APPENDIX B – AESTHETIC AND VISUAL RESOURCES

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B.1. Visual Resources Impact Assessment

VISUAL RESOURCE IMPACT ASSESSMENT

Westside Canal Battery Storage Project
Imperial County, California

PROJECT APPLICANT:

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PREPARED FOR:

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Executive Summary

This Visual Resources Impact Assessment evaluates potential impacts associated with the Westside Canal Battery Storage Project (project) per the applicable California Environmental Quality Act thresholds. A summary of the results is presented below.

1. **<u>The project would not have a substantial adverse effect on a scenic vista.</u>** The composition of views from areas and roadways surrounding the project would change as a result of the project however, no designated scenic vistas are identified in the Imperial County General Plan for the area, so **this Guideline is not applicable.**

2. **<u>The project would not substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings, within a state scenic highway.</u>** The project site is not visible from a designated Scenic Highway, nor from a route considered eligible for designation, so **this Guideline is not applicable.**

3. **<u>The project would not substantially degrade the existing visual character or quality of the site and its surroundings.</u>** The project would convert existing agricultural lands to a battery energy storage complex by replacing vegetation, and disturbed land with man-made elements including lithium-ion battery and/or flow battery energy storage facilities, a behind-the-meter solar energy facility to serve auxiliary power needs, a new on-site 230 kilovolt (kV) loop-in switching station, a 34.5 kV to 230 kV substation, underground electrical cables and other support equipment and structures, and permanent vehicular access to and from the site over a proposed bridge spanning Imperial Irrigation District's (IID's) Westside Main Canal. As viewed from surrounding areas and roadways, the project would largely be consistent with the existing visual character of the area, relating to similar elements in view. As a result, changes to the visual environment would not substantially degrade the existing visual character or quality of the site and its surroundings and the **visual impacts would therefore be insignificant. Short term construction related impacts would be less than significant.**

4. **<u>Light and glare impacts associated with the project are not considered to be significant.</u>** For the behind-the-meter solar facility, the Project proposes to use non-reflective photovoltaic (PV) panels, roof top and/or ground-mounted, which are not anticipated to be a significant source of glare. In addition, the project's lighting system will be designed to provide the minimum illumination required for security and operations. It is therefore anticipated that no

substantial sources of light and glare will be created so **light and glare impacts would** be **less than significant.**

5. **The project would be consistent with applicable policies and planning documents**. The project has been designed to be consistent with zoning and General Plan policies related to renewable energy and transmission. **Upon approval of a General Plan Amendment and Rezone, the project will be consistent with applicable policies and planning documents.**

7. **The composition of the project viewshed would not be adversely affected by physical changes introduced by cumulative projects**. The project in conjunction with cumulatively considerable projects would be largely consistent with the existing visual character and quality of the area which currently supports heavy agriculture, large scale solar facilities, and other green energy projects. Therefore, **visual impacts associated with cumulatively considerable projects would be less than significant.**

1.0 Introduction

The following Visual Resources Impact Assessment was prepared for the proposed Westside Canal Battery Storage Project (project).

1.1 Purpose

This report evaluates visual resource impacts associated with the project, to determine their significance under the California Environmental Quality Act (CEQA).

1.2 Key Issues

Key issues to be examined are identified in State CEQA Guidelines, Appendix G, for determining significance. The issues are whether the proposed project would have a substantial adverse effect on a scenic vista, substantially damage scenic resources within a state scenic highway, substantially degrade the existing visual character or quality of the site and its surroundings, and/or create a new source of substantial light or glare.

1.3 Principal Viewpoints to be Covered

This study analyzes changes in the visual environment that will occur as a result of project implementation from the following locations: Interstate 8 (I-8), Drew Road (County Highway 29), local roadways, surrounding residences including the Rio Bend RV Park and Golf Course, and the Westside Elementary School.

1.3 Definitions and Terminology

The following terms and concepts are used in the discussion below to describe and assess the visual environment and anticipated impacts from the proposed project.

Key Observation Point (KOP): A point along a travel route or at a use area where the proposed project would be most visible.

Scenic Vista: An area that is designated, signed, and accessible to the public for the express purposes of viewing and sightseeing as designated by a federal, state, or local agency.

Scenic Highway: A section of public roadway that is designated as a scenic corridor by a federal, state, or local agency.

Scenic Corridors: Scenic corridors refer to any designated freeway, highway, road, street, boulevard, or other vehicular right-of-way that traverses an area of unusual scenic quality.

Sensitive Viewpoints: Views from a public park, recreational trails, and/or culturally important sites are considered to have a high visual sensitivity and are considered examples of sensitive viewpoints.

Sensitive Receptors: Areas subject to high visibility by many people are considered to be sensitive receptors. Residential viewers typically have extended viewing periods and are therefore generally considered to have high visual sensitivity.

Viewshed: The landscape that can be viewed free of obstruction under favorable atmospheric conditions from a viewpoint or along a transportation corridor.

Visual Compatibility: The degree to which development with specific visual characteristics is similar in character to its setting.

Visual Character: Formed by the order of the patterns composing it: the visual elements of these patterns are the form, line, color, and texture of the landscape's components: Their interrelationships can be described in terms of dominance, scale, diversity, and continuity.

Visual Impact: The degree of change in visual resources and viewer response to those resources caused by a development project.

Visual Quality: Visual quality is dependent upon the visual environment's brilliance, distinction, and/or excellence. The two most commonly used criteria to define visual quality are vividness and intactness/unity. A visual resource with a high degree of vividness and intactness/unity will typically have a high level of visual quality.

Viewers' Response: An individual's perception of a view and his/her enjoyment of a view.

2.0 Project Description

Consolidated Edison Development, Inc. (CED) is proposing to develop, design, construct, own, operate, and maintain the CED Westside Canal Battery Storage Project (project), a utility-scale energy storage complex with a capacity of up to 2,000 megawatts (MW). The project would store energy generation from the electrical grid, and optimally discharge that energy back into the grid as firm, reliable generation and/or grid services.

The project would be comprised of lithium-ion battery and/or flow battery energy storage facilities, a behind-the-meter solar energy facility, a new on-site 230 kilovolt (kV) loop-in switching station, a 34.5 kV to 230 kV substation, underground electrical cables, and permanent vehicular access to and from the site over a proposed bridge spanning IID's Westside Main Canal. The proposed loop-in switching station would connect the project to the existing IID Campo Verde-Imperial Valley 230 kV radial gen-tie line, which connects to the Imperial Valley Substation (IV Substation) and the California Independent System Operator (CAISO), approximately one-third mile south of the project site. CED has submitted the necessary Interconnection Request Applications to the CAISO and IID.

The project would complement both the existing operational renewable energy facilities, as well as those planned for future development in Imperial County (County), and would support the broader southern California bulk electric transmission system by serving as a firm, dispatchable resource.

The project is pursuing the following objectives:

- To receive grid energy during beneficial market and operational periods and store that energy for dispatch when the customer (i.e., a load-serving entity) deems it to be more valuable.
- To be a valuable resource in allowing the customer and system operators to manage the effect of intermittent renewable generation on the grid and create reliable, dispatchable generation upon demand.
- To utilize available land that has not been used for agricultural production for more than 15 years, and enhance the site location by providing for permanent vehicular access.

2.1 Project Location

The project would be located in the unincorporated Mount Signal area of the County, approximately 8.0 miles southwest of the city of El Centro and approximately 5.3 miles north of the U.S.-Mexico border (see Regional Location Map, Figure 1). The project site is comprised of two parcels owned by CED, Assessor Parcel Number (APN) 051-350-010 and APN 051-350-011, totaling approximately 148 acres. These parcels have limited access corridors for vehicular traffic and are considered less desirable for agricultural production, as reflected by the last 15 years during which no farming activity has occurred.

The project site is approximately one-third mile north of the IV Substation and directly south of the intersection of Liebert Road and the IID's Westside Main Canal. The project site is bounded by the Westside Main Canal to the north, BLM lands to the south and west, and vacant private land to the east. The Campo Verde solar generation facility is located north of the project site, across the Westside Main Canal. The Vicinity Map, provided as Figure 2, shows an aerial view of the project site, the above-mentioned nearby facilities, and the key observation point locations.

The two project parcels are proposed for development as a utility-scale energy storage complex. The project would also utilize portions of two parcels located north of the Westside Main Canal (APN 051-350-019 owned by IID and APN 051-350-018 owned by a private landowner) for site access and as a temporary construction staging area. The project would also access a small portion of APN 051-350-009 within an IID easement for connection to the existing IID Campo Verde-Imperial Valley 230 kV radial gen-tie line during the construction of a switching station on the project site. The total proposed project development footprint, encompassing both temporary and permanent impacts, would be 163.32 acres.

2.2 Project Components

The Site Plan, provided as Figure 3, shows the conceptual plan for the project with a representation of the various energy storage technologies, behind-the-meter ground- and roof-mounted solar, common facilities within the project site, and permanent vehicular access to the project site. The actual configuration of the project would depend on the size of individual phases and the type of battery technology deployed. Specific project components are described below.

2.2.1 PHASING AND SCHEDULE

The project would be constructed in three to five phases over a 10-year period, with each phase ranging from approximately 25 MW up to 400 MW per phase. Depending on the size of the battery system for a given phase, construction and commissioning (approval to operate) is anticipated to take approximately 6 to 12 months. For the purposes of this analysis, the applicant has assumed that construction activities would last for approximately 32 months to complete the full project build-out.

Construction of the 100- to 200- MW first phase would include roads, a permanent clear-span bridge across the Westside Main Canal, the Operations and Maintenance (O&M) facilities, water connections and water-mains, storm water retention, switching station and project substation, legal permanent vehicle access, as well as the first energy storage facility. To access the project site, construction workers would travel along Interstate 8 (I-8) and head 4.6 miles south to the project site, and would utilize the IID Fern Check Bridge as a temporary pedestrian bridge until the permanent bridge is constructed. During peak construction activities, approximately 200 workers and approximately 30 daily deliveries would be required. If approved, it is anticipated that construction of the first phase would begin in 2021.

It is anticipated that each subsequent phase would be constructed within one to two years of each other, with the timing and size of each phase dependent on market conditions and the applicant's ability to secure commercial contracts with prospective customers. With the project being built in phases, the necessary infrastructure, such as water mains, retention ponds, and access roads, would be built out to serve the project phases from west to east and expanded over time to serve each phase. These subsequent phases would require improvements such as additional substation equipment, water main and site road extension, but would not require construction of additional common facilities which would be completed during the first phase. The total nameplate (or rated capacity) capacity of the project at full build-out (all phases completed) would be approximately 2,000 MW.

Construction activities during all project phases would only occur Monday through Friday, between the hours of 7:00 a.m. and 7:00 p.m. or Saturday between the hours of 9:00 a.m. and 5:00 p.m., excluding holidays, per County Ordinance.

2.2.2 COMMON COMPONENTS

As shown on the site plan (Figure 3), the northwest area of the project serves as the location for the common facilities, which include the switching station and project substation and the O&M facilities. With the project being built in phases, the necessary infrastructure, such as water mains, retention ponds and access roads, would be built out to serve the project phases from west to east and expanded over time to serve each phase.

A summary of the common facilities is presented below:

- 230 kV loop-in switching station
  - Connection to Campo Verde Imperial Valley 230 kV radial transmission line
  - Located on applicant property
- Project substation
- O&M facilities
- Project parking
- Storm water retention basins
- Fencing and gates
- Interior access roads

Industrial buildings, warehouses, engineered containers, and/or electrolyte storage tanks would be the primary structures needed to house the main project components. Other components to be located on the project site and adjacent to the proposed buildings, warehouses, containers, and tanks include the following:

- Inverters, transformers, power distribution panels
- Underground water-main loop for project operation and fire prevention
- Underground cable to connect to project substation
- Project site access roads (unpaved/crushed rock)
- Fire water storage tanks
- Above ground water storage tanks
- Heating, Ventilation, and Air Conditioning (HVAC) units
- Ground-mounted or roof-mounted photovoltaic (PV) arrays
- Emergency backup generator(s)

2.2.2.1 O&M Facilities

The O&M facilities are expected to be the only manned facility on the site. It would include up to approximately 20 full-time employees depending upon the number of phases and type of energy storage facility constructed. O&M employees would work typical weekday hours but may work extended hours, including weekends and 24 hours a day, depending upon the operations and maintenance needs. No offices or staffed control centers would be located within the storage-specific warehouses/buildings. For sanitary waste, the project would include a septic leach field to be located near the O&M facilities. The proposed O&M facilities would also require an HVAC unit.

2.2.2.2 Permanent Vehicle Access

There are no circulation element roadways in the immediate vicinity of the project site. The nearest freeways are I-8, located 4.6 miles north of the project site, and State Route 98 (SR-98), located 5.2 miles south of the project site. Drew Road, a two-lane collector, is located 1.3 miles east of the project site. All other roadways in the immediate vicinity of the project site are rural roadways. All roadways that would be used to access the project site from I-8 are currently paved, except for the portion of Liebert Road south of Wixom Road. However, this segment would be paved or graveled prior to project operation.

The project is surrounded by private landowners to the east, BLM land to the south and west, and IID maintenance roads and Westside Main Canal to the north. Due to the project site having no direct vehicular access routes, the applicant is proposing to construct roads on both the north and south sides of the Westside Main Canal on private land, and a new clear-span Imperial County-specified bridge over the Westside Main Canal.

The permanent new clear-span County-specified bridge would span the Westside Main Canal to connect to a proposed access road easement on the north side of the Westside Main Canal. The north side proposed access road would ultimately connect the project to county road (CR) Liebert Road.

Construction of the permanent clear-span bridge spanning the IID's Westside Main Canal requires CED to have access to both the north side and the south of the Canal to perform the necessary construction activities. In addition to being necessary to facilitate construction of the new permanent clear-span bridge, access from the south side of the Canal would allow CED to commence construction on the first phase of the project simultaneously, thereby shortening the duration of construction and potentially minimizing the associated impacts. CED is evaluating various options for temporary construction access, including accessing the project site from the south side of the Westside Main Canal off SR-98, as well as options involving access from the north side of the Westside Main Canal from I-8.

Option 1 would use the existing SDG&E maintenance road off Highway 98, which extends approximately 4.4 miles to the IV Substation. Option 1 would then continue along an existing 1.2-mile-long dirt access road that leads north, then east, outside the western and northern boundaries of the substation. Option 1 then continues northwest along an existing dirt access road that parallels two power lines until the access road connects with the western edge of the project. The existing dirt road was constructed for the construction and maintenance of the existing Campo Verde – Imperial Valley gen-tie line. Option 2 would use the existing IID Westside Mail Canal access road. The selected temporary access option would be used until construction of the permanent bridge is completed. Both temporary construction access routes are presented in Figure 4.

2.2.3 BATTERY STORAGE COMPONENTS

The first phase of site construction would consist of either a lithium-ion battery storage facility or a flow battery storage facility. This first phase would be dependent on the first commercial contract awarded to the applicant by a customer. Large industrial buildings, warehouses, and/or containers to house the storage equipment, including battery cells, modules, racks, and controls for lithium-ion technologies, would be needed. For flow battery technologies, cell stack modules, pumps, and controls may be installed inside industrial buildings or pre-engineered outdoor enclosures. Electrolyte storage tanks and associated piping may be located indoors or outdoors, depending on the technology.

2.2.3.1 Battery Modules Technology

Energy Storage

Energy storage is the capture of energy produced at one time for use at a later time. A device that stores energy is generally called an accumulator or battery. Energy storage involves converting energy from forms that are difficult to store to more conveniently or economically storable forms. For the purpose of grid connected energy storage, electrical energy will be stored in the form of chemical energy in lithium-ion and/or flow batteries Energy storage technology may be centralized or may be distributed throughout the plant. Due to requirements for energy storage, the project components such as the switching station, substation, transformers, and inverters will energize at all times with the potential to charge or discharge.

Lithium-Ion Battery

A lithium-ion battery is also a type of rechargeable battery. In the batteries, lithium ions move from the negative electrode through an electrolyte to the positive electrode during discharge, and back when charging. Lithium-ion batteries use an intercalated lithium compound as the material at the positive electrode and typically graphite at the negative electrode. The batteries have a high energy density, no memory effect and low self-discharge.

Flow Battery

A flow battery is a rechargeable fuel cell in which an electrolyte containing one or more dissolved electroactive elements flows through an electrochemical cell that reversibly converts chemical energy directly to electricity. Additional electrolyte is stored externally, generally in tanks, and is usually pumped through the cell (or cells) of the reactor, although gravity feed systems are also known to be used. Flow batteries can be rapidly "recharged" by replacing the electrolyte liquid while simultaneously recovering the spent material for re-energization. Many flow batteries use carbon felt electrodes due to its low cost and adequate electrical conductivity.

2.2.3.2 Backup Generators

The project would include emergency backup generator(s) to supply auxiliary power to the facility during rare events in which the entire facility or portions of the facility are disconnected from the electrical grid system. The generators would be sized to accommodate control systems and HVAC loads for equipment protection. The purpose of the generators would be to provide system safety for events in which the transmission interconnection and the on-site solar generation system are not available, by supplying the battery HVAC system to maintain battery safety and warranty temperature parameters.

These generators may be either installed in a central location near the common facilities or distributed among individual buildings or containers. They may be diesel, natural gas, or propane fueled. The generators would be periodically tested each year to maintain backup capability in the event of a grid emergency. All generators would be subject to Imperial County Air Pollution Control District review and permitting requirements.

Table 1 is a generalized depiction of installed emergency generator capacity based on 1,000 MW of lithium-ion batteries and 1,000 MW of flow batteries, including their safety and warranty temperature parameters. Size and quantity will scale with the MW proposed in each phase. Detailed design is required to accurately calculate the generator load, which will be included with each design phase based on the final battery technology selection.

Table 1
Approximate Generator Size

Technology	Project Size (MW)	Backup Generator Size (kW)	Backup Generator Quantity	Total Backup Generator Size (kW)
Lithium-ion	1,000	1,750	20	35,000
Flow	1,000	1,000	20	20,000
Total	2,000	--	--	55,000

2.2.4 SOLAR FACILITY COMPONENTS

Photovoltaic solar cells, also called PV cells, convert sunlight directly into electricity. PV gets its name from the process of converting light (photons) to electricity (voltage), which is called the PV effect. The panels are mounted at a fixed angle facing south, or they can be mounted on a tracking device that follows the sun, allowing them to capture the most sunlight. Many solar panels combined together to create one system is called a solar array. On-site PV solar generation would serve as station auxiliary power and be deployed throughout the project site.

2.3 Site Security

A six-foot-tall fence (e.g., chain-link) topped with one-foot-tall barbed wire would be installed around the entire project site for safety and in order to control access. The switching station and each substation proposed on the site plan would also have fences installed around its perimeter. A camera-equipped call button would be installed at the front entry gate to the site which would be monitored from the project's O&M facilities. Throughout the site at various points, security cameras may be installed to monitor other areas of the project site. During the construction of each project phase, the applicant would have on-site security personnel between dusk and dawn and during hours of non-active construction.

2.4 Interconnection Options

The proposed point of interconnection for the project is the IV Substation 230 kilovolt (kV) bus. As reflected in the conceptual site plan, to achieve this, the applicant plans to build a new loop-in switching station on the project site and connect to the existing IID Campo Verde - Imperial Valley 230 kV radial gen-tie line. This existing gen-tie line ultimately connects to the IV Substation one-third mile south of the project site. This location would serve as the project's point of interconnection to the CAISO grid. The applicant submitted the necessary Interconnection Request Applications to the CAISO and IID in 2017 and 2018, and approval is pending.

2.5 Existing and Proposed Utility Easements

2.5.1 EXISTING EASEMENTS

The project site (APNs 051-350-10 and 051-350-011) has three major easements lying across the site. The first is for overhead collector transmission circuits and utility facilities, as well as access. This is for the IID Campo Verde - Imperial Valley 230 kV transmission line easement, which lies inside and along the west property line and runs north/south.

The second major easement is a prescriptive easement for an overhead transmission circuit and a utility distribution line that runs north and south and lies directly in the center of the project site. The IID transmission line within this prescriptive easement is known as the S-Transmission line (S-Line). The third major easement lies along the north property line. This easement was granted to IID for the purposes of the existing Westside Main Canal and operation and maintenance roads adjacent to the Westside Main Canal.

2.5.2 PROPOSED EASEMENTS

The applicant and IID are in the process of determining the width of this S-Line easement to create a non-exclusive easement. This easement would also include the existing distribution line that lies within the easement. Until this new easement agreement is in place, the applicant has planned for a 300-foot temporary corridor on the project site plan (centerline of 300-foot corridor is the S-Line) to allow the IID energy engineering team to design and implement an appropriate new easement. Once the width and location of the new easement is determined, all other areas not part of the new S-Line easement lying within the 300-foot corridor will become part of the project site.

2.6 Project Operation

Operation of the project would require routine maintenance and security. It is anticipated that the project would employ a plant manager and an O&M manager, as well as the addition of a facility manager once the complex deploys approximately 500 MW of generation. The complex will also employ staff technicians, with at least one additional technician for every approximately 250 MW of capacity.

Operation of the project at full build-out would require up to approximately 20 full-time employees depending upon the number of phases and type of energy storage facility constructed. The project may require fewer full-time equivalent employees, but 20 was assumed to provide a conservative estimate. O&M employees would work typical weekday hours but may work extended hours, including weekends and 24 hours a day, depending upon the operations and maintenance needs. Assuming two one-way trips per employee, the project would be anticipated to generate up to 40 trips per day from all maintenance and security personnel.

Figure 3 shows the conceptual site plan for the project with a representation of lithium-ion buildings and containers as well as flow buildings and containers. The components that make up the energy storage systems and common facilities require various preventative maintenance and at times corrective maintenance. The O&M staff would maintain the project in accordance with manufacturer and industry best practice maintenance schedules and requirements. Depending on the technology selected for the energy storage component, the substation and transmission lines as well as the behind-the-meter solar inverters and transformers would be energized at all times.

2.7 Land Use and Zoning

The project site is currently zoned A-3 (Heavy Agriculture). Agricultural zoned land lies to the north, south, east, and west of the project site. The project proposes a General Plan Amendment and Rezone to change the land use designation and zoning for the project site from Agriculture (A-3) to Industrial. The Industrial zoning would be limited to Energy Production/Use.

2.8 Regulatory Framework

2.8.1 STATE

2.8.1.1 Southern California Association of Governments

The Southern California Association of Governments (SCAG) is responsible for fulfilling certain state requirements related to the California Environmental Quality Act (CEQA). Pursuant to CEQA, SCAG is responsible, through their Intergovernmental Review section, for reviewing regionally significant local plans, projects, and programs for consistency with SCAG's adopted regional plans.

