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Soda Mountain Solar Project
Visual Resources Technical Report
San Bernardino County, California

JULY 2024

PREPARED FOR

Soda Mountain Solar, LLC

PREPARED BY

SWCA Environmental Consultants

SODA MOUNTAIN SOLAR PROJECT
VISUAL RESOURCES TECHNICAL REPORT

Prepared for

Soda Mountain Solar, LLC
604 Sutter Street, Suite 250
Folsom, California 95630

Prepared by

SWCA Environmental Consultants
320 North Halstead Street, Suite 120
Pasadena, California 91107
(626) 240-0587

www.swca.com

SWCA Project No. 68347

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1 INTRODUCTION

SWCA Environmental Consultants (SWCA) has been contracted by Soda Mountain Solar, LLC (applicant), to evaluate the existing conditions of the landscape within and surrounding the proposed Soda Mountain Solar Project (project) and the potential visual impacts from the project.

This project is subject to compliance with the California Environmental Quality Act (CEQA). In order to provide a systematic basis for evaluating impacts to visual resources resulting from the construction and operation of the proposed project, the assessment was based in part on the Bureau of Land Management's (BLM's) Visual Resource Management (VRM) system. BLM Form 8400-4 (BLM 2018) was adapted for project purposes and used to document the potential visual contrast of the proposed project components to the surrounding landscape (Appendix C). The BLM's process is an industry standard and is often applied to non-BLM visual assessments to provide project proponents and authorizing agencies with a consistent and translatable methodology for understanding visual impacts from proposed projects.

This technical report details results of the visual resource analysis and accompanying studies relating to the potential for impacts associated with the construction, operation, maintenance, and decommissioning of the proposed project. The project is proposed on land managed by BLM. This land is additionally managed by the California Desert Conservation Area Plan to manage land use and development. Visual resources on BLM-administered land are managed in accordance with the VRM system (BLM 1986a). This analysis refers to the BLM VRM system as part of the assessment regarding potential impacts to visual resources and sensitive viewers, and addresses questions established by CEQA and San Bernardino County for compliance with aesthetic requirements (Section 7).

2 PROJECT LOCATION AND DESCRIPTION

2.1 Project Location

The project is located entirely on federally owned land managed by the BLM. The 2,670-acre project site is located approximately 7 miles southwest of the community of Baker in unincorporated San Bernardino County, California (Figure 1), approximately 50 miles northeast of Barstow. The project site is located in portions of Sections 1 and 11–14, Township 12 North, Range 7 East; Sections 25 and 36, Township 13 North, Range 7 East; Sections 6, 7, 8, and 18, Township 13 North, Range 8 East, San Bernardino Meridian, California.

2.1.1 Visual Setting

The project would occupy the alluvial valley dividing the northern and southern portions of the Soda Mountains in the Mojave Desert. The project site is composed of rural desert land and is almost entirely undeveloped.

The project is bounded directly to the east by the Mojave National Preserve (administered by the National Park Service) and BLM-managed land, including the Rasor Off-Highway Vehicle (OHV) recreation area at the southeast corner. Rasor Road, an unimproved BLM public access road, runs from the southwest corner of the site and splits into two forks. I-15, the former Arrowhead Trail Highway, runs along the western boundary of the project site, with Rasor Road Services Shell Oil gas station located off I-15 southwest of the project site, along the access road to the project site.

The project is not situated close to any non-residential sensitive receptors, such as schools, hospitals, daycare centers, or long-term care establishments. The nearest schools, Baker Elementary, Middle, and High Schools, are over 6.5 miles away, situated in the northeastern part of Baker. The closest residences to the project location can be found next to the Rasor Road service station, roughly 260 feet southwest of the proposed boundary. This area encompasses a stand-alone house and accommodation for four workers.

2.2 Project Description

The project would construct, operate, maintain, and decommission a proposed 300-megawatt (MW) photovoltaic (PV) solar facility located on approximately 2,670 acres administered by BLM in unincorporated San Bernardino County, approximately 6 miles southwest of the town of Baker, California, along Interstate 15 (I-15), as shown in Figure 1. As shown in Figure 2, the project components are as follows:

1. The solar plant site (i.e., all facilities that create a footprint in and around the field of solar panels, including the solar field consisting of solar power arrays identified as the East Array and South Arrays 1, 2, and 3), operation and maintenance (O&M) buildings and structures, stormwater infrastructure, and related infrastructure and improvements.
2. A substation and switchyard for interconnection to the existing transmission system.
3. Approximately 300 MW of battery energy storage system (BESS) across 18 acres.
4. Underground collection lines.

The project would generate and deliver solar-generated power to the regional electrical grid through an interconnection with the existing Mead-Adelanto 500-kV transmission line operated by the Los Angeles Department of Water & Power (LADWP).

2.2.1 Photovoltaic Panels/Solar Modules

The project would employ flat-plate crystalline silicon solar panels, also called photovoltaic (PV) panels, to generate power for delivery to the high-voltage transmission grid. The panels would be dark blue or black in color and include an anti-reflective coating. Overall maximum height of the PV panels would be 12 feet. The solar panel arrays would be organized into Area 1, Area 2, Area 3, and Area 4 on the southeast side of I-15.

2.2.2 Support and Mounting Structures

Individual PV panels would be mounted onto bare aluminum frames and attached to linear tracker structures oriented in a north-south direction. The panels would rotate throughout the day to increase total solar exposure. Each solar tracker would be approximately 400 feet long and would be used to mount 45 to 120 solar panels. The trackers would be mounted on support posts spaced 13 feet apart along the length of the tracker. The trackers would be approximately 8 to 12 feet tall, depending on site conditions.

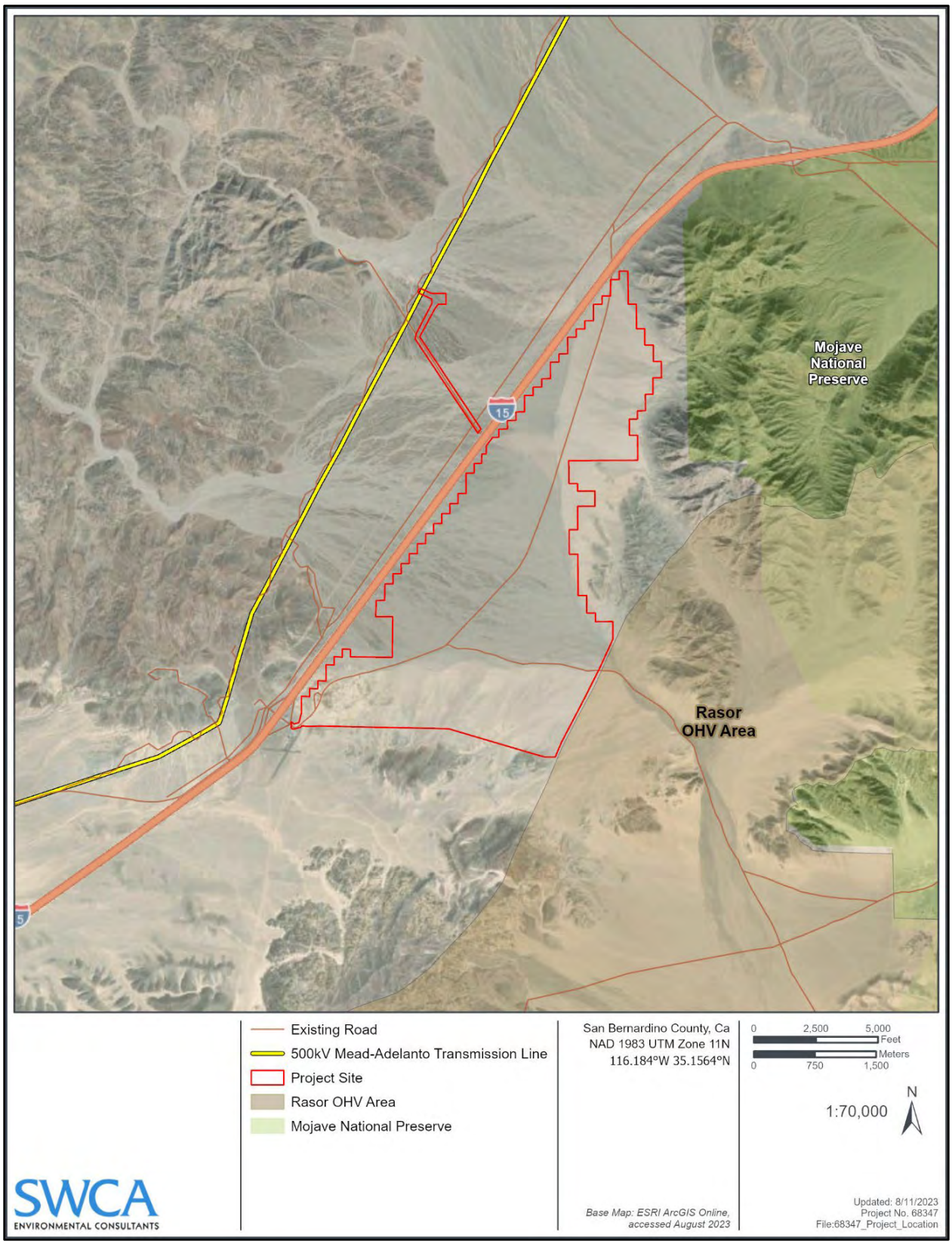

Figure 1. Project site location.

2.2.3 Interconnection Components (Substation and Switchyard)

A substation and switchyard grounding grid occupying approximately 15 acres would be permanently installed. Multiple cement pads and cement piers would be constructed as foundations for substation equipment, and the remaining area would be graveled. Concrete piers and footings would be installed to support the two turning structures that connect to the existing transmission towers, switchyard, and substation bus work. Electrical transformers, switchgear, and related substation facilities would be designed and constructed to transform the 34.5- to 60-kV power on the collection lines to the 500-kV transmission line voltage. A permanently gated, 7-foot-high chain-link fence with three-strand barbed wire meeting National Electric Safety Code requirements would be constructed around the substation and switchyard.

2.2.4 Battery Energy Storage System

The BESS would be located adjacent to the substation. Up to 18 acres may be utilized for the BESS throughout the project site at full buildout.

2.2.5 Access Roads

Primary operational access to the project site would be provided via a gated entrance off Rasor Road, accessed approximately 250 feet south from the I-15 northbound off-ramp. The project would maintain and improve the existing Rasor Road that runs from I-15 eastward to the Rasor OHV recreation area. The primary access road within the site would be 20 feet wide and run north-south, providing access from the site entrance to the substation. An access road would also be constructed from the LADWP transmission line access road to the switchyard. Access within the solar array fields would be provided using unpaved, unimproved internal corridors and would be designed for use by O&M vehicles. These roads would be compacted native material and graded as necessary. Larger boulders that could affect vehicle access would be removed. Internal access roads between the arrays would be 16 feet wide.

2.2.6 Perimeter Fencing

All project components would be surrounded by perimeter security fencing and desert tortoise exclusionary fencing. Combined security and desert tortoise fencing would be installed surrounding each individual array field and extend to include the substation and BESS area. The security fencing would be an 8-foot-high chain-link fence with an additional 1 foot of barbed wire.

2.2.7 Lighting

Lighting would be provided at the Rasor Road site entrance, operation and maintenance building, substation, and switchyard. Exterior security lighting would be installed to provide safe access to project facilities as well as visual surveillance. Some portable lighting also could be required for essential nighttime maintenance activities. All lighting would be kept to the minimum required for safety and security; sensors, motion detectors, and switches would be used to keep lighting turned off when not required. All lights would be downward, shielded, and directed so as to minimize light exposure.

The Soda Mountain Solar Project Outdoor Lighting Impact Assessment Report (Appendix A) concludes the following:

- Light Trespass is not applicable to this project as no permanent outdoor lighting will be installed close to any of the property line demarcations.

- Glare will be significantly reduced by employing mitigation measures such as fully shielded luminaries and applicable BUG ratings to be dark-sky compliant.

- Skyglow will be mostly eliminated because almost all permanent outdoor lighting will normally be automatically turned off during non-personnel hours during nighttime. Select luminaires may be left ON 24/7 for security purposes but they will not produce light spill as they will also auto-dim to 50% on vacancy.

2.2.8 Operations and Maintenance Facilities

The O&M building (approximate dimensions: 5,000 square feet, 30 feet high), O&M facility (approximate dimensions: 2,400 square feet, 35 feet high), and warehouse facility (approximate dimensions: 6,000 square feet, 35 feet high) would all be located at the southwest corner of the site. Parking areas would be located adjacent to the buildings. The parking areas are not expected to exceed approximately 0.33 acre, or 13,200 square feet.

O&M activities would include washing solar modules; maintenance of transformers, inverters, or other electrical equipment; road and fence repairs; vegetation/pest management; and site security. Solar modules would be washed as needed to maintain optimal electricity production (up to four times each year) using light utility vehicles with tow-behind water trailers.

2.2.9 Landscaping

Screen planting is proposed along the western perimeter of the project (Appendix B). The Preliminary Landscape Concept Plan shows a variety of trees and shrubs in an approximately 251,00 SF landscaped area.

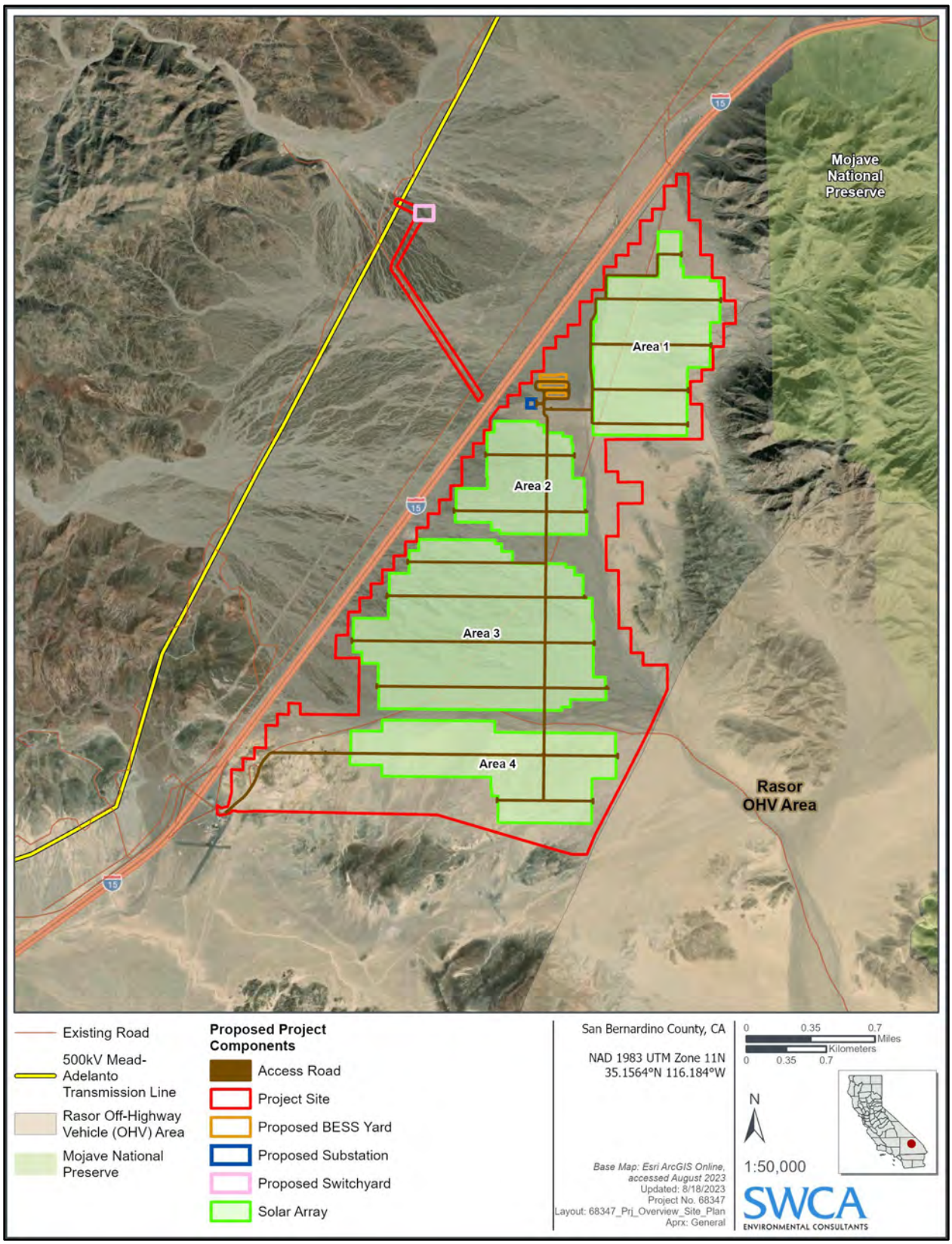

Figure 2. Proposed project components.

2.3 Construction

Project construction is expected to occur over an approximately 18-month period and consist of overlapping construction stages. Of the entire 2,670-acre project site, approximately 2,081 acres of temporary and permanent disturbance would result from construction of project components, which include a 300-MW PV solar facility, a substation and switchyard for interconnection to the existing transmission system, and approximately 300 MW of BESS across up to18 acres. Additionally, several permanent buildings would be constructed at the O&M facilities. Construction will include a 0.33-acre parking area in the southwest corner of the site, adjacent to the buildings.

The total number of acres of temporary and permanent disturbance for the project would be approximately 2,081 acres. Temporarily disturbed areas would be restored to pre-project conditions following construction. The estimate for permanent disturbance includes the construction of the solar arrays, substation, switchyard, interconnection, access roads, berms, collector routes, laydown areas, and fencing.

Two temporary access roads would be constructed between each of the South sub-array fields and between the South 1 and East Arrays. Only one permanent access road between each sub-array would be used during operation. Each array would also include an access road around the perimeter, outside the security fencing. The remaining temporary access road would be reclaimed following the completion of construction. Combined security and desert tortoise fencing is proposed to be constructed surrounding each individual sub-array. Tortoise guards would be at each permanent access road entrance/exit from the solar array field. Tortoise security fencing would be lower than perimeter fencing and solar arrays; therefore, they are not analyzed further or included in the visual simulations.

The project would use restricted nighttime task lighting during construction. Lighting would include only that needed to provide a safe workplace, and lights would be focused downward, shielded, and directed toward the interior of the site to minimize light exposure outside the construction area.

2.4 Decommissioning and Reclamation

The project has an anticipated operational life of up to 30 years and would be subject to renewal after that time. When the project reaches the end of its useful life, structures and equipment would be removed and the land surface would be reclaimed. A draft Decommissioning and Site Reclamation Plan has been prepared for the project. Because site conditions are likely to change over the life of the project, and to ensure that the Decommissioning and Site Reclamation Plan addresses all necessary conditions, the draft will be finalized and approved by BLM and/or California Department of Fish and Wildlife (CDFW) before decommissioning and reclamation activities begin.

Upon decommissioning, aboveground structures would be dismantled and removed from the site. Where required by BLM and/or CDFW, concrete pads or foundations would be demolished, and rubble would be removed to an off-site disposal facility authorized to accept the waste. Belowground facilities may be disconnected at the surface and left in place in conformance with guidance and approval from BLM. New project access roads and corridors would be closed, with the exception of Rasor Road, which would remain accessible.

Decommissioning of the substation and switchyard would involve deconstruction of structures. Salvaged materials would be recycled to the extent possible. Material that cannot be recycled would be transported for disposal in authorized landfills. Underground cabling and conduit may be left in place. The substation and office/storage areas would be graded to approximate the natural contour.

The applicant would prepare and implement a Final Closure and Reclamation Plan addressing removal of structures and site restoration in conformance with the CEQA lead agency and/or BLM requirements at the time of decommissioning. Construction hours and site cleanliness practices would be approximately the same during decommissioning as during construction.

3 REGULATORY SETTING

3.1 Federal Regulations

3.1.1 National Environmental Policy Act (42 USC 4371)

There are several applicable regulations, policies, and procedures that pertain to visual resources. The Council on Environmental Quality (CEQ) regulations for implementing the National Environmental Policy Act (NEPA) identify aesthetic effects as a type of impact to be addressed in NEPA reviews, which should include discussion of the design of the built environment (40 Code of Federal Regulations [CFR] 1502.16, 1508.8). The regulations also require discussion of possible conflicts of a proposed action with the objectives of Federal, regional, State, local, and tribal land use plans and policies; Federal land use plans, in particular, typically include guidance for management of visual resources. The CEQ regulations do not include more specific direction about aesthetic impact issues to be considered or provide a means for evaluating aesthetic impacts.

3.1.2 Federal Land Policy and Management Act

Federal regulations for right-of-way grants under the Federal Land Policy and Management Act of 1976 (U.S. DOI 2016) (43 CFR 2800) focus on administrative and procedural aspects of the grants. The BLM requires compliance with the terms and conditions of the grant to control or prevent damage to "(i) Scenic, aesthetic . . . values . . ." in accordance with 43 CFR section 28 2805.12(i)(3)(i). BLM consideration of visual resource issues associated with right-of-way grants is generally based on the visual resource provisions of standard BLM policies and procedures for land use planning and NEPA compliance.

3.1.3 Bureau of Land Management

The BLM has developed a formal VRM system to guide inventory, classification, and management of visual resources on the lands under its jurisdiction. The system includes an inventory of scenic values (BLM Manual 8410-1 – Visual Resource Inventory [BLM 1986a]) based on the following factors: 1) diversity of landscape features that define and characterize landscapes in a given planning area (scenic quality), 2) public concern for the landscapes that make up a planning area (sensitivity levels), and 3) landscape visibility from public viewing locations (distance zones). These factors are collectively described as the visual resource inventory and the Visual Resource Inventory (VRI) for BLM-administered land. Combined, the three VRI factors determine VRI Classes on land managed by the BLM. VRI Classes indicate the overall existing scenic values of BLM-administered land. The VRI Classes and individual factors provide baseline visual resources data that are then used, in combination with other resource needs, to determine VRM Classes.

VRM Classes are established to provide management objectives in terms of allowable levels of disturbance and noticeability (i.e., visual contrast), and are established through the BLM's land-use planning process, as described in BLM Manual 8410-1 (BLM 1986a). The objectives associated with

each VRM Class are defined in Table 2.1. The Project is proposed on lands managed under the Desert Renewable Energy Conservation Plan.

Table 2.1. VRM Class Descriptions

VRM Class	Description
I	The objective of this class is to preserve the existing character of the landscape. This class provides for natural ecological changes; however, it does not preclude very limited management activity. The level of change to the characteristic landscape should be very low and should not attract attention.
II	The objective of this class is to retain the existing character of the landscape. The level of change to the characteristic landscape should be low. Management activities may be seen but should not attract the attention of the casual observer. Any changes must repeat the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape.
III	The objective of this class is to partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate. Management activities may attract attention but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape.
IV	The objective of this class is to provide for management activities that require major modification of the existing character of the landscape. The level of change to the characteristic landscape can be high. These management activities may dominate the view and be the major focus of viewer attention. However, every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance, and repeating the basic elements of the landscape.

3.1.4 Desert Renewable Energy Conservation Plan

The Desert Renewable Energy Conservation Plan (DRECP) is an interagency plan developed by BLM, U.S. Fish and Wildlife Service, California Energy Commission, and CDFW (BLM 2016). This plan was developed to address the need for a landscape approach to renewable energy and conservation planning in the California desert.

The DRECP Land Use Plan Amendment (LUPA) establishes VRM classes for lands under its direction (further listed below). The landscapes under this plan have been inventoried using the BLM's Visual Resource Inventory (VRI) system and given a VRM classification for management direction. Each VRM class allows for landscape changes form management activities and use authorizations that contrast at different levels with the existing characteristic landscapes.

These LUPA-VRM and GLP (General Public Land)-VRM measures are directly quoted from the DRECP.

LUPA-VRM-1: Manage visual resources in accordance with the VRM classes.

LUPA-VRM-2: Ensure that activities with each of the VRM class polygons meets the VRM objectives described above, as measured though a visual contrast rating process.

LUPA-VRM-3: Ensure that transmission facilities are designed and located to meet the VRM class objectives for the area in which they are located. All reasonable effort must be made to reduce visual contrast of these facilities in order to meet the VRM class before pursuing Resource Management Plan amendments. This includes changes in routing, using lattice towers (vs. monopole), color treating facilities using an approved color from the BLM Environmental Color Chart CC-001 (dated June 2008, as updated April 2014, or the most recent version) (vs. galvanized) on towers and support facilities, and employing other best management practices (BMPs) to reduce contrast.

GPL-VRM-1: Development in GPLs is required to incorporate visual design standards and include the best available, most recent BMPs, as determined by BLM.

GPL-VRM-2: Required Visual Resource BMPs. All development will abide by the BMPs addressed in the most recent version of *Best Management Practices for Reducing Visual Impacts of Renewable Energy Facilities on BLM-Administered Lands* (BLM 2013) or its replacement.

GPL-VRM-3: Regional mitigation is required for visual impacts in GPLs. Mitigation will be based on the VRM class and the underlying visual values (scenic quality, sensitivity, and distance zone) for the development area as it stands at the time the ROD is signed for the DRECP. Compensation may involve reclamation of visual impacts that are present within other areas designated as BLM VRM Class I or II lands (so that they are no longer visible in the long term). Additional mitigation will be required where projects affect viewsheds of specially designated areas (e.g., National Scenic and Historic Trails).

3.1.5 National Park Service Night Sky Program

The protection of night skies, nighttime views, and environments are among the critical park features the NPS protects (NPS 2023). Under the Night Sky Program, NPS staff monitor dark night skies and develop exterior lighting guidelines to determine what light is appropriate for a location's historic character, energy, cost, maintenance efficiency, light pollution, and wildlife. NPS works to protect natural lightscapes by minimizing light that emanates from park facilities, and seek the cooperation of park visitors, neighbors, and state and local governments to prevent or minimize light pollution that can affect park ecosystems (NPS Management Policies 4.10) (NPS 2006). Although the proposed project site is not located within the Mojave National Preserve, the visual analysis area does overlap the westernmost portion of the preserve.

3.1.6 Mojave National Preserve

The Mojave National Preserve encompasses a diverse mosaic of ecological habitats and a 10,000-year history of human connection with the desert. Offering extensive opportunities to experience desert landscapes, the preserve promotes understanding and appreciation for the increasingly threatened resources of the Mojave Desert. This remote preserve encourages a sense of discovery and a connection to wild places. Although the proposed project site is not located within the Mojave National Preserve, the visual analysis area does overlap the westernmost portion of the preserve.

The *Foundation Document Mojave National Preserve* identifies desert scenery, encompassing geology, landscape, vegetation, big sky, and wildlife as fundamental resources and values for the preserve (NPS 2013).

3.1.6.1 GENERAL MANAGEMENT PLAN

The General Management Plan for the Mojave National Preserve catalogs general goals and policies for preserve management, including the protection of scenic resources (NPS 2002a). To date, the NPS has not adopted specific guidelines related to preservation of visual resources or evaluating impacts of projects within or near the preserve. The General Management Plan states that NPS will, at a future date, prepare more specific guidelines to establish visual consistency and themes in facility development. Guidelines will also be created for reaching visual compatibility with surrounding landscapes, significant architectural features, and site details. These guidelines' main objective will be to create harmony between the built and natural environments.

The following management direction is provided in the General Management Plan that affects visual resources (NPS 2002a):

Viewsheds / Visual Quality:

1. Encourage compatible adjacent land uses and seek to mitigate potential adverse effects on park values by actively participating in planning and regulatory processes of neighboring jurisdictions, other federal, state, and local agencies, and Native Americans.
2. Prepare guidelines for the built environment to establish visual consistency and themes in facility development and to create harmony between the built environment and the natural environment.
3. Prepare a communication management plan to address the NPS goals and the need to establish sites for communication equipment.

Night Sky: The NPS will partner with communities and local government agencies to minimize reflected light and artificial light intrusion on the dark night sky, recognizing the essential component that a carpet of stars against a black night sky is for a natural outdoor experience. The NPS will strive to set the best example in all developments that involve the use of artificial outdoor lighting, ensuring that such lighting is limited to basic safety requirements and shielded to the maximum extent possible, to keep light on the intended subject and out of the night sky. Baseline light measurements will be established to monitor changes over time. (NPS 2002a)

There are two General Management Plan land use designations within the preserve from which the project site may be seen (NPS 2002b). As described in the General Management Plan (NPS 2002a), these designations and their desired characteristics are:

Natural Areas: Natural areas of the Preserve that occur outside of designated wilderness provide an informal, self-guided desert learning experience for visitors. People are encouraged to get out of their vehicles and walk to features. The pace is slow with low to moderate levels of noise. Visitors typically focus on specific resources with few visual intrusions. Visitors experience a sense of learning through onsite interpretation or other means. The length of stay at each site is relatively short in comparison to the time visitors spend in the preserve. There is a moderate amount of social crowding and moderate interaction at points of interest and along dead-end trails. Guided ranger walks are occasionally provided for visitors at some locations. Development is limited to items such as low interpretive panels, small directional signs, and hardened dirt paths. Fences are used as a last resort to protect resources if other management efforts do not work. The tolerance for resource degradation is low to moderate, depending on the sensitivity of the resource. The degree of on-site visitor and resource management is moderate and increases or decreases with visitation levels.

