:18	24.9	25.0	25.3	26.8	25.5
96	2021/07/21 09:33:33	25.0	25.2	24.8	24.7	24.6
101	2021/07/21 09:33:48	24.8	24.9	24.8	24.9	25.1
106	2021/07/21 09:34:03	25.0	25.3	25.2	27.5	25.4
111	2021/07/21 09:34:18	25.8	25.1	25.0	25.2	25.0
116	2021/07/21 09:34:33	25.0	24.9	26.1	25.2	25.0
121	2021/07/21 09:34:48	25.1	25.3	24.9	25.2	24.9
126	2021/07/21 09:35:03	24.9	25.0	25.0	24.8	25.0
131	2021/07/21 09:35:18	25.1	25.2	25.2	25.0	25.1
136	2021/07/21 09:35:33	25.2	25.4	25.2	25.3	25.4
141	2021/07/21 09:35:48	25.3	25.1	25.0	25.1	25.1
146	2021/07/21 09:36:03	24.9	25.2	25.2	25.1	25.0
151	2021/07/21 09:36:18	25.2	25.1	25.2	25.1	25.0
156	2021/07/21 09:36:33	24.7	25.0	24.9	24.8	25.0
161	2021/07/21 09:36:48	24.8	25.1	25.0	25.0	25.0
166	2021/07/21 09:37:03	25.1	25.2	24.9	25.2	25.3
171	2021/07/21 09:37:18	25.4	25.4	25.6	25.5	25.5
176	2021/07/21 09:37:33	25.5	25.5	25.4	25.4	26.0
181	2021/07/21 09:37:48	25.5	25.3	25.4	25.2	25.4
186	2021/07/21 09:38:03	25.4	25.1	25.2	25.2	25.5
191	2021/07/21 09:38:18	25.2	25.4	25.3	25.2	25.5
196	2021/07/21 09:38:33	25.4	25.4	25.1	25.1	25.2
201	2021/07/21 09:38:48	25.0	24.8	25.5	25.3	25.2
206	2021/07/21 09:39:03	25.2	25.1	25.1	25.5	25.1
211	2021/07/21 09:39:18	25.2	25.1	25.1	26.1	25.1
216	2021/07/21 09:39:33	24.9	24.9	25.2	25.0	25.0
221	2021/07/21 09:39:48	24.7	24.8	24.7	24.8	25.0
226	2021/07/21 09:40:03	36.3	27.8	25.2	25.0	43.8
231	2021/07/21 09:40:18	48.0	42.2	30.9	25.8	40.0
236	2021/07/21 09:40:33	49.7	49.3	44.6	32.9	26.1
241	2021/07/21 09:40:48	25.4	25.7	25.0	25.0	25.1
246	2021/07/21 09:41:03	25.0	25.2	25.0	25.1	25.1
251	2021/07/21 09:41:18	24.9	25.4	44.2	47.7	46.0
256	2021/07/21 09:41:33	42.2	30.9	25.9	25.7	24.9
261	2021/07/21 09:41:48	24.9	25.1	25.2	25.0	25.0
266	2021/07/21 09:42:03	25.0	25.1	24.7	24.9	25.0
271	2021/07/21 09:42:18	24.6	24.8	24.9	25.0	25.1
276	2021/07/21 09:42:33	40.6	49.7	46.8	46.8	37.8
281	2021/07/21 09:42:48	28.5	26.2	31.9	32.0	26.3
286	2021/07/21 09:43:03	26.1	26.6	25.6	26.3	26.3
291	2021/07/21 09:43:18	26.2	26.7	28.8	30.2	33.3
296	2021/07/21 09:43:33	38.5	30.3	40.9	33.6	27.5

NM8

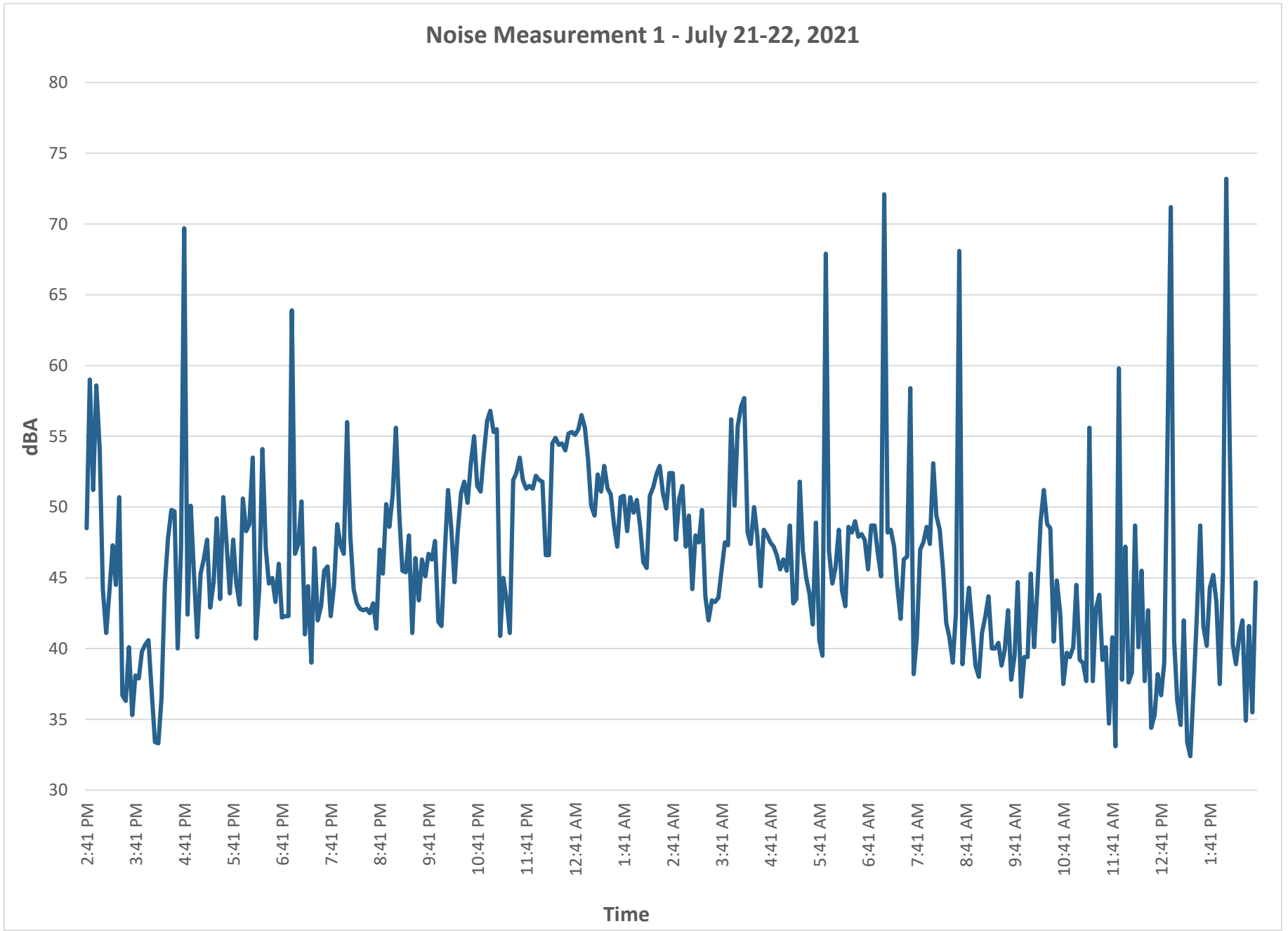
- Freq Weight : A
- Time Weight : SLOW
- Level Range : 40-100
- Max dB : 48.4 - 2021/07/21 12:04:07
- Level Range : 40-100
- SEL : 59.5
- Leq : 30.0
-

No.s	Date Time	(dB)				
1	2021/07/21 12:03:54	35.5	41.4	42.3	45.6	46.3
6	2021/07/21 12:04:09	39.6	35.4	33.1	34.1	31.9
11	2021/07/21 12:04:24	32.1	36.2	32.7	31.6	35.9
16	2021/07/21 12:04:39	33.1	31.2	32.7	31.0	31.7
21	2021/07/21 12:04:54	30.9	29.9	30.7	36.0	32.1
26	2021/07/21 12:05:09	28.7	27.9	28.3	29.2	28.1
31	2021/07/21 12:05:24	27.5	27.4	30.5	30.4	37.4
36	2021/07/21 12:05:39	30.3	30.8	29.5	32.3	31.9
41	2021/07/21 12:05:54	30.9	29.2	27.7	28.7	30.0
46	2021/07/21 12:06:09	28.7	30.3	29.5	32.0	29.9
51	2021/07/21 12:06:24	30.3	29.2	28.9	27.8	28.2
56	2021/07/21 12:06:39	27.1	27.8	28.9	29.2	27.2
61	2021/07/21 12:06:54	27.3	27.2	27.6	27.5	27.8
66	2021/07/21 12:07:09	27.8	27.3	27.0	28.6	28.0
71	2021/07/21 12:07:24	28.7	30.1	32.2	33.3	33.6
76	2021/07/21 12:07:39	36.0	36.5	37.4	36.2	37.2
81	2021/07/21 12:07:54	39.3	37.5	35.4	35.1	34.0
86	2021/07/21 12:08:09	36.3	34.1	33.8	33.3	33.2
91	2021/07/21 12:08:24	31.4	30.8	31.6	32.9	29.9
96	2021/07/21 12:08:39	29.1	29.3	27.9	28.0	28.2
101	2021/07/21 12:08:54	32.4	33.3	31.1	30.1	30.2
106	2021/07/21 12:09:09	28.9	31.6	34.1	30.9	33.0
111	2021/07/21 12:09:24	34.9	33.6	30.6	30.0	33.2
116	2021/07/21 12:09:39	33.6	31.8	28.6	28.5	31.2
121	2021/07/21 12:09:54	29.7	27.8	28.7	27.8	27.9
126	2021/07/21 12:10:09	28.9	31.3	28.4	28.7	30.0
131	2021/07/21 12:10:24	28.3	33.7	29.0	27.4	27.2
136	2021/07/21 12:10:39	29.8	33.0	31.4	29.7	36.2
141	2021/07/21 12:10:54	29.3	44.6	33.9	29.9	29.4
146	2021/07/21 12:11:09	27.2	27.0	33.6	31.0	30.6
151	2021/07/21 12:11:24	38.1	30.9	27.8	27.4	27.1
156	2021/07/21 12:11:39	27.1	27.0	27.0	27.1	27.1
161	2021/07/21 12:11:54	27.0	26.9	26.7	26.8	26.7
166	2021/07/21 12:12:09	26.5	26.7	26.6	26.8	26.8
171	2021/07/21 12:12:24	26.6	26.7	26.9	26.7	26.7
176	2021/07/21 12:12:39	26.8	26.8	26.8	26.8	26.7
181	2021/07/21 12:12:54	26.8	26.8	27.0	26.9	26.9
186	2021/07/21 12:13:09	27.2	27.0	27.0	27.5	27.4
191	2021/07/21 12:13:24	27.1	27.1	27.1	27.3	27.3
196	2021/07/21 12:13:39	27.2	27.4	27.4	27.4	27.7
201	2021/07/21 12:13:54	27.8	28.1	28.0	27.9	27.9
206	2021/07/21 12:14:09	28.0	27.8	28.1	28.4	28.5
211	2021/07/21 12:14:24	28.8	28.4	29.2	29.8	29.8
216	2021/07/21 12:14:39	31.2	32.3	34.4	37.9	35.5
221	2021/07/21 12:14:54	34.0	34.0	36.9	35.2	39.5
226	2021/07/21 12:15:09	33.4	33.9	33.8	35.8	36.0
231	2021/07/21 12:15:24	32.5	31.8	31.2	30.7	30.3
236	2021/07/21 12:15:39	30.4	30.6	31.4	31.2	30.4
241	2021/07/21 12:15:54	32.0	31.3	31.3	30.5	28.8
246	2021/07/21 12:16:09	28.6	29.1	29.0	28.8	28.5
251	2021/07/21 12:16:24	28.6	29.3	29.3	28.8	28.6
256	2021/07/21 12:16:39	28.3	28.4	28.4	28.3	28.2
261	2021/07/21 12:16:54	28.2	28.1	27.9	28.6	28.5
266	2021/07/21 12:17:09	28.4	28.4	28.6	28.6	28.6
271	2021/07/21 12:17:24	28.6	28.5	28.5	28.3	28.6
276	2021/07/21 12:17:39	28.6	28.5	28.4	28.3	28.3
281	2021/07/21 12:17:54	28.5	28.3	28.2	28.3	28.3
286	2021/07/21 12:18:09	28.5	28.5	28.6	28.8	28.7
291	2021/07/21 12:18:24	28.6	28.7	28.7	28.6	28.8
296	2021/07/21 12:18:39	29.1	29.0	29.1	29.1	29.2

LT-1 24hr Long Term

- Freq Weight : A
- Time Weight : SLOW
- Level Range : 40-100
- Max dB : 88.8 - 2021/07/21 15:13:11
- Level Range : 40-100
- SEL : 119.3
- Leq : 70.0
-

No.s	Date Time	(dB)				
1	2021/07/21 14:41:52	48.5	59.0	51.2	58.6	54.1
6	2021/07/21 15:01:52	44.2	41.1	44.0	47.3	44.5
11	2021/07/21 15:21:52	50.7	36.7	36.3	40.1	35.3
16	2021/07/21 15:41:52	38.1	37.9	39.8	40.3	40.6
21	2021/07/21 16:01:52	36.8	33.4	33.3	36.5	44.5
26	2021/07/21 16:21:52	47.8	49.8	49.7	40.0	47.1
31	2021/07/21 16:41:52	69.7	42.4	50.1	45.1	40.8
36	2021/07/21 17:01:52	45.3	46.3	47.7	42.9	44.7
41	2021/07/21 17:21:52	49.2	43.5	50.7	47.3	43.9
46	2021/07/21 17:41:52	47.7	44.6	43.1	50.6	48.3
51	2021/07/21 18:01:52	48.8	53.5	40.7	44.2	54.1
56	2021/07/21 18:21:52	47.1	44.6	45.0	43.3	46.0
61	2021/07/21 18:41:52	42.2	42.3	42.3	63.9	46.7
66	2021/07/21 19:01:52	47.4	50.4	41.0	44.4	39.0
71	2021/07/21 19:21:52	47.1	42.0	43.0	45.5	45.8
76	2021/07/21 19:41:52	42.3	44.5	48.8	47.3	46.7
81	2021/07/21 20:01:52	56.0	48.0	44.2	43.2	42.8
86	2021/07/21 20:21:52	42.7	42.8	42.5	43.2	41.4
91	2021/07/21 20:41:52	47.0	45.3	50.2	48.6	50.9
96	2021/07/21 21:01:52	55.6	49.5	45.5	45.4	48.0
101	2021/07/21 21:21:52	41.1	46.4	43.4	46.3	45.1
106	2021/07/21 21:41:52	46.7	46.3	47.6	41.9	41.6
111	2021/07/21 22:01:52	46.9	51.2	48.6	44.7	48.2
116	2021/07/21 22:21:52	51.0	51.8	50.3	53.0	55.0
121	2021/07/21 22:41:52	51.5	51.1	53.7	56.1	56.8
126	2021/07/21 23:01:52	55.3	55.5	40.9	45.0	43.4
131	2021/07/21 23:21:52	41.1	51.9	52.4	53.5	51.9
136	2021/07/21 23:41:52	51.3	51.5	51.3	52.2	51.9
141	2021/07/22 00:01:52	51.8	46.6	46.6	54.5	54.9
146	2021/07/22 00:21:52	54.4	54.5	54.0	55.2	55.3
151	2021/07/22 00:41:52	55.1	55.5	56.5	55.6	53.4
156	2021/07/22 01:01:52	50.1	49.4	52.3	51.1	52.9
161	2021/07/22 01:21:52	51.3	50.9	48.7	47.2	50.7
166	2021/07/22 01:41:52	50.8	48.3	50.7	49.6	50.5
171	2021/07/22 02:01:52	48.6	46.1	45.7	50.8	51.4
176	2021/07/22 02:21:52	52.3	52.9	51.0	49.9	52.4
181	2021/07/22 02:41:52	52.4	47.7	50.6	51.5	47.2
186	2021/07/22 03:01:52	49.4	44.2	48.0	47.5	49.8
191	2021/07/22 03:21:52	43.7	42.0	43.4	43.3	43.6
196	2021/07/22 03:41:52	45.5	47.5	47.3	56.2	50.1
201	2021/07/22 04:01:52	55.7	57.1	57.7	48.2	47.4
206	2021/07/22 04:21:52	50.0	48.0	44.4	48.4	48.0
211	2021/07/22 04:41:52	47.5	47.2	46.6	45.6	46.3
216	2021/07/22 05:01:52	45.5	48.7	43.2	43.5	51.8
221	2021/07/22 05:21:52	46.9	45.0	43.9	41.7	48.9
226	2021/07/22 05:41:52	40.6	39.5	67.9	46.9	44.6
231	2021/07/22 06:01:52	45.7	48.4	44.1	43.0	48.6
236	2021/07/22 06:21:52	48.2	49.0	47.9	48.1	47.7
241	2021/07/22 06:41:52	45.6	48.7	48.7	46.8	45.1
246	2021/07/22 07:01:52	72.1	48.2	48.4	47.2	44.4
251	2021/07/22 07:21:52	42.1	46.3	46.5	58.4	38.2
256	2021/07/22 07:41:52	40.8	47.0	47.5	48.6	47.4
261	2021/07/22 08:01:52	53.1	49.4	48.4	45.7	41.8
266	2021/07/22 08:21:52	40.8	39.0	42.5	68.1	38.9
271	2021/07/22 08:41:52	42.1	44.3	41.5	38.8	38.0
276	2021/07/22 09:01:52	41.1	42.3	43.7	40.0	40.0
281	2021/07/22 09:21:52	40.4	38.8	39.9	42.7	37.8
286	2021/07/22 09:41:52	39.5	44.7	36.6	39.4	39.4
291	2021/07/22 10:01:52	45.3	40.1	44.1	49.0	51.2
296	2021/07/22 10:21:52	48.8	48.5	40.5	44.8	42.5
301	2021/07/22 10:41:52	37.5	39.7	39.4	40.1	44.5
306	2021/07/22 11:01:52	39.2	39.0	37.7	55.6	37.7
311	2021/07/22 11:21:52	42.8	43.8	39.2	40.1	34.7
316	2021/07/22 11:41:52	40.8	33.1	59.8	37.8	47.2
321	2021/07/22 12:01:52	37.6	38.3	48.7	40.1	45.5
326	2021/07/22 12:21:52	37.7	42.7	34.4	35.3	38.2
331	2021/07/22 12:41:52	36.7	39.0	55.3	71.2	40.6
336	2021/07/22 13:01:52	36.3	34.6	42.0	33.4	32.4
341	2021/07/22 13:21:52	37.3	42.3	48.7	41.6	40.2
346	2021/07/22 13:41:52	44.3	45.2	43.3	37.5	45.3
351	2021/07/22 14:01:52	73.2	55.8	40.3	38.9	40.9
356	2021/07/22 14:21:52	42.0	34.9	41.6	35.5	44.7


Noise Measurement 1 - July 21-22, 2021
80
75
70
65
60
55
50
45
40
35
30
dBA
2:41 PM
3:41 PM
4:41 PM
5:41 PM
6:41 PM
7:41 PM
8:41 PM
9:41 PM
10:41 PM
11:41 PM
12:41 AM
1:41 AM
2:41 AM
3:41 AM
4:41 AM
5:41 AM
6:41 AM
7:41 AM
8:41 AM
9:41 AM
10:41 AM
11:41 AM
12:41 PM
1:41 PM
Time

Appendix B

Roadway Construction Noise Model (RCNM) Results

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 08/05/2021
Case Description: Parcel Construction

**** Receptor #1 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Reference Distance	Residential	50.0	45.0	40.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Auger Drill Rig	No	20		84.4	50.0	0.0
Front End Loader	No	40		79.1	50.0	0.0
Pickup Truck	No	40		75.0	50.0	0.0
Pneumatic Tools	No	50		85.2	50.0	0.0
Excavator	No	40		80.7	50.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA) Day		Evening		Night		Noise Limit Exceedance (dBA) Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Auger Drill Rig	84.4	77.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	79.1	75.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pickup Truck	75.0	71.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pneumatic Tools	85.2	82.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	80.7	76.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Total	85.2	84.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**** Receptor #2 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Meridian Road	Residential	50.0	45.0	40.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Auger Drill Rig	No	20		84.4	100.0	0.0
Front End Loader	No	40		79.1	100.0	0.0
Pickup Truck	No	40		75.0	100.0	0.0
Pneumatic Tools	No	50		85.2	100.0	0.0
Excavator	No	40		80.7	100.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA) Day		Evening		Night		Noise Limit Exceedance (dBA) Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Auger Drill Rig	78.3	71.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	73.1	69.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pickup Truck	69.0	65.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pneumatic Tools	79.2	76.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	74.7	70.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	79.2	78.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**** Receptor #3 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Sherman Way	Residential	50.0	45.0	40.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Auger Drill Rig	No	20		84.4	150.0	0.0
Front End Loader	No	40		79.1	150.0	0.0
Pickup Truck	No	40		75.0	150.0	0.0
Pneumatic Tools	No	50		85.2	150.0	0.0
Excavator	No	40		80.7	150.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA) Day		Evening		Night		Noise Limit Exceedance (dBA) Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Auger Drill Rig	74.8	67.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	69.6	65.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pickup Truck	65.5	61.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pneumatic Tools	75.6	72.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	71.2	67.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	75.6	75.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**** Receptor #4 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night

Midway Avenue	Residential	50.0	45.0	40.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Auger Drill Rig	No	20		84.4	300.0	0.0
Front End Loader	No	40		79.1	300.0	0.0
Pickup Truck	No	40		75.0	300.0	0.0
Pneumatic Tools	No	50		85.2	300.0	0.0
Excavator	No	40		80.7	300.0	0.0

Results

			Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
	Calculated (dBA)		Day		Evening		Night		Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Auger Drill Rig	68.8	61.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	63.5	59.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pickup Truck	59.4	55.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pneumatic Tools	69.6	66.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	65.1	61.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	69.6	69.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**** Receptor #5 ****

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Fern Road	Residential	50.0	45.0	40.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Auger Drill Rig	No	20		84.4	600.0	0.0
Front End Loader	No	40		79.1	600.0	0.0
Pickup Truck	No	40		75.0	600.0	0.0
Pneumatic Tools	No	50		85.2	600.0	0.0
Excavator	No	40		80.7	600.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Auger Drill Rig	62.8	55.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	57.5	53.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pickup Truck	53.4	49.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pneumatic Tools	63.6	60.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	59.1	55.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	63.6	63.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 09/13/2021
Case Description: Gen-Tie and Collector Lines

**** Receptor #1 ****

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Reference Distance	Residential	50.0	45.0	40.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Crane	No	16		80.6	50.0	0.0
Excavator	No	40		80.7	50.0	0.0
Pickup Truck	No	40		75.0	50.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA) Day		Evening		Night		Noise Limit Exceedance (dBA) Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Crane	80.6	72.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	80.7	76.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pickup Truck	75.0	71.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	80.7	78.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

**** Receptor #2 ****

Baselines (dBA)

Description	Land Use	Daytime	Evening	Night
Nearest Residence	Residential	50.0	45.0	40.0

Equipment

Description	Impact Device	Usage (%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Crane	No	16		80.6	100.0	0.0
Excavator	No	40		80.7	100.0	0.0
Pickup Truck	No	40		75.0	100.0	0.0

Results

	Calculated (dBA)		Noise Limits (dBA)						Noise Limit Exceedance (dBA)					
			Day		Evening		Night		Day		Evening		Night	
Equipment	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Crane	74.5	66.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Excavator	74.7	70.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pickup Truck	69.0	65.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total	74.7	72.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Appendix C

Traffic Noise Modeling Results

Appendix C

Rincon FHWA Traffic Noise Model

rincon

Model Input

Project Name :	Sienna Solar
Project Number :	21-11216
Modeling Condition :	Existing
Ground Type :	Soft
Metric (L_{eq}, L_{dn}, CNEL) :	Ldn

Peak ratio to ADT:	
Traffic Desc. (Peak or ADT) :	ADT

Segment Number	Roadway	Segment		Traffic Volume	Speed (mph)	Distance to Centerline	Vehicle Cassification Mix (%)					24-Hour Traffic Distribution (%)			K-Factor
		From	To				Automobiles	Motorcycles	Bus	Medium Trucks	Heavy Trucks	Day	Evening	Night	
1	Barstow Road	Rabbit Springs Road	to the north	2,920	55	50	94			4	2	65		35	
2	Northside Road	Barstow Road	to the east	700	45	50	94			4	2	65		35	
3	Rabbit Springs Road	Barstow Road	to the east	1,980	55	50	94			4	2	65		35	
4	State Route 247	Camp Rock Road	State Route 18	2,200	45	50	87			4	9	65		35	
5	State Route 247	State Route 18	Rabbit Springs Road	2,100	45	50	87			4	9	65		35	
6	State Route 247	Rabbit Springs Road	Lucerne Valley Cutoff	2,350	45	50	87			4	9	65		35	
7	State Route 18	Lucernce Valley	State Route 247	8,500	45	50	81			7	12	65		35	

rincon

Model Results

Project Number :	Sienna Solar
Modeling Condition :	21-11216
Ground Type :	Existing
Metric (Leq, Ldn, CNEL) :	Ldn

Segment Number	Roadway	Segment		Noise Levels (dB) Ldn					
		From	To	Automobiles	Motorcycles	Bus	Medium Trucks	Heavy Trucks	Total
1	Barstow Road	Rabbit Springs Road	to the north	62.7	0.0	0.0	55.0	56.4	64.2
2	Northside Road	Barstow Road	to the east	54.6	0.0	0.0	47.6	49.2	56.3
3	Rabbit Springs Road	Barstow Road	to the east	61.0	0.0	0.0	53.3	54.7	62.5
4	State Route 247	Camp Rock Road	State Route 18	59.2	0.0	0.0	52.5	60.7	63.4
5	State Route 247	State Route 18	Rabbit Springs Road	59.0	0.0	0.0	52.3	60.5	63.2
6	State Route 247	Rabbit Springs Road	Lucerne Valley Cutoff	59.5	0.0	0.0	52.8	61.0	63.7
7	State Route 18	Lucernce Valley	State Route 247	64.8	0.0	0.0	60.8	67.8	70.1

Distance to Traffic Noise Contours (feet)				
70 dB	65 dB	60 dB	55 dB	50 dB
20	44	95	204	439
6	13	28	61	132
16	34	73	157	339
18	39	84	181	391
18	38	82	176	379
19	41	88	190	408
51	109	236	508	1,095

Appendix C

Rincon FHWA Traffic Noise Model

rincon

Model Input

Project Name :	Sienna Solar
Project Number :	21-11216
Modeling Condition :	Existing Plus Project
Ground Type :	Soft
Metric (L_{eq}, L_{dn}, CNEL) :	Ldn

Peak ratio to ADT:	
Traffic Desc. (Peak or ADT) :	ADT

Segment Number	Roadway	Segment		Traffic Volume	Speed (mph)	Distance to Centerline	Vehicle Cassification Mix (%)					24-Hour Traffic Distribution (%)			K-Factor
		From	To				Automobiles	Motorcycles	Bus	Medium Trucks	Heavy Trucks	Day	Evening	Night	
1	Barstow Road	Rabbit Springs Road	to the north	3,950	55	50	94			4	2	65		35	
2	Northside Road	Barstow Road	to the east	870	45	50	94			4	2	65		35	
3	Rabbit Springs Road	Barstow Road	to the east	2,070	55	50	94			4	2	65		35	
4	State Route 247	Camp Rock Road	State Route 18	2,460	45	51	87			4	9	65		35	
5	State Route 247	State Route 18	Rabbit Springs Road	2,960	45	52	87			4	9	65		35	
6	State Route 247	Rabbit Springs Road	Lucerne Valley Cutoff	3,210	45	53	87			4	9	65		35	
7	State Route 18	Lucernce Valley	State Route 247	9,020	45	54	81			7	12	65		35	

rincon

Model Results

Project Number :	Sienna Solar
Modeling Condition :	21-11216
Ground Type :	Existing Plus Project
Metric (Leq, Ldn, CNEL) :	Ldn

Segment Number	Roadway	Segment		Noise Levels (dB) Ldn					
		From	To	Automobiles	Motorcycles	Bus	Medium Trucks	Heavy Trucks	Total
1	Barstow Road	Rabbit Springs Road	to the north	64.0	0.0	0.0	56.3	57.7	65.5
2	Northside Road	Barstow Road	to the east	55.5	0.0	0.0	48.5	50.1	57.2
3	Rabbit Springs Road	Barstow Road	to the east	61.2	0.0	0.0	53.5	54.9	62.7
4	State Route 247	Camp Rock Road	State Route 18	59.6	0.0	0.0	52.9	61.0	63.8
5	State Route 247	State Route 18	Rabbit Springs Road	60.3	0.0	0.0	53.6	61.7	64.4
6	State Route 247	Rabbit Springs Road	Lucerne Valley Cutoff	60.5	0.0	0.0	53.8	61.9	64.7
7	State Route 18	Lucernce Valley	State Route 247	64.5	0.0	0.0	60.6	67.6	69.9

Distance to Traffic Noise Contours (feet)				
70 dB	65 dB	60 dB	55 dB	50 dB
25	54	116	249	537
7	15	33	71	152
16	35	75	162	349
20	42	91	195	421
22	48	103	221	476
23	50	108	233	503
53	114	245	529	1,139

Appendix C

Rincon FHWA Traffic Noise Model

rincon

Model Input

Project Name :	Sienna Solar
Project Number :	21-11216
Modeling Condition :	Cumulative
Ground Type :	Soft
Metric (L_{eq}, L_{dn}, CNEL) :	Ldn

Peak ratio to ADT:	
Traffic Desc. (Peak or ADT) :	ADT

Segment Number	Roadway	Segment		Traffic Volume	Speed (mph)	Distance to Centerline	Vehicle Cassification Mix (%)					24-Hour Traffic Distribution (%)			K-Factor
		From	To				Automobiles	Motorcycles	Bus	Medium Trucks	Heavy Trucks	Day	Evening	Night	
1	Barstow Road	Rabbit Springs Road	to the north	6,270	55	50	94			4	2	65		35	
2	Northside Road	Barstow Road	to the east	890	45	50	94			4	2	65		35	
3	Rabbit Springs Road	Barstow Road	to the east	3,510	55	50	94			4	2	65		35	
4	State Route 247	Camp Rock Road	State Route 18	7,060	45	51	87			4	9	65		35	
5	State Route 247	State Route 18	Rabbit Springs Road	6,860	45	52	87			4	9	65		35	
6	State Route 247	Rabbit Springs Road	Lucerne Valley Cutoff	7,630	45	53	87			4	9	65		35	
7	State Route 18	Lucernce Valley	State Route 247	10,900	45	54	81			7	12	65		35	

rincon

Model Results

Project Number :	Sienna Solar
Modeling Condition :	21-11216
Ground Type :	Cumulative
Metric (Leq, Ldn, CNEL) :	Ldn

Segment Number	Roadway	Segment		Noise Levels (dB) Ldn					
		From	To	Automobiles	Motorcycles	Bus	Medium Trucks	Heavy Trucks	Total
1	Barstow Road	Rabbit Springs Road	to the north	66.0	0.0	0.0	58.3	59.7	67.5
2	Northside Road	Barstow Road	to the east	55.6	0.0	0.0	48.6	50.2	57.3
3	Rabbit Springs Road	Barstow Road	to the east	63.5	0.0	0.0	55.8	57.2	65.0
4	State Route 247	Camp Rock Road	State Route 18	64.2	0.0	0.0	57.5	65.6	68.3
5	State Route 247	State Route 18	Rabbit Springs Road	63.9	0.0	0.0	57.2	65.4	68.1
6	State Route 247	Rabbit Springs Road	Lucerne Valley Cutoff	64.2	0.0	0.0	57.5	65.7	68.4
7	State Route 18	Lucernce Valley	State Route 247	65.4	0.0	0.0	61.4	68.4	70.7

Distance to Traffic Noise Contours (feet)				
70 dB	65 dB	60 dB	55 dB	50 dB
34	73	157	339	731
7	15	33	72	154
23	50	107	230	496
39	85	183	395	850
39	83	180	387	834
42	90	193	416	896
60	129	278	600	1,292

Appendix C

Rincon FHWA Traffic Noise Model

rincon

Model Input

Project Name :	Sienna Solar
Project Number :	21-11216
Modeling Condition :	Cumulative Plus Project
Ground Type :	Soft
Metric (L_{eq}, L_{dn}, CNEL) :	Ldn

Peak ratio to ADT:	
Traffic Desc. (Peak or ADT) :	ADT

Segment Number	Roadway	Segment		Traffic Volume	Speed (mph)	Distance to Centerline	Vehicle Cassification Mix (%)					24-Hour Traffic Distribution (%)			K-Factor
		From	To				Automobiles	Motorcycles	Bus	Medium Trucks	Heavy Trucks	Day	Evening	Night	
1	Barstow Road	Rabbit Springs Road	to the north	6,270	55	50	94			4	2	65		35	
2	Northside Road	Barstow Road	to the east	890	45	50	94			4	2	65		35	
3	Rabbit Springs Road	Barstow Road	to the east	3,510	55	50	94			4	2	65		35	
4	State Route 247	Camp Rock Road	State Route 18	7,060	45	51	87			4	9	65		35	
5	State Route 247	State Route 18	Rabbit Springs Road	6,870	45	52	87			4	9	65		35	
6	State Route 247	Rabbit Springs Road	Lucerne Valley Cutoff	7,640	45	53	87			4	9	65		35	
7	State Route 18	Lucernce Valley	State Route 247	10,900	45	54	81			7	12	65		35	

rincon

Model Results

Project Number :	Sienna Solar
Modeling Condition :	21-11216
Ground Type :	Cumulative Plus Project
Metric (Leq, Ldn, CNEL) :	Ldn

Segment Number	Roadway	Segment		Noise Levels (dB) Ldn					
		From	To	Automobiles	Motorcycles	Bus	Medium Trucks	Heavy Trucks	Total
1	Barstow Road	Rabbit Springs Road	to the north	66.0	0.0	0.0	58.3	59.7	67.5
2	Northside Road	Barstow Road	to the east	55.6	0.0	0.0	48.6	50.2	57.3
3	Rabbit Springs Road	Barstow Road	to the east	63.5	0.0	0.0	55.8	57.2	65.0
4	State Route 247	Camp Rock Road	State Route 18	64.2	0.0	0.0	57.5	65.6	68.3
5	State Route 247	State Route 18	Rabbit Springs Road	63.9	0.0	0.0	57.2	65.4	68.1
6	State Route 247	Rabbit Springs Road	Lucerne Valley Cutoff	64.3	0.0	0.0	57.6	65.7	68.4
7	State Route 18	Lucernce Valley	State Route 247	65.4	0.0	0.0	61.4	68.4	70.7

Distance to Traffic Noise Contours (feet)				
70 dB	65 dB	60 dB	55 dB	50 dB
34	73	157	339	731
7	15	33	72	154
23	50	107	230	496
39	85	183	395	850
39	84	180	388	835
42	90	193	416	896
60	129	278	600	1,292

Appendix D

Equipment Specification Sheets

Introduction

In order to meet Energy storage market requirement, BYD developed 500kVA PCS (Power Conversion System) with years' experiences. This PCS is usually used for medium to large energy storage power station with high efficiency, reliable operation, high stability, and supplied for the following services: peak load shifting, adjustable reactive power etc.

PCS Topology

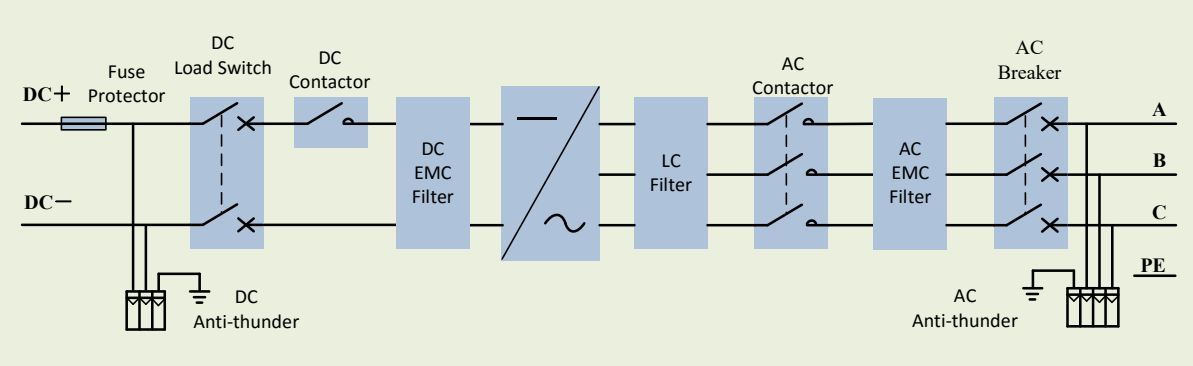


Figure 1: PCS Topology

System Parameters

No.	Item	Parameter	Remark
1	Type	BEG500KTL-U	
Parameters at DC side			
2	DC Voltage range	780～1000Vdc	
3	Max. DC current	700A	
Parameters at AC side			
4	Nominal AC voltage	480Vac	
5	Max.AC current	600A	
6	AC power	500kW	
7	Nominal Grid Frequency	60Hz	
8	Power Factor	0.95（leading）～0.95（lagging）	
9	THD	<5%	at nominal power
System parameter			
10	Isolation Method	Transformer less	

11	Max. Efficiency	97.5%	
12	Nominal power	97%	
13	Enclosure Protection Grade	IP20（indoor）	
14	Allowable Environment Temperature	-25～+55℃	Nominal output under 50℃
15	Allowable Relative Humidity	5～95% （no frozen）	
16	Allowable Max. Altitude	6000m	Power derating over 3000m
17	Noise	<75dB	
18	Cooling	Air cooling	
19	Fresh Air Consumption	10000m^3/h	
20	Display	Touch screen	
21	Communication Interface	RS485/Ethernet	
保护功能			
22	Short-circuit Protection	√	
23	Over-load Protection	√	
24	DC Over-voltage and Under-voltage Protection	√	
25	Grid Monitoring	√	
26	Insulation Monitoring	√	
27	Over-temperature Protection	√	
28	DC Reverse Polarity Protection	√	
29	Islanding Protection	Active and Passive Detection	
Mechanical Parameter			
30	Dimension (W/L/D) (mm)	2000/600/2150	
31	Weight (kg)	1700	
Reference Standard			
32	Safety	UL 1741-2nd Ed (January 28, 2010)	
33	On-grid	IEEE 1547（2003） IEEE 1547.1(2005)	

■ **Performance features**

- Wide DC voltage input range, max. voltage is 1000V
- Output harmonic wave is small, max. efficiency is up to 97.5%
- Very short switch time of charging and discharging at full power
- Adjustable reactive power
- Active power derating
- Thin-film capacitor design improve the system service life

■ Topology

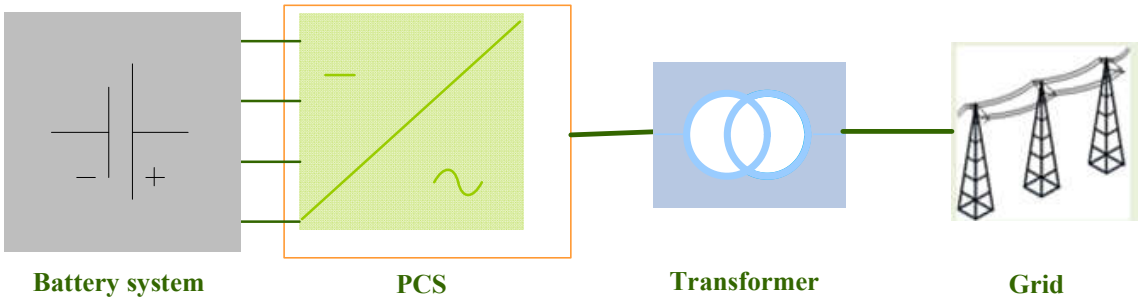


Figure 2: System Application



HEM

UTILITY SCALE MV CENTRAL STRING INVERTER



FIELD REPLACEABLE UNITS



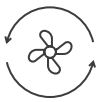
OUTDOOR DURABILITY



BUS PLUS SOLAR + STORAGE



NEMA 3R



ICOOL 3



ACTIVE HEATING



3 LEVEL TOPOLOGY



ECON MODE

THE INNOVATIVE MEDIUM VOLTAGE CENTRAL STRING INVERTER

The Power Electronics HEM medium voltage inverter is designed for utility scale solar applications, that require the advantages of a central inverter solution but also the modularity of a string architecture. The HEM can reach up to a nominal power of 3.6 MVA, and offers a wide MPPT window. It also has the added advantage of having an integrated medium voltage transformer and switchgear.

The Bus Plus ready feature allows the connection of up to six Freemaq DC/DC converters. It is the most cost competitive solution for solar-plus-storage retrofits.

Its architecture, composed of six field replaceable units (FRU), is designed to provide the highest availability and optimize yield production. Its use in Utility Scale PV plants provides considerable savings in CAPEX, since having an integrated MV transformer and switchgear reduces the need of additional connections between the LV and MV sides.

Thanks to the Power Electronics iCOOL3 cooling system, the HEM is able to provide NEMA 3R degree of protection with an air cooling system, and as a result reducing OPEX costs. This product has been designed to be the lowest LCOE solution in the market for solar applications.

ROBUST DESIGN



Polymeric Painting



Closed-Cell Insulation



Galvanized Steel | Stainless Steel (Optional)

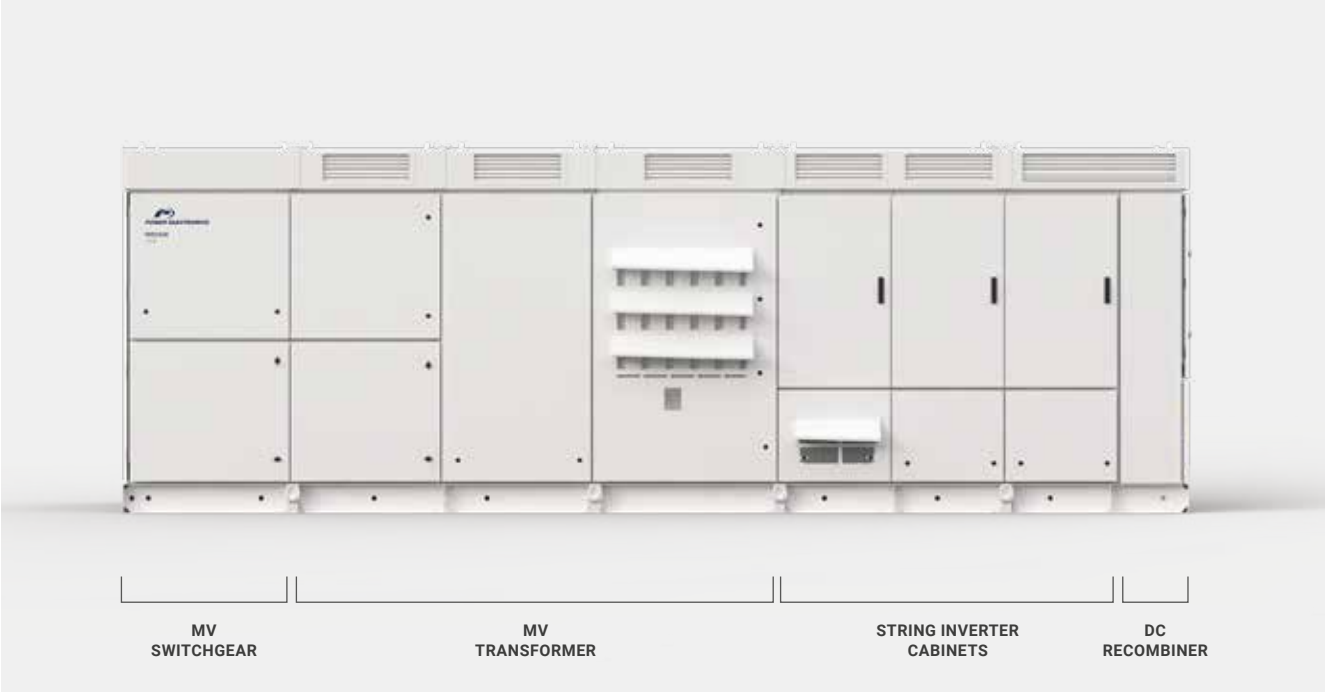
HEM inverter modules have a design life of greater than 30 years of operation in harsh environments and extreme weather conditions. HEM units are tested and ready to withstand conditions from the frozen Siberian tundra to the Californian Death Valley, featuring:

- Totally sealed electronics cabinet protects electronics against dust and moisture.
- Conformal coating on electronic boards shields PCBs from harsh atmospheres.
- Temperature and humidity controlled active heating prevents internal water condensation.
- C4 degree of protection according to ISO 12944.
  Up to C5-M optional.
- Closed-Cell insulation panel isolates the cabinet from solar heat gains.
- Roof cover designed to dissipate solar radiation, reduce heat build-up and avoid water leakages.
- The solid HEM structure avoids the need of additional external structures.
- Random units selected to pass a Factory Water Tightness Test ensuring product quality.
- NEMA 3R.

REAL TURN-KEY SOLUTION - EASY TO SERVICE

With the HEM, Power Electronics offers a real turn-key solution, including the MV transformer and switchgear fully assembled and tested at the factory. The HEM is a compact turn-key solution that will reduce site design, installation and connection costs, and therefore will minimize the LCOE.

By providing full front access the HEM series simplifies the maintenance tasks, reducing the MTTR (and achieving a lower OPEX). The total access allows a fast swap of the FRUs without the need of qualified technical personnel.



STRING CONCEPT POWER STAGES

The HEM combines the advantages of a central inverter with the modularity of the string inverters. Its power stages are designed to be easily replaceable on the field without the need of advanced technical service personnel, providing a safe, reliable and fast Plug&Play assembly system.

Following the modular philosophy of the Freesun series, the HEM is composed of 6 FRUs (field replaceable units), where all the power stages are physically joined in the DC side and therefore, in the event of a fault, the faulty module is taken off-line and its power is distributed evenly among the remaining functioning FRUs.



INNOVATIVE COOLING SYSTEM

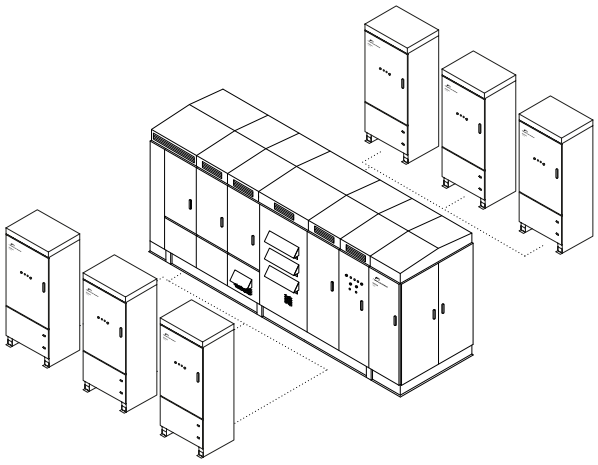
Based on more than 3 years of experience with our MV Variable Speed Drive, the iCOOL3 system allows to get NEMA 3R degree of protection in an outdoor solar inverter. iCOOL3 delivers a constant stream of clean air to the FRUs and the MV transformer, being the most effective way of reaching up to NEMA 3R degree of protection, without having to maintain cumbersome dust filters or having to use liquid-cooling systems, avoiding the commonly known inconveniences of it (complex maintenance, risk of leaks, higher number of components…), therefore resulting in an OPEX cost reduction and a LCOE improvement.



BUS PLUS READY - SOLAR + STORAGE

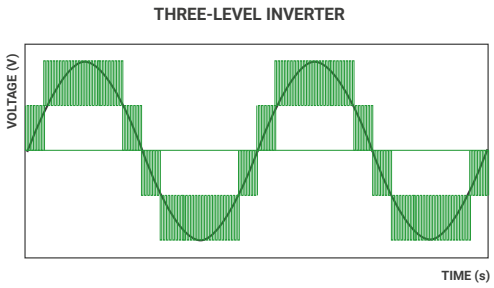
The Bus Plus feature allows the connection of up to six Freemaq DC/DC converters. It is the most cost competitive solution for solar-plus-storage retrofits. It prevents from additional connections out of the inverter between the DC/DC converters and the PV field. This solution provides considerable savings in CAPEX.

Power Electronics Freemaq DC/DC is a modular outdoor solution available from 500 kW to 3000 kW, fully compatible with different battery technologies and manufacturers. Freemaq DC/DC converter allows clipping energy recovery that will boost customer revenues and avoids the installation of additional station with a dedicated MV transformer.



MULTILEVEL TOPOLOGY

The multilevel IGBT topology is the most efficient approach to manage high DC link voltages and makes the difference in the 1,500 Vdc design. Power Electronics has many years of power design in both inverters and MV drives and the HEM design is the result of our experience with 3 level topologies. The 3 level IGBT topology reduces stage losses, increases inverter efficiency and minimizes total harmonic distortion. High efficiency to deliver the lowest LCOE.



VAR AT NIGHT

At night, in case of solar applications, the HEM inverter can shift to reactive power compensation mode. The inverter can respond to an external dynamic signal, a Power Plant Controller command or pre-set reactive power level (kVAr).

ACTIVE HEATING

At night, when the unit is not actively exporting power, the inverter can import a small amount of power to keep the inverter internal ambient temperature above -20°C, without using external resistors. This autonomous heating system is the most efficient and homogeneous way to prevent condensation, increasing the inverters availability and reducing maintenance. **PATENTED**

ECON MODE

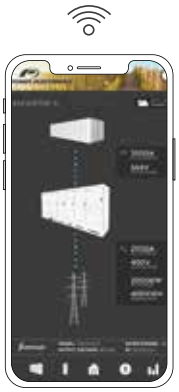
This innovative control mode allows increasing the efficiency of the MV transformer up to 25%, reducing the power consumption of the plant and therefore providing considerable savings. Available as an optional kit, this feature has a payback time of less than a few years, therefore resulting in the increase of the plant lifetime overall revenue.

EASY TO MONITOR

The Freesun app is the easiest way to monitor the status of our inverters. All our inverters come with built-in wifi, allowing remote connectivity to any smart device for detailed updates and information without the need to open cabinet doors.

The app user-friendly interface allows quick and easy access to critical information (energy registers, production and events).

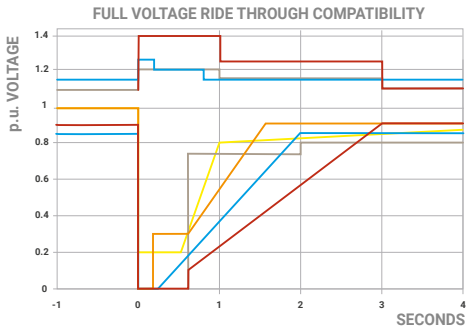
AVAILABLE INFORMATION	Grid and PV field data, inverter and power module data (voltages, currents, power, temperatures, I/O status...), weather conditions, alarms and warnings events, energy registers. Others.
FEATURES	Easy Wireless connection. Comprehensive interface. Real time data. Save and copy settings.
LANGUAGE	English, Spanish.
SYSTEM REQUIREMENTS	iOS or Android devices.
SETTINGS CONTROL	Yes.



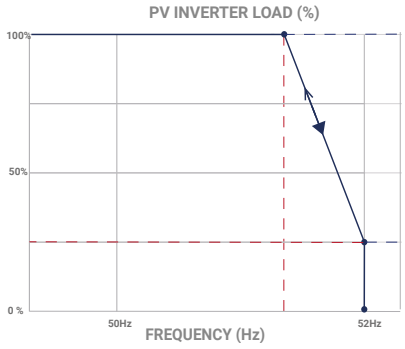


DYNAMIC GRID SUPPORT

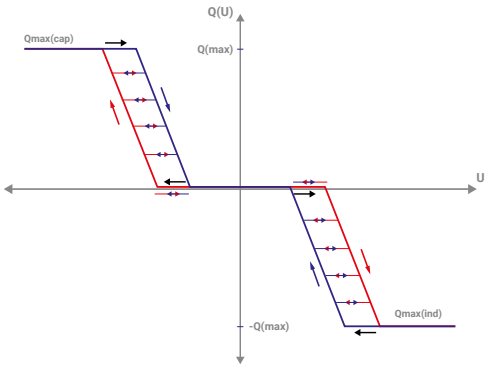
HEM firmware includes the latest utility interactive features (LVRT, OVRT, FRS, FRT, Anti-islanding, active and reactive power curtailment…), and can be configured to meet specific utility requirements.

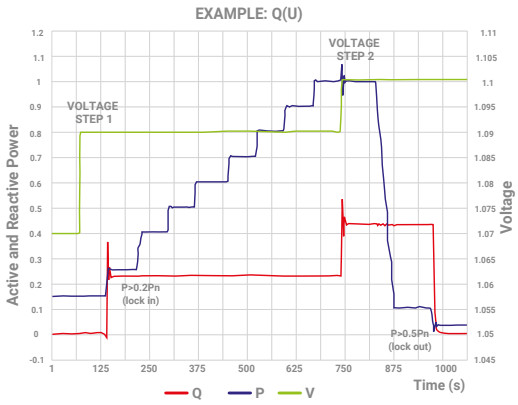


Low Voltage Ride Through (LVRT or ZVRT). Inverters can withstand any voltage dip or profile required by the local utility. In this situation, the inverter can inject current up to the nominal value.

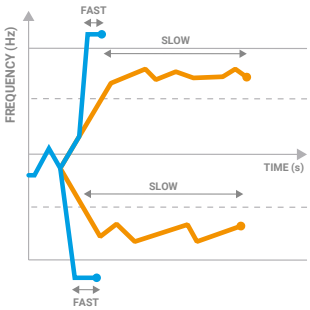


Frequency Regulation System (FRS). Frequency droop algorithm curtails the active power along a preset characteristic curve supporting grid stabilization.

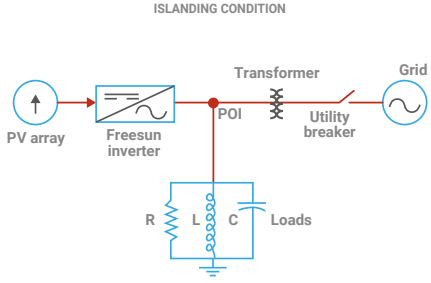




Q(V) curve. It is a dynamic voltage control function which provides reactive power in order to maintain the voltage as close as possible to its nominal value.



Frequency Ride Through (FRT). Freesun solar inverters have flexible frequency protection settings and can be easily adjusted to comply with future requirements.



Anti-islanding. This protection combines passive and active detection methods that eliminate nuisance tripping and allow to comply with the IEC 62116 and IEEE 1547 standards.

Introduction

In order to meet Energy storage market requirement, BYD developed 500kVA PCS (Power Conversion System) with years' experiences. This PCS is usually used for medium to large energy storage power station with high efficiency, reliable operation, high stability, and supplied for the following services: peak load shifting, adjustable reactive power etc.

PCS Topology

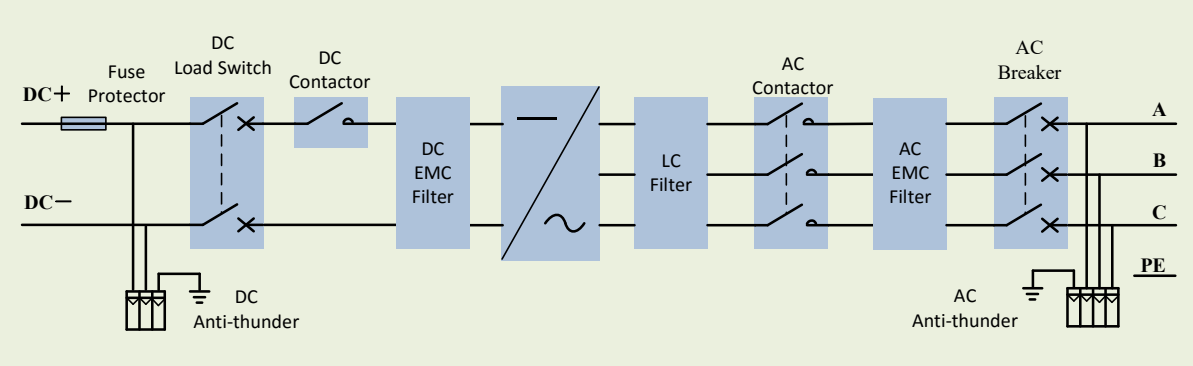


Figure 1: PCS Topology

System Parameters

No.	Item	Parameter	Remark
1	Type	BEG500KTL-U	
Parameters at DC side			
2	DC Voltage range	780～1000Vdc	
3	Max. DC current	700A	
Parameters at AC side			
4	Nominal AC voltage	480Vac	
5	Max.AC current	600A	
6	AC power	500kW	
7	Nominal Grid Frequency	60Hz	
8	Power Factor	0.95（leading）～0.95（lagging）	
9	THD	<5%	at nominal power
System parameter			
10	Isolation Method	Transformer less	

11	Max. Efficiency	97.5%	
12	Nominal power	97%	
13	Enclosure Protection Grade	IP20（indoor）	
14	Allowable Environment Temperature	-25～+55℃	Nominal output under 50℃
15	Allowable Relative Humidity	5～95% （no frozen）	
16	Allowable Max. Altitude	6000m	Power derating over 3000m
17	Noise	<75dB	
18	Cooling	Air cooling	
19	Fresh Air Consumption	10000m^3/h	
20	Display	Touch screen	
21	Communication Interface	RS485/Ethernet	
保护功能			
22	Short-circuit Protection	√	
23	Over-load Protection	√	
24	DC Over-voltage and Under-voltage Protection	√	
25	Grid Monitoring	√	
26	Insulation Monitoring	√	
27	Over-temperature Protection	√	
28	DC Reverse Polarity Protection	√	
29	Islanding Protection	Active and Passive Detection	
Mechanical Parameter			
30	Dimension (W/L/D) (mm)	2000/600/2150	
31	Weight (kg)	1700	
Reference Standard			
32	Safety	UL 1741-2nd Ed (January 28, 2010)	
33	On-grid	IEEE 1547（2003） IEEE 1547.1(2005)	

■ **Performance features**

- Wide DC voltage input range, max. voltage is 1000V
- Output harmonic wave is small, max. efficiency is up to 97.5%
- Very short switch time of charging and discharging at full power
- Adjustable reactive power
- Active power derating
- Thin-film capacitor design improve the system service life

■ Topology

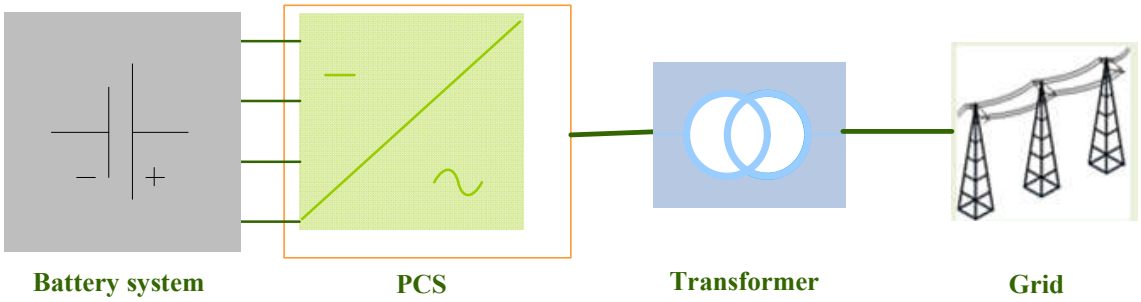


Figure 2: System Application

Transformer Performance Specification

For: For reference only Date: 3/20/2019

Quote: Item: Spec:

Rating								
Type	Substation Non-Auto	Class	H Winding		X Winding		Y Winding	
Phase	3		69	kV	34.5	kV	-	
Hertz	60	ONAN	72000	KVA	72000	KVA	-	KVA
Temp Rise	65 C	ONAF	96000	KVA	96000	KVA	-	KVA
Insulating Type	Mineral Oil	ONAF	120000	KVA	120000	KVA	-	KVA

Additional Tap Voltages	
H Winding (kV)	+2 -2 2.5%, DETC
X Winding (kV)	No Taps
Y Winding ()	-

Connections for Operation									
Transformers in Bank	To Transform from	Phase	Connected	To Transform from	Phase	Connected	To Transform To	Phase	Connected
1	69 kV	3	Delta	34.5 kV	3	Wye	-	3	-

Dielectric Tests				Insulation Levels	
Applied Voltage (To other windings and ground)	H Winding	34	kV	ITEMS	Basic Lightning Impulse Insulation Level (BIL kV)
	X Winding	34	kV		
	Y Winding	-	kV	H line	350
Induced Voltage	Enhancement level / 7200 Cycle (L-G)	72	kV	H neutral	-
				X line	150
	One hour level (L-G)	63	kV	X neutral	150
				Y line	-

Loss Data based on	NL @ 20C, LL @ 85C					
Based on loading at	69 kV	To	34.5 kV			
Winding Load KVA	H	72000	X	72000	Y	-
No Load Loss	TBD kW		Total Loss	TBD kW		

Regulation at		
69 kV	/	34.5 kV
72000		KVA
Power Factor	% Reg	% Load
1.0	TBD	100
0.8	TBD	100

Auxiliary Losses (Not included in above)	Percent Exciting Current	
	100% V	110% V
TBD kW	TBD	TBD

Average Sound Level	
dB(A)	Class
77	ONAN
79	ONAF
80	ONAF

Percent Impedance Voltage		
% IZ	Between Windings	At KVA
7.5	HV-XV	72000

Mechanical Data
Not for Construction Purposes

Drawing		
Height	(A)	216 in
Length	(B)	317 in
Width	(C)	188 in
Height over Cover	(D)	172 in
Untanking (Plus Slings)	(E)	291 in
Shipping Height		168 in
Shipping Width		118 in
Shipping Length		170 in
Oil Preservation		InertAir
Weights (approximate) (lbs)		
Core and Coils		112900 lbs
Tank and Fittings		66600 lbs
Fluid 7400 gal		54900 lbs
Total Weight		234400 lbs
Untanking Weight		112900 lbs
Shipping Weight		134900 lbs
Shipped in		Dry Air

For reference only – Losses and dimensions needs to be revised

WEG Transformers USA
One Pauwels Drive, Washington, MO 63090, USA
www.weg.net T: 1-636-239-9300 F: 1-636-239-9395

TECHNICAL SPECS

Customer Line No.:	Battery Storage System	**Quantity:**	36

Three Phase Pad-Mount Transformer(s)

kVA Rating:	3360 kVA	**Model #:**	
	Envirotemp FR3	**Cooling Class:**	KNAN
		Frequency:	60 Hz
		Avg. Winding Temp.	65 °C
Primary Voltage:	34500 Delta volts	**Secondary Voltage:**	600Y volts
Primary BIL Rating:	150 kV	**Secondary BIL Rating:**	45 kV
HV Winding Matl:	Aluminum	**LV Winding Matl:**	Aluminum
High Voltage Taps:	B Taps - Two 2.5% Taps below Nominal and Two 2.5% Taps above Nominal		
No Load Loss:	4200 Watts	**Load Loss:** 24300 Watts	**Total Loss:** 28500 Watts
Impedance:	5.75 %		

Tank Enclosure:
Welded Cover w/(1) Handhole(s) - 14x24
Cabinet Depth: 40 Inches, Pentahead Security Bolts
Steel HV-LV Barrier

Bushings:
Loop Feed ANSI Minimum Dimensions
Dead Front Primary Terminations: Integral Non-Loadbreak Bushings 600 Amp
Secondary Terminations: Epoxy Bushings w/Non-removable 12 Hole Spades, Spade Support

Protection:
PRCLF (), Weak Link Cartridge ()

Accessories:
Pressure Relief Valve Viat, Cover-Mounted Pressure Relief Device (), Drain valve w/Sampler
Liquid Level Gauge /w Contacts (Qty=1), Liquid Temperature Gauge, Pressure Vacuum Gauge

2-Winding SOLARPAD: Stadium Style Stacked Core Construction with Semi-Round Windings, Reduced Flux Density, Electrostatic Winding Shields, Increased Cooling, Door Gasketing, Hold down anchoring (x4 holes), Drain Valve & Sampler in External Box, Isolated Core Ground, Nitrogen Blanket, Schrader Valve, UL Listed

-Externally mounted gauges in pad lockable enclosure
-Externally mounted MV Switch in pad lockable enclosure
-HV located on the left and LV compartment located on the right
-Oil Temp Sensor: Analog output with 4-20mA transmitter, -50C to +150C
-Losses are at 20C core and 85C winding and are for reference only. ANSI tolerances will apply to quoted losses.

Switching:
Internally Isolated and Floating Neutral , One ON/OFF Transformer Switch (300 Amps)

Paint Color:
ASA #70 GRAY (Munsell 5.0BG7.0/0.4), Touch-up Paint Spray Can ,

Standards:
Quoted in compliance with the latest applicable ANSI standards unless otherwise specified by the customer.

Appendix E

Sample Noise Barrier

Acoustical Surfaces, Inc.

SOUNDPROOFING, ACOUSTICS, NOISE & VIBRATION CONTROL SPECIALISTS

123 Columbia Court North • Suite 201 • Chaska, MN 55318

(952) 448-5300 • Fax (952) 448-2613 • (800) 448-0121

Email: sales@acousticalsurfaces.com

Visit our Website: www.acousticalsurfaces.com

We Identify and S.T.O.P. Your Noise Problems



Echo Barrier™

The Industry's First Reusable, Indoor/ Outdoor Noise Barrier/Absorber

- Superior acoustic performance
- Industrial durability
- Simple and quick installation system
- Lightweight for easy handling
- Unique roll-up design for compact storage and transportation
- Double or triple up for noise 'hot spots'
- Ability to add branding or messages
- Range of accessories available
- Weatherproof – absorbs sound but not water
- Fire retardant
- 1 person can do the job of 2 or 3 people



Why is it all too often we see construction sites with fencing but no regard for sound issues created from the construction that is taking place? This is due to the fact that there has not been an efficient means of treating this type of noise that was cost effective ***until now.***

Echo Barrier temporary fencing is a reusable, outdoor noise barrier. Designed to fit on all types of temporary fencing. Echo Barrier absorbs sound while remaining quick to install, light to carry and tough to last.

BENEFITS: Echo Barrier can help reduce noise complaints, enhance your company reputation, extend site operating hours, reduce project timescales & costs, and improve working conditions.

APPLICATIONS: Echo Barrier works great for construction & demolition sites; rail maintenance & replacement; music, sports and other public events; road construction; utility/maintenance sites; loading and unloading areas; outdoor gun ranges.

DIMENSIONS: 6.56' × 4.49'.

WEIGHT: 13 lbs.

ACOUSTIC PERFORMANCE: 10-20dB noise reduction (greater if barrier is doubled up).

INSTALLATION: The Echo Barrier is easily installed using our quick hook system and specially designed elastic ties.

Echo Barrier Transmission Loss Field Data							
	125Hz	250Hz	500Hz	1KHz	2KHz	4KHz	8KHz
Single Layer	6	12	16	23	28	30	30
Double Layer	7	19	24	28	32	31	32

Appendix L. Traffic Assessment

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FINAL Traffic Assessment

July 7, 2023

To:	Rincon Consultants, Inc.	**Project:**	Sienna Solar and Storage Traffic Assessment
Attn:	David Daitch, Ph.D., Principal, RC Inc.		
From:	Peter Galloway; Senior Transportation Planner, Kiera Bryant, EIT	**Ref/Job No.:**	12617192 (12557185 archive)
CC:	Andrea Maben, Senior Environmental Project Manager, RC Inc.; Frank Penry, PE, PE, GHD	**File No.:**	12617192-Sienna Solar and Storage Traffic Assessment.docx
RE:	**FINAL Traffic Assessment**		

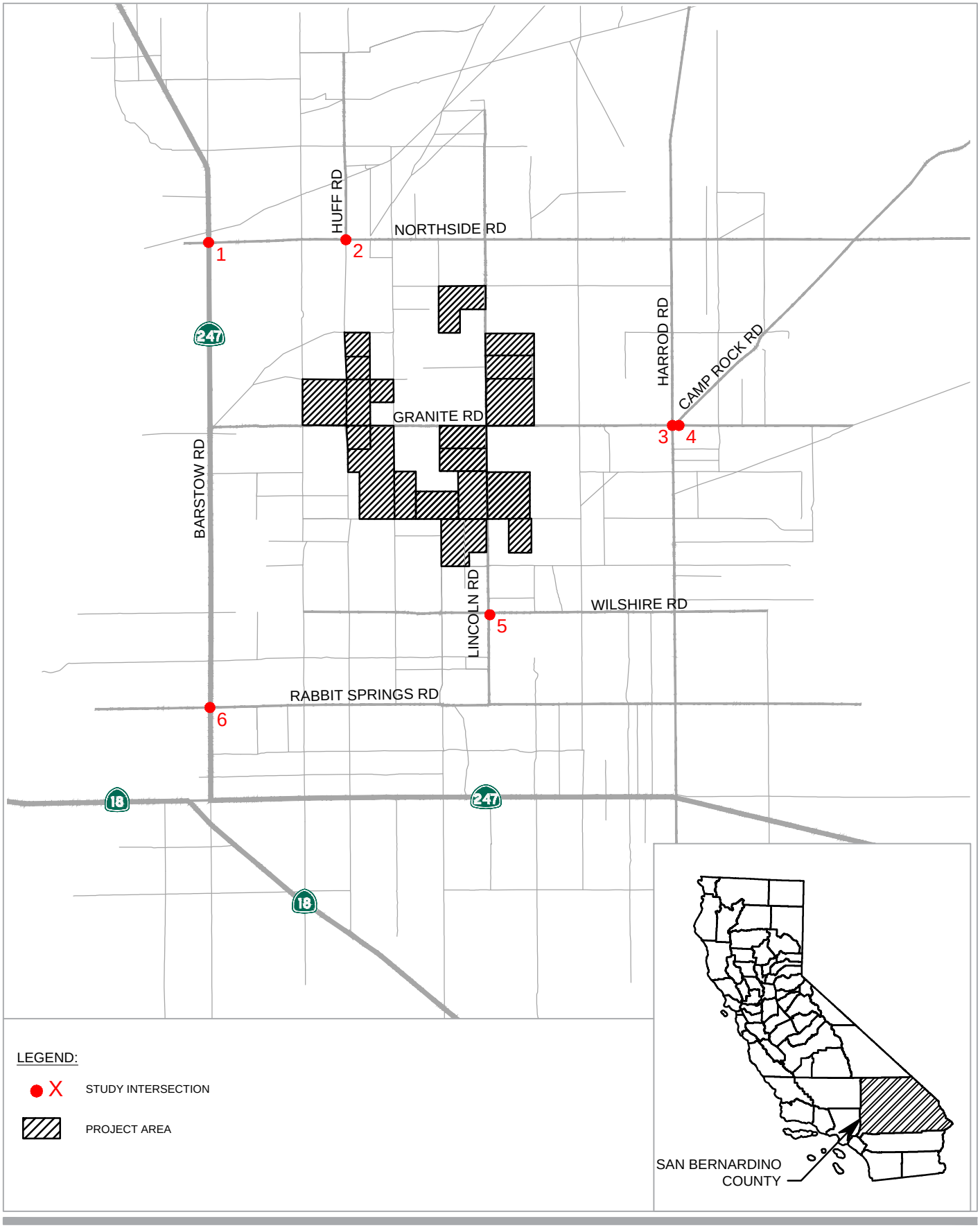
1. Introduction

The purpose of this Traffic Assessment is to present analysis for transportation impacts potentially related to construction and operation of the Sienna Solar Farm (Project) in San Bernardino County, California (reference Figure 1, Project Location Map). The proposed Sienna Solar Project is a 525-megawatt (MW) utility-scale solar farm with 525 MW battery storage located in unincorporated San Bernardino County. The site is located east of Barstow Road/State Route (SR) 247 roughly between Northside Road and Wilshire Road, northeast of the community of Lucerne Valley.

