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.

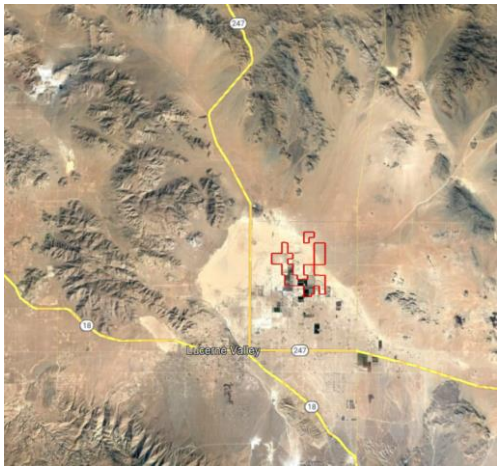
- Provide residents more affordable, reliable, diverse, and safe access to energy, especially renewable energy.

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

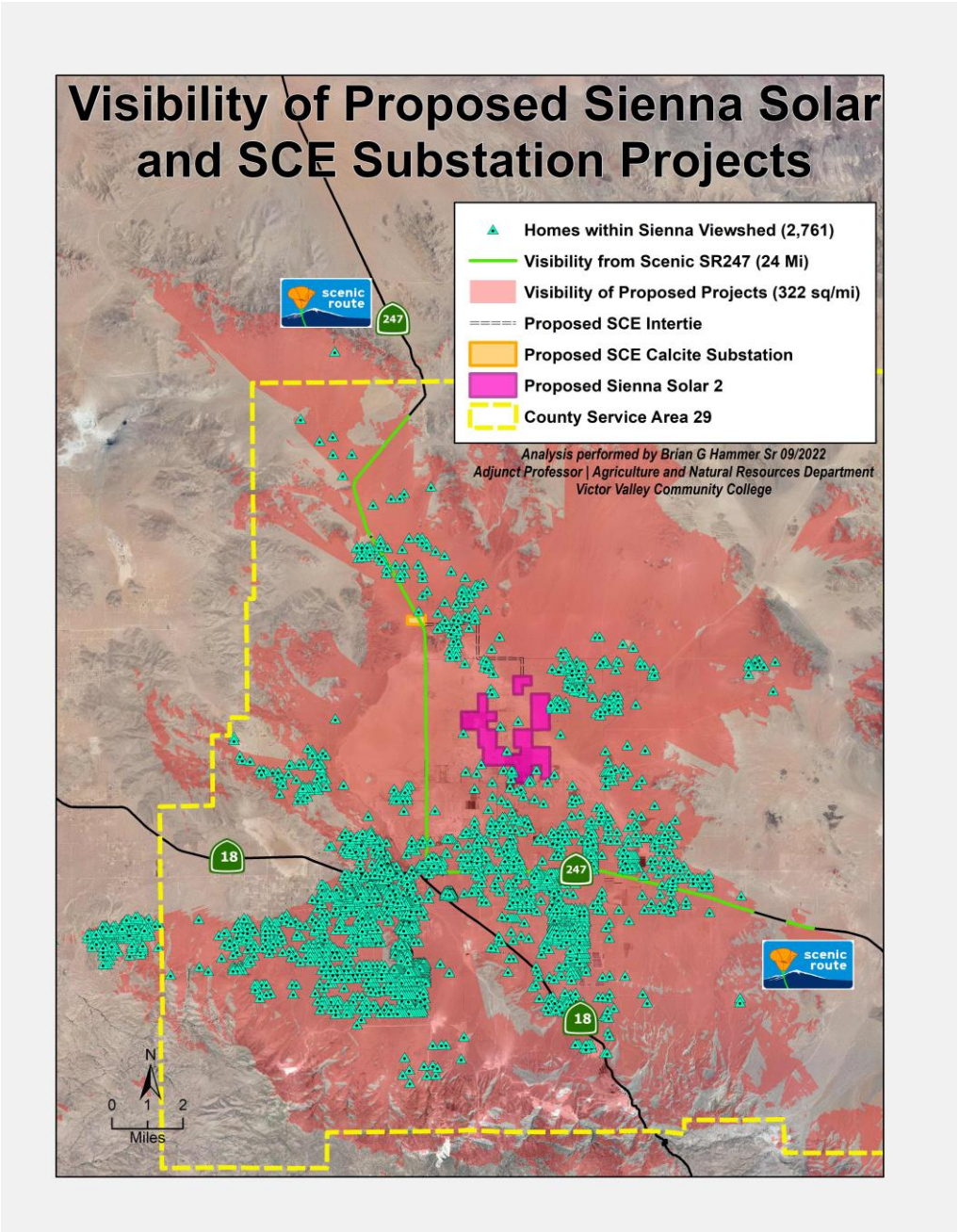


Figure 2: Visibility of proposed Sienna Solar and SCE Substation Projects

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.

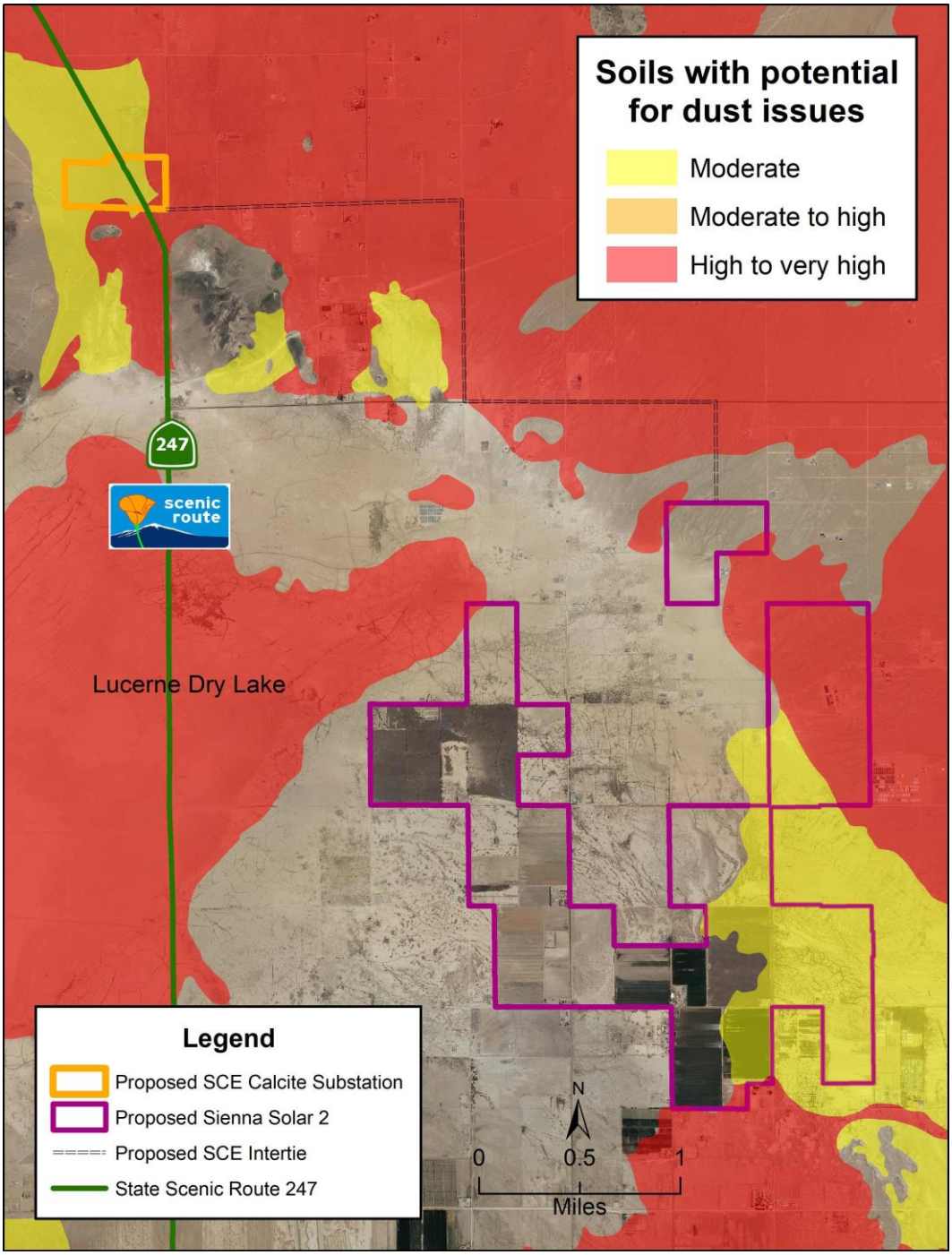


Figure 3: Soils with potential for dust issues

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.

