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

JANUARY 2025

PREPARED FOR

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SODA MOUNTAIN SOLAR PROJECT
VISUAL RESOURCES TECHNICAL REPORT

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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). 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 A). The BLM's process is an industry standard and is often applied to non-BLM visual assessments to provide project proponents and authorizing agencies 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 approximately 50 miles northeast of Barstow (see Figure 3). 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 site would occupy the alluvial valley dividing the northern and southern portions of the Soda Mountains in the Mojave Desert. The project site is visually and ecologically characteristic of the Mojave basins common in this region, composed of rural creosote bush–dominated desert land, and is almost entirely undeveloped (see Figures 1 and 2). The project is bounded directly to the east by the Mojave National Preserve (administered by the National Park Service [NPS]) and BLM-managed land, including the Rasor Off-Highway Vehicle (OHV) recreation area at the southeast corner, and the Soda Mountains Wilderness to the west. 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 project site access road.

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.

Figure 1. Representative east-facing view toward the project site from I-15 southbound.

Figure 2. Representative west-facing view toward project site from I-15 northbound.

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 3. As shown in Figure 4, 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).

Along with related plans, reports, correspondence, and other data, this Visual Resources Technical Report is based on the project description and project plans provided by the applicant as summarized in the following sections. The current 30% project plan set used for this analysis is provided as Appendix A of the EIR. Additionally, an aerial perspective of the existing site and developed project rendering are included in Appendix B of this report, and typical elevation drawings of project components are included in Appendix C of this report.

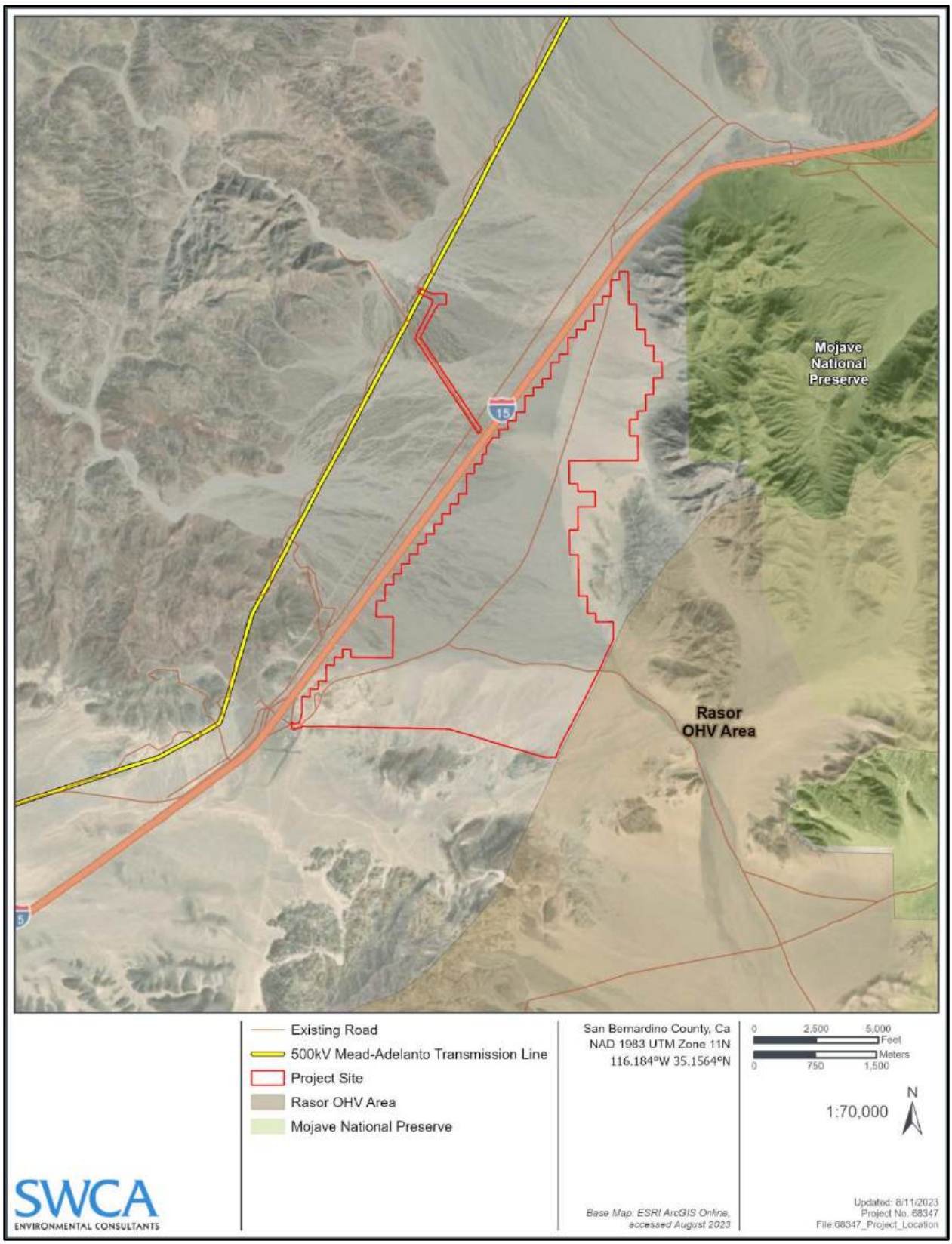

Figure 3. Project site location.

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. Figure 4 depicts the general location of project components.

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.

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. To reduce visual contrast, the BESS units will be painted a matte-finish dark brown, Sudan Brown, from the BLM Standard Environmental Color Chart (BLM 2021).

2.2.5 Gen-Tie

The project would connect to the electrical grid via a 1.5-mile overhead gen-tie line from the substation to the switchyard, located approximately 0.9 mile west of I-15. The gen-tie monopole tower structures would be up to 160 feet in height and fabricated from galvanized steel. The gen-tie conductors would be undergrounded beneath the I-15 right-of-way.

2.2.6 Access Roads

Primary operational access to the project site would be provided via a gated entrance off Rasor Road, accessed approximately 250 feet south of 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 with 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.

2.2.7 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 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.

2.2.8 Lighting

Lighting would be provided at the Rasor Road site entrance, O&M 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 shielded or hooded and directed downward to minimize light exposure. A project outdoor lighting plan is included in Appendix D of this report.

2.2.9 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 be clustered east of the BESS yard. To reduce visual contrast, the O&M buildings' exterior walls will be painted a matte-finish dark brown, Sudan Brown, from the BLM Environmental Color Chart. 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.

2.2.10 Drainage Facilities

The site drainage is designed to follow the existing natural drainage patterns, or generally from the northwest to the southeast across the site in three engineered channels between the solar array areas. None of the site components, including fences and solar panel structures, would prevent stormwater flow.

2.2.11 Landscape Screening

Native and naturalized landscape shrubs and trees are proposed to be installed in a continuous row of mixed and varied species along the project’s western perimeter to screen views from I-15. The plantings would be composed of clustered trees near the BESS and substation in particular to help screen these taller components. With time, the plantings are intended to soften and interrupt views of the project as seen from the highway. The conceptual landscape design plan is included in Appendix E. Additionally, the landscape screening design is depicted in the visual simulations prepared for this study (see Appendix F).

Table 2.1 describes the dimensions and material finishes of the primary project components.

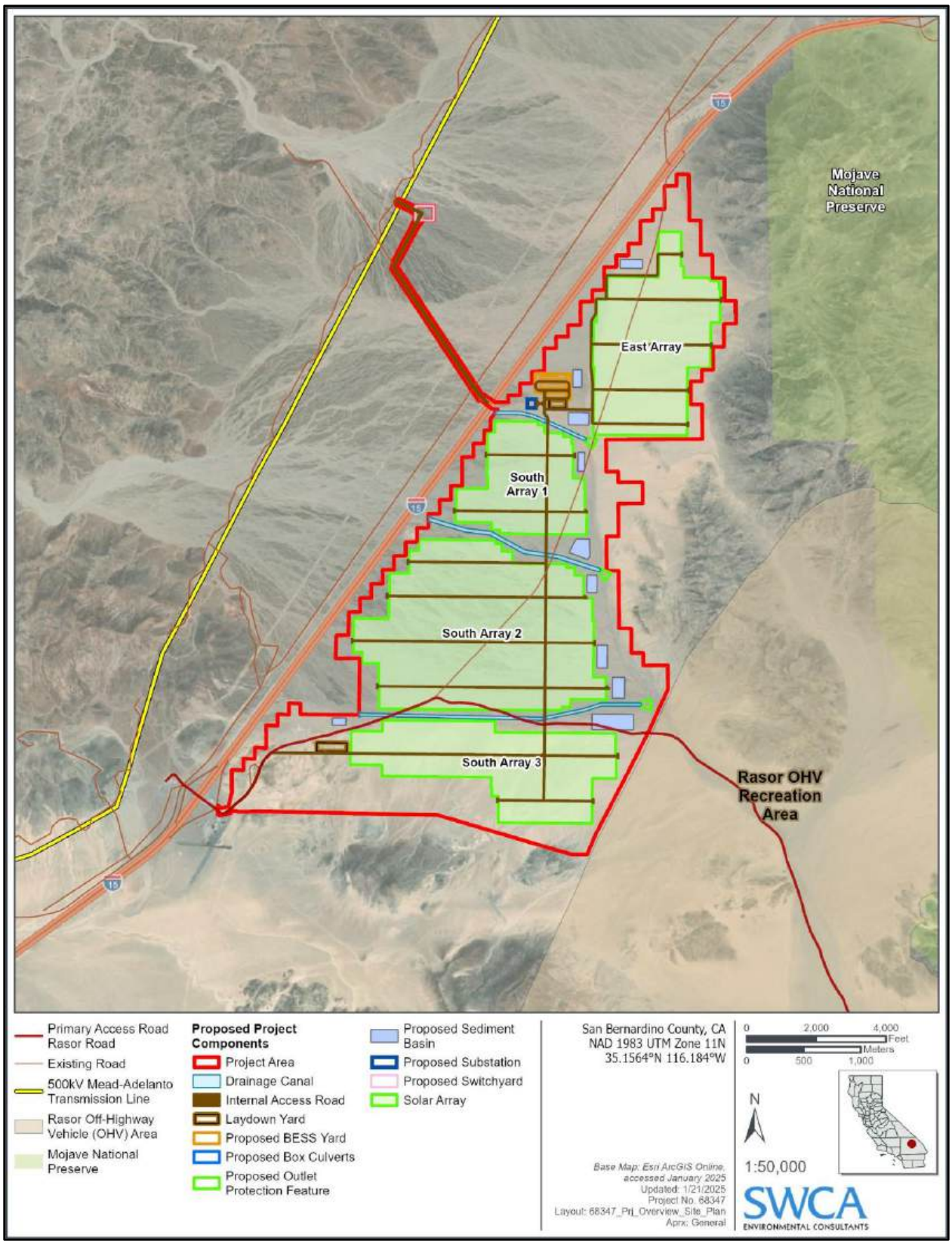

Figure 4. Proposed project components.

Table 2.1. Project Features Dimensions and Finishes

Project Component	Approximate Acreage and Dimensions	Primary Material	Surface Treatment or Finish
Solar Panel Arrays and Support Structures			
Solar Panels	Fencing: 1,771 acres Racking area: 1,635 acres	Crystalline PV panels	Uniformly dark in color, non-reflective
Support and Mounting Structure (Solar Tracker)	Approximately 6 to 12 feet high at maximum tilt	Steel	Galvanized steel, dull finish
Inverter Structures	74 inverters; approximate dimensions 3 feet long, 3 feet wide, 4 feet high	Rectangular metal enclosure on small concrete pad base	As manufactured, matte finish off-white
Substation, Switchyard, Gen-Tie			
Substation	140,000 square feet Maximum component height: 55 feet	Electrical equipment including support structures: galvanized steel (grey), aluminum, concrete, and other typical construction materials	Galvanized steel, dull finish
Switchyard	234,300 square feet Maximum component height: 100 feet	Electrical equipment including support structures: galvanized steel (grey), aluminum, concrete, and other typical construction materials	Galvanized steel, dull finish
Steel Poles	160 feet high, 10-foot base diameter	Galvanized steel and concrete	Galvanized steel, dull finish
Battery Energy Storage System (BESS)			
BESS enclosures	18 acres Each unit: 20 feet long, 6 feet wide, 8 feet high	Metal enclosure	Painted Sudan Brown from BLM Environmental Color Chart. Matte finish.
Operation and Maintenance (O&M) Buildings, Miscellaneous			
O&M buildings	(2) 5,000 square feet, 30 feet high (1) 2,400 square feet, 35 feet high	Pre-fabricated metal-sided structures, concrete foundations and pads	Painted Sudan Brown from BLM Environmental Color Chart. Matte finish.
Perimeter Fencing	8-foot chain link	Steel posts and wire	Galvanized steel, dull finish
Parking Area	13,200 square feet	Compacted native soil	Natural soil
Internal Access Roads	16 feet wide	Compacted native soil	Natural soil

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 2,059 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 to 18 acres. Additionally, permanent buildings would be constructed at the O&M facilities. Construction will include a 0.33-acre parking area adjacent to the buildings.

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 40 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 a 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 the 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 3.1. The Project is proposed on lands managed under the Desert Renewable Energy Conservation Plan.

Table 3.1. 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.

VRM Class	Description
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.

3.1.3.1 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 from 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).

3.1.4 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). While the project site is located outside the Mojave National Preserve, the visual analysis area does overlap the westernmost portion of the preserve.

3.1.5 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).

3.1.5.1 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)

3.1.6 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 Old Spanish National Historic Trail Comprehensive Administrative Strategy* guides the administrative management of the trail (NPS 2017). 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. The project site is approximately 3.4 miles west of the nearest segment of the OSNHT; however, the trail falls within the 5-mile visual analysis area (Figure 5).

3.1.7 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 San Bernardino 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 the County for State Scenic Highway status.

3.3 Local Regulations

The project is located entirely on BLM-administered public land. While the project is not subject to San Bernardino County jurisdictional authority, the following local policies, ordinances, and goals serve as indicators of potential sensitivity to changes in the visual environment for purposes of assessing visual impacts associated with implementation of the project.

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.

7. The proposed commercial solar energy generation facility will minimize site grading, excavating, and filling activities by being located on land where the existing grade does not exceed an average of five percent across the developed portion of the project site, and by utilizing construction methods that minimize ground disturbance.

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

19. The proposed commercial solar energy generation facility will avoid modification of scenic natural formations.

26. 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.

28. 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.

3.4 Conformance with Applicable Laws, Standards, or Plans

While the CEQA thresholds analysis (see Section 7.2) and consideration of the project site's existing VRM class III designation are required and important analyses, no permits are required that explicitly or specifically address visual resources. However, several federal, state, and local laws, ordinances, regulations, and standards applicable to visual resources are discussed and summarized in Table 3.2.

Table 3.2. Laws, Ordinances, Regulations, and Standards

Law, Ordinance, Regulation, or Standard	Administering Agency	Applicability	Conformance
Federal			
40 CFR 1502.16, 1508.8	CEQ	Calls for projects subject to NEPA to consider and identify aesthetic effects.	This Visual Resources Technical Report
43 CFR section 28 2805.12(i)(3)(i)	BLM	BLM, as a federal land manager, shall control or prevent damage to "(i) Scenic, aesthetic . . . values . . ."	This Visual Resources Technical Report
Desert Renewable Energy Conservation Plan – Land Use Plan Amendment			
LUPA-VRM-1	BLM	The project site is within lands categorized VRM Class III	This Technical Report: Sections 3.1.3; Section 5
LUPA-VRM-2	BLM	The project site is within lands categorized VRM Class III.	This Technical Report: Section 5
LUPA-VRM-3	BLM	Directly guides aesthetic considerations of proposed transmission lines.	This Technical Report: Section 5
GPL-VRM-1	BLM	Calls for developments to incorporate design standards and BMPs to reduce visual impacts.	This Technical Report: Section 2; Table 2.1; Appendix A, Appendix D, Appendix E, Appendix F
GPL-VRM-2	BLM	Identifies the BMP plan for reducing visual impacts from development.	This Technical Report: Section 2; Table 2.1; Appendix A, Appendix D, Appendix E, Appendix F

Law, Ordinance, Regulation, or Standard	Administering Agency	Applicability	Conformance
GPL-VRM-3:	BLM	Guides mitigation standards according to region and VRM Class.	This Technical Report: Section 2; Table 2.1; Appendix A, Appendix D, Appendix E, Appendix F
National Park Dark Sky Program	NPS	Guides monitoring and minimizing undue light pollution and trespassing on NPS lands.	This Technical Report: Appendix D
General Management Plan for the Mojave National Preserve	NPS	Not directly applicable but included for the sake of completeness. The General Management Plan for the Mojave National Preserve catalogs general goals and policies for preserve management, including the protection of scenic resources.	This Technical Report: Sections 3.1.5, 5.2.3
Old Spanish National Historic Trail Comprehensive Administrative Strategy	NPS	Not directly applicable but included for the sake of completeness. Establishes a framework for developing future trail planning efforts to support the protection and interpretation of the resources and values of the OSNHT.	This Technical Report: Sections 3.1.6, 5.2.4, Figure 5
BLM Solar Energy Program	BLM	Includes programmatic design practices for considering visual resources.	This Technical Report: Sections 4 and 5, Appendix A
State			
California State Scenic Highway System (I-15)	Caltrans	Although not directly applicable, the 'eligible' status of I-15 signals its sensitivity as a visual resource.	N/A
Local			
San Bernardino County Countywide Plan; County Development Code	County of San Bernardino	The project is located entirely within lands administered by the BLM. Although local plans and ordinances are considered with the CEQA analysis, they have no direct regulatory authority regarding the project.	N/A

Permits with considerations for visual effects required to construct, operate, and maintain the project are summarized in Table 3.3.

Table 3.3. Permits Required

Regulatory Agency	Permit Required	Agency Contact	Schedule
County of San Bernardino	N/A County review of Outdoor Lighting Assessment Report and Landscape Concept Plan	Delanie Garlick San Bernardino County, Contract Planner Harris & Associates 3620 American River Drive Suite 175 Sacramento, CA 95864 Delanie.Garlick@lus.sbcounty.gov	Completed

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 October 2, 2024, 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, nine key observation points (KOPs) were selected that best illustrate the visual changes that would occur as a result of the project (refer to Section 4.3, 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 F, Visual Simulations). The appearance of structures shown in the visual simulations is based on preliminary designs provided by the project applicant and as identified in the project description. Where project-specific information was not available, those project features were assigned a physical appearance typical of similar solar energy facilities built throughout the region and state.

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 5, Visual Contrast Rating Summary, and Appendix A, Visual Contrast Rating Worksheets). 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 G, 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 have 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. While the project site and much of the surrounding valley floor lands are categorized and managed according to the BLM's VRM Class III, no specific natural features, objects, or distinguishing geologic characteristics recognized for aesthetic value were identified within the project site.

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.

The visual context of the project site and the surrounding landscape is discussed further in Section 5.1, Visual Contrast Analysis by Key Observation Point.

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 5) and Visual Contrast Rating Worksheets (Appendix A) 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 from 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 (see Figure 5) 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 at 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 viewpoint at the Rasor Road Services Shell Oil Station was considered in this analysis.

Based in part on the review of the project viewshed analysis (see Figure 5), 16 field viewpoints were selected to evaluate typical viewing locations, and nine of those viewpoints were chosen to be carried forward as KOPs for simulations and further analysis (Figures 6 and 7; Tables 4.1 and 5.3). SWCA conducted in-field assessments on January 24, 2023, and October 2, 2024, 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.

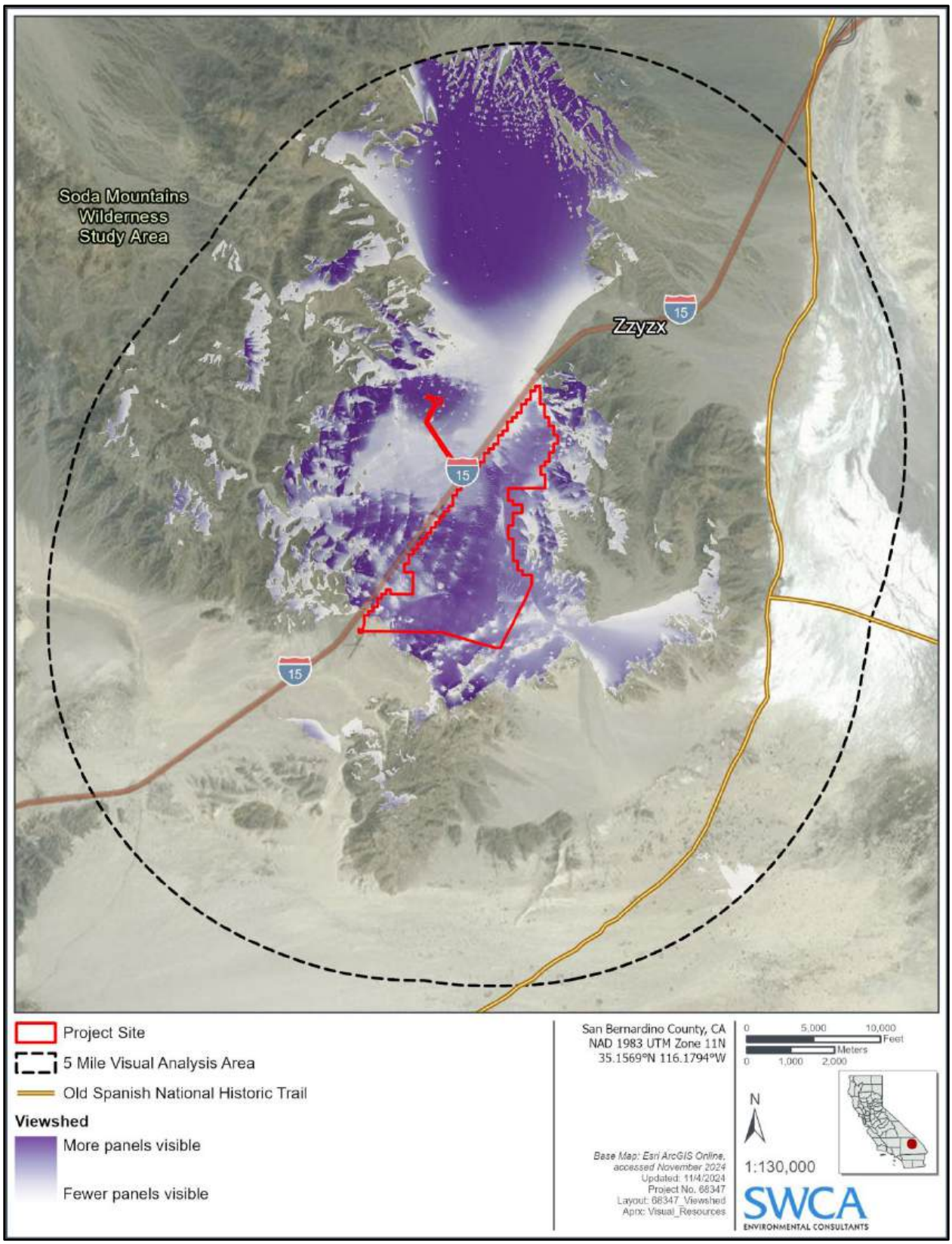

Figure 5. Solar arrays viewshed analysis.

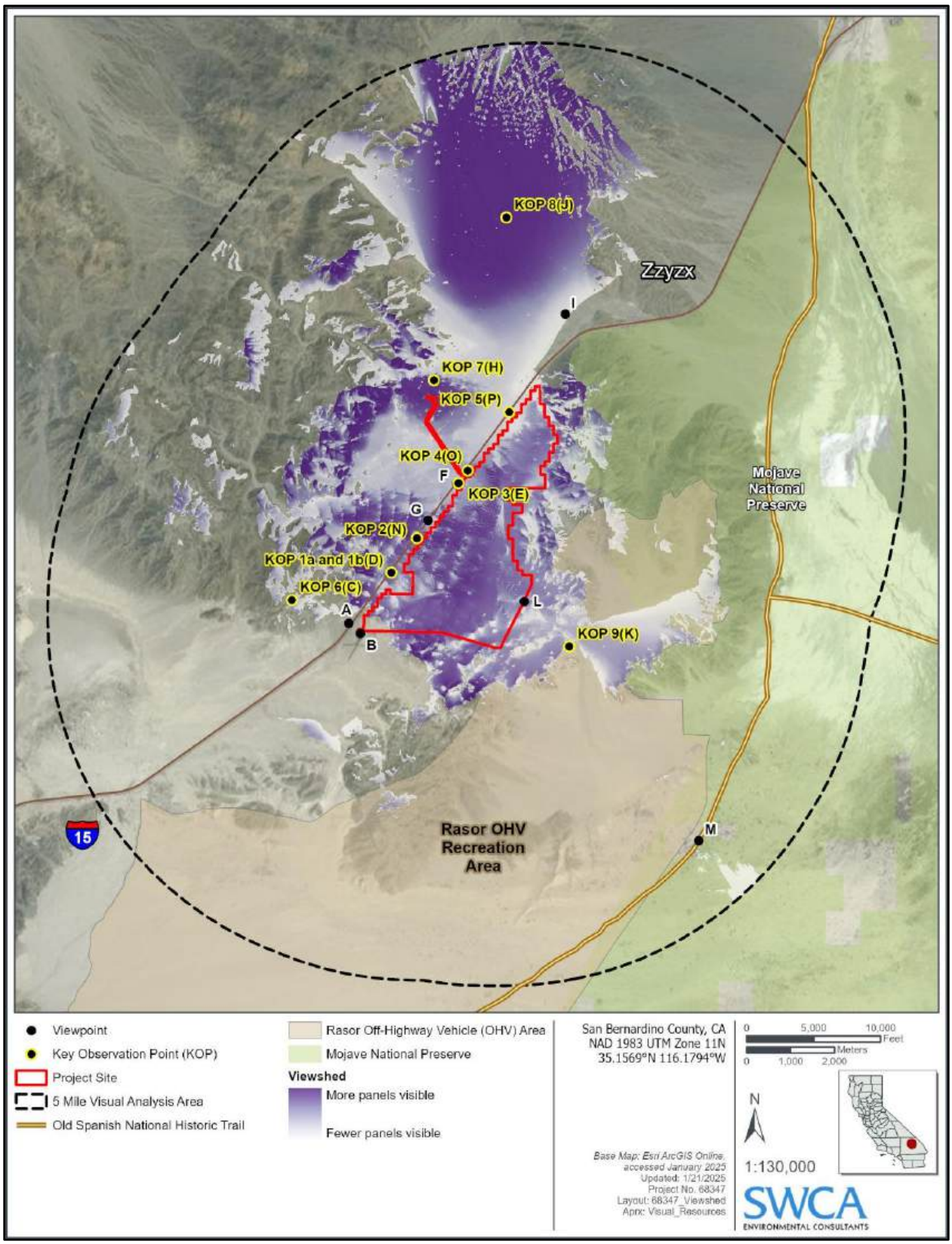

Figure 6. Preliminary field viewpoints and KOP simulation locations.

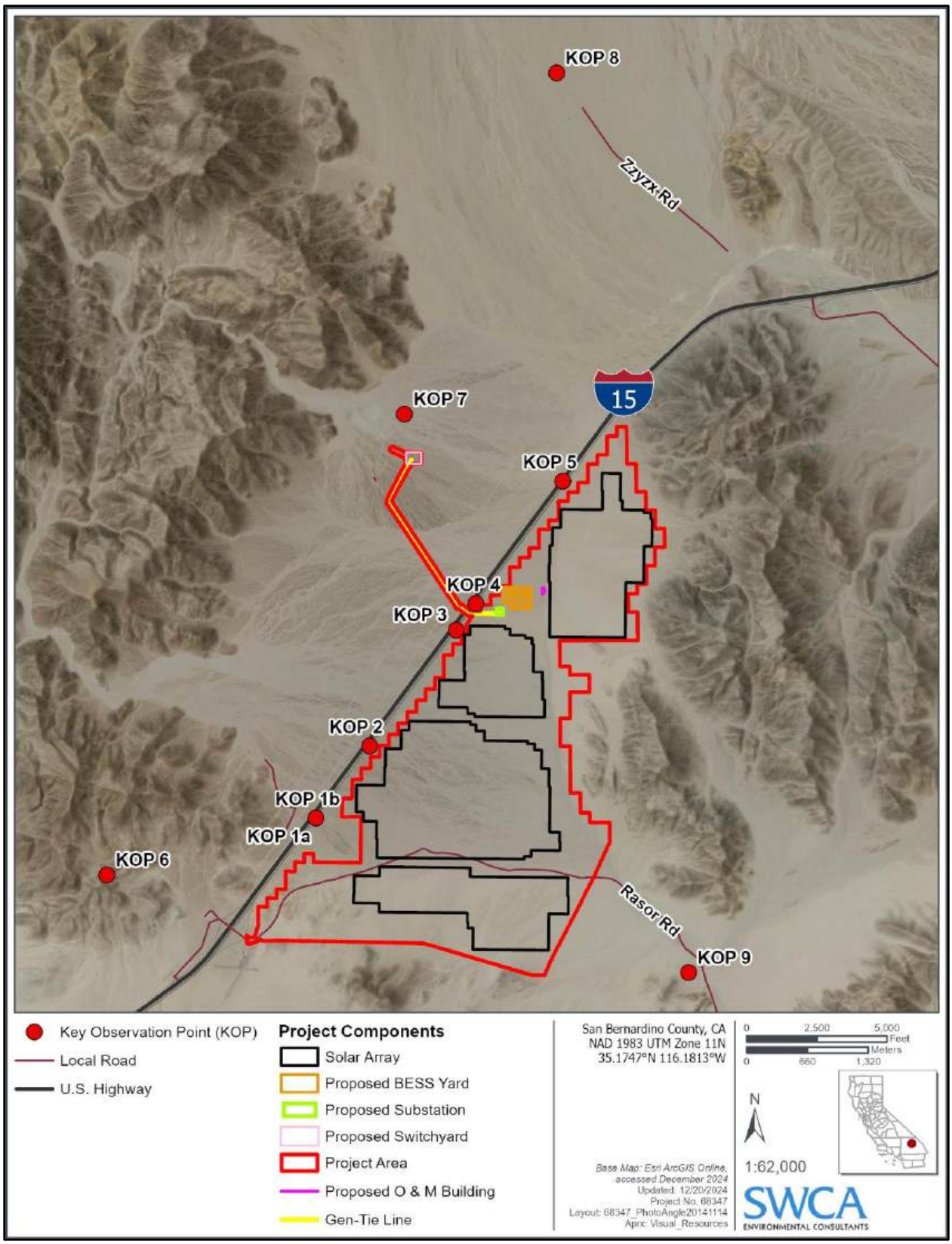

Figure 7. KOP locations in relation to the site plan.

Table 4.1 details the distance from project components, sensitive viewer types, and the rationale for inclusion from each viewpoint and the selected KOPs. Section 5.1 describes the setting at each KOP that was carried forward for simulations and analysis.

4.3.2.1 VEHICULAR TRAVEL ROUTES

KOPs 1a, 1b, 2, 3, 4, and 5 – I-15: I-15 is the fourth-longest north-south transcontinental interstate highway in the United States, passing 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.

KOP 6 – Transmission line access road: Located west of I-15, this unnamed gravel road is accessed via Arrowhead Trail and terminates at a communications tower located approximately 1 mile northwest of the Rasor Road overcrossing. This access road connects with several recreational roads that run along the alluvial valley west of the project and provide elevated views to the east. This KOP is representative of both vehicular travel routes and recreational areas.

4.3.2.2 RECREATIONAL AREAS

KOP 7 – Transmission Line Road B: Located northwest of the project site and near the project switchyard, 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 8 – OHV Recreational Area B: Located north of the project site, 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 9 – 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 National 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 4.1. Viewpoint and KOP Descriptions

Field Viewpoint ID	Name/Location	Sensitive Viewer Group	Approximate Distance to Nearest Solar Equipment (miles) Analysis Area Distance Zone	Rationale for Inclusion	Carried Forward for Simulation?
A	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
B	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
C	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 6]**
D	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 1a and 1b]**
E	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.	**YES – [KOP 3]**
F	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.	No, context only
G	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
H	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 7]**
I	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

Field Viewpoint ID	Name/Location	Sensitive Viewer Group	Approximate Distance to Nearest Solar Equipment (miles) Analysis Area Distance Zone	Rationale for Inclusion	Carried Forward for Simulation?
J	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 8]**
K	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 9]**
L	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
M	OSNHT and Mojave National Preserve	Recreational Area	4.02 Background	Representative of views of recreationalists of the surrounding OHV area, the Mojave National Preserve, and the OSNHT.	No, context only
N	I-15	Vehicular Travel Route	0.1 Foreground	Representative of foreground view of solar arrays for local residential, recreational, and destination/origin commuters headed northbound.	**YES – [KOP 2]**
O	I-15	Vehicular Travel Route	0.5 Foreground	Representative of foreground view of substation, BESS, and O&M buildings for local residential, recreational, and destination/origin commuters headed northbound.	**YES – [KOP 4]**
P	I-15	Vehicular Travel Route	0.2 Foreground	Representative of foreground view of solar arrays for local residential, recreational, and destination/origin commuters headed southbound.	**YES – [KOP 5]**

Note: The number identification of the nine KOP locations (KOPs 1a, 1b, 2–9) were identified during multiple desktop and field assessments, resulting in their appearing out of numerical order here.

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 A. 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 KOP locations and are included in Appendix F. 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 5.1 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 5.1. 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 5.2).

Table 5.2. 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 6, Glare Analysis Summary, and Appendix G). 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 Visual 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 analyzed KOPs is provided below in Table 5.3. The associated Visual Contrast Rating Worksheets for each of the KOPs are provided in Appendix A.

Table 5.3. Visual Contrast Ratings by KOP

KOP Number	Name Overall Level of Contrast	Contrast Discussion
1a	I-15 Northbound, facing northeast 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, including solar arrays, perimeter fencing, and landscape screening, would be visible from this location and would introduce form, line, color, and texture not common in the landscape. As with all KOPs located along I-15, during the morning, when the solar panels would be oriented east toward the rising sun, travelers on I-15 would observe the panels' medium gray-colored 'reverse face,' which would be similar to the colors and shadows in the mountains and hills around the project. During the afternoon, when the solar panels would be oriented west, travelers on I-15 would observe the panels' dark blue-black faces, which would create stronger visual contrast compared to morning conditions. Existing 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.