The project consists of the installation of a photovoltaic (PV) solar facility, Battery Energy Storage System (BESS), project substation, Operations and Maintenance building(s), underground collection system, a 230 kV generation-interconnect (gen-tie) line. The Sienna Project will interconnect at the SCE Calcite Substation (currently pending environmental clearance and construction) via a proposed overhead and/or underground 230-kV gen-tie line in addition to other ancillary features utilizing private and potentially public ROWs. The Project area encompasses 1,854 acres with an additional 77-acre substation site. Approximately 39 miles of collector lines and gen-tie alternatives will be analyzed in Traffic Assessment, although not all routes will be developed.

The information in this Traffic Assessment has been prepared using information provided by the Project proponent and reference to past studies for similar solar facilities. Primary users of the transportation system will be during the construction phase (roughly 12-24 months) and on-site personnel (operations and routine maintenance). Personnel is considered under two categories: 1) construction workers and 2) an estimated fifteen (15) employees charged with operations and maintenance when the facility is expected to be operating.

GHD
30 River Park Place West Suite 220 Fresno California United States
T +1 559 326 5900 **F** +1 559 412 2820 **W** www.ghd.com



N

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Rincon Consultants, Inc.
SIENNA SOLAR FARM TRAFFIC STUDY

STUDY AREA MAP

Project No. **12557185**
Report No. **001**
Date **1/31/2023**

FIGURE 1

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Source:

2. Existing Conditions

2.1 Existing Roadway System

Encompassing 20,105 square miles, San Bernardino County is California's largest county in land area. It is located in southern California and is bounded by Inyo County to the north; Orange and Riverside Counties to the south; Los Angeles and Kern Counties to the west; and Clark County (Nevada) and Mohave County (Arizona) to the east. San Bernardino County includes a diverse geography of mountainous areas, distinct valleys, agricultural/mineral lands, sparse and high-density urban areas, and desert areas.

Roadways that provide primary circulation in the vicinity of the Project area include Barstow Road (State Route 247), State Route 18, Rabbit Springs Road, and Camp Rock Road.

State Route 247 (Barstow Road) serves as a north-south route in San Bernardino County. This 2-4 lane highway passes through the Mojave Desert, connecting State Route 62 in Yucca Valley to Interstate 15 (I-15) in Barstow. Near I-15, State Route 247 is a 4-lane facility with the remaining 2-lane route extending through the Project study area and beyond. State Route 247 is eligible for the State Scenic Highway System but is not officially designated as a scenic highway by Caltrans.

According to *2019 Traffic Volumes on the California State Highways*, State Route 247 annual average daily traffic (AADT) ranges between 2,300 and 2,900. Higher volumes are found near Barstow; however, this area is outside of the study area.

State Route 18 is an east-west state highway primarily located in western San Bernardino County. This highway serves as a primary route into the San Bernardino Mountains, both from the Riverside-San Bernardino metropolitan area from the south and the Mojave Desert from the north.

State Route 18 extends between State Route 210 in San Bernardino and State Route 138 in Llano (Los Angeles County). Near the study area, AADT is estimated to be 9,000 (*2019 Traffic Volumes on the California State Highways*). State Route 18 is generally a two-lane undivided highway with limited and/or no shoulders.

Rabbit Springs Road is an east-west oriented facility that provides access to several properties, including educational, industrial, and agricultural. Currently, Rabbit Springs Road extends from State Route 18 and Kendall Road in the west connecting to Camp Rock Road south and east of the study area. Rabbit Springs Road is an undivided, two-lane road with limited and/or no shoulders. Lucerne Valley Middle/High School, with an enrollment of over 400 students, is located on Rabbit Springs Road just east of State Route 247 (Barstow Avenue).

Camp Rock Road is a two-lane undivided north-south local street. This roadway extends from State Route 18 northward to Northside Road. North of Northside Road, Camp Rock Road continues as a dirt road where it terminates as State Route 40 in Daggett, which is just east of Barstow. Camp Rock Road bisects the proposed solar farm facility and will provide access to the site.

2.1.1 Existing Traffic Data

Peak period (7:00-9:00 a.m. & 4:00-6:00 p.m.) intersection turning movement counts encompassing the proposed site were conducted on Tuesday, July 20, 2021, under favorable weather and traffic operating conditions. The following intersections are analyzed for peak hour operating conditions as follows:

Intersections:

- Northside Road/Barstow Road (State Route 247)
- Northside Road/Huff Road
- Granite Road/Harrod Road
- Granite Road/Camp Rock Road
- Wilshire Road/Lincoln Road
- Rabbit Springs Road/Barstow Road (State Route 247)

In addition to intersection analyses, average daily traffic (ADT) volumes were collected on the following roadway segments:

Roadway Segments:

- Barstow Road n/o Rabbit Springs Road
- Northside Road e/o Barstow Road
- Rabbit Springs Road e/o Barstow Road
- State Route 247: Camp Rock Road to State Route 18
- State Route 247: State Route 18 to Rabbit Springs Road
- State Route 247: Rabbit Springs Road to Lucerne Valley Cutoff Road
- State Route 18: Lucerne Valley, Jct. State Route 247

Existing AM and PM peak hour intersection volumes and roadway segment ADT are shown in Figure 3.

3. Level of Service Methodology and Guidelines

Intersection level of services (LOS) have been calculated for all control types using the methods documented in the Transportation Research Board Publication *Highway Capacity Manual 2016 (HCM 6)* and *Highway Capacity Manual 2000 (HCM 2000).* Traffic operations have been quantified through the determination of "Level of Service" (LOS). LOS is a qualitative measure of traffic operating conditions, whereby a letter grade "A" through "F" is assigned to an intersection of roadway segment representing progressively worsening traffic conditions.

The following section outlines the methodology and analysis parameters used to quantify existing conditions.

3.1 Intersection Capacity

For All-Way-Stop-Control (AWSC) intersections, overall intersection delay and LOS represent the average delay for all intersection approaches. For Two-Way Stop-Control (TWSC) intersections, LOS is based upon worst approach delay for the stop-sign controlled movement(s). Table 3.1 presents the delay-based LOS criteria for different types of intersection control.

Table 3.1 – Level of Service (LOS) Criteria for Intersections

Level of Service	Type of Flow	Delay	Maneuverability	Stopped Delay/Vehicle		
				Signalized	Un-signalized	All-Way Stop
A	Stable Flow	Very slight delay. Progression is very favorable, with most vehicles arriving during the green phase not stopping at all.	Turning movements are easily made, and nearly all drivers find freedom of operation.	<10.0	<10.0	<10.0
B	Stable Flow	Good progression and/or short cycle lengths. More vehicles stop than for LOS A, causing higher levels of average delay.	Vehicle platoons are formed. Many drivers begin to feel somewhat restricted within groups of vehicles.	>10.0 and <20.0	>10.0 and <15.0	>10.0 and <15.0
C	Stable Flow	Higher delays resulting from fair progression and/or longer cycle lengths. Individual cycle failures may begin to appear at this level. The number of vehicles stopping is significant, although many still pass through the intersection without stopping.	Back-ups may develop behind turning vehicles. Most drivers feel somewhat restricted	>20.0 and <35.0	>15.0 and <25.0	>15.0 and <25.0
D	Approaching Unstable Flow	The influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high volume-to-capacity ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.	Maneuverability is severely limited during short periods due to temporary back-ups.	>35.0 and <55.0	>25.0 and <35.0	>25.0 and <35.0
E	Unstable Flow	Generally considered to be the limit of acceptable delay. Indicative of poor progression, long cycle lengths, and high volume-to-capacity ratios. Individual cycle failures are frequent occurrences.	There are typically long queues of vehicles waiting upstream of the intersection.	>55.0 and <80.0	>35.0 and <50.0	>35.0 and <50.0
F	Forced Flow	Generally considered to be unacceptable to most drivers. Often occurs with over saturation. May also occur at high volume-to-capacity ratios. There are many individual cycle failures. Poor progression and long cycle lengths may also be major contributing factors.	Jammed conditions. Back-ups from other locations restrict or prevent movement. Volumes may vary widely, depending principally on the downstream back-up conditions.	>80.0	>50.0	>50.0

Reference: Highway Capacity Manual 6th Edition

3.2 Agency LOS Guidelines

3.2.1 San Bernadino County LOS Guidelines[1]

San Bernadino County Level of Service Assessment for General Plan Consistency: *Consistent with the acceptable LOS for the Desert, Valley, and Mountain regions as described in the General Plan, the County should consider the following unsignalized intersection criteria when identifying operational deficiencies:*

Intersections:

An operational improvement would be required if the study determines that either section a) or both sections b) and c) occur:

a) The addition of project related traffic causes the intersection to degrade from an LOS D or better to a LOS E or worse in the Valley and Mountain regions or from an LOS C or better to an LOS D or worse in the Desert region.

OR

b) The project adds 5.0 seconds or more of delay to an intersection that is already projected to operate without project traffic at an LOS E or F in the Valley and Mountain regions or at an LOS D, E, or F in the Desert region (per Section 10.5.2 b))

AND

c) One or both of the following conditions are met:

1) The project adds ten (10) or more trips to any minor street approach
2) The intersection meets the peak hour traffic signal warrant after the addition of project traffic (per Section 10.5.2 c)).

If the conditions above are satisfied, improvements should be identified that achieve the following:

• In the Valley and Mountain regions, improvements should be identified that would achieve LOS D or better for case a) above or to pre-project LOS and delay for case b) above.

• In the Desert region, improvements should be identified that would achieve LOS C or better for case a) above or to pre-project LOS and delay for case b) above.

Roadway Segments:

Consistent with the acceptable LOS for the Desert, Valley, and Mountain regions as described in the current General Plan, the County should consider the following roadway segment thresholds and improvement requirements:

[1] San Bernadino County, Transportation Impact Study Guidelines, July 9, 2019.

- Any study roadway segment in the Valley or Mountain regions that is operating at an LOS D or better without project traffic in which the addition of project traffic causes the segment to degrade to an LOS E or F should identify improvements to achieve LOS D.

    - Any study roadway segment in the Desert region that is operating at an LOS C or better without project traffic in which the addition of project traffic causes the segment to degrade to an LOS D, E, or F should identify improvements to achieve LOS D.

    - Any roadway segment that operates unacceptably in the no project scenario where the project adds traffic in excess of 5% of the roadway capacity (e.g., a volume-to-capacity ratio increase of 0.05) should identify improvements to add capacity to the segment.

For this analysis, LOS "C" is the minimum standard that will be used for all County intersection control types in this report. Based on the County's Land Use Map (*Policy Map LU-1C North Desert Region, Victor Valley & Barstow*), the proposed project area would be located in the North Desert. LOS "C" will be also used for state facilities.

3.3 Intersection Operation Analysis Software

Synchro 10 software suite was used to analyze the LOS analysis for unsignalized intersections analyzed within this study. This software is based upon the latest assumptions provided in the *Highway Capacity Manual* (HCM), 6th Edition.

3.4 Technical Analysis Parameters

This assessment provides evaluation of traffic operating conditions by incorporating appropriate heavy vehicle adjustment factors, peak hour factors (PHF), and reports the resulting intersection delays and LOS as estimated using *Synchro 10*. The following section describes all technical parameters incorporated into intersection analysis. Table 3.2 presents technical parameters that were applied to study intersections during the analysis.

Table 3.2 – Intersection LOS: Technical Analysis Parameters

Technical Parameters	Assumption
% Trucks	Intersection approach, based on existing counts, min. 2%
PHF for Existing	Intersection approach, based on existing counts
PHF for Future Conditions Scenarios	Intersection overall, 0.92 or higher
Grade	2% or less at all intersections
Passenger Car Equivalent (PCE)	2.0 passenger cars per heavy duty vehicle

Additionally, in terms of factors that affect how a road or intersection operates, PHFs are a significant measure of how concentrated traffic is during the busiest portion of the peak hour. A PHF at a given intersection is the sum of the traffic entering the intersection over the busiest 60 minutes divided by four times the entering volume of the busiest 15-minutes within the hour. A PHF of 1.0 means traffic levels are

evenly spread out over the whole hour, where a lower number means traffic spikes for a short period (e.g., school site drop-offs/pick-ups).

3.5 Roadway Capacity

Roadway segment LOS were estimated using *Highway Capacity Manual* (HCM 6th Edition) methodologies. For standard roadways, LOS was estimated using ADT-based LOS thresholds, as presented in Table 3.3.

Table 3.3 Daily Roadway Capacity by Facility Type

	Average Daily Traffic (ADT) – Total of Both Directions				
Roadway Type	A	B	C	D	E
Six-Lane Freeway	42,000	64,800	92,400	111,600	120,000
Four-Lane Freeway	28,000	43,200	61,600	74,400	80,000
Six-Lane Divided Expressway	35,500	42,200	46,200	55,800	60,000
Four-Lane Divided Expressway	23,667	28,133	30,800	37,200	40,000
Four-Lane Divided Arterial	22,000	25,000	29,000	32,500	36,000
Four-Lane Arterial (w/LTL)	22,000	25,000	29,000	32,500	36,000
Four-Lane Arterial (No LTL)	18,000	21,000	24,000	27,000	30,000
Two-Lane Divided Arterial	11,000	12,500	14,500	16,000	18,000
Two-Lane Arterial (w/LTL)	11,000	12,500	14,500	16,000	18,000
Two-Lane Arterial (No LTL)	9,000	10,500	12,000	13,500	15,000
Two-Lane Roundabout Arterial	14,300	16,250	18,850	20,800	23,400
Four-Lane Collector	12,000	15,000	18,000	21,000	24,000
Two-Lane Collector	6,000	7,500	9,000	10,500	12,000
Two-Lane Local	1,000	2,000	3,000	4,000	5,000

Notes:
1. *w/LTL indicates arterials with either continuous center left turn lane (LTL) or left turn lanes at major intersections.*
2. *No LTL indicates arterials without left turn lanes (LTL) at most major intersections.*
3. *Daily volume to capacity on roadway types does not supplant the need to perform peak-hour HCM-based analysis.*

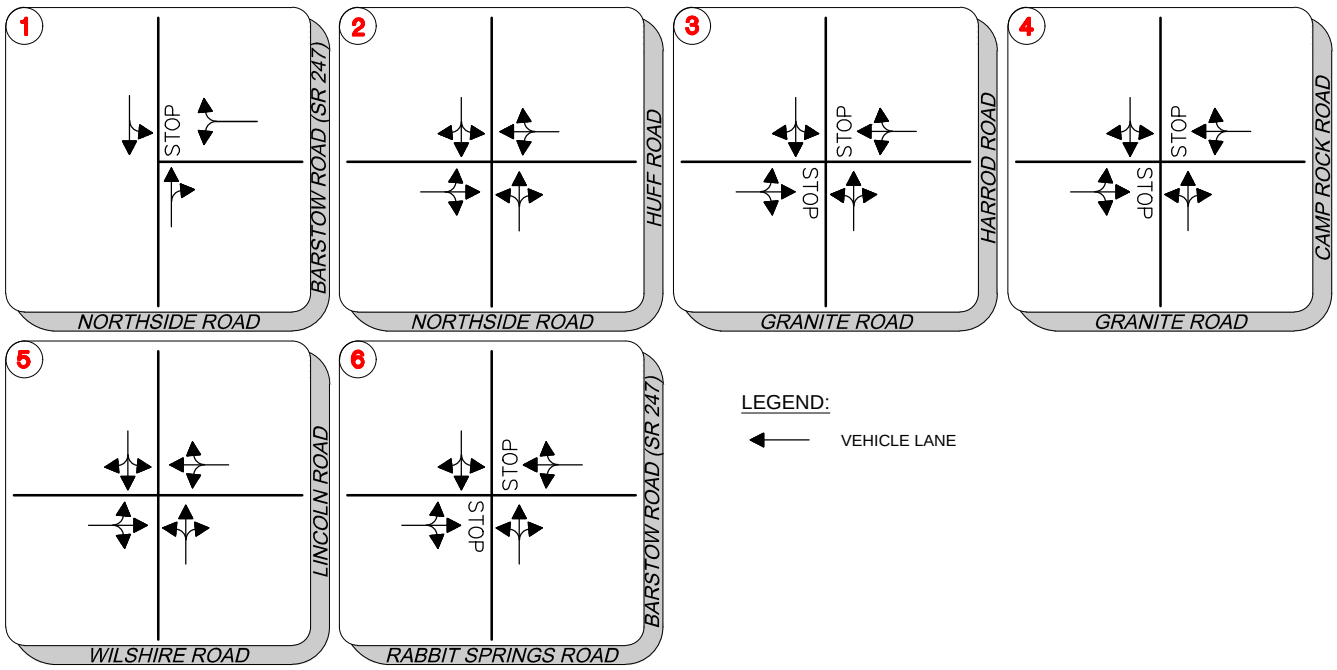
4. Existing Conditions

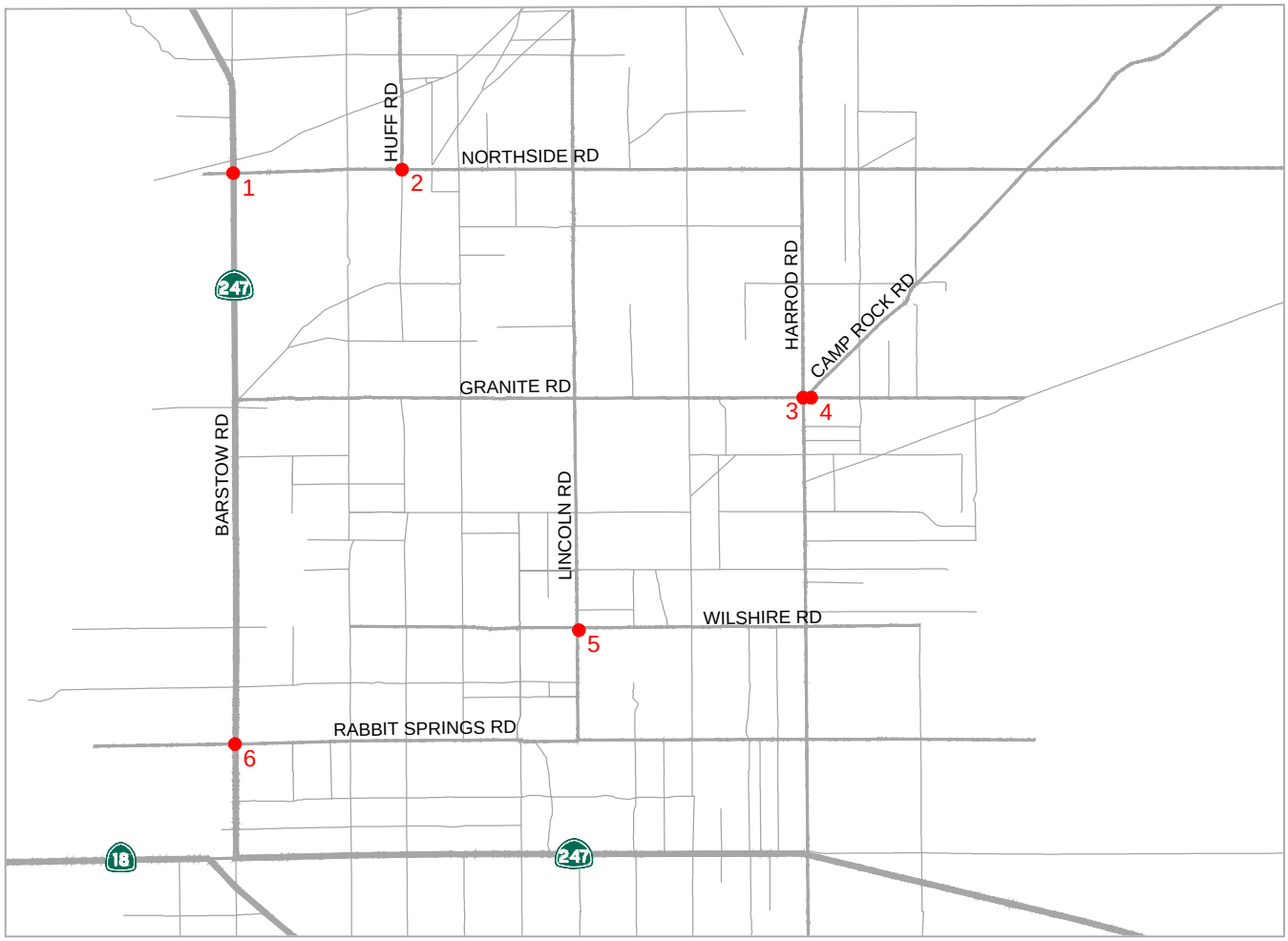
Existing conditions is the analysis scenario in which current operations at study locations are analyzed and establishes the baseline traffic conditions. Traffic counts were conducted while school was not in session; however, local school peak hour volumes from the Lucerne Valley Elementary and Middle Schools (10788 Barstow Road) with 440 students were added to existing volume data to develop Existing Base conditions. *ITE Trip Generation* was utilized to calculate school trips for Daily, AM and PM peak periods as shown in Attachment A.

Existing Lane Geometrics and Control for the Project study intersections is shown in Figure 2. Existing peak hour and daily traffic volumes are shown in Figure 3.

4.1 Existing Intersection Operations

Existing weekday AM and PM peak hour intersection traffic operations were quantified utilizing the existing traffic volumes and intersection lane geometrics and control. Table 4.1 presents intersection operations for the *Existing* conditions.





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Rincon Consultants, Inc.
SIENNA SOLAR FARM TRAFFIC STUDY

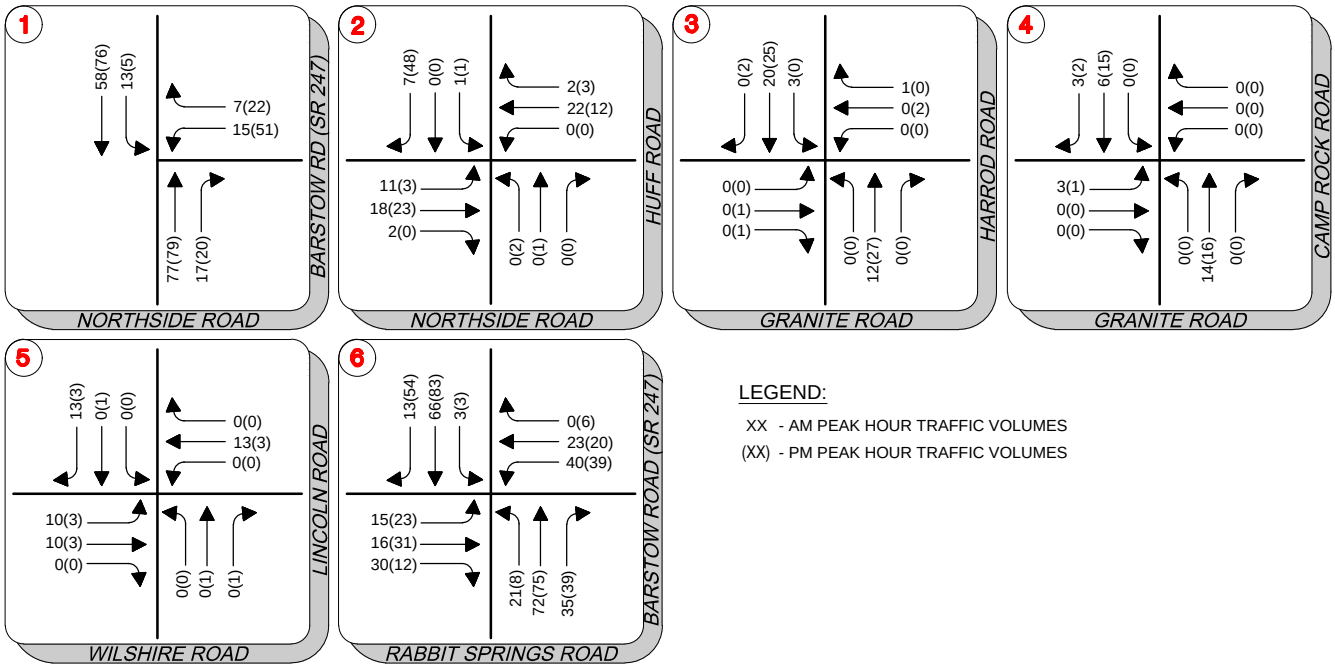
EXISTING LANE GEOMETRICS AND CONTROL

Project No. 12557185
Report No. 001
Date 8/27/2021

FIGURE 2

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Rincon Consultants, Inc.
SIENNA SOLAR FARM TRAFFIC STUDY

EXISTING PEAK HOUR TRAFFIC VOLUMES

Project No. 12557185
Report No. 001
Date 8/27/2021

FIGURE 3

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Table 4.1 – Existing Intersection Operations

#	Intersection	Control Type[1,2]	Target LOS	AM Peak Hour			PM Peak Hour		
				Delay	LOS	Warrant Met?[3]	Delay	LOS	Warrant Met?[3]
1	Northside Road/Barstow Road	TWSC	C	9.7	A	No	10.0	A	No
2	Northside Road/Huff Road	Yield	C	8.8	A	No	5.2	A	No
3	Granite Road/Harrod Road	TWSC	C	8.7	A	No	9.6	A	No
4	Granite Road/Camp Rock Road	TWSC	C	8.9	A	No	9.0	A	No
5	Wilshire Road/Lincoln Road	Yield	C	7.3	A	No	8.0	A	No
6	Rabbit Springs Road/Barstow Road	TWSC	C	11.6	B	No	12.6	B	No

Notes:
1. AWSC = All Way Stop Control; TWSC = Two Way Stop Control; RNDBT = Roundabout
2. LOS = Delay based on worst minor street approach for TWSC intersections, average of all approaches for AWSC, Signal, RNDBT
3. Warrant = Based on California MUTCD Warrant 3
*4. **Bold** = Unacceptable Conditions*

As presented in Table 4.1, all study intersections for Existing conditions currently operate at acceptable LOS B conditions or better during the AM and/or PM peak hour conditions.

4.2 Existing Roadway Segment Operations

LOS for the traffic counts were established using the capacities in Table 3.3. Table 4.2 contains a summary of the Existing roadway segment analysis and LOS conditions.

Table 4.2 Existing Roadway Segment LOS Conditions

#	Roadway	Location	Facility Type (# of Lanes)	Target LOS	Average Daily Traffic	LOS
1	Barstow Road	n/o Rabbit Springs Rd.	Two-Lane Collector	C	2,920	A
2	Northside Road	e/o Barstow Road	Two-Lane Collector	C	700	A
3	Rabbit Springs Rd.	e/o Barstow Road	Two-Lane Collector	C	1,980	A
4	State Route 247	Camp Rock Rd.-SR 18	Two-Lane Highway	C	2,200	A
	State Route 247	SR 18-Rabbit Springs Rd	Two-Lane Highway	C	2,100	A
	State Route 247	Rabbit Springs Rd.-LVCR	Two-Lane Highway	C	2,350	A
	State Route 18	Lucerne Valley-Jct. SR247	Two-Lane Highway	C	8,500	A

Notes:
1. No LTL arterials without left turn lanes (LTL) at most major intersections (within study area).
2. Daily volume to capacity on roadways does not supplant the need to perform peak-hour HCM-based analysis.

As presented in Table 4.2, all roadway segments are operating at acceptable LOS A conditions under Existing conditions scenario.

5. Approved/Pending Projects

In order to determine if any approved/pending projects in Lucerne Valley, San Bernardino County, fall within a 2-mile radius of the Project, GHD contacted the San Bernardino Land Use Services Department of the Planning Division. Through their website, GHD was able to review two years of all building permits in Supervisor District 3, which includes the Lucerne Valley.

Based upon our review, it was determined that there are no critical approved/pending projects near the study site. Many of the planning applications that were reviewed were lot line adjustments, inclusion of a second home, re-modeling efforts, minor zone changes, etc. There were no high trip generating land use proposals within Lucerne Valley. As such, a short-term cumulative analysis scenario is not required. It should be noted that projects identified in the EIRs and NOPs are included in the long-term cumulative analysis (Year 2040) in a subsequent section of this report.

6. Existing plus Project

6.1 Project Description

As described in the introduction, the proposed Sienna Solar Project is a 525-megawatt (MW) utility-scale solar farm with 525 MW battery storage located in unincorporated San Bernardino County. The site is located east of Barstow Road/State Route (SR) 247 roughly between Northside Road and Wilshire Road, northeast of the community of Lucerne Valley.

The project consists of the installation of a photovoltaic (PV) solar facility, Battery Energy Storage System (BESS), project substation, Operations and Maintenance building(s), underground collection system, a 230 kV generation-interconnect (gen-tie) line. The Sienna Project will interconnect at the SCE Calcite Substation (currently pending environmental clearance and construction) via a proposed overhead and/or underground 230-kV gen-tie line in addition to other ancillary features utilizing private and potentially public ROWs. The Project area encompasses 1,854 acres with an additional 77-acre substation site. Approximately 39 miles of collector lines and gen-tie alternatives will be analyzed in Traffic Assessment, although not all routes will be developed.

6.2 Construction Vehicle and Passenger Car Equivalent (PCE) Trip Generation

As indicated in the Introduction, the proposed Project is a commercial solar-generating facility situated in San Bernardino County as identified in Figure 1. Typically, trip generation rates would be estimated utilizing documentation from the *Institute of Transportation Engineers (ITE)*. However, the proposed land use is not a represented in *ITE Trip Generation (10th Edition)*. Therefore, in order to calculate trip generation for the proposed Project, GHD corresponded with the applicant, or Project proponent, to discuss operations.

Detailed trip generation was estimated for six phases: 1) Site Preparation; 2) Grading and Earthwork; 3) Foundations; 4) Steel Installation; 5) Electrical Installation; and 6) Collector Line Installation. Each phase

describes off-road equipment, construction vehicle types, number of units, phase duration, daily hours, and daily mileage per vehicle. Types of vehicles include passenger (commuters), and truck type (pickup, water, flatbed, gravel, concreted, delivery trucks, etc.).

Because the six phases are staggered and overlap, i.e., they will not occur simultaneously, GHD assumed the worst-case construction phases (based upon vehicle/truck trips) that could potentially occur at the same time. This is based upon the Project Schedule provided by the applicant. It was determined that the combination of Phases 3, 4 and 5 make up the most trips that could potentially overlap with a total of 860 workers and associated construction equipment. As a result, Attachment B provides a detailed summary of Sienna Solar Farm Project Trip Generation implemented for this analysis.

In addition, a passenger car equivalent (PCE) was applied to vehicle type. A PCE is a metric used in transportation engineering to assess traffic-flow rate on a highway. A PCE is essentially the impact that a mode of transport has on highway variable (e.g., headway, speed, density, etc.) compared to a single passenger car. For this analysis, a conservative PCE of 2.0 was applied to account for large trucks. This is consistent with the methodology presented in *HCM 6th Edition*.

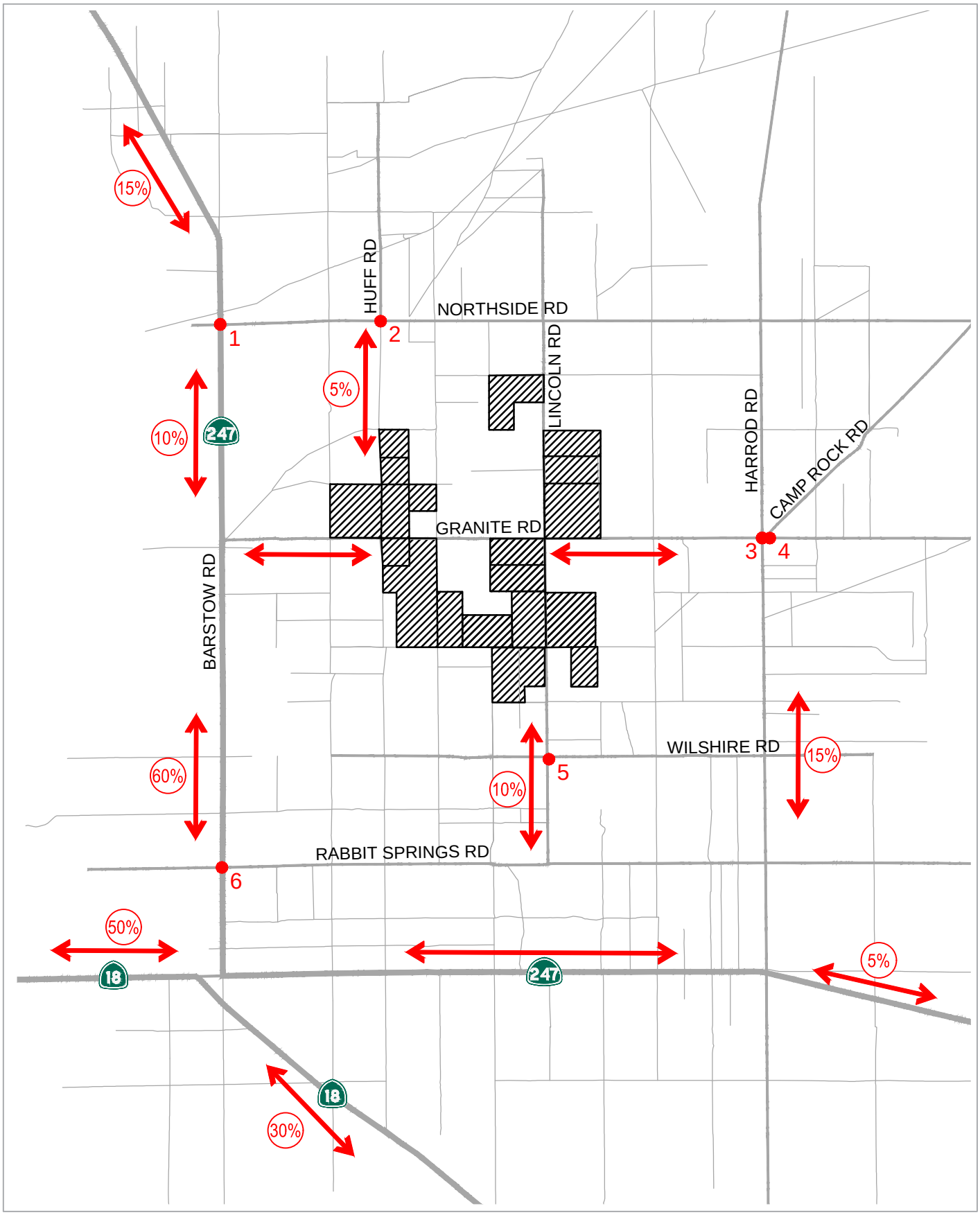
Trip generation for the construction phase is based on types of vehicles used and number of workers that are anticipated to report to the job site. Based on San Bernadino County Ordinance 83.01.080 (Noise); "Temporary construction, maintenance, repair, or demolition activities between 7:00 a.m. and 7:00 p.m., (except Sundays and Federal holidays)" are considered exempt from County noise regulations. Therefore, construction may occur during the a.m. peak (7:00 – 9:00 a.m.) and the p.m. peak (4:00 to 6:00 p.m.) commute periods, even though construction activities will occur throughout the day.

In order to simulate the worst-case trip generation scenario, construction workers are assumed to arrive in the a.m. peak hour and leave during the p.m. peak hour each weekday. Although some construction workers may carpool, this is not assumed, i.e., each worker will drive alone to/from work. Based upon our understanding of the Project, a PCE of 860 construction workers are anticipated to commute to and from the proposed Project area during phases 3 through 5 (worst-case scenario).

As shown in Attachment B, 1,830 daily trips (including PCE factor) are forecasted to be generated for short-term construction purposes. This would include short-term AM and PM peak hour trips of 813 in and out, respectively, during construction phases. Following construction, it is estimated that day to day operations and maintenance trips would be minimal, i.e., 17 peak hour trips per day (discussed further under Cumulative plus Project conditions). This would include 15 full-time employees (commute and lunch break trips) with any deliveries and/or visitors.

6.3 Project Trip Distribution

The Project is expected to "generate" and "attract" construction-related trips throughout the County and from other locations throughout the region. However, the majority of Project trips will be to/from the west and east on State Route 18. Remaining Project trips are expected to be to/from State Route 247 via northern and southern origins. Based upon existing traffic flow patterns, geographical location of Project area, location of lodging and/or employment bases, and previous traffic impact studies, these considerations resulted in a distribution of Project trip types throughout the study area shown in Figure 4 and as follows:



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TRIP DISTRIBUTION

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FIGURE 4

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Source:

Estimated Project Trip Distribution:

- 50% to/from State Route 18 (Old Woman Springs Road) west of State Route 247
- 30% to/from State Route 18 south of State Route 247
- 15% to/from State Route 247 (Barstow Road) north of Rabbit Springs Road
- 5% to/from State Route 247 (Old Woman Springs Road) east of Granite Road

6.4 Project Area Access

Given the existing grid network of paved and semi-paved streets providing access to multiple development parcels, access to the Project area is provided by a variety of primary and secondary driveways. Access to the Project driveways would be gained via Barstow Road, Camp Rock Road, Old Woman Springs Road to parcels located in the southern portion of the development area. Parcels located in the northern half would gain access from Haynes Road and No End Road east of State Route 247.

6.5 Existing plus Project Intersection Operations

Existing plus Project weekday AM and PM peak hour intersection traffic operations were quantified by superimposing traffic volumes generated by the proposed Project onto Existing conditions (reference Figure 5). Table 6.1 shows the summary of the Existing plus Project roadway analysis and LOS conditions.

Table 6.1 – Existing plus Project Intersection Operations

#	Intersection	Control Type[1,2]	Target LOS	AM Peak Hour			PM Peak Hour		
				Delay	LOS	Warrant Met?[3]	Delay	LOS	Warrant Met?[3]
1	Northside Road/Barstow Road	TWSC	C	11.2	B	No	10.6	B	No
2	Northside Road/Huff Road	Yield	C	9.4	A	No	7.6	A	No
3	Granite Road/Harrod Road	TWSC	C	8.6	A	No	9.5	A	No
4	Granite Road/Camp Rock Road	TWSC	C	9.0	A	No	9.1	A	No
5	Wilshire Road/Lincoln Road	Yield	C	7.8	A	No	7.5	A	No
6	**Rabbit Springs Road/Barstow Road**	**TWSC**	**C**	21.8	C	No	**26.1**	**D**	**No**
7	Access Road/Barstow Road	TWSC	C	12.0	B	No	24.6	C	No

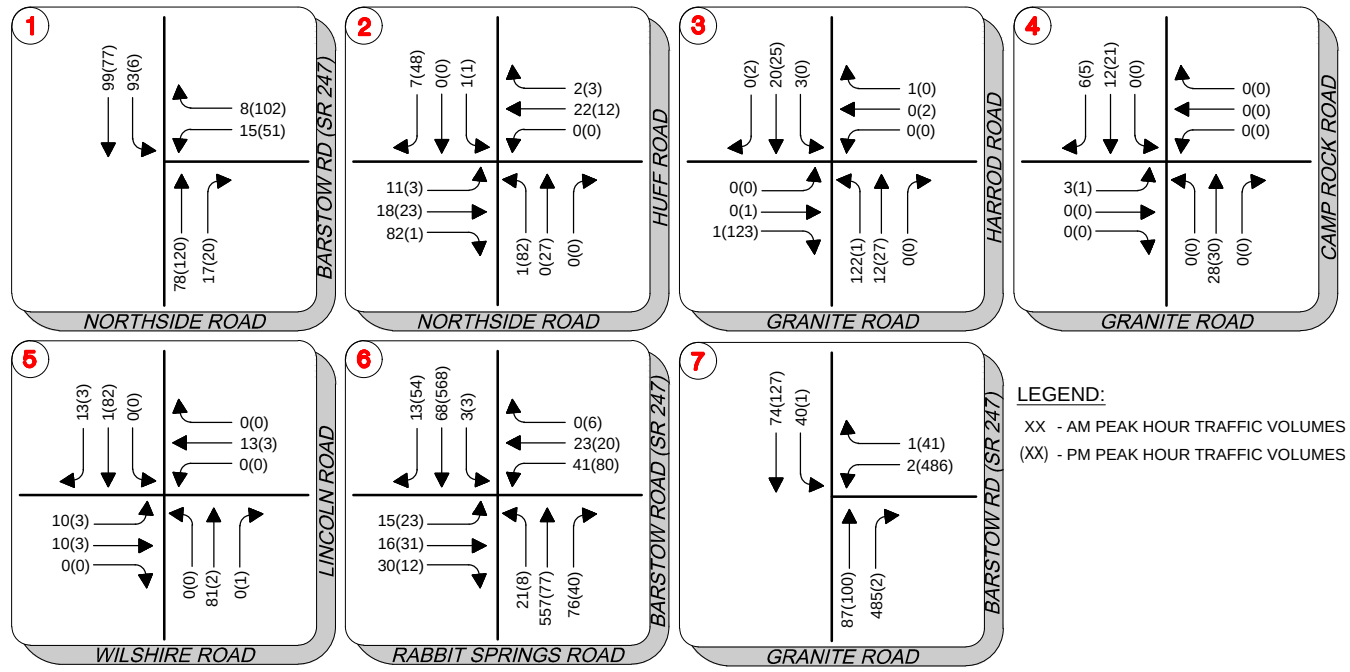
Notes:

1. TWSC = Two Way Stop Control

2. LOS = Delay based on worst minor street approach for TWSC and Yield intersections

3. Warrant = Based on California MUTCD Warrant 3 (70% Factor)

*4. **Bold** = Unacceptable Conditions*





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EXISTING PLUS PROJECT
PEAK HOUR TRAFFIC VOLUMES

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FIGURE 5

As presented in Table 6.1, all intersections are forecasted to operate at acceptable LOS C conditions or better under Existing plus Project conditions scenario with one exception. The Rabbit Springs Road/Barstow Road intersection is projected to operate at LOS D during the PM peak hour. However, this intersection is not anticipated to meet Warrant 4 (70%) under any scenario. Recommended improvements are identified in subsequent section of this report.

6.6 Existing plus Project Roadway Segment Operations

Table 6.2 contains a summary of the Existing plus Project roadway segment analysis and LOS conditions.

Table 6.2 Existing plus Project Roadway Segment LOS Conditions

#	Roadway	Location	Facility Type (# of Lanes)	Target LOS	Average Daily Traffic	LOS
1	Barstow Road	n/o Rabbit Springs Rd.	Two-Lane Collector	C	3,950	A
2	Northside Road	e/o Barstow Road	Two-Lane Collector	C	870	A
3	Rabbit Springs Rd.	e/o Barstow Road	Two-Lane Collector	C	2,070	A
4	State Route 247	Camp Rock Rd.-SR 18	Two-Lane Highway	C	2,460	A
	State Route 247	SR 18-Rabbit Springs Rd	Two-Lane Highway	C	2,960	A
	State Route 247	Rabbit Springs Rd.-LVCR	Two-Lane Highway	C	3,210	A
	State Route 18	Lucerne Valley-Jct. SR247	Two-Lane Highway	C	9,020	B

Notes:

1. *No LTL arterials without left turn lanes (LTL) at most major intersections (within study area).*
2. *Daily volume to capacity on roadways does not supplant the need to perform peak-hour HCM-based analysis.*

As presented in Table 6.2, all roadway segments are forecasted to operate at acceptable LOS A or B conditions under Existing plus Project conditions scenario.

7. Cumulative (2040) Conditions

San Bernadino County Transportation Authority (SBCTA) provided 2016 and 2040 outputs from their Regional Travel Demand Forecast Model (Model). The latest General Plans from all agencies land use and circulation elements in San Bernadino County are included in SBTA Model. GHD used the Model's 2016 (validated Base) and 2040 (Cumulative) traffic forecasts to identify the incremental change in traffic volumes by approach and applied the factor to known (existing) traffic counts to forecast 2040 traffic volumes. The count delta method forecasts adjustment is based upon the difference of recent counts from interpolation resulting from Base and Cumulative years. Following this process, GHD checked the forecasted turning movements for reasonableness considering existing and future circulation conditions.

7.1 Cumulative Intersection Operations

Cumulative traffic volumes were forecasted and are shown in Figure 6. Table 7.1 presents a summary of the Cumulative study intersection LOS conditions.

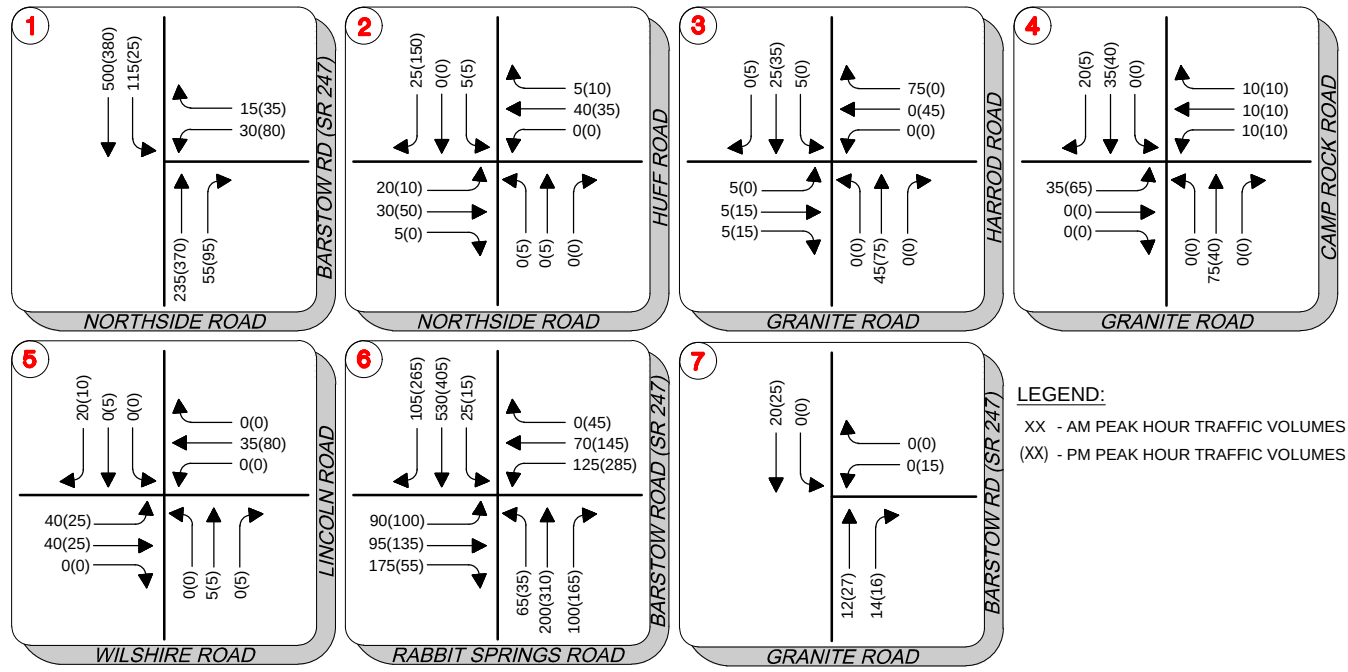
Table 7.1 – Cumulative Intersection Operations

#	Intersection	Control Type[1,2]	Target LOS	AM Peak Hour			PM Peak Hour		
				Delay	LOS	Warrant Met?[3]	Delay	LOS	Warrant Met?[3]
1	Northside Road/Barstow Road	TWSC	C	23.0	C	No	24.9	C	No
2	Northside Road/Huff Road	Yield	C	9.0	A	No	11.3	B	No
3	Granite Road/Harrod Road	TWSC	C	9.7	A	No	10.3	B	No
4	Granite Road/Camp Rock Road	TWSC	C	10.1	B	No	10.1	B	No
5	Wilshire Road/Lincoln Road	Yield	C	7.4	A	No	8.8	A	No
6	**Rabbit Springs Road/Barstow Road**	**TWSC**	**C**	**OVR**	**F**	**Yes**	**OVR**	**F**	**Yes**

Notes:

1. *TWSC = Two Way Stop Control;*
2. *LOS = Delay based on worst minor street approach for TWSC and Yield intersections*
3. *Warrant = Based on California MUTCD Warrant 3 (70% Factor)*
4. ***Bold** = Unacceptable Conditions*
5. *OVR = > 100 seconds delay*

Under Cumulative conditions, all of the study intersections, except for one, are forecasted to operate at acceptable LOS. Intersection #6 (Rabbit Springs Road) is projected operate at LOS F condition and meets the Caltrans' Peak Hour Warrant 3 (70%) under the Cumulative AM and PM peak hour scenarios. All recommended improvements, regardless of relationship to Project, are discussed in a subsequent section of this report.



LEGEND:

XX - AM PEAK HOUR TRAFFIC VOLUMES

(XX) - PM PEAK HOUR TRAFFIC VOLUMES



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2040 CUMULATIVE
PEAK HOUR TRAFFIC VOLUMES

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FIGURE 6

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7.2 Cumulative Roadway Segment Operations

Table 7.2 contains a summary of the projected Cumulative roadway segment analysis and LOS conditions.

Table 7.2 Cumulative Roadway Segment LOS Conditions

#	Roadway	Location	Facility Type (# of Lanes)	Target LOS	Average Daily Traffic	LOS
1	Barstow Road	n/o Rabbit Springs Rd.	Two-Lane Collector	C	6,270	B
2	Northside Road	e/o Barstow Road	Two-Lane Collector	C	890	A
3	Rabbit Springs Rd.	e/o Barstow Road	Two-Lane Collector	C	3,510	A
4	State Route 247	Camp Rock Rd.-SR 18	Two-Lane Highway	C	7,060	A
	State Route 247	SR 18-Rabbit Springs Rd	Two-Lane Highway	C	6,860	A
	State Route 247	Rabbit Springs Rd.-LVCR	Two-Lane Highway	C	7,630	A
	State Route 18	Lucerne Valley-Jct. SR247	Two-Lane Highway	C	10,900	C

Notes:

1. *No LTL arterials without left turn lanes (LTL) at most major intersections.*
2. *Daily volume to capacity on roadways does not supplant the need to perform peak-hour HCM-based analysis.*

As presented in Table 7.2, all roadway segments are forecasted to operate at acceptable LOS A, B or C conditions under Cumulative conditions scenario.

8. Cumulative plus Project Conditions

Project trip generation under cumulative conditions are much lower than under Existing plus Project conditions that included development of the solar facility. Following completion of the construction phase, it is estimated that fifteen (15) employees will be assigned to the operations plant for maintenance and oversight. To calculate trip generation for post-construction activities, Table 8.1 was developed. It is assumed that that the 15 employees will generate 60 daily trips, including arrival and departure during the peak hour periods. It is further assumed that 4 daily trips would be generated by deliveries or "other" trip types.

Table 8.1 – Cumulative plus Project Trip Generation

Land Use Category	Unit	Daily Trip Rate/Unit	AM Peak Hour Trip Rate/Unit			PM Peak Hour Trip Rate/Unit		
			Total	In %	Out %	Total	In %	Out %
Solar Maintenance Worker	EMP	4.0	0.25	100%	0%	0.25	0%	100%
Project Name	**Quantity (Units)**	**Daily Trips**	**AM Peak Hour Trips**			**PM Peak Hour Trips**		
			Total	**In**	**Out**	**Total**	**In**	**Out**
Employee	15	60	15	15	0	15	0	15
Deliveries/Other	2	4	2	1	1	2	1	1
Project Trips		**64**	**17**	**16**	**1**	**17**	**1**	**16**

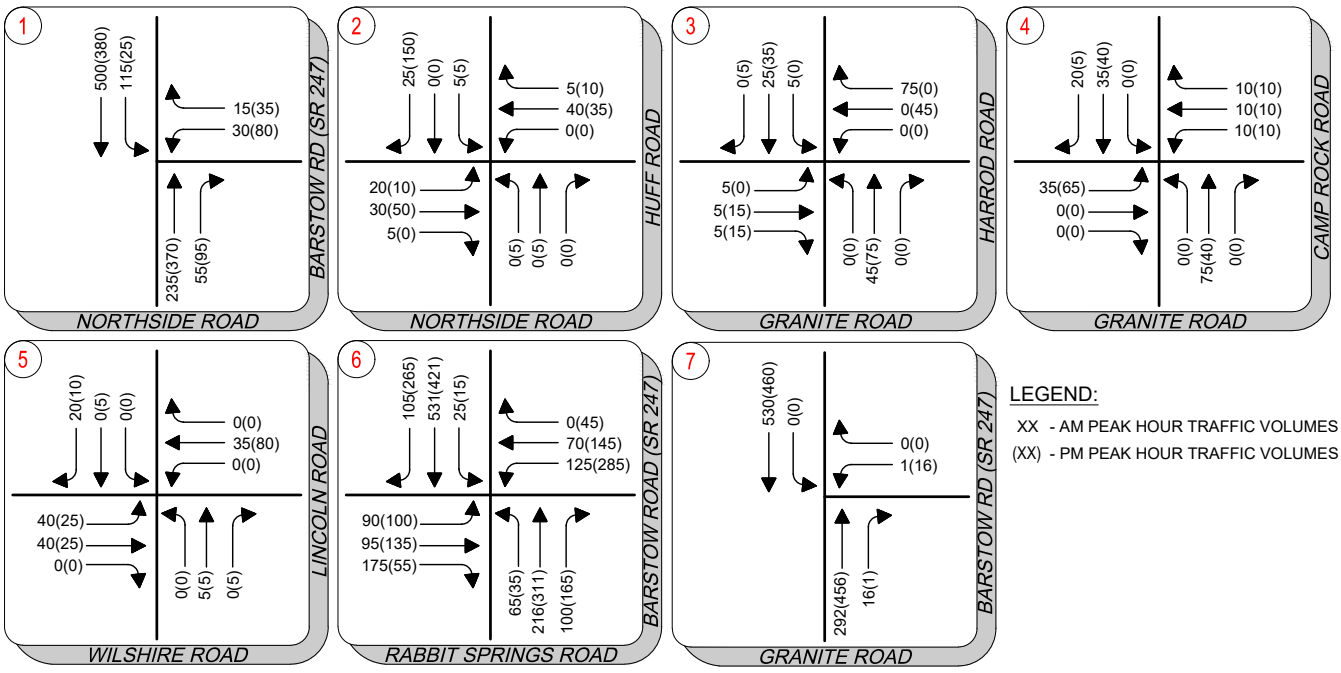
Notes:

1. *Estimated based upon data provided by Project proponent.*
2. *Deliveries are shown during peak hours.*
3. *Errors due to rounding may occur.*

As shown in Table 8.1, the Cumulative plus Project daily trip generation assumes 64 trips, with 17 trips occurring during the AM and PM peak hours, respectively. 64 daily trips were distributed locally within Lucerne Valley.

8.1 Cumulative plus Project Intersection Operations

Cumulative plus Project traffic volumes were forecasted by applying traffic generated by the proposed Project (Table 8.1) onto Cumulative conditions (reference Figure 7). Cumulative plus Project weekday AM and PM peak hour intersection traffic operations are shown in Table 8.2.



LEGEND:

XX - AM PEAK HOUR TRAFFIC VOLUMES

(XX) - PM PEAK HOUR TRAFFIC VOLUMES



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2040 CUMULATIVE PLUS PROJECT PEAK HOUR TRAFFIC VOLUMES

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Report No. **001**
Date **7/6/2023**

FIGURE 7

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Table 8.2 – Cumulative plus Project Intersection Operations

#	Intersection	Control Type[1,2]	Target LOS	AM Peak Hour			PM Peak Hour		
				Delay	LOS	Warrant Met?[3]	Delay	LOS	Warrant Met?[3]
1	Northside Road/Barstow Road	TWSC	C	23.0	C	No	24.9	C	No
2	Northside Road/Huff Road	Yield	C	9.0	A	No	11.3	B	No
3	Granite Road/Harrod Road	TWSC	C	9.7	A	No	10.3	B	No
4	Granite Road/Camp Rock Road	TWSC	C	10.1	B	No	10.1	B	No
5	Wilshire Road/Lincoln Road	Yield	C	7.4	A	No	8.8	A	No
6	**Rabbit Springs Road/Barstow Road**	**TWSC**	**C**	**OVR**	**F**	**Yes**	**OVR**	**F**	**Yes**
7	Access Road/Barstow Road	TWSC	C	16.7	C	No	19.2	C	No

Notes:

1. *TWSC = Two Way Stop Control;*
2. *LOS = Delay based on worst minor street approach for TWSC and Yield intersections*
3. *Warrant = Based on California MUTCD Warrant 3 (70% Factor)*
4. ***Bold** = Unacceptable Conditions*
5. *OVR = Overflow Conditions (>100 seconds delay)*

As shown in Table 8.2, six (6) of the study intersections are anticipated to operate at acceptable LOS under Cumulative plus Project conditions. However, Intersection #6 (Rabbit Springs Road/Barstow Road) is projected to operate at unacceptable LOS conditions and meets the Caltrans' Peak Hour Warrant 3 (70%) under the Cumulative plus Project AM and PM peak hour scenarios. Recommended improvements are discussed in a subsequent section of this report.

8.2 Cumulative Roadway Segment Operations

Table 8.3 contains a summary of the forecasted Cumulative roadway segment analysis and LOS conditions.

Table 8.3 Cumulative plus Project Roadway Segment LOS Conditions

#	Roadway	Location	Facility Type (# of Lanes)	Target LOS	Average Daily Traffic	LOS
1	Barstow Road	n/o Rabbit Springs Rd.	Two-Lane Collector	C	6,270	B
2	Northside Road	e/o Barstow Road	Two-Lane Collector	C	890	A
3	Rabbit Springs Rd.	e/o Barstow Road	Two-Lane Collector	C	3,510	A
4	State Route 247	Camp Rock Rd.-SR 18	Two-Lane Highway	C	7,060	A
	State Route 247	SR 18-Rabbit Springs Rd	Two-Lane Highway	C	6,870	A
	State Route 247	Rabbit Springs Rd.-LVCR	Two-Lane Highway	C	7,640	A
	State Route 18	Lucerne Valley-Jct. SR247	Two-Lane Highway	C	10,900	C

Notes:

1. *No LTL arterials without left turn lanes (LTL) at most major intersections (within study area).*
2. *Daily volume to capacity on roadways does not supplant the need to perform peak-hour HCM-based analysis.*

As presented in Table 8.3, all roadway segments are forecasted to operate at acceptable LOS A conditions under Cumulative plus Project conditions.

9. Vehicle Miles Travelled (VMT)

Transportation planners have used VMT as a metric for several purposes going back decades. VMT measures the amount of travel for all vehicles in a geographic region over a given period of time. It is calculated by adding up all the miles driven by all the cars and trucks on all the roadways in a region, or simply by multiplying the number of vehicles by distance in miles. This metric plays an integral role in the transportation planning, policymaking, and revenue estimation processes due to its ability to indicate travel demand and behavior.

Per CEQA Guidelines section 15064.3, subdivision (b), VMT analysis under CEQA may be based on the following:

- Qualitative Analysis: If existing models or methods are not available to estimate VMT for the particular project being considered, a lead agency may analyze the project's VMT qualitatively. Such a qualitative analysis would evaluate factors such as the availability of transit, proximity to other destinations, etc. For many projects, a qualitative analysis of construction traffic may be appropriate.
- Methodology: A lead agency has discretion to choose the most appropriate methodology to evaluate a project's VMT, including whether to express the chance in absolute terms, per capita, per household or in any other measure. A lead agency may use models to estimate a project's vehicle miles traveled and may revise those estimates to reflect professional judgement based on substantial evidence. Any assumptions used to estimate vehicle miles traveled and any revisions to model outputs should be documented and explained in the environmental document prepared for the project.

CEQA Guidelines section 15064.3, subdivision (b) was adopted in December 2018 by the California Natural Resources Agency. These revisions to the CEQA Guidelines criteria for determining the significance of transportation impacts are primarily focused on projects within transit priority areas and shifts the focus from driver delay to reduction of vehicular greenhouse gas emissions through creation of multimodal networks, and creation of a mix of land uses that can facilitate fewer and shorter vehicle trips.

VMT is a measure of the total number of miles driven for various purposes and is sometimes expressed as an average per trip or per person. Construction traffic would be temporary and would not permanently affect VMT characteristics in this part of San Bernardino County or elsewhere. Long-term, operational traffic would be limited, with a small work force of fifteen (15) employees. It was assumed that the employ resides near the Project, e.g., greater Lucerne Valley. According to technical guidance issued by the Office of Planning and Research (OPR), projects generating less than 110 or fewer daily vehicle trips may be presumed to have a less than significant impact involving VMT. This Project is anticipated to result in "Low VMT" based upon estimate of 64 daily trips and would have less than significant impact.

10. Recommended Improvements

This section presents a list of potential improvements to be considered for the study intersections and roadways based upon the results of the analysis presented in this report. Recommended improvements have been developed for worst case scenarios to achieve acceptable LOS conditions. The study intersections and roadway segments are projected to operate at acceptable LOS conditions if recommended improvements are implemented. Figure 7 identifies Mitigated Lane Geometrics and Control.

10.1 Existing Conditions

Under *Existing Conditions*, the study intersections and roadways currently operate at acceptable LOS. As such, no improvements at intersections or roadways are recommended.

10.2 Existing plus Project Conditions

Under *Existing plus Project Conditions*, the study intersections and roadways are projected to operate at acceptable LOS, with the exception of one intersection identified below. No improvement at other intersections or roadways are recommended.

***Rabbit Springs Road/Barstow Road (State Route 247)**:* This intersection is projected to operate a LOS "D" conditions during the PM peak hour. It does not meet Warrant 3 (70%) under this scenario. Because this LOS deficiency is related to temporary construction impact, no improvements are recommended.

*It should be noted that **Hours of Operation**, regulated by San Bernardino County noise ordinance and identified earlier in this report, indicate that, "Temporary construction, maintenance, repair, or demolition activities between 7:00 a.m. and 7:00 p.m., (except Sundays and Federal holidays)" are considered exempt from County noise regulations. Therefore, construction may occur during the a.m. peak (7:00 – 9:00 a.m.) and the p.m. peak (4:00 to 6:00 p.m.) commute periods, even though construction activities will occur throughout the day.*

10.3 Cumulative Conditions

Under *Cumulative Conditions*, one (1) intersection is anticipated to operate at unacceptable LOS "F" conditions. As such the following improvements are recommended:

Rabbit Springs Road/Barstow Road (State Route 247): Install a traffic signal and widen northbound and southbound approaches to include dedicated left, thru and right lanes and widen the eastbound and westbound approaches to include dedicated left turn and thru-right movements. This intersection is forecasted to operate at LOS "D" conditions during the AM and PM peak hour and is anticipated to meet the Caltrans' Peak Hour Warrant 3 (70%). With installation of a traffic signal and modification of approach lanes as described, this intersection is forecasted to operate at LOS "C" under AM and PM peak hour conditions as displayed in Appendix D.

> *[Note that according to the CA MUTCD, the satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal. Warrant 3 (70%) is one of 9 traffic signal warrants. Should the County desire to pursue a future traffic signal at this location, an engineering study should be prepared to determine if installing a traffic control signal will improve the overall safety and/or operation of the intersection].*

This recommended improvement is a non-project impact, i.e., this intersection is projected to operate poorly with or without the Project. Under this scenario, the applicant has no responsibility. The improvement is identified to assist the local jurisdiction is planning for future improvements at this location.

10.4 Cumulative plus Project Conditions

Under *Cumulative plus Project Conditions*, ***Rabbit Springs Road/Barstow Road (State Route 247)*** is again forecasted to operate at unacceptable LOS "F" conditions. Implementing recommended improvements identified under Cumulative Conditions will similarly result in LOS "C" conditions. The applicant is responsible for 1.08% of the Project cost (installation of a traffic signal and associated widening) based upon the number of trips generated by permanent employees following construction of the solar facility. This calculation is described below.

11. Pro Rata Share

The project applicant is charged with all improvement costs identified in this report that would benefit the proposed project, i.e., "plus Project" impacts. In circumstances where a project proponent will be receiving a substantial benefit from the identified improvements, the project should take full responsibility toward providing the necessary infrastructure, as is the case with CEQA mitigation measures.[2]

Table 11.1 below is a listing of the study intersection warranting improvements, the corresponding improvements that the proposed project would be required to pay a Fair-Share of Improvement cost towards, and the proposed project's equitable share of these improvements. The proposed project's equitable share is calculated using the method for calculating equitable mitigation measures outlined in the Caltrans *Guide for the Preparation of Traffic Impact Studies* (State of California, DOT, December 2002), which is shown below:

$P=T/(T_B - T_E)$

Where:
P = The equitable share for the proposed project's traffic impact.
T = The vehicle trips generated by the project during the peak hour of adjacent State highway facility in vehicles per hour (vph).
TB = The forecasted traffic volume on an impacted State highway facility at the time of general plan build-out (e.g., 20-year model or the furthest future model date feasible), vph.
TE = The traffic volume existing on the impacted State highway facility plus other approved projects that will generate traffic that has yet to be constructed/opened, vph.

Note that the percent Fair-Share calculated using the above formula is reported based upon the highest fair share percentage from AM peak hour scenarios, which were higher than the PM peak hour.

Table 11.1 – Summary of Fair Share Calculations for Intersections

#	Intersection	T	T_B	T_E	P
1	Rabbit Springs Road/Barstow Road	17	1,970	393	**1.08%**

According to the methodology described in Caltrans' *Guide for the Preparation of Traffic Impact Studies*, Table 14 is neither intended as nor does it establish a legal standard for determining equitable responsibility and cost of the project's traffic impact; the intent is to provide:

1. A starting point for early discussions to address traffic mitigation equitably;
2. A means for calculating the equitable share for mitigating traffic impacts; and
3. A means for establishing rough proportionality [Dolan vs. City of Tigard, 1994, 512 U.S. 374 (114 S. Ct. 2309)].

[2] Caltrans' *Guide for the Preparation of Traffic Impact Studies* (December 2002).

Additionally, this formula is not intended in circumstances where a project proponent will be receiving a substantial benefit from the identified mitigation measures. In cases, (e.g., mid-block access and signalization to a shopping center) the project should take full responsibility to toward providing the necessary infrastructure.