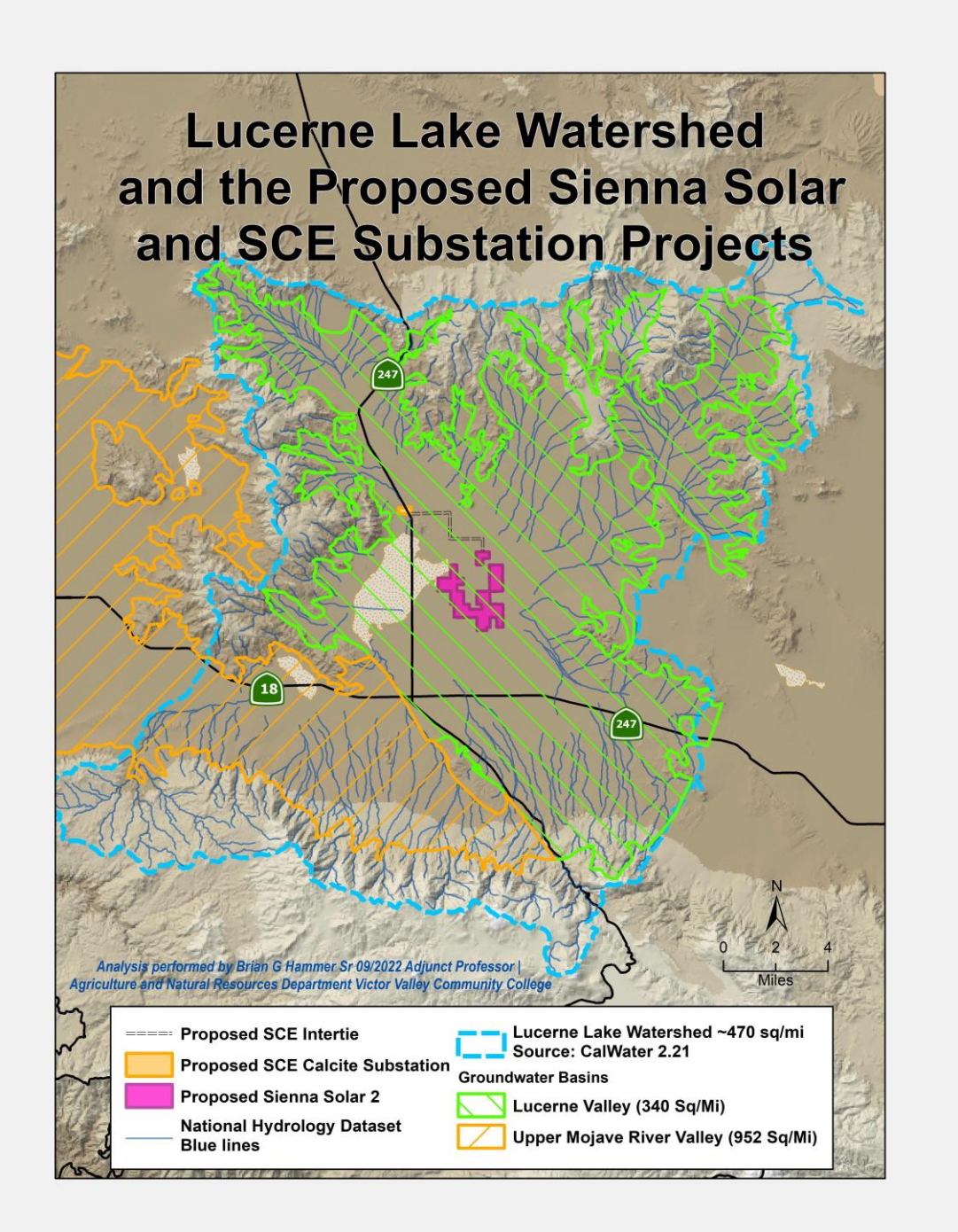


Figure 4: Lucerne Lake Watershed and Groundwater Basins

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

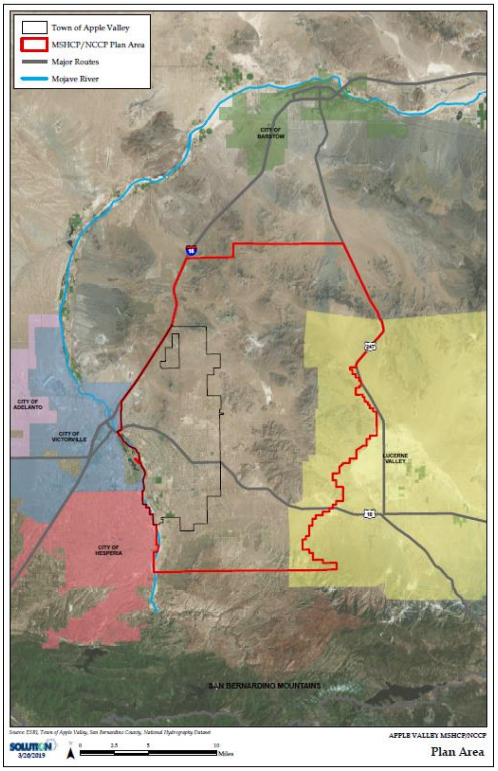


Figure 5: Plan Area for the Apple Valley HCCP

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

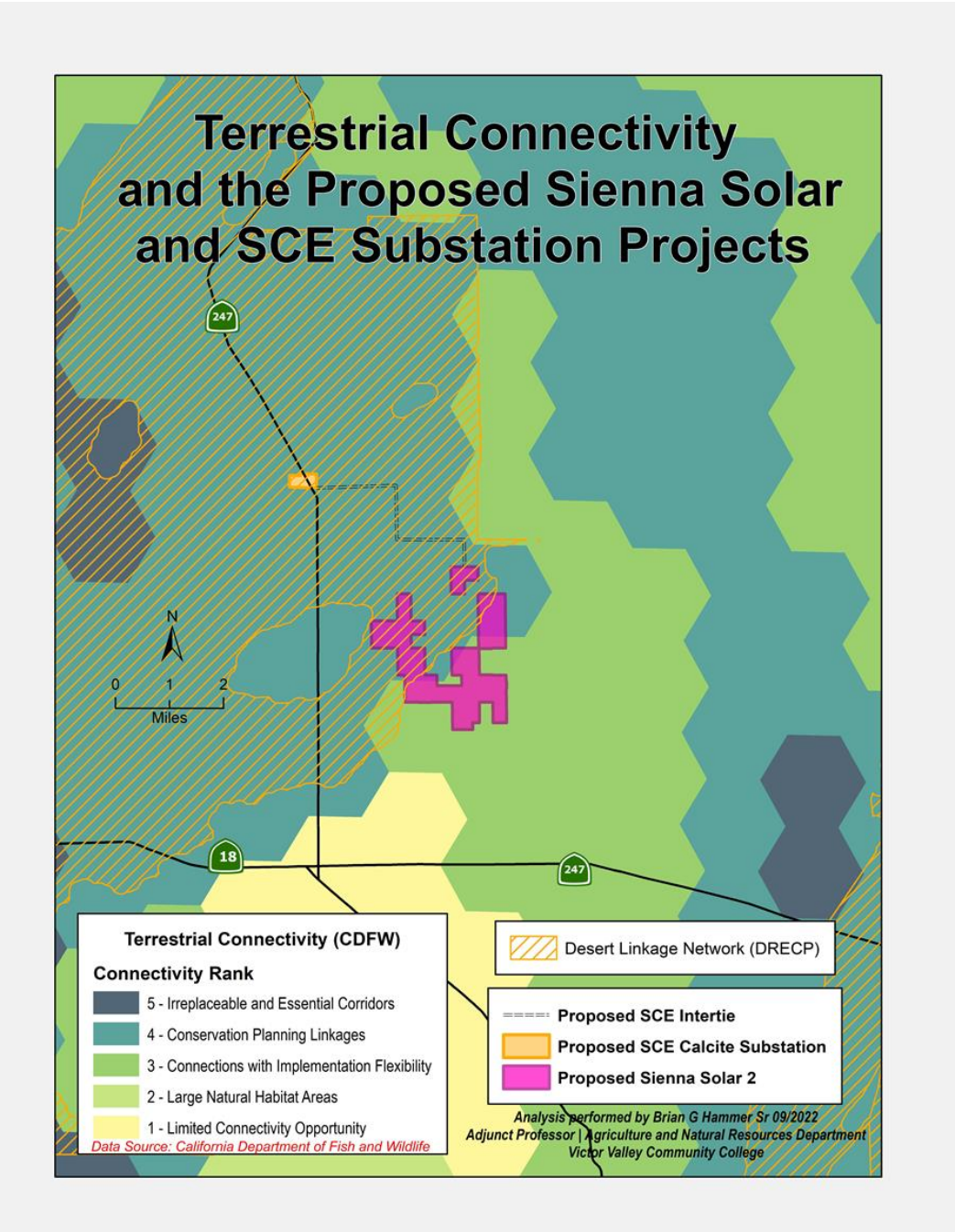


Figure 6: Terrestrial Connectivity

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.

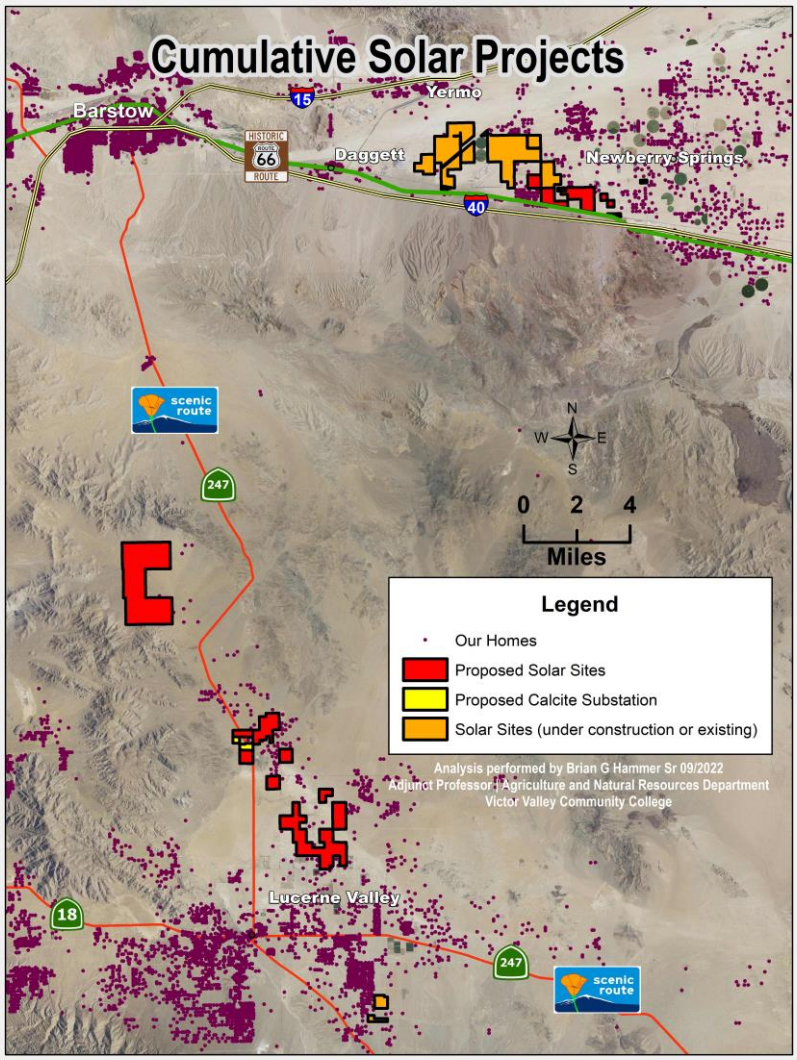


Figure 7: Cumulative Solar Projects

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
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Supervisor Joe Baca, Jr.	Supervisor.Baca@bos.sbcounty.gov

APPENDIX A

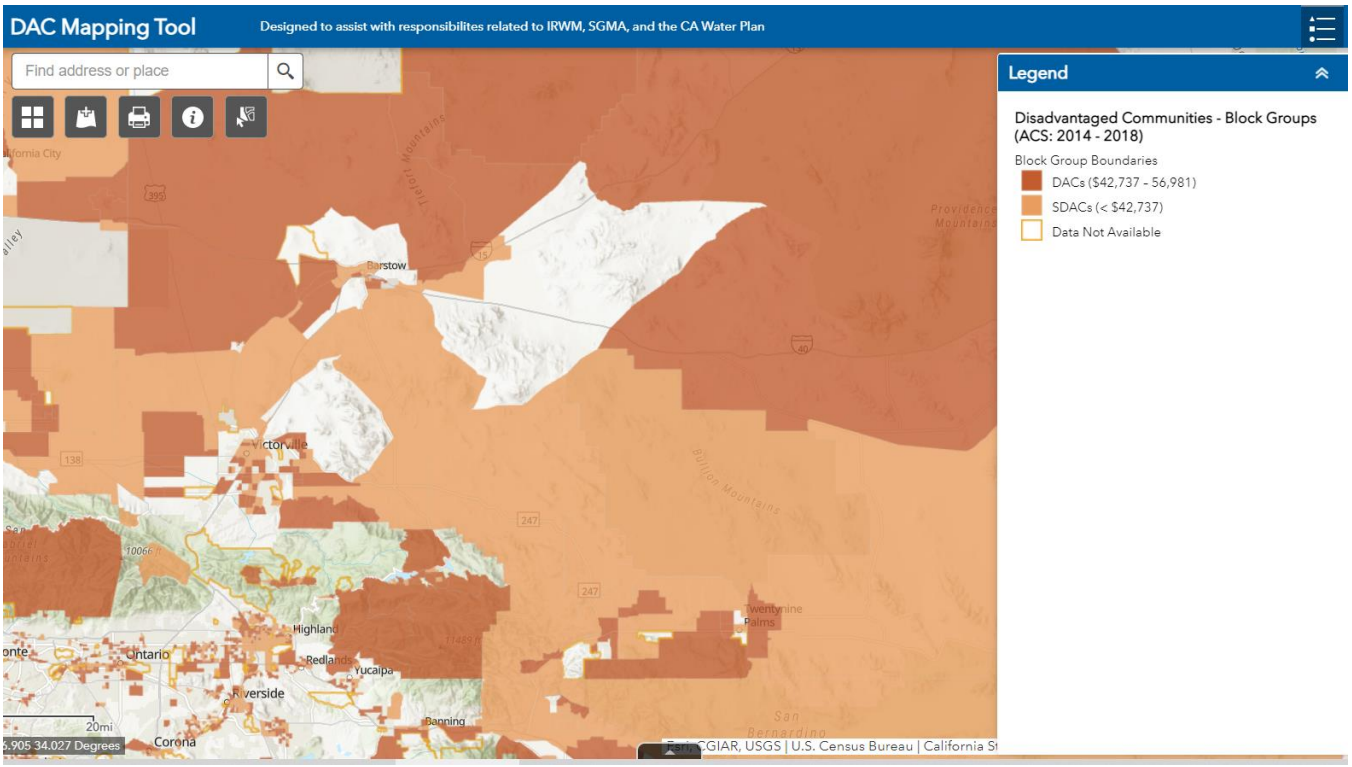


Figure 9: Map showing the Severely Disadvantaged Communities (SDAC) of Lucerne Valley and Newberry Springs.

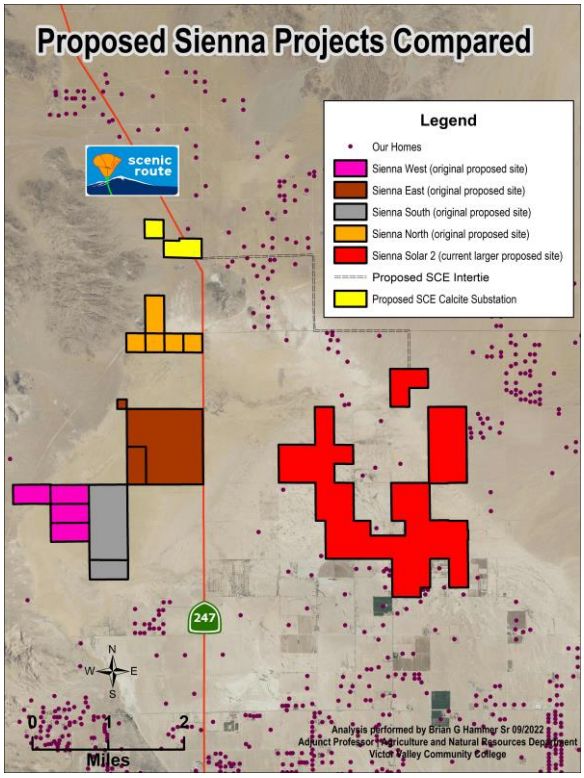


Figure 10: Proposed Sienna Projects Compared

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.