KOP Number	Name Overall Level of Contrast	Contrast Discussion
1b	I-15 Northbound, facing east 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, including solar arrays, perimeter fencing, and landscape screening, would be visible from this location and would introduce form, line, color, and texture not common in the landscape. Existing 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.
2	I-15 Northbound, facing east 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, including solar arrays, perimeter fencing, and landscape screening, would be prominently apparent from this location and would introduce form, line, color, and texture not common in the landscape. Existing development present in this view is similar to that described for KOP 1a. As viewed from KOP 2, the landscape would appear heavily altered, and project elements, specifically the solar arrays and perimeter fencing, would demand attention and begin to dominate the scenery, especially for views oriented east of I-15. The gen-tie structures, about 1 mile to the north, would begin to be noticeable by northbound travelers from KOP 2. 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.
3	I-15 Northbound, facing northwest Strong	Level of contrast would be strong. Views of the project from this KOP are oriented northwest, on the opposite (west) side of I-15 from the solar arrays. The primary backdrop is composed of the brown pyramidal hills of the Soda Mountains located about 2 miles away, and the tan-colored alluvial plain sloping steadily downward from the hills' base. The project gen-tie, carried on galvanized steel monopoles, would pass over I-15 between the substation and the switchyard (although the conductors would be undergrounded beneath the freeway right-of-way). Existing development around this location includes the I-15 corridor, a graded service road east of the freeway, two electrical distribution lines on slender wood poles, and a 500-kV transmission line carried on steel lattice towers approximately 0.80 mile west of I-15. Despite the existing infrastructure visible from KOP 3, the project's tall, gray monopoles, switchyard, and clustered lattice towers at the loop-in would draw the attention of viewers due to their form, lines, color, textures, and scale, creating strong contrast.
4	I-15 Northbound, facing east Strong	Level of contrast would be strong. Views of the project from this KOP would be predominately backdropped by the flat valley in the foreground and rugged trapezoidal mountains just over 1 mile away. The project solar arrays, substation, BESS units, drainage channel, perimeter fencing, and landscape screening would be visible from this location and would introduce form, line, color, and texture not common in the landscape. Existing development around this location includes I-15, roadway signage, and low repetitive fencing. 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 emphasize energy development. Although the existing development and landscape screening would partially reduce the contrast caused by the project, it is anticipated that the level of contrast at this KOP would remain strong.

KOP Number	Name Overall Level of Contrast	Contrast Discussion
5	I-15 Southbound, facing southeast Strong	Level of contrast would be strong This KOP illustrates typical views from the southbound lanes of I-15 near the north end of the project. Views of the project from this location would be predominately backdropped against the broad valley floor and rugged mountains in the near background. As viewed from this KOP, the landscape would appear heavily altered, and project elements, specifically the solar arrays and perimeter fencing to the east, would demand attention and begin to shift the landscape character from open desert to energy production. The gen-tie structures and switchyard, about 1 mile to the west, would also be apparent to travelers from this KOP. Although the degree of existing development would partially reduce the contrast caused by the project, it is anticipated that the level of contrast at KOP 5 would remain strong.
6	Transmission Line Access Road Moderate	Level of contrast would be moderate. Views of the project from this location would be predominately backdropped against low pyramidal hills and rugged mountains in the background. The southern portion of the project solar arrays would be visible at a distance of 1.75 miles (although partly obscured by foreground hills) 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 of the solar arrays when oriented east. In this view, there is a greater degree of human development visible than other KOPs including sections of I-15, transmission lines (monopole, H-frame, and lattice towers), and unimproved gravel roadways. The landscape would appear moderately altered, and the large, low-profile rectangular form of the solar arrays would begin to dominate the visual setting, particularly when viewed from this location in the afternoon when the panels' dark faces are oriented west. 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.
7	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.
8	Zzyzx Road/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 H-frame and lattice tower transmission lines in the foreground, unimproved gravel roads, and the I-15 corridor crossing the mid ground. 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
9	Rasor Road/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.

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 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 a strong degree of visual contrast when viewed from eight of the nine selected KOPs (KOPs 1a/1b, 2–5, 7–9). At 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 remaining KOP (KOP 6). At this location, 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 Historic 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 (see Figure 5). It is therefore anticipated that there would be negligible or no visual contrast from the proposed project based on the viewshed analysis and analysis from field viewpoint M, which was assessed during the fieldwork for this study (see Table 4.1 and Figure 6). 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 G). 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 in the glare analysis by OPs 1–7 and linear 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 (i.e., the viewer is positioned above the observed features). As indicated by the analysis results, these receptor points and routes would experience "0" minutes of potential glint or glare; therefore, there are no glare impacts to motorists indicated along I-15. 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.

7 IMPACT ANALYSIS

7.1 Applicant-Proposed Measures

The applicant identified and committed to implementing the following Applicant-Proposed Measures (APMs) as part of the proposed project to avoid or substantially lessen potentially significant impacts to visual resources, to the extent feasible. The APMs, where applicable, are discussed in the impact analysis section below. These measures include the following:

- **APM AES-1: Siting and Design.** Visual design elements shall be integrated into the construction plans, details, shop drawings and specifications; these shall include, but not be limited to, grubbing and clearing, vegetation thinning and clearing, grading, revegetation, drainage, and structural plans. Visual design elements within the plans shall be measurable by size and monitored while under construction, while operational, and when decommissioned. Visual design elements to be integrated into construction plans, details, shop drawings and specifications must at a minimum include:

1. *Vary the grid layout to reduce contrast caused by long straight roads*. Employ an off-set in the grid layout to reduce visual contrast caused by long straight roads and, to the extent possible, arrays. The result shall be that no road extends from one side of the solar field to the other in a straight line. To further reduce contrast caused by exposing un-oxidized soils and rock in roadways, at select locations of concern from KOPs, spot applications of a product such as Permeon shall be used to dull and darken the ground plane in a short time.

2. *Color treat structures to reduce contrasts with the existing landscape*. The applicant shall treat surfaces of all permanent, large project structures and buildings (O&M building, inverters, electrical enclosures, gen-tie poles, conductors, tanks, pipes, and walls) and chain-link fences visible to the public such that: (a) their colors minimize visual intrusion and contrast by blending with (matching) the existing characteristic landscape colors; (b) their colors and finishes do not create excessive glare from surface brightness; and (c) their colors and finishes are consistent with local policies and ordinances. The transmission line conductors shall be non-specular and non-reflective, and the insulators shall be non-reflective and non-refractive.

   Following consultation with the BLM Visual Resources specialist, and other representatives as deemed necessary, the applicants shall submit for the CDFW's and BLM's review, a specific Surface Treatment Plan that will satisfy these requirements. The consultation would be in-field at the agencies' election, or as a desktop review if preferred by the agencies. The treatment plan shall include:

   a. A description of the overall rationale for the proposed surface treatment, including the selection of the proposed color(s) and finishes based on the characteristic landscape. Colors will be fielded tested using the actual distances from the KOPs to the proposed structures, using the proposed colors painted on representative surfaces;

   b. A list of each major project structure, building, tank, pipe, and wall; the transmission line towers and/or poles; and fencing, specifying the color(s) and finish proposed for each. Colors must be identified by vendor, name, and pantone number; or according to a universal designation system;

   c. One set of color brochures or color chips showing each proposed color and finish;

   d. A specific schedule for completion of the treatment; and

   e. A procedure to ensure proper treatment maintenance for the life of the project. The applicant shall not specify to the vendors the treatment of any buildings or structures treated during manufacture or perform the final treatment on any buildings or structures treated in the field, until the applicant receives notification of approval of the treatment plan by the BLM. Subsequent modifications to the treatment plan are prohibited without the BLM's approval for components under their respective authorities; however, the applicant may consider the agencies' failure to respond to a request for review within 60 days an acceptance of the proposal.

1. *Lighting* – Consistent with safety and security considerations, the applicant shall design and install all permanent exterior lighting and all temporary construction lighting such that: (a) lamps and reflectors are not visible from beyond the projects' site, including any off-site security buffer areas; (b) lighting does not cause excessive reflected glare; (c) direct lighting does not illuminate the nighttime sky, except for required FAA aircraft safety lighting; (d) illumination of the project and its immediate area is minimized and (e)

it complies with local policies and ordinances. Prior to construction, the applicant shall submit to BLM and CDFW a Lighting Management Plan that outlines the following:

a. *Construction and operational (permanent) lightin*g – Except as required to meet safety and security requirements, there shall be no exterior nighttime lighting on the project site during the construction and operation periods. For these purposes, "nighttime" means the period of time between two hours after sunset until sunrise. To verify compliance with this measure, the applicant shall include a The safety and security reasons that created the need for nighttime lighting shall be included in the log as well.

b. *Facility lighting* – Lighting for facilities shall not exceed the minimum number, intensity, and coverage required for safety and basic security. Lighting shall be amber in color when accurate color rendition is not required. Use low-pressure sodium lamps or yellow LED lighting, or equivalent. No bluish-white lighting shall be used in permanent outdoor lighting.

c. *Lighting plan* – Prior to construction, a lighting plan shall be prepared that documents how security and safety lighting will be designed and installed to minimize night-sky impacts during facility construction and operation. The lighting plan shall include the safety and security reasons that require the need for all nighttime lighting on the facility during construction and operation periods. Lighting for facilities shall not exceed the minimum number of lights and brightness required for safety and security and shall not cause excessive reflected glare. Low-pressure sodium light sources shall be used to reduce light pollution. Full cut-off luminaires shall be used to minimize uplighting. Lights shall be directed downward or toward the area to be illuminated. Light fixtures shall not spill light beyond the project boundary. Lights in highly illuminated areas that are not occupied on a continuous basis shall be equipped with switches, timer switches, or motion detectors so that the lights operate only when the area is occupied. Wherever feasible, consistent with safety and security, lighting shall be kept off when not in use. The lighting plan shall include a process for promptly addressing and mitigating complaints about potential lighting impacts. The applicant shall submit the lighting plan to the BLM and CDFW for review and approval at least 30 days prior to construction.

2. Vegetation and ground disturbance associated with access road construction, and distribution line installations shall be minimized and take advantage of existing clearings wherever feasible.

3. Along all off-site access roads, all off-site distribution line corridors, and all internal access roads 16 feet or wider, graveled surfaces, areas to be permanently cleared of vegetation, and (if applicable) cut slopes shall be treated with rock stains or other color treatment appropriate with the surrounding landscape.

4. Openings in vegetation for facilities, structures, and roads shall be feathered and shaped to repeat the size, shape, and characteristics of naturally occurring openings.

5. The distribution line shall utilize non-specular conductors and non-reflective coatings on insulators.

- **APM AES-2: Construction.** A pre-construction meeting with BLM landscape architects or other designated visual/scenic resource specialists shall be held before construction begins to coordinate on the mitigation strategy and confirm the compliance checking schedule and procedures. Final design and construction documents will be reviewed for completeness with

regard to the visual mitigation elements, assuring that requirements and commitments are adequately addressed. The construction documents shall include, but not be limited to grading, drainage, revegetation, vegetation clearing, and feathering plans, and must demonstrate how VRM objectives will be met, monitored, and measured for conformance.

1. The applicant shall reduce visual impacts during construction by clearly delineating construction boundaries and minimizing areas of surface disturbance; preserving existing, native vegetation to the extent feasible; utilizing undulating surface-disturbance edges; stripping, salvaging, and replacing topsoil; using contoured grading; controlling erosion; using dust suppression techniques; and restoring exposed soils to their original contour and vegetation.
2. Visual impact mitigation objectives and activities shall be discussed with equipment operators before construction activities begin.
3. Existing rocks, vegetation, and drainage patterns shall be preserved to the extent feasible.
4. Brush-beating or mowing or using protective surface matting rather than removing vegetation shall be employed where feasible.
5. Where not in conflict with other mitigation requirements, slash from vegetation removal shall be mulched and spread to cover fresh soil disturbances as part of the revegetation plan. Slash piles shall not be left in sensitive viewing areas.
6. If graveled surfaces are used during construction, the visual color contrast of graveled surfaces shall be reduced with approved color treatment practices.
7. No paint or permanent discoloring agents shall be applied to rocks or vegetation to indicate surveyor construction activity limits.
8. All stakes and flagging shall be removed from the construction area and disposed of in an approved facility.

- **APM AES-3: Operation and Maintenance.** Terms and conditions for VRM mitigation compliance shall be maintained and monitored on an annual basis for the life of the project for compliance with visual objectives, adaptive management adjustments, and modifications listed below and as necessary and approved by the BLM landscape architect or other designated visual/scenic resource specialist. Minimum measures are as follows:

    1. The applicant shall maintain revegetated surfaces until a self-sustaining stand of vegetation which does not require supplemental water or fertilizer is re-established and visually adapted to the undisturbed surrounding vegetation. No new disturbance shall be created during operation without completion of a VRM analysis and approval by the BLM Authorized Officer.
    2. Interim restoration shall be undertaken during the operating life of the project as soon as possible after disturbances.
    3. Painted facilities shall be kept in good repair and repainted when color fades or flakes.
    4. Color-treated solar panel backs/supports shall be kept in good repair and retreated when color fades and/or flakes.

- **APM AES-4: Decommissioning and Site Reclamation.** A Decommissioning and Site Reclamation Plan, covering visual impact mitigation measures, shall be in place prior to construction, and reclamation activities shall be undertaken as soon as possible after disturbances occur and be maintained throughout the life of the project. The following

decommissioning/reclamation activities/practices shall be implemented to partially mitigate visual impacts associated with solar energy development, where feasible:

1. Pre-development visual conditions, and the B-Quality scenery (BLM, 2010a) and integrity shall be reviewed, and the visual elements of form, line, color, and texture shall be restored to pre-development visual compatibility or to that of the surrounding landscape setting conditions, whichever achieves the better visual quality and most ecologically sound outcome.
2. A Decommissioning and Site Reclamation Plan shall be developed, approved by the BLM, and implemented. The plan shall require that all aboveground and near-ground structures be removed. Some structures shall be removed only to a level below the ground surface that will allow reclamation/restoration. Topsoil from all decommissioning activities shall be salvaged and reapplied during final reclamation. The plan shall include provisions for monitoring and determining compliance with the Project's visual mitigation and reclamation objectives.
3. Soil borrow areas, cut-and-fill slopes, berms, water bars, and other disturbed areas shall be contoured to approximate naturally occurring slopes, thereby avoiding form and line contrasts with the existing landscapes. The applicant shall contour to a rough texture (i.e., use large rocks/boulders, grade uneven surfaces, and/or vegetation mulches/debris) in order to trap seed and to discourage off-road travel, thereby reducing associated visual impacts.
4. A combination of seeding, planting of nursery stock, transplanting of local vegetation within the proposed disturbance areas, and staging of decommissioning activities enabling direct transplanting shall be utilized. Where feasible, native vegetation shall be used for revegetating to establish a composition consistent with the form, line, color, and texture of the surrounding undisturbed landscape.
5. Stockpiled topsoil shall be reapplied to disturbed areas, and the areas shall be revegetated by using a mix of native species selected for visual compatibility with existing vegetation, where applicable, or by using a mix of native and non-native species if necessary to ensure successful revegetation. Gravel and other surface treatments shall be removed or buried.
6. Rocks, brush, and vegetal debris shall be restored whenever possible to approximate preexisting visual conditions.
7. Edges of revegetated areas shall be feathered to reduce form and line contrasts with the existing landscapes.
8. A decommissioning VRM Monitoring and Compliance Plan shall be prepared by the applicant and approved by the BLM that establishes the schedule and terms for monitoring and the conditions and methods of measurement for determining compliance.

- **MM AES-5: Glint and Glare Mitigation and Monitoring.** Consistent with Best Management Practices for Reducing Visual Impacts of Renewable Energy Facilities on BLM-Administered Lands, the applicant shall prepare and submit to the BLM a Glint and Glare Mitigation and Monitoring plan identifies mitigation measures to reduce the potential health, safety, and visual impacts associated with glint and glare, and provides for monitoring of the effectiveness and maintenance of such measures. The goals of the mitigation shall be to ensure that glare with the potential for temporary after-image effects is not visible to drivers on I-15, and that glare visible from observation points does not exceed a cumulative total duration of 30 minutes per day. Mitigation measures to achieve these goals shall include, but not be limited to:

1. Program solar tracker arrays contributing to glare to turn away from affected KOPs during the times of day when glare visible at that KOP is generated.
2. Use solar panels made with textured glass surfaces to diffuse reflected light. If the use of textured glass panels is found not to be feasible, the plan shall describe the reason for its infeasibility.
3. Employ materials to reduce the effect of glare where such materials would not result in greater adverse visual impacts than the glint or glare that would be offset and would not result in shading the solar panels. These materials may include fencing with privacy slats or fabric screening of a BLM standard environmental color that is identified through a site study for color and texture selection and approved by the BLM, earthen berms, or vegetative screening.
4. If glare with the potential for temporary after-image remains visible to drivers on I-15, coordinate with Caltrans to place signs warning drivers of the potential for hazardous glare.

7.2 Thresholds of Significance

7.2.1 California Environmental Quality Act (CEQA) Guidelines

The State CEQA Guidelines Section 15382 defines a "significant effect" on the environment to mean a "substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project including land, air, water, minerals, flora, fauna, ambient noise, and objects of historic or aesthetic significance."

Per CEQA Guidelines, the project would be considered to have a significant effect on visual and aesthetic resources if the effects exceed the significance criteria described below:

Would the project:

a. Have a substantial adverse effect on a scenic vista.
b. Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway.
c. In non-urbanized areas, substantially degrade the existing visual character or quality of public views of the site and its surroundings (public views are those that are experienced from publicly accessible vantage points), or in an urbanized area, conflict with applicable zoning and other regulations governing scenic quality.
d. Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area.

The project setting is considered "non-urbanized" based on CEQA Section 15387 which defines "urbanized area" as a central city or a group of contiguous cities with a population of 50,000 or more, together with adjacent densely populated areas having a population density of at least 1,000 persons per square mile.

7.3 Environmental Impacts

7.3.1 Would the project have a substantial adverse effect on a scenic vista?

Less than Significant with Mitigation Incorporated. Scenic vistas are generally defined as a specific viewpoint or viewing location (often an elevated overlook) displaying good aesthetic and compositional value of a highly valued landscape accessible by the public. If the project substantially degrades the scenic landscape as viewed from public roads or from other public or recreation areas, this would be considered a potentially significant impact to the scenic vista. The degree of potential impact to scenic vistas also varies with factors such as viewing distance, duration, viewer sensitivity, and the visual context.

Scenic vistas in the region that are either identified in county planning policy or otherwise meet the quality definition of a scenic vista typically include views of surrounding hills and mountains, and the native desert landscape. From KOPs and other viewpoints in the project vicinity, scenic vistas as determined by field reconnaissance and/or official scenic designations primarily include hillsides and ridgeline backdrops associated with the Soda Mountain Wilderness and Mojave National Preserve.

The results of the viewshed analysis (Section 4.3) and visual simulations (Appendix F) show 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. Although the project is bordered by the Mojave National Preserve and Soda Mountain Wilderness, views within these areas would be obscured by the surrounding mountains or at such a distance that the project would become increasingly perceptibly smaller and less discernable, and any infrequent views of solar arrays would look like a mirage or shadow on the valley floor.

Most viewpoints surrounding the project, including views from I-15 (KOPs 1a, 1b, 2–5) and recreation areas (KOPs 6–9) would allow unaltered views over and beyond the proposed PV arrays, substations, BESS, and other project components. As a result, the project would maintain existing views of identified scenic vistas such as the surrounding mountains. Where visible, although the project would introduce new structures and development on the site, these changes would not substantially affect public access to the visual resources that comprise scenic vistas in the area.

Implementation of APMs AES-1 through AES-4 would ensure that the visual design elements are integrated into the project to minimize substantial adverse effects on a scenic vista. Impacts would be less than significant, and no mitigation is required.

7.3.2 Would the project substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?

Less than Significant Impact. This CEQA threshold does not apply because the project site is not within the view corridor of any officially designated state scenic highway. I-15, which crosses through the project site, is identified by the California Department of Transportation as an eligible state scenic highway. However, in order for a route to be designated as an Official 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. Therefore, impacts to scenic resources within a state scenic highway would be less than significant.

7.3.3 In non-urbanized areas, would the project substantially degrade the existing visual character or quality of public views of the site and its surroundings?

Significant and Unavoidable Impact. Project-related actions would be considered to have a significant impact to the visual character of the site and surroundings if they altered the area in a way that substantially changed, detracted from, or degraded the visual quality of the site. The degree to which that change reflects documented community values and meets viewers' aesthetic expectations is the primary basis for determining the extent of potential visual impact. Visual contrast and compatibility can be used as a measure of the potential impact that the project may have to the visual quality of the site. If a strong contrast occurred where project features or activities alter and dominate the landscape setting, this would be considered a potentially significant impact to visual character or quality of the site. Project components that are not compatible with the visual context could result in a significant change in the character of the community. Consideration of potential significance includes analysis of visual character elements such as land use and intensity, visual integrity of the landscape type, and other factors.

The project site itself is of high visual quality. The project would redefine the visual character of the site and the project vicinity. A change in character is inherent with the conversion of vacant land to an industrial utility-scale solar development.

Construction

During the construction period, earth-moving activities and construction materials, equipment, trucks, and parked vehicles could be visible on the site. Construction would occur over 18 consecutive months, during which a number of activities would take place, including large-scale vegetation removal, earthwork, and installation of concrete foundations and equipment. These construction activities could result in a degree of visual contrast within the landscape that is greater than the operation phase discussed below. The predominant visual impacts would be dust and vehicular traffic caused by grading, on-site traffic, and the presence of construction workers. As outlined in the Air Quality Technical Report (Appendix C of this EIR), the implementation of APM AIR-1 through AIR-8 would minimize dust emissions. Additionally, the color of the underlying earth (light tan) stands in greater contrast within the landscape than the dark grey or black, non-reflective surfaces of the solar panels that would be installed. However, the overall degree of visual impact would be somewhat lessened because the area covered by any one phase of construction would be smaller compared to full build-out of the project, and the visual effects would be temporary. Visual impacts associated with construction would create a weak temporary contrast with the existing landscape character, resulting in low impacts to scenery from identified KOP locations.

Operation

During project operation and maintenance, visual impacts would consist of the contrast created from the presence of project elements, compared with the existing setting, resulting in modifications to the existing scenery and affecting views from identified KOP locations.

The project would introduce forms, lines, colors, and textures associated with the PV arrays and associated infrastructure that are uncommon and not currently found in the existing landscape character. The addition of the repetitive, vertical upright forms, angular and horizontal lines, dark colors and textures associated with the solar arrays, trackers and security fenced land would be uncommon in this natural setting. Project structures and buildings would additionally be uncommon within this currently undeveloped area, with the only existing development within this valley currently being the Shell Oil Station. Implementation of the project would add geometrical and angular forms and lines not commonly

found in the area. The substation, switchyard, and associated infrastructure would add muted gray elements, and irregular forms and lines not commonly found in the area. Development in this area is limited, and due to the lack of existing development of the area, the project would be noticeable and would visually dominate and attract attention in the primarily enclosed low, gently sloped alluvial valley, resulting in strong impacts to landscape character and scenery.

Portions of the project would be highly visible from important public transportation corridors and recreation areas. Views of the project from both I-15 northbound (KOPs 1a, 1b, 2) and southbound (KOP 5) and OHV recreational areas to the east (KOP 9) would be substantially changed. The existing high visual quality visual character as seen from these viewpoints would be degraded, and the existing rural and open space would be replaced with an inherent semi-industrial, utilitarian landscape character.

As outlined in APM AES-4, following the end of its useful life (approximately 40 years), the project would be subject to decommissioning and site reclamation. Structures and equipment would be removed, and new project access roads and corridors would be closed, except the relocated Rasor Road. Decommissioning of the substation and switchyard would involve deconstruction of those structures. The substation and O&M building areas would be graded to approximate the natural contour. Construction hours and site cleanliness practices would be the same during decommissioning as during construction. The decommissioning of the project would create new visual impacts similar to those seen during construction. After decommissioning and with time, the project site would be restored to a landscape that once again blends into the surrounding valley's forms, vegetation, and textures.

Potential effects on existing visual quality and character would be minimized by implementation of APM AES-1 through AES-4. However, the project would remain highly visible and out-of-character with the existing high-quality visual landscape as seen from public viewpoints, resulting in significant and unavoidable impacts to the existing visual quality and character of the site and surroundings. No other potentially feasible mitigation measures would avoid or substantially lessen this significant effect.

7.3.4 Would the project create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?

Less than Significant Impact. The project would result in a significant impact if it subjects public viewing locations to a substantial amount of point-source lighting visibility at night, or if project illumination results in a noticeable spill-over effect into the nighttime sky, increasing the ambient light over the region. The placement of lighting, source of illumination, and fixture types combined with viewer locations, adjacent reflective elements, and atmospheric conditions can affect the degree of change to nighttime views. If the project results in direct visibility of a substantial number of lighting sources, or allows a substantial amount of light to project toward the sky, significant impacts to nighttime views and aesthetic character would result.

Light

Existing nighttime lighting conditions vary throughout the area. No light sources currently exist on the project site. Open space and rural lands, including the Mojave National Preserve and Rasor Off-Highway Vehicle Area, have little to no night lighting. However, I-15 introduces a substantial amount of lighting in the nighttime environment from vehicle lights and from the sparsely located overcrossings.

Project use of uncontrolled or excessive lighting would be noticeable to nearby motorists on I-15. Nighttime lighting would also affect the nighttime experience for dispersed recreational users in the surrounding wilderness and recreational areas. Excessive lighting can also cause an adverse effect to

viewers of the night sky via sky glow, which diminishes the visibility of the nighttime sky and stars. Prevention of off-site light spillage for ground observers does not necessarily prevent back-reflected light (i.e., light reflected off the ground and/or structures from down-directed lamps) from diminishing the visibility of the night sky. Normally, the contribution of project-related lighting is negligible when in an environment with abundant light sources; however, the project area is highly valued in terms of the quality of its nighttime skies. This is attributable to the scarce and scattered nature of existing light sources in the surrounding area and the prevalence of federally administered land in the region, which limits opportunities for development.

As described in Section 2.2.8 and shown in Appendix D, Outdoor Lighting Assessment Report, the project would require permanent lighting at the Rasor Road site entrance, O&M buildings, substation, and switchyard. Some portable lighting also could be required for essential nighttime maintenance activities. In accordance with APM AES-1, lighting would be limited to areas required for operations or safety, directed on-site to avoid backscatter and minimize spillover, and shielded from public view. Lighting that is not required during nighttime hours shall be controlled with sensors or switches operated such that lighting will be on only when needed. The project's O&M area would be located near the project substation, somewhat concentrating new visible light sources as seen from I-15, but also introducing noticeable lighting into an existing undeveloped desert area where no artificial lighting outside of the freeway corridor exists. Northwest of the freeway, the project switchyard would introduce additional noticeable lighting to the affected viewsheds and would draw attention, both as point-source lights and by altering the nighttime landscape character from primarily undeveloped to developed. These new sources of visible light would be seen from viewing locations along I-15 (KOPs 1a, 1b, 2–5) and from recreation areas (KOPs 6–9). Given the relatively sparse development in the surrounding area and the general lack of stationary nighttime lighting, the introduction of nighttime task lighting would constitute a potentially significant impact.

Therefore, the project would implement APM AES-1 to reduce potential off-site lighting impacts. APM AES-1 requires the preparation of a lighting plan that documents how lighting will be designed and installed to minimize night-sky impacts during facility construction and operation. The project lighting plan is included in Appendix D; it specifies the type of lighting and includes numerous measures to prevent unnecessary use of lights, minimize light intensity, and prevent light spillage and reflectance to off-site areas.

The implementation of APM AES-1 would minimize the amount of lighting potentially visible off-site. While these measures would not totally eliminate the light visible by surrounding user groups, project lighting would be minimized and controlled such that it would not be a nuisance and would not detract from the ability of affected viewers to enjoy their surroundings or view the night sky. Therefore, impacts related to light would be less than significant.

Glare

The project would use PV panels that are uniformly dark in color, non-reflective, and designed to be highly absorptive of all light that strikes their glass surfaces. The project would use an anti-reflective coating, designed to generate electricity rather than reflect light. The solar panels are also designed to track the sun to maximize panel exposure to the sun, which would direct most reflected light back toward the sun in a skyward direction. PV panels have a lower index of refraction/reflectivity than common sources of glare in residential environments. The glare and reflectance levels from a given PV system are lower than the glare and reflectance levels of steel, snow, standard glass, plexiglass, and smooth water. The glare and reflectance levels of panels are further reduced with the application of anti-reflective coatings. PV suppliers typically use stippled glass for panels as the "texturing" of the glass allows more light energy to be channeled/transmitted through the glass while weakening the reflected light. With the

application of anti-reflective coatings and use of modern glass technology, the PV panels would display overall low reflectivity.

Any glare that results from project facilities (not panels) and the high-voltage gen-tie line would be reduced by incorporation of APM AES-1. This would require that the gen-tie facilities be finished with nonspecular and non-reflective material and that the insulators be non-reflective and non-refractive. The O&M buildings and BESS units would be painted a medium brown color with a matte finish to blend with the landscape. These measures would prevent glare or reduce glare from structural (not panel) surfaces to minimal levels that would not be noticeable or distracting to potential viewers.

The ForgeSolar Glare Analysis Report (see Appendix G) finds that the project would create a new source of glint/glare. Potentially affected observers would be travelers on I-15 and recreationalists in the OHV area. As summarized in Table 7.1, the project could produce glare over the course of a typical year for two of the glare receptor locations. Glare analysis point receptors (referred to as OPs) 4 and 8 could receive green glare. No OPs would experience red glare. No glare impacts would affect OPs along I-15.

Travelers along I-15 northbound and southbound (point receptors 1–7) experience views to the 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 point receptor 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. Point receptor 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.

Regarding the nearest airport, two potential flight paths were considered. The closest airport considered in the analysis includes the public Baker Airport, approximately 5.8 miles to the northeast. During takeoff and landing procedures, airborne viewers (e.g., pilots) would be elevated relative to the project site. The results of the glare analysis conducted for this project indicate that airborne viewers would not experience glare within the two 2-mile-long takeoff and landing flight path segments analyzed by ForgeSolar-established parameters to meet FAA requirements. As outlined in Appendix G, all SGHAT model input parameters would be appropriate. Based on the results of the model, the project would have the potential to produce glare for the sensitive viewing locations discrete observation receptors included in the model. Glare results for the analysis are summarized in Table 7.1 for each photo receptor and path analyzed.

Table 7.1. Glare Analysis at Analyzed Photo Receptors

OP Number or Location Name	Green Glare (minutes)	Yellow Glare (minutes)	Red Glare (minutes)	Glare Results
Baker Airport – Northwest Runway	0	0	0	No glare produced over the course of a typical year.
Baker Airport – Southeast Runway	0	0	0	No glare produced over the course of a typical year.
1	0	0	0	No glare produced over the course of a typical year.
2	0	0	0	No glare produced over the course of a typical year.
3	0	0	0	No glare produced over the course of a typical year.
4	329	0	0	Glare observed: 329 minutes of green glare.
5	0	0	0	No glare produced over the course of a typical year.
6	0	0	0	No glare produced over the course of a typical year.

OP Number or Location Name	Green Glare (minutes)	Yellow Glare (minutes)	Red Glare (minutes)	Glare Results
7	0	0	0	No glare produced over the course of a typical year.
8	198	0	0	Glare observed: 198 minutes of green glare.
9	0	0	0	No glare produced over the course of a typical year.
10	0	0	0	No glare produced over the course of a typical year.
11	0	0	0	No glare produced over the course of a typical year.
12	0	0	0	No glare produced over the course of a typical year.
13	0	0	0	No glare produced over the course of a typical year.
I-15 – Northbound	0	0	0	No glare produced over the course of a typical year.
I-15 – Southbound	0	0	0	No glare produced over the course of a typical year.

Therefore, glare impacts would be brief (a few minutes in the morning) and would not shine light directly at motorists on I-15 nor cause a nuisance to vehicular travel routes. As the impacts associated glare would be limited in nature and reduced by APM AES-4, impacts would be less than significant.

7.4 Cumulative Impacts

Significant and Unavoidable Impact. The discussion of cumulative impacts relates to the potential for the project to contribute to an aggregate change in visual quality from the surrounding public viewing areas, taking into consideration existing as well as proposed development. Multiple projects are proposed or operating within the 50-mile radius of the project site. Projects under construction or currently operating within the project viewshed have the potential to combine for significant cumulative aesthetic impacts. As described in Chapter 3.0, Environmental Impacts Analysis, several solar energy generation facilities are proposed, in addition to the proposed Barstow International Gateway (BIG) Specific Plan Area from the County of San Bernadino into the City of Barstow. The nearest of the past, present, or reasonably foreseeable future projects would be located a minimum of 30 miles from the Soda Mountain Solar project and concentrated southwest of the project in the mostly developed areas adjacent to the I-40 corridor. However, the project's visual impacts in combination with two proposed small solar developments near the community of Harvard, along I-15, would contribute to an incremental shift in the landscape character viewed from this important travel route from mostly undeveloped natural desert to increasingly a landscape of energy generation infrastructure.

Because of the project's large scale, layout, topographic exposure, visibility from a major transportation corridor, recreation areas, and other public viewpoints, combined with its visible contrast with existing visual character and scenic resources, the project would contribute to a cumulative public perception that the region is undergoing an overall loss of visual quality as it shifts from primarily undeveloped desert valleys to energy generation infrastructure. Although implementation of measures APM AES-1 through APM AES-5 would partially reduce impacts, the project would still contribute to the cumulative visual degradation of the project site and vicinity and would be considered **significant and unavoidable cumulative impacts.**

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APPENDIX A

Visual Contrast Rating Worksheets

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. 7E, S. 11	See location map figure.
2. Key Observation Point (KOP) Name 1a and 1b - 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)				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 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 contrast from 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: 01/06/2024
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. 11	See location map figure.
2. Key Observation Point (KOP) Name KOP 2 - I-15 Northbound		
3. VRM Class at Project Location VRM Class III	(Lat. Long) 35.15208 °N, -116.194324 °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 behind.	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.
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: 01/06/2024

(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 contrast from 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: 01/06/2024
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. 11	See location map figure.
2. Key Observation Point (KOP) Name KOP 3 - I-15 Northbound		
3. VRM Class at Project Location VRM Class III	(Lat. Long) 35.16338 °N, -116.18389 °W	

SECTION B. CHARACTERISTIC LANDSCAPE DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Upward-sloping valley below pyramidal hills in foreground. Trapezoidal mountain ranges in background.	Sparsely scattered small bushes and grasses at roadsides and across the alluvial plain	Flat planes of the roadway lanes; tall narrow transmission poles beyond. Tall angular lattice towers subtly seen.
LINE	Gently sloping, diagonal valley floor. Steep diagonal hillsides and mountainsides.	Tufted, brushy creosote bush foliage in immediate foreground. Faint, indistinct stems throughout valley.	Horizontal highway striping. Vertical transmission poles
COLOR	Pale brown soils and gray-brown rocks in valley. Light tan, medium brown, and dark brown hills. Hazy blue mountains behind.	Olive green creosote bush. Pale gray woody stems.	Dark gray asphalt road; yellow highway striping; dark brown wood poles.
TEX-TURE	Smooth valley floor with striated rocky deposits. Coarse hills and mountains.	Fine shrub canopy.	Smooth aspahlt roadway surface.