Appendix

Attachment A – ITE Trip Generation for Elementary School (520): Weekday, AM and PM Peak Periods

Attachment B – Project Trip Generation

Appendix A – AM and PM Peak Hour Traffic Counts (Metro Traffic Data)

Appendix B – Synchro 10 Worksheet Output Files

Appendix C – California MUTCD Peak Hour Warrant 3 (70%) Worksheets

Appendix D – Mitigated Synchro 10 LOS Output Worksheets

Attachment A – ITE Trip Genera for Elementary School (520): Weekday, AM and PM Peak Periods

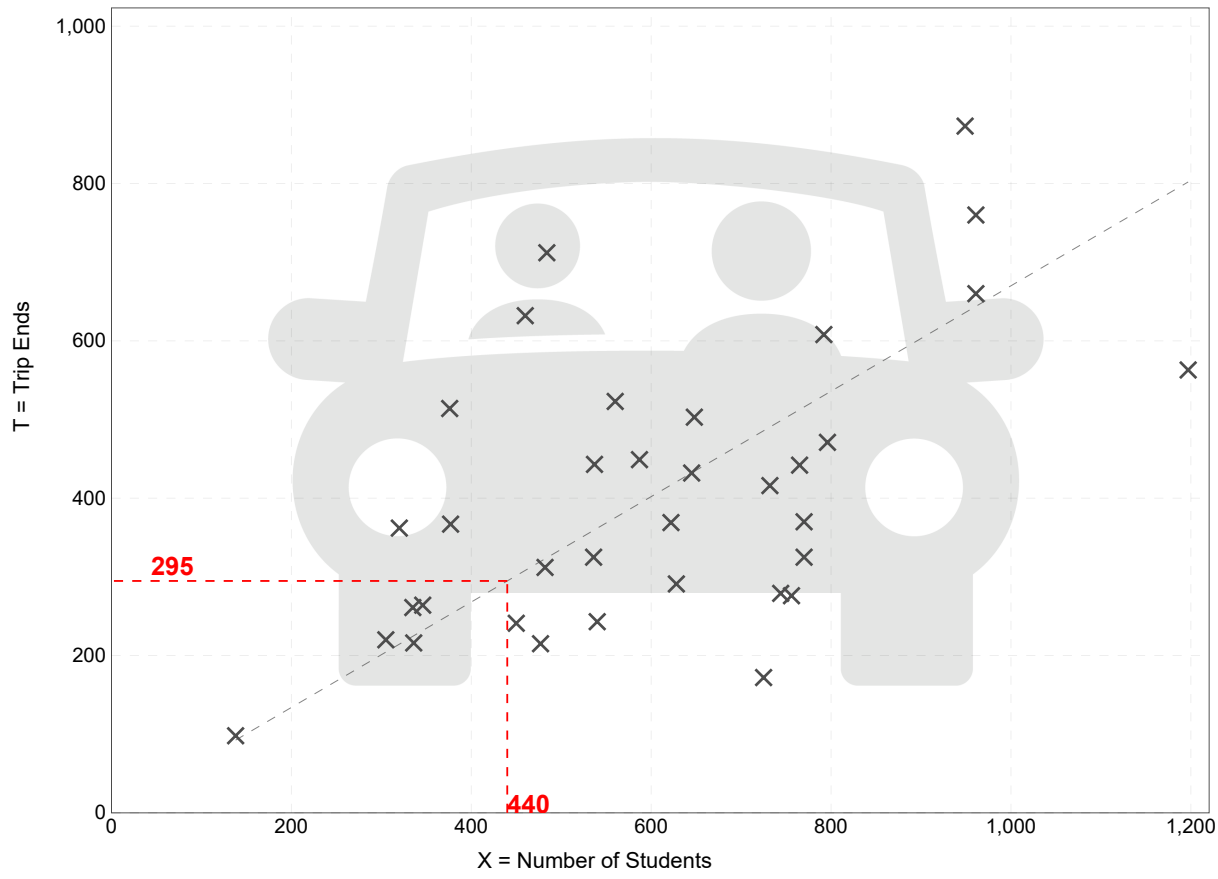
Elementary School
(520)

Vehicle Trip Ends vs:	**Students**
On a:	**Weekday,**
	Peak Hour of Adjacent Street Traffic,
	One Hour Between 7 and 9 a.m.
Setting/Location:	**General Urban/Suburban**
Number of Studies:	35
Avg. Num. of Students:	603
Directional Distribution:	54% entering, 46% exiting

Vehicle Trip Generation per Student

Average Rate	Range of Rates	Standard Deviation
0.67	0.24 - 1.47	0.27

Data Plot and Equation



Fitted Curve Equation: Not Given

R^2= ****

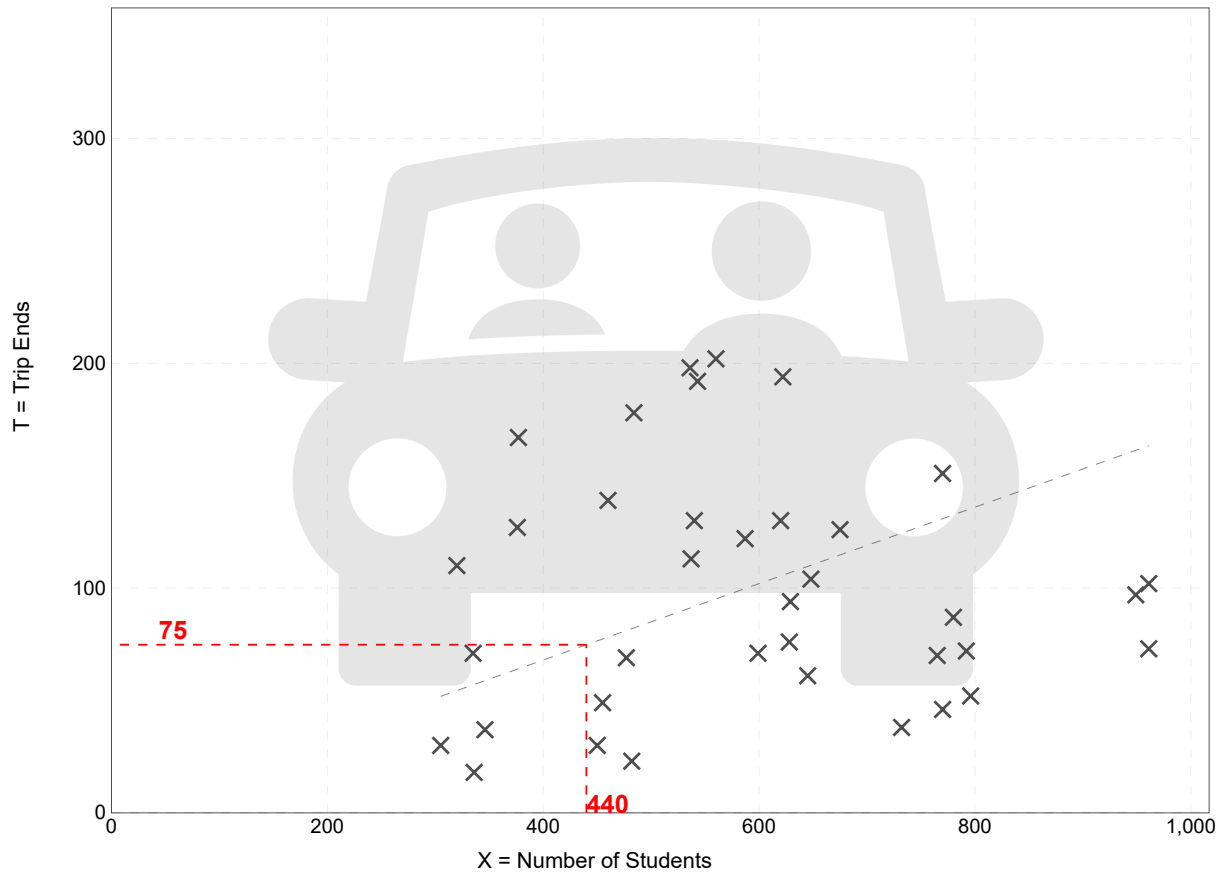
Elementary School
(520)

Vehicle Trip Ends vs:	**Students**
On a:	**Weekday,** **Peak Hour of Adjacent Street Traffic,** **One Hour Between 4 and 6 p.m.**
Setting/Location:	**General Urban/Suburban**
Number of Studies:	37
Avg. Num. of Students:	590
Directional Distribution:	48% entering, 52% exiting

Vehicle Trip Generation per Student

Average Rate	Range of Rates	Standard Deviation
0.17	0.05 - 0.44	0.11

Data Plot and Equation



Fitted Curve Equation: Not Given

R^2= ****

Elementary School
(520)

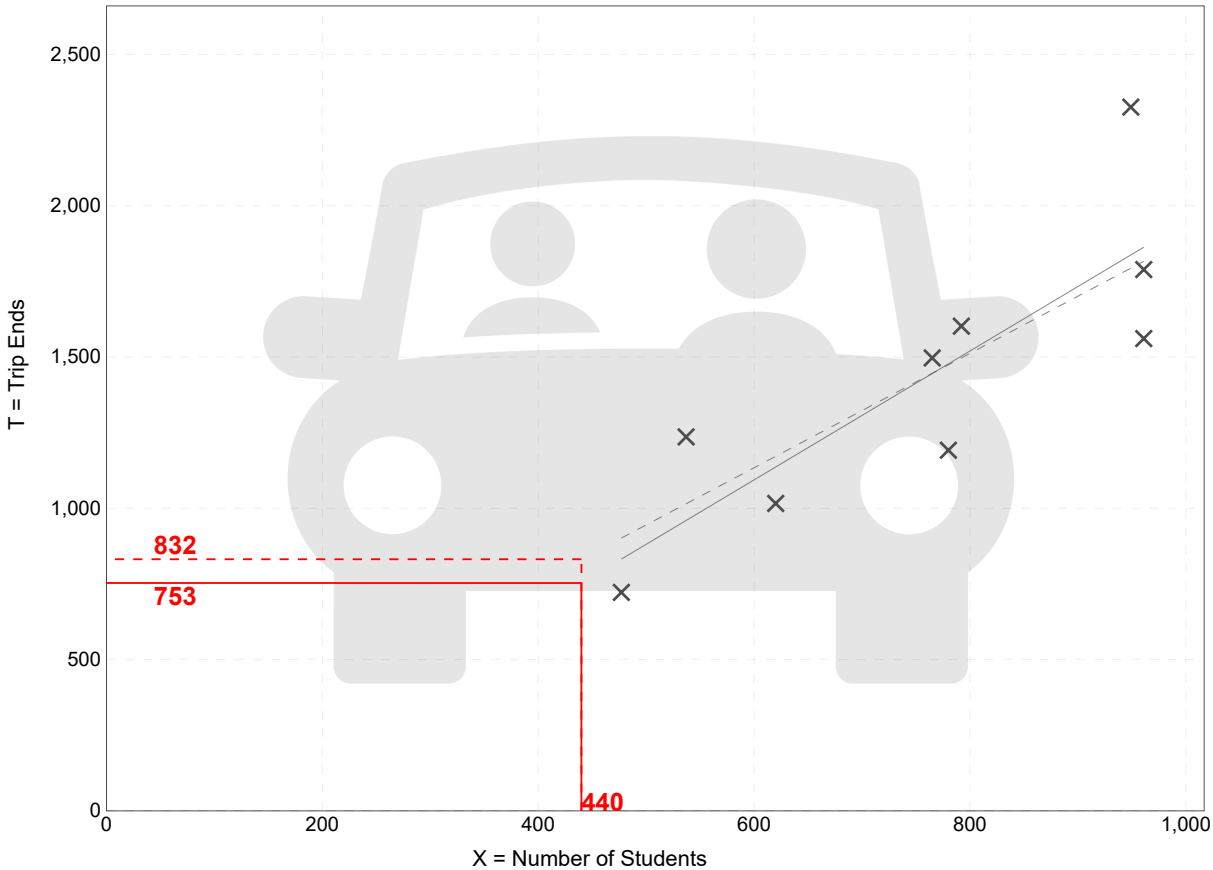
Vehicle Trip Ends vs: **Students**
On a: **Weekday**

Setting/Location: **General Urban/Suburban**
Number of Studies: 9
Avg. Num. of Students: 760
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Student

Average Rate	Range of Rates	Standard Deviation
1.89	1.51 - 2.45	0.34

Data Plot and Equation



Fitted Curve Equation: T = 2.13(X) - 184.07

R^2= 0.70

Attachment B – Project Trip Generation

Attachment B: Sienna Solar Farm Project Construction Phase Trip Generation

Phase		Construction Vehicles				Vehicle Trip Generation							PCE Trip Generation						
							AM Peak Hour			PM Peak Hour				AM Peak Hour			PM Peak Hour		
Activity/Description	Duration	Description	#	Vehicle Type	PCE	ADT	In	Out	Tot	In	Out	Tot	ADT	In	Out	Tot	In	Out	Tot
		Workers	100	Passenger	1.0	200	100		100		100	100	200	100		100		100	100
		Pickup Truck (On-site)	5	Passenger	1.0	10	5		5		5	5	10	5		5		5	5
		Water, Flatbed, Gravel, Concrete, Delivery Trucks, etc.	25	Large Truck	2.0	50	2	2	4	2	2	4	100	4	4	8	4	4	8
1) Site Preparation	***79 Days***	*Subtotal*	*130*			*260*	*107*	*2*	*109*	*2*	*107*	*109*	*310*	*109*	*4*	*113*	*4*	*109*	*113*
		Workers	400	Passenger	1.0	800	400		400		400	400	800	400		400		400	400
		Pickup Truck (On-site)	5	Passenger	1.0	10	5		5		5	5	10	5		5		5	5
		Water, Flatbed, Gravel, Concrete, Delivery Trucks, etc.	25	Large Truck	2.0	50	4	4	8	4	4	8	100	8	8	16	8	8	16
2) Grading & Earthwork	***79 Days***	*Subtotal*	*430*			*860*	*409*	*4*	*413*	*4*	*409*	*413*	*910*	*413*	*8*	*421*	*8*	*413*	*421*
		Workers	800	Passenger	1.0	1,600	800		800		800	800	1,600	800		800		800	800
		Pickup Truck (On-site)	5	Passenger	1.0	10	5		5		5	5	10	5		5		5	5
		Water, Flatbed, Gravel, Concrete, Delivery Trucks, etc.	55	Large Truck	2.0	110	4	4	8	4	4	8	220	8	8	16	8	8	16
3,4,5) Foundations, Steel, Elec.	***237 Days***	*Subtotal*	*860*			*1,720*	*809*	*4*	*813*	*4*	*809*	*813*	*1,830*	*813*	*8*	*821*	*8*	*813*	*821*
		Workers	75	Passenger	1.0	150	75		75		75	75	150	75		75		75	75
		Pickup Truck (On-site)	5	Passenger	1.0	10	5		5		5	5	10	5		5		5	5
		Water, Flatbed, Gravel, Concrete, Delivery Trucks, etc.	15	Large Truck	2.0	30	4	4	8	4	4	8	60	8	8	16	8	8	16
6) Collector Line Installation	***38 Days***	*Subtotal*	*95*			*190*	*84*	*4*	*88*	*4*	*84*	*88*	*220*	*88*	*8*	*96*	*8*	*88*	*96*
		TOTAL TRIPS				**3,030**	**1,409**	**14**	**1,423**	**14**	**1,409**	**1,423**	**3,270**	**1,423**	**28**	**1,451**	**28**	**1,423**	**1,451**

PCE = Passenger Car Equivalent

Note: Rounding Errors May Occur

Appendix A – AM and PM Peak Hour Traffic Counts (Metro Traffic Data)

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Turning Movement Report

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Roseville, CA 95678

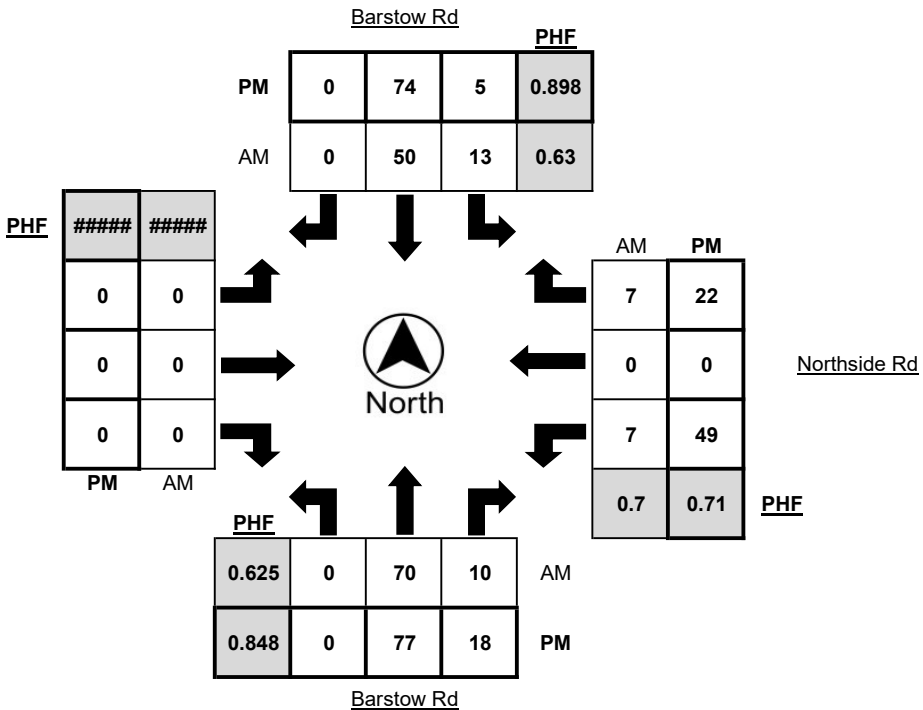
LOCATION Northside Rd @ Barstow Rd
LATITUDE 34.5311
COUNTY San Bernardino
LONGITUDE -116.9452
COLLECTION DATE Tuesday, July 20, 2021
WEATHER Clear

	Northbound				Southbound				Eastbound				Westbound			
Time	Left	Thru	Right	Trucks	Left	Thru	Right	Trucks	Left	Thru	Right	Trucks	Left	Thru	Right	Trucks
7:00 AM - 7:15 AM	0	10	2	3	2	14	0	8	0	0	0	0	3	0	0	0
7:15 AM - 7:30 AM	0	9	2	2	2	15	0	9	0	0	0	0	1	0	5	2
7:30 AM - 7:45 AM	0	18	2	4	2	13	0	5	0	0	0	0	3	0	3	0
7:45 AM - 8:00 AM	0	6	0	1	4	8	0	2	0	0	0	0	4	0	2	1
8:00 AM - 8:15 AM	0	18	4	7	6	9	0	5	0	0	0	0	3	0	2	1
8:15 AM - 8:30 AM	0	9	1	3	5	20	0	4	0	0	0	0	1	0	2	1
8:30 AM - 8:45 AM	0	27	5	6	1	10	0	1	0	0	0	0	2	0	1	0
8:45 AM - 9:00 AM	0	16	0	6	1	11	0	1	0	0	0	0	1	0	2	0
TOTAL	**0**	**113**	**16**	**32**	**23**	**100**	**0**	**35**	**0**	**0**	**0**	**0**	**18**	**0**	**17**	**5**

	Northbound				Southbound				Eastbound				Westbound			
Time	Left	Thru	Right	Trucks	Left	Thru	Right	Trucks	Left	Thru	Right	Trucks	Left	Thru	Right	Trucks
4:00 PM - 4:15 PM	0	7	1	0	2	22	0	3	0	0	0	0	4	0	1	0
4:15 PM - 4:30 PM	0	15	3	2	5	16	0	6	0	0	0	0	4	0	3	1
4:30 PM - 4:45 PM	0	10	2	7	2	27	0	2	0	0	0	0	4	0	3	1
4:45 PM - 5:00 PM	0	27	4	7	0	19	0	2	0	0	0	0	0	0	3	2
5:00 PM - 5:15 PM	0	14	2	1	1	20	0	5	0	0	0	0	11	0	3	4
5:15 PM - 5:30 PM	0	22	6	4	3	14	0	8	0	0	0	0	12	0	9	0
5:30 PM - 5:45 PM	0	21	5	5	1	18	0	3	0	0	0	0	19	0	6	1
5:45 PM - 6:00 PM	0	20	5	3	0	22	0	3	0	0	0	0	7	0	4	3
TOTAL	**0**	**136**	**28**	**29**	**14**	**158**	**0**	**32**	**0**	**0**	**0**	**0**	**61**	**0**	**32**	**12**

	Northbound				Southbound				Eastbound				Westbound			
PEAK HOUR	Left	Thru	Right	Trucks	Left	Thru	Right	Trucks	Left	Thru	Right	Trucks	Left	Thru	Right	Trucks
8:00 AM - 9:00 AM	0	70	10	22	13	50	0	11	0	0	0	0	7	0	7	2
5:00 PM - 6:00 PM	0	77	18	13	5	74	0	19	0	0	0	0	49	0	22	8

	PHF	Trucks
AM	0.853	22.3%
PM	0.875	16.3%



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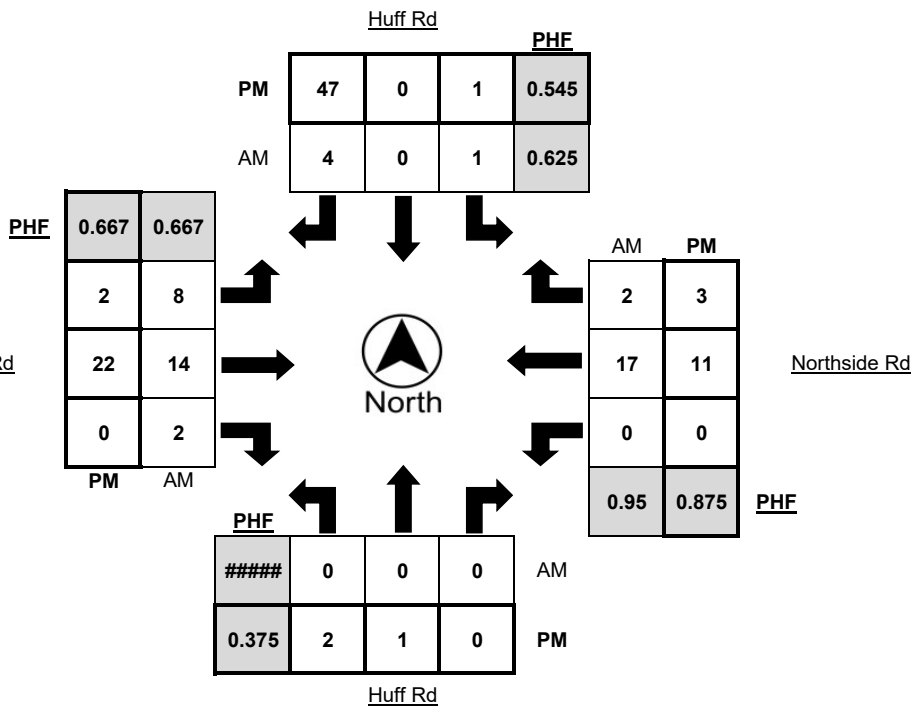
LOCATION Northside Rd @ Huff Rd
LATITUDE 34.5313
COUNTY San Bernardino
LONGITUDE -116.9192
COLLECTION DATE Tuesday, July 20, 2021
WEATHER Clear

	Northbound				Southbound				Eastbound				Westbound			
Time	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**
7:00 AM - 7:15 AM	0	0	1	1	1	0	0	0	0	0	0	0	0	3	0	0
7:15 AM - 7:30 AM	0	0	0	0	0	0	2	2	2	4	1	4	0	5	0	0
7:30 AM - 7:45 AM	0	0	0	0	0	0	0	0	0	4	0	2	0	5	0	1
7:45 AM - 8:00 AM	0	0	0	0	1	0	1	1	1	3	0	1	0	3	2	0
8:00 AM - 8:15 AM	0	0	0	0	0	0	1	0	5	3	1	1	0	4	0	1
8:15 AM - 8:30 AM	0	0	0	0	7	0	0	0	1	1	1	0	0	2	0	1
8:30 AM - 8:45 AM	0	0	0	0	0	0	0	0	6	1	0	0	0	3	0	0
8:45 AM - 9:00 AM	0	0	0	0	0	0	0	0	0	2	0	0	0	4	0	0
TOTAL	**0**	**0**	**1**	**1**	**9**	**0**	**4**	**3**	**15**	**18**	**3**	**8**	**0**	**29**	**2**	**3**

	Northbound				Southbound				Eastbound				Westbound			
Time	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**
4:00 PM - 4:15 PM	0	0	0	0	0	0	1	0	0	2	1	1	0	3	2	2
4:15 PM - 4:30 PM	0	0	0	0	3	0	7	1	0	9	1	3	0	1	2	1
4:30 PM - 4:45 PM	1	0	0	0	0	0	2	1	0	3	0	0	0	4	0	0
4:45 PM - 5:00 PM	0	0	0	0	1	0	3	4	1	4	1	0	0	2	1	1
5:00 PM - 5:15 PM	1	1	0	0	0	0	6	0	0	4	0	1	0	2	0	0
5:15 PM - 5:30 PM	0	0	0	0	0	0	13	1	2	7	0	2	0	4	0	1
5:30 PM - 5:45 PM	1	0	0	0	1	0	21	0	0	5	0	0	0	2	2	0
5:45 PM - 6:00 PM	0	0	0	0	0	0	7	2	0	6	0	0	0	3	1	2
TOTAL	**3**	**1**	**0**	**0**	**5**	**0**	**60**	**9**	**3**	**40**	**3**	**7**	**0**	**21**	**8**	**7**

	Northbound				Southbound				Eastbound				Westbound			
PEAK HOUR	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**
7:15 AM - 8:15 AM	0	0	0	0	1	0	4	3	8	14	2	8	0	17	2	2
5:00 PM - 6:00 PM	2	1	0	0	1	0	47	3	2	22	0	3	0	11	3	3

	PHF	Trucks
AM	0.857	27.1%
PM	0.695	10.1%



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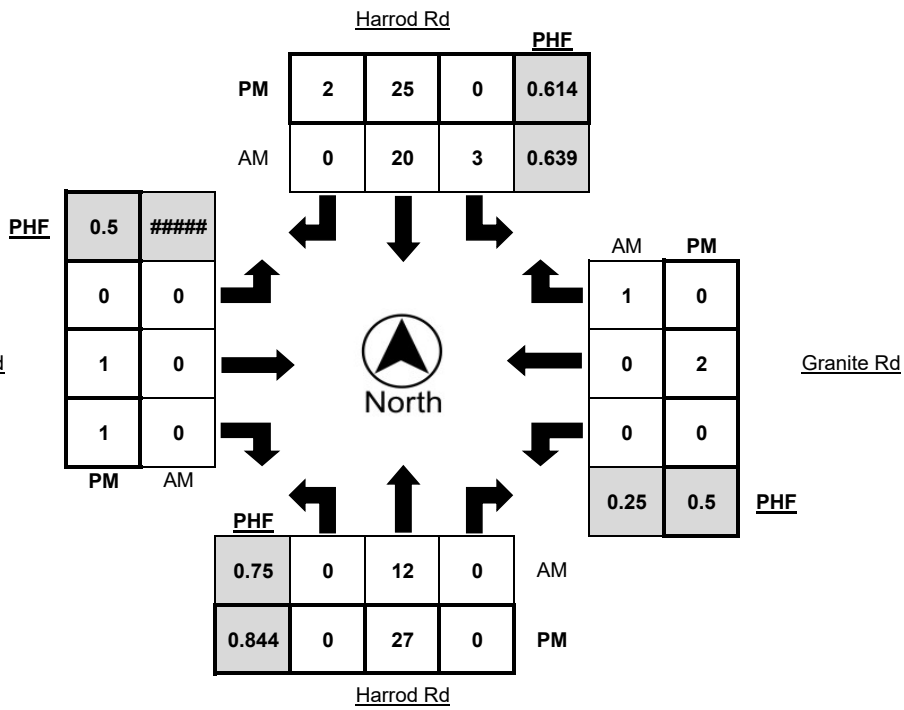
LOCATION Granite Rd @ Harrod Rd
LATITUDE 34.5017
COUNTY San Bernardino
LONGITUDE -116.8579
COLLECTION DATE Tuesday, July 20, 2021
WEATHER Clear

	Northbound				Southbound				Eastbound				Westbound			
Time	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**
7:00 AM - 7:15 AM	0	3	0	0	0	1	0	0	0	0	0	0	0	0	1	0
7:15 AM - 7:30 AM	0	0	0	0	0	2	0	1	0	0	1	0	0	0	1	0
7:30 AM - 7:45 AM	0	4	0	2	0	7	0	2	0	0	0	0	0	0	1	0
7:45 AM - 8:00 AM	0	3	0	1	3	6	0	2	0	0	0	0	0	0	0	0
8:00 AM - 8:15 AM	0	2	0	1	0	5	0	2	0	0	0	0	0	0	0	0
8:15 AM - 8:30 AM	0	3	0	2	0	2	0	1	0	0	0	0	0	0	0	0
8:30 AM - 8:45 AM	1	2	0	0	0	5	0	0	1	0	0	0	0	1	0	0
8:45 AM - 9:00 AM	0	4	0	0	1	2	0	1	0	0	0	0	1	0	0	1
TOTAL	**1**	**21**	**0**	**6**	**4**	**30**	**0**	**9**	**1**	**0**	**1**	**0**	**1**	**1**	**3**	**1**

	Northbound				Southbound				Eastbound				Westbound			
Time	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**
4:00 PM - 4:15 PM	0	8	0	3	0	4	0	0	0	0	0	0	0	1	0	0
4:15 PM - 4:30 PM	0	7	0	0	0	10	1	2	0	0	0	0	0	1	0	0
4:30 PM - 4:45 PM	0	8	0	1	0	6	0	1	0	1	0	0	0	0	0	0
4:45 PM - 5:00 PM	0	4	0	1	0	5	1	1	0	0	1	0	0	0	0	0
5:00 PM - 5:15 PM	0	3	0	2	0	2	0	0	0	0	0	0	0	0	1	0
5:15 PM - 5:30 PM	0	6	0	1	0	3	0	1	0	0	0	0	0	1	1	0
5:30 PM - 5:45 PM	0	7	0	3	1	4	0	3	0	0	0	0	0	0	0	0
5:45 PM - 6:00 PM	0	1	0	0	0	3	0	1	0	1	0	0	0	1	0	0
TOTAL	**0**	**44**	**0**	**11**	**1**	**37**	**2**	**9**	**0**	**2**	**1**	**0**	**0**	**4**	**2**	**0**

	Northbound				Southbound				Eastbound				Westbound			
PEAK HOUR	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**
7:30 AM - 8:30 AM	0	12	0	6	3	20	0	7	0	0	0	0	0	0	1	0
4:00 PM - 5:00 PM	0	27	0	5	0	25	2	4	0	1	1	0	0	2	0	0

	PHF	Trucks
AM	0.750	36.1%
PM	0.763	15.5%



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Roseville, CA 95678

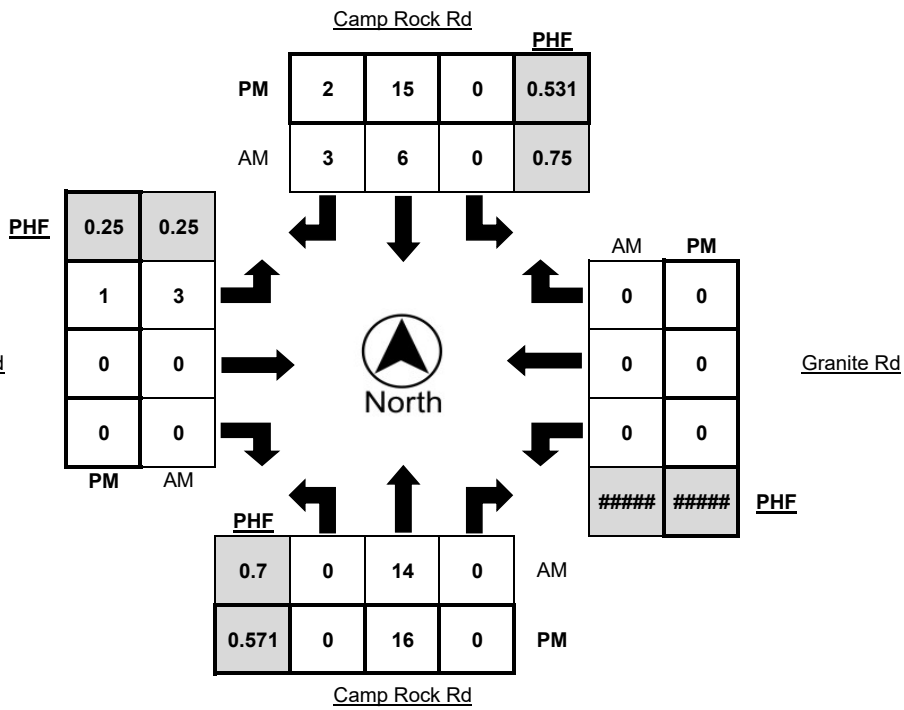
LOCATION Granite Rd @ Camp Rock Rd
LATITUDE 34.5017
COUNTY San Bernardino
LONGITUDE -116.8575
COLLECTION DATE Tuesday, July 20, 2021
WEATHER Clear

	Northbound				Southbound				Eastbound				Westbound			
Time	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**
7:00 AM - 7:15 AM	0	5	0	0	0	2	1	1	0	0	0	0	0	0	0	0
7:15 AM - 7:30 AM	0	4	0	2	0	1	1	0	0	0	0	0	0	0	0	0
7:30 AM - 7:45 AM	0	1	0	1	0	1	1	0	0	0	0	0	0	0	0	0
7:45 AM - 8:00 AM	0	4	0	1	0	2	0	0	3	0	0	1	0	0	0	0
8:00 AM - 8:15 AM	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0
8:15 AM - 8:30 AM	0	1	0	0	0	2	1	2	0	0	0	0	0	0	0	0
8:30 AM - 8:45 AM	0	2	0	0	0	1	1	1	0	0	0	0	0	0	0	0
8:45 AM - 9:00 AM	0	2	0	0	0	2	0	0	1	0	0	0	0	0	0	0
TOTAL	**0**	**19**	**0**	**4**	**0**	**13**	**5**	**4**	**4**	**0**	**0**	**1**	**0**	**0**	**0**	**0**

	Northbound				Southbound				Eastbound				Westbound			
Time	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**
4:00 PM - 4:15 PM	0	2	0	0	0	5	1	1	0	0	0	0	0	0	0	0
4:15 PM - 4:30 PM	0	5	0	2	0	7	1	3	0	0	0	0	0	0	0	0
4:30 PM - 4:45 PM	0	2	0	0	0	1	0	0	1	0	0	1	0	0	0	0
4:45 PM - 5:00 PM	0	7	0	1	0	2	0	1	0	0	0	0	0	0	0	0
5:00 PM - 5:15 PM	0	4	0	1	0	2	1	1	0	0	0	0	0	0	0	0
5:15 PM - 5:30 PM	0	3	0	0	0	1	2	1	0	0	0	0	0	0	0	0
5:30 PM - 5:45 PM	0	2	0	1	0	1	0	1	1	0	0	0	0	0	0	0
5:45 PM - 6:00 PM	0	1	0	0	0	3	1	2	1	0	0	0	0	0	0	0
TOTAL	**0**	**26**	**0**	**5**	**0**	**22**	**6**	**10**	**3**	**0**	**0**	**1**	**0**	**0**	**0**	**0**

	Northbound				Southbound				Eastbound				Westbound			
PEAK HOUR	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**
7:00 AM - 8:00 AM	0	14	0	4	0	6	3	1	3	0	0	1	0	0	0	0
4:00 PM - 5:00 PM	0	16	0	3	0	15	2	5	1	0	0	1	0	0	0	0

	PHF	Trucks
AM	0.722	23.1%
PM	0.654	26.5%



Metro Traffic Data Inc.
310 N. Irwin Street - Suite 20
Hanford, CA 93230

800-975-6938 Phone/Fax
www.metrotrafficdata.com

Turning Movement Report

Prepared For:

GHD
943 Reserve Drive
Roseville, CA 95678

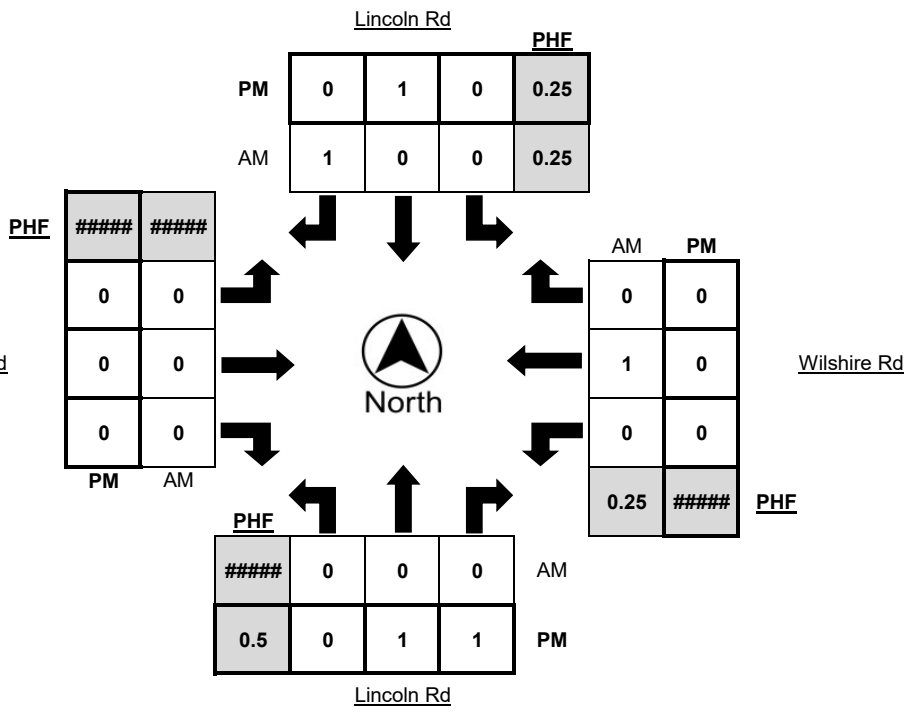
LOCATION Wilshire Rd @ Lincoln Rd
LATITUDE 34.4728
COUNTY San Bernardino
LONGITUDE -116.8931
COLLECTION DATE Tuesday, July 20, 2021
WEATHER Clear

	Northbound				Southbound				Eastbound				Westbound			
Time	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**
7:00 AM - 7:15 AM	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0
7:15 AM - 7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM - 7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM - 8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 AM - 8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM - 8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM - 8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM - 9:00 AM	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
TOTAL	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**

	Northbound				Southbound				Eastbound				Westbound			
Time	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**
4:00 PM - 4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM - 4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM - 4:45 PM	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0
4:45 PM - 5:00 PM	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM - 5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM - 5:30 PM	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM - 5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM - 6:00 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
TOTAL	**0**	**1**	**1**	**1**	**0**	**2**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

	Northbound				Southbound				Eastbound				Westbound			
PEAK HOUR	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**
7:00 AM - 8:00 AM	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0
4:30 PM - 5:30 PM	0	1	1	1	0	1	0	1	0	0	0	0	0	0	0	0

	PHF	Trucks
AM	0.250	0.0%
PM	0.750	66.7%



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Turning Movement Report

Prepared For:

GHD
943 Reserve Drive
Roseville, CA 95678

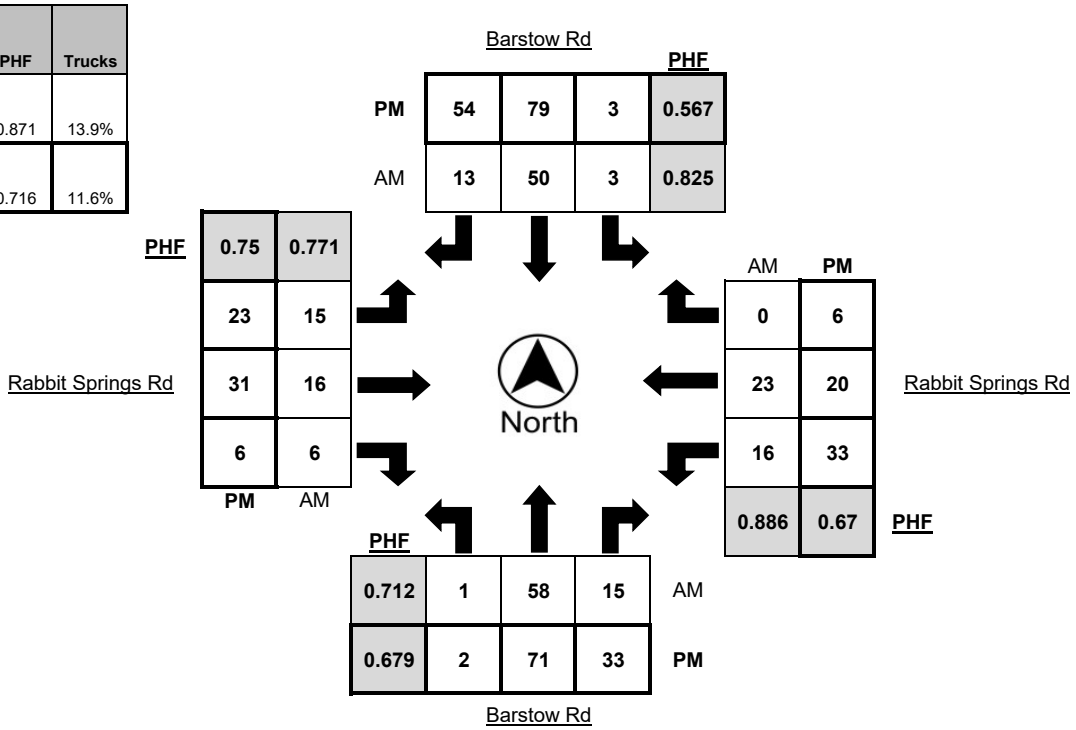
LOCATION Rabbit Springs Rd @ Barstow Rd
LATITUDE 34.4584
COUNTY San Bernardino
LONGITUDE -116.9458
COLLECTION DATE Tuesday, July 20, 2021
WEATHER Clear

	Northbound				Southbound				Eastbound				Westbound			
Time	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**
7:00 AM - 7:15 AM	0	8	3	2	1	5	2	1	1	9	1	0	6	9	1	1
7:15 AM - 7:30 AM	0	16	2	4	0	13	8	8	6	5	1	2	0	2	1	1
7:30 AM - 7:45 AM	2	10	1	5	1	5	6	4	2	7	0	1	6	7	1	0
7:45 AM - 8:00 AM	1	16	4	7	0	12	6	3	4	4	0	0	6	5	0	0
8:00 AM - 8:15 AM	0	8	1	2	1	6	2	0	4	5	1	2	2	9	0	0
8:15 AM - 8:30 AM	0	21	5	4	0	14	6	7	6	2	0	3	6	1	0	0
8:30 AM - 8:45 AM	0	14	4	4	1	15	2	1	2	2	3	1	3	8	0	2
8:45 AM - 9:00 AM	1	15	5	2	1	15	3	2	3	7	2	0	5	5	0	0
TOTAL	**4**	**108**	**25**	**30**	**5**	**85**	**35**	**26**	**28**	**41**	**8**	**9**	**34**	**46**	**3**	**4**

	Northbound				Southbound				Eastbound				Westbound			
Time	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**
4:00 PM - 4:15 PM	1	10	8	1	2	31	1	7	5	3	2	0	3	6	2	0
4:15 PM - 4:30 PM	2	14	9	8	0	12	4	0	3	7	0	0	7	6	1	0
4:30 PM - 4:45 PM	1	20	6	6	3	17	10	6	2	9	0	0	9	17	2	0
4:45 PM - 5:00 PM	0	12	7	3	0	17	7	1	8	4	0	0	15	3	4	0
5:00 PM - 5:15 PM	0	21	10	4	2	23	7	7	4	12	4	1	9	5	1	1
5:15 PM - 5:30 PM	1	10	6	2	0	11	9	4	2	7	0	0	6	7	1	0
5:30 PM - 5:45 PM	1	28	10	6	1	28	31	12	9	8	2	0	3	5	0	1
5:45 PM - 6:00 PM	1	13	4	3	1	23	10	4	8	5	0	0	1	3	1	0
TOTAL	**7**	**128**	**60**	**33**	**9**	**162**	**79**	**41**	**41**	**55**	**8**	**1**	**53**	**52**	**12**	**2**

	Northbound				Southbound				Eastbound				Westbound			
PEAK HOUR	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**	**Left**	**Thru**	**Right**	**Trucks**
8:00 AM - 9:00 AM	1	58	15	12	3	50	13	10	15	16	6	6	16	23	0	2
4:45 PM - 5:45 PM	2	71	33	15	3	79	54	24	23	31	6	1	33	20	6	2

	PHF	Trucks
AM	0.871	13.9%
PM	0.716	11.6%



Appendix B – Synchro 10 Worksheet Output Files

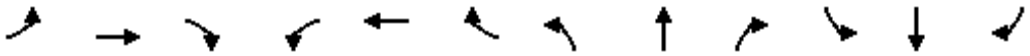
Intersection	
Int Delay, s/veh	1.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	15	7	77	17	13	58
Future Vol, veh/h	15	7	77	17	13	58
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	22	22	22	22	22	22
Mvmt Flow	18	8	91	20	15	68

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	199	101	0	0	111	0
Stage 1	101	-	-	-	-	-
Stage 2	98	-	-	-	-	-
Critical Hdwy	6.62	6.42	-	-	4.32	-
Critical Hdwy Stg 1	5.62	-	-	-	-	-
Critical Hdwy Stg 2	5.62	-	-	-	-	-
Follow-up Hdwy	3.698	3.498	-	-	2.398	-
Pot Cap-1 Maneuver	747	902	-	-	1363	-
Stage 1	875	-	-	-	-	-
Stage 2	878	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	739	902	-	-	1363	-
Mov Cap-2 Maneuver	739	-	-	-	-	-
Stage 1	875	-	-	-	-	-
Stage 2	868	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.7	0	1.4
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	784	1363	-
HCM Lane V/C Ratio	-	-	0.033	0.011	-
HCM Control Delay (s)	-	-	9.7	7.7	0
HCM Lane LOS	-	-	A	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	11	18	2	0	22	2	0	0	0	1	0	7
Future Volume (Veh/h)	11	18	2	0	22	2	0	0	0	1	0	7
Sign Control		Free			Free			Yield			Yield	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Hourly flow rate (vph)	13	21	2	0	26	2	0	0	0	1	0	8
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	28			23			83	76	22	75	76	27
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	28			23			83	76	22	75	76	27
tC, single (s)	4.4			4.4			7.4	6.8	6.5	7.4	6.8	6.5
tC, 2 stage (s)												
tF (s)	2.4			2.4			3.7	4.2	3.5	3.7	4.2	3.5
p0 queue free %	99			100			100	100	100	100	100	99
cM capacity (veh/h)	1438			1444			834	762	987	852	762	981

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	36	28	0	9
Volume Left	13	0	0	1
Volume Right	2	2	0	8
cSH	1438	1444	1700	965
Volume to Capacity	0.01	0.00	0.00	0.01
Queue Length 95th (ft)	1	0	0	1
Control Delay (s)	2.8	0.0	0.0	8.8
Lane LOS	A		A	A
Approach Delay (s)	2.8	0.0	0.0	8.8
Approach LOS			A	A

Intersection Summary				
Average Delay	2.4			
Intersection Capacity Utilization	18.3%	ICU Level of Service	A	
Analysis Period (min)	15			

Intersection	
Int Delay, s/veh	0.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	0	0	0	0	0	1	0	12	0	3	20	0
Future Vol, veh/h	0	0	0	0	0	1	0	12	0	3	20	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	75	75	75	75	75	75	75	75	75	75	75	75
Heavy Vehicles, %	36	36	36	36	36	36	36	36	36	36	36	36
Mvmt Flow	0	0	0	0	0	1	0	16	0	4	27	0

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	52	51	27	51	51	16	27	0	0	16	0	0
Stage 1	35	35	-	16	16	-	-	-	-	-	-	-
Stage 2	17	16	-	35	35	-	-	-	-	-	-	-
Critical Hdwy	7.46	6.86	6.56	7.46	6.86	6.56	4.46	-	-	4.46	-	-
Critical Hdwy Stg 1	6.46	5.86	-	6.46	5.86	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.46	5.86	-	6.46	5.86	-	-	-	-	-	-	-
Follow-up Hdwy	3.824	4.324	3.624	3.824	4.324	3.624	2.524	-	-	2.524	-	-
Pot Cap-1 Maneuver	869	779	959	870	779	973	1392	-	-	1406	-	-
Stage 1	901	803	-	923	819	-	-	-	-	-	-	-
Stage 2	921	819	-	901	803	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	866	777	959	868	777	973	1392	-	-	1406	-	-
Mov Cap-2 Maneuver	866	777	-	868	777	-	-	-	-	-	-	-
Stage 1	901	801	-	923	819	-	-	-	-	-	-	-
Stage 2	920	819	-	898	801	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	8.7	0	1
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1392	-	-	-	973	1406	-	-
HCM Lane V/C Ratio	-	-	-	-	0.001	0.003	-	-
HCM Control Delay (s)	0	-	-	0	8.7	7.6	0	-
HCM Lane LOS	A	-	-	A	A	A	A	-
HCM 95th %tile Q(veh)	0	-	-	-	0	0	-	-

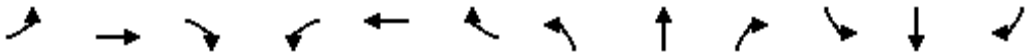
Intersection	
Int Delay, s/veh	1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	3	0	0	0	0	0	0	14	0	0	6	3
Future Vol, veh/h	3	0	0	0	0	0	0	14	0	0	6	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	72	72	72	72	72	72	72	72	72	72	72	72
Heavy Vehicles, %	23	23	23	23	23	23	23	23	23	23	23	23
Mvmt Flow	4	0	0	0	0	0	0	19	0	0	8	4

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	29	29	10	29	31	19	12	0	0	19	0	0
Stage 1	10	10	-	19	19	-	-	-	-	-	-	-
Stage 2	19	19	-	10	12	-	-	-	-	-	-	-
Critical Hdwy	7.33	6.73	6.43	7.33	6.73	6.43	4.33	-	-	4.33	-	-
Critical Hdwy Stg 1	6.33	5.73	-	6.33	5.73	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.33	5.73	-	6.33	5.73	-	-	-	-	-	-	-
Follow-up Hdwy	3.707	4.207	3.507	3.707	4.207	3.507	2.407	-	-	2.407	-	-
Pot Cap-1 Maneuver	929	824	1013	929	822	1001	1480	-	-	1471	-	-
Stage 1	959	847	-	948	839	-	-	-	-	-	-	-
Stage 2	948	839	-	959	845	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	929	824	1013	929	822	1001	1480	-	-	1471	-	-
Mov Cap-2 Maneuver	929	824	-	929	822	-	-	-	-	-	-	-
Stage 1	959	847	-	948	839	-	-	-	-	-	-	-
Stage 2	948	839	-	959	845	-	-	-	-	-	-	-

Approach	EB	WB	NE	SW
HCM Control Delay, s	8.9	0	0	0
HCM LOS	A	A		

Minor Lane/Major Mvmt	NEL	NET	NER	EBLn1	WBLn1	SWL	SWT	SWR
Capacity (veh/h)	1480	-	-	929	-	1471	-	-
HCM Lane V/C Ratio	-	-	-	0.004	-	-	-	-
HCM Control Delay (s)	0	-	-	8.9	0	0	-	-
HCM Lane LOS	A	-	-	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0	-	0	-	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Yield			Yield			Yield			Yield	
Traffic Volume (vph)	10	10	0	0	13	0	0	0	0	0	0	13
Future Volume (vph)	10	10	0	0	13	0	0	0	0	0	0	13
Peak Hour Factor	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Hourly flow rate (vph)	40	40	0	0	52	0	0	0	0	0	0	52

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	80	52	0	52
Volume Left (vph)	40	0	0	0
Volume Right (vph)	0	0	0	52
Hadj (s)	0.13	0.03	0.00	-0.57
Departure Headway (s)	4.2	4.1	4.2	3.6
Degree Utilization, x	0.09	0.06	0.00	0.05
Capacity (veh/h)	843	857	826	957
Control Delay (s)	7.6	7.4	7.2	6.8
Approach Delay (s)	7.6	7.4	0.0	6.8
Approach LOS	A	A	A	A

Intersection Summary				
Delay	7.3			
Level of Service	A			
Intersection Capacity Utilization	17.7%	ICU Level of Service	A	
Analysis Period (min)	15			

Intersection	
Int Delay, s/veh	4.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	15	16	30	40	23	0	21	72	35	3	66	13
Future Vol, veh/h	15	16	30	40	23	0	21	72	35	3	66	13
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	87	87	87	87	87	87	87	87	87	87	87	87
Heavy Vehicles, %	14	14	14	14	14	14	14	14	14	14	14	14
Mvmt Flow	17	18	34	46	26	0	24	83	40	3	76	15

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	254	261	84	267	248	103	91	0	0	123	0	0
Stage 1	90	90	-	151	151	-	-	-	-	-	-	-
Stage 2	164	171	-	116	97	-	-	-	-	-	-	-
Critical Hdwy	7.24	6.64	6.34	7.24	6.64	6.34	4.24	-	-	4.24	-	-
Critical Hdwy Stg 1	6.24	5.64	-	6.24	5.64	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.24	5.64	-	6.24	5.64	-	-	-	-	-	-	-
Follow-up Hdwy	3.626	4.126	3.426	3.626	4.126	3.426	2.326	-	-	2.326	-	-
Pot Cap-1 Maneuver	675	624	943	662	634	920	1432	-	-	1393	-	-
Stage 1	889	798	-	824	750	-	-	-	-	-	-	-
Stage 2	811	735	-	860	792	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	643	612	943	614	621	920	1432	-	-	1393	-	-
Mov Cap-2 Maneuver	643	612	-	614	621	-	-	-	-	-	-	-
Stage 1	873	796	-	809	737	-	-	-	-	-	-	-
Stage 2	768	722	-	808	790	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	10.3	11.6	1.2	0.3
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1432	-	-	750	617	1393	-	-
HCM Lane V/C Ratio	0.017	-	-	0.093	0.117	0.002	-	-
HCM Control Delay (s)	7.6	0	-	10.3	11.6	7.6	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.3	0.4	0	-	-

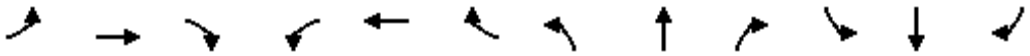
Intersection	
Int Delay, s/veh	3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	51	22	79	20	5	76
Future Vol, veh/h	51	22	79	20	5	76
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	16	16	16	16	16	16
Mvmt Flow	58	25	90	23	6	86

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	200	102	0	0	113	0
Stage 1	102	-	-	-	-	-
Stage 2	98	-	-	-	-	-
Critical Hdwy	6.56	6.36	-	-	4.26	-
Critical Hdwy Stg 1	5.56	-	-	-	-	-
Critical Hdwy Stg 2	5.56	-	-	-	-	-
Follow-up Hdwy	3.644	3.444	-	-	2.344	-
Pot Cap-1 Maneuver	758	916	-	-	1394	-
Stage 1	888	-	-	-	-	-
Stage 2	892	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	754	916	-	-	1394	-
Mov Cap-2 Maneuver	754	-	-	-	-	-
Stage 1	888	-	-	-	-	-
Stage 2	888	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10	0	0.5
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	796	1394	-
HCM Lane V/C Ratio	-	-	0.104	0.004	-
HCM Control Delay (s)	-	-	10	7.6	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.3	0	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	23	0	0	12	3	2	1	0	1	0	48
Future Volume (Veh/h)	3	23	0	0	12	3	2	1	0	1	0	48
Sign Control		Free			Free			Yield			Yield	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70
Hourly flow rate (vph)	4	33	0	0	17	4	3	1	0	1	0	69
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	21			33			129	62	33	60	60	19
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	21			33			129	62	33	60	60	19
tC, single (s)	4.2			4.2			7.2	6.6	6.3	7.2	6.6	6.3
tC, 2 stage (s)												
tF (s)	2.3			2.3			3.6	4.1	3.4	3.6	4.1	3.4
p0 queue free %	100			100			100	100	100	100	100	93
cM capacity (veh/h)	1544			1529			769	812	1018	913	814	1036

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	37	21	4	70
Volume Left	4	0	3	1
Volume Right	0	4	0	69
cSH	1544	1529	779	1034
Volume to Capacity	0.00	0.00	0.01	0.07
Queue Length 95th (ft)	0	0	0	5
Control Delay (s)	0.8	0.0	9.6	8.7
Lane LOS	A		A	A
Approach Delay (s)	0.8	0.0	9.6	8.7
Approach LOS			A	A

Intersection Summary				
Average Delay	5.2			
Intersection Capacity Utilization	13.7%	ICU Level of Service	A	
Analysis Period (min)	15			

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	0	1	1	0	2	0	0	27	0	0	25	2
Future Vol, veh/h	0	1	1	0	2	0	0	27	0	0	25	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	76	76	76	76	76	76	76	76	76	76	76	76
Heavy Vehicles, %	16	16	16	16	16	16	16	16	16	16	16	16
Mvmt Flow	0	1	1	0	3	0	0	36	0	0	33	3

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	73	71	35	72	72	36	36	0	0	36	0	0
Stage 1	35	35	-	36	36	-	-	-	-	-	-	-
Stage 2	38	36	-	36	36	-	-	-	-	-	-	-
Critical Hdwy	7.26	6.66	6.36	7.26	6.66	6.36	4.26	-	-	4.26	-	-
Critical Hdwy Stg 1	6.26	5.66	-	6.26	5.66	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.26	5.66	-	6.26	5.66	-	-	-	-	-	-	-
Follow-up Hdwy	3.644	4.144	3.444	3.644	4.144	3.444	2.344	-	-	2.344	-	-
Pot Cap-1 Maneuver	885	793	999	886	792	998	1489	-	-	1489	-	-
Stage 1	946	839	-	945	838	-	-	-	-	-	-	-
Stage 2	943	838	-	945	838	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	882	793	999	883	792	998	1489	-	-	1489	-	-
Mov Cap-2 Maneuver	882	793	-	883	792	-	-	-	-	-	-	-
Stage 1	946	839	-	945	838	-	-	-	-	-	-	-
Stage 2	940	838	-	942	838	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.1	9.6	0	0
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1489	-	-	884	792	1489	-	-
HCM Lane V/C Ratio	-	-	-	0.003	0.003	-	-	-
HCM Control Delay (s)	0	-	-	9.1	9.6	0	-	-
HCM Lane LOS	A	-	-	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0	0	0	-	-

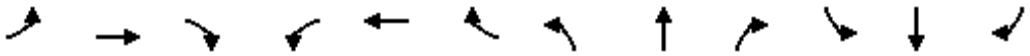
Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	1	0	0	0	0	0	0	16	0	0	15	2
Future Vol, veh/h	1	0	0	0	0	0	0	16	0	0	15	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	65	65	65	65	65	65	65	65	65	65	65	65
Heavy Vehicles, %	27	27	27	27	27	27	27	27	27	27	27	27
Mvmt Flow	2	0	0	0	0	0	0	25	0	0	23	3

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	50	50	25	50	51	25	26	0	0	25	0	0
Stage 1	25	25	-	25	25	-	-	-	-	-	-	-
Stage 2	25	25	-	25	26	-	-	-	-	-	-	-
Critical Hdwy	7.37	6.77	6.47	7.37	6.77	6.47	4.37	-	-	4.37	-	-
Critical Hdwy Stg 1	6.37	5.77	-	6.37	5.77	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.37	5.77	-	6.37	5.77	-	-	-	-	-	-	-
Follow-up Hdwy	3.743	4.243	3.543	3.743	4.243	3.543	2.443	-	-	2.443	-	-
Pot Cap-1 Maneuver	891	795	983	891	794	983	1440	-	-	1442	-	-
Stage 1	932	827	-	932	827	-	-	-	-	-	-	-
Stage 2	932	827	-	932	826	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	891	795	983	891	794	983	1440	-	-	1442	-	-
Mov Cap-2 Maneuver	891	795	-	891	794	-	-	-	-	-	-	-
Stage 1	932	827	-	932	827	-	-	-	-	-	-	-
Stage 2	932	827	-	932	826	-	-	-	-	-	-	-

Approach	EB	WB	NE	SW
HCM Control Delay, s	9	0	0	0
HCM LOS	A	A		

Minor Lane/Major Mvmt	NEL	NET	NER	EBLn1	WBLn1	SWL	SWT	SWR
Capacity (veh/h)	1440	-	-	891	-	1442	-	-
HCM Lane V/C Ratio	-	-	-	0.002	-	-	-	-
HCM Control Delay (s)	0	-	-	9	0	0	-	-
HCM Lane LOS	A	-	-	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0	-	0	-	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Yield			Yield			Yield			Yield	
Traffic Volume (vph)	3	3	0	0	3	0	0	1	1	0	1	3
Future Volume (vph)	3	3	0	0	3	0	0	1	1	0	1	3
Peak Hour Factor	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
Hourly flow rate (vph)	4	4	0	0	4	0	0	1	1	0	1	4

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	8	4	2	5
Volume Left (vph)	4	0	0	0
Volume Right (vph)	0	0	1	4
Hadj (s)	1.24	1.14	0.84	0.66
Departure Headway (s)	5.2	5.1	4.8	4.6
Degree Utilization, x	0.01	0.01	0.00	0.01
Capacity (veh/h)	692	706	740	777
Control Delay (s)	8.2	8.1	7.8	7.6
Approach Delay (s)	8.2	8.1	7.8	7.6
Approach LOS	A	A	A	A

Intersection Summary				
Delay	8.0			
Level of Service	A			
Intersection Capacity Utilization	13.3%	ICU Level of Service	A	
Analysis Period (min)	15			

Intersection	
Int Delay, s/veh	4.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	23	31	12	39	20	6	8	75	39	3	83	54
Future Vol, veh/h	23	31	12	39	20	6	8	75	39	3	83	54
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	72	72	72	72	72	72	72	72	72	72	72	72
Heavy Vehicles, %	12	12	12	12	12	12	12	12	12	12	12	12
Mvmt Flow	32	43	17	54	28	8	11	104	54	4	115	75

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	332	341	153	344	351	131	190	0	0	158	0	0
Stage 1	161	161	-	153	153	-	-	-	-	-	-	-
Stage 2	171	180	-	191	198	-	-	-	-	-	-	-
Critical Hdwy	7.22	6.62	6.32	7.22	6.62	6.32	4.22	-	-	4.22	-	-
Critical Hdwy Stg 1	6.22	5.62	-	6.22	5.62	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.22	5.62	-	6.22	5.62	-	-	-	-	-	-	-
Follow-up Hdwy	3.608	4.108	3.408	3.608	4.108	3.408	2.308	-	-	2.308	-	-
Pot Cap-1 Maneuver	603	565	867	592	558	892	1326	-	-	1363	-	-
Stage 1	818	746	-	826	752	-	-	-	-	-	-	-
Stage 2	808	732	-	788	719	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	569	558	867	542	551	892	1326	-	-	1363	-	-
Mov Cap-2 Maneuver	569	558	-	542	551	-	-	-	-	-	-	-
Stage 1	811	744	-	819	745	-	-	-	-	-	-	-
Stage 2	764	725	-	726	717	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	12.1	12.6	0.5	0.2
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1326	-	-	601	565	1363	-	-
HCM Lane V/C Ratio	0.008	-	-	0.153	0.16	0.003	-	-
HCM Control Delay (s)	7.7	0	-	12.1	12.6	7.6	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.5	0.6	0	-	-

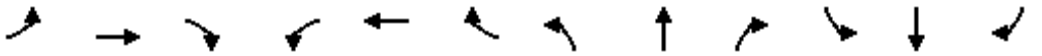
Intersection	
Int Delay, s/veh	3.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	15	8	78	17	93	99
Future Vol, veh/h	15	8	78	17	93	99
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	12	12	12	12	12	12
Mvmt Flow	18	9	92	20	109	116

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	436	102	0	0	112	0
Stage 1	102	-	-	-	-	-
Stage 2	334	-	-	-	-	-
Critical Hdwy	6.52	6.32	-	-	4.22	-
Critical Hdwy Stg 1	5.52	-	-	-	-	-
Critical Hdwy Stg 2	5.52	-	-	-	-	-
Follow-up Hdwy	3.608	3.408	-	-	2.308	-
Pot Cap-1 Maneuver	559	926	-	-	1418	-
Stage 1	898	-	-	-	-	-
Stage 2	704	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	513	926	-	-	1418	-
Mov Cap-2 Maneuver	513	-	-	-	-	-
Stage 1	898	-	-	-	-	-
Stage 2	646	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.2	0	3.8
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	607	1418	-
HCM Lane V/C Ratio	-	-	0.045	0.077	-
HCM Control Delay (s)	-	-	11.2	7.8	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0.2	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	11	18	82	0	22	2	1	0	0	1	0	7
Future Volume (Veh/h)	11	18	82	0	22	2	1	0	0	1	0	7
Sign Control		Free			Free			Yield			Yield	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Hourly flow rate (vph)	13	21	95	0	26	2	1	0	0	1	0	8
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	28			116			130	122	68	122	169	27
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	28			116			130	122	68	122	169	27
tC, single (s)	4.2			4.2			7.2	6.6	6.3	7.2	6.6	6.3
tC, 2 stage (s)												
tF (s)	2.3			2.3			3.6	4.1	3.4	3.6	4.1	3.4
p0 queue free %	99			100			100	100	100	100	100	99
cM capacity (veh/h)	1535			1424			813	747	973	830	704	1026

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	129	28	1	9
Volume Left	13	0	1	1
Volume Right	95	2	0	8
cSH	1535	1424	813	1000
Volume to Capacity	0.01	0.00	0.00	0.01
Queue Length 95th (ft)	1	0	0	1
Control Delay (s)	0.8	0.0	9.4	8.6
Lane LOS	A		A	A
Approach Delay (s)	0.8	0.0	9.4	8.6
Approach LOS			A	A

Intersection Summary				
Average Delay	1.1			
Intersection Capacity Utilization	23.3%	ICU Level of Service	A	
Analysis Period (min)	15			

Intersection	
Int Delay, s/veh	6.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	0	0	1	0	0	1	122	12	0	3	20	0
Future Vol, veh/h	0	0	1	0	0	1	122	12	0	3	20	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	75	75	75	75	75	75	75	75	75	75	75	75
Heavy Vehicles, %	17	17	17	17	17	17	17	17	17	17	17	17
Mvmt Flow	0	0	1	0	0	1	163	16	0	4	27	0

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	378	377	27	378	377	16	27	0	0	16	0	0
Stage 1	35	35	-	342	342	-	-	-	-	-	-	-
Stage 2	343	342	-	36	35	-	-	-	-	-	-	-
Critical Hdwy	7.27	6.67	6.37	7.27	6.67	6.37	4.27	-	-	4.27	-	-
Critical Hdwy Stg 1	6.27	5.67	-	6.27	5.67	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.27	5.67	-	6.27	5.67	-	-	-	-	-	-	-
Follow-up Hdwy	3.653	4.153	3.453	3.653	4.153	3.453	2.353	-	-	2.353	-	-
Pot Cap-1 Maneuver	553	532	1007	553	532	1021	1495	-	-	1509	-	-
Stage 1	944	837	-	643	612	-	-	-	-	-	-	-
Stage 2	642	612	-	943	837	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	504	472	1007	504	472	1021	1495	-	-	1509	-	-
Mov Cap-2 Maneuver	504	472	-	504	472	-	-	-	-	-	-	-
Stage 1	840	834	-	572	545	-	-	-	-	-	-	-
Stage 2	571	545	-	939	834	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	8.6	8.5	7	1
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1495	-	-	1007	1021	1509	-	-
HCM Lane V/C Ratio	0.109	-	-	0.001	0.001	0.003	-	-
HCM Control Delay (s)	7.7	0	-	8.6	8.5	7.4	0	-
HCM Lane LOS	A	A	-	A	A	A	A	-
HCM 95th %tile Q(veh)	0.4	-	-	0	0	0	-	-

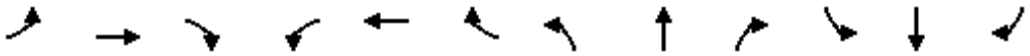
Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	3	0	0	0	0	0	0	28	0	0	12	6
Future Vol, veh/h	3	0	0	0	0	0	0	28	0	0	12	6
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	72	72	72	72	72	72	72	72	72	72	72	72
Heavy Vehicles, %	12	12	12	12	12	12	12	12	12	12	12	12
Mvmt Flow	4	0	0	0	0	0	0	39	0	0	17	8

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	60	60	21	60	64	39	25	0	0	39	0	0
Stage 1	21	21	-	39	39	-	-	-	-	-	-	-
Stage 2	39	39	-	21	25	-	-	-	-	-	-	-
Critical Hdwy	7.22	6.62	6.32	7.22	6.62	6.32	4.22	-	-	4.22	-	-
Critical Hdwy Stg 1	6.22	5.62	-	6.22	5.62	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.22	5.62	-	6.22	5.62	-	-	-	-	-	-	-
Follow-up Hdwy	3.608	4.108	3.408	3.608	4.108	3.408	2.308	-	-	2.308	-	-
Pot Cap-1 Maneuver	912	812	1028	912	808	1005	1527	-	-	1509	-	-
Stage 1	972	858	-	951	843	-	-	-	-	-	-	-
Stage 2	951	843	-	972	855	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	912	812	1028	912	808	1005	1527	-	-	1509	-	-
Mov Cap-2 Maneuver	912	812	-	912	808	-	-	-	-	-	-	-
Stage 1	972	858	-	951	843	-	-	-	-	-	-	-
Stage 2	951	843	-	972	855	-	-	-	-	-	-	-

Approach	EB	WB	NE	SW
HCM Control Delay, s	9	0	0	0
HCM LOS	A	A		

Minor Lane/Major Mvmt	NEL	NET	NER	EBLn1	WBLn1	SWL	SWT	SWR
Capacity (veh/h)	1527	-	-	912	-	1509	-	-
HCM Lane V/C Ratio	-	-	-	0.005	-	-	-	-
HCM Control Delay (s)	0	-	-	9	0	0	-	-
HCM Lane LOS	A	-	-	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0	-	0	-	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Yield			Yield			Yield			Yield	
Traffic Volume (vph)	10	10	0	0	13	0	0	81	0	0	1	13
Future Volume (vph)	10	10	0	0	13	0	0	81	0	0	1	13
Peak Hour Factor	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
Hourly flow rate (vph)	20	20	0	0	26	0	0	162	0	0	2	26

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	40	26	162	28
Volume Left (vph)	20	0	0	0
Volume Right (vph)	0	0	0	26
Hadj (s)	0.13	0.03	0.03	-0.52
Departure Headway (s)	4.5	4.4	4.1	3.7
Degree Utilization, x	0.05	0.03	0.19	0.03
Capacity (veh/h)	768	781	853	946
Control Delay (s)	7.7	7.5	8.0	6.8
Approach Delay (s)	7.7	7.5	8.0	6.8
Approach LOS	A	A	A	A

Intersection Summary				
Delay	7.8			
Level of Service	A			
Intersection Capacity Utilization	18.7%	ICU Level of Service	A	
Analysis Period (min)	15			

Intersection	
Int Delay, s/veh	2.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	15	16	30	41	23	0	21	557	76	3	68	13
Future Vol, veh/h	15	16	30	41	23	0	21	557	76	3	68	13
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	4	4	4	4	4	4	4	4	4	4	4	4
Mvmt Flow	16	17	33	45	25	0	23	605	83	3	74	14

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	792	821	81	805	787	647	88	0	0	688	0	0
Stage 1	87	87	-	693	693	-	-	-	-	-	-	-
Stage 2	705	734	-	112	94	-	-	-	-	-	-	-
Critical Hdwy	7.14	6.54	6.24	7.14	6.54	6.24	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.14	5.54	-	6.14	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.14	5.54	-	6.14	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.536	4.036	3.336	3.536	4.036	3.336	2.236	-	-	2.236	-	-
Pot Cap-1 Maneuver	305	307	973	298	321	467	1495	-	-	897	-	-
Stage 1	916	819	-	430	442	-	-	-	-	-	-	-
Stage 2	424	423	-	888	813	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	280	298	973	269	312	467	1495	-	-	897	-	-
Mov Cap-2 Maneuver	280	298	-	269	312	-	-	-	-	-	-	-
Stage 1	893	816	-	419	431	-	-	-	-	-	-	-
Stage 2	389	412	-	837	810	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	14.6	21.8	0.2	0.3
HCM LOS	B	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1495	-	-	442	283	897	-	-
HCM Lane V/C Ratio	0.015	-	-	0.15	0.246	0.004	-	-
HCM Control Delay (s)	7.4	0	-	14.6	21.8	9	0	-
HCM Lane LOS	A	A	-	B	C	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.5	0.9	0	-	-

Intersection	
Int Delay, s/veh	0.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	2	1	87	485	40	74
Future Vol, veh/h	2	1	87	485	40	74
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	15	15	15	15	15	15
Mvmt Flow	2	1	95	527	43	80