Analysis

The IRG section does not include any relevant policies that address aesthetics, light or glare, so therefore the project cannot be reviewed for consistency with IRG policies.

2.8.2 LOCAL

2.8.2.1 Imperial County General Plan

The Imperial County General Plan is a broad-based planning document that contains text, maps, and diagrams explaining the County's long-range growth and development goals and policies. The adopted General Plan contains the Renewable Energy and Transmission Element which contains policies related to visual resources.

Renewable Energy and Transmission Element

This Element addresses the potential impacts associated with renewable energy to existing visual character and quality, including scenic vistas, natural environment and existing landscape, general built environment and historic buildings, and scenic highways. In addition, the Element identifies the potential for Renewable energy facilities to create new sources of substantial light or glare which would adversely affect day or nighttime views in the area.

E. Implementation Standards

3. Environmental

The design, siting, and operation of renewable energy facilities shall give adequate consideration to potential direct and indirect environmental impacts pursuant to the California Environmental Quality Act related to aesthetics.

2.8.2.2 Zoning Ordinance

The Imperial County Zoning Ordinance provides detailed regulatory provisions for development of all lands within the county. County zoning is used to implement the goals and objectives of the adopted General Plan in accordance with state law, which requires that the General Plan and corresponding zoning be consistent with one another. The project site is currently zoned A-3 (Heavy Agriculture). The project proposes a General Plan Amendment and Rezone to change the land use designation and zoning for the project site from Agriculture (A3) to Industrial.

3.0 Visual Environment of the Project

The visual environment of the project is generally defined by the desert region within which it's located, where elevations range from below sea level to over 3,000-feet above mean sea level (AMSL) and the terrain includes a mountain backdrop, alluvial fans and desert floor. Views are expansive and characterized by dramatic landforms, native desert habitat, and low desert valleys where the form, line, color, and texture, of the natural setting is comingled with utility transmission towers, substations, industrial solar photovoltaic installations, intensive agriculture, and residential and commercial development.

3.1 Project Setting

The site is generally flat, having been graded to support agriculture, its current use, and is approximately 6' below AMLS at its high and 22' below AMLS at its low.

Several residences, the Westside Elementary School, IID Campo Verde Solar facility, and a residential community are located to the north. Drew Road, several residential structures, agricultural fields, and open space are located to the east, and BLM land managed mainly as open desert, to the south and west of the project. The Imperial Valley Substation, with its numerous tall transmission towers, and other equipment, is located on BLM land south of the project.

Character views depicting the project setting are provided as Figures 5a and 5b, Existing Conditions.

Very little light and glare is generated in this area of the County. The primary source of light and glare in the area is from motor vehicles traveling on surrounding roadways. Glare is generated during daytime hours from the sun's reflection off cars and paved roadway surfaces. Likewise, at night, vehicle headlights on surrounding roadways generate light and glare. Warning lighting is also located on the existing transmission lines to alert aircraft of potential flight path hazards. Lighting associated with the Imperial Valley Substation and IID Campo Verde Solar facility is also present.

3.2 Project Viewshed

A “viewshed” is an analytical tool used to aid in the identification of views that could be affected by a potential project. The viewshed is defined as the surrounding geographic area from which the project is likely to be seen.

The project viewshed, provided as Figure 6, Generalized Viewshed, was determined through an analysis of aerial photographs, and topographic data produced and distributed by the USGS. This data is based on the National Elevation Dataset (NED) and uses 1/3 arc second data (approximate 10-meter accuracy). The viewshed does not account for intervening structures and vegetation that obstruct views toward the site but provides us with a generalized presentation of areas from which views of the site are available. Viewshed analysis was prepared using Global Mapper and evaluated the visibility of a 60’ transmitter to a receiver located 5’ above ground elevation.

Due to the relatively flat topography of the project site and surrounding area, views of the project are available from Interstate 8 to the north and northwest, Drew Road (County Highway 29) to the east, and local roadways to the north, and east.

4.0 Existing Visual Resources and Viewer Response

4.1 Existing Visual Resources

4.1.1 VISUAL CHARACTER

Our understanding or cognition of the visual environment is based on the visual character of objects and the relationships between them. Descriptions of visual character can distinguish at least two levels of attributes: pattern elements and pattern character.

Visual pattern elements include an object’s form, line, color, and texture. Our awareness of these pattern elements varies with distance, for example individual details are lost and colors are muted as distances increase.

Pattern character refers to the visual relationships between these elements. Differences in visual character are generally traced to four aspects of pattern character: dominance, scale, diversity, and continuity. For example, there is a great difference between the visual character of country road and I-8, although both may exhibit similar line, color, and texture.

The four aspects of pattern character are defined as follows:

- Dominance: Specific components in a landscape may be visually dominant because of position, extent, or contrast of basic pattern elements.
- Scale is the apparent size relationship between a landscape component and its surroundings; an object can be made to look smaller or larger in scale by manipulating its visual pattern elements.

- Visual diversity is a function of the number, variety, and intermixing of visual pattern elements.
- Continuity is the uninterrupted flow of pattern elements in a landscape and the maintenance of visual relationships between immediately connected or related landscape components.

The project and project setting are assessed according to these attributes (see Visual Inventory/Character Evaluation, and Visual Quality Evaluation, provided as Figure 7 and Figures 8a and 8b) and if their visual character is similar, the visual compatibility of the project will be high. If the visual character of the project contrasts strongly with the visual character of its setting, its visual compatibility will generally be low. As noted on these assessment forms, evaluations are based on both photo simulations and through extrapolation.

4.1.2 VISUAL QUALITY

Aesthetics is not only concerned with the character of the visual experience, but also with its quality. The perception of quality is based upon a viewer's response to vividness, intactness, and unity occurring within the visual environment. These factors affect perceptual quality and are defined as follows:

- Vividness is the visual power or memorability of landscape components as they combine in striking and distinctive visual patterns.
- Intactness is the visual integrity of the natural and man-built landscape and its freedom from encroaching elements.
- Unity is the visual coherence and compositional harmony of the landscape considered as a whole.

Areas with high visual quality are those where all three of these factors are high. Areas with Moderate Visual Quality are those where one of these factors is low. Areas with low visual quality are those where two or more of these factors are low.

While many elements of the project's visual environment are considered memorable and distinct, both natural and man-made, they are not intact, free from visual encroachments, nor do they join to form coherent, harmonious, visual patterns associated with high quality visual environments. The area is therefore considered to have a low to medium visual quality rating.

4.2 Viewer Response

Viewer response is composed of two elements: viewer sensitivity and viewer exposure. These elements combine to form a method of predicting how the viewers might react to visual changes brought about by a project.

4.2.1 VIEWER SENSITIVITY

Viewer sensitivity is both the viewers' concern for scenic quality and the viewers' response to change in the visual resources that make up the view.

4.2.2 VIEWER GROUPS

Primary viewer groups exposed to the project consist of motorists, and surrounding residents, residential community golf course users, and school attendees.

4.2.3 VIEWER EXPOSURE

The number of viewers and the duration of view are also important to analyzing impacts.

The number of viewers in nearby residences (stationary view), and the duration of their view of a project would be very different than the number of people who see a project from a highway or roadway (moving view). Whether the viewers on the highway are residents of the local community or visitors may also affect their responses to a viewshed.

Viewer exposure is typically assessed by measuring the number of viewers exposed to the resource change, type of viewer activity, duration of their view, speed at which the viewer moves, and position of the viewer. Viewer exposure is described in greater detail in Chapter 5, Visual Impact Assessment.

4.2.4 VIEWER AWARENESS

A viewer's response is also affected by the degree to which he/she is receptive to the visual details, character, and quality of the surround landscape. A viewer's ability to perceive the landscape is affected by his/her activity. A viewer on vacation would probably take pleasure in looking at the landscape, and an individual may be strongly attached to the view from his/her home, but a local County resident commuting to work may not "register" those same visual resources on a daily basis. Viewer exposure is described in greater detail in Chapter 5, Visual Impact Assessment.

4.2.5 SENSITIVITY TO CHANGE

Visual sensitivity is based on an area's ability to absorb changes in character and quality. Areas with a high sensitivity to change are those that are visually prominent, distinctive, contain a dominant visual character element, and have high visual quality. These are areas that would contrast to a great degree with a proposed improvement.

An area with moderate sensitivity to change would contain a several visual character elements that vary in form, line, color, and texture, and that is of moderate visual quality. An area with low sensitivity to change are those that have many visual character elements that vary in form, line, color and texture, and is of low visual quality.

5.0 Visual Impact Assessment

This section describes the potential impacts related to aesthetics for the project. It describes the guidelines used to determine significance and identifies potential mitigation measures to reduce impacts below levels of significance.

5.1 Guidelines for Determining Significance

The project will result in a significant impact if it would:

5.1.1 Visual Resources

Guideline No. 1: Have a substantial adverse effect on a scenic vista

Guideline No. 2: Substantially damage scenic resources, including, but limited to, trees, rock outcroppings, and historic buildings within a state scenic highway.

Guideline No. 3: Substantially degrade the existing visual character or quality of the site and its surroundings.

5.1.2 Light and Glare

Guideline No. 4: Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area.

5.1.3 Consistency with Policy & Planning documents

Guideline No. 5: The project would not comply with applicable state or local goals, policies, or requirements related to visual resources including but not limited to the California Scenic Highway Program, Imperial County General Plan & Zoning Ordinance, as applicable.

5.2 Guideline Sources

Guideline Nos. 1 and 2 are derived from the CEQA Guidelines, Appendix G, Environmental Checklist Form and are intended to support definition of whether the proposed project will have a significant impact on visual character and quality. Due to this circumstance, these two significance guidelines are based on established principles from the most widely used and accepted visual resource assessment methodologies, including the U.S. Department of Transportation, *Federal Highway Administration's Visual Impact Assessment for Highway Projects*; the U.S. Department of Agriculture, Forest Service Visual Management System; and the U.S. Department of Interior, Bureau of Land Management (BLM) modified Visual Management System. The concepts contained in these assessment approaches provide accepted practices for evaluating visual resources both objectively (visual character) and subjectively (visual quality). This is accomplished by comparing the existing visual environment to the construction and post-construction visual environment; and subsequently, determining whether the project will result in physical changes that are deemed to be incompatible with visual character or degrade visual quality, as outlined in Guideline Nos. 1 and 2.

Guideline No. 3 is based in part on the principles discussed above as well as those contained in County's General Plan related to preservation of visual resources.

Guidelines Nos. 4 and 5 rely on policies contained in the Imperial County General Plan related to preservation of visual resources and aesthetics. Furthermore, the plan recognizes that renewable energy facilities may also create new sources of substantial light or glare which would adversely affect day or nighttime views in the area. Because of the proximity of several military installations in the area, future substantial sources of light and glare which would adversely affect day or nighttime views in the area would be considered significant as would projects that don't comply with applicable policies related to visual resources.

In compliance with the thresholds of significance and analysis methodologies determined for the project, this analysis includes the following elements and considerations:

- A map of the viewshed and a discussion of communities and roads from which it may be viewed as a prominent feature.
- A discussion of the compatibility of the scale and mass of the proposed project with the surrounding area.
- A discussion of the architectural style of the structures and their site utilization related to the manner in which surrounding properties have developed.
- Photo simulations and analysis comparing project to existing setting.

5.3 Analysis of Project Effects and Determination of Significance

5.3.1 HAVE A SUBSTANTIAL ADVERSE EFFECT ON A SCENIC VISTA (GUIDELINE 1)

The composition of views from areas and roadways surrounding the project would change as a result of project implementation, however, no designated scenic vistas are identified in the Imperial County General Plan for the area, so the impact is therefore considered **less than significant.**

5.3.2 DAMAGE SCENIC RESOURCES WITHIN A STATE SCENIC HIGHWAY (GUIDELINE 2)

The project site is not visible from a designated Scenic Highway, nor from a route considered eligible for designation, so therefore this Guideline is not applicable.

5.3.3 DEGRADE THE EXISTING VISUAL CHARACTER OR QUALITY OF THE SITE AND ITS SURROUNDINGS (GUIDELINE 3)

The proposed project would convert existing agricultural lands) to a battery energy storage complex by replacing vegetation, and disturbed land with man-made elements including lithium-ion battery and/or flow battery energy storage facilities, a behind-the-meter solar energy facility to serve auxiliary power needs, a new on-site 230 kilovolt (kV) loop-in switching station, a 34.5 kV to 230 kV substation, underground electrical cables and other support equipment and structures, and permanent vehicular access to and from the site over a proposed bridge spanning Imperial Irrigation District's (IID's) Westside Main Canal. The project would occupy approximately 163.3 acres and would consist of industrial buildings, 30'-60' in height and approximately 140'-400' in length, that would house lithium-ion and/or flow battery storage technologies. In addition, there would be ground and/or roof-mounted solar PV for auxiliary power needs, storage tanks up to 50' in height, a battery storage system enclosed in 8' tall containers stacked up to 4 high, with a maximum anticipated height of 40'. A proposed loop-in switching station, project substation, retention ponds, operations and maintenance building, bridge crossing and circulation improvements are also planned for the project (see Site Plan & Site Plan Elements, Figure 3 and Figures 9 and 10).

Short Term Visual Affects

The project would be built in three to five phases over 10-year period, with each phase ranging from approximately 25 MW up to 400 MW per phase. During that time, short term impacts associated with project construction would occur as heavy equipment, materials, and vehicular traffic (see Figure 4, Temporary Construction Access Routes), are added to the site. This would impact nearby residences and users of area roadways, including I-8 and Drew Road. Lighting from construction activities and daytime glare from equipment and vehicles would be increased during construction periods. As phases of the project are completed, equipment would be removed and/or relocated elsewhere on the site, thereby potentially reducing the impact. While construction impacts are potentially significant, due to their short duration they are anticipated to be **less than significant.**

Long Term Visual Affects

The proposed project would alter the visual environment of an area that is transitioning from intense agriculture to energy production by introducing a new battery storage facility, a new bridge crossing the Westside Main Canal, large industrial buildings housing lithium-ion and/or flow battery storage technologies, stacked containerized battery storage systems, a loop-in switching station, project substation, connection to the IID Campo Verde – Imperial Valley transmission gen-tie line, operations & maintenance building, project parking, ground and/or roof mounted solar PV arrays, water storage tanks, security lighting, and other equipment and support facilities.

The entire site would be surrounding by a 6-foot chain link security fence topped with barbed wire and posts spaced 8-10’ on center. The fence would provide minimal screening and most of the site would be visible from surrounding areas where view blocking vegetation, structures, and landforms do not exist.

Key Observation Points

Key Observation Points (KOPs), selected and described below, represent typical views experienced by primary viewer groups.

Existing views of the project are available from areas surrounding the site, specifically from I-8, Drew Road, and local roadways (Wixom, Vaughn, and Liebert Road). Additionally, views of the project are available from the Westside Elementary School, Rio Bend RV and Golf Resort, and nearby residences.

To evaluate visual impacts, 12 KOPs were selected (see Figure 2, Vicinity Map & Key Observation Point Locations). The KOPs identified are described below:

View from Interstate-8

Views of the project are available from Interstate 8 (see KOP 1) which is located approximately 5.1 miles west of the site. From this location views are expansive and distant and include, memorable mountain landforms, desert floor with native habitat, overhead utilities and tower structures, development, intensive agriculture, and industrial scaled solar installations. From locations along I-8, project features such as the buildings, utility connections, and substation, will be visible and viewed in conjunction with the other elements described above. This will reduce project contrast such that it will appear as an extension of the elements that surround it, i.e., the structures, overhead utilities and transmission towers, substation, and tree groupings. Given the setting’s lack of intactness and unity, existing views are assigned a low to medium visual quality rating. And while the project is visible in the background over an approximate distance of 0.5 mile, or several seconds traveling at 65 mph, it’s contrast would be minimized due to its distance away from visual receptors and visual relationship to existing man-made elements in view. It is therefore anticipated that **visual impacts associated with the project along this corridor will be less than significant**.

View near the Westview Elementary School looking southeast.

Views from the Westview Elementary School encompass a foreground of agricultural fields, dirt roads, irrigation canals lined by view blocking vegetation and earthen berms, a middle ground containing the Campo Verde Solar facility, overhead utilities, the Imperial Valley Substation, and mountain backdrop (see KOP 2, Figure 11). This area is given a low visual quality rating based on its lack of vividness, intactness, and unity.

The project, as viewed from this location (see Photo Simulation KOP 2, Figure 12), will be visible behind photovoltaic arrays, substation, operations buildings, and overhead utilities associated with the Campo Verde facility, and will be seen in front of and amongst structures associated with the Imperial Valley Substation and utility corridors. Buildings and structures will relate architecturally in terms of form, material, and color with other structures in the viewshed. Foreground view blocking vegetation and earthen berms will substantially screen the lower portions of the project from view, but overhead utilities and upper portions of buildings will be visible. As such, visible project components will relate to that which exists such that contrast is reduced between the project and existing visual environment. While the project will introduce a scale of structure not currently present in this viewshed, it will appear less dominant from this location than many of the existing elements in view. Furthermore, project buildings will be non-reflective and painted in light, earth-tone colors which will further reduce project contrast by relating to other colors in view, both man-made and natural. It is therefore anticipated that **changes to the visual environment, as a result of the project, will be less than significant.**

Nearby Residential Communities

KOP 3 represents a view looking south from the southern end of the Rio Bend RV Resort and Golf Course Community. Views from this KOP encompass the verdant landscape associated with the Rio Bend development, agricultural fields and outbuildings, natural vegetation, solar facilities, and memorable mountain landforms in the background (see Figure 13).

This view has been assigned a low-med visual quality rating based on its vividness, intactness, and unity and is representative of what residents and guests will see looking south toward the project.

As viewed from this location (see Photo Simulation KOP 3, Figure 14), the project will be partially visible behind a foreground of view blocking vegetation, landforms, and structures. It will be viewed amongst equipment and structures associated with Campo Verde facility and Imperial Valley Substation. As such, project components will relate to existing elements in view, such as the transmission towers and overhead utilities, buildings, and photovoltaic arrays, which will reduce contrast between the project and existing visual environment. While the buildings will introduce a scale of structure not present in this viewshed, they will be lower than the other existing man-made elements that lie nearby, will be partially screened by view-blocking vegetation and berms associated with the adjacent canal, and will be painted in light earth tone colors, thereby relating to other elements in view, both man-made and natural. As such, it is anticipated that contrast will be reduced and the **change to the visual environment as a result of the project will be less than significant.**

Views from Neighboring Residences & Local Roadways

Key Observation Points 4, 6, and 8, represent views of the project from surrounding residences and local roadways (Liebert, Wixom, and Vogel Roads).

Views from these locations encompass intensive agriculture, the Campo Verde Solar facility, overhead utilities, and mountain backdrop (see Figure 15).

This area is assigned a low visual quality rating based on lack of vividness, intactness, and unity and is representative of what residences and travelers along local roadways will experience when viewing the project.

The project as viewed from these areas (see Photo Simulation KOP 6, Figure 16) will appear amongst equipment and structures associated with Campo Verde facility and Imperial Valley Substation, partially screened by view-blocking vegetation and berms that line the adjacent canal. As such, project components will relate to a large degree to the existing elements in view, both man-made and natural. Project components will relate to existing overhead utilities, buildings, photovoltaic arrays, and vertical vegetative groupings. While the buildings will introduce a scale of structure not currently present in this viewshed, they will appear lower than the other man-made elements that surround them, will relate architecturally to surrounding structures and buildings, and will be painted in light, earth-tone colors to relate to other elements in view, both man-made and natural. Dominant mountain landforms will remain visible and foreground vegetation and canal berms will screen lower portions of the project from view. It is therefore anticipated that contrast will be reduced such that the **change in visual environment as a result of this project will be less than significant from these locations.**

<u>Views from Roadways Adjacent to Project</u>

Views from roadways adjacent to the project, KOPs 5, 11, & 12, depict views from Mandrapa and Liebert Roads looking south and east toward the project. Views from these areas encompass a variety of elements including dirt roadways, fallow fields, agriculture, desert vegetation, dominant patterns of overhead utilities, the Westside Canal and associated earthen berms, the Campo Verde facility, and a background consisting of mountains and dominant landforms (see Figure 17).

These are close-proximity views and represent areas most affected by the project. They are also areas that receive the least amount of traffic, as they are corridors used primarily for canal maintenance, access to the Campo Verde facility and project access.

As viewed from these areas, the project will appear rising behind the earthen berms behind a foreground of vegetation and structures. As with the other views, it will relate to a large degree to the existing man-made elements in view, appearing as an extension to that which exists, relate in form, line, color and texture, to the existing overhead utilities, outbuildings, photovoltaic arrays, and operations center of the neighboring Campo Verde facility and equipment of the Imperial Valley Substation.

While the industrial buildings will introduce a scale of structure not currently present in this viewshed, they will appear lower than some of the other man-made elements that surround them and will be painted in light, earth-tone colors, thereby relating to other elements in view, both man-made and natural. Dominant mountain landforms will remain visible and foreground vegetation and canal berms will screen and buffer the lower portions of the project from view.

It is therefore anticipated that the **change in visual environment as a result of the project will be less than significant.**

Views from Local Highways

The Drew Road Corridor (S29) offers views of the project to north and southbound travelers (KOPs 7, 9, & 10). Views from this corridor encompass a foreground of agricultural fields, dirt roads, irrigation canals, a middle ground containing the Campo Verde Solar facility, overhead utilities, the Imperial Valley Substation, tall vegetation, and mountain backdrop (see figures 18 and 19). This area is assigned a low visual quality rating based on its lack of vividness, intactness, and unity.

Given the design speeds along this corridor (55 mph+/-), views of the project will be of short duration. Where visible between view-blocking foreground vegetation, and structures (Photo Simulation KOP 10, Figure 20) the project will be visible on the horizon, backed by dominant landforms, and will relate to existing transmission towers and man-made structures within the viewshed. This will serve to reduce the contrast between the project and existing visual environment.

It is therefore anticipated that, from views from local highways, **the change in visual environment as a result of the project will be less than significant.**

5.3.4 CREATE A NEW SOURCE OF SUBSTANTIAL LIGHT OR GLARE (GUIDELINE 4)

The project proposes to use security and operation lighting and non-reflective photovoltaic (PV) panels, roof top and ground-mounted, which are not anticipated to create substantial adverse light and glare impacts to surrounding areas. While there exists some potential for low angle reflection from PV panels directed south during the summer solstice, as well as some indirect reflection, adverse impacts to the built environment associated with either are not anticipated to be significant, according to the Campo Verde's Solar Glare Analysis. In addition, the project's lighting system will be designed to provide minimum illumination for security and safety. Therefore, impacts associated with substantial light and glare are considered **less than significant**.

