Appendix H – Visual Report/Simulation

VISUAL IMPACT ANALYSIS FOR THE WINSTON ENERGY PROJECT
LYON COUNTY, NEVADA

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ICF. 2025. *Visual Impact Analysis for the Winston Energy Project, Lyon County, Nevada*. November. Sacramento, CA. Prepared for Winston FC Solar, LLC, San Diego, CA.

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Introduction

Purpose

The purpose of this visual impact assessment (VIA) memorandum is to document potential visual change in the Area of Visual Effect (AVE) for the Winston Energy Project proposed project. This memorandum follows guidance outlined in the publication *Guidelines for the Visual Impact Assessment of Highway Projects*, published by the Federal Highway Administration (FHWA) in January 2015.

Project Description

Winston FC Solar LLC is pursuing approvals to construct the Winston Energy Project (Project), a 400-megawatt (MW) photovoltaic (PV) solar energy facility (facility) with a 400 MW 4 hour Battery Energy Storage System (BESS) located entirely on 2,374.3 acres of privately owned land in Lyon County, Nevada. The Project site is located just east of U.S. Alt Highway 95 (U.S. Hwy 95A), approximately 15 miles northeast of the City of Yerington, and adjacent to the Walker River Substation. Ancillary Project facilities include a substation, collection lines, operations and maintenance building, and site access roads.

The Site Location Map (Figure 1) below illustrates the proposed Project elements and is based on the current preliminary design. Project components have been located to minimize and avoid sensitive resources. The final location and orientation of any of the Project components could change based on advanced design engineering or additional environmental constraints.

Figure 1. Winston Energy Project Site Location Map

Methodology

The analysis is based on desktop review, GIS viewshed modeling, site observations, public feedback, and photorealistic simulations. The viewshed model is based on GIS Digital Elevation Models (DEM) from USGS 2025 data and was used as an initial filter to determine Key Observation Points (KOPs). KOPs were then field verified, and adjustments to KOPs were made based on field observations.

Photorealistic simulations were created using geospatial and rendering technologies. The process begins with data acquisition, including high-resolution aerial or satellite imagery, DEM from USGS, calibrated ground-level photographs, and GIS shapefiles of Project features. All datasets are reprojected to a common coordinate system (NAD83 UTM Zone 14N) to ensure spatial consistency. Terrain modeling uses DEM data to generate a detailed 3D surface, while proposed infrastructure is geolocated and integrated using Trimble SketchUp and ArcGIS Pro. Lighting and shadow simulation is based on solar azimuth and elevation angles for the specified date and time to replicate real-world conditions. Photo simulation involves precise camera matching using calibration parameters—focal length, sensor size, and orientation—followed by rendering from identical viewpoints and blending with original photographs in Adobe Photoshop 2025, applying perspective correction and color balancing for realism. Quality assurance includes scale verification, alignment checks, and stakeholder review cycles. Limitations stem from imagery and elevation resolution, environmental variability such as seasonal vegetation, and simplification of complex design elements for computational efficiency.

Affected Environment

Project Location and Setting

The Project location and setting provide the context for determining the type of changes to the existing visual environment. The Project area is in the Mason Valley Rural Character District, as defined by the 2020 Lyon County Comprehensive Master Plan. The primary land use is agriculture with pockets of rural residential. The project site is zoned Rural Residential - Suburban south of Sierra Way and Heavy Industrial – Suburban and a small area Rural Residential north of Sierra Way. Adjacent properties are zoned Light Industrial – Suburban and Rural Residential (State of Nevada 2022). For more information, please refer to the Winston Energy Project development permitting documents.

The Project lies within the Central Basin and Range Lahontan Salt Shrub Basin (13j) as described in the Level IV Ecoregion of Nevada (Bryce et el. 2003). This ecoregion is composed of rolling plains with alluvial fans, scattered hills and buttes, foothills, stream terraces, flood plains, and sand sheets in internally drained basins. The relatively flat terrain of the Project area supports grassland and salt-tolerant shrubs including shadscale, Shockley desert thorn, and Bailey greasewood. Agricultural uses and intermountain cold desert shrub surround the Project site, with some rural residential development to the south and west of the Project site. Surrounding lands are primarily private agricultural, rural, and industrial, in addition to public property administered by the Nevada Division of State Lands.

Regulatory Background

Regulatory context provides insight into the values local, state, and federal jurisdictions place on the scenic environment. Federal, State, and local laws, ordinances, and regulations that relate to the visual environment are summarized in Table 1.

Table 1. Laws, Ordinances, and Regulations Relating to Visual and Aesthetics

Jurisdiction	Document	Scenic Objectives
Department of Transportation, Federal Aviation Administration (FAA)	14 CFR Part 77, published May 11, 2021	Policy requires airports to measure the visual impact of airport solar projects on pilots and air traffic control personnel to ensure projects don't create hazardous glare. Applies to federally obligated towered airports.
Lyon County	2020 Lyon County Master Plan	**Goal NR 8: Views.** Lyon County will protect scenic views of mountain backdrops and dark skies. **Policy NR 8.1: Mountain Backdrop.** Recognizing that views of the mountains in and around the county provide a unique scenic value for residents and visitors, Lyon County will strive to preserve such views. Continue to implement setbacks, height limitations, or other regulations in urbanizing areas to minimize undesirable impacts to the views enjoyed by existing residences. **Policy NR 8.2 Dark Skies.** Lyon County will minimize light pollution while allowing for adequate lighting for safety and security. Continue to implement lighting standards for commercial and industrial properties to address issues such as avoiding light intrusion onto neighboring properties, parking lot lighting scale and intensity, minimal security lighting outside of hours of operation, and similar. **Goal FS 5: Utility Corridors.** Utility Corridors will be located to ensure optimum connectivity, level of service, and protection of natural, cultural, and visual resources, and minimize conflicts with communities. Policy FS 5.3: Aboveground utility corridors must not conflict with any existing or planned infrastructure or utility projects and must be located to minimize conflicts with residential and commercial development.
Lyon County	Lyon County Code of Ordinances	**15.337 Performance Requirements for Industrial Uses** 15.337.03 Standards E. Heat, Light, and Glare: All operations and facilities producing heat, light, and glare, including exterior lighting, shall be so constructed, screened or used as to not unreasonably infringe upon the use and enjoyment of property beyond boundaries of the district. 15.402 Landscape Standards Landscape Standards are provided to ensure that new landscaping and the retention of existing landscaping is an integral part of all development and that it contributes and improves the environmental and aesthetic character of the community.

	15.402.03 Design Standards B. Protection of existing vegetation: the appeal and character of the site shall be preserved and enhanced by retaining and protecting existing vegetation and trees wherever possible. 15.402.04 Buffering and Screening C.2. Loading and Service Area: ...Screening and landscaping shall be provided to help mitigate spill-over glare, noise, or exhaust fumes.

Project Viewshed and Representative Views

A project viewshed is defined as the general area from which a project is visible and is initially determined by running a GIS viewshed analysis using a USGS Digital Elevation Model (DEM). The results of the DEM viewshed model illustrate potential visibility from sensitive viewpoints including the Mason Wildlife Management Area (WMA), U.S. 95A, scenic overlooks, and nearby residences. Since the viewshed is based on elevation it does not account for surface features including buildings and vegetation that may screen views. A field survey was conducted to confirm visibility and identify appropriate locations for key observation points (KOP) and visual simulations used in the analysis. The viewshed model generated for the project and representative key observation point (KOPs) locations are shown in Figure 2.

For purposes of describing a project's visual setting and assessing potential visual impacts, the viewshed can be broken down into foreground, middleground, and background zones. The foreground is defined as the zone within 0.25 to 0.5 mile of the viewer; the middleground is defined as the zone that extends from the foreground to a maximum of 3 to 5 miles of the viewer; and the background zone are distant views and features that frame the landscape. The viewing distance is a key factor that affects the potential degree of project visibility. Visual details are generally apparent to the viewer when observed in the foreground, at a distance of 0.25 to 0.5 mile. The primary focus of this visual analysis is the foreground viewshed zone, where change could be noticeable.

Photographs from KOPs showing existing conditions from the highway and nearby residential development are provided in Figure 3.

Figure 2. Key Observation Points

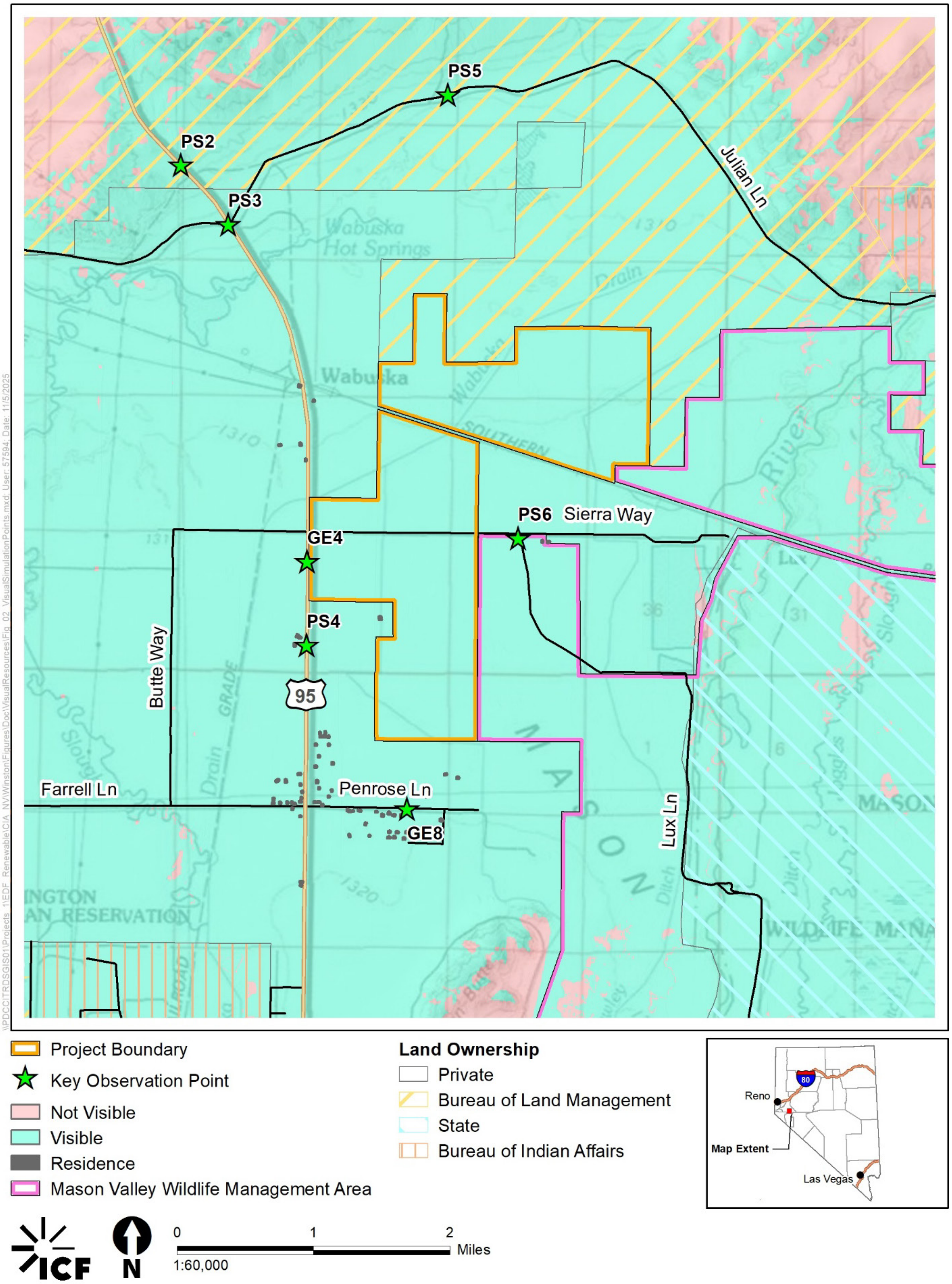


Figure 3. Landscape Photographs

Photograph PS2: Existing view looking southeast

Photo date: May 14, 2025 Time: 4:29 PM Lat/Long: 39°10’38”N 119°12’26” W

Photograph PS3: Existing view looking southeast from US 95A at Julian Lane

Photo date: May 14, 2025 Time: 4:29 PM Lat/Long: 39°9’39”N 119°11’31” W

Photograph PS4: Existing view looking northeast from US 95A at Masini Ranch

Photo date: May 14, 2025 Time: 4:29 PM Lat/Long: 39° 7' 42" N 119°10’52” W

Photograph PS5: Existing view looking south from Julian Lane

Photo date: May 14, 2025 Time: 4:29 PM Lat/Long: 39° 13' 5" N 119° 8' 2" W

Photograph PS6: Existing view looking west from Sierra Way and Mason Valley WMA entrance

Photo date: May 14, 2025 Time: 4:29 PM Lat/Long: 39° 7' 41.5" N 119° 9' 8" W

Photograph GE4: Existing view looking east from US 95A near Sierra Way

Photo date: October 30, 2025 Time: 3:30 PM Lat/Long: 39°07'30.4"N 119°10'52.0"W

Photograph GE8: Existing view looking north from Penrose Lane

Photo date: October 30, 2025 Time: 3:20 PM Lat/Long: 39°05'56.0"N 119°10'02.0"W

Visual Resources and Scenic Resources

The closest officially designated State Scenic Highway to the Project site are State Routes (SR) 445, 446, and a portion of 447 near Pyramid Lake, SR 431 along Mount Rose, and SR 28 and U.S. Highway 50 along the east shore of Lake Tahoe (NDOT 2025). These highways are all more than 40 miles away. The Bureau of Land Management (BLM) also has designated Back Country Byways (Byway) of which there are eight in Nevada. The nearest is Fort Churchill to Wellington Byway, a 67-mile corridor following the Pony Express National Historic Trail along the Carson River to Dayton and then veers south through the Pine Nut Mountains west of the Project to Smith Valley (Recreation.gov 2025). Although this Byway is 10-20 miles from the Project, it does not fall within the Project viewshed.

Public lands adjacent to the Project include the 16,635-acre Mason Valley WMA is managed by the Nevada Department of Wildlife. The area features desert shrub lands and wet meadows through the Walker River floodplain attracting a vast array of wildlife. Public facilities include hiking, fishing, and interpretive areas.