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Geometric graded area.	Geometric cleared area.	Tall, slender, vertical repeating monopoles; low, long horizontal switchyard
LINE	Straight and geometric lines.	Straight and geometric cleared area.	Straight Vertical monopoles; busy network of fine lines of switchyard
COLOR	Brown-tan exposed soil.	No perceived change.	Silver gray steel and aluminum monopoles, lattice towers, switchyard
TEX-TURE	Fine, smooth, flowing.	No perceived change.	Uniform smooth metal textures

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: 01/06/2024

(Continued on Page 2)

Comments from item 2.

This KOP is located on the northbound lane of I-15 (aka Mojave Freeway) west of the proposed Project site. 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 contrast from the large, vertical structures oriented perpendicular to the line of the highway and existing transmission lines. The gen-tie monopoles, large switchyard, and tightly clustered lattice towers 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 existing development patterns 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: 01/06/2024
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. 11	See location map figure.
2. Key Observation Point (KOP) Name KOP 4 - I-15 Northbound		
3. VRM Class at Project Location VRM Class III	(Lat. Long) 35.17787 °N, -116.17097 °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 behind.	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.	Low, horizontal Geometric arrays. Repeating blocky BESS units. Cylindrical and narrow substation posts
LINE	Straight and geometric lines.	Straight and geometric cleared area.	linear horizontal & straight arrays & ancillary facilities. Straight vertical structures at substaiton
COLOR	Brown-tan exposed soil.	No perceived change.	Dark blueish-black arrays. Silver Aluminum fence and structures. brown BESS
TEX-TURE	Fine, smooth, flowing.	No perceived change.	Organized, smooth, 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: 01/06/2024

(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 contrast from 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 existing development visible from this KOP. The degree of existing development and proposed landscape screening trees 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. 12N, R. 7E, S. 10	See location map figure.
2. Key Observation Point (KOP) Name KOP 6 - 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.	Large, flat-appearing geometric array fields.
LINE	Straight and geometric lines.	Straight and geometric cleared area.	Angular & straight arrays & ancillary facilities.
COLOR	Brown-tan exposed soils.	No perceived change.	Dark grayish/ or blue-black arrays.
TEX-TURE	Fine, smooth, flowing.	No perceived change.	Organized, smooth, 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)

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. 7E, S. 11	See location map figure.
2. Key Observation Point (KOP) Name KOP 5 - I-15 Median North End		
3. VRM Class at Project Location VRM Class III	(Lat. Long) 35.17787°N, -116.17097°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.	Flatish, horizontal highway plane. 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.	Straight, continuous striping and asphalt edge. 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.	Dark gray asphalt highway, yellow striping. Tan-gray gravel median surface. Metallic gray fencing.
TEX-TURE	Smooth valley floor with striated rocky deposits. Coarse hills and mountains.	Fine shrub canopy.	Rough gravel median, smooth asphalt roadway. Linear, continuous fence line.

SECTION C. PROPOSED ACTIVITY DESCRIPTION

	1. LAND/WATER	2. VEGETATION	3. STRUCTURES
FORM	Geometric graded area.	Geometric cleared area.	Low-profile, rectilinear arrays. Short, horizontal perimeter fencing.
LINE	Straight and geometric lines.	Straight and geometric cleared area.	Angular & straight arrays with short, slender vertical supports. Slender vertical and horizontal fence rails.
COLOR	Brown-tan exposed soil.	No perceived change.	Dark blue-black arrays. Gray aluminum support structures and fence. Uniformly tan graded ground surface beneath arrays.
TEX-TURE	Fine, smooth, flowing.	No perceived change.	Repeating smooth & continuous arrays. Smooth, cleared ground surface

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 in the median of I-15 (aka Mojave Freeway) west of the proposed Project area, facing east. This area showcases typical low angle views of the surrounding valley as vehicular travelers would see headed south or 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 is limited to I-15, low fencing, roadway signage, .

From this viewpoint the Project would introduce contrast from the geometric grading of the landscape and uniform vegetation clearing. Solar arrays would be visible from this KOP and would introduce form, line, textures 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, particularly for east-facing views. The Project would be out of scale with the natural landscape and would introduce an increased degree of development compared to the minimal 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

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: 02/14/2023
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 7 - 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 8 - 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 9 - 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

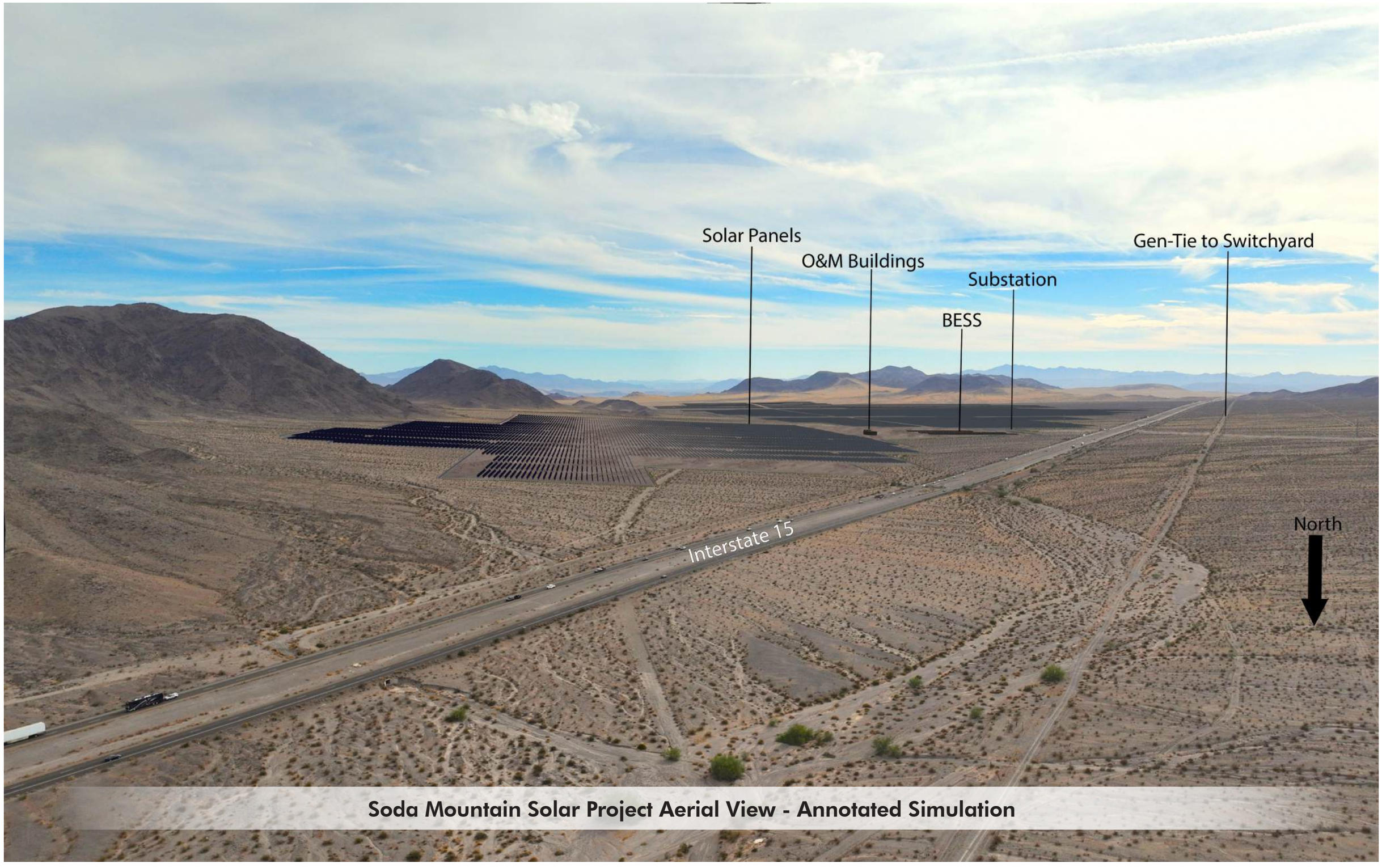
Good Housekeeping
- Maintain a clean worksite

APPENDIX B

Aerial Perspective Project Rendering

Soda Mountain Solar Project Aerial View - Existing Condition

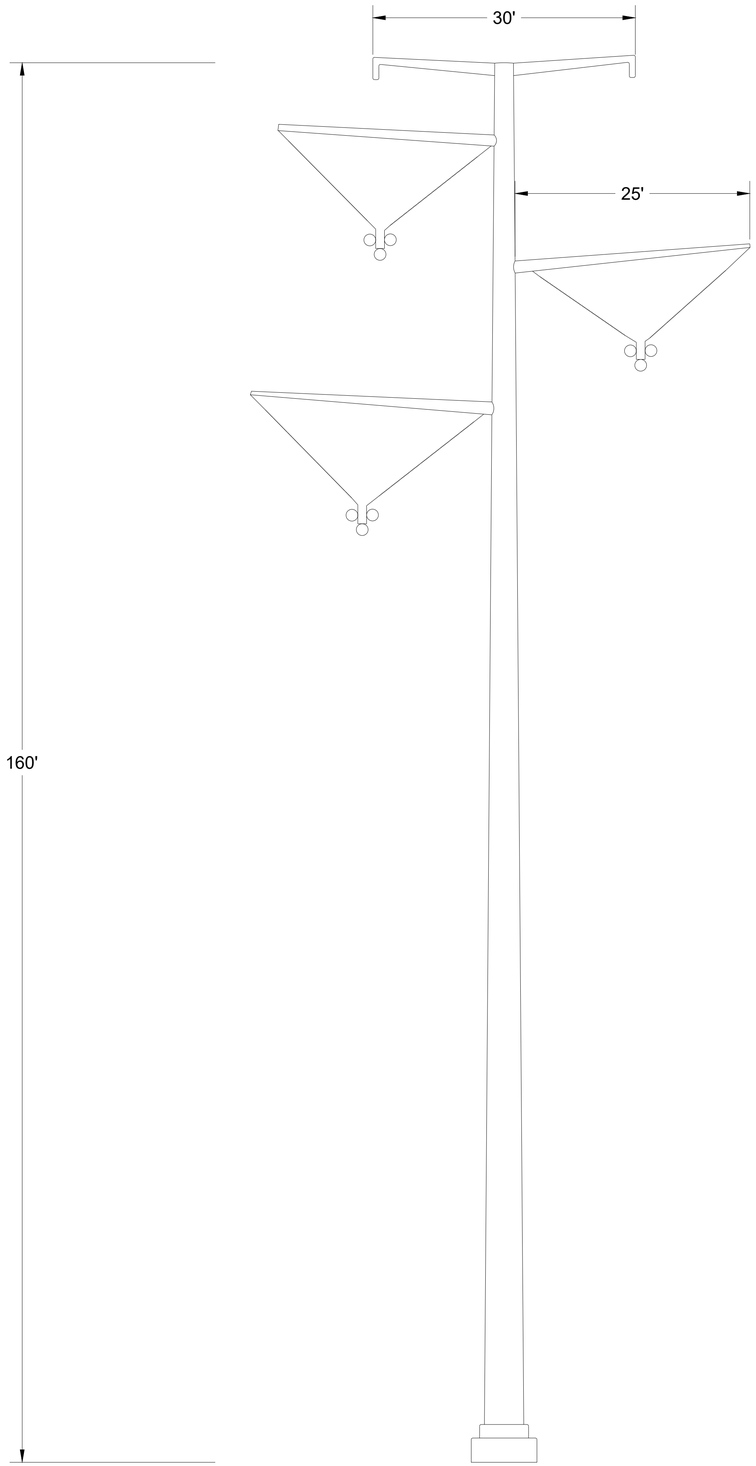
Soda Mountain Solar Project Aerial View - Simulation with Landscaping



Soda Mountain Solar Project Aerial View - Annotated Simulation

APPENDIX C

Project Component Elevation Drawings



SODA MOUNTAIN

REV.	BY	DESCRIPTION	DATE	APP'D BY

ZGLOBAL
Power Engineering & Energy Solutions

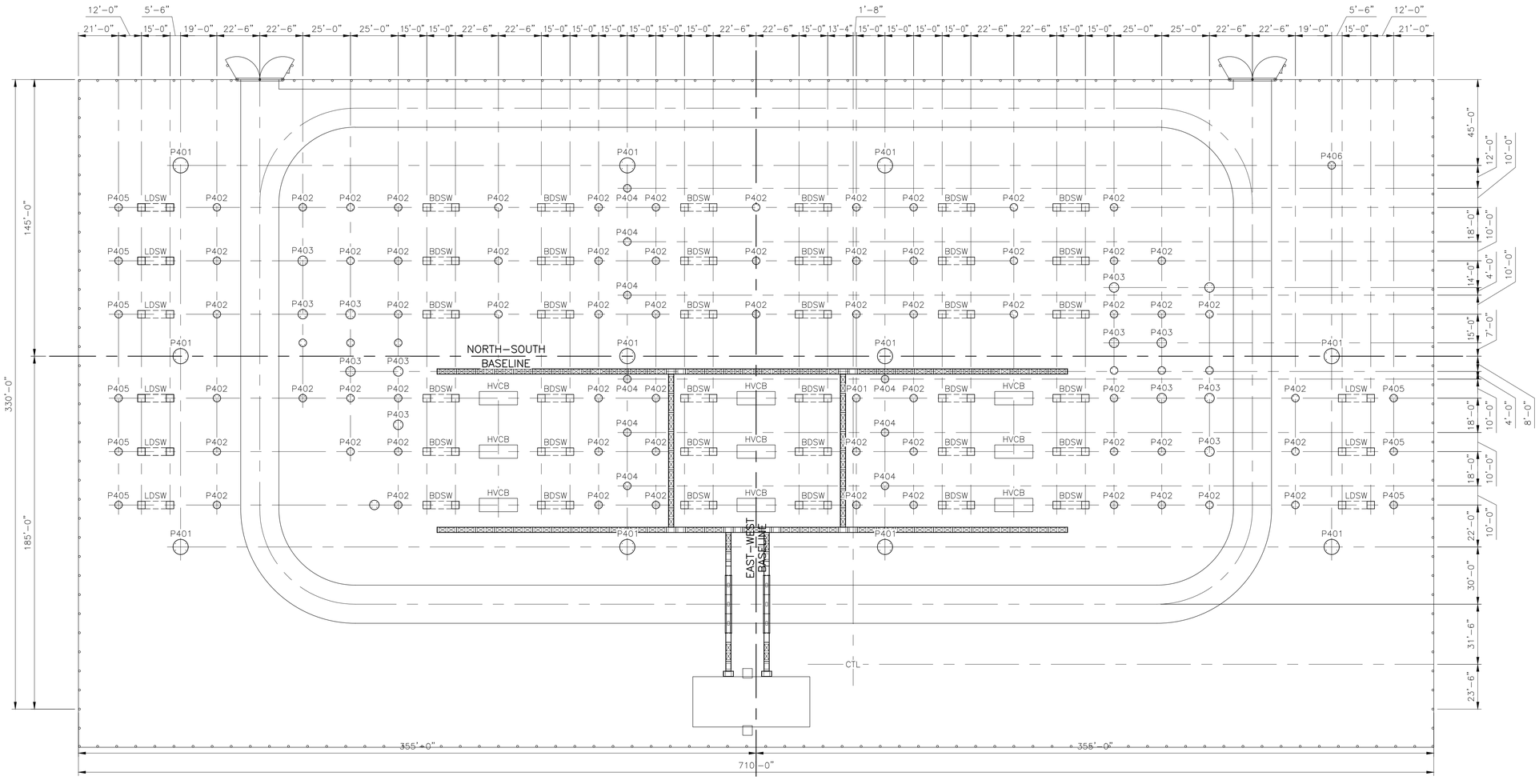
604 SUTTER ST, STE 250
FOLSOM, CA 95630
Phone : 916.985.9461
Fax: 916.985.9467

SHEET TITLE:

SINGLE CIRCUIT POLE

DRAWN BY:	ZH	DRAWING No.
CHECKED:	BR	
SCALE:		
JOB NO:		
DATE:	07/30/2024	REV No. -

NORTH–SOUTH BASELINE N



NOTE

1. FINISH GRADE ELEVATION INCLUDES A NOMINAL 4" LAYER OF 3000 OHMMETER AGGREGATE MATERIAL ATOP ROUGH GRADE.

LEGEND

- PIER FOUNDATION
- SLAB FOUNDATION
- PIER FOUNDATION WITH BRIDGE

P401	80 FT. LATTICE DEADEND (100 FT. COLUMN SPACING)
P402	500 kV 1–PHASE BUS SUPPORT (LOW)
P403	500 kV 1–PHASE BUS SUPPORT (HIGH)
P405	500 kV 1–PHASE SURGE ARRESTER SUPPORT
P406	80 FT. STATIC MAST POLE
BDSW	500 kV 1–POLE BREAKER DISCONNECT SWITCH SUPPORT
LDSW	500 kV 1–POLE LINE DISCONNECT SWITCH SUPPORT (WITH GROUND SWITCH ATTACHMENT)
CTL	CONTROL ENCLOSURE FOUNDATION

0 30'–0" 60'–0"

SCALE: 1"=30'_XREF

NO.	REVISIONS	DATE	ENG	DES/DFT	CHK

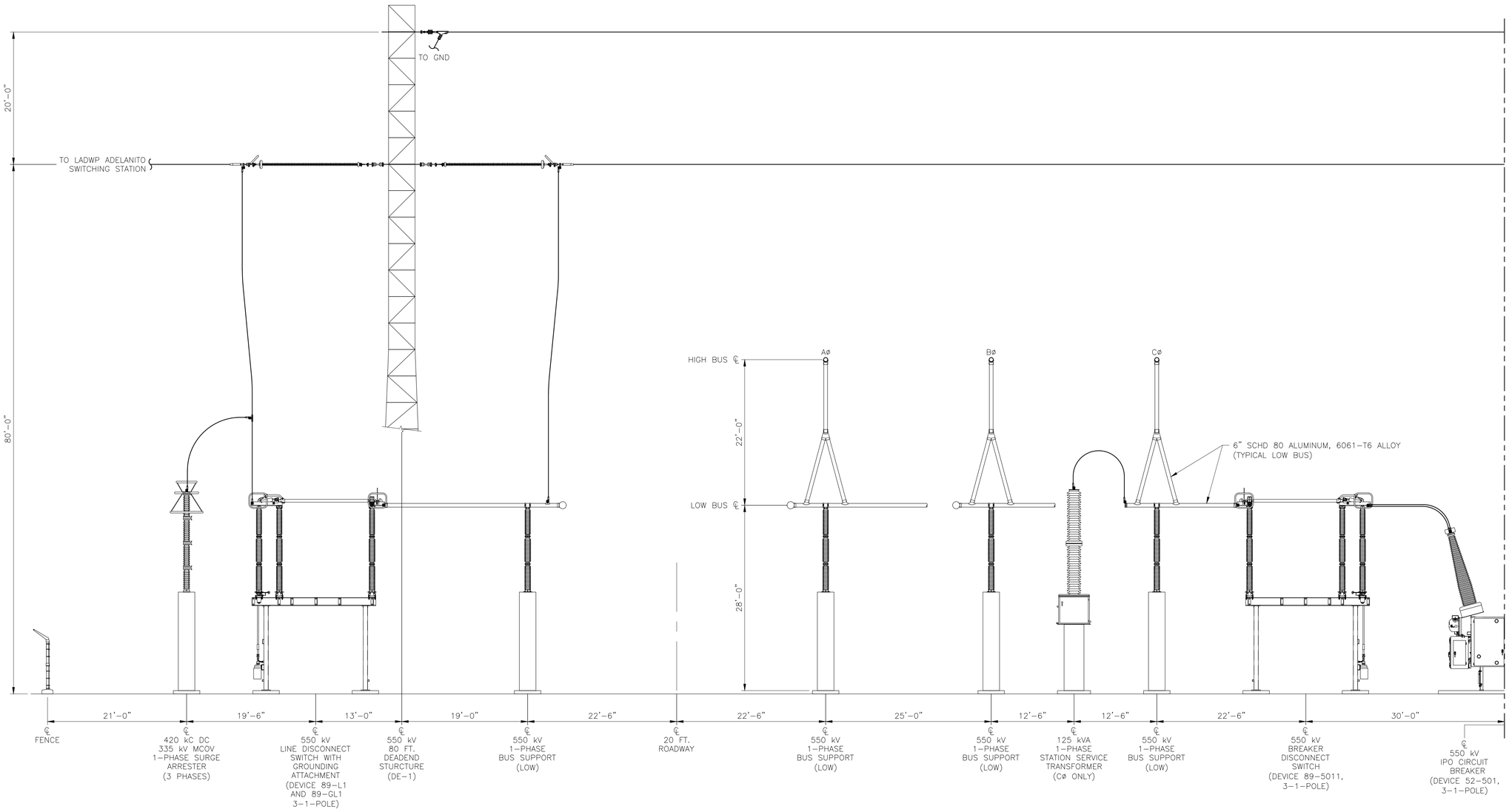
NO.	REVISIONS	DATE	ENG	DES/DFT	CHK
A	RELEASED FOR CLIENT REVIEW	01/10/23	KJL	CDI	ODR

Stantec
Consulting Engineers
Portland, Oregon

ENGINEERING RECORD	DATE
DES/DRFT BY: STC/CDI	11/28/22
ENGINEERED BY: STC/KJL	11/28/22
CHECKED BY: STC/CAL	XX/XX/XX

SODA MOUNTAIN SOLAR
500 kV INTERCONNECTION SWITCHING STATION FOUNDATION PLAN

CADFILE: SMS–C–110–01.DWG | SCALE: AS NOTED | DWG.NO. SMS-C-110 | SHEET 1 | REV A



A-A / – ELEVATION – 500 kV SWITCH AND BUS-BAY 1
SCALE: ⅛"=1'-0"

NOTES

1. VERTICAL DIMENSIONS ARE BASED ON THE HEIGHT OF THE SUPPORT STRUCTURE AND ARE MEASURED FROM THE STRUCTURES' BASE PLATE BOTTOM. USE FOUNDATION ANCHOR BOLT LEVELING NUTS TO ADJUST ELEVATIONS IN THE FIELD. REFERENCED HEIGHTS TYPICALLY REFER TO CENTERLINES OF THE TUBULAR BUS AND/OR TOP OF DISCONNECT SWITCH TERMINAL PADS.
2. THESE COMPONENTS ARE ONLY DIMENSIONALLY REPRESENTATIVE, THERE MAY BE ORIENTATION DIFFERENCES WHEN ACTUAL EQUIPMENT IS PROCURED.

0 8'-0" 16'-0"
SCALE: 1/8" = 1'-0"

NO.	REVISIONS	DATE	ENG	DES/DFT	CHK

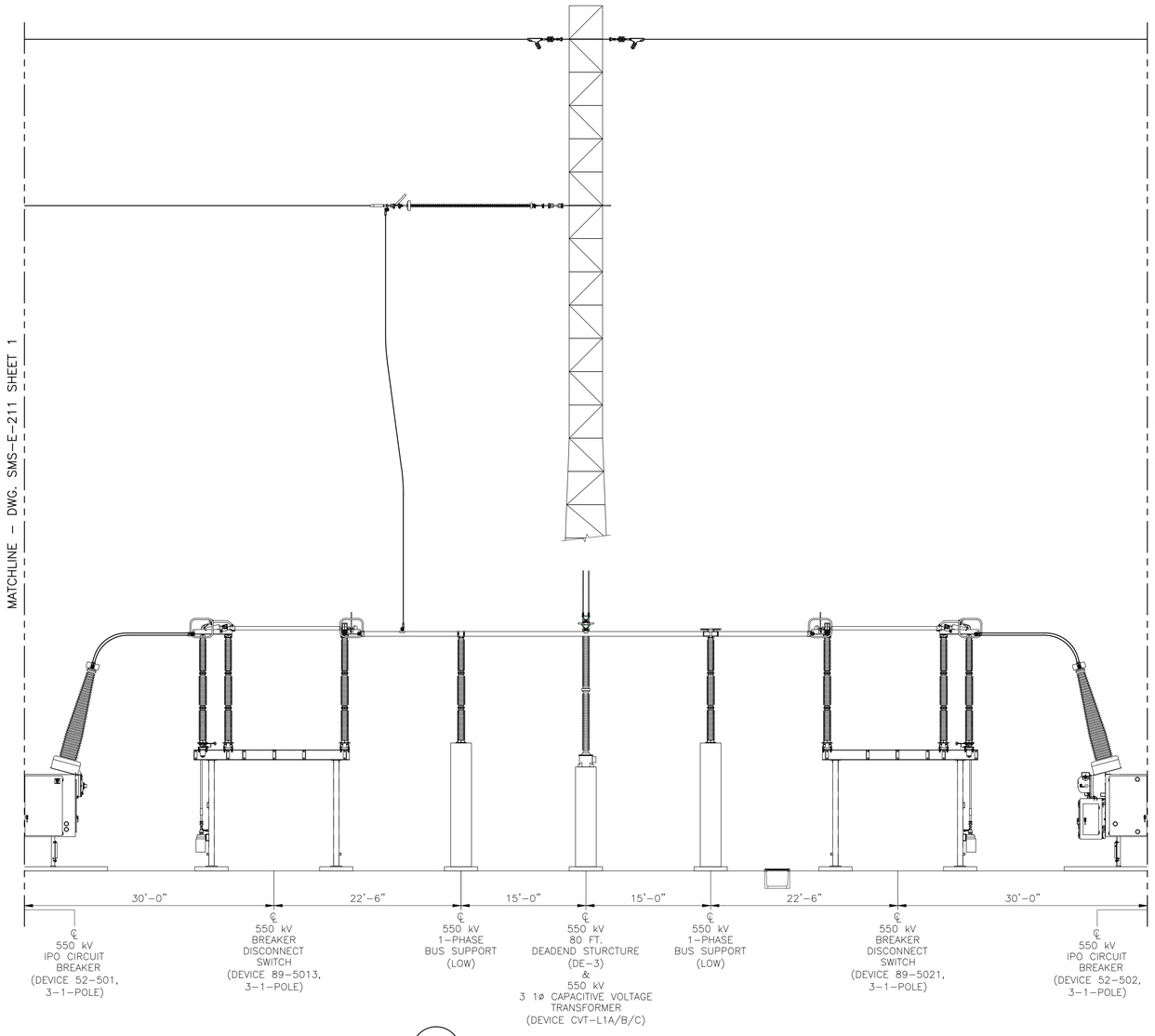
NO.	REVISIONS	DATE	ENG	DES/DFT	CHK
A	RELEASED FOR CLIENT REVIEW	01/10/23	KJL	CDI	ODR

Stantec
Consulting Engineers
Portland, Oregon

ENGINEERING RECORD	DATE
DES/DRFT BY: STC/CDI	11/23/22
ENGINEERED BY: STC/KJL	11/23/22
CHECKED BY: STC/CAL	XX/XX/XX
CADFILE: SMS-E-211-01.DWG	

SODA MOUNTAIN SOLAR
500 kV INTERCONNECTION SWITCHING STATION SWITCH AND BUS ELEVATION

SCALE: AS NOTED | DWG.NO. SMS-E-211 | SHEET 1 of 7 | REV A



A–A — ELEVATION – 500 kV SWITCH AND BUS–BAY 1
SCALE: ⅛"=1'-0"

NOTE

1. REFER TO SHEET 1 FOR NOTES, LEGEND AND BUS SUPPORT CONFIGURATIONS.

0 8'-0" 16'-0"
SCALE: 1/8" = 1'-0"

NO.	REVISIONS	DATE	ENG	DES/DFT	CHK

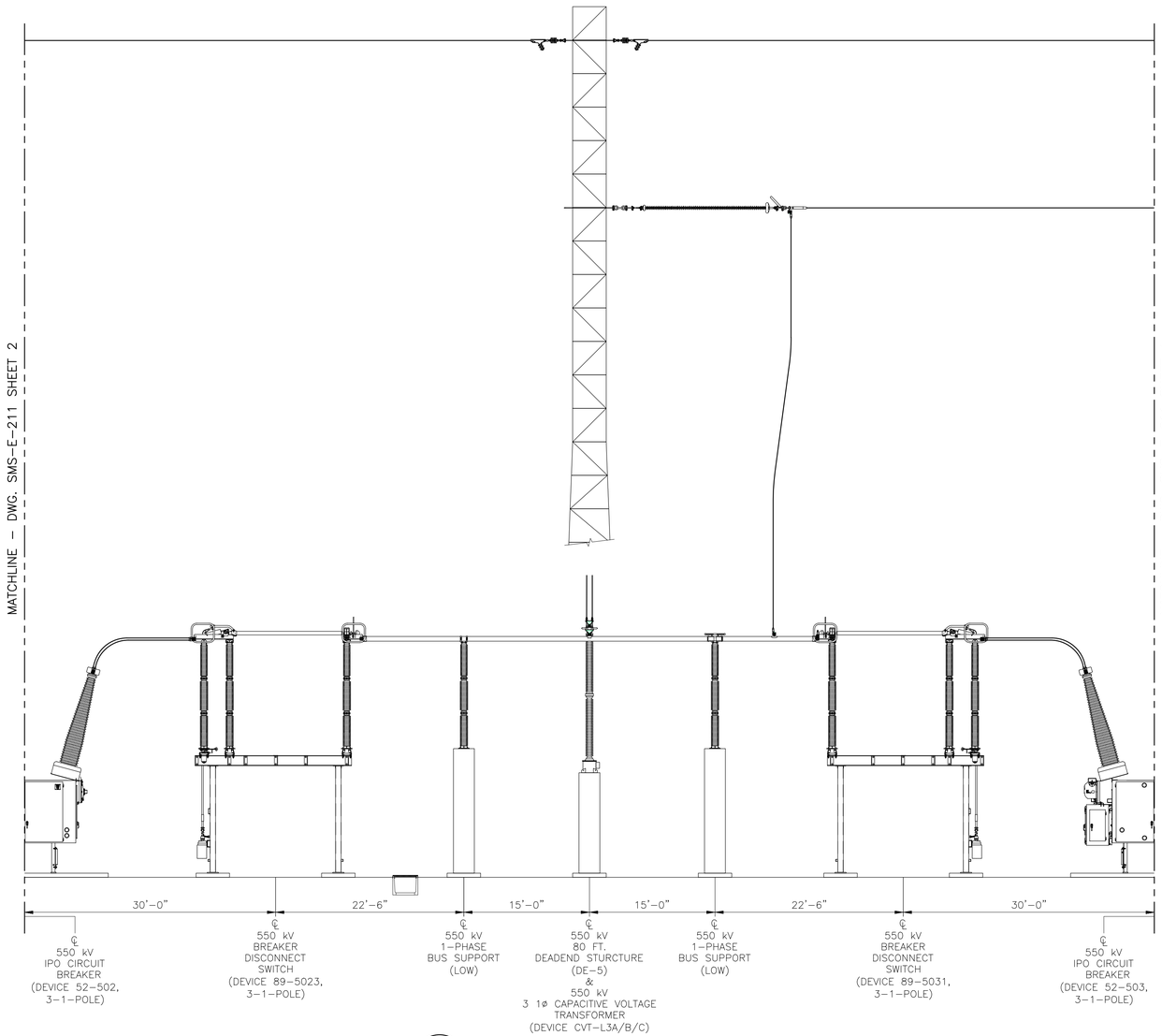
NO.	REVISIONS	DATE	ENG	DES/DFT	CHK
A	RELEASED FOR CLIENT REVIEW	01/10/23	KJL	CDI	ODR

Stantec
Consulting Engineers
Portland, Oregon

ENGINEERING RECORD	DATE
DES/DRFT BY: STC/CDI	11/23/22
ENGINEERED BY: STC/KJL	11/23/22
CHECKED BY: STC/CAL	XX/XX/XX

SODA MOUNTAIN SOLAR
500 kV INTERCONNECTION SWITCHING STATION
SWITCH AND BUS ELEVATION

CADFILE: SMS-E-211-02.DWG	SCALE: AS NOTED	DWG.NO. SMS-E-211	SHEET 2	REV A



A–A / – ELEVATION – 500 kV SWITCH AND BUS–BAY 1
SCALE: ⅛"=1'–0'

NOTE

1. REFER TO SHEET 1 FOR NOTES, LEGEND AND BUS SUPPORT CONFIGURATIONS.

0 8'–0" 16'–0"
SCALE: 1/8" = 1'–0"