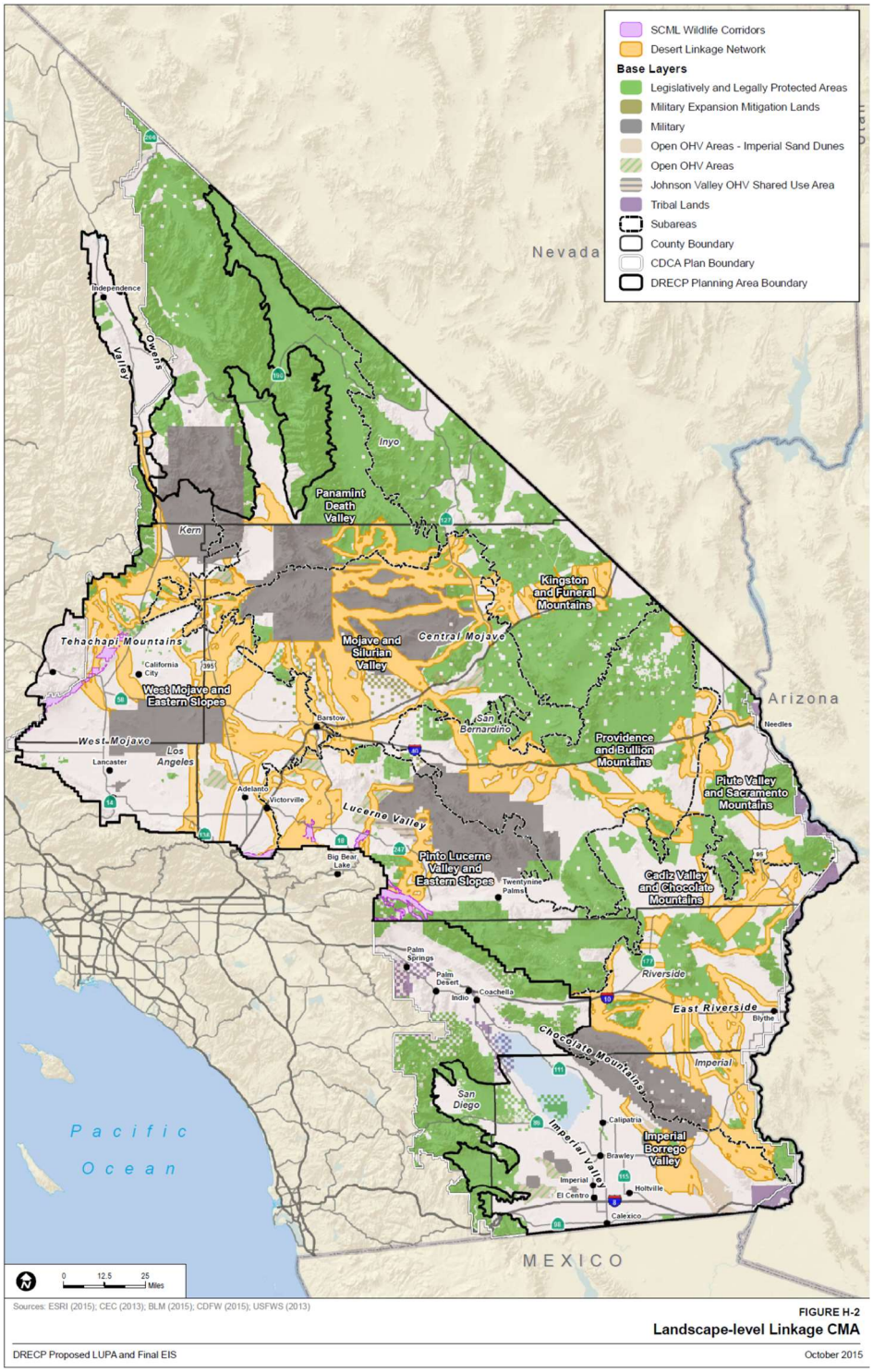
Respectfully submitted,

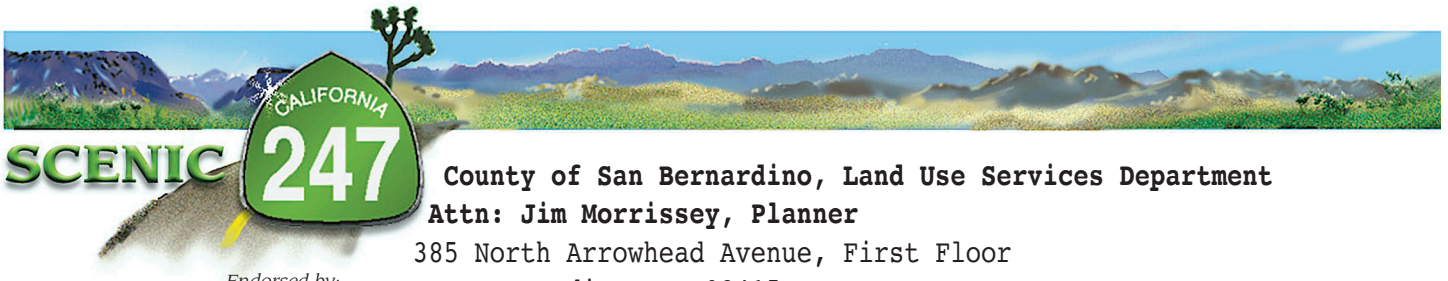
Jeff Aardahl
Senior California Representative
Defenders of Wildlife
jaardahl@defenders.org

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.





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see www.johnsonvalley.com

Hammerking Productions
dave@kingofthehammers.com

Landers Association

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www.barstowrailmuseum.org

Lucerne Valley
Chamber of Commerce

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Economic Development Association

Lucerne Valley Market & Hardware

Lucerne Valley Museum

Route 66 Mother Road Museum
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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:

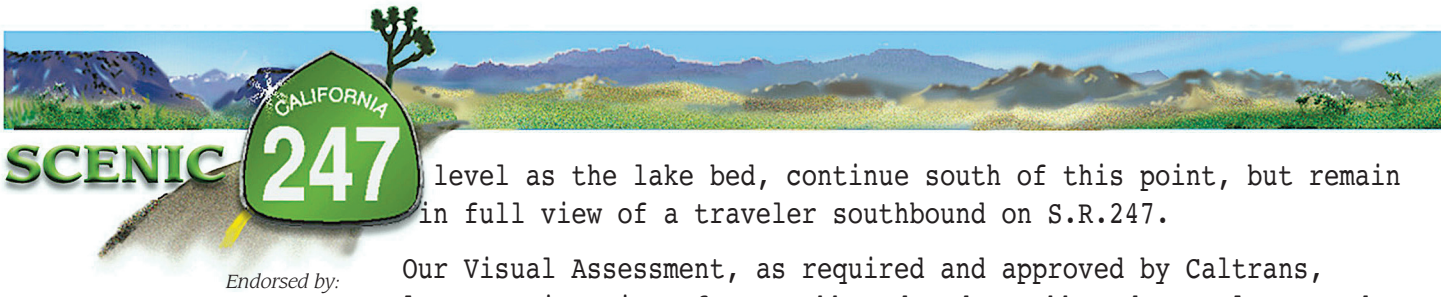
1) The Scenic Corridor includes everything visible from the highway.

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.

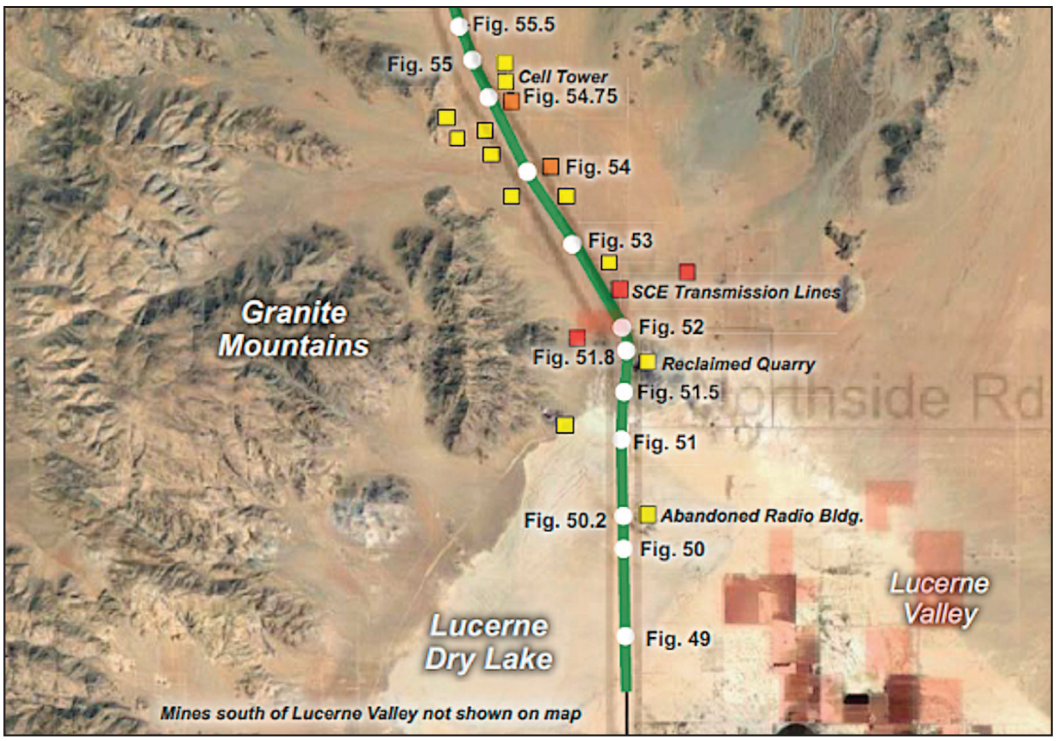
The Sienna project undeniably sits in the 247 scenic corridor.

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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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.

SCENIC 247 COMMITTEE •
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A committee of the Homestead Valley Community Council

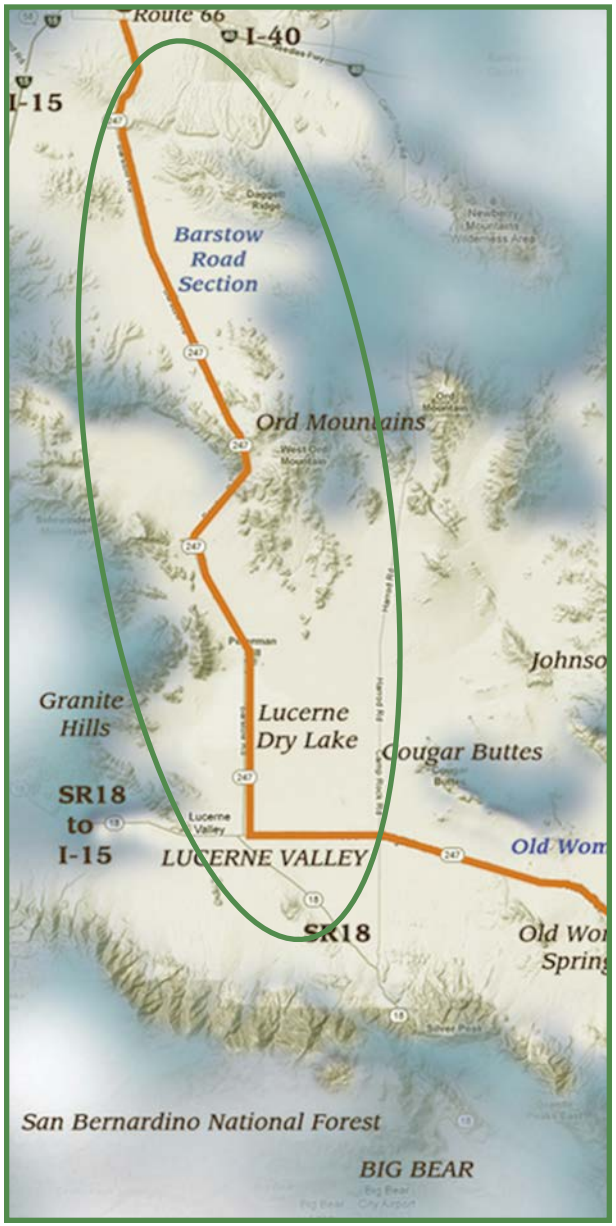
Pages 50-59 and 68
of the
Scenic 247 Visual Assessment

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

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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