Construction:

During construction, short -term sources of lighting and glare will occur as part of the site's staging, storage, security areas, and from vehicles accessing the site. Construction related lighting will be directed on-site. Short term sources of glare from vehicle windshields or metallic surfaces of PV panels and support structures may occur but It is anticipated that construction related lighting and glare impacts would be **less than significant.**

Operation:

Project lighting would be the minimum needed to illuminate service and security areas. Lighting would be directed on-site and utilize shielding as necessary to minimize light intrusion into dark skies and onto neighboring properties. While new sources of nighttime lighting will be introduced into the area, it is not anticipated to be substantial.

As described in further detail below, PV panels are designed to absorb light and not reflect it. Building materials, as well, will be non-reflective. While some glare impacts will occur as a result of project construction, they are not anticipated to be substantial.

While new sources of light and glare will not occur as a result of this project, they are anticipated to be **less than significant.**

Reflectivity of Flat-plate Photovoltaic Solar Panels

As discussed in the Solar Glare Analysis prepared by the Good Company for several photovoltaic ground-mounted array installations in Imperial County (citations noted), flat-plate photovoltaic solar panels are designed to absorb sunlight in order to convert it into electricity[1]. Monocrystalline silicon wafers, the basic building block of most photovoltaic solar modules, absorb up to seventy percent of the sun's solar radiation in the visible light spectrum[2]. Solar cells are typically encased in a transparent material referred to as an encapsulant and covered with a transparent cover film, commonly glass. The addition of these protective layers further reduces the amount of visible light reflected from photovoltaic modules. Photovoltaic panels are using the absorbed energy in two ways; 1) the panels generate electricity, and 2) the mass of the panels heat up.

To maximize the efficiency of electricity production, the study states, photovoltaic manufacturers design their panels to minimize the amount of reflected sunlight. The most common methods to accomplish this are the application of anti-reflective coatings and surface texturing of solar cells. Combined, these techniques can reduce reflection losses to a few percent.[3] Most solar panels are now designed with at least one anti-reflective layer and some panels have multiple layers.

Comparison of the Reflectivity of Solar Panel to the Surrounding Environment

One measure of reflectivity of solar panels to the surrounding environment described is albedo – the ratio of solar radiation across the visible and invisible light spectrum reflected by a surface. Albedo varies between 0, a surface that reflects no light, and 1, a mirror-like surface that reflects all incoming light. Solar panels with a single anti-reflective coating have a reflectivity of around 0.10. [4] By comparison, sand has an albedo between 0.15

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[1] Good Company. 2011. Solar Glare Analysis of Proposed Calipatria Solar Farm I & II

[2] Luque and Hegedus. 2003. Handbook of Photovoltaic Science and Engineering. Wiley and Sons, New Jersey

[3] Ibid.

[4] Lanier and Ang. 1990. Photovoltaic Engineering Handbook. New York: Taylor & Francis.

and 0.45 and agricultural vegetation has an albedo between 0.18 and 0.25. [5] **In other words, solar panels have a lower reflectivity than the area's prevailing ground cover, sand and agricultural crops as the Good Company study states.**

Visibility of a Direct Reflection of Sunlight for South Facing Fixed Mount Panels

The Good Company study describes the impact of south facing PV panels as follows:

To maximize electricity production, solar panels must be oriented toward the sun as much as possible. For the purpose of this analysis it is anticipated that the panels will face polar south at a tilt of 25 degrees above horizontal. The position of the sun relative to the solar panels will vary by the time of day and time of year. As a result, the angle of direct reflection from the panels will also vary accordingly. The greatest likelihood of a low angle of direct reflection that might impact the built environment occurs midday on the summer solstice when the sun is at its highest point in the sky and the angle of reflection is lowest. The potential impact at that moment is the best proxy for maximum impact overall. During summer solstice at the proposed project's latitude, the sun's solar elevation is approximately 80 degrees[6]. With the sun at this height, the resulting angle of direct reflection is approximately 50 degrees above the horizon. It is unlikely that any objects in the built environment near the project site would be adversely affected by a direct reflection of sunlight from this angle, including vehicles traveling on nearby roads or houses south of the project site.

During the winter months, when the sun travels across the sky at lower angles relative to the horizon, the angle of reflection and the resulting height of the reflected sunlight are higher. At midday on the winter solstice at the proposed project's latitude, the sun's solar elevation is approximately 34 degrees. At this angle of elevation, the resulting angle of reflection is 96 degrees. At this angle of reflection, the height of the reflected sunlight would exceed 190 feet in elevation at a distance of only 20 feet away and the further away from the array the greater the height of the reflected sunlight.

While the discussion above discusses direct reflection, the Good Company's study also addresses indirect reflections, which is the visibility of diffused sunlight on the surface of panels. As is the case with direct reflections, indirect reflections are not considered a significant concern since they are significantly less intense and as the study notes, moving just 30 degrees off a direct reflection lowers light intensity by nearly 80%.[7] And while at

5 Budikova, Dagmar. 2010. "Albedo." Encyclopedia of Earth. Washington, D.C.: Environmental Information Coalition, National

6 Based on sun chart produced by University of Oregon Solar Radiation Monitoring Laboratory's Sun Chart software

7 Glare Analysis (Calipatria I, Midway I, and Midway II), 2011.

certain times of the day an observer would have a view of an indirect reflection, the relative intensity of the reflection would not be significant or a concern.[8]

Comparison of Fixed Mount and Single-Axis Tracking Mount Panels

At midday on the summer solstice solar panels, either fixed mount or single-axis tracking mounts, will be facing the same direction and likely to produce their lowest angle reflection of the year. At other times of the year, as the Good Company study states, the angles of reflection would be higher and as such the height of direct reflection would increase as compared to the summer solstice.

Additionally, the project developer has proposed to construct a 8-foot chain link fence around the perimeter of the project, which will somewhat soften the peripheral view of the project (and any indirect reflection) for drivers traveling past the project.

In summary, direct or indirect glare impacts from either ground mounted fixed tilt or single axis tracking mounted panels are **not anticipated to be significant to viewers at ground level. Lighting for service and security areas is not anticipated to be a substantial source of light or glare.**

5.3.5 CONSISTENCY WITH APPLICABLE POLICIES & PLANNING DOCUMENTS (GUIDELINE 5)

5.3.5.1 Imperial County General Plan

The Imperial County General Plan is a broad-based planning document that contains text, maps, and diagrams explaining the County's long-range growth and development goals and policies. The adopted General Plan contains the Renewable Energy and Transmission Element which contains policies related to visual resources.

Renewable Energy and Transmission Element

This Element addresses the potential impacts associated with renewable energy to existing visual character and quality, including scenic vistas, natural environment and existing landscape, general built environment and historic buildings, and scenic highways. In addition, the Element identifies the potential for Renewable energy facilities to create new sources of substantial light or glare which would adversely affect day or nighttime views in the area.

E. Implementation Standards

3. Environmental

8 Ibid.

> *The design, siting, and operation of renewable energy facilities shall give adequate consideration to potential direct and indirect environmental impacts pursuant to the California Environmental Quality Act related to aesthetics.*

Analysis:

The project, as proposed, ties into existing transmission lines located within a designated utility corridor and will contains improvements substantially similar to those that exist in the immediate vicinity, with regard to site coverage, architecture and design. While industrial buildings 30'-60' in height, and storage tanks to 50' in height, are proposed, these structures will be partially screened by the berms and vegetation lining the Westside Main Canal, other surrounding vegetation and structures, and will be viewed in relative to the large scale, visually dominant overhead utilities that exist in the immediate area. As such, improvements will appear consistent and a part of those that currently exist, minimizing adverse aesthetic impacts by relating to existing man-made improvements in view. While changes to the visual environment will occur as a result of project implementation, contrast will be reduced, and views toward major landforms preserved, and impacts to existing visual character and quality minimized. New sources of light and glare are not anticipated to adversely affect the day or nighttime views in the area. **The project will therefore be consistent with General Plan policies related to renewable energy and transmission.**

5.3.5.2 Zoning Ordinance

The Imperial County Zoning Ordinance provides detailed regulatory provisions for development of all lands within the county. County zoning is used to implement the goals and objectives of the adopted General Plan in accordance with state law, which requires that the General Plan and corresponding zoning be consistent with one another. The project site is currently zoned A-3 (Heavy Agriculture). The project proposes a General Plan Amendment and Rezone to change the land use designation and zoning for the project site from Heavy Agriculture (A3) to Industrial. **The project will be in compliance with underlying Zoning upon approval of a General Plan Amendment and Rezone.**

5.4 Cumulative Visual Impacts

Cumulative impacts are those resulting from the combination of two or more individual effects; either (1) within a single project or (2) from a combination of multiple projects. Projects contributing to cumulative visual effects (including the proposed project) include those within the project viewshed. The viewshed encompasses the area within which the viewer is most likely to observe both the project and surrounding community uses.

Cumulatively considerable projects include those shown on the most current Imperial County Solar Farm Projects – South End Projects Map, provided as Figure 21. It includes the following projects presented in Table 2:

TABLE 2
CUMULATIVE PROJECT LIST

	Project Name	Description
1	Imperial Solar West	1,130 Acres – Under Construction
2	Ocotillo Sol	100 Acres – Approved, not built
3	Centinella Solar	422 Acres – Approved, not built
4	Wisteria Ranch Solar Energy Center	2,330 Acres – Phase 1 built; Phase 2 approved, not built
5	Drew Solar, LLC	762 Acres – Pending Entitlement
6	Vega SES	574 Acres – Pending Entitlement
7	Big Rock Cluster (Big Rock Solar)	1,380 Acres - Approved, not built

These projects, within the project viewshed, will combine with the proposed project and change the composition of the visual environment as the area transitions from agriculture to one that includes a greater number of green energy projects. This will result in physical changes that would affect the viewshed, but it is not anticipated that these changes will be significant.

The project, therefore, in conjunction with cumulatively considerable projects, **would not significantly alter the composition of the visual environment and would therefore not result in cumulatively significant adverse visual impacts.**

6.0 Visual Mitigation and Design Considerations

While impacts would be less than significant, and no mitigation is required, this conclusion assumes the project would be utilizing non-reflective, light, earth-toned colors and materials. This will enable the project to relate to, and minimize contrast with, the surrounding natural and man-made visual environment.

7.0 References

1. Federal Highways Administration, (n.d.) Visual Impact Assessments for Highway Projects.

2. Imperial County General Plan, Approved November 9, 1993, Amended October 6, 2015.

3. Southern California Association of Governments, Draft 2008 Regional Transportation PEIR, January 2008, Section 3.1 Aesthetics and Views.

4. U.S. Bureau of Land Management. 6/20/2012. Visual Resource Management System.

5. The California Desert Conservation Area (CDCA) Plan, September 2016

6. Campo Verde Solar Project Draft EIR, May 2012

7. Calipatria Solar Farm I & II EIR, 2011

8.0 List of Preparers

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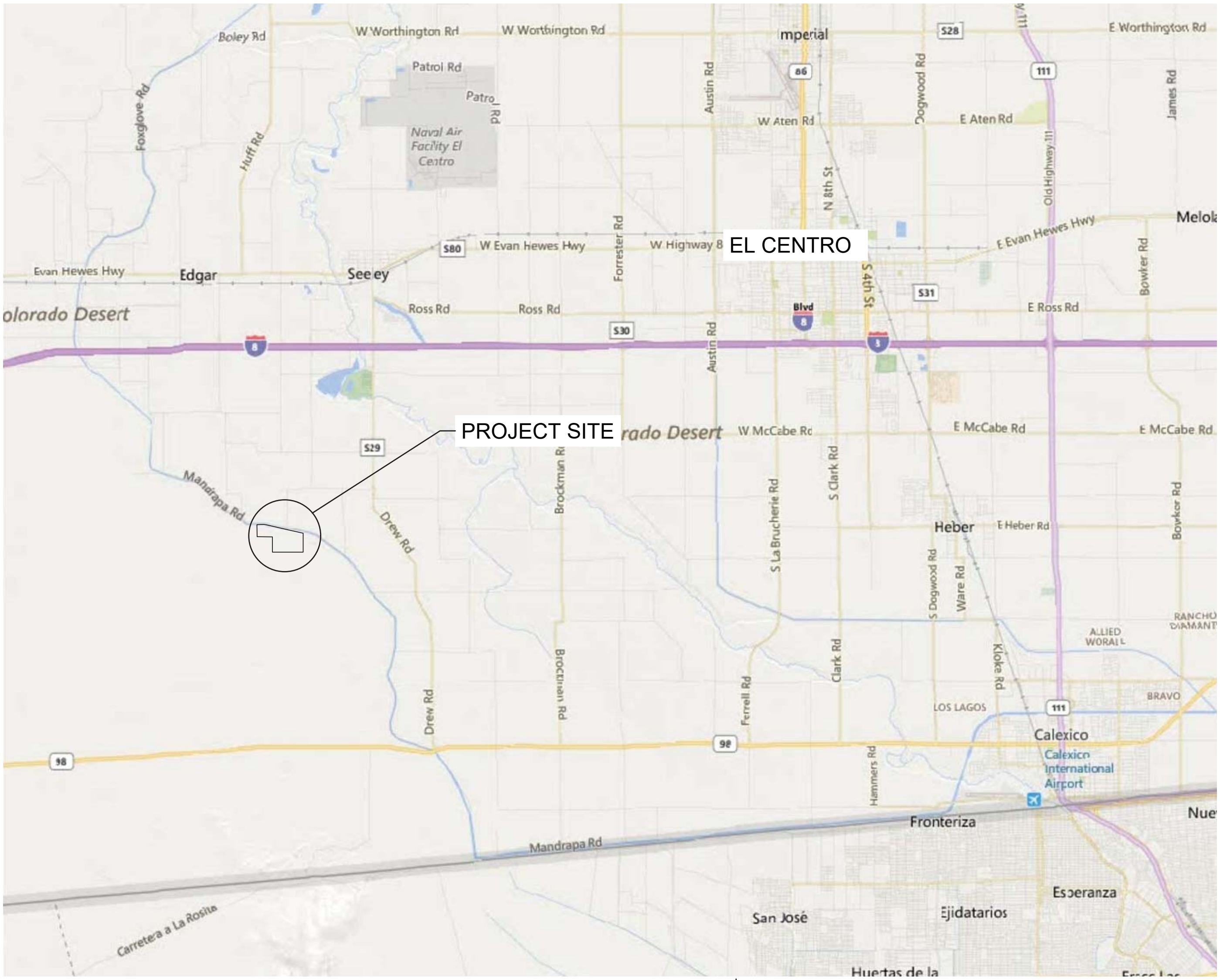

VICINITY MAP

NOT TO SCALE

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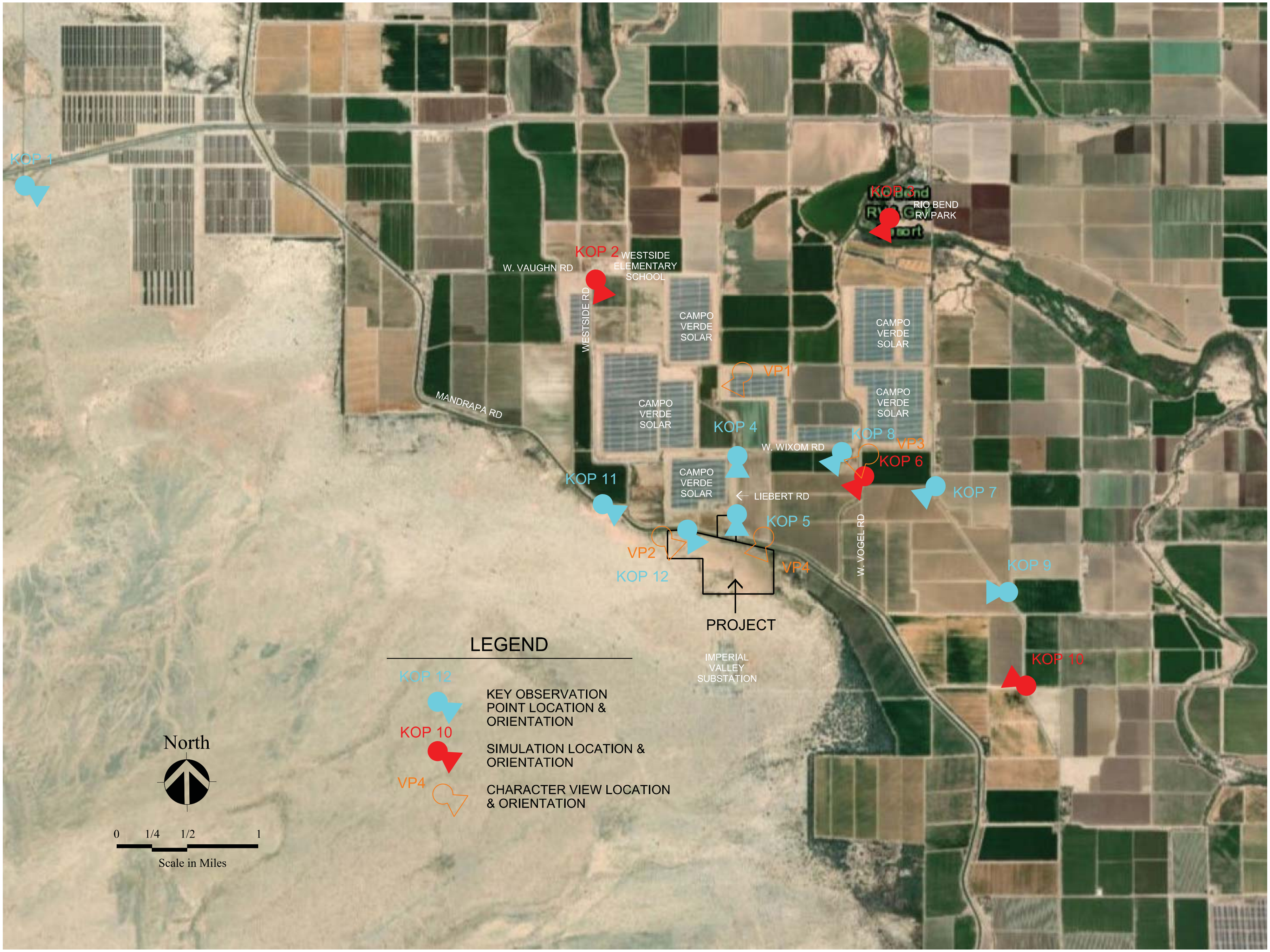
REGIONAL LOCATION MAP

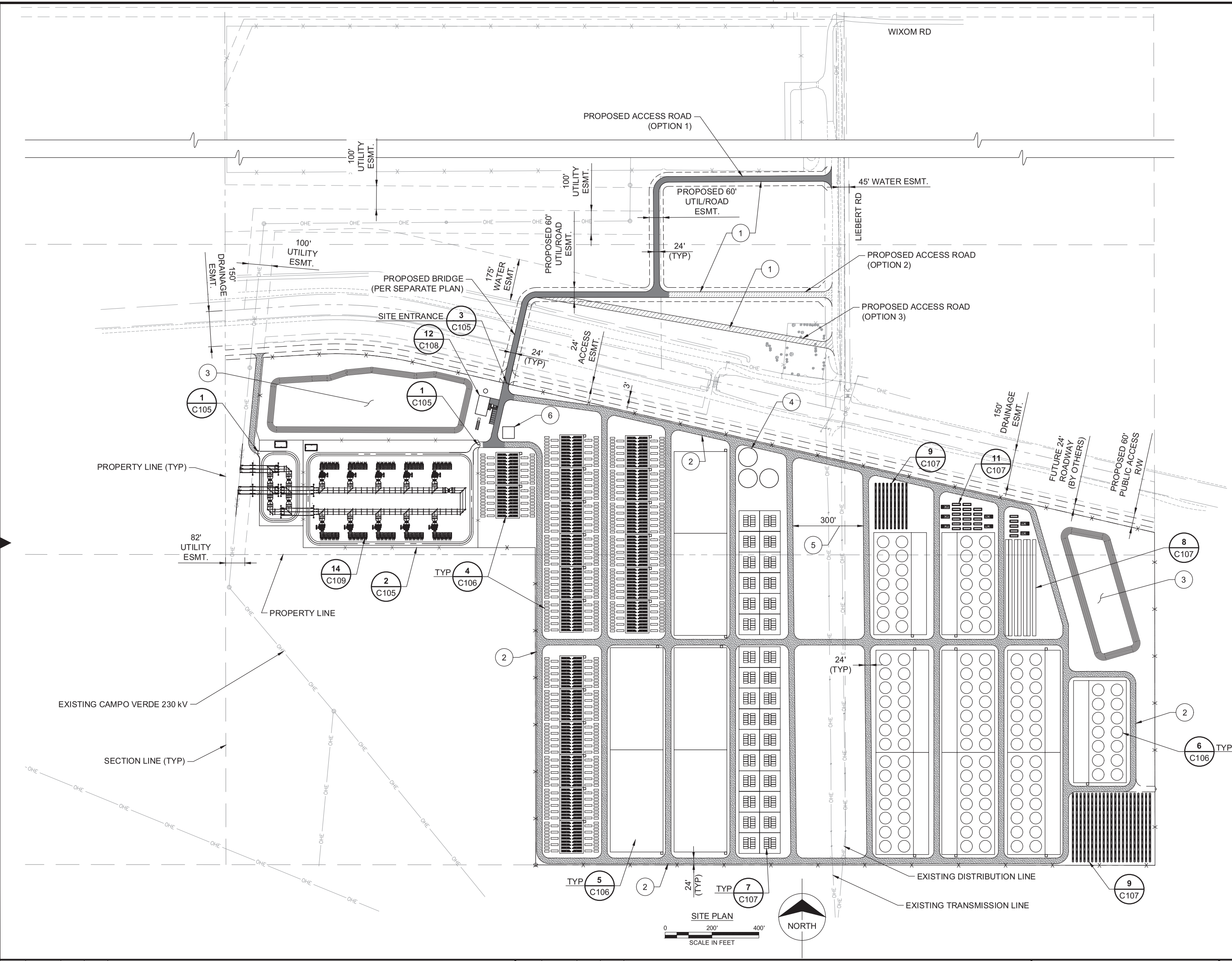
County of Imperial
July 2020

Westside Canal Solar Facility
FIGURE 1



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community, April 8, 2020

VICINITY MAP & KEY OBSERVATION POINT (KOP) LOCATIONS



KEY NOTES:

1. SITE ACCESS ROAD (GRAVEL).
2. PROPOSED GRAVEL ROADWAY.
3. STORMWATER RETENTION AREA (TYP). SEE NOTE 2.
4. PROPOSED WATER STORAGE TANK. SEE UTILITY PLAN C102.
5. TEMPORARY 300' CORRIDOR. DEFINED EASEMENT TO BE DETERMINED WITH IMPERIAL IRRIGATION DISTRICT FOR S-TRANSMISSION LINE
6. CENTRALIZED LOCATION FOR EMERGENCY GENERATORS.