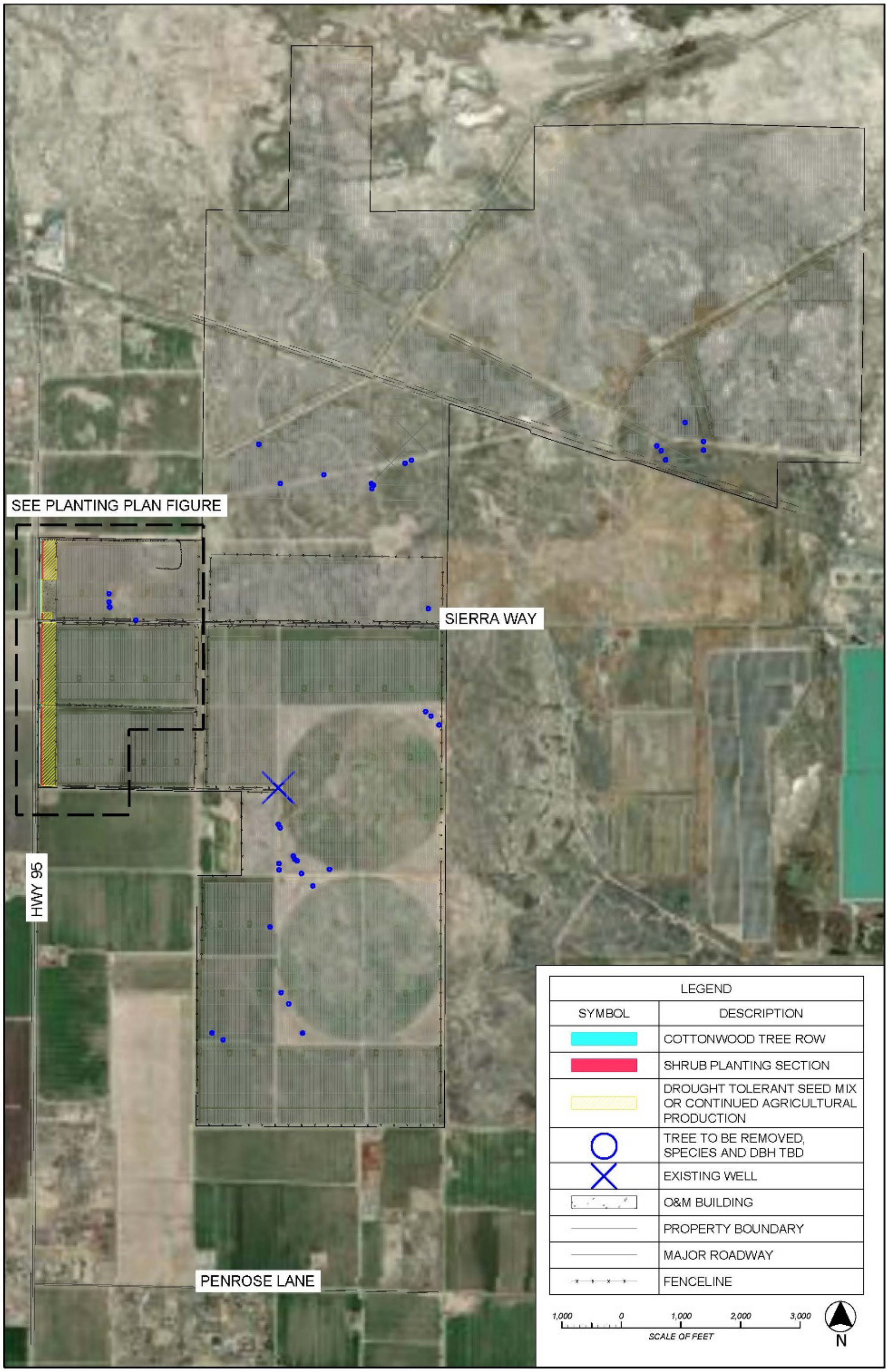
Air traffic can be affected by glare from solar farms. The nearest airports in Lyon County are listed in Table 1. The Airport Influence Areas consider airport runway length and the type of aircraft operations and anticipate noise, safety, and regulatory components for airport land use compatibility planning purposes as described in the Lyon County Master Plan (Lyon County 2022).

Table 2. County Airports and Proximity to Project

Airport	Airport Influence Area[1] (feet)	Distance from Project (miles)
Yerington Municipal Airport – public general aviation	6,000	6.4
Silver Springs Airport – public general aviation	6,000	17.7
Dayton Airpark – private general aviation	4,500	21.0
Farias Wheel Airport – private general aviation	4,500	22.0
Rosaschi/Smith Valley Air Park – private general aviation	4,500	22.5

[1] Distance from any point on the runway

Figure 4. Landscape Overview



Viewers

There are two types of viewers within the AVE: Neighbors and travelers. Viewer sensitivity is based on viewer exposure measured by proximity, extent, and duration; viewer awareness is measured by attention, focus, and preference. Based on feedback at the public open house on October 23, 2025, and input from community leaders, viewers within this region are moderately sensitive to impacts and have expectations that the natural and cultural landscape will be preserved.

The Project arrays will be in the foreground views for travelers along US 95A and approximately 40 residents. Travelers will have relatively brief and indirect exposure in the northbound direction. Travelers in the southbound direction will have longer but more distant exposure as they descend the pass into the Mason Valley. Their awareness and focus is likely to be high because this is the dominant view. Views are currently dominated by agriculture; however, this will become industrial energy production once the Project is completed.

Residents located within 0.25 to 0.5 miles from the Project will have foreground views; however, since the landscape is relatively flat the arrays do not dominate the viewshed. Trees and other vegetation surrounding most residences soften the horizon and the arrays will not block background views of the surrounding mountains or sky. Residents attention is likely to be focused on immediate surroundings and tasks, although extent and duration could be long.

Landscape Visual Quality

The landscape visual quality of the AVE considers the intactness, unity, and vividness of the natural, cultural, and existing visible project environments. The existing natural and cultural landscape characters are well balanced. Views of verdant agricultural landscapes are surrounded by the stark mountains and sage scrubland surrounding the Mason Valley. Fremont cottonwood trees throughout the valley provide vivid green vertical accents in spring and summer and golden yellow accents during fall creating a warm and welcoming landscape. The trees and agricultural fields create a striking contrast to the native landscape. Rural residential development is minimal and blends into the agrarian landscape. Industrial power plants to the north and east of the valley are tall features at the edge of the valley, and although prominent, do not dominate views. Viewers likely find the mixed agrarian and natural landscape of Mason Valley highly memorable. Landscape visual quality measures are summarized as follows:

- Medium Intactness – the highway corridor contains few extraneous features, agricultural landscape features and Fremont Cottonwood trees complement or enhance the highway and the surrounding natural landscape
- Medium to High Unity – the natural, cultural, and existing highway environment are generally well ordered, balanced, in scale and harmonious.
- Medium to High Vividness – the natural and agricultural segments of the Project area are quite distinct and memorable while the rural residential areas are generally well screened and present little distraction. Industrial areas are in the middleground and background and do not dominate views.

Overall, the AVE qualifies as medium for intactness, unity, and vividness within the natural, cultural and existing visible project environments.

The Mason Valley has many scenic resources including the Mason Valley WMA, agricultural field, and surrounding mountains. However, based on desktop review, there are no scenic pullouts, overlooks, historic views or buildings, rock outcrops, or heritage trees within the AVE.

Visual Impact Analysis

To assess the potential visual impact of the Project from the identified KOPs visual simulations were conducted to depict the Project components on the landscape. As indicated by the photo simulations presented in Figure 5 from each KOP, the overall visual change within the AVE and from the KOPs is minor to moderate, visual compatibility is moderate, and contrast is moderate to high, depending on the KOP and the nearby visual receptors. Overall, contrast would be minor to moderate with application of the mitigation measures and landscape plan (see Appendix A). Among the KOPs that were simulated, visual changes would be most noticeable along U.S. 95A due to the proximity of the highway to the Project. Impacts to viewers along U.S. 95A would be mitigated through vegetation screening and other mitigation as described below and presented in Figure 6.

Overall viewer sensitivity would likely be moderate to high during construction. Construction vehicles, installation equipment, and supplies will be noticeable to nearby residences during the construction phase, which is expected to last approximately 24 months. Visual impacts due to construction equipment and activity would cease entirely after the 24-month construction period but the solar arrays and other infrastructure would continue to affect the visual character and quality of public views of the Project area during operation, primarily from elevated viewpoints and areas where the project is adjacent to roadways without a setback.

The Project will not remove or change any scenic resources including designated landmarks, historic resources, or rock outcroppings, but would remove 38 trees for construction and operation of the Project. The Project does not conflict with applicable zoning or regulations governing scenic quality for the area.

The project will not create new sources of nighttime light because the Winston Energy Project operations require minimal nighttime lighting, and all light fixtures will be shielded and use downward-facing fixtures to prevent light pollution. Since solar energy is generated during daylight hours, the site will remain largely inactive at night, preserving the natural night environment.

There are no anticipated impacts to aviation from glint and glare because the nearest airports are located approximately 30 miles away in Fallon and Carson City. However, a glint and glare analysis for the Project was conducted using a ForgeSolar Glare Analysis (Appendix B) to determine how drivers and nearby viewers could experience glint and glare effects and the potential for an after-image (flash blindness) that could distract drivers and nearby viewers. Due to the size and different terrains and screening for various portions of the solar field, 15 different PV solar array areas of the Project were modeled in the glint and glare analysis and potential effects were presented at 6 different receptors (5 along U.S. 95A, 1 south of the Project). As indicated in the glint and glare analysis, the potential for glint and glare and after image effects would be negligible to minor. PV array area 1 is estimated produce up to 96 minutes a year of yellow glare effects[1] to nearby drivers, PV array area 2 is estimated to produce up to 37 minutes a year of yellow glare effects, PV array area 9 is estimated to produce up to 95 minutes a year of yellow glare effects, and PV array area 11 is estimated to produce up to 57 minutes a year of yellow glare effects. Total glare effects would include up to 228 minutes a year of yellow glare effects along U.S. 95A and 57 minutes a year of yellow glare effects at receptor OP1 (see Appendix B). During the rest of the year glint and glare from the PV arrays on receptor locations would have either no glare effects or would result in minor green glare effects (glare with low potential to cause an after-image/flash blindness).

[1] "Yellow" glare is glare with potential to cause an after-image (flash blindness) when observed prior to a typical blink response time.

Figure 5. Photo Simulations

Photograph PS2: Simulated view looking southeast

Photo date: May 14, 2025 Time: 4:29 PM Lat/Long: 39°10’38”N 119°12’26” W

Photograph PS3: Simulated view looking southeast from US 95A at Julian Lane

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Mitigation

Mitigation measures have been proposed to lessen the visual impact of the Project and may also help generate public acceptance of the Project. The following measure was developed to enhance the scenic quality along U.S. Hwy 95A where the roadway is closest to the Project. Establishing native trees and shrubs will also enhance the overall scenic quality of the Mason Valley by continuing the existing Fremont cottonwood tree allés along the highway and provide ancillary wildlife benefits.

Measure Vis-1. The Project will be set back 300 feet east from the highway. Within this setback, a 45-foot landscape corridor would be established. The landscape planting would include a row of Fremont Cottonwood (*Populus fremontii*) trees along the east side of the drainage ditch, within the Project area boundaries. In addition to the trees, a 30-foot corridor of native shrubs would be planted to help soften views of the Project. The remaining land between the planting area and the Project fence line would either remain in agriculture or be seeded with native grass. Introduction and establishment of nonnative invasive plant species will be controlled using best practices for weed control during construction and operations.

Implementation of this mitigation measure is further described in the Conceptual Landscape Plan provided in Appendix A. Figure 6 illustrates the mitigated view from US 95A.

Conclusion

Based on the findings in this report and the proposed mitigation measures and landscape plan (Appendix A), the potential visual effects from the Project are expected to be minor to moderate based on the following factors:

- During Project construction, the views of the Project area by nearby drivers and residences would be degraded due to construction equipment, construction traffic, construction workforce, and other activity. However, construction-related effects would only persist for the 24-month construction period.
- During Project operation, views of the Project area would be degraded due to the presence of solar panels, the BESS, the O&M building, and other Project infrastructure. These effects would generally be limited to portions of U.S. 95A and other roadways that are adjacent to the Project area and from elevated viewpoints. The potential impacts will be mitigated through application of setbacks from roadways (300-foot setback from U.S. 95A), establishment of a 45-foot landscape corridor between the highway and the Project, and the proposed landscape plan (see Appendix A).
- The Project will not create new sources of nighttime light because the Winston Energy Project operations require minimal nighttime lighting. As such, no impact on night skies is anticipated from the Project.
- Glare associated with the Project would result in negligible to minor glare effects on nearby drivers and receptors with total glare effects including up to 228 minutes a year of yellow glare effects along U.S. 95A and 57 minutes a year of yellow glare effects at receptor OP1 (see Appendix B). These potential glare effects would be mitigated by establishment of the proposed 45-foot landscape corridor between U.S. 95A and the Project area and the additional plantings and vegetative screening described in the landscape plan (Appendix A).
- There would be no glint and glare effects on aviation because there are no identified flight paths over the Project area and the nearest airports are approximately 30 miles away.

Figure 6. Visual Mitigation Simulation Along US 95A

References

Bryce, S.A., Woods, A.J., Morefield, J.D., Omernik, J. M., McKay, T.R., Brackley, G.K., Hall, R.K., Higgins, D.K., McMorran, D.C., Vargas, K.E., Peterson, E.B., Zamudio, D.C., and Comstock, J.A., 2003, Ecoregions of Nevada (color poster with map, descriptive text, summary tables, and photographs); Reston, Virginia, U.S. Geological Survey (map scape 1:1,350,000)

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Appendix A
Conceptual Landscape Plan

Conceptual Landscape Plan for Visual Impacts for the Winston Energy Project Lyon County, Nevada

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October 2025

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ICF. 2025. *Conceptual Landscape Plan for Visual Impacts for the Winston Energy Project, Lyon County, Nevada*. October. (ICF 104036.0.027.) Sacramento, CA. Prepared for Winston FC Solar, LLC, San Diego, CA.

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Project Background

Winston FC Solar LLC (Winston Solar) is pursuing approvals to construct the Winston Energy Project (Project), a 400-megawatt (MW) photovoltaic (PV) solar energy facility (facility) with a 400 MW 4 hour Battery Energy Storage System (BESS) located entirely on 2,374.3 acres of privately owned land in Lyon County, Nevada. The Project site is located just east of U.S. Alt Highway 95 (U.S. Hwy 95A), approximately 15 miles northeast of the City of Yerington, and adjacent to the Walker River Substation. Ancillary Project facilities include a substation, collection lines, operations and maintenance building, and site access roads.

Introduction and Purpose

The purpose of this Landscape Management Plan (LMP) is to provide direction for establishing native plant landscape to screen sensitive views of the Project from U.S. Hwy 95A.