Table of Contents

Figures

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

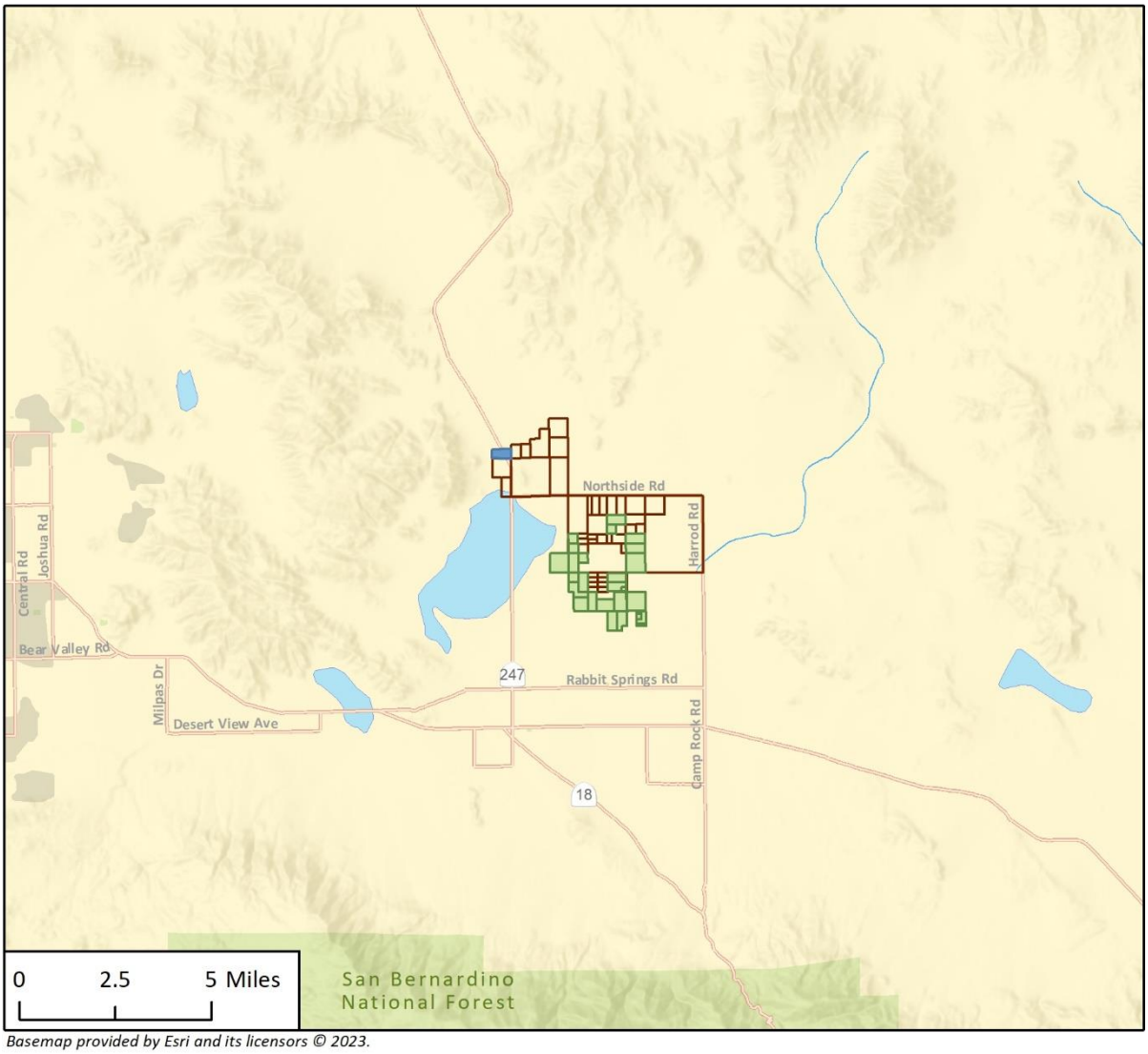
The approximately 1,854-acre Project area is located in the southwestern portion of Mojave Desert in and near Lucerne Dry Lake, in unincorporated San Bernardino County, California. The Project is predominately located east of State Route 247 (Barstow Road), north of the unincorporated community of Lucerne 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

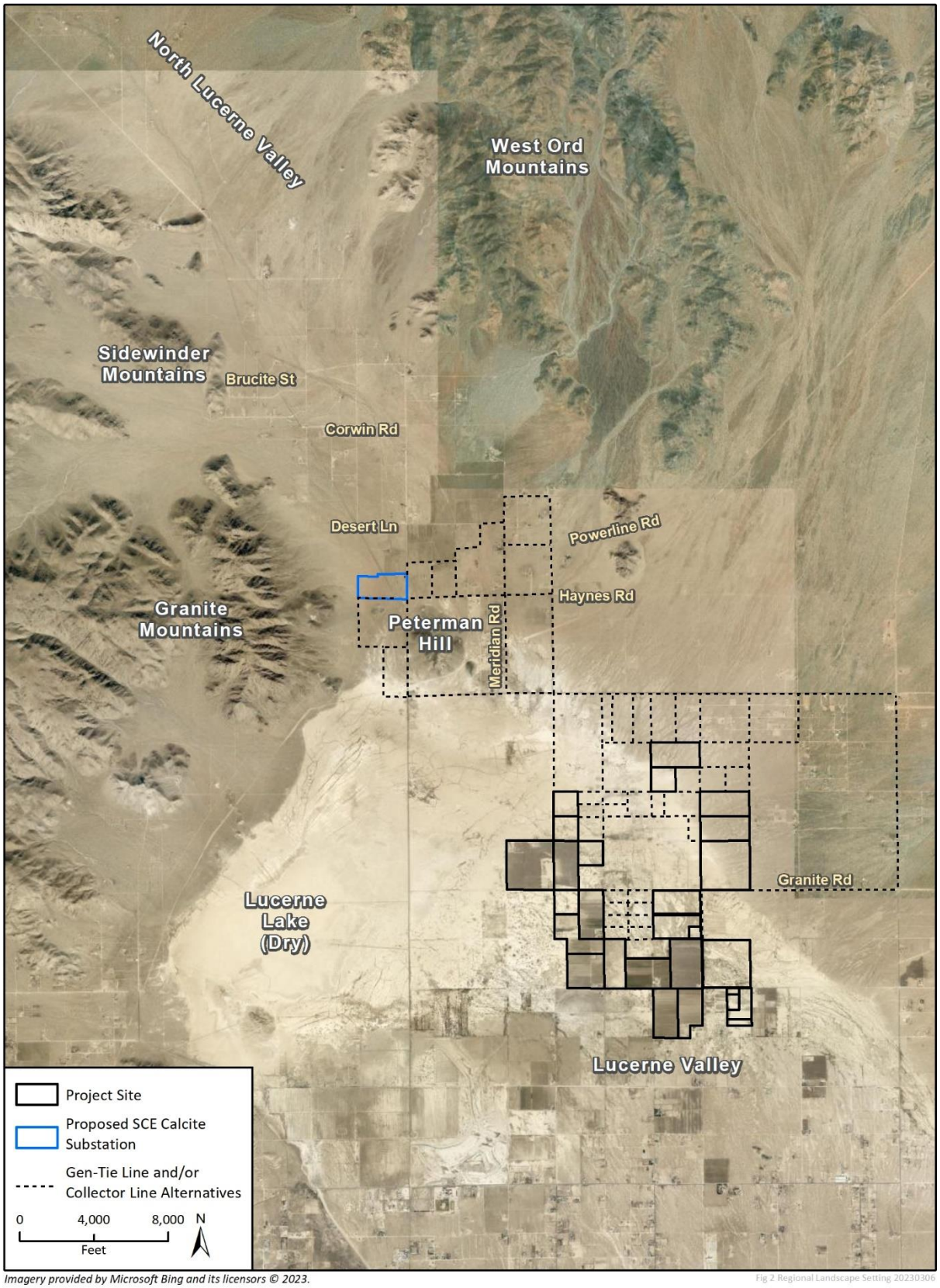


Basemap provided by Esri and its licensors © 2023.

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

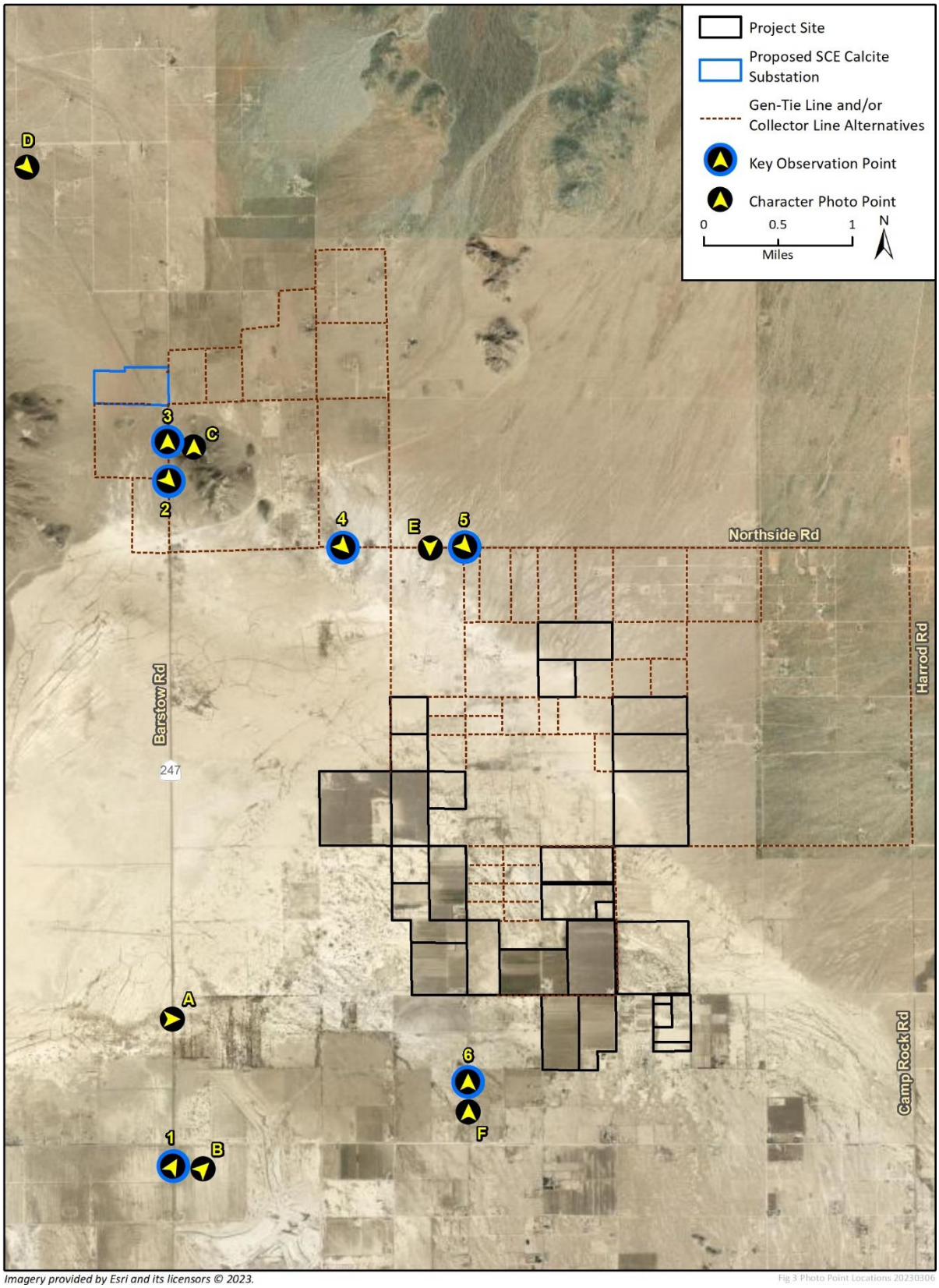


Figure 4 Project Area Character Photographs

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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Appendix C1. Air Quality and Greenhouse Gas Study

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Sienna Solar and Storage Project

Air Quality and Greenhouse Gas Study

prepared for

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July 2023

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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.