Wilderness: Wilderness, as a desired future condition, is a subset of the natural environment, where protection of the natural values and resources is the primary management goal. Restrictions on use of these areas are imposed by law and policy in order to provide a primitive environment free from modern mechanization and motorized travel. The landscape offers a high degree of challenge and adventure for visitors. The visual quality of the landscape contributes significantly to the visitor experience and needs to be protected. The tolerance for resource degradation is low, with the exception of designated trail corridors, where a slightly higher level of degradation is allowed within a few feet of the trail and at points where camping occurs. A minimal amount of resource and visitor management is present. (NPS 2020a)

The General Management Plan also addresses scenery-related effects of external development on adjacent lands. In part, the plan provides the following direction:

> To fulfill the mandate to preserve park resources unimpaired for future generations, adopting strategies and actions beyond park boundaries has become increasingly necessary. Because ecological processes cross park boundaries, and parks typically do not incorporate the entire ecosystem or scenic vista, many activities proposed or existing on adjacent lands have the potential to significantly affect park resources, programs, visitor experiences and wilderness values.
>
> Recognizing these issues, the park staff will work cooperatively with others to anticipate, avoid, and resolve potential conflicts and to address mutual interests in the quality of life for community residents. (NPS 2020a)

3.1.7 Old Spanish National Historic Trail

The Old Spanish National Historic Trail (OSNHT) links Santa Fe and Los Angeles across six states and 2,700 miles. The Old Spanish Trail was designated by Congress as a National Historic Trail in December 2002 (Public Law 107–325). By memorandum from the Secretary of the Interior, the OSNHT is jointly administered by BLM and NPS, working in partnership with other federal, state, and local government agencies, as well as private landowners who manage or own lands along the trail route. The Armijo Route of the OSNHT route follows the Mojave River into the Mojave National Preserve, then travels on the east side of the Soda Mountains through Zzyzx to Baker (NPS 2017).

3.1.8 Solar Energy Program

The ROD for the Solar Programmatic Environmental Impact Statement, signed in October 2012, amended 89 BLM land-use plans in a six-state study area (Arizona, California, Colorado, Nevada, New Mexico, and Utah), including Southern California (BLM and U.S. Department of Energy 2012). The BLM adopted programmatic design features for visual resources as part of the ROD, including VRM BMPs, procedures for coordinating with BLM staff during the project application process, evaluating visual resources, analyzing potential visual effects, and avoiding or minimizing potentially significant effects.

3.2 State Regulations

3.2.1 California Scenic Highway System

California's Scenic Highway Program was created by the Legislature in 1963. Its purpose is to preserve and protect scenic highway corridors from change that would diminish the aesthetic value of lands adjacent to highways. The state laws governing the Scenic Highway Program are found in the Streets and Highways Code, Section 260 et seq.

The State Scenic Highway System includes a list of highways that are either eligible for designation as scenic highways or have been so designated. The status of a state scenic highway changes from eligible to officially designated when the local jurisdiction adopts a scenic corridor protection program, applies to the California Department of Transportation (Caltrans) for scenic highway approval, and receives notification from Caltrans that the highway has been designated as a State Scenic Highway.

I-15 is identified by the County as a County Scenic Route and by Caltrans as an Eligible State Scenic Highway (San Bernardino County 2020; Caltrans 2019). However, in order for a route to be designated as

a State Scenic Highway, it must first be nominated for designation by the County. I-15 has not been nominated for designation by San Bernardino County for State Scenic Highway status.

3.3 Local Regulations

The project is located entirely on BLM-administered public land. While it is not subject to County land use plans and ordinances, local plans were reviewed for informational purposes.

3.3.1 San Bernardino County Countywide Plan

The San Bernardino County Policy Plan (Policy Plan) contains the long-term goals and policies that will guide County decisions, investments, and improvements toward achieving the countywide vision (San Bernardino County 2020). The Policy Plan represents a unique approach to county planning. It serves as the County's General Plan for the unincorporated areas, which is mandated by state law, but it also includes policy direction for adult and child supportive services, healthcare, public safety, and other regional services the County administers in both incorporated and unincorporated areas.

The following policies are relevant to this analysis:

- **Policy LU-2.3 Compatibility with natural environment.** We require that new development is located, scaled, buffered, and designed for compatibility with the surrounding natural environment and biodiversity.

- **Policy LU-4.1 Context-sensitive design in the Mountain/Desert Regions.** We require new development to employ site and building design techniques and use building materials that reflect the natural mountain or desert environment and preserve scenic resources.

- **Policy LU-4.7 Dark skies.** We minimize light pollution and glare to preserve views of the night sky, particularly in the Mountain and Desert regions where dark skies are fundamentally connected to community identities and local economies. We also promote the preservation of dark skies to assist the military in testing, training, and operations.

- **Policy IU-5.5 Energy and fuel facilities.** We encourage the development and upgrade of energy and regional fuel facilities in areas that do not pose significant environmental or public health and safety hazards, and in a manner that is compatible with military operations and local community identity.

- **Policy NR-4.1 Preservation of scenic resources.** We consider the location and scale of development to preserve regionally significant scenic vistas and natural features, including prominent hillsides, ridgelines, dominant landforms, and reservoirs.

- **Policy NR-4.2 Coordination with agencies.** We coordinate with adjacent federal, state, local, and tribal agencies to protect scenic resources that extend beyond the County's land use authority and are important to countywide residents, businesses, and tourists.

- **Policy RE-4.4.** Encourage siting, construction, and screening of renewable energy (RE) generation facilities to avoid, minimize or mitigate significant changes to the visual environment including minimizing light and glare.

- **RE 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.

- **Goal RE-5 Siting.** Renewable energy facilities will be located in areas that meet County standards, local values, community needs and environmental and cultural resource protection priorities.
- **Policy RE-5.7.** Support renewable energy projects that are compatible with protection of the scenic and recreational assets that define San Bernardino County for its residents and make it a destination for tourists.
- **RE 5.7.1**. Site RE generation facilities in a manner that will avoid, minimize or substantially mitigate adverse impacts to sensitive habitats, cultural resources, surrounding land uses, and scenic viewsheds.

3.3.2 San Bernardino County Development Code -Title 8 (2014)

The following policies from the San Bernardino County Development Code help minimize aesthetic and light and glare impacts and are relevant to this analysis:

83.07.060 Mountain and Desert Requirements.

This section provides standards for outdoor lighting in the Mountain and Desert regions of the County.

a) *Shielding Required.* All outdoor light fixtures shall be fully shielded, installed and maintained in such a manner that the shielding does not permit light trespass in excess of amounts set forth in subdivision (f).

b) *Light Pollution Standards.* Light pollution and trespass shall be minimized through the use of directional lighting, fixture location, height and the use of shielding and/or motion sensors and timers in such a manner that the light source does not permit light trespass in excess of amounts set forth in subdivision (f).

c) *Automated Controls.* Automated control systems, such as motion sensors and timers, shall be used to meet curfew requirements set forth in subdivision (d). Photocells or photo controls shall be used to extinguish all outdoor lighting automatically when sufficient daylight is available. Automated controls should be fully programmable and supported by battery or similar backup.

d) *Dark Sky Curfew.* All outdoor lighting shall be extinguished by 11:00 p.m., close of business, or when people are no longer present in exterior areas, whichever is later, except for the following.

   1. Lighting used for entry and exit points of a structure, parking areas, driveways and driveway ingress/egress points; or
   2. Lighting activated by a motion sensor that extinguishes no later than five minutes after activation.

e) *Lighting Color.* The correlated color temperature of all outdoor lighting shall be 3,000 Kelvin or less except for seasonal lighting.

f) *Allowable Light Trespass.* Outdoor lighting shall not cause light trespass exceeding one-tenths foot-candles measured with a light meter oriented vertically or horizontally either at the property line of the adjacent property or measured from some other point on the property where light trespass may be reasonably determined to occur due to differences in property or improvement elevations.

g) *Blinking, Flashing, or High Intensity Lighting.* Permanently installed lighting that blinks, flashes or is of high intensity or brightness that causes a light trespass is prohibited.

84.29.035 Required Findings for Approval of a Commercial Solar Energy Facility.

a) In order to approve a commercial solar energy generation facility, the Planning Commission shall determine that the location of the proposed commercial solar energy facility is appropriate in relation to the desirability and future development of communities, neighborhoods, and rural residential uses, and will not lead to loss of the scenic desert qualities that are key to maintaining a vibrant desert tourist economy by making each of the findings of fact in Subdivision (c).

b) In making these findings of fact, the Planning Commission shall consider:

1. The characteristics of the commercial solar energy facility development site and its physical and environmental setting, as well as the physical layout and design of the proposed development in relation to nearby communities, neighborhoods, and rural residential uses; and

2. The location of other commercial solar energy generation facilities that have been constructed, approved, or applied for in the vicinity, whether within a city or unincorporated territory, or on State or Federal land.

c) The findings of fact shall include the following:

1. The proposed commercial solar energy generation facility is either: Sufficiently separated from existing communities and existing/developing rural residential areas so as to avoid adverse effects, or of a sufficiently small size, provided with adequate setbacks, designed to be lower profile than otherwise permitted, and sufficiently screened from public view so as to not adversely affect the desirability and future development of communities, neighborhoods, and rural residential use.

2. Proposed fencing, walls, landscaping, and other perimeter features of the proposed commercial solar energy generation facility will minimize the visual impact of the project so as to blend with and be subordinate to the environment and character of the area where the facility is to be located.

3. The siting and design of the proposed commercial solar energy generation facility will be either: unobtrusive and not detract from the natural features, open space and visual qualities of the area as viewed from communities, rural residential uses, and major roadways and highways,[1] or located in such proximity to already disturbed lands, such as electrical substations, surface mining operations, landfills, wastewater treatment facilities, etc., that it will not further detract from the natural features, open space and visual qualities of the area as viewed from communities, rural residential uses, and major roadways and highways.

4. The siting and design of project site access and maintenance roads have been incorporated in the visual analysis for the project and shall minimize visibility from public viewpoints while providing needed access to the development site.

5. 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.

6. Adequate provision has been made to maintain and promote native vegetation and avoid the proliferation of invasive weeds during and following construction.

7. The proposed commercial solar energy generation facility will avoid modification of scenic natural formations.
8. For proposed facilities within two miles of the Mojave National Preserve boundaries, the location, design, and operation of the proposed commercial solar energy facility will not be a predominant visual feature of, nor substantially impair views from, hiking and backcountry camping areas within the National Preserve.
9. For proposed facilities within two miles of the boundaries of a County, State or Federal agency designated wilderness area, the location, design, and operation of the proposed commercial solar energy facility will not be a predominant visual feature of, nor substantially impair views from, the designated wilderness area.

84.29.070 Decommissioning Requirements

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.

4 VISUAL IMPACT ASSESSMENT PROCESS

This analysis and subsequent determination of impacts is based primarily on a comparison of the project with the visual character and quality of its setting and surrounding vistas. The study also compares the proposed project with the specific visual resource goals of San Bernardino County. When policy and stated goals demonstrate that a high degree of value is placed on the visual environment, the standards to which the project is compared are considered equally high. As a result of the project's location relative to important public transportation corridors, and state and federal recreational areas, combined with an awareness of scenic quality as reflected in both County and adjacent jurisdictional planning policy, it is anticipated that viewer sensitivity to visual changes are moderately high.

4.1 Methodology

4.1.1 Field Reconnaissance and Visual Context Establishment

The physical conditions and viewing context of the project are analyzed to gain an understanding of the existing landscape quality and character, and its potential relationship to the viewing public. In addition to relevant document research, field reviews of the project site and its surroundings are documented in order to establish a visual baseline of the affected visual environment. Resource inventories related to existing visual character, quality, and scenic views are conducted both on foot and from moving vehicles.
The visual setting is analyzed and defined as experienced primarily from surrounding public viewpoints.

Planning documents and previous studies relevant to the surrounding area are referenced to gain an understanding of community and regional aesthetic values.

Field reconnaissance was conducted on January 24, 2023, and included review of the entire project site as well as the surrounding area. Existing visual resources and site conditions were photographed and recorded. Site assessment of proposed project elements (e.g., solar arrays, battery storage facilities, substations, gen-tie lines, etc.) in relation to the site and its surroundings was based on plans and descriptions provided by the project applicant.

4.1.2 Viewsheds and Key Observation Point Selection

The project site was viewed from potential viewer group locations in the surrounding area. Representative public viewpoints were identified for further analysis, based on dominance of the site within the view, the relationship to visual resources, duration of views, and expected sensitivity of the viewer group. Of those representative viewpoints, key observation points (KOPs) were selected that best illustrate the visual changes that would occur as a result of the project (refer to Section 3.3, Project Viewshed and Key Observations Points).

4.1.3 Visual Simulations

Visual simulations were prepared to quantify potential project visibility and to assess related visual effects (refer to Appendix D, Visual Simulations). The appearance of structures shown in the photo-simulations is based on preliminary designs provided by the project applicant and as identified in the project description. Where project information was not available, those project features were assigned a physical appearance typical of similar solar energy facilities built throughout the region and state. Landscaping shown in the visual simulations is depicted at approximately 1 year after planting.

4.1.4 Visual Contrast Analysis

To provide a systematic basis for evaluating impacts to visual resources resulting from the construction and operation of the proposed project, the visual assessment was based in part on the BLM VRM system. BLM Form 8400-4 (BLM 2018) was adapted for project purposes and used to document the potential visual contrast of the proposed project components to the surrounding landscape (refer to Section 4, Visual Contrast Rating Summary, and Appendix C). The BLM's contrast analysis is an industry standard and can be used as a basis for CEQA visual impact assessments and provides the public and authorizing agencies a consistent and translatable methodology for understanding potential visual impacts from proposed projects.

4.1.5 Glare Analysis

To determine the potential for significant glint or glare from solar panels and other built-project components, SWCA used the Sandia National Laboratory's online Solar Glare Hazard Analysis Tool by ForgeSolar. The glare tool and associated analysis illustrate via Google Earth imagery where the project is located relative to sensitive viewing locations such as public roadways, airports, and other locations. The glare analysis provides a quantitative assessment of when and where glare from the project components will occur throughout the year and shows potential effects on the human eye at locations where glare occurs. Additional information regarding the orientation and tilt of the PV panels, reflectance of project components, local environmental conditions, and ocular factors (e.g., flash blindness) are considered in the glare analysis (Appendix E, ForgeSolar Glare Analysis Report).

4.2 Visual Context

The existing scenery in the visual analysis area is characterized by a gently downward-sloping and undulating broad unnamed alluvial valley nearly enclosed by mountains contained within the Soda Mountain Wilderness and the Mojave National Preserve. A sense of visual enclosure results from the surrounding mountains, Rasor Road interchange to the west, and the Zzyzx Road interchange through the east. Soda Lake and the town of Baker are east of the I-15/Zzyzx Road interchange and about 300 feet below it in elevation. Due to these elevation changes, in addition to the ridgelines of the Soda Mountains, Cronese Valley, Soda Lake, and Baker are visually disconnected from the site. Erosion associated with water and the alluvial fans has created washes in the area and allowed for the population of vegetation. Vegetation within the area is characterized by a typical creosote desert scrub interspersed between areas of exposed soils.

The NPS-managed Mojave National Preserve is east of the project site. A portion of the preserve boundary is immediately east of the project and is visible in the foreground/middleground distance zone. Figure 3 shows the location of the Mojave National Preserve along with other designated recreation and potentially sensitive scenic vista and resource areas within 5 miles of the project.

The visual character of the landscape within the region has substantial variability based on the location of the viewer and other variables, such as seasonal climate, atmospheric and lighting conditions, cultural modifications, and the visibility, presence, and extent of character-defining visual features. Generally, the landscape can be characterized as a broadly enclosed valley that is unencumbered by intervening features. I-15 and the surrounding Soda Mountains dominate the visual landscape associated with the analysis area. The primary travel route through the site, I-15, typically provides viewers low-angle perspectives of the valley, and viewer attention is most typically drawn to the Soda Mountain range due to the size and dominant nature of the mountains. The foreground consists of straight lines, I-15 asphalt and accompanying guardrails that cut through the open valley, sandy soil and dotted scrub brush and grasses. The light tan sandy soil and various shades of low green vegetation, combined with areas or rocky outcroppings, stretch through the middleground to meet up with the base of the surrounding mountains and background. As viewers gain elevation in the landscape, the form, lines, colors, and textures of the pyramidal mountains and the alluvial washes flowing from the mountains draw the observer’s eye toward the middle of the valley creating a focal point.

Human development within the analysis area includes two existing transmission lines northwest of I-15, opposite the project site. A smaller distribution line can also be seen to the northwest. These vertical structures stand out against the relatively low and flat landscape, and contrast with the background mountains. The transmission lines (the 500-kV Mead-Adelanto transmission line and the Southern California Edison 115-kV transmission line) somewhat parallel I-15, at a distance ranging from approximately 1.0 to 1.5 miles. The most prominent visual features associated with these transmission lines are the geometric vertical support structures. The accompanying horizontal conductor lines, although less noticeable, can also be seen. Two overcrossings, one at Rasor Road and another at Zzyzx Road, cross I-5 in the project vicinity. Buildings can be seen in the southeast quadrant of the I-15/ Rasor Road overcrossing, including a gas station, convenience store, and scattered utility buildings. Several unimproved roadways cross the landscape in the vicinity. The nearest concentration of residential development is Baker, California, about 6 miles from the project site.

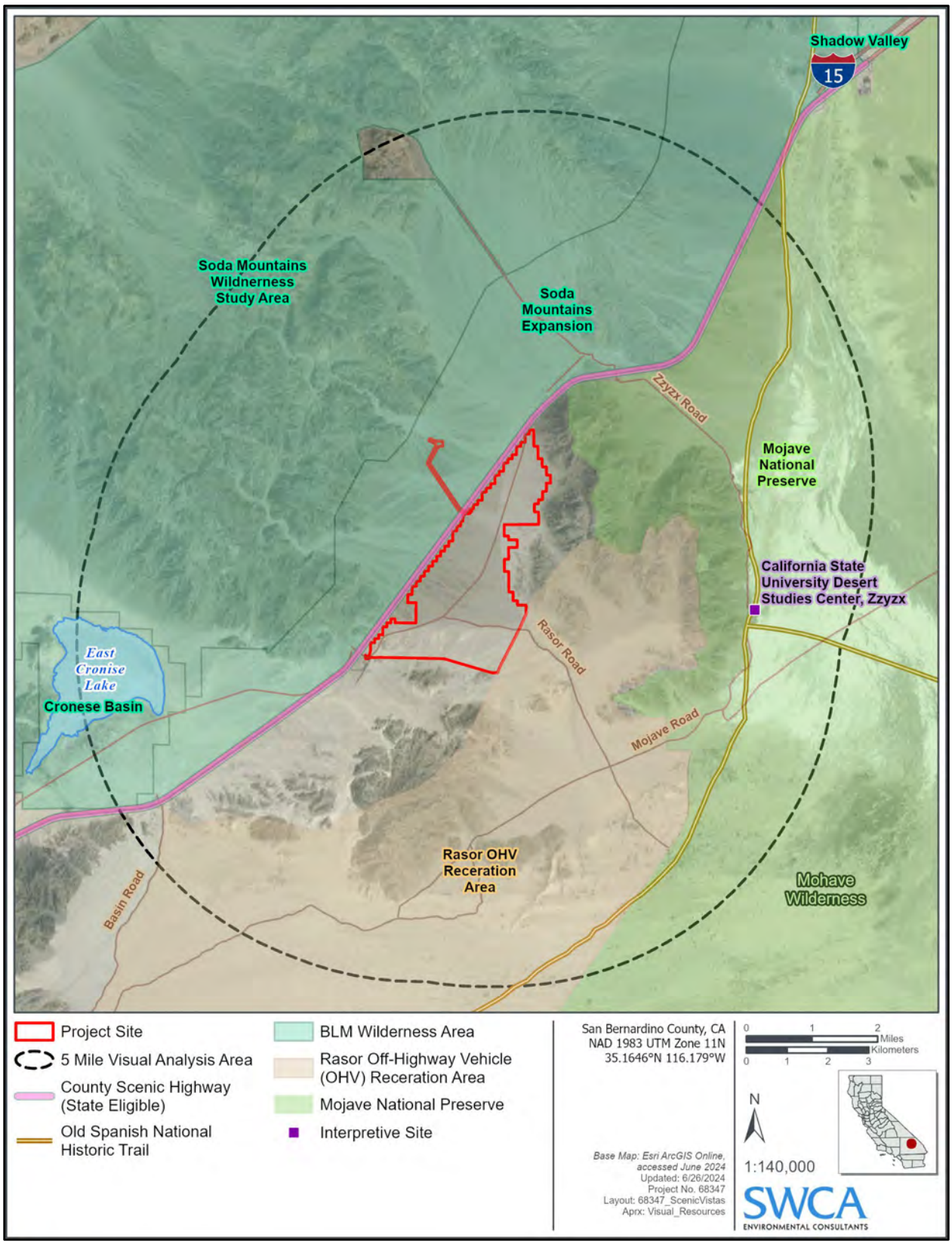

Figure 3. Designated recreation and potentially sensitive scenic vista areas

4.2.1 Project Viewing Distances

Potential viewing distances can be defined as foreground/middleground (visibility distance of 3–5 miles), background (visibility distance of 5 miles to a maximum of 15 miles based on atmospheric conditions), and seldom seen (portions of the landscape that are not visible or visible at distances greater than 15 miles). These definitions contribute to the framework for contrast and impact analysis. The Visual Contrast Rating Summary (Section 4) and Visual Contrast Rating Worksheets (Appendix C) assess the level of visual change associated with the project and evaluates the fundamental design elements (form, color, texture, and scale) and the influence of environmental factors that can influence the level of contrast based on the casual viewers perspective and distance.

As seen from public viewpoints, the project is primarily located within the foreground/middle ground. The overall analysis area is also in the foreground/middleground distance zone. Since project elements located in this distance range would have a closer proximity to potential viewers, the project site is considered to be visually sensitive.

4.3 Project Viewshed and Key Observation Points

4.3.1 Project Viewshed

Based on field review, an analysis area was defined as a 3-mile-radius area surrounding the project site. The size of the analysis area was selected based on the assumptions that 1) visibility of the project would attenuate at this distance when observed from inferior or at-grade observer positions; 2) visual contrast of the project would be weak when viewed form higher elevations at this distance, and 3) topographic conditions surrounding the project would limit exposure to visual contrast introduced by the project for observers beyond this distance. The analysis area was further refined after analyzing the potential project visibility illustrated by the viewshed analysis.

The viewshed analysis was conducted using a digital elevation model (DEM) and numerous points laid out in a grid pattern inside the solar array polygons in a geographic information system (GIS). Potential visibility was determined with the results of the viewshed based on topography, height of project components (solar arrays), and the average eye-level height of observers. The resulting viewshed model (Figure 4) illustrates where theoretical direct line-of-site views may occur between terrain locations and selected points used to represent the locations and heights of project components. This model is based on elevation and landform and does not account for vegetation, existing structures, and other elements in the landscape that could potentially obstruct views. It is possible that the project may be seen to some degree from beyond the 3-mile analysis area; however, the project is not expected to draw the attention of viewers from such areas due to distance, viewing angle, and the presence of intervening and surrounding landscape features where viewer focus would be directed.

The results of the viewshed analysis illustrate that visibility of the project outside of the valley is substantially reduced. The viewshed is limited by the surrounding high-elevation landforms of the Soda Mountains Wilderness, which extend from the northeast to the southeast, and the mountains at the western edge of the Mojave National Preserve. Review of the viewshed data shows that the project is almost entirely surrounded by these mountains, which limit the extent of views due to their elevations, rising least 100 feet higher than the project site.

4.3.2 Viewpoints and Key Observation Points

Visually sensitive viewing locations represent specific historic places, public gathering areas, natural scenic features, and recreational activities that have scenic importance relative to one's home, social, business,' and recreational environments. They include viewpoints where the public would experience the project both from a stationary (e.g., residential area) or a linear (e.g., major roadway) location. Potential changes in the viewshed are evaluated primarily from these identified viewpoints. Identification of viewpoints and KOPs for this analysis was also based on a review of aerial photography and topographic maps, and field investigations. Analyzed sensitive viewing locations included:

- **Vehicular travel routes** – highways and roads used by origin/destination travelers, designated scenic or historic byways, and recreation destination roads (i.e., roads that provide access to designated recreation areas).
- **Recreation areas** – existing recreation sites used for picnicking, camping, hiking, scenic overlooks, OHV driving, rest areas, or other recreational activities.
- **Residences** – single-family detached structures and permanent mobile homes or mobile home parks and associated land uses. A KOP at the Rasor Road Services Shell Oil Station was included for this analysis.

Based in part on the review of the project viewshed mapping (see Figure 4), 13 viewpoints were selected to represent typical viewing locations, and six of those viewpoints were chosen to be carried forward as KOPs for simulations and further analysis (Figure 5; Table 3.1). SWCA conducted in-field assessments on January 24, 2023, including contrast rating evaluations in support of the CEQA analysis. Data collected at each of the KOPs included the following: GPS location, digital photographic panorama of the viewshed (used for visual simulations and context imagery), required information to complete the Visual Contrast Rating Worksheets, time of day and atmospheric conditions, and existing structures and roads in the viewshed.

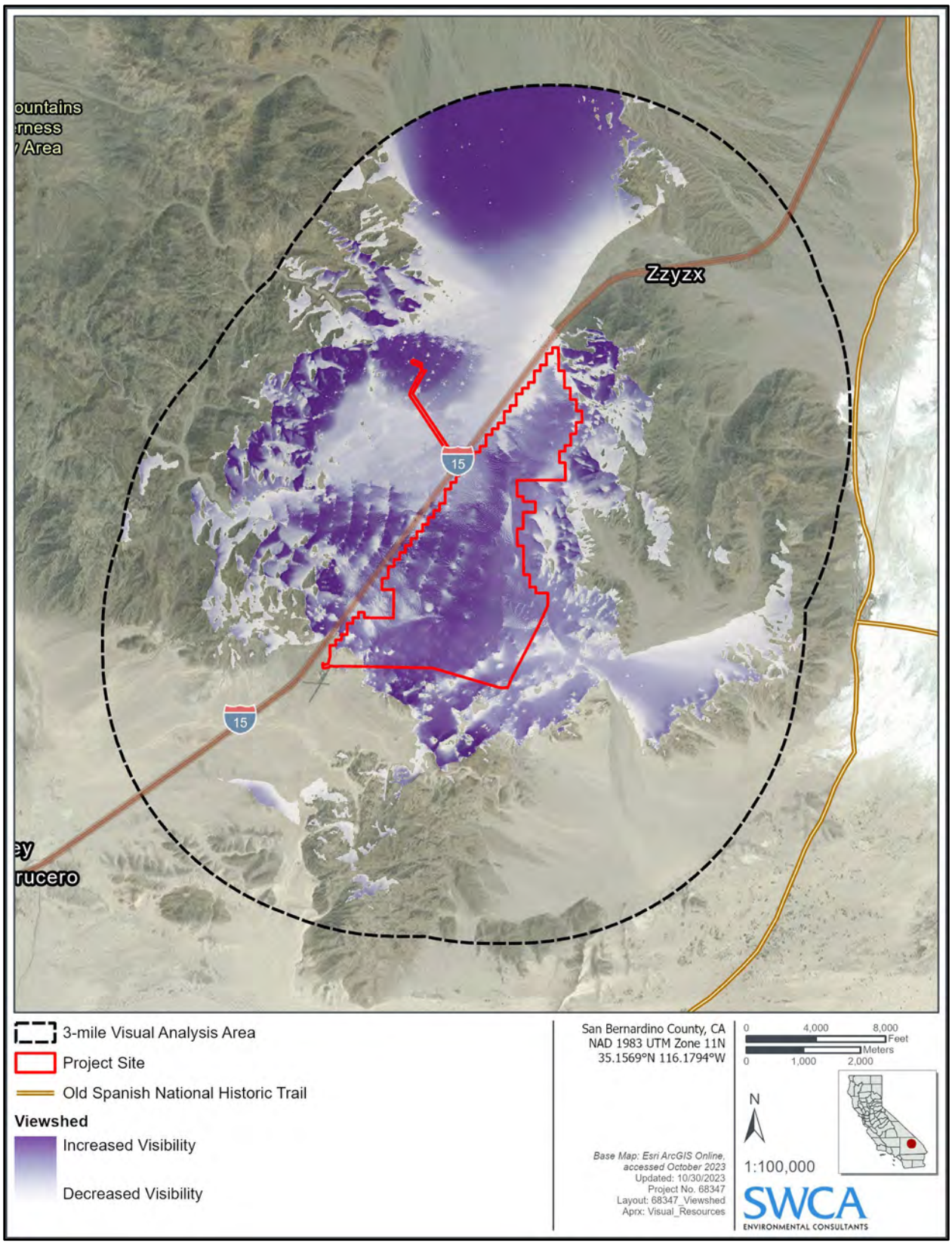

Figure 4. Viewshed analysis map.