NO.	REVISIONS	DATE	ENG	DES/DFT	CHK

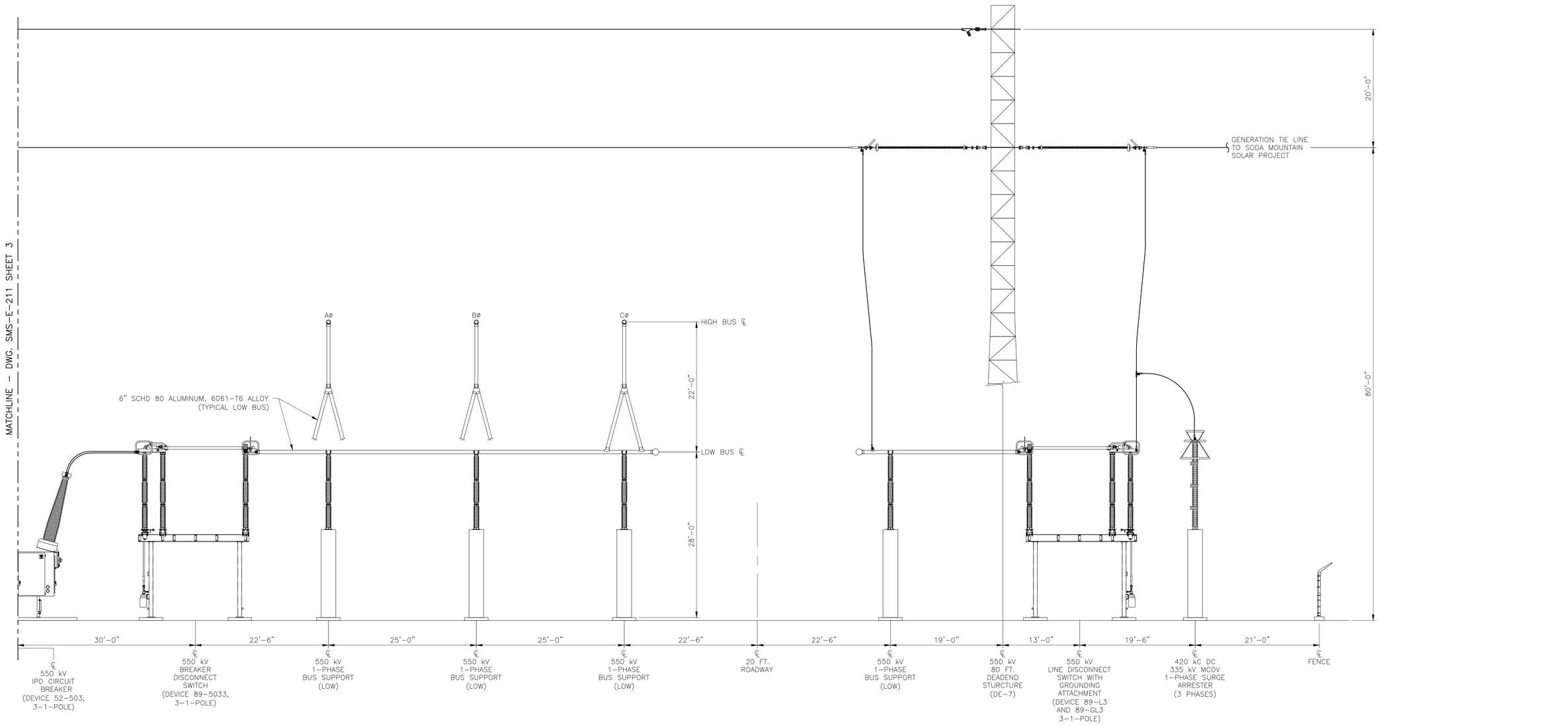
NO.	REVISIONS	DATE	ENG	DES/DFT	CHK
A	RELEASED FOR CLIENT REVIEW	01/10/23	KJL	CDI	ODR

Stantec
Consulting Engineers
Portland, Oregon

ENGINEERING RECORD	DATE
DES/DRFT BY: STC/CDI	11/23/22
ENGINEERED BY: STC/KJL	11/23/22
CHECKED BY: STC/CAL	XX/XX/XX
CADFILE: SMS–E–211–03.DWG	

SODA MOUNTAIN SOLAR
500 kV INTERCONNECTION SWITCHING STATION
SWITCH AND BUS ELEVATION

SCALE: AS NOTED	DWG.NO. SMS-E-211	SHEET 3	REV A



A–A / – ELEVATION – 500 kV SWITCH AND BUS–BAY 1

SCALE: ⅛"=1'–0'

NOTE

1. REFER TO SHEET 1 FOR NOTES, LEGEND AND BUS SUPPORT CONFIGURATIONS.

0 8'–0" 16'–0"

SCALE: 1/8" = 1'–0"

NO.	REVISIONS	DATE	ENG	DES/DFT	CHK

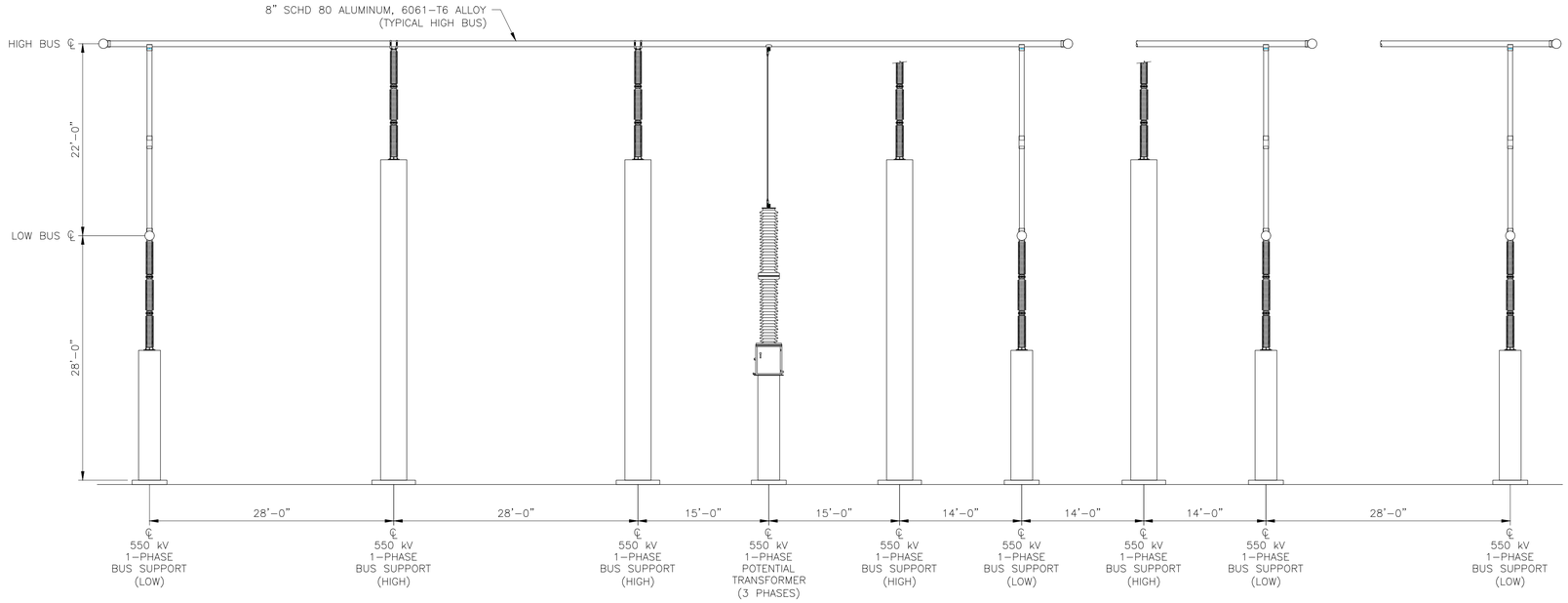
NO.	REVISIONS	DATE	ENG	DES/DFT	CHK
A	RELEASED FOR CLIENT REVIEW	01/10/23	KJL	CDI	ODR

Stantec
Consulting Engineers
Portland, Oregon

ENGINEERING RECORD	DATE
DES/DRFT BY: STC/CDI	11/23/22
ENGINEERED BY: STC/KJL	11/23/22
CHECKED BY: STC/CAL	XX/XX/XX
CADFILE: SMS–E–211–04.DWG	

SODA MOUNTAIN SOLAR
500 kV INTERCONNECTION SWITCHING STATION
SWITCH AND BUS ELEVATION

SCALE: AS NOTED	DWG.NO. SMS-E-211	SHEET 4	REV A



B-B / - ELEVATION – 500 kV SWITCH AND BUS-MAIN BUS 1

SCALE: ⅛"=1'-0"

NOTE

1. REFER TO SHEET 1 FOR NOTES, LEGEND AND BUS SUPPORT CONFIGURATIONS.

0 8'-0" 16'-0"

SCALE: 1/8" = 1'-0"

NO.	REVISIONS	DATE	ENG	DES/DFT	CHK

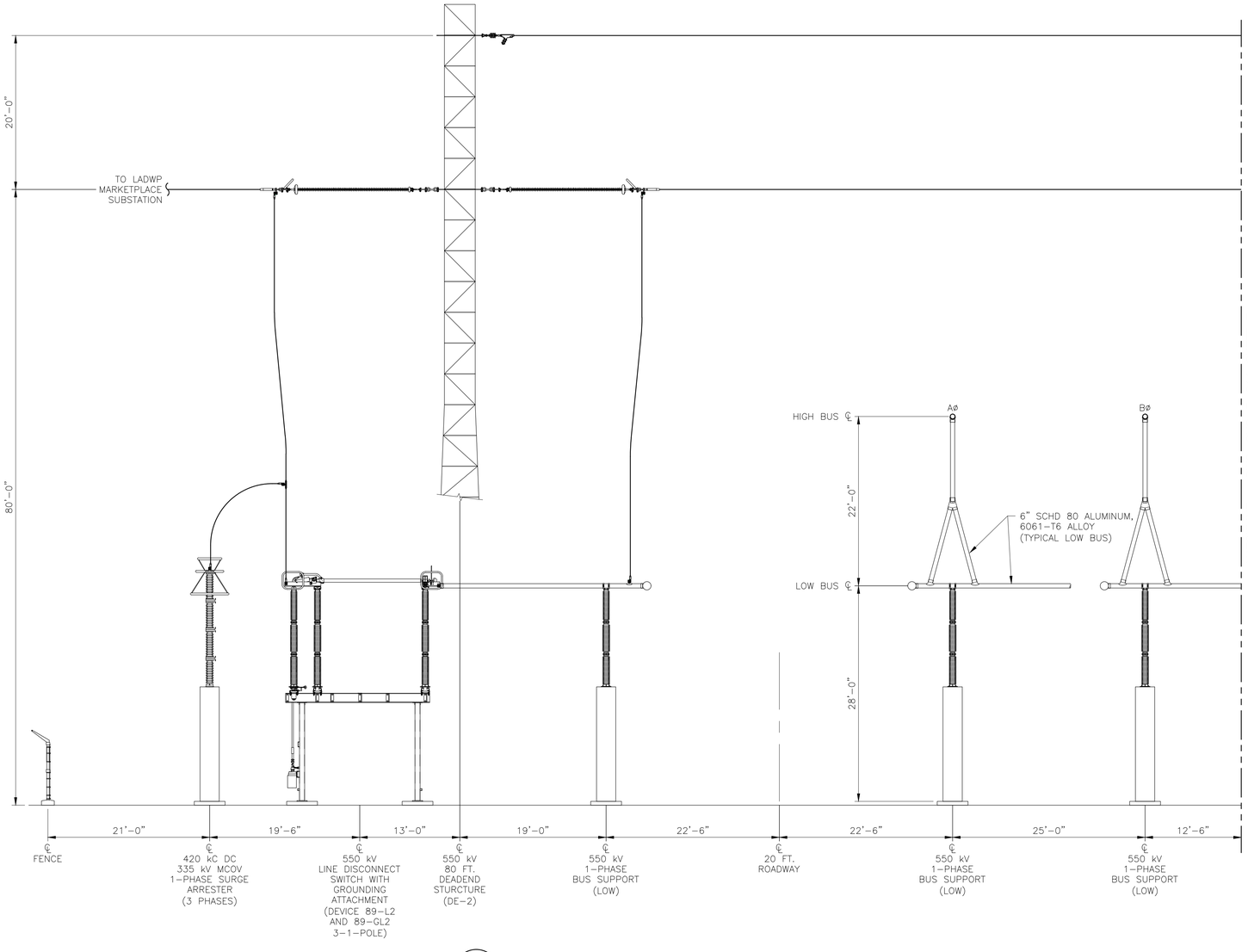
NO.	REVISIONS	DATE	ENG	DES/DFT	CHK
A	RELEASED FOR CLIENT REVIEW	01/10/23	KJL	CDI	ODR

Stantec
Consulting Engineers
Portland, Oregon

ENGINEERING RECORD	DATE
DES/DRFT BY: STC/CDI	11/23/22
ENGINEERED BY: STC/KJL	11/23/22
CHECKED BY: STC/CAL	XX/XX/XX
CADFILE: SMS-E-211-05.DWG	

SODA MOUNTAIN SOLAR
500 kV INTERCONNECTION SWITCHING STATION
SWITCH AND BUS ELEVATION

SCALE: AS NOTED	DWG.NO. SMS-E-211	SHEET 5	REV A



C-C / – ELEVATION – 500 kV SWITCH AND BUS-BAY 2 PARTIAL
SCALE: ⅛"=1'-0'

NOTE

1. REFER TO SHEET 1 FOR NOTES, LEGEND AND BUS SUPPORT CONFIGURATIONS.

0 8'-0" 16'-0"
SCALE: 1/8" = 1'-0"

NO.	REVISIONS	DATE	ENG	DES/DFT	CHK

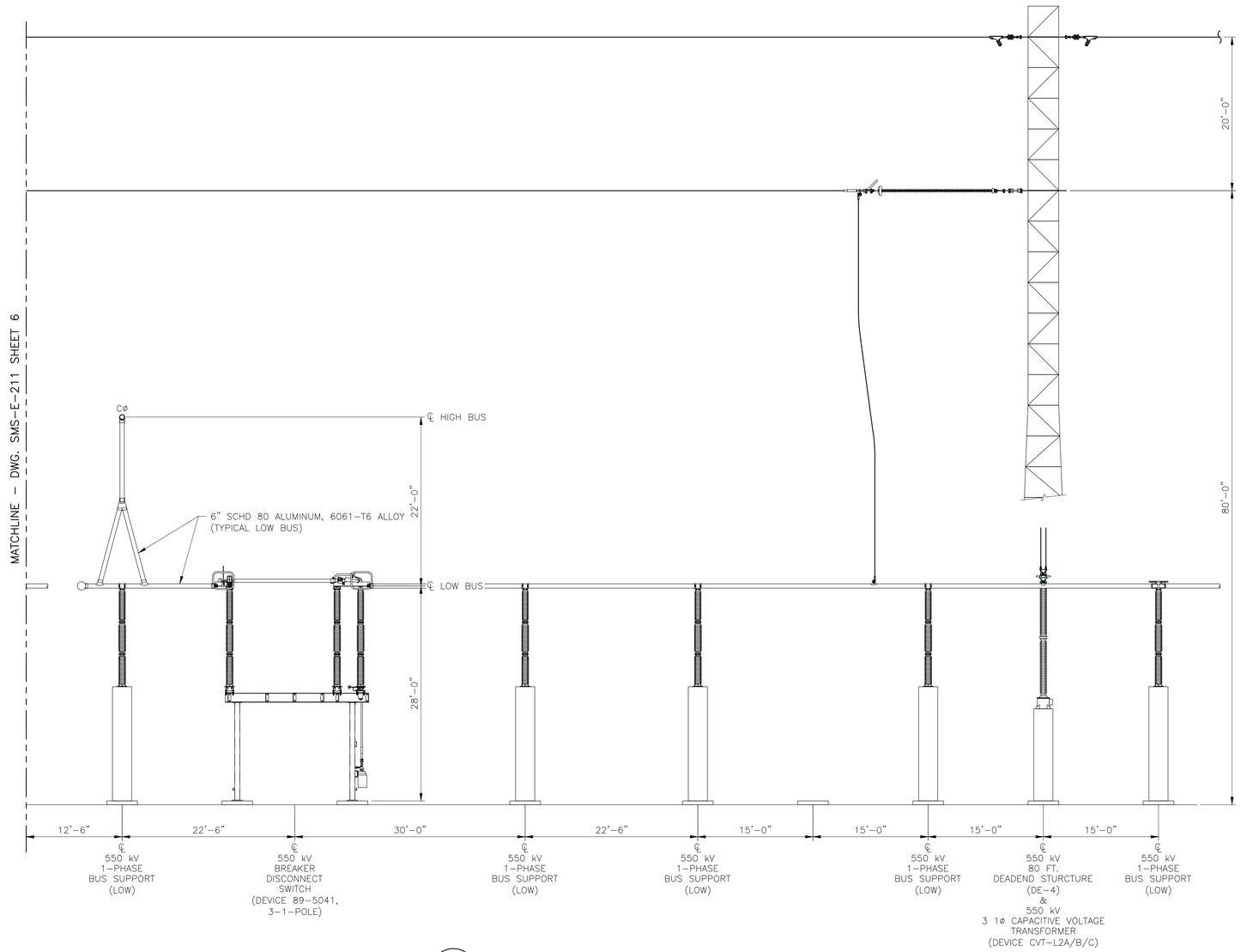
NO.	REVISIONS	DATE	ENG	DES/DFT	CHK
A	RELEASED FOR CLIENT REVIEW	01/10/23	KJL	CDI	ODR

Stantec
Consulting Engineers
Portland, Oregon

ENGINEERING RECORD	DATE
DES/DRFT BY: STC/CDI	11/28/22
ENGINEERED BY: STC/KJL	11/28/22
CHECKED BY: STC/CAL	XX/XX/XX
CADFILE: SMS-E-211-06.DWG	

SODA MOUNTAIN SOLAR
500 kV INTERCONNECTION SWITCHING STATION
SWITCH AND BUS ELEVATION

SCALE: AS NOTED | DWG.NO. SMS-E-211 | SHEET 6 | REV A



C–C / – ELEVATION – 500 kV SWITCH AND BUS–BAY 2 PARTIAL

SCALE: ⅛"=1'-0'

NOTE

1. REFER TO SHEET 1 FOR NOTES, LEGEND AND BUS SUPPORT CONFIGURATIONS.

0 8'-0" 16'-0"

SCALE: 1/8" = 1'-0"

NO.	REVISIONS	DATE	ENG	DES/DFT	CHK

NO.	REVISIONS	DATE	ENG	DES/DFT	CHK
A	RELEASED FOR CLIENT REVIEW	01/10/23	KJL	CDI	ODR

Stantec
Consulting Engineers
Portland, Oregon

ENGINEERING RECORD	DATE
DES/DRFT BY: STC/CDI	11/28/22
ENGINEERED BY: STC/KJL	11/28/22
CHECKED BY: STC/CAL	XX/XX/XX
CADFILE: SMS-E-211-07.DWG	

SODA MOUNTAIN SOLAR
500 kV INTERCONNECTION SWITCHING STATION
SWITCH AND BUS ELEVATION

SCALE: AS NOTED | DWG.NO. SMS-E-211 | SHEET 7 | REV A

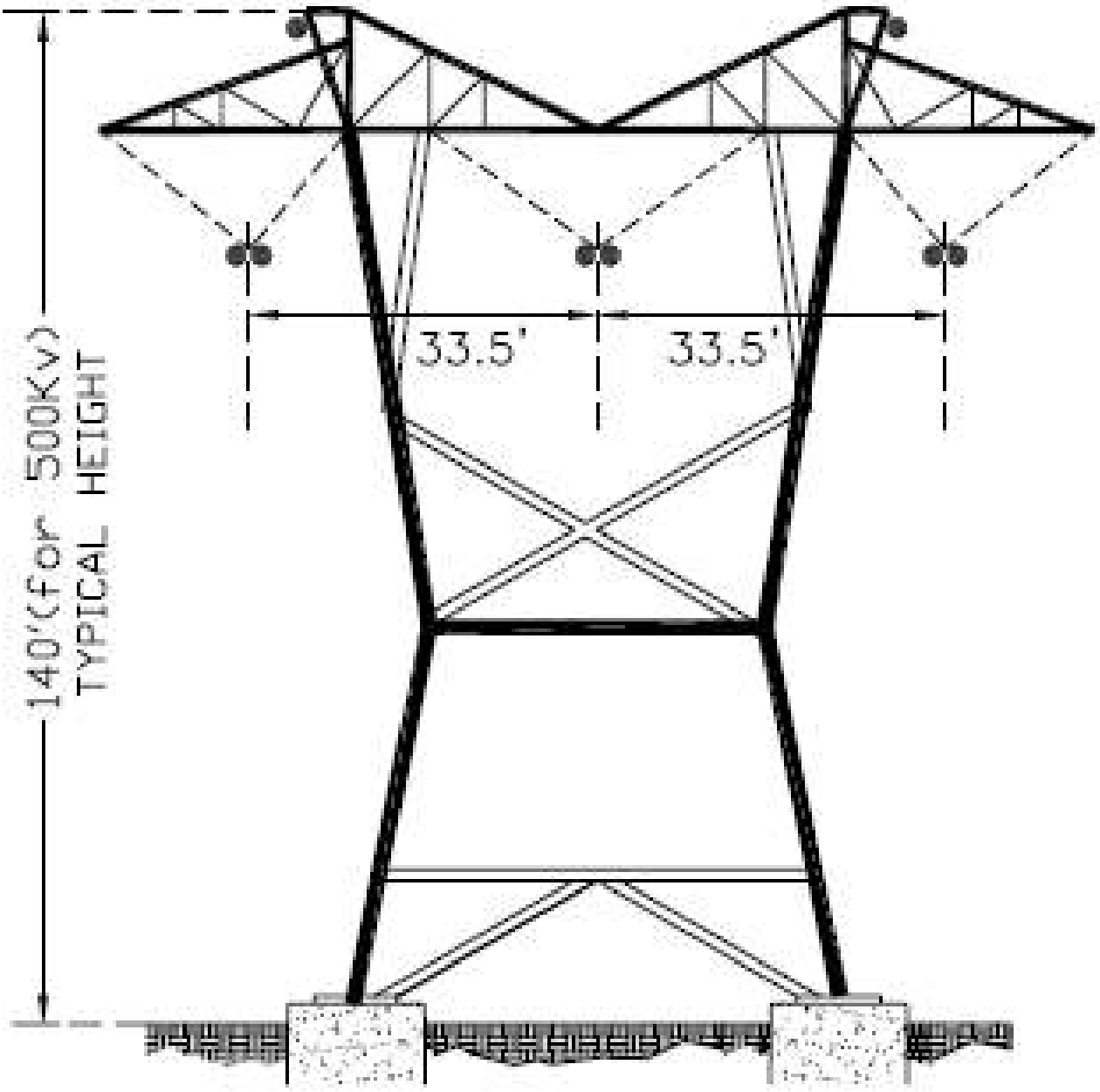


Figure 4

APPENDIX D

Outdoor Lighting Assessment Report

Soda Mountain Solar Project
Outdoor Lighting Impact Assessment Report

Submitted to:

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Prepared by:

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Date: 06/13/2024
REV 1 Date: 10/01/2024

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 building exterior surface reflectances has been modelled in Exhibit 2 of the Appendices. At these low reflectance values, the exterior surfaces are mostly diffuse in nature and will not exhibit any specular distribution, irrespective of the viewing angle. This project will also 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.

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. Exhibit 3 provides a complete luminaire schedule and product specification sheets for consideration.

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:

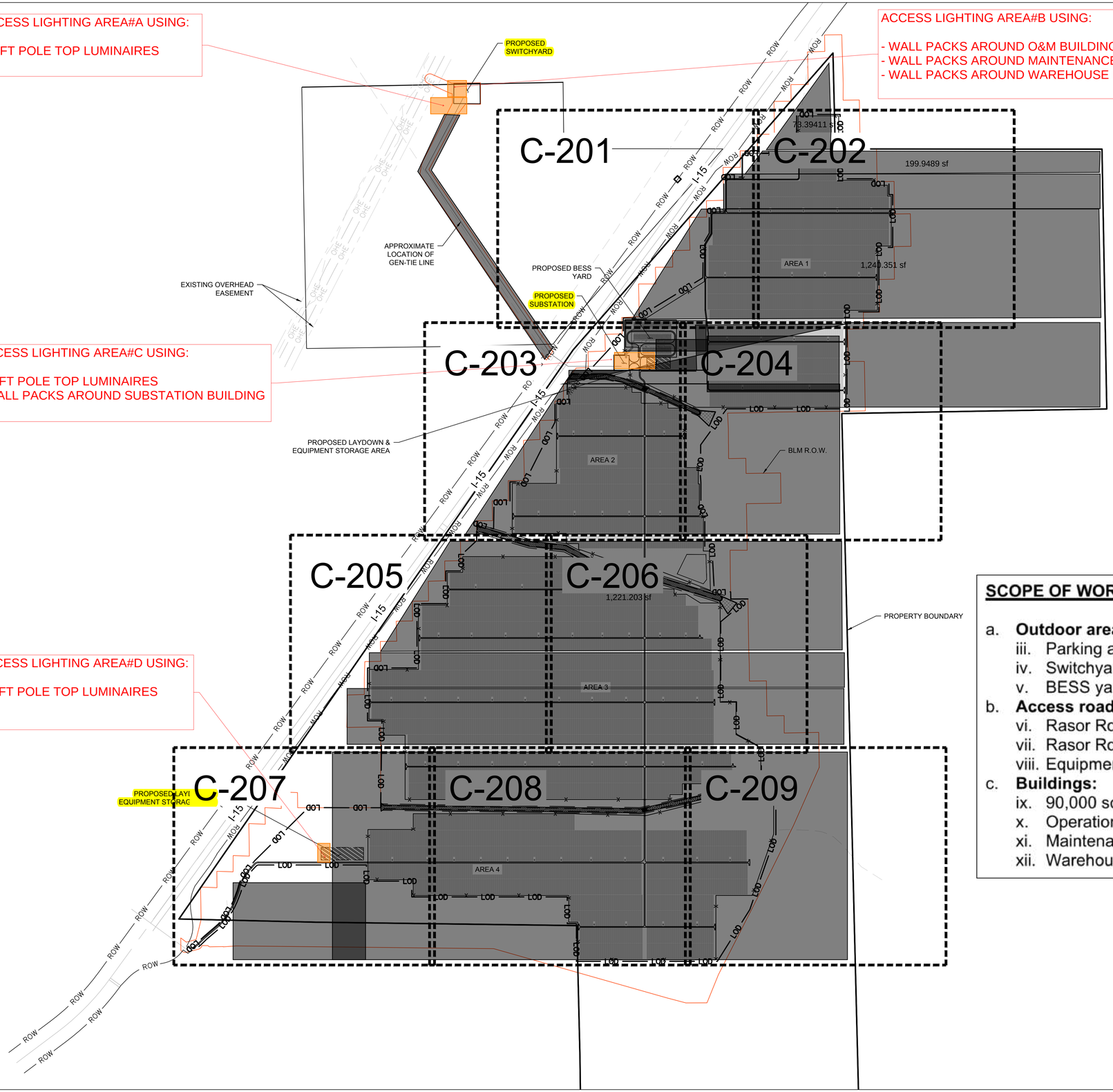
- WALL PACKS AROUND O&M BUILDING
- WALL PACKS AROUND MAINTENANCE BUILDING
- WALL PACKS AROUND WAREHOUSE BUILDING

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.

AKELA

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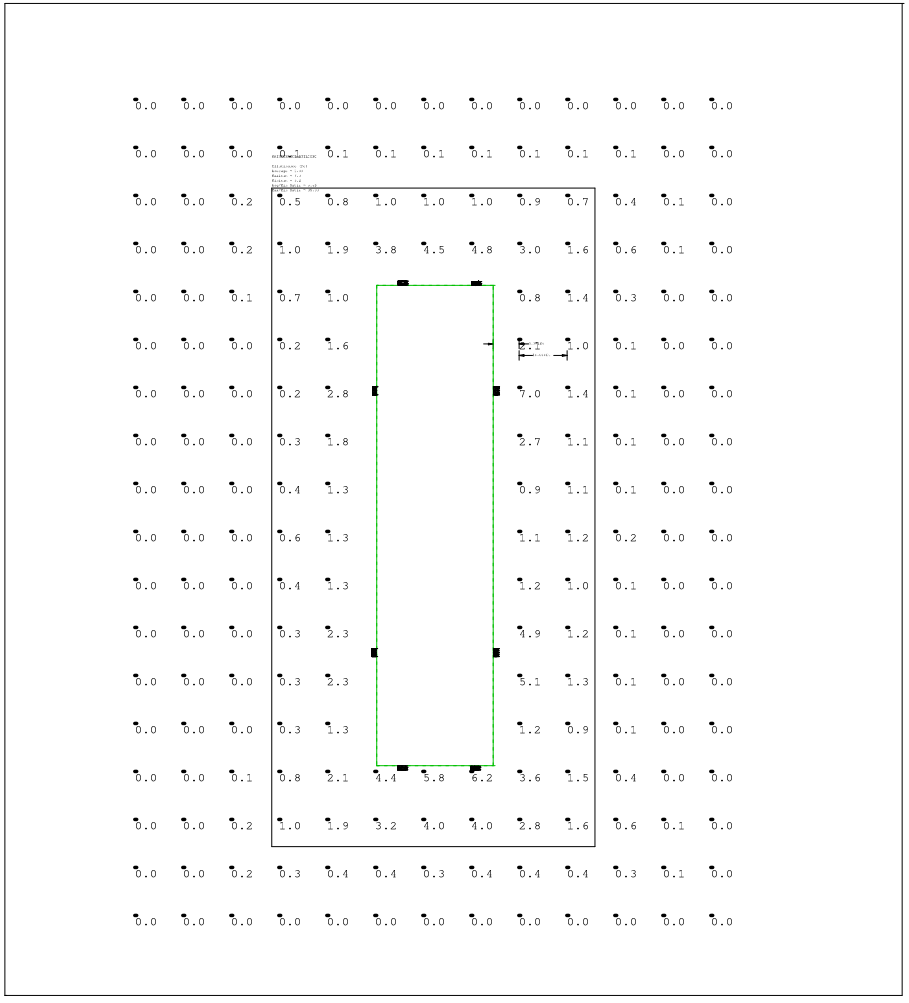
Soda Mountain Solar Project Conceptual Lighting Study - Exhibit 2

LIGHTING CALCULATIONS: MAINTENANCE BUILDING

Date:10/1/2024
Filename: Soda Mountain Solar Project Conceptual Lighting Study - Maintenance Building.AGI
CALCULATION BY: WCD

Calculation Summary							
Label	CalcType	Units	Avg	Max	Min	Avg/Min	Max/Min
MAINTENANCE BUILDING SURROUNDING	Illuminance	Fc	0.67	7.0	0.0	N.A.	N.A.
MAINTENANCE BUILDING	Illuminance	Fc	1.89	7.0	0.2	9.45	35.00

Building Exterior Surface Summary			
Maintenance Building	Label	Color	Reflectance
	South Wall		0.08
	East Wall		0.08
	North Wall		0.08
	East Wall		0.08



CALC POINTS AT 10FT INTERVALS

Building Summary	
Label	Wall Ht.
OPERATIONS	12

Scale: 1 inch= 20 Ft.

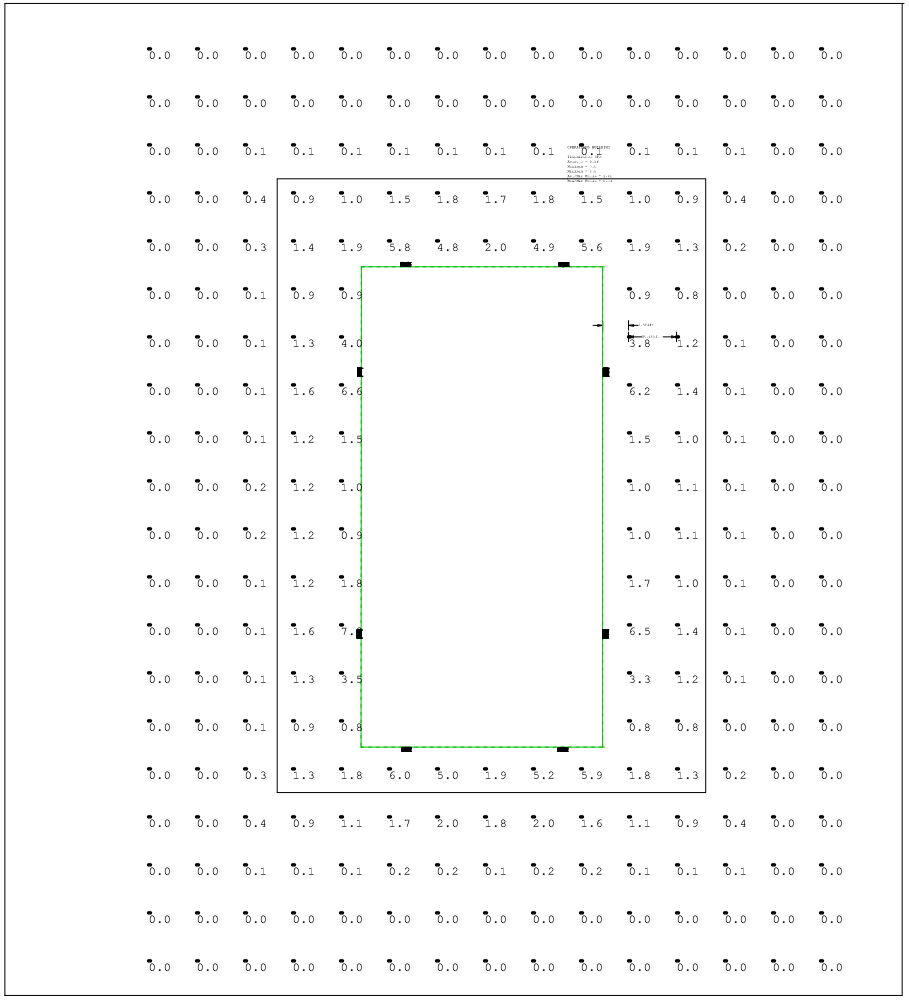
Soda Mountain Solar Project Conceptual Lighting Study - Exhibit 2

LIGHTING CALCULATIONS: OPERATIONS BUILDING

Date:10/1/2024
Filename: Soda Mountain Solar Project Conceptual Lighting Study - Operations Building.AGI
CALCULATION BY: WCD

Calculation Summary							
Label	CalcType	Units	Avg	Max	Min	Avg/Min	Max/Min
OPERATIONS BUILDING SURROUNDING	Illuminance	Fc	0.68	7.0	0.0	N.A.	N.A.
OPERATIONS BUILDING	Illuminance	Fc	2.24	7.0	0.8	2.80	8.75

Building Exterior Surface Summary			
Operations Building	Label	Color	Reflectance
	South Wall		0.08
	East Wall		0.08
	North Wall		0.08
	East Wall		0.08



CALC POINTS AT 10FT INTERVALS

Building Summary	
Label	Wall Ht.
OPERATIONS	12

Scale: 1 inch= 20 Ft.