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	525	359	0	0	622	0
Stage 1	359	-	-	-	-	-
Stage 2	166	-	-	-	-	-
Critical Hdwy	6.55	6.35	-	-	4.25	-
Critical Hdwy Stg 1	5.55	-	-	-	-	-
Critical Hdwy Stg 2	5.55	-	-	-	-	-
Follow-up Hdwy	3.635	3.435	-	-	2.335	-
Pot Cap-1 Maneuver	491	657	-	-	899	-
Stage 1	679	-	-	-	-	-
Stage 2	833	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	466	657	-	-	899	-
Mov Cap-2 Maneuver	466	-	-	-	-	-
Stage 1	679	-	-	-	-	-
Stage 2	791	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	12	0	3.2
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	516	899	-
HCM Lane V/C Ratio	-	-	0.006	0.048	-
HCM Control Delay (s)	-	-	12	9.2	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0	0.2	-

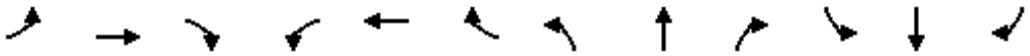
Intersection	
Int Delay, s/veh	4.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	51	102	120	20	6	77
Future Vol, veh/h	51	102	120	20	6	77
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	11	11	11	11	11	11
Mvmt Flow	58	116	136	23	7	88

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	250	148	0	0	159	0
Stage 1	148	-	-	-	-	-
Stage 2	102	-	-	-	-	-
Critical Hdwy	6.51	6.31	-	-	4.21	-
Critical Hdwy Stg 1	5.51	-	-	-	-	-
Critical Hdwy Stg 2	5.51	-	-	-	-	-
Follow-up Hdwy	3.599	3.399	-	-	2.299	-
Pot Cap-1 Maneuver	719	876	-	-	1367	-
Stage 1	858	-	-	-	-	-
Stage 2	900	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	715	876	-	-	1367	-
Mov Cap-2 Maneuver	715	-	-	-	-	-
Stage 1	858	-	-	-	-	-
Stage 2	896	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.6	0	0.6
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	815	1367	-
HCM Lane V/C Ratio	-	-	0.213	0.005	-
HCM Control Delay (s)	-	-	10.6	7.6	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.8	0	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	23	1	0	12	3	82	1	0	1	0	48
Future Volume (Veh/h)	3	23	1	0	12	3	82	1	0	1	0	48
Sign Control		Free			Free			Yield			Yield	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70
Hourly flow rate (vph)	4	33	1	0	17	4	117	1	0	1	0	69
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	21			34			130	62	34	61	61	19
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	21			34			130	62	34	61	61	19
tC, single (s)	4.2			4.2			7.2	6.6	6.3	7.2	6.6	6.3
tC, 2 stage (s)												
tF (s)	2.3			2.3			3.6	4.1	3.4	3.6	4.1	3.4
p0 queue free %	100			100			85	100	100	100	100	93
cM capacity (veh/h)	1569			1552			778	819	1028	922	820	1048

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	38	21	118	70
Volume Left	4	0	117	1
Volume Right	1	4	0	69
cSH	1569	1552	778	1046
Volume to Capacity	0.00	0.00	0.15	0.07
Queue Length 95th (ft)	0	0	13	5
Control Delay (s)	0.8	0.0	10.5	8.7
Lane LOS	A		B	A
Approach Delay (s)	0.8	0.0	10.5	8.7
Approach LOS			B	A

Intersection Summary			
Average Delay	7.6		
Intersection Capacity Utilization	21.7%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection	
Int Delay, s/veh	6.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	0	1	123	0	2	0	1	27	0	0	25	2
Future Vol, veh/h	0	1	123	0	2	0	1	27	0	0	25	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	76	76	76	76	76	76	76	76	76	76	76	76
Heavy Vehicles, %	9	9	9	9	9	9	9	9	9	9	9	9
Mvmt Flow	0	1	162	0	3	0	1	36	0	0	33	3

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	75	73	35	154	74	36	36	0	0	36	0	0
Stage 1	35	35	-	38	38	-	-	-	-	-	-	-
Stage 2	40	38	-	116	36	-	-	-	-	-	-	-
Critical Hdwy	7.19	6.59	6.29	7.19	6.59	6.29	4.19	-	-	4.19	-	-
Critical Hdwy Stg 1	6.19	5.59	-	6.19	5.59	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.19	5.59	-	6.19	5.59	-	-	-	-	-	-	-
Follow-up Hdwy	3.581	4.081	3.381	3.581	4.081	3.381	2.281	-	-	2.281	-	-
Pot Cap-1 Maneuver	898	804	1018	797	803	1017	1531	-	-	1531	-	-
Stage 1	963	852	-	960	850	-	-	-	-	-	-	-
Stage 2	957	850	-	872	851	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	895	803	1018	669	802	1017	1531	-	-	1531	-	-
Mov Cap-2 Maneuver	895	803	-	669	802	-	-	-	-	-	-	-
Stage 1	962	852	-	959	849	-	-	-	-	-	-	-
Stage 2	953	849	-	732	851	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.2	9.5	0.3	0
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1531	-	-	1016	802	1531	-	-
HCM Lane V/C Ratio	0.001	-	-	0.161	0.003	-	-	-
HCM Control Delay (s)	7.4	0	-	9.2	9.5	0	-	-
HCM Lane LOS	A	A	-	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.6	0	0	-	-

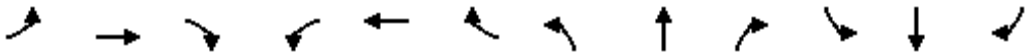
Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	1	0	0	0	0	0	0	30	0	0	21	5
Future Vol, veh/h	1	0	0	0	0	0	0	30	0	0	21	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	65	65	65	65	65	65	65	65	65	65	65	65
Heavy Vehicles, %	16	16	16	16	16	16	16	16	16	16	16	16
Mvmt Flow	2	0	0	0	0	0	0	46	0	0	32	8

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	82	82	36	82	86	46	40	0	0	46	0	0
Stage 1	36	36	-	46	46	-	-	-	-	-	-	-
Stage 2	46	46	-	36	40	-	-	-	-	-	-	-
Critical Hdwy	7.26	6.66	6.36	7.26	6.66	6.36	4.26	-	-	4.26	-	-
Critical Hdwy Stg 1	6.26	5.66	-	6.26	5.66	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.26	5.66	-	6.26	5.66	-	-	-	-	-	-	-
Follow-up Hdwy	3.644	4.144	3.444	3.644	4.144	3.444	2.344	-	-	2.344	-	-
Pot Cap-1 Maneuver	873	782	998	873	778	985	1484	-	-	1476	-	-
Stage 1	945	838	-	933	830	-	-	-	-	-	-	-
Stage 2	933	830	-	945	835	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	873	782	998	873	778	985	1484	-	-	1476	-	-
Mov Cap-2 Maneuver	873	782	-	873	778	-	-	-	-	-	-	-
Stage 1	945	838	-	933	830	-	-	-	-	-	-	-
Stage 2	933	830	-	945	835	-	-	-	-	-	-	-

Approach	EB	WB	NE	SW
HCM Control Delay, s	9.1	0	0	0
HCM LOS	A	A		

Minor Lane/Major Mvmt	NEL	NET	NER	EBLn1	WBLn1	SWL	SWT	SWR
Capacity (veh/h)	1484	-	-	873	-	1476	-	-
HCM Lane V/C Ratio	-	-	-	0.002	-	-	-	-
HCM Control Delay (s)	0	-	-	9.1	0	0	-	-
HCM Lane LOS	A	-	-	A	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0	-	0	-	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Yield			Yield			Yield			Yield	
Traffic Volume (vph)	3	3	0	0	3	0	0	2	1	0	82	3
Future Volume (vph)	3	3	0	0	3	0	0	2	1	0	82	3
Peak Hour Factor	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
Hourly flow rate (vph)	4	4	0	0	4	0	0	3	1	0	109	4

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	8	4	4	113
Volume Left (vph)	4	0	0	0
Volume Right (vph)	0	0	1	4
Hadj (s)	0.17	0.07	-0.08	0.05
Departure Headway (s)	4.3	4.2	3.9	4.0
Degree Utilization, x	0.01	0.00	0.00	0.12
Capacity (veh/h)	807	825	891	898
Control Delay (s)	7.4	7.2	7.0	7.5
Approach Delay (s)	7.4	7.2	7.0	7.5
Approach LOS	A	A	A	A

Intersection Summary			
Delay	7.5		
Level of Service	A		
Intersection Capacity Utilization	14.5%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection	
Int Delay, s/veh	4.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	23	31	12	80	20	6	8	77	40	3	568	54
Future Vol, veh/h	23	31	12	80	20	6	8	77	40	3	568	54
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	5	5	5	5	5	5	5	5	5	5	5	5
Mvmt Flow	25	34	13	87	22	7	9	84	43	3	617	59

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	791	798	647	800	806	106	676	0	0	127	0	0
Stage 1	653	653	-	124	124	-	-	-	-	-	-	-
Stage 2	138	145	-	676	682	-	-	-	-	-	-	-
Critical Hdwy	7.15	6.55	6.25	7.15	6.55	6.25	4.15	-	-	4.15	-	-
Critical Hdwy Stg 1	6.15	5.55	-	6.15	5.55	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.15	5.55	-	6.15	5.55	-	-	-	-	-	-	-
Follow-up Hdwy	3.545	4.045	3.345	3.545	4.045	3.345	2.245	-	-	2.245	-	-
Pot Cap-1 Maneuver	304	316	466	300	312	940	902	-	-	1441	-	-
Stage 1	451	459	-	873	788	-	-	-	-	-	-	-
Stage 2	858	771	-	438	445	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	283	312	466	265	308	940	902	-	-	1441	-	-
Mov Cap-2 Maneuver	283	312	-	265	308	-	-	-	-	-	-	-
Stage 1	446	458	-	863	779	-	-	-	-	-	-	-
Stage 2	819	763	-	393	444	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	19.5	26.1	0.6	0
HCM LOS	C	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	902	-	-	320	284	1441	-	-
HCM Lane V/C Ratio	0.01	-	-	0.224	0.406	0.002	-	-
HCM Control Delay (s)	9	0	-	19.5	26.1	7.5	0	-
HCM Lane LOS	A	A	-	C	D	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.8	1.9	0	-	-

Intersection	
Int Delay, s/veh	17.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	486	41	100	2	1	127
Future Vol, veh/h	486	41	100	2	1	127
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	8	8	8	8	8	8
Mvmt Flow	528	45	109	2	1	138

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	250	110	0	0	111	0
Stage 1	110	-	-	-	-	-
Stage 2	140	-	-	-	-	-
Critical Hdwy	6.48	6.28	-	-	4.18	-
Critical Hdwy Stg 1	5.48	-	-	-	-	-
Critical Hdwy Stg 2	5.48	-	-	-	-	-
Follow-up Hdwy	3.572	3.372	-	-	2.272	-
Pot Cap-1 Maneuver	726	927	-	-	1442	-
Stage 1	900	-	-	-	-	-
Stage 2	872	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	725	927	-	-	1442	-
Mov Cap-2 Maneuver	725	-	-	-	-	-
Stage 1	900	-	-	-	-	-
Stage 2	871	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	24.6	0	0.1
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	738	1442	-
HCM Lane V/C Ratio	-	-	0.776	0.001	-
HCM Control Delay (s)	-	-	24.6	7.5	0
HCM Lane LOS	-	-	C	A	A
HCM 95th %tile Q(veh)	-	-	7.6	0	-

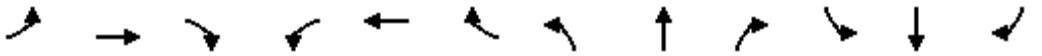
Intersection	
Int Delay, s/veh	2.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	30	15	235	55	115	500
Future Vol, veh/h	30	15	235	55	115	500
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	22	22	22	22	22	22
Mvmt Flow	33	16	255	60	125	543

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1078	285	0	0	315	0
Stage 1	285	-	-	-	-	-
Stage 2	793	-	-	-	-	-
Critical Hdwy	6.62	6.42	-	-	4.32	-
Critical Hdwy Stg 1	5.62	-	-	-	-	-
Critical Hdwy Stg 2	5.62	-	-	-	-	-
Follow-up Hdwy	3.698	3.498	-	-	2.398	-
Pot Cap-1 Maneuver	222	709	-	-	1140	-
Stage 1	720	-	-	-	-	-
Stage 2	413	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	187	709	-	-	1140	-
Mov Cap-2 Maneuver	187	-	-	-	-	-
Stage 1	720	-	-	-	-	-
Stage 2	348	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	23	0	1.6
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	248	1140	-
HCM Lane V/C Ratio	-	-	0.197	0.11	-
HCM Control Delay (s)	-	-	23	8.5	0
HCM Lane LOS	-	-	C	A	A
HCM 95th %tile Q(veh)	-	-	0.7	0.4	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	30	5	0	40	5	0	0	0	5	0	25
Future Volume (Veh/h)	20	30	5	0	40	5	0	0	0	5	0	25
Sign Control		Free			Free			Yield			Yield	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	22	33	5	0	43	5	0	0	0	5	0	27
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	48			38			152	128	36	125	128	46
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	48			38			152	128	36	125	128	46
tC, single (s)	4.4			4.4			7.4	6.8	6.5	7.4	6.8	6.5
tC, 2 stage (s)												
tF (s)	2.4			2.4			3.7	4.2	3.5	3.7	4.2	3.5
p0 queue free %	98			100			100	100	100	99	100	97
cM capacity (veh/h)	1413			1425			731	708	970	785	708	957

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	60	48	0	32
Volume Left	22	0	0	5
Volume Right	5	5	0	27
cSH	1413	1425	1700	926
Volume to Capacity	0.02	0.00	0.00	0.03
Queue Length 95th (ft)	1	0	0	3
Control Delay (s)	2.9	0.0	0.0	9.0
Lane LOS	A		A	A
Approach Delay (s)	2.9	0.0	0.0	9.0
Approach LOS			A	A

Intersection Summary				
Average Delay	3.3			
Intersection Capacity Utilization	19.7%	ICU Level of Service	A	
Analysis Period (min)	15			

Intersection	
Int Delay, s/veh	5.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	5	5	5	0	0	75	0	45	0	5	25	0
Future Vol, veh/h	5	5	5	0	0	75	0	45	0	5	25	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	85	85	85	85	85	85	85	85	85	85	85	85
Heavy Vehicles, %	36	36	36	36	36	36	36	36	36	36	36	36
Mvmt Flow	6	6	6	0	0	88	0	53	0	6	29	0

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	138	94	29	100	94	53	29	0	0	53	0	0
Stage 1	41	41	-	53	53	-	-	-	-	-	-	-
Stage 2	97	53	-	47	41	-	-	-	-	-	-	-
Critical Hdwy	7.46	6.86	6.56	7.46	6.86	6.56	4.46	-	-	4.46	-	-
Critical Hdwy Stg 1	6.46	5.86	-	6.46	5.86	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.46	5.86	-	6.46	5.86	-	-	-	-	-	-	-
Follow-up Hdwy	3.824	4.324	3.624	3.824	4.324	3.624	2.524	-	-	2.524	-	-
Pot Cap-1 Maneuver	760	736	956	807	736	926	1390	-	-	1361	-	-
Stage 1	894	798	-	880	788	-	-	-	-	-	-	-
Stage 2	832	788	-	887	798	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	686	733	956	795	733	926	1390	-	-	1361	-	-
Mov Cap-2 Maneuver	686	733	-	795	733	-	-	-	-	-	-	-
Stage 1	894	795	-	880	788	-	-	-	-	-	-	-
Stage 2	753	788	-	872	795	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.7	9.3	0	1.3
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1390	-	-	776	926	1361	-	-
HCM Lane V/C Ratio	-	-	-	0.023	0.095	0.004	-	-
HCM Control Delay (s)	0	-	-	9.7	9.3	7.7	0	-
HCM Lane LOS	A	-	-	A	A	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.3	0	-	-

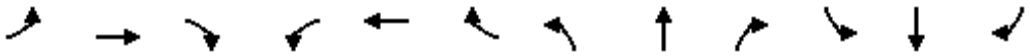
Intersection	
Int Delay, s/veh	3.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	35	0	0	10	10	10	0	75	0	0	35	20
Future Vol, veh/h	35	0	0	10	10	10	0	75	0	0	35	20
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	85	85	85	85	85	85	85	85	85	85	85	85
Heavy Vehicles, %	23	23	23	23	23	23	23	23	23	23	23	23
Mvmt Flow	41	0	0	12	12	12	0	88	0	0	41	24

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	153	141	53	141	153	88	65	0	0	88	0	0
Stage 1	53	53	-	88	88	-	-	-	-	-	-	-
Stage 2	100	88	-	53	65	-	-	-	-	-	-	-
Critical Hdwy	7.33	6.73	6.43	7.33	6.73	6.43	4.33	-	-	4.33	-	-
Critical Hdwy Stg 1	6.33	5.73	-	6.33	5.73	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.33	5.73	-	6.33	5.73	-	-	-	-	-	-	-
Follow-up Hdwy	3.707	4.207	3.507	3.707	4.207	3.507	2.407	-	-	2.407	-	-
Pot Cap-1 Maneuver	769	713	958	783	702	915	1413	-	-	1385	-	-
Stage 1	909	811	-	870	783	-	-	-	-	-	-	-
Stage 2	857	783	-	909	801	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	750	713	958	783	702	915	1413	-	-	1385	-	-
Mov Cap-2 Maneuver	750	713	-	783	702	-	-	-	-	-	-	-
Stage 1	909	811	-	870	783	-	-	-	-	-	-	-
Stage 2	833	783	-	909	801	-	-	-	-	-	-	-

Approach	EB	WB	NE	SW
HCM Control Delay, s	10.1	9.8	0	0
HCM LOS	B	A		

Minor Lane/Major Mvmt	NEL	NET	NER	EBLn1	WBLn1	SWL	SWT	SWR
Capacity (veh/h)	1413	-	-	750	791	1385	-	-
HCM Lane V/C Ratio	-	-	-	0.055	0.045	-	-	-
HCM Control Delay (s)	0	-	-	10.1	9.8	0	-	-
HCM Lane LOS	A	-	-	B	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.2	0.1	0	-	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Yield			Yield			Yield			Yield	
Traffic Volume (vph)	40	40	0	0	35	0	0	5	0	0	0	20
Future Volume (vph)	40	40	0	0	35	0	0	5	0	0	0	20
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	47	47	0	0	41	0	0	6	0	0	0	24

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	94	41	6	24
Volume Left (vph)	47	0	0	0
Volume Right (vph)	0	0	0	24
Hadj (s)	0.13	0.03	0.03	-0.57
Departure Headway (s)	4.1	4.1	4.2	3.6
Degree Utilization, x	0.11	0.05	0.01	0.02
Capacity (veh/h)	858	867	810	950
Control Delay (s)	7.6	7.3	7.3	6.7
Approach Delay (s)	7.6	7.3	7.3	6.7
Approach LOS	A	A	A	A

Intersection Summary				
Delay	7.4			
Level of Service	A			
Intersection Capacity Utilization	21.0%	ICU Level of Service	A	
Analysis Period (min)	15			

Intersection	
Int Delay, s/veh	319

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	90	95	175	125	70	0	65	200	100	25	530	105
Future Vol, veh/h	90	95	175	125	70	0	65	200	100	25	530	105
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	14	14	14	14	14	14	14	14	14	14	14	14
Mvmt Flow	98	103	190	136	76	0	71	217	109	27	576	114

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1139	1155	633	1248	1158	272	690	0	0	326	0	0
Stage 1	687	687	-	414	414	-	-	-	-	-	-	-
Stage 2	452	468	-	834	744	-	-	-	-	-	-	-
Critical Hdwy	7.24	6.64	6.34	7.24	6.64	6.34	4.24	-	-	4.24	-	-
Critical Hdwy Stg 1	6.24	5.64	-	6.24	5.64	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.24	5.64	-	6.24	5.64	-	-	-	-	-	-	-
Follow-up Hdwy	3.626	4.126	3.426	3.626	4.126	3.426	2.326	-	-	2.326	-	-
Pot Cap-1 Maneuver	169	187	459	142	186	739	851	-	-	1169	-	-
Stage 1	418	430	-	592	573	-	-	-	-	-	-	-
Stage 2	565	542	-	346	404	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	~ 96	161	459	~ 37	161	739	851	-	-	1169	-	-
Mov Cap-2 Maneuver	~ 96	161	-	~ 37	161	-	-	-	-	-	-	-
Stage 1	375	414	-	531	514	-	-	-	-	-	-	-
Stage 2	432	486	-	146	389	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	$ 540.1	$ 1583.3	1.7	0.3
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	851	-	-	189	51	1169	-	-
HCM Lane V/C Ratio	0.083	-	-	2.07	4.156	0.023	-	-
HCM Control Delay (s)	9.6	0	-	$ 540.5	$ 1583.3	8.2	0	-
HCM Lane LOS	A	A	-	F	F	A	A	-
HCM 95th %tile Q(veh)	0.3	-	-	30.2	23.5	0.1	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

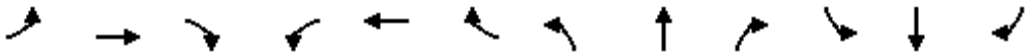
Intersection	
Int Delay, s/veh	3.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	80	35	370	95	25	380
Future Vol, veh/h	80	35	370	95	25	380
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	16	16	16	16	16	16
Mvmt Flow	91	40	420	108	28	432

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	962	474	0	0	528	0
Stage 1	474	-	-	-	-	-
Stage 2	488	-	-	-	-	-
Critical Hdwy	6.56	6.36	-	-	4.26	-
Critical Hdwy Stg 1	5.56	-	-	-	-	-
Critical Hdwy Stg 2	5.56	-	-	-	-	-
Follow-up Hdwy	3.644	3.444	-	-	2.344	-
Pot Cap-1 Maneuver	268	563	-	-	972	-
Stage 1	598	-	-	-	-	-
Stage 2	589	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	258	563	-	-	972	-
Mov Cap-2 Maneuver	258	-	-	-	-	-
Stage 1	598	-	-	-	-	-
Stage 2	567	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	24.9	0	0.5
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	309	972	-
HCM Lane V/C Ratio	-	-	0.423	0.029	-
HCM Control Delay (s)	-	-	24.9	8.8	0
HCM Lane LOS	-	-	C	A	A
HCM 95th %tile Q(veh)	-	-	2	0.1	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	50	0	0	35	10	5	5	0	5	0	150
Future Volume (Veh/h)	10	50	0	0	35	10	5	5	0	5	0	150
Sign Control		Free			Free			Yield			Yield	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Hourly flow rate (vph)	13	63	0	0	44	13	6	6	0	6	0	188
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	57			63			328	146	63	142	140	50
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	57			63			328	146	63	142	140	50
tC, single (s)	4.2			4.2			7.2	6.6	6.3	7.2	6.6	6.3
tC, 2 stage (s)												
tF (s)	2.3			2.3			3.6	4.1	3.4	3.6	4.1	3.4
p0 queue free %	99			100			99	99	100	99	100	81
cM capacity (veh/h)	1498			1490			492	725	980	799	731	995

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	76	57	12	194
Volume Left	13	0	6	6
Volume Right	0	13	0	188
cSH	1498	1490	586	988
Volume to Capacity	0.01	0.00	0.02	0.20
Queue Length 95th (ft)	1	0	2	18
Control Delay (s)	1.3	0.0	11.3	9.5
Lane LOS	A		B	A
Approach Delay (s)	1.3	0.0	11.3	9.5
Approach LOS			B	A

Intersection Summary				
Average Delay	6.2			
Intersection Capacity Utilization	26.1%	ICU Level of Service	A	
Analysis Period (min)	15			

Intersection	
Int Delay, s/veh	3.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	0	15	15	0	45	0	0	75	0	0	35	5
Future Vol, veh/h	0	15	15	0	45	0	0	75	0	0	35	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	85	85	85	85	85	85	85	85	85	85	85	85
Heavy Vehicles, %	16	16	16	16	16	16	16	16	16	16	16	16
Mvmt Flow	0	18	18	0	53	0	0	88	0	0	41	6

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	159	132	44	150	135	88	47	0	0	88	0	0
Stage 1	44	44	-	88	88	-	-	-	-	-	-	-
Stage 2	115	88	-	62	47	-	-	-	-	-	-	-
Critical Hdwy	7.26	6.66	6.36	7.26	6.66	6.36	4.26	-	-	4.26	-	-
Critical Hdwy Stg 1	6.26	5.66	-	6.26	5.66	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.26	5.66	-	6.26	5.66	-	-	-	-	-	-	-
Follow-up Hdwy	3.644	4.144	3.444	3.644	4.144	3.444	2.344	-	-	2.344	-	-
Pot Cap-1 Maneuver	776	734	988	787	731	933	1475	-	-	1424	-	-
Stage 1	936	831	-	886	795	-	-	-	-	-	-	-
Stage 2	857	795	-	915	829	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	733	734	988	759	731	933	1475	-	-	1424	-	-
Mov Cap-2 Maneuver	733	734	-	759	731	-	-	-	-	-	-	-
Stage 1	936	831	-	886	795	-	-	-	-	-	-	-
Stage 2	800	795	-	880	829	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.5	10.3	0	0
HCM LOS	A	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1475	-	-	842	731	1424	-	-
HCM Lane V/C Ratio	-	-	-	0.042	0.072	-	-	-
HCM Control Delay (s)	0	-	-	9.5	10.3	0	-	-
HCM Lane LOS	A	-	-	A	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.2	0	-	-

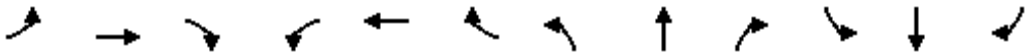
Intersection	
Int Delay, s/veh	5.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	65	0	0	10	10	10	0	40	0	0	40	5
Future Vol, veh/h	65	0	0	10	10	10	0	40	0	0	40	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	80	80	80	80	80	80	80	80	80	80	80	80
Heavy Vehicles, %	27	27	27	27	27	27	27	27	27	27	27	27
Mvmt Flow	81	0	0	13	13	13	0	50	0	0	50	6

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	116	103	53	103	106	50	56	0	0	50	0	0
Stage 1	53	53	-	50	50	-	-	-	-	-	-	-
Stage 2	63	50	-	53	56	-	-	-	-	-	-	-
Critical Hdwy	7.37	6.77	6.47	7.37	6.77	6.47	4.37	-	-	4.37	-	-
Critical Hdwy Stg 1	6.37	5.77	-	6.37	5.77	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.37	5.77	-	6.37	5.77	-	-	-	-	-	-	-
Follow-up Hdwy	3.743	4.243	3.543	3.743	4.243	3.543	2.443	-	-	2.443	-	-
Pot Cap-1 Maneuver	805	742	948	821	739	952	1403	-	-	1410	-	-
Stage 1	900	804	-	903	806	-	-	-	-	-	-	-
Stage 2	889	806	-	900	801	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	784	742	948	821	739	952	1403	-	-	1410	-	-
Mov Cap-2 Maneuver	784	742	-	821	739	-	-	-	-	-	-	-
Stage 1	900	804	-	903	806	-	-	-	-	-	-	-
Stage 2	864	806	-	900	801	-	-	-	-	-	-	-

Approach	EB	WB	NE	SW
HCM Control Delay, s	10.1	9.6	0	0
HCM LOS	B	A		

Minor Lane/Major Mvmt	NEL	NET	NER	EBLn1	WBLn1	SWL	SWT	SWR
Capacity (veh/h)	1403	-	-	784	828	1410	-	-
HCM Lane V/C Ratio	-	-	-	0.104	0.045	-	-	-
HCM Control Delay (s)	0	-	-	10.1	9.6	0	-	-
HCM Lane LOS	A	-	-	B	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.3	0.1	0	-	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Yield			Yield			Yield			Yield	
Traffic Volume (vph)	25	25	0	0	80	0	0	5	5	0	5	10
Future Volume (vph)	25	25	0	0	80	0	0	5	5	0	5	10
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	29	29	0	0	94	0	0	6	6	0	6	12

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	58	94	12	18
Volume Left (vph)	29	0	0	0
Volume Right (vph)	0	0	6	12
Hadj (s)	1.24	1.14	0.84	0.74
Departure Headway (s)	5.3	5.2	5.2	5.1
Degree Utilization, x	0.09	0.14	0.02	0.03
Capacity (veh/h)	665	675	665	675
Control Delay (s)	8.8	9.0	8.3	8.2
Approach Delay (s)	8.8	9.0	8.3	8.2
Approach LOS	A	A	A	A

Intersection Summary				
Delay	8.8			
Level of Service	A			
Intersection Capacity Utilization	19.4%	ICU Level of Service	A	
Analysis Period (min)	15			

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	100	135	55	285	145	45	35	310	165	15	405	265
Future Vol, veh/h	100	135	55	285	145	45	35	310	165	15	405	265
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	80	80	80	80	80	80	80	80	80	80	80	80
Heavy Vehicles, %	12	12	12	12	12	12	12	12	12	12	12	12
Mvmt Flow	125	169	69	356	181	56	44	388	206	19	506	331

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1408	1392	672	1408	1454	491	837	0	0	594	0	0
Stage 1	710	710	-	579	579	-	-	-	-	-	-	-
Stage 2	698	682	-	829	875	-	-	-	-	-	-	-
Critical Hdwy	7.22	6.62	6.32	7.22	6.62	6.32	4.22	-	-	4.22	-	-
Critical Hdwy Stg 1	6.22	5.62	-	6.22	5.62	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.22	5.62	-	6.22	5.62	-	-	-	-	-	-	-
Follow-up Hdwy	3.608	4.108	3.408	3.608	4.108	3.408	2.308	-	-	2.308	-	-
Pot Cap-1 Maneuver	~ 111	~ 135	439	~ 111	~ 124	558	756	-	-	935	-	-
Stage 1	409	422	-	484	485	-	-	-	-	-	-	-
Stage 2	415	435	-	~ 351	353	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	-	~ 118	439	-	~ 108	558	756	-	-	935	-	-
Mov Cap-2 Maneuver	-	~ 118	-	-	~ 108	-	-	-	-	-	-	-
Stage 1	372	405	-	440	441	-	-	-	-	-	-	-
Stage 2	200	396	-	~ 166	339	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s			0.7	0.2
HCM LOS	-	-		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	756	-	-	-	-	935	-	-
HCM Lane V/C Ratio	0.058	-	-	-	-	0.02	-	-
HCM Control Delay (s)	10.1	0	-	-	-	8.9	0	-
HCM Lane LOS	B	A	-	-	-	A	A	-
HCM 95th %tile Q(veh)	0.2	-	-	-	-	0.1	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	2.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	30	15	235	55	115	500
Future Vol, veh/h	30	15	235	55	115	500
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	22	22	22	22	22	22
Mvmt Flow	33	16	255	60	125	543

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1078	285	0	0	315	0
Stage 1	285	-	-	-	-	-
Stage 2	793	-	-	-	-	-
Critical Hdwy	6.62	6.42	-	-	4.32	-
Critical Hdwy Stg 1	5.62	-	-	-	-	-
Critical Hdwy Stg 2	5.62	-	-	-	-	-
Follow-up Hdwy	3.698	3.498	-	-	2.398	-
Pot Cap-1 Maneuver	222	709	-	-	1140	-
Stage 1	720	-	-	-	-	-
Stage 2	413	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	187	709	-	-	1140	-
Mov Cap-2 Maneuver	187	-	-	-	-	-
Stage 1	720	-	-	-	-	-
Stage 2	348	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	23	0	1.6
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	248	1140	-
HCM Lane V/C Ratio	-	-	0.197	0.11	-
HCM Control Delay (s)	-	-	23	8.5	0
HCM Lane LOS	-	-	C	A	A
HCM 95th %tile Q(veh)	-	-	0.7	0.4	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	30	5	0	40	5	0	0	0	5	0	25
Future Volume (Veh/h)	20	30	5	0	40	5	0	0	0	5	0	25
Sign Control		Free			Free			Yield			Yield	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	22	33	5	0	43	5	0	0	0	5	0	27
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	48			38			152	128	36	125	128	46
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	48			38			152	128	36	125	128	46
tC, single (s)	4.4			4.4			7.4	6.8	6.5	7.4	6.8	6.5
tC, 2 stage (s)												
tF (s)	2.4			2.4			3.7	4.2	3.5	3.7	4.2	3.5
p0 queue free %	98			100			100	100	100	99	100	97
cM capacity (veh/h)	1413			1425			731	708	970	785	708	957

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	60	48	0	32
Volume Left	22	0	0	5
Volume Right	5	5	0	27
cSH	1413	1425	1700	926
Volume to Capacity	0.02	0.00	0.00	0.03
Queue Length 95th (ft)	1	0	0	3
Control Delay (s)	2.9	0.0	0.0	9.0
Lane LOS	A		A	A
Approach Delay (s)	2.9	0.0	0.0	9.0
Approach LOS			A	A

Intersection Summary				
Average Delay	3.3			
Intersection Capacity Utilization	19.7%	ICU Level of Service	A	
Analysis Period (min)	15			

Intersection	
Int Delay, s/veh	5.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	5	5	5	0	0	75	0	45	0	5	25	0
Future Vol, veh/h	5	5	5	0	0	75	0	45	0	5	25	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	85	85	85	85	85	85	85	85	85	85	85	85
Heavy Vehicles, %	36	36	36	36	36	36	36	36	36	36	36	36
Mvmt Flow	6	6	6	0	0	88	0	53	0	6	29	0

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	138	94	29	100	94	53	29	0	0	53	0	0
Stage 1	41	41	-	53	53	-	-	-	-	-	-	-
Stage 2	97	53	-	47	41	-	-	-	-	-	-	-
Critical Hdwy	7.46	6.86	6.56	7.46	6.86	6.56	4.46	-	-	4.46	-	-
Critical Hdwy Stg 1	6.46	5.86	-	6.46	5.86	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.46	5.86	-	6.46	5.86	-	-	-	-	-	-	-
Follow-up Hdwy	3.824	4.324	3.624	3.824	4.324	3.624	2.524	-	-	2.524	-	-
Pot Cap-1 Maneuver	760	736	956	807	736	926	1390	-	-	1361	-	-
Stage 1	894	798	-	880	788	-	-	-	-	-	-	-
Stage 2	832	788	-	887	798	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	686	733	956	795	733	926	1390	-	-	1361	-	-
Mov Cap-2 Maneuver	686	733	-	795	733	-	-	-	-	-	-	-
Stage 1	894	795	-	880	788	-	-	-	-	-	-	-
Stage 2	753	788	-	872	795	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.7	9.3	0	1.3
HCM LOS	A	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1390	-	-	776	926	1361	-	-
HCM Lane V/C Ratio	-	-	-	0.023	0.095	0.004	-	-
HCM Control Delay (s)	0	-	-	9.7	9.3	7.7	0	-
HCM Lane LOS	A	-	-	A	A	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.3	0	-	-

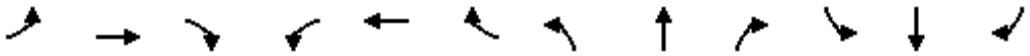
Intersection	
Int Delay, s/veh	3.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	35	0	0	10	10	10	0	75	0	0	35	20
Future Vol, veh/h	35	0	0	10	10	10	0	75	0	0	35	20
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	85	85	85	85	85	85	85	85	85	85	85	85
Heavy Vehicles, %	23	23	23	23	23	23	23	23	23	23	23	23
Mvmt Flow	41	0	0	12	12	12	0	88	0	0	41	24

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	153	141	53	141	153	88	65	0	0	88	0	0
Stage 1	53	53	-	88	88	-	-	-	-	-	-	-
Stage 2	100	88	-	53	65	-	-	-	-	-	-	-
Critical Hdwy	7.33	6.73	6.43	7.33	6.73	6.43	4.33	-	-	4.33	-	-
Critical Hdwy Stg 1	6.33	5.73	-	6.33	5.73	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.33	5.73	-	6.33	5.73	-	-	-	-	-	-	-
Follow-up Hdwy	3.707	4.207	3.507	3.707	4.207	3.507	2.407	-	-	2.407	-	-
Pot Cap-1 Maneuver	769	713	958	783	702	915	1413	-	-	1385	-	-
Stage 1	909	811	-	870	783	-	-	-	-	-	-	-
Stage 2	857	783	-	909	801	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	750	713	958	783	702	915	1413	-	-	1385	-	-
Mov Cap-2 Maneuver	750	713	-	783	702	-	-	-	-	-	-	-
Stage 1	909	811	-	870	783	-	-	-	-	-	-	-
Stage 2	833	783	-	909	801	-	-	-	-	-	-	-

Approach	EB	WB	NE	SW
HCM Control Delay, s	10.1	9.8	0	0
HCM LOS	B	A		

Minor Lane/Major Mvmt	NEL	NET	NER	EBLn1	WBLn1	SWL	SWT	SWR
Capacity (veh/h)	1413	-	-	750	791	1385	-	-
HCM Lane V/C Ratio	-	-	-	0.055	0.045	-	-	-
HCM Control Delay (s)	0	-	-	10.1	9.8	0	-	-
HCM Lane LOS	A	-	-	B	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.2	0.1	0	-	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Yield			Yield			Yield			Yield	
Traffic Volume (vph)	40	40	0	0	35	0	0	5	0	0	0	20
Future Volume (vph)	40	40	0	0	35	0	0	5	0	0	0	20
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	47	47	0	0	41	0	0	6	0	0	0	24

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	94	41	6	24
Volume Left (vph)	47	0	0	0
Volume Right (vph)	0	0	0	24
Hadj (s)	0.13	0.03	0.03	-0.57
Departure Headway (s)	4.1	4.1	4.2	3.6
Degree Utilization, x	0.11	0.05	0.01	0.02
Capacity (veh/h)	858	867	810	950
Control Delay (s)	7.6	7.3	7.3	6.7
Approach Delay (s)	7.6	7.3	7.3	6.7
Approach LOS	A	A	A	A

Intersection Summary				
Delay	7.4			
Level of Service	A			
Intersection Capacity Utilization	21.0%	ICU Level of Service	A	
Analysis Period (min)	15			

Intersection	
Int Delay, s/veh	344.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		⇕			⇕			⇕			⇕	
Traffic Vol, veh/h	90	95	175	125	70	0	65	216	100	25	531	105
Future Vol, veh/h	90	95	175	125	70	0	65	216	100	25	531	105
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	14	14	14	14	14	14	14	14	14	14	14	14
Mvmt Flow	98	103	190	136	76	0	71	235	109	27	577	114

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1158	1174	634	1267	1177	290	691	0	0	344	0	0
Stage 1	688	688	-	432	432	-	-	-	-	-	-	-
Stage 2	470	486	-	835	745	-	-	-	-	-	-	-
Critical Hdwy	7.24	6.64	6.34	7.24	6.64	6.34	4.24	-	-	4.24	-	-
Critical Hdwy Stg 1	6.24	5.64	-	6.24	5.64	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.24	5.64	-	6.24	5.64	-	-	-	-	-	-	-
Follow-up Hdwy	3.626	4.126	3.426	3.626	4.126	3.426	2.326	-	-	2.326	-	-
Pot Cap-1 Maneuver	164	182	458	137	181	722	850	-	-	1151	-	-
Stage 1	418	429	-	579	562	-	-	-	-	-	-	-
Stage 2	552	531	-	345	404	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	~ 91	157	458	~ 34	156	722	850	-	-	1151	-	-
Mov Cap-2 Maneuver	~ 91	157	-	~ 34	156	-	-	-	-	-	-	-
Stage 1	374	412	-	518	503	-	-	-	-	-	-	-
Stage 2	419	475	-	145	388	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	$ 577	$ 1753.9	1.6	0.3
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	850	-	-	182	47	1151	-	-
HCM Lane V/C Ratio	0.083	-	-	2.15	4.51	0.024	-	-
HCM Control Delay (s)	9.6	0	-	$ 577	$ 1753.9	8.2	0	-
HCM Lane LOS	A	A	-	F	F	A	A	-
HCM 95th %tile Q(veh)	0.3	-	-	30.9	23.9	0.1	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	0

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	1	0	292	16	0	530
Future Vol, veh/h	1	0	292	16	0	530
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	0	317	17	0	576

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	902	326	0	0	334	0
Stage 1	326	-	-	-	-	-
Stage 2	576	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	308	715	-	-	1225	-
Stage 1	731	-	-	-	-	-
Stage 2	562	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	308	715	-	-	1225	-
Mov Cap-2 Maneuver	308	-	-	-	-	-
Stage 1	731	-	-	-	-	-
Stage 2	562	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	16.7	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	308	1225	-
HCM Lane V/C Ratio	-	-	0.004	-	-
HCM Control Delay (s)	-	-	16.7	0	-
HCM Lane LOS	-	-	C	A	-
HCM 95th %tile Q(veh)	-	-	0	0	-

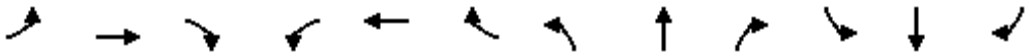
Intersection	
Int Delay, s/veh	3.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	80	35	370	95	25	380
Future Vol, veh/h	80	35	370	95	25	380
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	88	88	88	88	88	88
Heavy Vehicles, %	16	16	16	16	16	16
Mvmt Flow	91	40	420	108	28	432

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	962	474	0	0	528	0
Stage 1	474	-	-	-	-	-
Stage 2	488	-	-	-	-	-
Critical Hdwy	6.56	6.36	-	-	4.26	-
Critical Hdwy Stg 1	5.56	-	-	-	-	-
Critical Hdwy Stg 2	5.56	-	-	-	-	-
Follow-up Hdwy	3.644	3.444	-	-	2.344	-
Pot Cap-1 Maneuver	268	563	-	-	972	-
Stage 1	598	-	-	-	-	-
Stage 2	589	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	258	563	-	-	972	-
Mov Cap-2 Maneuver	258	-	-	-	-	-
Stage 1	598	-	-	-	-	-
Stage 2	567	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	24.9	0	0.5
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	309	972	-
HCM Lane V/C Ratio	-	-	0.423	0.029	-
HCM Control Delay (s)	-	-	24.9	8.8	0
HCM Lane LOS	-	-	C	A	A
HCM 95th %tile Q(veh)	-	-	2	0.1	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	10	50	0	0	35	10	5	5	0	5	0	150
Future Volume (Veh/h)	10	50	0	0	35	10	5	5	0	5	0	150
Sign Control		Free			Free			Yield			Yield	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Hourly flow rate (vph)	13	63	0	0	44	13	6	6	0	6	0	188
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	57			63			328	146	63	142	140	50
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	57			63			328	146	63	142	140	50
tC, single (s)	4.2			4.2			7.2	6.6	6.3	7.2	6.6	6.3
tC, 2 stage (s)												
tF (s)	2.3			2.3			3.6	4.1	3.4	3.6	4.1	3.4
p0 queue free %	99			100			99	99	100	99	100	81
cM capacity (veh/h)	1498			1490			492	725	980	799	731	995

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	76	57	12	194
Volume Left	13	0	6	6
Volume Right	0	13	0	188
cSH	1498	1490	586	988
Volume to Capacity	0.01	0.00	0.02	0.20
Queue Length 95th (ft)	1	0	2	18
Control Delay (s)	1.3	0.0	11.3	9.5
Lane LOS	A		B	A
Approach Delay (s)	1.3	0.0	11.3	9.5
Approach LOS			B	A

Intersection Summary				
Average Delay	6.2			
Intersection Capacity Utilization	26.1%	ICU Level of Service	A	
Analysis Period (min)	15			

Intersection	
Int Delay, s/veh	3.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	0	15	15	0	45	0	0	75	0	0	35	5
Future Vol, veh/h	0	15	15	0	45	0	0	75	0	0	35	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	85	85	85	85	85	85	85	85	85	85	85	85
Heavy Vehicles, %	16	16	16	16	16	16	16	16	16	16	16	16
Mvmt Flow	0	18	18	0	53	0	0	88	0	0	41	6

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	159	132	44	150	135	88	47	0	0	88	0	0
Stage 1	44	44	-	88	88	-	-	-	-	-	-	-
Stage 2	115	88	-	62	47	-	-	-	-	-	-	-
Critical Hdwy	7.26	6.66	6.36	7.26	6.66	6.36	4.26	-	-	4.26	-	-
Critical Hdwy Stg 1	6.26	5.66	-	6.26	5.66	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.26	5.66	-	6.26	5.66	-	-	-	-	-	-	-
Follow-up Hdwy	3.644	4.144	3.444	3.644	4.144	3.444	2.344	-	-	2.344	-	-
Pot Cap-1 Maneuver	776	734	988	787	731	933	1475	-	-	1424	-	-
Stage 1	936	831	-	886	795	-	-	-	-	-	-	-
Stage 2	857	795	-	915	829	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	733	734	988	759	731	933	1475	-	-	1424	-	-
Mov Cap-2 Maneuver	733	734	-	759	731	-	-	-	-	-	-	-
Stage 1	936	831	-	886	795	-	-	-	-	-	-	-
Stage 2	800	795	-	880	829	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.5	10.3	0	0
HCM LOS	A	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1475	-	-	842	731	1424	-	-
HCM Lane V/C Ratio	-	-	-	0.042	0.072	-	-	-
HCM Control Delay (s)	0	-	-	9.5	10.3	0	-	-
HCM Lane LOS	A	-	-	A	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.2	0	-	-

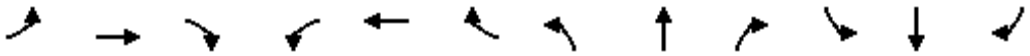
Intersection	
Int Delay, s/veh	5.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	65	0	0	10	10	10	0	40	0	0	40	5
Future Vol, veh/h	65	0	0	10	10	10	0	40	0	0	40	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	80	80	80	80	80	80	80	80	80	80	80	80
Heavy Vehicles, %	27	27	27	27	27	27	27	27	27	27	27	27
Mvmt Flow	81	0	0	13	13	13	0	50	0	0	50	6

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	116	103	53	103	106	50	56	0	0	50	0	0
Stage 1	53	53	-	50	50	-	-	-	-	-	-	-
Stage 2	63	50	-	53	56	-	-	-	-	-	-	-
Critical Hdwy	7.37	6.77	6.47	7.37	6.77	6.47	4.37	-	-	4.37	-	-
Critical Hdwy Stg 1	6.37	5.77	-	6.37	5.77	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.37	5.77	-	6.37	5.77	-	-	-	-	-	-	-
Follow-up Hdwy	3.743	4.243	3.543	3.743	4.243	3.543	2.443	-	-	2.443	-	-
Pot Cap-1 Maneuver	805	742	948	821	739	952	1403	-	-	1410	-	-
Stage 1	900	804	-	903	806	-	-	-	-	-	-	-
Stage 2	889	806	-	900	801	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	784	742	948	821	739	952	1403	-	-	1410	-	-
Mov Cap-2 Maneuver	784	742	-	821	739	-	-	-	-	-	-	-
Stage 1	900	804	-	903	806	-	-	-	-	-	-	-
Stage 2	864	806	-	900	801	-	-	-	-	-	-	-

Approach	EB	WB	NE	SW
HCM Control Delay, s	10.1	9.6	0	0
HCM LOS	B	A		

Minor Lane/Major Mvmt	NEL	NET	NER	EBLn1	WBLn1	SWL	SWT	SWR
Capacity (veh/h)	1403	-	-	784	828	1410	-	-
HCM Lane V/C Ratio	-	-	-	0.104	0.045	-	-	-
HCM Control Delay (s)	0	-	-	10.1	9.6	0	-	-
HCM Lane LOS	A	-	-	B	A	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.3	0.1	0	-	-



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Yield			Yield			Yield			Yield	
Traffic Volume (vph)	25	25	0	0	80	0	0	5	5	0	5	10
Future Volume (vph)	25	25	0	0	80	0	0	5	5	0	5	10
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	29	29	0	0	94	0	0	6	6	0	6	12

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	58	94	12	18
Volume Left (vph)	29	0	0	0
Volume Right (vph)	0	0	6	12
Hadj (s)	1.24	1.14	0.84	0.74
Departure Headway (s)	5.3	5.2	5.2	5.1
Degree Utilization, x	0.09	0.14	0.02	0.03
Capacity (veh/h)	665	675	665	675
Control Delay (s)	8.8	9.0	8.3	8.2
Approach Delay (s)	8.8	9.0	8.3	8.2
Approach LOS	A	A	A	A

Intersection Summary				
Delay	8.8			
Level of Service	A			
Intersection Capacity Utilization	19.4%	ICU Level of Service	A	
Analysis Period (min)	15			

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	100	135	55	285	145	45	35	311	165	15	421	265
Future Vol, veh/h	100	135	55	285	145	45	35	311	165	15	421	265
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	80	80	80	80	80	80	80	80	80	80	80	80
Heavy Vehicles, %	12	12	12	12	12	12	12	12	12	12	12	12
Mvmt Flow	125	169	69	356	181	56	44	389	206	19	526	331

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1429	1413	692	1429	1475	492	857	0	0	595	0	0
Stage 1	730	730	-	580	580	-	-	-	-	-	-	-
Stage 2	699	683	-	849	895	-	-	-	-	-	-	-
Critical Hdwy	7.22	6.62	6.32	7.22	6.62	6.32	4.22	-	-	4.22	-	-
Critical Hdwy Stg 1	6.22	5.62	-	6.22	5.62	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.22	5.62	-	6.22	5.62	-	-	-	-	-	-	-
Follow-up Hdwy	3.608	4.108	3.408	3.608	4.108	3.408	2.308	-	-	2.308	-	-
Pot Cap-1 Maneuver	~ 107	~ 131	427	~ 107	~ 120	557	742	-	-	934	-	-
Stage 1	399	413	-	483	484	-	-	-	-	-	-	-
Stage 2	415	434	-	~ 342	346	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	-	~ 114	427	-	~ 104	557	742	-	-	934	-	-
Mov Cap-2 Maneuver	-	~ 114	-	-	~ 104	-	-	-	-	-	-	-
Stage 1	362	396	-	439	439	-	-	-	-	-	-	-
Stage 2	199	394	-	~ 158	331	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s			0.7	0.2
HCM LOS	-	-		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	742	-	-	-	-	934	-	-
HCM Lane V/C Ratio	0.059	-	-	-	-	0.02	-	-
HCM Control Delay (s)	10.2	0	-	-	-	8.9	0	-
HCM Lane LOS	B	A	-	-	-	A	A	-
HCM 95th %tile Q(veh)	0.2	-	-	-	-	0.1	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection	
Int Delay, s/veh	0.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	16	0	456	1	0	460
Future Vol, veh/h	16	0	456	1	0	460
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	17	0	496	1	0	500

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	997	497	0	0	497	0
Stage 1	497	-	-	-	-	-
Stage 2	500	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	271	573	-	-	1067	-
Stage 1	611	-	-	-	-	-
Stage 2	609	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	271	573	-	-	1067	-
Mov Cap-2 Maneuver	271	-	-	-	-	-
Stage 1	611	-	-	-	-	-
Stage 2	609	-	-	-	-	-

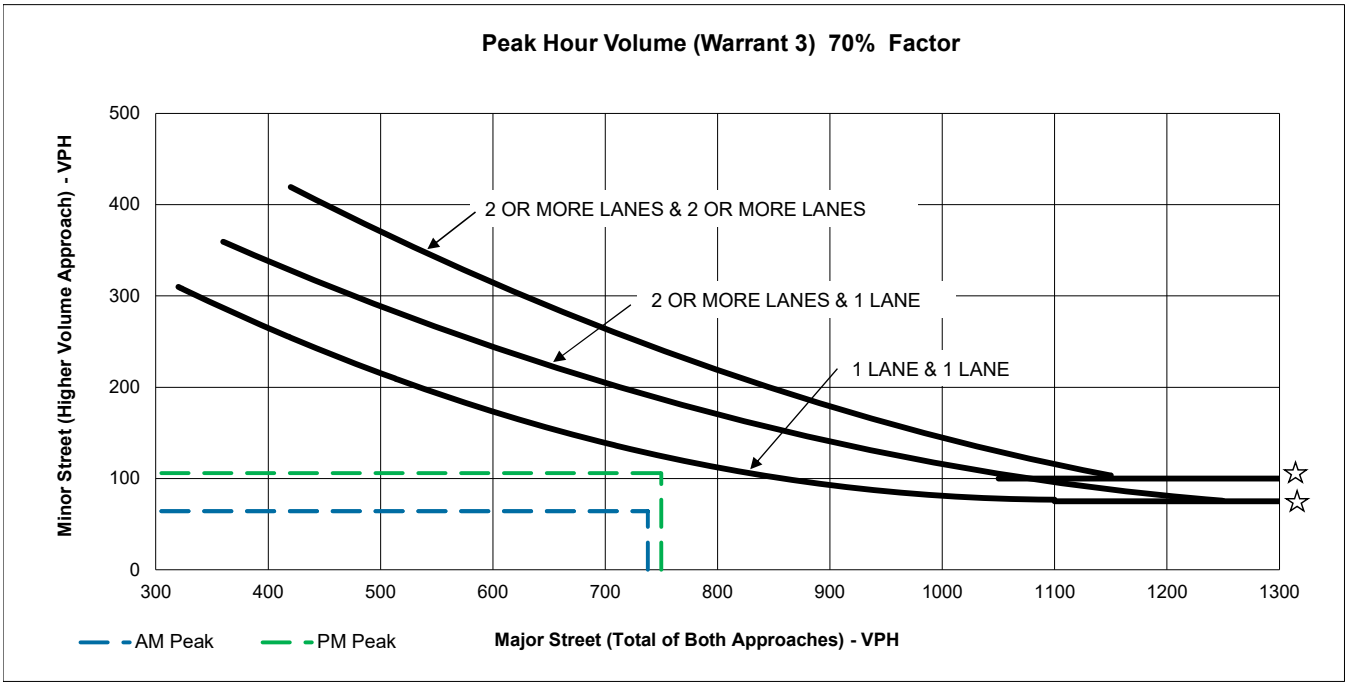
Approach	WB	NB	SB
HCM Control Delay, s	19.2	0	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	271	1067	-
HCM Lane V/C Ratio	-	-	0.064	-	-
HCM Control Delay (s)	-	-	19.2	0	-
HCM Lane LOS	-	-	C	A	-
HCM 95th %tile Q(veh)	-	-	0.2	0	-

Appendix C – California MUTCD Peak Hour Warrant 3 (70%) Worksheets

Both 1 Lane Approaches		2 or more Lane and One Lane Approaches		Both 2 or more Lane Approaches	
Major Street Total of Both Approaches	Minor Street High Volume Approach	Major Street Total of Both Approaches	Minor Street High Volume Approach	Major Street Total of Both Approaches	Minor Street High Volume Approach
400	265	400	340	400	N/A
500	210	500	290	500	375
600	180	600	240	600	310
700	150	700	200	700	260
800	90	800	175	800	220
900	100	900	140	900	180
1000	85	1000	120	1000	150
1100	75	1100	95	1150	100
1200	75	1200	80	1200	100
1300	75	1250	75	1300	100

** Note: Values in Table are approximate, actual curves based upon 2nd order polynomial equation*

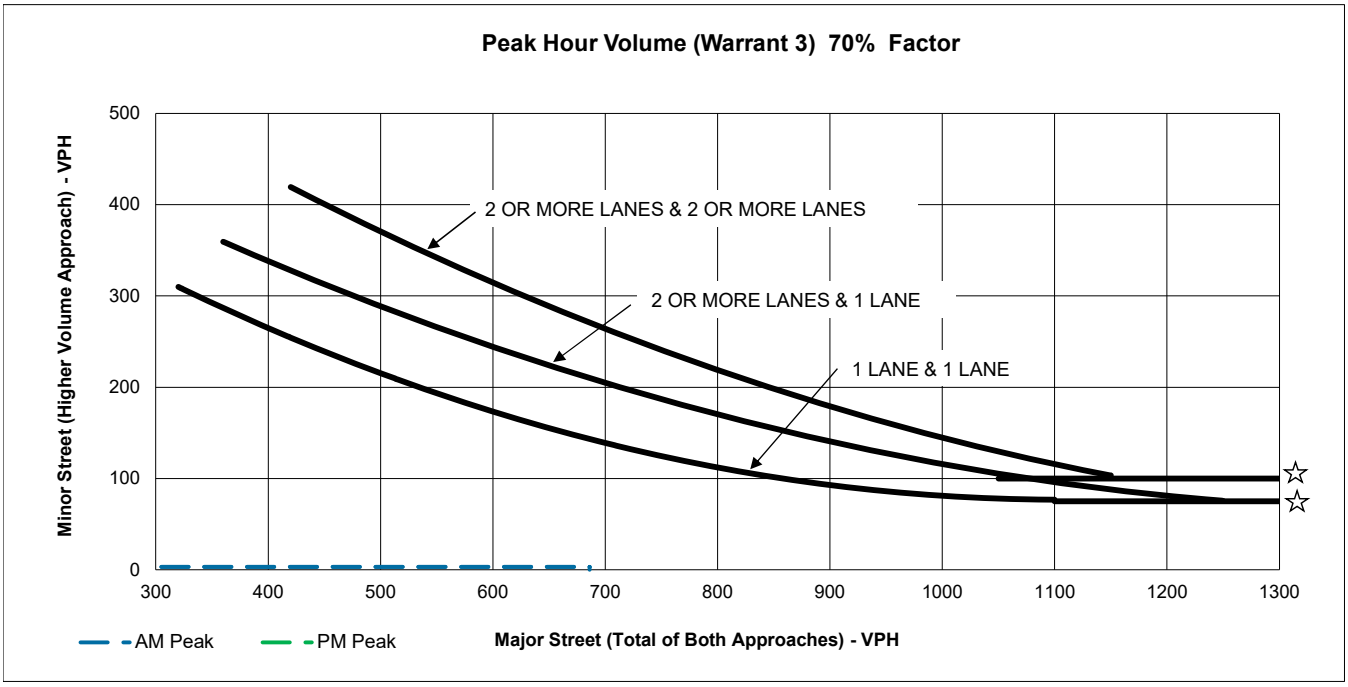


☆ NOTE:
100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR MINOR STREET APPROACH WITH TWO OR MORE LANES AND 75 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

Existing Plus Project (AM/PM)		
		Number of Lanes
Major Approach	Barstow Rd	1
Minor Approach	Rabbit Springs Rd	1
	AM Peak	PM Peak
Major St. Volume:	738	750
Minor St. Volume:	64	106
Warrant Met?:	No	No

Both 1 Lane Approaches		2 or more Lane and One Lane Approaches		Both 2 or more Lane Approaches	
Major Street Total of Both Approaches	Minor Street High Volume Approach	Major Street Total of Both Approaches	Minor Street High Volume Approach	Major Street Total of Both Approaches	Minor Street High Volume Approach
400	265	400	340	400	N/A
500	210	500	290	500	375
600	180	600	240	600	310
700	150	700	200	700	260
800	90	800	175	800	220
900	100	900	140	900	180
1000	85	1000	120	1000	150
1100	75	1100	95	1150	100
1200	75	1200	80	1200	100
1300	75	1250	75	1300	100

** Note: Values in Table are approximate, actual curves based upon 2nd order polynomial equation*

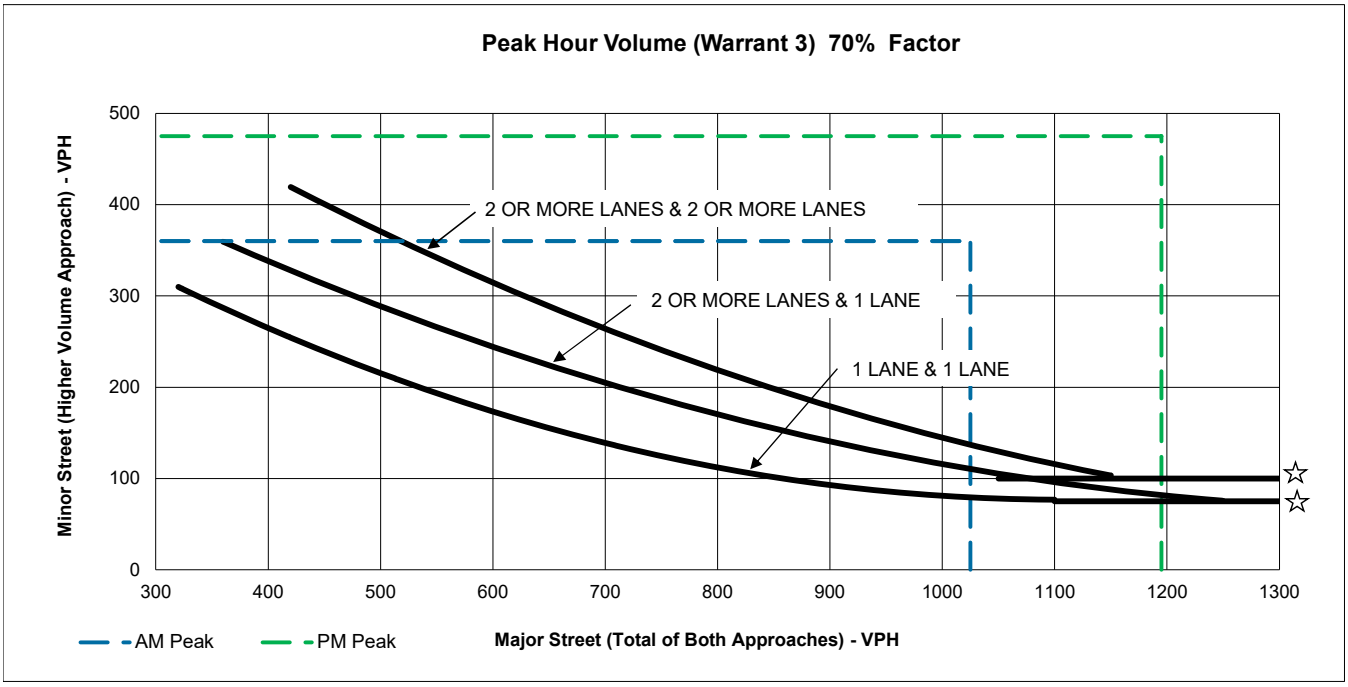


☆ NOTE:
100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR MINOR STREET APPROACH WITH TWO OR MORE LANES AND 75 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

Existing Plus Project (AM/PM)		
		Number of Lanes
Major Approach	Barstow Rd	1
Minor Approach	Access Road	1
	AM Peak	PM Peak
Major St. Volume:	686	230
Minor St. Volume:	3	527
Warrant Met?:	No	No

Both 1 Lane Approaches		2 or more Lane and One Lane Approaches		Both 2 or more Lane Approaches	
Major Street Total of Both Approaches	Minor Street High Volume Approach	Major Street Total of Both Approaches	Minor Street High Volume Approach	Major Street Total of Both Approaches	Minor Street High Volume Approach
400	265	400	340	400	N/A
500	210	500	290	500	375
600	180	600	240	600	310
700	150	700	200	700	260
800	90	800	175	800	220
900	100	900	140	900	180
1000	85	1000	120	1000	150
1100	75	1100	95	1150	100
1200	75	1200	80	1200	100
1300	75	1250	75	1300	100

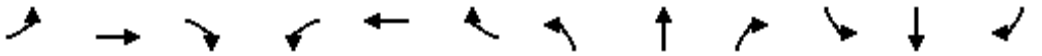
** Note: Values in Table are approximate, actual curves based upon 2nd order polynomial equation*



☆ NOTE:
100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR MINOR STREET APPROACH WITH TWO OR MORE LANES AND 75 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

2040 (AM/PM)		
		Number of Lanes
Major Approach	Barstow Rd	1
Minor Approach	Rabbit Springs Rd	1
	AM Peak	PM Peak
Major St. Volume:	1,025	1,195
Minor St. Volume:	360	475
Warrant Met?:	Yes	Yes

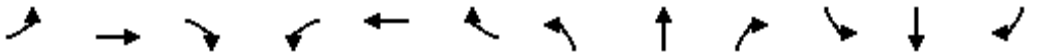
Appendix D – Mitigated Synchro 10 LOS Output Worksheets



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	90	95	175	125	70	0	65	200	100	25	530	105
Future Volume (veh/h)	90	95	175	125	70	0	65	200	100	25	530	105
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1693	1693	1693	1693	1693	1693	1693	1693	1693	1693	1693	1693
Adj Flow Rate, veh/h	98	103	190	136	76	0	71	217	109	27	576	114
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	14	14	14	14	14	14	14	14	14	14	14	14
Cap, veh/h	142	118	218	179	414	0	87	630	534	113	657	557
Arrive On Green	0.09	0.22	0.22	0.11	0.24	0.00	0.05	0.37	0.37	0.07	0.39	0.39
Sat Flow, veh/h	1612	533	983	1612	1693	0	1612	1693	1434	1612	1693	1434
Grp Volume(v), veh/h	98	0	293	136	76	0	71	217	109	27	576	114
Grp Sat Flow(s),veh/h/ln	1612	0	1516	1612	1693	0	1612	1693	1434	1612	1693	1434
Q Serve(g_s), s	4.2	0.0	13.3	5.8	2.5	0.0	3.1	6.6	3.7	1.1	22.5	3.8
Cycle Q Clear(g_c), s	4.2	0.0	13.3	5.8	2.5	0.0	3.1	6.6	3.7	1.1	22.5	3.8
Prop In Lane	1.00		0.65	1.00		0.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	142	0	336	179	414	0	87	630	534	113	657	557
V/C Ratio(X)	0.69	0.00	0.87	0.76	0.18	0.00	0.81	0.34	0.20	0.24	0.88	0.20
Avail Cap(c_a), veh/h	204	0	394	249	488	0	159	899	762	152	892	756
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	31.5	0.0	26.7	30.7	21.3	0.0	33.3	16.1	15.2	31.3	20.2	14.5
Incr Delay (d2), s/veh	5.9	0.0	17.0	8.5	0.2	0.0	16.1	0.3	0.2	1.1	7.6	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.7	0.0	5.9	2.5	0.9	0.0	1.5	2.3	1.1	0.4	8.8	1.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	37.4	0.0	43.7	39.2	21.5	0.0	49.4	16.4	15.4	32.3	27.8	14.6
LnGrp LOS	D	A	D	D	C	A	D	B	B	C	C	B
Approach Vol, veh/h		391			212			397			717	
Approach Delay, s/veh		42.1			32.8			22.0			25.8	
Approach LOS		D			C			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.0	30.5	11.9	19.8	7.9	31.6	10.2	21.4
Change Period (Y+Rc), s	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Max Green Setting (Gmax), s	6.7	37.8	11.0	18.5	7.0	37.5	9.0	20.5
Max Q Clear Time (g_c+I1), s	3.1	8.6	7.8	15.3	5.1	24.5	6.2	4.5
Green Ext Time (p_c), s	0.0	1.5	0.1	0.5	0.0	3.2	0.0	0.2

Intersection Summary	
HCM 6th Ctrl Delay	29.5
HCM 6th LOS	C



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	100	135	55	285	145	45	35	310	165	15	405	265
Future Volume (veh/h)	100	135	55	285	145	45	35	310	165	15	405	265
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1722	1722	1722	1722	1722	1722	1722	1722	1722	1722	1722	1722
Adj Flow Rate, veh/h	125	169	69	356	181	56	44	388	206	19	506	331
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Percent Heavy Veh, %	12	12	12	12	12	12	12	12	12	12	12	12
Cap, veh/h	156	202	82	395	403	125	65	601	510	36	571	484
Arrive On Green	0.10	0.17	0.17	0.24	0.32	0.32	0.04	0.35	0.35	0.02	0.33	0.33
Sat Flow, veh/h	1640	1162	475	1640	1262	390	1640	1722	1459	1640	1722	1459
Grp Volume(v), veh/h	125	0	238	356	0	237	44	388	206	19	506	331
Grp Sat Flow(s),veh/h/ln	1640	0	1637	1640	0	1652	1640	1722	1459	1640	1722	1459
Q Serve(g_s), s	5.7	0.0	10.8	16.2	0.0	8.8	2.0	14.6	8.2	0.9	21.4	15.1
Cycle Q Clear(g_c), s	5.7	0.0	10.8	16.2	0.0	8.8	2.0	14.6	8.2	0.9	21.4	15.1
Prop In Lane	1.00		0.29	1.00		0.24	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	156	0	285	395	0	527	65	601	510	36	571	484
V/C Ratio(X)	0.80	0.00	0.84	0.90	0.00	0.45	0.68	0.65	0.40	0.53	0.89	0.68
Avail Cap(c_a), veh/h	301	0	394	448	0	546	107	650	550	107	650	550
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	34.1	0.0	30.7	28.3	0.0	20.8	36.4	21.0	19.0	37.2	24.3	22.2
Incr Delay (d2), s/veh	9.0	0.0	10.7	19.7	0.0	0.6	11.6	2.0	0.5	11.9	12.9	3.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.5	0.0	4.8	7.9	0.0	3.1	1.0	5.5	2.6	0.5	9.7	5.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	43.1	0.0	41.4	48.0	0.0	21.4	48.1	23.0	19.5	49.1	37.2	25.2
LnGrp LOS	D	A	D	D	A	C	D	C	B	D	D	C
Approach Vol, veh/h		363			593			638			856	
Approach Delay, s/veh		42.0			37.4			23.6			32.8	
Approach LOS		D			D			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	6.2	30.9	22.5	17.4	7.5	29.5	11.3	28.5
Change Period (Y+Rc), s	4.5	4.0	4.0	4.0	4.5	4.0	4.0	4.0
Max Green Setting (Gmax), s	5.0	29.0	21.0	18.5	5.0	29.0	14.1	25.4
Max Q Clear Time (g_c+I1), s	2.9	16.6	18.2	12.8	4.0	23.4	7.7	10.8
Green Ext Time (p_c), s	0.0	2.3	0.3	0.6	0.0	2.1	0.1	1.0

Intersection Summary	
HCM 6th Ctrl Delay	32.9
HCM 6th LOS	C

Appendix M. Water Supply Assessment

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Sienna Solar and Storage Project

Water Supply Assessment

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July 2023

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Appendices

Appendix A DWR Guidebook for Implementation of Senate Bill 610

Acronyms and Abbreviations

AF	acre-feet
AFY	acre-feet per year
BAP	Base Annual Production
CEQA	California Environmental Quality Act
DWR	California Department of Water Resources
ESS	Energy Storage System
FPA	Free Production Allowance
gpm	gallons per minute
GSA	Groundwater Sustainability Agency
GSP	Groundwater Sustainability Plan
GWMP	Groundwater Management Plan
kV	kilovolt
PSY	Production Safe Yield
PV	photovoltaic
MW	megawatts
MV	medium voltage
mg/L	milligrams per liter
MWA	Mojave Water Agency
NMP	Nutrient Management Plan
O&M	operations and maintenance
PV	photovoltaic
RO	reverse osmosis
RWMG	Regional Water Management Group
SCE	Southern California Edison
SB	Senate Bill
SGMA	Sustainable Groundwater Management Act
SMP	Salt Management Plan
TDS	Total Dissolved Solids
USGS	United States Geological Survey
UWMP	Urban Water Management Plan
WSA	Water Supply Assessment

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1 Introduction

In 2001, California adopted Senate Bill (SB) 610 and SB 221, amending the California Water Code to require that certain types of development projects provide detailed assessments of water supply availability and reliability to city and county decision-makers prior to project approval. These Water Supply Assessments (WSAs) identify water supply for an identified project over a 20-year projection under varying climactic (drought) conditions. The primary purpose of these requirements is to promote collaborative planning between local water supply and land use decisions.