The Project area is in the Mason Valley Rural Character District, as defined by the 2020 Lyon County Comprehensive Master Plan. The Site Location Map (Figure 1) below illustrates the proposed Project elements and is based on the current preliminary design. Project components have been located to minimize and avoid sensitive resources. The final location and orientation of any of the Project components could change based on advanced design engineering or additional environmental constraints.

Existing Project Site Conditions

The primary land use is agriculture and most of the parcels in the Project area are zoned as Agricultural, except for the undeveloped parcels in the northern extents of the Project. The Project lies within the Central Basin and Range Lahontan Salt Shrub Basin (13j) as described in the Level IV Ecoregion of Nevada (Bryce et el. 2003). This ecoregion is composed of rolling plains with alluvial fans, scattered hills and buttes, foothills, stream terraces, flood plains, and sand sheets in internally drained basins. The relatively flat terrain of the Project area supports grassland and salt-tolerant shrubs including shadscale, Shockley desert thorn, and Bailey greasewood. Agricultural uses and intermountain cold desert shrub surround the Project site, with some rural residential development to the south and west of the Project site. Surrounding lands are primarily private agricultural, rural, and industrial, in addition to public property administered by the Nevada Division of State Lands.

Proposed Site Development Considerations

The following site development considerations have been proposed by the Applicant.

- Project development would set back 300 feet from US 95A.
- Tree removal would occur as part of site preparation. Grassland would not have to be cleared. Following Project construction, it is expected that existing ruderal vegetation would return within the solar arrays.

Figure 1. Winston Energy Project Site Location Map

Landscape Goals and Objectives

The following goals and objectives are guidelines for addressing scenic/visual buffer objectives and methods addressed in this plan. Although the primary objective is to enhance the scenic quality along U.S. Hwy 95A where the roadway is closest to the Project, establishing native trees and shrubs will also enhance the overall scenic quality of the Mason Valley by continuing the existing Fremont cottonwood tree allés along the highway and provide ancillary wildlife benefits.

- Provide visual softening of the Project from U.S. Hwy 95A and incorporate the Project into the local cultural and natural landscape.
- Control the introduction and establishment of nonnative invasive plant species using best practices for weed control during construction and operations.
- Prevent soil erosion and protect water quality through implementation of Best Management Practices (BMPs) during Project construction and operations.

To meet these goals and objectives, the Project will be set back 300 feet east from the highway. Within this setback, a 45-foot landscape corridor would be established. The landscape planting would include a row of Fremont Cottonwood (*Populus fremontii*) trees along the east side of the drainage ditch, within the Project area boundaries. In addition to the trees, a 30-foot corridor of native shrubs would be planted to help soften views of the Project. The remaining land between the planting area and the Project fence line would either remain in agriculture or be seeded with native grass. Figure 2 is a conceptual cross-section illustrating landscape screening from the highway.

Additional Landscape Considerations

Most of the Project area has been cultivated as alfalfa, hay, or row crops for generations. Successive cultivation of crops like alfalfa can create nitrogen build-up in the soils that impede native plant growth while encouraging non-native broadleaf species that compete with natives for soil moisture (pers. comm. Dashell Hibbard). It may be beneficial to plant a cover crop to absorb excess nutrient buildup and till the organic material into the soil prior to planting.

Although noxious weeds are not anticipated, non-native broadleaf species are likely to establish once agricultural production ceases (pers. comm Dashell Hibbard). These weed species will compete with native plants for resources and create additional maintenance. To reduce the existing non-native seed bank, it’s recommended to encourage two weed seed germination periods followed by broad-leaf herbicide treatment to prepare the area for planting.

Tree Removal

There are 38 trees located within the Project site that may need to be removed as part of Project development. Trees were located using Google Earth satellite imagery and are mostly likely Fremont Cottonwood, see Figure 3 Landscape Overview for approximate locations. Tree species, size, and vigor will be surveyed and field verified by a certified arborist or Landscape Architect during 30 percent design development.

Figure 2. Conceptual Landscape Cross-Section

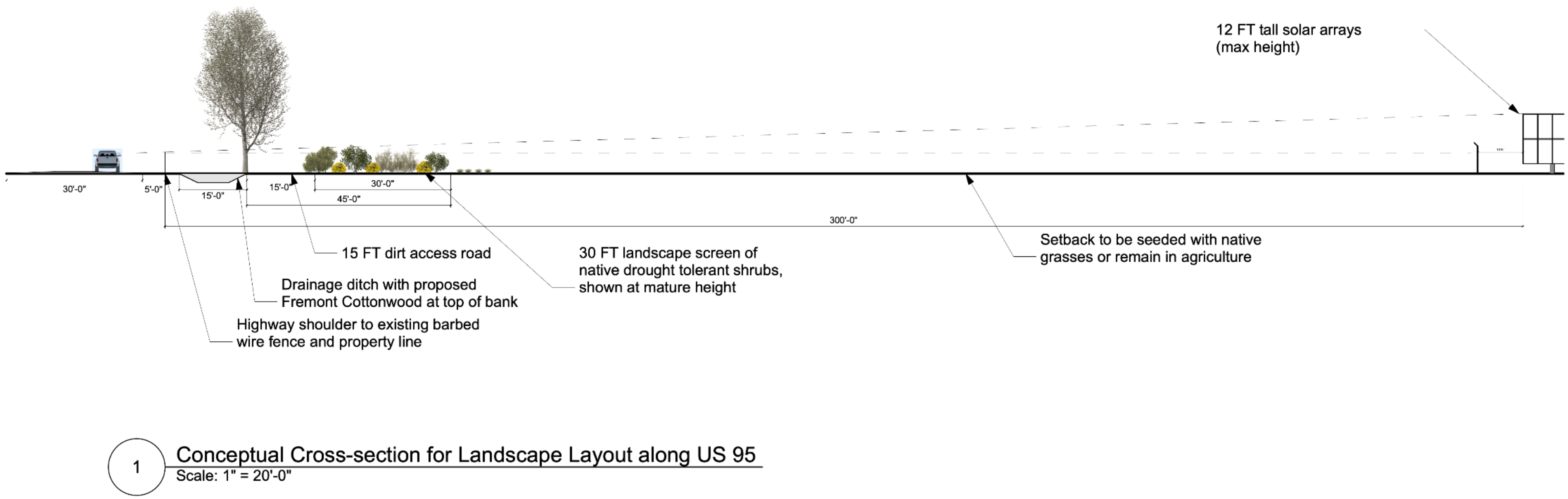
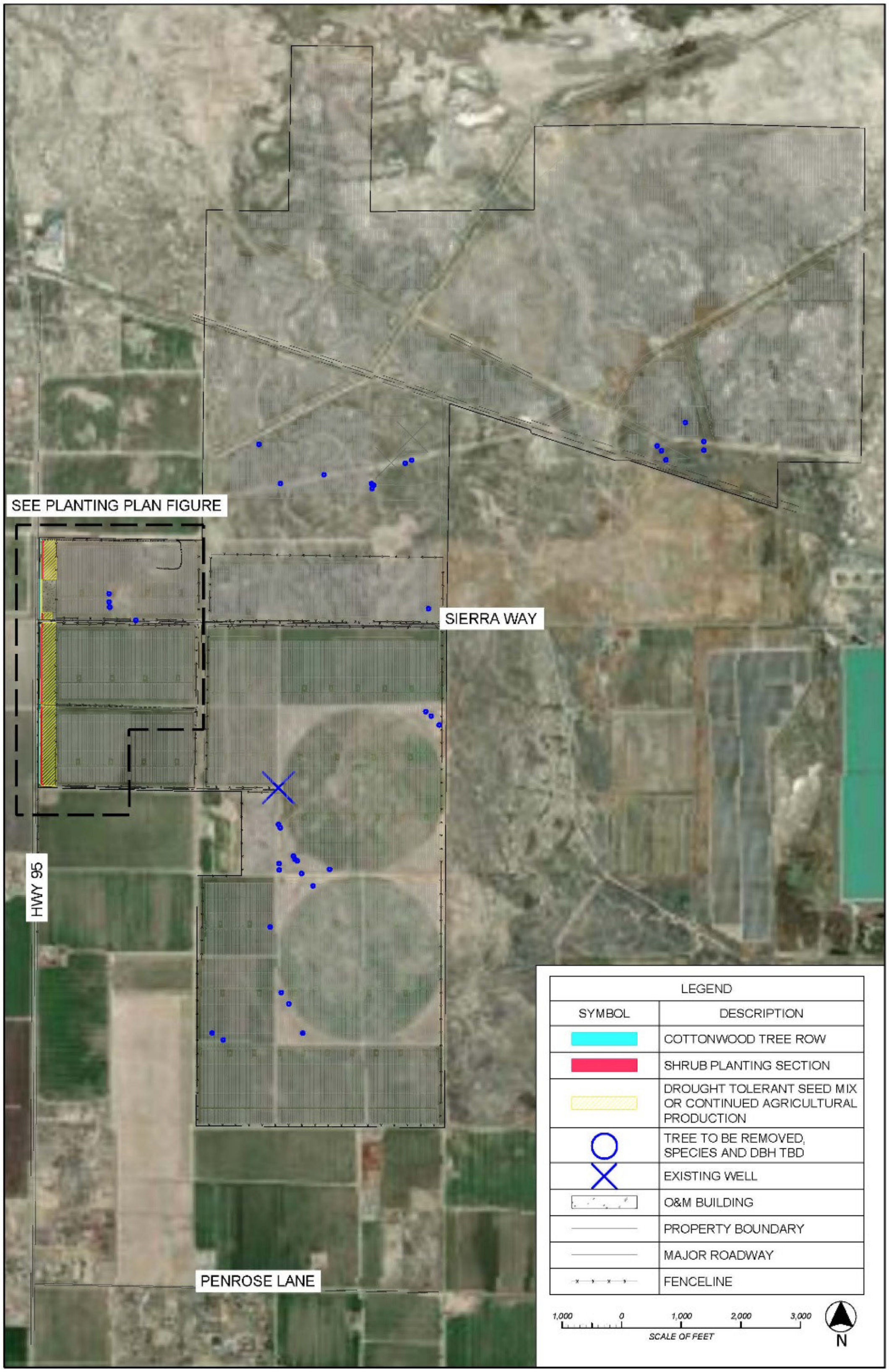


Figure 3. Landscape Overview



Planting Methodology

The plant species selected for the Project were selected based on site environmental conditions including soils, hydrology, and local presence and their ability to provide visual screening that is consistent with the surrounding natural landscape. The native plants selected are all suitable for creating a natural hedge, but provide a mixture of color, texture, and flowering periods to create visual variability and seasonal wildlife habitat. Table 1 lists the recommended landscape plants, characteristics, and requirements.

Table 1. Landscape Plant List[1]

Species Name	Common Name	Size	Flowering Season	Persistence	Water Requirements	Spacing (feet on center)
Atriplex canescens	Fourwing Saltbush	1-10 ft tall 3-7 ft wide	Spring, summer	Semi-drought deciduous shrub	Low water Max 1x / month	10
Atriplex lentiformus	Big Saltbush	3-10 ft tall 10 ft wide	Summer	Evergreen shrub	Low water Max 2x / month	10
Ericameria nauseosa	Rubber Rabbitbrush	5 ft tall / wide	Summer to fall	Winter deciduous shrub	Very low	Clusters of 3 @ 5 ft o.c.
Populus fremontii	Fremont Cottonwood	40-100 ft tall 35 ft wide	Spring	Winter deciduous tree	Summer irrigation required	60
Sarcobatus vermiculatus	Black Greasewood	6-10 ft tall / wide	Spring	Winter deciduous shrub	Very low	10
Shepherdia argentea	Silver Buffaloberry	7-20 ft tall 15 ft wide	Spring	Winter deciduous shrub	Low water Max 1x / month	15

[1] Species composition and density subject to change based on final design.

The visual screen will be planted with nursery grown container plants and irrigated during establishment. Shrubs will be 1-gallon or similar size containers. Trees will be tree-bands or similar to ensure trees have a healthy tap root prior to planting. Trees should be approximately 3-4 feet tall at time of planting. To ensure availability, plants will need to be contract grown with a native plant nursery 1-2 years in advance of planting.

It typically takes several growing seasons to establish native plants. All species will need irrigation during the first 2-3 growing seasons. According to the Project geotechnical report, the ground water table in this area is relatively shallow, within in 15-feet of the surface. Assuming groundwater levels are relatively stable, all species should intercept groundwater as they mature. However, the Fremont Cottonwood trees may need supplemental water more frequently and for a longer period than the recommended shrub species.

Figures 4 and 5 diagrams the planting zones within the 300-foot setback area and a typical plant layout.