NOTES:

1. THIS LAYOUT IS CONCEPTUAL IN NATURE AND IS SUBJECT TO CHANGE DURING DETAILED DESIGN.
2. STORMWATER BASINS WILL BE DESIGNED IN ACCORDANCE WITH IMPERIAL COUNTY REGULATIONS. FINAL LOCATION AND SIZE OF STORMWATER FACILITIES AND BEST MANAGEMENT PRACTICES TO BE DETERMINED AT FINAL DESIGN.
3. ALL COMPONENTS INTERCHANGEABLE TO ANY LOCATION WITHIN THE SITE BOUNDARY.

no.	date	by	ckd	description
E	07/01/19	BNS	JTD	ISSUED FOR PERMITTING
D	06/21/19	BNS	JTD	ISSUED FOR REVIEW
C	06/14/19	BNS	JTD	ISSUED FOR REVIEW
B	05/24/19	BNS	JTD	ISSUED FOR REVIEW
A	04/26/19	BNS	JTD	ISSUED FOR REVIEW

no.	date	by	ckd	description
F	07/16/19	BNS	JTD	ISSUED FOR PERMITTING

BURNS McDONNELL
9400 WARD PARKWAY
KANSAS CITY, MO 64114
816-333-9400
FIRM LICENSE NO. 11523

designed T. DOWELL
detailed B. SVOR

conEdison Development

IMPERIAL COUNTY, CA

WESTSIDE CANAL BATTERY STORAGE COMPLEX
CONDITIONAL USE PERMIT
SITE PLAN

project 110578
contract -
drawing C101 — rev. F
sheet - of - sheets
file 110578C101.dwg

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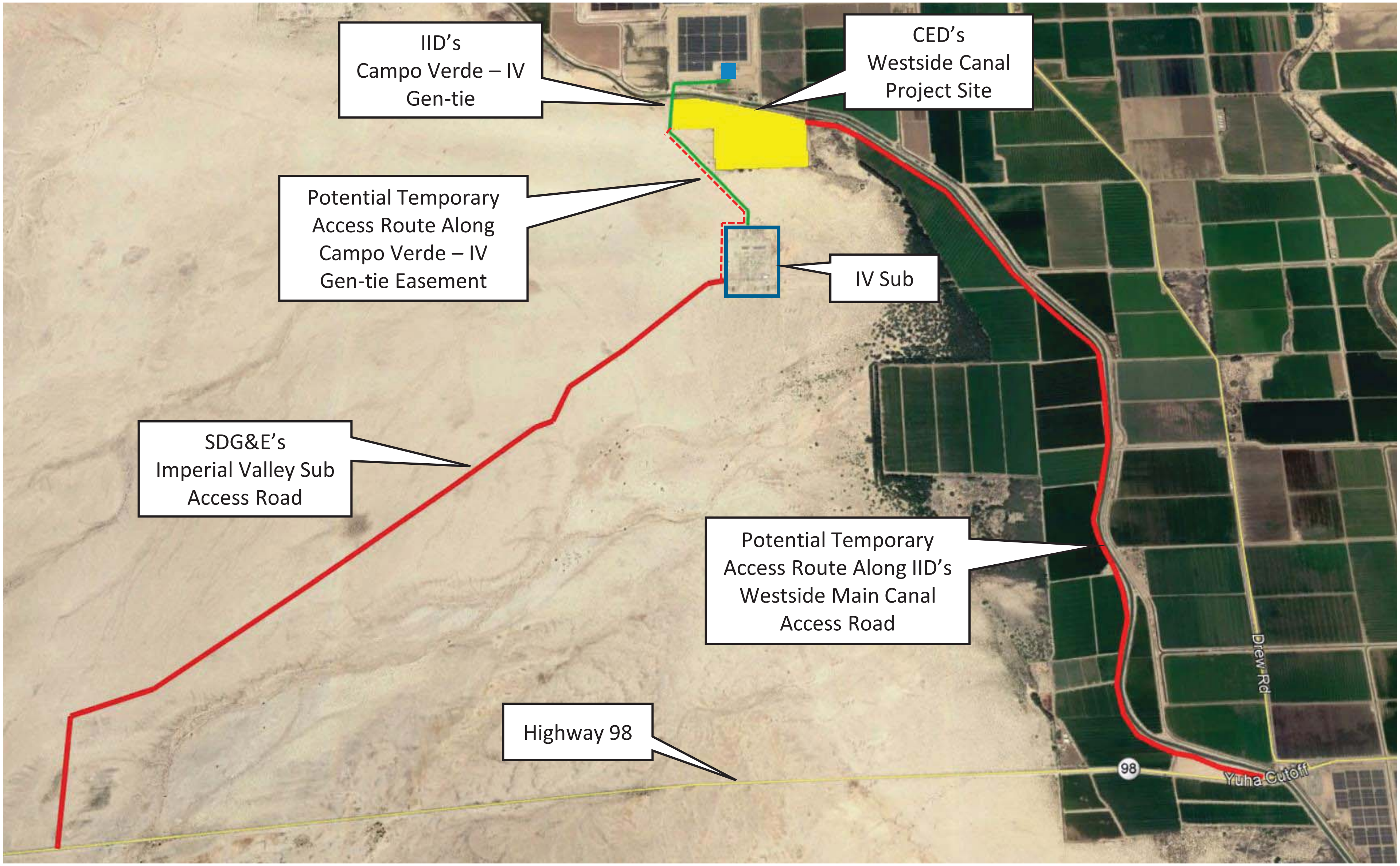
Z:\CLIENTS\ENR\SEMPRA\110578_WESTSIDE-CUP\DESIGN\CIVIL\SHEETS\110578C101.DWG 7/16/2019 2:54 PM JTDOWELL

SITE PLAN



RECON
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TEMPORARY CONSTRUCTION ACCESS ROUTES

County of Imperial
July 2020

Westside Canal Solar Facility
FIGURE 4

VP1 - View looking southwest toward the IID Campo Verde solar generation facility

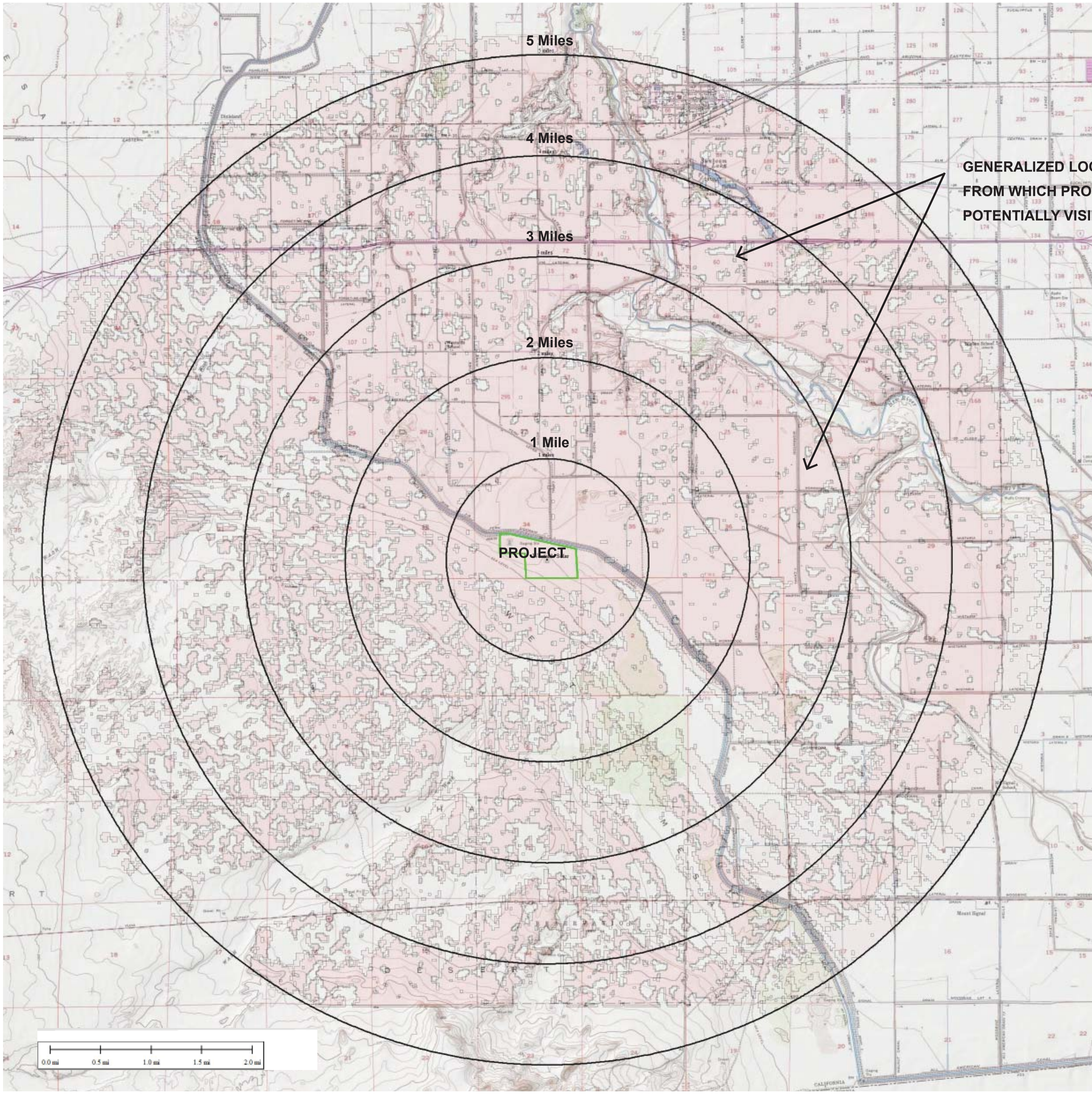
VP2 - View looking northeast toward project site, the Imperial Valley Substation, Centinella Peak, and the Yahu Desert

EXISTING CONDITIONS

VP3 - View southwest toward residential structures located on W. Wixom

VP4 - View southeast toward Project, with the Westside Canal in the foreground and Centinella Peak in the background.

EXISTING CONDITIONS



NOTES:

1. Analysis excludes view blocking foreground vegetation, & structures, and is based on digital base data accurate to within 10 meters.
2. This exhibit evaluates visibilty of a 60-foot structure to a visual receptor located 5' above existing ground elevation.

Source: Global Mapper, USGS

GENERALIZED VIEWSHED

Westside Canal Solar Facility
FIGURE 6

VISUAL INVENTORY / CHARACTER EVALUATION

Visual Inventory / Character Evaluation				
Project: WESTSIDE CANAL			Evaluator: AGEVANTHOR	
Assessment Unit: DESERT/AGRICULTURE			Date: 5/10/19	
			Weather: CLOUDY	
	PATTERN ELEMENTS			
Visual Information	**PATTERN ELEMENTS**	LANDFORM/WATER	VEGETATION	STRUCTURES/DEVELOPMENT
INTENSIVE AG INTERSPERSED WITH SOLAR ENERGY FACILITIES, PANEL ARRAYS, SUBSTATIONS, UTIL. TOWERS, EDGED BY YUHA DESERT ALDNS BROKEY BY OVERHEAD UTILS (SU NRISE POWERLINK).	Form	1 2 3 4	1 2 3 4	1 2 3 4
	Line	1 2 3 4	1 2 3 4	1 2 3 4
MTN. BAKDROP FRONTED BY MORE DRAMATIC LANDFORMS. SPARSE DESERT LANDSCAPE, CANALS, EARTHEN BERMS	Color	1 2 3 4	1 2 3 4	1 2 3 4
	Texture	1 2 3 4	1 2 3 4	1 2 3 4
	PATTERN CHARACTER			
IMG 130-CAMPO VERDE, IMG 109-PROP CORNER LOOKING N/E, IMG 137 - VIEW S/W TOWARD NB RESIDENCES, IMG 98 - VIEW S/E	**PATTERN CHARACTER**	LANDFORM/WATER	VEGETATION	STRUCTURES/DEVELOPMENT
	Dominance	1 2 3 4	1 2 3 4	1 2 3 4
	Scale	1 2 3 4	1 2 3 4	1 2 3 4
	Visual Diversity	1 2 3 4	1 2 3 4	1 2 3 4
	Continuity	1 2 3 4	1 2 3 4	1 2 3 4
	Evaluation Scale:			
	3=High Prominance			
	2=Moderate Prominance			
	1=Present			

Visual Quality Evaluation

Project: Westside Canal
Assessment Unit:
Desert/Ag/Solar
Camera: Sony RX100

Evaluator: Agevanthor
Date: 5/10/19
Weather: Cloudy

Evaluation Scale:
1=Very Low
4=Medium
7=Very High

Observer Position
S=Superior
N=Normal
I=Inferior

Project Distance
F=Foregro to 1/4 miles
M=Middle 1/4 to 3 miles
B=Backgro beyond 3 miles

	VIEW					VISUAL QUALITY								IMPACT			
		SETTING					Vividness		Intactness		Unity						
							Memorability of landscape components as they combine in striking and distinctive visual patterns.		The integrity of visual pattern. The extent to which the landscape is free from visual encroachments.		The degree to which visual elements of the landscape join to form a coherent, harmonious visual pattern						
Observer Viewpo	Proposed/Existin	Land Use	Observer Positio	Project Distance	General Visual Quality	Overall Vividness	FEATURES	General Intactne	ENCROACHMENT	Overall Unity	ELEMENTS	(V+I+U) /3		Visual Quality Differn	Positive Difference	Negative Difference	Image No.
	E	OS	N	B	3	3	OPEN DESERT	3	BROKEN UP BY MM UTILS	2	LACKS UNITY	2.67					156
KOP1	P					3	OVERHEAD UTIL. MTN BKDROP	3	AGRICULTURE	2		2.67		0			
	E	AG	N	M	2	3	AG/SOLAR FAC/BKGD MNTS	3	BROKEN UP BY MM UTILS	2	LACKS UNITY	2.67					192
KOP2*	P					3		3	AGRICULTURE	2		2.67		0			
	E	SSU	N	M	3	4	GOLF COURSE, OS, AG LAND	3	DESERT LANDSCAPE BROKEN	3	SOMEWHAT UNIFIED	3.3					149
KOP3*	P					4	DISTINCTIVE PEAKS, M.G. UTILS	3	BY MM ELEMENTS	3		3.3		0			
	E	AG	N	M	2	3	BKGD LANDFORMS	2	NONE	2		2.3					129
KOP4	P					3	DOMINANT UTIL PATTERNS	2		2		2.3		0			130
	E	I	N	M	2	3	MTN PEAKS, MEMORABLE	2	BROKEN UP BY MM UTILS	2	LACKS UNITY	2.33					124
KOP5	P					3	DESERT, AG	2	AGRICULTURE, ROADS	2		2.3		0		0.33	
	E	AG	N	F	2	3	MTN PEAKS, MEMORABLE	2	BROKEN UP BY MM UTILS	2	LACKS UNITY	2.33					140
KOP6*	P					3	DESERT, AG	2	AGRICULTURE, ROADS	2		2.33		0			
	E	AG	N	M	2	3	MTN PEAKS, MEMORABLE	2	BROKEN UP BY MM UTILS	2		2.33					142
KOP7	P					3	DESERT, AG	2	AGRICULTURE, ROADS	2		2.33		0			
	E	AG	N	F	2	3	MTN BKDROP	2	WORKING/INTENSIVE	2		2.33					135
KOP8	P					3		2	AGRICULTURE	2		2.33		0			
	E	AG	I	M	2	3	MTN BKDROP	2	WORKING/INTENSIVE	2		2.33					146
KOP9	P					3		2	AGRICULTURE	2		2.33		0			

* Evaluated with aid of photo simulation. Analysis for other views extrapolated.

VISUAL QUALITY EVALUATION

Visual Quality Evaluation

Project: Westside Canal
Assessment Unit:
Desert/Ag/Solar
Camera: Sony RX100

Evaluator: Agevanthor
Date: 5/10/19
Weather: Cloudy

Evaluation Scale:
1=Very Low
4=Medium
7=Very High

Observer Position
S=Superior
N=Normal
I=Inferior

Project Distance
F=Foregroı to 1/4 miles
M=Middle 1/4 to 3 miles
B=Backgro beyond 3 miles

	VIEW					VISUAL QUALITY								IMPACT			
		SETTING					Vividness		Intactness		Unity						
							Memorability of landscape components as they combine in striking and distinctive visual patterns.		The integrity of visual pattern. The extent to which the landscape is free from visual encroachments.		The degree to which visual elements of the landscape join to form a coherent, harmonious visual pattern						
Observer Viewpo	Proposed/Existin	Land Use	Observer Positio	Project Distance	General Visual Quality	Overall Vividness	FEATURES	General Intactne	ENCROACHMENT	Overall Unity	ELEMENTS	(V+I+U) /3		Visual Quality Differn	Positive Impact	Negative Impact	Image No.
	E	AG	N	M	2	2	UNREMARKABLE OPEN DESERT	2	BROKEN UP BY MM UTILS	2	LACKS UNITY	2.0					148
KOP10*	P					2	OVERHEAD UTIL. MTN BKDROP	2	AGRICULTURE	2		2.0		0.0			
	E	AG	N	F	3	3	AG/SOLAR FAC/BKGD MNTS	3	BROKEN UP BY MM UTILS	3	SOMEWHAT UNIFIED	3.0					96
KOP11	P					2		2	AGRICULTURE	2		2.0		1.0		1.0	
	E	AG	N	I	3	3	OS, AG LAND,UTILS	3	DESERT LANDSCAPE BROKEN	3	SOMEWHAT UNIFIED	3.0					112
KOP12	P					2		2	BY MM ELEMENTS	2		2.0		1.0		1.0	
	E																
	P																
	E																
	P																
	E																
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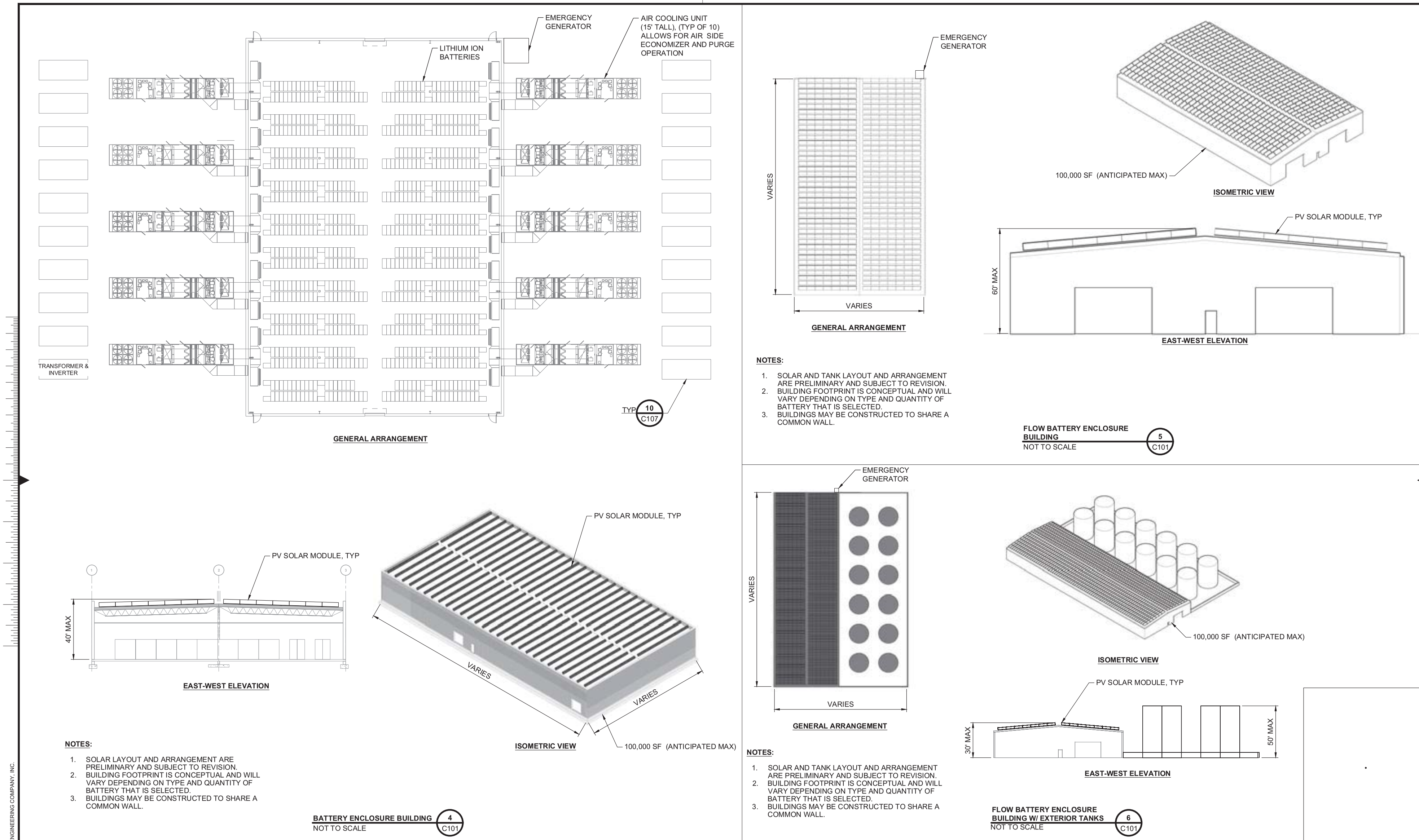
* Evaluated with aid of photo simulation. Analysis for other views extrapolated.

VISUAL QUALITY EVALUATION



NOTES:

1. SOLAR LAYOUT AND ARRANGEMENT ARE PRELIMINARY AND SUBJECT TO REVISION.
2. BUILDING FOOTPRINT IS CONCEPTUAL AND WILL VARY DEPENDING ON TYPE AND QUANTITY OF BATTERY THAT IS SELECTED.
3. BUILDINGS MAY BE CONSTRUCTED TO SHARE A COMMON WALL.