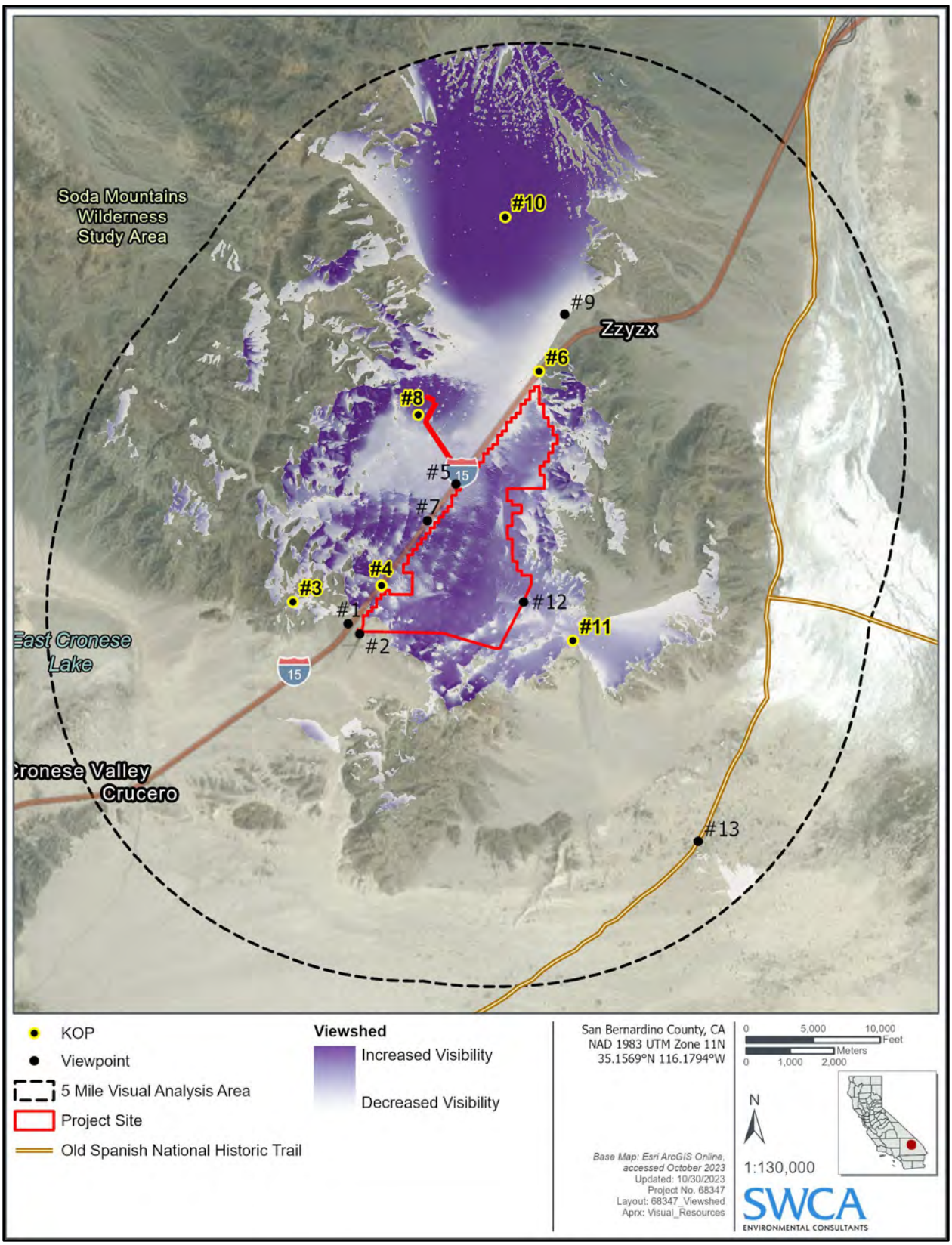

Figure 5. Preliminary viewpoints and KOP simulation locations.

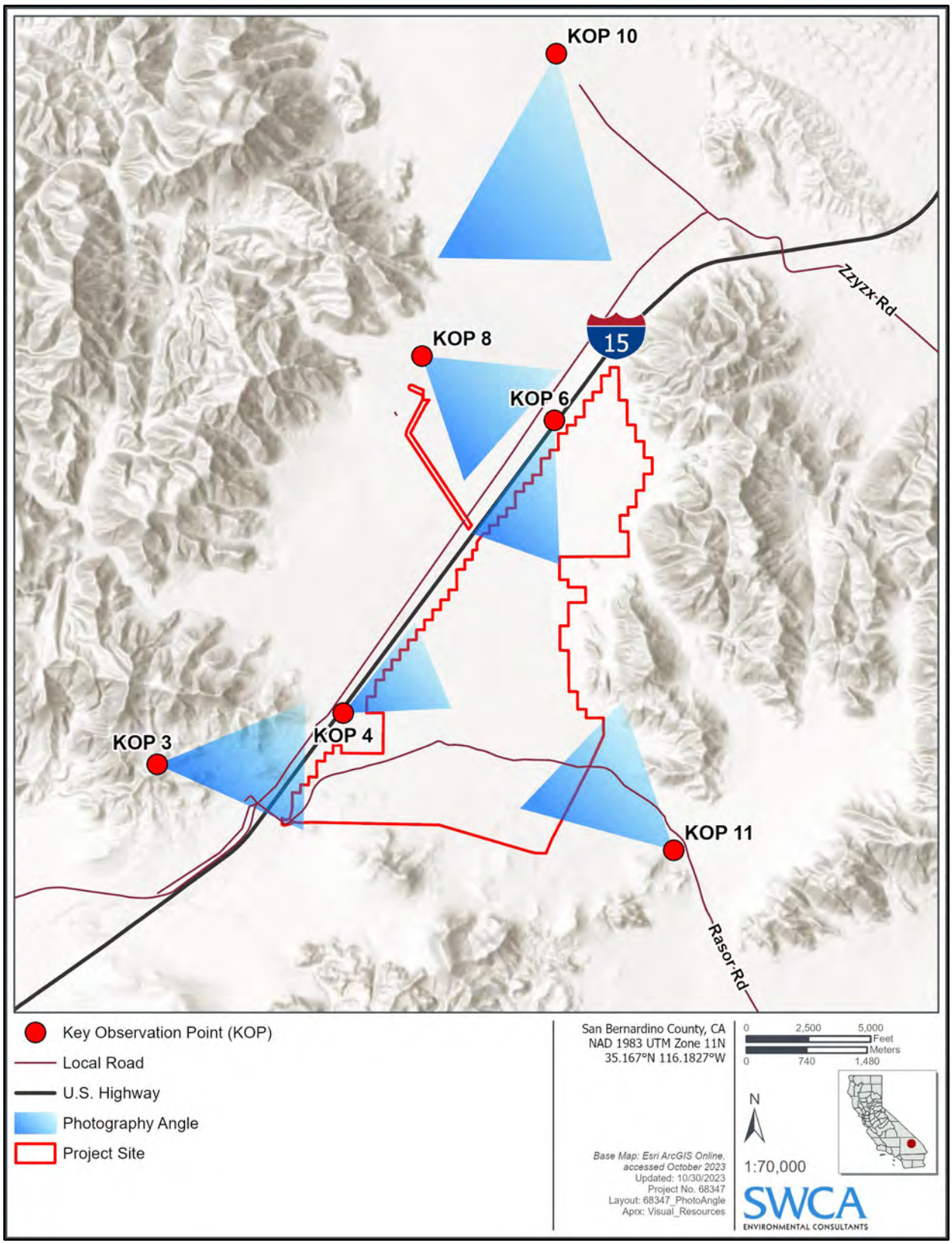

Figure 6. KOP simulation locations.

Table 3.1 details the distance from project components, sensitive viewer types, and the rationale for inclusion from each viewpoint and the selected KOPs. A description of the setting at each KOP that was carried forward for simulations and analysis is further detailed in Section 4.1.

4.3.2.1 VEHICULAR TRAVEL ROUTES

KOP 3 – Communications Tower Road: This is the road up to the communications tower accessible via Arrowhead Trail from I-15. The road leading up to this tower connects with several recreational roads that run along the alluvial valley along the western edge of the valley and provide an elevated view of the project. This KOP is representative of both vehicular travel routes and recreational areas.

KOPs 4 and 6 – I-15: I-15 is the fourth-longest north-south transcontinental interstate highway in the United States, cutting through California, Nevada, Arizona, Utah, Idaho, and Montana. This roadway bisects the valley where the project is contained and provides north and south views along the vehicular corridor. This portion of I-15 has been identified as an eligible state scenic highway (but has not been nominated for designation) but is identified as a San Bernardino County scenic route.

4.3.2.2 RECREATIONAL AREAS

KOP 8 – Transmission Line Road B: This KOP is located on the west side of the valley on the transmission line maintenance road. This area has slightly elevated views of the valley and provides and full panoramic view of most of the surrounding valley.

KOP 10 – OHV Recreational Area B: This KOP is just northwest of an intersection of two recreational roadways (Zzyzx Road north of I-15 and the road that runs parallel to the two transmission lines). This area was identified by the viewshed analysis as having high visibility of the project site.

KOP 11 – OHV Recreational Area A: This KOP is on Rasor Road right before it begins to pass over the mountains and enter the BLM OHV recreational area headed toward the Mojave Wilderness and Natural Preserve. There are many recreational roadways in the OHV recreation area, and Rasor Road is the most direct route to the Shell Oil Station for fueling recreational and other vehicles.

Table 3.1. Viewpoint and KOP Descriptions

Viewpoint Number	Name	Sensitive Viewer Group	Approximate Distance to Nearest Solar Equipment (miles) Analysis Area Distance Zone	Rationale for Inclusion	Carried Forward for Simulation?
1	I- 15 Rasor Road Overpass	Vehicular Travel Route	0.73 Foreground	Representative of foreground views for vehicular drivers including working and recreational drivers.	No, context only
2	Rasor Road Services Shell Oil Station	Residential Area	0.56 Foreground	Representative of foreground view for local working residents, visiting tourists, and recreators.	No, context only
3	Communications Tower Road	Vehicular Travel Route/Recreational Area	1.55 Foreground	Representative of foreground views for vehicular drivers including working and recreational drivers.	**YES – [KOP 3]**
4	I-15 Northbound – South End	Vehicular Travel Route	0.32 Foreground	Representative of foreground view for local residential, recreational, and destination/origin commuters headed southbound on the south end of the project.	**YES – [KOP 4]**
5	I-15 Northbound – North End	Vehicular Travel Route	0.11 Foreground	Representative of foreground view for local residential, recreational, and destination/origin commuters headed northbound on the north end of the project.	No, context only
6	I-15 Southbound – North End	Vehicular Travel Route	0.19 Foreground	Representative of foreground view for local residential, recreational, and destination/origin commuters headed southbound on the north end of the project.	**YES – [KOP 6]**
7	I-15 Southbound – South End	Vehicular Travel Route	0.21 Foreground	Representative of foreground view for a local residential, recreational, and destination/origin commuters headed southbound on the south end of the project.	No, context only
8	Transmission Line Road B	Vehicular Travel Route/Recreational Area	1.21 Foreground	Representative of foreground view of recreational visitors with elevated views on the west side of the alluvial valley.	**YES – [KOP 8]**
9	Transmission Line Road A	Vehicular Travel Route/Recreational Area	1.39 Foreground	Representative of foreground view of recreational visitors with elevated views on the north side of the alluvial valley.	No, context only
10	OHV Recreational Area B	Recreational Area	2.56 Foreground	Representative of foreground views of recreational visitors with elevated views from the north end of the alluvial valley.	**YES –[KOP 10]**
11	OHV Recreational Area A – Hill Top	Recreational Area	0.87 Foreground	Representative of the foreground views of recreationalists with elevated views on the south end of the alluvial valley headed to or from the Mojave Wilderness and National Preserve.	**YES – [KOP 11]**

Viewpoint Number	Name	Sensitive Viewer Group	Approximate Distance to Nearest Solar Equipment (miles) Analysis Area Distance Zone	Rationale for Inclusion	Carried Forward for Simulation?
12	Rasor Road	Recreational Area	0.19 Foreground	Representative of the foreground views of recreationalists with elevated views on the south end of the alluvial valley headed to or from the Mojave Wilderness and National Preserve.	No, context only
13	OSNHT and Mojave National Preserve	Recreational Area	4.02	Representative of views of recreationalists of the surrounding OHV area, the Mojave National Preserve, and the OSNHT.	No, context only

5 VISUAL CONTRAST RATING SUMMARY

The purpose of this section is to summarize the visual contrast that would result from implementation of the project. Associated Visual Contrast Rating Worksheets are provided in Appendix C. Visual impacts are defined as the change to the existing visual environment resulting from the introduction of modifications to the landscape. An analysis of visual dominance, scale, and contrast was used in determining to what degree the project would attract attention and to assess the relative change in character compared with the existing landscape and its inherent scenic quality. This analysis was performed using visual simulations and contrast ratings from each KOP. The amount of visual contrast that would be created is directly related to the amount of attention that would be drawn to a feature in the landscape.

Photorealistic simulations were developed from each of the identified KOP locations and included in Appendix D. Photographs of existing conditions were taken using standard focal lengths to represent the human field of view most closely. In order to create photographic simulations, a three-dimensional model of solar arrays, distribution line, and other project features were placed in the photographic view, taking into consideration project topography, elevation, and distance from the observation point. Simulated solar arrays, distribution line, and other project features were aligned to the photographs and the model rendered and composited to create the visualizations.

The construction, operation, and maintenance of the proposed project would result in the contrast felt by observers with existing visual resources. Table 4.1 defines the levels of visual contrast associated with the landscape's scenic quality and landscape character as well as those impacts perceived by the casual observer from KOPs. The magnitude of contrast ranges from "None" to "High".

Table 4.1. Criteria for Assessing Level of Contrast on Visual Resources

Magnitude	Change to Landscape Character/ Scenery	Contrast Perceived by Viewers (KOPs)
None	• Landscape is unaltered, and project elements would not attract attention. • Landscape character is intact with only minor, if any, modifications. • Project elements repeat the form, line, color, texture, or scale common in the landscape.	• Landscape when viewed is unaltered. • Project elements would not be visually evident.
Low	• Landscape would appear slightly altered. • Modifications may be present but repeat the form, line, color, texture, and pattern common to the landscape character so completely, and at such scale, that they are not evident. • Project elements would introduce the form, line, color, texture, or scale common in the landscape and would be visually subordinate.	• Landscape when viewed appears slightly altered. • Project elements would create weak contrast compared with other features in the landscape when viewed.
Moderate	• Landscape would appear to be moderately altered, and project elements would begin to dominate the visual setting. • Modifications remain visually subordinate to the landscape character being viewed. • Project elements would introduce form, line, color, texture, or scale not common in the landscape and would be visually prominent in the landscape	• Landscape when viewed appears moderately altered. • Project elements would be visually subordinate in the landscape and would create moderate contrast compared with other features in the landscape when viewed.

Magnitude	Change to Landscape Character/ Scenery	Contrast Perceived by Viewers (KOPs)
High	• Landscape would appear to be heavily altered, and project elements would dominate the visual setting. • Modifications strongly dominate the landscape character being viewed. • Project elements would be out of scale or contain detail that is out of character with natural landscape as viewed in the foreground or middleground.	• Landscape when viewed appears heavily altered. • Project elements would introduce elements and/or patterns that are uncommon or not found in the landscape and create disharmony when viewed.

Visual contrast typically results from 1) landform modifications that are necessary to prepare a project site or right-of-way for construction, 2) the removal of vegetation to construct and maintain facilities, and 3) the introduction of new aboveground facilities into the landscape.

The contrast rating analysis method measures potential project-related changes to the landscape. The method allows for a level of objectivity and consistency in the process and reduces subjectivity associated with assessing landscape character and scenic quality impacts. Using the BLM's Visual Resource Contrast Rating system, as outlined in BLM Manual H-8431 (BLM 1986b), the level of contrast between the proposed project and the existing landscape was evaluated from the selected KOPs. This level of contrast determines the degree to which the project would affect the intrinsic visual character and, in turn, the scenic quality of the landscape. In the context of the proposed project, the form, line, color, and texture associated with the landform, water, vegetation, and existing structures within and adjacent to the analysis area was recorded. The degree of contrast for each landscape element (e.g., land/water, vegetation, and structures) was then evaluated as none, weak, moderate, or strong (Table 4.2).

Table 4.2. Criteria for Degree of Contrast

Degree of Contrast	Criteria
None	The element contrast is not visible or perceived.
Weak	The element contrast can be seen but does not attract attention.
Moderate	The element contrast begins to attract attention and begins to dominate the characteristic landscape.
Strong	The element contrast demands attention, cannot be overlooked, and is dominant in the landscape.

Source: BLM (1986b)

Environmental factors can influence the amount of visual contrast, dominance, and level of attraction introduced by project components. For this analysis, the factors considered and evaluated as part of the determination of the level of contrast from each KOP include visibility conditions, angle of view (relative viewer position and view orientation), duration of view (in time or distance), and scale and spatial relationship (degree of contrast) of the project.

Visibility conditions refer to how the project components (i.e., arrays and associated infrastructure) would be viewed in the landscape from KOPs, not whether the proposed project would be seen or not seen from KOPs. These conditions are assessed by looking at the relationship of the project components in the context of the landscape. The first condition is whether the project components would be seen predominantly skylined along the horizon line of a landform or backdropped against a landform. The second condition is whether the views of project components would be predominantly unobstructed or obstructed from the KOP. The third condition is the influence of lighting conditions and the consideration of the intensity of reflection or shadowing (discussed in further detail in Section 5, Glare Analysis Summary, and Appendix E). The angle of observation from the KOP is also evaluated to

determine whether the project components would be seen in the same viewing direction as a dominant visual feature in the landscape.

The duration of view is how long the project components would be seen from KOPs. For linear KOPs, the duration of view can be calculated in terms of both time and distance by determining the total travel time along the total distance of the platform that the project components would be seen.

The last two environmental factors used in this contrast analysis, scale and spatial relationship, evaluate the degree of contrast of the proposed project components in relation to the surrounding landscape when viewed from KOPs. Scale refers to the size of the project components relative to various landscape features. The larger the project components would appear, the less they would repeat the common elements and patterns in the surrounding landscape; that is, the project components would appear to dominate the landscape.

In addition to scale, the arrangement or spatial relationship of landscape features can affect the visual prominence of project components from KOPs. The amount of visual contrast created is directly related to the amount of attention that is drawn to an element in the landscape. For example, if the view from a platform is of a panoramic or expansive landscape, the project components would be less prominent (lower contrast), whereas if the view is of an enclosed or encircled landscape such as a narrow valley, the project components would be more prominent and would appear to dominate the landscape (higher contrast). For this analysis, contrast is assessed by comparing the project with the major features in the existing landscape.

Changes in the visual setting because of variable atmospheric conditions and seasonal use differences were evaluated as part of the environmental factors for this project.

5.1 Project and Contrast Analysis by Key Observation Point

Visual contrast related to scenic resources was determined by examining the photo-simulations and evaluating the visual change and contrast with the existing landscape that would result from the construction and operation of the project.

The contrast analysis for each of the six KOPs is provided below in Table 4.3. Associated Contrast Rating Worksheets for each of the KOPs are provided in Appendix C.

Table 4.3. Visual Contrast Ratings by KOP

KOP Number	Name Overall Level of Contrast	Contrast Discussion
3	Communications Tower Road	Level of contrast would be moderate.
	Moderate	Views of the project from this location would be predominately backdropped against low pyramidal hills and rugged mountains in the background. Project components would be somewhat visible (obscured by some hills in the foreground) and would introduce form, line, and color not common in the landscape. Colors and shadows in the mountains and hills around the project during the morning would be similar to the color to the solar arrays. In this view, there is a greater degree of human development visible from this KOP than other KOPs including I-15, transmission lines (monopole, H-frame, and lattice towers), and unimproved gravel roadways. The landscape would appear moderately altered, and project elements would begin to dominate the visual setting. The degree of existing development would somewhat reduce the contrast caused by the project. It is anticipated that the level of contrast at this KOP would be moderate.

KOP Number	Name Overall Level of Contrast	Contrast Discussion
4	I-15 Northbound – South End Strong	Level of contrast would be strong. Views of the project from this KOP would be predominately backdropped against a broad valley, pyramidal hills, and trapezoidal mountain ranges in the background. Project components would be visible from this location and would introduce form, line, color, and texture not common in the landscape. Colors and shadows in the mountains and hills around the project during the morning would be similar to the color of the solar arrays. Development around this location includes I-15, roadway signage, low repetitive fencing, a monopole transmission line, and unimproved gravel roads. The landscape would appear heavily altered, and project elements would dominate the visual setting. The project would be out of scale with the natural landscape and would introduce an increased degree of development. Although the degree of existing development would partially reduce the contrast caused by the project, it is anticipated that the level of contrast at this KOP would remain strong.
6	I-15 Southbound – North End Moderate	Level of contrast would be moderate. Views of the project from this platform would be predominately backdropped against a flat valley floor with pyramidal and trapezoidal hills and mountains in the background. Project components would be visible from this KOP and would introduce form, line, color, and texture not common in the landscape. Colors and shadows in the mountains and hills around the project during the morning would be similar to the color of the solar arrays. Development around this location includes I-15, low repetitive fencing, a monopole transmission line, and unimproved gravel roads. The landscape would appear moderately altered, and project elements would begin to dominate the visual setting. From this location on I-15, project components would be partially obscured by existing vegetation. The degree of existing development would reduce the contrast caused by the project, but it is anticipated that the level of contrast at this KOP would remain strong.
8	Transmission Line Road B Strong	Level of contrast would be strong. Views of the project from this viewing area would be predominately backdropped against a broad, gently sloping valley floor with pyramidal and trapezoidal hills and mountains in the background. Project components would be visible from this KOP and would introduce form, line, color and texture not common in the landscape. Colors and shadows in the mountains and hills around the project during the morning would be similar to the color of the solar arrays. Development around this location includes I-15, monopole and lattice tower transmission lines and unimproved gravel roadways. The landscape would appear heavily altered, and project elements would dominate the visual setting. The project would be out of scale with the natural landscape and would introduce an increased degree of development. The degree of existing development would somewhat reduce the contrast caused by the project; however, it is anticipated that the level of contrast at this KOP would remain strong.
10	OHV Recreational Area B Strong	Level of contrast would be strong. Views of the project from this platform would be predominately backdropped against a sloping alluvial fan transitioning into a flat valley floor with pyramidal and trapezoidal hills and mountains in the background. Project components would be visible from this KOP and would introduce form, line, color, and texture not common in the landscape. Colors and shadows in the mountains and hills around the project during the morning would be similar to the color of the solar arrays. Development around this location includes I-15, H-frame and lattice tower transmission lines, and unimproved ravel roads. The landscape would appear heavily altered, and project elements would dominate the visual setting. The project would be out of scale with the natural landscape and would introduce an increased degree of development. The degree of existing development would partially reduce the contrast caused by the project, but it is anticipated that the level of contrast as this KOP would remain strong.

KOP Number	Name Overall Level of Contrast	Contrast Discussion
11	OHV Recreational Area A Strong	Level of contrast would be strong. Views of the project from this area would be predominately backdropped against a broad sloping valley with rough trapezoidal mountains. Project components would be visible from this KOP and would introduce form, line, color, and texture not common in the landscape. Colors and shadows in the mountains and hills around the project during the morning would be similar to the color of the solar arrays. Development around this location is limited to distant views of I-15 and unimproved gravel roads. The landscape would appear heavily altered, and project elements would dominate the visual setting. The project would be out of scale with the natural landscape and would introduce an increased degree of development. The degree of existing development would somewhat reduce the contrast caused by the project; however, it is anticipated that the level of contrast at this KOP would remain strong.

Note: The number identification of the six KOP locations (KOPs 3, 4, 6, 8, 10, and 11) are intended to be consistent with the original field data and are therefore not shown in direct numerical sequence as part of the analysis.

5.2 Summary of Visual Contrast from Surrounding Designated Scenic Areas

The project site is within the vicinity of federal lands having visual quality designations. This CEQA visual analysis recognizes these designations and policies as documented indicators of viewer sensitivity and potential concern regarding changes to the visual environment.

5.2.1 Bureau of Land Management Visual Resource Management System

The project would create strong degree of visual contrast when viewed from the four of the six selected KOPs (KOPs 4, 8, 10, and 11). At these locations along I-15, the OHV recreational area and within the surrounding valley, the degree of contrast generated by the project would demand the attention of the casual observer as it would be a dominant development in the landscape at a scale not common in the valley. The project would introduce elements and patterns that are not currently found in the viewshed, resulting in disharmony with the natural existing landscape.

The project would create a moderate degree of contrast when viewed from the two remaining KOPs (KOPs 3 and 6) surrounding the project. At these locations, views of the project would be partially obscured; however, the portions of the project that are visible would begin to attract the attention of casual observers and begin to dominate the existing landscape. Overall, the project would be visually subordinate in the landscape and would create a moderate contrast compared with other features in the landscape.

5.2.2 Desert Renewable Energy Conservation Plan

Due to viewing distance, intervening topography, existing vegetation, and the lack of visibility shown by the viewshed analysis indicates that the project would result in no visual contrast as seen from lands with the DRECP area, including points viewpoints along the OSNHT.

5.2.3 Mojave National Preserve

It was determined that sensitive viewing locations within the Mojave National Preserve (Soda Dry Lake, Zzyzx Spring, and the Desert Studies Center) located within the analysis area would have no or very limited views of the project due to the significant changes in topography between those locations and the

project. Other sensitive viewing locations outside of the visual analysis area and within the preserve identified on the Mojave National Preserve NPS website are located 10 or more miles away from the project. The low profile of the solar arrays, combined with the degree of topographical change, distance, and atmospheric conditions between these sites and the project viewers indicate that viewers would have indiscernible views, if any, of the project. Where visible, the project would be less discernable and any infrequent views of solar arrays would look like a mirage or shadow. Additionally, no area of the preserve would experience full views of the project.

5.2.4 Old Spanish National Historical Trail

The congressionally designated alignment of the Armijo Route of the OSNHT is present just outside of the visual analysis area to the east and south of the project. There are no high-value sites or segments along this portion of the OSNHT. At its closest point, the OSNHT is approximately 3.4 miles from the project, and no visibility along the OSNHT was shown in the viewshed analysis. It is anticipated that there would be negligible or no visual contrast from the proposed project based on the viewshed analysis and analysis from KOP 13. The project would have no discernible visual contrasts with current views from the trail, and the project would not interfere with the trail's nature and purpose or other trail management direction.

6 GLARE ANALYSIS SUMMARY

The purpose of this section is to summarize potential glinting and glare effects that may be introduced by the project as identified in the ForgeSolar Glare Analysis Report (Appendix E). Glare is defined as a semicontinuous and sustained source of light that may appear to sparkle from viewing locations. Glint is typically defined as a sudden, momentary flash of bright light, often caused by a reflection off a moving source. The difference between glint and glare is the duration of light. The ocular impact of solar glare is quantified into three categories (ForgeSolar 2022):

- Green glare has low potential to cause an afterimage (flash blindness) when observed prior to a typical blink response time.
- Yellow glare has potential to cause an afterimage (flash blindness) when observed prior to a typical blink response time.
- Red glare has potential to cause retinal burn and permanent eye damage.

An analysis of the project glare potential was completed using the ForgeSolar Solar Glare Hazard Analysis Tool (SGHAT) (ForgeSolar 2022). The SGHAT meets Federal Aviation Administration (FAA) glare analysis requirements (49 United States Code 471) for solar facilities located on federally regulated airports and was developed in cooperation with the U.S. Department of Energy. The SGHAT is designed to approximate the level of glare and duration of exposure that may be experienced at observation points (OPs) or routes, and the potential for a solar project to result in flash blindness, or to conflict with FAA glare standards for projects at federally regulated airports. While the project is not at a federally regulated airport, the ForgeSolar SGHAT is commonly used to evaluate glare conditions for all types of PV solar projects to support environmental impact analyses in the landscape and near airports, flight paths, and other important OPs.

6.1 Input Parameters

The GlareGauge inputs the specifications of the array including a single-axis tracking system with a north-south orientation, maximum tracking angle of 60°, resting angle of 0°, and a panel height of 7 feet

above ground level. SWCA also assumed a smooth panel surface with anti-reflective coating to provide maximum flexibility in module selection. Modeling was then undertaken for the applicable sensitive receptors: OPs from a casual observer (e.g., hikers, equestrians) representing a 6-foot height, and travel route receptors representing a 4-foot height, the average height of a viewer traveling in a vehicle.
The Baker Airport, approximately 5.8 miles to the northeast, is the nearest airport to the project. No air traffic control tower was included in the analysis because it does not exist at this airport.