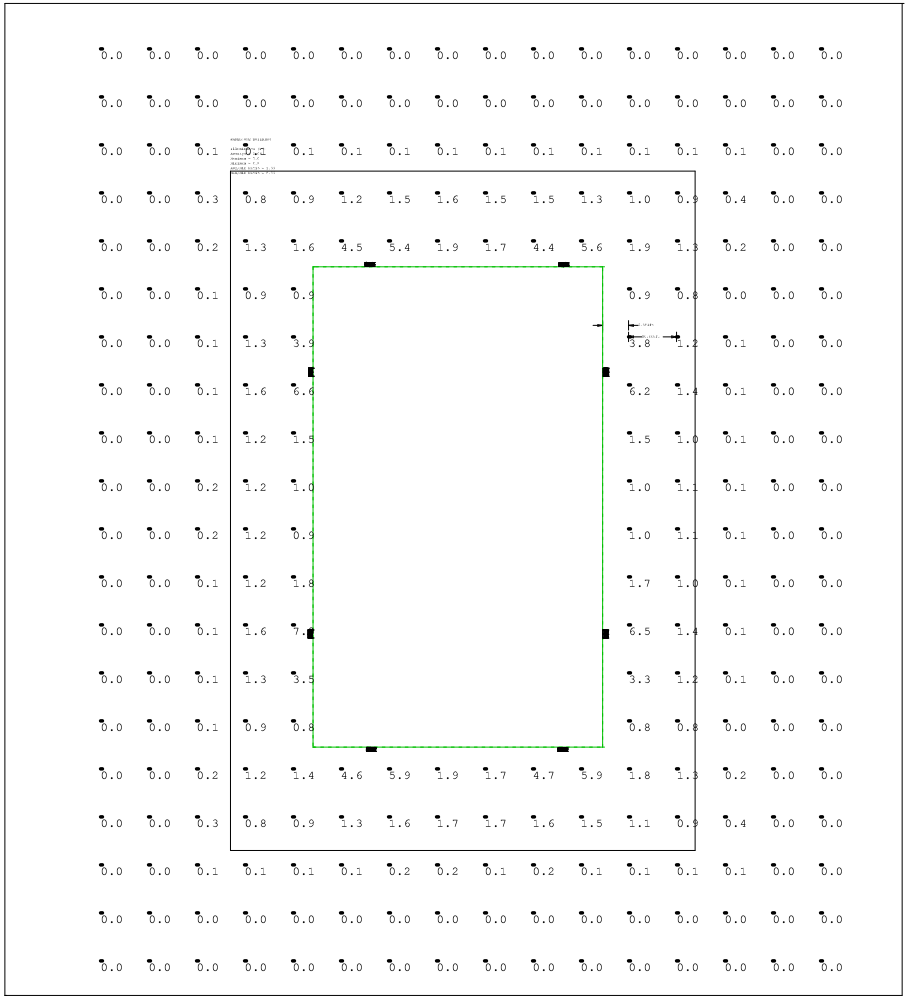
Soda Mountain Solar Project Conceptual Lighting Study - Exhibit 2

LIGHTING CALCULATIONS: WAREHOUSE BUILDING

Date:10/1/2024
Filename: Soda Mountain Solar Project Conceptual Lighting Study - Warehouse Building.AGI
CALCULATION BY: WCD

Calculation Summary							
Label	CalcType	Units	Avg	Max	Min	Avg/Min	Max/Min
WAREHOUSE BUILDING SURROUNDING	Illuminance	Fc	0.65	7.0	0.0	N.A.	N.A.
WAREHOUSE BUILDING	Illuminance	Fc	2.04	7.0	0.8	2.55	8.75

Building Exterior Surface Summary			
Warehouse Building	Label	Color	Reflectance
	South Wall		0.08
	East Wall		0.08
	North Wall		0.08
	East Wall		0.08



CALC POINTS AT 10FT INTERVALS

Building Summary	
Label	Wall Ht.
WAREHOUSE	12

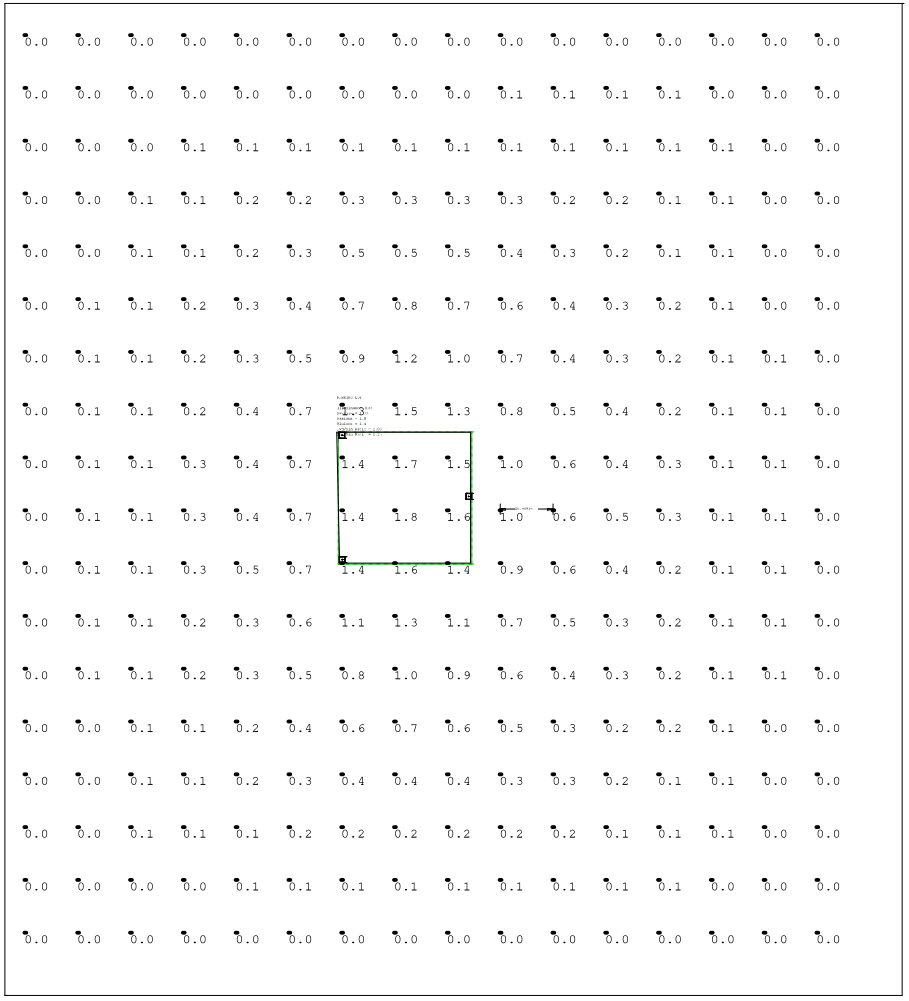
Scale: 1 inch= 20 Ft.

Soda Mountain Solar Project Conceptual Lighting Study - Exhibit 2

LIGHTING CALCULATIONS: SITE PARKING LOT AND SURROUNDING AREA

Date:10/1/2024
Filename: Soda Mountain Solar Project Conceptual Lighting Study - Parking lot.AGI
CALCULATION BY: WCD

Calculation Summary							
Label	CalcType	Units	Avg	Max	Min	Avg/Min	Max/Min
PARKING LOT SURROUNDING AREA	Illuminance	Fc	0.26	1.8	0.0	N.A.	N.A.
PARKING LOT	Illuminance	Fc	1.53	1.8	1.4	1.09	1.29



CALC POINTS AT 10FT INTERVALS

Scale: 1 inch= 18.18 Ft.

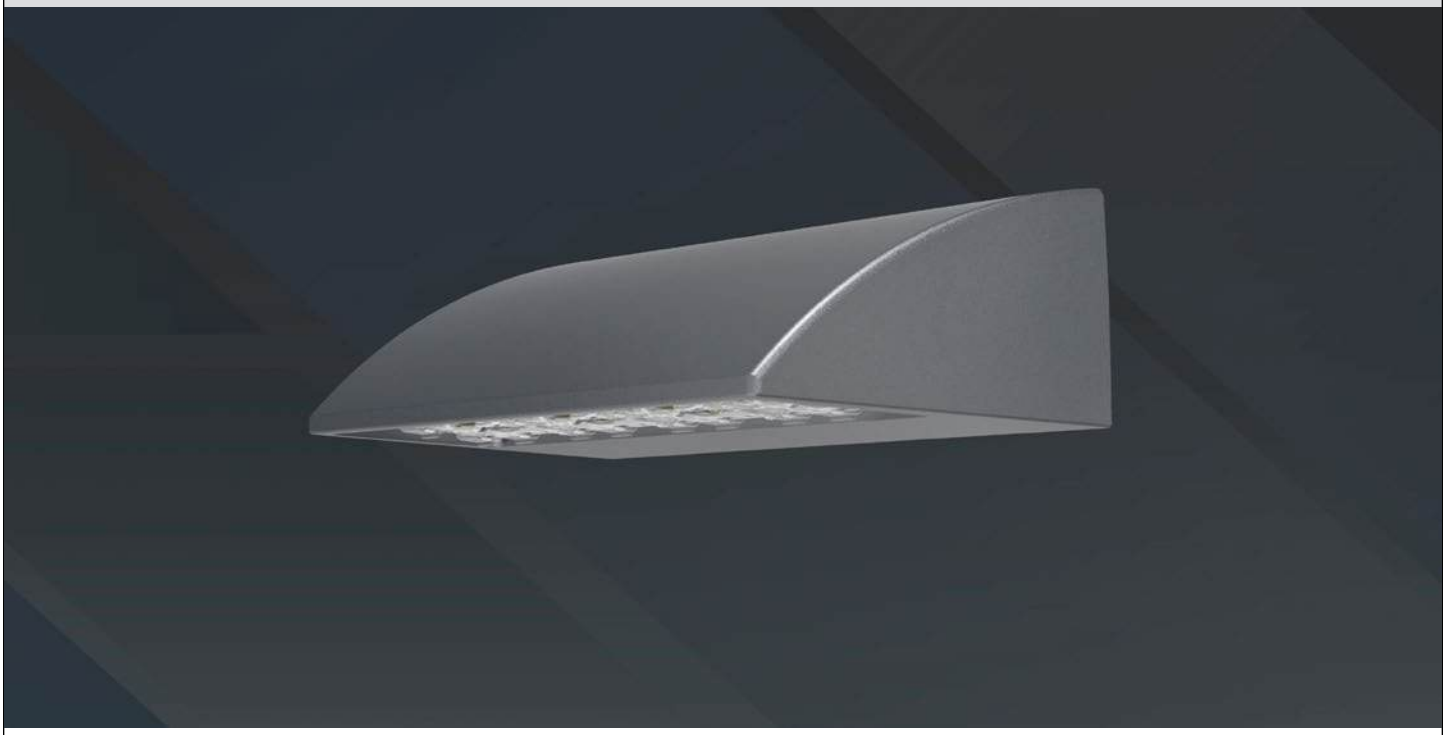
Exhibit 3 - Luminaire Schedule and Specifications

LUMINAIRE SCHEDULE													
TYPE	DESCRIPTION	MANUFACTURER		LAMP				POWER				MOUNTING	NOTES
		NAME	CATALOG NO.	TYPE	LUMENS	CCT	CRI (MIN)	VOLTAGE	INPUT WATTAGE	DIMMING TYPE	DIMMING DIM TYPE	TYPE	
S01	DARK SKY COMPLIANT AREA LED ON A 25' POLE WITH TYPE 4 DISTRIBUITION AND INTEGRAL PHOTOCELL.	NLS LIGHTING NLS LIGHTING	VSS-1-T4-48L-7-AMBER-UNV-DP6-BLK-PC RSSP-25-4R-11G	LED	11,232	AMB	70	UNV	108	INTEGRAL DRIVER	0-10V	POLE	VERIFY FINISH, MOUNTING, AND LOCATION WITH ARCHITECT PRIOR TO ROUGH-IN.
S02	DARK SKY COMPLIANT WALL PACK WITH TYPE 3 DISTRIBUITION AND INTEGRAL PHOTOCELL.	NLS LIGHTING	NV-W2-T3-64L-53-AMBER-UNV-WM-BLK-PC	LED	9,712	AMB	70	UNV	99	INTEGRAL DRIVER	0-10V	SURFACE	VERIFY FINISH, MOUNTING, AND LOCATION WITH ARCHITECT PRIOR TO ROUGH-IN.

NLS LIGHTING

NV-W2

ARCHITECTURAL HIGH PERFORMANCE FULL CUTOFF WALL PACK



LED WATTAGE CHART	
	64L
530 milliamps	99w
700 milliamps	136w
1050 milliamps	205w

KEY FEATURES

- Ideal for Exterior Walls, Entryways, Pathways, New Construction and Renovation, Warehouse and Receiving Docks, Court Yards, and School Playgrounds
- Sleek Minimalistic Design of the NV-W2 (up to 24,000 Lumens, 18”W x 9.38”D x 5”H) Compliments the NV-W (up to 11,000 Lumens, 12”W x 9”D x 5.5”H)
- 2700K, 3000K, 3500K, 4000K, 5000K CCT Multichip High Power 70 & 80 CRI LEDs
- IP66 Rated Against Dust & Water Ingress, IK10 Rated for Tamper/Vandalism/Impact Protection
- 20KA Surge Protection (120V - 480V) Cold Weather Integrated Battery Back-Up Safety Options
- Silicone Optics providing 96% Clarity and Heat Resistant up to 150°C
- 9 Standard Finishes, Custom Finish and Marine Grade Finish Available
- Controls Agnostic, Compatible with Most Control Systems and Sensors Linstings
- Environmentally Friendly Product Which Reduces Energy Consumption, L70 > 100,000 hours
- IDA qualified for 3000K CCT and Lower for Down-light Application, Reducing Light Pollution and Trespass
- Buy America(n) Option Available, Quick Mount for Easy Installation
- Cost Competitive and Short Shipping Lead Times in Days & Weeks

BUY AMERICAN

To ensure the latest BAA/TAA/BABA Standards are being met, please select BAA, TAA, or BABA in the options section. Please contact the factory before placing an order for any NLS products requesting BAA (Buy American Act), TAA (Trade American Act), or BABA (Build America, Buy America).

Project Name:	Type:

NV-W2 ORDERING GUIDE

Cat#

NV-W
(NV-W2)

Light Dist.

Type 2
(T2)

Type 3
(T3)

Type 4
(T4)

of LEDs

64
(64L)

Miliamps

530
(53)

700
(7)

1050
(1)

Kelvin

Amber 585-600nM
(AMBER) [9, 11, 12]

2700K, 70 CRI
(27K7) [4]

2700K, 80 CRI
(27K8) [1, 4]

3000K, 70 CRI
(30K7) [4]

3000K, 80 CRI
(30K8) [1, 4]

3500K, 80 CRI
(35K8)

4000K, 70 CRI
(40K7)

4000K, 80 CRI
(40K8) [1]

5000K, 70 CRI
(50K7)

5000K, 80 CRI
(50K8) [1]

Volts

120-277
(UNV)

347-480
(HV)

Mounting

Wall Mount
(WM)

Color

Bronze Textured
(BRZ)

White Textured
(WHT)

Smooth White Gloss
(SWT)

Silver Metallic
(SVR)

Black Textured
(BLK)

Smooth Black Gloss
(SBK)

Graphite Textured
(GPH)

Grey Textured
(GRY)

Green Textured
(GRN)

Hunter Green Textured
(HGN)

Custom
(CS)

Controls Options

Nema 7-Pin Receptacle
(PE7)

Nema 7-Pin Receptacle +Shorting Cap
(PER)

Photocell + Receptacle
(PCR)

Button Photocell
(PC) [2]

FSP-211 with Motion Sensor (UNV Voltage)
*8' and Below
(FSP-8) [2]

*9'-20' Heights
(FSP-20) [2]

*21'-40' Heights
(FSP-40)

Options

Marine Grade Finish
(MGF)

Aluminum Vanity Plate 22"x16"
(VP22)

Housing Extension
(HE)

Surge Protector
(20KA)

Up Light
(UP)

Emergency Battery 4W
(EM4) [2, 3]

Emergency Battery 8W
(EM8) [2, 3]

Emergency Cold Pk Battery 14W
(EMCP) [2, 3]

Black Hardware
(BH) [5]

Black Optic Frame
(BOF) [5]

Buy American Act
(BAA) [10]

Trade Agreement Act
(TAA) [10]

Build America Buy American
(BABA) [10]

Custom Controls Integration
(CCI) [8]

Lens Options

Glass Lens
(GL) [6, 13]

HAL Lens
(HAL) [7, 13]

NOTES:

1. Consult Factory for Lead Time. Consult Factory for 90 CRI Requests
2. Universal Voltage 120-27
3. All Emergency Battery Options Certified CA Title 20
4. 3000K or lower, with fixed mounting options only, must be selected to meet International Dark Sky Association certification
5. Consult Factory for Lead Time
6. Glass Lens: Low iron glass, fully tempered per ANSI C1047 (QCH-2201-37)
7. HAL Lens: Yellow Polycarbonate Lens – less than 2% Blue Light Content
8. Please contact Factory for Custom Control Integration requests (nLight, NX, WaveLinx, Crestron, DMX/RDM, Synapse, Casambi, Dali II, Avi-On, or other control systems)
9. Turtle Safe
10. Consult factory for all BAA/TAA/BABA requests
11. Consult factory for Lead Time
12. Not Available above 1000mA
13. Contact Factory

PRODUCT SPECIFICATIONS

ELECTRICAL
• 120-277 Volts (UNV) or 347-480 Volts (HV)
• 0-10V dimming driver
• Driver power factor at maximum load is ≥ .95, THD maximum load is 15%
• LED Drivers Ambient Temp. Min is -40°C and Ambient Temp. Max ranges from 50°C to 55°C and, in some cases, even higher. Consult the factory for revalidation by providing the fixture catalog string before quoting and specifying it.
• All internal wiring UL certified for 600 VAC and 105°C • All drivers, controls, and sensors housed in enclosed IP66 compartment
• CRI 70, 80, 90
• Color temperatures: 2700K, 3000K, 3500K, 4000K, 5000K

CONSTRUCTION
• Die Cast Aluminum
• Internal cooling fins
• Corrosion resistant external hardware
• One-piece silicone gasket ensures IP66 seal for electronics compartment
• Two-piece silicone Micro Optic system ensures IP67 level seal around each PCB
• Silicone Micro Optics: Recessed, full cutoff, vandal resistant and non-yellowing • Dark Sky Approved

OPTIONS
MARINE GRADE FINISH (MGF) - A multi-step process creating protective finishing coat against harsh environments. Chemically washed in a 5 stage cleaning system. Prebaked, Powder coated 3-5 mils of Zinc Rich Super Durable Polyester Primer. Oven Baked. Finished Powder Coating of Super Durable Polyester Powder Coat 3-5 mil thickness.

VANITY PLATE (VP) - Optional Vanity Plate was designed to cover the unsightly remains on a wall where a larger HID wallpack was removed. The aluminum Vanity Plate will be painted to match the finish of the NV- W2, custom finishes are available, please consult factory. The standard Vanity Plate is 22"W x 16"H.

20KA SURGE PROTECTOR (20KA) - protects the complete system against nominal surges of up to 20KA. Protection against power surges, storms and lightning strikes.

EMERGENCY BATTERY BACKUP (EM4) (EM8)

EMERGENCY COLD PACK BATTERY (EMPC) - Emergency cold pack (-20ºC minimum) battery system available in 14W output.

UP LIGHT (UP) - Inverted luminaire for up lighting.

BLACK HARDWARE (BH) - Black stainless steel hardware.

BLACK OPTIC FRAME (BOF) - Black optic frame. Standard is white.

CONDUIT BOX (JBOX) - Conduit J-Box.

GLASS LENS (GL) - Low Iron Glass, fully tempered.

HIGH PERFORMANCE AMBER LENS (HAL)

CONTROL OPTIONS
• FSP-211 (FSP-X) - Passive infrared (PIR) sensor providing multi-level control based on motion/daylight contribution.
• All control parameters adjustable via wireless configuration remote storing and transmitting sensor profiles.
• FSP-8 Mounting heights 8 feet and below
• FSP-20 mounting heights 9-20 feet
• FSP-40 mounting heights 21-40 feet.
• Includes 5 dimming event cycles, 0-10V dimming with motion sensing, re-programmable in the field. Programmable remote must be purchased separately.
• FSIR-100 commissioning remote is required to change sensor settings. Please contact factory for ordering.

• Controls Agnostic: Please contact factory for your preferred controls option. (nLight, NX, WaveLinx, Crestron, DMX/RDM, Synapse, Casambi, DALI II, Avi-On, or other control systems)

NEMA 7-PIN RECEPTACLE (PE7) - An ANSI C136.41-2013 receptacle provides electrical and mechanical interconnection between photo control cell and luminaire. Dimming receptacle available two or four dimming contacts supports 0-10 VDC dimming methods or Digital Addressable Lighting Interface (DALI), providing reliable power interconnect.

BUTTON PHOTOCELL–Dusk to dawn optional Button Photocell.

FINISH
3-5 mils electrostatic powder coat.
NLS Lighting's standard high-quality finishes prevent corrosion, and protects against extreme environmental conditions.

WARRANTY
Five-year limited warranty for drivers and LEDs.

OPTICS
Silicone optics high thermal stability and light output provide higher powered LEDs with minimized lumen depreciation. UV stability with scratch resistance increases exterior application durability. Silicone optics do not yellow, crack or brittle over time.

LISTINGS
• Certified to UL 1598
• UL 8750
• CSA C22.2 No. 250.0
• DesignLights Consortium® (DLC) Pending
• DesignLights Consortium Premium® (DLCP) Pending
• IP66 Rated Fixture / IP67 Rated Optics
• IK10 Rated
• IDA Dark Sky Approved

BUY AMERICAN OPTION
While all of the NLS Lighting products listed in this document qualify for the Buy America(n) Act of 1933, we reserve the right to change our listings without notice.

The information provided above is for general informational purposes only. We encourage you to consult legal professionals for advice particular to your projects concerning BAA, TAA, BABA or Buy America.

Additional NLS Products that meet BAA, TAA standards can be found at the following link:

https://nlslighting.com/buy-american/

The information and specifications on this document are subject to change without any notification. All values are design, nominal, typical or prorated values when measured under internal and external laboratory conditions.

PRODUCT SPECIFICATIONS

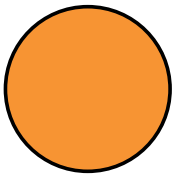
LUMENS							
PART NUMBER	**T2**	**LM/W**	**T3**	**LM/W**	**T4**	**LM/W**	**WATTS**
NV-W2-64L-53-27K8	9345	94	9712	B2-U0-G2	9285	94	99
NV-W2-64L-53-27K7	9980	101	10372	B2-U0-G2	9915	100	99
NV-W2-64L-53-30K8	10020	101	10413	B2-U0-G2	9955	101	99
NV-W2-64L-53-30K7	10791	109	11215	B2-U0-G2	10722	108	99
NV-W2-64L-53-35K8	10020	101	10413	B2-U0-G2	9955	101	99
NV-W2-64L-53-40K8	10791	109	11215	B2-U0-G2	10722	108	99
NV-W2-64L-53-40K7	11660	118	12118	B2-U0-G2	11585	117	99
NV-W2-64L-53-50K8	10791	109	11215	B2-U0-G2	10722	108	99
NV-W2-64L-53-50K7	11660	118	12118	B2-U0-G2	11585	117	99
NV-W2-64L-7-27K8	12343	91	12828	B2-U0-G2	12263	90	136
NV-W2-64L-7-27K7	13181	97	13698	B3-U0-G3	13096	96	136
NV-W2-64L-7-30K8	13234	97	13753	B3-U0-G3	13148	97	136
NV-W2-64L-7-30K7	14253	105	14812	B3-U0-G3	14161	104	136
NV-W2-64L-7-35K8	13234	97	13753	B3-U0-G3	13148	97	136
NV-W2-64L-7-40K8	14253	105	14812	B3-U0-G3	14161	104	136
NV-W2-64L-7-40K7	15400	113	16005	B3-U0-G3	15301	113	136
NV-W2-64L-7-50K8	14253	105	14812	B3-U0-G3	14161	104	136
NV-W2-64L-7-50K7	15400	113	16005	B3-U0-G3	15301	113	136
NV-W2-64L-1-27K8	18515	90	19241	B3-U0-G3	18395	90	205
NV-W2-64L-1-30K7	19771	96	20547	B3-U0-G3	19644	96	205
NV-W2-64L-1-30K8	19850	97	20630	B3-U0-G3	19722	96	205
NV-W2-64L-1-30K7	21379	104	22218	B3-U0-G3	21241	104	205
NV-W2-64L-1-35K8	19850	97	20630	B3-U0-G3	19722	96	205
NV-W2-64L-1-40K8	21379	104	22218	B3-U0-G3	21241	104	205
NV-W2-64L-1-40K7	23100	113	24007	B3-U0-G3	22951	112	205
NV-W2-64L-1-50K8	21379	104	22218	B3-U0-G3	21241	104	205
NV-W2-64L-1-50K7	23100	113	24007	B3-U0-G3	22951	112	205
3000K or lower must be selected to meet International Dark Sky Association certification.							

BUG RATINGS				
PART NUMBER	**T2**	**T3**	**T4**	**WATTS**
NV-W2-64L-53-27K8	B1-U0-G2	B2-U0-G2	B2-U0-G2	99
NV-W2-64L-53-27K7	B2-U0-G2	B2-U0-G2	B2-U0-G2	99
NV-W2-64L-53-30K8	B2-U0-G2	B2-U0-G2	B2-U0-G2	99
NV-W2-64L-53-30K7	B2-U0-G2	B2-U0-G2	B2-U0-G2	99
NV-W2-64L-53-35K8	B2-U0-G2	B2-U0-G2	B2-U0-G2	99
NV-W2-64L-53-40K8	B2-U0-G2	B2-U0-G2	B2-U0-G2	99
NV-W2-64L-53-40K7	B2-U0-G2	B2-U0-G2	B2-U0-G2	99
NV-W2-64L-53-50K8	B2-U0-G2	B2-U0-G2	B2-U0-G2	99
NV-W2-64L-53-50K7	B2-U0-G2	B2-U0-G2	B2-U0-G2	99
NV-W2-64L-7-27K8	B2-U0-G2	B2-U0-G2	B2-U0-G2	136
NV-W2-64L-7-27K7	B2-U0-G2	B3-U0-G3	B2-U0-G2	136
NV-W2-64L-7-30K8	B2-U0-G2	B3-U0-G3	B2-U0-G2	136
NV-W2-64L-7-30K7	B2-U0-G2	B3-U0-G3	B2-U0-G2	136
NV-W2-64L-7-35K8	B2-U0-G2	B3-U0-G3	B2-U0-G2	136
NV-W2-64L-7-40K8	B2-U0-G2	B3-U0-G3	B2-U0-G2	136
NV-W2-64L-7-40K7	B3-U0-G3	B3-U0-G3	B3-U0-G3	136
NV-W2-64L-7-50K8	B2-U0-G2	B3-U0-G3	B2-U0-G2	136
NV-W2-64L-7-50K7	B2-U0-G2	B3-U0-G3	B3-U0-G3	136
NV-W2-64L-1-27K8	B2-U0-G2	B3-U0-G3	B2-U0-G2	205
NV-W2-64L-1-30K7	B3-U0-G3	B3-U0-G3	B3-U0-G3	205
NV-W2-64L-1-30K8	B3-U0-G3	B3-U0-G3	B3-U0-G3	205
NV-W2-64L-1-30K7	B3-U0-G3	B3-U0-G3	B3-U0-G3	205
NV-W2-64L-1-35K8	B3-U0-G3	B3-U0-G3	B3-U0-G3	205
NV-W2-64L-1-40K8	B3-U0-G3	B3-U0-G3	B3-U0-G3	205
NV-W2-64L-1-40K7	B3-U0-G3	B3-U0-G3	B3-U0-G4	205
NV-W2-64L-1-50K8	B3-U0-G3	B3-U0-G3	B3-U0-G3	205
NV-W2-64L-1-50K7	B3-U0-G3	B3-U0-G3	B3-U0-G4	205

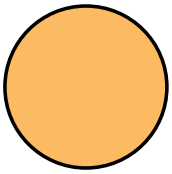
EMERGENCY BATTERY BACK-UP LUMENS				
PART NUMBER	**T2**	**T3**	**T4**	**WATTS**
EM14-27K7	1,287	1,299	1,287	13
EM14-30K7	1,396	1,409	1,396	13
EM14-35K8	1,208	1,221	1,208	13
EM14-40K7	1,467	1,482	1,467	13
EM14-50K7	1,467	1,482	1,467	13
EMCP-27K7	1,287	1,299	1,287	13
EMCP-30K7	1,396	1,409	1,396	13
EMCP-35K8	1,208	1,221	1,208	13
EMCP-40K7	1,467	1,482	1,467	13
EMCP-50K7	1,467	1,482	1,467	13

Lumen Maintenance Data							
Ambient Temperature	**Drive Current**	**L90 Hours***	**L70 Hours****	**30,000 Hours***	**50,000 Hours***	**60,00 Hours***	**100,000 Hours****
25°C	Up to 700mA	58,000	173,000	95.7%	91.6%	89.6%	82.1%
	1050mA	48,000	143,000	94.3%	89.5%	87.2%	78.5%
*Reported extrapolations per IESNA TM-21			**Projected extrapolations per IESNA TM-21				

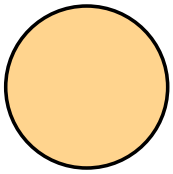
LED KELVIN RANGE



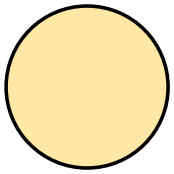
AMBER
585-600 nm



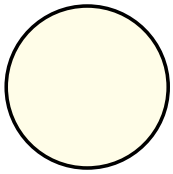
2700K 70 CRI



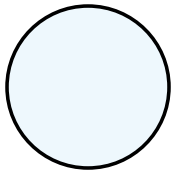
3000K 70 CRI



3500K 80 CRI



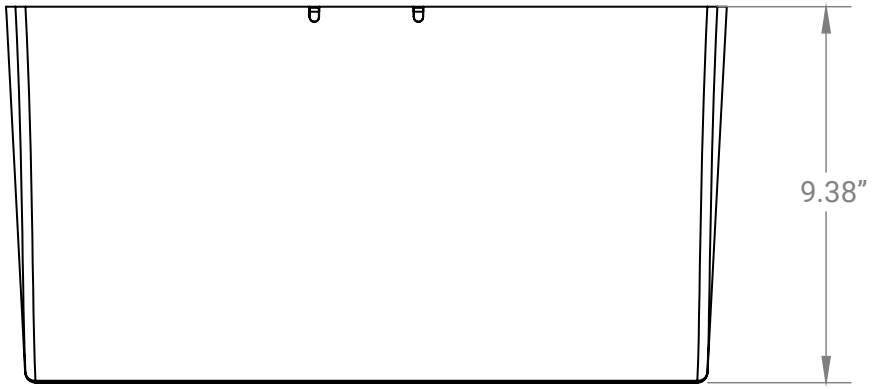
4000K 70 CRI

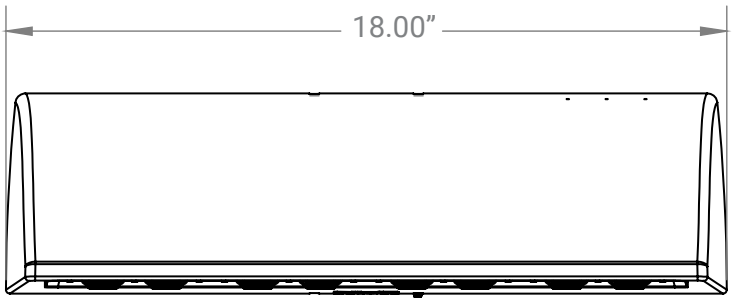


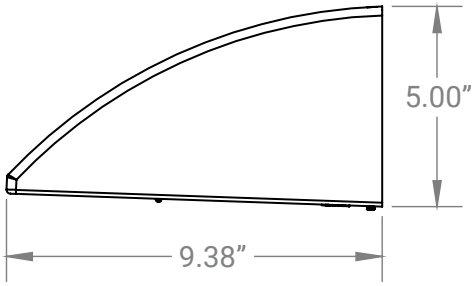
5000K 70 CRI

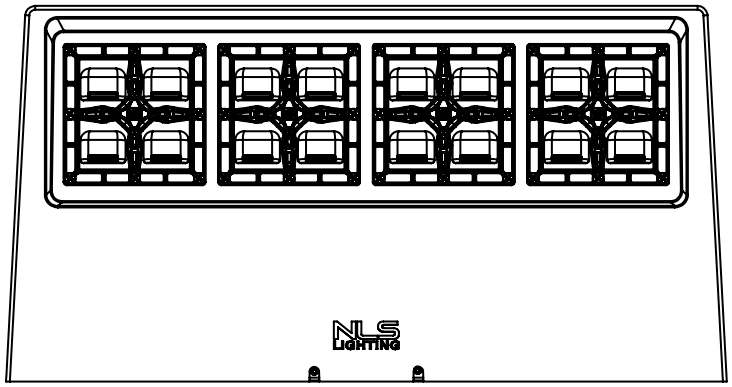
Color	Dominant or Peak Wavelength Range (nm)	
	Minimum	Maximum
Amber	585	600

DIMENSIONS



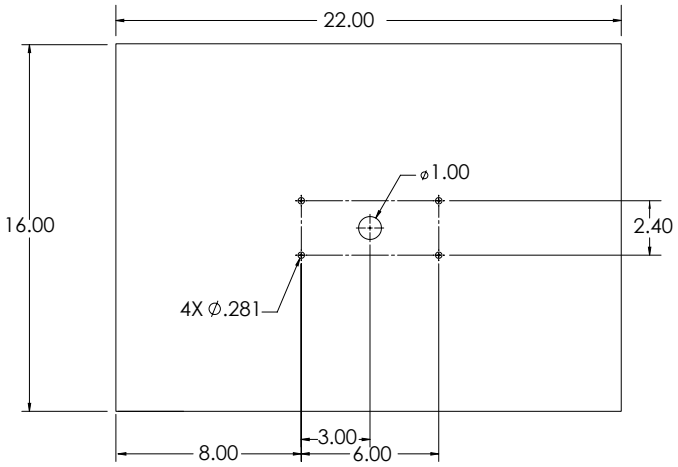




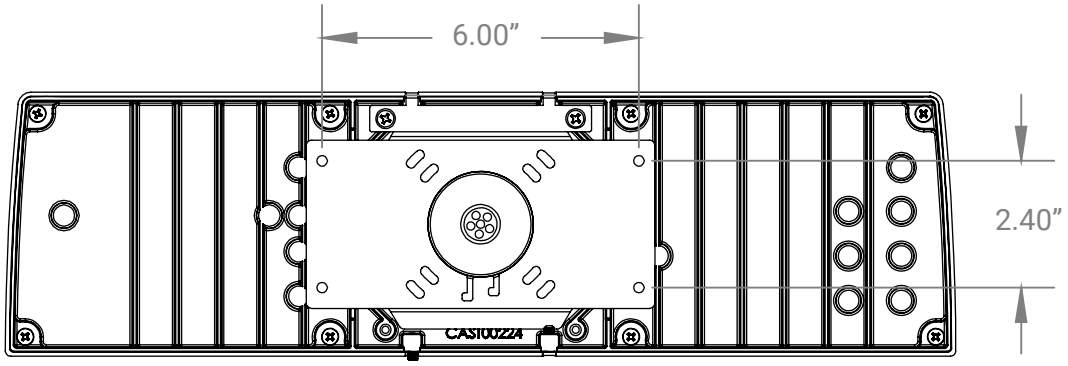


Weight: 16 lbs

VANITY PLATE (VP)