NOTES:

1. SOLAR AND TANK LAYOUT AND ARRANGEMENT ARE PRELIMINARY AND SUBJECT TO REVISION.
2. BUILDING FOOTPRINT IS CONCEPTUAL AND WILL VARY DEPENDING ON TYPE AND QUANTITY OF BATTERY THAT IS SELECTED.
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NOTES:

1. SOLAR AND TANK LAYOUT AND ARRANGEMENT ARE PRELIMINARY AND SUBJECT TO REVISION.
2. BUILDING FOOTPRINT IS CONCEPTUAL AND WILL VARY DEPENDING ON TYPE AND QUANTITY OF BATTERY THAT IS SELECTED.
3. BUILDINGS MAY BE CONSTRUCTED TO SHARE A COMMON WALL.

no.	date	by	ckd	description
E	07/01/19	BNS	JTD	ISSUED FOR PERMITTING
D	06/21/19	BNS	JTD	ISSUED FOR REVIEW
C	06/14/19	BNS	JTD	ISSUED FOR REVIEW
B	05/24/19	BNS	JTD	ISSUED FOR REVIEW
A	04/26/19	BNS	JTD	ISSUED FOR REVIEW

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KANSAS CITY, MO 64114
816-333-9400
FIRM LICENSE NO. 11523

designed T. DOWELL | detailed B. SVOR

conEdison Development
IMPERIAL COUNTY, CA

WESTSIDE CANAL BATTERY STORAGE COMPLEX
CONDITIONAL USE PERMIT
SITE DETAILS

project 110578 | contract -
drawing C106 | rev. E
sheet - of - sheets
file 110578C106.dwg

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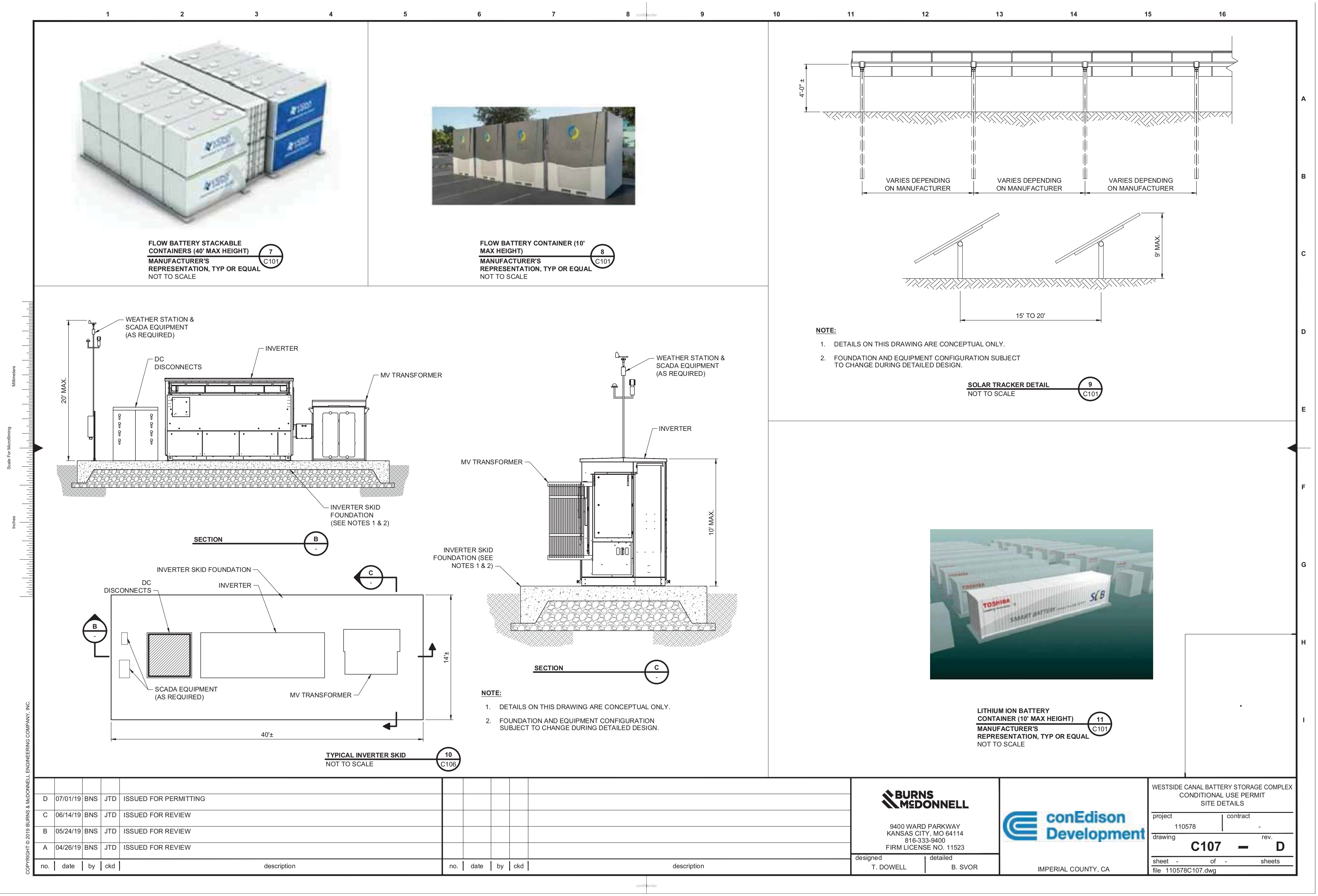
SITE PLAN ELEMENTS



SITE PLAN ELEMENTS

County of Imperial
July 2020

Westside Canal Solar Facility
FIGURE 10

KOP #1 - View from Interstate-8 and Dunaway Rd looking southeast, approximately 5 miles from project.

KOP #2 - View near the Westview Elementary School looking southeast, approximately 1.8 miles from project.

KEY OBSERVATION POINTS (KOPs)

KOP #2 - View near the Westview Elementary School looking southeast.

PHOTO SIMULATION KOP #2

KOP #3 - View south from southern end of Rio Bend RV Resort and Golf Course, approx. 2.5 miles from project.

KOP #4 - View south from southern edge of residence located north of West Wixom/Liebert Roads, approx. .6 miles from site.

KEY OBSERVATION POINTS (KOPs)

KOP #3 - View looking south from the southern end of the Rio Bend RV Resort and Golf Course Community.

PHOTO SIMULATION KOP #3

KOP #5 - View south toward project from Liebert Rd near southern edge of the Campo Verde Solar Project, approx. .2 miles from site.

KOP #6 - View southwest from Vogel Rd., south of existing residence at intersection of Vogel /W. Wixom Rd, .8 miles from site.

KEY OBSERVATION POINTS (KOPs)

KOP #6 - View looking southwest from a location on Vogel Rd., south of an existing residence located at the intersection of Vogel Rd and W. Wixom Rd

PHOTO SIMULATION KOP #6

KOP #11 - View from Mandrapa Rd. looking southeast approximately .49 miles from project.

KOP #12 - View south of canal approximately 236' from project entry.

KEY OBSERVATION POINTS (KOPs)

KOP #7 - Looking southwest from Drew Rd, south of existing residence at intersection of Drew/W. Grahm Rd., approx. 1.2 miles from site..

KOP #8 - View southwest from residence located at 1995 W. Wixom Rd., approx. .84 miles from project.

KEY OBSERVATION POINTS (KOPs)

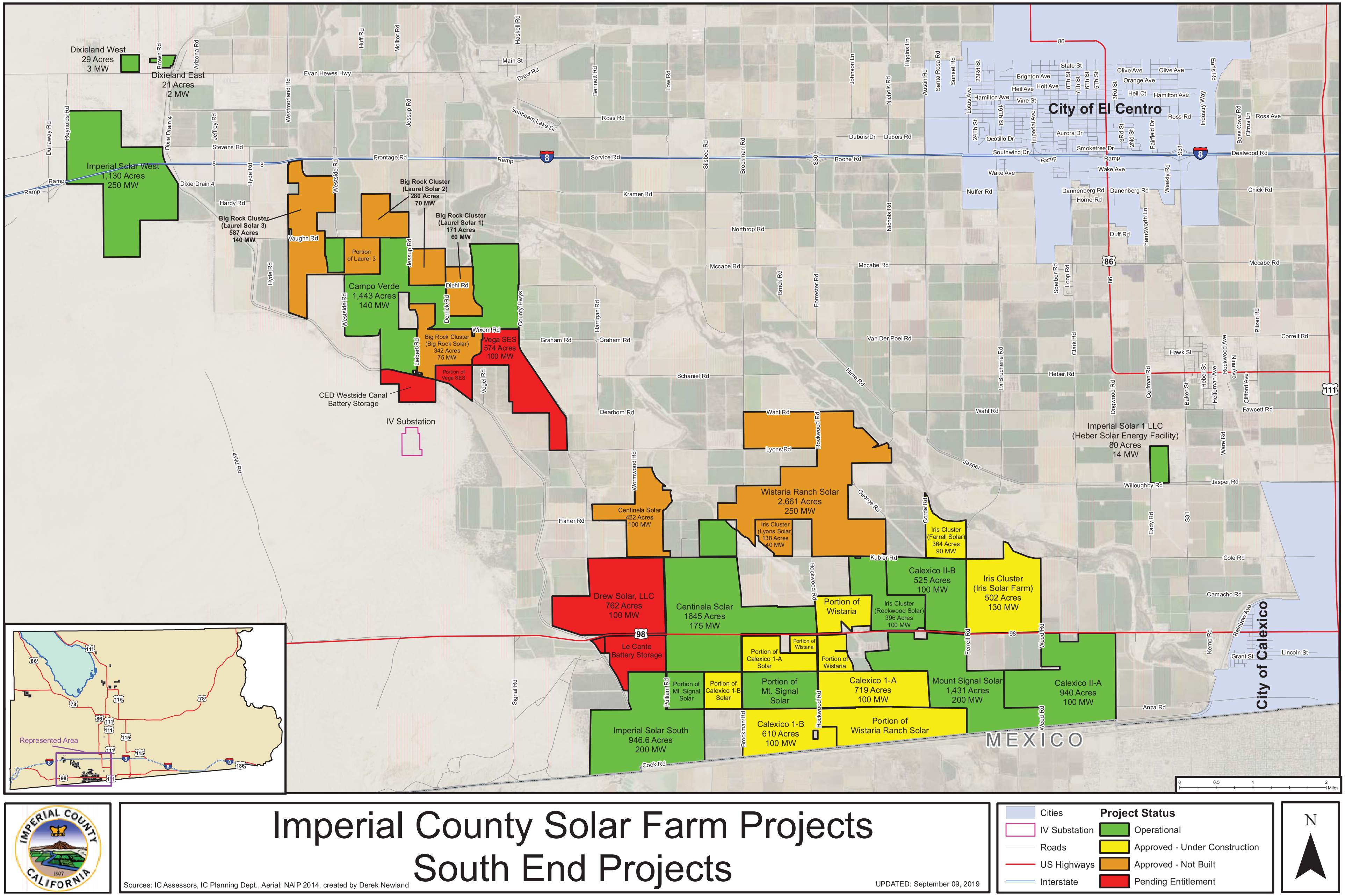
KOP #9 - View looking west toward project from Drew Rd., approx. 1.7 miles from project.

KOP #10 - View looking northwest from Drew Rd. and Lyons, approximately 1.9 miles from project.

KEY OBSERVATION POINTS (KOPs)

KOP #10 - View looking northwest from Drew Rd. and Lyons

PHOTO SIMULATION KOP #10



Imperial County Solar Farm Projects – South End Projects Map

APPENDIX B – AESTHETIC AND VISUAL RESOURCES

B.2. Solar Glare Hazard Analysis

Solar Glare Hazard Analysis: Westside Canal Battery Storage Project

To: RECON Environmental, Inc.: Michael Page and Nick Larkin
Date: May 2020
From: Good Company: Justin Overdevest and Joshua Proudfoot

KEY FINDINGS

- **Short windows of glare:** Glare could occur from March through October for short periods of time (approximately 5-20 minutes) during morning and evening hours with most sites experiencing low or no glare. The intensity of the glare is low to moderate, never extensive or dangerous.
- **Assessed multiple observation points:** Strategically placed Key Observation Points (KOPs) were analyzed surrounding the site, with only five of the 18 points showing potential for glare.
- **No dwellings or commercials structures are affected:** Only auxiliary gravel roads, agricultural areas, and electrical lines indicated potential for glare.
- **Taller building design more of a challenge:** The potential for glare is highest with the 50-foot building height, 25-degree panel tilt roof-mount array option, with generally higher glare anticipated from the 25-degree tilt over 10-degree tilt.
- **No impact on adjacent sensitive sites:** There is no airport/runway glare predicted at Imperial County Airport nor the nearby U.S. Naval Air Facility. There is no glare at either Air Traffic Control Tower (ATCT). There is no glare predicted at the nearby Imperial Valley substation.

PROJECT DESCRIPTION

RECON hired Good Company to evaluate the potential for glare from the proposed Westside Canal Battery Storage (project) located in Imperial County, CA to surrounding ground-level key observation points (KOPs). The KOPs assessed include roads, agricultural areas, utility sites, and surrounding air strips including flight approaches and take offs.

Consolidated Edison Development, Inc. (CED) is proposing to develop, design, construct, own, operate, and maintain the CED Westside Canal Battery Storage Project (project), a utility-scale energy storage complex with a capacity of up to 2,000 megawatts (MW). The project would store energy generation from the electrical grid, and optimally discharge that energy back into the grid as firm, reliable generation and/or grid services.

The project would be comprised of lithium-ion battery and/or flow battery energy storage facilities, a behind-the-meter solar energy facility, a new on-site 230 kilovolt (kV) loop-in switching station, a 34.5kV to 230kV substation, underground electrical cables, and permanent vehicular access to and from the site over a proposed bridge spanning Imperial Irrigation District's (IID's) Westside Main Canal. The proposed loop-in switching station would connect the project to the existing IID Campo Verde-Imperial Valley 230 kV radial gen-tie line, which connects to the Imperial Valley Substation (IV Substation) and the California Independent System Operator (CAISO), approximately one-third mile south of the project site. CED has submitted the necessary Interconnection Request Applications to the CAISO and IID.

The project would complement both the existing operational renewable energy facilities, as well as those planned for future development in the County, and would support the broader Southern California bulk electric transmission system by serving as a firm, dispatchable resource.

The project would be constructed in three to five phases over a 10-year period, with each phase ranging from approximately 25 MW up to 400 MW per phase. Depending on the size of the battery system for a given phase, construction and commissioning (approval to operate) is anticipated to take approximately 6 to 12 months. For the purposes of this analysis, the applicant has assumed that construction activities would last for approximately 32 months to complete the full project build-out.

Construction of the 100- to 200- MW first phase would include roads, a permanent clear-span bridge across the Westside Main Canal, the Operations and Maintenance (O&M) facilities, water connections and water-mains, storm water retention, switching station and project substation, legal permanent vehicle access, as well as the first energy storage facility. To access the project site, construction workers would travel along Interstate 8 (I-8) and head 4.6 miles south to the project site, and would utilize the IID Fern Check Bridge as a pedestrian bridge until the permanent bridge is constructed. During peak construction activities, approximately 200 workers and approximately 30 daily deliveries would be required. If approved, it is anticipated that construction of the first phase would begin in 2021.

It is anticipated that each subsequent phase would be constructed within one to two years of each other, with the timing and size of each phase dependent on market conditions and the applicant's ability to secure commercial contracts with prospective customers. With the project being built in phases, the necessary infrastructure, such as water mains, retention ponds, and access roads, would be built out to serve the project phases from west to east and expanded over time to serve each phase. These subsequent phases would require improvements such as additional substation equipment, water main and site road extension, but would not require construction of additional common facilities which would be completed during the first phase. The total nameplate (or rated capacity) capacity of the project at full build-out (all phases completed) would be approximately 2,000 MW.

Construction activities during all project phases would only occur Monday through Friday, between the hours of 7:00 a.m. and 7:00 p.m. or Saturday between the hours of 9:00 a.m. and 5:00 p.m., excluding holidays, per County Ordinance.

On-site photovoltaic (PV) solar generation will serve as station auxiliary power and be deployed throughout the project site, constructed during each phase. Each PV module would be constructed out of a poly-crystalline silicon semiconductor material encapsulated in glass, in which the PV effect would allow the electrons to flow through that material to produce electricity. The PV modules will be organized into electrical groups referred to as an array. Arrays can be mounted on a rooftop, on a motionless ground-mounted steel structure, or a rotating PV tracker. For a fixed ground mount or tracker, each array will encompass 5-8 or more acres of PV panels (producing at least 1 MWAC or more) and include at least one DC to AC inverter. Construction would include installation of mounting posts, module rail assemblies, PV modules, inverters, transformers and buried electrical conductors. Concrete would be required for the footings, foundations and pads for the transformers and substation work. Tracker foundations would be comprised of either driven or vibrated steel posts/pipes, and/or concrete in some places (depending on soil and underground conditions).

Roof mounted arrays will be set approximately 6-24" above the roof surface, and anchored to the building structure with a ballasted assembly, or a bolt and rail system. The size of each array will depend upon the capacity of the associated inverters, which in turn will depend upon the type and size of inverters available for purchase and other related electrical design considerations. Conductors will extend from the PV panels to the inverter(s) via a cable management system either underground or aboveground. The output of the inverter(s) will be connected to a transformer (if needed), to match the voltage at the point of interconnection (480V, 34.5kV, etc.). The interconnection point will be behind the on-site service meter. The transformers will connect to the system auxiliary load with an above ground or underground cable management system, such as overhead power lines, conduit, direct burial cables, etc.

PROJECT LOCATION

The project would be located in the unincorporated Mount Signal area of the County, approximately 8.0 miles southwest of the city of El Centro and approximately 5.3 miles north of the U.S.-Mexico border. The project site is comprised of two parcels owned by CED, Assessor Parcel Number (APN) 051-350-010 and APN 051-350-011, totaling approximately 148 acres. These parcels have limited access corridors for vehicular traffic and are considered less desirable for agricultural production, as reflected by the last 15 years during which no farming activity has occurred.

The project site is approximately one-third mile north of the IV Substation and directly south of the intersection of Liebert Road and the IID's Westside Main Canal. The project site is bounded by the Westside Main Canal to the north, Bureau of Land Management lands to the south and west, and vacant private land to the east. The Campo Verde solar generation facility is located north of the project site, across the Westside Main Canal. Figure 2 shows the project site on a U.S. Geological Survey Map. Figure 3a shows an aerial photograph of the project site and the above-mentioned nearby facilities.

The two project parcels are proposed for development as a utility-scale energy storage complex. The project would also utilize portions of two parcels located north of the Westside Main Canal (APN 051-350-019 owned by IID and APN 051-350-018 owned by a private land owner) for site access and as a temporary construction staging area. The project would also access a small portion of APN 051-350-009 within an IID easement for connection to the existing IID Campo Verde Imperial Valley 230 kV radial gen-tie line during the construction of a substation on the project site. The total proposed project development footprint, encompassing both temporary and permanent impacts, would be 163.32 acres.

METHODOLOGY

The purpose of a glare analysis is to assess the potential impact of glare from PV modules and other components as a potential hazard or distraction for motorists, nearby residences, commercial and agriculture facilities, airports and approaching airplanes. Glare is a common phenomenon that originates from the reflection of a light source (usually the sun) off any reflective service (e.g., windows, chrome automobile bumpers, water, etc.).

The methodology for the analysis consists of two parts: 1) identifying the observational points of concern ("key observation points," or KOPs) around the project site, and 2) conducting the calculations necessary to determine if the observational points of concern intersect with the angles of light reflection, resulting in glare.

RECON provided the location of the project site and we selected points of concern and KOPs using Google Maps. For the Westside Canal project site, our team identified adjacent road intersections, residential and agricultural structures, and regional air strips. Airport analyses include air traffic control towers and approaching flight paths and pilot visibility.

The calculations in this analysis are based on the Solar Glare Hazard Analysis Tool (SGHAT) methodology and tool, developed by Sandia National Laboratory for the U.S. Department of Energy. This subscription-based online tool is built on a Google Maps platform and allows assessment for potential solar glare hazard based on multiple variables including: panel elevations, observation points, panel tilt, panel orientation, reflectivity, peak direct normal irradiance and ocular measurements. The following points describe the main variables adjusted for this analysis:

- **Panel elevation:** refers to the height of the panels. To account for multiple architectural design options being considered by the development team, models were run at 5 ft., 20 ft., 30 ft., 40 ft., and 50 ft.

- **Panel orientation:** refers to the direction the panel is facing. Orientation is expressed in degrees off of due north. For example, 90° represents due east, whereas 180° is due south and 270° is due west. Models were run for 180°, facing due south.
- **Panel tilt**: angle of the panels. To account for multiple options, models for these fixed-tilt panels were run at 10° and 25° off horizontal.
- **Reflectivity:** refers to the amount of light reflected. This variable can be manually set or variable depending on glass surface texture and the presence of anti-reflective coatings (ARC).
- **Observation Height:** refers to the height of each KOP used for calculating glare. A height of five feet is used to compare to ground level observers either standing or driving vehicles. No multi-story structures are located adjacent to the site.
- **ATCT observation height:** refers to the height of Air Traffic Control Tower. KOPs for ATCTs were set at 100 ft.

The SGHAT tool's output provides a finding of whether or not the potential for glare exists as a result of the angle of reflected light reaching a particular observation point and the related intensity of the glare. The tool calculates the angle reflection for all hours of the day and all days of the year based on the changing azimuth[1] of the sun.

For approaching airplanes to designated runways, SGHAT calculates glare every quarter mile beginning at the threshold (beginning of runway) to two miles out. Flight path heights of each quarter mile point are calculated based on the threshold height above ground, glide slope and threshold elevation.