Figure 4. Planting Zones within the Setback

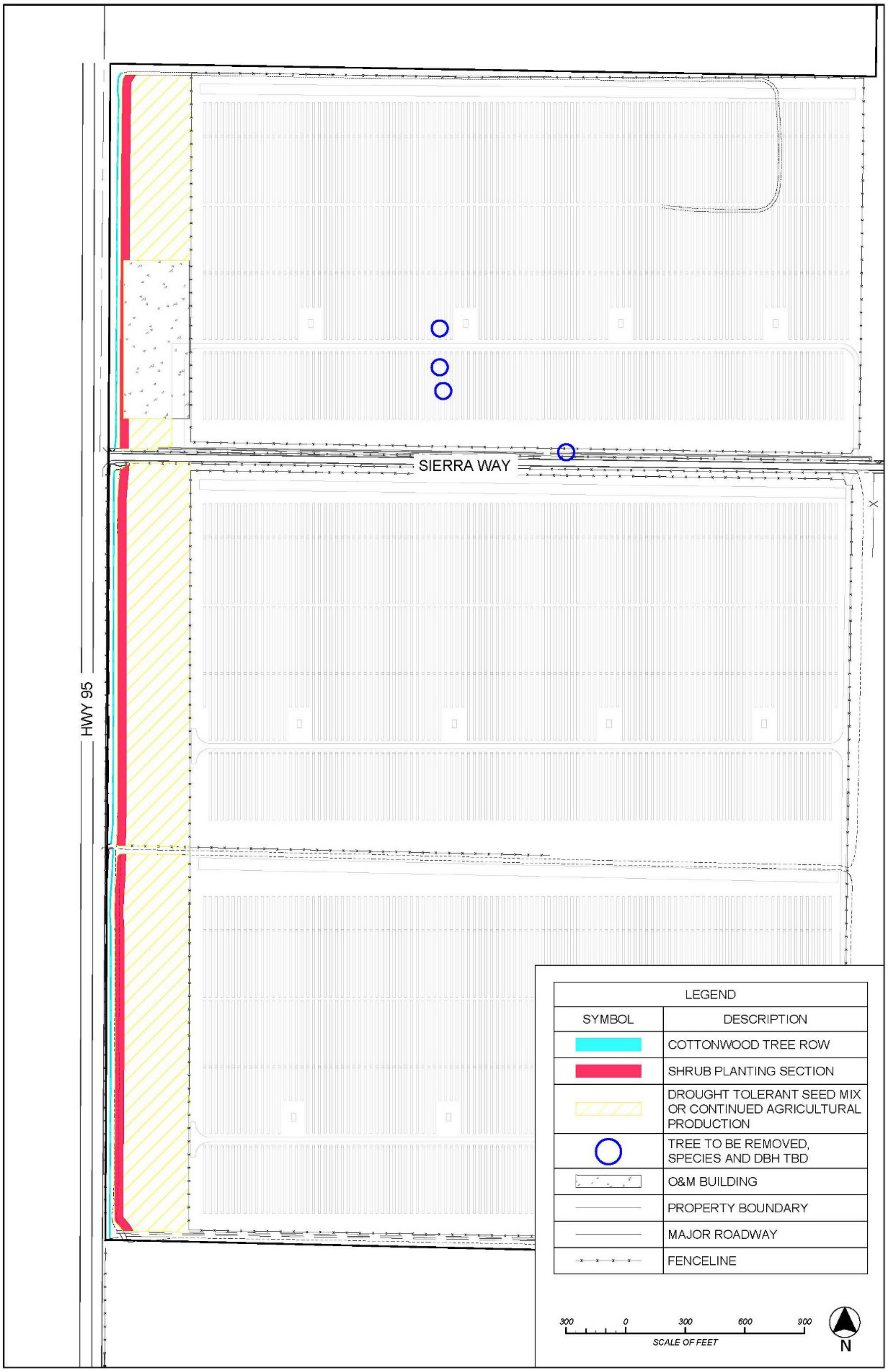
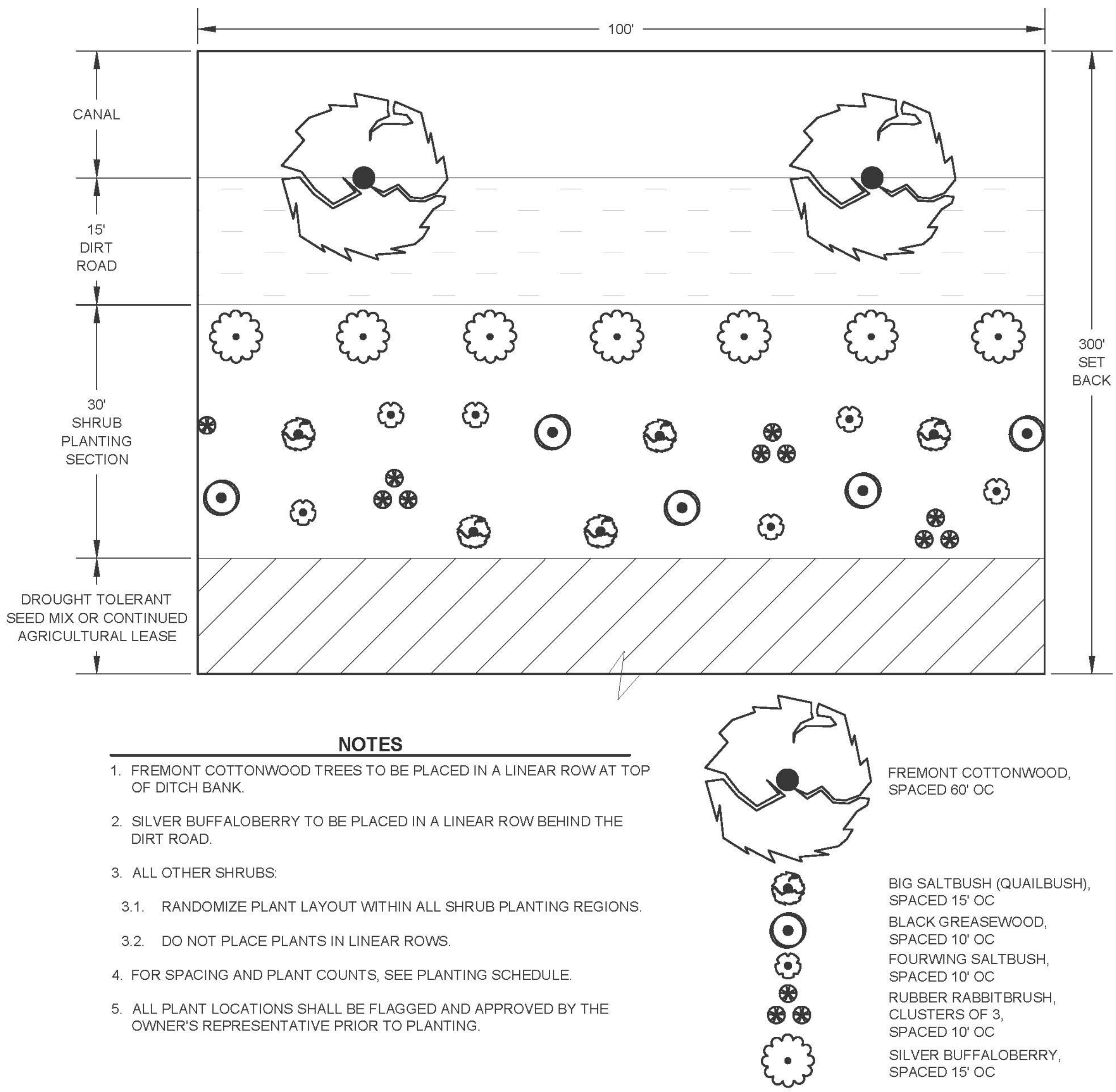


Figure 5. Typical Plant Layout



Irrigation Methodology

The proposed landscape planting will require temporary irrigation during plant establishment. Water can be supplied through a temporary drip irrigation system connected to an existing well (location identified on Figure 3) or connected to an onsite water storage tank. Main lines connecting the water source to drip distribution lines would be installed underground, but distribution lines would be on the surface. The trees would be on a separate valve line from the shrubs to manage plant water needs and ensure healthy plant establishment. Detailed information on water source and irrigation design will be provided during the detailed design phase of the Project.

Maintenance Activities

Landscape areas will require ongoing maintenance and monitoring. Maintenance activities would emphasize weed management and fire safety. Maintenance activities focused on controlling weed establishment and spread may include the targeted use of selective herbicides, string-trimming, or hand pulling of undesirable vegetation, particularly within the shrub planting area.

References

Bryce, S.A., Woods, A.J., Morefield, J.D., Omernik, J. M., McKay, T.R., Brackley, G.K., Hall, R.K., Higgins, D.K., McMorran, D.C., Vargas, K.E., Peterson, E.B., Zamudio, D.C., and Comstock, J.A., 2003, Ecoregions of Nevada (color poster with map, descriptive text, summary tables, and photographs); Reston, Virginia, U.S. Geological Survey (map scape 1:1,350,000)

Dashall Hibbard, Restoration Ecologist, Walker Basin Conservancy, Personal Communication October 15, 2025.

Appendix B
ForgeSolar Glare Analysis

FORGESOLAR GLARE ANALYSIS

Project: **Winston**

400-MW solar installation in Mason Valley and associated BESS facility

Site configuration: **Winston Solar-temp-2**

Created 04 Nov, 2025
Updated 04 Nov, 2025
Time-step 1 minute
Timezone offset UTC-8
Minimum sun altitude 0.0 deg
DNI peaks at 1,000.0 W/m^2
Category 100 MW to 1 GW
Site ID 163462.27385

Ocular transmission coefficient 0.5
Pupil diameter 0.002 m
Eye focal length 0.017 m
Sun subtended angle 9.3 mrad
PV analysis methodology V2

Summary of Results

Glare with potential for temporary after-image predicted

PV Array	Tilt	Orient	Annual Green Glare		Annual Yellow Glare		Energy
	°	°	min	hr	min	hr	kWh
PV array 1	SA tracking	SA tracking	171	2.9	96	1.6	-
PV array 10	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 11	SA tracking	SA tracking	146	2.4	57	0.9	-
PV array 12	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 13	SA tracking	SA tracking	130	2.2	0	0.0	-
PV array 14	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 15	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 2	SA tracking	SA tracking	14	0.2	37	0.6	-
PV array 3	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 4	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 5	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 6	SA tracking	SA tracking	642	10.7	0	0.0	-
PV array 7	SA tracking	SA tracking	327	5.5	0	0.0	-
PV array 8	SA tracking	SA tracking	116	1.9	0	0.0	-
PV array 9	SA tracking	SA tracking	428	7.1	95	1.6	-

Total glare received by each receptor; may include duplicate times of glare from multiple reflective surfaces.

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Route 1	1,526	25.4	228	3.8
OP 1	207	3.5	57	0.9
OP 2	130	2.2	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	111	1.9	0	0.0

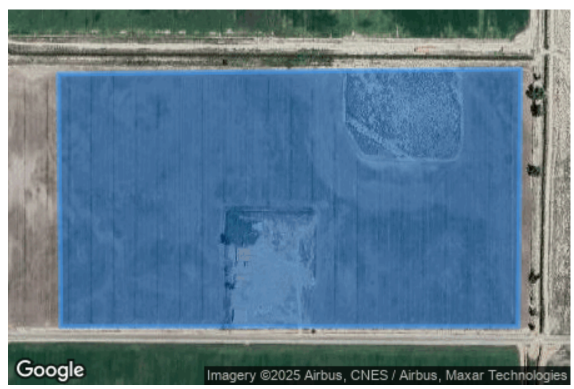
Component Data

PV Arrays

Name: PV array 1
Axis tracking: Single-axis rotation
Backtracking: Shade
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 0.0°
Ground Coverage Ratio: 0.5
Rated power: -
Panel material: Smooth glass without AR coating
Reflectivity: Vary with sun
Slope error: correlate with material

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	39.140847	-119.170796	4300.78	0.00	4300.78
2	39.141013	-119.171182	4299.97	0.00	4299.97
3	39.138084	-119.171225	4300.79	0.00	4300.79
4	39.138117	-119.170152	4302.00	0.00	4302.00
5	39.136486	-119.170109	4301.99	0.00	4301.99
6	39.138750	-119.164230	4301.65	0.00	4301.65
7	39.139482	-119.164187	4300.48	0.00	4300.48

Name: PV array 10
Axis tracking: Single-axis rotation
Backtracking: Shade
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 0.0°
Ground Coverage Ratio: 0.5
Rated power: -
Panel material: Smooth glass without AR coating
Reflectivity: Vary with sun
Slope error: correlate with material

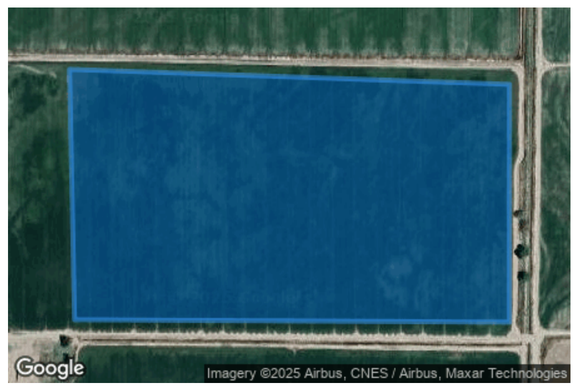


Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	39.131742	-119.179822	4303.00	0.00	4303.00
2	39.128380	-119.179779	4306.27	0.00	4306.27
3	39.128380	-119.171926	4306.50	0.00	4306.50
4	39.131809	-119.171883	4305.04	0.00	4305.04

Name: PV array 11
Axis tracking: Single-axis rotation
Backtracking: Shade
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 0.0°
Ground Coverage Ratio: 0.5
Rated power: -
Panel material: Smooth glass without AR coating
Reflectivity: Vary with sun
Slope error: correlate with material

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	39.128047	-119.179779	4303.43	0.00	4303.43
2	39.124718	-119.179693	4307.88	0.00	4307.88
3	39.124685	-119.171969	4307.45	0.00	4307.45
4	39.127947	-119.171969	4305.89	0.00	4305.89

Name: PV array 12
Axis tracking: Single-axis rotation
Backtracking: Shade
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 0.0°
Ground Coverage Ratio: 0.5
Rated power: -
Panel material: Smooth glass without AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	39.124452	-119.179650	4307.70	0.00	4307.70
2	39.121122	-119.179565	4309.29	0.00	4309.29
3	39.121089	-119.172097	4310.93	0.00	4310.93
4	39.124252	-119.172097	4307.65	0.00	4307.65

Name: PV array 13
Axis tracking: Single-axis rotation
Backtracking: Shade
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 0.0°
Ground Coverage Ratio: 0.5
Rated power: -
Panel material: Smooth glass without AR coating
Reflectivity: Vary with sun
Slope error: correlate with material

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	39.120723	-119.169723	4312.10	0.00	4312.10
2	39.117235	-119.169734	4311.90	0.00	4311.90
3	39.117260	-119.167491	4314.68	0.00	4314.68
4	39.120690	-119.167491	4313.16	0.00	4313.16

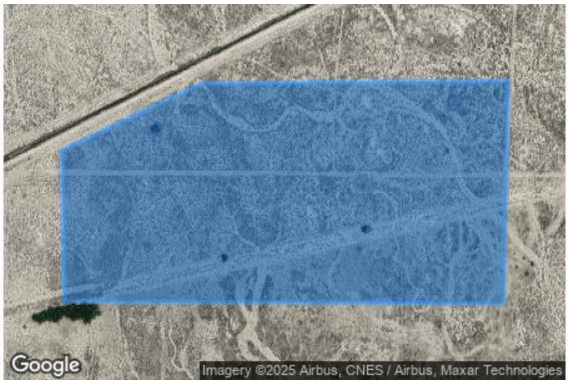
Name: PV array 14
Axis tracking: Single-axis rotation
Backtracking: Shade
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 0.0°
Ground Coverage Ratio: 0.5
Rated power: -
Panel material: Smooth glass without AR coating
Reflectivity: Vary with sun
Slope error: correlate with material

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	39.126757	-119.171354	4306.51	0.00	4306.51
2	39.121031	-119.171429	4310.66	0.00	4310.66
3	39.120989	-119.167062	4314.89	0.00	4314.89
4	39.117060	-119.167105	4314.46	0.00	4314.46
5	39.117177	-119.158007	4315.01	0.00	4315.01
6	39.130944	-119.158007	4305.51	0.00	4305.51
7	39.130977	-119.171153	4307.92	0.00	4307.92
8	39.129346	-119.171218	4305.36	0.00	4305.36
9	39.128314	-119.171271	4305.48	0.00	4305.48