6.2 Vehicular Travel Routes

Travelers along I-15 represented by KOPs 1 through 7 (Point Receptors 1–7) and travel routes I-15 – Northbound and I-15 – Southbound experience views that are northeast, east, and southwest of the project and have superior views of the landscape. Travelers along these routes would experience "0" minutes of potential glint or glare; therefore, there are no glare impacts to vehicular travel routes. However, a viewer standing along I-15, represented by OP 4, could experience up to 329 minutes per year of green ocular impact. The glare would occur from mid-November to the end of January from 6:00 a.m. to 7:30 a.m. for approximately 8 minutes per day. OP 8 could experience up to 198 minutes per year of green ocular impact; the glare would occur from the beginning of November to the beginning of February from 6:30 a.m. to 8:00 a.m. for approximately 5 minutes per day.

6.3 Recreation Areas

The Rasor OHV area is adjacent to the project site; however, the potential OPs are widely dispersed, and no formal or official viewing platforms are identified or evident in the area. Other recognized recreation areas and trails are beyond the 3-mile analysis area. From these distant locations, the viewing distance, viewing angle, and presence of intervening and surrounding landform would substantially preclude views of the project and potential glare.

6.4 Residential Areas

The residence located near I-15 and Rasor Road (Point Receptors 2) would have “0” minutes of glint or glare from the project because of views that would be partially to completely screened by topography, vegetation, distance to project, and existing structures.

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APPENDIX A

Outdoor Lighting Impact Assessment Report

Soda Mountain Solar Project
Outdoor Lighting Impact Assessment Report

Submitted to:

Michael Baker INTERNATIONAL

Tony Rai, Sr. Associate - Survey Geomatics
5 Hutton Centre Drive, Suite 500
Santa Ana, CA 92707
949-472-3491
TRai@mbakerintl.com

Prepared by:

AKELA

Harneet Randhawa, PE
801 S Grand Ave, Suite 250
Los Angeles, CA 90014
619-278-1372
Harneet.Randhawa@akelaeng.com

Date: 06/13/2024

I. Table of Contents

II. Executive Summary

This assessment has been prepared for Michael Baker International (MBI) to evaluate the impact of outdoor lighting installations for the Soda Mountain Solar Project in San Bernardino County, Baker, CA. Evaluation of these conceptual outdoor lighting methodologies has been completed by Akela Engineering and Consulting (Akela). The following summary contains a background of project information, applicable codes and requirements, and a description of recommended design solutions. In summary, proposed outdoor lighting installations for this project will have negligible impact on the surrounding areas with almost no observable lighting issues such as glare, skyglow and light trespass.

Background

The 2,670-acre project site is located approximately 7 miles southwest of the community of Baker in unincorporated San Bernadino County, California, approximately 50 miles northeast of Barstow. The project is bounded directly to the east by the Mojave National Preserve (administered by the National Park Service) and BLM lands, including the Rasor Off-Highway Vehicle (OHV) recreation area at the southeast corner. Interstate 15 (I-15), the former Arrowhead Trail Highway, runs along the western boundary of the project site, with Rasor Road Services Shell Oil gas station located off I-15 southwest of the project site, along the access road to the project site. Primary access to the project site is from a north-bound exit off I-15. The purpose of this project is to generate up to 300 megawatts (MW) of renewable energy through solar power inputs and include up to 300 MW of battery storage.

A preliminary submission of this project to the California Energy Commission (CEC) for review purposes resulted in further information being requested in relation to proposed outdoor lighting design elements of this project.

The purpose of this study is to evaluate the extent of impacts from any proposed outdoor lighting installations resulting from the successful activation of this project.

Relevant Codes & Documents

An assessment was performed in accordance with the 2022 California Electrical codes, as well as authorities having jurisdiction (AHJ) including California Bureau of Land Management. Applicable regulations set forth by the 2022 California Green Building Standards Code, Title 24 Energy Efficiency Standards have been cited in the full analysis.

The following documents were used in the preparation of this report:

- Soda Mountain Solar Project Environmental Impact Report, September 2023
- Soda Mountain Solar Project Preliminary Civil Design Plans, August 2023
- 2022 California Electrical Code
- 2022 Administrative Regulations, Title 24, Part 1
- 2022 Building Energy Efficiency Standards, Title 24, Part 6
- Joint IDA-IESNA Model Outdoor Lighting Ordinance (MLO), June 2011
- Best Management Practices for Artificial Light at Night on BLM-Managed Lands, Technical Note 457, April 2023
- 2023 FHWA Lighting Handbook, US Department of Transportation, Federal Highway Administration
- 2024 Code of Federal Regulations (CFR), Title 29, Subtitle B, Chapter XVII, Part 1926, Subpart D - Occupational Health and Environmental Controls, Section 1926.56 – Illumination
- 2024 CEQA Statute & Guidelines Handbook, Appendix G

Anticipated Outdoor Lighting Scope of Work

The project area appears to be quite extensive at first glance, but the very nature of this project severely limits the need for wide-ranging outdoor lighting installations. The outdoor lighting can be best described as Lighting Zone LZ1 or Low ambient illumination per Section 140.7 of Title 24, California Code of Regulations, Part 6. All outdoor lighting provided on this project will be for site and building access, and security purposes only. There will be no sign lighting on this project. A conceptual plan with a list of proposed luminaires for this project is demonstrated in Exhibit 1 of the Appendices. Per this assessment, it is anticipated that outdoor lighting will be provided in the below areas only:

1) **Outdoor areas:**
   a) Parking areas – ~13,000 sq. ft.
   b) Switchyard entrance
   c) BESS yard entrance
   d) HV Substation entrance
   e) Equipment storage areas entrances
2) **Access roads:**
   a) Rasor Rd North connector to HV Substation (I-15 on/off ramp only)
   b) Rasor Rd South connector to Solar Array area (I-15 on/off ramp only)
3) **Buildings:**
   a) Substation - ~6,000 sq. ft.
   b) Switchyard - ~6,000 sq. ft.
   c) Operations and Maintenance - ~5,000 sq. ft.
   d) Maintenance Facility - ~2,400 sq. ft.
   e) Warehouse Facility – 6,000 sq. ft.

III. Outdoor Lighting Impact Assessment

Glossary of Lighting Terminology

Discussions of lighting issues include precise definitions, descriptions, or terminology of the specific lighting technical parameters. The following glossary summarizes explanations of the technical lighting terms utilized in this Study and the related practice standards to facilitate discussion of these issues. The following technical terms are used in this Study.

Brightness: The magnitude of sensation that results from viewing surfaces from which light comes to the eye. This sensation is determined partly by the measurable luminance of the source and partly by the conditions of observation (Context), such as the state of adaptation of the eye. For example, very bright lamps at night appear dim during the day, because the eye adapts to the higher brightness of daylight.

BUG Rating: A luminaire classification system established in IES TM15-11, BUG Ratings Addendum that provides for uniform assessment of the directional characteristics of illumination for exterior area lighting. BUG is an acronym composed of Backlight, Uplight, and Glare. BUG ratings are based on a zonal lumen calculations for secondary solid angles defined in IES TM15-11.

Candela: Measure of light energy from a source at a specific standard angle and distance. Candela (cd) is a convenient measure to evaluate output of light from a lamp or light fixture in terms of both the intensity of light and the direction of travel of the light energy away from the source.

Contrast: Calculated evaluation of high, medium and low contrast of visible light sources or surfaces within the Property by a ratio of luminance. Contrast is the ratio of one surface luminance to a second surface luminance or to the field of view. Contrast exceeding 30 to 1 are usually deemed uncomfortable; 10 to 1 are clearly visible; and less than 3 to 1 appear to be equal.

Fully Shielded: A lighting fixture constructed in such a manner that all light emitted by the fixture, either directly from the lamp or a diffusing element, or indirectly by reflection or refraction from any part of the Luminaire, is projected below the horizontal as determined by photometric test or certified by the manufacturer. Any structural part of the light fixture providing this shielding must be permanently affixed. In other words, no light shines above the horizontal from any part of the fixture.

Glare: Glare is visual discomfort experienced from high luminance or high range of luminance. For exterior environments at night, glare occurs when the range of luminance in a visual field is too large. The light energy incident at a point is measured by a scale of footcandles or lux, and is described in the technical term Illuminance. This incident light is not visible to the eye until it is reflected from a surface, such as pavement, wall, dust in the atmosphere or the surface of a light bulb. The visible brightness of a surface is measured in footlamberts (or metric equivalent candelas per square meter) and is described by the term Luminance.

The human eye processes brightness variations across a very broad spectrum of intensities. The range of brightness generated by direct noon sun versus a moonlight evening is over 5000 to 1. Human eyes are capable of accommodating to this range of intensities given adequate time to adjust. However, the eye cannot process brightness ratios of more than 30 to 1 within a view without discomfort. See IESNA 10th Edition Handbook, Section 4.10.1, Discomfort Glare and Section 10.9.2 Calculating Glare.

For the purpose of this analysis, brightness of light sources may be described subjectively by the following criteria:

High Contrast Conditions: View of light fixture emitting surface, such as a lens, reflector, or lamp, where brightness contrast ratio exceeds 30 to 1 (source Luminance to background Luminance ratio in footlamberts).

Medium Contrast Conditions: Brightly lighted surfaces where contrast ratio exceeds 10 to 1 but is less than 30 to 1 (lighted surface Luminance to background Luminance ratio in footlamberts).

Low Contrast Conditions: Illuminated surfaces where contrast ratio exceeds 3 to 1, but less than 10 to 1 (source Luminance to background Luminance ratio in footlamberts).

Illuminance: Illuminance is the means of evaluating the density of Luminous Flux. Illuminance indicates the amount of Luminous Flux from a light source falling on a given area. Illuminance is measured in footcandles (fc) which is the lumens per square foot, or Lux (lumens per square meter). Illuminance need not necessarily be related to a real surface since it may be measured at any point within a space. Illuminance is determined from the Luminous intensity of the light source. Illuminance of a

point source decreases with the square of the distance from the light source (see Inverse Square Law definition).

Horizontal Illuminance: Illuminance incident upon a horizontal plane. The orientation of the illuminance meter or calculation point will be 180deg from Nadir.

Vertical Illuminance: Illuminance incident upon a vertical plane. The orientation of the illuminance meter or calculation point will be 90deg from Nadir.

Light Source: Device which emits light energy from an electric power source.

Light Trespass: Electric light from subject property incident onto adjacent properties, measured in footcandles or lux, usually analyzed by measurement at or near the adjacent property line.

Luminaire: A complete lighting unit consisting of a light source together with parts designed to distribute the light, to position and protect the light source, and to connect the light source to the power supply. Also referred to as a Light Fixture.

Luminance: Luminance is a measure of emissive or reflected light from a specific surface in a specific direction over a standard area. Luminance is measured in footlamberts (fL) (1/π Candela per square foot) or cd/m2 (Candela per square meter). 1fL = 3.43 cd/m2.

Whereas Illuminance indicates the amount of Luminous Flux falling on a given surface, Luminance describes the brightness of an illuminated or luminous surface. Luminance is defined as the ratio of luminous intensity of a surface (Candela) to the projected area of this surface (m2 or ft2).

Luminous Flux: Mean value of total Candelas produced by a light source. Luminous Flux describes the total amount of light emitted by a light source. The unit for measuring Luminous Flux is Lumen (lm).

This radiation could basically be measured or expressed in watts. This does not, however, describe the optical effect of a light source adequately since the varying spectral sensitivity of the eye is not taken into account. To include the spectral sensitivity of the eye the Luminous Flux is measured in lumen. Radiant Flux or 1 W emitted at the peak of the spectral sensitivity (in the photopic range at 555 nanometers produces a Luminous Flux of 683 lumen). The unit of lumen does not define direction.

Skyglow: Skyglow is the description of luminous atmospheric background and results from both natural and human made conditions. Natural causes of skyglow include sunlight reflected from the surface of the earth and moon, sunlight illuminating the upper atmosphere, and visible illumination from other interplanetary sources. Human made causes of skyglow include electric light that is emitted directly upward into the sky (Uplight) or reflected off of the ground.

Project Description

The project (Soda Mountain Solar Power Generating Station) is located entirely on federally owned land managed by the BLM. The 2,670-acre project site is located approximately 7 miles southwest of the community of Baker in unincorporated San Bernadino County, California, approximately 50 miles northeast of Barstow. The project site is in

portions of Sections 1 and 11–14, Township 12 North, Range 7 East; Sections 25 and 36, Township 13 North, Range 7 East; Sections 6, 7, 8, and 18, Township 13 North, Range 8 East, San Bernardino Meridian, California.

The project is bounded directly to the east by the Mojave National Preserve (administered by the National Park Service) and BLM lands, including the Rasor Off-Highway Vehicle (OHV) recreation area at the southeast corner. Interstate 15 (I-15), the former Arrowhead Trail Highway, runs along the western boundary of the project site, with Rasor Road Services Shell Oil gas station located off I-15 southwest of the project site, along the access road to the project site. Primary access to the project site is from a north-bound exit off I-15. Infrastructure surrounding the site includes the four-lane I-15, two high-voltage electric transmission lines, an electrical distribution line, wireless cellular telephone towers, two fiber-optic cables, and two fuel pipelines. The two high-voltage electrical transmission lines to the west of I-15 are a 115-kV sub-transmission line owned by Southern California Edison (SCE) and the Marketplace-Adelanto 500-kV transmission line operated by the Los Angeles Department of Public Works (LADWP), as shown on Exhibit 1 in the Appendices. There is no existing nighttime lighting on this project site and the closest permanent outdoor lighting is located at the Rasor Rd off ramp where this is light commercial activity with a gas station. Since this is a rural area of the I-15 freeway corridor, there are no existing streetlights in the vicinity either.

This project is a solar power generating station and as such almost all the visible building materials utilized onsite will be metallic in nature. For instance, all buildings will be typical industrial steel metal sheds. All exposed surfaces will have ridges or grooves and are not expected to be flat and polished. Typical metal sheds color options range from light to dark surfaces as demonstrated in Exhibit 2 of the Appendices. This project will consider using the darker colors to absorb as much direct sunlight as possible. All glass for windows and doors can be made available with anti-reflective options. As such, no portion of these buildings can be considered as specular reflective surfaces. Other site appurtenances will be typical substation installations which are expected to be mostly stainless steel in H-Frame, A-Frame, and stand-alone pole installations; the surface area of these installations is quite narrow to be concerned about glare producing reflections.

The remaining installations will be solar power panels and no outdoor luminaires will be installed in the solar array areas. This is because there is no operational need for any nighttime access to these arrays and if needed portable mobile lighting solutions can be utilized. Several studies have also demonstrated that modern solar panels do not contribute to any daytime glare effects as well; National Renewable Energy Laboratory (NREL) has compiled a list of these studies on their website. Click here for access: *Research and Analysis Demonstrate the Lack of Impacts of Glare from Photovoltaic Modules | State, Local, and Tribal Governments | NREL*

Review of Outdoor Lighting Regulations & Reference Standards

Outdoor lighting is regulated throughout California by the state energy and building codes, and other AHJ codes. Reference standards include model lighting ordinances provided by the Illuminating Engineering Society of North America (IESNA) and the International Dark Sky Association (IDA), and the U.S. Green Building Council. Various aspects of these reference standards are included in state and AHJ regulations to improve the outcomes of any approved project and avoid future disputes or legal challenges to proposed outdoor lighting installations. The lighting standards summarized below balance the requirements of property owners for sufficient brightness and flexibility for the use of a particular property, while minimizing the off-site negative effects of Skyglow, Light Trespass and Glare. In a case where there are conflicting and overlapping requirements from several sources, the most stringent requirement or direction given by the AHJ will be enforced. All luminaires that are intended to light the right of way on publicly maintained roads, sidewalks, or bikeways, such as the public portion of the I-15 freeway on/off ramp, will be exempted from these requirements.

2022 Administrative Regulations, Title 24, Part 1

This article applies to all residential and nonresidential buildings and contains administrative regulations relating to the energy building regulations in Title 24, Part 6. The specific section of this code utilized in our assessment is *Section 10-114 Determination of Outdoor Lighting Zones and Administrative Rules For Use* which contains the table of lighting zones as demonstrated in Exhibit 3 below.

Zone	Ambient Illumination	State wide Default Location	Moving Up to Higher Zones	Moving Down to Lower Zones
LZ0	Very Low	Undeveloped areas of government design at ed parks, recreation areas, and wildlife preserves.	Undeveloped areas of government design at ed parks, recreation areas, and wildlife preserves can be designated as LZ1 or LZ2 if they are contained within such a zone.	Not applicable
LZ1	Low	Rural areas, as defined by the 2010 U.S. Census . These areas include: single or dual family residential areas, parks, and agricultural zone districts, developed portion of government designated parks, recreation areas, and wildlife preserves. Those that are wholly contained within a higher lighting zone may be considered by the local government as part of that lighting zone.	Developed portion of a government designated park, recreation area, or wildlife preserve, can be designated as LZ2 or LZ3 if they are contained within such a zone. Retail stores, located in a residential neighborhood, and rural town centers, as defined by the 2010 U.S. Census, can be designated as LZ2 if the business operate s during hours of darkness.	Not applicable.
LZ2	Moderate	Urban clusters, as defined by the 2010 U.S. Census. The following building types may occur here: multifamily housing, mixed use residential neighborhoods, religious facilities, schools, and light commercial business districts or industrial zoning districts.	Special districts within a default LZ2 zone may be designated as LZ3 or LZ4 by a local jurisdiction. Examples include special commercial districts or areas with special security considerations located within a mixed-use residential area or city center .	Special districts may be designated as LZ1 by the local jurisdiction, without any size limits.
LZ3	Moderately High	Urban areas, as defined by the 2010 U.S. Census. The following building types may occur here: high intensity commercial corridors, entertainment centers, and heavy industrial or manufacturing zone districts.	Special districts within a default LZ3 may be designated as a LZ4 by local jurisdiction for high intensity nighttime use, such as entertainment or commercial districts or areas with special security considerations requiring very high light levels.	Special districts may be designated as LZ1 or LZ2 by the local jurisdiction, without any size limits.
LZ4	High	None.	Not applicable.	Not applicable.

Exhibit 3: Table 10-114-A Lighting Zone Characteristics and Rules For Amendments By Local Jurisdictions

Based on the above criteria, the project site can be designated with a Lighting Zone LZ1 category and this parameter will be utilized to understand the impact of proposed ambient illumination levels for this project.

2022 Building Energy Efficiency Standards, Title 24, Part 6

The Building Energy Efficiency Standards serve to reduce wasteful, uneconomical, and unnecessary uses of energy for the state. They include requirements in the Energy Code (Title 24, Part 6) and voluntary energy efficiency provisions in CALGreen (Title 24, Part 11). Outdoor lighting installations of this project will follow prescriptive requirements set forth in Title 24, Part 6; specifically, *Section 130.2 – Outdoor Lighting Controls and Equipment* and *Section 140.7 – Prescriptive Requirements for Outdoor Lighting.* These requirements are summarized below for ease of reference:

- Per Section 130.2 (b), all outdoor luminaires of 6,200 initial luminaire lumens or greater, shall comply with applicable Backlight, Uplight, and Glare (BUG) rating

- Per Section 130.2 (c) 1-3, all outdoor luminaires shall be controlled by a photocell for daylight harvesting and provided with automatic scheduling controls. Some of these lights intended to be used for security purposes will also have motion sensing controls.
- Per Section 140.7 (a) – (d), all outdoor luminaires shall have a maximum lighting power density calculated per the allowed lighting power method.

Joint IDA-IES Model Lighting Ordinance (IDA/IES MLO-11)

As more impacts to the environment by lighting have been identified, an international "dark sky" movement is advocating for the precautionary approach to outdoor lighting design. Many communities have passed anti-light-pollution laws and ordinances. However, there is little or no agreement among these laws, and they vary considerably in language, technical quality, and stringency. This is confusing for designers, engineers, and code officials. The lack of a common basis prevents the development of standards, educational programs, and other means of achieving the goal of effective lighting control. This MLO will allow communities to drastically reduce light pollution and glare and lower excessive light levels. These recommended practices of the IES can be met using readily available, reasonably priced lighting equipment.

We propose utilizing the prescriptive method as defined in Section IV. Non-Residential Lighting with the below criteria:

1) *Total Site Lumen Limit*
   a) Proposed outdoor lighting solutions shall not exceed this limit calculated per the Hardscape Area method
2) *Limits to Off Site Impacts*
   a) All luminaires shall be rated and installed according to Table C from this ordinance as shown in Exhibit 4 below
3) *Light Shielding for Parking Lot Illumination*
   a) All parking lot lighting shall have no light emitted above 90 degrees

Table C - Maximum Allowable Backlight, Uplight and Glare (BUG) Ratings

May be used for any project. A luminaire may be used if it is rated for the lighting zone of the site or lower in number for all ratings B, U and G. Luminaires equipped with adjustable mounting devices permitting alteration of luminaire aiming in the field shall not be permitted.

TABLE C-1	Lighting Zone 0	Lighting Zone 1	Lighting Zone 2	Lighting Zone 3	Lighting Zone 4
Allowed Backlight Rating*					
Greater than 2 mounting heights from property line	B1	B3	B4	B5	B5
1 to less than 2 mounting heights from property line and ideally oriented**	B1	B2	B3	B4	B4
0.5 to 1 mounting heights from property line and ideally oriented**	B0	B1	B2	B3	B3
Less than 0.5 mounting height to property line and properly oriented**	B0	B0	B0	B1	B2

Table C - 2 Maximum Allowable Uplight (BUG) Ratings - Continued

TABLE C-2	Lighting Zone 0	Lighting Zone 1	Lighting Zone 2	Lighting Zone 3	Lighting Zone 4
Allowed Uplight Rating	U0	U1	U2	U3	U4
Allowed % light emission above 90° for street or Area lighting	0%	0%	0%	0%	0%

Table C - 3 Maximum Allowable Glare (BUG) Ratings - Continued

TABLE C-3	Lighting Zone 0	Lighting Zone 1	Lighting Zone 2	Lighting Zone 3	Lighting Zone 4
Allowed Glare Rating	G0	G1	G2	G3	G4
Any luminaire not ideally oriented*** with 1 to less than 2 mounting heights to any property line of concern	G0	G0	G1	G1	G2
Any luminaire not ideally oriented*** with 0.5 to 1 mounting heights to any property line of concern	G0	G0	G0	G1	G1
Any luminaire not ideally oriented*** with less than 0.5 mounting heights to any property line of concern	G0	G0	G0	G0	G1

Exhibit 4: Table C – Maximum Allowable Backlight, Uplight and Glare (BUG) ratings

BLM Technical Note 457

The mission of the Bureau of Land Management (BLM) is to sustain the health, diversity, and productivity of the public lands for the use and enjoyment of present and future generations. BLM-managed lands provide differing types of activities, developments, and visitor services that include outdoor lighting where appropriate to provide for worker and visitor safety, security, and enjoyment. Due to growing public concern and research available about light pollution, this technical note provides a set of best practices for outdoor lighting.

Per *Section 3.1.2 – Types of Light Pollution*, there are different types of light pollution and associated effects:

- Glare
  - Possible exposure because this project utilizes pole top luminaires
- Skyglow
  - Possible exposure because this project utilizes pole top luminaires
- Light trespass
  - Not applicable to this project because lighting installations are far away from the property line
- Light clutter
  - Not applicable to this project because lighting is sparse
- Over-illumination
  - Not applicable to this project because lighting is low intensity and task driven only

Per *Section 4 – Principles of Artificial Light at Night to Avoid Light Pollution*, below best practices have been identified:

- Warmer color temperatures lighting 2200K - 3000K shall be utilized
- Automatic scheduling via lighting controls shall be used to provide lighting when needed
- When operational, this facility has no nighttime lighting requirements and as such all outdoor lighting will be task driven only such as building access or security lighting
- Only LED luminaires shall be utilized on this project

Per *Section 5 - BMPs for Artificial Light at Night on BLM-Managed Lands,* consideration has been given to nearby Astronomical Observatories and there is no such facility within 100 miles radius of this project site. The closest observatory is Mt. Potosi observatory which is in Mountain Springs, Nevada - more than 100 miles away from this project site.

Review of Proposed Outdoor Luminaires

Outdoor lighting requirements can arise from several use cases throughout the life cycle of this project. However, they can be differentiated into two broad categories: Permanent and Temporary. All permanent lighting installations are provided for access and security purposes for the entire post-construction lifecycle of this project. Temporary lighting will be mainly needed for construction activities and any unplanned maintenance operations during non-personnel hours after occupancy.

Permanent Outdoor Lighting

Exhibit 1 in the Appendices illustrates a conceptual lighting plan with proposed outdoor luminaires in the below project site areas:

1) **Outdoor areas:**
    i) *Suggested 25ft pole top luminaires to illuminate access/security pathways to all the below areas*
    ii) *These luminaires will be controlled by a photocell for daylight harvesting, automatic shut-off past operating hours and auto dim to 50% when unoccupied during operating hours*
    iii) *All luminaires will be 2200K-3000K CCT, fully shielded and have the appropriate BUG rating to be dark-sky compliant*
    b) Parking areas – ~13,000 sq. ft.
    c) Switchyard entrance
    d) BESS yard entrance
    e) HV Substation entrance
    f) Equipment storage areas entrances
2) **Access roads:**
    i) *Noted for record only. On/Off ramp to Rasor Rd North & South from I-15 is under Department of Transportation jurisdiction and current review of outdoor lighting requirements from 2023 FHWA Lighting Handbook suggests that no additional lighting is needed on this public right-of-way*
    ii) *Should outdoor lighting be required, then all 25ft pole top luminaires can be fully shielded and have the appropriate BUG rating to be dark-sky compliant*
    b) Rasor Rd North connector to HV Substation (I-15 on/off ramp only)
    c) Rasor Rd South connector to Solar Array area (I-15 on/off ramp only)
3) **Buildings:**
    i) *Suggested 10ft wallpack luminaires to illuminate access/security pathways to all the below buildings*

ii) *These luminaires will be controlled by a photocell, automatic shut-off past operating hours and auto dim to 50% when unoccupied during operating hours*
iii) *All luminaires will be 2200K-3000K, fully shielded and have the appropriate BUG rating to be dark-sky compliant*

b) Substation - ~6,000 sq. ft.
c) Switchyard - ~6,000 sq. ft.
d) Operations and Maintenance - ~5,000 sq. ft.
e) Maintenance Facility - ~2,400 sq. ft.
f) Warehouse Facility – 6,000 sq. ft.

To summarize, all luminaires will have the necessary accessories and options to be dark sky compliant. As such, the International Dark-Sky Association Fixture Seal of Approval is not required for this project. Using commercially available luminaires offers the best balance of cost, availability and maintenance and we have demonstrated how adding luminaires options can successfully mitigate all light pollution. This concept lighting plan should be deemed sufficiently reasonable and further certification of individual luminaires will not be required.

Temporary Outdoor Lighting

As noted in *Section 3 – Project Description* of this report, much of the project site use is comprised of solar panel arrays and these areas have no requirements for permanent outdoor lighting installations. It is anticipated that any task driven lighting can be provided by use of portable vehicle-mounted lights or mobile light towers as needed for any unplanned activities outside of personnel hours.

Outdoor lighting provided for construction purposes will be temporary in nature and will be governed by Occupational Health and Safety (OSHA) standards. An excerpt of these lighting requirements from CFR / 1926.56 is demonstrated below in Exhibit 5.

Table D-3—Minimum Illumination Intensities in Foot-Candles

Foot-candles	Area or operation
5	General construction area lighting.
3	General construction areas, concrete placement, excavation and waste areas, accessways, active storage areas, loading platforms, refueling, and field maintenance areas.
5	Indoors: warehouses, corridors, hallways, and exitways.
5	Tunnels, shafts, and general underground work areas: (Exception: minimum of 10 foot-candles is required at tunnel and shaft heading during drilling, mucking, and scaling. Bureau of Mines approved cap lights shall be acceptable for use in the tunnel heading.)
10	General construction plant and shops (e.g., batch plants, screening plants, mechanical and electrical equipment rooms, carpenter shops, rigging lofts and active storerooms, barracks or living quarters, locker or dressing rooms, mess halls, and indoor toilets and workrooms).
30	First aid stations, infirmaries, and offices.

Exhibit 5: Table D-3 – Minimum Illumination Intensities in Foot-Candles

This project will utilize standard 4000K LED luminaires for all temporary outdoor lighting to support construction activities to provide the best illuminance for construction worker safety.

Significance Threshold

Appendix G of the California Environmental Quality Act (CEQA) Guidelines (14 California Code of Regulations, Sections 15000–15387) provides a set of sample questions to evaluate impacts regarding aesthetics, including light and glare. The question that pertains to Light Trespass and Glare is as follows:

Would the project:

- Create a new source of substantial light and glare which would adversely affect day or nighttime views in the area?