SGHAT has become the *de facto* option for solar glare hazard analysis due to its ease of use, powerful analytical abilities and design pedigree and acceptance by such organizations as the Federal Aviation Administration (FAA). ***Good Company's analysis is wholly dependent on the information provided by the developer client, RECON and the abilities and limits of the SGHAT tool.***

DEFINING SOLAR GLARE HAZARD

Glare can be described as a continuous source of excessive brightness.[2] Glare, and its effect on vision, is not a simple measurement because the effect of glare depends on a number of

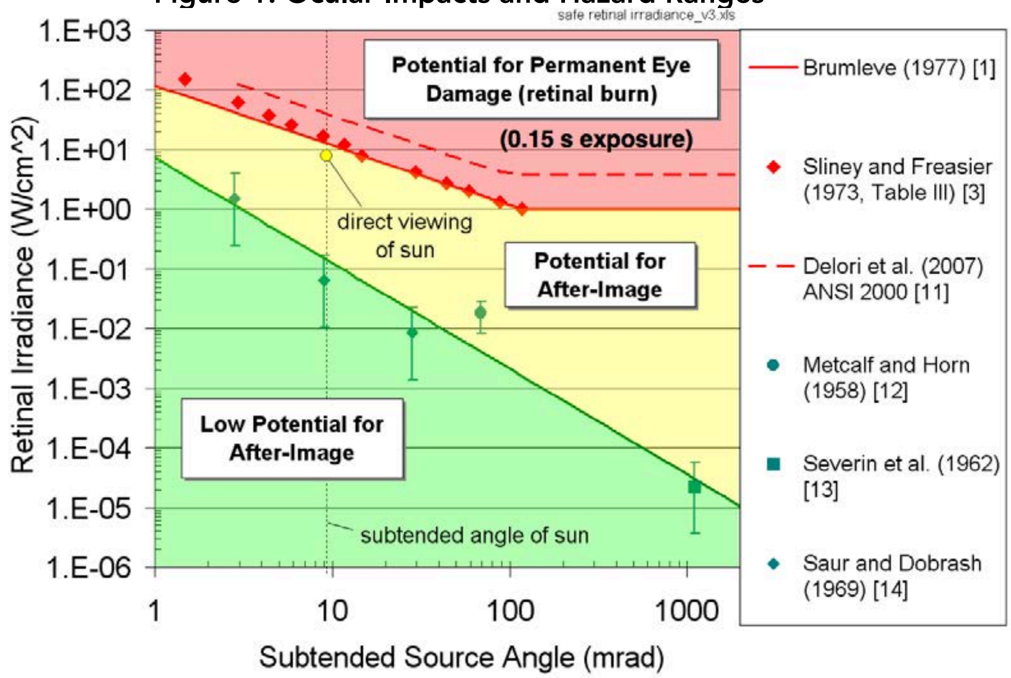
[1] Azimuth is the horizontal direction expressed as the angular distance between the direction of a fixed point (as the observer's heading) and the direction of the object. This word is being used here to describe the arc of the sun in the sky as it changes with the seasons (i.e. higher arc in the summer and lower in winter).

[2] Ho and Khalsa. 2011. *Summary of Impact Analyses of Renewable Energy Technologies on Aviation and Airports.* Sandia National Laboratories. Retrieved October 30, 2013 at https://share.sandia.gov/phlux/static/references/glint-glare/SGHAT_Ho.pdf

factors including the source radiance, source angle, duration of exposure, wavelength, pupil diameter and eye focal length.

Retinal irradiance (W/cm^2 – watts per cm^2) and *subtended source angle* (mrad) are the two main factors used to assess impact on the human eye. Retinal irradiance calculates the total power of the light entering the pupil and the retinal image area. *Subtended source angle* is calculated using the light source size, distance and focal length. These two factors are shown as axes of Figure 1, which maps the potential ocular impacts and thresholds for each of the three bands of potential hazard from available research on the subject.

Figure 1: Ocular Impacts and Hazard Ranges

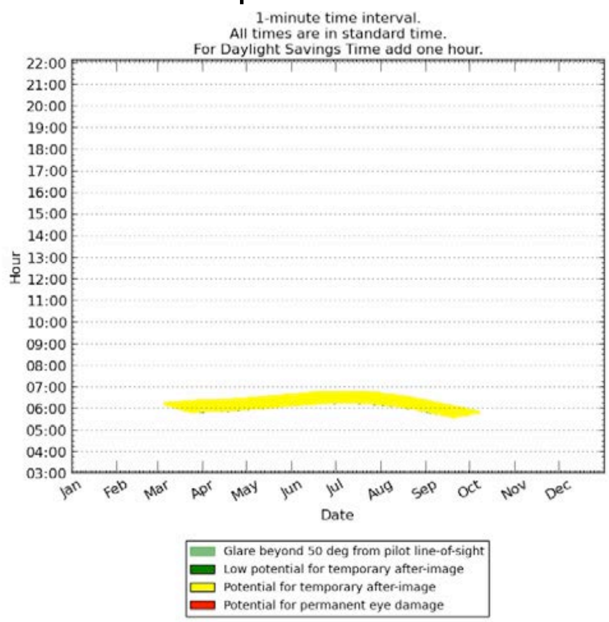


Source: Solar Glare Hazard Analysis Tool (SGHAT, 2018) https://share-ng.sandia.gov/glare-tools/

After-image experiences (green and yellow bands in Figure 1 above) vary broadly and are commonly described as flash blindness, which results from bright sources of light bleaching retinal visual pigments. Commonly, yellow can mean caution, and in some instances potential for after-image can infer caution such as when directly viewing the sun (a point labeled in Figure 1). However, when considering the results of the SGHAT tool, it is important to remember that the yellow band describes a range of effects, not a single point or single effect. Experiencing after-image potential is common. Examples of after-image potential include the eye's reaction to a flash bulb or a light being turned on in a dark room. The red band is not applicable to this analysis, as PV or CPV panels are not capable of creating the conditions that would cause permanent eye damage.

This technical definition of glare is provided to the reader as background information because the SGHAT tool uses calculated values for *retinal irradiance and subtended source angle*, and the same colors used in Figure 1, to describe the intensity of glare in the results. Figure 2 provides an example of the one output from the SGHAT tool. The yellow line shows the timing, duration and intensity of glare (yellow = potential for temporary after image). Data from the tool may also be downloaded as a text file.

Figure 2: Example of SGHAT Results Graphic



Source: Solar Glare Hazard Analysis Tool (SGHAT, 2018) https://share-ng.sandia.gov/glare-tools/
Note: This image is not a result from this study. No pilot line-of-sight glare was found during this analysis.

ANALYSIS

The project analysis consisted of 18 key observation points (KOPs) representing road, utility, and agricultural sites. No commercial or residential sites were present. Two airplane runways were analyzed: Imperial County Airport (11 miles northeast of the site) and U.S. Naval Air Facility El Centro (7 miles north-northeast of the site). The topography gradually slopes upward to the south and west, becoming steeper in the southwest.

Figure 3: Examples of large roof-mounted and ground-mounted solar PV arrays.

This glare analysis was run for flat-plate fixed-axis PV modules (or panels) with a fixed tilt of either 10° or 25° off horizontal facing due south (180°). A fixed-axis solar panel will reflect some light based on the angle of the sun relative to the surface of the panel. Panel reflectivity was assessed with SGHAT tool using an assumed smooth glass panel with anti-reflective coating (ARC) with SGHAT varying the reflectivity based on angle of sun incidence. Generally, smooth glass panels with ARC have a reflectivity of 2%. When the sun is closer to the horizon during sunrise and sunset, it will be reflected in the opposite direction at glancing angles (angles greater than 60%). Because the sun is so low in the sky during these times of the day, it is at these times that the likelihood for glare to be an issue at ground level is the greatest for ground-level observation points. At large glancing angles, reflectivity for PV modules can be 20% or more, even with texturing and anti-glare coatings.[3] Heights of 5 feet, 20 feet, 30 feet, 40 feet, and 50 feet were analyzed to allow for multiple architectural possibilities of both ground-mounted and rooftop arrays, with panel tilts of both 10 degrees and 25 degrees.

The 115-acre site was defined as having a combination of solar PV and battery storage coverage. Total spatial PV coverage was used based on the site boundaries provided by the solar developer client to assess all options.

Roads, structures and agricultural lands that are near the site were selected as KOPs. A substation to the south and an electrical power line were also selected in case of personnel performing work at either location. An observation height of five feet is used and is

[3] Ho, C. April 2013. Relieving a Glaring Problem, Solar Today
https://share.sandia.gov/phlux/static/references/glint-glare/Ho-SolarToday-April13_v2.pdf

representative of sitting near first story windows and car windows. No multi-story buildings appeared to be present based on satellite imagery available from the SGHAT tool.

The airport analysis consists of a KOP at each site representing an air traffic control tower and flight paths of approaching flights out to two miles. The regional airport is 11 miles northeast of the PV site and the flight approaches are from the southeast/northwest (152°/332°) and east/west (90°/270°). The nearby U.S. Naval Facility is seven miles north-northeast of the PV site and the flight approaches are from southeast/northwest (135°/315°) and east/west (90°/270°). The flight path approaches take into account the pilot's line-of-sight.

SITEWIDE RESULTS

All options assumed 180° orientation (due south) and a KOP observation height of five feet. The analysis estimated 5-20 minutes of glare per day during select months – see *Results by KOP* section for details. For reference, there are **525,600 minutes in one year**.

Green blocks represent number of minutes in one year of "low potential to cause temporary after-image" per the SGHAT tool. Yellow blocks represent number of minutes in one year of "potential to cause temporary after-image" per the SGHAT tool. See Individual KOP Results section for details.

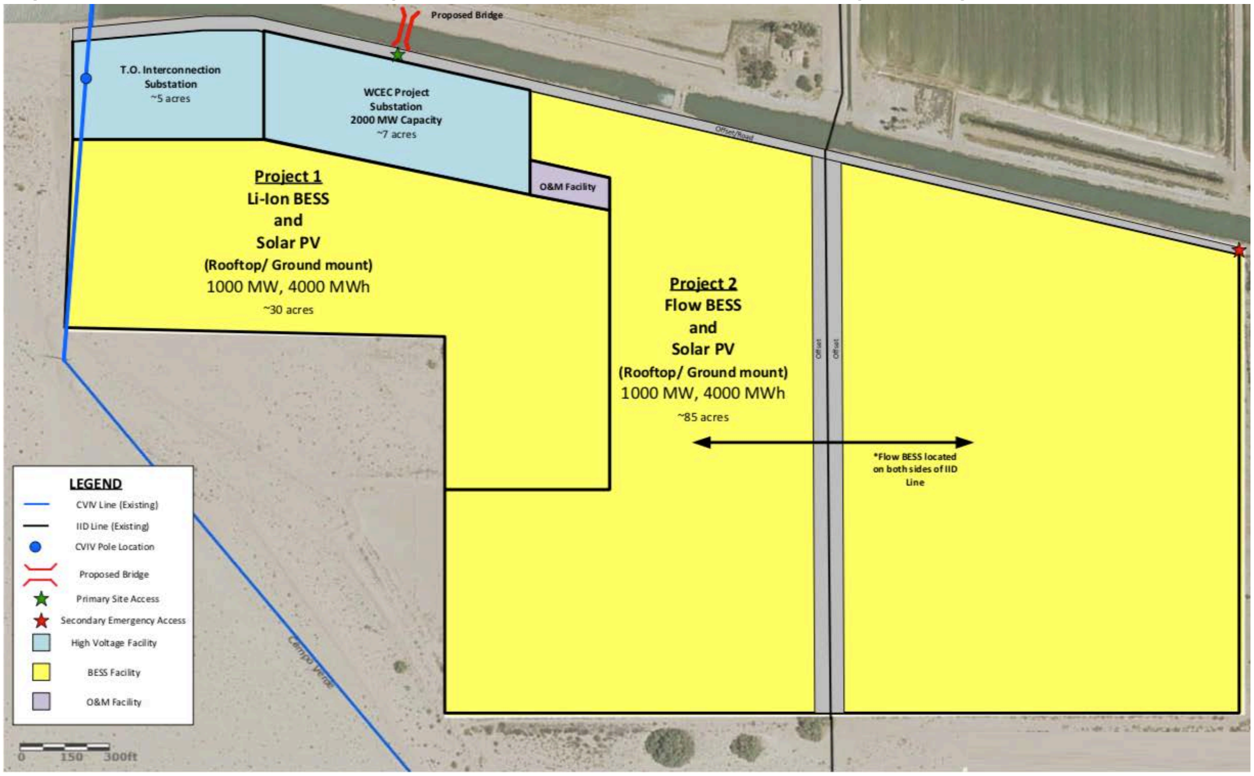
Figure 4: Summary of Glare Results for the Westside Canal Project 1 (minutes per year)

PROJECT 1	**10-degree tilt**		**25-degree tilt**	
Ground (5 ft).	263	901	163	1597
20 ft	279	372	249	927
30 ft	267	118	272	444
40 ft	369	406	292	819
50 ft	313	522	293	1216

Figure 5: Summary of Glare Results for the Westside Canal Project 2 (minutes per year)

PROJECT 2	**10-degree tilt**		**25-degree tilt**	
Ground (5 ft).	86	4325	-	3863
20 ft	118	1770	4	3018
30 ft	84	2800	2	4300
40 ft	183	2643	3	4823
50 ft	176	3038	6	5261

Figure 6: Conceptual Site Layout of the Westside Canal Battery Storage Complex



Potential for after-image was detected at five of the 18 KOPs representing select roads, agricultural sites, and structures with anticipated human activity (see bold items below). KOP sites are as follows (see Figure 7):

1. Nearby electrical utility facility, north of the site
2. **Nearby built facility on the irrigation canal, north of the site**
    a. Project 1: glare detected at all panel heights
    b. Project 2: glare detected at ground-level and 20ft panel heights
3. **Corner of Mandrapa Road and Fig Drain, east of the site**
    a. Project 1: glare detected at all panel heights
    b. Project 2: glare detected at all panel heights
4. Nearby electrical substation, south of the site
5. Agricultural site/dirt road west of Mandrapa Road and Lyons Road, southeast of the site
6. **Corner of Mandrapa Road and Lyons Road, southeast of the site**
    a. Project 1: glare detected at all panel heights
    b. Project 2: glare detected at all panel heights
7. Agricultural site/dirt road west of Mandrapa Road, southeast of the site
8. Highway 98/Yuha Cutoff – a section of road west of Tom's Hay Farm, south-southeast of the site
9. Highway 98/Yuha Cutoff, south of the site
10. Highway 98/Yuha Cutoff, southwest of the site
11. Highway 98/Yuha Cutoff, southwest of the site
12. A residential structure on the south side of the irrigation canal near Mandrapa Road, northwest of the site
13. Westside Road at the corner of a solar array installation, northwest of the site
14. A residence near Fern Canal south of Diehl Road, north of the site
15. A residence near Liebert Road and Wixom Road, north of the site
16. A residence near Wixom Road and Vogel Road, northeast of the site
17. **A utility pole (no other structures), southwest of the site**
    a. Project 1: glare detected at all panel heights
    b. Project 2: glare detected at all panel heights
18. **A nearby structure (aerial views indicate that the structure may be abandoned or used only for storage), north of the site**
    a. Project 1: glare detected at all panel heights
    b. Project 2: glare detected at 20ft, 30ft, 40ft, and 50ft panel heights

In addition to the 18 regular KOPs, two air facilities, their runway flight paths, and air traffic control towers (ATCT) were analyzed. The ATCTs will be listed as KOPs in the SGHAT reports.

19. US Naval Base El Centro, runway flight path, and ATCT (100 ft), north of the site
20. Imperial County Airport, runway flight path, and ATCT (100 ft), northeast of the site

Figure 7: Map showing site and all KOPs

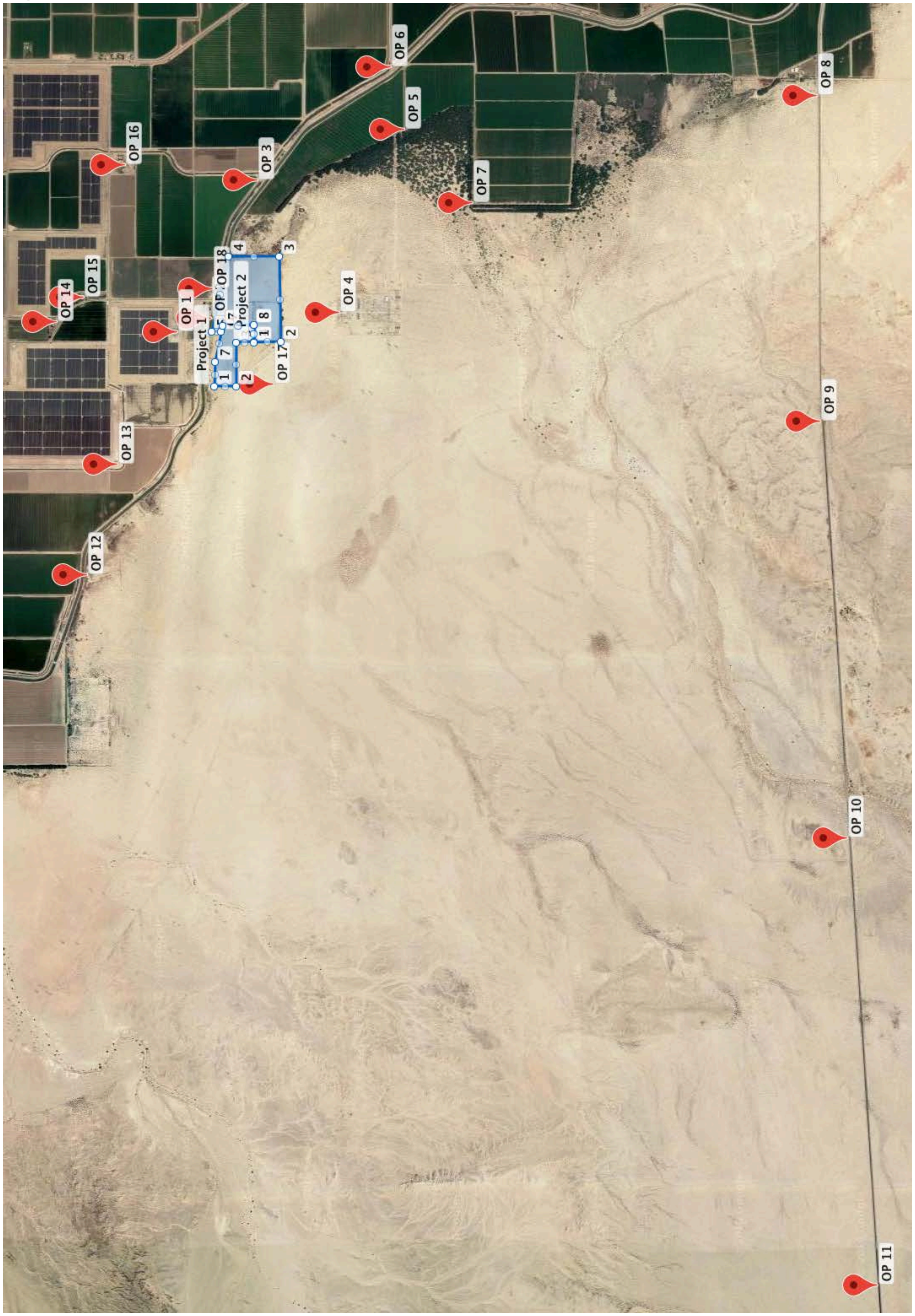
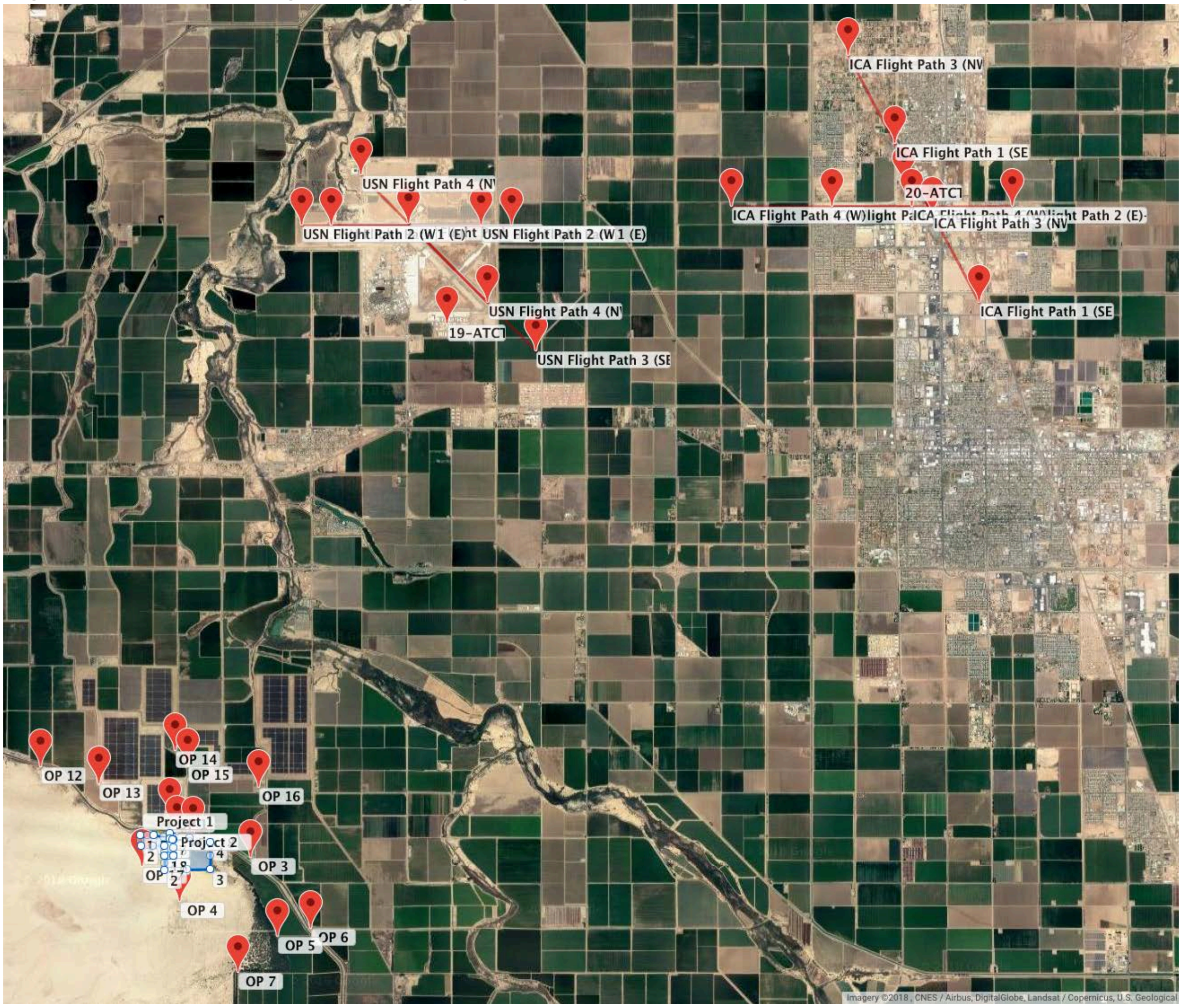


Figure 8: Map showing site, majority of KOPs, and both airport facilities



Potential for glare exists from March to October for all panel heights and tilt angles. The potential for after-image is present only for short periods of time (5 – 20 minutes) in the morning or evening. Details for months of the year and time of day are available in detailed Results by KOP section.

Figure 9: Summary of Glare Results for the Westside Canal Project 1: KOPs with potential for glare in minutes per year.