Name: PV array 15
Axis tracking: Single-axis rotation
Backtracking: Shade
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 0.0°
Ground Coverage Ratio: 0.5
Rated power: -
Panel material: Smooth glass without AR coating
Reflectivity: Vary with sun
Slope error: correlate with material

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	39.116911	-119.171525	4311.41	0.00	4311.41
2	39.106355	-119.171440	4320.68	0.00	4320.68
3	39.106421	-119.157964	4321.34	0.00	4321.34
4	39.116844	-119.158007	4314.29	0.00	4314.29

Name: PV array 2
Axis tracking: Single-axis rotation
Backtracking: Shade
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 0.0°
Ground Coverage Ratio: 0.5
Rated power: -
Panel material: Smooth glass without AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	39.135820	-119.170109	4301.40	0.00	4301.40
2	39.133823	-119.170066	4303.60	0.00	4303.60
3	39.133790	-119.162513	4302.67	0.00	4302.67
4	39.136752	-119.162427	4301.18	0.00	4301.18
5	39.136719	-119.167706	4301.05	0.00	4301.05

Name: PV array 3
Axis tracking: Single-axis rotation
Backtracking: Shade
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 0.0°
Ground Coverage Ratio: 0.5
Rated power: -
Panel material: Smooth glass without AR coating
Reflectivity: Vary with sun
Slope error: correlate with material

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	39.139682	-119.162556	4300.50	0.00	4300.50
2	39.141779	-119.160625	4299.21	0.00	4299.21
3	39.145706	-119.170982	4300.78	0.00	4300.78
4	39.141812	-119.171024	4299.70	0.00	4299.70

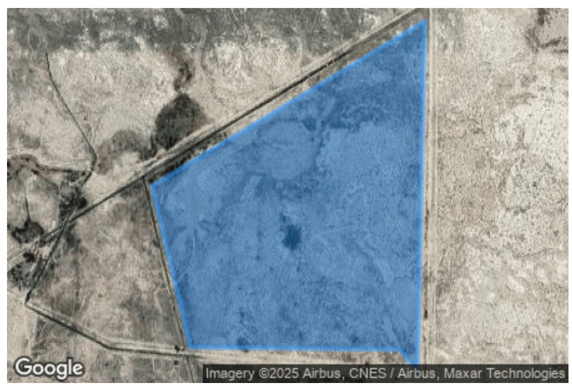
Name: PV array 4
Axis tracking: Single-axis rotation
Backtracking: Shade
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 0.0°
Ground Coverage Ratio: 0.5
Rated power: -
Panel material: Smooth glass without AR coating
Reflectivity: Vary with sun
Slope error: correlate with material

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	39.141346	-119.159724	4300.16	0.00	4300.16
2	39.139548	-119.161440	4301.81	0.00	4301.81
3	39.137218	-119.153201	4301.24	0.00	4301.24
4	39.138317	-119.151012	4302.41	0.00	4302.41

Name: PV array 5
Axis tracking: Single-axis rotation
Backtracking: Shade
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 0.0°
Ground Coverage Ratio: 0.5
Rated power: -
Panel material: Smooth glass without AR coating
Reflectivity: Vary with sun
Slope error: correlate with material

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	39.153577	-119.166762	4297.36	0.00	4297.36
2	39.153577	-119.162470	4297.05	0.00	4297.05
3	39.146222	-119.162256	4298.09	0.00	4298.09
4	39.146222	-119.156333	4298.46	0.00	4298.46
5	39.142261	-119.159852	4298.68	0.00	4298.68
6	39.145689	-119.169551	4298.63	0.00	4298.63
7	39.146322	-119.169465	4299.11	0.00	4299.11
8	39.146288	-119.166590	4299.34	0.00	4299.34

Name: PV array 6
Axis tracking: Single-axis rotation
Backtracking: Shade
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 0.0°
Ground Coverage Ratio: 0.5
Rated power: -
Panel material: Smooth glass without AR coating
Reflectivity: Vary with sun
Slope error: correlate with material



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	39.140713	-119.144217	4300.46	0.00	4300.46
2	39.136419	-119.142887	4302.84	0.00	4302.84
3	39.136353	-119.135677	4305.19	0.00	4305.19
4	39.135754	-119.135076	4305.89	0.00	4305.89
5	39.145107	-119.134819	4300.61	0.00	4300.61

Name: PV array 7
Axis tracking: Single-axis rotation
Backtracking: Shade
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 0.0°
Ground Coverage Ratio: 0.5
Rated power: -
Panel material: Smooth glass without AR coating
Reflectivity: Vary with sun
Slope error: correlate with material

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	39.139315	-119.146234	4301.04	0.00	4301.04
2	39.140497	-119.144475	4300.65	0.00	4300.65
3	39.136469	-119.143294	4302.65	0.00	4302.65
4	39.136786	-119.146020	4302.01	0.00	4302.01

Name: PV array 8
Axis tracking: Single-axis rotation
Backtracking: Shade
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 0.0°
Ground Coverage Ratio: 0.5
Rated power: -
Panel material: Smooth glass without AR coating
Reflectivity: Vary with sun
Slope error: correlate with material

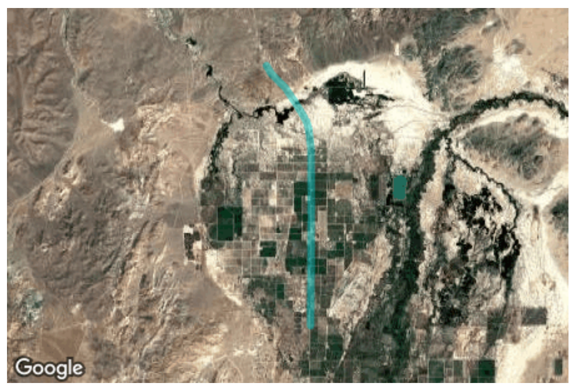
Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	39.139249	-119.146341	4301.08	0.00	4301.08
2	39.137601	-119.148369	4303.74	0.00	4303.74
3	39.136727	-119.146105	4303.39	0.00	4303.39

Name: PV array 9
Axis tracking: Single-axis rotation
Backtracking: Shade
Tracking axis orientation: 180.0°
Max tracking angle: 60.0°
Resting angle: 0.0°
Ground Coverage Ratio: 0.5
Rated power: -
Panel material: Smooth glass without AR coating
Reflectivity: Vary with sun
Slope error: correlate with material

Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	39.149517	-119.151341	4299.21	0.00	4299.21
2	39.150083	-119.134933	4298.15	0.00	4298.15
3	39.145922	-119.134847	4297.92	0.00	4297.92
4	39.138666	-119.150139	4301.07	0.00	4301.07
5	39.141995	-119.158937	4300.39	0.00	4300.39
6	39.149384	-119.153186	4297.79	0.00	4297.79

Route Receptors

Name: Route 1
Path type: Two-way
Azimuthal view angle: 50.0°
Downward view angle: 90.0°



Vertex	Latitude (°)	Longitude (°)	Ground elevation (ft)	Height above ground (ft)	Total elevation (ft)
1	39.173898	-119.205423	4546.38	0.00	4546.38
2	39.170637	-119.202934	4476.23	0.00	4476.23
3	39.166511	-119.197784	4396.93	0.00	4396.93
4	39.164582	-119.195123	4358.31	0.00	4358.31
5	39.158193	-119.189630	4304.26	0.00	4304.26
6	39.152203	-119.184823	4290.01	0.00	4290.01
7	39.149673	-119.183192	4295.84	0.00	4295.84
8	39.146678	-119.182163	4299.71	0.00	4299.71
9	39.138756	-119.180961	4299.46	0.00	4299.46
10	39.122141	-119.180874	4312.24	0.00	4312.24
11	39.084942	-119.180959	4332.75	0.00	4332.75
12	39.063120	-119.181217	4344.01	0.00	4344.01

Discrete Observation Point Receptors

Name	ID	Latitude (°)	Longitude (°)	Elevation (ft)	Height (ft)
OP 1	1	39.128136	-119.181097	4305.36	0.00
OP 2	2	39.117915	-119.181097	4311.62	0.00
OP 3	3	39.099000	-119.167937	4326.01	0.00
OP 4	4	39.106394	-119.180983	4318.55	0.00
OP 5	5	39.171501	-119.203413	4493.31	0.00
OP 6	6	39.164381	-119.194888	4356.18	0.00

Glare Analysis Results

Summary of Results Glare with potential for temporary after-image predicted

PV Array	Tilt	Orient	Annual Green Glare		Annual Yellow Glare		Energy
	°	°	min	hr	min	hr	kWh
PV array 1	SA tracking	SA tracking	171	2.9	96	1.6	-
PV array 10	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 11	SA tracking	SA tracking	146	2.4	57	0.9	-
PV array 12	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 13	SA tracking	SA tracking	130	2.2	0	0.0	-
PV array 14	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 15	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 2	SA tracking	SA tracking	14	0.2	37	0.6	-
PV array 3	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 4	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 5	SA tracking	SA tracking	0	0.0	0	0.0	-
PV array 6	SA tracking	SA tracking	642	10.7	0	0.0	-
PV array 7	SA tracking	SA tracking	327	5.5	0	0.0	-
PV array 8	SA tracking	SA tracking	116	1.9	0	0.0	-
PV array 9	SA tracking	SA tracking	428	7.1	95	1.6	-

Total glare received by each receptor; may include duplicate times of glare from multiple reflective surfaces.

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Route 1	1,526	25.4	228	3.8
OP 1	207	3.5	57	0.9
OP 2	130	2.2	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
OP 5	0	0.0	0	0.0
OP 6	111	1.9	0	0.0

PV: PV array 1 potential temporary after-image

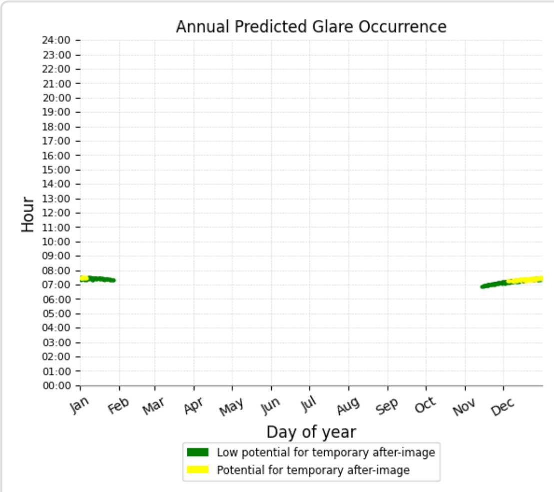
Receptor results ordered by category of glare

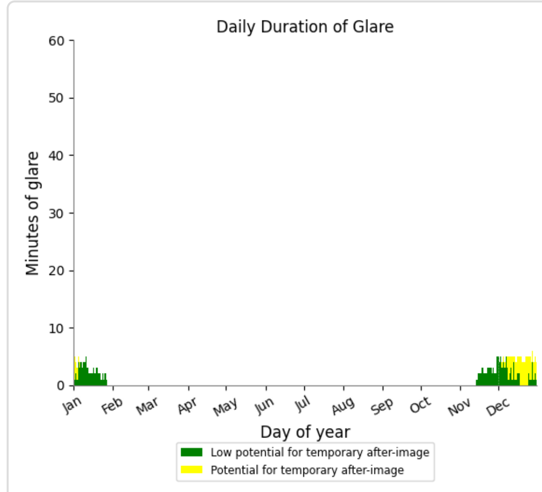
Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Route 1	171	2.9	96	1.6
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0

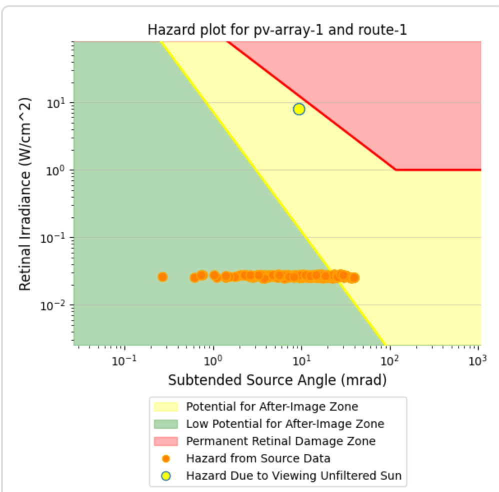
PV array 1 and Route: Route 1

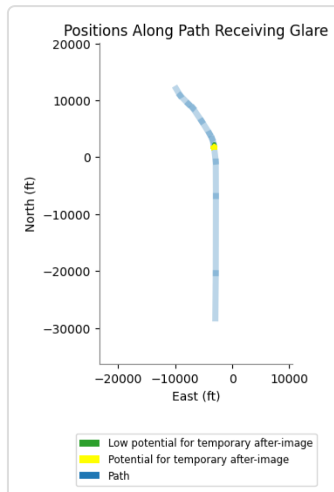
Yellow glare: 96 min.

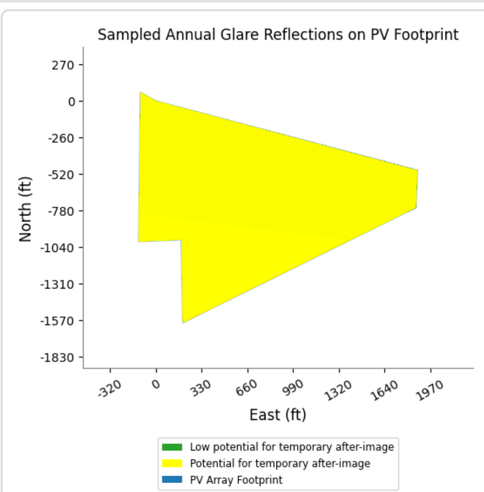
Green glare: 171 min.