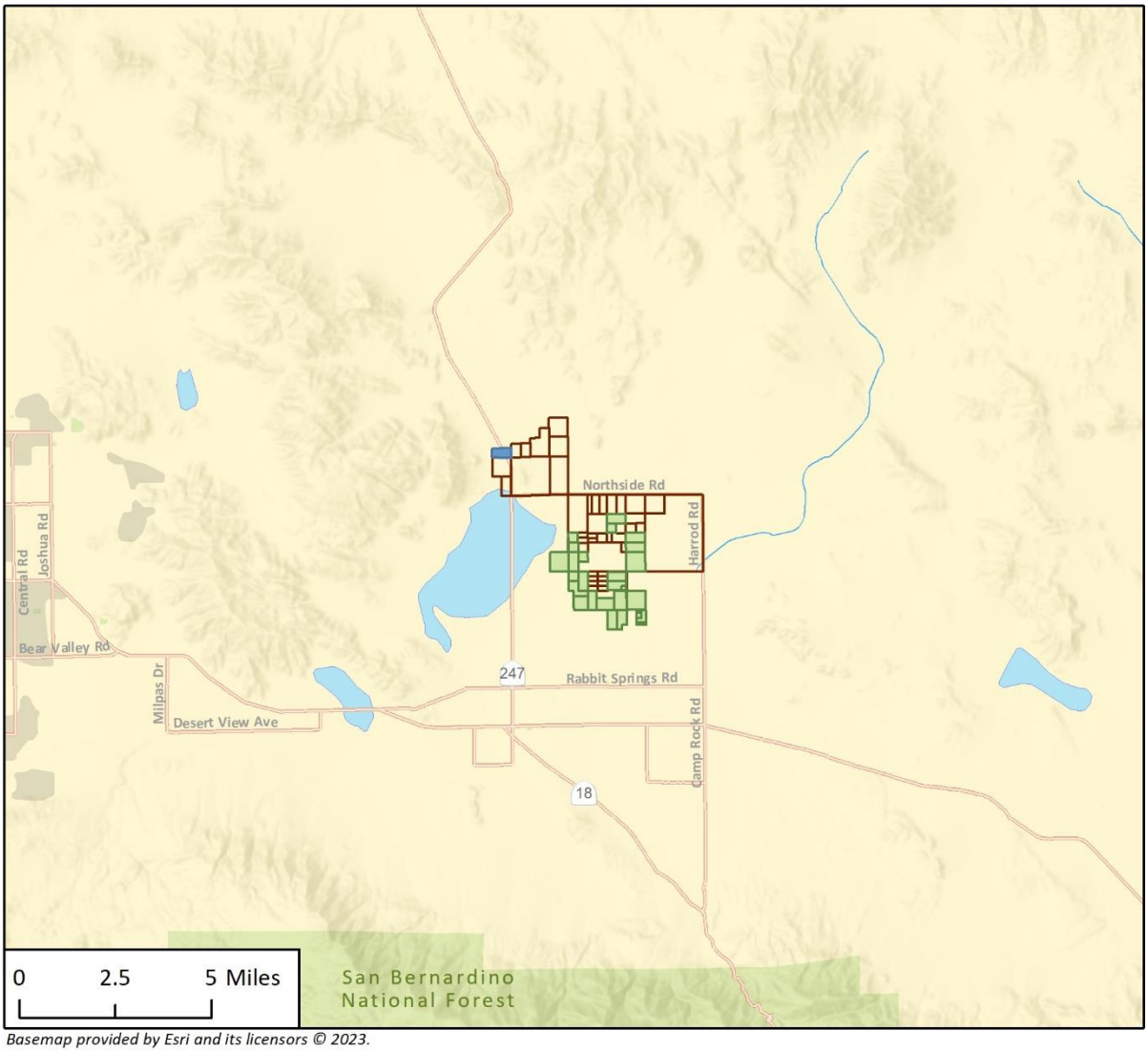
SB 610 was not originally clear as to whether renewable energy developments are subject to SB 610 and require the preparation of a WSA. SB 267 was signed into law on October 8, 2011, amending California's Water Law to revise the definition of "project" specified in SB 610. Under SB 267, wind and photovoltaic (PV) projects that consumed less than 75 acre-feet per year (AFY) of water were not considered to be a "project" under SB 610; subsequently, a WSA would not be required for this type of project. The renewable energy exclusions provided by SB 267 expired in January 2017. Since the language of SB 610 remains unclear as to whether renewable energy projects meet the definition of a "project," this WSA takes a conservative approach and considers renewable energy projects to be subject to the requirements of SB 610.

Water requirements associated with the Sienna Solar and Storage Project ("project" or "proposed project") are described in Section 2.3, *Project Water Demands*. The Project is located in the Lucerne Valley Subbasin in the Este Subarea of the Mojave Basin Area. Water supply for the project would either be sourced from the underlying groundwater basin, using existing water extraction rights associated with the subject properties, or it would be purchased from a local retail supplier and trucked to the site. Most local retail providers in the project area do not meet the Urban Water Management Planning Act's minimum threshold statutory criteria to be required to prepare an Urban Water Management Plan (UWMP). The largest retail purveyors near the Project are the Jubilee Mutual Water Company, and the Golden State Water Company, both of which overlie the Lucerne Valley Subbasin, as with the proposed project, and are assessed herein.

In accordance with California Water Code, a WSA must examine the availability of an identified water supply under normal-year (no drought), single-dry-year (limited drought), and multiple-dry-year (extended drought) conditions, over a 20-year projection. The WSA must account for the projected water demand of the project in addition to other existing and planned future uses of the identified water supply, including agricultural and manufacturing uses, to the extent information is available. A common lack of data for groundwater usage and replenishment rates often makes it difficult to estimate baseline conditions regarding water supply availability; therefore, where data is not available to make quantitative estimates of water supply, reasonable assumptions are made based on available information and data. In the interest of effective planning, this WSA examines the water supply up to the year 2055 to encompass the entire lifespan of the proposed project.

Figure 1 shows the regional location of the proposed Project, Figure 2 shows the 27 parcels that comprise the site, and Figure 3 shows the boundaries of the Lucerne Valley Subbasin within the Este Subarea of the Mojave Basin Area. The steps followed to ensure compliance of this WSA with California Water Code are described in Attachment A to this WSA.

Figure 1 Regional Location and Project Site



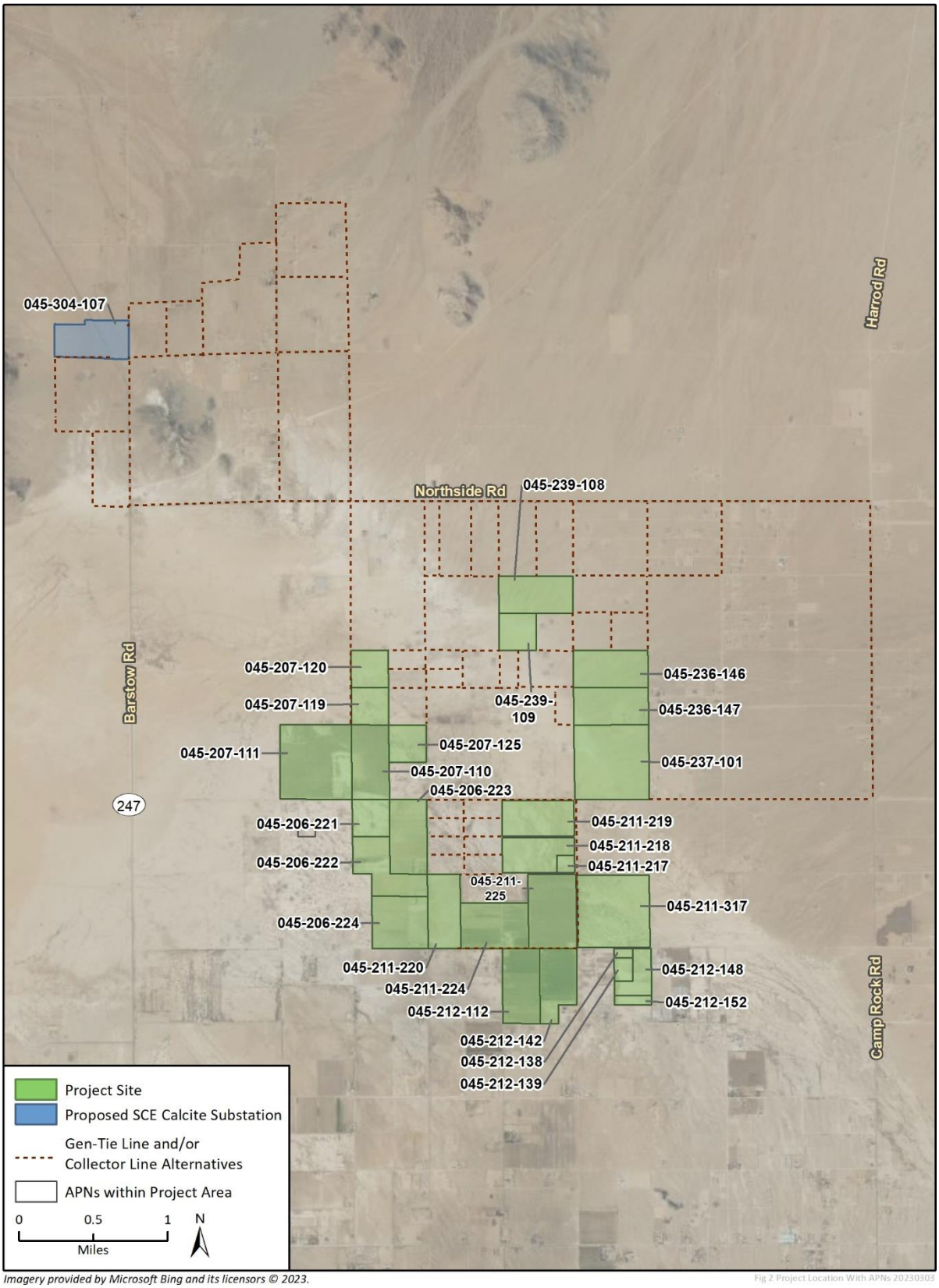
Basemap provided by Esri and its licensors © 2023.

Project Site
Proposed SCE Calcite Substation
Gen-tie Line and/or
Collector Line Alternatives

N



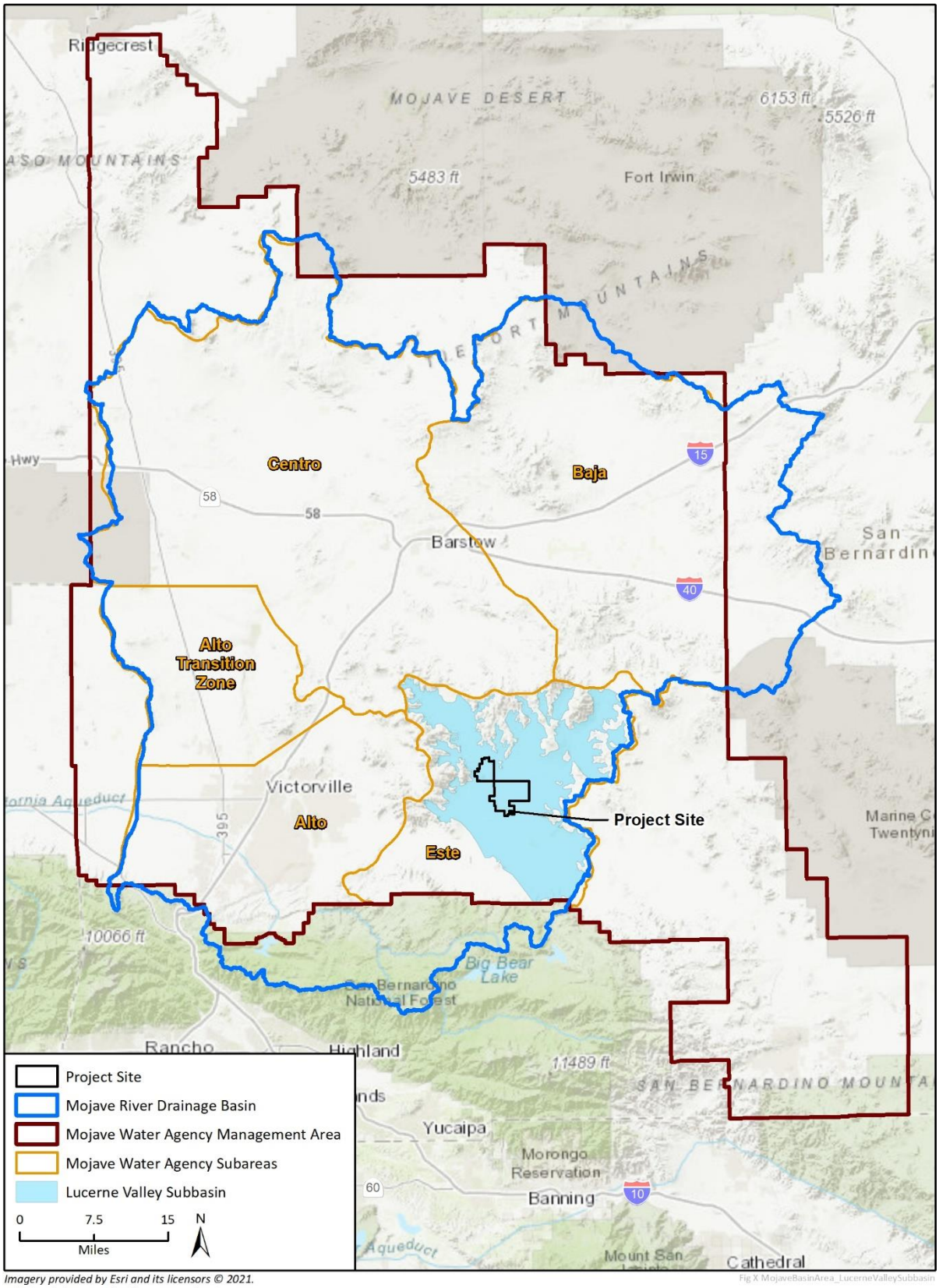
Figure 2 Project Location with Assesor Parcel Numbers



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Fig 2 Project Location With APNs 20230303

Figure 3 Groundwater Resources and Management Area



Imagery provided by Esri and its licensors © 2021.
Additional data provided by USGS and Mojave Water Agency, 2021.

Fig X MojaveBasinArea_LucerneValleySubbasin

2 Project and Property Description

2.1 Location and Setting

The proposed Project area encompasses 1,854.7 acres, with an additional 77 acres dedicated to a substation, for a total Project footprint of 1,931.7 acres, located in the southwestern portion of Mojave Desert in unincorporated San Bernardino County, California. The Project is within the historic bed of Lucerne Dry Lake and along its eastern and northern margins. The Project is 35 miles south of the City of Barstow, 45 miles northwest of the town of Yucca Valley, 15 miles southeast of the town of Apple Valley, and 20 miles north of the City of Big Bear Lake. Barstow Road would provide primary access to the Project. Land uses in the area are primarily farmland, open space, and transportation corridors, with some rural residential and recreational uses consisting primarily of open space enjoyment and off highway vehicle (OHV) activities. Table 1 lists the Assessor Parcel Number (APN) and associated acreage of each parcel within the Project, as shown on Figure 2; these are used to inform the discussion of water supply allocations associated with the Mojave Area Basin Adjudication Judgement, which governs groundwater use in the Project area.

Table 1 Parcels Within the Project Area

APN	Acreage (per Assessor's Map)	APN	Acreage (per Assessor's Map)
45207120	40.201988	45211217	8.8374063
45207119	40.21116	45211317	151.40044
45207111	154.92994	45212112	80.724638
45207125	40.206093	45212142	70.847518
45207110	80.411658	45212138	5.0164927
45206223	80.447237	45212139	12.554045
45206221	40.207435	45212148	33.286326
45206222	76.437885	45212152	10.188996
45206224	84.470432	45237101	161.27385
45211220	70.208881	45236147	80.707295
45211224	89.9045	45236146	80.667639
45211225	103.44547	45239109	39.915267
45211219	73.471912	45239108	80.023993
45211218	64.725183		

2.2 Description of Project

The proposed project is a utility-scale solar energy generation and battery energy storage system and a parcel subdivision. The solar facility would generate up to 525 megawatts (MW) of photovoltaic (PV) power on 1,854.7 acres, with an additional 77 acres dedicated to a substation, for a total Project footprint of 1,931.7 acres. The Project is located in unincorporated San Bernardino County in the Lucerne Valley area (see Figure 2). Power generated by the Project would be delivered from the site via 230-kilovolt (kV) overhead and/or underground generation-interconnect ("gen-tie") lines to a new Southern California Edison (SCE) 230-kV substation. The Project applicant would secure Conditional Use Permits from San Bernardino County, along with permits from other relevant agencies as required by law.

Primary components of the proposed Project are detailed in the following sections, and include: PV modules, energy storage system, substation, gen-tie lines, water storage tank, water quality treatment system, operations and maintenance building, site security and fencing, and site lighting. As discussed in the analysis provided in Section 2.3, *Project Water Demands*, water demand for the project has been estimated based upon the water demands of other similarly scaled and located projects, as well as publicly available information and guidance developed by the USGS and Sandia National Laboratories (SNL) (SNL 2013).

2.2.1 Solar Photovoltaic System

The Project would use solar PV panels or modules on mounting frameworks to convert sunlight directly into electricity. The solar panel array would be arranged in groups called blocks, with

inverter stations generally located centrally within the blocks. The solar blocks would produce direct electrical current (DC), which is converted to alternating current (AC) at the inverter stations.

During operation and maintenance of the PV panels, they would be washed with water on an as-needed basis. The frequency of panel washing activities will primarily depend on weather conditions and the associated rate of dust accumulation. Cleaning the PV panels of accumulated dust and debris is necessary to maintain operational efficiency of the PV panels. In addition, it is necessary that the water used to wash PV panels does not have high concentrations of total dissolved solids (TDS), which can cling to the PV panels and reduce operational efficiency; therefore, to be conservative for the purposes of this WSA, it is assumed the Project would include a water quality treatment system to reduce TDS concentrations in wash water. Please see Section 2.3 for discussion of water demands for solar panel washing and water quality treatment.

2.2.2 Project Substation and Gen-Ties

Energy output from the inverter stations would be transferred via electrical conduits and electrical conductor wires to an on-site substation. Substations typically include a small control building (roughly 500 square feet), comprised of either prefabricated concrete or steel. The control building would house voltage switch gear and metering equipment, a station supply transformer, and a control technology room for a main computer, distribution euipment, and intrusion detection system. From the Project substation, power would be transmitted to SCE's planned Calcite Substation via up to 230-kV overhead and/or underground gen-tie lines.

No water demand is associated with operation of the substation and gen-tie lines.

2.2.3 Energy Storage

An energy storage system (ESS) may be installed as part of the Project to capture energy produced at one time for use at a later time. Energy storage involves converting energy from forms that are difficult to store to forms that may be stored more conveniently or economically storable forms. The ESS would be located at or near the substation on site, or at the inverter station. The ESS would consist of modular and scalable battery packs and battery control systems that conform to national safety standards. ESS modules typically consist of ISO-standard containers housed in pad- or post-mounted, stackable metal structures; ESS modules may alternatively be housed in a dedicated building(s). The actual dimensions and number of ESS modules and structures required for the Project will be determined by the applicant, supplier, and configuration chosen, as well as on- off-taker/power purchase agreement requirements, and County building standards.

No water demand is associated with operation of the ESS.

2.2.4 Operations and Maintenance Building

The proposed Project components would include an operations and maintenance (O&M) building, which is assumed to include an office space, repair and storage area, control room, and restroom facilities. Roads, driveways, and parking lot entrances would be constructed in accordance with San Bernardino standards and California Accessibility Regulations. For the purposes of this WSA, and based on the size of similar buildings at other utility-scale solar installations, the O&M building is estimated to cover approximately 2,000 square feet.

Water demands associated with the O&M building are described in Section 2.3.2

2.2.5 Reverse Osmosis/Deionization Water Treatment System

As discussed in Section 4.2*,* Lucerne Valley Subbasin groundwater is characterized by high concentrations of total dissolved solids (TDS). High concentrations of TDS in wash water can leave behind a residue that decreases panel efficiency; therefore, water for washing the PV panels must not have high TDS concentrations. Because local groundwater may be used to meet the Project's water demands, and the local groundwater is known to have high TDS concentrations, for the purposes of this WSA it is assumed that water would need to be treated prior to application on the solar panels. It is further assumed that a combined reverse osmosis (RO) and deionization (DI) system would be used to treat the water used for panel washing.

Water demands for the panel washing are discussed in Section 2.3.2.

2.2.6 Water Storage Tanks

It is assumed for the purposes of this WSA that a water supply for emergency fire suppression would be stored on-site in an above-ground water storage tank with a capacity of up to 80,000 gallons (0.25 acre-foot); the amount of water stored on-site for fire suppression may be greater if required by local fire safety requirements. The water storage tank would be placed on site, near the O&M building. The storage tank would have the appropriate fire department connections so it could be used for fire suppression on an as-needed emergency basis.

Water demand associated with the Project's water storage tank is discussed in Section 2.3.2.

2.2.7 Construction

The duration of Project construction is currently undetermined. An analysis of utility-scale solar projects of similar size and in similar conditions, both operating, under construction, and planned, reveals that construction periods generally range between nine and 18 months, with projects over twice as large as the proposed Project rarely exceeding two years for construction (Solar Energy Industries Association 2021). Construction of the proposed Project would occur over approximately 12 to 24 months.

For the purposes of this WSA, construction water demands are analyzed for a 12-month construction period. The project's monthly water demands would be higher for a 12-month construction period than a 24-month construction period, because the project's total construction water demands would remain the same regardless of the duration of construction. Therefore, assuming a 12-month construction period provides a more conservative analysis than would be reflected by distributing water demands over a 24-month construction period.

Construction activities would include site preparation, installation of interconnection facilities and ESS, cable installation, pile and skid installation, tracker and module installation, and site cleanup. All construction staging areas would be located within the development footprint of the solar facility.

Water demands associated with construction are described in Section 2.3.1, and detailed in Table 2.

2.2.8 Operation and Maintenance

The proposed Project is anticipated to have an operating life of 30 years, which is 10 years longer than the 20-year projection required by California Water Code (as amended by SB 610) to be considered in a WSA. However, for the purposes of full disclosure and to provide a conservative

analysis, this WSA presents all anticipated water demands of the Project over the entirety of its anticipated lifespan, including for the final decommissioning or repowering phase.

During the O&M phase, the proposed Project would passively generate power during daylight hours over seven days per week, 365 days per year. The proposed Project facilities would be tested, maintained, and regularly inspected and repaired as needed. The ESS would store and dispatch power during both daylight and non-daylight hours as required by grid operators year-round.

Up to 15 O&M staff may be on-site at a time for as-needed facility maintenance and repairs. As many as four times per year, up to 12 workers could be on site to support annual module washing activities. Solar module washing would include the use of a water truck and high-pressure washer to clean dust and debris accumulated on the solar modules. In addition, it is conservatively assumed that an on-site water treatment system would be implemented to treat locally-sourced groundwater for panel-washing purposes during the O&M period.

Water demands associated with Project O&M are described in Section 2.3.2.

2.2.9 Decommissioning or Repowering

Once the functional operating life of the Project is over, the facility would either be decommissioned to remove Project components and restore the site, or it would be repowered to continue providing solar energy generation and storage. Project decommissioning would occur in accordance with the expiration of the Conditional Use Permit and would involve the removal of above-grade facilities, buried electrical conduit, and all concrete foundations in accordance with a project-specific Decommissioning Plan. Equipment would be repurposed off-site, recycled, or disposed of in a landfill as appropriate. It is anticipated that repowering would also require ground-disturbing activities to replace or upgrade Project components that were not otherwise replaced or upgraded as part of regular O&M for the Project.

For the purposes of this WSA, it is assumed that water demands associated with decommissioning or repowering the Project would be comparable in duration and scale to water demands associated with the construction period, and would primarily be related to dust suppression and soil compaction. As discussed above in Section 2.2.7, although construction activities could occur for up to 24 months, for the purposes of this WSA, water demands are analyzed for a 12-month construction period as a more conservative approach. Because decommissioning or repowering would be comparable in duration and scale to the construction period, it is assumed that this phase would occur over 12 months, to provide a more conservative analysis for this WSA.

2.3 Project Water Demands

The proposed Project would require a temporary water supply during the construction and decommissioning/repowering phases, as well as a long-term water supply over the Project's 30-year operational lifetime. As discussed above, the construction and decommissioning/repowering phases would both occur over 12 to 24 months and, for the purposes of this WSA, analysis of water demands assumes a 12-month construction period because this provides a more conservative analysis that distributing water demands over a 24-month period. If sufficient water is determined to be available under the most conservative approach (12 months) then sufficient water will also be available under longer construction and decommissioning/repowering periods (up to 24 months).

For the purposes of this WSA, it is assumed the Project's water supply would be obtained from on-

or off-site groundwater wells in the Lucerne Valley Subbasin of the Mojave Basin Area, and/or it would be purchased from local water purveyor and trucked to the Project. As described in Section 4.3, any water pumped from the local groundwater basin underlying the Project area would be regulated by Mojave Water Agency in its role as Watermaster for the Mojave Basin Area.

Table 2 details the estimated water demands associated with each Project phase, including construction, operation, and decommissioning. Conservative assumptions were developed and applied to each of the Project's water-demanding activities to inform the estimates provided in Table 2; these assumptions are detailed following the table below.

Table 2 Project Water Demands

Project Phase (Duration of Phase)	Annual Demand (acre-feet/year)	Total Demand (acre-feet)
Construction[1]		
Dust Suppression	225	225.0
Total Construction	**225**	**225.0**
Operation and Maintenance (30 years)[2]		
Panel Washing[3]	25	750.0
Water Treatment Brine[4]	25	750.0
Fire Suppression[5]	0.25	7.5
O&M Building[6]	0.11	3.3
Total O&M	**50.36**	**1,510.8**
Decommissioning[7]		
Dust Suppression	225	225.0
Total Decommissioning	**225**	**225.0**
TOTAL DEMAND	-	**1,960.8**
Amortized Demand[8]	**61.28**	

[1] The construction and decommissioning periods would each occur over 12 to 24 months. The total water demand for each phase is assumed to be 225 acre-feet regardless of the duration of the respective Project phase; as such, a longer duration would result in a lower monthly demand. For the purposes of this WSA, water demands are analyzed for a 12-month period for each phase, as this provides a more conservative analysis than assuming a 24-month duration, which would reduce monthly water demands by approximately half (i.e., if sufficient water would be available for a 12-month period, then sufficient water would also be available for a 24-month period because the longer the phase duration, the lower the monthly water demands will be.

[2] The O&M period is assumed to be 30 years, which is 10 years longer than the 20-year projection required by California Water Code (as amended by SB 610) to be considered in a WSA. However, for the purposes of full disclosure and to provide a conservative analysis, this table presents all anticipated water demands of the Project over the entirety of its anticipated operational lifespan of 30 years. During the O&M period, the activities requiring water supply would include washing the solar panels (including accounting for the water in the brine waste stream produced from water treatment), for emergency fire suppression water, and for uses in the O&M building.

[3] This analysis assumes that solar PV panel washing requires approximately 0.05 AFY of water per MW of the Project, based on other utility-scale solar PV projects in California (SNL 2013). The Project is anticipated to produce up to 500 MW. Therefore, operational requirements for solar PV panel washing would be approximately 25 AFY. Please see Section 2.3.2.

[4] Water treatment brine consists of the waste product from the Project's assumed water treatment system. This analysis conservatively assumes the recovery rate of the water treatment system will be approximately 50 percent, meaning that for every gallon of clean water produced, one gallon of waste product (concentrated brine) would be produced, such that two gallons of raw water are required to produce one gallon of treated water (and one gallon of water treatment brine). This is likely an over-estimation; please see Section 2.3.2.

[5] This analysis assumes that approximately 0.25 acre-feet of water would be stored on-site and designated for emergency fire suppression use only. In addition, this analysis conservatively assumes that the fire suppression water would be entirely replenished each year; this is likely an over-estimation, as emergency fire suppression activities are unlikely to occur on an annual basis.

[6] This analysis assumes the Project would include one O&M building encompassing approximately 2,000 square feet, and further assumes that an adjusted water demand factor for commercial land uses of approximately 2,000 gallons per day per acre, or 0.046 gallons per day per square foot (Hesperia 2008) is appropriate for the Project's O&M building. Please see Section 2.3.2.

[7] Decommissioning activities for the proposed Project are not specifically known at this time; therefore, in order to provide a conservative analysis that accounts for all Project phases, this analysis assumes that the duration of decommissioning activities would be the same as the duration of construction activities. As discussed above (see footnote no. 1), Project construction would occur over 12 to 24 months; for the purposes of this WSA, a 12-month construction period is assumed because this provides a more conservative analysis of water supply availability than a 24-month period, which would reduce monthly water demands by approximately half.

[8] The amortized demand of 61.28 AFY is the Project's total estimated water demand (1,960.8 acre-feet) averaged over the cumulative duration of all Project phases (32 years).

AFY = acre-feet per year

As shown in Table 2, the Project's amortized annual water demand is 61.28 AFY, which accounts for the total construction (one year), operation and maintenance (30 years), and decommissioning (one year) period water demands of 1,960.8 acre-feet divided by the Project's cumulative total duration of 32 years. The amortized water demand is considered a useful tool in assessing long-term water supply availability. For the purposes of this WSA, water supply availability is considered for each phase's anticipated annual demand, as well as the Project's cumulative total demand. Water demands associated with each Project component are discussed in detail in Sections 2.2.1 through 2.2.9. Water supplies that would be used to meet the Project's water demands are discussed in Section 4, *Water Supply Analysis.*

2.3.1 Construction Water Assumptions

As shown in Table 2, construction of the proposed Project would require approximately 225 acre-feet of water for dust suppression over the assumed 12-month construction period. The following additional assumptions were developed to inform the analysis provided herein:

- Water supply for Project construction would either be produced from the local Lucerne Valley Subbasin, or it would be purchased from a local purveyor and trucked to the Project area; as discussed in Section 5, this analysis assumes the Jubilee Mutual Water Company and the Golden State Water Company could potentially serve the Project
- If construction water is pumped from an off-site groundwater well, such as those owned by Jubilee Mutual Water Company or Golden State Water Company, it is assumed such a well would source water from the Lucerne Valley Subbasin
- Drinking water for construction personnel would be provided as bottled water, and would be delivered to the Project area via truck
- Restroom facilities would be provided as portable units to be serviced by licensed providers, and would not require an on-site water source
- Construction water uses would not require an on-site water quality treatment system, as high TDS concentrations in the local groundwater do not adversely affect the water's effectiveness in use for on-site dust suppression
- Construction water demands do not include water for concrete production, because it is assumed that concrete for Project features such as but not limited to the footings for solar PV modules would be purchased from a local retailer that would provide pre-mixed concrete, and the retailer would therefore be responsible for ensuring the water supply availability for production of their product

2.3.2 Operational Water Assumptions

During the Project's 30-year lifetime, water demands would be associated with annual washing of the solar PV panels to maintain efficiency, potential wastewater associated with water treatment by an RO/DI system, emergency fire suppression water (stored on-site), and potential operation of the Project's O&M building. For the purposes of this WSA, additional assumptions were developed to provide a conservative analysis respective to the long-term water supply availability and reliability for the Project. Based upon these additional assumptions, which are detailed below and in the Table 2 notes, this WSA assesses an operational water demand of up to 50.36 AFY for each year the Project is operational.

Panel Washing

To maintain energy production efficiency of the PV solar panels, they would be washed with water once per year to clean accumulated dust from the panel surfaces. This requires the wash water to have low concentrations of TDS so that salts in the wash water are not deposited on the panel surfaces, which would decrease efficiency of the panels. It is assumed the Project's water supply would be sourced from the local groundwater, or it would be purchased from a local purveyor and trucked to the site. As discussed in Section 2.2.5, the Lucerne Valley Subbasin has elevated TDS concentrations, and it is therefore assumed that a combined RO/DI system would be installed on-site and used to treat the Project's water supply and reduce TDS concentration prior to use as panel washing water.

Industrial RO systems typically run between 50 and 85 percent recovery, depending on the feed water characteristics and other design considerations (PureTec Industrial Water 2019). Recovery is the amount of water permeated per unit time, typically measured in gallons per minute (gpm) and expressed as a percentage of the source water flow rate. In other words, an 85 percent recovery rate means that 85 percent of the amount of water fed into a system is produced as treated water, and 15 percent is produced as concentrate for disposal. Source water that has higher concentrations of water quality constituents results in lower recovery rates from a RO/DI system (PurTec 2019). Because water from the Lucerne Valley Subbasin is known to have high concentrations of TDS, it is conservatively assumed the RO recovery rate for the Project would be at the lowest level of approximately 50 percent. As such, for every 100 gallons of source water that enters the proposed RO/DI system, 50 gallons would be produced as clean wash water, and 50 gallons would be produced as concentrate for disposal. This is reflected in the estimates provided in Table 2.

The solar PV panel washing analysis relies on an assumed water demand rate of 0.05 AFY of water per MW, based on other utility-scale solar PV projects in California (SNL 2013). As discussed in Section 2.2, *Description of Project*, the Project is anticipated to produce up to 500 MW. Therefore, operational requirements for solar PV panel washing would be approximately 25 AFY. In addition, based on the conservatively assumed 50 percent recovery rate of the RO/DI water treatment system, the Project's operational water demand has been expanded to account for this, such that the total water demand associated with panel washing would be approximately 50 AFY, which includes 25 AFY for the wash water plus 25 AFY for wastewater produced by a potential RO/DI system[1].

Fire Suppression

It is assumed that a water supply for emergency fire suppression would be stored in the Project area throughout the O&M period. The San Bernardino County Fire Protection District may recommend as a condition of approval of the Project that a supply of emergency fire suppression water is stored on the Project area for as needed use. Other recent solar energy developments were reviewed to determine that approximately 29 gallons/acre is a typical quantity of fire suppression water stored on-site for emergency purposes. Accordingly, this factor was applied to the Project's proposed 1,931.7 acres of development area, for an estimated total of 56,019 gallons of water for emergency fire suppression. The Project's fire suppression water would be contained in an on-site storage tank sized for up to 80,000 gallons of water, or approximately 0.25 acre-feet. This size is slightly larger than the Project's required tank size for emergency fire suppression, allowing for the storage of

[1] Assuming a 50 percent recovery rate for water treatment, 50 acre-feet of raw water would need to enter the treatment system, so that 25 acre-feet (50 percent of 50 acre-feet) of clean (treated) water will be produced for use in panel washing operations.

excess water not used during a given calendar year and ensuring that sufficient water remains in storage on site to respond to emergencies as needed.

It is unlikely that O&M of the Project would require use of the full 0.25 acre-feet of stored fire suppression water every year; however, in the interest of providing a conservative analysis for this WSA, it is assumed that the 0.25 acre-feet of water would be replaced every year. Excess water may be used for dust suppression as needed.

O&M Building

The Project may include one O&M building which is assumed to encompass approximately 2,000 square feet. Hesperia Water District, a nearby water district in San Bernardino County, identifies an adjusted water demand factor for commercial land uses of approximately 2,000 gallons per day per acre, or 0.046 gallons per day per square foot (Hesperia 2008). Using this adjusted water demand factor, commercial land uses totaling 2,000 square feet in size would require approximately 92 gallons per day, or approximately 0.11 AFY. To provide a conservative analysis for this WSA, the Project's O&M building is considered a commercial land use and would require 0.11 AFY to support operations. It is assumed this water supply would be stored on-site and replenished annually. During Project operation, sanitary waste produced at the O&M building would be held in a tank system and regularly removed and transported via truck to an approved off-site disposal facility, such that the O&M building would not include a septic system and leach field.

2.3.3 Decommissioning Water Assumptions

For the purposes of quantifying total water demand of the proposed Project, it is assumed the Project's potential decommissioning or repowering phase would be comparable to the Project's construction period, with a duration of 12 months and a water demand of 225 acre-feet.

3 Senate Bill 610 Applicability

This regulatory setting discussion is specific to the assessment of water supply availability, as required by SB 610, which became effective in 2002 and amended California Water Code to require detailed analysis of water supply availability for certain types of development projects. The primary purpose of SB 610 is to improve the linkage between water and land use planning by ensuring greater communication between water providers and local planning agencies and guaranteeing land use decisions for certain large development projects are fully informed as to whether sufficient water supplies are available to meet Project demands. SB 610 requires the preparation of a WSA for a project that is subject to CEQA and meets certain requirements, each of which is discussed below.

California Water Code, as amended by SB 610, requires a WSA address the following questions:

- Is there a public water system that will service the proposed project? (Section 3.3)
- Is there a current Urban Water Management Plan that accounts for the project demand? (Section 3.4)
- Is groundwater a component of the supplies for the project? (Section 3.5)
- Are there sufficient supplies to serve the project over the next twenty years? (Section 3.6)

The primary question to be answered in a WSA is:

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

The following sections address the SB 610 WSA questions as they relate to the Project.

3.1 Is the Proposed Project Subject to CEQA?

California Water Code Section 10910(a) states any city or county that determines a project, as defined in Section 10912, is subject to CEQA must prepare a WSA. Projects requiring an issuance of a discretionary permit by a public agency, projects undertaken by a public agency, and projects funded by a public agency are subject to CEQA.

The proposed Project requires issuance of discretionary permits, consisting of a Conditional Use Permit from San Bernardino County. Therefore, the Project is subject to CEQA.

3.2 Is the Proposed Project a "Project" Under SB 610?

California Water Code, as amended by SB 610, states any proposed action that meets the definition of "project" under SB 610 is required to prepare a WSA to demonstrate whether sufficient water supplies are available to meet requirements of the Project under normal and drought conditions. Water Code Section 10912 defines a "project" as any one of six different development types with certain water use requirements. Each identified development type and associated water requirements is addressed below.

3.2.1 Residential Development

A proposed residential development of more than 500 dwelling units is defined as a "project" under SB 610.

The Project is not a residential development.

3.2.2 Shopping Center or Business Establishment

A proposed shopping center or business establishment employing more than 1,000 persons or having more than 500,000 square feet of floor space is defined as a "project" under SB 610.

The Project is not a shopping center or business establishment.

3.2.3 Commercial Office Building

A proposed commercial office building employing more than 1,000 persons or having more than 250,000 square feet of floor space is defined as a "project" under SB 610.

The Project is not a commercial office building.

3.2.4 Hotel or Motel

A proposed hotel or motel, or both, having more than 500 rooms is defined as a "project" under SB-610.

The Project is not a hotel or motel.

3.2.5 Industrial, Manufacturing, or Processing Plant or Industrial Park

A proposed industrial, manufacturing, or processing plant, or industrial park planned to house more than 1,000 persons, occupying more than 40 acres of land, or having more than 650,000 square feet of floor area is defined as a "project" under SB 610.

The Project is not a manufacturing plant, processing plant, or industrial park. However, the Project is an industrial facility occupying more than 40 acres. As such, this analysis conservatively determined the Project to be considered a "project" under Water Code Section 10912. Therefore, this WSA has been prepared to satisfy the requirements of SB 610.

3.3 Is There a Public Water System that Will Serve the Proposed Project?

California Water Code Section 10912 defines a "public water system" as a system that has 3,000 or more service connections and provides piped water to the public for human consumption.

Furthermore, California Water Code Section 10910 (b) states:

> The city or county, at the time that it determines whether an environmental impact report, a negative declaration, or a mitigated negative declaration is required for any project subject to the California Environmental Quality Act pursuant to Section 21080.1 of the Public Resources Code , shall identify any water system whose service area includes the project site and any water system adjacent to the project site that is, or may become as a result of supplying water

> to the project identified pursuant to this subdivision, a public water system, as defined in Section 10912 , that may supply water for the project. If the city or county is not able to identify any public water system that may supply water for the project, the city or county shall prepare the water assessment required by this part after consulting with any entity serving domestic water supplies whose service area includes the project site, the local agency formation commission, and any public water system adjacent to the project site.

Water for the proposed Project would either be sourced from locally produced groundwater in the Lucerne Valley Subbasin, or it would be purchased from a local water purveyor and trucked to the Project area. There are no water purveyors meeting the Urban Water Management Planning Act definition of a "public water system" that would serve the Project.

3.4 Is There a Current UWMP that Accounts for the Project Demand?

California's urban water suppliers prepare UWMPs to support long-term resource planning and ensure adequate water supplies. Every urban water supplier that either delivers more than 3,000 AFY of water annually or serves more than 3,000 connections is required to assess the reliability of its water sources over a 20-year period under normal, single-dry, and multiple-dry year scenarios. UWMPs must be updated and submitted to the California Department of Water Resources (DWR) every five years for review and approval (DWR 2016). As stated above, there is not a public water system in the Project area that would provide a water service connection to the Project. However, the Mojave Water Agency, which is a regional water wholesaler and State Water Project (SWP) contractor, has prepared an UWMP for the entire Mojave Basin Area, which does encompass the proposed Project area (MWA 2020a). The Mojave Water Agency's UWMP does not specifically analyze the proposed Project; however, it does analyze water supply availability and reliability in the Project area, and is therefore incorporated by reference to this WSA. As discussed in the analysis provided in Sections 4 and 5, the Mojave Water Agency's UWMP describes that excess water is available for use in the Este Subarea of the Mojave Basin Area, and the UWMP includes projections of how water demand is anticipated to increase over time throughout its service area.

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

The Project's water demands may be met in part or in full by groundwater produced from the underlying Lucerne Valley Subbasin of the Este Subarea of the Mojave Basin Area.

3.6 Are There Sufficient Supplies to Serve the Project Over the Next Twenty Years?

The sufficiency of water supply availability for the Project is assessed in Section 5, *Water Supply Analysis*. The information and analysis provided in this WSA support the conclusion that there are sufficient water supplies available to meet the needs of the Project. Conclusions associated with the sufficiency of available water supplies are discussed in Section 6, *Conclusions.*

4 Water Supply Analysis

As shown on Figure 3, the Project overlies the Lucerne Valley Subbasin of the Este (East) Subarea within the Mojave Basin Area, which is managed by the Mojave Water Agency, a wholesale water agency in San Bernardino County. Figure 3 also indicates the boundaries of the Mojave River Drainage Basin; this area refers to the surface drainage area associated with the Mojave River, which is interrelated with the underlying groundwater resources, which have been adjudicated for management purposes, and to facilitate the management of sustainable groundwater conditions. Mojave Water Agency is a SWP contractor and Watermaster for the Mojave Basin Area Adjudication Judgement; Section 4.1.2 provides further discussion of the Adjudication Judgement and the Mojave Water Agency's role as Watermaster. There are numerous individual private water users in the Mojave Basin Area, consisting of individual farms, ranches, homes, and some industrial uses. The Mojave Basin Area, Lucerne Valley Subbasin, and Mojave Water Agency are described below, to provide a background of the region's water supply sources.

4.1 Mojave Basin Area

4.1.1 Basin Description and Hydrology

The MWA service area overlies all or a portion of 36 groundwater basins and subbasins as defined by DWR Bulletin 118.28, covering approximately 4,900 square miles. Collectively, these basins and subbasins are broadly grouped into two larger hydrogeologic distinct areas–the South Lahontan Hydrologic Region and the Colorado River Hydrologic Region. Groundwater basins along the Mojave River and adjacent areas are referred to as the Mojave River Groundwater Basin and are commonly referred to as the Mojave Basin Area. Remaining basins in the southeastern Mojave Region are generally referred to as the Morongo Basin/Johnson Valley Area or "Morongo Area," with the exception of the Lucerne Valley. The Lucerne Valley subbasin is divided along the Helendale Fault with the southwest portion in the Mojave River Groundwater Basin and the northeast portion in the Morongo Area. Surface water drainage of Lucerne Valley is in the Colorado River Hydrologic Region but is not included in with the "Morongo Basin Area," isolating this area due to the hydrogeologic conditions. (MWA 2014; MWA 2020a)

The Mojave River is the largest river in the Mojave Basin Area, formed by the confluence of the West Fork of the Mojave River and Deep Creek. These streams originate in the northwestern San Bernardino Mountains. The Mojave Basin Area is essentially a closed basin meaning that very limited amounts of groundwater enter or exit the basin. However, within the basin, groundwater movement occurs between the different Subareas, as well as groundwater-surface water and groundwater-atmosphere interchanges. Groundwater is recharged into the basin predominantly by infiltration of stormflow runoff water from the San Bernardino Mountains into the Mojave River. Other sources of recharge include infiltration of storm runoff into small streams and desert washes, and other activities such as irrigation return flows, wastewater discharge, and enhanced recharge with imported water. (MWA 2014; MWA 2020a)

Groundwater is discharged from the Mojave Basin Area primarily by well pumping, evaporation through soil, transpiration by plants, seepage into dry lakes where accumulated water evaporates, and seepage into the Mojave River.

Recent investigations by MWA, USGS, and others have resulted in an improved understanding of the geology and hydrogeology of the Mojave Basin Area. Specifically, a more refined examination of the hydrostratigraphy has allowed for differentiation between the more permeable Floodplain Aquifer that has a limited extent along the Mojave River and the more extensive but less permeable Regional Aquifer. In the Mojave Basin Area, Alto, Centro, and Baja Subareas contain both the Floodplain Aquifer and the Regional Aquifer, while Oeste and Este Subareas only contain the Regional Aquifer. (MWA 2014; MWA 2020a)

The Regional Aquifer underlies and surrounds the Floodplain Aquifer with interconnected alluvial fan and basin fill deposits. The Regional Aquifer is generally recharged by groundwater movement from the Floodplain Aquifer to the Regional Aquifer, infiltration of runoff from the higher altitudes of the San Gabriel and San Bernardino Mountains, and smaller amounts of runoff from local intermittent streams and washes.

4.1.2 Basin Adjudication

The Mojave Basin Area is adjudicated and is managed by MWA in its role as Watermaster. Adjudicated groundwater basins are not required to be managed under a Groundwater Sustainability Plan (GSP) for compliance with the Sustainable Groundwater Management Act (SGMA), because implementation of the Adjudication Judgement by the designated Watermaster serves the same purpose towards achieving and maintaining groundwater sustainability as would occur under a GSP. For those basins that are not adjudicated, SGMA establishes a framework for local groundwater management and requires local agencies to bring over-drafted basins into balanced levels of pumping and recharge. The DWR uses the California Statewide Groundwater Elevation Model (CASGEM) Priority List to rank groundwater basins across the state according to priority levels of High, Medium, Low, or Very Low, and SGMA specifies deadlines for completion of GSPs in order of basin priority. Currently, deadlines are only applicable to High- and Medium-Priority basins, and all subbasins within the Mojave Basin Area, including Lucerne Valley Subbasin, are designated by the DWR as Very Low Priority (DWR 2019).

The Adjudication process was initiated in 1990, prior to which rapid growth had resulted in groundwater levels becoming severely depleted. The Final Adjudication Judgement was entered into on January 10, 1996, adopting the physical solution set forth in the Stipulated Judgement.

For the purposes of this assessment, the key elements of the Judgement are:

- The installation of MWA as the Watermaster for the Mojave Basin Area
- The creation of a class of producers who are exempt from the Judgement's restrictions ("minimal producers") as long as they withdraw less than 10 AFY
- The assignment of Base Annual Production (BAP) rights to each producer using 10 AFY or more based on their historical usage during 1986-1990, the determination of annual Free Production Allowances (FPA), and the purchase of Replacement Water by producers who pump more than their FPA

The MWA does not supply water directly to consumers; virtually all water utilized by end-users in the Mojave Basin Area comes from a local well managed by a local agency under the oversight of MWA. Minimal producers, or those which withdraw less than 10 AFY from within the Adjudication area, are largely exempt from the provisions of the Adjudication Judgement. In practice there is little oversight of minimal producers. Many rural residential areas and small industrial uses have their own wells on their property and qualify as minimal producers.

As the Watermaster, MWA assigns each non-minimal producer a variable FPA each year, which is a percentage of their BAP based on current and projected hydrological conditions and the long-term groundwater sustainability goals of MWA. The BAP is also reduced over time until the FPA comes within five percent of the Production Safe Yield (PSY) defined by the Judgement, thus gradually reducing over-drafting and bringing the Basin water levels back into stability. If a producer pumps more than their FPA, they must transfer unused FPA internally within the subarea, or purchase from the Watermaster sufficient Replacement Water to replace the water used above the FPA in terms of time, place, quantity, and quality. MWA uses the funds from Replacement Water purchases to in turn purchase additional imported surface water from the SWP, as available, and uses that additional purchased SWP supply to recharge the local aquifers. MWA also purchases and stores water for future obligations and to maintain supply in dry years.

Producers who use less than their FPA can keep a portion of the unused amount as a credit for the next year, referred to as "carryover", which allows the producer to withdraw up to their FPA plus their carryover amount. The FPA for the Este Subarea for 2020-2021 was set at 70 percent of BAP, and the FPA for 2021-2022 will be set at 65 percent (MBAW 2021).

4.1.3 Water Quality

Numerous studies dating back to the early 1900s have been conducted by various agencies to characterize groundwater quality in the Mojave service area and further the understanding of the Mojave River and Morongo Groundwater Basins. The MWA has also established a program with the USGS to maintain an 850-well monitoring network, from which groundwater quality is regularly sampled, analyzed, and recorded. In addition, the Mojave Salt and Nutrient Management Plan (SNMP) was completed in 2015. The results of these studies generally confirm the suitability of groundwater for beneficial uses in the Region. Investigations have also been conducted to identify the source and occurrence of key naturally occurring groundwater contaminants, including hexavalent chromium and arsenic, in the Mojave Desert region. (MWA 2014, 2020a)

The impairment of groundwater from the perspective of its beneficial use as drinking water is determined by comparing concentrations of constituents of concern in the groundwater against drinking water maximum contaminant levels (MCLs) and agricultural water quality parameters needed for specific crops. Key groundwater constituents of concern in the MWA service area include arsenic, nitrates, iron, manganese, Cr-VI, fluoride, and total dissolved solids (TDS), primarily comprised of salts (nitrates). Measurements exceeding drinking water standards have been found for some of these constituents within the Mojave River Basin and the Morongo Basin. Groundwater in these areas may require treatment prior to consumption. (MWA 2014, 2020a)

4.2 Lucerne Valley Subbasin

The Lucerne Valley Subbasin (DWR Basin No. 7-19) underlies a large portion of the Este Subarea of the Mojave Basin Area, and covers approximately 230 square miles in the northwest part of the Colorado River Hydrologic Region. The basin is bounded on the south by the San Bernardino Mountains and on the west by the Granite Mountains and the Helendale fault. The Ord Mountains bound the basin on the north. The Camp Rock fault and Kane Wash Area Groundwater Basin bound this basin on the east and the Fry Mountains bound this basin on the southeast. Surface water drains toward Lucerne Dry Lake in the western portion of the basin, which has an altitude of 2,850 feet above sea level. (DWR 2004)

The principal water-bearing deposits in the Lucerne Valley Subbasin are Quaternary age alluvium, and dune sand. The deposits are unconsolidated or semi-consolidated and the alluvium is composed of gravel, sand, silt, clay, and occasional boulders. Where saturated, the alluvium yields water freely to wells. Irrigation wells in the basin yield as much as 1,000 gpm (DWR 2004). Thickness of the alluvial deposits varies throughout the basin and reaches at least 1,800 feet along the Helendale fault. Water well and oil well logs indicate that the thickness of the alluvium averages about 600 feet. Fine-grained playa deposits in the western part of the basin yield little water to wells and the water is usually of poor quality. In the western part of the basin, between Lucerne Lake and Helendale faults, a thick layer of playa deposits separates the groundwater system into an upper unconfined aquifer and a lower, confined aquifer. Throughout the rest of the basin, groundwater is unconfined, meaning that it moves between subsurface layers without restriction. The basin is principally recharged by runoff from the San Bernardino Mountains and secondarily by runoff from the Granite, Ord, and Fry Mountains to the north. Groundwater generally flows from areas of recharge (infiltration from the surface) toward Lucerne Lake. (DWR 2004)

Water quality in the Lucerne Valley Subbasin is characterized by calcium-magnesium bicarbonate, calcium bicarbonate, and magnesium-sodium sulfate. These constituents result in the groundwater typically containing high concentrations of TDS, particularly in areas near Lucerne Dry Lake, including the proposed Project area, where the groundwater is sodium chloride in character and has very high TDS concentrations (DWR 2004). The concentration of TDS in groundwater tends to increase in the direction of groundwater flow, which is generally towards the dry lakebed, because as water is withdrawn or evaporates the overall salinity of the remaining water increases (DWR 2004). The USGS and MWA maintain an extensive network of wells throughout the Mojave Basin Area to monitor water quality parameters; monitoring wells in the vicinity of the Project show the highest recorded values of TDS throughout MWA's jurisdiction (California Water Science Center [CWSC] 2021a). For example, the Maximum Contaminant Level (MCL) for TDS set by the United States Environmental Protection Agency (USEPA) for drinking water is 500 mg/L (USEPA 2021), while untreated groundwater in the vicinity of the Lucerne Dry Lake has measured as high as 19,200 mg/L (CWSC 2021b). As discussed in Section 2, groundwater high in TDS needs to be treated to reduce the TDS concentration prior to the water being used for washing solar panels during Project operation; this factor is accounted for in the water demand and availability projections developed for this WSA.

4.3 Mojave Water Agency

The Mojave Water Agency serves as the Watermaster for the entire Mojave Basin Area, including the Lucerne Valley Subbasin which underlies the proposed Project area. For management purposes, the Mojave Basin Area is divided into five Subareas; the proposed Project area within the Lucerne Valley Subbasin is within the Este Subarea, as shown on Figure 3. The Mojave Water Agency does not sell water directly to consumers; rather, in its role as Watermaster, it regulates the groundwater supplies in the Mojave Basin Area, sets FPA limits for each owner of BAP rights, and manages the purchase and import of Replacement Water and the storage of groundwater supplies for future use during dry years. As defined in Section 4.1.2 above, BAP refers to the water rights associated with landowners that historically produced more than 10 AFY from the basin, while FPA refers to the annually variable percentage of its BAP that each non-minimal (more than 10 AFY) producer is allowed to use before it is required to purchase Replacement Water; these requirements are in place for compliance with the Adjudication Judgement, as administered by MWA as Watermaster.

The MWA uses water from several sources to manage recharge groundwater within its management jurisdiction, including:

- Imported water from the SWP
- Reclaimed wastewater imports from treatment facilities outside the MWA service area, including facilities in Victorville, Big Bear, Crestline, and Lake Arrowhead
- 'Return Flow' water, or water flowing back into the Basins' groundwater after being discharged by industrial and wastewater facilities, runoff from irrigation, percolating septic system outflows, and stormwater discharges.

Mojave Water Agency also manages several large water storage projects that are used to maintain water supply in case of extended drought. Each Subarea is assigned a storage allowance that it can bank and then maintain; once a Subareas storage limit is reached it cannot bank further credits. The storage limits are intended to provide several years of historical average consumptive use. Currently the Este Subarea, where the Project area is located, has reached its maximum storage allotment (MWA 2020a). Other Subareas in the region, as shown on Figure 3, include Centro Subarea, which is approaching its limit and continuing to store water, Oeste Subarea, which has no storage available, and Baja and Alto Subareas, which have declining storage levels as water use continues to exceed supply (MWA 2020a).

As a SWP contractor, MWA receives SWP supplies via the California Aqueduct. MWA purchases Replacement Water from the SWP on behalf of purveyors in its service area that exceed their FPA in a given year, and uses the Replacement Water in spreading grounds to recharge the local groundwater in the same Subarea where the excess withdrawal occurred. As MWA continues to manage the groundwater supplies in the various Subareas, it has relied less and less on imported SWP water. Availability of SWP water in the future and MWA's ability to access increased imports if needed is discussed in Section 5.2.2. The tables below provide an overview of MWA's water demands and supplies. Table 3 shows the total annual water use in the MWA service area from 2015 to 2020, with water uses broken down for large retailers (those required to maintain an UWMP), small water systems and rural domestic systems, agricultural uses, and other uses including industrial and recreational uses.

Table 3 Mojave Water Agency Water Use 2015-2020

Water User Category	2015	2016	2017	2018	2019	2020
Large Retailer	63,687	63,492	65,406	64,588	65,893	69,858
Small Systems and Rural Domestic	13,163	12,141	12,720	16,896	12,393	11,014
Agricultural	38,800	39,400	33,000	32,200	30,100	26,600
Other (Industrial, golf course, recreational)	21,100	20,600	21,700	23,600	21,600	21,720
Total Water Use	**136,750**	**135,633**	**132,826**	**137,284**	**129,986**	**129,192**

Source: MWA 2020

As shown in Table 3, the total water demands and uses in MWA's jurisdiction was 136,750 acre-feet in 2015, which consistently decreased each year through 2020, when water demands totaled 129,192 acre-feet. This is a reduction of approximately 5.5 percent. Table 4, below, provides an overview of water supply in MWA's jurisdiciton, including total imports, return flow (groundwater), and natural supply for the 2019-2020 water year.

Table 4 Mojave Water Agency Estimated Water Supply 2020

Water Supply Source	Amount (AF)
Natural Supply[1]	57,349
Imported Wastewater (Victorville)	13,719
Imported Wastewater (Other)	4,019
Imported SWP	9,397
Return Flows (estimated)	44,347
Total	**128,831**

[1] MWA estimates the average natural supply to the basin, from precipitation and snowmelt, as 57,349 AFY. This long-term average is assumed to be stable despite changing drought conditions which may affect hydrological conditions and recharge.

Source: MWA 2020

As shown in Table 4, MWA's total estimated water supply for water year 2019-2020 was 128,831 acre-feet. This is a difference of approximately 361 acre-feet, representing 0.3 percent less supply than the total demand projected for year 2020, as shown in Table 3. Considering the scope of the MWA jurisdiction, and the multitude of factors affecting supply availability, this difference is considered minimal. Water supply availability and reliability with respect to the proposed Project are detailed in the following section.

5 Water Supply Analysis

This section provides analysis of the availability and reliability of all potential water supply sources that may be used to meet the water demands of the proposed Project, consisting of groundwater pumped on- or off-site from the Lucerne Valley Subbasin or water purchased from a local purveyor and trucked to the site. For the purposes of this analysis, the focus is on the supply situation primarily in the Este Subarea of the Mojave Basin Area, of which the Lucerne Valley Subbasin is a major component. Individual data for the Lucerne Valley Subbasin is not readily available, and the majority of the water use in the Este Subarea lies within the Lucerne Valley Subbasin. Therefore, MWA data on the state of the Este Subbasin is considered a proxy for the state of the Lucerne Valley Subbasin. Supply reliability for MWA as a whole will also be examined, as supply issues in the Este Subarea would require MWA to meet the demand with other sources.

5.1 Water Supply Availability

Water supply for the proposed Project would be obtained from locally produced groundwater using an on- or off-site well, or by purchasing treated water from a local purveyor and trucking it to the site. Both potential options are addressed below, followed by discussion of their long-term availability and reliability.

5.1.1 Locally Produced Groundwater

As discussed previously, groundwater local to the proposed Project area is within an area managed in accordance with an Adjudication Judgement; as such, each property owner and water user within the Adjudication Area has an allocated amount of groundwater that is allowed to be produced from that respective parcel(s) in any given year, subject to the management direction of the MWA. The proposed Project area consists of up to 27 individual parcels distinguished by APNs, as shown on Figure 2 and listed in Table 1. Some of the parcels within the proposed Project area are currently in use as agricultural land and/or have existing water supply, as well as BAP rights and allotted FPAs. Of the 27 parcels within the Project area, several parcels comprise nearly one third of groundwater produced in the Lucerne Valley Subbasin, as shown in Table 5 below.

Table 5 Sample Parcel Water Allocations

Parcel APN	Base Annual Production	2020-2021 FPA	2019-2020 Production	2021-2022 FPA	2021 Carryover	Percent of Este Total BAP[1]
045 206 224	1,500	1,050	80	975	1,125	7.7
045 211 224	1,773	1,242	1,037	1,153	1,330	9.2
Totals						**27.9**

All values are in acre-feet (AF)

[1]The Este Subarea has a total of 19,251 AF in assigned BAP amongst 65 different owners (MBAW 2021)

Source: San Bernardino County 2021, MBAW 2021

As discussed above and shown in Table 5, several parcels within the proposed Project area collectively account for at least 27.9 percent of the total BAP rights assigned to the Este Subarea under the Adjudication Judgement for the Mojave Basin Area. Each of these parcels had 2021

Carryover values between 1,125 and 1,651 acre-feet, where "carryover" represents a portion of unused FPA which producers are allowed under the Adjudication Judgement to use in the year subsequent to the FPA allocation. The values from 2020 indicate that a large portion of the allocated water was not used during the 2019-2020 water year. The fact that the three largest producers in the Mojave Basin Area are located within the proposed Project area and all experienced excess supply as 2021 Carryover from their 2019-2020 FPA indicates that the region is coming into balance (i.e., making progress towards sustainable groundwater conditions), with excess supply availability even while FPA allocations are decreasing in accordance with the Adjudication Judgement.

Notably, in accordance with the Adjudication Judgement, the water rights associated with individual parcels may be transferred to other parcel(s) owned by the same party/parties within the Este Subarea, as the BAP is attached to the property owner(s) over the individual parcel(s); i.e., if the owners of the parcels described in Table 5 also have ownership of other parcels in the Este Subarea, their BAP is freely assignable amongst their other parcels, such that a change of ownership may also result in a change of water supply allocations to the subject properties. The issue of water rights would be addressed between the Project applicant, the individual property owners, and the Watermaster, prior to initiation of water uses for the Project.

5.1.2 Purchased Water from a Local Retailer

Alternative to using locally produced groundwater for the proposed Project, water supply may also be purchased from a local retailer with capacity to provide the required supply. In the Este Subarea, the largest retailers are the Jubilee Mutual Water Company and the Golden State Water Company. Neither of these purveyors has an UWMP, as they each have fewer than 3,000 connections or deliver less than 3,000 AFY, however, in its role as Watermaster, the MWA tracks their production rates and assigns them each an annual FPA for compliance with the Adjudication Judgement.

In the 2019-2020 water year, Jubilee Mutual Water Company had an FPA of 107 acre-feet as well as a carryover of 50 acre-feet. During the same water year, Jubilee pumped 117 acre-feet of its allocated 157 acre-feet, resulting in 40 acre-feet of unused water allocation which was then contributed to Jubilee's 2020-2021 allocation as carryover supply. Similarly, in the 2019-2020 water year, Golden State Water Company had an FPA of 134 acre-feet FPA as well as a carryover of 143 acre-feet, of which it pumped 151 acre-feet, leaving 126 acre-feet unused to carryover to water year 2020-2021 (MBAW 2021).

This data indicates that Jubilee Mutual Water Company and Golden State Water Company both had excess water supply available in water year 2019-2020, resulting in carryover to water year 2020-2021. In accordance with the Adjudication Judgement, there will be annual decreases in the FPA allocated to all water rights holders in the Mojave Basin Area, including these local purveyors, in an effort to achieve and maintain sustainable groundwater conditions. As such, the water supply availability for these local purveyors may decrease in future years.

5.2 Water Supply Reliability

SB 610 requires that a WSA include the consideration of water supply availability under varying climatic (drought) conditions, including normal [water] year, single-dry year, and multiple-dry year scenarios for the next 20 years, which for this analysis would be further extended to 30 years to cover the expected lifespan of the Project. For this WSA, the analysis of varying drought scenarios is based on MWA's drought planning and management activities as described in its current UWMP. As discussed, the Project's water supply may be sourced from an on- or off-site groundwater well in

the Lucerne Valley Subbasin, or it may be purchased from a local retailer and trucked to the site. Groundwater produced from the Lucerne Valley Subbasin would be subject to compliance with the Adjudication Judgement, under the management direction of the MWA.

Currently the Mojave Basin Area is recovering from historic patterns of over-use and, while some areas continue to be affected by overdraft conditions, other areas are in balance. MWA continues to bolster and expand its available water supply through ongoing banking activities, including through storage of Carryover supplies in San Luis Reservoir. While the SWP allocation has declined and is expected to continue to decline, MWA is well-placed to continue providing supply to its customers under varying drought scenarios.

Table 6 details MWA's total projected supply and demand amounts through 2055. This table reflects supplies associated with groundwater resources and imported SWP water, as well as water storage and banking activities conducted by MWA. The reliability of groundwater and imported surface water supplies are discussed respectively in the following Sections 5.2.1 and 5.2.2.

Table 6 Total MWA Projected Supply and Demand Through 2055[1]

		2025	2030	2035	2040	2045	2050	2055
Normal Year								
Supply Totals		158,541	159,452	159,372	159,299	160,710	161,985	163,141
Demand Totals		130,800	135,300	137,700	140,200	142,900	145,500	147,801
Difference		**27,741**	**24,152**	**21,672**	**19,099**	**17,810**	**16,485**	**15,341**
Single Dry Year								
Supply Totals		130,800	135,300	137,700	140,200	142,900	145,500	147,801
Demand Totals		130,800	135,300	137,700	140,200	142,900	145,500	147,801
Difference		**0**	**0**	**0**	**0**	**0**	**0**	**0**
Multiple Dry Years								
First Year	Supply Totals	139,234	141,492	142,759	144,033	145,444	146,719	147,875
	Demand Totals	130,800	135,300	137,700	140,200	142,900	145,500	147,801
	Difference	**8,434**	**6,192**	**5,059**	**3,833**	**2,544**	**1,219**	**75**
Second Year	Supply Totals	130,800	135,300	137,700	140,200	142,900	145,500	147,801
	Demand Totals	130,800	135,300	137,700	140,200	142,900	145,500	147,801
	Difference	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Third Year	Supply Totals	130,800	135,300	137,700	140,200	142,900	145,500	147,801
	Demand Totals	130,800	135,300	137,700	140,200	142,900	145,500	147,801
	Difference	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Fourth Year	Supply Totals	130,800	135,300	137,700	140,200	142,900	145,500	147,801
	Demand Totals	130,800	135,300	137,700	140,200	142,900	145,500	147,801
	Difference	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Fifth Year	Supply Totals	139,234	141,492	142,759	144,033	145,444	146,719	147,875
	Demand Totals	130,800	135,300	137,700	140,200	142,900	145,500	147,800
	Difference	**8,434**	**6,192**	**5,059**	**3,833**	**2,544**	**1,219**	**75**

[1] Supply includes natural supply, imported wastewater, imported SWP water, and return flows

Units in acre-feet

Source: MWA 2020

The data in Table 6 indicate that under all considered drought scenarios, including normal water year, single-dry water year, and multiple-dry year conditions, water supplies are sufficient to meet projected demands. Under normal (non-drought) conditions, MWA banks water for later use, and anticipates an increase in available supply that will meet the projected demand increases shown above. Under single-year drought conditions, MWA anticipates a reduction in supply from reduced SWP allocations, and MWA has sufficient storage reserves available to meet the projected demands. Under multiple-year drought conditions, MWA would ramp down water banking activities to provide additional supply. Water banking activities would cease during consecutive years of multiple-year drought conditions until year five, at which time MWA anticipates utilizing SWP water again to continue water banking at a reduced rate.

MWA's drought analysis is based upon examination of historical drought data and consideration of multiple possible drought scenarios, as well as potential non-drought events that could interrupt water supply. The planning horizon defined by MWA in its UWMP extends to 2055, which is longer than the 20-year projection required for a WSA; as such, the projections provided in MWA's UWMP are sufficient to inform the projections discussed herein for compliance with SB 610. The following Sections 5.2.1 and 5.2.2 provide further information regarding the reliability of MWA's primary water supply sources, including groundwater (natural and managed), and imported SWP supply.

5.2.1 Groundwater Supply and Banking

As discussed throughout this WSA, groundwater in the Mojave Basin Area is managed in accordance with an Adjudication Judgement administered by MWA as the Watermaster. In this role, MWA assigns an FPA allowance to each non-minimal producer within the Mojave Basin Area, including the 27 parcels within the proposed Project area. As shown in Table 5, several of the parcels within the proposed Project area comprise 27.9 percent of the total BAP rights assigned to the Este Subarea under the Adjudication Judgement for the Mojave Basin Area. Under the proposed Project, these parcels would be utilized for solar energy development, which generally required far less water than the agricultural activities which have historically characterized these parcels.

As the Mojave Basin Area has historically been over-utilized, MWA has been reducing BAP and FPA allowances steadily since adjudication. FPA allowances are also adjusted yearly based on current and projected hydrological conditions, with the goal of bringing BAP within five percent of the Production Safe Yield (PSY). When a Subarea's total BAP is within five percent of the PSY amount, further BAP reductions will no longer be needed for compliance with the Adjudication Judgement. The Este Subarea is currently in balance and has had stable water levels for several years; however, its total BAP is not within five percent of its PSY and BAP therefore continues to be ramped down annually. (MWA 2020; MBAW 2021)

As discussed in Section 4.3, MWA's managed groundwater supply consists of natural supply, wastewater imports, imported water, and return flows. Table 7 shows MWA's anticipated managed groundwater supplies, not including SWP imports, through 2055.

Table 7 MWA Managed Groundwater Supplies Through 2055

Total Supply[1]	2025	2030	2035	2040	2045	2050	2055
Normal	107,804	110,062	111,329	112,603	114,014	115,289	116,445
Single Dry Year	107,804	110,062	111,329	112,603	114,014	115,289	116,445
Multi-Year Drought							
Year 1	107,804	110,062	111,329	112,603	114,014	115,289	116,445
Year 2	107,804	110,062	111,329	112,603	114,014	115,289	116,445
Year 3	107,804	110,062	111,329	112,603	114,014	115,289	116,445
Year 4	107,804	110,062	111,329	112,603	114,014	115,289	116,445
Year 5	107,804	110,062	111,329	112,603	114,014	115,289	116,445

[1] Sources include natural supply, imported wastewater, and return flows.

Units are in acre-feet.