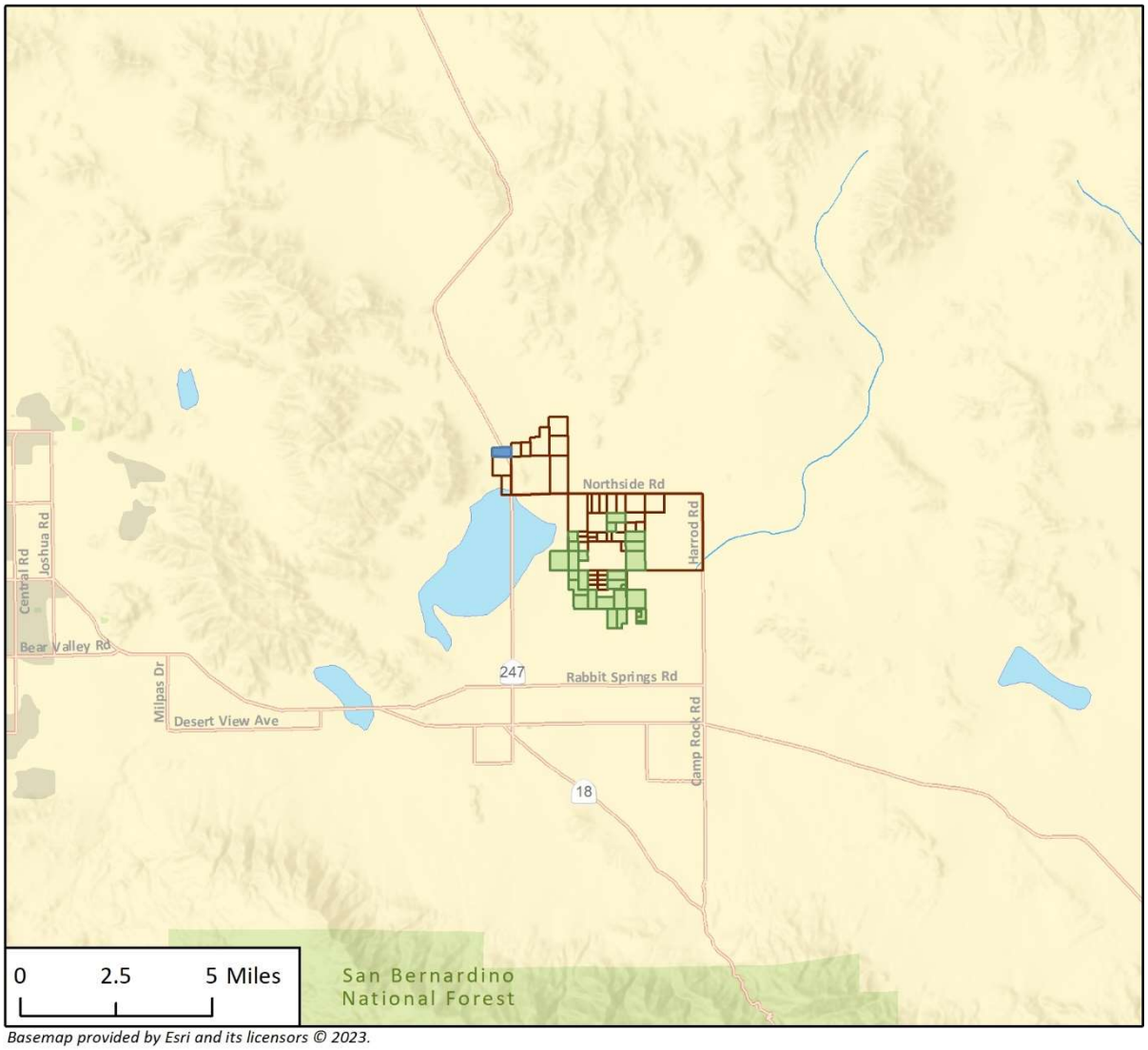
1.2 Project Area and Description

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

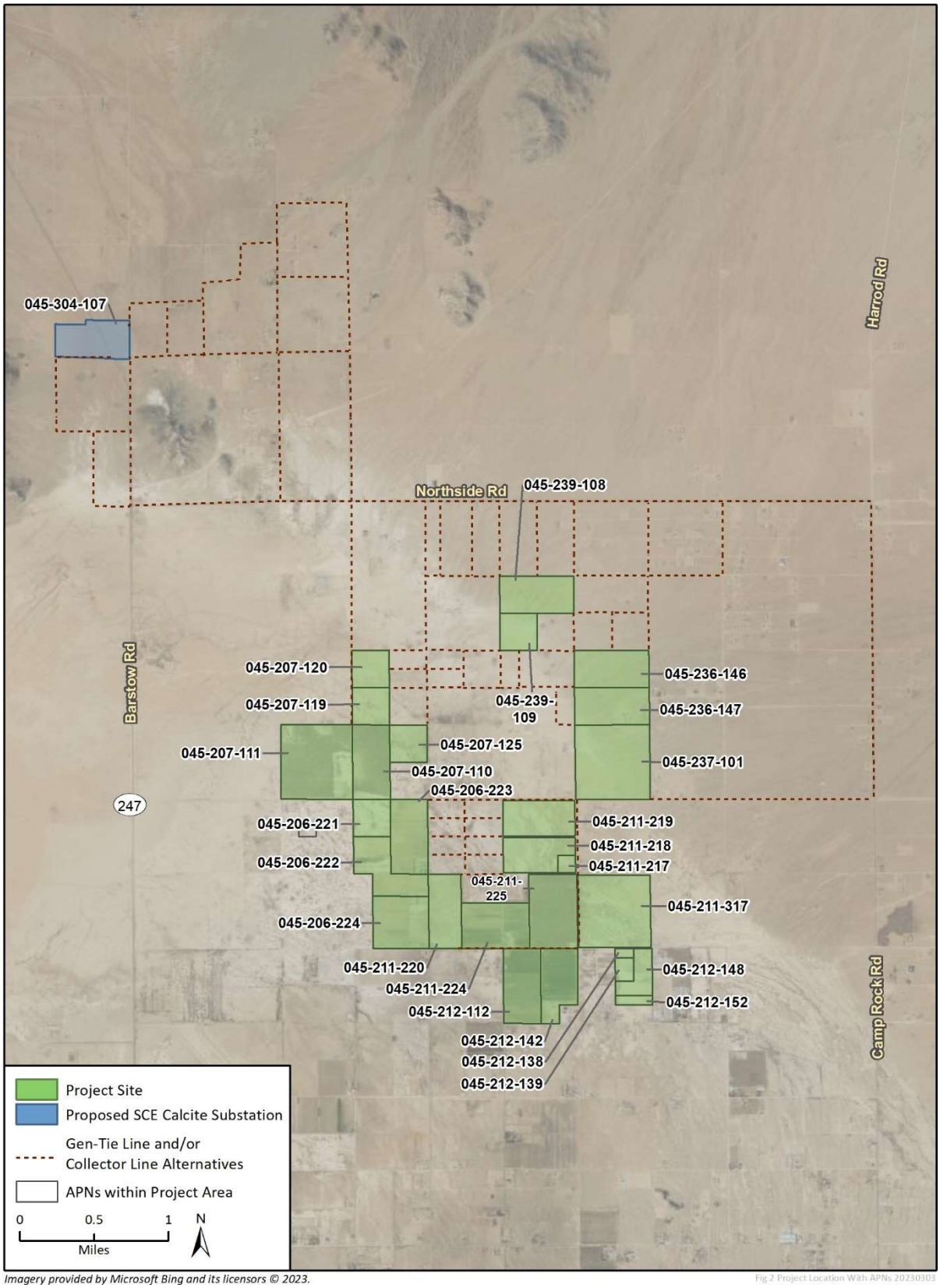


Basemap provided by Esri and its licensors © 2023.

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

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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

Table of Contents

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

Table of Contents

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

Table of Contents

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

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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
(323) 525-0900

Principal Investigator(s)

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Report Preparer(s) and Performers of Fieldwork

Fieldwork was completed under the direction of staff approved by the County of San Bernardino and all staff are listed below:

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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.

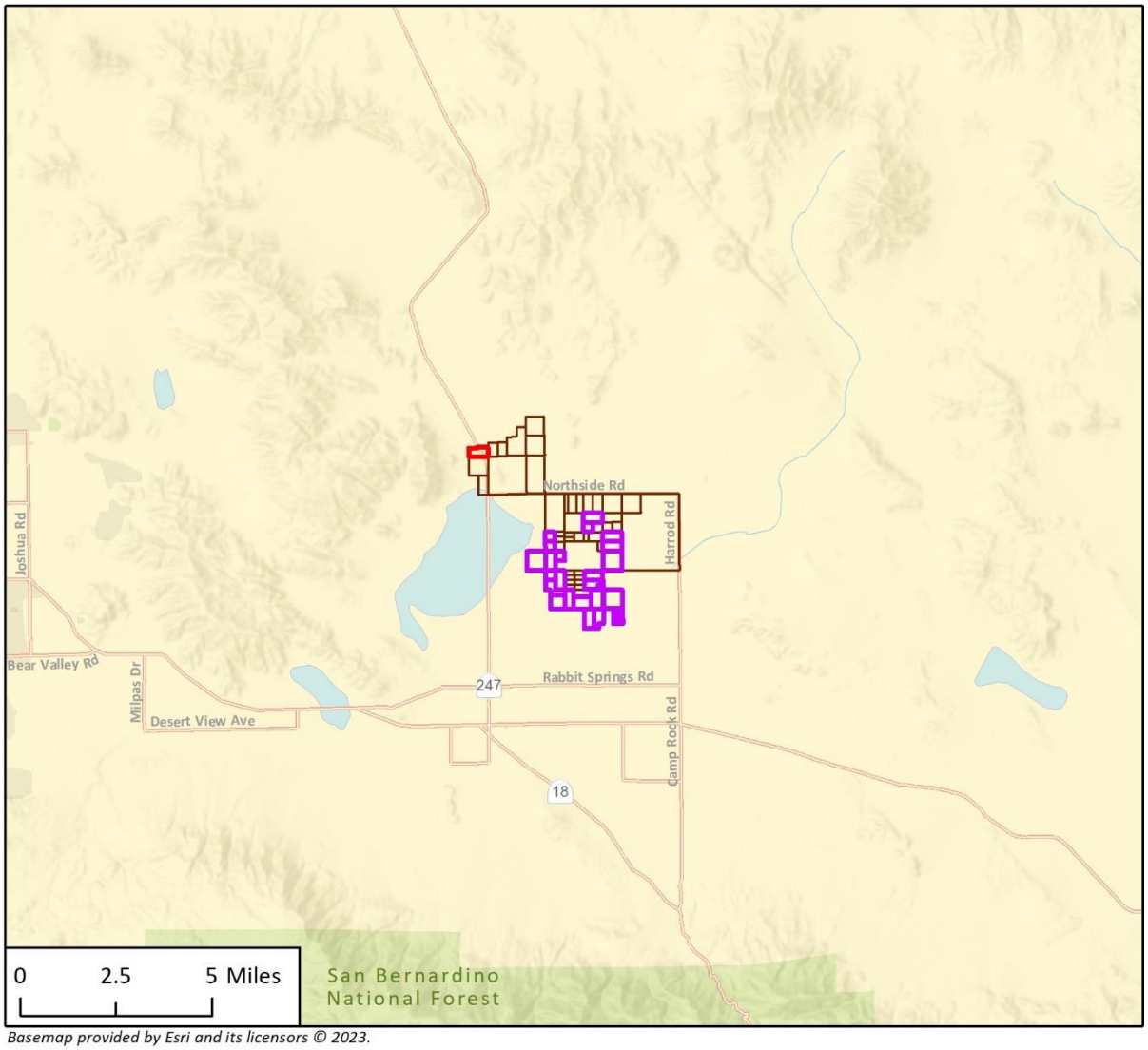
The proposed Project consists of the installation of a photovoltaic (PV) solar facility, Battery Energy Storage System (BESS), Project substation, Operations and Maintenance building(s), underground collection system, a 230 kV generation-interconnect (gen-tie) line, new Southern California Edison 230 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