PV array 1 and OP 1

No glare found

PV array 1 and OP 2

No glare found

PV array 1 and OP 3

No glare found

PV array 1 and OP 4

No glare found

PV array 1 and OP 5

No glare found

PV array 1 and OP 6

No glare found

PV: PV array 10 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	**hr**	**min**	**hr**
Route 1	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0

PV array 10 and Route: Route 1

No glare found

PV array 10 and OP 1

No glare found

PV array 10 and OP 2

No glare found

PV array 10 and OP 3

No glare found

PV array 10 and OP 4

No glare found

PV array 10 and OP 5

No glare found

PV array 10 and OP 6

No glare found

PV: PV array 11 potential temporary after-image

Receptor results ordered by category of glare

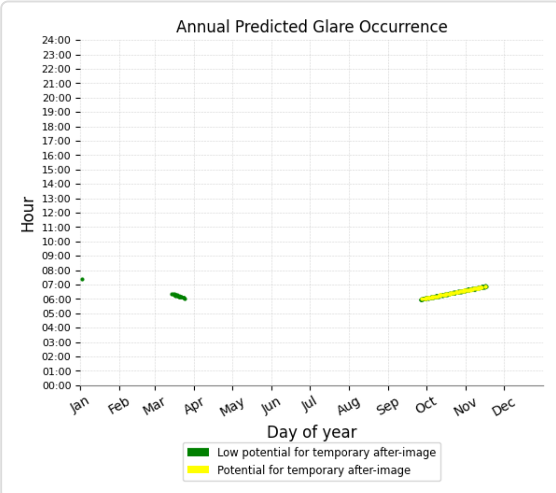
Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Route 1	0	0.0	0	0.0
OP 1	146	2.4	57	0.9
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0

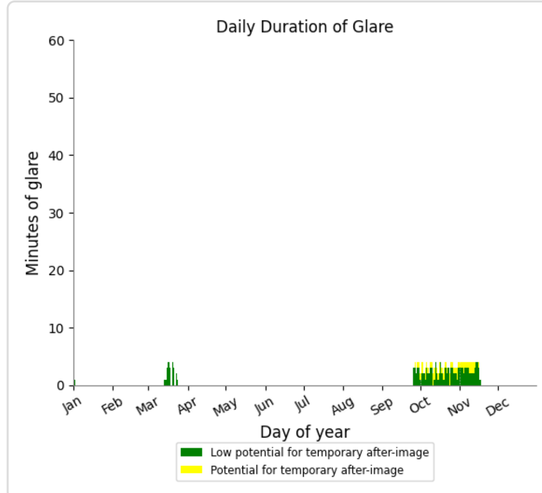
PV array 11 and Route: Route 1

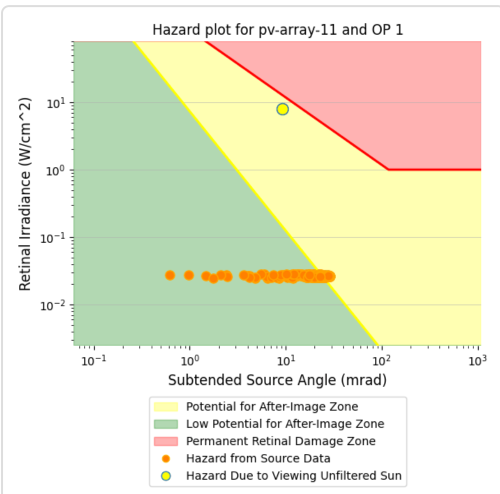
No glare found

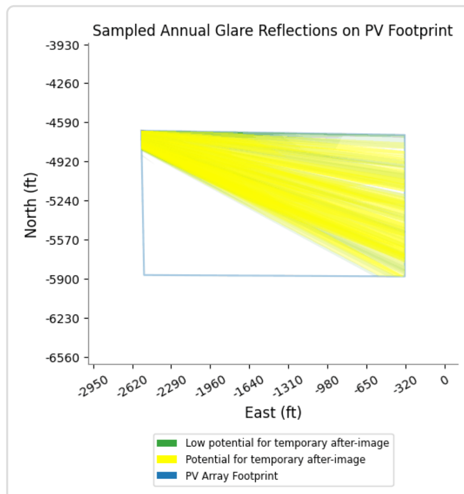
PV array 11 and OP 1

Yellow glare: 57 min.
Green glare: 146 min.









PV array 11 and OP 2

No glare found

PV array 11 and OP 3

No glare found

PV array 11 and OP 4

No glare found

PV array 11 and OP 5

No glare found

PV array 11 and OP 6

No glare found

PV: PV array 12 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Route 1	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0

PV array 12 and Route: Route 1

No glare found

PV array 12 and OP 1

No glare found

PV array 12 and OP 2

No glare found

PV array 12 and OP 3

No glare found

PV array 12 and OP 4

No glare found

PV array 12 and OP 5

No glare found

PV array 12 and OP 6

No glare found

PV: PV array 13 low potential for temporary after-image

Receptor results ordered by category of glare

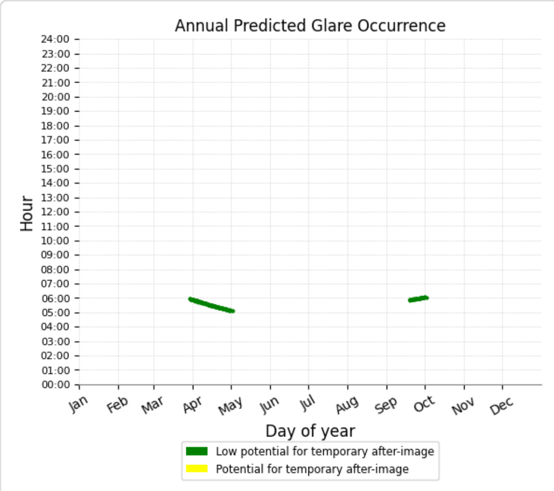
Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Route 1	0	0.0	0	0.0
OP 2	130	2.2	0	0.0
OP 1	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0

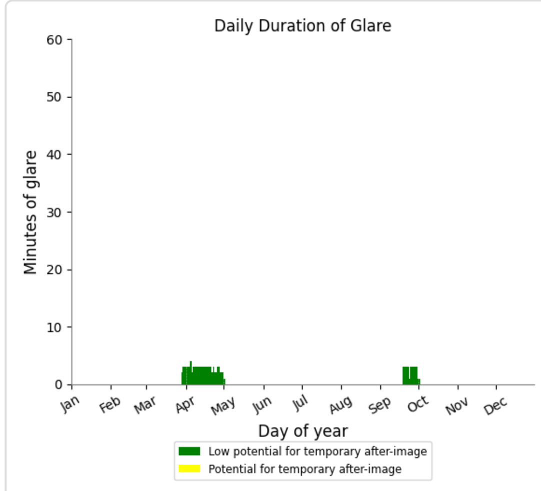
PV array 13 and Route: Route 1

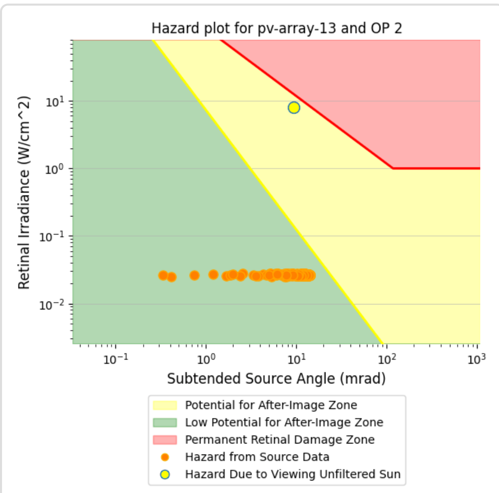
No glare found

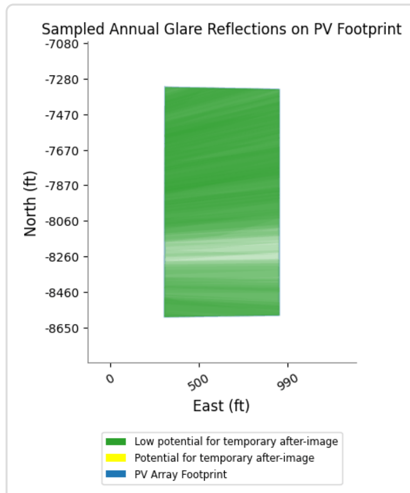
PV array 13 and OP 2

Yellow glare: none
Green glare: 130 min.









PV array 13 and OP 1

No glare found

PV array 13 and OP 3

No glare found

PV array 13 and OP 4

No glare found

PV array 13 and OP 5

No glare found

PV array 13 and OP 6

No glare found

PV: PV array 14 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Route 1	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0

PV array 14 and Route: Route 1

No glare found

PV array 14 and OP 1

No glare found

PV array 14 and OP 2

No glare found

PV array 14 and OP 3

No glare found

PV array 14 and OP 4

No glare found

PV array 14 and OP 5

No glare found

PV array 14 and OP 6

No glare found

PV: PV array 15 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Route 1	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0

PV array 15 and Route: Route 1

No glare found

PV array 15 and OP 1

No glare found

PV array 15 and OP 2

No glare found

PV array 15 and OP 3

No glare found

PV array 15 and OP 4

No glare found

PV array 15 and OP 5

No glare found

PV array 15 and OP 6

No glare found

PV: PV array 2 potential temporary after-image

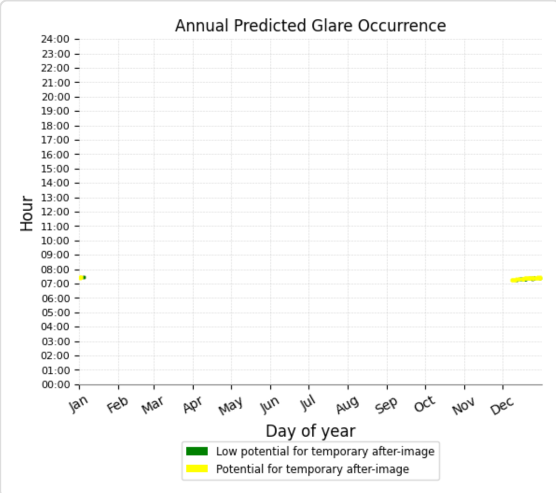
Receptor results ordered by category of glare

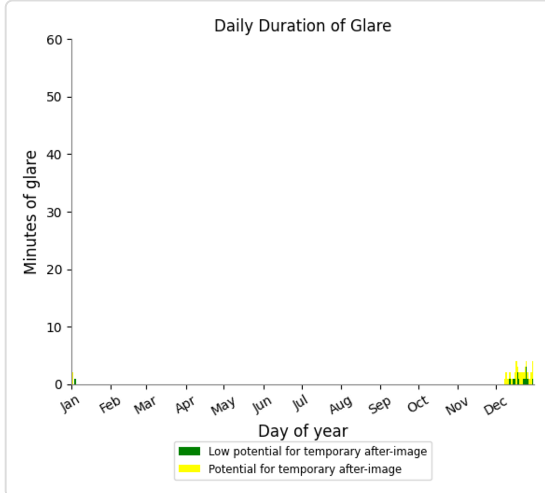
Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Route 1	14	0.2	37	0.6
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0

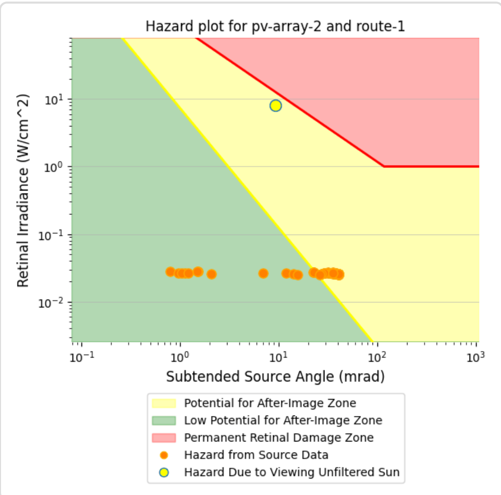
PV array 2 and Route: Route 1

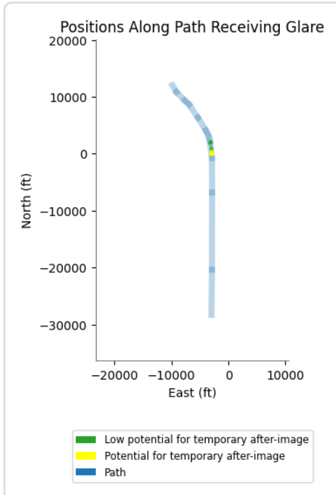
Yellow glare: 37 min.

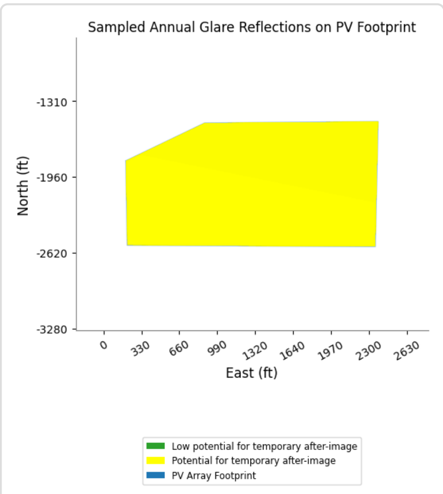
Green glare: 14 min.