In the context of this question from Appendix G of the CEQA Guidelines, the determination of significance in this Study considers the following factors:

- The change in ambient nighttime levels because of project light sources; and
- The extent to which project lighting would spill off the Property and affect adjacent properties

Specifically, the Permanent Outdoor Lighting would create a Less Than Significant Impact regarding artificial light or glare because:

- Outdoor lighting installations are deep seated on the site and far away from the property line demarcations
- Outdoor luminaires will be fully shielded and utilize the applicable BUG ratings to be dark-sky compliant
- No outdoor sign lighting will be utilized on this project

In addition, the Temporary Outdoor Lighting would create momentary Potentially Significant Impact regarding artificial light or glare if:

- Unshielded and floodlights are utilized for maximum site coverage close to the property line demarcations
- Glare is produced with new high contrast conditions, with luminance greater than 600 cd/m2 or contrast ratio greater than 30:1, visible from a field of view during construction activities near the Rasor Rd Rest Area

IV. Conclusion

Following the required codes and the proposed outdoor lighting system design criteria, it is feasible to conclude that this project poses almost no impact to surrounding areas. This report identifies and summarizes the regulatory requirements and best design practices to achieve dark sky compliance from permanent outdoor lighting installations. This report acknowledges that there may be periods of potential significant impacts from temporary lighting from construction activities taking place near the property line demarcations. The project stakeholders are aware of these limitations and will provide a detailed lighting management plan prior to construction start to mitigate as much construction related impact as feasible; while keeping in mind to strike the balance of adhering to labor safety laws.

The outdoor lighting impact issues focused around three key subjects: Light Trespass, Glare and Skyglow. This study establishes that:

- Light Trespass is not applicable to this project as no permanent outdoor lighting will be installed close to any of the property line demarcations
- Glare will be significantly reduced by employing mitigation measures such as fully shielded luminaries and applicable BUG ratings to be dark-sky compliant
- Skyglow will be mostly eliminated because almost all permanent outdoor lighting will normally be automatically turned off during non-personnel hours during nighttime. Select luminaires may be left ON 24/7 for security purposes but they will not produce light spill as they will also auto-dim to 50% on vacancy

V. Appendices

ACCESS LIGHTING AREA#A USING:

- 25FT POLE TOP LUMINAIRES

ACCESS LIGHTING AREA#B USING:

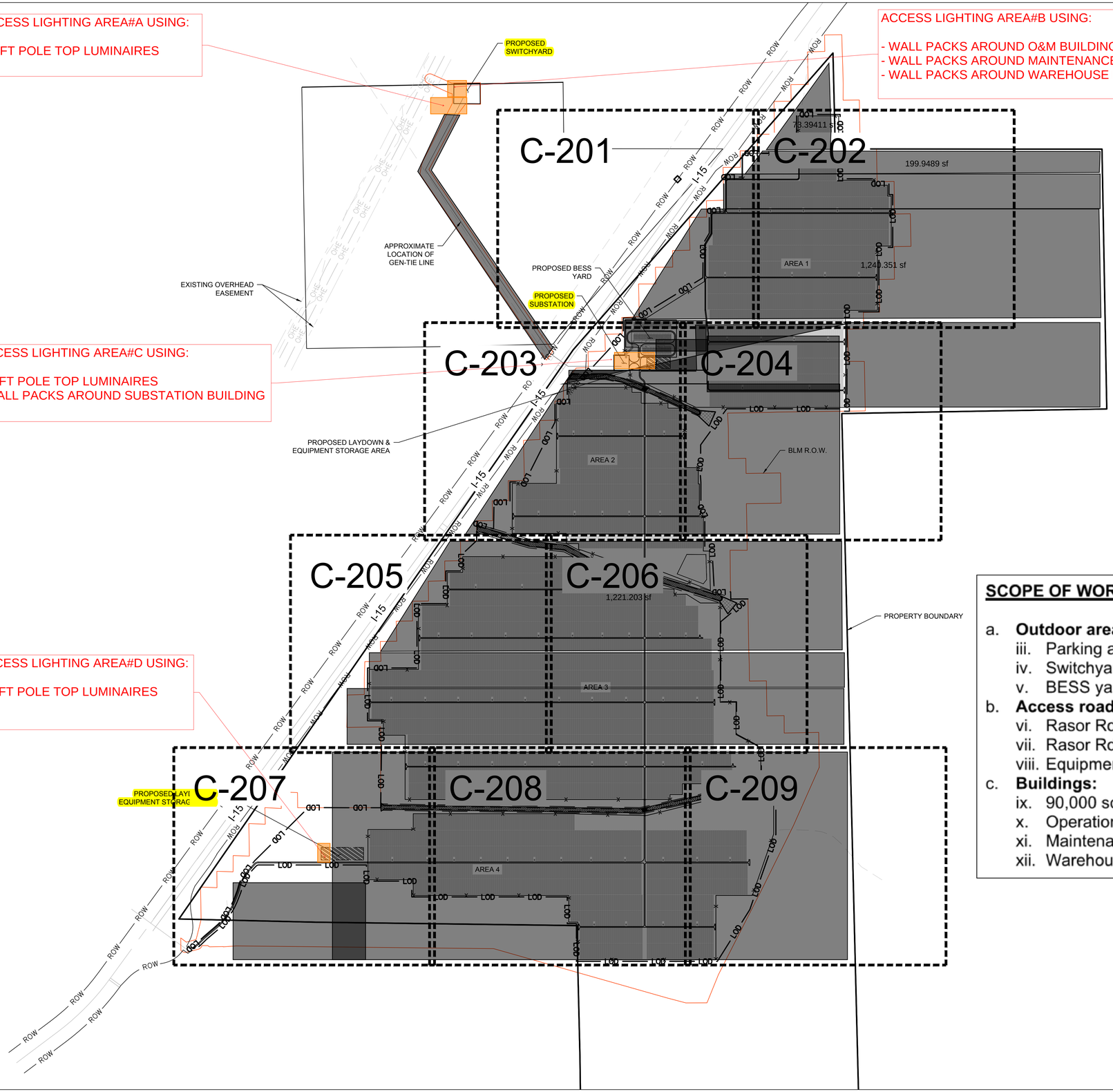
- WALL PACKS AROUND O&M BUILDING
- WALL PACKS AROUND MAINTENANCE BUILDING
- WALL PACKS AROUND WAREHOUSE BUILDING

ACCESS LIGHTING AREA#C USING:

- 25FT POLE TOP LUMINAIRES
- WALL PACKS AROUND SUBSTATION BUILDING

ACCESS LIGHTING AREA#D USING:

- 25FT POLE TOP LUMINAIRES



LEGEND

LIGHTING ZONE

DARK ZONE

EXHIBIT 1 - SODA MOUNTAIN SOLAR PROJECT - CONCEPTUAL OUTDOOR LIGHTING PLAN

SCALE: 1" = 1000'

SCOPE OF WORK AREA

a. **Outdoor areas:**
   iii. Parking areas - 13,200 sq. ft.
   iv. Switchyard - 5 acres.
   v. BESS yard - 18 acres.
b. **Access roads:**
   vi. Rasor Rd North connector to HV substation.
   vii. Rasor Rd South connector to Sollar Array area.
   viii. Equipment maintenance roads in east west direction throughout solar array.
c. **Buildings:**
   ix. 90,000 sq. ft. HV substation.
   x. Operations and Maintenance building – 5,000 sq. ft.
   xi. Maintenance facility – 2,400 sq. ft.
   xii. Warehouse facility – 6,000 sq. ft.

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Exhibit 2 – Standard Metal Buildings Exterior Color Options

*Non-Stock Color: Extended lead times may apply. * The Galvalume coating process is likely to result in variances in spangle (size, number, and reflection) from coil to coil which may result in noticeable shade variations. Galvalume is also subject to variable weathering and may appear to have different shades due to weathering characteristics. These shade variations are not cause for rejection. † ENERGY STAR® Qualified Color. All SP colors have a 25-year finish warranty. Colors shown closely approximate actual coating colors. These colors utilize Cool Coating Technology.

Source: Metal Building Standard Color Options - Rapidset Metal Buildings (rapidsetbuildings.com)

APPENDIX B

Preliminary Landscape Concept Plan

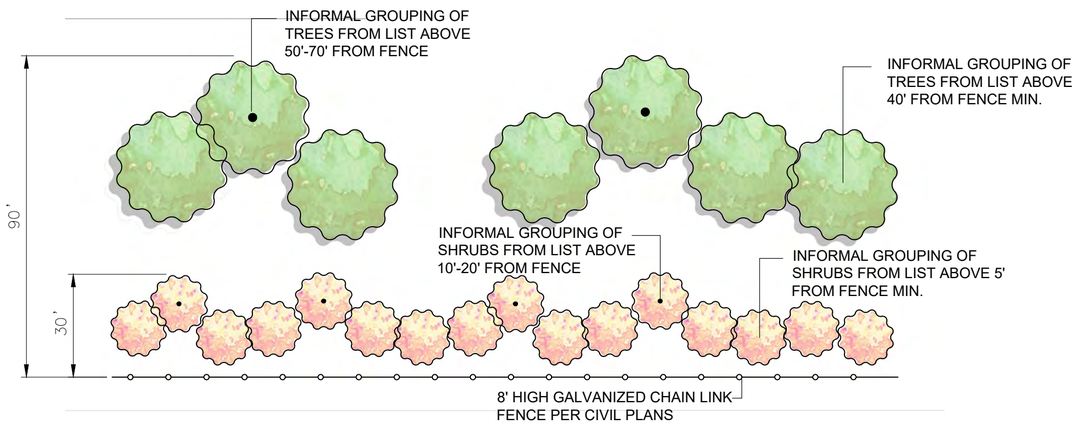
PLANTING LEGEND

SYMBOL	QTY	TREES, SUCH AS:
	6,680 LF	
	335 TREE	

BOTANICAL NAME/ COMMON NAME	WATER USE	SIZE	SPACING	CONTAINER HT.X SP.	EXPECTED HT AT (APPROXIMATE): ONE YEAR	5 YEARS	MATURITY
ACACIA GREGGII - CATCLAW	LOW	24" BOX	15'	6' X 4'	±7'	±9'	±12'
CHILOPSIS LINEARIS - DESERT WILLOW	MOD	24" BOX	25'	6' X 4'	±10'	±15'	±25'
PINUS EDULIS - PINYON PINE	LOW	24" BOX	25'	6' X 4'	±7'	±10'	±15'
PROSOPIS GLANDULOSA - HONEY MESQUITE	LOW	24" BOX	15'	6' X 4'	±7'	±10'	±20'
QUERCUS SPECIES - OAK	LOW	24" BOX	30'	6' X 4'	±7'	±15'	±30'

SYMBOL	QTY	SHRUBS, SUCH AS:
	30,710 LF	
	3,850 SHRUB	

BOTANICAL NAME/ COMMON NAME	WATER USE	SIZE	SPACING	CONTAINER HT.X SP.	EXPECTED HT AT (APPROXIMATE): ONE YEAR	5 YEARS	MATURITY
AMBROSIA SALSOLA - CHEESEBUSH	LOW	5 GAL/ 15 GAL	6'	2' X 2'	±3'	±4'	±6'
ARTEMISIA TRIDENTATA - BIG SAGEBRUSH	LOW	5 GAL/ 15 GAL	10'	2' X 2'	±3'	±5'	±8'
ATRIPLEX CANESCENS - FOURWING SALTBUSH	LOW	5 GAL/ 15 GAL	5'	2' X 2'	±3'	±4'	±5'
ATRIPLEX POLYCARPA - CATTLE SALTBUSH	LOW	5 GAL/ 15 GAL	5'	2' X 2'	±3'	±4'	±6'
BACCHARIS SAROTHROIDES - BROOM BACCHARIS	LOW	5 GAL/ 15 GAL	5'	2' X 2'	±3'	±6'	±8'
CERCOCARPUS BETULOIDES - WESTERN MOUNTAIN MAHOGANY	LOW	5 GAL/ 15 GAL	8'	2' X 2'	±3'	±6'	±10'
CONDEA EMORYI - DESERT LAVENDER	LOW	5 GAL/ 15 GAL	8'	2' X 2'	±3'	±5'	±8'
ERICAMERIA NAUSEOSA - RUBBER RABBITBRUSH	LOW	5 GAL/ 15 GAL	8'	2' X 2'	±3'	±5'	±7'
FORESTIERA PUBESCENS - DESERT OLIVE	LOW	5 GAL/ 15 GAL	6'	2' X 2'	±3'	±5'	±8'
HETEROMELES ARBUTIFOLIA - TOYON	LOW	5 GAL/ 15 GAL	8'	2' X 2'	±3'	±5'	±7'
JUNIPERUS CALIFORNICA - CALIFORNIA JUNIPER	LOW	5 GAL/ 15 GAL	10'	2' X 2'	±3'	±8'	±12'
LARREA TRIDENTATA - CREOSOTE BUSH	LOW	5 GAL/ 15 GAL	6'	2' X 2'	±3'	±5'	±8'
QUERCUS DUMOSA - SCRUB OAK	LOW	5 GAL/ 15 GAL	8'	2' X 2'	±3'	±5'	±7'
RHUS OVATA - SUGAR BUSH	LOW	5 GAL/ 15 GAL	10'	2' X 2'	±3'	±5'	±8'



TYPICAL TREE & SHRUB PLANTING PLAN DETAIL

NOT TO SCALE

PRELIMINARY WATER USE CALCULATIONS

TREE PLANTING AREA*: 6,680' LENGTH X 60' WIDTH = 400,800 SF (9.20 AC)
SHRUB PLANTING AREA*: 30,710' LENGTH X 30' WIDTH = 921,300 SF (21.15 AC)
TOTAL LANDSCAPE AREA*: 400,800 SF (9.20 AC)+921,300 SF (21.15 AC)=1,322,100 SF (30.35 AC)
* INCLUDING IRRIGATED LANDSCAPE AREA SHOWN BELOW.

POINT SOURCE DRIP IRRIGATION AREA:
335 TREES WITH ±15' Ø WET ZONE: 335 X 175 SF = 58,625 SF (1.35 AC)
3,850 SHRUB WITH ±8' Ø WET ZONE: 3,850 X 50 SF = 192,500 SF (4.42 AC)
TOTAL IRRIGATED LANDSCAPE AREA: 58,625 SF (1.35 AC)+192,500 SF (4.42 AC)=251,125 SF (5.77 AC)

MAXIMUM APPLIED WATER ALLOWANCE (MAWA)
MAWA = (ETo)(0.62)[(ETAF x LA) + ((1- ETAF) x SLA)] = GALLONS PER YEAR
MAWA = (86.6)(0.62)[(0.45 x 251,125) + ((0.55) x 0)] = 6,067,532 GALLONS PER YEAR

ESTIMATED TOTAL WATER USE (ETWU) - POINT SOURCE DRIP IRRIGATION
ETWU = Eto x 0.62 x (PF/IE) x Area = GALLONS PER YEAR
ETWU = 86.6 x 0.62 x (0.3/0.81) x 251,125 = 4,993,853 GALLONS PER YEAR

GENERAL DESCRIPTIONS/ DESIGN INTENT

1. ALL LANDSCAPE IMPROVEMENTS SHALL BE DESIGNED IN ACCORDANCE WITH COUNTY OF BERNARDINO LANDSCAPE STANDARDS, CHAPTER 83.10 - LANDSCAPING STANDARDS, CHAPTER 88.01 - PLANT PROTECTION AND MANAGEMENT AND IN ACCORDANCE WITH AB 1881 - STATE WATER CONSERVATION REQUIREMENTS AND THE CALIFORNIA ENERGY COMMISSION REQUIREMENTS.
2. NATIVE AND DROUGHT TOLERANT PLANTS THAT MINIMIZE WATER USE AND MAINTENANCE WILL BE UTILIZED TO SCREEN THE SECURITY FENCE FROM THE I-15 FREEWAY. PLANT MATERIALS WILL BE APPROPRIATE FOR THE DESERT CLIMATE AND FIT IN WITH THE ADJACENT NEIGHBORHOOD.
3. ALL LANDSCAPED AREAS SHALL BE IRRIGATED WITH AN AUTOMATIC DRIP IRRIGATION SYSTEM AS NEEDED.
4. APPLICANT/ PERMITTEE SHALL BE RESPONSIBLE FOR MAINTAINING THE VEGETATION DURING THE LIFE OF THE PERMIT. ALL DEAD, DYING, OR DISEASED PLANTS WILL BE REPLACED IN KIND.

SITE DATA

TOTAL PERVIOUS SURFACE AMOUNT FOR THE PROJECT SITE (LIMITS OF DISTURBANCE AREA)	2,040 AC
NEW SURFACE INCLUDING SOLAR ARRAY MODULE LAYOUT AREAS, BESS YARD, LAYDOWN & EQUIPMENT STORAGE AREAS, SUBSTATION, DRAINAGE CHANNEL & OUTLET PROTECTION FEATURE, BERMS, TEMPORARY SEDIMENT BASINS, LOW WATER CROSSINGS, BOX CULVERTS, TEMPORARY DIVERSION DITCHS, AND CONSTRUCTION ENTRANCES/ EXITS WITH CONCRETE WASHOUT**	1,969.65 AC
SURFACE TO BE REPLACED WITH INTERNAL ACCESS GRAVEL ROADS	40 AC
TOTAL AREA TO BE LANDSCAPED	30.35 AC

** REFER TO "30% CIVIL DESIGN PLANS FOR SODA MOUNTAIN SOLAR PROJECT" PREPARED BY KLEINFELDER, DATED 8/8/2023, FOR ADDITIONAL INFORMATION.

REGISTERED LANDSCAPE ARCHITECT
ALAA CHAABANI LIC.NO. 4732
SIGNATURE
DEC. 31, 2024
RENEWAL DATE
DATE
STATE OF CALIFORNIA

TYPICAL SECTION
TREE PLANTING
NOT TO SCALE

1 YEAR GROWTH | 5 YEAR GROWTH | 15 YEAR GROWTH

TYPICAL SECTION
SHRUB PLANTING
NOT TO SCALE

1 YEAR GROWTH | 5 YEAR GROWTH | 15 YEAR GROWTH

Michael Baker INTERNATIONAL

SODA MOUNTAIN SOLAR PROJECT
PRELIMINARY LANDSCAPE CONCEPT PLAN

SAN BERNARDINO COUNTY, BAKER, CA 92309
JUNE 14, 2024

APPENDIX C

Contrast Rating Worksheets

Form 8400-4
(June 2018)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
VISUAL CONTRAST RATING WORKSHEET

Date: 02/14/2023
District Office: Southern Nevada
Field Office: Barstow
Land Use Planning Area: DRECP

SECTION A. PROJECT INFORMATION

1. Project Name	4. KOP Location (T.R.S)	5. Location Sketch
Soda Mountain Solar Project	T. 12N, R. 7E, S. 10	See location map figure.
2. Key Observation Point (KOP) Name KOP 3 - Communication Tower Road		
3. VRM Class at Project Location VRM Class III	(Lat. Long) 35.139653°N, -116.225778°W	

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Low, pyramidal hills in foreground with smooth slopes interspersed. Flat valley below rugged mountains in background.	Sparse, indistinct vegetation in foreground.	Columnar monopoles, complex lattice transmission structures, and a low, linear highway in foreground.
LINE	Steep diagonal and gentle diagonal hills and slopes in foreground. Horizontal valley floor. Jagged diagonal mountainsides.	Rounded edges of individual creosote bush shrubs.	Simple, vertical monopoles and vertical lattice structures with angular details. Horizontal highway.
COLOR	Light tan and red brown low hills and slopes. Light brown valley floor. Pale brown background mountains.	Olive gray creosote bushes.	Dark brown monopoles and shiny, metallic gray lattice structures. Pale gray highway.
TEX-TURE	Coarse, complex hills and slopes. Smooth, continuous valley floor. Coarse mountains.	Random, patchy creosote bushes.	Rigid, directional transmission corridors. Flat, smooth, continuous highway.

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Geometric graded area.	Geometric cleared area.	Geometric arrays. Geometric facilities. Repeating columnar collection line. Cylindrical & geometric ancillary facilities.
LINE	Straight and geometric lines.	Straight and geometric cleared area.	Angular & straight arrays & ancillary facilities. Vertical collection line with thin, horizontal transmission line.
COLOR	Brown-tan exposed soils.	No perceived change.	Dark grayish/blue arrays. Aluminum support structures. Gravel access roads. Flat gray substation components.
TEX-TURE	Fine, smooth, flowing.	No perceived change.	Repetitive collection lines. Organized, smooth, flowing & continuous arrays.

SECTION D. CONTRAST RATING __SHORT TERM ✓LONG TERM

1. DEGREE OF CONTRAST		FEATURES: LAND/WATER BODY (1)				VEGETATION (2)				STRUCTURES (3)			
		STRONG	MODERATE	WEAK	NONE	STRONG	MODERATE	WEAK	NONE	STRONG	MODERATE	WEAK	NONE
ELEMENTS	FORM			✓				✓			✓		
	LINE			✓				✓			✓		
	COLOR			✓					✓		✓		
	TEXTURE				✓				✓			✓	

2. Does project design meet visual resource management objectives? ✓Yes ___No (Explain on reverses side)

3. Additional mitigating measures recommended ✓Yes ___No (Explain on reverses side)

Evaluator's Names: SWCA Environmental Consultants

Date: 02/21/2023

(Continued on Page 2)

Comments from item 2.

This KOP is located near a communications tower west of the proposed Project area. This area has an elevated view of the southern portion of the valley and views of the surrounding and distant mountains. This area is populated with sparse creosote brush and layers of coarse rock. From this position viewers can see the rich diversity of color (various shades of reds, browns and tans) and textures (fine to coarse) in the valley and surrounding mountains. Development visible from this KOP includes I-15, multiple monopole, H-frame and lattice tower transmission lines, and unimproved gravel roadways.

From this viewpoint the Project would introduce a weak degree of contrast with the geometric grading of the landscape and clearing of vegetation. Solar arrays would be visible from this KOP and would introduce form, line and color not common in the existing landscape. Overall the level of contrast introduced into the landscape at this KOP would be moderate. The landscape would appear moderately altered and Project elements would begin to dominate the visual setting. The Project would introduce form, line and color not common in the landscape and would begin to be prominent in the valley. The degree of existing development does reduce the degree of contrast some as will applying the recommended BMPs, however, the degree of contrast introduced by the Project is still anticipated to remain moderate.

The Project is located on BLM lands classified as a VRM Class III and it is expected that the Project would meet VRM Class III objectives at this KOP as described in the Desert Renewable Energy Conservation Plan.

Additional Mitigating Measures (See item 3)

Additional best management practices (BMPs) to further reduce visual impacts as found in BMPs for Reducing Visual Impacts of Renewable Energy Facilities on BLM-Administered Lands (First Edition - 2013):

Facilities and Structures

- Select materials and surface treatments to repeat form, line, color, and texture of surrounding landscape
- Color treat structures (collectors, support structures, to reduce contrast with the existing landscape
- Use non-reflective materials, coatings and/or paint
- Select surface treatment colors from the BLM standard environmental colors chart, recommended colors include: Shadow Gray, Covert Green and Carob Brown
- Color treat grouped structures with the same color
- Color treat transmission line poles to reduce contrast with the existing landscape
- Maintain painted, stained or coated surfaces properly

Lighting

- Direct lights properly to eliminate light spill and trespass
- Use amber lighting instead of bluish-white lighting

Avoiding Disturbance

- Minimize project footprint and associated disturbance
- Preserve existing vegetation

Vegetation Management

- Preserve existing vegetation

Good Housekeeping
- Maintain a clean worksite

Form 8400-4
(June 2018)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
VISUAL CONTRAST RATING WORKSHEET

Date: 02/10/2023
District Office: Southern Nevada
Field Office: Barstow
Land Use Planning Area: DRECP

SECTION A. PROJECT INFORMATION

1. Project Name Soda Mountain Solar Project	4. KOP Location (T.R.S) T. 12N, R. 7E, S. 11	5. Location Sketch See location map figure.
2. Key Observation Point (KOP) Name KOP 4 - I-15 Northbound - South End		
3. VRM Class at Project Location VRM Class III	(Lat. Long) 35.145084°N, -116.200804°W	

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Broad valley below pyramidal hills in foreground. Combs of trapezoidal mountain ranges in background.	Prominent creosote bush shrubs in immediate foreground. Stunted, woody shrubs throughout valley floor.	Low, columnar fence posts with perpendicular fence wire in foreground.
LINE	Gently sloping, diagonal valley floor. Steep diagonal hillsides and mountainsides.	Tufted, brushy creosote bush foliage in immediate foreground. Faint, indistinct stems throughout valley.	Vertical fence posts, horizontal fence wire.
COLOR	Pale brown soils and gray-brown rocks in valley. Light tan, medium brown, and dark brown hills. Hazy blue mountains.	Olive green creosote bush. Pale gray woody stems.	Metallic gray fencing.
TEX-TURE	Smooth valley floor with striated rocky deposits. Coarse hills and mountains.	Fine shrub canopy.	Linear, continuous fence line.

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Geometric graded area.	Geometric cleared area.	Geometric arrays. Geometric facilities. Repeating columnar collection line. Cylindrical & geometric ancillary facilities.
LINE	Straight and geometric lines.	Straight and geometric cleared area.	Angular & straight arrays & ancillary facilities. Vertical collection line with thin, horizontal transmission line.
COLOR	Brown-tan exposed soil.	No perceived change.	Dark grayish/blue arrays. Aluminum support structures. Gravel access roads. Flat gray substation components.
TEX-TURE	Fine, smooth, flowing.	No perceived change.	Repetitive collection lines. Organized, smooth, flowing & continuous arrays.

SECTION D. CONTRAST RATING __SHORT TERM ✓ LONG TERM

1. DEGREE OF CONTRAST		FEATURES: LAND/WATER BODY (1) STRONG	MODERATE	WEAK	NONE	VEGETATION (2) STRONG	MODERATE	WEAK	NONE	STRUCTURES (3) STRONG	MODERATE	WEAK	NONE
ELEMENTS	FORM			✓				✓		✓			
	LINE			✓				✓		✓			
	COLOR			✓					✓	✓			
	TEXTURE			✓					✓		✓		

2. Does project design meet visual resource management objectives? ___Yes ✓No (Explain on reverses side)

3. Additional mitigating measures recommended ✓Yes ___No (Explain on reverses side)

Evaluator's Names: SWCA Environmental Consultants

Date: 02/21/2023

(Continued on Page 2)

Comments from item 2.

This KOP is located on the north bound lane I-15 (aka Mojave Freeway) west of the proposed Project area. This area showcases typical low angle views of the surrounding valley as vehicular travelers would see headed north on 1-15. This area is populated with sparse creosote brush and layers of coarse rock. From the road viewers can see various colors (browns and tans) and textures (fine to coarse) in the valley and surrounding mountains. Development visible from this KOP includes I-15, low fencing, roadway signage, monopole transmission lines and unimproved gravel roadways.

From this viewpoint the Project would introduce a weak degree of contrast with the geometric grading of the landscape and clearing of vegetation. Solar arrays would be visible from this KOP and would introduce form, line and color not common in the existing landscape. Overall the level of contrast introduced into the landscape at this KOP would be strong. The landscape would appear heavily altered and Project elements would dominate the visual setting. The Project would be out of scale with the natural landscape and would introduce an increased degree of development compared to the development visible from this KOP. The degree of existing development does reduce the degree of contrast some as will applying the recommended BMPs, however, the degree of contrast introduced by the Project is still anticipated to remain strong.

The Project is located on BLM lands classified as a VRM Class III and it is expected that the Project would not meet VRM Class III objectives at this KOP as described in the Desert Renewable Energy Conservation Plan.

Additional Mitigating Measures (See item 3)

Additional best management practices (BMPs) to further reduce visual impacts as found in BMPs for Reducing Visual Impacts of Renewable Energy Facilities on BLM-Administered Lands (First Edition - 2013):

Facilities and Structures

- Select materials and surface treatments to repeat form, line, color, and texture of surrounding landscape
- Color treat structures (collectors, support structures, to reduce contrast with the existing landscape
- Use non-reflective materials, coatings and/or paint
- Select surface treatment colors from the BLM standard environmental colors chart, recommended colors include: Shadow Gray, Covert Green and Carob Brown
- Color treat grouped structures with the same color
- Color treat transmission line poles to reduce contrast with the existing landscape
- Maintain painted, stained or coated surfaces properly

Lighting

- Direct lights properly to eliminate light spill and trespass
- Use amber lighting instead of bluish-white lighting

Avoiding Disturbance

- Minimize project footprint and associated disturbance
- Preserve existing vegetation

Vegetation Management

- Preserve existing vegetation

Good Housekeeping
- Maintain a clean worksite

Form 8400-4
(June 2018)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
VISUAL CONTRAST RATING WORKSHEET

Date: 02/14/2023
District Office: Southern Nevada
Field Office: Barstow
Land Use Planning Area: DRECP

SECTION A. PROJECT INFORMATION

1. Project Name	4. KOP Location (T.R.S)	5. Location Sketch
Soda Mountain Solar Project	T. 13N, R. 8E, S. 30	See location map figure.
2. Key Observation Point (KOP) Name KOP 6 - I-15 Southbound - North End		
3. VRM Class at Project Location VRM Class III	(Lat. Long) 35.177159°N, -116.171929°W	

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Flat valley floor in foreground below pyramidal and trapezoidal hills and mountains.	Amorphous, indistinct creosote bush cover in valley.	Prominent, linear highway in immediate foreground.
LINE	Horizontal valley floor. Steep diagonal hillsides and mountainsides.	Horizontal shrub canopy with diffuse edges of individual shrubs.	Horizontal road surface.
COLOR	Pale gray valley floor. Light tan and dark brown hills. Hazy blue mountains.	Olive green creosote bush shrubs.	Dark gray asphalt with bright yellow and white road paint.
TEX-TURE	Smooth, continuous valley floor. Coarse hills and mountains.	Fine, smooth shrub canopy.	Rigid, smooth roadway.