Source: MWA 2020

As shown in the table above, which is informed by MWA's current UWMP, MWA does not anticipate natural supply or wastewater imports to change during conditions of drought; rather, it expects increased return flow due to increased conservation efforts. MWA anticipates providing 8,641 AFY more groundwater supply by 2055 than it does in 2025 under any drought scenario, primarily through increases in return flow from conservation, improved wastewater and stormwater retention, and utilization of stored resources during dry years. In addition, MWA addresses drought conditions and SWP allocation reductions through management of its extensive water banking and storage activities. MWA stores unused carryover water from SWP allocations and unused Subarea FPA. SWP carryover water is stored in San Luis Reservoir, which is utilized to store carryover supplies from multiple SWP contractors. MWA maintains a large Carryover balance due to its continued reduction in utilization of its allocation amounts and increasing self-reliance. In 2020 MWA had a total of 40,424 acre-feet available in SWP Carryover water (MWA 2020).

MWA also has water banking and storage programs within the Subareas. These storage banks are filled with unused FPA within the respective Subarea or with imported SWP water and Carryover water. The storage amounts have a maximum amount for each Subarea, and MWA is required under the Mojave Basin Area Adjudication Judgement to utilize the stored water by 2035; however, MWA can use some of the water and continue to replenish it, in order to extend that timeline. The Este Subarea has reached its storage capacity of 1,320 acre-feet under the Adjudication Judgement. This storage supply would be drawn upon in the event of drought-related water shortages severe enough to reduce MWA's ability to import SWP water to meet demand in the Este Subarea, which is already balanced with a large portion of its BAP unutilized each year (MWA 2020). MWA has a total of 191,915 acre-feet in storage within the Mojave Basin Area, the majority of which is in the Alto Subarea (MWA 2020).

5.2.2 Imported SWP Supply

MWA obtains imported surface water supplies from the SWP, which is the largest state-built water project in the country. SWP water is allocated according to service contracts between water purveyors and the California DWR; MWA is one of 29 water agencies that have a SWP contract with DWR. Each contract contains a "Table A Annual Amount" which lists the maximum amount of water a SWP contractor may receive under its SWP contract. MWA's current Table A Contract Allocation is 89,800 AFY (MWA 2020). In conditions of reduced water availability, the DWR reduces SWP allocations that can be significantly less than the Table A amount for each contractor. The last year that 100 percent allocation occurred was 2006. During the 2010-2020 period, SWP allocations to MWA ranged from 85 percent to as low as five percent of the Table A amount, with an average of approximately 53 percent. MWA adjusts to these fluctuations through groundwater management and stored supply projects to maintain supply during drought years.

MWA has developed anticipated future allocations based on DWR's planning and the *Final State Water Project Delivery Capability Report* (DCR) published by DWR in 2020. According to the 2020 DCR, average SWP reliability has shown a downward trend from 62 percent historically to 58 percent in 2019. With consideration of the effects of climate change and sea level rise scenarios discussed in the 2020 DCR, long-term reliability further reduces to 52 percent. Therefore, MWA characterizes SWP reliability as declining from 58 percent to 52 percent by 2040, and maintains a 52 percent reliability throughout its 2065 planning horizon (DWR 2020, MWA 2020). In an abundance of caution, MWA projects multi-year drought conditions to be characterized by critical long-term droughts with extreme drought years embedded in them. As such, MWA's multi-year drought planning includes two full years of SWP allocation being five percent, which is the lowest amount

ever on record. MWA also plans for a single-year drought to be an extreme drought and uses the five percent SWP allocation amount for single-year drought planning. Table 8 shows MWA's future anticipated SWP allocations under these various drought scenarios.

Table 8 Future SWP Allocations by Year Type

Year	SWP Contract Table A Amount (AFY)	Percent Allocation	Allocation Amount (AFY)
Normal	89,800	58	52,084
Single Dry Year	89,800	5	4,490
Multi-Year Drought			
Year 1	89,800	35	31,430
Year 2	89,800	5	4,490
Year 3	89,800	5	4,490
Year 4	89,800	20	17,960
Year 5	89,800	35	31,430

Source: MWA 2020

As shown above, MWA anticipates the worst-case drought conditions to result in multiple years of a Table A allocation reduced to 4,490 acre-feet. For perspective, in 2019 MWA imported 9,397 acre-feet of water from SWP for use in groundwater recharge. This indicates that under normal conditions, or even extended drought conditions, MWA would be able to access water from its SWP contract amounts except in cases of extreme drought. MWA plans for such conditions through its use of water banking and storage, discussed above.

6 Conclusions

In accordance with the California Water Code, as amended by SB 610, this WSA identifies and characterizes all known and potential water demands of the Project, in comparison to the water supplies available over the Project's operational lifespan, and with consideration to varying drought conditions and ongoing long-term supply management activities. Water supply sources considered for the purposes of this WSA include groundwater pumped from the Lucerne Valley Subbasin via an on- or off-site groundwater well, and water purchased from a local purveyor and trucked to the site. Surface water in the Mojave Basin Area consists of imported SWP water which is conveyed from northern California via the California Aqueduct, and distributed locally via the MWA.

The Project's amortized annual water demand is 61.28 AFY; this is the Project's total maximum water demand averaged over all phases of the Project, accounting for 32 years to capture one year of construction, 30 years of operation and maintenance, and one year of decommissioning or repowering. The Project area consists of numerous parcels, as shown on Figure 2, some of which are designated, zoned, and used for agricultural purposes, including irrigated crops. Any conversion of land from irrigated agriculture to solar energy development is assumed to result in a decreased water demand on the affected parcel(s), because irrigated agriculture is generally more water intensive than solar energy development.

Several of the parcels within the Project area currently account for a sizeable portion of the total amount of water consumed in the Este Subarea. Because the Project would replace existing uses with less water-intensive uses, and the water demand projections in the MWA's UWMP are based upon the current, more water-intensive uses, it can be inferred that the Project's water demands are fully accounted for in the UWMP. Furthermore, MWA's UWMP projects a surplus water supply under normal water year conditions and some drought scenarios, and sufficient supply availability to meet projected demand under multiple-year drought scenarios. Therefore, sufficient water supply is available in the Project area to meet the demands of the proposed Project. This reliability of the available water supply is largely due to MWA's management of groundwater resources throughout the Mojave Basin Area, including responding to water shortages by pumping banked groundwater that is actively managed for this purpose.

As discussed above, if the Project pumps water on-site, utilizing purchased or leased FPA rights, the Project's demand would be less than the current or projected future BAP amounts of the parcels. If the Project's water supply is obtained by purchasing water from a local purveyor, that water would come from the respective purveyor's FPA allowances and thus be regulated and managed by the MWA in accordance with the Adjudication Judgement. This WSA concludes that sufficient water supply is available to meet the Project's potential water demands under normal-year, single-dry-year, and multiple-dry-year conditions.

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Appendix A

DWR Guidebook for Implementation of Senate Bill 610

DWR Guidebook for Implementation of Senate Bill 610

The Water Supply Assessment (WSA) for the proposed Sienna Solar and Storage Project ("proposed project") was prepared using guidance contained in the California Department of Water Resources' (DWR) Guidebook for Implementation of Senate Bill (SB) 610 and SB 221 of 2001 (DWR Guidebook). The California DWR prepared the Guidebook to assist water suppliers in preparation of the water assessments and the written verification of water supply availability required by SB 610 and SB 221; the DWR has no regulatory or permitting approval authority concerning water assessments or verifications of sufficient water supply, and provides the Guidebook purely as an assistance tool (DWR 2003). The following table provides a detailed description of how the DWR Guidebook was used in preparing the Project's WSA.

Table A-1 Sienna Solar and Storage Project – WSA Consistency with DWR Guidelines

Guidelines Section Number and Title (DWR 2003)	Guidelines Direction	Relevant WSA Section and Response
Section 1 (page 2). Does SB 610 or SB 221 apply to the proposed development?	Is the Project subject to SB 610? Is the Project subject to CEQA (Water Code §10910(a))? If yes, continue.	Yes, the Project subject to CEQA.
	Is it a "project" as defined by Water Code §10912(a) or (b)? If yes, to comply with SB 610 go to Section 2, page 4.	Yes, the Project is considered to meet the definition of "project" per Water Code §10912(a) or (b).
	Is the project subject to SB 221? Does the tentative map include a "subdivision" as defined by Government Code §66473.7(a)(1)? If no, stop.	No, the Project does not include a "subdivision;" SB 221 does not apply to the Project, and no further action relevant to SB 221 is required.
Section 2 (page 4). Who will prepare the SB 610 analysis?	Is there a public water system ("water supplier") for the project (Water Code § 10910(b))? If no, go to Section 3, page 6.	No, there is no public water system for the Project.
Section 3 (page 6). Has an assessment already been prepared that includes this project?	Has this project already been the subject of an assessment (Water Code §10910(h))? If no, go to Section 4, page 8.	No, the Project has not been the subject of an assessment.
Section 4 (page 8). Is there a current Urban Water Management Plan?	Is there an adopted urban water management plan (UWMP) (Water Code §10910(c))? If yes, continue. If yes, information from the UWMP related to the proposed water demand for the project may also be used for carrying out Section 5, Steps 1 and 2, and Section 7; proceed to Section 5, page 10 of the Guidelines.	Mojave Water Agency (MWA), the water wholesaler that provides imported SWP water to the Project area, has an adopted UWMP. Information from the UWMP was used to inform this WSA.
	Is the projected water demand for the project accounted for in the most recent UWMP (Water Code §10910(c)(2))? If no, go to Section 5, page 10.	The MWA's UWMP does not specifically reference the proposed Project; however, the UWMP assumes the Project area land uses consist of agricultural uses, which are generally higher in water demand than solar energy development. As such, the proposed Project would reduce water demands on the Project area from those

Guidelines Section Number and Title (DWR 2003)	Guidelines Direction	Relevant WSA Section and Response
		assumed in the MWA's UWMP for the area.
Section five (page 10). What information should be included in an assessment?	Step One (page 13). Documenting wholesale water supplies.	MWA provides water to the Project area, and has an adopted UWMP. Information from the UWMP was used for this WSA.
	Step Two (page 17). Documenting Supply if Groundwater is a Source*.	The Project's water demands may be met with groundwater supplies from the Lucerne Valley Subbasin.
	Specify if a groundwater management plan or any other specific authorization for groundwater management for the basin has been adopted and how it affects the water supplier's use of the basin.	The proposed Project area is underlain by the Lucerne Valley Subbasin, which is within the adjudicated Mojave Basin Area and therefore subject to the Adjudication Judgement, under the management direction of MWA as the Watermaster.
	The description of the groundwater basin may be excerpted from the groundwater management plan, from DWR Bulletin 118, California's Ground Water, or from some other document that has been published and that discusses the basin boundaries, type of rock that constitutes the aquifer, variability of the aquifer material, and total groundwater in storage (average specific yield times the volume of the aquifer).	WSA Sections 2.1 and 4.1 provide description of the groundwater basin characteristics using available resources, including DWR Bulletin 118.
	In an adjudicated basin the amount of water the urban supplier has the legal right to pump should be enumerated in the court decision.	The Project is located in an adjudicated groundwater area; see WSA Section 4.2.1.
	The Department of Water Resources has projected estimates of overdraft, or "water shortage," based on projected amounts of water supply and demand (basin management), at the hydrologic region level in Bulletin 160, California Water Plan Update. Estimates at the basin or subbasin level will be projected for some basins in Bulletin 118. If the basin has not been evaluated by DWR, data that indicate groundwater level trends over a period of time should be collected and evaluated.	WSA Section 4.1.2 discusses groundwater level trends.
	If the evaluation indicates an overdraft due to existing groundwater extraction, or projected increases in groundwater extraction, describe actions and/or program designed to eliminate the long-term overdraft condition.	The evaluation does not indicate an overdraft due to existing groundwater extraction.
	If water supplier wells are plotted on a map, or are available from a geographic information system, the amount of water extracted by the water supplier for the past five years can be obtained from the Department of Health Services, Office of Drinking Water and Environmental	Water pumping for the Project would not initiate until the onset of construction activities; site-specific historical records are not available.

Guidelines Section Number and Title (DWR 2003)	Guidelines Direction	Relevant WSA Section and Response
	Management.	
	Description and analysis of the amount and location of groundwater pumped by the water supplier for the past five years. Include information on proposed pumping locations and quantities. The description and analysis is to be based on information that is reasonably available, including, but not limited to, historic use records from DWR.	Section 4 addresses available historical groundwater pumping data.
	Analysis of the location, amount, and sufficiency of groundwater that is projected to be pumped by the water supplier.	WSA Sections 4 and 5 discuss location, amount, and sufficiency of groundwater supplies from the Lucerne Valley Subbasin.
	Step 3 (page 21). Documenting project demand (Project Demand Analysis).	WSA Section 2.3 details the Project demand analysis.
	Step 4 (page 26). Documenting dry year(s) supply.	WSA Section 5 discusses water supply reliability including during dry year scenarios.
	Step five (page 31). Documenting dry year(s) demand.	WSA Section 5 discusses water supply reliability including during dry year scenarios.
Section 6 (page 33). Is the projected water supply sufficient or insufficient for the proposed project?		WSA Section 5 summarizes why the identified water supply/supplies are considered sufficient for the Project.
Section 7 (page 35). If the projected supply is determined to be insufficient.	Does the assessment conclude that supply is "sufficient"? If no, continue.	WSA Section 6. It is reasonably anticipated that sufficient water supplies are available for the Project.
Section 8 (page 38). Final SB 610 assessment actions by lead agencies.	The lead agency shall review the WSA and must decide whether additional water supply information is needed for its consideration of the proposed project. The lead agency "shall determine, based on the entire record, whether projected water supplies will be sufficient to satisfy the demands of the project, in addition to existing and planned future uses."	The WSA for the Project will be included as part of the CEQA document for the Project. Per SB 610, the lead agency will approve or disapprove a project based on a number of factors, including but not limited to the water supply assessment.

Source: DWR (Department of Water Resources). 2003. Guidebook for Implementation of Senate Bill 610 and Senate Bill 221 of 2001. October 8.

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Appendix N. Gen-Tie Alternative Addendum Report

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December 18, 2023
Project No: 21-11216

99MT 8me, LLC
211 Sutter Street, 6th Floor
San Fracisco, California 94108

Subject: Sienna Solar Project, Gen-tie Alternative Addendum Report
San Bernardino County, California

Rincon has prepared this Report for the Sienna Solar and Storage Project in San Bernardino County, California. Rincon understands that Avantus is adding approximately 12.3 miles of gen-tie alignment alternatives to the previously analyzed Sienna Solar and Storage Project. These additional areas of potential development require environmental review under the California Environmental Quality Act (CEQA). The purpose of this Report is to disclose the existing conditions present within the potential development area of the additional 12.3 miles of gen-tie alignment alternatives, evaluate whether the previous impacts analyses for all resource areas were sufficient to assess potential impacts within the newly added gen-tie alternatives areas, and if necessary, provide additional analysis and/or mitigation to address any potential impacts not addressed in the previous studies. This addendum addresses the following resource areas:

1) Air Quality/Greenhouse Gas
2) Biological Resources
3) Cultural Resources
4) Noise
5) Paleontological Resources
6) Traffic
7) Visual Resources
8) Water Supply

A biological resources reconnaissance survey was conducted to inform the biological resources component of this analysis; however, the analyses contained within this addendum are predominantly desktop in nature. The addition of the approximately 12.3 miles of gen-tie alternative included existing conditions not present within the previously defined study area, including: 1) a vegetation community not present within the previously defined study area; 2) additional cultural resources identified in the expanded record search area; and 3) and one (1) additional geologic formation not present within the previously defined study area. None of these changes in existing conditions resulted in potential impacts not previously disclosed, and no new mitigation measures were required to address potential impacts within the new gen-tie alternative area.

Updated Project Description

The proposed Project consists of the installation of a photovoltaic (PV) solar facility, Battery Energy Storage System (BESS), Project substation, Operations and Maintenance building(s), underground collection system, a 220 kV generation-interconnect (gen-tie) line, and other ancillary facilities. The proposed solar project would interconnect at the new Southern California Edison (SCE) substation (known as the proposed "Calcite Sub-station"). The solar project area encompasses 1,854 acres, while the SCE sub-station parcel comprises 77 acres. Approximately 39 miles of collector lines and gen-tie alternatives were previously analyzed in the "original DIER." An additional 12.3 miles of gen-tie line alternatives now being incorporated into the project description are the subject of this analysis. This addendum is intended to inform the revised DEIR; however, not all routes will ultimately be developed. The updated regional location and Project area with the additional gen-tie line and/or collector alternative are shown in Figure 1 and Figure 2.

Technical Study Resource

Below is a discussion of each of the technical sections either describing consistency with the previously prepared technical studies or describing additional analysis and/or mitigation measures.

Air Quality/Greenhouse Gas

The new gen-tie alternative routes are located to the north and west of gen-tie routes previously evaluated. The new routes run off roadways that travel past rural single-family residences, with an approximate distance of 50 feet from the gen-ties to the closest residences, similar to the gen-tie previously proposed routes from the July analysis. The new gen-tie alternative routes would not require additional equipment or time during construction than was analyzed for the original gen-tie routes. Therefore, emissions from construction would be the same as those reported in tables 5 and 6 for air quality and table 9 for GHG. Additionally, the operational activities associated with the new gen-tie alternatives would be identical to those identified in the original air quality and greenhouse gas analysis and would be the same as were identified in Tables 7 and 10 for air quality and greenhouse gas respectively. Consistent with the original analysis, all criteria pollutant emissions and greenhouse gas emissions would be below regulatory thresholds.

The number of days of construction near existing sensitive receptors, nor increase construction time. Additionally, it would not change the operations from what was previously analyzed. Therefore, consistent with the July 2023 Analysis, the TAC emissions associated with the new gen-tie alternative would not increase construction or operational risk from what was originally analyzed.

The new gen-tie alternative does not change the anticipated number of workers accessing the site throughout the year. Therefore, as identified in the original July 2023 analysis, there would not result in or substantially contribute to concentrations that exceed the one-hour or eight-hour CO standard.

The new gen-tie alternative would expose workers and nearby sensitive receptors to Valley Fever and odors consistent with the exposure identified in the July 2023 analysis. As indicated in the Section 3.3, Project Impact Analysis, of the original 2023 analysis, Valley Fever impacts can be minimized with the incorporation of Reduction Measure AQ-1 which incorporates an active dust control plan to minimize exposure of personnel and the public to exposure to spores of Valley Fever. Further odor impacts were determined to be unsubstantial in the original July 2023 analysis and therefore, consistent with the proposed project would not expose people to substantial odor emissions.

As the new gen-tie alternative does not change the nature of the project, it would not change the project's consistency with the 2022 Scoping Plan and SB 100. Therefore, consistent with the original Technical Study, dated July 2023, the new gen-tie alternative would be consistent with state and

regional plans to reduce GHG emissions and be consistent with the *2022 Climate Change Scoping Plan Update*.

Biological Resources

Rincon biologist conducted a reconnaissance survey of the gen-tie alternative routes on December 5, 2023. Species-specific surveys were not conducted during this effort. Habitats on-site were mapped at a general level of scale. Specifically, the survey focused on documenting existing conditions and biological resources, evaluating the new gen-tie alternatives for potential to support special-status plant and wildlife species, and identifying special-status vegetation communities.

The gen-tie alternative routes contain historical lake bed, natural spinescale scrub (*Atriplex spinifera* Shrubland Alliance), and one new vegetation community not present within the previous study area: creosote bush scrub (*Larrea tridentata* Shrubland Alliance) (Figure 3). Historical lake bed and natural spinescale scrub were discussed in the Biological Resources Assessment (August 2023); Creosote bush scrub is described below. Mapping of vegetation communities and land cover along the gen-tie and collector line alternative routes was completed at a course scale and shows the dominant land cover within the 300-foot corridor.

Creosote Bush Scrub (*Larrea tridentata* Shrubland Alliance)

Creosote bush scrub is found along the northwest lines of the gen-tie alternatives routes (Figure 3). Associated scrub species includes burrobush (*Ambrosia salsola*), rayless goldenheads (Acamptopappus sphaerocephalus), cheesebush (*Ambrosia salsola*), California jointfir (*Ephedra californica*), and Anderson thornbush (*Lycium andersonii*). This vegetation community is often found on alluvial fans and upland slopes (Sawyer et al. 2009).

Impacts Analysis

The presence of Creosote bush scrub within the project's new study area does not change the analysis of the potential for occurrence of sensitive biological resources, as creosote bush scrub provides habitat for the same species as spinescale scrub; however, these portions of the new study area are substantially undisturbed and represent high quality native desert habitat for the species identified below. Species identified within the Biological Resources Assessment (BRA; Rincon 2023) with moderate to high potential to occur within the natural and recovering spinescale scrub include Parish's phacelia (*Phacelia parishii*), desert tortoise (*Gopherus agassizii*), golden eagle (foraging: *Aquila chrysaetos*), Bendire's thrasher (*Toxostoma bendirei*), and Le Conte's thrasher (*Toxostoma lecontei*) as well as those species observed during the 2021 reconnaissance surveys, burrowing owl (*Athene cunicularia*), prairie falcon (*Falco mexicanus*), and loggerhead shrike (*Lanius ludovicianus*).

Potential impacts to biological resources within the newly proposed gen-tie alternative routes were identified in the original BRA, and the recommendations proposed in the original BRA are sufficient to address those impacts. No new impacts analysis and no new mitigation measures for biological resources are required.

Cultural Resources

A California Historical Resources Information System record search was completed on November 29, 2023, for the new gen-tie alternative routes. The record search identified four additional resources previously documented in the new gen-tie alternative routes. These resources include two historical isolates that require no further management considerations and two historical sites that have both been recommended ineligible for listing on the National and California registers. A review of historical

maps and aerial imagery did not identify any built environment structures within the new gen-tie alternative routes.

Based on the results of the record search and historical map and aerial imagery review, potential impacts to cultural resources resulting from the proposed gen-tie alternative routes are equal or lesser to those identified in the original cultural resources assessment, and the recommendations proposed for cultural resources are sufficient to address those impacts.

Consistent with Rincon's previous recommendations, following selection of the gen-tie route for the project, a cultural resources pedestrian survey should be completed to determine if additional cultural resources beyond those identified in the record searches exist within the selected gen-tie route. Should cultural resources that require further management be identified, the project should adhere to the recommended mitigation measures included in the cultural resources study completed for the project.

Noise

The new gen-tie alternative routes are located to the north and west of gen-tie routes previously evaluated. The new routes run off roadways that travel past rural single-family residences, with an approximate distance of 50 feet from the gen-ties to the closest residences, similar to the gen-tie previously proposed routes. Therefore, similar to the construction noise estimates in Table 11 of the Noise Study completed in July 2023 by Rincon Consultants, Inc., construction of the gen-tie alternative routes would result in construction noise levels of 78 A-weighted decibels (dBA) L_{eq} at the nearest residences. This would be below Federal Transit Administration's (FTA's) construction noise threshold of 80 dBA L_{eq} (8-hour). Most gen-tie construction activities would occur further from nearby noise receptors, and would, therefore, result in lower noise levels. Heavy construction would not occur during nighttime hours. Construction activities outside of acceptable hours would require a variance to conduct construction activities during those hours. Project construction may occur outside of the allowed construction hours (7:00 AM to 7:00 PM, Monday through Saturday). Therefore, similar to the gen-tie previously proposed routes, alternative gen-tie construction noise would not exceed applicable thresholds.

The cumulative construction noise analysis in the Noise Study made a conservative assumption that construction at all Project parcels and the gen-tie previously proposed routes would occur simultaneously for a worse-case scenario. With the same assumption for the gen-tie alternative routes, cumulative construction noise involving the Project parcels and the gen-tie alternative routes would result in similar noise levels as shown in Table 12 of the Noise Study (Rincon 2023), with noise levels reaching up to 83 dBA Leq at the nearest residences. This would be above FTA's construction noise threshold of 80 dBA L_{eq} (8-hour). Therefore, similar to the gen-tie previously proposed routes, cumulative construction noise from the gen-tie alternative routes would potentially exceed applicable FTA thresholds. Recommendation NOI-1 in the Noise Study would reduce cumulative construction noise levels with the gen-tie alternative routes at adjacent residential properties by 10 dBA. As such, nighttime and cumulative construction noise levels would be reduced to 78 dBA, which would not exceed applicable FTA construction noise level limit of 80 dBA L_{eq} at noise sensitive uses.

As shown in Table 13 in the Noise Study (Rincon 2023), construction traffic including the gen-tie previously proposed routes would increase noise levels by up to 1 dBA L_{eq} on Project utilized roadway segments, well below exceeding applicable FTA criteria. Construction traffic with the alternative gen-tie proposed routes is anticipated to be similar to the gen-tie previously proposed routes. Therefore, the short-term increase in traffic noise from construction of the gen-tie alternative routes would be less than significant.

Similar to the gen-tie previously proposed route transmission lines, the gen-tie alternative route transmission lines would generate noise from the corona affect, which is a phenomenon associated

with the electrical ionization of the air that occurs near the surface of the energized conductor and suspension hardware due to very high electric field strength. This is audible power line noise that is generated from electric corona discharge, which is usually experienced as a random crackling or hissing sound. According to the Noise Study, the corona effect on the gen-tie transmission line would generate a noise level of 20 dBA at a distance of 50 feet. This is the approximate distance to the nearest residences from the alternative gen-tie routes. In addition, according to the Noise Study, as observed during a site visit to existing solar farms, noise levels from these transmission lines were not detected over the existing ambient noise sources in the area (wind and vehicles) just outside of the solar farm properties. Therefore, per site observations and the general low noise of transmissions lines, alternative gen-tie route noise would not exceed County's standard of 55 dBA L_{eq} at the nearest residences, and impacts would not exceed County thresholds.

Similar to the gen-tie previously proposed routes, gen-tie alternative route construction may require the use of an auger drill rig that has the potential to result in temporary vibration impacts on structures and humans. Based on the potential alternative gen-tie locations and similar to the gen-tie previously proposed routes, auger drilling activities could occur within 50 feet of the nearest off-site residential structure. Other than use of an auger drill rig, other construction activities at the gen-tie corridors are less intensive than auger drill rig and would have lower inches per second (in./sec.) peak particle velocity (PPV) than the auger drill rig. Therefore, vibration levels from the auger drill rig are considered worst case for the gen-tie construction. It is estimated that a drill rig would create a vibration level of 0.031 in./sec. PPV at 50 feet, which would be below the County's vibration standard of 0.2 in./sec. PPV. In addition, heavy construction activity involving drilling would not occur during nighttime hours. Therefore, vibration associated with alternative gen-tie construction would not exceed County thresholds.

Paleontological Resources

The new gen-tie alternative routes are underlain by Quaternary young alluvium, Quaternary young playa deposits, and quartz monzonite (Dibblee and Minch 2008). Two of these geologic units, Quaternary young alluvium and Quaternary young playa deposits, were assessed in the original Paleontological Resources Analysis (PRA), and both were assigned low paleontological sensitivity at the surface and undetermined paleontological sensitivity greater than 10 feet below the surface. Quartz monzonite does not underlie any of the previously proposed project components and thus was not assessed in the original PRA. Quartz monzonite is an intrusive igneous rock, meaning it forms from the cooling of molten rock below Earth's surface, meaning it cannot preserve paleontological resources. Therefore, according to the Society of Vertebrate Paleontology (SVP) paleontological sensitivity scale, quartz monzonite has no paleontological sensitivity (SVP 2010).

The original PRA determined that the potential impacts to paleontological resources resulting from gen-tie construction in sediments mapped as Quaternary young alluvium and Quaternary young playa deposits would be potentially significant if these activities reached greater than 10 feet below the surface. Construction activities in areas mapped as quartz monzonite do not pose a risk to significantly impact paleontological resources. Therefore, the potential impacts to paleontological resources resulting from the newly proposed gen-tie routes are equal or lesser to those identified in the original PRA, and the recommendations proposed in the original PRA are sufficient to address those impacts.

Traffic

Consistent with the most recent traffic assessment for the proposed project (GHD, July 2023), the proposed gen-tie line alternatives in the northwest quadrant of the project study area would not cause additional significant transportation impacts as described in the attached Traffic Consistency Analysis for Gen-Tie Lines Alternative Memorandum (Attachment 2).

Visual Resources

The new gen-tie alternative routes are located to the north and west of gen-tie routes previously evaluated. The built environment of the new gen-tie alternative routes is dominated by a lattice of paved and dirt roads extending from SR 247, which runs generally north-south to the west of the project area. Several large regional power lines supported by tall steel lattice towers run east-west in the project vicinity. Low wood post and wire fences are present throughout the project vicinity, as are small, single-story residences dotting the landscape. Also present and visible are the wood poles of local electrical distribution lines providing service to the residences.

Character Photo Point D in Figure 3 of the original Visual Resources Assessment provides a representative view of the new northern-most gen-tie alternative routes from SR 247. Key Observation Points 1 and 2 of the original Visual Resources Assessment provide representative existing and simulated views of the project, including gen-tie routes adjacent to SR 247. The existing view to northbound motorists on SR 247 includes generally flat land surfaces in the near and middleground, dipping down then sloping up to the mountain range in the background. Tan soils and low shrubby olive-green vegetation characterize the landscape. The existing view for southbound motorists on SR 247 includes a landscape dotted with low vegetation, while the distant San Bernardino Mountains dominate the view.

The original Visual Resources Assessment found that the new 230-kV TSPs add industrial character to views in the project vicinity, especially in views where the associated transmission structures are skylined, but the structures are similar in form to existing electrical infrastructures in the Project vicinity. Overall, the Project would not substantially degrade the existing visual character or quality of public views of the Project area and its surroundings. The additional gen-tie alternative routes would not change the findings of the original Visual Resources Assessment.

Water Supply

The proposed Project revisions include an additional 12.4 miles of gen-tie line alternatives. Construction of the new gen-tie line would require a water supply for dust suppression, consistent with construction of other project components. No other water demands are associated with gen-tie construction or operation, as operation of the lines would not require a water supply. The additional 12.4 miles of gen-tie line represents approximately 32 percent of the original (previously analyzed) 39 miles of gen-tie; therefore, it is assumed that water demands for dust suppression during construction would represent approximately 32 percent of the dust suppression demands for the original 39 miles. However, water demands for Project construction reflect the overall project, and are not broken down by individual components; approximately 225 acre-feet per year (AFY) was identified as the total water demand for dust suppression during construction. If it is conservatively assumed that water demands for the original 39 mile of gen-tie represent five percent of the overall project's water demands, the per-mile demand would be approximately 0.28 AFY, and the new 12.4 miles would require 3.6 AFY.

As with the proposed Project, the new gen-tie alternatives are located in the Lucerne Valley Subbasin in the Este Subarea of the Mojave Basin Area, which is adjudicated and therefore managed in accordance with Court-ordered Adjudication Judgement. The Judgement identifies Base Annual Production (BAP) and Free Production Allowance (FPA) quantities to each party subject to the adjudication, where the BAP is the party's total amount of water rights, and the FPA is the adjusted (lower) amount of water the party is able to produce annually without causing or contributing to overdraft conditions.

Any water for the Project that is procured from the adjudicated area would be pumped under purchased or leased FPA rights held by parties to the Adjudication Judgement, and would therefore be compliant with the Adjudication Judgement and would have no adverse effects on water supply in the

adjudicated area. If the Project's water supply is obtained by purchasing water from a local purveyor, that water would come from the respective purveyor's FPA allowances and thus also be regulated and managed in accordance with the Adjudication Judgement. Additionally, the proposed Project would replace existing land uses with less water-intensive uses, ultimately relieving reliance of land uses on the local groundwater and thereby supporting recovery from historic overdraft conditions. Therefore, the addition of 12.34 miles of gen-tie alternatives to the Project would not introduce new impacts or issues related to water supply availability and reliability. The conclusions of the Water Supply Assessment prepared for the original project remain applicable; no revisions are necessary.

Conclusions

This addendum evaluated the inclusion of an additional approximately 12.3 miles of gen-tie alternatives to the Sienna Clean Energy project study area. These 12.34 miles of gen-tie alternative represent additional options for the selection of the final gen-tie route but would only be developed if included in the selected route. As such, these additional areas do not represent a substantive change to the project, rather they represent an expansion of the study area requiring evaluation. The additional study area did include existing conditions not previously present within the study area including: 1) a vegetation community not present within the previously defined study area; 2) additional cultural resources identified in the expanded record search area; and 3) and one (1) additional geologic formation not present within the previously defined study area. However, no new impacts were identified and the previously identified mitigation measures, as applicable, are sufficient to reduce impacts within the new gen-tie alternative areas to less than significant.

Sincerely,
Rincon Consultants, Inc.

David Daitch, Ph.D.
Vice President Natural Resources

Andrea Maben
Project Manager

Attachments

Attachment 1 Figures

Attachment 2 Traffic Consistency Analysis for Gen-Tie Lines Alternative Memorandum

References

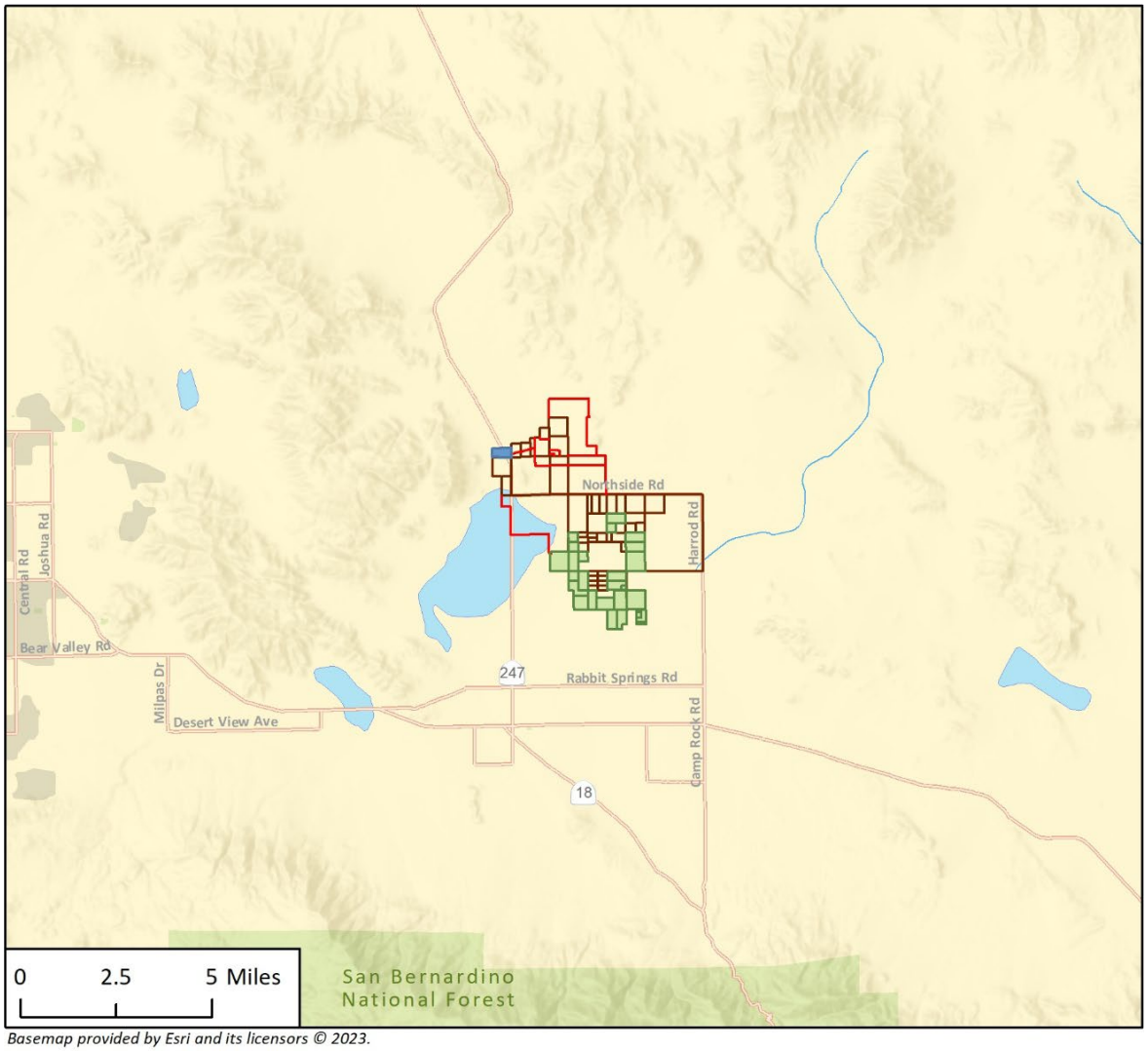
Dibblee, T.W. and J.A. Minch. 2008. Geologic map of the Apple Valley and Ord Mountains 15 minute quadrangle, San Bernardino County, California. [map]. Dibblee Geologic Foundation, Dibblee Foundation Map DF-377, scale 1:62,500.

Society of Vertebrate Paleontology (SVP). 2010. Standard Procedures for the Assessment and Mitigation of Adverse Impacts to Paleontological Resources. Society of Vertebrate Paleontology Impact Mitigation Guidelines Revision Committee. https://vertpaleo.org/wp-content/uploads/2021/01/SVP_Impact_Mitigation_Guidelines-1.pdf.

Attachment 1

Figures

Figure 1 Regional Location



Basemap provided by Esri and its licensors © 2023.

Project Site
Proposed SCE Calcite Substation
Gen-tie Line and/or
Collector Alternative
Additional Gen-tie Line and/or
Collector Alternative (12.3 miles)

N



Figure 2 Project Location

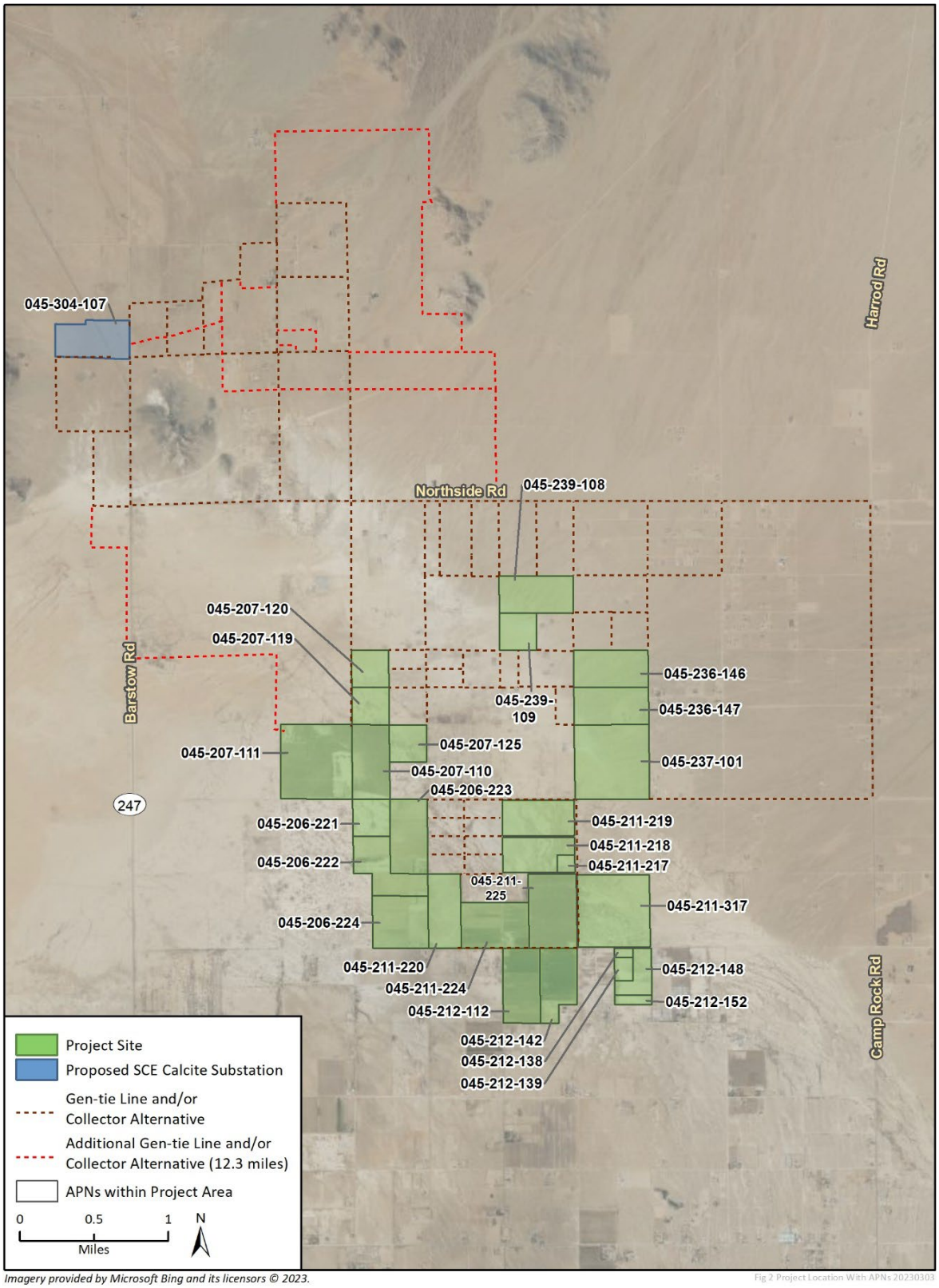


Figure 3 Vegetation and Land Cover

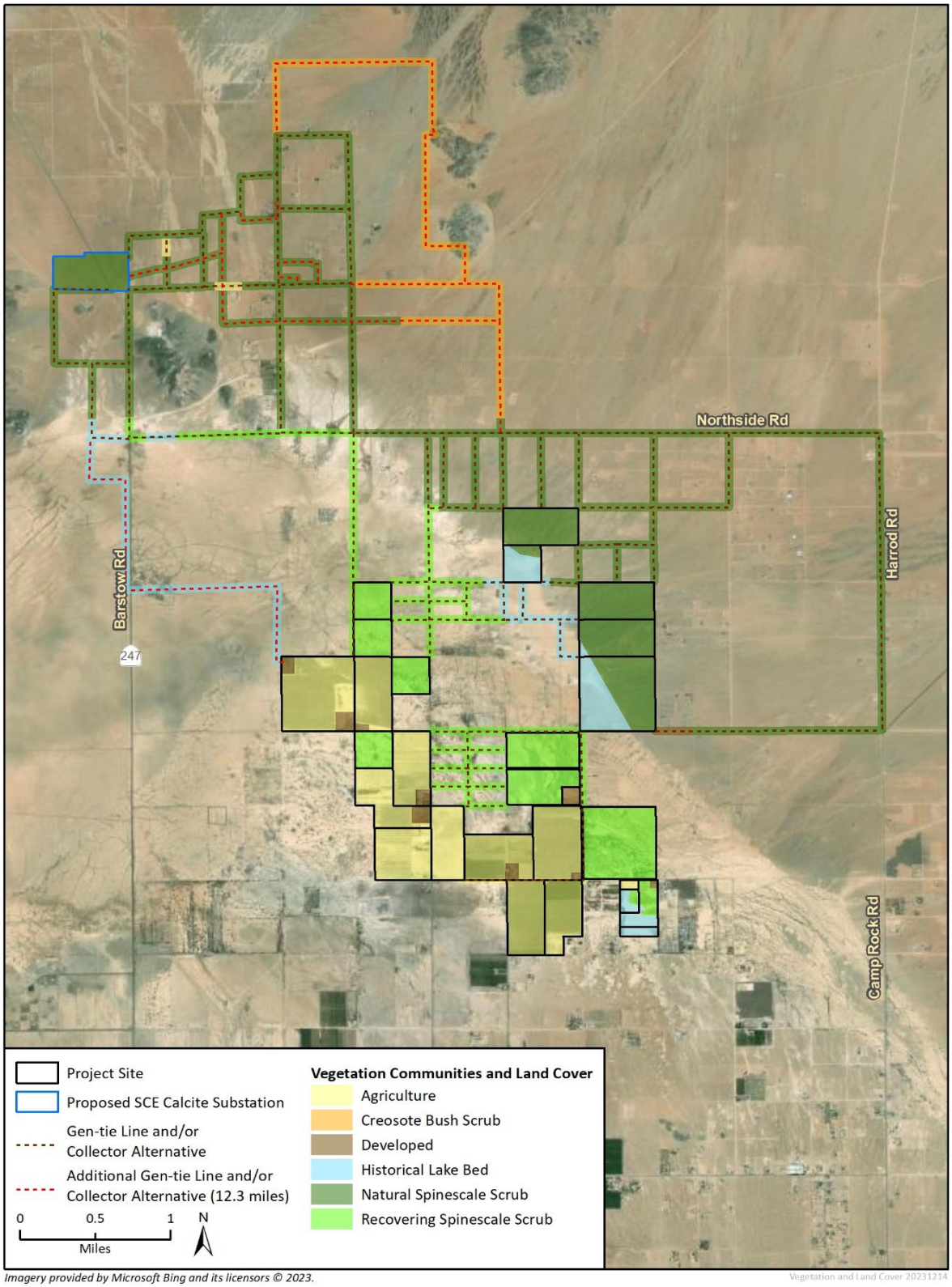
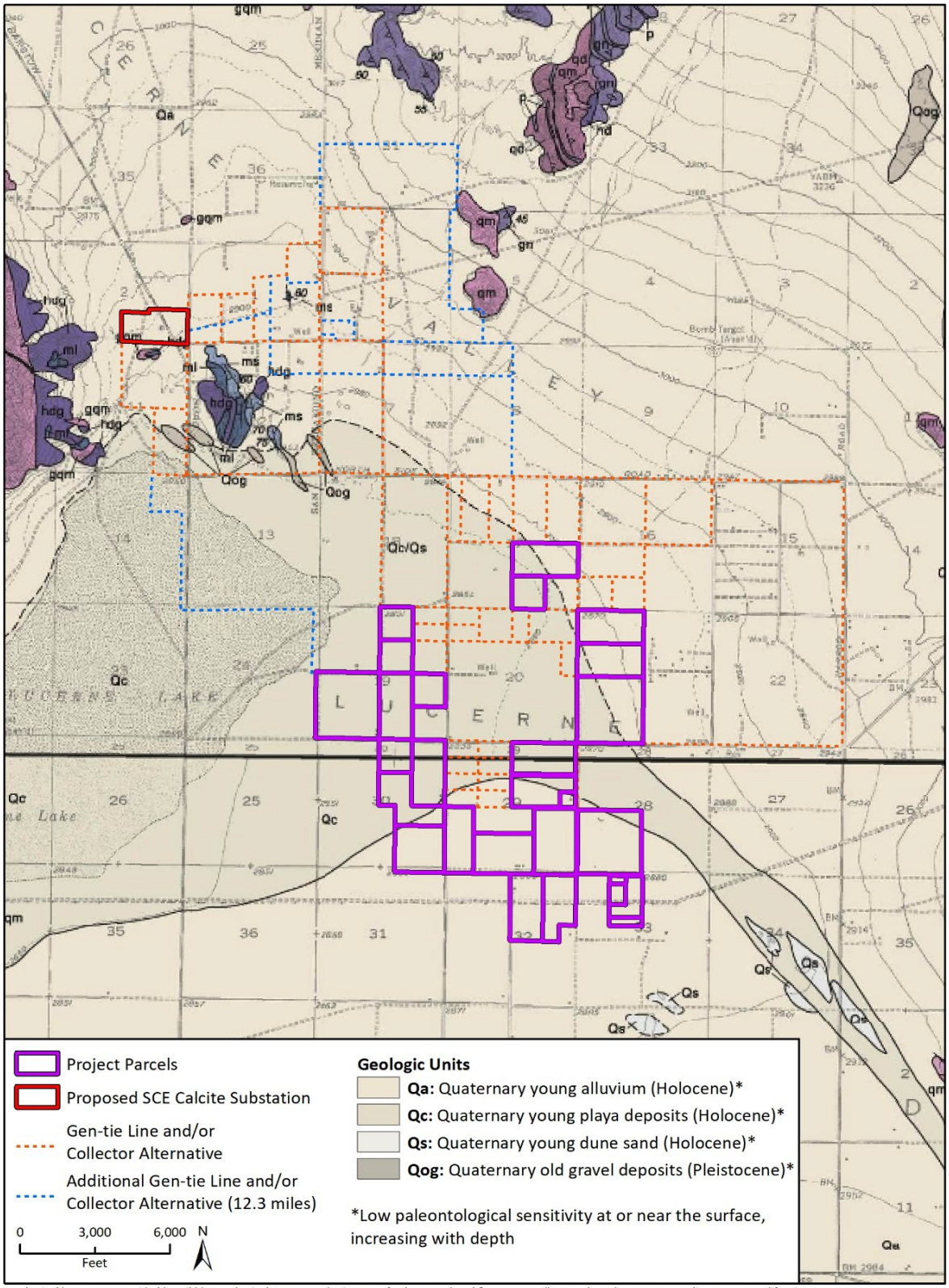


Figure 4 Paleontological Resources



Geological basemaps provided by Dibblee and Minch 2008. Geologic map of Lake Arrowhead & Lucerne Valley quadrangles, San Bernardino County, California, and Geologic Map of Apple Valley and Ord Mountains 15 minute quadrangles, San Bernardino County, California.

Fig X Geology_Paleo 20231214

Attachment 2

Traffic Consistency Analysis for Gen-Tie Lines Alternative Memorandum

Technical Memorandum

December 15, 2023

To	**Andrea Maben**, Senior Environmental Project Manager Rincon	**Contact No.**	303-818-6072
Copy to	**David Daitch**, PhD., Vice President, Natural Resources, Rincon **Frank Penry**, PE, TE, PTOE Senior Project Manager, Traffic ITS	**Email**	
From	**Peter Galloway**, Senior Transportation Planner, GHD	**Project No.**	12557185 (legacy) 12617192
Project Name	Sienna Solar and Storage Traffic Assessment (July 7, 2023 Final)		
Subject	**Consistency Analysis for Gen-Tie Lines Alternative**		

The following technical memorandum provides additional transportation review and qualitative analyses related to the traffic assessment for the proposed Sienna Solar and Storage project in San Bernadino County, CA (*GHD, July 2023*). Based on the most recent project description, gen-tie line alternatives are proposed for the northwest portion of the project development area north of Northside Road and Haynes Road as well as west to Barstow Road (see **Figure 2—Gen Tie Alternative Lines**). To ensure that the proposed gen-tie in line alternatives would not cause additional significant transportation impacts as identified in the traffic assessment for the proposed project; a review of the most recent traffic assessment for the project has been conducted to address consistency with previously analyzed intersections and roadways adjacent to the expanded development area and overall findings.[1] The following sections provide description, review, and assessment of proposed alternative gen-tie lines in study area.

Project Alternative Description Update

The proposed project site currently consists of a 525-megawatt (MW) utility scale solar farm with 525 MW battery storage located in unincorporated San Bernadino County. The project site is located east of Barstow Road/State Route (SR) 247 roughly between Northside Road and Wilshire Road, northeast of the community of Lucerne Valley. It is noted that the previous traffic assessment indicated that (within the project site) there would be approximately 39 miles of collector lines and gen-tie alternatives, *although not all routes will be developed*. In addition, gen-tie lines analyzed as part of the final traffic assessment extended approximately 2-miles north of Northside Road along Huff Road and Meridian Road and west to Fern Road tying into Barstow Road/SR 247.

Under the new project development alternatives, gen-tie lines would be added to the northwest quadrant within and slightly outside the initial study area. As shown in **Figure 2**, alternative gen-tie lines (shown in red) would be extended approximately 1.0 mile north from Northside Road to Hayes Road and then west Meridian Road within the initial study area. Another alternative gen-tie route would extend north approximately 1.5 miles north from Haynes Road through Powerline Road and Waalew Road before extending west to Meridian Road.

[1] GHD, Sienna Solar and Storage Traffic Assessment, Final Assessment, July 7, 2023.

Finally, an additional gen-tie line would be added within initial study area extending west from Hull Road to Barstow Road/SR 247 then north to Northside Road.

Project Trip Generation

Proposed project trip generation would remain unchanged from stated levels in the final traffic assessment with additional proposed gen-tie lines. The total PCE (passenger car equivalent) estimated for project development during the three most intense phases (3-5) would remain at 860 construction workers. Under short-term (temporary) conditions, 860 construction workers were estimated to generate 813 AM and PM peak hour trips (in and out), respectively, during the temporary construction phases. Following construction, day-to-day operations and maintenance of the proposed project would be minimal with 17 peak hour trips per day as a result of 15 full-time employees.

Trip Assignment

In addition to proposed project trip generation, vehicle trip distribution/assignment would also remain unchanged from the final traffic assessment. Specifically, the majority of proposed project trips would continue to be to/from south and west via State Route 18 and State Route 247. The reason for this trip assignment is that the location of lodging and employment bases are primarily in the Lucerne Valley and Desert Knolls areas south and west of the site. Fewer employees associated with proposed project construction would be coming to/from the north via SR 247 (15%). In addition, employees would still use the same routes to access project construction areas in the northwest portion of project site where the new gen-tie lines would be located.

Intersection LOS and Roadway Segment LOS Adjacent to Proposed Gen-Tie Lines

Intersection and roadway segment level-of-service was reviewed in the northwest quadrant of the project site to ensure acceptable operations with proposed alternative gen-tie lines. Based on the most recent traffic assessment, there are five (5) project study intersections located in the northern areas of the site off Barstow Road, Northside Road and Granite Road that would provide key access to the alternative gen-tie line areas including the following (as numbered in the most recent traffic assessment):

1. Northside Road/Barstow Road (State Route 247)
2. Northside Road/Huff Road
3. Granite Road/Harrod Road
4. Granite Road/Camp Rock Road
7. Access Road/Barstow Road

In addition to key study intersections (above), roadway segments in the northwest quadrant of Barstow Road and Northside Road provide access to the alternative gen-tie line areas as follows:

1. Barstow Road north of Springs Road
2. Northside Road east of Barstow Road
4. State Route 247 south of Camp Rock Road

As shown in **Table 1** and **Table 2**, all “with project” scenarios including Existing plus Project and Cumulative plus Project indicate acceptable level-of-service (LOS C or better) during the AM and PM peak hours. Activities related to the alternative gen-tie lines would be focused primarily at the Barstow Road, Northside Road, and Granite Road intersections. Due to the limited number of access intersections and “grid pattern” of the street network in the northwest quadrant areas where the alternative gen-tie lines would be located, workers would continue to use these same key intersections to/from the site.

In addition to intersection operations, roadway segments adjacent to the proposed alternative gen-tie lines and northwest quadrant of project site were reviewed for operations as shown in **Table 3** and **Table 4**. As with

.

Table 1: Existing Plus Project Intersection Operation

#	Intersection	Control Type[1,2]	Target LOS	AM Peak Hour			PM Peak Hour		
				Delay	LOS	Warrant Met?[3]	Delay	LOS	Warrant Met?[3]
1	Northside Road/Barstow Road	TWSC	C	11.2	B	No	10.6	B	No
2	Northside Road/Huff Road	Yield	C	9.4	A	No	7.6	A	No
3	Granite Road/Harrod Road	TWSC	C	8.6	A	No	9.5	A	No
4	Granite Road/Camp Rock Road	TWSC	C	9.0	A	No	9.1	A	No
5	Wilshire Road/Lincoln Road	Yield	C	7.8	A	No	7.5	A	No
6	**Rabbit Springs Road/Barstow Road**	**TWSC**	C	21.8	C	No	**26.1**	**D**	**No**
7	Access Road/Barstow Road	TWSC	C	12.0	B	No	24.6	C	No

Notes:
1. TWSC = Two Way Stop Control
2. LOS = Delay based on worst minor street approach for TWSC and Yield intersections
3. Warrant = Based on California MUTCD Warrant 3 (70% Factor)
*4. **Bold** = Unacceptable Conditions*

Table 2: Cumulative plus Project Intersection Operation

#	Intersection	Control Type[1,2]	Target LOS	AM Peak Hour			PM Peak Hour		
				Delay	LOS	Warrant Met?[3]	Delay	LOS	Warrant Met?[3]
1	Northside Road/Barstow Road	TWSC	C	11.2	B	No	10.6	B	No
2	Northside Road/Huff Road	Yield	C	9.4	A	No	7.6	A	No
3	Granite Road/Harrod Road	TWSC	C	8.6	A	No	9.5	A	No
4	Granite Road/Camp Rock Road	TWSC	C	9.0	A	No	9.1	A	No
5	Wilshire Road/Lincoln Road	Yield	C	7.8	A	No	7.5	A	No
6	**Rabbit Springs Road/Barstow Road**	**TWSC**	C	21.8	C	No	**26.1**	**D**	**No**
7	Access Road/Barstow Road	TWSC	C	12.0	B	No	24.6	C	No

Notes:
1. TWSC = Two Way Stop Control
2. LOS = Delay based on worst minor street approach for TWSC and Yield intersections
3. Warrant = Based on California MUTCD Warrant 3 (70% Factor)
*4. **Bold** = Unacceptable Conditions*

Table 3: Existing plus Project Roadway Segment LOS Conditions

#	Roadway	Location	Facility Type (# of Lanes)	Target LOS	Average Daily Traffic	LOS
1	Barstow Road	n/o Rabbit Springs Rd.	Two-Lane Collector	C	3,950	A
2	Northside Road	e/o Barstow Road	Two-Lane Collector	C	870	A
3	Rabbit Springs Rd.	e/o Barstow Road	Two-Lane Collector	C	2,070	A
4	State Route 247	Camp Rock Rd.-SR 18	Two-Lane Highway	C	2,460	A
5	State Route 247	SR 18-Rabbit Springs Rd	Two-Lane Highway	C	2,960	A
6	State Route 247	Rabbit Springs Rd.-LVCR	Two-Lane Highway	C	3,210	A
7	State Route 18	Lucerne Valley-Jct. SR247	Two-Lane Highway	C	9,020	B

Notes:
1. *No LTL arterials without left turn lanes (LTL) at most major intersections (within study area).*
2. *Daily volume to capacity on roadways does not supplant the need to perform peak-hour HCM-based analysis.*

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Table 4: Cumulative plus Project Roadway Segment LOS Conditions

#	Roadway	Location	Facility Type (# of Lanes)	Target LOS	Average Daily Traffic	LOS
1	Barstow Road	n/o Rabbit Springs Rd.	Two-Lane Collector	C	6,270	B
2	Northside Road	e/o Barstow Road	Two-Lane Collector	C	890	A
3	Rabbit Springs Rd.	e/o Barstow Road	Two-Lane Collector	C	3,510	A
4	State Route 247	Camp Rock Rd.-SR 18	Two-Lane Highway	C	7,060	A
5	State Route 247	SR 18-Rabbit Springs Rd	Two-Lane Highway	C	6,870	A
6	State Route 247	Rabbit Springs Rd.-LVCR	Two-Lane Highway	C	7,640	A
7	State Route 18	Lucerne Valley-Jct. SR247	Two-Lane Highway	C	10,900	C

Notes:

1. *No LTL arterials without left turn lanes (LTL) at most major intersections (within study area).*
2. *Daily volume to capacity on roadways does not supplant the need to perform peak-hour HCM-based analysis.*

intersection operations, all roadway segments are projected to operate at acceptable conditions (LOS C or better) during the AM and PM peak hour periods. Focusing on the roadway segments in the northwest quadrant of the project site, operations would be LOS B or better. With construction activities focused in these northwest quadrant areas, slight changes in travel patterns due to alternative gen-tie line locations would not significantly alter roadway LOS. There is ample capacity on these roadway segments to absorb minor changes to travel patterns from construction activities. Again, with no increase in proposed project trip generation all study intersections and roadway segments would operate acceptably with proposed alternative gen-tie lines.

Mitigation Review/Summary

Consistent with the most recent traffic assessment for the proposed project (*GHD, July 2023*), the proposed gen-tie line alternatives in the northwest quadrant of the project study area would not cause additional significant transportation impacts for the following reasons:

- Vehicle/truck access to the alternative gen-tie line routes would still be gained by key intersections analyzed on Barstow Road (State Route 247), Northside Road, and Huff Road;
- Proposed project trip generation and trip assignment would remain unchanged with proposed gen-tie line alternative routes;
- Study intersection and roadway segment LOS in the northwest quadrant study area where alternative gen-tie lines would be located would remain unchanged from proposed project levels during the AM and PM peak hour (LOS C or better).
- Mitigation measures were recommended for the Rabbit Springs Road/Barstow Road (State Route 247) intersection under Cumulative (No Project) conditions. The Rabbit Springs Road/Barstow Road (SR 247) intersection is located in the southwest quadrant of the project site away from proposed gen-tie line alternative routes. However, mitigation for the intersection would still be recommended. Under Cumulative plus Project Conditions, the applicant would be responsible for 1.08% of the total costs (installation of a traffic signal and associated widening). Study intersections and roadway segments located within the northwest quadrant where new gen-tie lines are proposed would continue to operate at acceptable levels along Barstow Road, Northside Road, Huff Road, and Camp Parks Road (LOS A or B at these intersections/roadway segments).

Appendix O. Project Description - SCE'S Calcite Substation and the Interconnection of Sienna Solar Project

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PROJECT DESCRIPTION

SCE'S CALCITE SUBSTATION AND THE INTERCONNECTION OF SIENNA SOLAR PROJECT

~~**MAY 2023**~~ **Updated: March 2025**

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CALCITE SUBSTATION PROJECT DESCRIPTION

PROJECT OVERVIEW

Southern California Edison Company ("SCE") proposes to construct the Calcite Substation and associated facilities ("Calcite Substation Project") to interconnect Avantus, LLC (99MT 8ME, LLC), Sienna Solar Farm ("Sienna Solar") to SCE's existing Lugo-Pisgah No. 1 220 kV Transmission Line. See Figure SCE-1 PROPOSED CALCITE SUBSTATION. The following is a summary of the Calcite Substation Project main components:

- Calcite Substation: Construct a 220 kV switchyard on approximately 7 acres along with approximately 4 acres for drainage, grading, and an access road.
- Transmission Lines: Loop-in the Lugo-Pisgah No. 1 220 kV Transmission Line into Calcite Substation adding a total of approximately ~~5,000~~4,600 feet of new transmission line (two lines of approximately ~~2,500~~1,600 and 3,000 feet located ~~adjacent to one another~~in the same vicinity) creating the Calcite-Lugo and Calcite-Pisgah 220 kV Transmission Lines.
- Generation Tie Line Connection: Connect the Sienna Solar-built generation tie line ("gen-tie") into the SCE-owned Calcite Substation. SCE will construct ~~up to three~~one structure~~s~~ and ~~four~~two spans, starting at the generator's closest structure to the Calcite Substation property to connect to the new position within the switchyard.
- Distribution Line for Calcite Substation Light and Power: Construct approximately 700 feet of 12 kV overhead distribution line and approximately 3,100 feet of underground distribution line (connecting the existing distribution system along Haynes Road to Calcite Substation) to provide temporary power for construction and permanent substation light and power.
- Telecommunications Facilities: Install fiber optic communication cables, equipment, and associated structures for diverse path routing of communications required for the proposed Calcite Substation Project.

PROJECT LOCATION

The proposed Calcite Substation would be located on an approximate 75-acre parcel of land that extends on the west and east sides of California State Highway 247, directly north of Haynes Road, in the County of San Bernardino ("Calcite Substation Property"). See Figure SCE-1 PROPOSED CALCITE SUBSTATION. The proposed substation footprint would require approximately 7 acres along with approximately 4 acres for drainage, grading, and an access road, generally located within the western part of the approximate 75-acre parcel.

By looping the existing Lugo-Pisgah No.1 220 kV transmission line into Calcite Substation, two new 220 kV transmission lines would be created. These transmission lines (T/Ls) would depart from the existing Lugo-Pisgah No. 1 220 kV line approximately ~~2,500~~1,600 and 3,000 feet south of Calcite Substation, cross under SCE's Eldorado-Lugo and Lugo-Mohave 500 kV ~~lines~~ T/Ls and enter Calcite Substation from the south.

The Sienna Solar Project's portion of the 220 kV gen-tie line along with OPGW and underground fiber are currently anticipated to extend onto an easement ~~inside~~ south of the Calcite Substation ~~Property~~property, extend~~ed~~ ~~North~~ north from Haynes Road, southwest of the 247 Highway, the proposed Lugo-Pisgah No. 1 220 kV T/L loop-in. Beginning at the last structure to be constructed and owned by Sienna Solar (a dead-end structure) just to the southwest of the of the 247 Highway, SCE would construct all remaining electrical facilities to extend the remainder of the gen-tie into Calcite~~the~~ Substation.[1] See Figure SCE-2 PROPOSED TRANSMISSION AND DISTRIBUTION LINES.

The Calcite Substation would require the extension of the existing 12kV distribution circuit in order to provide temporary power and permanent substation light and power. The existing 12 kV overhead circuit would extend westward overhead on Haynes Road, for approximately 700 feet. The circuit would then continue underground for approximately 3,100 feet by heading westward under the existing transmission right-of-way (ROW) along Haynes Road and then north along the new Calcite Substation access road into the station light and power rack within Calcite Substation. See Figure SCE-2 PROPOSED TRANSMISSION AND DISTRIBUTION LINES.

The telecommunication facilities to support the Calcite Substation would require two new fiber optic cables. The fiber optic cables would connect Calcite Substation to SCE's Barstow Repeater Communication Site ("CS") and to a splice box on tower M29-T3 at SCE's Lugo Mohave 500kV T/L. See Figure SCE-1 PROPOSED CALCITE SUBSTATION.

PROJECT DESCRIPTION

I. CALCITE SUBSTATION

The Calcite Substation would be a new regional 220 kV collector station initially needed to support the Sienna Solar Project, measuring approximately 620 feet by 500 feet. The Calcite Substation would be an unattended collector station (no power transformation) surrounded by a 10 ft high perimeter wall, including the top guard, and with two vehicular gates and a pedestrian gate.

Substation Design and Equipment

SCE would engineer, design, construct, and test the proposed Calcite Substation. The substation would be designed to accommodate a total of eight 220 kV positions, with four positions initially constructed. Three positions would be utilized in the initial design: one position for the Sienna Solar Project gen-tie line, one position for the Pisgah 220 kV transmission line, and one position for the Lugo 220 kV transmission line. The remaining positions would be available for future network or generation tie-lines.

Calcite Substation would be initially equipped with:

[1] The portion of the gen-tie running from the Sienna Solar Project to this last Sienna Solar structure is anticipated to be described elsewhere by Sienna Solar, not in this description of the work to be undertaken by SCE.

- Two (2) overhead 220 kV buses
- Six (6) circuit breakers
- Twelve (12) group-operated disconnect switches
- One (1) Mechanical Electrical Equipment Room (MEER)
- Station light and power transformers and associated equipment
- Station lighting, switchrack lighting, roadway and gate lights
- Permanent wall
- Perimeter Security Intrusion Detection System

Grading and Land Disturbance

The Calcite Substation Property would be prepared by clearing existing vegetation and installing a temporary chain-link fence to surround the construction site. The Property would be graded in accordance with approved grading plans. The area to be enclosed by the proposed substation perimeter wall would be graded to a slope that varies between one and three percent. To protect the substation from flooding, and to keep the existing drainage patterns, drainage conveyances would be constructed around the substation. These features would disturb an area approximately 35 feet wide around the substation (approximately two acres) resulting in a total permanent disturbance area of approximately 11 acres. Final site grading and drainage would be subject to the conditions of the grading permit obtained from the County of San Bernardino (see Table SCE – 1 below).

Additional temporary land disturbance (up to approximately 4 acres) within the proposed Calcite Substation Property may be necessary for temporary equipment storage and material staging areas. An additional 3 acres would be temporarily disturbed due to construction grading (see Table SCE-2 below).

The Calcite Substation access road would be 24 feet wide and composed of asphalt concrete. This road would connect to Highway 247 (Barstow Road) and would require the improvement of approximately 1,100 feet of the existing Haynes Road and the establishment of approximately 800 feet of new road. Permanent land disturbance would be approximately 2 acres on the Calcite Substation Property. Any permits needed for the access road would be acquired from the local agencies.

Table SCE - 1 below provides Substation Ground Surface Improvement Materials and the approximate volume and type of earth materials proposed to be used or disposed.

Table SCE - 1:
Substation Ground Surface Improvement Materials and Estimated Volumes

Element	Material	Approximate Surface Area (ft^2)	Approximate Volume (yd^3)
Site Fill (import)	Soil	420,000	51,000
Waste Removal (export)	Soil/Vegetation	420,000	3,000

Replacement fill (import)	Soil	420,000	4,000
Substation Equipment Foundations	Concrete	4,900	850
Equipment and cable trench excavations *	Soil	270,000	1,200
Cable Trenches**	Concrete	6,300	25
Internal Driveway ***	Asphalt concrete Class II aggregate base	48,000 48,000	600 900
Access Road****	Asphalt concrete Class II aggregate base Concrete	6051,000 6051,000 6051,000	1,200900 1,600000 200100
Substation Rock Surfacing	Rock, nominal 1 to 1-1/2 inch per SCE Standard	250,000	3,200

Notes to Table SCE - 1

* Excavation "spoils" would be placed on site during the below-ground construction phase and used to the extent possible for the required on-site grading.

** Standard cable trench elements are factory fabricated, delivered to the Property and installed by crane. Intersections are cast in place concrete.

*** Internal Driveway refers to all paved roads within the substation walls.

**** Access Road refers to the paved road from the public right of way to the primary entrance gate and secondary access.

Table SCE - 2 below provides the approximate area of land disturbance at the Calcite Substation Property. This includes the area immediately outside the substation.

Table SCE - 2:
Land Disturbance for Substation Construction

Project Feature	Project Quantity	Disturbed Acreage Calculation	Construction Disturbance Acreage	Temporary Disturbance Acreage	Permanent Disturbance Acreage
Calcite Substation	1	620' x 5048~~0~~'	10.0	3.0	7.0
Drainage and Grading	1	Varies	2.0	0.0	2.0
New Access Roads	1	linear miles x 24' wide	2.0	0.0	2.0
Material & Equipment Staging Yard - (Calcite)	1	approx. 2 acres	2.0	2.0	0.0
Total Estimated Disturbance Acreage			**16.0**	**5.0**	**11.0**

Below Grade Construction

After the Calcite Substation Property is graded, below grade facilities would be installed. Below grade facilities include a ground grid, underground conduit, trenches, and all required foundations. The design of the ground grid would be based on soil resistivity measurements collected during a geotechnical investigation that would be conducted prior to construction.

Equipment Installation

Above grade installation of substation facilities (*i.e.*, buses, circuit breakers, steel structures, and the MEER) would commence after the below grade structures are in place.

Hazards and Hazardous Materials

Construction and operation of the Calcite Substation would require the limited use of hazardous materials such as fuels, lubricants, and cleaning solvents. SCE would comply with all applicable laws relating to hazardous materials use, storage, and disposal. A Stormwater Pollution Prevention Plan (SWPPP) would also be prepared for the Calcite Substation Project.