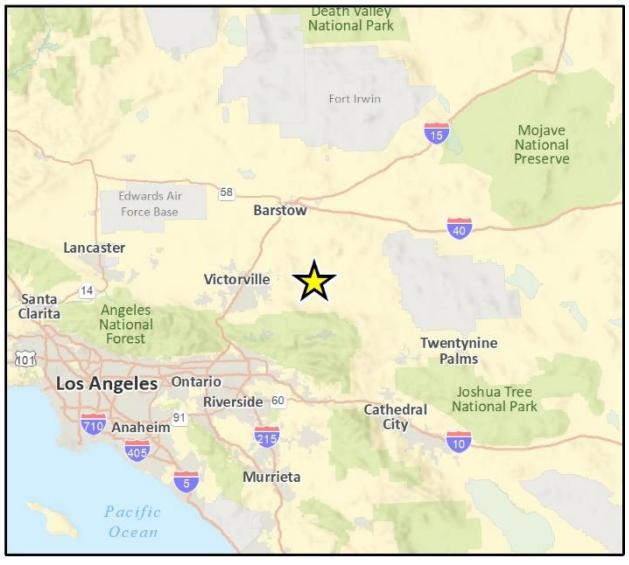


Fig 1 Regional Location Paleo

Figure 2 Project Location with APNs

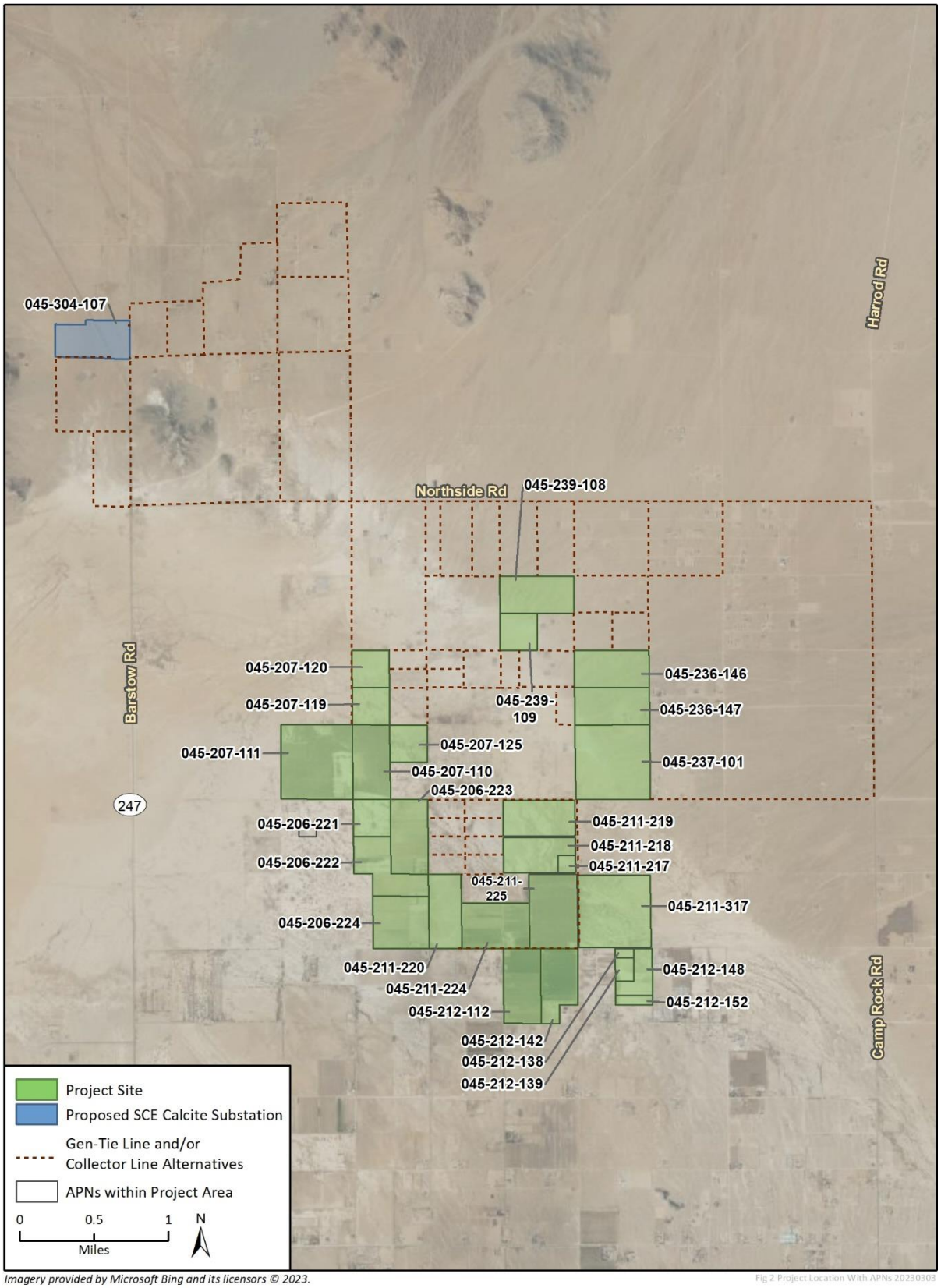
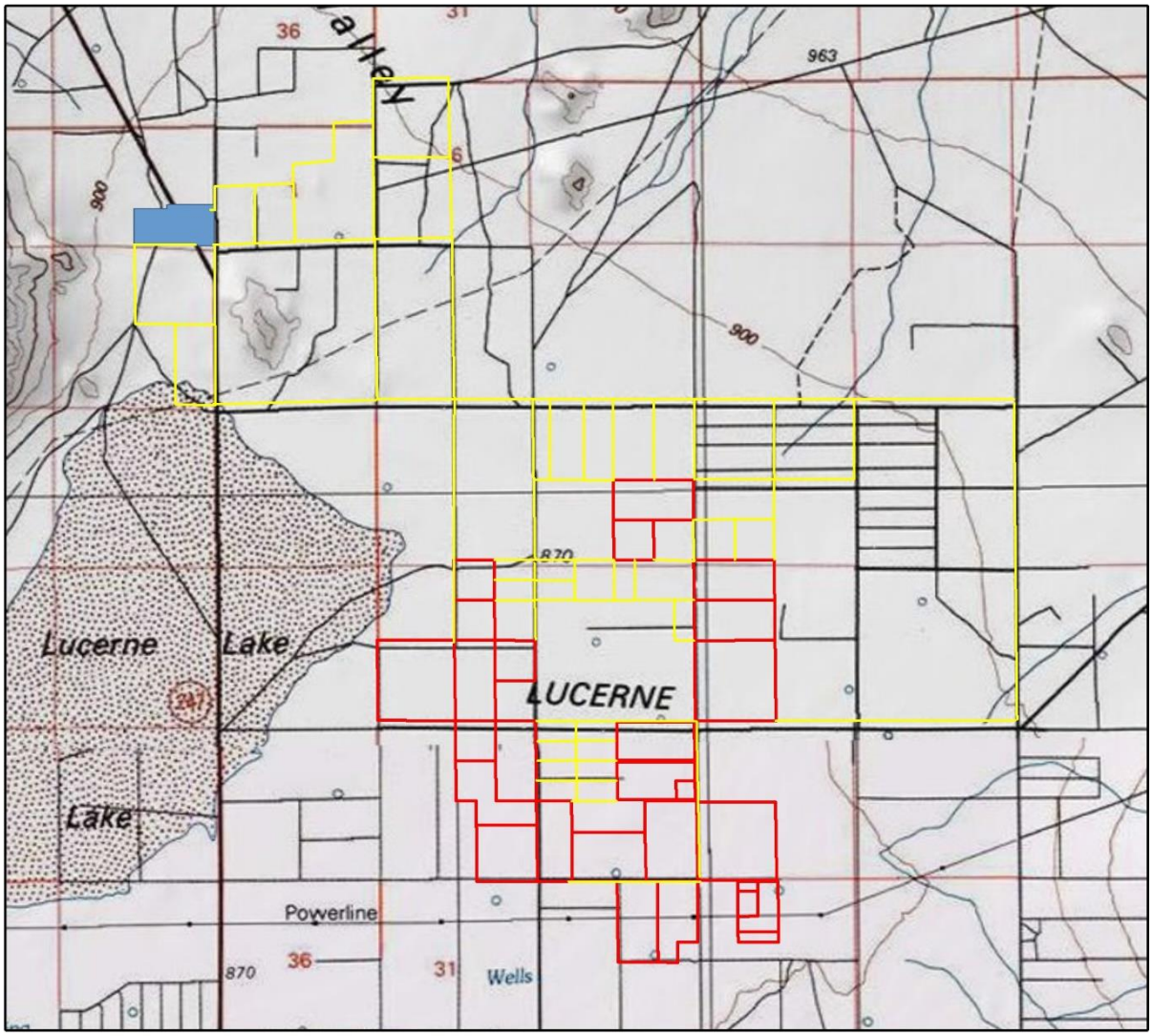
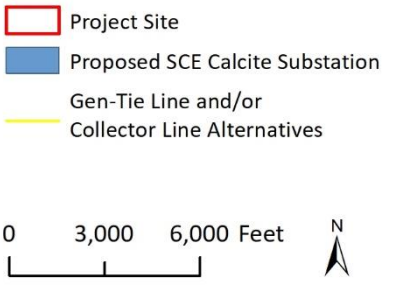


Figure 3 Project Location (Topographic Map)



Basemap provided by National Geographic Society, Esri, and their licensors © 2023.



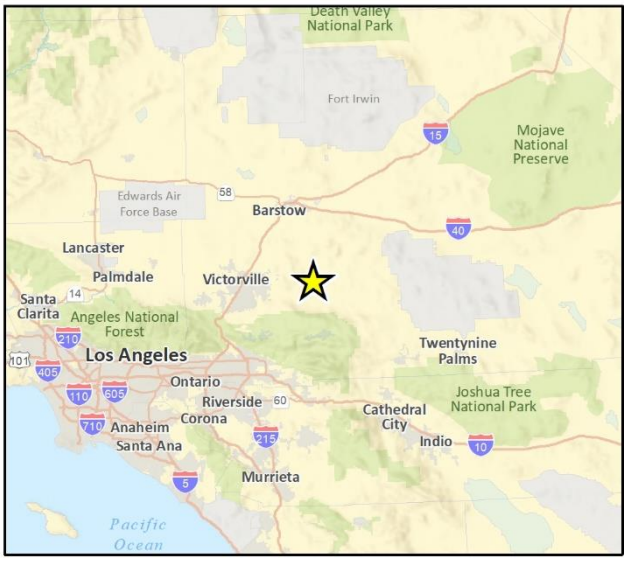


Fig 3 Regional Location Topo

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.