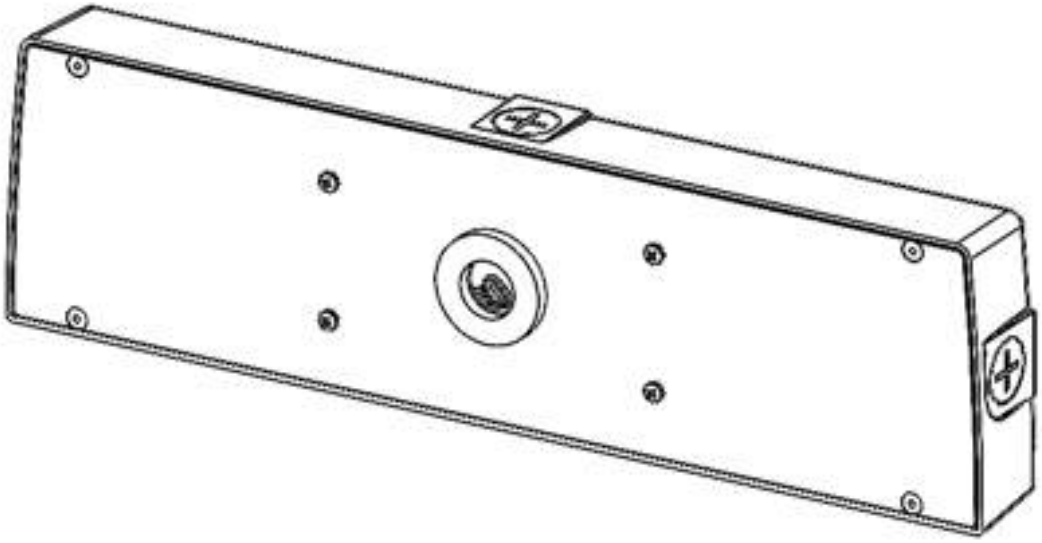
MOUNTING HOLE



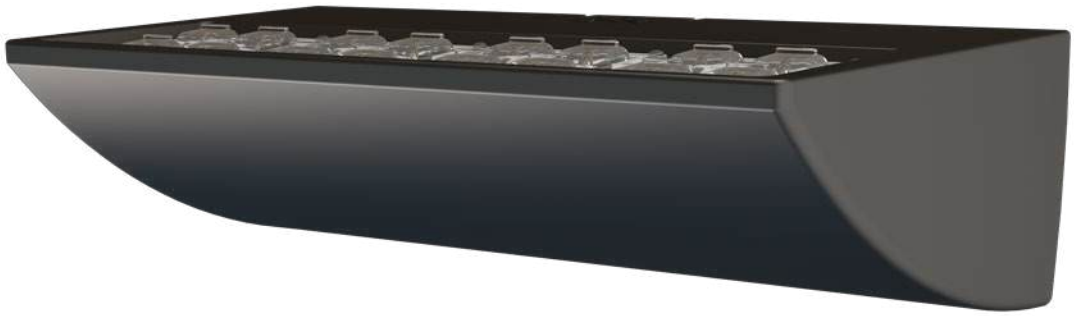
** 3 Conduit access points on either side or center back.*

** Option to mount the bracket slots onto the J-box tabs*

CONDUIT BOX
3/4" NPT

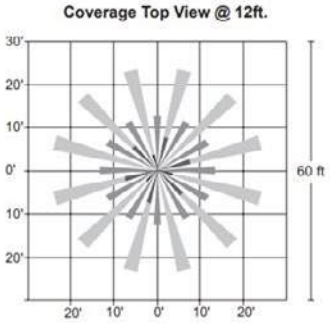


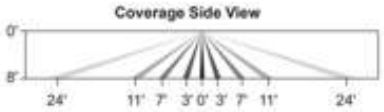
UP LIGHT



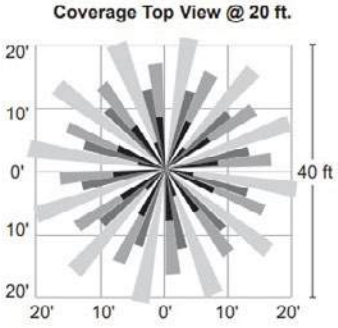
MOTION SENSOR PLACEMENT

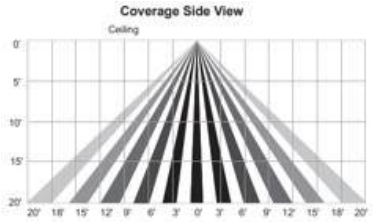
FSP-8



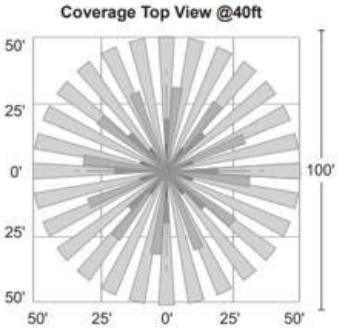


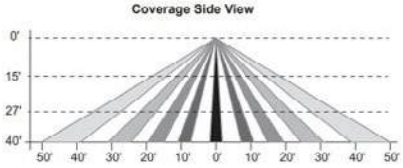
FSP-20





FSP-40

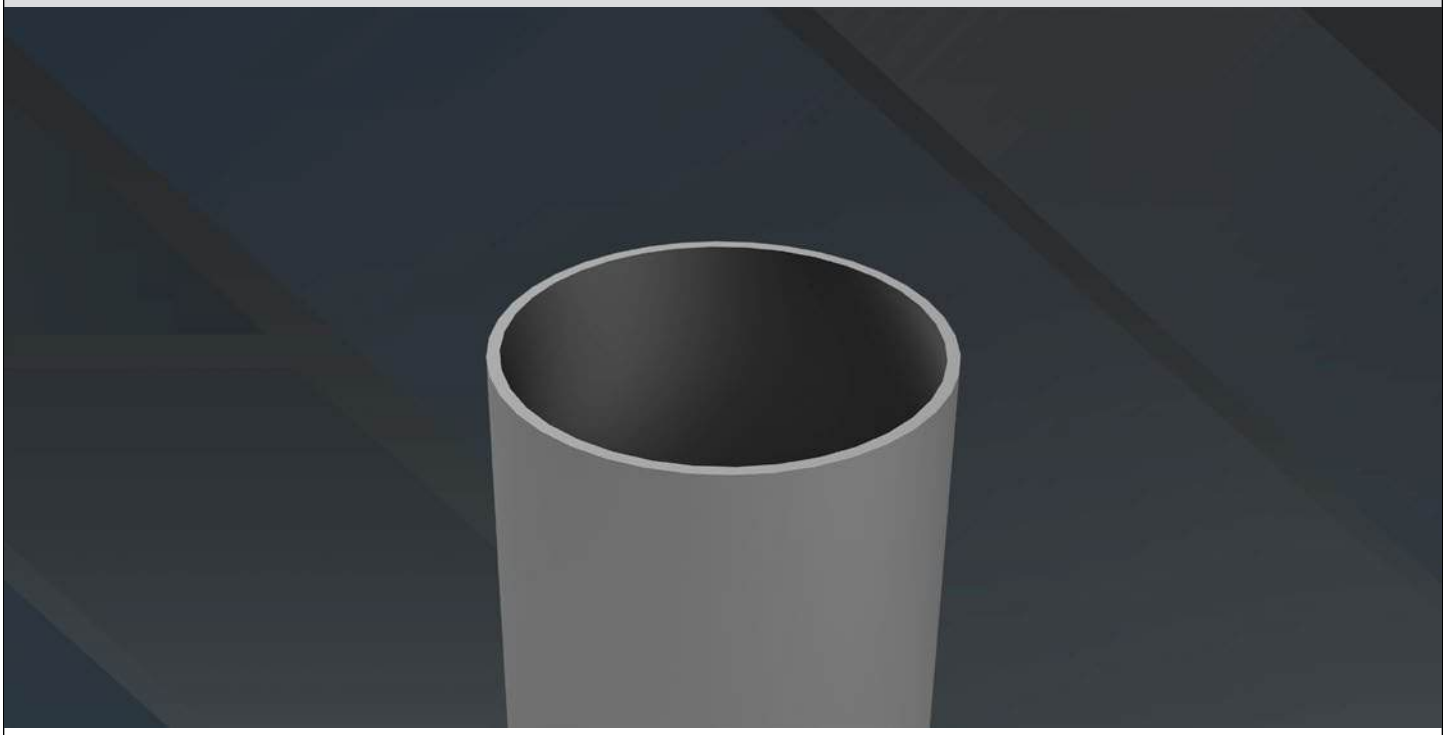




NLS LIGHTING

RSSP

ROUND STRAIGHT STEEL POLE



HEIGHT
10’ - 30’

POLE SHAFT
The pole shaft material is a weldable grade hot rolled commercial quality steel tubing with a minimum yield of 46,000 psi. Conforms to ASTM A500 Grade B Standards. Poles have ground lug welded inside hand-hole opposite side of the hand-hole. Pole shaft is welded to base plate on top and bottom of base plate.

BASE PLATE
The Base Plate is manufactured from structural hot rolled steel that meets or exceeds a minimum yield strength of 36,000 psi, conforms the ASTM–A36 standards. Base Plate vary in size from 1” thick for poles 21 feet and over, 3/4” thick for poles 10 to 20 feet.

ANCHOR BOLTS
All anchor bolts are hot dipped galvanized steel and come with two galvanized nuts and washers per bolt. Minimum yield strength 50,000 psi. Anchor bolts are not included for Custom Bolt Circle.

BASE COVER
All base covers are fabricated two-piece 6063 aluminum and powder coated to match the pole. Square base cover comes standard, Round base cover optional.

HAND-HOLE
A reinforced hand-hole is 12” on center from the base plate and is constructed of 3“x 5” rectangular steel tubing which is welded to pole shaft for added strength. The hand-hole covers are provided with internal bridge support and powder coated to match pole finish.

POLE CAP
All poles come with a removable polymer pole cap installed. All pole caps are black finish. Aluminum Pole Cap option is painted to match pole.

FINISH
All poles are treated with shot blast media for a near white finish, power blasted with 100 psi prior to powder coat application. Electrostatically applied AAMA 2604 polyester powder coat with a 3 to 5 mil thickness for maximum adherence.

MARINE GRADE FINISH
All poles are washed through a 5-stage cleaning system with a deionized rinse, a 3 to 5 mils zinc rich durable polyester primer powder coat, followed by a 3 to 5 mils super durable AAMA 2604 polyester powder coat finish.
Recommended for applications near the coastline or in demanding environments.

GALVANIZED FINISH
All poles are Hot Dipped Galvanized in a multi stage process. Galvanizing Specification, Zinc (Hot Dipped Galvanized) per ASTM A 123/A 123M – 02

Zinc coatings on threaded materials shall conform to specification A 153 /A 153M. The coating shall be continuous and reasonably smooth and uniform in thickness and in weight.

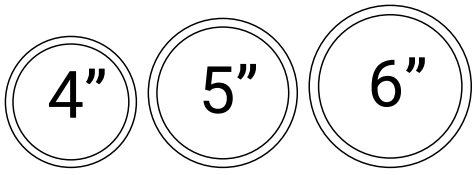
Galvanizing Adherence - The Zinc coating shall withstand handling consistent with the nature and thickness of the coating and normal use of the article without peeling or flaking.

Provides the most protection against the elements in coastal and harsh environments.

GALVANIZED UNDER POWDER
Galvanized Under Powder (GUP) adheres to above galvanized specification, and the second stage is a light sand blast on the outside of the pole, third stage is a 3-5 mils AAMA 2604 polyester powder coat finish for maximum adherence.

VIBRATION DAMPENER
The Vibration Dampener is factory installed and consists of a rugged galvanized chain coated with heavy duty polyester tubing that is factory secured at the bottom 2-3rds of the pole and can optionally be secured in the field by a contractor at the base during installation.

BUY AMERICAN
To ensure the latest BAA/TAA/BABA Standards are being met, please select BAA, TAA, or BABA in the options section. Please contact the factory before placing an order for any NLS products requesting BAA (Buy American Act), TAA (Trade American Act), or BABA (Build America, Buy America).



Project Name:	Type:

RSSP ORDERING GUIDE

Cat#

Round
Straight
Steel Pole
(RSSP)

Height

10′ **(10)**
12′ **(12)**
14′ **(14)**
16′ **(16)**
18′ **(18)**
20′ **(20)**
22′ **(22)**
24′ **(24)**
25′ **(25)**
26′ **(26)**
28′ **(28)**
30′ **(30)**

Pole Dimension

4″ Round
(4R)

5″ Round
(5R)

6″ Round
(6R)

Gauge

.120
Wall Thickness
(11G)

.180
Wall Thickness
(7G)

Base Pattern

(10′-20′)
9″- 10 3/8″
Bolt Circle
(9BC)

(22′-30′)
11 1/2″- 14″
Bolt Circle
(12BC)

Custom
Bolt Circle
(CBC)
** Consult Factory*

Mounting

Single
(SGL)

Double
(D-90)
(D-180)

Triple
(T-90)
(T-120)

Quad
(QD)

No Drill
(ND)
**Tenon Option*

Tenon

2 3/8″ Round **(T2R)**

3″ Round **(T3R)**

3 1/2″ Round **(T312R)**

4″ Round **(T4R)**

4 1/2″ Round **(T412R)**

Color

Bronze Textured
(BRZ)

White Textured
(WHT)

Smooth White Gloss
(SWT)

Silver
(SVR)

Green Textured
(GRN)

Hunter Green Textured
(HGN)

Black Textured
(BLK)

Smooth Black
Gloss
(SBK)

Graphite Textured
(GPH)

Grey Textured
(GRY)

Custom
(CS)

Bolts

3/4″ x 30″
(3430)

1″ x 36″
(136)

Less Anchor
Bolts
(LAB)

Options

GFI Kit
(GFI20A)❸❹
20 Amp
Weather Proof Receptacle

GFI
Provision Only
(PROV)❹

Galvanized
(GLV)

Round Base Cover
(RBC)
**Consult Factory for Pricing*

Galvanized
Under Powder
(GUP)

1/2″ Coupling
(COUP)❹
**Specify Location*

Vibration Dampener
(VD)

Extra Hand Hole
(XHH)❹
** Specify Location*

Marine Grade Finish
(MGF)

UL Certified with label
(UL)❶

Aluminum Pole Cap
(APC)❷

Buy American Act
(BAA)❷

Trade Agreement Act
(TAA)❷

Build America Buy American
(BABA)❷

Notes:
❶ Aluminum Pole Cap must be selected for UL Certified Pole Option
❷ Consult Factory
❸ Standard weatherproof cover comes standard with option.
For lockable cover requests, please contact factory
❹ Specify the Height from base and degree orientation from hand hole.

NLS LIGHTING
701 Kingshill Place, Carson, CA 90746
Call Us Today (310) 341-2037
nlslighting.com

PRODUCT SPECIFICATIONS

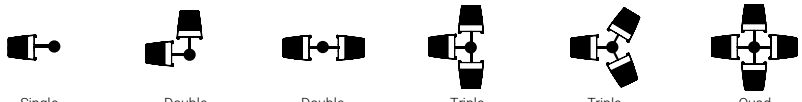
Max. allowable EPA - RSSP poles (per AASHTO LRFDLTS-1)																																
Catalog Number	Shaft Length, ft	Wall thick-ness, in.	Shaft dia., in.	Base Plate, in.	Bolt Circle, in.	Bolts	80 mph	Max. wt. (lb)	90 mph	Max. wt. (lb)	100 mph	Max. wt. (l b)	110 mph	Max. wt. (lb)	115 mph	Max. wt., lb	120 mph	Max. wt., lb	130 mph	Max. wt., lb	140 mph	Max. wt., lb	150 mph	Max. wt., lb	160 mph	Max. wt., lb	170 mph	Max. wt., lb	180 mph	Max. wt., lb
RSSP-10-4R-11G-9BC-3430	10	0.120	4	9" sq.	9	3/4"x30"	20.0	500	20.0	500	20.0	500	20.0	500	18.3	458	16.6	416	13.9	347	11.7	292	10.0	250	8.7	217	7.6	190	6.8	169
RSSP-12-4R-11G-9BC-3430	12	0.120	4	9" sq.	9	3/4"x30"	20.0	500	20.0	500	20.0	500	16.1	402	14.5	363	13.1	329	10.8	270	9.0	225	7.6	190	6.6	165	5.7	143	5.0	126
RSSP-14-4R-11G-9BC-3430	14	0.120	4	9" sq.	9	3/4"x30"	20.0	500	20.0	500	16.4	409	13.0	326	11.7	292	10.5	262	8.5	213	7.0	174	5.8	145	4.9	124	4.3	108	3.7	93
RSSP-16-4R-11G-9BC-3430	16	0.120	4	9" sq.	9	3/4"x30"	20.0	500	16.3	408	12.6	316	9.9	247	8.8	220	7.8	196	6.2	156	4.9	124	4.0	100	3.4	85	2.9	73	2.5	63
RSSP-18-4R-11G-9BC-3430	18	0.120	4	9" sq.	9	3/4"x30"	18.3	458	13.7	344	10.4	261	8.0	201	7.1	177	6.2	154	4.8	119	3.6	91	2.8	70	2.3	60	2.0	60	1.6	60
RSSP-20-4R-11G-9BC-3430	20	0.120	4	9" sq.	9	3/4"x30"	15.7	393	11.6	289	8.6	216	6.5	162	5.5	139	4.8	120	3.5	88	2.5	62	1.8	60	1.4	60	1.1	60	0.9	60
RSSP-20-4R-7G-9BC-3430	20	0.188	4	9" sq.	9	3/4"x30"	20.0	500	19.6	489	15.1	378	11.8	294	10.5	262	9.3	232	7.3	183	5.7	144	4.6	116	3.9	98	3.3	84	2.9	72
RSSP-20-5R-11G-9BC-3430	20	0.120	5	9" sq.	9	3/4"x30"	20.0	500	19.7	491	14.9	374	11.5	288	10.1	253	9.0	226	7.4	186	6.2	156	5.2	131	4.5	112	3.8	96	3.3	83
RSSP-20-5R-7G-9BC-3430	20	0.188	5	9" sq.	9	3/4"x30"	20.0	500	20.0	500	20.0	500	16.2	406	14.4	361	13.0	325	10.8	271	9.1	228	7.8	195	6.7	167	5.8	146	5.1	127
RSSP-22-4R-11G-12BC-136	22	0.120	4	12" sq.	12	1"x36"	12.3	308	8.9	222	6.4	161	4.6	115	3.9	97	3.2	80	2.1	60	1.3	60	0.7	60	0.5	60	0.3	60	0.1	60
RSSP-22-4R-7G-12BC-136	22	0.188	4	12" sq.	12	1"x36"	20.0	500	15.6	389	11.8	295	9.0	226	8.0	199	7.0	174	5.3	133	4.0	100	3.1	77	2.6	64	2.2	60	1.8	60
RSSP-22-5R-11G-12BC-136	22	0.120	5	12" sq.	12	1"x36"	20.0	500	15.4	385	11.5	287	8.6	215	7.5	187	6.6	164	5.4	134	4.4	110	3.7	92	3.1	77	2.6	65	2.2	60
RSSP-22-5R-7G-12BC-136	22	0.188	5	12" sq.	12	1"x36"	20.0	500	20.0	500	20.0	500	15.8	396	14.1	351	12.7	316	10.5	263	8.9	221	7.5	188	6.5	162	5.6	140	4.9	122
RSSP-25-4R-11G-12BC-136	25	0.120	4	12" sq.	12	1"x36"	9.7	242	6.7	167	4.5	112	2.9	72	2.3	60	1.7	60	0.7	60	0.0	-	0.0	-	0.0	-	0.0	-	0.0	-
RSSP-25-4R-7G-12BC-136	25	0.188	4	12" sq.	12	1"x36"	17.1	428	12.5	313	9.3	231	6.8	170	5.8	145	5.0	124	3.5	88	2.4	60	1.6	60	1.2	60	0.9	60	0.7	60
RSSP-25-5R-11G-12BC-136	25	0.120	5	12" sq.	12	1"x36"	16.9	423	12.1	302	8.7	217	6.2	154	5.1	128	4.4	110	3.5	87	2.7	68	2.2	60	1.7	60	1.4	60	1.1	60
RSSP-25-5R-7G-12BC-136	25	0.188	5	12" sq.	12	1"x36"	20.0	500	20.0	500	16.4	409	12.5	312	10.9	272	9.7	243	8.0	200	6.7	167	5.6	140	4.8	119	4.0	101	3.5	87
RSSP-26-4R-11G-12BC-136	26	0.120	4	12" sq.	12	1"x36"	8.9	222	6.0	150	3.9	98	2.4	60	1.7	60	1.2	60	0.3	60	0.0	-	0.0	-	0.0	-	0.0	-	0.0	-
RSSP-26-4R-7G-12BC-136	26	0.188	4	12" sq.	12	1"x36"	16.1	401	11.6	290	8.5	212	6.2	154	5.2	130	4.4	109	3.0	74	1.9	60	1.2	60	0.8	60	0.6	60	0.3	60
RSSP-26-5R-11G-12BC-136	26	0.120	5	12" sq.	12	1"x36"	13.3	333	11.1	278	7.9	196	5.4	135	4.4	111	3.7	93	2.9	72	2.3	60	1.8	60	1.4	60	1.1	60	0.8	60
RSSP-26-5R-7G-12BC-136	26	0.188	5	12" sq.	12	1"x36"	12.1	302	16.1	403	13.9	347	11.5	287	10.0	249	8.9	222	7.3	182	6.0	150	5.0	125	4.2	106	3.6	89	3.1	77
RSSP-28-4R-7G-12BC-136	28	0.188	4	12" sq.	12	1"x36"	14.1	353	10.0	250	7.1	177	4.9	122	4.0	100	3.3	82	2.0	60	1.0	60	0.3	60	0.1	60	0.0	-	0.0	-
RSSP-28-5R-11G-12BC-136	28	0.120	5	12" sq.	12	1"x36"	13.6	341	9.4	234	6.3	158	4.0	101	3.1	78	2.5	63	1.8	60	1.3	60	0.9	60	0.6	60	0.4	60	0.2	60
RSSP-28-5R-7G-12BC-136	28	0.188	5	12" sq.	12	1"x36"	20.0	500	17.8	445	13.1	329	9.7	242	8.3	207	7.2	181	5.9	147	4.8	120	3.9	98	3.2	81	2.7	68	2.3	60
RSSP-28-6R-7G-12BC-136	28	0.188	6	12" sq.	12	1"x36"	20.0	500	20.0	500	20.0	500	17.0	425	15.4	385	14.0	349	11.6	290	9.7	243	8.2	206	7.1	177	6.1	152	5.3	132
RSSP-30-5R-11G-12BC-136	30	0.120	5	12" sq.	12	1"x36"	11.7	293	7.8	194	4.9	122	2.8	69	1.9	60	1.4	60	0.8	60	0.4	60	0.1	60	0.0	-	0.0	-	0.0	-
RSSP-30-6R-11G-12BC-136	30	0.120	6	12" sq.	12	1"x36"	18.6	466	12.9	321	9.0	225	7.0	175	6.2	154	5.5	136	4.3	108	3.5	87	2.8	69	2.2	60	1.8	60	1.4	60
RSSP-30-5R-7G-12BC-136	30	0.188	5	12" sq.	12	1"x36"	20.0	500	15.6	391	11.3	282	8.1	201	6.8	169	5.8	146	4.6	115	3.7	92	3.0	74	2.4	60	1.9	60	1.5	60
RSSP-30-6R-7G-12BC-136	30	0.188	6	12" sq.	12	1"x36"	20.0	500	20.0	500	18.6	465	14.9	371	13.4	334	12.1	303	10.0	250	8.3	208	7.0	176	6.0	149	5.1	127	4.4	110
*Pole Assemblies With EPA>9.0 Require Specific Review																														

CAUTION: Installation of poles without luminaire(s) will compromise pole strength. Any accessories attached to the pole, or other modifications done in the field, will compromise the pole strength and may result in pole failure. Wind load evaluations and provisions for appendages such as banner arms, signage, cameras, etc., must be evaluated and approved by the factory prior to placing an order. Additional evaluation and approval should be performed by the customer's local structural engineer on the project.

Anchor Bolts are NOT included with Custom Bolt Circle.
Do NOT pour concrete referencing this drawing. Consult Factory.

All wind loading calculations are based on sustained wind force plus an additional 1.3 gust.

MOUNTING CONFIGURATION



Single **(SGL)** | Double **(D-90)** | Double **(D-180)** | Triple **(T-90)** | Triple **(T-120)** | Quad **(QD)**

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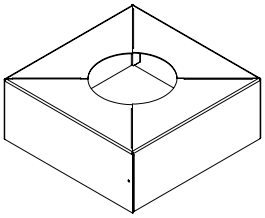
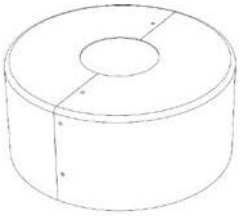
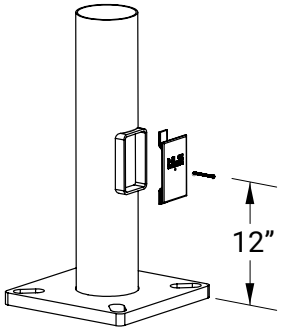
PRODUCT SPECIFICATIONS



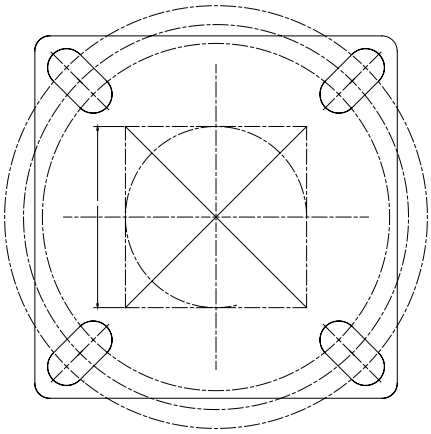
Base Cover



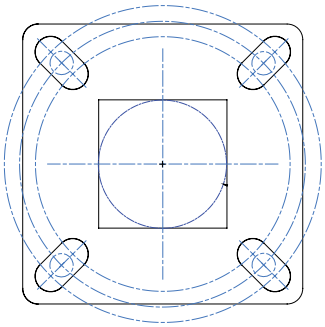
Optional Round Base Cover



Base Detail



12” Base Detail



9” Base Detail

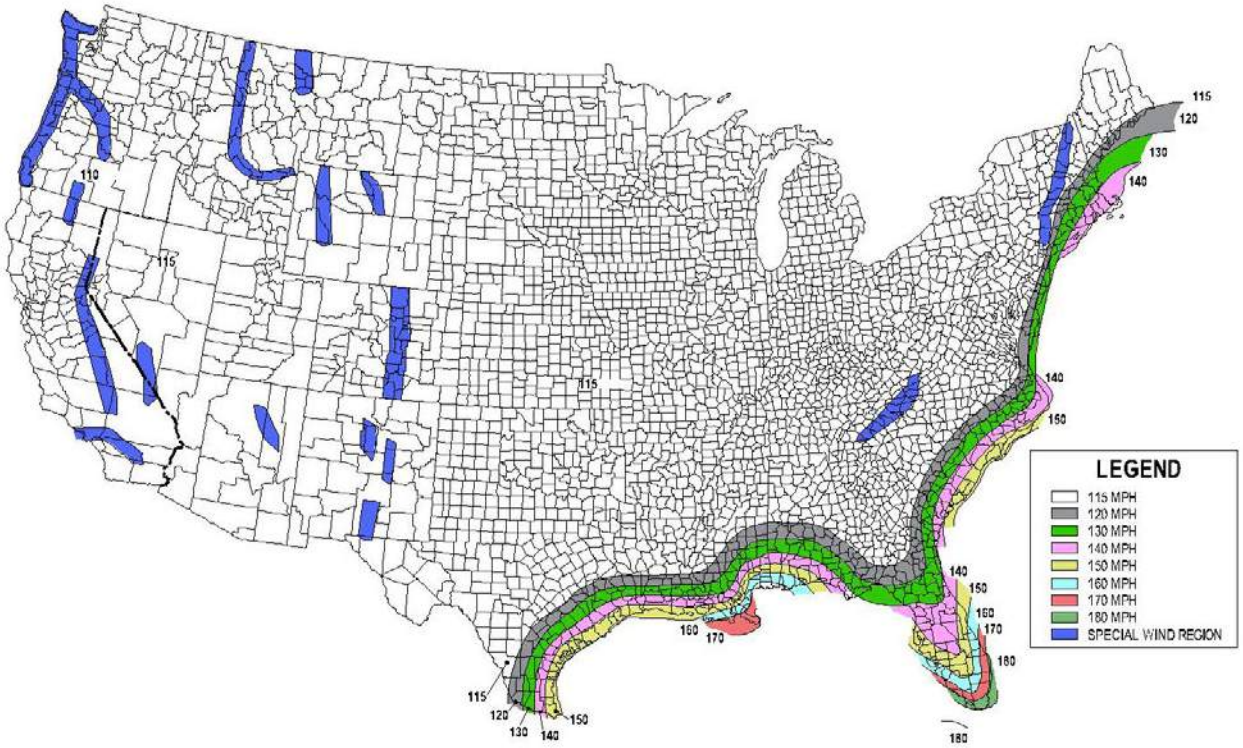


FIG. 3.8-1b - 700-Year MRI Basic Wind Speed, mph (AASHTO LRFDLTS-1)

1) All wind load calculations are based on sustained wind force plus and additional 1.3 gust
2) Wind Map is to be used as a reference only. Please coordinate with local agencies for further review.
3) Wind Map values are based on a 50 year mean recurrence. These values do not account for severe conditions, such as hurricanes, tornadoes, etc…
4) For review of poles with additional configurations (arms, banners, shorter/longer pole lengths, etc…), please contact factory.

BUY AMERICAN OPTION

While all of the NLS Lighting products listed in this document qualify for the Buy America(n) Act of 1933, we reserve the right to change our listings without notice.

The information provided above is for general informational purposes only. We encourage you to consult legal professionals for advice particular to your projects concerning BAA, TAA, BABA or Buy America.

Additional NLS Products that meet BAA, TAA standards can be found at the following link:

https://nlslighting.com/wp-content/uploads/cs/NLS_BuyAmerica(n).pdf

NLS LIGHTING

VSS-1

AREA, SITE & ROADWAY

LED WATTAGE CHART

	32L	48L	64L
700 milliamps	71w	104w	136w
1050 milliamps	106w	156w	205w

FORM AND FUNCTION

- Sleek, low profile housing
- Engineered for optimum thermal management
- Low depreciation rate
- Optical system designed for:
  - Parking Lots
  - Commercial Applications

CONSTRUCTION

- Die Formed heavy duty Aluminum
- Corrosion resistant external hardware
- One-piece silicone gasket ensures IP-65 seal for electronics compartment
- Two-piece silicone Micro Optic system ensures IP-67 level seal around each PCB

BUY AMERICAN

To ensure the latest BAA/TAA/BABA Standards are being met, please select BAA, TAA, or BABA in the options section. Please contact the factory before placing an order for any NLS products requesting BAA (Buy American Act), TAA (Trade American Act), or BABA (Build America, Buy America).

Project Name:	Type:

VSS-1 ORDERING GUIDE

Cat#

Value Series Round Small
(VSS-1)

Light Dist.

Type 2
(T2)

Type 3
(T3)

Type 4
(T4)

Type 5
(T5)

No. of LEDs

32
(32L)

48
(48L)

64
(64L)

Milliamps

700
(7)

1050
(1)

Kelvin

Amber 585-600nM
(AMBER) ❺❼

2700K, 70 CRI
(27K7) ❺

2700K, 80 CRI
(27K8) ❶❺

3000K, 70 CRI
(30K7) ❺

3000K, 80 CRI
(30K8) ❶❺

3500K, 80 CRI
(35K8)

4000K, 70 CRI
(40K7)

4000K, 80 CRI
(40K8) ❶

5000K, 70 CRI
(50K7)

5000K, 80 CRI
(50K8) ❶

Volts

120-277
(UNV)

347-480
(HV)

Mounting

Direct Pole 6" Arm Single, D180
(DP6) ❷

Direct Pole 10" Arm D90, T90, T120, Quad
(DP10) ❷

Knuckle Mount
(KM)

Wall Mount
(WM) ❸

Tennis Arm
(TA)

Color

Bronze Textured
(BRZ)

White Textured
(WHT)

Smooth White Gloss
(SWT)

Silver Metallic
(SVR)

Black Textured
(BLK)

Smooth Black Gloss
(SBK)

Graphite Textured
(GPH)

Grey Textured
(GRY)

Green Textured
(GRN)

Hunter Green Textured
(HGN)

Custom
(CS)

Control Options

Nema 7-Pin Receptacle
(PE7)

Photocell + Receptacle
(PCR)

Receptacle + Shorting Cap
(PER)

Button Photocell
(PC) ❹

FSP-211 with Motion Sensor (UNV Voltage)
(FSP-8) ❹
*8' and Below
(FSP-20) ❹
*9'-20" Heights
(FSP-40) ❹
*21'-40' Heights

Options

Bird Spikes
(BS)

Marine Grade Finish
(MGF)

Quick Mount Bracket
(QMB)

Retrofit Mount Bracket
(RQMB)

Round Pole Adapter 3"- 4" Pole
(RPA4)

Round Pole Adapter 5"- 6" Pole
(RPA5)

Rotated Optic Left
(ROL)

Rotated Optic Right
(ROR)

Automotive House Side Shield
(AHS)

House Side Shield
(HSS)

Buy American
(BAA) ❽

Trade American
(TAA) ❽

Build America Buy American
(BABA) ❽

Custom Controls Integration
(CCI) ❻

Notes:
❶ Consult Factory for Lead Time. Consult Factory for 90 CRI Requests
❷ For Round Pole Specify RPA4 or RPA5
❸ Includes 6" Bolt on Arm
❹ Universal Voltage 120-27
❺ 3000K or lower must be selected to meet International
❻ Please contact Factory for Custom Control Integration requests (nLight, NX, WaveLinx, Crestron, DMX/RDM, Synapse, Casambi, Dali II, Avi-On, or other control systems)
❼ Turtle Safe
❽ Consult factory for all BAA/TAA/BABA requests

PRODUCT SPECIFICATIONS

ELECTRICAL

- 120-277 Volts (UNV) or 347-480 Volts (HV)
- 0-10V dimming driver
- Driver power factor at maximum load is ≥ .95, THD maximum load is 15%
- LED Drivers Ambient Temp. Min is -40°C and Ambient Temp. Max ranges from 50°C to 55°C and, in some cases, even higher. Consult the factory for revalidation by providing the fixture catalog string before quoting and specifying it.
- All internal wiring UL certified for 600 VAC and 105°C
- All drivers, controls, and sensors housed in enclosed IP-65 compartment
- CRI 70, 80 or 90
- Color temperatures: Amber, 2700K, 3000K, 3500K, 4000K, 5000K
- Surge Protection: 20KA supplies as standard.