Waste Management

Construction of the Calcite Substation would result in the generation of various waste materials including soil, vegetation, and sanitation waste (portable toilets). Soil excavated for the Calcite Substation would either be used as fill or disposed of off-site at an appropriately licensed waste facility. Sanitation waste (*i.e.*, human generated waste) would be disposed of according to sanitation waste management practices.

Dust Control

During construction, water trucks from local water purveyors would be used to minimize the quantity of airborne dust created by construction activities.

Post-Construction Cleanup

Any damage to existing roads as a result of construction would be repaired once construction is completed in accordance with local agency requirements. Following completion of construction activities, SCE would also restore all areas that were temporarily disturbed by construction of the Calcite Substation to as close to preconstruction conditions as possible or where applicable to the conditions agreed upon between the landowner and SCE. In addition, all construction materials and debris would be removed from the area and recycled or properly disposed of off-site. SCE would conduct a final inspection to ensure that cleanup activities were successfully completed.

Operations and Maintenance

The proposed Calcite Substation would be unstaffed, and electrical equipment within the substation would be remotely monitored and controlled by an automated system from SCE's Lugo Substation Switching Center. SCE personnel would typically visit for electrical switching and routine maintenance purposes. Routine maintenance would include equipment testing, monitoring and repair.

Geotechnical Studies

Prior to the start of construction, SCE would conduct a geotechnical study of the Substation Property and the transmission line routes that would include an evaluation of the depth to the water table, evidence of faulting, liquefaction potential, physical properties of subsurface soils, soil resistivity, and slope stability. Geotechnical borings would take place at various depths throughout the Calcite Substation Property.

Construction Equipment Personnel and Temporary Facilities

The estimated elements, materials, number of personnel and equipment required for construction of the Calcite Substation are summarized below in Table SCE - 3. In addition to the information provided in Table SCE - 3, a temporary contractor office trailer and equipment trailer would be placed within the proposed substation construction area during the construction phase of the project.

Construction would be performed by either SCE construction crews or its contractors. Contractor construction personnel would be managed by SCE construction management personnel. SCE anticipates a total of approximately 30 construction personnel working on any given day. SCE anticipates that crews would work concurrently whenever possible; however, the estimated deployment and number of crew members would be dependent upon county permitting, material availability and construction scheduling. For example, installation of electrical equipment (such as the MEER, wiring, and circuit breaker) installation may occur while the transmission line construction proceeds.

Table SCE - 3

CALCITE SUBSTATION PROJECT
CONSTRUCTION EQUIPMENT AND WORKFORCE ESTIMATES BY ACTIVITY
CONSTRUCT 220 KV SUBSTATION & ACCESS ROAD

WORK ACTIVITY				ACTIVITY ESTIMATES			
Primary Equipment Description	Estimated Horse-Power	Probable Fuel Type	Primary Equipment Quantity	Estimated Crew Workforce	Estimated Schedule (Days)	Estimated Usage (Hrs/Day)	Estimated Activity Value
Survey (1)				**4**	**10**		**Substation, Laydown Yard & Access Road**
1-Ton Truck, 4x4	300	Gas	2		10	8	
Grading (2)				**10**	**40**		**Substation, Laydown Yard & Access Road**
1-Ton Truck, 4x4	300	Gas	1		40	8	
Dozer	350	Diesel	1		40	7	
Loader	350	Diesel	2		40	7	
Scraper	350	Diesel	2		40	7	
Grader	350	Diesel	1		40	7	
Dump Truck	350	Diesel	2		40	7	

CALCITE SUBSTATION PROJECT
CONSTRUCTION EQUIPMENT AND WORKFORCE ESTIMATES BY ACTIVITY
CONSTRUCT 220 KV SUBSTATION & ACCESS ROAD

WORK ACTIVITY				ACTIVITY ESTIMATES			
Primary Equipment Description	Estimated Horse-Power	Probable Fuel Type	Primary Equipment Quantity	Estimated Crew Workforce	Estimated Schedule (Days)	Estimated Usage (Hrs/Day)	Estimated Activity Value
Backhoe	200	Diesel	2		40	7	
Tamper	350	Diesel	1		35	7	
Tool Truck	300	Gas	1		40	7	
Utility Cart	50	Diesel	2		40	7	
Water Truck	300	Diesel	3		40	8	
Fencing (3)				**5**	**25**		**Substation & Laydown Yard**
1-Ton Truck, 4x4	300	Gas	1		25	8	
Bobcat	200	Diesel	1		25	8	
Flatbed Truck	300	Gas	1		15	3	
Utility Cart	50	Diesel	1		25	7	
Water Truck	300	Diesel	1		25	8	
Civil (4)				**10**	**60**		**Substation & Access Road**
1-Ton Truck, 4x4	300	Gas	1		60	8	
Excavator	60	Diesel	1		45	4	
Lo-Drill/Auger	350	Diesel	1		30	4	
Backhoe	200	Diesel	2		60	7	
Bobcat	200	Diesel	1		60	8	
Dump Truck	350	Diesel	2		50	7	
Skip Loader	350	Diesel	1		60	8	
Forklift	200	Diesel	1		45	4	
Concrete Truck	300	Diesel	2		30	4	
Generator	50	Gas/Diesel	2		60	7	
Tool Truck	300	Gas	1		60	7	
Utility Cart	50	Diesel	2		60	7	
Water Truck	300	Diesel	2		60	8	
MEER Install (Drop In) (5)				**7**	**25**		**Substation**
1-Ton Truck, 4x4	300	Gas	1		25	8	
Manlift/Bucket Truck	150	Diesel	2		20	7	
Stake Truck	350	Gas	1		20	3	
Crane	350	Diesel	1		15	4	
Forklift	250	Diesel	1		25	4	
Tool Truck	300	Gas	1		25	7	
Electrical (6)				**10**	**70**		**Substation**
1-Ton Truck, 4x4	300	Gas	2		3	8	
Scissor Lift	60	Diesel	1		70	7	
Manlift/Bucket Truck	150	Diesel	2		60	7	

CALCITE SUBSTATION PROJECT
CONSTRUCTION EQUIPMENT AND WORKFORCE ESTIMATES BY ACTIVITY
CONSTRUCT 220 KV SUBSTATION & ACCESS ROAD

WORK ACTIVITY				ACTIVITY ESTIMATES			
Primary Equipment Description	Estimated Horse-Power	Probable Fuel Type	Primary Equipment Quantity	Estimated Crew Workforce	Estimated Schedule (Days)	Estimated Usage (Hrs/Day)	Estimated Activity Value
Reach Manlift	250	Diesel	1		45	7	
Crane	400	Diesel	1		20	4	
Forklift	250	Diesel	1		70	4	
Generator	50	Gas	1		70	7	
Utility Cart	50	Diesel	2		70	7	
Tool Truck	300	Gas	1		70	7	
Wiring (7)				**4**	**65**		**Substation**
1-Ton Truck, 4x4	300	Gas	1		65	8	
Manlift/Bucket Truck	150	Diesel	1		25	4	
Utility Cart	50	Diesel	1		65	7	
Maintenance Crew (8)				**2**	**30**		**Substation**
1-Ton Truck, 4x4	300	Gas	1		30	8	
Testing (9)				**4**	**60**		**Substation**
Test Truck	300	Gas	2		60	8	
Asphalt (10)				**6**	**40**		**Substation & Access Road**
1-Ton Truck, 4x4	300	Gas	2		40	4	
Stake Truck	350	Gas	1		30	4	
Dump Truck	350	Diesel	1		35	7	
Asphalt Paver	350	Diesel	1		35	7	
Tractor	350	Diesel	1		40	4	
Paving Roller	150	Diesel	2		40	6	
Asphalt Curb Machine	50	Diesel	1		30	4	
Utility Cart	50	Diesel	1		40	7	

Crew Size Assumptions For:

1) Survey – one 4-man crew
2) Grading – one 10-man crew
3) Fencing – one 5-man crew
4) Civil – one 10-man crew
5) MEER – one 7-man crew
6) Electrical – one 10-man crew
7) Wiring – two 2-man crews (4 total)
8) Maintenance – one 2-man crew
9) Testing – two 2-man crews (four total)
10) Asphalt/Paving – one 6-man crew

Material & Equipment Staging Yard

Construction of the substation, transmission lines, distribution lines, and telecommunication lines would require the establishment of approximately 4 acres of staging yards within the Calcite Substation Property. This staging yard would be used as a reporting location for workers, vehicle and equipment parking, and material storage.[2] The yard may also have construction trailers for supervisory and clerical personnel. The staging yard may be lit for staging and security. Normal maintenance and refueling of construction equipment would also be conducted at the yard. All refueling and storage of fuels would be in accordance with the Storm Water Pollution Prevention Plan (SWPPP).

Preparation of the staging yard would include temporary perimeter fencing and depending on existing ground conditions at the Property, possible minor grading to level the site, and application of gravel or crushed rock for dust/erosion control.

The majority of the materials associated with construction efforts would be delivered by truck to the staging yard, although some materials may be delivered directly to the temporary construction laydown/work areas.

Any land that may be disturbed at the staging yard could be restored to preconstruction conditions if there is no longer a need for the staging yard.

II. TRANSMISSION LINE ("T/L") AND RELATED STRUCTURES

SCE's transmission line requirements for the Sienna Solar interconnection to Calcite Substation and the Lugo-Pisgah No. 1 220 kV Transmission Line connection to Calcite Substation are defined by the following components: loop-in lines, and gen-tie line connection. Each of these components is described below.

220 kV Transmission Line Loop-In Design

The proposed Calcite Substation would connect to the Lugo-Pisgah No. 1 220 kV Transmission Line via a loop-in T/L. The loop-in would modify the Lugo-Pisgah No. 1 220 kV Transmission Line creating two new line segments: the Calcite-Lugo 220 kV T/L and the Calcite-Pisgah 220 kV T/L. ~~Each~~The new T/L segments entering into the Calcite Substation would be approximately

[2] Transmission line construction materials commonly stored at construction staging yards typically include, but may not be limited to: construction trailers; construction equipment; portable sanitation facilities; steel bundles; steel/wood poles; conductor reels; overhead ground wire (OHGW); hardware; insulators; cross arms; signage; consumables (such as fuel and filler compound); waste materials for salvaging, recycling, or disposal; and BMP materials (such as straw wattles, gravel, and silt fences). Substation construction materials commonly stored at the construction staging area include, but may not be limited to: portable construction trailers; sanitation facilities; electrical and construction equipment such as circuit breakers, disconnect switches, lightning arresters, transformers, vacuum switches, steel beams, rebar, foundation cages, conduit, insulators, conductor and cable reels, pull boxes and line hardware; and BMP materials (such as straw wattles, gravel, and silt fences).

~~2,500 feet long~~1,600 feet and 3,000 feet long for the Calcite-Pisgah 220kV T/L and Calcite-Lugo 220kV T/L respectively. See Figure SCE-2 PROPOSED TRANSMISSION AND DISTRIBUTION LINES.

The proposed routes for these new T/Ls would require crossing under SCE's Eldorado-Lugo and Lugo-Mohave 500 kV lines. Crossing under the 500 kV lines would require direct embedding the static wire at ~~each~~the Calcite-Pisgah 220kV T/L crossing for adequate grounding and to satisfy GO95 overhead clearance requirements between circuits. See Figure SCE-3 220 kV TUBULAR STEEL POLE CONFIGURATION.

The new 220 kV T/Ls would require approximately ~~six transmission structures; four single circuit structures and two double-circuit structures~~seven single circuit transmission structures. See Figure SCE-2 PROPOSED TRANSMISSION AND DISTRIBUTION LINES. Four single circuit structures with heights ranging from approximately ~~50~~60 feet to approximately 100 feet would be used to cross underneath the Eldorado-Lugo 500kV and Lugo-Mohave 500kV transmission lines. ~~The path would then continue north to two double-circuit structures with approximate heights of 110 to 160 feet~~The Calcite-Lugo 220kV T/L and Calcite-Pisgah 220kV T/L paths would then continue north to two single-circuit structures and one single-circuit structure respectively with approximate heights to 90 to 160 feet. See Figure SCE-3 220 kV TUBULAR STEEL POLE CONFIGURATION for possible 220 kV structure configurations. The conductor utilized would be 2B-1590 kcmil "Lapwing" Aluminum Conductor Steel Reinforced ("ACSR") conductor or similar.

Additionally, two existing 220 kV lattice steel towers in the existing ROW would be removed since they would not be in use in the proposed configuration.

The ~~six~~seven new structures would require a new ROW ranging between approximately 100 and 200 feet wide (depending on structure types and line crossings) from SCE's existing ROW to the Calcite Substation Property. See Figure SCE-2 PROPOSED TRANSMISSION AND DISTRIBUTION LINES.

220 kV Generation Tie Line Extension Design

The proposed Calcite Substation design includes terminating the Sienna Solar 220 kV gen-tie line into the switchrack. See Figure SCE-2 PROPOSED TRANSMISSION AND DISTRIBUTION LINES. There would be ~~up to 3 TSP dead-end structures with heights ranging from approximately 130 feet to approximately 180 feet~~one tubular steel pole (TSP) dead-end structure with an approximate height of 130 feet on the Calcite Substation Property for the connection of Sienna Solar's gen-tie line to a 220 kV position inside the Calcite Substation. The Sienna Solar 220 kV gen-tie line would carry 200 MW utilizing 2B-1590 kcmil "Lapwing" Aluminum Conductor Steel Reinforced ("ACSR") conductor.

The structure~~s~~ inside the proposed Calcite Substation property would be constructed by SCE and would be a dead-end structure~~s~~. ~~Aurora~~Sienna Solar would be responsible for construction of all structures beyond the last SCE dead-end structure from the Point of Change of Ownership (POCO) to the Sienna Solar's Substation. SCE would construct, own, operate, and maintain the circuit from the customer-owned POCO structure to the A-Frame of the Calcite Substation. SCE would work

with Avantus LLC, to integrate final design of the POCO structure. See Figure SCE-2 PROPOSED TRANSMISSION AND DISTRIBUTION LINES.

Transmission Line Access and Spur Roads

This portion of the Calcite Substation Project involves construction within existing and new Right of Way (ROW). Existing public roads as well as existing transmission line roads would be used as much as possible during construction. However, the Calcite Substation Project would require new transmission line roads to access the new 220 kV transmission line segments and structure locations between the Calcite Substation and existing SCE ROW.

Transmission line roads are classified into two groups: access roads and spur roads. Access roads are through roads that run between tower sites and serve as the main transportation route. Spur roads are roads that lead from access roads and terminate at one or more structure sites.

Rehabilitation work may be necessary in some locations along the existing transmission line roads to accommodate construction activities. This work may involve the re-grading and repair of existing access and spur roads, including work such as: clearing of vegetation; grading to remove potholes, ruts, and other surface irregularities; widening of the drivable surface of the road; improving drainage across access roads; and over-excavation and re-compaction to provide a smooth and dense riding surface capable of supporting heavy construction equipment. The actual widening would vary between approximately 1 foot and approximately 10 feet, in order to provide a minimum of 14 ft drivable width for safe vehicle operation.

Portions of the drivable surface would be widened along curved sections of the access road. In aAccess road gradients would be leveled so that sustained grades generally do not exceed approximately 12 percent. Along curves in the road, typically, a minimum radius of curvature of 50 feet measured at the center line of the usable road surface is required.

New access road alignments would first be cleared and grubbed of vegetation. Roads would be blade-graded to remove potholes, ruts, and other surface irregularities; fill material would be deposited where necessary; and roads would be re-compacted to provide a smooth and dense riding surface capable of supporting heavy construction equipment. The graded road would have a minimum drivable width that will vary between 14 feet and 22 feet with 2 feet of shoulder on each side as required by the existing land terrain, but may be wider depending on final engineering requirements and field conditions. The minimum center line turning radius required along a curve is 50 feet (the minimum turning radius required to meet construction and maintenance vehicle requirements) and where typical berm and swale drainage improvements is required for -erosion control along the road. This width is increased by a factor of 400/Radius along curvatures to accommodate the vehicle envelope as it turns (resulting in a maximum drivable width of 22 feet).

Construction of New 220 kV Transmission Structures

The new structure pad locations and laydown/work areas (see Table SCE - 4) would first be graded and/or cleared of vegetation as required to provide a reasonably level and vegetation-free surface for structure installation. Property would be graded such that water would run toward the direction

of the natural drainage. In addition, drainage would be designed to prevent ponding and erosive water flows that could cause damage to the structure footings. The graded area would be compacted to at least 90 percent relative density, and would be capable of supporting heavy vehicular traffic.

Structure foundations would be engineered to satisfy the soil/rock profile at each location as needed based on final engineering results. Typical structure foundations for each Tubular Steel Pole ("TSP") would consist of one poured-in-place concrete footing and TSP H-Frames would require two drilled poured-in-place concrete footings. Actual footing diameters and depths for each of the structure foundations would depend on the soil conditions and topography at each property and would be determined during final engineering.

The foundation process begins with the drilling of the holes for each type of structure. The holes would be drilled using truck- or track-mounted excavators with various diameter augers to match the diameter requirements of the structure type. The excavated material would be distributed at the structure site, used as fill for new roads or substation property or used in the rehabilitation of existing access roads. Alternatively, the excavated soil may be disposed of at an off-site disposal facility in accordance with all applicable laws.

Following excavation of foundation footings, steel reinforced rebar cages would be set, survey positioning of anchor bolts and/or stub angles would be verified, and concrete would then be poured. The steel reinforced rebar cages would be assembled off-site and delivered to the structure location by flatbed truck. A typical transmission structure foundation would require approximately 50 to 150 cubic yards of concrete delivered to the structure location depending upon the type of structure being constructed and each footing would project approximately 1 to 4 feet above the ground level. During construction, existing concrete supply facilities would be used where feasible.

TSP and H-Frames consist of multiple sections. The pole sections would be placed in temporary laydown areas at each pole location. See Table SCE-4 below for approximate laydown dimensions. Structure assembly begins with the hauling of steel pole sections from a staging yard to each structure location. This activity involves the use of trucks with trailers and a rough terrain crane. After the steel pole sections are delivered and placed within the structure laydown/work area, crews would proceed with the assembly of the structure. A crane would be used to set each steel pole base section on top of the previously prepared foundations. When the base section is secured, the remaining sections of the TSPs and H-Frames would be lifted into place with a crane and secured by an erection crew.

After construction is completed, the transmission structure site would be graded such that water would run toward the direction of the natural drainage. In addition, drainage would be designed to prevent ponding and erosive water flows that could damage the structure footing. The graded area would be compacted and capable of supporting heavy vehicular traffic.

Wire Stringing of 220 kV Conductor

Wire stringing activities would be in accordance with SCE common practices and are similar to process methods detailed in the IEEE Standard 524-2003 (Guide to the Installation of Overhead Transmission Line Conductors).

To ensure the safety of workers and the public, safety devices such as traveling grounds, guard structures, radio-equipped public safety roving vehicles and linemen would be in place prior to the initiation of wire stringing activities. Advanced planning by supervision is required to determine circuit outages, pulling times, and safety protocols for ensuring that the safe installation of wire is accomplished. Wire stringing includes all activities associated with the installation of the primary conductors onto transmission line structures. These activities include the installation of conductor, ground wire ("OHGW/OPGW"), insulators, stringing sheaves (rollers or travelers), vibration dampeners, weights, suspension and dead-end hardware assemblies for the entire length of the route.

The following five steps describe typical wire stringing activities:

- Step 1: Planning: Develop a wire stringing plan to determine the sequence of wire pulls and the set-up locations for the wire pull/tensioning/splicing equipment.
- Step 2: Sock Line Threading: A helicopter would fly a lightweight sock line from structure to structure, which would be threaded through rollers in order to engage a camlock device that would secure the pulling sock in the roller. This threading process would continue between all structures through the rollers of a particular set of spans selected for a wire pull.
- Step 3: Pulling: The sock line would be used to pull in the conductor pulling rope and/or cable. The pulling rope or cable would be attached to the conductor using a special swivel joint to prevent damage to the wire and to allow the wire to rotate freely to prevent complications from twisting as the conductor unwinds off the reel.
- Step 4: Splicing, Sagging, and Dead-Ending: Once the conductor is pulled in, if necessary, all mid-span splicing would be performed at dead end tower locations. Once the conductor is to proper tension and dead-ended to the structures, the splicing would be completed.
- Step 5: Clipping-In: After the conductor is dead-ended, the conductors would be secured to all tangent structures; a process called clipping in. Once this is complete, spacers would be attached between the bundled conductors of each phase to keep uniform separation between each conductor.

The puller, tensioner, and splicing set-up locations associated with the Calcite Substation Project's transmission facilities would be temporary and the land would be restored to its previous condition following completion of pulling and splicing activities. The set-up locations require level areas to allow for maneuvering of the equipment and, when possible, these locations would be located on existing roads and level areas to minimize the need for grading and cleanup. The number and location of these sites would be determined during final engineering. The approximate area needed for stringing set-ups associated with wire installation is variable and depends upon terrain. See Table SCE – 4 below for approximate size of pulling, tensioning and splicing equipment set-up areas and laydown dimensions.

Wire pulls are the length of any given continuous wire installation process between two selected points along the line. Wire pulls are selected based on availability of dead-end structures, conductor size, geometry of the line as affected by points of inflection, terrain, and suitability of stringing and splicing equipment set-up locations. Generally, pulling locations and equipment set-

ups would be in direct line with the direction of the overhead conductors and established approximately a distance of three times the height away from the adjacent structure.

Each stringing operation consists of a puller set-up positioned at one end and a tensioner set-up with wire reel stand truck positioned at the other end of the wire pull. Temporary splices may be used during stringing since permanent splices that join the conductor together cannot travel through the rollers. Splicing set-up locations are used to remove temporary pulling splices and install permanent splices once the conductor is strung through the rollers located on each structure.

Land Disturbance

Table SCE - 4 below provides information on temporary and permanent land disturbance areas related to construction of the transmission loop-in lines and SCE portion of gen-tie construction.

Table SCE - 4: Land Disturbance for Transmission Loop-In and SCE Portion of Gen-tie Construction

Project Feature	Project Quantity	Disturbed Acreage Calculation	Construction Disturbance Acreage	Temporary Disturbance Acreage	Permanent Disturbance Acreage
Guard Structures	4	150' x 50'	0.7	0.7	0
Remove Existing Lattice Steel Towers (1)	2	220' x 220'	2.2	2.2	0
Construct New TSPs (2)	~~5~~4	220' x 220'	~~5.6~~4.4	~~5.2~~4.1	~~0.4~~0.3
Construct New Steel Pole H-frames (2)	4	220' x 220'	4.4	4.1	0.3
220kV Conductor Stringing Areas (3)	12	400' x 150'	16.5	16.5	0
Install Underground Ground Wire (4)	1,100	linear feet x 15' wide	0.4	0.4	0
Existing Tower Work Areas	2	100' x 100'	0.5	0.5	0
New Access Roads / Road Widening (5)		Varies	1.64	0	1.64
Access Road & Tower Buffers		Varies	1.3	1.3	0
Material & Equipment Staging Yard - (Calcite)	1	approx. 2 acres	2	2	0
Total Estimated Disturbance Acreage (6)			**345.0**	**312.89**	**2.21**

Notes:
1. Includes the removal of existing conductor, teardown of existing structure, and removal of foundation 2' below ground surface.
2. Includes structure assembly & erection, conductor & OHGW installation. Area to be restored after construction. Portion of R/W within 20' of ALL structures to remain cleared of vegetation. Permanently disturbed areas for H-Frame/3-Pole=0.08 acre.
3. Based on standard conductor reel lengths, conductor size, number of circuits, route design, and terrain.
4. Based on a required ground wire needed between structures underneath the existing 500kV T/Ls.
5. Based on a combination of widening existing roads and constructing new roads to a drivable road width of 14'-22' w/ 2' of berm on each side of road.
6. The disturbed acreage calculations are estimates based upon SCE's preferred area of use for the described project feature, the width of the existing right-of-way, or the width of the proposed right-of-way. They are subject to revision based upon final engineering and review of the project by SCE's Construction Manager and/or Contractor awarded project.

Foundation / Base Volume and Area Calculations (approximate):
H-Frame: 2 per structure, 30-ft deep, 6-ft diameter; Earth removed for footings = 62.8 cu.yds; Surface area = 56.5 sqft

Construction Site Cleanup

Any damage to existing roads as a result of construction would be repaired once construction is complete.

SCE would restore all areas that are temporarily disturbed by project activities (including the staging yard, pull and tension sites, and structure laydown and assembly sites) to preconstruction conditions following the completion of construction.

Restoration may include grading and restoration of sites to original contours and reseeding where appropriate. In addition, all construction materials and debris would be removed from the area and recycled or properly disposed of at an off-site disposal facility in accordance with all applicable laws. SCE would conduct a final inspection to ensure that cleanup activities are successfully completed.

Operations and Maintenance

Operations and Maintenance (O&M) activities are necessary to ensure reliable service, as well as the safety of the utility worker and the general public, as mandated by the California Public Utilities Commission (CPUC). SCE facilities are subject to Federal Energy Regulatory Commission jurisdiction. SCE transmission facilities are under operational control of the California Independent System Operator.

The transmission lines would be maintained in a manner consistent with CPUC General Order (G.O.) 95 and G.O. 128 as applicable. Normal operation of the lines would be controlled remotely through SCE control systems and manually, in the field, as required. SCE inspects overhead transmission facilities in a manner consistent with CPUC G.O. 165 a minimum of once per year via ground and/or aerial observation, but this usually occurs more frequently based on system reliability.

Maintenance is performed as needed to maintain circuit reliability. A majority of regular O&M activities related to overhead facilities are performed from existing access roads with no surface disturbance. These activities could include repairing/re-stringing conductors to repair damage, washing/replacing insulators, repairing/replacing hardware components, replacing poles/towers, tree trimming, brush and weed control, and access road maintenance. Repairs to existing facilities, such as repairing/replacing existing poles/towers or conductor re-stringing, could occur in undisturbed areas.

Routine access road maintenance is conducted on an annual and/or as-needed basis to maintain a vegetation-free corridor to facilitate access to existing facilities and to aide in fire prevention. Road maintenance activities could include: blading to smooth over washouts, eroded areas, and washboard surfaces; cleaning ditches; moving/establishing berms; clearing/installing functional drain inlets to culverts; repairing culverts; clearing/establishing water bars; and cleaning/repairing over-side drains. Access road maintenance could include the repair, replacement and/or installation of storm water diversion devices on an as-needed basis.

O&M activities could also include brushing activities in order to maintain vegetation-free access roads and clearances around electrical lines. Brushing (*i.e.*, trimming or shrub removal) approximately two to five feet beyond road's edge or berm is necessary to keep vegetation from intruding into the roadway. In addition, the clearance of brush and weeds around pole and transmission tower pads is necessary for fire protection and may be required by applicable regulations on fee owned ROWs. In accordance with Public Resources Code section 4292, a 10-foot radial clearance around non-exempt poles and towers (as defined by California Code of Regulations Title 14, Division 1.5, Ch 7, Article 4) would be maintained.

In addition to regular O&M activities, emergency repairs could be required at any time. SCE conducts a wide variety of emergency infrastructure repairs due to damage resulting from high winds, storms, fires, and other natural disasters and accidents. Such repairs could include replacement of towers, poles, or conductors.

Labor and Equipment

Construction would be performed by SCE Crews or its contract personnel. The estimated number of persons and types of equipment required for each phase of transmission line construction is shown in Table SCE - 5 below.

Table SCE - 5

CALCITE SUBSTATION PROJECT
CONSTRUCTION EQUIPMENT AND WORKFORCE ESTIMATES BY ACTIVITY
CONSTRUCT 220 KV TRANSMISSION LINE LOOP-IN & GEN-TIE

WORK ACTIVITY				ACTIVITY ESTIMATES			
Primary Equipment Description	Estimated Horse-Power	Probable Fuel Type	Primary Equipment Quantity	Estimated Crew Workforce	Estimated Schedule (Days)	Estimated Usage (Hrs/Day)	Estimated Activity Value
Survey (1)				**4**	**4**		**4 Miles**
1-Ton Truck, 4x4	300	Gas	2		4	8	1 Mile
Road Work & Structure Pads (3)				**5**	**~~10~~9**		**2 Miles & ~~9~~ 8 Pads**
1-Ton Truck, 4x4	300	Gas	1		~~10~~9	8	
Backhoe/Front Loader	125	Diesel	1		~~10~~9	4	
Tracked Dozer	150	Diesel	1		~~10~~9	8	
Motor Grader	250	Diesel	1		~~10~~9	8	
Water Truck	300	Diesel	2		~~10~~9	8	
Drum Compactor	100	Diesel	1		~~10~~9	4	
Excavator	250	Diesel	1		3	4	
Lowboy Truck/Trailer	450	Diesel	1		~~10~~9	2	
Guard Structure Installation (4)				**6**	**2**		**4 Structures**
1-Ton Truck, 4x4	300	Gas	2		2	8	
Compressor Trailer	60	Diesel	1		2	4	
Manlift/Bucket Truck	250	Diesel	1		2	4	

CALCITE SUBSTATION PROJECT
CONSTRUCTION EQUIPMENT AND WORKFORCE ESTIMATES BY ACTIVITY
CONSTRUCT 220 KV TRANSMISSION LINE LOOP-IN & GEN-TIE

WORK ACTIVITY				ACTIVITY ESTIMATES			
Primary Equipment Description	Estimated Horse-Power	Probable Fuel Type	Primary Equipment Quantity	Estimated Crew Workforce	Estimated Schedule (Days)	Estimated Usage (Hrs/Day)	Estimated Activity Value
Boom/Crane Truck	350	Diesel	1		2	8	
Auger Truck	210	Diesel	1		2	4	
Flat Bed Truck	400	Diesel	1		2	8	
Conductor & GW Removal (5)				**14**	**4**		**9,250 Feet**
1-Ton Truck, 4x4	300	Gas	4		4	4	
Manlift/Bucket Truck	250	Diesel	2		4	8	
Boom/Crane Truck	350	Diesel	2		4	8	
Puller	350	Diesel	1		4	8	
Static Truck/ Tensioner	350	Diesel	1		4	8	
Dump/Stake Bed Truck	350	Diesel	1		4	8	
LST Removal (6)				**6**	**4**		**2 Structures**
1-Ton Truck, 4x4	300	Gas	2		4	4	
Compressor Trailer	60	Diesel	1		4	8	
R/T Crane (L)	275	Diesel	1		4	8	
Dump Truck	350	Diesel	1		4	8	
Flat Bed Truck	400	Diesel	1		4	2	
LST Foundation Removal (7)				**4**	**2**		**2 Structures**
1-Ton Truck, 4x4	300	Gas	2		2	4	
Compressor Trailer	60	Diesel	1		2	8	
Backhoe/Front Loader	125	Diesel	1		2	8	
Dump Truck	350	Diesel	1		2	8	
Excavator	250	Diesel	1		2	2	
Steel Pole Structure Foundation Installation (8)				**6**	**~~15~~14**		**9 Structures**
1-Ton Truck, 4x4	300	Gas	2		~~15~~14	4	
Boom/Crane Truck	350	Diesel	1		~~15~~14	4	
Backhoe/Front Loader	125	Diesel	1		~~15~~14	8	
Drill Rig	275	Diesel	1		~~10~~9	8	
Water Truck	300	Diesel	1		~~15~~14	8	
Dump Truck	350	Diesel	1		~~15~~14	8	
Concrete Truck	350	Diesel	3		8	6	
Steel Pole Structure Haul (9)				**4**	**3**		**~~9~~ 8 Structures**
1-Ton Truck, 4x4	300	Gas	1		3	8	
Boom/Crane Truck	350	Diesel	1		3	4	
Flat Bed Truck	400	Diesel	1		3	8	
Steel Pole Structure Assembly (10)				**6**	**8**		**~~9~~ 8 Structures**

CALCITE SUBSTATION PROJECT
CONSTRUCTION EQUIPMENT AND WORKFORCE ESTIMATES BY ACTIVITY
CONSTRUCT 220 KV TRANSMISSION LINE LOOP-IN & GEN-TIE

WORK ACTIVITY				ACTIVITY ESTIMATES			
Primary Equipment Description	Estimated Horse-Power	Probable Fuel Type	Primary Equipment Quantity	Estimated Crew Workforce	Estimated Schedule (Days)	Estimated Usage (Hrs/Day)	Estimated Activity Value
1-Ton Truck, 4x4	300	Gas	2		8	4	
Compressor Trailer	60	Diesel	1		8	8	
Manlift/Bucket Truck	250	Diesel	1		8	8	
R/T Crane (L)	275	Diesel	1		8	8	
Steel Pole Structure Erection (11)				**6**	**8**		**~~9~~ 8 Structures**
1-Ton Truck, 4x4	300	Gas	2		8	4	
Compressor Trailer	60	Diesel	1		8	4	
Manlift/Bucket Truck	250	Diesel	1		8	8	
Crane	400	Diesel	1		8	8	
220kV Conductor & GW Installation (12)				**28**	**~~7~~6**		**~~43,500~~36,000 Feet**
1-Ton Truck, 4x4	275	Gas	8		~~7~~6	4	
Manlift/Bucket Truck	250	Diesel	4		~~7~~6	8	
Boom/Crane Truck	350	Diesel	2		~~7~~6	8	
R/T Crane (M)	215	Diesel	2		~~7~~6	4	
Dump Truck	350	Diesel	1		~~7~~6	4	
Wire Truck/Trailer	350	Diesel	2		~~7~~6	8	
Sock Line Puller	300	Diesel	1		3	8	
Bullwheel Puller	350	Diesel	1		~~5~~4	8	
Static Truck/ Tensioner	350	Diesel	1		~~7~~6	8	
R/T Forklift	125	Diesel	1		~~7~~6	8	
Spacing Cart	10	Diesel	3		2	8	
Backhoe/Front Loader	125	Diesel	1		~~5~~4	4	
Sag Cat w/ Winches	350	Diesel	2		~~7~~6	2	
Water Truck	300	Diesel	1		~~7~~6	8	
Lowboy Truck/Trailer	450	Diesel	2		~~7~~6	2	
Hughes 500 E	400	Jet A	1		~~7~~6	7	
Fuel, Helicopter Support Truck	300	Diesel	1		~~7~~6	7	
UG Ground Wire Installation (13)				**4**	**6**		**1,100 Trench Feet**
1-Ton Truck, 4x4	275	Gas	1		6	4	
Backhoe/Front Loader	125	Diesel	1		6	8	
Dump Truck	350	Diesel	1		6	8	
Water Truck	300	Diesel	1		6	8	
Guard Structure Removal (14)				**6**	**2**		**4 Structures**
1-Ton Truck, 4x4	300	Gas	2		2	8	

CALCITE SUBSTATION PROJECT
CONSTRUCTION EQUIPMENT AND WORKFORCE ESTIMATES BY ACTIVITY
CONSTRUCT 220 KV TRANSMISSION LINE LOOP-IN & GEN-TIE

WORK ACTIVITY				ACTIVITY ESTIMATES			
Primary Equipment Description	Estimated Horse-Power	Probable Fuel Type	Primary Equipment Quantity	Estimated Crew Workforce	Estimated Schedule (Days)	Estimated Usage (Hrs/Day)	Estimated Activity Value
Compressor Trailer	60	Diesel	1		2	4	
Manlift/Bucket Truck	250	Diesel	1		2	4	
Boom/Crane Truck	350	Diesel	1		2	8	
Flat Bed Truck	400	Diesel	1		2	8	
Restoration (15)				**7**	**6**		**3 Miles**
1-Ton Truck, 4x4	300	Gas	2		6	4	
Backhoe/Front Loader	125	Diesel	1		6	8	
Motor Grader	250	Diesel	1		6	4	
Water Truck	300	Diesel	1		6	8	
Drum Compactor	100	Diesel	1		6	4	
Lowboy Truck/Trailer	450	Diesel	1		6	2	

Crew Size Assumptions For:

1) Survey = one 4-man crew
2) Staging/Material Yards = one 4-man crew per yard
3) Roads & Pad Work = one 5-man crew
4) Guard Structure Installation = one 6-man crew
5) Conductor/GW Removal = one 14-man crew
6) LST Removal = one 6-man crew
7) LST Foundation Removal = one 4-man crew
8) Steel Pole Structure Foundation Installation = one 6-man crew
9) Steel Pole Structure Haul = one 4-man crew
10) Steel Pole Structure Assembly = one 6-man crew
11) Steel Pole Structure Erection = one 6-man crew
12) Conductor & GW Installation = one 28-man crew
13) UG Ground Wire Installation = one 4-man crew
14) Guard Structure Removal = one 6-man crew
15) Restoration = one 7-man crew

III. DISTRIBUTION SYSTEM FOR STATION LIGHT AND POWER

CALCITE SUBSTATION

An extension of a 12 kV distribution circuit would be required to provide permanent station light and power and/or temporary power for construction for Calcite Substation. The 12kV distribution circuitry would be extended for approximately 700 feet by installing approximately 6 wood poles. See Figure SCE-1 PROPOSED CALCITE SUBSTATION, Figure SCE-3 POLE CONFIGURATION, and Figure SCE-4 POLE AND CROSSARM CONFIGURATION WITH RAPTOR GUARD.

The 12 kV distribution circuit would then extend underground heading west along Haynes Road under the existing California Highway 247 and transmission Right of Way (ROW) and then turn north along the Calcite Substation driveway and into Calcite Substation. The total underground circuit extension length would be approximately 3,100 feet. These new facilities would also be utilized for installation of the required telecommunication fiber optic cables into Calcite Substation (described below in Section IV. Telecommunication Facilities).

Circuit modification may be required to provide support for voltage regulating requirements such as new capacitors or voltage regulators. A pad-mount transformer would be installed on the Calcite Substation Property outside the Calcite Substation for temporary construction power. Additionally, new station light and power transformers would be installed within the Calcite Substation wall.

Materials needed for distribution construction activities would be stored at the proposed staging yard within the Calcite Substation Property described above. Two line trucks with three-person crews (6 people total) would be called upon to perform the work.

Construction Activities for Distribution Lines and Related Structures

For the locations that require overhead construction, components would be shipped by truck to the staging yard and then trucked to the individual sites. Poles and associated equipment would then be erected along the required routes. The permanent ground disturbance for each pole installation would be approximately 4.9 sq. ft. per pole and 0.1 sq. ft. per pole anchor. At some structure locations, vegetation may be removed and/or trimmed to accommodate the installation of overhead and/or underground distribution facilities.

Wire stringing includes all activities associated with installation of the distribution circuit conductors onto the distribution poles. This would include the installation of primary conductor, insulators, and dead-end hardware assemblies. These installations may also include vibration dampeners, weights, spacers and fault indicators. Insulators and stringing sheaves (rollers or travelers) may be attached to the conductors as part of the stringing activity, during the distribution pole erection process. The dimensions of the area needed for the stringing setups associated with conductor installation will vary depending on structure height and terrain conditions, but will not extend beyond the limits of the temporary construction use areas. At some wire stringing locations, vegetation may be removed and/or trimmed to accommodate the wiring stringing process.

For the locations that require the construction of a trench or underground structure, excavation activities would generally be done using a backhoe. The anticipated dimensions for the trench would be approximately 24 inches wide by approximately 51 inches deep, and by the lengths identified earlier in this section. Shields or trench shoring would then be temporarily installed for safety to brace the walls of the trench. The conduits would then be installed using spacers to create a duct bank consisting of two columns of three stacked 5-inch conduits a piece. The temporary shoring would be removed.

Underground structure excavation would typically be a maximum of three feet greater than the structure's width and length dimensions, as well as a maximum of four feet deeper than the

structure's height. The backhoe would be used to place the excavated soil into the dump truck to haul away. The area of disturbance would be approximately 30 feet on either side of trench and on all sides of the underground structures. The conduits would then be encased in concrete with a minimum encasement of three inches on all sides. After the concrete encasement has hardened, the trench would be backfilled with 1.5 sack and sand slurry (which is a mix of sand and water with 1.5 bags of cement added with no aggregate). If repaving is necessary, this work would be performed in accordance with San Bernardino County permit requirements. Precast underground structures would typically be installed and backfilled with slurry.

Table SCE - 6A

DISTRIBUTION SYSTEM CONSTRUCTION ACTIVITIES
CONSTRUCTION EQUIPMENT AND WORKFORCE ESTIMATES BY ACTIVITY
CONSTRUCT DISTRIBUTION LINE EXTENSION FOR STATION LIGHT & POWER TO CALCITE SUBSTATION

WORK ACTIVITY				ACTIVITY PRODUCTION			
Primary Equipment Description	Estimated Horse-Power	Probable Fuel Type	Primary Equipment Quantity	Estimated Workforce	Estimated Schedule (Days)	Duration of Use (Hrs/Day)	Estimated Production Per Day
Install Down Guys (1)				**3**	**2**		**Approx 2 Down Guys**
1-Ton Crew Cab Flat Bed, 4x4	300	Diesel	1		2	8	1 Down Guy /Day
Bucket Truck	300	Diesel	1		2	8	
Install New Poles (2)				**4**	**6**		**12 Wood Poles**
1-Ton Pick-up Truck, 4x4	300	Diesel	2		6	8	2-Wood Pole/Day
30-Ton Crane Truck	300	Diesel	1		6	8	
Bucket Truck	300	Diesel	2		6	8	
40' Flat Bed Truck/ Trailer	350	Diesel	1		6	8	
Install Overhead Wire (3)				**6**	**1**		**700 Circuit Feet**
1-Ton Crew Cab Pick-up Truck, 4x4	300	Diesel	1		1	8	1,000 feet / Day
55' Double Bucket Truck	350	Diesel	1		1	8	
Underground Cable Pulling & Transformer Installation (4)				**4**	**3**		**3,100 Circuit Feet**
1 - Ton Pick-up Truck, 4x4	300	Diesel	1		3	8	1,000 feet/Day
55' Double Bucket Truck	350	Diesel	1		3	8	
Hydraulic Rewind Puller	300	Diesel	1		3	8	

DISTRIBUTION SYSTEM CONSTRUCTION ACTIVITIES
CONSTRUCTION EQUIPMENT AND WORKFORCE ESTIMATES BY ACTIVITY
CONSTRUCT DISTRIBUTION LINE EXTENSION FOR STATION LIGHT & POWER TO CALCITE SUBSTATION

WORK ACTIVITY				ACTIVITY PRODUCTION			
Primary Equipment Description	Estimated Horse-Power	Probable Fuel Type	Primary Equipment Quantity	Estimated Workforce	Estimated Schedule (Days)	Duration of Use (Hrs/Day)	Estimated Production Per Day
Underground Cable Makeup (5)				**4**	**2**		
1- Ton Crew Cab, 4x4	300	Diesel	1		2	8	
55' Double Bucket Truck	350	Diesel	1				
Underground Trenching, Structure Excavation Conduit (6)				**4**	**6**		**Approx. 2,800 ft.**
1-Ton Pick-up Truck, 4x4	300	Diesel	1		6	8	500 ft./Day
Backhoe/Front Loader	200	Diesel	1		6	8	
1-Ton Crew Cab Flat Bed, 4x4	300	Diesel	1		6	8	
4000 gallon Water Truck	350	Diesel	1		6	8	
Concrete Truck	350	Diesel	1		6	8	
Underground Boring, Casing and Conduit Installation (7)				**6**	**3**		**Approx. 300 ft.**
1-Ton Pick-up Truck, 4x4	300	Diesel	1		3	8	100 ft./Day
Backhoe/Front Loader	200	Diesel	1		3	8	
1-Ton Crew Cab Flat Bed, 4x4	300	Diesel	1		3	8	
Excavation and Boring Equipment	300	Diesel	1		3	8	
Restoration (8)				**4**	**1**		**2,800 feet**
1-Ton Crew Cab, 4x4	300	Diesel	2		1	2	1 Mile/Day
Water Truck	300	Diesel	1		1	8	

Project Feature	Project Qty.	Disturbed Acreage Calculation	Construction Disturbance Acreage	Temporary Disturbance Acreage	Acres Permanently Disturbed
Underground trench/duct for conduit	1	2,800 ft. x 2 ft.	0.13	0.13	0
Underground construction equipment work space	1	2,800 ft. x 28 ft.	1.8	1.8	0
Distribution line excavation pits	5	10 ft. x 24 ft.	0.0275	0.0275	0

Underground Highway crossing	1	No surface disturbance	No surface disturbance	No surface disturbance	No surface disturbance
Distribution line vault covers	3	4 ft. x 5 ft.	0.0014	0	0.0014
New Poles	6	2.5 ft. diameter (5.0 sq. ft.)	0.0007	0	0.0007
Pole replacements for new telecom	6	2.5 ft. diameter (5.0 sq. ft.)	0.0007	0	0.0007
Down Guys	2	1 ft. x 1.25 ft.	0.00005	0	0.00005
Overhead construction equipment work space	1	125 ft. x 60 ft.	0.172	0.172	0
Total Estimated Disturbance Acreage			**2.132**	**2.130**	**0.002**

Distribution System for Station Light & Power	
Distribution Circuit Extension Length (Proposed)	3,800 ft. (0.5 miles approximately)
Total Length Underground (U.G.)	3,100 ft.
-New U.G. Conduits Needed	3,100 ft
Total Length Overhead (O.H.)	700 ft.
-New Poles – O.H.	700 ft.
-New Poles Required	6
New Down Guys Required	2
Time and Resources to Construct (Average 4 men per crew)	24 Crew Days
Total Man Days Required (4 x 24)	96 Man Days

Crew Size Assumptions:
1. Overhead Line Work = one 3-man crew
2. Pole installation/replacement crew = one 4-man crew
3. Overhead Line Work = two 3-man crews
4. Underground Cable Pulling = one 4-man crew
5. Underground Cable Makeup = one 4-man crew
6. Trenching and Conduit Installation = one 4-man crew
7. Trenching and Underground Boring = one 6-man crew
8. Trenching Backfill and Restoration = one 4-man crew

IV. TELECOMMUNICATION FACILITIES

A telecommunication system would be required to provide monitoring and remote operation capabilities of the electrical equipment at Calcite Substation, transmission line protection, and Remedial Action Scheme (or "RAS")[3].

[3] RASs are Reliability Network Upgrades consisting of "protective systems that typically utilize a combination of conventional protective relays, computer-based processors, and telecommunications to accomplish rapid, automated response (including outages) to unplanned power system events" (CAISO Master Definition Supplement, available at: ~~http://caiso.com/rules/Pages/Regulatory/Default.aspx)~~ https://www.caiso.com/documents/conformed-tariff-as-of-feb-

The SCE telecommunication facilities expected to be constructed as part of the Calcite Substation Project would include two approximately 1-mile long fiber optic cables to the nearest splice points on an OPGW that is expected to already be in place on the 500kV Lugo-Mohave T/L by the time any work associated with the Calcite Substation Project commences.[4] See Figure SCE-1 PROPOSED CALCITE SUBSTATION.

The first proposed fiber optic cable would start from Calcite Substation and would be installed along the new 12 kV distribution path as previously described in Section III, including the new underground section under Haynes Road, and then overhead along a new telecommunications and distribution pole line. The proposed line turns north along an un-named dirt road for approximately 1,100 feet attaching to existing wood poles and arriving at the Barstow Repeater Communication Site ("CS"). The line would drop down into a new riser and continues underground for approximately 150 feet into an existing communication room within the CS.

The second proposed fiber optic cable would start from Calcite Substation and exit the substation to the south for approximately 400 feet in new underground conduit and then turn east onto Haynes Road for approximately 1,200 feet. The conduit would turn south-west on an existing access road for approximately 4,000 feet and then turn northwest to get to tower M29-T3 on the Lugo-Mohave T/L where the existing splice box is located. This underground conduit route would be built exclusively for telecommunications use.

Telecommunication Gen-Tie Cables

The first proposed telecommunication gen-tie cable route will be an OPGW fiber optic cable installed by the customer from the customer's substation on the gen-tie 220 kV structures. The

5-2025.pdf.~~—~~A RAS is designed to detect predetermined system conditions and automatically take corrective actions that may include, but are not limited to, adjusting or tripping generation. The Sienna Solar Project will be required participate in what will be referred to as the Calcite Centralized RAS (CRAS) for the purpose of maintaining system reliability following pre-determined unplanned system events which include transmission line outages.~~Currently, there is an existing High Desert Power Plant (HDPP) RAS that is in place and the Sienna Solar Project would be required to participate in the HDPP RAS (as well as be subject to CAISO's congestion management protocols that could be implemented by CAISO) at the outset. In addition, SCE is also in the process of preparing to develop the North of Lugo Centralized RAS (NoL CRAS) to replace the existing HDPP RAS and other RASs in the area, as a distinct and independent project being separately undertaken irrespective of, and with independent utility from, the Calcite Substation Project. Once the NoL CRAS is complete, both Calcite Substation and the Sienna Solar Project would participate in the NoL CRAS instead of the HDPP RAS.~~ All Calcite CRAS ~~conversion~~ work is limited to installing equipment within the MEER building. The Sienna Solar Project and future generation interconnection projects that interconnect to Calcite would be required to participate in the Calcite CRAS.

[4] That OPGW is expected to be in place as a result of the anticipated completion of SCE's Eldorado Lugo Mohave Series Capacitors (ELM) Project. The ELM Project is a distinct and independent project being separately undertaken by SCE that has independent utility from the Calcite Substation Project and was approved by the CPUC on August 27, 2020. Completion and operation of the ELM Project would include OPGW which would be tapped in order to connect to the proposed Calcite Substation. Similarly, SCE also has another distinct and independent project with telecommunications equipment that, if constructed, would obviate the need to construct any other telecommunication facilities to support the Calcite Substation, namely, the Lugo-Victorville 500kV Remedial Action Scheme Project (LVRAS Project). In fact, SCE has already submitted a Standard Form 299 application to the U.S. Bureau of Land Management for authorization to complete the LVRAS Project, which also has independent utility from the Calcite Substation Project. Assuming that both the ELM Project and the LVRAS Project currently planned by SCE are constructed and placed into operation prior to the operation of Calcite Substation, SCE would not need to construct any further telecommunication facilities to support the Calcite Substation (other than the two 1-mile taps described above).

OPGW would end at a splice enclosure on the first customer-owned structure outside the Calcite Substation. Underground conduit and cable would be installed by the customer from the transmission POCO with the OPGW splice to the telecommunication POCO vault outside the wall of the Calcite Substation. The customer would ~~a leave~~leave a 100' coil of cable in the POCO vault. An SCE crew would use the coil for making the demarcation splice in the POCO vault. SCE will install approximately ~~1,000 1,200~~ 1,560 feet of conduit and cable from the POCO vault to the MEER. See Figure SCE-1: PROPOSED CALCITE SUBSTATION.

The diverse telecommunication gen-tie cable route would be an underground fiber optic cable installed by the customer in the gen-tie 220kV right of way. The conduit with this underground cable would connect to the diverse POCO vault outside the Calcite Substation. A coil of 100' of the cable would be left in the diverse POCO vault for making the demarcation splice. SCE will install approximately ~~1,000 1,160~~ 1,700 feet of conduit and cable from the diverse POCO vault to the MEER and make the demarcation splice.

The above description is based on our preliminary design and would be finalized as part of final engineering.

Telecommunications Equipment

- New overhead/underground 96-strand fiber optic cable to connect the Calcite Substation to Barstow Repeater CS. New overhead/underground 96-strand fiber optic cables to connect Calcite Substation to an existing splice box on M29-T3 on Lugo Mohave 500kV T/L.
- The Calcite Substation MEER would also include a communication room for telecommunication equipment. The communication room would be equipped with AC power, AC-DC rectifiers, DC power, battery, overhead cable tray, redundant air conditioners, fiber terminating shelves, lightwave terminals, channel equipment, communications alarm/switch equipment, data equipment and diverse fiber entry conduits for connection to outside plant fiber optic cables.
- New fiber optic multiplex equipment and channel equipment at Lugo, Pisgah, Victor, Kramer and Gale Substations and any other location necessary to support the communication requirements for the Calcite Substation Project.
- Replacement of existing poles if required, to be determined by final engineering.

Laydown Areas and Access Roads

Laydown areas may include the following existing SCE facilities;

- Victorville Service Center - Hesperia Rd, Victorville
- Apple Valley Sub – Deep Creek Rd, Apple Valley
- Calcite Substation Property – Barstow Rd. (Hwy. 247), Lucerne Valley
- Barstow Service Center – Rimrok Rd, Barstow

Construction Activities

SCE or its contractor crews would use standard construction methods to construct the required fiber optic cables. The crews would comply with all rules, regulations and standards while in their

performance of the construction phase. Portions of the fiber optic cable would be constructed on existing overhead distribution and transmission wood and light duty steel poles. In addition, portions of the cable would be constructed on new overhead structures and newly constructed underground conduit system(s), subject to determination through final engineering. This project description is based on planning level assumptions. Exact details would be determined following completion of preliminary and final engineering, identification of field conditions, availability of labor, material, and equipment, and compliance with applicable environmental and permitting requirements.

Generally no hazardous material would be used in installing underground conduit, new wood communication poles, and the stringing of fiber-optic cables. There is generally no need for local services or utilities (such as water). Waste generated (which typically would include empty cable reels, cut-off pieces of fiber cable) would be disposed of at existing SCE facilities.

The cable crew would use existing roads or previously established roads to proceed with the function of cable installation when possible. Workforce estimates, equipment details, and disturbance totals are provided in Tables SCE below– 7A through – 7H.

Installation of Fiber Optic Cable on Poles

The overhead fiber optic cable SCE installs is a type of cable known as All Dielectric Self-supporting Fiber Optic Cable (ADSS). Usually this cable is installed with the use of a bucket truck. One four-man crew and two trucks would be used. A crew can install up to 1,000 feet of cable in one day. A crew can complete one 96 fiber splice in a day.

ADSS stringing includes all activities associated with the installation of cables on existing wood pole or Light Weight Steel (LWS) structures. This activity includes the installation of cross arms, suspension and dead-end hardware assemblies and vibration dampeners, stringing sheaves (rollers or travelers) may be used when installing the cable. Advanced planning by supervision determines pulling locations, times, and safety protocols needed for ensuring that safe and quick installation of cable is accomplished.

Fiber optic cable pulls typically occur every 5,000 feet to 20,000 feet over flat or mountainous terrain. Fiber optic cable pulls are based on access for pulling equipment to designated dead-end structures, terrain, and suitability for fiber optic cable splicing equipment set ups. The dimensions of the area needed for stringing set ups varies depending upon the terrain; however, a typical stringing set up is 40 feet by 60 feet. Where necessary due to space limitations, crews can work from within a smaller area.

A distribution line pole would be replaced if the pole does not meet wind load specifications. Inter-set poles may be added to spans where needed to achieve required ground clearance for the fiber optic cable. Replacing distribution line pole requires a four-man crew, one pole trailer truck, one pole digger truck, and one crew truck. An approximate 30-foot x 40-foot work area is required for the work. A hole about eight feet in depth would be drilled next to the existing pole, and a new pole would be erected. Conductors would be transferred from the existing pole to the new pole and the old pole removed.

Installation of Fiber Optic Cable in Conduit

For the installation of the fiber optic cable in existing and new underground conduit, a high-density polyethylene smooth wall innerduct would be used. Innerduct facilitates the installation of the fiber optic cable, provides protection, and helps identify the cable. The innerduct is installed first inside the conduit between underground vaults. The fiber optic cable is then installed inside the innerduct. An approximate 30-foot x 40-foot work area is required at each vault to install the underground cable. A coil of 100 feet is left on each cable end in the vault for splicing.
~~is required at each vault to install the underground cable. A coil of 100' of cable is left on each cable end in the vault for splicing.~~

Splicing Fiber Optic Cable

For splicing fiber optic cables, Outside Plant Splicing Labs and Foreman Trucks would be used. The workspace required would be an approximate 30-foot by 40-foot area. The crew would bring the fiber optic cable ends into the Splice Lab and splice together the fibers from the two cables. After the fibers are spliced and secured in a splice case, the splice case and cable slack would be mounted on a cross arms on a pole or attached to the side wall of an underground vault. Because of the rigid nature of OPGW, the splice case is placed inside a splice cabinet mounted on a lattice tower and the OPGW stored in a coil around the cabinet.

Operation and Maintenance

Following the completion of project construction, operation of the new telecommunication facilities would commence. The frequency of inspection and maintenance activities would be on an as-needed basis.

Table SCE – 7A:
Telecommunication Systems Construction Activities
Construction Equipment and Workforce Estimates by Activity
Construct Barstow Repeater CS - Calcite Fiber Optic Cable

Work Activity				Activity Production			
Primary Equipment Description	Estimated Horse-Power	Probable Fuel Type	Primary Equipment Quantity	Estimated Workforce	Estimated Schedule (Days)	Duration of Use (Hrs/Day)	Estimated Production Per Day
Install Fiber Optic Cable on 5 foot Crossarm				**5**	**3**		**1,800 ft**
1-Ton Crew Cab Flat Bed, 4x4	300	Diesel	1		3	8	800 ft /Day
Bucket Truck	300	Diesel	2		3	8	
Install Down Guys				**2**	**2**		**Approx 4 Down Guys**
1-Ton Crew Cab Flat Bed, 4x4	300	Diesel	1		2	4	2 Down Guy /Day
Bucket Truck	300	Diesel	1		2	4	
Install Fiber Optic Cable Underground				**5**	**4**		**3,250 ft.**
1-Ton Crew Cab, 4x4	300	Diesel	1		4	8	1,000 ft./Day
Bucket Truck	350	Diesel	2		4	8	
Splice Fiber Optic Cable				**2**	**4**		**3 Splices**
Splicing Lab	300	Diesel	2		4	8	1 splice per day
Underground Conduit				**5**	**2**		**Approx. 150 ft.**
1-Ton Crew Cab, 4x4	300	Diesel	1		2	8	100 ft./Day
Backhoe/Front Loader	200	Diesel	1		2	8	
1-Ton Crew Cab Flat Bed, 4x4	300	Diesel	1		2	8	
4000 gallon Water Truck	350	Diesel	1		2	8	
Concrete Truck	350	Diesel	1		1	8	
Restoration				**7**	**1**		**150 ft.**
1-Ton Crew Cab, 4x4	300	Diesel	2		1	2	1 Mile/Day
Water Truck	300	Diesel	1		1	8	

Table SCE – 7B:
Telecommunication Systems Construction Activities
Construction Equipment and Workforce Estimates by Activity
Construct Calcite tap OPGW slice at M29-T3

Work Activity				Activity Production			
Primary Equipment Description	Estimated Horse-Power	Probable Fuel Type	Primary Equipment Quantity	Estimated Workforce	Estimated Schedule (Days)	Duration of Use (Hrs/Day)	Estimated Production Per Day
Install Fiber Optic Cable Underground				**5**	**6**		**5,600 ft.**
¾-Ton Pick-up Truck, 4x4	300	Diesel	2		6	8	1,000 ft./Day
Bucket Truck	350	Diesel	2		6	8	
Splice Fiber Optic Cable				**5**	**2**		**2 Splices**
Splicing Lab	300	Diesel	2		2	8	1splice/Day

Underground Conduit				**5**	**12**		**Approx. 5,600 ft.**
¾-Ton Pick-up Truck, 4x4	300	Diesel	1		12	8	500 ft./Day
Backhoe/Front Loader	200	Diesel	1		12	8	
1-Ton Crew Cab Flat Bed, 4x4	300	Diesel	1		12	8	
4000 gallon Water Truck	350	Diesel	1		12	8	
Concrete Truck	350	Diesel	1		12	8	
Restoration				**7**	**2**		**5,600 ft.**
1-Ton Crew Cab, 4x4	300	Diesel	2		2	2	1 Mile/Day
Water Truck	300	Diesel	1		2	8	

Table SCE - 7C:
Telecommunication Fiber Optic Cable Summary

	Calcite to Repeater		**Calcite to M29-T3**
Fiber-Optic Cable Length (Proposed)	5,050 ft.		5,600 ft.
Total Length Underground (U.G.)	3,250 ft.		5,600 ft.
Existing U.G. Conduits (installed by distribution)	3,100 ft.		0 ft.
New U.G. Conduits Needed	150 ft.		5,600 ft.
Total Length Overhead (O.H.)	1,800 ft.		0ft.
On Existing Poles - O.H.	1,100 ft.		0 ft.
On New Poles – O.H. (installed by distribution)	700 ft.		0 ft.
Existing Poles	5		0
New Poles Required	0		0
New Down Guys Required	4		0
Time and Resources to Construct (4 men per crew)	16 Crew Days		22 Crew Days
Total Man Days Required	64 Man Days		88 Man Days

Table SCE – 7D:
Telecommunication Ground Disturbance Calculations Table SCE – 7D:
Telecommunication Ground Disturbance Calculations

Telecommunication Route Project Feature	**Qty.**	**Disturbed Acreage Calculation**	**Acres Disturbed During Construction**	**Acres To Be Restored**	**Acres Permanently Disturbed**
Calcite – Barstow Repeater					
Trenching	1	2ft X 150	0.007 (300 sq. ft.)	0.007 (300 sq. ft.)	0
Underground construction equipment work space	1	28ft X 150	0.096 (4,200 sq. ft.)	0.096 (4,200 sq. ft.)	0
Calcite – M29-T3					
Trenching	1	2ft X 5,600	0.26 (11,200 sq. ft.)	0.26 (11,200 sq. ft.)	0.002 (96 sq. ft.)
Underground construction equipment work space	1	28ft X 5,600	3.6 (156,800 sq. ft.)	3.6 (156,800 sq. ft.)	0

Table SCE – 7E:
Telecommunication Systems Construction Activities
Construction Equipment and Workforce Estimates by Activity
OPGW Gen-Tie Fiber Optic Cable

Work Activity				**Activity Production**			
Primary Equipment Description	Estimated Horse-Power	Probable Fuel Type	Primary Equipment Quantity	Estimated Workforce	Estimated Schedule (Days)	Duration of Use (Hrs/Day)	Estimated Production Per Day
Install Fiber Optic Cable				**4**	**~~1~~ 2**		**~~1,600~~ 1,760ft.**
¾-Ton Pick-up Truck, 4x4	300	Diesel	2		~~1~~ 2	8	~~1,600~~ 1,000ft./Day
Bucket Truck	350	Diesel	2		~~1~~ 2	8	
Splice Fiber Optic Cable				**4**	**2**		**2 Splices**
Splicing Lab	300	Diesel	2		2	8	1 splice/Day
Underground Conduit				**5**	**~~1~~3**		Approx. ~~225~~ 1,560 ft.
a splice cabinet	300	Diesel	1		1	8	~~225~~ 500 ft./Day
Backhoe/Front Loader	200	Diesel	1		1	8	
1-Ton Crew Cab Flat Bed, 4x4	300	Diesel	1		1	8	
4000 gallon Water Truck	350	Diesel	1		1	8	
Concrete Truck	350	Diesel	1		1	8	
Restoration				7	1		225 ft.
1-Ton Crew Cab, 4x4	300	Diesel	2		1	2	225 ft/Day
Water Truck	300	Diesel	1		1	8	

Table SCE – 7F:
Telecommunication Systems Construction Activities
Construction Equipment and Workforce Estimates by Activity
Redundant Gen-Tie Fiber Optic Cable

Work Activity				**Activity Production**			
Primary Equipment Description	Estimated Horse-Power	Probable Fuel Type	Primary Equipment Quantity	Estimated Workforce	Estimated Schedule (Days)	Duration of Use (Hrs/Day)	Estimated Production Per Day
Install Fiber Optic Cable				**4**	**~~1~~ 2**		**~~1,000~~ 1,900 ft.**
a splice cabinet Truck, 4x4	300	Diesel	2		~~1~~ 2	8	1,000 ft./Day
Bucket Truck	350	Diesel	2		~~1~~ 2	8	
Splice Fiber Optic Cable				**4**	**2**		**2 Splices**
Splicing Lab	300	Diesel	2	2	2	8	1 Splices/Day
Underground Conduit				**5**	**1**		**Approx. ~~225~~ 1,700 ft.**
a splice cabinet	300	Diesel	1		~~1~~ 3	8	~~225~~ 500 ft./Day
Backhoe/Front Loader	200	Diesel	1		1	8	

1-Ton Crew Cab Flat Bed, 4x4	300	Diesel	1		1	8	
4000 gallon Water Truck	350	Diesel	1		1	8	
Concrete Truck	350	Diesel	1		1	8	
Restoration				**7**	**1**		**225 ft.**
1-Ton Crew Cab, 4x4	300	Diesel	2		1	2	225 ft/Day
Water Truck	300	Diesel	1		1	8	

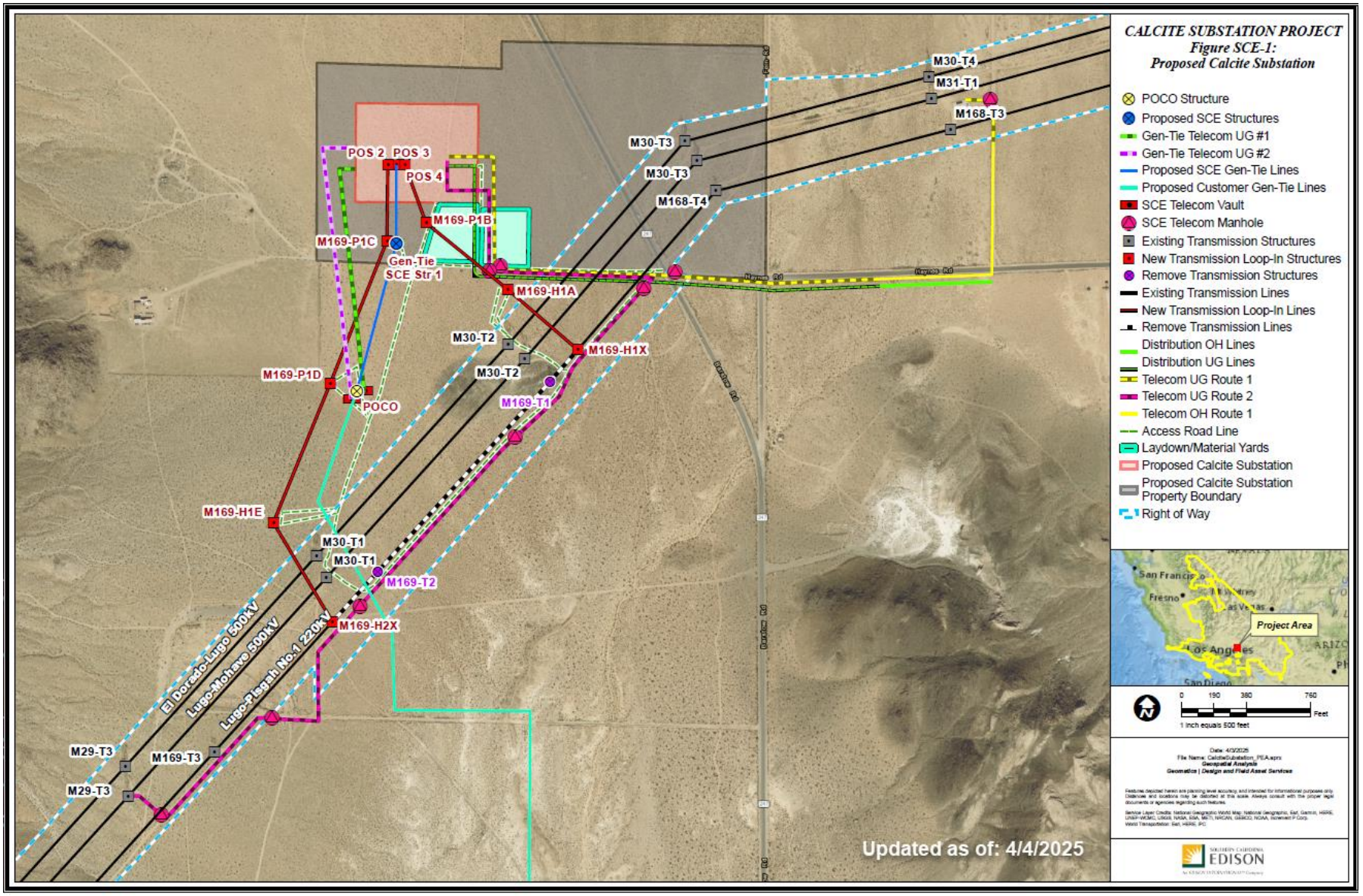
Table SCE – 7G:
Telecommunication Fiber Optic Gen-Tie Cable Summary

	OPGW Gen-Tie		**ADSS Gen-Tie**
Fiber-Optic Cable Length (Proposed)	~~1,100~~ 1,760 ft.		~~1,000~~ 1,900 ft.
Total Length Underground (U.G.)	~~1,100~~ 1,760 ft.		~~1,000~~ 1,900 ft.
Existing U.G. Conduits (Installed by Substation Construction)	875 ft.		775 ft.
New U.G. Conduits Needed	~~225~~ 1,560 ft.		~~225~~ 1,700 ft.
Total Length Overhead (O.H.)	0 ft.		0 ft.
On Existing Poles - O.H.	0 ft.		0 ft.
On New Poles – O.H.	0 ft.		0 ft.
Existing Poles	0		0
New Poles Required	0		0
New Down Guys Required	0		0
Time and Resources to Construct (4 men per crew)	5 Crew Days		5 Crew Days
Total Man Days Required	20 Man Days		20 Man Days

Table SCE –7H:
Telecommunication Gen-Tie Ground Disturbance Calculations

Telecommunication Route Project Feature	**Qty.**	**Disturbed Acreage Calculation**	**Acres Disturbed During Construction**	**Acres To Be Restored**	**Acres Permanently Disturbed**
OPGW Gen-Tie	1	2ft x ~~225~~ 1,560	0.01 (450 sq ft)	0.01 (450 sq ft)	0.0004 (16 sq.ft)
Underground construction equipment work space	1	28ft x ~~225~~ 1,560	0.145 (6,300 sq. Ft.)	0.145 (6,300 sq. ft.)	0
ADSS Gen-Tie	1	2ft x ~~225~~ 1,700	0.01 (450 sq. ft.)	0.01 (450sq. ft.)	0.0004 (16 sq.ft)
Underground construction equipment work space	1	28ft x ~~225~~ 1,700	0.145 (6,300 sq. Ft.)	0.145 (6,300 sq. Ft.)	0