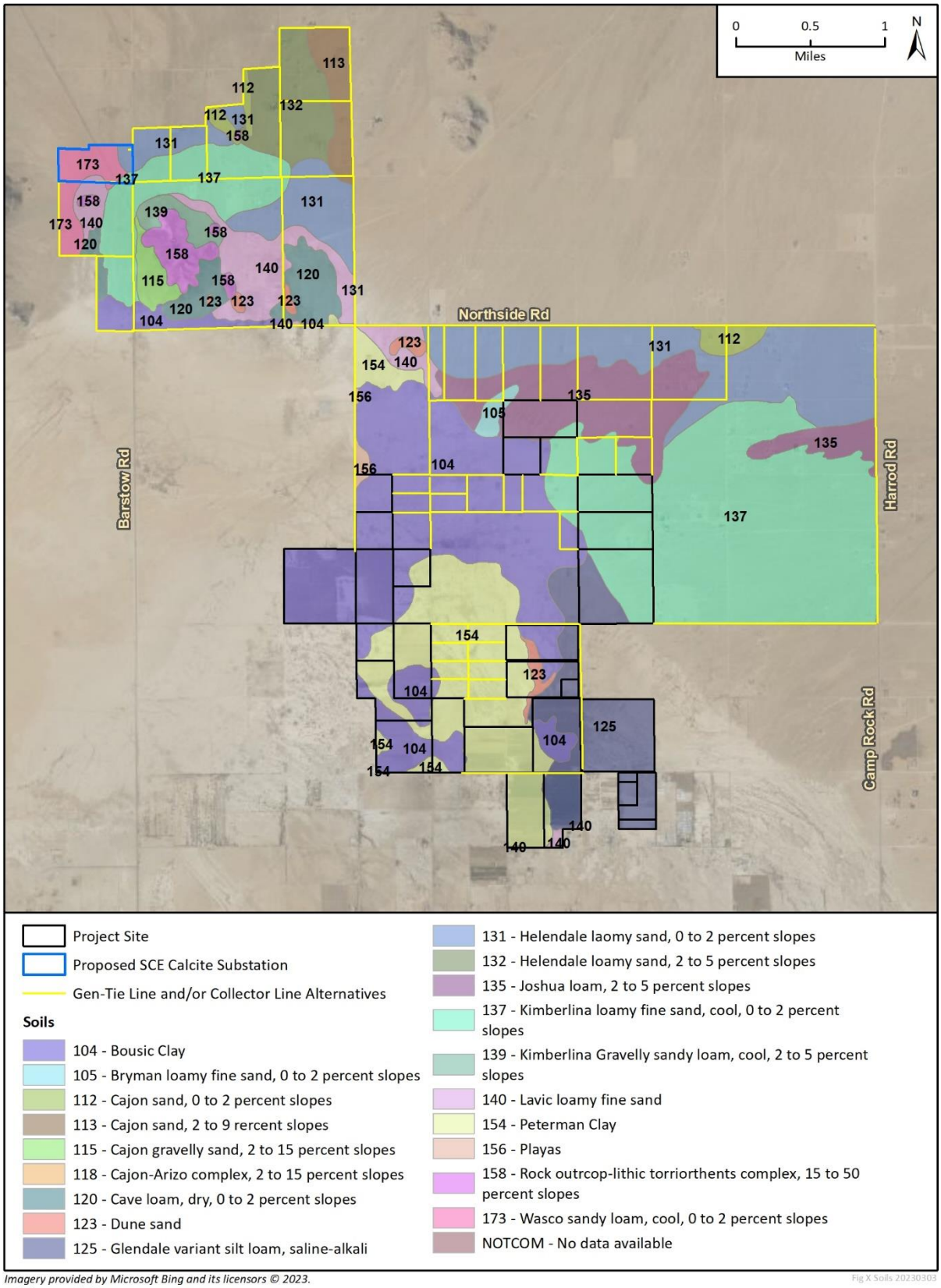
1.2.3 Soils

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

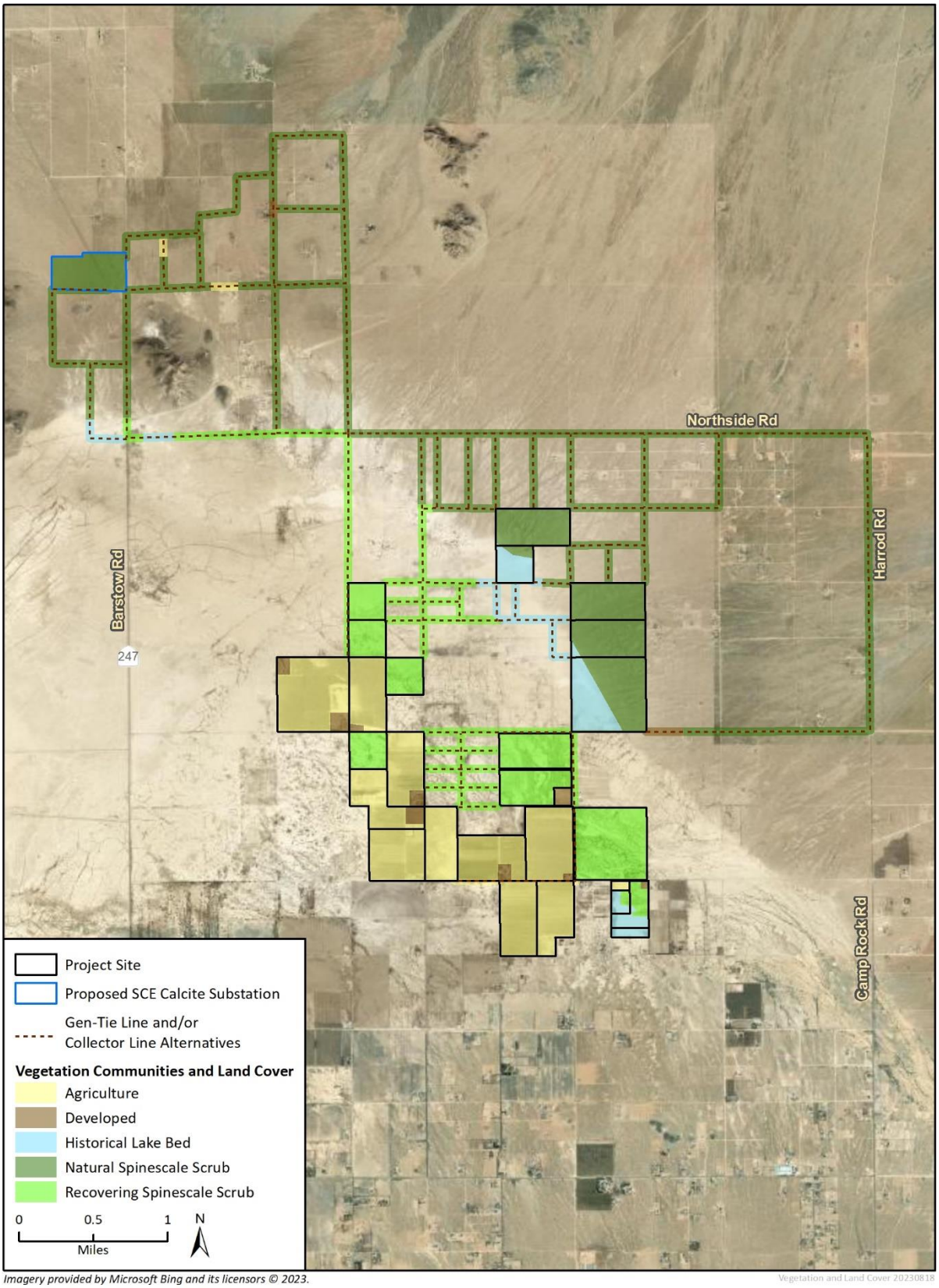
Vegetation types in the Mojave Desert are strongly influenced by arid climatic conditions and desert soils. Vegetation in the region includes a predominance of plant morphological adaptations to extreme aridity (e.g., waxy or resinous leaf cuticles, drought deciduous or succulent plants, woolly leaf 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