OPTIONS

- **BIRD SPIKES (BS)**—Offers effective and humane deterrent for larger bird species and provides cost-effective long-term solution to nuisance bird infestations and protect your property.
- **MARINE GRADE FINISH (MGF)**—A multi-step process creating protective finishing coat against harsh environments.
  - Chemically washed in a 5 stage cleaning system.
  - Pre-baked
  - Powder coated 3-5 mils of Zinc Rich Super Durable Polyester Primer.
  - 1-2 feet inside pole coverage top and bottom.
  - Oven Baked.
  - Finished Powder Coating of Super Durable Polyester Powder Coat 3-5 mil thickness.
- **SHIELDS (HSS, AHS)**—House Side Shield (HSS) is designed for full property line cut-off. Automotive House Side Shield (AHS) is a single-sided shield allowing partial cut-off on either side or front of luminaire.
- **ROUND POLE ADAPTER (RPA)–** When using round poles, specify Round Pole Adapter (RPA). Specify RPA4 when installing on 3"-4" round poles, and RPA5 when installing on 5"-6" round poles.

CONTROLS

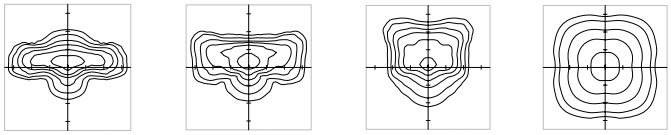
- **FSP-211 (FSP-X)**—Passive infrared (PIR) sensor providing multi-level control based on motion/daylight contribution.
  - All control parameters adjustable via wireless configuration remote storing and transmitting sensor profiles.
  - FSP-20 mounting heights 9-20 feet
  - FSP-40 mounting heights 21-40 feet.
  - Includes 5 dimming event cycles, 0-10V dimming with motion sensing, re-programmable in the field.
  - FSIR-100 commissioning remote is required to change sensor settings. Please contact factory for ordering.
- **NEMA 7-PIN RECEPTACLE (PE7)**—An ANSI C136.41-2013 receptacle provides electrical and mechanical interconnection between photo control cell and luminaire. Dimming receptacle available two or four dimming contacts supports 0-10 VDC dimming methods or Digital Addressable Lighting Interface (DALI), providing reliable power interconnect.

• Controls Agnostic: Please contact factory for your preferred controls option. (nLight, NX, WaveLinx, Crestron, DMX/RDM, Synapse, Casambi, DALI II, Avi-On, or other control systems)

OPTICS

Silicone optics high photothermal stability and light output provides higher powered LEDs with minimized lumen depreciation LED life. UV and thermal stability with scratch resistance increases exterior application durability.

- IES Types



TYPE II (T2) TYPE III (T3) TYPE IV (T4) TYPE V (T5)

FINISH

- 5 mils electrostatic powder coat.
- NLS' standard high-quality finishes prevent corrosion protects against extreme environmental conditions

WARRANTY

Five-year limited warranty for drivers and LEDs.

LISTINGS

- Certified to UL 1598
- CSA C22.2 No. 250.0
- IP65/ IP67 Rated
- Dark Sky Approved
- IK10 Rated

BUY AMERICAN OPTION

While all of the NLS Lighting products listed in this document qualify for the Buy America(n) Act of 1933, we reserve the right to change our listings without notice.

The information provided above is for general informational purposes only. We encourage you to consult legal professionals for advice particular to your projects concerning BAA, TAA, BABA or Buy America.

Additional NLS Products that meet BAA, TAA standards can be found at the following link:

https://nlslighting.com/buy-american/

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nlslighting.com

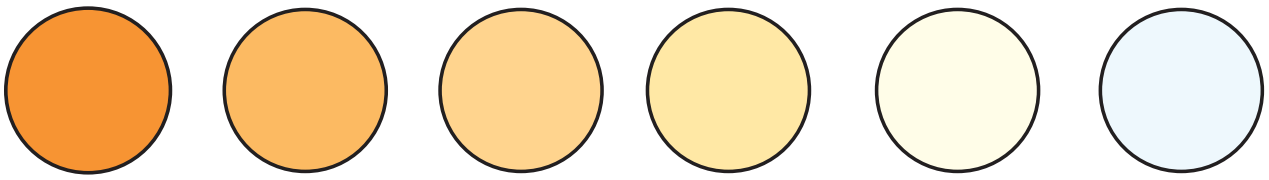
PRODUCT SPECIFICATIONS

LUMENS

PART NUMBER	T2	LM/W	BUG	T3 HSS	LM/W	BUG	T3	LM/W	BUG	T4 AHS	LM/W	T4 HSS	LM/W	BUG	T4	LM/W	BUG	T5	LM/W	BUG	Watts
VSS-1-32L-7-30K7	7384	104	B1-U0-G1	4118	58	B0-U0-G1	7242	102	B2-U0-G2	5112	72	4047	57	B0-U0-G1	7668	108	B2-U0-G2	8179	115	B3-U0-G2	71
VSS-1-32L-7-40K7	8023	113	B2-U0-G2	4402	62	B0-U0-G1	7952	112	B2-U0-G2	5396	76	4331	61	B0-U0-G1	8307	117	B2-U0-G2	8946	126	B3-U0-G2	71
VSS-1-32L-7-50K7	8662	122	B2-U0-G2	4686	66	B0-U0-G1	8520	120	B2-U0-G2	5680	80	4615	65	B0-U0-G2	8946	126	B2-U0-G2	9585	135	B3-U0-G2	71
VSS-1-32L-1-30K7	10706	101	B2-U0-G2	6148	58	B0-U0-G2	10600	100	B2-U0-G2	7632	72	6042	57	B0-U0-G2	10812	102	B2-U0-G2	11125	105	B4-U0-G2	106
VSS-1-32L-1-40K7	11660	110	B2-U0-G2	6572	62	B0-U0-G2	11554	109	B2-U0-G2	8056	76	6466	61	B0-U0-G2	11766	111	B2-U0-G2	12190	115	B4-U0-G2	106
VSS-1-32L-1-50K7	12508	118	B2-U0-G2	6996	66	B0-U0-G2	12402	117	B2-U0-G2	8480	80	6890	65	B0-U0-G2	12508	118	B2-U0-G2	13144	124	B4-U0-G2	106
VSS-1-48L-7-30K7	10816	104	B2-U0-G2	6032	58	B0-U0-G2	10712	103	B2-U0-G2	7488	72	5928	57	B0-U0-G2	11232	108	B2-U0-G2	12272	118	B4-U0-G2	104
VSS-1-48L-7-40K7	11752	113	B2-U0-G2	6448	62	B0-U0-G2	11648	112	B2-U0-G2	7904	76	6344	61	B0-U0-G2	12168	117	B2-U0-G2	13312	128	B4-U0-G2	104
VSS-1-48L-7-50K7	12688	122	B2-U0-G2	6864	66	B0-U0-G2	12480	120	B2-U0-G2	8320	80	6760	65	B0-U0-G2	13104	126	B3-U0-G3	14248	137	B4-U0-G2	104
VSS-1-48L-1-30K7	16559	106	B3-U0-G3	9048	58	B0-U0-G2	15756	101	B3-U0-G3	11232	72	8892	57	B1-U0-G2	15912	102	B3-U0-G3	16536	106	B4-U0-G2	156
VSS-1-48L-1-40K7	17160	110	B3-U0-G3	9672	62	B1-U0-G2	17004	109	B3-U0-G3	11856	76	9516	61	B1-U0-G2	17316	111	B3-U0-G3	17940	115	B4-U0-G2	156
VSS-1-48L-1-50K7	18408	118	B3-U0-G3	10296	66	B1-U0-G2	18252	117	B3-U0-G3	12480	80	10140	65	B1-U0-G2	18408	118	B3-U0-G3	19188	123	B4-U0-G2	156
VSS-1-64L-7-30K7	14144	104	B2-U0-G2	7888	58	B0-U0-G2	13736	101	B3-U0-G3	9792	72	7752	57	B0-U0-G2	14688	108	B3-U0-G3	16048	118	B4-U0-G2	136
VSS-1-64L-7-40K7	15368	113	B3-U0-G3	8432	62	B0-U0-G2	14824	109	B3-U0-G3	10336	76	8296	61	B1-U0-G2	15912	117	B3-U0-G3	17408	128	B4-U0-G2	136
VSS-1-64L-7-50K7	16592	122	B3-U0-G3	8976	66	B0-U0-G2	16048	118	B3-U0-G3	10880	80	8840	65	B1-U0-G2	17136	126	B3-U0-G3	18632	137	B4-U0-G2	136
VSS-1-64L-1-30K7	21730	106	B3-U0-G3	11890	58	B1-U0-G2	20705	101	B3-U0-G3	14760	72	11685	57	B1-U0-G2	20910	102	B3-U0-G3	21730	106	B5-U0-G3	205
VSS-1-64L-1-40K7	22550	110	B3-U0-G3	12710	62	B1-U0-G2	22345	109	B3-U0-G3	15580	76	12505	61	B1-U0-G3	22755	111	B3-U0-G3	23575	115	B5-U0-G3	205
VSS-1-64L-1-50K7	24190	118	B3-U0-G3	13530	66	B1-U0-G2	23780	116	B3-U0-G3	16400	80	13325	65	B1-U0-G3	24190	118	B3-U0-G4	25215	123	B5-U0-G3	205

Lumen Maintenance Data							
Ambient Temperature	Drive Current	L90 Hours*	L70 Hours**	30,000 Hours*	50,000 Hours*	60,00 Hours*	100,000 Hours**
25°C	Up to 700mA	58,000	173,000	95.7%	91.6%	89.6%	82.1%
	1050mA	38,000	96,000	93.0%	85.4%	81.8%	68.8%
*Reported extrapolations per IESNA TM-21 **Projected extrapolations per IESNA TM-21							

LED KELVIN RANGE



AMBER 585-600 nm | 2700K 70 CRI | 3000K 70 CRI | 3500K 80 CRI | 4000K 70 CRI | 5000K 70 CRI

Color	Dominant or Peak Wavelength Range (nm)	
	Minimum	Maximum
Amber	585	600

PRODUCT SPECIFICATIONS

DIMENSION	VSS-1
A	17 in. SQ
B	5 in.
Weight	20 lbs

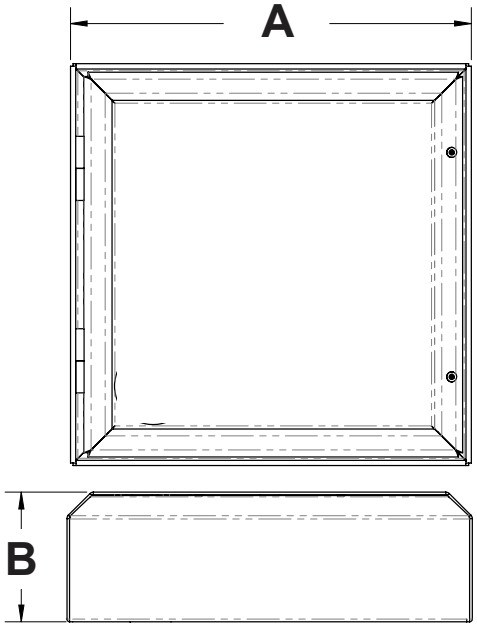
EPA

EPA	SGL	D90	D180	T90	T120	QD
VSS-1	0.68	1.37	1.37	2.05	1.38	2.74

DPX ARM LENGTH

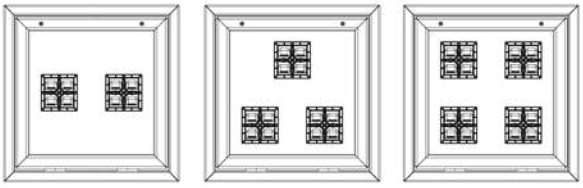
DPX ARM LENGTH	SGL	D90	D180	T90	T120	QD
VSS-1	6"	10"	6"	10"	10"	10"

*6" - **DPX6** | 10" - **DPX10***



OPTICAL CONFIGURATIONS

Rotatable Optics (ROR) Rotated Right, (ROL) Rotated Left options available. Optics field and factory rotatable.

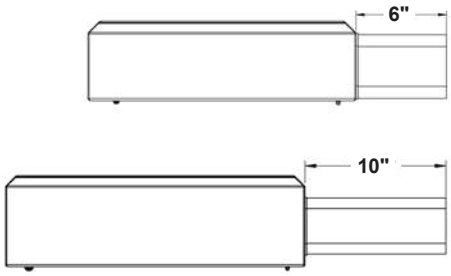


VSS-1 / 32L **VSS-1 / 48L** **VSS-1 / 64L**

PRODUCT SPECIFICATIONS

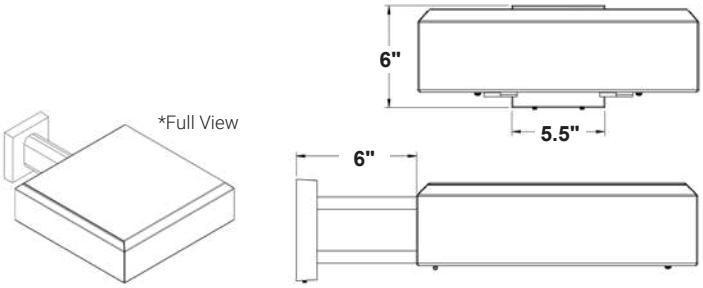
DIRECT POLE (DP)

Standard mounting arm is extruded aluminum in lengths of 6", And 10"
*Arm lengths may vary depending on configuration



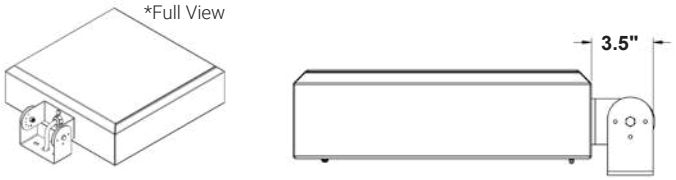
WALL MOUNT (WM)

Cast Aluminum Plate for direct wall mount.
6" extruded aluminum arm mounts directly to a cast wall mount box.



TRUNNION MOUNT (TM)

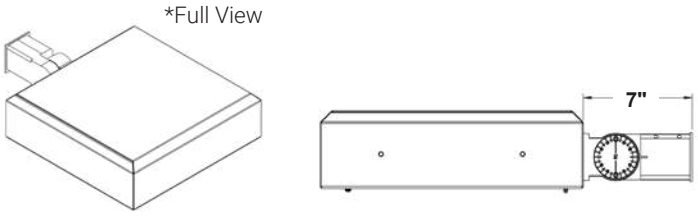
Steel bolt-on-mounting for adjustable installation with a maximum uplift of 90°.



KNUCKLE MOUNT (KM)

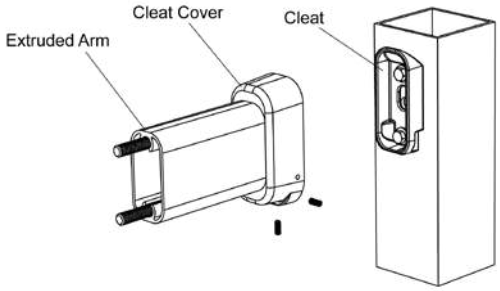
Die Cast Knuckle great for adjustable installation on 2-3/8" OD vertical or horizontal tenon.

- Max Uptilt of 110 degrees
- Adjustable in 5 degree increments

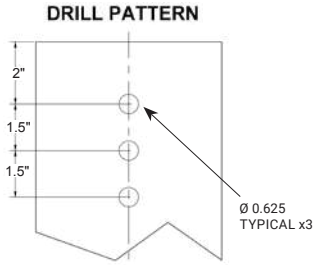


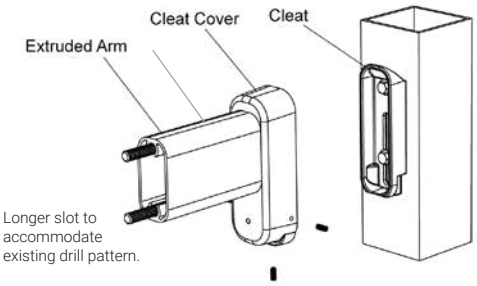
PRODUCT SPECIFICATIONS

Optional Cast Aluminum Bracket designed for quick mounting on Direct Square or Round Poles. Cleat mounts directly to pole for easily hung fixtures.

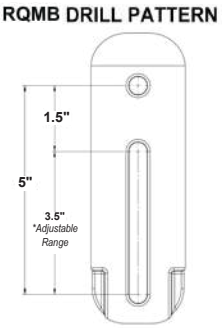


QUICK MOUNT BRACKET (QMB) DIRECT POLE (DP6/DP10)

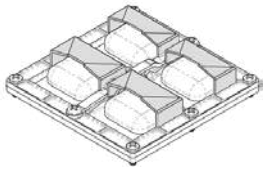




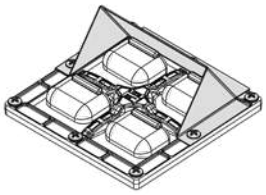
RETROFIT QUICK MOUNT BRACKET (RQMB)



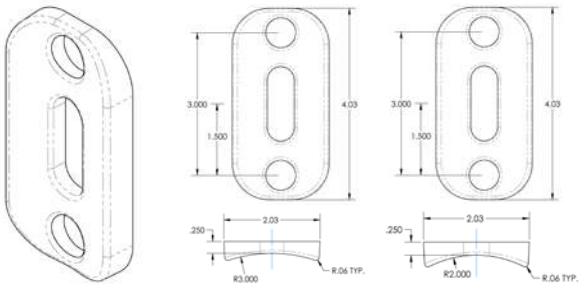
HOUSE SIDE SHIELD



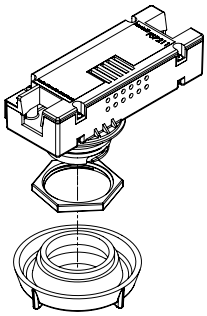
AUTOMOTIVE HOUSE SIDE SHIELD



RPA4 / RPA5



FSP-211



APPENDIX E

Conceptual Landscape Design Plan

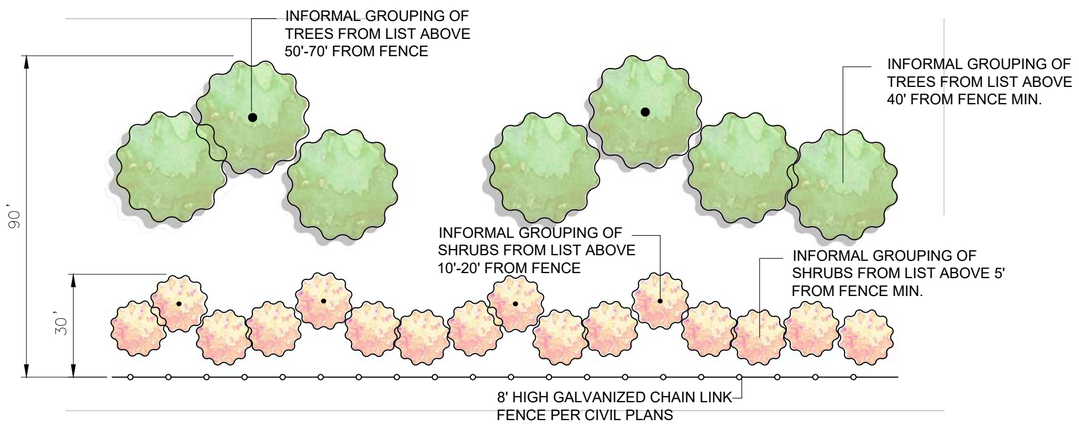
PLANTING LEGEND

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 F

Visual Simulations

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**

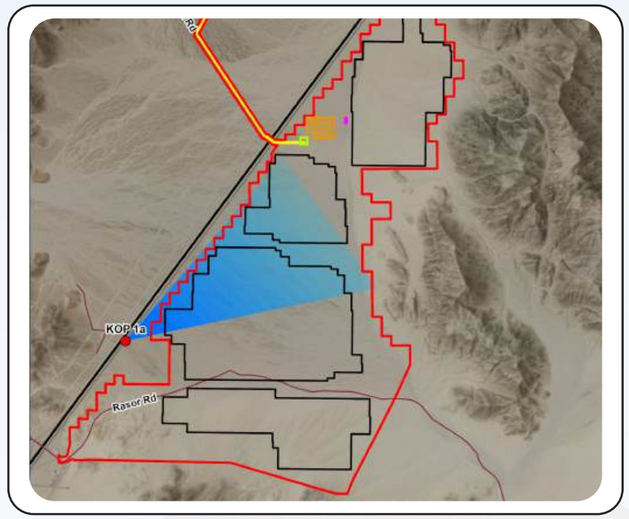
Wind: **10 mph**

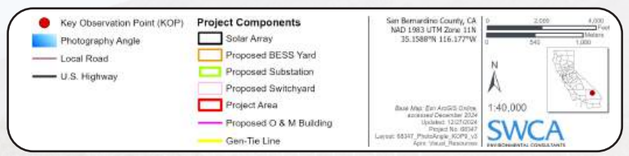
Cloud Cover: **0 %**

Temperature (°F): **55°F**

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

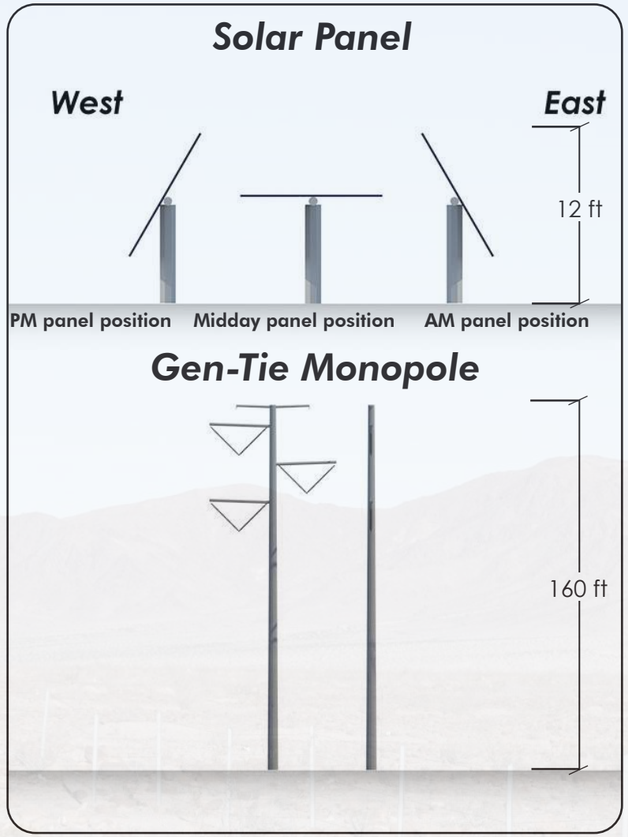
Simulation was prepared using information provided by client. Locations, colors, and heights may vary based on final engineering and design.



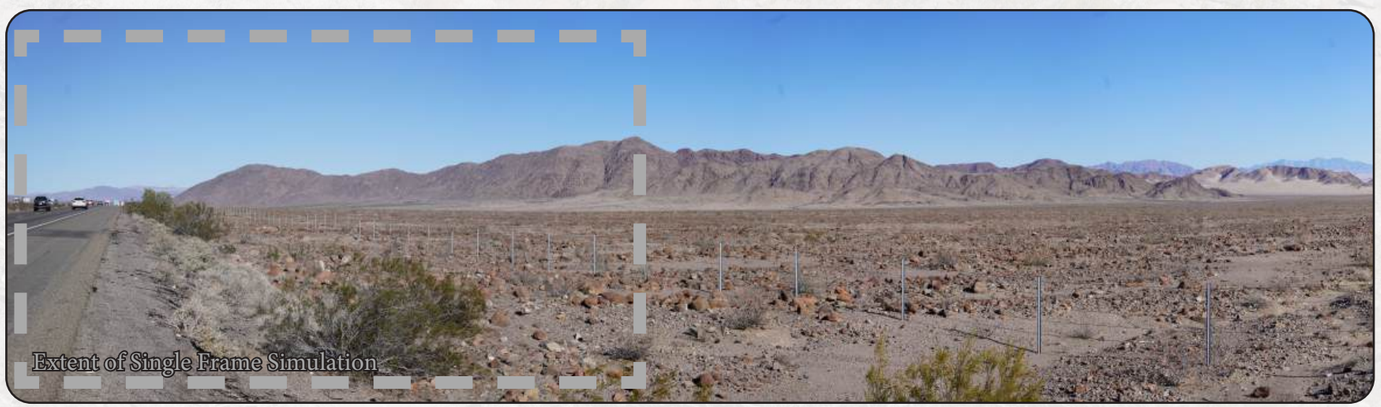


Approximate Distance to Nearest Solar Panel: **0.3 miles**

Project Location



Structure Diagram



KOP 1a - Interstate 15

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 1a: View from Interstate 15 looking northeast - Existing Condition

KOP 1a: View from Interstate 15 looking northeast - Simulation with Landscaping

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**

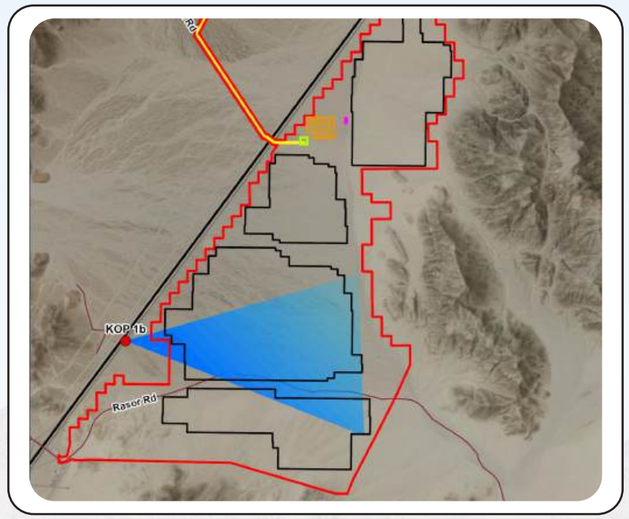
Wind: **10 mph**

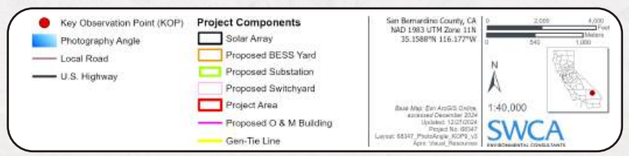
Cloud Cover: **0 %**

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.

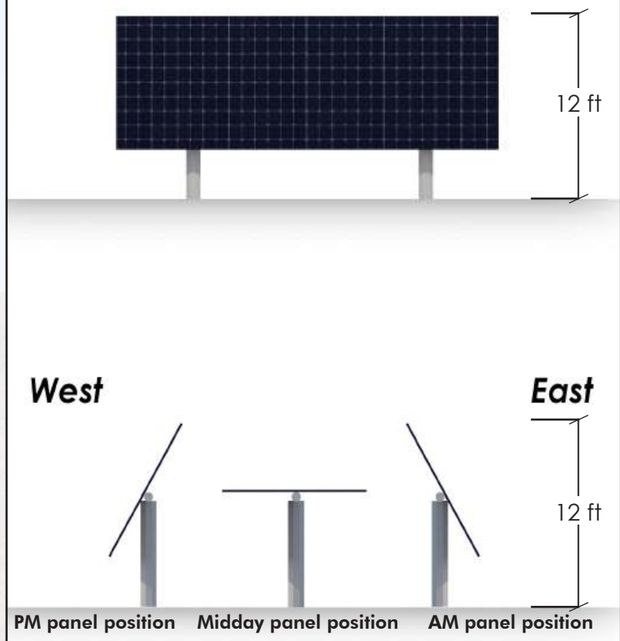




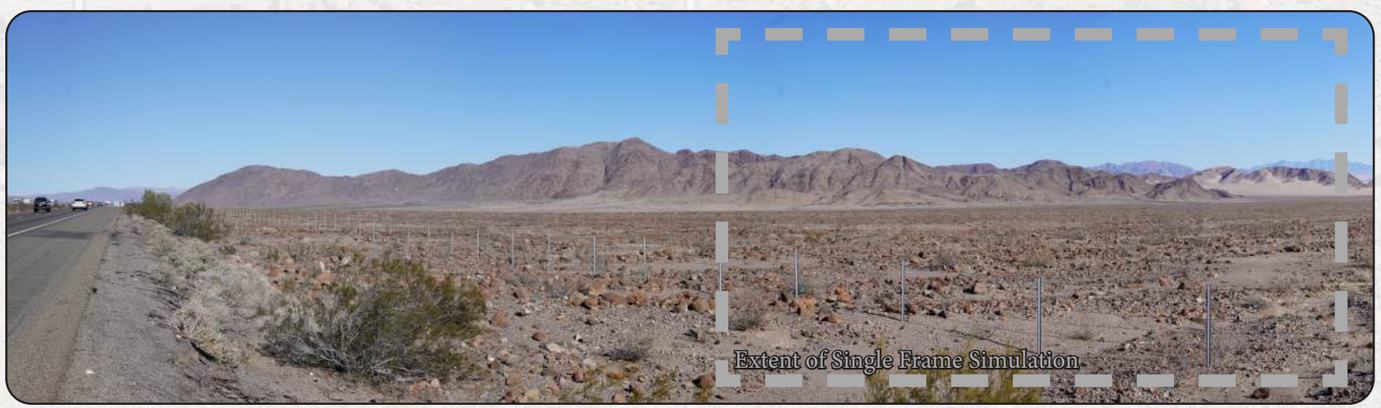
Approximate Distance to Nearest Solar Panel: **0.3 miles**

Project Location

Solar Panel



Structure Diagram



KOP 1b - Interstate 15

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 1b: View from Interstate 15 looking east - Existing Condition

KOP 1b: View from Interstate 15 looking east - Simulation with Landscaping

Soda Mountain Solar Project

Sun and Weather

Sunny

Date: **10-2-24**

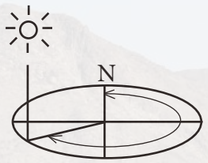
Photo Time: **6:32 pm**

Visibility:

Good — Poor

Air Quality: Good

Sun Azimuth:



267.04°

Sun Angle: **-2.74°**

Lighting Angle on Project: **Side Lit**

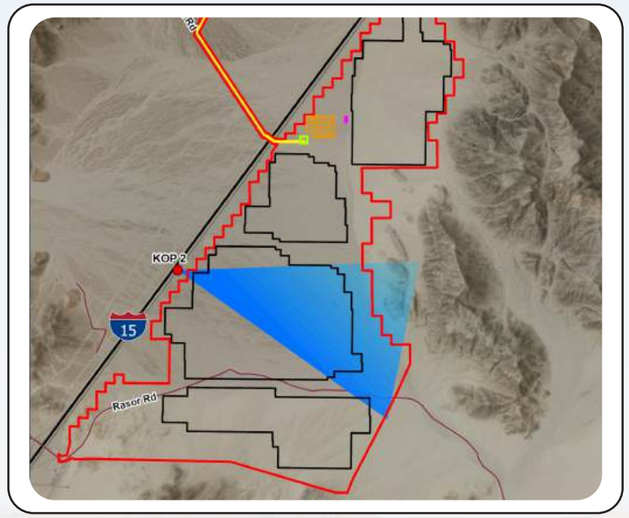
Wind: **8 mph**

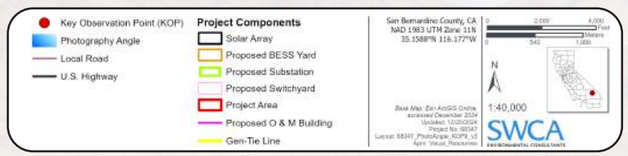
Cloud Cover: **0 %**

Temperature (°F): **91°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.