PROJECT 1		10-degree tilt		25-degree tilt	
Ground (5 ft).	KOP 2:	-	-	-	1
	KOP 3:	269	129	223	497
	KOP 6:	89	-	57	-
	KOP 17:	-	1102	-	1455
	KOP 18:	-	-	2	10
20 ft	KOP 2:	-	-	-	1
	KOP 3:	237	104	194	395
	KOP 6:	42	-	55	-
	KOP 17:	-	261	-	522
	KOP 18:	-	7	-	9
30 ft	KOP 2:	-	-	-	1
	KOP 3:	193	101	208	415
	KOP 6:	73	-	62	-
	KOP 17:	-	10	-	15
	KOP 18:	1	7	2	13
40 ft	KOP 2:	-	1	-	-
	KOP 3:	276	57	219	445
	KOP 6:	93	-	71	-
	KOP 17:	-	347	-	361
	KOP 18:	-	1	2	13
50 ft	KOP 2:	-	-	-	1
	KOP 3:	223	82	228	478
	KOP 6:	89	-	65	-
	KOP 17:	-	436	-	722
	KOP 18:	1	4	-	15

Figure 10: Summary of Glare Results for the Westside Canal Project 2: KOPs with potential for glare in minutes per year.

PROJECT 2		10-degree tilt		25-degree tilt	
Ground (5 ft).	KOP 2:	-	327	-	101
	KOP 3:	7	589	-	1244
	KOP 6:	101	178	-	302
	KOP 17:	-	3034	-	2928
20 ft	KOP 2:	-	-	-	3
	KOP 3:	4	641	4	1428
	KOP 6:	114	222	-	189
	KOP 17:	-	907	-	1393
	KOP 18:	-	-	-	5
30 ft	KOP 3:	3	885	2	1601

	KOP 6:	81	174	-	164
	KOP 17:	-	1740	-	2520
	KOP 18:	-	1	-	15
40 ft	KOP 3:	5	757	3	1740
	KOP 6:	178	184	-	259
	KOP 17:	-	1700	-	2812
	KOP 18:	-	2	-	12
50 ft	KOP 3:	5	963	5	1888
	KOP 6:	171	161	-	321
	KOP 17:	-	1914	1	3048
	KOP 18:	-	-	-	4

Figure 11: A close-up view with the five KOPs with potential for glare: 2, 3, 6, 17, and 18

RESULTS BY KOP

This section provides more detailed information on the potential impacts to affected KOPs. KOPs that have no anticipated glare are not included (other than airports) but can be reviewed in the Appendices.

Assumptions by the SGHAT tool:

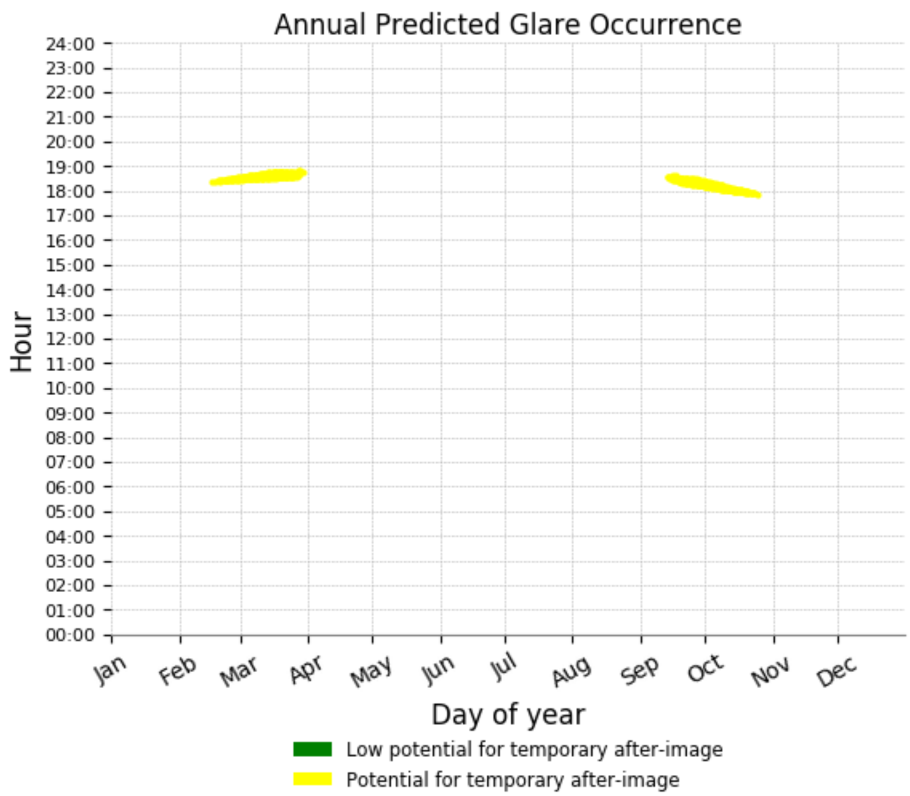
- Times associated with glare are denoted in Standard time. For Daylight Savings, add one hour.
- Glare analyses do not account for physical obstructions between reflectors and receptors. This includes buildings, tree cover and geographic obstructions.
- Detailed system geometry is not rigorously simulated.
- The glare hazard determination relies on several approximations including observer eye characteristics, angle of view, and typical blink response time. Actual values and results may vary.
- Several calculations utilize the PV array centroid, rather than the actual glare spot location, due to 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.)
- Hazard zone boundaries shown in the Glare Hazard plot are an approximation and visual aid. Actual ocular impact outcomes encompass a continuous, not discrete, spectrum.
- 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.
- Refer to the User's Manual for assumptions and limitations not listed here.

How to read the results:

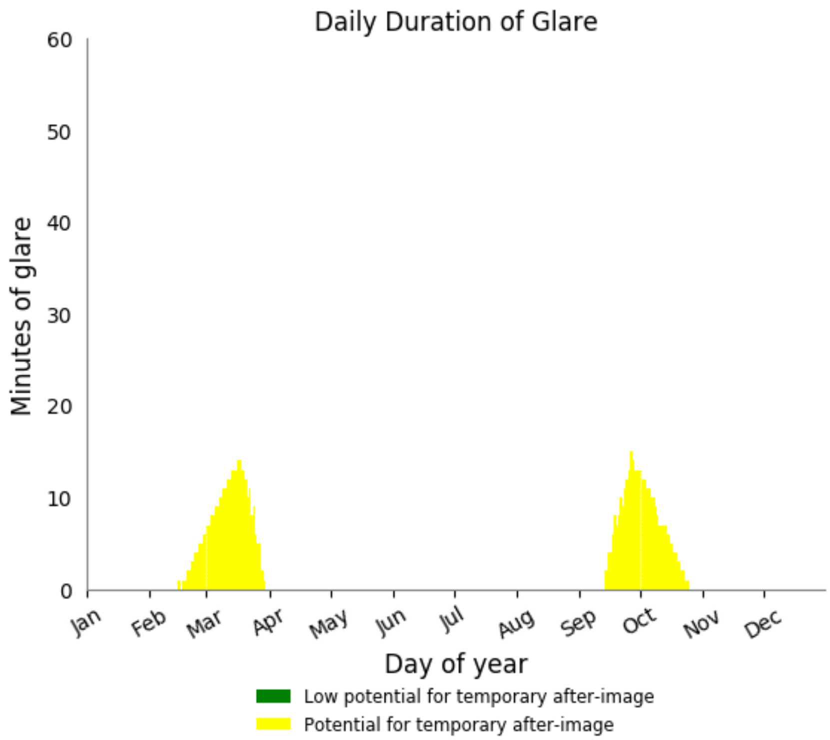
- **Satellite images:** All images courtesy of satellite imagery from the SGHAT tool.
- **Description:** Brief description of the location of the KOP.
- **Table results:** These tables describe analysis results for individual KOP with all scenarios, by project, in minutes per year.
    - Green blocks represent number of minutes in one year of "low potential to cause temporary after-image" per the SGHAT tool.

- Yellow blocks represent number of minutes in one year of "potential to cause temporary after-image" per the SGHAT tool. See individual KOP results for details.

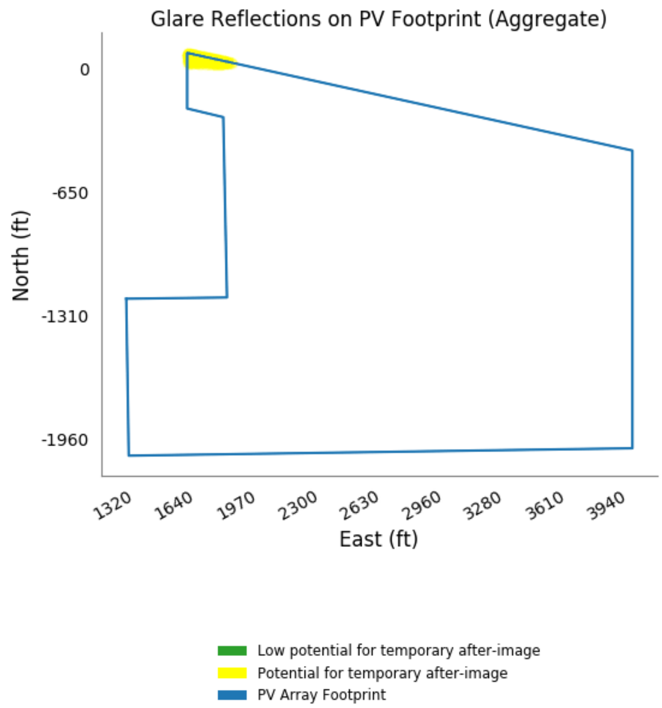
- **Impacts:** Brief description of severity and timing of anticipated glare.
- **Sample details:** Four graphics from the reports were selected for detailed review, including annual predicted glare occurrence, daily duration of glare, glare reflection on PV footprint, and hazard plot. Only the most impactful scenario was selected. All scenarios can be viewed in Appendices. Explanation of how to read the graphics using the sample details from KOP 2:
  - Green colors represent "low potential to cause temporary after-image"
  - Yellow colors represent "potential to cause temporary after-image"
  - **Annual predicted glare occurrence:** This graphic explains what time of year that glare is anticipated, as well as what time of day. The following graphic shows that glare is anticipated to occur approximately between 6pm and 7pm, from mid-February to end of March, and mid-September to end of October. Keep in mind that times associated with glare are denoted in Standard time. For Daylight Savings, add one hour.



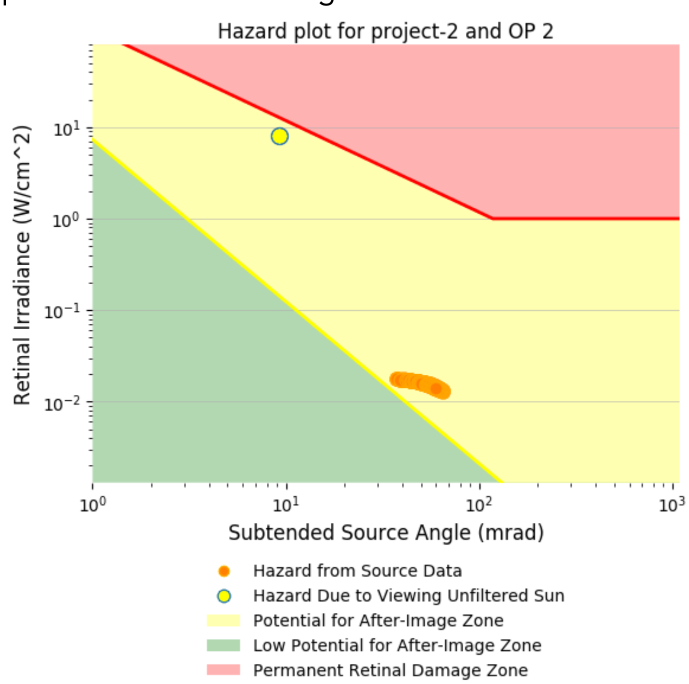
- **Daily duration of glare:** This graphic explains how many minutes per day of glare is expected for a given day of the year. The following graphic shows that glare is anticipated to occur for approximately 1-15 minutes per day, starting in mid-February, peaking at 15 minutes per day in March, and ending at the end of March. Glare is also predicted for 1-15 minutes starting in mid-September, peaking at 15 minutes per day at the end of September, and ending at the end of October.



- **Glare reflection on PV footprint:** This graphic outlines the project site and shows where glare is coming from. The following graphic has glare reflecting only from the far northwest corner of the site. Graphics will show either an outline of Project 1 or Project 2 (not both) depending on which scenario had stronger glare.



- **Hazard plot:** This graphic shows the hazard of the glare to the human eye. Glare from the site is mapped in orange circles, with a mapped yellow and blue circle representing direct viewing of unfiltered sun by comparison. For details explaining the components of this graphic, please see the *Defining Solar Glare* section of the methodology chapter of this report. Note: no scenario yielded permanent retinal damage.



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Glare results for Key Observation Point 2:

Figure 12: KOP detail and context maps.

Description: KOP 2 is located north and adjacent to the site, on an existing bridge and facility on the water channel. This facility does not appear to be frequently visited.

Figure 13: analysis results for individual KOP with all scenarios, by project, in minutes per year.

PROJECT 1	10-degree tilt		25-degree tilt	
Ground (5 ft).	-	-	-	1
20 ft	-	-	-	1
30 ft	-	-	-	1
40 ft	-	1	-	-
50 ft	-	-	-	1

Figure 14: analysis results for individual KOP with all scenarios, by project, in minutes per year.

PROJECT 2	10-degree tilt		25-degree tilt	
Ground (5 ft).	-	327	-	101
20 ft	-	-	-	3
30 ft	-	-	-	-
40 ft	-	-	-	-
50 ft	-	-	-	-

Impacts: Low impact with less than 15 minutes of glare in the evenings during spring and fall months.

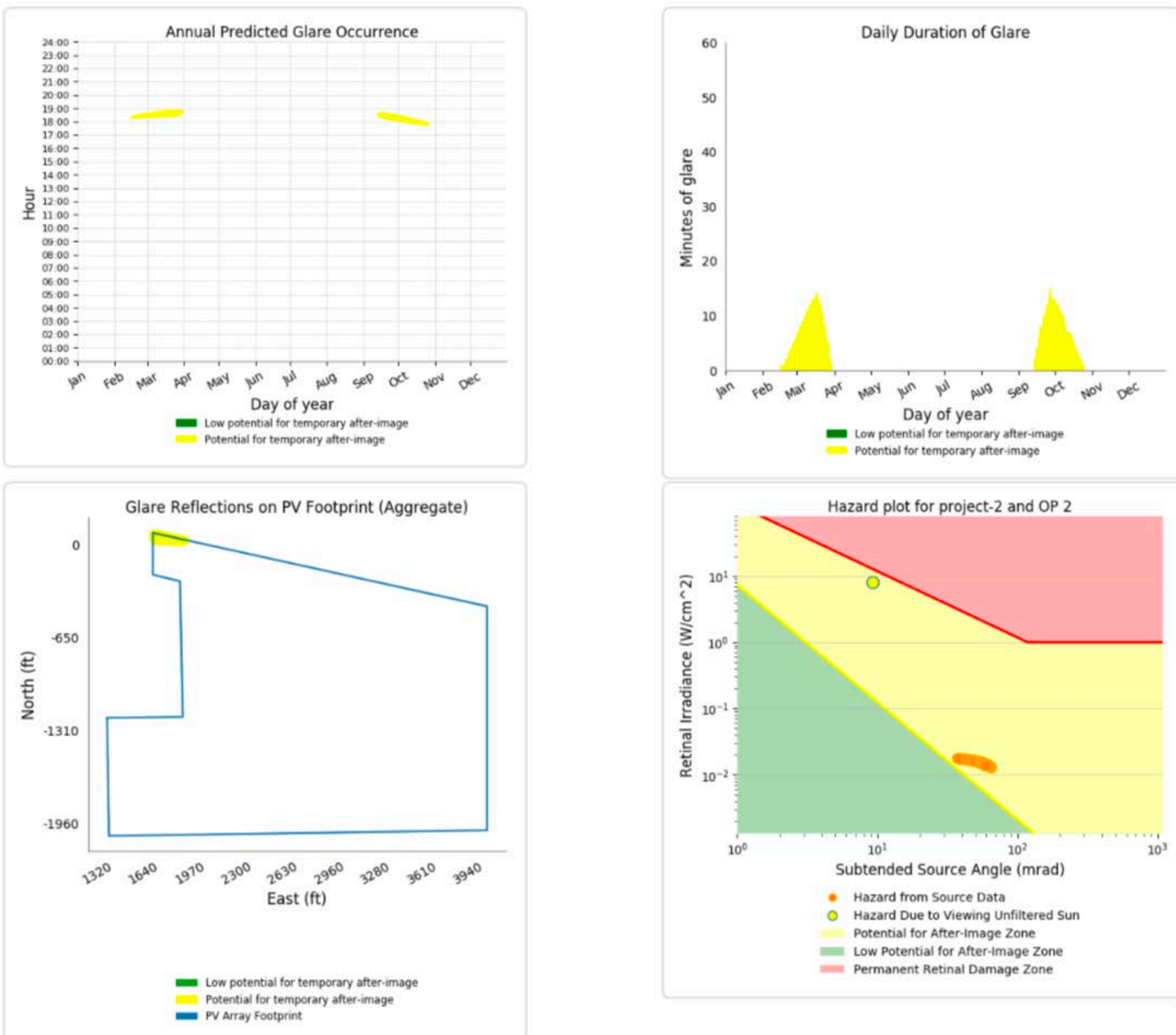
Sample details:
Detailed annual predicted glare occurrence, daily duration of glare, glare reflection on PV footprint, and hazard plot from highest glare scenario.

Figure 15: Project 2, Ground-mount at 10-degree tilt

Project 2 - OP Receptor (OP 2)

PV array is expected to produce the following glare for receptors at this location:

- 0 minutes of "green" glare with low potential to cause temporary after-image.
- 644 minutes of "yellow" glare with potential to cause temporary after-image.



Glare results for Key Observation Point 3:

Figure 16: KOP detail and context maps.

Description: KOP 3 is located east of the site on the intersection of Mandrapa Road and Fig Drain, near agricultural land. No structures nearby.

Figure 17: analysis results for individual KOP with all scenarios, by project, in minutes per year.

PROJECT 1	10-degree tilt		25-degree tilt	
Ground (5 ft).	269	129	223	497
20 ft	237	104	194	395
30 ft	193	101	208	415
40 ft	276	57	219	445
50 ft	223	82	228	478

Figure 18: analysis results for individual KOP with all scenarios, by project, in minutes per year.

PROJECT 2	10-degree tilt		25-degree tilt	
Ground (5 ft).	7	589	-	1244
20 ft	4	641	4	1428
30 ft	3	885	2	1601
40 ft	5	757	3	1740
50 ft	5	963	5	1888

Impacts: Moderate impact with less than 20 minutes of glare in the evenings during spring through fall months.

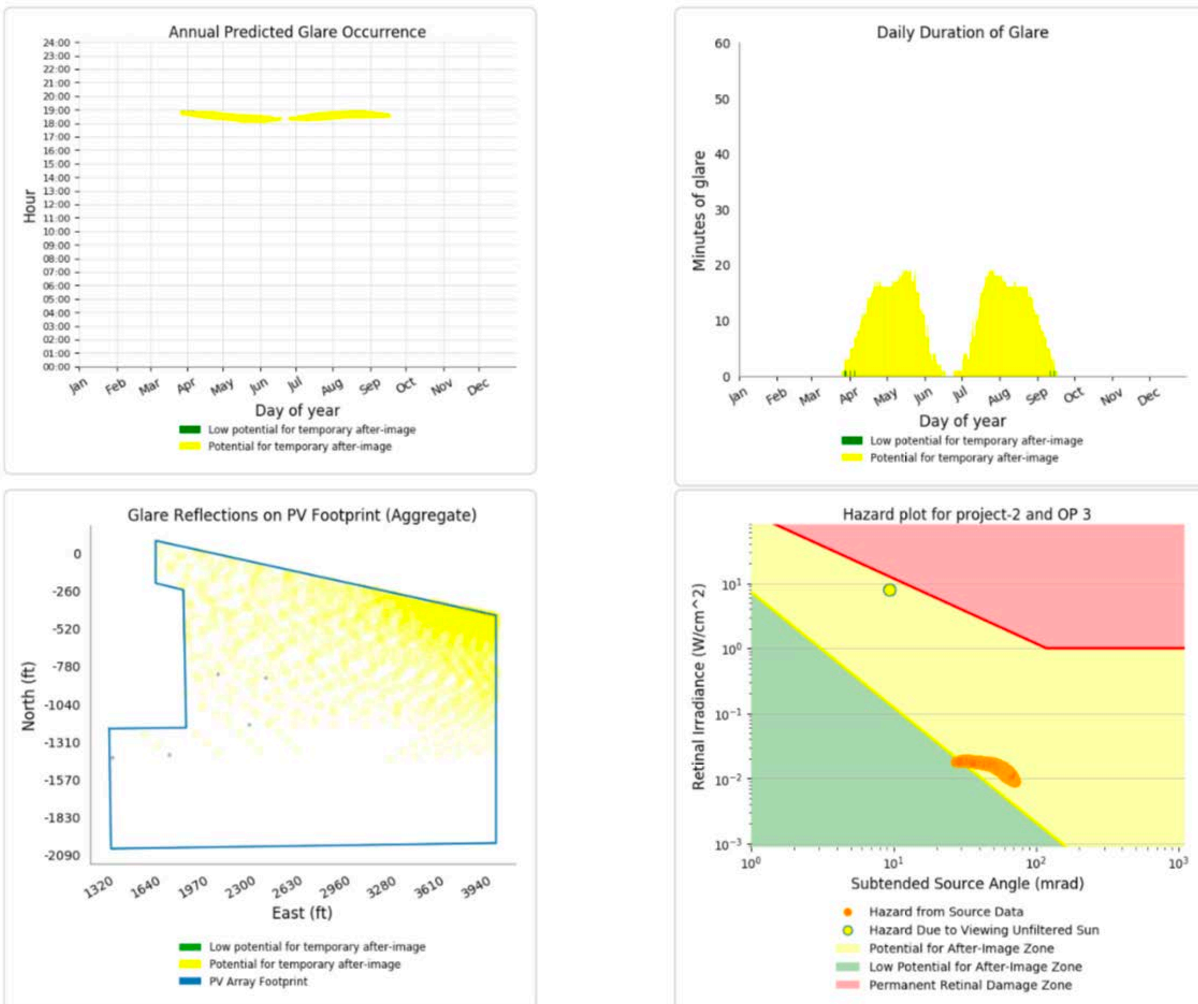
Sample details:
Detailed annual predicted glare occurrence, daily duration of glare, glare reflection on PV footprint, and hazard plot from highest glare scenario.