PV array 2 and OP 1

No glare found

PV array 2 and OP 2

No glare found

PV array 2 and OP 3

No glare found

PV array 2 and OP 4

No glare found

PV array 2 and OP 5

No glare found

PV array 2 and OP 6

No glare found

PV: PV array 3 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Route 1	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0

PV array 3 and Route: Route 1

No glare found

PV array 3 and OP 1

No glare found

PV array 3 and OP 2

No glare found

PV array 3 and OP 3

No glare found

PV array 3 and OP 4

No glare found

PV array 3 and OP 5

No glare found

PV array 3 and OP 6

No glare found

PV: PV array 4 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Route 1	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0

PV array 4 and Route: Route 1

No glare found

PV array 4 and OP 1

No glare found

PV array 4 and OP 2

No glare found

PV array 4 and OP 3

No glare found

PV array 4 and OP 4

No glare found

PV array 4 and OP 5

No glare found

PV array 4 and OP 6

No glare found

PV: PV array 5 no glare found

Receptor results ordered by category of glare

Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Route 1	0	0.0	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0

PV array 5 and Route: Route 1

No glare found

PV array 5 and OP 1

No glare found

PV array 5 and OP 2

No glare found

PV array 5 and OP 3

No glare found

PV array 5 and OP 4

No glare found

PV array 5 and OP 5

No glare found

PV array 5 and OP 6

No glare found

PV: PV array 6 low potential for temporary after-image

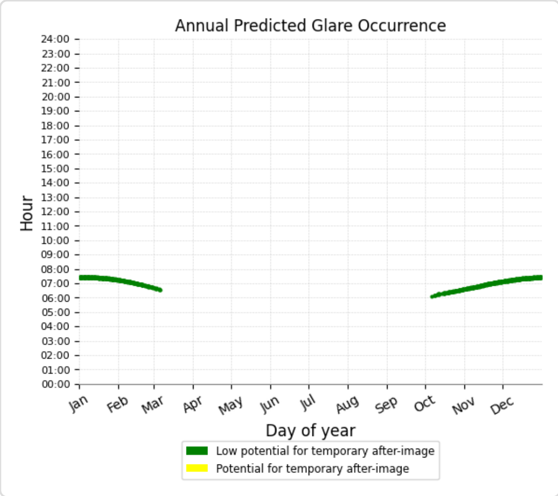
Receptor results ordered by category of glare

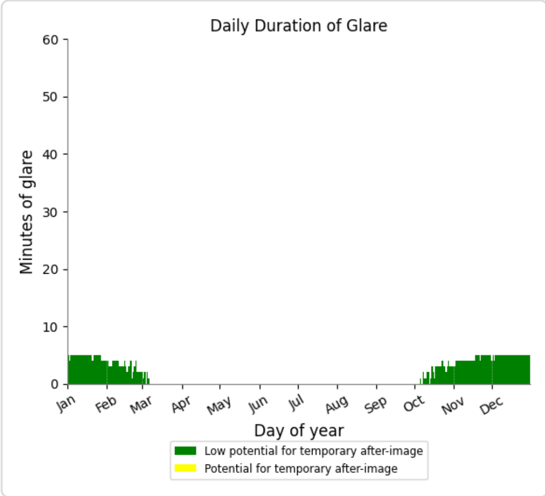
Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Route 1	585	9.8	0	0.0
OP 6	57	0.9	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0

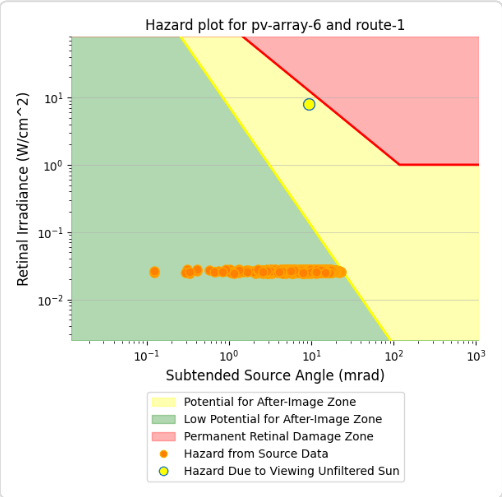
PV array 6 and Route: Route 1

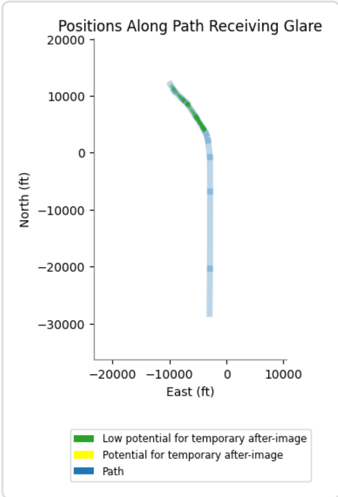
Yellow glare: none

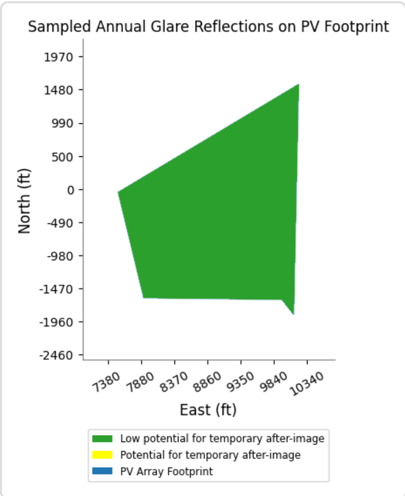
Green glare: 585 min.





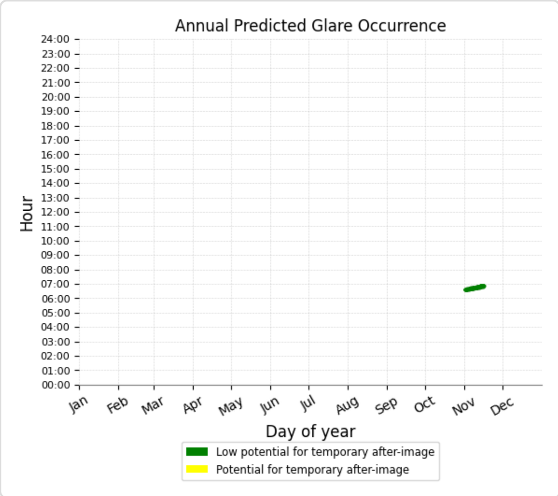


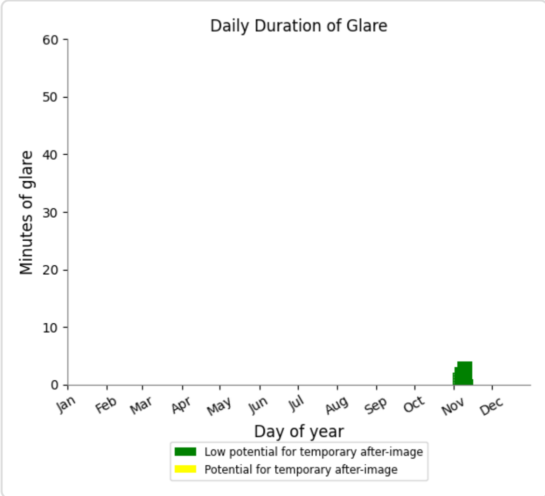


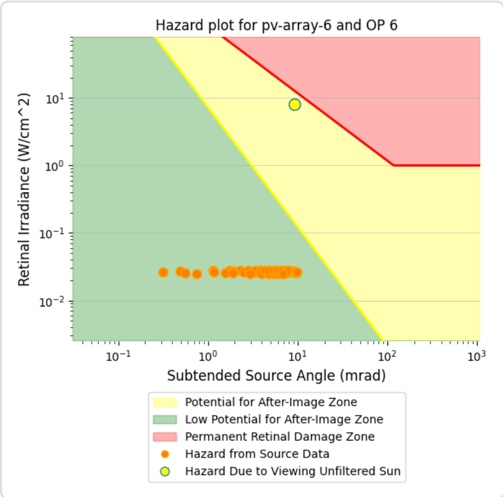


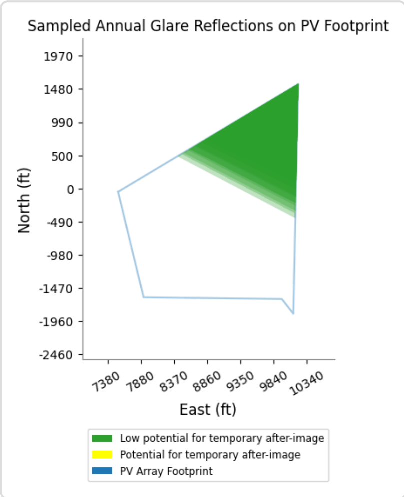
PV array 6 and OP 6

Yellow glare: none
Green glare: 57 min.









PV array 6 and OP 1

No glare found

PV array 6 and OP 2

No glare found

PV array 6 and OP 3

No glare found

PV array 6 and OP 4

No glare found

PV array 6 and OP 5

No glare found

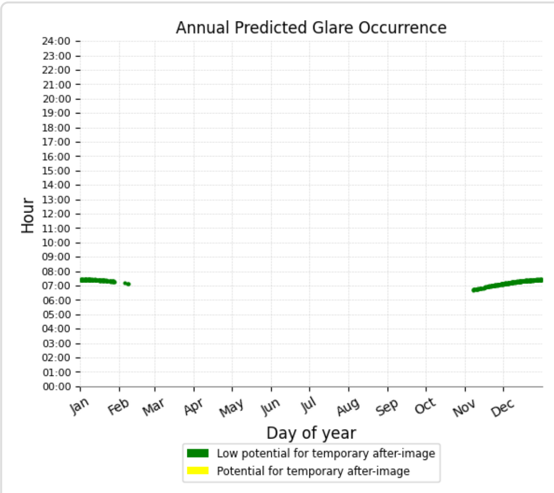
PV: PV array 7 low potential for temporary after-image

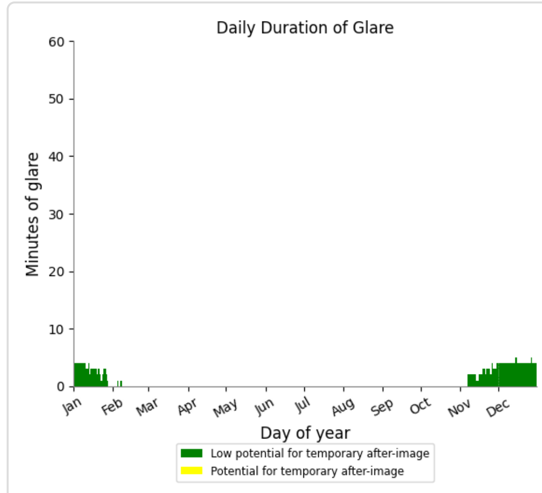
Receptor results ordered by category of glare

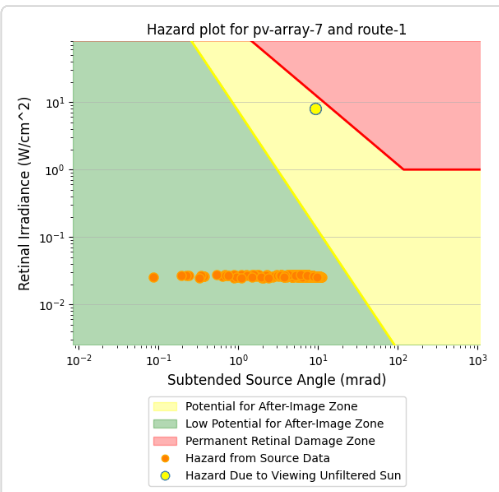
Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Route 1	273	4.5	0	0.0
OP 6	54	0.9	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0

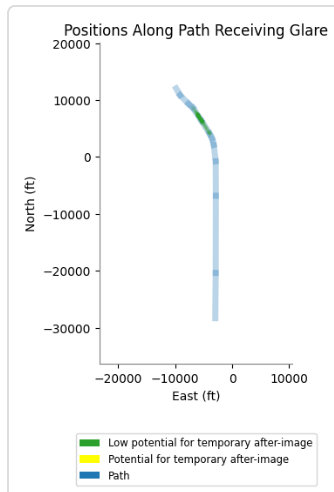
PV array 7 and Route: Route 1

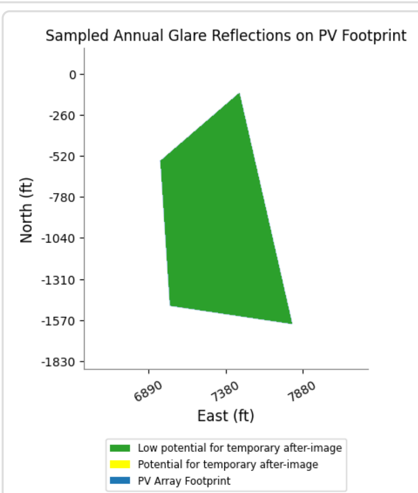
Yellow glare: none
Green glare: 273 min.





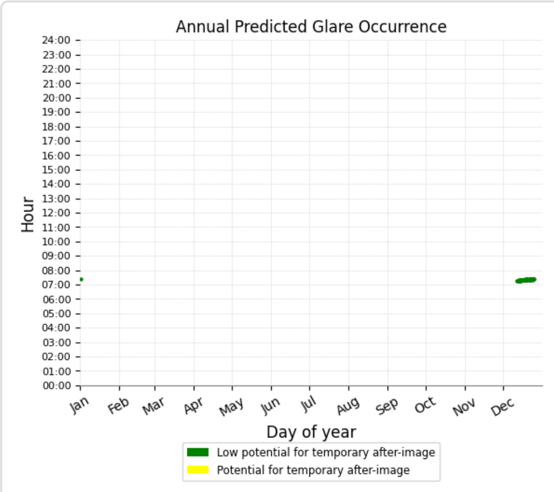


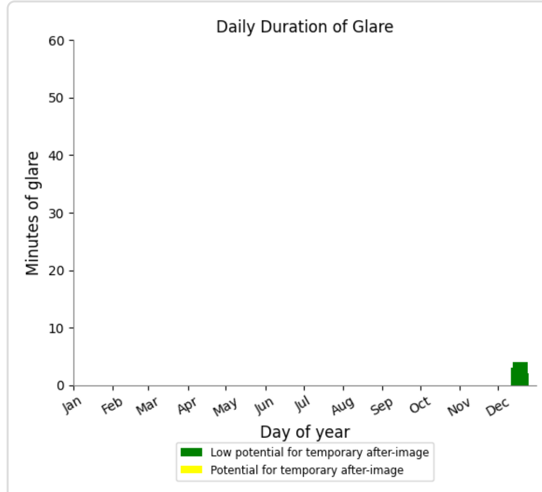


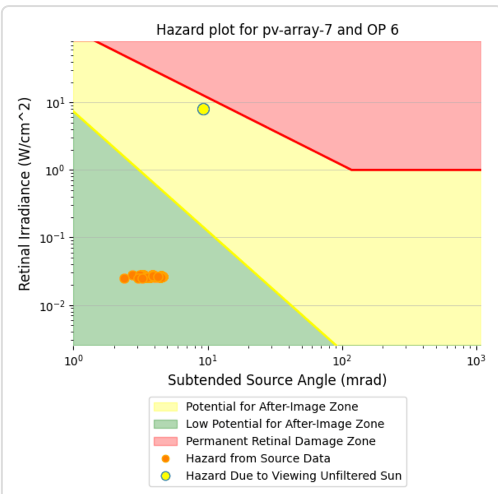


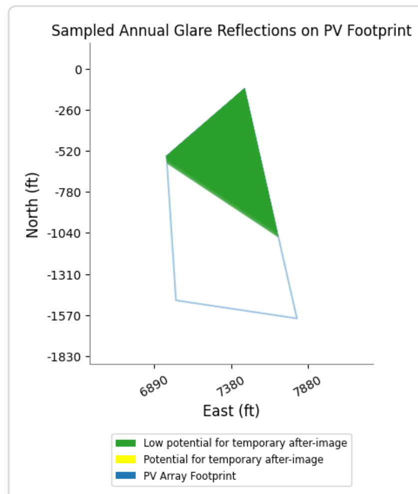
PV array 7 and OP 6

Yellow glare: none
Green glare: 54 min.