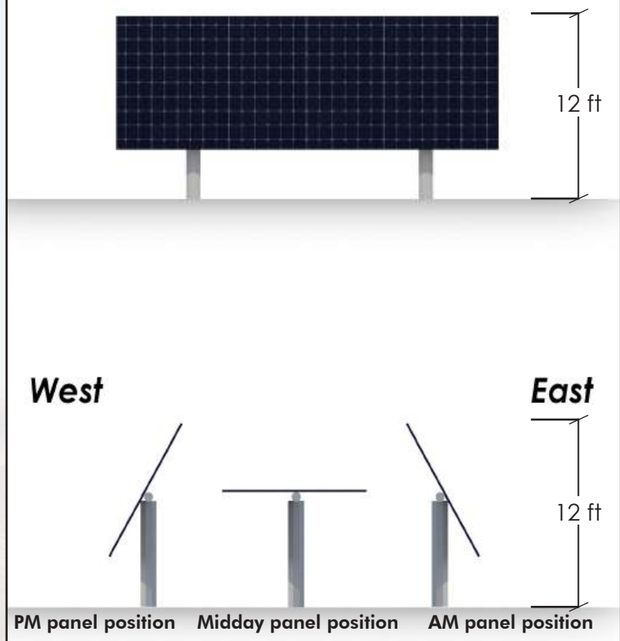




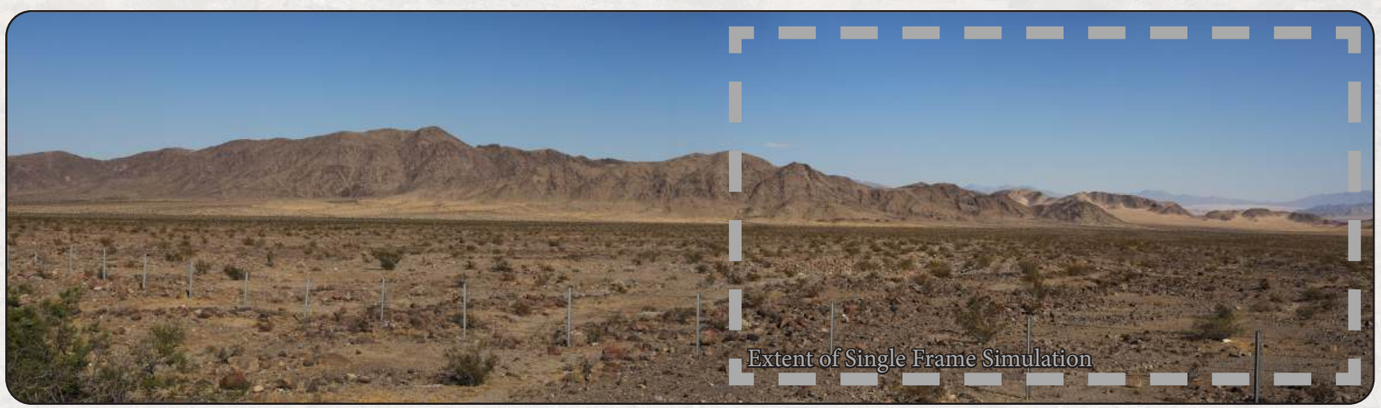
Approximate Distance to Nearest Solar Panel: **0.1 mile**

Project Location

Solar Panel



Structure Diagram



KOP 2 - Interstate 15

Base Photographic Documentation

Latitude, Longitude (º): **35.15208, -116.19432**

Viewpoint Elevation (feet): **1483**

Camera Height (meters): **1.5**

Camera Heading (degrees): **110**

Camera Make & Model: **Canon EOS 5D Mark IV**

Camera Sensor Size (mm): **36 x 24 Full Frame**

Crop Factor: **1**

Lens Make & Model: **AF-P Nikkor**

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

Image Size (pixels): **6720 x 4480**

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 2: View from Interstate 15 looking east - Existing Condition

KOP 2: View from Interstate 15 looking east - Simulation with Landscaping

Soda Mountain Solar Project

Sun and Weather

Sunny

Date: **10-2-24**

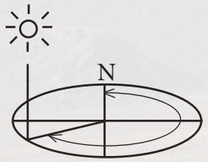
Photo Time: **6:11 pm**

Visibility:

Good — Poor

Air Quality: Good

Sun Azimuth: **263.95°**



Sun Angle: **1.48°**

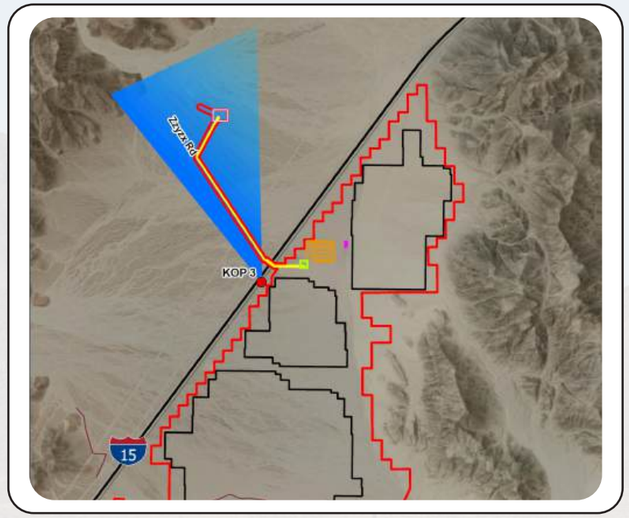
Lighting Angle on Project: **Side Lit**

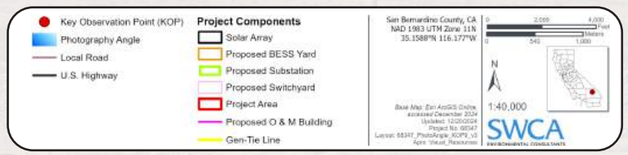
Wind: **9 mph**

Cloud Cover: **0 %**

Temperature (°F): **93°F**

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

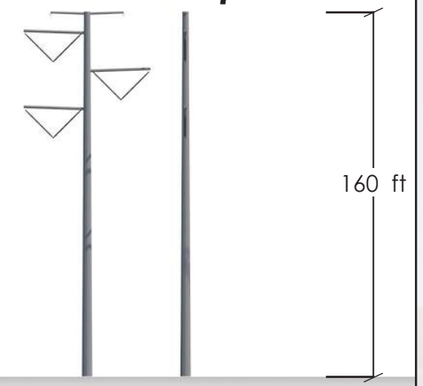




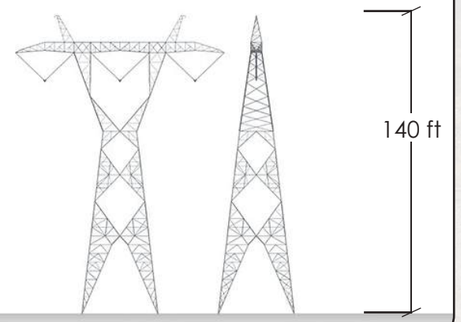
Approximate Distance to Nearest Transmission Pole: **0.17 mile**

Project Location

Gen-Tie Monopole



Switchyard Lattice Tower



Structure Diagram

KOP 3 - Interstate 15

Base Photographic Documentation

Latitude, Longitude (º): **35.16338, -116.18389**

Viewpoint Elevation (feet): **1406**

Camera Height (meters): **1.5**

Camera Heading (degrees): **340**

Camera Make & Model: **Canon EOS 5D Mark IV**

Camera Sensor Size (mm): **36 x 24 Full Frame**

Crop Factor: **1**

Lens Make & Model: **AF-P Nikkor**

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

Image Size (pixels): **6720 x 4480**

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 Interstate 15 looking northwest - Existing Condition

KOP 3: View from Interstate 15 looking northwest - Simulated Condition

Soda Mountain Solar Project

Sun and Weather

Sunny

Date: **10-2-24**

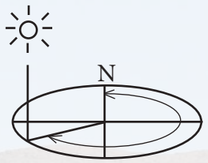
Photo Time: **5:46 pm**

Visibility:

Good — Poor

Air Quality: Good

Sun Azimuth:



260.21°

Sun Angle: **6.48°**

Lighting Angle on Project: **Side Lit**

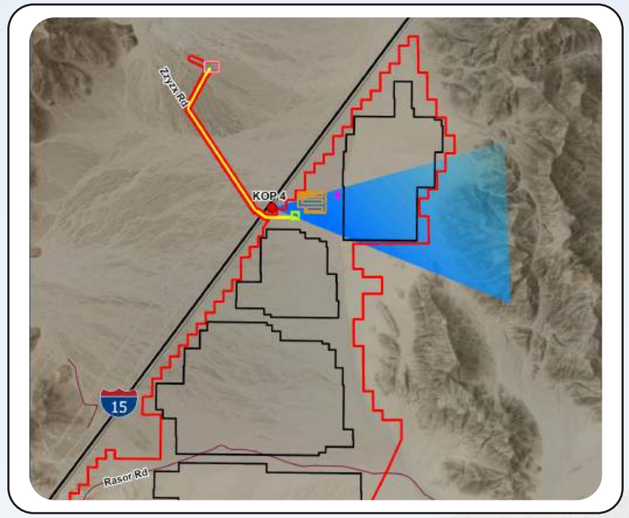
Wind: **9 mph**

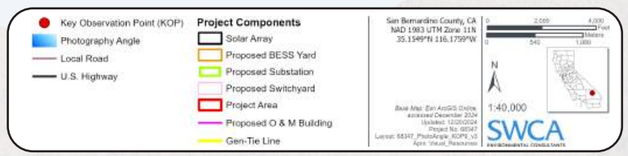
Cloud Cover: **0 %**

Temperature (°F): **93°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.

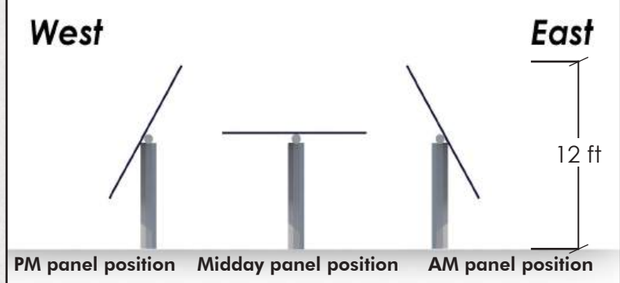




Approximate Distance to Nearest Solar Panel: **0.5 mile**

Project Location

Solar Panel



Structure Diagram

KOP 4 - Interstate 15

Base Photographic Documentation

Latitude, Longitude (º):
35.17787, -116.17097

Viewpoint Elevation (feet): **1340**

Camera Height (meters): **1.5**

Camera Heading (degrees): **140**

Camera Make & Model: **Canon EOS 5D Mark IV**

Camera Sensor Size (mm): **36 x 24 Full Frame**

Crop Factor: **1**

Lens Make & Model: **AF-P Nikkor**

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

Image Size (pixels): **6720 x 4480**

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 looking northeast - Existing Condition

KOP 4: View from Interstate 15 looking northeast - Simulation with Landscaping

Soda Mountain Solar Project

Sun and Weather

Sunny

Date: **10-2-24**

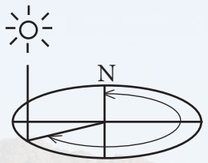
Photo Time: **7:43 pm**

Visibility:

Good — Poor

Air Quality: Good

Sun Azimuth:



287.86°

Sun Angle: **-29.05°**

Lighting Angle on Project: **Side Lit**

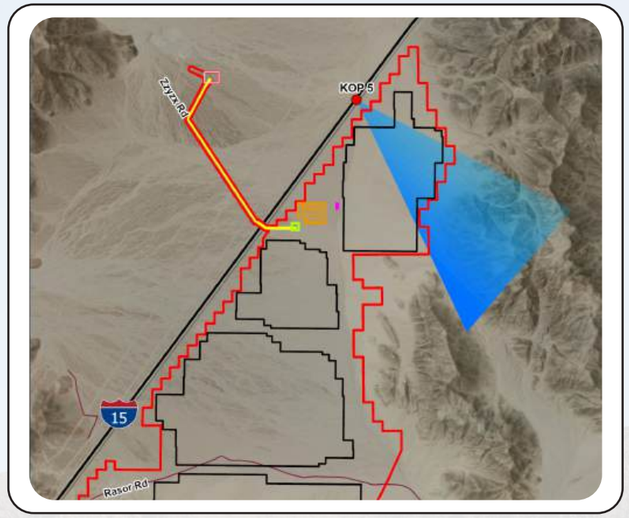
Wind: **5 mph**

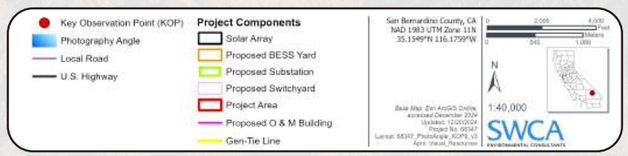
Cloud Cover: **0 %**

Temperature (°F): **90°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.

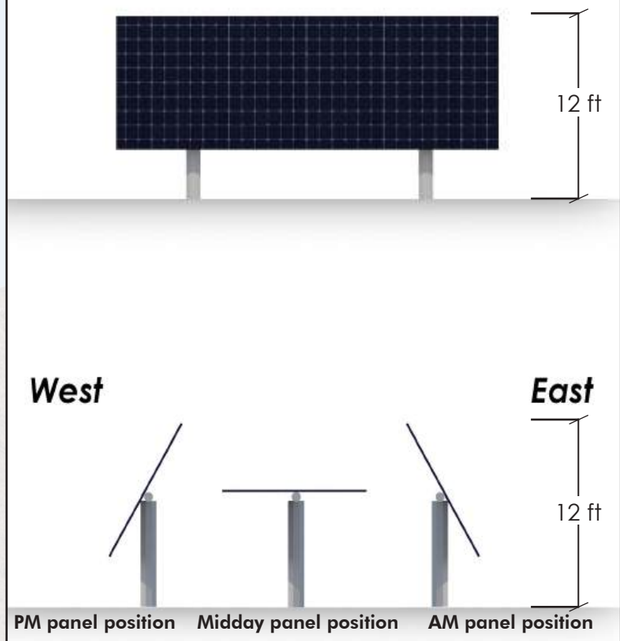




Approximate Distance to Nearest Solar Panel: **0.2 mile**

Project Location

Solar Panel



Structure Diagram

KOP 5 - Interstate 15

Base Photographic Documentation

Latitude, Longitude (º): **35.17787, -116.17097**

Viewpoint Elevation (feet): **1340**

Camera Height (meters): **1.5**

Camera Heading (degrees): **140**

Camera Make & Model: **Canon EOS 5D Mark IV**

Camera Sensor Size (mm): **36 x 24 Full Frame**

Crop Factor: **1**

Lens Make & Model: **AF-P Nikkor**

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

Image Size (pixels): **6720 x 4480**

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 5: View from Interstate 15 looking southeast - Existing Condition

KOP 5: View from Interstate 15 looking southeast - Simulation with Landscaping

Soda Mountain Solar Project

Sun and Weather

Sunny

Date: **1-24-23**

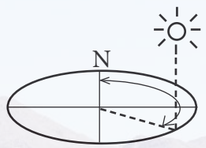
Photo Time: **11:50 am**

Visibility:

Good — Poor

Air Quality: Good

Sun Azimuth:



162.76°

Sun Angle: **32.69°**

Lighting Angle on Project: **Side Lit**

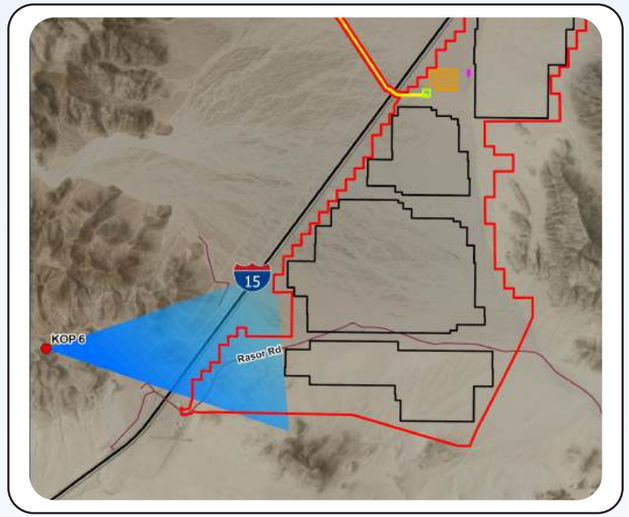
Wind: **15 mph**

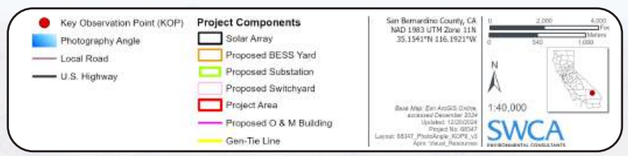
Cloud Cover: **0 %**

Temperature (°F): **50°F**

Solar panels are represented at full tilt (60 degrees) facing east to reflect AM conditions. West-facing panels would be observed during PM conditions.

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

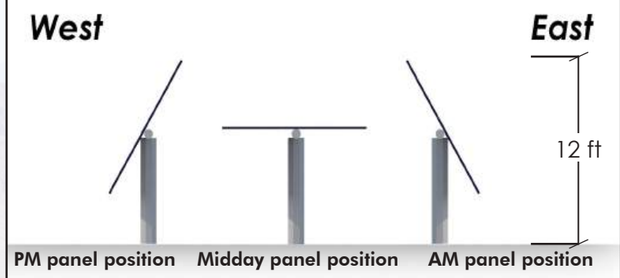




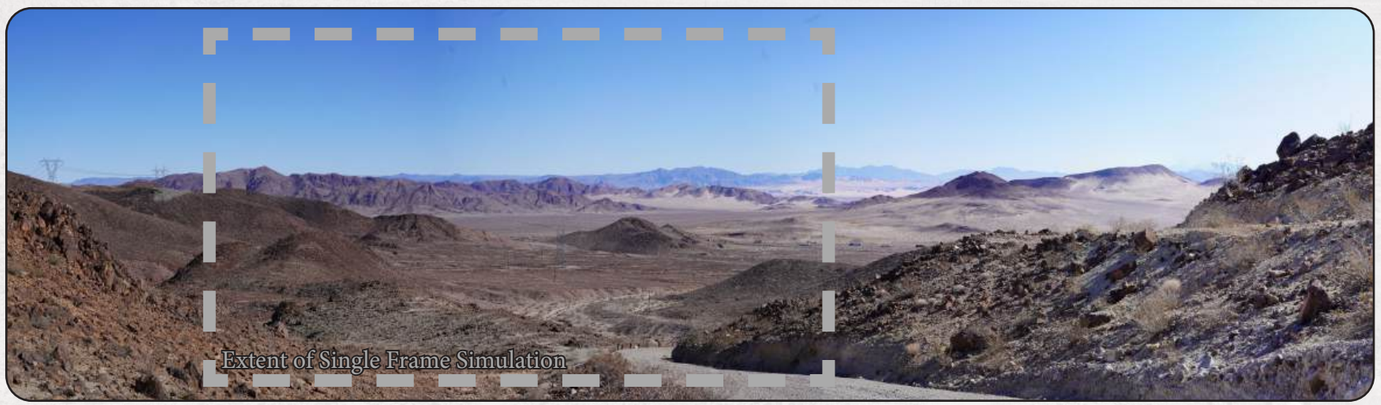
Approximate Distance to Nearest Solar Panel: **1.75 miles**

Project Location

Solar Panel



Structure Diagram



KOP 6 - 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 6: View from Transmission Line Access Road looking east - Existing Condition

KOP 6: View from Transmission Line Access Road looking east - Simulated Condition, panels facing east

KOP 6: View from Transmission Line Access Road looking east - Simulation with Landscaping

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**

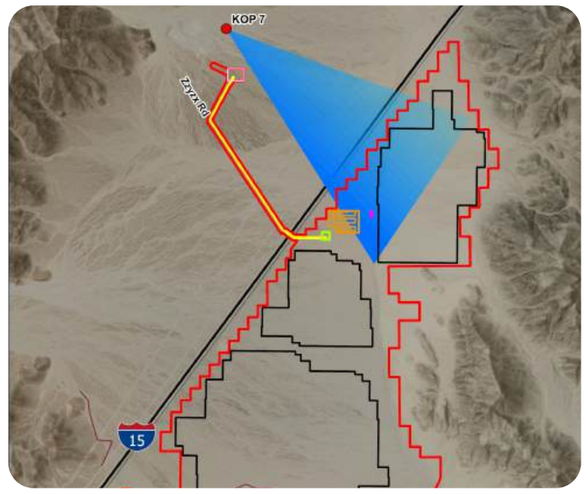
Wind: **5 mph**

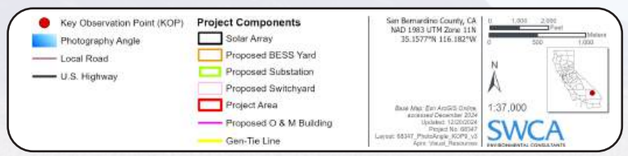
Cloud Cover: **0 %**

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.

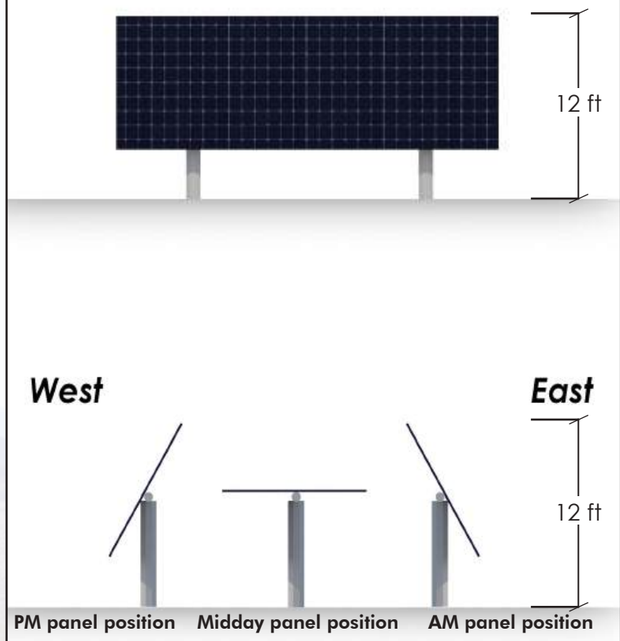




Approximate Distance to Nearest Solar Panel: **1.4 miles**

Project Location

Solar Panel



Structure Diagram

KOP 7 - 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 7: View from Transmission Line Access Road looking southeast - Existing Condition

KOP 7: View from Transmission Line Access Road looking southeast - Simulation with Landscaping

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**

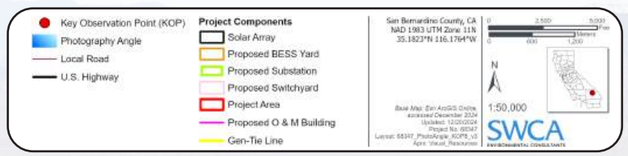
Cloud Cover: **0 %**

Temperature (°F): **35°F**

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

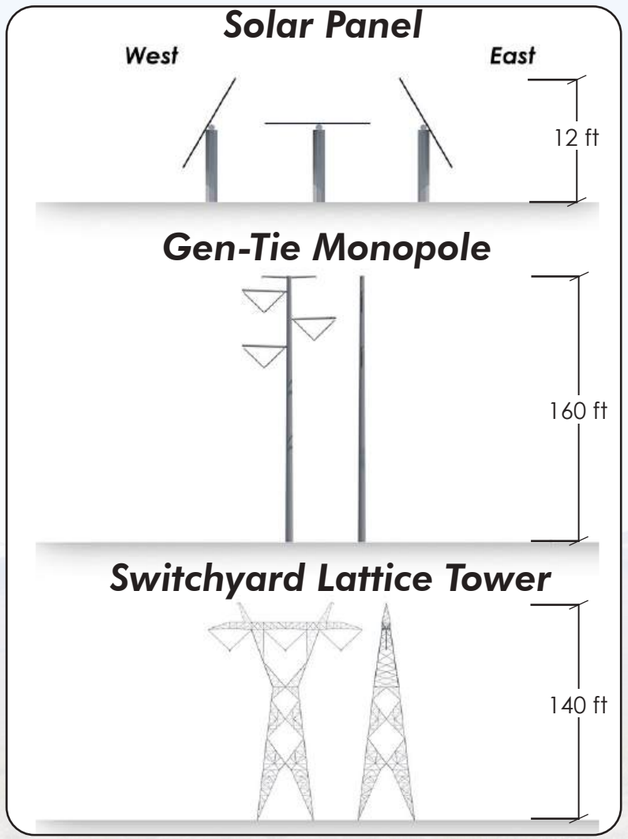
Simulation was prepared using information provided by client. Locations, colors, and heights may vary based on final engineering and design.

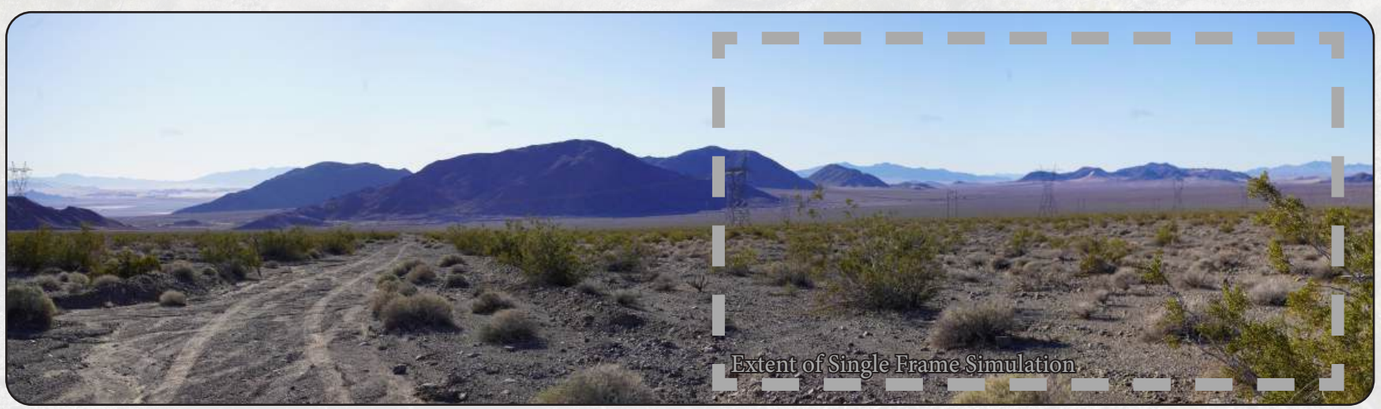
Project Location



Approximate Distance to Nearest Solar Panel: **2.8 miles**

Structure Diagram





KOP 8 - 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 8: View from Zzyzx Road looking south - Existing Condition

KOP 80: View from Zzyzx Road looking south - Simulation with Landscaping

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**

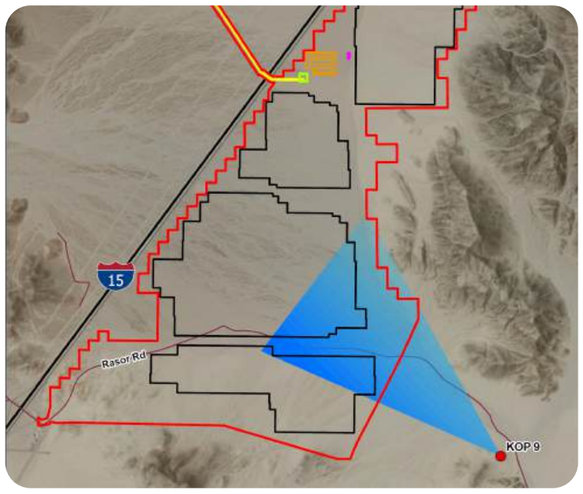
Cloud Cover: **0 %**

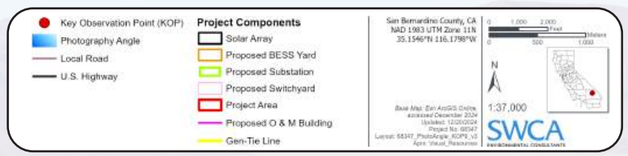
Temperature (°F): **55°F**

Solar panels are represented at full tilt (60 degrees) facing east to reflect AM conditions. West-facing panels would be observed during PM conditions.

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

Project Location

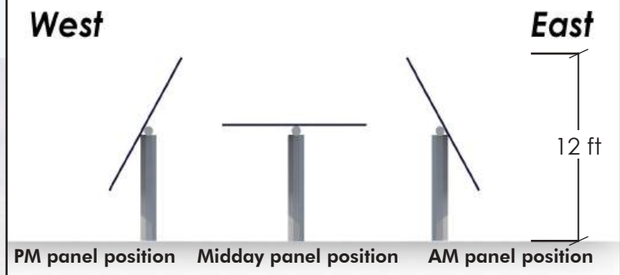




Approximate Distance to Nearest Solar Panel: **1 mile**

Structure Diagram

Solar Panel



KOP 9 - 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%.

SWCA® ENVIRONMENTAL CONSULTANTS

KOP 9: View from Rasor Road and OHV trail looking northwest - Existing Condition

KOP 9: View from Rasor Road and OHV trail looking northwest (panels facing east) - Simulated Condition

KOP 9: View from Rasor Road and OHV trail looking northwest (panels facing west) - Simulated Condition

APPENDIX G

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):

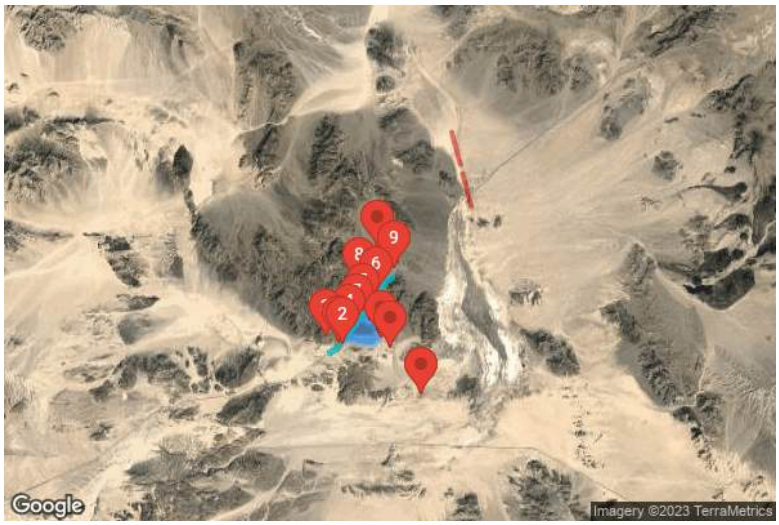
- Analysis time interval: 1 minute
- Ocular transmission coefficient: 0.5
- Pupil diameter: 0.002 meters
- Eye focal length: 0.017 meters
- Sun subtended angle: 9.3 milliradians

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

SITE CONFIGURATION

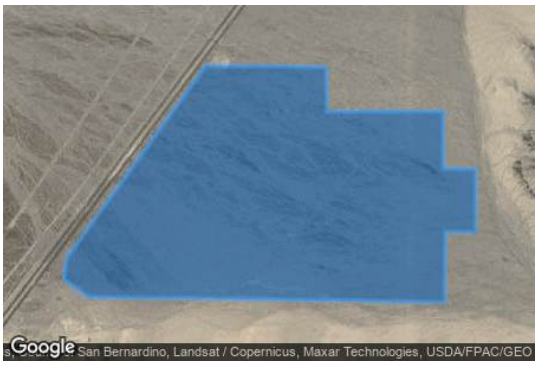
Analysis Parameters

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



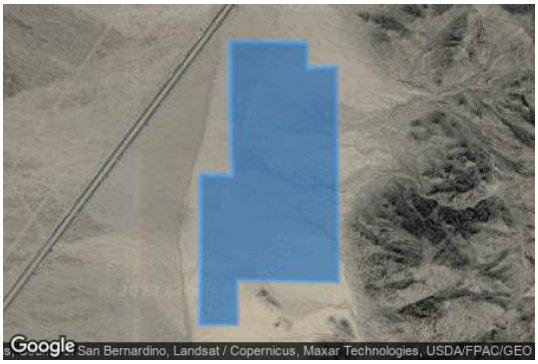
PV Array(s)

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



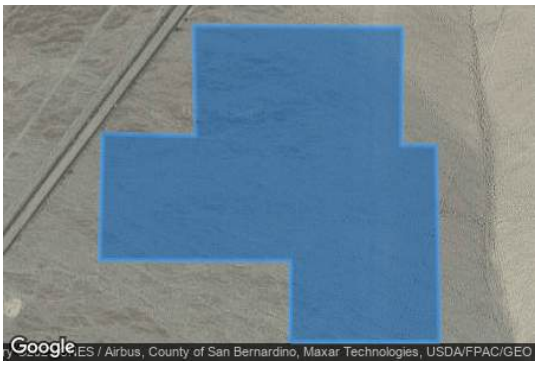
Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	35.143359	-116.201592	1478.78	7.00	1485.78
2	35.146201	-116.199070	1483.97	7.00	1490.97
3	35.149044	-116.196530	1480.12	7.00	1487.12
4	35.151887	-116.194019	1478.11	7.00	1485.11
5	35.154746	-116.191487	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

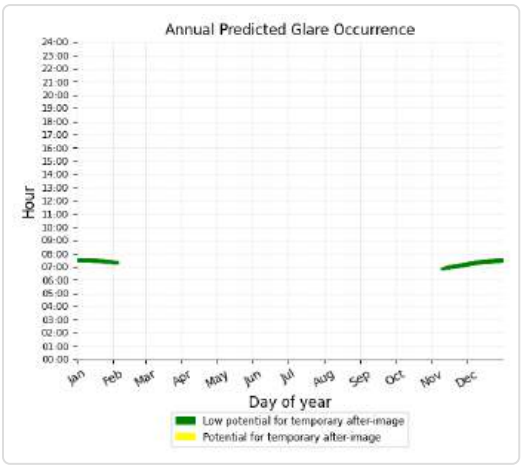
0 minutes of yellow glare
0 minutes of green glare

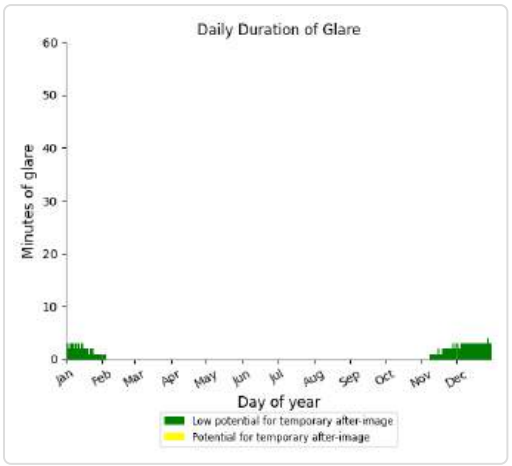
Point Receptor: OP 7

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

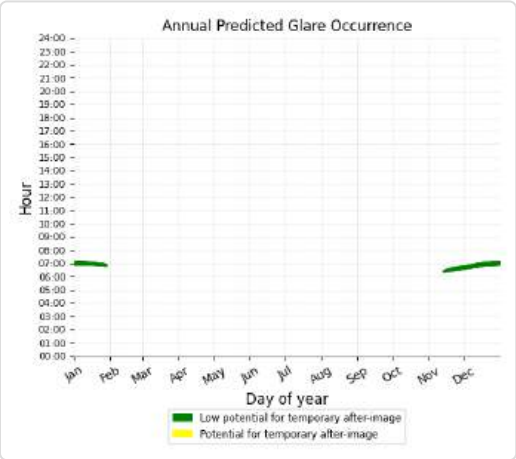
0 minutes of yellow glare
0 minutes of green glare

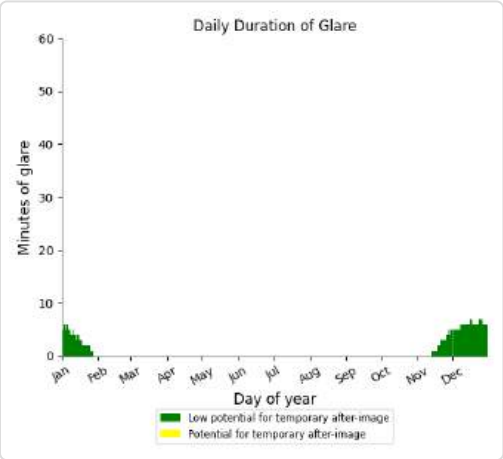
Point Receptor: OP 3

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.