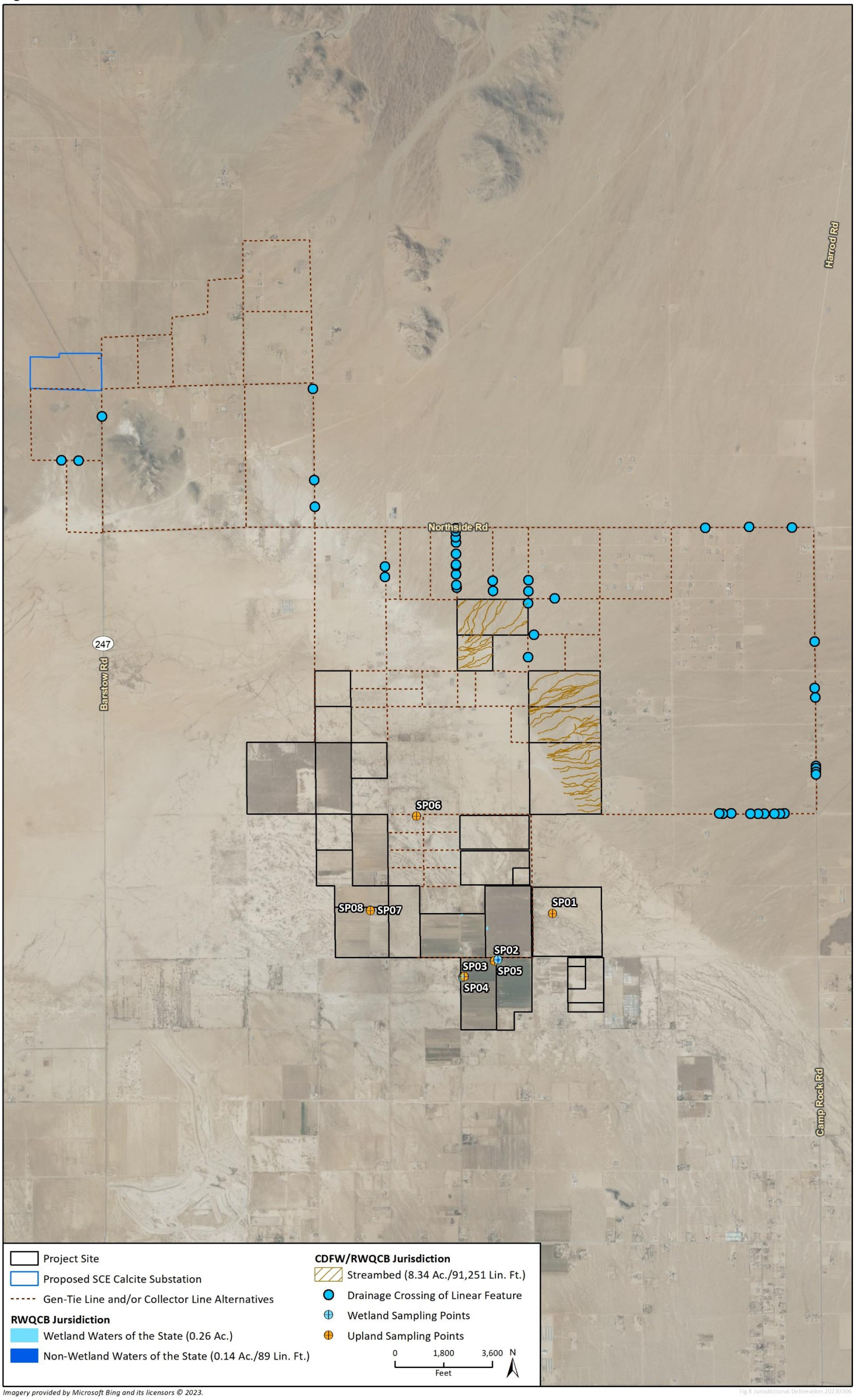


Figure 7 Jurisdictional Delineation Results- Page 1

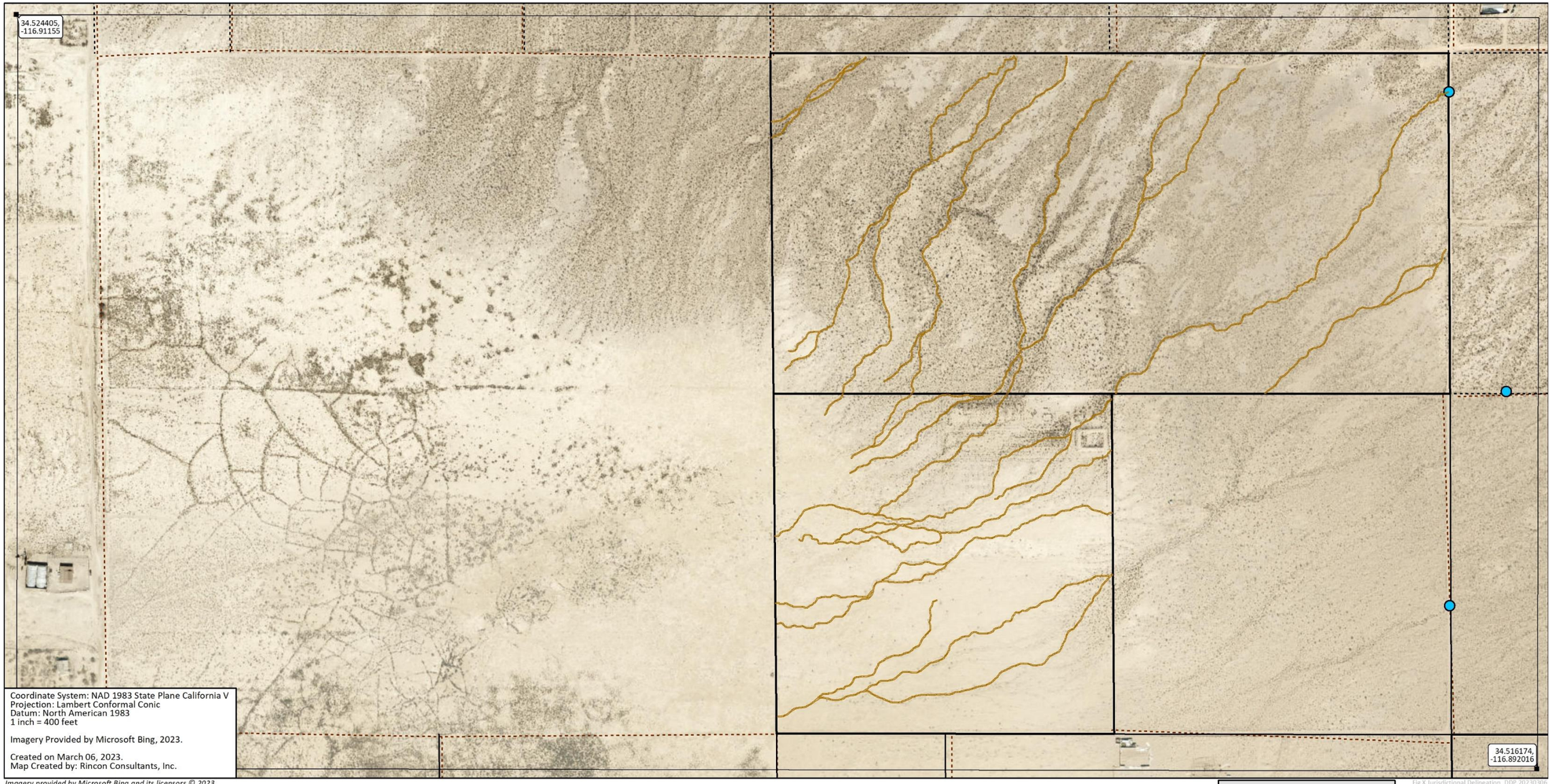


Figure 8 Jurisdictional Delineation Results – Page 2

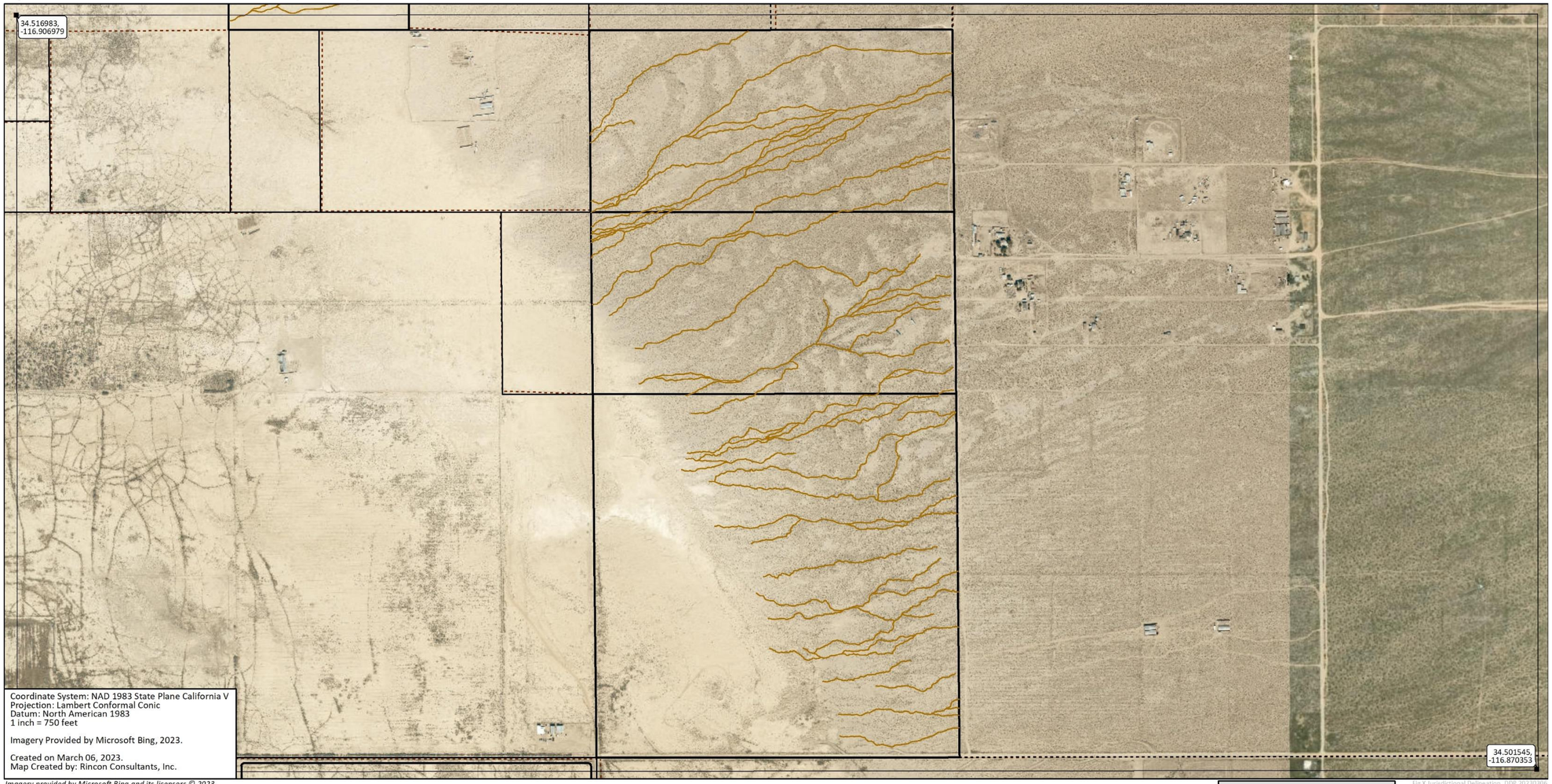


Figure 9 Jurisdictional Delineation Results- Page 3

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

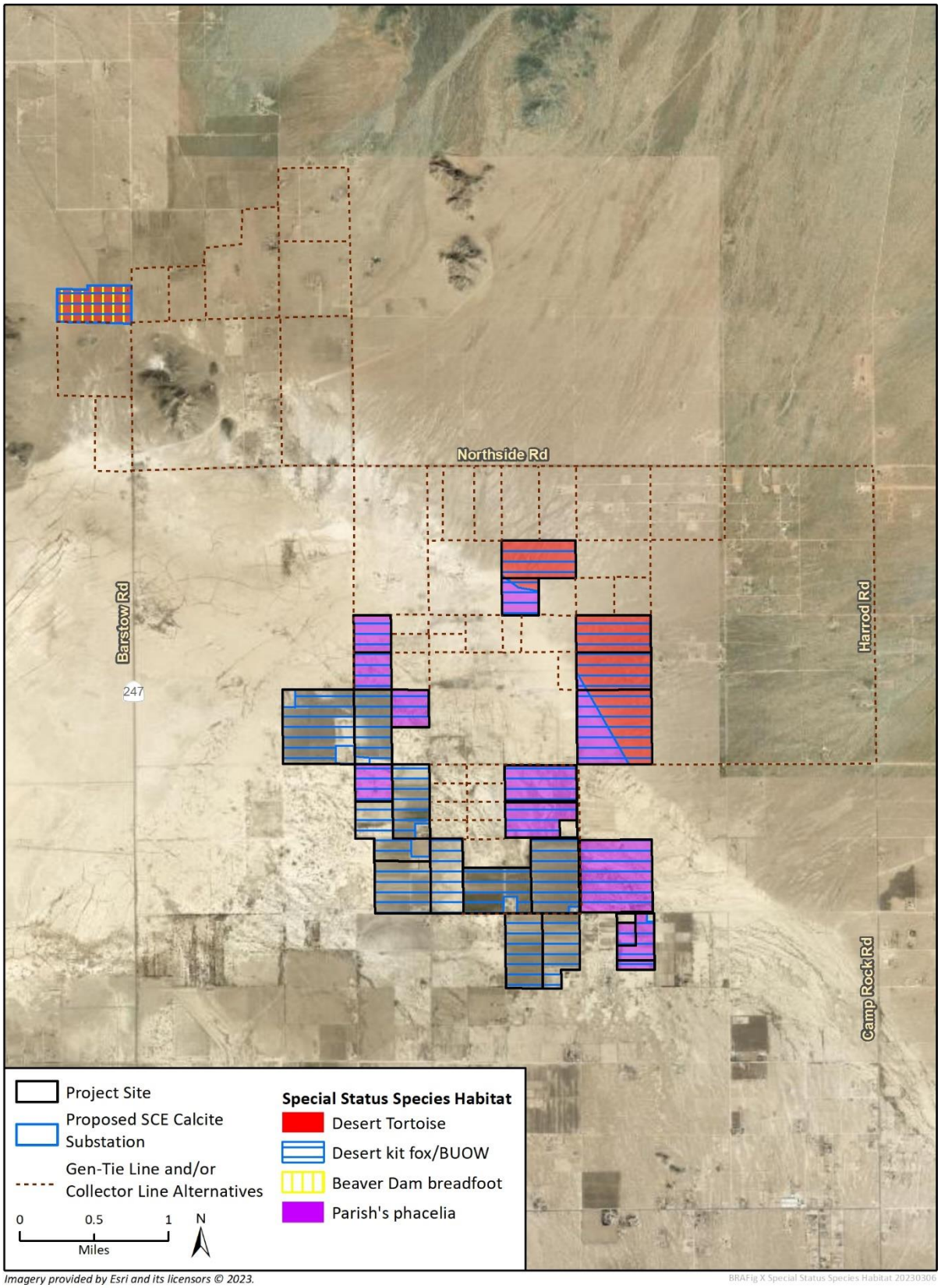
Overall, the Project area contains marginal habitat for most of the special-status plants with potential to occur on-site. The determination of marginality is based on prior use, existing disturbances, limited suitable habitat characteristics (e.g., preferred soils), and prevalence of nonnative species.

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

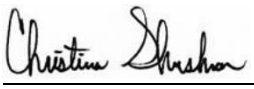
Sarah Toback, Associate Biologist

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.

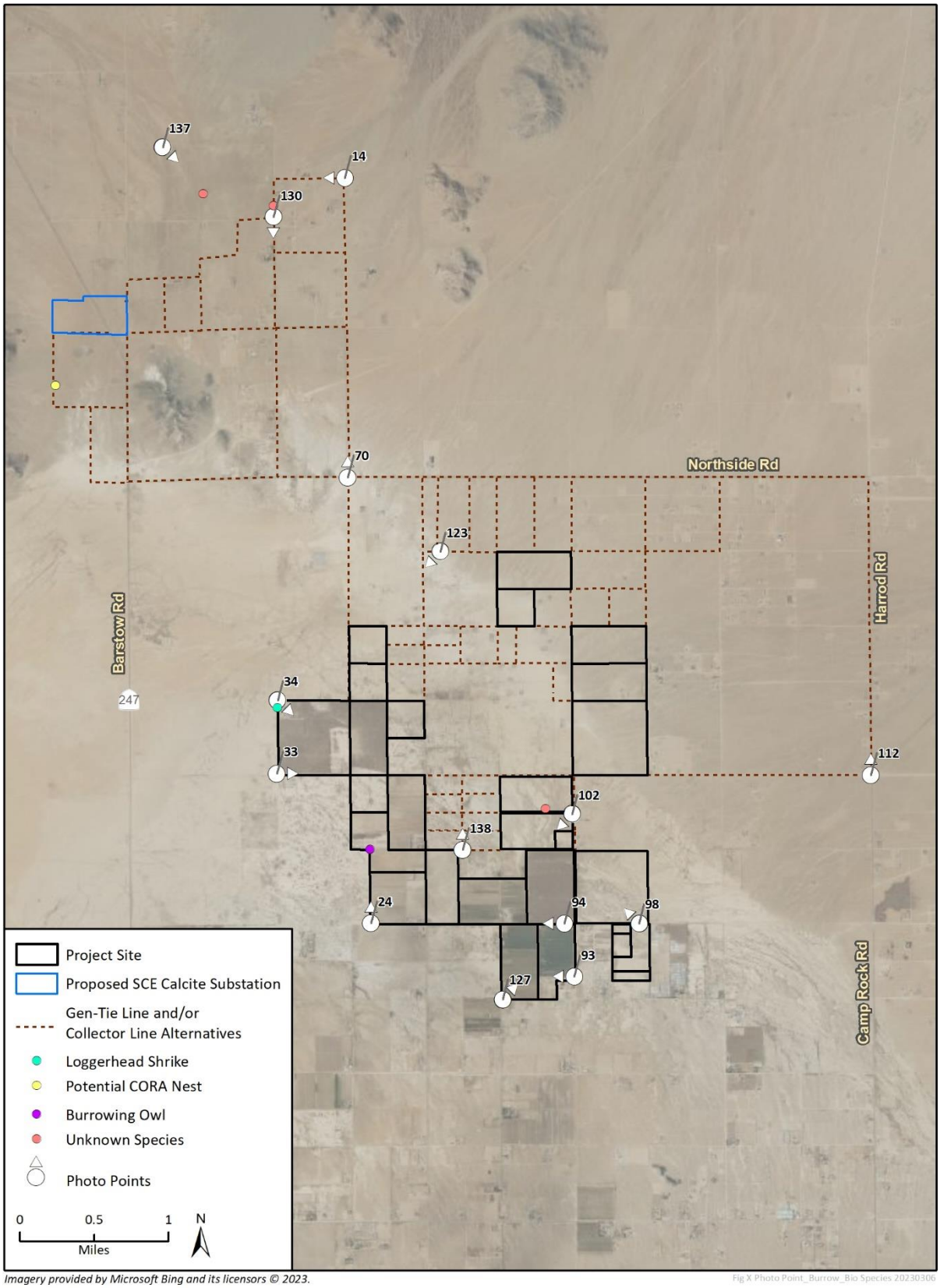
- **Policy 4.8:** Encourage mitigation for RE generation facility projects to locate habitat conservation offsets on public lands where suitable habitat is available.
  - **4.8.1:** Collaborate with appropriate state and Federal agencies to facilitate mitigation/habitat conservation activities on public 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

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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.