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Geometric graded area.	Geometric clearing area.	Geometric arrays. Geometric facilities. Repeating columnar collection line. Cylindrical & geometric ancillary facilities.
LINE	Straight and geometric lines.	Straight and geometric cleared area.	Angular & straight arrays & ancillary facilities. Vertical collection line with thin, horizontal transmission line.
COLOR	Brown-tan exposed soil.	No perceived change.	Dark grayish/blue arrays. Aluminum support structures. Gravel access roads. Flat gray substation components.
TEX-TURE	Fine, smooth, flowing.	No perceived change.	Repetitive collection lines. Organized, smooth, flowing & continuous arrays.

SECTION D. CONTRAST RATING __SHORT TERM ✓ LONG TERM

1. DEGREE OF CONTRAST		FEATURES: LAND/WATER BODY (1)				VEGETATION (2)				STRUCTURES (3)			
		STRONG	MODERATE	WEAK	NONE	STRONG	MODERATE	WEAK	NONE	STRONG	MODERATE	WEAK	NONE
ELEMENTS	FORM			✓				✓			✓		
	LINE			✓				✓			✓		
	COLOR			✓					✓			✓	
	TEXTURE				✓				✓			✓	

2. Does project design meet visual resource management objectives? ___Yes ✓No (Explain on reverses side)

3. Additional mitigating measures recommended ✓Yes ___No (Explain on reverses side)

Evaluator's Names: SWCA Environmental Consultants

Date: 02/21/2023

(Continued on Page 2)

Comments from item 2.

This KOP is located on the south bound lane I-15 (aka Mojave Freeway) west of the proposed Project area. This area showcases typical low angle views of the surrounding valley as vehicular travelers would see headed south on 1-15. This area is populated with sparse creosote brush and layers of coarse rock. From the road viewers can see various colors (browns and tans) and textures (fine to coarse) in the valley and surrounding mountains. Development visible from this KOP includes I-15, low fencing, monopole transmission lines and unimproved gravel roadways.

From this viewpoint the Project would introduce a weak degree of contrast with the geometric grading of the landscape and clearing of vegetation. Solar arrays would be visible from this KOP and would introduce form, line and color not common in the existing landscape. Overall the level of contrast introduced into the landscape at this KOP would be moderate. The landscape would appear moderately altered and Project elements would begin to dominate the visual setting. The Project would introduce form, line and color not common in the landscape and would be prominent in the valley. The degree of existing development does reduce the degree of contrast some as will applying the recommended BMPs, however, the degree of contrast introduced by the Project is still anticipated to remain moderate.

The Project is located on BLM lands classified as a VRM Class III and it is expected that the Project would meet VRM Class III objectives from this KOP as described in the Desert Renewable Energy Conservation Plan.

Additional Mitigating Measures (See item 3)

Additional best management practices (BMPs) to further reduce visual impacts as found in BMPs for Reducing Visual Impacts of Renewable Energy Facilities on BLM-Administered Lands (First Edition - 2013):

Facilities and Structures

- Select materials and surface treatments to repeat form, line, color, and texture of surrounding landscape
- Color treat structures (collectors, support structures, to reduce contrast with the existing landscape
- Use non-reflective materials, coatings and/or paint
- Select surface treatment colors from the BLM standard environmental colors chart, recommended colors include: Shadow Gray, Covert Green and Carob Brown
- Color treat grouped structures with the same color
- Color treat transmission line poles to reduce contrast with the existing landscape
- Maintain painted, stained or coated surfaces properly

Lighting

- Direct lights properly to eliminate light spill and trespass
- Use amber lighting instead of bluish-white lighting

Avoiding Disturbance

- Minimize project footprint and associated disturbance
- Preserve existing vegetation

Vegetation Management

- Preserve existing vegetation

Good Housekeeping
- Maintain a clean worksite

Form 8400-4
(June 2018)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
VISUAL CONTRAST RATING WORKSHEET

Date: 02/14/2023
District Office: Southern Nevada
Field Office: Barstow
Land Use Planning Area: DRECP

SECTION A. PROJECT INFORMATION

1. Project Name	4. KOP Location (T.R.S)	5. Location Sketch
Soda Mountain Solar Project	T. 13N, R. 7E, S. 25	See location map figure.
2. Key Observation Point (KOP) Name KOP 8 - Transmission Line Road B		
3. VRM Class at Project Location VRM Class III	(Lat. Long) 35.184567°N, -116.189816°W	

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Broad, gently sloping valley floor in foreground. Pyramidal hills and trapezoidal mountains in background.	Brushy creosote bush overstory with low, globular woody shrubs underneath.	Tall, complex lattice transmission structures with perpendicular, striated transmission lines.
LINE	Horizontal valley floor. Steep diagonal hillsides and mountainsides. Serrated mountain ridges.	Amorphous, indistinct shrub canopy.	Vertical lattice structures with geometric detail. Thin, horizontal and scalloped runs of transmission lines.
COLOR	Gray rocks in immediate foreground. Light tan and brown valley floor. Dark brown hills. Hazy blue mountains.	Olive green creosote bush foliage, pale gray woody stems.	Dark, metallic gray transmission structures with dark gray transmission lines.
TEX-TURE	Smooth, continuous valley floor. Coarse hills and mountains.	Fine shrub canopy.	Rigid, directional transmission corridor.

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Geometric graded area.	Geometric clearing area.	Geometric arrays. Geometric facilities. Repeating columnar collection line. Cylindrical & geometric ancillary facilities.
LINE	Straight and geometric lines.	Straight and geometric cleared area.	Angular & straight arrays & ancillary facilities. Vertical collection line with thin, horizontal transmission line.
COLOR	Brown-tan exposed soil.	No perceived change.	Dark grayish/blue arrays. Aluminum support structures. Gravel access roads. Flat gray substation components.
TEX-TURE	Fine, smooth, flowing.	No perceived change.	Repetitive collection lines. Organized, smooth, flowing & continuous arrays.

SECTION D. CONTRAST RATING __SHORT TERM ✓LONG TERM

1. DEGREE OF CONTRAST		FEATURES: LAND/WATER BODY (1)				VEGETATION (2)				STRUCTURES (3)			
		STRONG	MODERATE	WEAK	NONE	STRONG	MODERATE	WEAK	NONE	STRONG	MODERATE	WEAK	NONE
ELEMENTS	FORM			✓				✓		✓			
	LINE			✓				✓		✓			
	COLOR			✓					✓		✓		
	TEXTURE			✓					✓		✓		

2. Does project design meet visual resource management objectives? ___Yes ✓No (Explain on reverses side)

3. Additional mitigating measures recommended ✓Yes ___No (Explain on reverses side)

Evaluator's Names: SWCA Environmental Consultants
Date: 02/21/2023

(Continued on Page 2)

Comments from item 2.

This KOP is located on the road paralleling the lattice tower transmission line north west of the proposed Project area. This area has a slightly elevated view of the valley and provides views of the surrounding and distant mountains. This area is populated with sparse creosote brush and layers of coarse rock. From this position viewers can see the rich diversity of color (various shades of reds, browns and tans, and the contrast between dark mountains and light soils) and textures (fine to coarse) in the valley and surrounding mountains. Development visible from this KOP includes I-15, monopole and lattice tower transmission lines, and unimproved gravel roadways.

From this viewpoint the Project would introduce a weak degree of contrast with the geometric grading of the landscape and clearing of vegetation. Solar arrays would be visible from this KOP and would introduce form and line not common in the existing landscape. Overall the level of contrast introduced into the landscape at this KOP would be strong. The landscape would appear heavily altered and Project elements would dominate the visual setting. The Project would be out of scale with the natural landscape and would introduce an increased degree of development compared to the development visible from this KOP. Colors around the project during the morning on the mountains would be similar in shade and color to the solar arrays. The degree of existing development does reduce the degree of contrast some as will applying the recommended BMPs, however, the degree of contrast introduced by the Project is still anticipated to remain strong.

The Project is located on BLM lands classified as a VRM Class III and it is expected that the Project would not meet VRM Class III objectives at this KOP as described in the Desert Renewable Energy Conservation Plan.

Additional Mitigating Measures (See item 3)

Additional best management practices (BMPs) to further reduce visual impacts as found in BMPs for Reducing Visual Impacts of Renewable Energy Facilities on BLM-Administered Lands (First Edition - 2013):

Facilities and Structures

- Select materials and surface treatments to repeat form, line, color, and texture of surrounding landscape
- Color treat structures (collectors, support structures, to reduce contrast with the existing landscape
- Use non-reflective materials, coatings and/or paint
- Select surface treatment colors from the BLM standard environmental colors chart, recommended colors include: Shadow Gray, Covert Green and Carob Brown
- Color treat grouped structures with the same color
- Color treat transmission line poles to reduce contrast with the existing landscape
- Maintain painted, stained or coated surfaces properly

Lighting

- Direct lights properly to eliminate light spill and trespass
- Use amber lighting instead of bluish-white lighting

Avoiding Disturbance

- Minimize project footprint and associated disturbance
- Preserve existing vegetation

Vegetation Management

- Preserve existing vegetation

Good Housekeeping
- Maintain a clean worksite

Form 8400-4
(June 2018)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
VISUAL CONTRAST RATING WORKSHEET

Date: 02/14/2023
District Office: Southern Nevada
Field Office: Barstow
Land Use Planning Area: DRECP

SECTION A. PROJECT INFORMATION

1. Project Name	4. KOP Location (T.R.S)	5. Location Sketch
Soda Mountain Solar Project	T. 13N, R. 8E, S. 08	See location map figure.
2. Key Observation Point (KOP) Name KOP 10 - OHV Recreation Area B		
3. VRM Class at Project Location VRM Class III	(Lat. Long) 35.217847°N, -116.171379°W	

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Sloping alluvial fan transitioning to valley floor in foreground. Pyramidal hills and trapezoidal mountains in background.	Brushy creosote bush overstory with low, globular woody shrubs underneath.	Tall, complex lattice transmission structures with perpendicular transmission lines.
LINE	Horizontal alluvial fan and valley floor. Steep diagonal hillsides. Jagged mountains.	Amorphous, indistinct shrub canopy.	Vertical lattice structures with geometric detail. Thin, scalloped transmission lines.
COLOR	Gray exposed rocks on alluvial fan. Hazy brown valley floor, dark brown hills, and hazy blue mountains.	Olive green creosote bush foliage, pale gray woody stems.	Dark, metallic gray-brown transmission structures.
TEX-TURE	Broad, smooth alluvial fan and valley floor. Coarse hills and mountains.	Fine shrub canopy.	Organized, repetitive transmission corridor.

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Geometric graded area.	Geometric clearing area.	Geometric arrays. Geometric facilities. Repeating columnar collection line. Cylindrical & geometric ancillary facilities.
LINE	Straight and geometric lines.	Straight and geometric cleared area.	Angular & straight arrays & ancillary facilities. Vertical collection line with thin, horizontal transmission line.
COLOR	Brown-tan exposed soil.	No perceived change.	Dark grayish/blue arrays. Aluminum support structures. Gravel access roads. Flat gray substation components.
TEX-TURE	Fine, smooth, flowing.	No perceived change.	Repetitive collection lines. Organized, smooth, flowing & continuous arrays.

SECTION D. CONTRAST RATING __SHORT TERM ✓LONG TERM

1. DEGREE OF CONTRAST		FEATURES: LAND/WATER BODY (1)				VEGETATION (2)				STRUCTURES (3)			
		STRONG	MODERATE	WEAK	NONE	STRONG	MODERATE	WEAK	NONE	STRONG	MODERATE	WEAK	NONE
ELEMENTS	FORM			✓				✓		✓			
	LINE			✓				✓		✓			
	COLOR			✓					✓		✓		
	TEXTURE			✓					✓		✓		

2. Does project design meet visual resource management objectives? ___Yes ✓No (Explain on reverses side)

3. Additional mitigating measures recommended ✓Yes ___No (Explain on reverses side)

Evaluator's Names: SWCA Environmental Consultants
Date: 02/21/2023

(Continued on Page 2)

Comments from item 2.

This KOP is located on a recreational road heading towards the Soda Mountain Wilderness and is north west of the proposed Project area. This area has a elevated view of the surrounding area and provides extensive views of the valley, surrounding mountains and distant mountains in the background. This area is populated with sparse creosote brush and layers of coarse rock. From this elevated position viewers can see the rich diversity of color (various shades of reds, browns and tans, and the contrast between dark mountains and light soils) and textures (fine to coarse) in the valley and surrounding mountains. Development visible from this KOP includes I-15, H frame and lattice tower transmission lines, and unimproved gravel roadways.

From this viewpoint the Project would introduce a weak degree of contrast with the geometric grading of the landscape and clearing of vegetation. Solar arrays would be visible from this KOP and would introduce form and line not common in the existing landscape. Overall the level of contrast introduced into the landscape at this KOP would be strong. The landscape would appear heavily altered and Project elements would dominate the visual setting. The Project would be out of scale with the natural landscape and would introduce an increased degree of development compared to the development visible from this KOP. Colors around the project during the morning on the mountains would be similar in shade and color to the solar arrays. The degree of existing development does reduce the degree of contrast some as will applying the recommended BMPs, however, the degree of contrast introduced by the Project is still anticipated to remain strong.

The Project is located on BLM lands classified as a VRM Class III and it is expected that the Project would not meet VRM Class III objectives at this KOP as described in the Desert Renewable Energy Conservation Plan.

Additional Mitigating Measures (See item 3)

Additional best management practices (BMPs) to further reduce visual impacts as found in BMPs for Reducing Visual Impacts of Renewable Energy Facilities on BLM-Administered Lands (First Edition - 2013):

Facilities and Structures

- Select materials and surface treatments to repeat form, line, color, and texture of surrounding landscape
- Color treat structures (collectors, support structures, to reduce contrast with the existing landscape
- Use non-reflective materials, coatings and/or paint
- Select surface treatment colors from the BLM standard environmental colors chart, recommended colors include: Shadow Gray, Covert Green and Carob Brown
- Color treat grouped structures with the same color
- Color treat transmission line poles to reduce contrast with the existing landscape
- Maintain painted, stained or coated surfaces properly

Lighting

- Direct lights properly to eliminate light spill and trespass
- Use amber lighting instead of bluish-white lighting

Avoiding Disturbance

- Minimize project footprint and associated disturbance
- Preserve existing vegetation

Vegetation Management

- Preserve existing vegetation

Good Housekeeping
- Maintain a clean worksite

Form 8400-4
(June 2018)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
VISUAL CONTRAST RATING WORKSHEET

Date: 02/10/2023
District Office: Southern Nevada
Field Office: Barstow
Land Use Planning Area: DRECP

SECTION A. PROJECT INFORMATION

1. Project Name	4. KOP Location (T.R.S)	5. Location Sketch
Soda Mountain Solar Project	T. 12N, R. 8E, S. 00 (gap in PLSS data here)	See location map figure.
2. Key Observation Point (KOP) Name KOP 11B - OHV Recreation Area A		
3. VRM Class at Project Location VRM Class III	(Lat. Long) 35.129606°N, -116.156524°W	

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Broad, gently sloping valley below rough, trapezoidal mountains.	Stunted, spindly creosote bushes throughout valley floor.	None present or apparent.
LINE	Subtle diagonal valley floor with striated rocks and soils. Diagonal mountainsides.	Rounded shrubs with diffuse edges.	None present or apparent.
COLOR	Light gray exposed rocks and light tan exposed soils throughout valley. Copper brown mountains.	Dark woody gray and olive green shrubs.	None present or apparent.
TEX-TURE	Smooth, continuous valley. Coarse mountains.	Sparse cover of shrubs, dotted throughout valley floor.	None present or apparent.

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Geometric graded area.	Geometric clearing area.	Geometric arrays. Geometric facilities. Repeating columnar collection line. Cylindrical & geometric ancillary facilities.
LINE	Straight and geometric lines.	Straight and geometric cleared area.	Angular & straight arrays & ancillary facilities. Vertical collection line with thin, horizontal transmission line.
COLOR	Brown-tan exposed soil.	No perceived change.	Dark grayish/blue arrays. Aluminum support structures. Gravel access roads. Flat gray substation components.
TEX-TURE	Fine, smooth, flowing.	No perceived change.	Repetitive collection lines. Organized, smooth, flowing & continuous arrays.

SECTION D. CONTRAST RATING __SHORT TERM ✓ LONG TERM

1. DEGREE OF CONTRAST		FEATURES: LAND/WATER BODY (1)				VEGETATION (2)				STRUCTURES (3)			
		STRONG	MODERATE	WEAK	NONE	STRONG	MODERATE	WEAK	NONE	STRONG	MODERATE	WEAK	NONE
ELEMENTS	FORM			✓				✓		✓			
	LINE			✓				✓		✓			
	COLOR			✓					✓	✓			
	TEXTURE			✓					✓		✓		

2. Does project design meet visual resource management objectives? ___Yes ✓No (Explain on reverses side)

3. Additional mitigating measures recommended ✓Yes ___No (Explain on reverses side)

Evaluator's Names Date

(Continued on Page 2)

Comments from item 2.

This KOP is located on a recreational road headed towards the BLM designated OHV area and the Mojave National Preserve and is south east of the proposed Project area. This area has a elevated view of the surrounding area including the valley and mountains. his area is populated with sparse creosote brush and layers of coarse rock. From this elevated position viewers can see the rich diversity of color (various shades of reds, browns and tans, and the contrast between dark mountains and light soils) and textures (fine to coarse) in the valley and surrounding mountains. Development visible from this KOP is limited to I-15 due to distance and unimproved gravel roads.

From this viewpoint the Project would introduce a weak degree of contrast with the geometric grading of the landscape and clearing of vegetation. Solar arrays would be visible from this KOP and would introduce form and line not common in the existing landscape. Overall the level of contrast introduced into the landscape at this KOP would be strong. The landscape would appear heavily altered and Project elements would dominate the visual setting. The Project would be out of scale with the natural landscape and would introduce an increased degree of development compared to the development visible from this KOP. Colors around the project during the morning on the mountains would be similar in shade and color to the solar arrays. The degree of existing development does reduce the degree of contrast some as will applying the recommended BMPs, however, the degree of contrast introduced by the Project is still anticipated to remain strong.

The Project is located on BLM lands classified as a VRM Class III and it is expected that the Project would not meet VRM Class III objectives at this KOP as described in the Desert Renewable Energy Conservation Plan.

Additional Mitigating Measures (See item 3)

Additional best management practices (BMPs) to further reduce visual impacts as found in BMPs for Reducing Visual Impacts of Renewable Energy Facilities on BLM-Administered Lands (First Edition - 2013):

Facilities and Structures

- Select materials and surface treatments to repeat form, line, color, and texture of surrounding landscape
- Color treat structures (collectors, support structures, to reduce contrast with the existing landscape
- Use non-reflective materials, coatings and/or paint
- Select surface treatment colors from the BLM standard environmental colors chart, recommended colors include: Shadow Gray, Covert Green and Carob Brown
- Color treat grouped structures with the same color
- Color treat transmission line poles to reduce contrast with the existing landscape
- Maintain painted, stained or coated surfaces properly

Lighting

- Direct lights properly to eliminate light spill and trespass
- Use amber lighting instead of bluish-white lighting

Avoiding Disturbance

- Minimize project footprint and associated disturbance
- Preserve existing vegetation

Vegetation Management

- Preserve existing vegetation

Good Housekeeping
- Maintain a clean worksite

APPENDIX D

Visual Simulations

Soda Mountain Solar Project

Sun and Weather

Sunny

Date: **1-24-23**

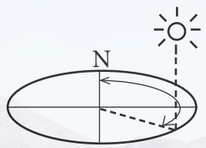
Photo Time: **11:50 am**

Visibility:

Good — Poor

Air Quality: Good

Sun Azimuth: **162.76°**



Sun Angle: **32.69°**

Lighting Angle on Project: **Side Lit**

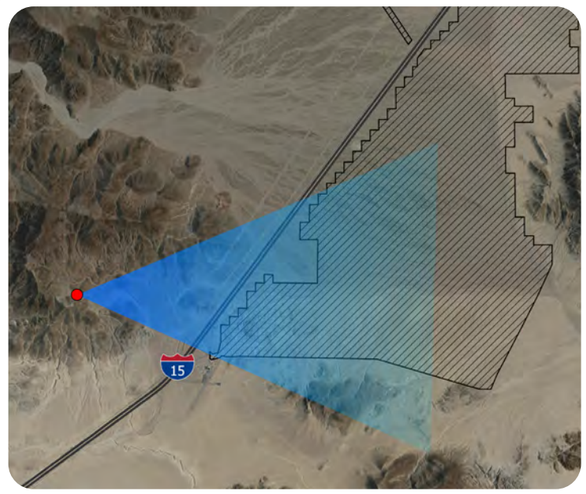
Wind: **15 mph**

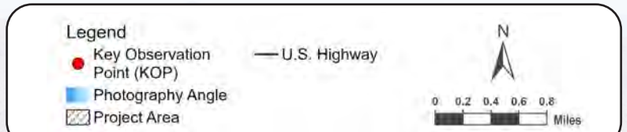
Cloud Cover: **0 %**

Temperature (°F): **50°F**

Solar panels are represented at full tilt (60 degrees) facing east to reflect AM conditions.

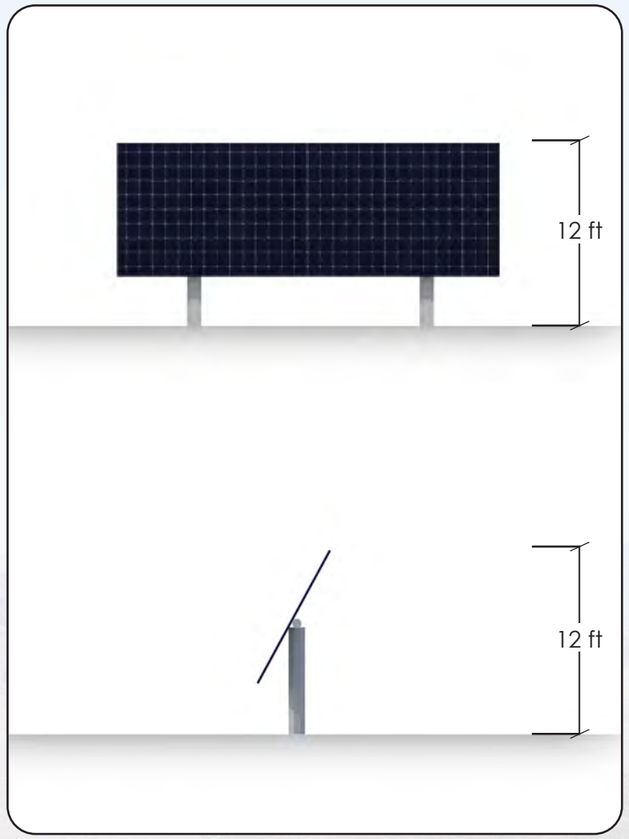
Simulation was prepared using information provided by client. Locations, colors, and heights may vary based on final engineering and design.





Approximate Distance to Nearest Project Component: **1.3 miles**

Project Location



Structure Diagram

KOP 3 - Transmission Line Access Road

Base Photographic Documentation

Latitude, Longitude (º): **35.1396, -116.2257**

Viewpoint Elevation (feet): **1843**

Camera Height (meters): **1.5**

Camera Heading (degrees): **90**

Camera Make & Model: **Sony Alpha 7R IV**

Camera Sensor Size (mm): **35.7 x 23.8 Full Frame**

Crop Factor: **1**

Lens Make & Model: **Sony FE 50mm F2.5G**

Lens Focal Length (mm): **50**

Image Size (pixels): **9504 x 6336**

Single frame simulation approximates 50mm full frame equivalent.

Viewing Instructions: Printed at 100% the resulting simulation is 16 inches wide by 10 inches high. At this size and focal length, the simulation should be viewed at arms length (24 inches). If viewed on a computer monitor, scale should be 100%.

SWCA® ENVIRONMENTAL CONSULTANTS

KOP 3: View from Transmission Line Access Road looking east - Existing Condition

KOP 3: View from Transmission Line Access Road looking east - Simulated Condition including Landscaping

This image does not represent a simulated condition. The purpose of this image is to highlight the modeled location of the structures in the foreground and obstructed by topography which may otherwise be difficult for viewers to discern in the simulated condition.

South Array 2
South Array 3

KOP 3: View from Transmission Line Access Road looking east - Color Overlay

Soda Mountain Solar Project

Sun and Weather

Sunny

Date: **1-24-23**

Photo Time: **2:15 pm**

Visibility:

Good — Poor

Air Quality: Good

Sun Azimuth: **206.78°**

Sun Angle: **29.95°**

Lighting Angle on Project: **Side Lit**

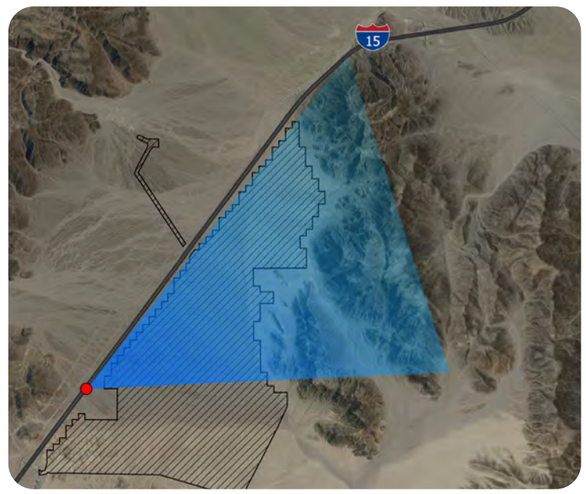
Wind: **10 mph**

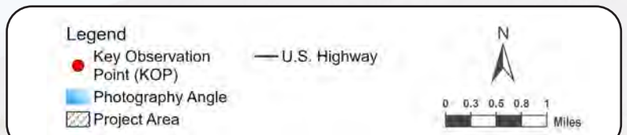
Cloud Cover: **0 %**

Temperature (°F): **55°F**

Solar panels are represented at full tilt (60 degrees) facing west to reflect PM conditions.

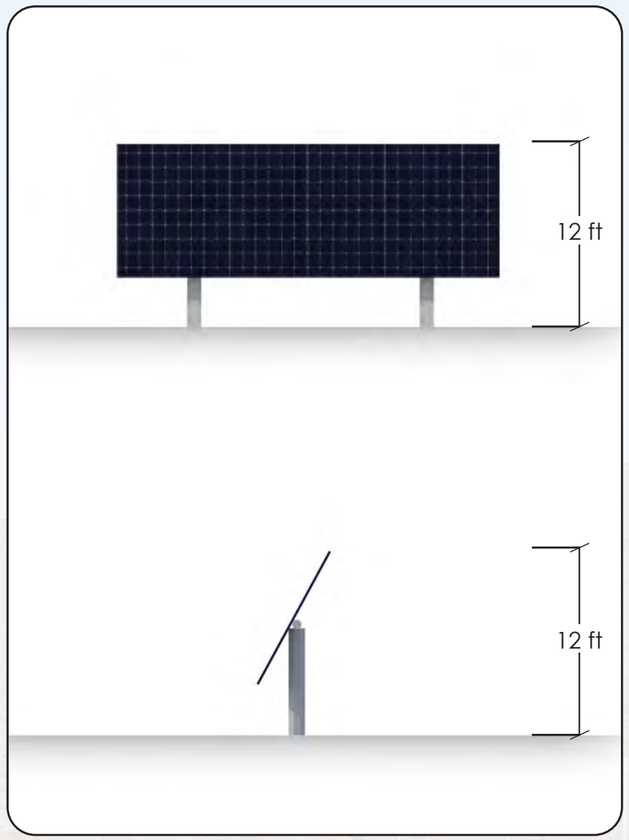
Simulation was prepared using information provided by client. Locations, colors, and heights may vary based on final engineering and design.





Approximate Distance to Nearest Project Component: **0.3 miles**

Project Location



Structure Diagram

KOP 4 - Interstate 15 Northbound

Base Photographic Documentation

Latitude, Longitude (º): **35.1450, -116.2008**

Viewpoint Elevation (feet): **1489**

Camera Height (meters): **1.5**

Camera Heading (degrees): **65**

Camera Make & Model: **Sony Alpha 7R IV**

Camera Sensor Size (mm): **35.7 x 23.8 Full Frame**

Crop Factor: **1**

Lens Make & Model: **Sony FE 50mm F2.5G**

Lens Focal Length (mm): **50**

Image Size (pixels): **9504 x 6336**

Single frame simulation approximates 50mm full frame equivalent.

Viewing Instructions: Printed at 100% the resulting simulation is 16 inches wide by 10 inches high. At this size and focal length, the simulation should be viewed at arms length (24 inches). If viewed on a computer monitor, scale should be 100%.