PV array 7 and OP 1

No glare found

PV array 7 and OP 2

No glare found

PV array 7 and OP 3

No glare found

PV array 7 and OP 4

No glare found

PV array 7 and OP 5

No glare found

PV: PV array 8 low potential for temporary after-image

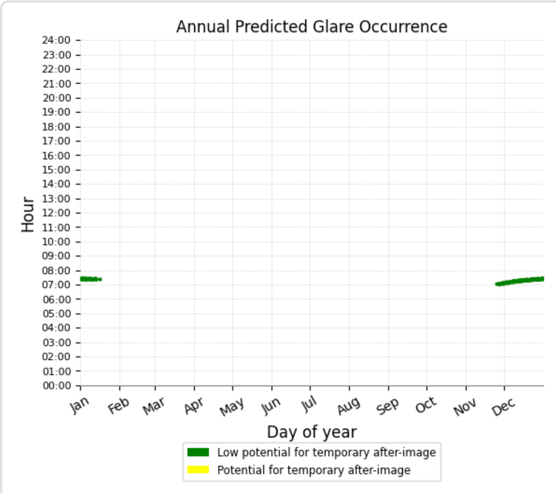
Receptor results ordered by category of glare

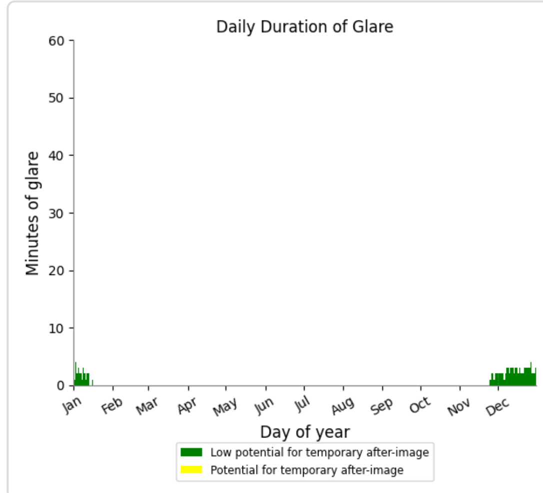
Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Route 1	116	1.9	0	0.0
OP 1	0	0.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0

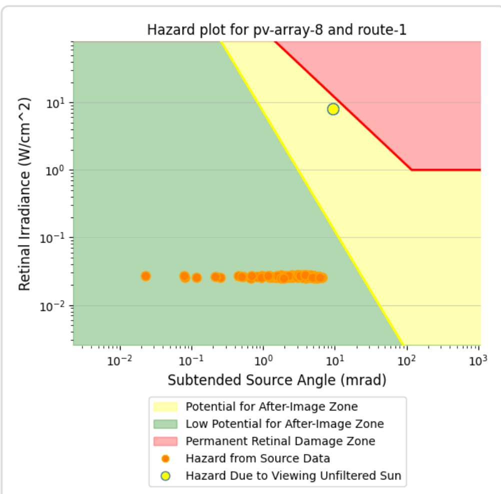
PV array 8 and Route: Route 1

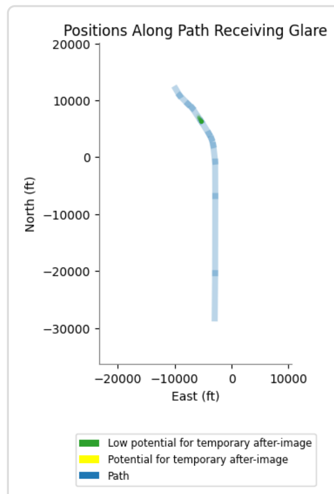
Yellow glare: none

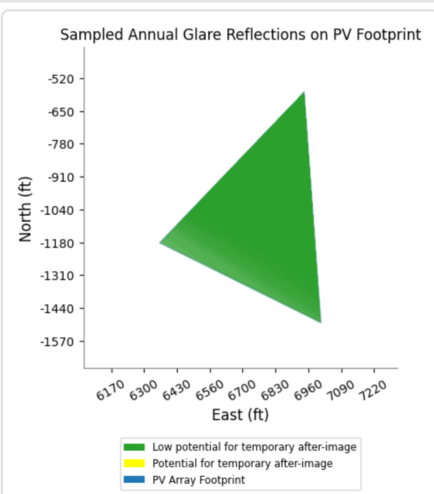
Green glare: 116 min.











PV array 8 and OP 1

No glare found

PV array 8 and OP 2

No glare found

PV array 8 and OP 3

No glare found

PV array 8 and OP 4

No glare found

PV array 8 and OP 5

No glare found

PV array 8 and OP 6

No glare found

PV: PV array 9 potential temporary after-image

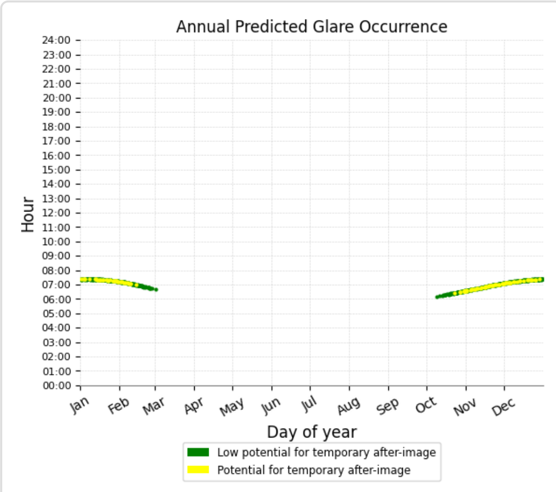
Receptor results ordered by category of glare

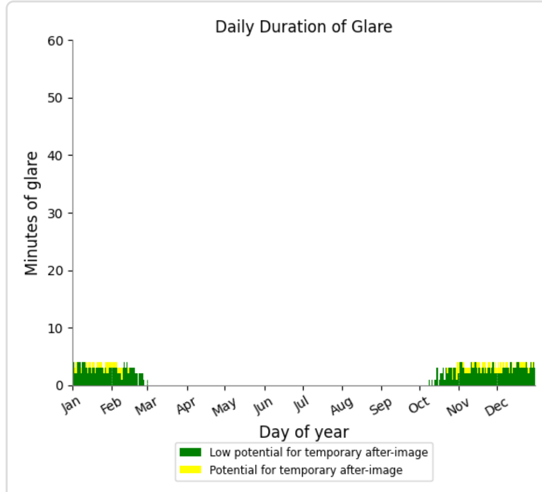
Receptor	Annual Green Glare		Annual Yellow Glare	
	min	hr	min	hr
Route 1	367	6.1	95	1.6
OP 1	61	1.0	0	0.0
OP 2	0	0.0	0	0.0
OP 3	0	0.0	0	0.0
OP 4	0	0.0	0	0.0
OP 5	0	0.0	0	0.0
OP 6	0	0.0	0	0.0

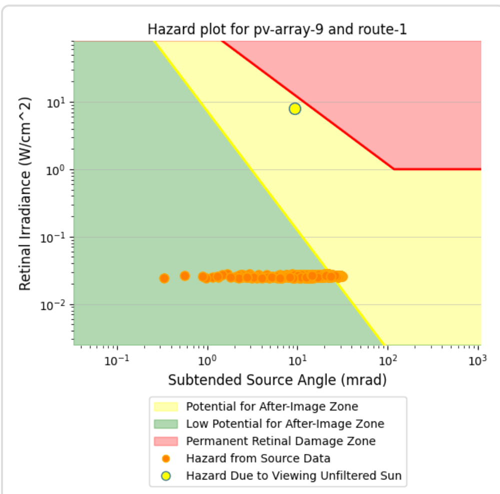
PV array 9 and Route: Route 1

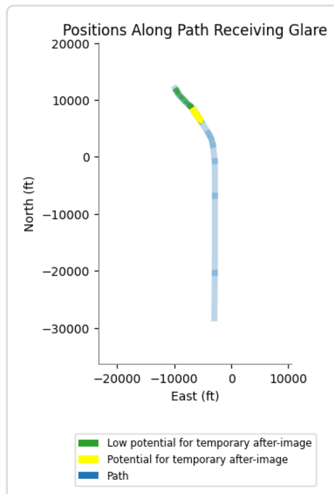
Yellow glare: 95 min.

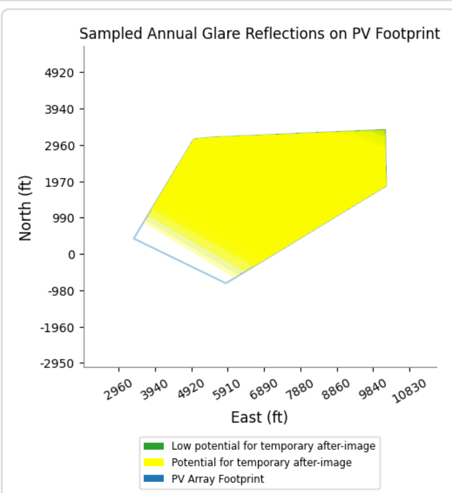
Green glare: 367 min.





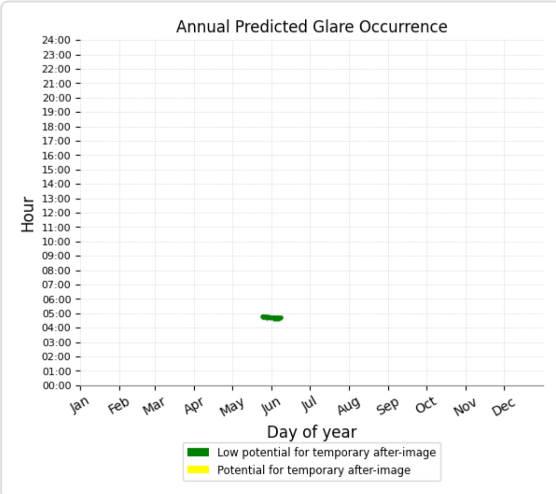


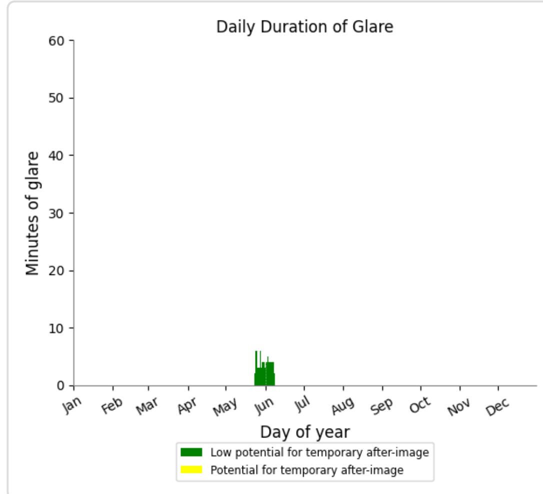


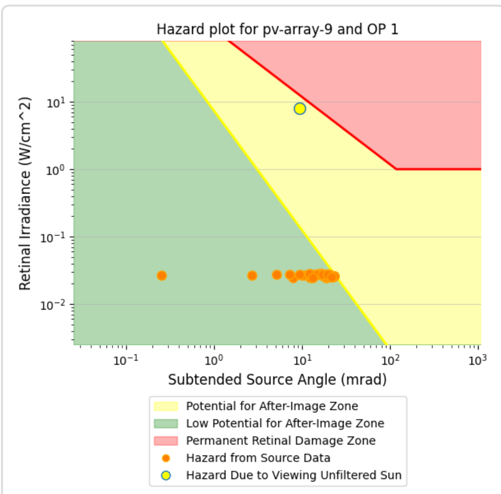


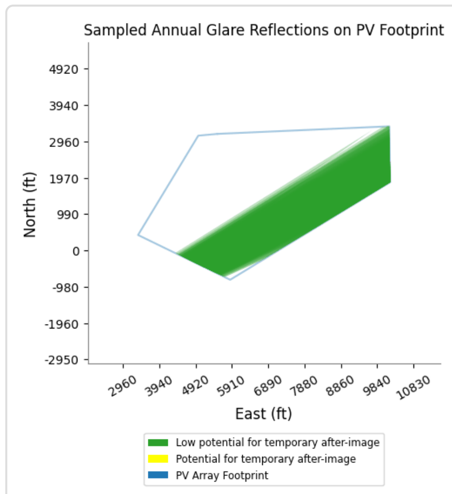
PV array 9 and OP 1

Yellow glare: none
Green glare: 61 min.









PV array 9 and OP 2

No glare found

PV array 9 and OP 3

No glare found

PV array 9 and OP 4

No glare found

PV array 9 and OP 5

No glare found

PV array 9 and OP 6

No glare found

Assumptions

"Green" glare is glare with low potential to cause an after-image (flash blindness) when observed prior to a typical blink response time.
"Yellow" glare is glare with potential to cause an after-image (flash blindness) when observed prior to a typical blink response time.
Times associated with glare are denoted in Standard time. For Daylight Savings, add one hour.
The algorithm does not rigorously represent the detailed geometry of a system; detailed features such as gaps between modules, variable height of the PV array, and support structures may impact actual glare results. However, we have validated our models against several systems, including a PV array causing glare to the air-traffic control tower at Manchester-Boston Regional Airport and several sites in Albuquerque, and the tool accurately predicted the occurrence and intensity of glare at different times and days of the year.
Several V1 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. This primarily affects V1 analyses of path receptors.
Random number computations are utilized by various steps of the annual hazard analysis algorithm. Predicted minutes of glare can vary between runs as a result. This limitation primarily affects analyses of Observation Point receptors, including ATCTs. Note that the SGHAT/ForgeSolar methodology has always relied on an analytical, qualitative approach to accurately determine the overall hazard (i.e. green vs. yellow) of expected glare on an annual basis.
The analysis does not automatically consider obstacles (either man-made or natural) between the observation points and the prescribed solar installation that may obstruct observed glare, such as trees, hills, buildings, etc.
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.)
The variable direct normal irradiance (DNI) feature (if selected) scales the user-prescribed peak DNI using a typical clear-day irradiance profile. This profile has a lower DNI in the mornings and evenings and a maximum at solar noon. The scaling uses a clear-day irradiance profile based on a normalized time relative to sunrise, solar noon, and sunset, which are prescribed by a sun-position algorithm and the latitude and longitude obtained from Google maps. The actual DNI on any given day can be affected by cloud cover, atmospheric attenuation, and other environmental factors.
The ocular hazard predicted by the tool depends on a number of environmental, optical, and human factors, which can be uncertain. We provide input fields and typical ranges of values for these factors so that the user can vary these parameters to see if they have an impact on the results. The speed of SGHAT allows expedited sensitivity and parametric analyses.
The system output calculation is a DNI-based approximation that assumes clear, sunny skies year-round. It should not be used in place of more rigorous modeling methods.
Hazard zone boundaries shown in the Glare Hazard plot are an approximation and visual aid based on aggregated research data. Actual ocular impact outcomes encompass a continuous, not discrete, spectrum.
Glare locations displayed on receptor plots are approximate. Actual glare-spot locations may differ.
Refer to the Help page at **www.forgesolar.com/help/** for assumptions and limitations not listed here.

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

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