Figure 19: Project 2, 50-foot roof mount at 25-degree tilt

Project 2 - OP Receptor (OP 3)

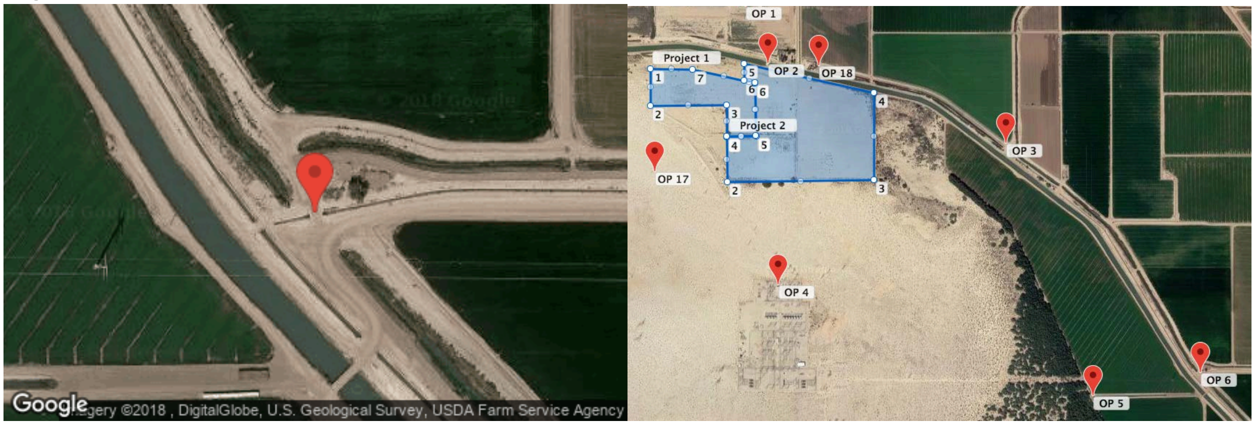
PV array is expected to produce the following glare for receptors at this location:

- 5 minutes of "green" glare with low potential to cause temporary after-image.
- 1,888 minutes of "yellow" glare with potential to cause temporary after-image.



Glare results for Key Observation Point 6:

Figure 20: KOP detail and context maps.



Description: KOP 6 is located southeast of the site, on the intersection of Mandrapa Road and Lyons Road, near agricultural land. No structures nearby.

Figure 21: analysis results for individual KOP with all scenarios, by project, in minutes per year.

PROJECT 1	10-degree tilt		25-degree tilt	
Ground (5 ft).	89	-	57	-
20 ft	42	-	55	-
30 ft	73	-	62	-
40 ft	93	-	71	-
50 ft	89	-	65	-

Figure 22: analysis results for individual KOP with all scenarios, by project, in minutes per year.

PROJECT 2	10-degree tilt		25-degree tilt	
Ground (5 ft).	101	178	-	302
20 ft	114	222	-	189
30 ft	81	174	-	164
40 ft	178	184	-	259
50 ft	171	161	-	321

Impacts: Low impact with less than 10 minutes of glare in the evenings during summer months.

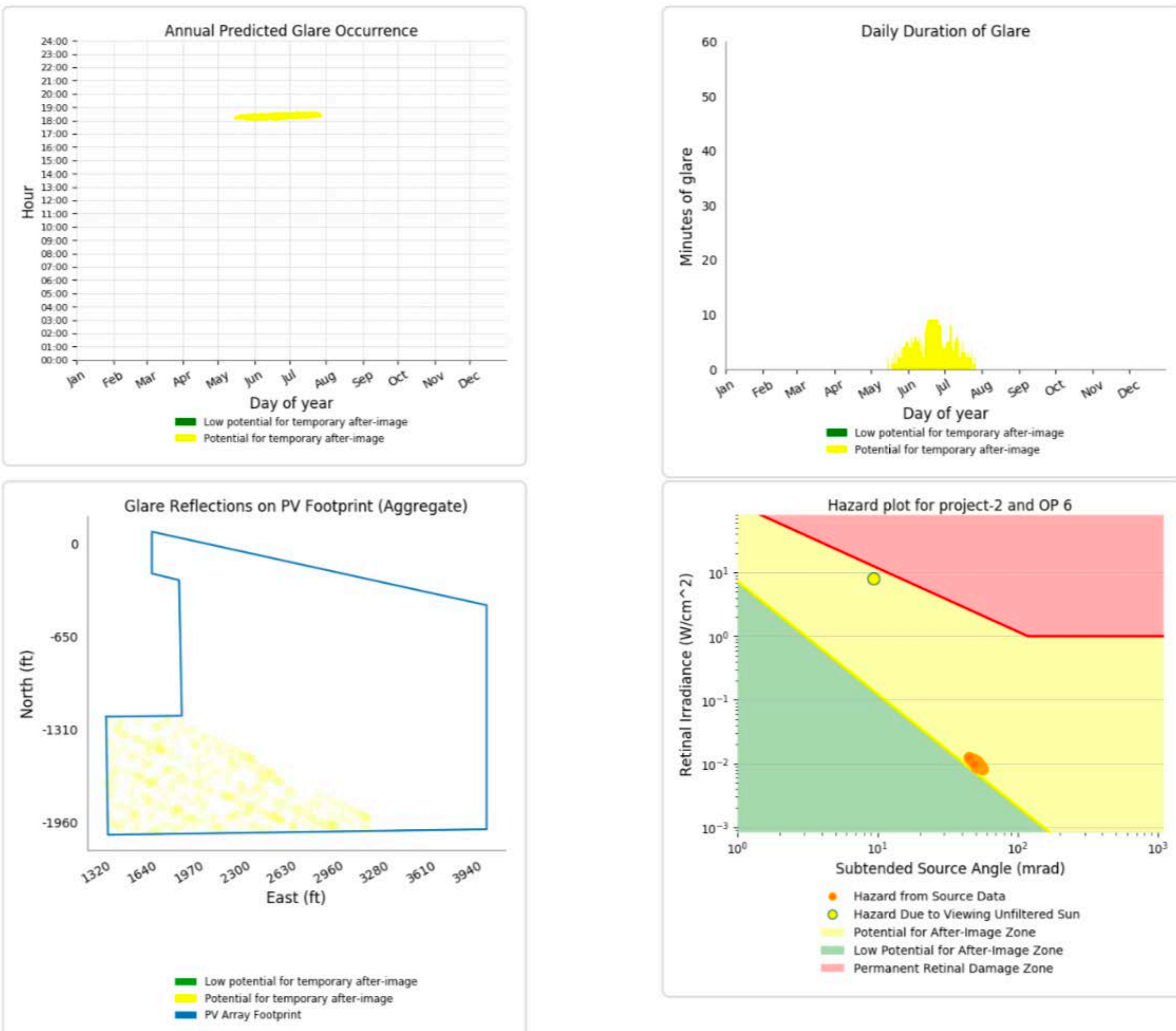
Sample details:
Detailed annual predicted glare occurrence, daily duration of glare, glare reflection on PV footprint, and hazard plot from highest glare scenario.

Figure 23: Project 2, 50-foot roof mount at 25-degree tilt

Project 2 - OP Receptor (OP 6)

PV array is expected to produce the following glare for receptors at this location:

- 0 minutes of "green" glare with low potential to cause temporary after-image.
- 321 minutes of "yellow" glare with potential to cause temporary after-image.



Glare results for Key Observation Point 17:

Figure 24: KOP detail and context maps.

Description: KOP 17 is located south of project 1 and west of project 2. It is located on undeveloped land with large electrical utility lines. No structures are nearby. This area does not appear to be frequently visited, but utility workers may be present in instances of maintenance.

Figure 25: analysis results for individual KOP with all scenarios, by project, in minutes per year.

PROJECT 1	10-degree tilt		25-degree tilt	
Ground (5 ft).	-	1102	-	1455
20 ft	-	261	-	522
30 ft	-	10	-	15
40 ft	-	347	-	361
50 ft	-	436	-	722

Figure 26: analysis results for individual KOP with all scenarios, by project, in minutes per year.

PROJECT 2	10-degree tilt		25-degree tilt	
Ground (5 ft).	-	3034	-	2928
20 ft	-	907	-	1393
30 ft	-	1740	-	2520
40 ft	-	1700	-	2812
50 ft	-	1914	1	3048

Impacts: Moderate impact with approximately 20 minutes or less of glare in the mornings during spring through fall months.

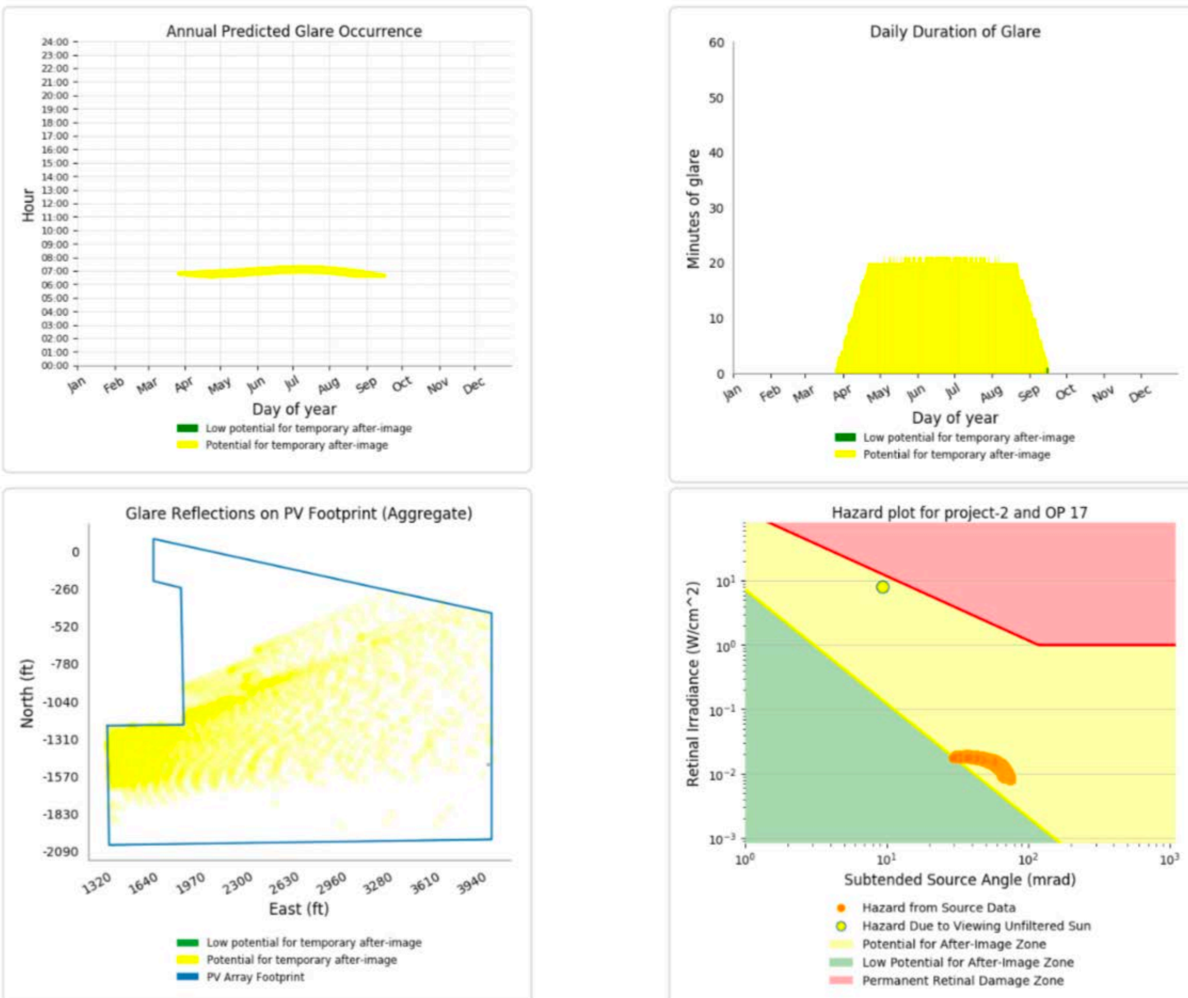
Sample details:
Detailed annual predicted glare occurrence, daily duration of glare, glare reflection on PV footprint, and hazard plot from highest glare scenario.

Figure 27: Project 2, 50-foot roof mount at 25-degree tilt

Project 2 - OP Receptor (OP 17)

PV array is expected to produce the following glare for receptors at this location:

- 1 minutes of "green" glare with low potential to cause temporary after-image.
- 3,048 minutes of "yellow" glare with potential to cause temporary after-image.



Glare results for Key Observation Point 18:

Figure 28: KOP detail and context maps.

Description: KOP 18 is located north and adjacent to project 2, on Mandrapa Road east of Liebert Road, near agricultural land. There is one structure, but aerial views indicate that the structure may be abandoned or used only for storage.

Figure 29: analysis results for individual KOP with all scenarios, by project, in minutes per year.

PROJECT 1	10-degree tilt		25-degree tilt	
Ground (5 ft).	-	-	2	10
20 ft	-	7	-	9
30 ft	1	7	2	13
40 ft	-	1	2	13
50 ft	1	4	-	15

Figure 30: analysis results for individual KOP with all scenarios, by project, in minutes per year.

PROJECT 2	10-degree tilt		25-degree tilt	
Ground (5 ft).	-	-	-	-
20 ft	-	-	-	5
30 ft	-	1	-	15
40 ft	-	2	-	12
50 ft	-	-	-	4

Impacts: Low impact with less than 5 minutes of glare in the evenings during the months of March, September, and October.

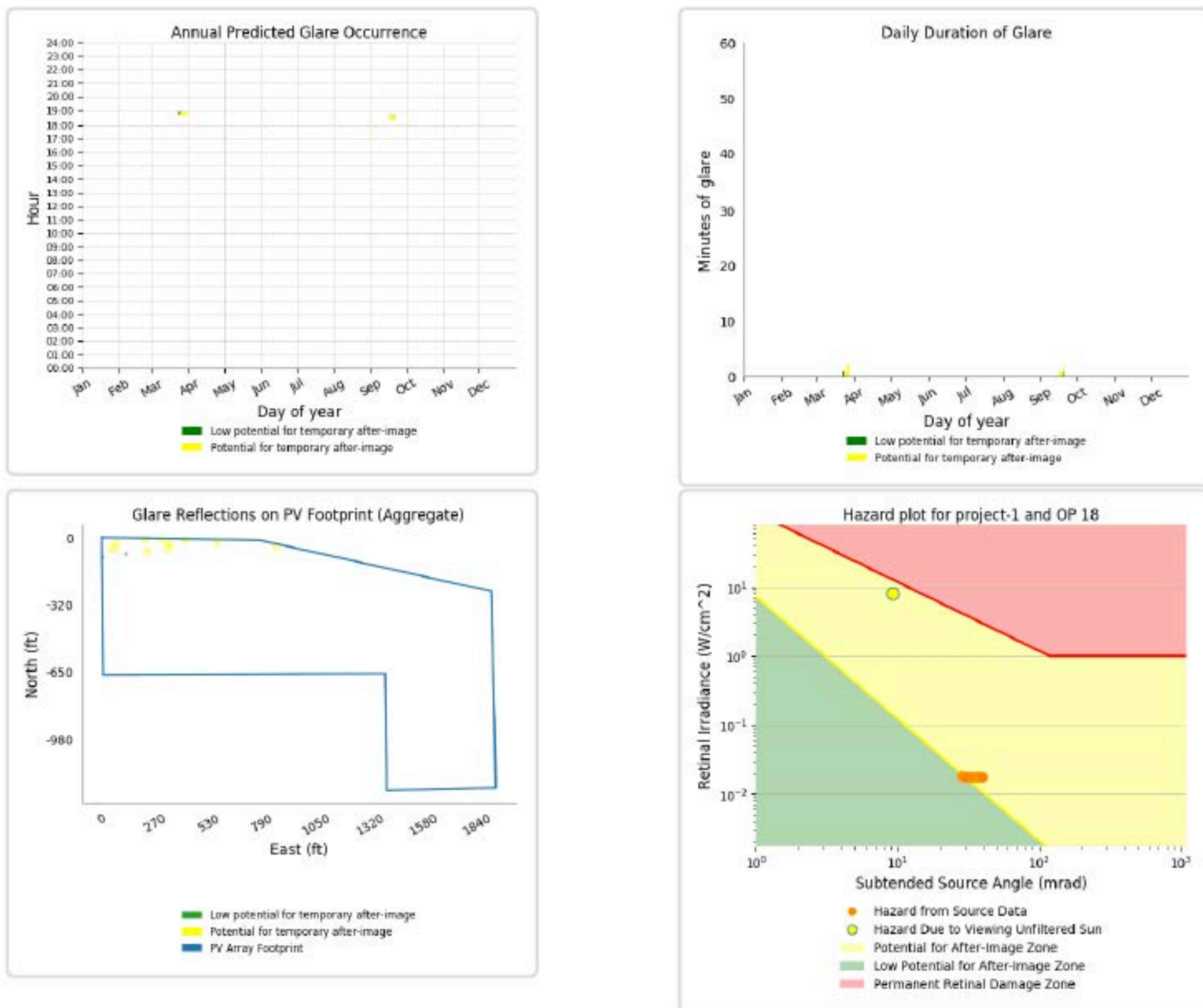
Sample details:
Detailed annual predicted glare occurrence, daily duration of glare, glare reflection on PV footprint, and hazard plot from highest glare scenario.

Figure 31: Project 1, ground-mount at 25-degree tilt

Project 1 - OP Receptor (OP 18)

PV array is expected to produce the following glare for receptors at this location:

- 2 minutes of "green" glare with low potential to cause temporary after-image.
- 10 minutes of "yellow" glare with potential to cause temporary after-image.



U.S. Naval Air Facility El Centro

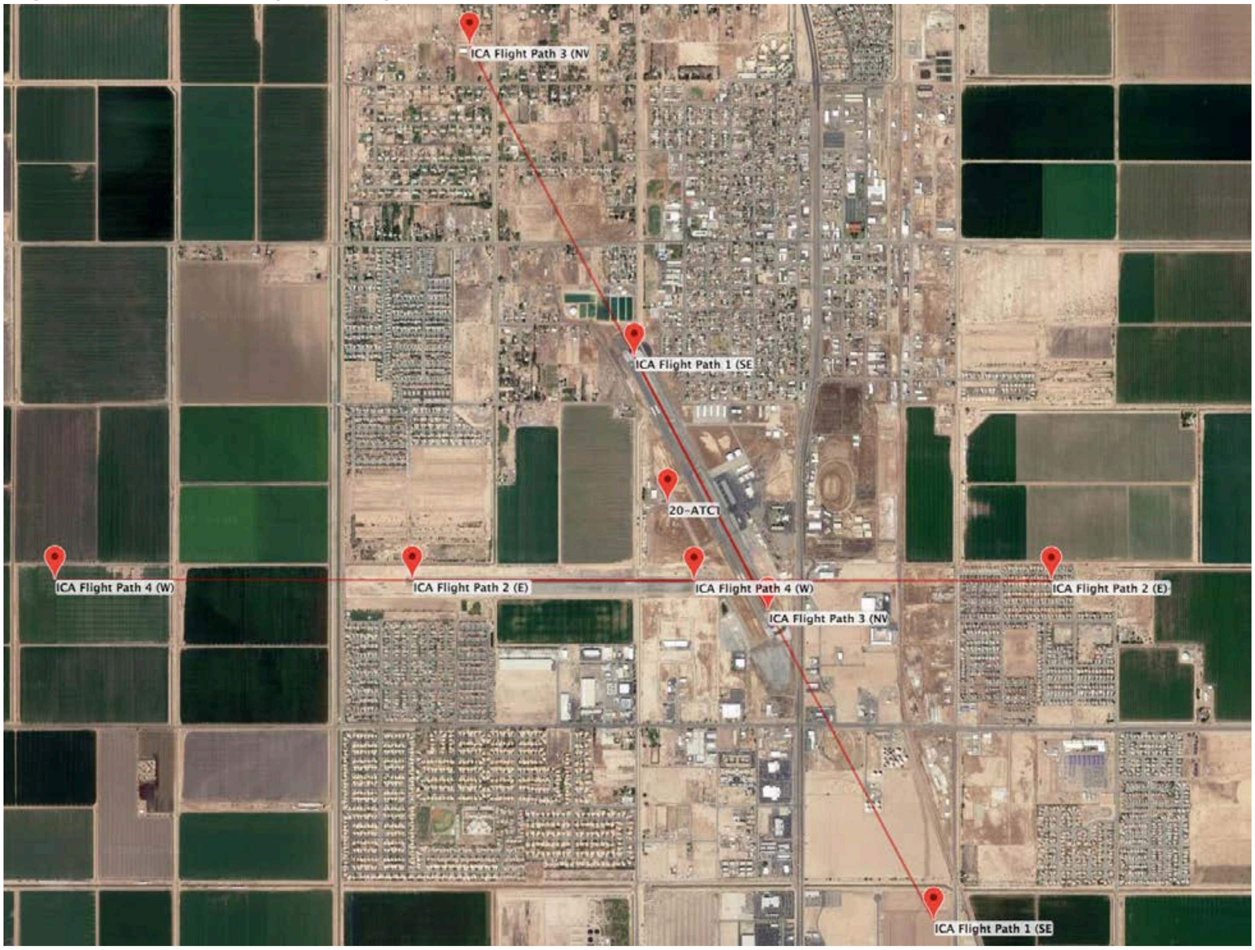
Figure 32: Air facility runway and ATCT map

Description: The nearby US Naval Facility is 7 miles north-northeast of the PV site and the flight approaches are from southeast/northwest (135°/315°) and east/west (90°/270°). The flight path approaches take into account pilot line-of-sight.

Results: No glare found
Flight paths: No glare found
ATCT – KOP 19: No glare found (100 ft.)

Imperial County Airport

Figure 33: Air facility runway and ATCT map



Description: The regional airport is 11 miles northeast of the PV site and the flight approaches are from the southeast/northwest (152°/332°) and east/west (90°/270°). The flight path approaches take into account pilot line-of-sight.

Results: No glare found
Flight paths: No glare found
ATCT – KOP 20: No glare found (100 ft.)

APPENDICES – ALL RESULTS

A. Ground-mount (5 ft.), 10-degree tilt
B. Ground-mount (5 ft.), 25-degree tilt
C. 20-foot building-mount, 10-degree tilt
D. 20-foot building-mount, 25-degree tilt
E. 30-foot building-mount, 10-degree tilt
F. 30-foot building-mount, 25-degree tilt
G. 40-foot building-mount, 10-degree tilt
H. 40-foot building-mount, 25-degree tilt
I. 50-foot building-mount, 10-degree tilt
J. 50-foot building-mount, 25-degree tilt

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