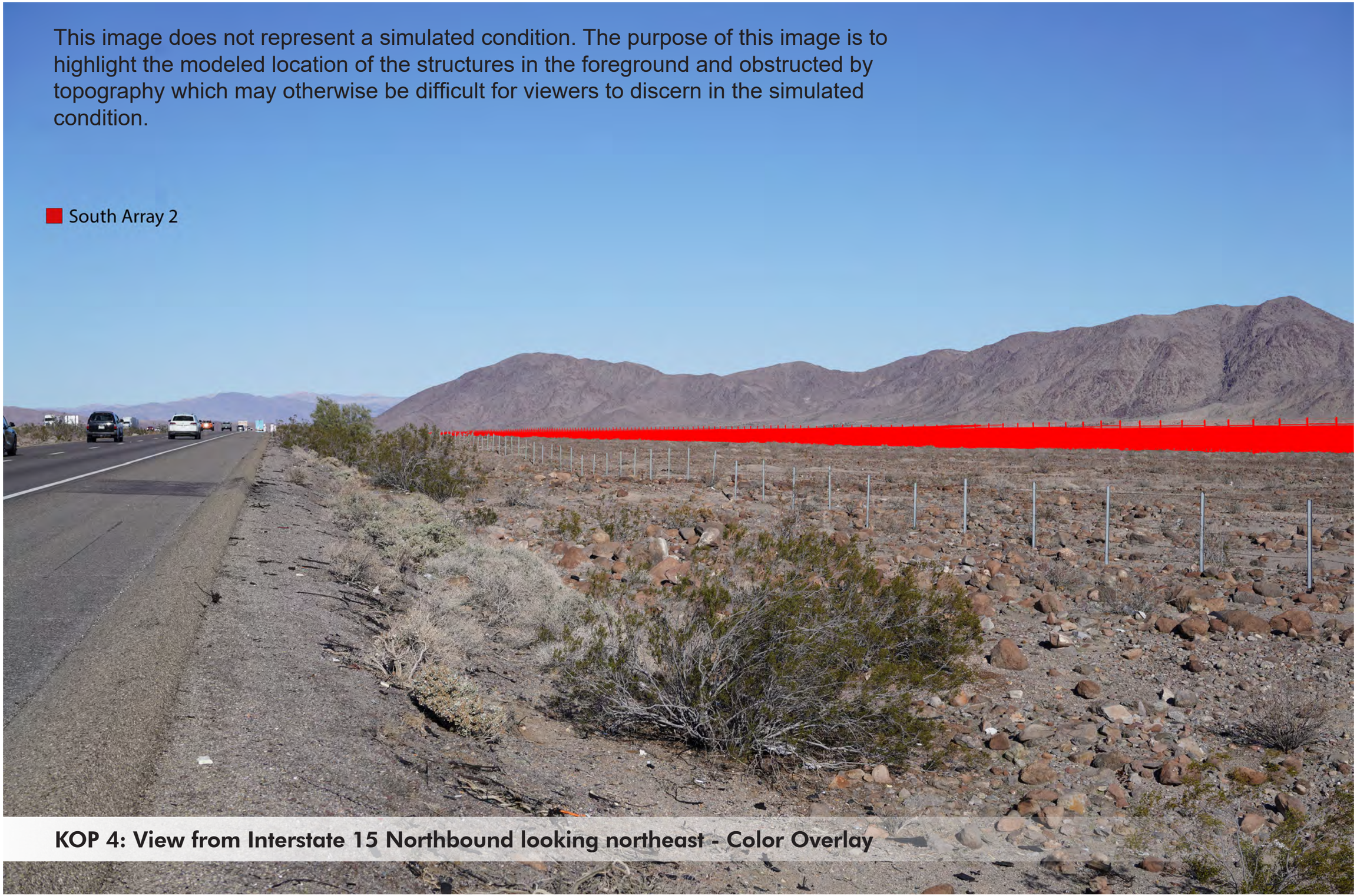
SWCA® ENVIRONMENTAL CONSULTANTS

KOP 4: View from Interstate 15 Northbound looking northeast - Existing Condition

KOP 4: View from Interstate 15 Northbound looking northeast - Simulated Condition including Landscaping

This image does not represent a simulated condition. The purpose of this image is to highlight the modeled location of the structures in the foreground and obstructed by topography which may otherwise be difficult for viewers to discern in the simulated condition.

South Array 2



KOP 4: View from Interstate 15 Northbound looking northeast - Color Overlay

Soda Mountain Solar Project

Sun and Weather

Sunny

Date: **1-24-23**

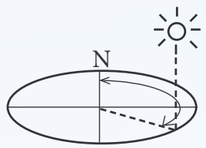
Photo Time: **10:50 am**

Visibility:

Good — Poor

Air Quality: Good

Sun Azimuth: **147.47°**



Sun Angle: **27.57°**

Lighting Angle on Project: **Side Lit**

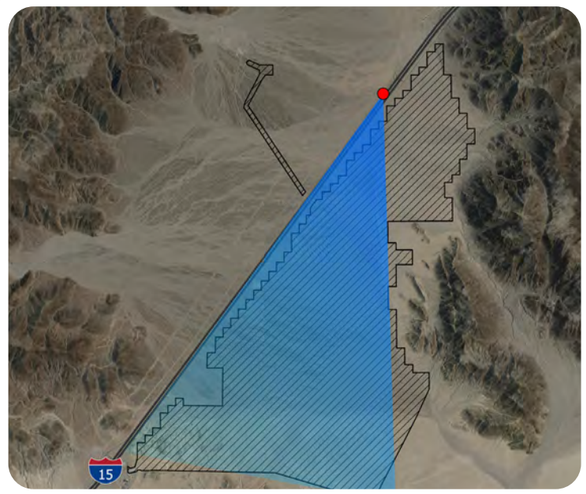
Wind: **15 mph**

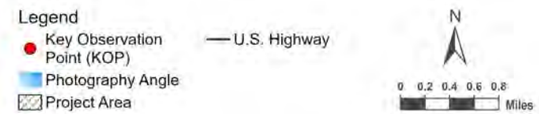
Cloud Cover: **0 %**

Temperature (°F): **50°F**

Solar anels are represented at full tilt (60 degrees) facing east to reflect AM conditions.

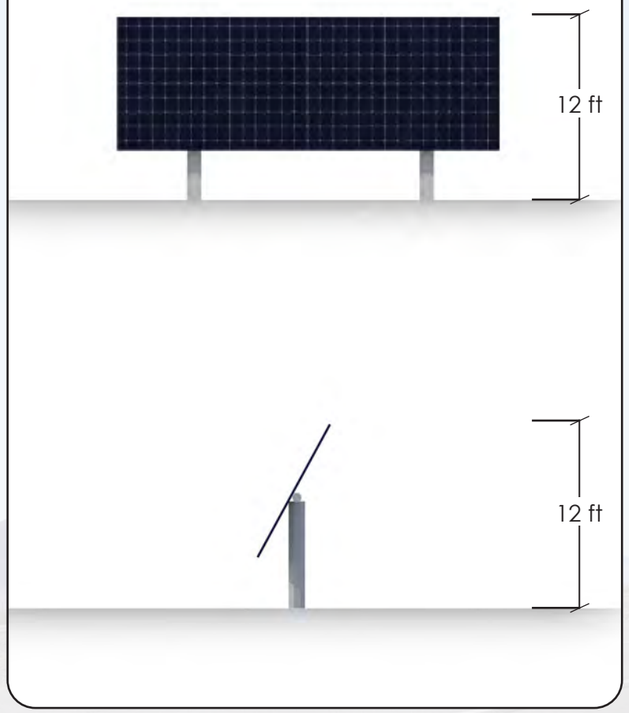
Simulation was prepared using information provided by client. Locations, colors, and heights may vary based on final engineering and design.





Approximate Distance to Nearest Project Component: **0.4 miles**

Project Location



Structure Diagram

KOP 6 - Interstate 15 Southbound

Base Photographic Documentation

Latitude, Longitude (º): **35.1771, -116.1719**

Viewpoint Elevation (feet): **1341**

Camera Height (meters): **1.5**

Camera Heading (degrees): **185**

Camera Make & Model: **Sony Alpha 7R IV**

Camera Sensor Size (mm): **35.7 x 23.8 Full Frame**

Crop Factor: **1**

Lens Make & Model: **Sony FE 50mm F2.5G**

Lens Focal Length (mm): **50**

Image Size (pixels): **9504 x 6336**

Single frame simulation approximates 50mm full frame equivalent.

Viewing Instructions: Printed at 100% the resulting simulation is 16 inches wide by 10 inches high. At this size and focal length, the simulation should be viewed at arms length (24 inches). If viewed on a computer monitor, scale should be 100%.

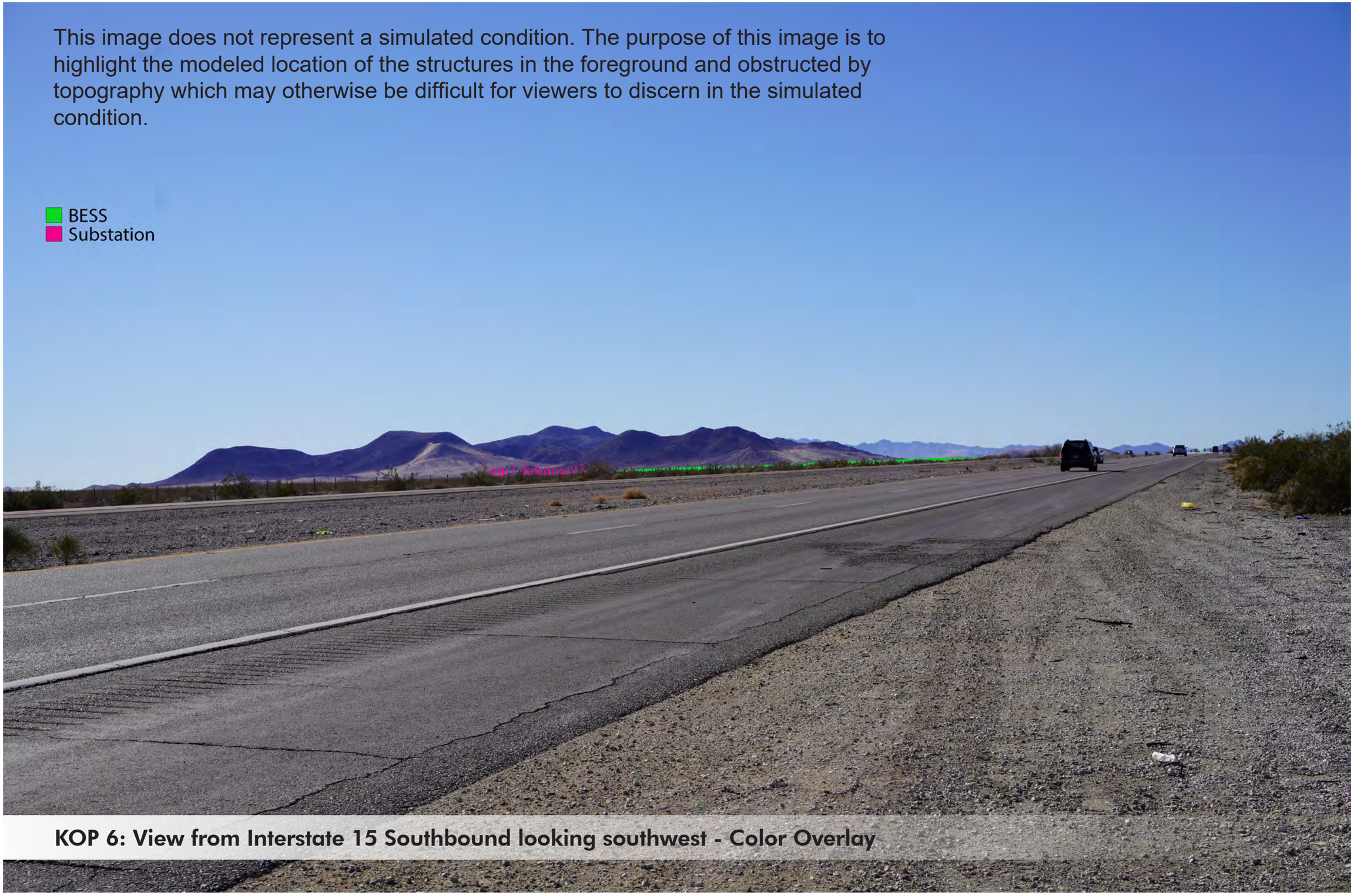
SWCA® ENVIRONMENTAL CONSULTANTS

KOP 6: View from Interstate 15 Southbound looking southwest - Existing Condition

KOP 6: View from Interstate 15 Southbound looking southwest - Simulated Condition including Landscaping

This image does not represent a simulated condition. The purpose of this image is to highlight the modeled location of the structures in the foreground and obstructed by topography which may otherwise be difficult for viewers to discern in the simulated condition.

BESS
Substation



KOP 6: View from Interstate 15 Southbound looking southwest - Color Overlay

Soda Mountain Solar Project

Sun and Weather

Sunny

Date: **1-24-23**

Photo Time: **9:35 am**

Visibility:

Good — Poor

Air Quality: Good

Sun Azimuth: **131.52°**

Sun Angle: **17.71°**

Lighting Angle on Project: **Front Lit**

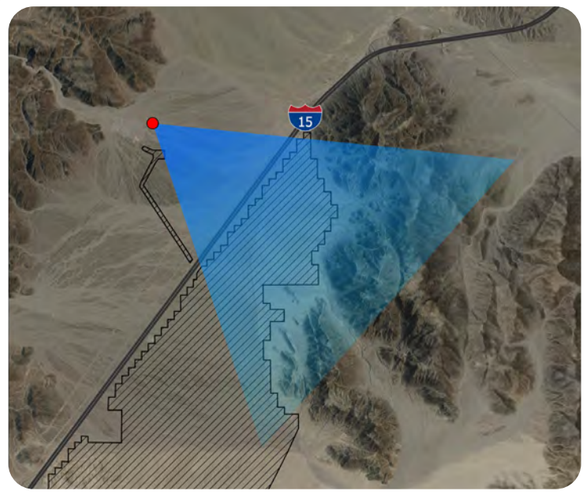
Wind: **5 mph**

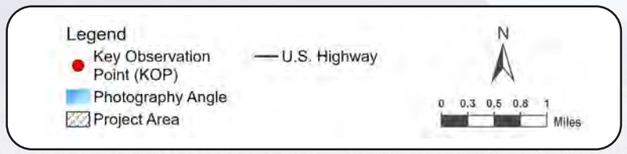
Cloud Cover: **0 %**

Temperature (°F): **45°F**

Solar panels are represented at full tilt (60 degrees) facing east to reflect AM conditions.

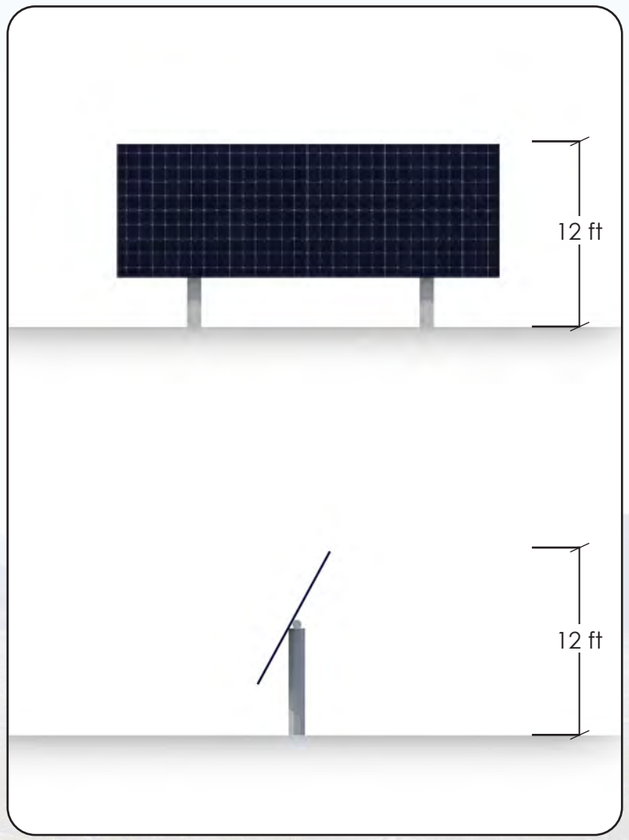
Simulation was prepared using information provided by client. Locations, colors, and heights may vary based on final engineering and design.





Approximate Distance to Nearest Project Component: **1.3 miles**

Project Location



Structure Diagram

KOP 8 - Transmission Line Access Road

Base Photographic Documentation

Latitude, Longitude (º): **35.1845, -116.1898**

Viewpoint Elevation (feet): **1541**

Camera Height (meters): **1.5**

Camera Heading (degrees): **135**

Camera Make & Model: **Sony Alpha 7R IV**

Camera Sensor Size (mm): **35.7 x 23.8 Full Frame**

Crop Factor: **1**

Lens Make & Model: **Sony FE 50mm F2.5G**

Lens Focal Length (mm): **50**

Image Size (pixels): **9504 x 6336**

Single frame simulation approximates 50mm full frame equivalent.

Viewing Instructions: Printed at 100% the resulting simulation is 16 inches wide by 10 inches high. At this size and focal length, the simulation should be viewed at arms length (24 inches). If viewed on a computer monitor, scale should be 100%.

SWCA® ENVIRONMENTAL CONSULTANTS

KOP 8: View from Transmission Line Access Road looking southeast - Existing Condition

KOP 8: View from Transmission Line Access Road looking southeast - Simulated Condition including Landscaping

This image does not represent a simulated condition. The purpose of this image is to highlight the modeled location of the structures in the foreground and obstructed by topography which may otherwise be difficult for viewers to discern in the simulated condition.

BESS
Substation
East Array
South Array 1

KOP 8: View from Transmission Line Access Road looking southeast - Color Overlay

Soda Mountain Solar Project

Sun and Weather

Sunny

Date: **1-24-23**

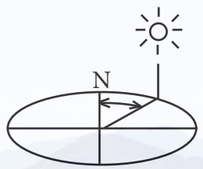
Photo Time: **8:50 am**

Visibility:

Good — Poor

Air Quality: Good

Sun Azimuth:



123.82°

Sun Angle: **10.84°**

Lighting Angle on Project: **Side Lit**

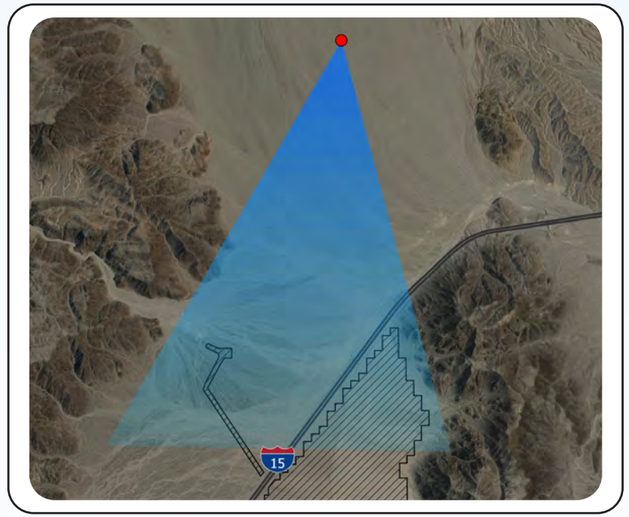
Wind: **0 mph**

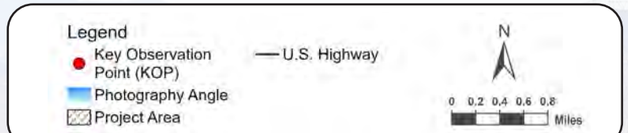
Cloud Cover: **0 %**

Temperature (°F): **35°F**

Solar panels are represented at full tilt (60 degrees) facing east to reflect AM conditions.

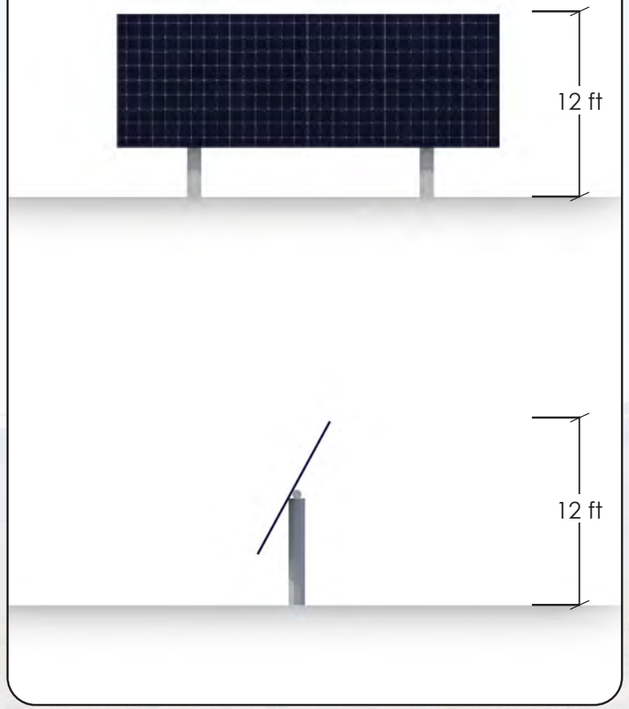
Simulation was prepared using information provided by client. Locations, colors, and heights may vary based on final engineering and design.





Approximate Distance to Nearest Project Component: **2.5 miles**

Project Location



Structure Diagram

KOP 10 - Zzyzx Road

Base Photographic Documentation

Latitude, Longitude (º): **35.2178, -116.1713**

Viewpoint Elevation (feet): **1676**

Camera Height (meters): **1.5**

Camera Heading (degrees): **185**

Camera Make & Model: **Sony Alpha 7R IV**

Camera Sensor Size (mm): **35.7 x 23.8 Full Frame**

Crop Factor: **1**

Lens Make & Model: **Sony FE 50mm F2.5G**

Lens Focal Length (mm): **50**

Image Size (pixels): **9504 x 6336**

Single frame simulation approximates 50mm full frame equivalent.

Viewing Instructions: Printed at 100% the resulting simulation is 16 inches wide by 10 inches high. At this size and focal length, the simulation should be viewed at arms length (24 inches). If viewed on a computer monitor, scale should be 100%.

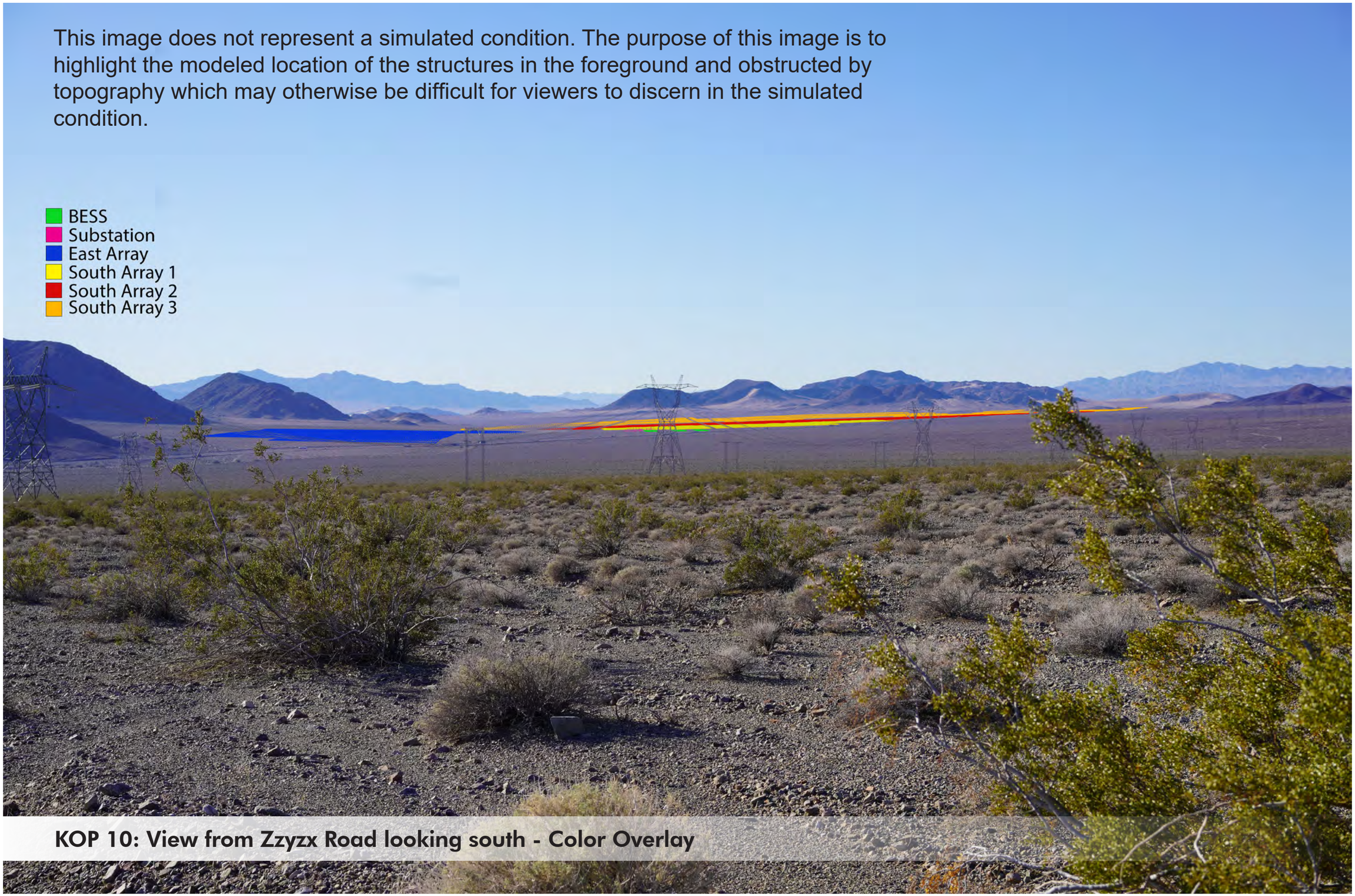
SWCA® ENVIRONMENTAL CONSULTANTS

KOP 10: View from Zzyzx Road looking south - Existing Condition

KOP 10: View from Zzyzx Road looking south - Simulated Condition including Landscaping

This image does not represent a simulated condition. The purpose of this image is to highlight the modeled location of the structures in the foreground and obstructed by topography which may otherwise be difficult for viewers to discern in the simulated condition.

BESS
Substation
East Array
South Array 1
South Array 2
South Array 3



KOP 10: View from Zzyzx Road looking south - Color Overlay

Soda Mountain Solar Project

Sun and Weather

Sunny

Date: **1-24-23**

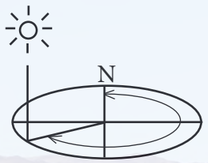
Photo Time: **1:50 pm**

Visibility:

Good — Poor

Air Quality: Good

Sun Azimuth:



197.09°

Sun Angle: **32.74°**

Lighting Angle on Project: **Side Lit**

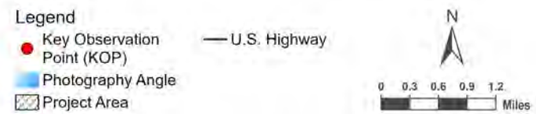
Wind: **15 mph**

Cloud Cover: **0 %**

Temperature (°F): **55°F**

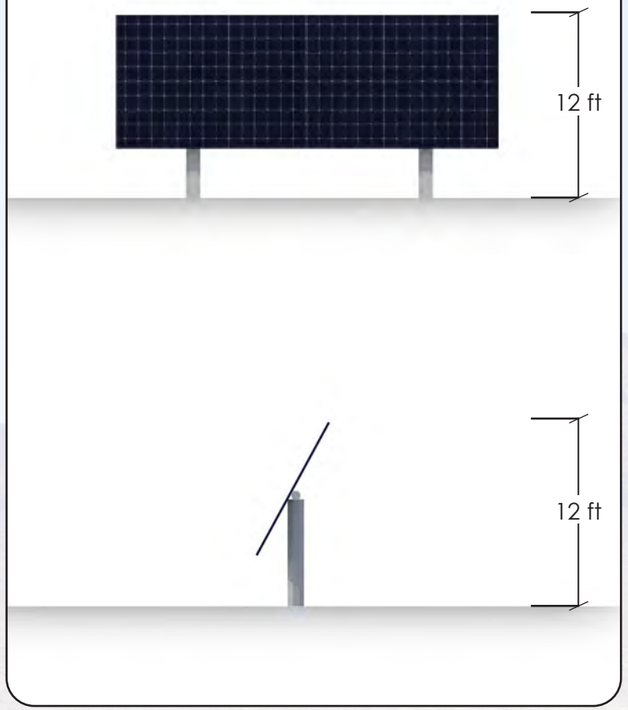
Solar panels are represented at full tilt (60 degrees) facing west to reflect PM conditions.

Simulation was prepared using information provided by client. Locations, colors, and heights may vary based on final engineering and design.