Figure SCE - 1


CALCITE SUBSTATION PROJECT
Figure SCE-1:
Proposed Calcite Substation
POCO Structure
Proposed SCE Structures
Gen-Tie Telecom UG #1
Gen-Tie Telecom UG #2
Proposed SCE Gen-Tie Lines
Proposed Customer Gen-Tie Lines
SCE Telecom Vault
SCE Telecom Manhole
Existing Transmission Structures
New Transmission Loop-In Structures
Remove Transmission Structures
Existing Transmission Lines
New Transmission Loop-In Lines
Remove Transmission Lines
Distribution OH Lines
Distribution UG Lines
Telecom UG Route 1
Telecom UG Route 2
Telecom OH Route 1
Access Road Line
Laydown/Material Yards
Proposed Calcite Substation
Proposed Calcite Substation Property Boundary
Right of Way
Project Area
1 inch equals 500 feet
Updated as of: 4/4/2025
POS 2
POS 3
POS 4
M169-P1B
M169-P1C
Gen-Tie SCE Str 1
M169-H1A
M169-H1X
M169-P1D
POCO
M169-H1E
M169-H2X
M169-T1
M169-T2
M169-T3
M30-T1
M30-T2
M30-T3
M30-T4
M31-T1
M168-T3
M168-T4
M29-T3
El Dorado-Lugo 500kV
Lugo-Mohave 500kV
Lugo-Pisgah No.1 220kV

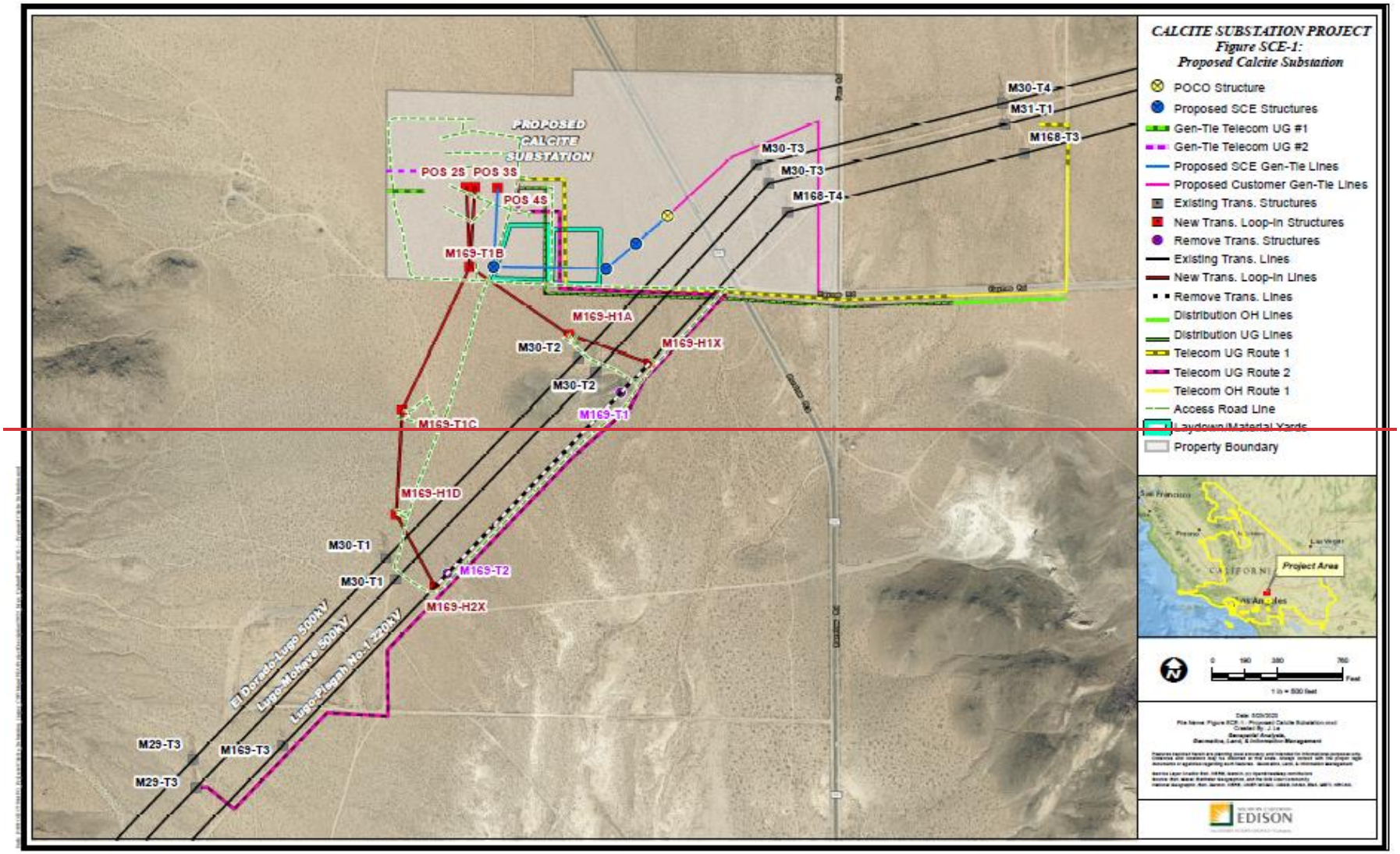
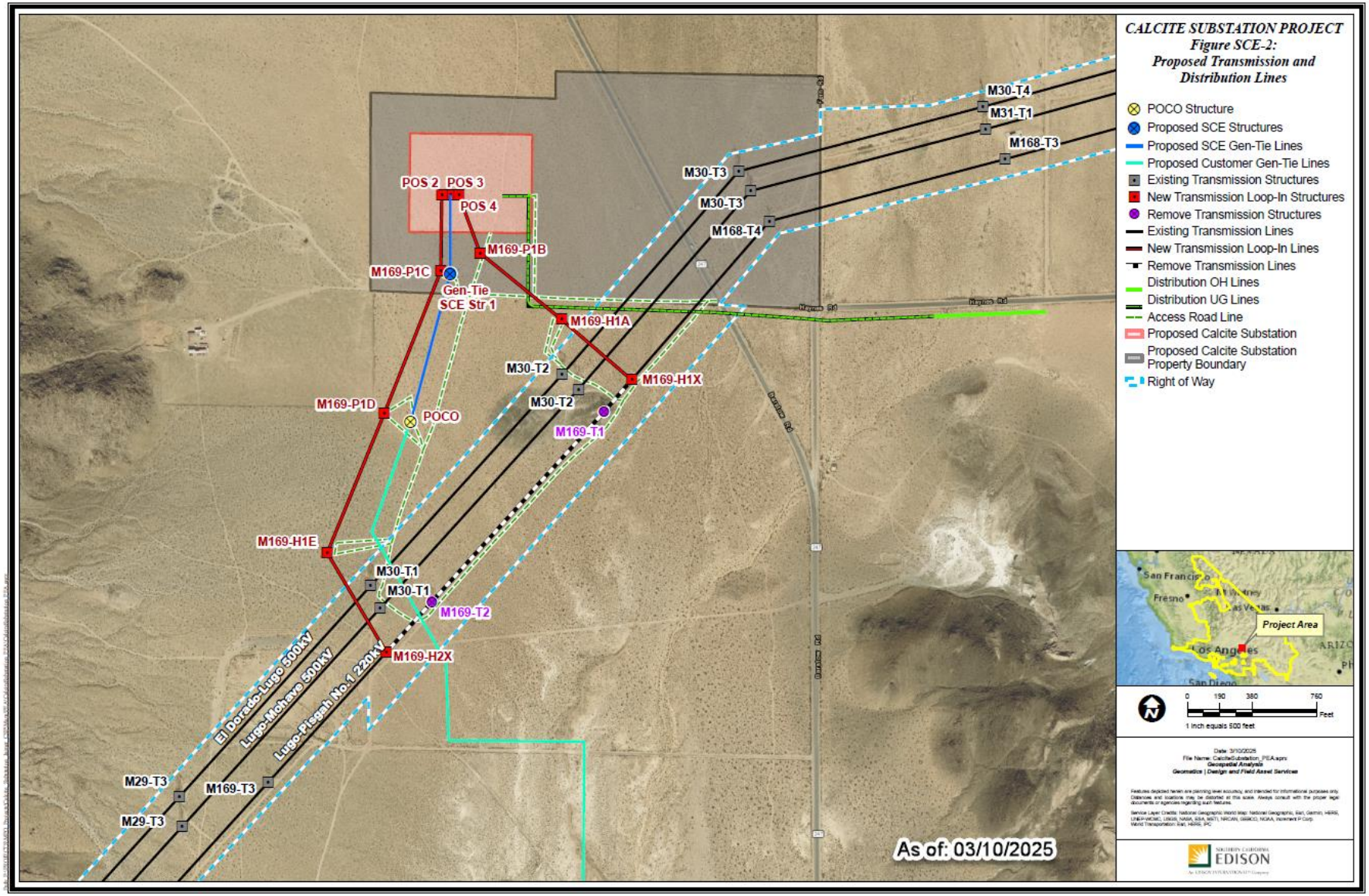

CALCITE SUBSTATION PROJECT
Figure SCE-1:
Proposed Calcite Substation
PROPOSED CALCITE SUBSTATION
POS 2S
POS 3S
POS 4S
M169-T1B
M169-H1A
M169-H1X
M30-T2
M30-T2
M169-T1
M169-T1C
M169-H1D
M30-T1
M30-T1
M169-T2
M169-H2X
M29-T3
M169-T3
M29-T3
M30-T4
M31-T1
M168-T3
M30-T3
M30-T3
M168-T4
El Dorado-Lugo 500kV
Lugo-Mohave 500kV
Lugo-Pisgah No.1 220kV
POCO Structure
Proposed SCE Structures
Gen-Tie Telecom UG #1
Gen-Tie Telecom UG #2
Proposed SCE Gen-Tie Lines
Proposed Customer Gen-Tie Lines
Existing Trans. Structures
New Trans. Loop-In Structures
Remove Trans. Structures
Existing Trans. Lines
New Trans. Loop-In Lines
Remove Trans. Lines
Distribution OH Lines
Distribution UG Lines
Telecom UG Route 1
Telecom UG Route 2
Telecom OH Route 1
Access Road Line
Laydown/Material Yards
Property Boundary
Project Area
EDISON

Figure SCE - 2


CALCITE SUBSTATION PROJECT
Figure SCE-2:
Proposed Transmission and Distribution Lines
POCO Structure
Proposed SCE Structures
Proposed SCE Gen-Tie Lines
Proposed Customer Gen-Tie Lines
Existing Transmission Structures
New Transmission Loop-In Structures
Remove Transmission Structures
Existing Transmission Lines
New Transmission Loop-In Lines
Remove Transmission Lines
Distribution OH Lines
Distribution UG Lines
Access Road Line
Proposed Calcite Substation
Proposed Calcite Substation Property Boundary
Right of Way
POS 2
POS 3
POS 4
M169-P1B
M169-P1C
Gen-Tie SCE Str 1
M169-H1A
M169-H1X
M169-P1D
POCO
M169-T1
M169-H1E
M169-T2
M169-H2X
M30-T4
M31-T1
M168-T3
M30-T3
M30-T3
M168-T4
M30-T2
M30-T2
M30-T1
M30-T1
M29-T3
M29-T3
M169-T3
El Dorado-Lugo 500kV
Lugo-Mohave 500kV
Lugo-Pisgah No.1 220kV
Project Area
0 190 380 760 Feet
1 inch equals 500 feet
As of: 03/10/2025
EDISON

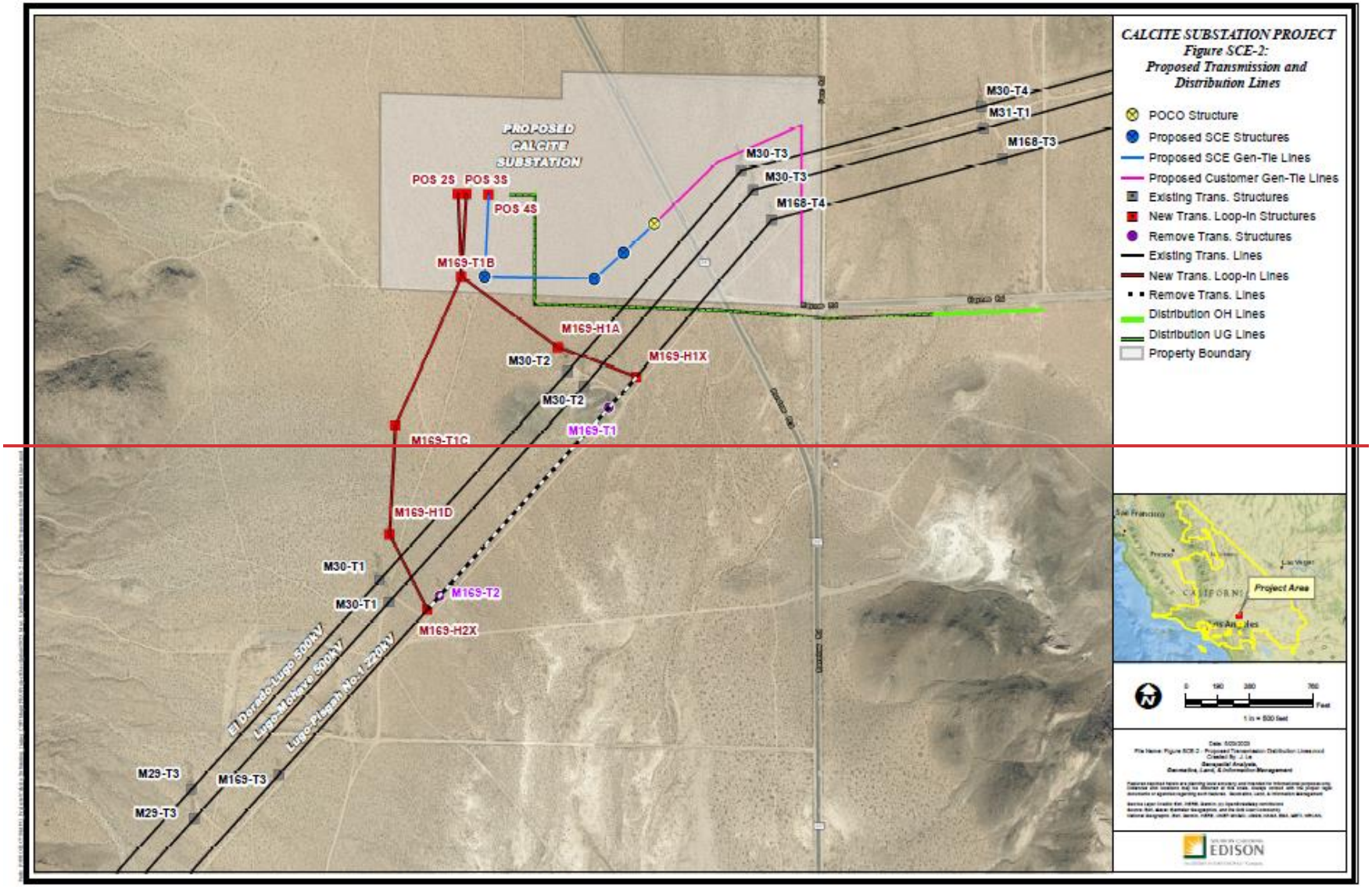

CALCITE SUBSTATION PROJECT
Figure SCE-2:
Proposed Transmission and Distribution Lines
POCO Structure
Proposed SCE Structures
Proposed SCE Gen-Tie Lines
Proposed Customer Gen-Tie Lines
Existing Trans. Structures
New Trans. Loop-In Structures
Remove Trans. Structures
Existing Trans. Lines
New Trans. Loop-In Lines
Remove Trans. Lines
Distribution OH Lines
Distribution UG Lines
Property Boundary
PROPOSED CALCITE SUBSTATION
POS 2S
POS 3S
POS 4S
M169-T1B
M169-H1A
M169-H1X
M169-T1
M169-T1C
M169-H1D
M169-T2
M169-H2X
M30-T1
M30-T2
M30-T3
M30-T4
M31-T1
M168-T3
M168-T4
M29-T3
M169-T3
El Dorado-Lugo 500kV
Lugo-Mohave 500kV
Lugo-Pisgah No. 1 220kV
Project Area
EDISON

Figure SCE - 3

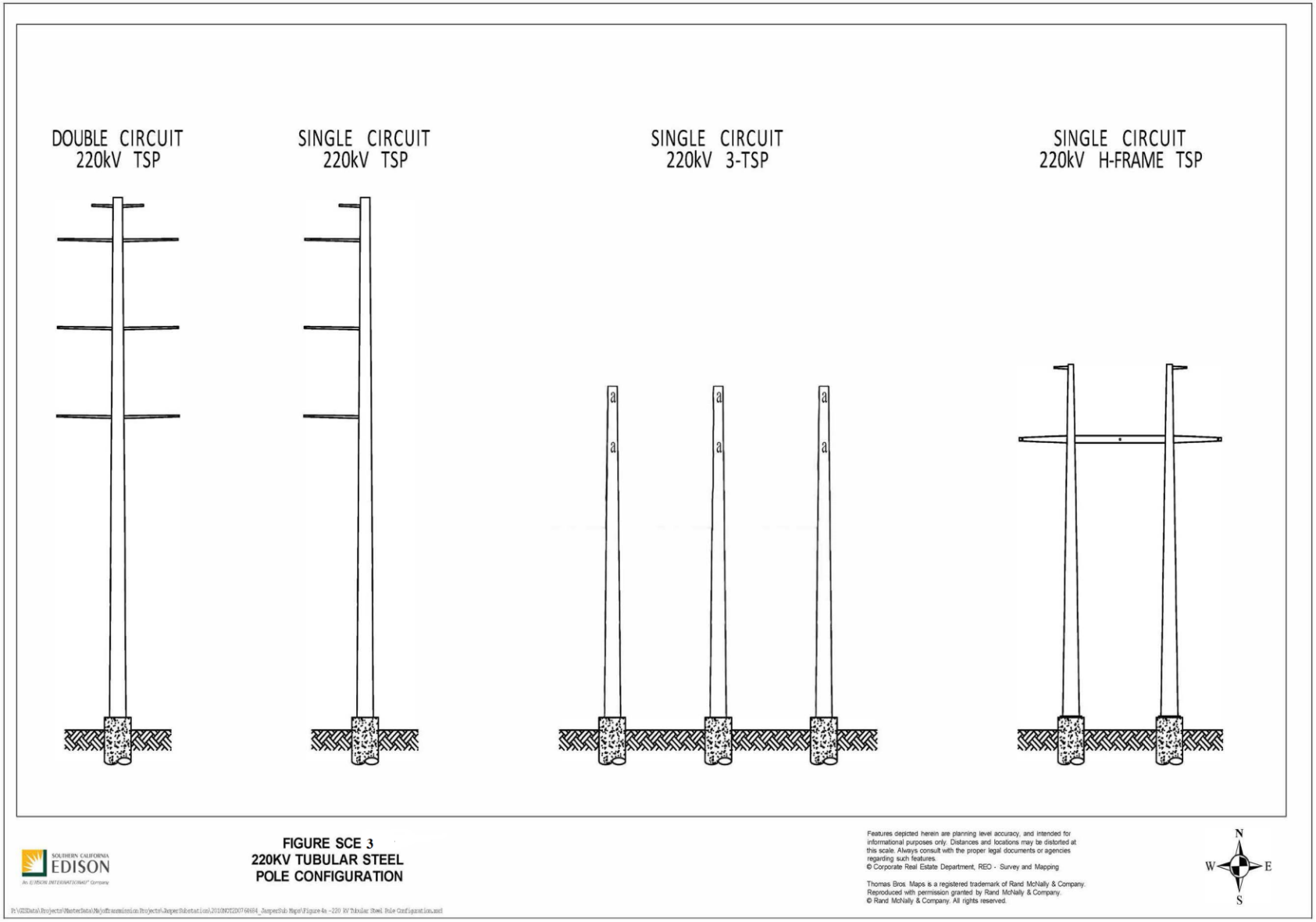
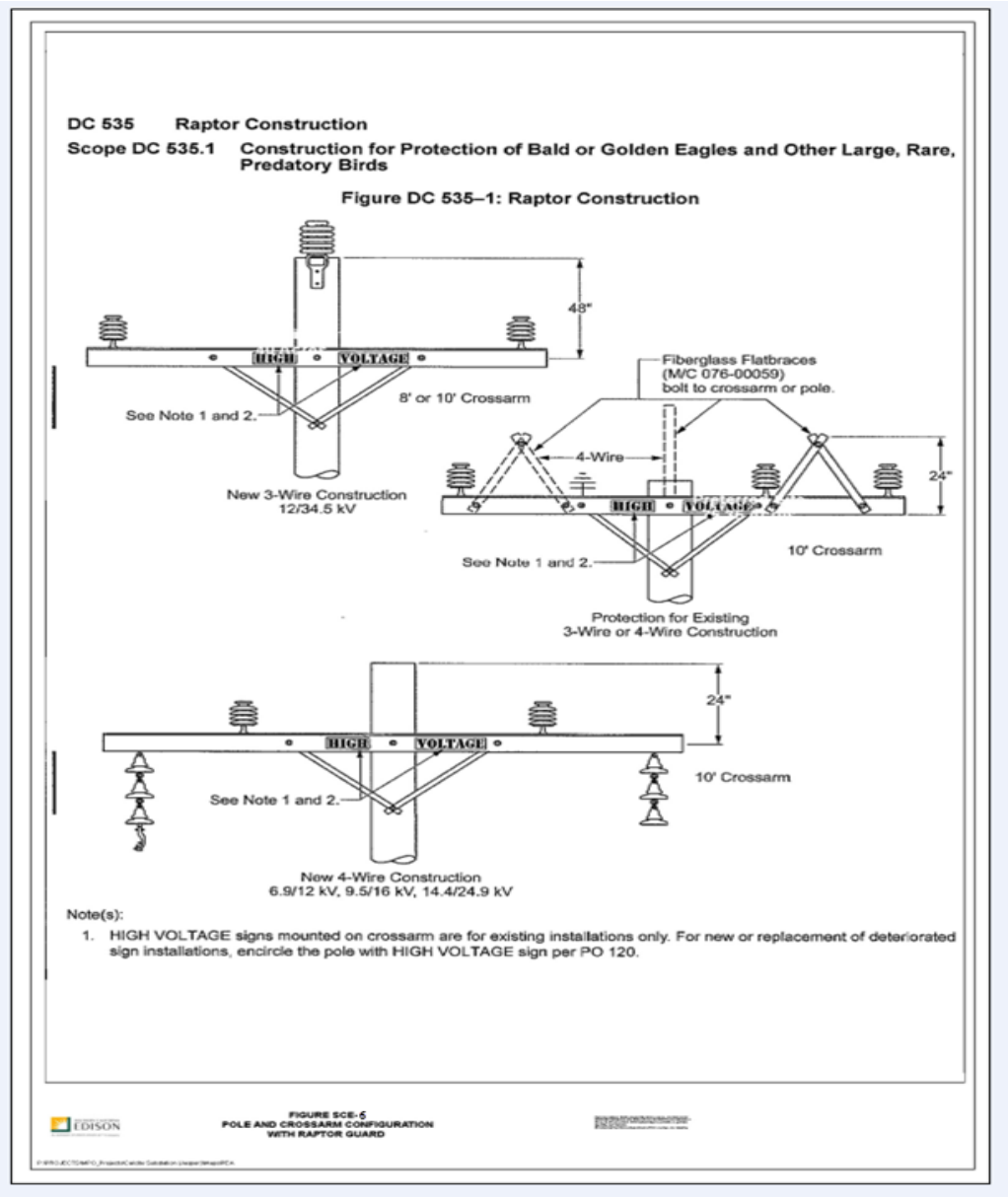

DOUBLE CIRCUIT
220kV TSP
SINGLE CIRCUIT
220kV TSP
SINGLE CIRCUIT
220kV 3-TSP
SINGLE CIRCUIT
220kV H-FRAME TSP
a
a
a
a
a
a
SOUTHERN CALIFORNIA
EDISON
An EDISON INTERNATIONAL Company
FIGURE SCE 3
220KV TUBULAR STEEL
POLE CONFIGURATION
Features depicted herein are planning level accuracy, and intended for informational purposes only. Distances and locations may be distorted at this scale. Always consult with the proper legal documents or agencies regarding such features.
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N
W
E
S

Figure SCE - 4


DC 535 Raptor Construction
Scope DC 535.1 Construction for Protection of Bald or Golden Eagles and Other Large, Rare, Predatory Birds
Figure DC 535–1: Raptor Construction
48"
HIGH VOLTAGE
8' or 10' Crossarm
See Note 1 and 2.
New 3-Wire Construction
12/34.5 kV
Fiberglass Flatbraces
(M/C 076-00059)
bolt to crossarm or pole.
4-Wire
24"
HIGH VOLTAGE
10' Crossarm
See Note 1 and 2.
Protection for Existing
3-Wire or 4-Wire Construction
24"
HIGH VOLTAGE
10' Crossarm
See Note 1 and 2.
New 4-Wire Construction
6.9/12 kV, 9.5/16 kV, 14.4/24.9 kV
Note(s):
1. HIGH VOLTAGE signs mounted on crossarm are for existing installations only. For new or replacement of deteriorated sign installations, encircle the pole with HIGH VOLTAGE sign per PO 120.
EDISON
FIGURE SCE-6
POLE AND CROSSARM CONFIGURATION
WITH RAPTOR GUARD

Appendix P. Sienna Solar Addendum Report

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180 North Ashwood Avenue
Ventura, California 93003
805-644-4455

April 4, 2025
Project No: 21-11216

99MT 8me, LLC
211 Sutter Street, 6th Floor
San Francisco, California 94108

Subject: Sienna Solar and Storage Project Addendum to Technical Reports regarding "Gen-tie line" Alternatives and Improvements Associated with the Southern California Edison (SCE) Calcite Substation; San Bernardino County, California

Rincon Consultants, Inc. (Rincon) has prepared this Addendum to the Technical Reports associated with PROJ-2022-00013 for the proposed Sienna Solar and Storage Project and SCE Calcite Substation, (together representing the "Project") in San Bernardino County (County), California (Figure 1). The County is the lead agency under the California Environmental Quality Act (CEQA). To date, the County has circulated a Draft Environmental Impact Report (DEIR) that was available for public review between August 30, 2023 and October 16, 2023 and a "Recirculated DEIR" that was available for public review between August 9, 2024 and September 30, 2024 (SCH Number 2022080518).

The intent of this Addendum Report is to update existing Rincon-prepared Technical Reports to provide clarification and augmentation of information about existing conditions and potential impacts associated with minor modifications to the following Project elements:

- Approximately 13.3 miles of gen-tie line alternatives proposed in proximity to the alternatives illustrated on Figure 2-2, Local Vicinity Map in the (Recirculated DEIR 2024), described on page 2-5;
- Transmission-related improvements associated with the construction of SCE's Calcite Substation Project illustrated on Figure SCE-1, Proposed Calcite Substation (Figure 5 herein), including transmission lines, generation tie-line connection, distribution line for light and power, access road line(s), and telecommunication facilities, amongst other ancillary items (as described in the Project Description for SCE's Calcite Substation and the Interconnection of Sienna Solar Project updated March 2025) located primarily within Assessor Parcel Numbers (APNs) 045-305-107 and 045-305-110 and partially within APNs 045-305-104 and 045-305-105.

This Addendum Report provides additional details concerning the existing conditions present along the proposed 13.3 miles of gen-tie line alternatives, and where SCE proposes to develop transmission-related improvements associated with the substation within APNs 045-305-107 and 045-305-110, 045-305-104, and 045-305-105. The Recirculated Draft EIR included this area as part of the Project but did not expressly refer to the three APNs referenced above. This Addendum addresses the following resource areas:

1) Air Quality/Greenhouse Gas
2) Biological Resources
3) Cultural Resources
4) Noise
5) Paleontological Resources
6) Traffic

7) Visual Resources
8) Water Supply

As provided in more detail below, the items that are the subject of this Addendum Report do not represent a substantive departure from the existing Project description(s) and impact analysis provided in the DEIR and Recirculated DEIR circulated in 2023 and 2024. No new impacts were identified and the previously prepared Technical Reports and previously identified mitigation measures, as applicable, are sufficient to reduce impacts to less than significant, consistent with the conclusions in the DEIR and Recirculated DEIR. Thus, the information presented in this Addendum Report does not constitute new significant information warranting recirculation of the Recirculated Draft EIR as set forth in CEQA Guidelines Section 15088.5.

Project Description

Approximately 39 miles of gen-tie line (including collector line[s]) alternatives were analyzed in the DEIR published in August 2023, and an additional 12.3 miles of gen-tie line alternatives were analyzed in December of 2023 and provided to the County as an "Addendum to Technical Reports" to inform the Recirculated DEIR, which was published in August 2024 (Recirculated DEIR 2024; Page 2-5). The subject of this Addendum Report is to provide documentation of the analysis of an additional 13.3 miles of gen-tie line alternatives in the vicinity of the alternatives analyzed in the DEIR and Recirculated DEIR. The proposed potential 13.3 miles of gen-tie line alternatives are additional alternative routes that expand the total gen-tie alternatives for the Project, from which the final preferred gen-tie alignment would be selected. As such, these additional alternatives would not result in any greater or fewer miles of gen-tie line development, but instead provide additional routes for the final gen-tie alignment to travel (Figure 2 herein).

The proposed Sienna Solar and Storage Project requires interconnection at the proposed SCE Calcite Substation (APN 045-304-107) previously analyzed in the DEIR published in August 2023 and the Recirculated DEIR, which was published in August 2024. This Addendum provides additional information about transmission-related infrastructure and improvements (located within APNs 045-305-107, 045-305-110, 045-305-104, and 045-305-105) associated with the Calcite Substation, (i.e., transmission lines, generation tie-line connection, distribution line for light and power, and; telecommunications facilities) on privately-owned land (as described in the Project Description for SCE's Calcite Substation and the Interconnection of Sienna Solar Project updated March 2025) (Figure 2 and Figure 5 herein).

Technical Study Resource

Air Quality/Greenhouse Gas

The proposed 13.3 miles of gen-tie line alternatives are located adjacent and in close vicinity to gen-tie line alternatives previously evaluated in the DEIR and Recirculated Draft EIR (Figure 1 herein and Figure 2-2, Local Vicinity Map (Recirculated DEIR 2024). The new gen-tie alternative routes would result in similar impacts as have previously been discussed and would not require additional equipment, increase the number of days of construction near existing sensitive receptors, or result in a longer construction period than was analyzed in the Air Quality and Greenhouse Gas Study completed in July 2023 by Rincon (Rincon 2023a) and provided as Appendix C1 of the Recirculated DEIR. Therefore, air quality and greenhouse gas emissions from construction would be the same as those reported in Tables 5, 6, and 9 of the Air Quality and Greenhouse Gas Study (Rincon 2023a).

Additionally, the operational activities associated with the 13.3 miles of gen-tie line alternatives would be consistent with those identified in the Air Quality and Greenhouse Gas Study and would be the same as were identified in Tables 7 and 10 for air quality and greenhouse gas respectively. Consistent with the Air Quality and Greenhouse Gas Study (Rincon 2023a), all criteria pollutant emissions and greenhouse gas emissions would be below regulatory thresholds, and the TAC emissions associated with the new gen-tie alternatives would not increase construction or operational impacts from what was originally analyzed.

The 13.3 miles of gen-tie line alternatives do not change the anticipated number of workers accessing the site throughout the year. Therefore, as identified in the Air Quality and Greenhouse Gas Study (Rincon 2023a), construction and operation of the gen-tie line would not result in or substantially contribute to concentrations that exceed the one-hour or eight-hour CO standard.

The 13.3 miles of gen-tie line alternatives could expose workers and sensitive receptors to Valley Fever and odors consistent with the exposure identified in the Air Quality and Greenhouse Gas Study. As indicated in the Section 3.3, Project Impact Analysis, of the Air Quality and Greenhouse Gas Study, Valley Fever impacts can be minimized with the incorporation of Reduction Measure AQ-1 which incorporates an active dust control plan to minimize exposure of personnel and the public to exposure to spores of Valley Fever. Further, odor impacts were determined to be less than significant in the Air Quality and Greenhouse Gas Study (Rincon 2023a) and therefore, consistent with the proposed Project, would not expose people to substantial odor emissions. No additional analysis is required.

The 13.3 miles of gen-tie line alternatives do not introduce any additional or increased Project activities from what was analyzed in the Recirculated DEIR, would not impact the Project's consistency with the 2022 Scoping Plan and SB 100 and are consistent with the Air Quality and Greenhouse Gas Study, dated July 2023, and remain consistent with state and regional plans to reduce GHG emissions and be consistent with the *2022 Climate Change Scoping Plan Update*.

Emissions from construction and operation of the SCE Calcite Substation and associated infrastructure are addressed in the analysis prepared and detailed in Recirculated DEIR published in August 2024 and include the transmission-related infrastructure within APNs 045-305-107, 045-305-110, 045-305-104, and 045-305-105.

Biological Resources

Rincon conducted reconnaissance surveys within APNs 045-305-107 and 045-305-110 where SCE's transmission-related improvements would occur and representative portions of the gen-tie alignments on October 24, 2024. The reconnaissance survey within APN s 045-305-107 and 045-305-110 consisted of pedestrian surveys as described in the methods section of the Biological Resources Assessment report (Rincon 2023b). Reconnaissance surveys along gen-tie alternative routes were vehicular, as described in the methods section of the Biological Resources Assessment report (Rincon 2023b). Results of these survey are documented herein. Due to restricted site access, the portions of APNs 045-305-104 and 045-305-105 where SCE transmission-related infrastructure and improvements would occur were not included in the reconnaissance surveys; however, both areas are within approximately 250 feet or less of APN 045-305-107 and were visually observed during the October 2024 surveys and were reviewed at a desktop-level. The analysis contained within this amendment is based on the results of the reconnaissance survey and a desktop review of available information and aerial imagery.

The 13.3 miles of gen-tie line alternatives and proposed SCE transmission-related infrastructure and improvements (within APNs 045-305-107, 045-305-110, 045-305-104, and 045-305-105) fall within the broader biological resources study area outlined in the Biological Resources Assessment (Rincon

2023b). Habitats on-site were mapped at a general level of scale. Specifically, surveys focused on documenting existing conditions and biological resources, evaluating representative portions of the additional proposed gen-tie line alternatives and APNs 045-305-107 and 045-305-110 for potential to support special-status plant species, wildlife species, and vegetation communities.

As previously described in the Recirculated DEIR, this area comprises historical lakebed and recovering spinescale scrub (*Atriplex spinifera* Shrubland Alliance). Historical lakebed and recovering spinescale scrub were discussed in the Biological Resources Assessment completed by Rincon in August 2023 (Rincon 2023b) and provided as Appendix D1 of the Recirculated DEIR. Mapping of vegetation communities and land cover along the gen-tie and collector line alternative routes was completed at a course scale and shows the dominant land cover within the 300-foot gen-tie corridor (Figure 3 herein). Potential impacts to biological resources within the vicinity of the 13.3 miles of gen-tie line alternatives were identified in the previously prepared Biological Resources Assessment (Rincon 2023b). No new impacts are identified within these areas, and previously proposed avoidance and mitigation recommendations are sufficient to address potential impacts as identified in the Biological Resources Assessment (Rincon 2023b).

Vegetation communities present within the areas of the proposed SCE transmission-related infrastructure and improvements consist of natural spinescale scrub (*Atriplex spinifera* Shrubland Alliance) and creosote bushscrub (*Larrea tridentata* Shrubland Alliance), consistent with vegetation communities documented within the Calcite Substation parcel and nearby gen-tie alignments. This development area had similar levels of disturbance and represent similar levels of habitat quality to those documented in the Calcite Substation parcel (APN 045-304-107). Based on the similarity of this work area to previously analyzed portions of the Project study area, development within APNs 045-305-107, 045-305-110, 045-305-104, and 045-305-105 would not be anticipated to result in any impacts not previously disclosed in the previously-prepared Biological Resources Assessment (Rincon 2023b), inclusive of potential impacts to desert tortoise (*Gopherus agassizii*), desert kit fox (*Vulpes macrotis*), burrowing owl (*Athene cunicularia*), and beaverdam breadfoot (*Pediomelum castoreum*) (Rincon 2023b; Figure 10), and the recommended avoidance and mitigation measures presented therein would be sufficient to reduce impacts to these species to less than significant.

Cultural Resources

The 13.3 miles of gen-tie line alternatives and APNs 045-305-107, 045-305-110, 045-305-104, and 045-305-105 are within areas covered by previously conducted cultural resources record searches conducted at the South Central Coastal Information Center in 2021, as described in the previously-prepared Cultural Resources Assessment (Rincon 2023c). Rincon completed a review of historical maps and aerial imagery for the 13.3 miles of gen-tie alternative routes and APNs 045-305-107, 045-305-110, 045-305-104, and 045-305-105 and did not identify any built environment structures within these areas.

To confirm previous findings, Rincon completed a pedestrian survey on October 24 and 25, 2024 within APNs 045-305-107 and 045-305-110 where SCE's transmission-related improvements would occur. Results of these surveys are documented herein. The pedestrian survey was completed by Alli Berry and Jeremy Wood using survey methods described in the Cultural Resources Assessment (Rincon 2023c). The survey identified six isolates and two archaeological sites, a historical refuse scatter, and a historical refuse scatter and prospecting pit, as described in Table 1 below.

Table 1 Newly Identified Cultural Resources

Temporary ID	Resource Type	Description
Sienna-2024-S-03	Historical Site	Refuse scatter and prospecting pit
Sienna-2024-S-09	Historical Site	Refuse scatter
Sienna-2024-ISO-01	Prehistoric Isolate	Two flakes
Sienna-2024-ISO-05	Prehistoric Isolate	Two biface fragments and two flakes
Sienna-2024-ISO-06	Prehistoric Isolate	Metate fragment
Sienna-2024-ISO-07	Prehistoric Isolate	Unifacial mano
Sienna-2024-ISO-08	Prehistoric Isolate	Five lithic flakes, same material and likely representative of one lithic reduction event
Sienna-2024-ISO-10	Prehistoric Isolate	One flake

Rincon completed Department of Parks and Recreation Series 523 Forms for the resources identified during this survey effort. The six isolates are ineligible for consideration as historical resources under CEQA.

Archaeological sites Sienna-2024-S-03 and Sienna-2024-S-09 are historical refuse scatters; Sienna-2024-S-03 also includes an associated prospecting pit (Rincon 2023c). The resources have not been previously recorded or subject to an eligibility evaluation for listing in the California Register of Historical Resources (CRHR). Rincon reviewed the BLM's GLO records for the site locations and did not identify an association with significant persons or events (USDI 2024). No evidence is present to suggest resources are associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage (does not meet Criterion A/1) or that they are associated with the lives of persons important in our past (does not meet Criterion B/2). These resources do not embody any distinctive characteristics (does not meet Criterion C/3). Twentieth-century refuse scatters are ubiquitous throughout the Mojave Desert, particularly in rural areas where unregulated trash dumping is common. Because these resources primarily consist of cans, ceramics, and bottle glass dating to the mid-twentieth century, they likely represent single or multiple historic refuse dumping episodes associated with the many roads, residential properties, and/or agricultural operations in the area. Lastly, these resources are all surface scatters of artifacts, and their data potential was exhausted during their recording (does not meet Criterion D/4). Thus, Rincon recommends Sienna-2024-S-03 and Sienna-2024-S-09 as ineligible for listing in the CRHR and ineligible for consideration as historical resources under CEQA.

Based on the results of the record search, historical map and aerial imagery review, and pedestrian survey completed for the improvements located within APNs 045-305-107 and 045-305-110, potential impacts to cultural resources are considered to be equal or lesser to those identified in the Cultural Resources Assessment completed in June 2023 by Rincon (Rincon 2023c) and provided as Appendix F of the Recirculated DEIR, and the recommendations proposed for cultural resources are sufficient to address those impacts. As stated in the Cultural Resources Assessment completed by Rincon, gen-tie alternatives have not been subject to pedestrian survey; however, the selected gen-tie route would be subject to the cultural mitigation outlined in the Recirculated DEIR and Errata to the EIR. Similarly, due to restricted site access, the portions of APNs 045-305-104 and 045-305-105 where SCE transmission-related infrastructure and improvements would occur were not included in the October 2024 pedestrian surveys but would be subject to the cultural mitigation outlined in the Recirculated DEIR and Errata to the EIR. Based on a review of record search, historical map and aerial imagery review for the 13.3 miles of gen-tie line alternatives and transmission related infrastructure within APN 045-305-104 no previously documented cultural resources are known to exist.

Noise

The 13.3 miles of gen-tie line alternatives are located throughout the study area, within areas of gen-tie alternatives previously evaluated (Figure 1). Construction of the final gen-tie line would be consistent with methods described in Section 2.8 of the Recirculated DEIR 2024. Therefore, consistent with the construction noise estimates in Table 11 of the Noise Study completed in July 2023 by Rincon (Rincon 2023d) and provided as Appendix K of the Recirculated DEIR, construction of the alternative gen-tie routes would result in construction noise levels of 78 A-weighted decibels (dBA) L_{eq} at the nearest residences. This would be below Federal Transit Administration's (FTA's) construction noise threshold of 80 dBA L_{eq} (8-hour). Most gen-tie construction activities would occur further from nearby noise receptors, and would, therefore, result in lower noise levels. Heavy construction would not occur during nighttime hours. Limited construction activities outside of acceptable hours would require a variance to conduct construction activities during those hours. Therefore, similar to the previously proposed gen-tie routes, alternative gen-tie route construction noise would not exceed applicable thresholds.

The cumulative construction noise analysis in the Noise Study made a conservative assumption that construction at all Project parcels and the previously proposed gen-tie routes would occur simultaneously for a worse-case scenario. With the same assumption for the gen-tie alternative routes, cumulative construction noise involving the Project parcels and the gen-tie alternative routes would result in similar noise levels as shown in Table 12 of the previously prepared Noise Study (Rincon 2023d), with noise levels reaching up to 83 dBA Leq at the nearest residences. This would be above FTA's construction noise threshold of 80 dBA L_{eq} (8-hour). Therefore, similar to the previously proposed gen-tie routes, cumulative construction noise from the gen-tie alternative routes would potentially exceed applicable FTA thresholds. Recommendation NOI-1 in the Noise Study would reduce cumulative construction noise levels with the alternative gen-tie routes at adjacent residential properties by 10 dBA. As such, cumulative construction noise levels would be reduced to 78 dBA, which would not exceed applicable FTA construction noise level limit of 80 dBA L_{eq} at noise sensitive uses.

As shown in Table 13 in the Noise Study (Rincon 2023d), construction traffic including the previously proposed gen-tie routes would increase noise levels by up to 1 dBA L_{eq} on Project utilized roadway segments, well below exceeding applicable FTA criteria. Construction traffic with the alternative gen-tie proposed routes is anticipated to be similar to the gen-tie previously proposed routes. Therefore, the short-term increase in traffic noise from construction of the alternative gen-tie routes would be less than significant.

Transmission lines would generate noise from the corona affect, which is a phenomenon associated with the electrical ionization of the air that occurs near the surface of the energized conductor and suspension hardware due to very high electric field strength. This is audible power line noise that is generated from electric corona discharge, which is usually experienced as a random crackling or hissing sound. According to the Noise Study, the corona effect on the gen-tie transmission line would generate a noise level of 20 dBA at a distance of 50 feet. This is the approximate distance to the nearest residences from the alternative gen-tie routes. In addition, according to the Noise Study, as observed during a site visit to existing solar farms, noise levels from these transmission lines were not detected over the existing ambient noise sources in the area (wind and vehicles) just outside of the solar farm properties. Therefore, per site observations and the general low noise of transmissions lines, additional alternative gen-tie route noise would not exceed County's standard of 55 dBA L_{eq} at the nearest residences, and impacts would not exceed County thresholds.

Construction of the gen-tie line may require the use of an auger drill rig that has the potential to result in temporary vibration impacts on structures and humans. Based on the potential alternative gen-tie

locations and similar to the previously proposed gen-tie routes, auger drilling activities would not occur closer than the previously disclosed 50-feet of the nearest off-site residential structure. Other than use of an auger drill rig, other construction activities at the gen-tie corridors are less intensive than auger drill rig and would have lower inches per second (in./sec.) peak particle velocity (PPV) than the auger drill rig. Therefore, vibration levels from the auger drill rig are considered worst case for the gen-tie construction. It is estimated that a drill rig would create a vibration level of 0.031 in./sec. PPV at 50 feet, which would be below the County's vibration standard of 0.2 in./sec. PPV. In addition, heavy construction activity involving drilling would not occur during nighttime hours. Therefore, vibration associated with construction of the additional proposed gen-tie alternatives would not exceed County thresholds.

Noise impacts associated with construction and operation of the SCE Calcite Substation and associated infrastructure are addressed in the Recirculated DEIR published in August 2024 and include the transmission-related infrastructure within APNs 045-305-107, 045-305-110, 045-305-104, and 045-305-105.

Paleontological Resources

The 13.3 miles of gen-tie line alternatives are underlain by six geologic units: Quaternary young playa deposits, Quaternary young dune sand deposits, Quaternary alluvium (Figure 4 herein), Quaternary old gravel deposits, undifferentiated hornblende diorite and gabbro, and undifferentiated granite and quartz monzonite (Dibblee and Minch 2008a, b). Of these six geologic units, four were assessed in the Paleontological Resources Analysis (PRA) completed in March 2023 by Rincon (Rincon 2023e) and provided as Appendix H of the Recirculated DEIR. Quaternary young playa deposits, Quaternary young dune sand deposits, and Quaternary alluvium, were assigned low paleontological sensitivity at the surface and undetermined paleontological sensitivity greater than 10 feet below the surface. Quaternary old gravel deposits were assigned low paleontological sensitivity regardless of depth. Undifferentiated hornblende diorite and gabbro and undifferentiated granite and quartz monzonite are Mesozoic-aged intrusive igneous rocks that do not preserve paleontological resources and have no paleontological sensitivity (Society of Vertebrate Paleontology 2010).

APNs 045-305-107, 045-305-110, 045-305-104, and 045-305-105 are underlain by three geologic units per Dibblee and Minch (2008): Quaternary alluvium, undifferentiated hornblende diorite and gabbro, and undifferentiated granite and quartz monzonite (Figure 4 herein).

The PRA determined that the potential impacts to paleontological resources resulting from ground disturbing activities in sediments mapped as Quaternary young alluvium, Quaternary young dune, and Quaternary young playa deposits would be potentially significant if these activities reached greater than 10 feet below the surface (Rincon 2023e). Ground-disturbing activities in areas mapped as undifferentiated hornblende diorite and gabbro and undifferentiated granite and quartz monzonite do not pose a risk to significantly impact paleontological resources. Therefore, the potential impacts to paleontological resources resulting from the 13.3 miles of gen-tie line alternatives and transmission-related infrastructure and improvements associated with the SCE Calcite Substation are equal or lesser to those identified in the PRA, and the recommendations proposed in the PRA are sufficient to address those impacts.

Traffic

Consistent with the most recent traffic assessment for the Project (GHD, July 2023), the 13.3 miles of gen-tie line alternatives in the Project study area would not cause significant transportation impacts; impacts would be consistent with those described in the previously-prepared Traffic Consistency Analysis for Gen-Tie Lines Alternative Memorandum prepared by GHD in December 2023 and included

as an attachment to Appendix N of the Recirculated DEIR. Traffic impacts associated with construction and operation of the SCE Calcite Substation and associated infrastructure are addressed in the Recirculated DEIR published in August 2024 and include the transmission-related infrastructure within APNs 045-305-107, 045-305-110, 045-305-104, and 045-305-105.

Visual Resources

The 13.3 miles of gen-tie line alternatives are situated throughout the Project area among the gen-tie alternatives previously evaluated in the Recirculated DEIR and Visual Resource Assessment (Rincon 2023f). The built environment of the Project, including the 13.3 miles of gen-tie alternative routes is dominated by a lattice of paved and dirt roads extending from SR 247, which runs generally north-south to the west of the Project area. Several large regional power lines supported by tall steel lattice towers run east-west in the Project vicinity. Low wood post and wire fences are present throughout the Project vicinity, as are small, single-story residences that dot the landscape and wooden poles that distribute local electricity, providing service to these residences. The gen-tie line alternatives would not necessarily result in any greater or fewer miles of gen-tie line development. Key Observation Points (KOP) 1 through 6 of the Visual Resources Assessment completed in March 2023 by Rincon (Rincon 2023f) and provided as Appendix B of the Recirculated DEIR, provide representative existing and simulated views of the Project, including gen-tie routes adjacent to SR 247. The findings of the previously prepared Visual Resources Assessment remain the same for the 13.3 miles of gen-tie line alternatives and no additional analysis is required.

Visual impacts associated with construction and operation of the SCE Calcite Substation and associated improvements are addressed in the Recirculated DEIR published in August 2024 and include the transmission-related infrastructure within APNs 045-305-107, 045-305-110, 045-305-104, and 045-305-105. KOP 3 of the Visual Resources Assessment provides the existing condition and simulated view of the Project looking north along SR 247 toward the proposed SCE Calcite Substation Project (Figure 3.2-8 of the Recirculated DEIR). The transmission-related infrastructure associated with APNs 045-305-107, 045-305-110, 045-305-104, and 045-305-105 at Calcite Substation was included in the Project design as evaluated in the Recirculated DEIR and no additional analysis is required.

The Visual Resources Assessment found that the proposed gen-tie line would be similar in nature to the existing electric distribution and transmission infrastructure in the Project vicinity. The 13.3 miles gen-tie alternatives would be consistent with the Project elements previously evaluated and would not change the findings of the Visual Resources Assessment (Rincon 2023f). The transmission-related infrastructure at Calcite Substation was included in the Project design considered in the Visual Resources Assessment and Recirculated Draft EIR. As concluded in the Recirculated DEIR, the Project would not substantially degrade the existing visual character or quality of public views of the Project area and its surroundings. No additional analysis is required for the gen-tie line alternatives or the transmission-related infrastructure at Calcite Substation and the findings of the Visual Resources Assessment remain the same.

Water Supply

The July 2023 Water Supply Assessment (WSA) provided as Appendix M of the Recirculated DEIR assessed water demands associated with construction and operation of all Project components, including gen-tie line alternatives totaling 39 miles. The WSA (Rincon 2023g) identified 225 acre-feet per year (AFY) as the total amount of water needed for dust suppression during construction of all Project components (Rincon 2023g; see Table 2, *Project Water Demands*, on page 10 of the WSA) and determined sufficient water supply is reliably available for construction and operation of the

Project. The 13.3 miles of gen-tie line alternatives would not increase the overall length of the selected gen-tie route. Consideration of the additional proposed gen-tie alternatives would not increase the Project's previously assessed water demands or alter the projected supply availability, such that no additional analysis is required beyond the July 2023 WSA that was used to inform the Recirculated DEIR (Rincon 2023g). Gen-tie line operation would not require a water supply.

Water demands associated with construction and operation of the SCE Calcite Substation are addressed in the Recirculated DEIR published in August 2024 and include the transmission-related infrastructure within APNs 045-305-107, 045-305-110, 045-305-104, and 045-305-105. As described in the Recirculated DEIR, SCE's Calcite Substation would require approximately 30.7 AFY of water for dust suppression during the construction period and would not introduce a new operational water demand and therefore would not affect the Project's operational water demand of approximately 50.36 AFY. The Recirculated DEIR determined that due to existing groundwater conditions in the Este Subbasin of the Mojave Basin Area, where the Calcite Substation would be located, as well as protections to local groundwater provided by the Adjudication Judgement for the Mojave Basin Area, and the option to purchase construction water from existing groundwater producers within the Mojave Basin Area, the Calcite Substation would not result in significant adverse impacts to groundwater supply or recharge. No additional analysis is required.

The additional gen-tie alternatives and transmission-related infrastructure at SCE's Calcite Substation would not alter the Project's operational water demands, and potential impacts associated with temporary construction water needs for these Project components were previously assessed in the Recirculated DEIR and the WSA. Neither the gen-tie alternatives nor the Calcite Substation transmission infrastructure would introduce new impacts or issues related to water supply availability and reliability. The conclusions of the WSA and Recirculated DEIR remain applicable; no revisions are necessary.

Conclusions

This Addendum to the Technical Reports associated with PROJ-2022-00013 for the proposed Sienna Solar and Storage Project and SCE Calcite Substation Project evaluated (1) 13.3 miles of gen-tie line alternatives proposed in proximity to the alternatives previously described and analyzed in the Recirculated DEIR (2024) and (2) transmission-related infrastructure and improvements associated with the construction of SCE's Calcite Substation illustrated on Figure SCE-1, Proposed Calcite Substation (Figure 5 herein), including transmission lines, generation tie-line connection, distribution line for light and power, and, telecommunication facilities, amongst other ancillary items (as described in the Project Description for SCE's Calcite Substation and the Interconnection of Sienna Solar Project updated March 2025) mainly located within APNs 045-305-107 and 045-305-110 and partially within APNs 045-305-104 and 045-305-105.

The 13.3 miles of gen-tie line alternatives represent additional options to inform the final gen-tie line alignment that will be constructed to interconnect the Sienna Solar and Storage Project to the Calcite Substation. The proposed transmission infrastructure and improvements mainly located within APNs 045-305-107, 045-305-110, 045-305-104, and 045-305-105, as described above, were evaluated in the Recirculated DEIR (2024), and this Addendum provides supplemental information supporting that existing analysis. As such, the items that are the subject of this Addendum Report do not represent a substantive departure from the existing Project description(s) and impact analysis provided in the DEIR circulated in 2023 and the Recirculated DEIR circulated in 2024. In summary, updates to existing conditions include the following: (1) additional cultural resources and (2) two additional geologic formations not previously described. However, no new impacts were identified and the previously prepared Technical Reports and previously identified mitigation measures, as applicable, are sufficient

to reduce impacts to less than significant, consistent with the conclusions in the DEIR and Recirculated DEIR. Thus, the information presented in this Addendum does not constitute new significant information warranting recirculation of the Recirculated Draft EIR as set forth in CEQA Guidelines Section 15088.5.

Sincerely,
Rincon Consultants, Inc.



David Daitch, Ph.D.
Vice President Natural Resources



Evelyn Langsdale
Project Manager

Attachments

Attachment 1 Figures

References

Dibblee, T.W. and J.A. Minch. 2008. Geologic map of the Apple Valley and Ord Mountains 15 minute quadrangle, San Bernardino County, California. [map]. Dibblee Geologic Foundation, Dibblee Foundation Map DF-377, scale 1:62,500.

GHD. 2023. Traffic Consistency Analysis for Gen-Tie Line Alternative Memorandum.

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_____. 2023b. Sienna Solar and Storage Project Biological Resources Assessment.

_____. 2023c. Sienna Solar and Storage Project Cultural Resources Assessment.

_____. 2023d. Sienna Solar and Storage Project Noise Study.

_____. 2023e. Sienna Solar and Storage Project Paleontological Resources Assessment.

_____. 2023f. Sienna Solar and Storage Project Visual Resources Assessment.

_____. 2023g. Sienna Solar and Storage Project Water Supply Assessment.

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Attachment 1

Figures

Figure 1 Regional Location

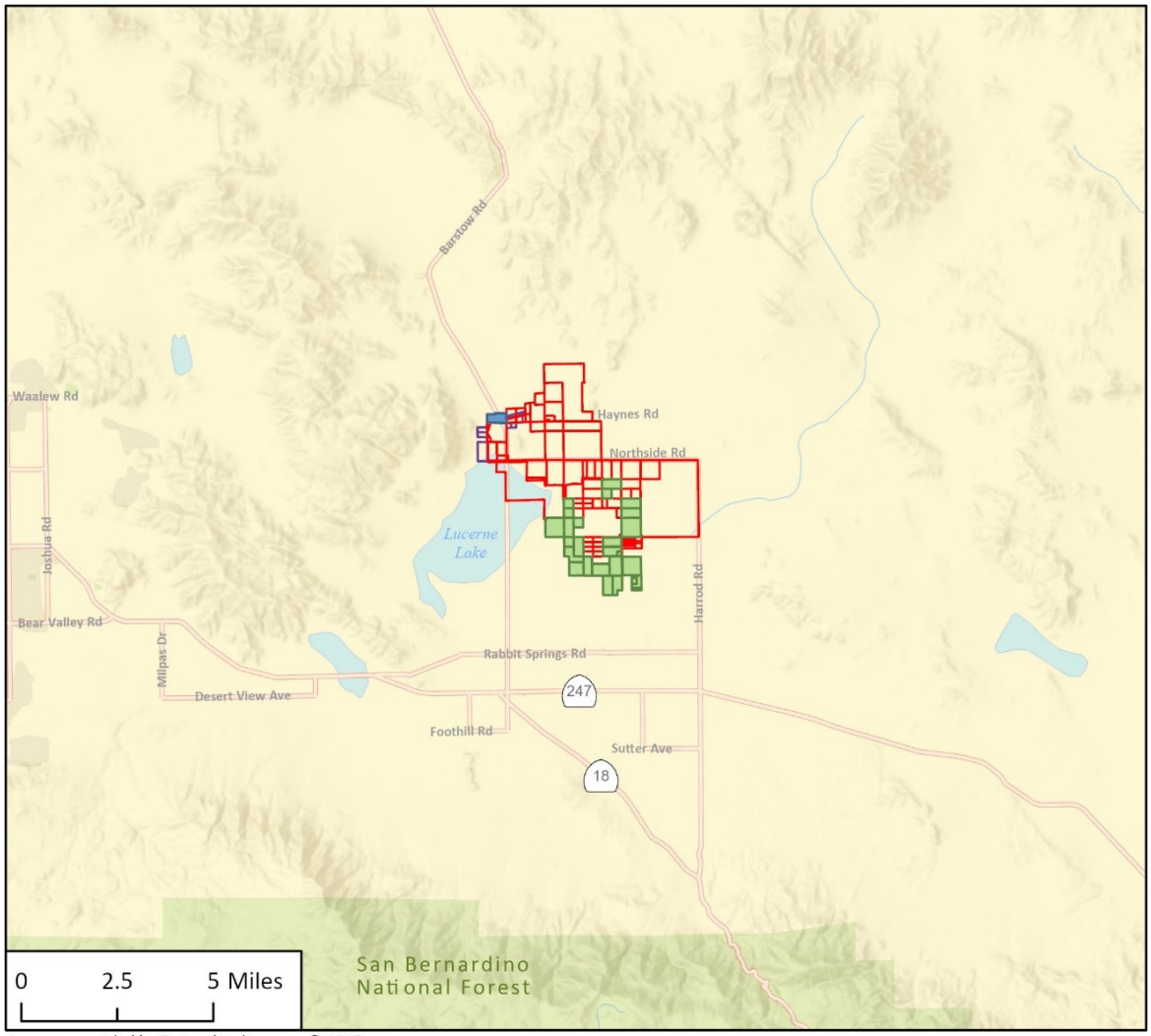
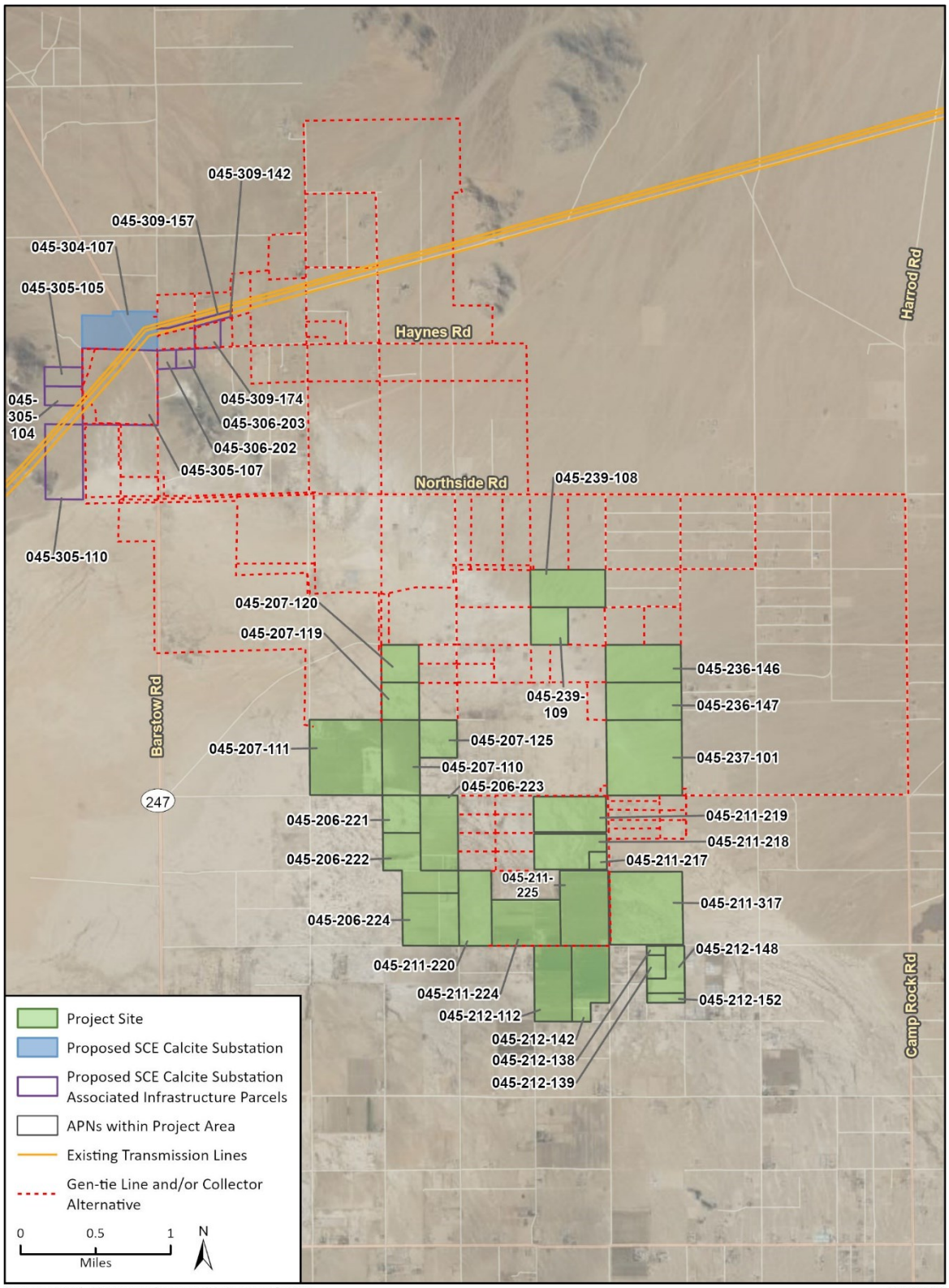


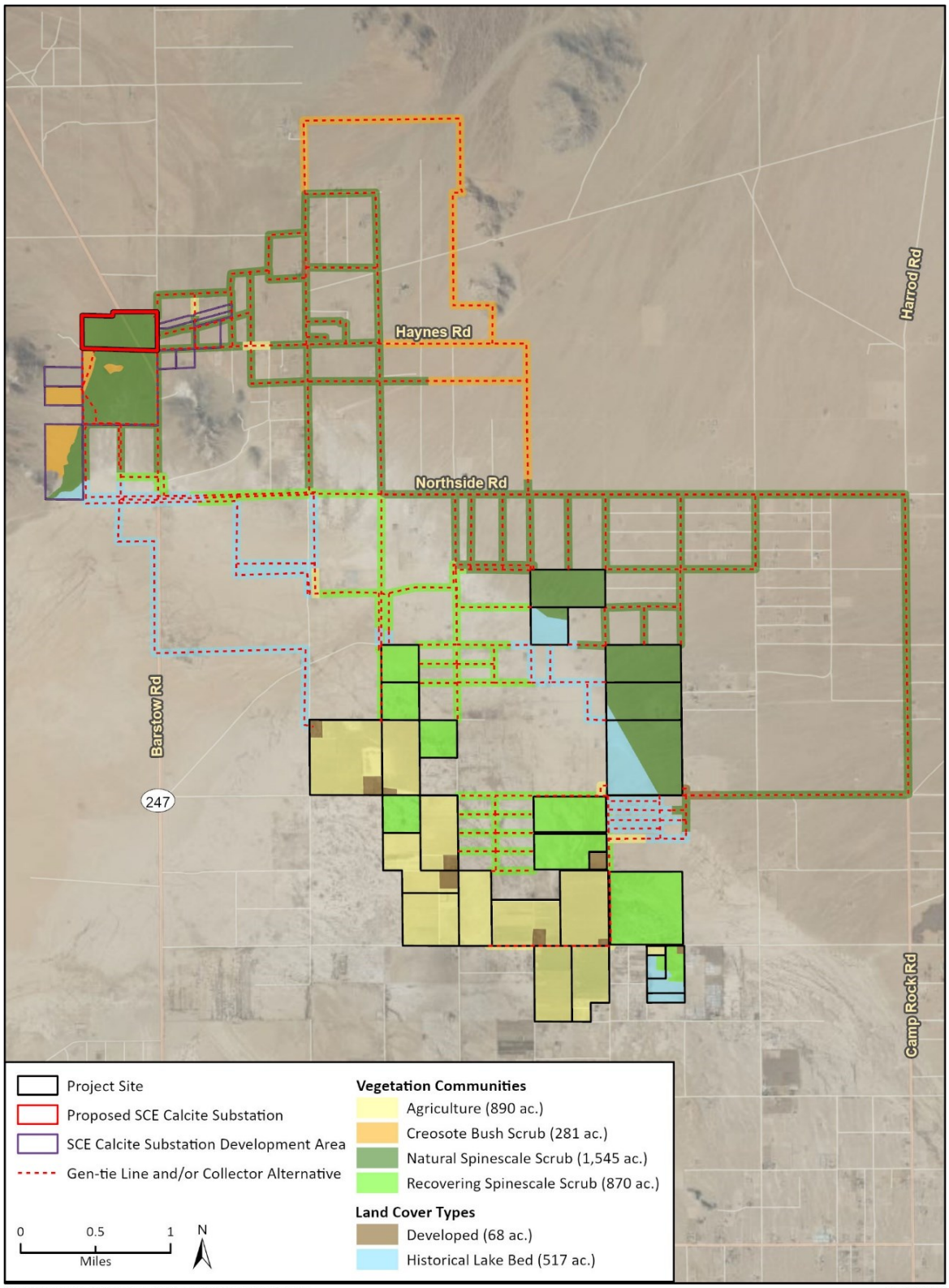
Figure 2 Project Location



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Additional data provided by Southern California Edison, 2024.

21-11216 BIO
Fig 2 Project Location With APNs

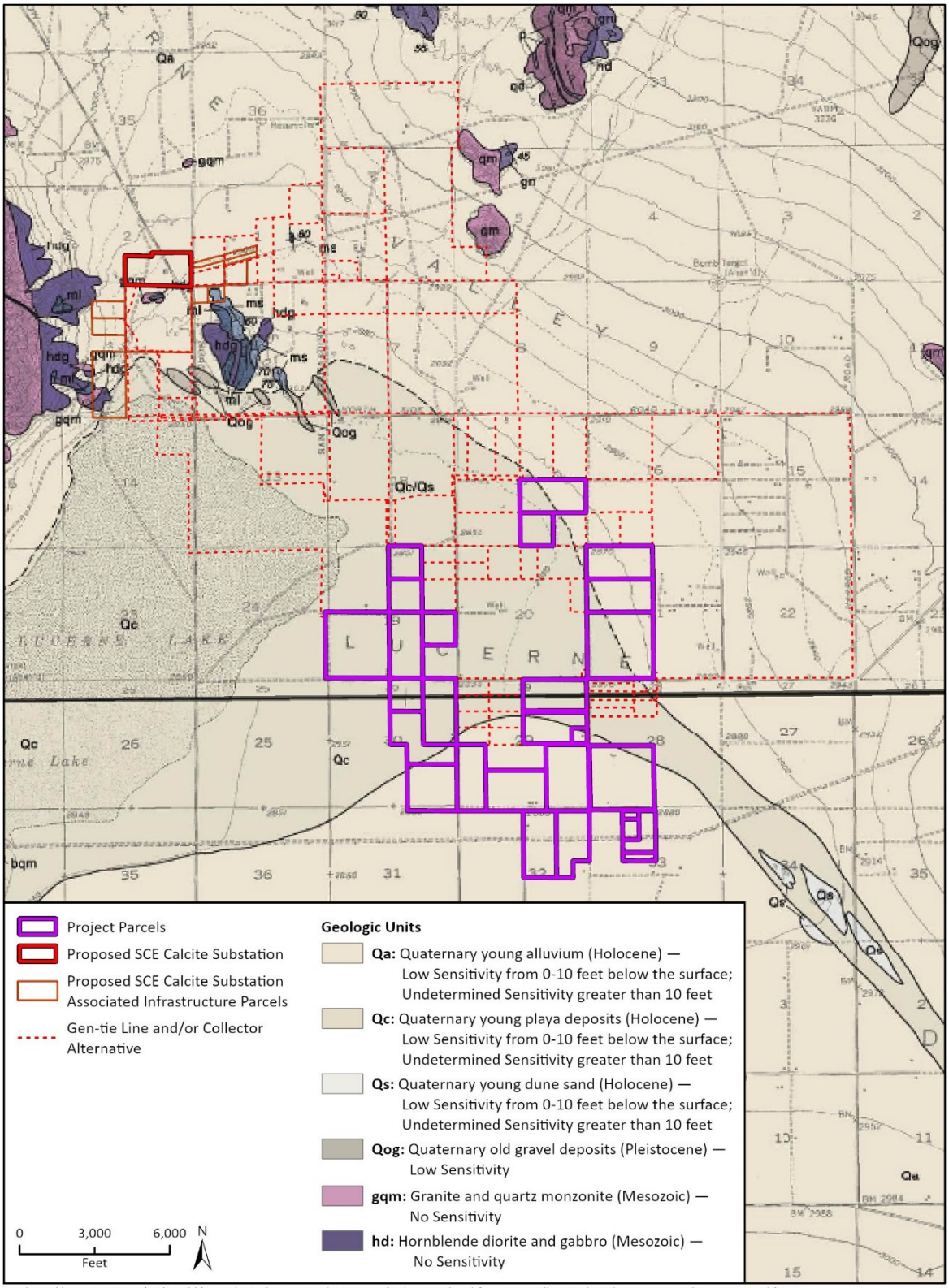
Figure 3 Vegetation Communities and Land Cover



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Fig X Vegetation and Land Cover

Figure 4 Paleontological Resources



Geological basemaps provided by Dibblee and Minch 2008. Geologic map of Lake Arrowhead & Lucerne Valley quadrangles, San Bernardino County, California, and Geologic Map of Apple Valley and Ord Mountains 15 minute quadrangles, San Bernardino County, California.

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Fig X Geology_Paleo

Figure 5 Figure SCE-1 Proposed Calcite Substation