Approximate Distance to Nearest Project Component: **1 mile**

Project Location



Structure Diagram

KOP 11 - Rasor Road and OHV trail

Base Photographic Documentation

Latitude, Longitude (º): **35.1296, -116.1565**

Viewpoint Elevation (feet): **1267**

Camera Height (meters): **1.5**

Camera Heading (degrees): **315**

Camera Make & Model: **Sony Alpha 7R IV**

Camera Sensor Size (mm): **35.7 x 23.8 Full Frame**

Crop Factor: **1**

Lens Make & Model: **Sony FE 50mm F2.5G**

Lens Focal Length (mm): **50**

Image Size (pixels): **9504 x 6336**

Single frame simulation approximates 50mm full frame equivalent.

Viewing Instructions: Printed at 100% the resulting simulation is 16 inches wide by 10 inches high. At this size and focal length, the simulation should be viewed at arms length (24 inches). If viewed on a computer monitor, scale should be 100%.

KOP 11: View from Rasor Road and OHV trail looking northwest - Existing Condition

KOP 11: View from Rasor Road and OHV trail looking northwest - Simulated Condition

This image does not represent a simulated condition. The purpose of this image is to highlight the modeled location of the structures in the foreground and obstructed by topography which may otherwise be difficult for viewers to discern in the simulated condition.

South Array 1
South Array 2
South Array 3

KOP 11: View from Rasor Road and OHV trail looking northwest - Color Overlay

APPENDIX E

ForgeSolar Glare Analysis Report

FORGESOLAR GLARE ANALYSIS

Project: **68347_Soda Mountain**
Site configuration: **68347_Soda Mountain**
Analysis conducted by Ryan Rausch (rrausch@swca.com) at 21:29 on 13 Jun, 2023.

U.S. FAA 2013 Policy Adherence

The following table summarizes the policy adherence of the glare analysis based on the 2013 U.S. Federal Aviation Administration Interim Policy 78 FR 63276. This policy requires the following criteria be met for solar energy systems on airport property:

- No "yellow" glare (potential for after-image) for any flight path from threshold to 2 miles
- No glare of any kind for Air Traffic Control Tower(s) ("ATCT") at cab height.
- Default analysis and observer characteristics (see list below)

ForgeSolar does not represent or speak officially for the FAA and cannot approve or deny projects. Results are informational only.

COMPONENT	STATUS	DESCRIPTION
Analysis parameters	PASS	Analysis time interval and eye characteristics used are acceptable
2-mile flight path(s)	PASS	Flight path receptor(s) do not receive yellow glare
ATCT(s)	N/A	No ATCT receptors designated

Default glare analysis parameters and observer eye characteristics (for reference only):

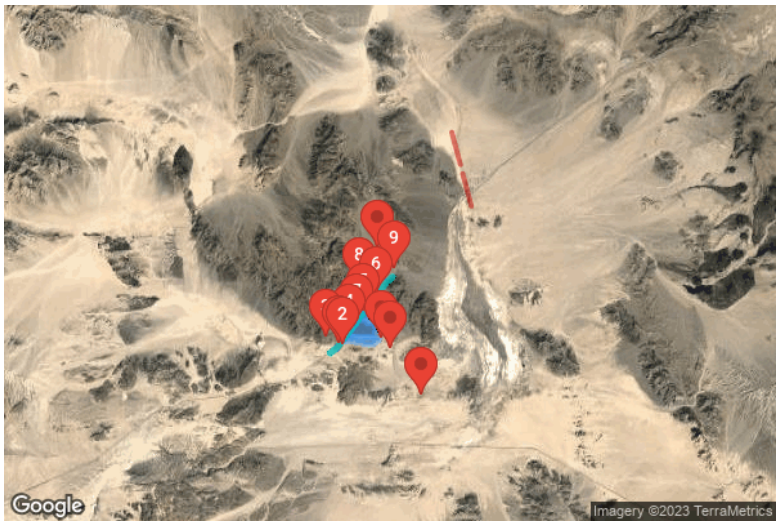
- Analysis time interval: 1 minute
- Ocular transmission coefficient: 0.5
- Pupil diameter: 0.002 meters
- Eye focal length: 0.017 meters
- Sun subtended angle: 9.3 milliradians

FAA Policy 78 FR 63276 can be read at https://www.federalregister.gov/d/2013-24729

SITE CONFIGURATION

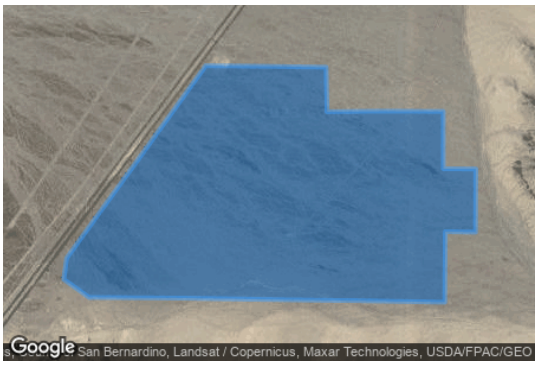
Analysis Parameters

DNI: peaks at 1,000.0 W/m^2
Time interval: 1 min
Ocular transmission coefficient: 0.5
Pupil diameter: 0.002 m
Eye focal length: 0.017 m
Sun subtended angle: 9.3 mrad
Site Config ID: 92389.16260
Methodology: V2



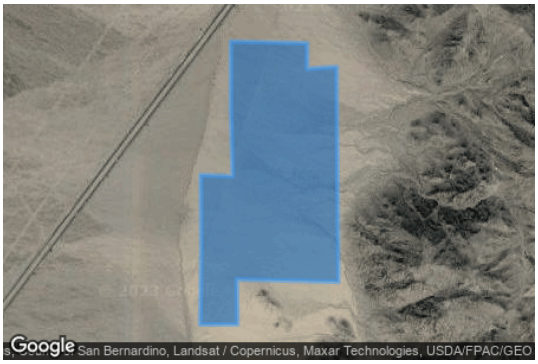
PV Array(s)

Name: PV array 1
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 0.0°
Ground Coverage Ratio: 0.5
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



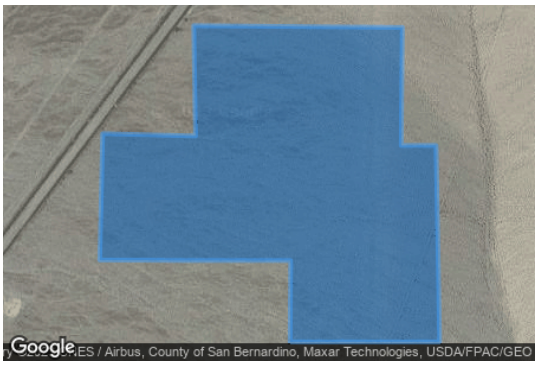
Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	35.143359	-116.201592	1478.78	7.00	1485.78
2	35.146201	-116.199070	1483.97	7.00	1490.97
3	35.149044	-116.196530	1480.12	7.00	1487.12
4	35.151887	-116.194019	1478.11	7.00	1485.11
5	35.154746	-116.191487	1463.07	7.00	1470.07
6	35.154711	-116.187046	1425.75	7.00	1432.75
7	35.154659	-116.182754	1392.39	7.00	1399.39
8	35.152027	-116.182690	1384.92	7.00	1391.92
9	35.152060	-116.178582	1357.11	7.00	1364.11
10	35.152042	-116.174247	1332.84	7.00	1339.84
11	35.148656	-116.174247	1324.08	7.00	1331.08
12	35.148639	-116.171887	1311.04	7.00	1318.04
13	35.144902	-116.171909	1301.90	7.00	1308.90
14	35.144937	-116.174097	1314.84	7.00	1321.84
15	35.140761	-116.174140	1309.46	7.00	1316.46
16	35.140848	-116.180513	1345.60	7.00	1352.60
17	35.140918	-116.187079	1381.82	7.00	1388.82
18	35.141006	-116.193602	1419.11	7.00	1426.11
19	35.141041	-116.199954	1454.96	7.00	1461.96
20	35.142112	-116.201799	1467.72	7.00	1474.72

Name: PV array 2
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 0.0°
Ground Coverage Ratio: 0.5
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



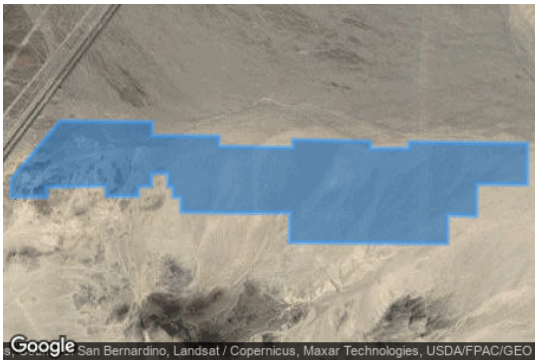
Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	35.160085	-116.169369	1371.76	7.00	1378.76
2	35.160085	-116.172073	1352.39	7.00	1359.39
3	35.164506	-116.171987	1364.48	7.00	1371.48
4	35.168926	-116.172030	1360.97	7.00	1367.97
5	35.168856	-116.169712	1375.54	7.00	1382.54
6	35.172750	-116.169841	1361.06	7.00	1368.06
7	35.176819	-116.169841	1341.23	7.00	1348.23
8	35.176714	-116.164305	1392.58	7.00	1399.58
9	35.175205	-116.164305	1398.98	7.00	1405.98
10	35.175311	-116.162159	1423.25	7.00	1430.25
11	35.168926	-116.162095	1438.34	7.00	1445.34
12	35.162611	-116.162031	1456.78	7.00	1463.78
13	35.162751	-116.169412	1388.80	7.00	1395.80

Name: PV array 3
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 0.0°
Ground Coverage Ratio: 0.5
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	35.163182	-116.183517	1402.57	7.00	1409.57
2	35.163130	-116.175942	1367.11	7.00	1374.11
3	35.159639	-116.175985	1359.05	7.00	1366.05
4	35.159639	-116.174719	1352.60	7.00	1359.60
5	35.156779	-116.174655	1346.91	7.00	1353.91
6	35.153832	-116.174590	1338.51	7.00	1345.51
7	35.153832	-116.180019	1371.61	7.00	1378.61
8	35.156235	-116.179998	1377.78	7.00	1384.78
9	35.156235	-116.183452	1401.20	7.00	1408.20
10	35.156253	-116.186929	1427.20	7.00	1434.20
11	35.159990	-116.186821	1429.48	7.00	1436.48
12	35.159919	-116.183452	1402.58	7.00	1409.58

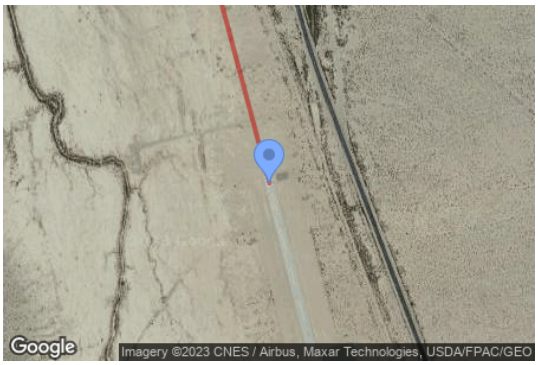
Name: PV array 4
Axis tracking: Single-axis rotation
Backtracking: Shade-slope
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 0.0°
Ground Coverage Ratio: 0.5
Rated power: -
Panel material: Smooth glass with AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	35.140686	-116.203005	1472.58	7.00	1479.58
2	35.140616	-116.196310	1433.52	7.00	1440.52
3	35.139818	-116.196332	1431.57	7.00	1438.57
4	35.139774	-116.191482	1405.86	7.00	1412.86
5	35.139177	-116.191482	1407.08	7.00	1414.08
6	35.139096	-116.186104	1379.77	7.00	1386.77
7	35.139570	-116.186104	1377.21	7.00	1384.21
8	35.139465	-116.180482	1344.65	7.00	1351.65
9	35.139044	-116.180461	1346.25	7.00	1353.25
10	35.139044	-116.177692	1332.83	7.00	1339.83
11	35.139430	-116.177671	1330.30	7.00	1337.30
12	35.139342	-116.169067	1281.41	7.00	1288.41
13	35.136921	-116.169109	1291.30	7.00	1298.30
14	35.136956	-116.172757	1321.46	7.00	1328.46
15	35.135055	-116.172789	1327.48	7.00	1334.48
16	35.135125	-116.174860	1341.24	7.00	1348.24
17	35.133432	-116.174882	1354.32	7.00	1361.32
18	35.133467	-116.180568	1407.52	7.00	1414.52
19	35.133502	-116.186340	1457.88	7.00	1464.88
20	35.135257	-116.186297	1428.97	7.00	1435.97
21	35.135239	-116.190138	1452.90	7.00	1459.90
22	35.135310	-116.194215	1469.44	7.00	1476.44
23	35.136187	-116.194236	1455.35	7.00	1462.35
24	35.136169	-116.194794	1456.67	7.00	1463.67
25	35.136819	-116.194816	1448.08	7.00	1455.08
26	35.136801	-116.195181	1451.21	7.00	1458.21
27	35.137573	-116.195138	1437.80	7.00	1444.80
28	35.137591	-116.196404	1446.37	7.00	1453.37
29	35.136819	-116.196382	1456.42	7.00	1463.42
30	35.136819	-116.197348	1461.45	7.00	1468.45
31	35.136240	-116.197326	1469.38	7.00	1476.38
32	35.136225	-116.199638	1494.35	7.00	1501.35
33	35.136857	-116.199680	1468.42	7.00	1475.42
34	35.136769	-116.204015	1488.02	7.00	1495.02
35	35.136190	-116.203993	1506.59	7.00	1513.59
36	35.136190	-116.206568	1514.19	7.00	1521.19
37	35.137243	-116.206547	1512.41	7.00	1519.41

Flight Path Receptor(s)

Name: Baker Airport - Northwest Runway
Description:
Threshold height: 50 ft
Direction: 165.0°
Glide slope: 3.0°
Pilot view restricted? Yes
Vertical view: 30.0°
Azimuthal view: 50.0°



Point	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
Threshold	35.290354	-116.082661	917.61	50.00	967.61
Two-mile	35.318284	-116.091827	911.38	609.66	1521.04

Name: Baker Airport - Southeast Runway
Description:
Threshold height: 50 ft
Direction: 345.1°
Glide slope: 3.0°
Pilot view restricted? Yes
Vertical view: 30.0°
Azimuthal view: 50.0°

Point	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
Threshold	35.282249	-116.080126	923.46	50.00	973.46
Two-mile	35.254311	-116.070996	940.19	586.70	1526.89

Discrete Observation Receptors

Name	ID	Latitude (°)	Longitude (°)	Elevation (ft)	Height (ft)
OP 1	1	35.134569	-116.211419	1510.06	6.00
OP 2	2	35.133113	-116.208211	1473.28	6.00
OP 3	3	35.139645	-116.225798	1839.21	6.00
OP 4	4	35.145083	-116.200806	1484.63	6.00
OP 5	5	35.162622	-116.185326	1417.62	6.00
OP 6	6	35.177142	-116.171925	1340.62	6.00
OP 7	7	35.154005	-116.193242	1477.55	6.00
OP 8	8	35.184560	-116.189820	1539.59	6.00
OP 9	9	35.199460	-116.153580	1263.14	6.00
OP 10	10	35.217852	-116.171369	1662.34	6.00
OP 11	11	35.129605	-116.156520	1268.32	6.00
OP 12	12	35.138882	-116.166318	1266.12	6.00
OP 13	13	35.089468	-116.124564	978.08	6.00

Route Receptor(s)

Name: Interstate 15 - Northbound
Path type: One-way (toward increasing index)
Observer view angle: 50.0°

Note: Route receptors are excluded from this FAA policy review. Use the 2-mile flight path receptor to simulate flight paths according to FAA guidelines.

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	35.126134	-116.221601	1390.94	4.00	1394.94
2	35.127924	-116.218587	1417.72	4.00	1421.72
3	35.129749	-116.215508	1447.24	4.00	1451.24
4	35.131609	-116.213276	1476.80	4.00	1480.80
5	35.134838	-116.210293	1502.55	4.00	1506.55
6	35.138019	-116.207408	1506.43	4.00	1510.43
7	35.141200	-116.204480	1487.55	4.00	1491.55
8	35.144275	-116.201595	1482.43	4.00	1486.43
9	35.147561	-116.198581	1492.05	4.00	1496.05
10	35.150662	-116.195675	1485.43	4.00	1489.43
11	35.153904	-116.192683	1473.66	4.00	1477.66
12	35.157040	-116.189776	1455.32	4.00	1459.32
13	35.160317	-116.186784	1431.76	4.00	1435.76
14	35.163439	-116.183904	1404.98	4.00	1408.98
15	35.166632	-116.180938	1395.14	4.00	1399.14
16	35.169702	-116.178102	1383.03	4.00	1387.03
17	35.172983	-116.175093	1366.00	4.00	1370.00
18	35.176096	-116.172224	1345.43	4.00	1349.43
19	35.179280	-116.169269	1334.95	4.00	1338.95
20	35.182428	-116.166315	1341.76	4.00	1345.76
21	35.185717	-116.163360	1313.51	4.00	1317.51
22	35.187321	-116.161535	1301.53	4.00	1305.53
23	35.188943	-116.159432	1290.16	4.00	1294.16
24	35.190605	-116.157130	1278.01	4.00	1282.01
25	35.192406	-116.154743	1271.27	4.00	1275.27

Name: Interstate 15 - Southbound
Path type: One-way (toward increasing index)
Observer view angle: 50.0°

Note: Route receptors are excluded from this FAA policy review. Use the 2-mile flight path receptor to simulate flight paths according to FAA guidelines.

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	35.126423	-116.221798	1392.49	4.00	1396.49
2	35.128197	-116.218826	1421.79	4.00	1425.79
3	35.130007	-116.215832	1449.61	4.00	1453.61
4	35.131722	-116.213783	1479.57	4.00	1483.57
5	35.134951	-116.210758	1506.22	4.00	1510.22
6	35.138180	-116.207732	1508.24	4.00	1512.24
7	35.141444	-116.204728	1487.39	4.00	1491.39
8	35.144357	-116.202046	1485.94	4.00	1489.94
9	35.147655	-116.198977	1495.44	4.00	1499.44
10	35.150778	-116.196166	1491.14	4.00	1495.14
11	35.154006	-116.193205	1477.44	4.00	1481.44
12	35.157271	-116.190165	1461.58	4.00	1465.58
13	35.160481	-116.187183	1434.59	4.00	1438.59
14	35.163621	-116.184307	1408.69	4.00	1412.69
15	35.166761	-116.181432	1396.21	4.00	1400.21
16	35.169813	-116.178535	1384.05	4.00	1388.05
17	35.173163	-116.175488	1366.05	4.00	1370.05
18	35.176306	-116.172568	1343.82	4.00	1347.82
19	35.179445	-116.169714	1333.07	4.00	1337.07
20	35.182690	-116.166732	1338.05	4.00	1342.05
21	35.185882	-116.163685	1307.49	4.00	1311.49
22	35.187513	-116.161925	1294.22	4.00	1298.22
23	35.189144	-116.159801	1283.01	4.00	1287.01
24	35.190836	-116.157494	1270.77	4.00	1274.77
25	35.192668	-116.155102	1264.27	4.00	1268.27

GLARE ANALYSIS RESULTS

Summary of Glare

PV Array Name	Tilt (°)	Orient (°)	"Green" Glare min	"Yellow" Glare min	Energy kWh
PV array 1	SA tracking	SA tracking	0	0	-
PV array 2	SA tracking	SA tracking	198	0	-
PV array 3	SA tracking	SA tracking	0	0	-
PV array 4	SA tracking	SA tracking	329	0	-

Total annual glare received by each receptor

Receptor	Annual Green Glare (min)	Annual Yellow Glare (min)
Baker Airport - Northwest Runway	0	0
Baker Airport - Southeast Runway	0	0
OP 1	0	0
OP 2	0	0
OP 3	0	0
OP 4	329	0
OP 5	0	0
OP 6	0	0
OP 7	0	0
OP 8	198	0
OP 9	0	0
OP 10	0	0
OP 11	0	0
OP 12	0	0
OP 13	0	0
Interstate 15 - Northbound	0	0
Interstate 15 - Southbound	0	0

Results for: PV array 1

Receptor	Green Glare (min)	Yellow Glare (min)
Baker Airport - Northwest Runway	0	0
Baker Airport - Southeast Runway	0	0
OP 1	0	0
OP 2	0	0
OP 3	0	0
OP 4	0	0
OP 5	0	0
OP 6	0	0
OP 7	0	0
OP 8	0	0
OP 9	0	0
OP 10	0	0
OP 11	0	0
OP 12	0	0
OP 13	0	0
Interstate 15 - Northbound	0	0
Interstate 15 - Southbound	0	0

Flight Path: Baker Airport - Northwest Runway

0 minutes of yellow glare
0 minutes of green glare

Flight Path: Baker Airport - Southeast Runway

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 1

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 2

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 3

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 4

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 5

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 6

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 7

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 8

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 9

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 10

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 11

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 12

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 13

0 minutes of yellow glare
0 minutes of green glare

Route: Interstate 15 - Northbound

0 minutes of yellow glare
0 minutes of green glare

Route: Interstate 15 - Southbound

0 minutes of yellow glare
0 minutes of green glare

Results for: PV array 2

Receptor	Green Glare (min)	Yellow Glare (min)
Baker Airport - Northwest Runway	0	0
Baker Airport - Southeast Runway	0	0
OP 1	0	0
OP 2	0	0
OP 3	0	0
OP 4	0	0
OP 5	0	0
OP 6	0	0
OP 7	0	0
OP 8	198	0
OP 9	0	0
OP 10	0	0
OP 11	0	0
OP 12	0	0
OP 13	0	0
Interstate 15 - Northbound	0	0
Interstate 15 - Southbound	0	0

Flight Path: Baker Airport - Northwest Runway

0 minutes of yellow glare
0 minutes of green glare

Flight Path: Baker Airport - Southeast Runway

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 1

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 2

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 3

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 4

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 5

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 6

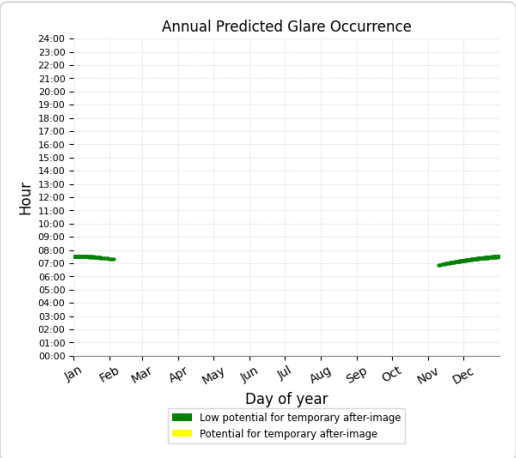
0 minutes of yellow glare
0 minutes of green glare

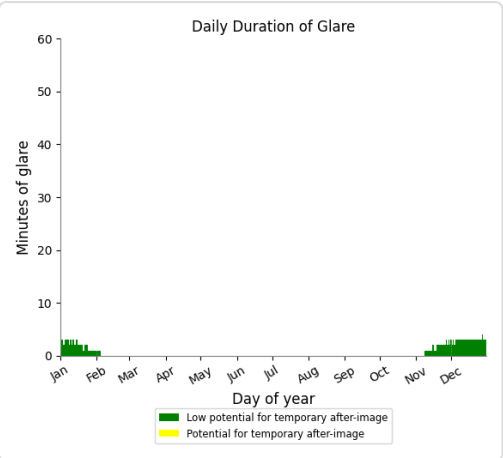
Point Receptor: OP 7

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 8

0 minutes of yellow glare
198 minutes of green glare





Point Receptor: OP 9

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 10

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 11

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 12

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 13

0 minutes of yellow glare
0 minutes of green glare

Route: Interstate 15 - Northbound

0 minutes of yellow glare
0 minutes of green glare

Route: Interstate 15 - Southbound

0 minutes of yellow glare
0 minutes of green glare

Results for: PV array 3

Receptor	Green Glare (min)	Yellow Glare (min)
Baker Airport - Northwest Runway	0	0
Baker Airport - Southeast Runway	0	0
OP 1	0	0
OP 2	0	0
OP 3	0	0
OP 4	0	0
OP 5	0	0
OP 6	0	0
OP 7	0	0
OP 8	0	0
OP 9	0	0
OP 10	0	0
OP 11	0	0
OP 12	0	0
OP 13	0	0
Interstate 15 - Northbound	0	0
Interstate 15 - Southbound	0	0

Flight Path: Baker Airport - Northwest Runway

0 minutes of yellow glare
0 minutes of green glare

Flight Path: Baker Airport - Southeast Runway

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 1

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 2

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 3

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 4

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 5

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 6

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 7

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 8

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 9

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 10

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 11

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 12

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 13

0 minutes of yellow glare
0 minutes of green glare

Route: Interstate 15 - Northbound

0 minutes of yellow glare
0 minutes of green glare

Route: Interstate 15 - Southbound

0 minutes of yellow glare
0 minutes of green glare

Results for: PV array 4

Receptor	Green Glare (min)	Yellow Glare (min)
Baker Airport - Northwest Runway	0	0
Baker Airport - Southeast Runway	0	0
OP 1	0	0
OP 2	0	0
OP 3	0	0
OP 4	329	0
OP 5	0	0
OP 6	0	0
OP 7	0	0
OP 8	0	0
OP 9	0	0
OP 10	0	0
OP 11	0	0
OP 12	0	0
OP 13	0	0
Interstate 15 - Northbound	0	0
Interstate 15 - Southbound	0	0

Flight Path: Baker Airport - Northwest Runway

0 minutes of yellow glare
0 minutes of green glare

Flight Path: Baker Airport - Southeast Runway

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 1

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 2

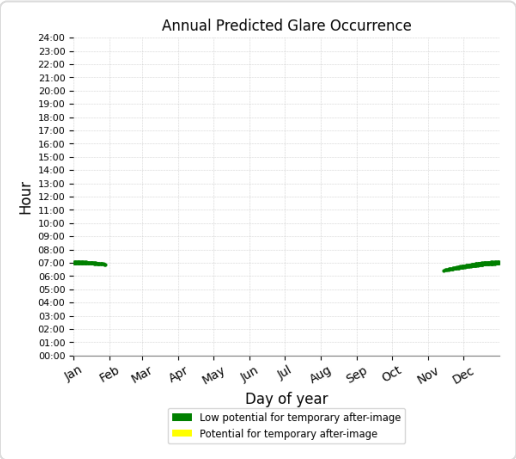
0 minutes of yellow glare
0 minutes of green glare

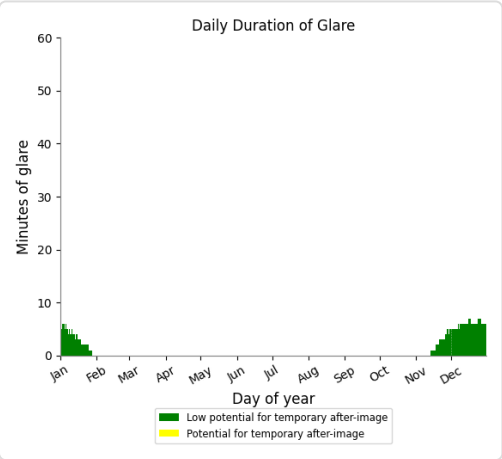
Point Receptor: OP 3

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 4

0 minutes of yellow glare
329 minutes of green glare





Point Receptor: OP 5

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 6

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 7

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 8

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 9

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 10

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 11

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 12

0 minutes of yellow glare
0 minutes of green glare

Point Receptor: OP 13

0 minutes of yellow glare
0 minutes of green glare

Route: Interstate 15 - Northbound

0 minutes of yellow glare
0 minutes of green glare

Route: Interstate 15 - Southbound

0 minutes of yellow glare
0 minutes of green glare

Assumptions

"Green" glare is glare with low potential to cause an after-image (flash blindness) when observed prior to a typical blink response time.
"Yellow" glare is glare with potential to cause an after-image (flash blindness) when observed prior to a typical blink response time.
Times associated with glare are denoted in Standard time. For Daylight Savings, add one hour.
Glare analyses do not account for physical obstructions between reflectors and receptors. This includes buildings, tree cover and geographic obstructions.
Several calculations utilize the PV array centroid, rather than the actual glare spot location, due to V1 algorithm limitations. This may affect results for large PV footprints. Additional analyses of array sub-sections can provide additional information on expected glare.
The subtended source angle (glare spot size) is constrained by the PV array footprint size. Partitioning large arrays into smaller sections will reduce the maximum potential subtended angle, potentially impacting results if actual glare spots are larger than the sub-array size. Additional analyses of the combined area of adjacent sub-arrays can provide more information on potential glare hazards. (See previous point on related limitations.)
Glare locations displayed on receptor plots are approximate. Actual glare-spot locations may differ.
Glare vector plots are simplified representations of analysis data. Actual glare emanations and results may differ.
The glare hazard determination relies on several approximations including observer eye characteristics, angle of view, and typical blink response time. Actual results and glare occurrence may differ.
Hazard zone boundaries shown in the Glare Hazard plot are an approximation and visual aid based on aggregated research data. Actual ocular impact outcomes encompass a continuous, not discrete, spectrum.
Refer to the Help page at **www.forgesolar.com/help/** for assumptions and limitations not listed here.